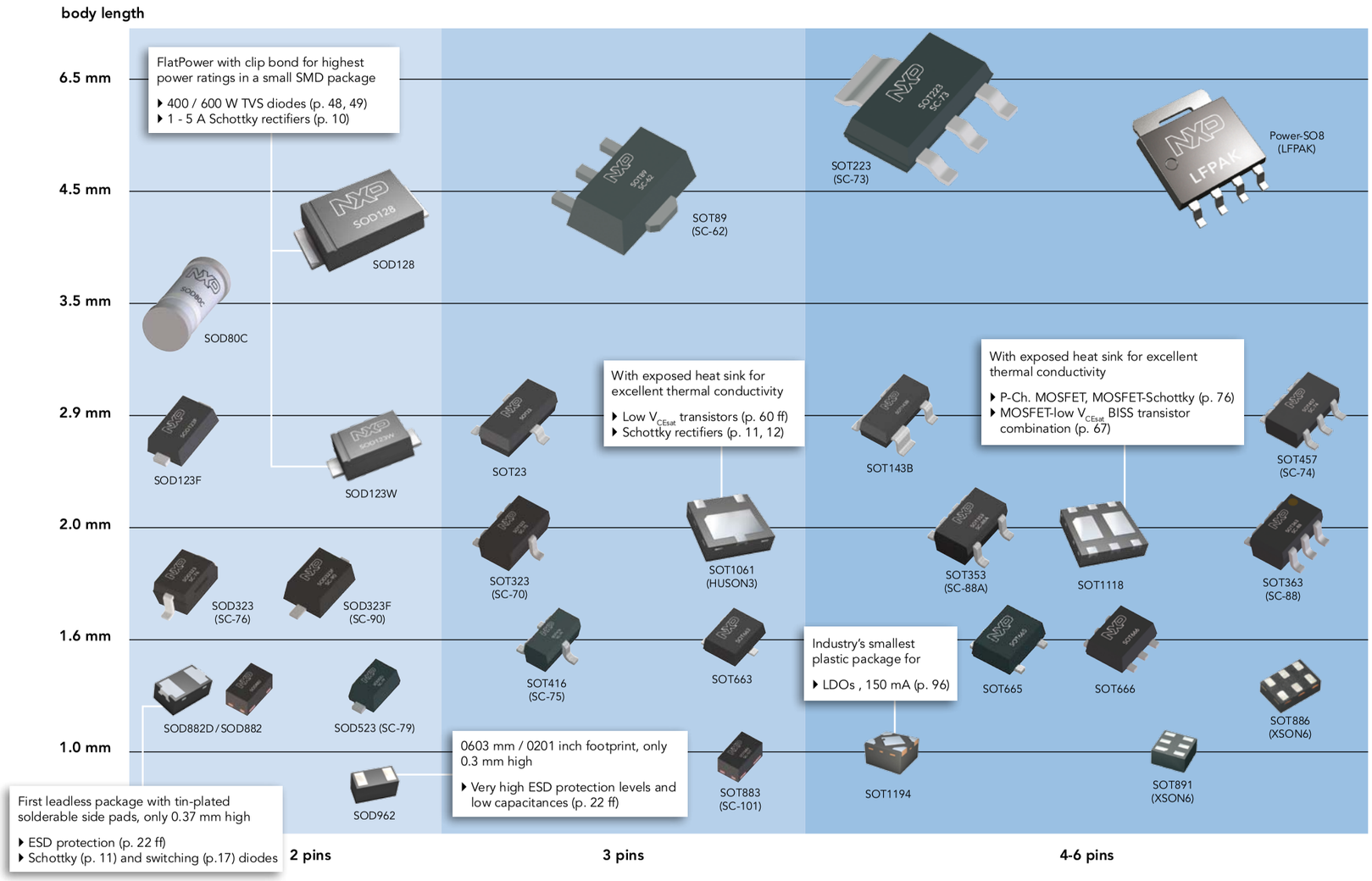
Discrete Semiconductors Selection Guide 2011

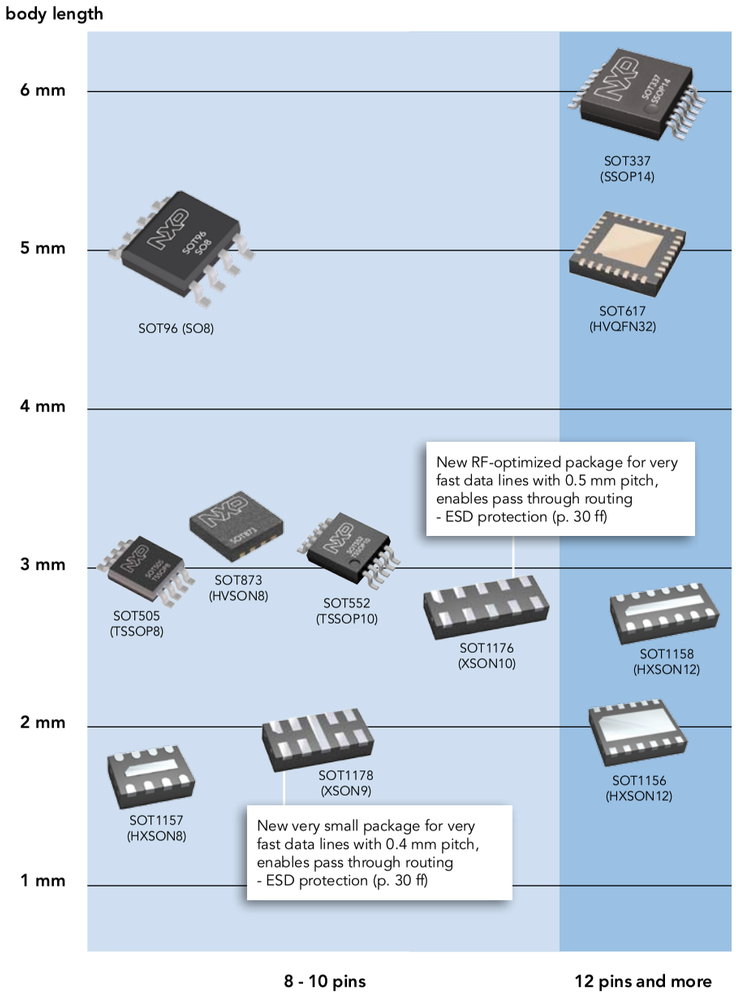
Diodes, protection and signal conditioning devices, bipolar transistors, MOSFETs, thyristors

Discrete Semiconductors packages – portfolio and highlights

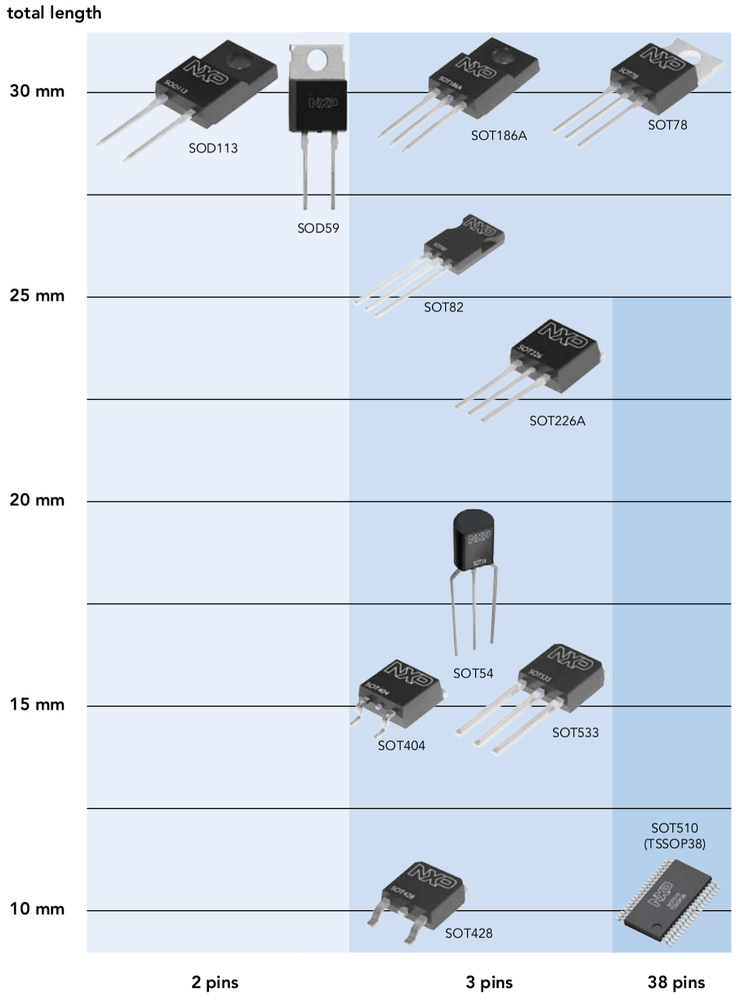
Small SMD packages with 2 - 6 pins



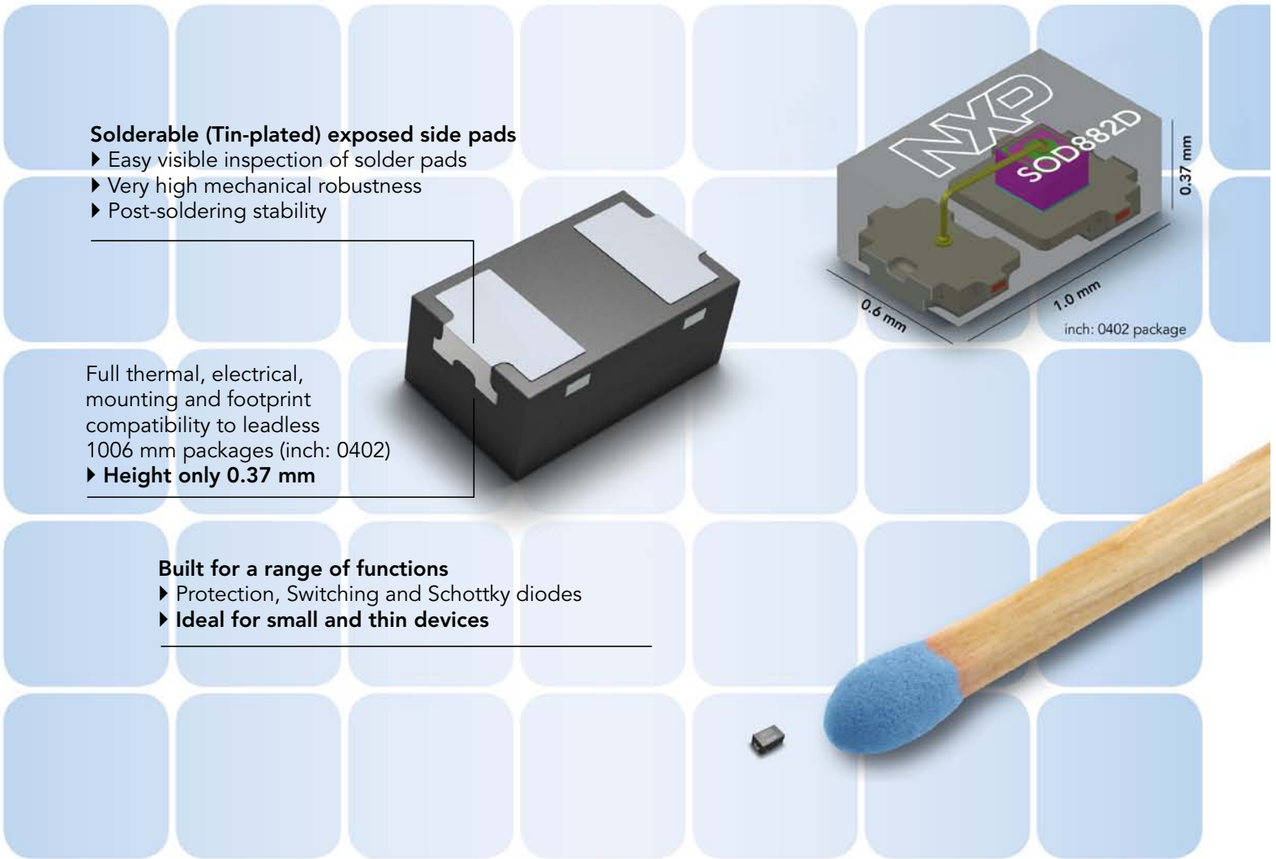
Small SMD packages with 8 pins and more



Through-hole and SMD packages with total length of + 9 mm



The first leadless package with solderable side pads



Get ready to improve your ultra-flat PCB design with our SOD882D package.

http://standardproducts.nxp.com

Discrete Semiconductors Selection Guide 2011

Benefit from interactive features in the online edition of this selection guide: A click on a product type takes you to the corresponding product information page on the NXP website. There you'll find data sheets and other design-support documents. To access the online selection guide, go to www.nxp.com/discrete_selection_guide

Diodes
Page 7

Protection and signal conditioning
Page 21

Bipolar transistors
Page 51

MOSFETs
Page 69

Thyristors
Page 85

Standard & advanced linear products
Page 91

Packages
Page 99

Index
Page 122

Table of Contents

Support tools 6

Diodes 7

Schottky barrier diodes and rectifiers 8
- General purpose Schottky diodes ≤ 250 mA 8
- Low capacitance Schottky diodes 9
- Medium power low V_F Schottky rectifiers single ≥ 200 mA 10
- Medium power low V_F Schottky rectifiers dual ≥ 200 mA 12
- Improved forward characteristics of (MEGA) Schottky rectifiers in new packages 13

Zener diodes 14
- General purpose Zener diodes 14
- Zener diodes specifications 15

Switching diodes 16
- General purpose switching diodes ≤ 100 V 16
- General purpose switching diodes > 100 V 18
- Controlled avalanche switching diodes 19
- Low leakage current switching diodes 19

Power diodes 20
- Ultrafast recovery power diodes 20
- Hyperfast power diodes 20

Protection and signal conditioning 21

Standard ESD protection devices 22

Low capacitance ESD protection devices 24

ESD protection for very high speed interfaces (< 2 pF) 28

Application-specific ESD and ESD/EMI solutions 32
- Audio interfaces 32
- Video interfaces 32
- Multichannel EMI filters, ESD protection for LCD and camera 36
- SD-, SIM-card and MMC 42
- Battery and charger protection 42
- USB, SATA, LAN 43
- Automotive LIN/CAN/FlexRay 47

TVS diodes 48
- TVS diodes, 24 W/40 W 48
- TVS diodes, 400 W 48
- TVS diodes, 600 W 49

Bipolar transistors 51

General purpose bipolar transistors 52
- Single transistors NPN 52
- Single transistors PNP 52
- Double transistors 53
- Single and double switching transistors 53
- Medium power general purpose transistors 54
- High voltage transistors 54
- Low noise transistors 54
- Matched pair transistors 55
- Darlington transistors 56
- Schmitt trigger 56
- MOSFET driver 57
- Medium frequency transistors 57

Resistor-equipped transistors (RETs) 58
- RETs 100 mA single 58
- RETs 100 mA double 59
- RETs 500 mA 59
- Low V_{CEsat} (BISS) RETs 59

Low V_{CEsat} (BISS) transistors 60
- Low V_{CEsat} (BISS) transistors single NPN 60
- Low V_{CEsat} (BISS) transistors single PNP 62
- Low V_{CEsat} (BISS) double transistors 64
- Low V_{CEsat} (BISS) load switches 65
- High voltage low V_{CEsat} (BISS) transistors 66
- Low V_{CEsat} (BISS) RETs 66
- Low V_{CEsat} (BISS) transistor PNP – N-channel MOSFET combination 67
- Advantages of low V_{CEsat} (BISS) technology 67

High voltage power bipolar transistors 68
- High voltage bipolar transistors for lighting, SMPS and industrial applications 68

MOSFETs 69

Small-signal MOSFETs 70
- Small-signal MOSFETs single (N-channel) < 50 V 70
- Small-signal MOSFETs single (N-channel) ≥ 50 V 72
- Small-signal MOSFETs dual (N-channel) 74
- Small-signal MOSFETs single (P-Channel) 74
- Small-signal MOSFET – Schottky combination 76
- Small-signal MOSFETs dual (P-channel) 76

Power MOSFETs 77
- 12 V - 25 V N-channel MOSFETs 77
- 30 V N-channel MOSFETs 78
- 40 V - 55 V N-channel MOSFETs 79
- 60 V - 80 V N-channel MOSFETs 80
- 100 V - 110 V N-channel MOSFETs 81
- 150 V - 300 V N-channel MOSFETs 82
- P-channel MOSFETs 83
- Multi-chip MOSFETs 83

Thyristors 85

4-Quadrant Triacs 86

3-Quadrant Triacs 88

AC Thyristors 89

Silicon Controlled Rectifiers 89

Standard & advanced linear products 91

Adjustable shunt voltage regulator TL431 92

Adjustable shunt voltage regulator TLVH431 93

Discrete voltage regulator / Constant current source 94

Low-dropout regulator 95

Advanced linear ultra low-dropout voltage regulators 96

Packages 99

Package cross reference 100

Packing methods 102

Minimized outline drawings and reflow soldering footprint 108

Index 122

Support tools

Check the NXP Standard Products Portal www.standardproducts.nxp.com

Your first stop for NXP's wide range of diodes, bipolar transistors, MOSFETs, thyristors and ESD protection products. The gateway focuses on:

- Product and application information
- Recently launched products
- News items and related documents
- Design hints, with simple solutions to some of today's common design challenges, incl. energy efficiency, integration, packaging, and protection

Direct links to popular design support tools and items:

Datasheets
http://standardproducts.nxp.com/all_datasheets

Find cross references of industry type numbers and download X-Reference offline tool
http://www.nxp.com/search/advanced

Application notes
http://standardproducts.nxp.com/all_appnotes

Sales literature
http://standardproducts.nxp.com/all_literature

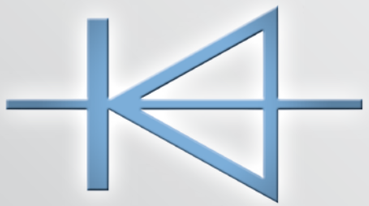
Selection Guide (download pdf file)
http://www.nxp.com/discrete_selection_guide

Models and test data
http://www.nxp.com/models

Technical support portal
http://www.nxp.com/technical_support

FAQ (Frequently Asked Questions) Discretes
http://www.nxp.com/faq_discretes

Direct support needed? Find complete contact information to your regional NXP sales offices and distributors
http://www.nxp.com/profile/sales



Diodes

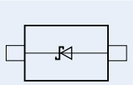
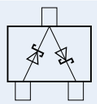
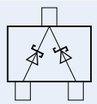
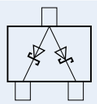
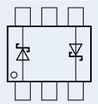
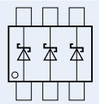
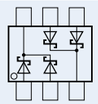
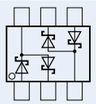
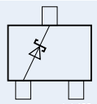
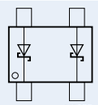
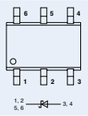
Schottky barrier diodes and rectifiers	**8**
General purpose Schottky diodes ≤ 250 mA	8
Low capacitance Schottky diodes	9
Medium power low V_F Schottky rectifiers single ≥ 200 mA	10
Medium power low V_F Schottky rectifiers dual ≥ 200 mA	12
Improved forward characteristics of (MEGA) Schottky rectifiers in new packages	13
Zener diodes	**14**
General purpose Zener diodes	14
Zener diodes specification	15
Switching diodes	**16**
General purpose switching diodes ≤ 100 V	16
General purpose switching diodes > 100 V	18
Controlled avalanche switching diodes	19
Low leakage current switching diodes	19
Power diodes	**20**
Ultrafast recovery power diodes	20
Hyperfast power diodes	20

Schottky barrier diodes and rectifiers

General purpose Schottky diodes ≤ 250 mA

types in **bold** represent new products

I_F max (mA)	V_R max (V)	V_F max (mV)	@ I_F (mA)	I_R max (µA)	@ V_R (V)	Package	SOD80C (MiniMelf)	SOD68 (DO-34)	SOT23	SOT143B		SOD123F	SOT323 (SC-70)	SOT363 (SC-88)	SOD323F (SC-90)	SOD323 (SC-76)	SOT666	SOT416 (SC-75)	SOD523 (SC-79)	SOD882/ SOT883 (SC-101)
						Size (mm)	3.5 x 1.5 x 1.5	3.04 x 1.6 x 0.55	2.9 x 1.3 x 1.0	2.9 x 1.3 x 1.0		2.6 x 1.6 x 1.1	2.0 x 1.25 x 0.95	2.0 x 1.25 x 0.95	1.7 x 1.25 x 0.7	1.7 x 1.25 x 0.95	1.6 x 1.2 x 0.55	1.6 x 0.8 x 0.77	1.2 x 0.8 x 0.6	1.0 x 0.6 x 0.5
						P_{tot} (mW)	300	500	250	250		830	250	300	550	400	300	150	500	250
70	70	750	10	0.1	50	single			BAS70			BAS70H	BAS70W			1PS76SB70			1PS79SB70	BAS70L
						dual series			BAS70-04				BAS70-04W							
						dual c.c.			BAS70-05				BAS70-05W							
						dual c.a.			BAS70-06				BAS70-06W							
						dual isolated				BAS70-07				BAS70-07S			BAS70-07V			
						triple isolated											BAS70VV			
						quad 2x series								BAS70XY						
120	40	370	1	0.5	30	single										RB751V40			RB751S40	RB751CS40
		500	10	1	30	single			BAS40			BAS40H	BAS40W			1PS76SB40			1PS79SB40	BAS40L
						dual series			BAS40-04				BAS40-04W							
						dual c.c.			BAS40-05				BAS40-05W					1PS75SB45		
						dual c.a.			BAS40-06				BAS40-06W							
						dual isolated				BAS40-07							BAS40-07V			
						quad c.c./c.c.								1PS88SB48			BAS40-05V			
						quad 2x series								BAS40XY						
200	30	300	10	30	10	single													1PS79SB31	
		340	10	2	25	single			BAT754											
						dual series			BAT754S											
						dual c.c.			BAT754C											
						dual c.a.			BAT754A											
						triple isolated								BAT754L						
		400	10	2	25	single	BAS85	BAT85	BAT54			BAT54H	BAT54W		BAT54J	1PS76SB10		BAT54T	1PS79SB10	BAT54L
						dual series			BAT54S				BAT54SW							
						dual c.c.			BAT54C				BAT54CW							BAT54CM
						dual c.a.			BAT54A				BAT54AW							
						dual isolated				BAT74				BAT74S			BAT74V			
						triple isolated											BAT54VV			
						quad c.c./c.c.											BAT54CV			
						quad 2x series								BAT54XY						
		500	200	30	10	single													RB521S30	**RB521CS30L**
		600	200	1	10	single													RB520S30	**RB520CS30L**
	40	300	10	15	30	single			BAT721							1PS76SB21				
						dual series			BAT721S											
						dual c.c.			BAT721C											
						dual c.a.			BAT721A											
		360	10	0.5	25	single													1PS79SB30	
		420	30	0.5	25	single							BAT854W							
						dual series							BAT854SW							
						dual c.c.							BAT854CW							
						dual c.a.							BAT854AW							
	50	450	10	5	40	single	BAS86	BAT86												
250	100	850	250	4	75	single						**BAT46WH**			**BAT46WJ**					

single	dual series	dual c.c.	dual c.a.	dual isolated	triple isolated	quad c.c./c.c.	quad 2x series
 brb122	 brb124	 brb125	 brb126	 brb127	 brb129	 brb130	 brb131
 brb123				 brb128			
							

Low capacitance Schottky diodes

I_F max (mA)	V_R max (V)	V_F max (mV)	@ I_F (mA)	C_d max (pF)	@ V_R = 0 V	Package	SOT23	SOT323 (SC-70)	SOT363 (SC-88)	SOD323 (SC-76)	SOT666	SOD523 (SC-79)	SOD882
						Size (mm)	2.9 x 1.3 x 1.0	2.0 x 1.25 x 0.95	2.0 x 1.25 x 0.95	1.7 x 1.25 x 0.95	1.6 x 1.2 x 0.55	1.2 x 0.8 x 0.6	1.0 x 0.6 x 0.5
						P_{tot} (mW)	250	250	300	400	300	500	250
30	4	450	1	1		single	BAT17			1PS76SB17		1PS79SB17	
						triple isolated					1PS66SB17		
						dual series	PMBD353 PMBD354 [1]						
	15	340	1	1		single		1PS70SB82					1PS10SB82
						triple isolated			1PS88SB82		1PS66SB82		
						dual series		1PS70SB84					
						dual c.c.		1PS70SB85					
						dual c.a.		1PS70SB86					

[1] Diodes have matched capacitance

Schottky barrier diodes and rectifiers

Medium power low V_F Schottky rectifiers single ≥ 200 mA

types in **bold** represent new products

I_F max (A)	V_R max (V)	V_F max (mV) @ I_F max	I_R max (mA) @ V_R max	Package	SOD128	SOT457 (SC-74)	SOT23	SOD123W	SOD123F		SOT1061	SOT323 (SC-70)	SOD323F (SC-90)	SOD323 (SC-76)	SOT666	SOD523 (SC-79)	SOD882	SOD882D
				Size (mm)	3.8 x 2.5 x 1.0	2.9 x 1.5 x 1.0	2.9 x 1.3 x 1.0	2.6 x 1.7 x 1.0	2.6 x 1.6 x 1.1		2.0 x 2.0 x 0.65	2.0 x 1.25 x 0.95	1.7 x 1.25 x 0.7	1.7 x 1.25 x 0.95	1.6 x 1.2 x 0.55	1.2 x 0.8 x 0.6	1.0 x 0.6 x 0.5	1.0 x 0.6 x 0.37
				P_{tot} (mW) @ 1 cm²	1050	540	420	950	830		1000	250	830	570	570	450	250	250
				Optimization														
0.2	30	480	0.04	low V_F									PMEG3002EJ			PMEG3002AEB	PMEG3002AEL	**PMEG3002AELD**
	40	600	0.01	low I_R									PMEG4002EJ			PMEG4002EB	PMEG4002EL	**PMEG4002ELD**
	60	600	0.1	low V_F									PMEG6002EJ			PMEG6002EB		
0.5	20	390	0.2	low V_F			PMEG2005ET		PMEG2005EH				PMEG2005EJ	PMEG2005AEA	PMEG2005AEV			
		440	1.5	low V_F													PMEG2005AEL	**PMEG2005AELD**
		480	0.01	low I_R												PMEG2005EB		
		500	0.03	low I_R													PMEG2005EL	**PMEG2005ELD**
	30	430	0.15	low V_F			PMEG3005ET		PMEG3005EH				PMEG3005EJ	PMEG3005AEA	PMEG3005AEV			
		500	0.5	low V_F												PMEG3005EB	PMEG3005EL	**PMEG3005ELD**
	40	470	0.1	low V_F			PMEG4005ET		PMEG4005EH				PMEG4005EJ	PMEG4005AEA	PMEG4005AEV			
		550	0.1	low V_F			BAT720					1PS70SB20						
1.0	20	340	1	low V_F				PMEG2010ER										
		375	1.9	low V_F							PMEG2010EPA							
		430	0.2	low V_F			PMEG2010AET		PMEG2010AEH									
		450	0.05	low I_R				PMEG2010BER										
		500	0.2	low V_F			PMEG2010ET		PMEG2010EH				PMEG2010EJ	PMEG2010BEA	PMEG2010BEV			
		550	0.07	low I_R									PMEG2010AEJ	PMEG2010EA BAT760	PMEG2010EV BAT960			
		620	1.5	low V_F												PMEG2010AEB		
	30	450	1.0	low V_F		1PS74SB23												
		360	1.5	low V_F	PMEG3010EP			PMEG3010ER										
		450	0.05	low I_R	PMEG3010BEP			PMEG3010BER										
		520	0.05	low I_R					PMEG3010CEH				PMEG3010CEJ					
		560	0.15	low V_F			PMEG3010ET		PMEG3010EH				PMEG3010EJ	PMEG3010BEA	PMEG3010BEV			
		680	0.5	low V_F												PMEG3010EB		
	40	490	0.05	low V_F	PMEG4010EP			PMEG4010ER										
		640	0.1	low V_F			PMEG4010ET		PMEG4010EH				PMEG4010EJ	PMEG4010BEA	PMEG4010BEV			
		570	0.05	low I_R					PMEG4010CEH				PMEG4010CEJ					
	60	530	0.06	low V_F	PMEG6010EP			PMEG6010ER										
		650	0.35	low V_F		PMEG6010AED												
		660	0.05	low I_R					PMEG6010CEH				PMEG6010CEJ					
1.5	20	660	0.07	low I_R					PMEG2015EH				PMEG2015EJ	PMEG2015EA	PMEG2015EV			
	30	550	1.0	low V_F					PMEG3015EH				PMEG3015EJ		PMEG3015EV			
2.0	10	460	3.0	low V_F					PMEG1020EH				PMEG1020EJ	PMEG1020EA	PMEG1020EV			
	20	420	1.9	low V_F							PMEG2020EPA							
		525	0.2	low V_F					PMEG2020EH				PMEG2020EJ	PMEG2020AEA				
	30	360	3.0	low V_F	PMEG3020EP													
		420	1.5	low V_F	PMEG3020CEP			PMEG3020ER										
		450	0.1	low I_R	PMEG3020BEP													
		470	2.5	low V_F							PMEG3020EPA							
		520	0.05	low I_R	PMEG3020DEP			PMEG3020BER										
		620	1.0	low V_F					PMEG3020EH				PMEG3020EJ					
	40	490	0.1	low V_F	PMEG4020EP			PMEG4020ER										
		535	0.1	low V_F							PMEG4020EPA							
	60	530	0.15	low V_F	PMEG6020EP			PMEG6020ER										
		575	0.25	low V_F							PMEG6020EPA							
3.0	10	530	3.0	low V_F					PMEG1030EH				PMEG1030EJ					
	30	360	5.0	low V_F	**PMEG3030EP**													
		450	0.15	low I_R	**PMEG3030BEP**													
	40	490	0.2	low V_F	**PMEG4030EP**													
		540	0.1	low I_R				**PMEG4030ER**										
	60	530	0.2	low V_F	**PMEG6030EP**													
5.0	30	360	8.0	low V_F	**PMEG3050EP**													
		450	0.25	low I_R	**PMEG3050BEP**													
	40	490	0.3	low V_F	**PMEG4050EP**													

In the Spotlight

Low V_F (MEGA) Schottky rectifiers in new leadless SOD882D

- Ultra low package height of only 0.37 mm typ
- Tin-plated solderable side pads
- Ultra small dimensions 1.0 x 0.6 mm
- Portfolio of five low V_F (MEGA) Schottky diodes (I_F up to 0.5 A)
- AEC-Q101 qualified

Medium power low V_F Schottky rectifiers dual ≥ 200 mA

types in **bold** represent new products

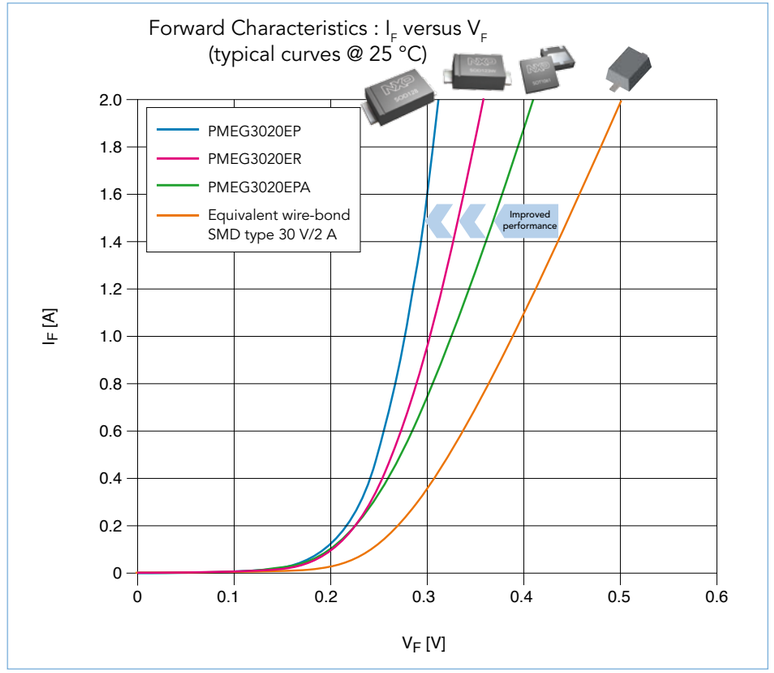
I_F max (A)	V_R max (V)	V_F max (mV) @ I_F max	I_R max (mA) @ V_R max	Optimization	Package	SOT223 (SC-73)	SOT23	SOT1061	SOT666
					Size (mm)	6.5 x 3.5 x 1.65	2.9 x 1.3 x 1.0	2.0 x 2.0 x 0.65	1.6 x 1.2 x 0.55
					P_{tot} (mW)	1500	250	1000	300
0.2	30	480	0.03	low V_F	dual isolated				PMEG3002TV
	60	600	0.1	low V_F					PMEG6002TV
0.5	20	390	0.2	low V_F	dual c.c.		PMEG2005CT		
	30	430	0.15	low V_F			PMEG3005CT		
	40	470	0.1	low V_F			PMEG4005CT		
1.0	25	450	1.0	low V_F	dual series	BAT120S			
				low V_F	dual c.c.	BAT120C			
				low V_F	dual c.a.	BAT120A			
	40	500	0.05	low V_F	dual c.c.			**PMEG4010CPA**	
	60	540	0.06	low V_F	dual c.c.			**PMEG6010CPA**	
		650	0.35	low V_F	dual series	BAT160S			
				low V_F	dual c.c.	BAT160C			
				low V_F	dual c.a.	BAT160A			
2.0	20	420	1.0	low V_F	dual c.c.			**PMEG2020CPA**	
	30	440	2.0	low V_F	dual c.c.			**PMEG3020CPA**	

In the Spotlight

Medium power single and dual Schottky rectifiers in SOT1061

- Small (2 x 2 x 0.65 mm) leadless medium power package SOT1061
- Exposed heat sink for excellent thermal and electrical performance (P_{tot} > 1 W)
- High forward-current capability (I_F up to 2 A) with low forward voltage drop
- High reverse voltage (V_F up to 60 V)
- AEC-Q101 qualified

Improved forward characteristics of (MEGA)[1] Schottky rectifiers in new packages



[1] Maximum Efficiency General Application

In the Spotlight

3 and 5 A low V_F (MEGA) Schottky rectifiers in SOD123W and SOD128

- Small FlatPower packages SOD123W/128, only 1 mm high
- Very low forward voltage drop V_F down to 340 mV
- Low reverse current I_R down to 0.05 mA
- High power capability due to clip-bonding technology and optimized die design
- AEC-Q101 qualified

Nomenclature of low V_F (MEGA) Schottky rectifiers

PMEG 20 10 A E V

NXP MEGA Schottky rectifier

Max. reverse voltage in V
e.g. 20 = 20 V

Cont. foward current in A
e.g. 10 = 1.0 A

Variant number (optional)

Internal configuration:
- E = single
- A = CA
- C = CC
- S = series
- P = double, parallel
- R = triple, anti-parallel
- V = triple
- Z = 2 x CA
- Y = 2 x CC
- X = 2 x series
- W = CA and CC

Package Indicator:
- A = SOD323
- B = SOD523
- D = SOT457
- H = SOD123
- J = SOD323F
- T = SOT23
- V = SOT666
- L = SOD882
- P = SOD128
- PA = SOT1061
- R = SOD123W
- LD = SOD882D

General purpose Zener diodes

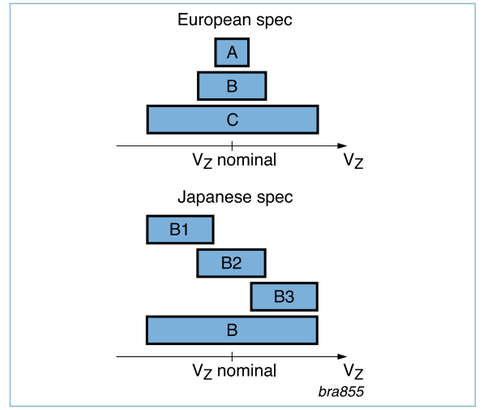
types in **bold** represent new products

I_F max (mA)	P_{ZSM} (W)	V_Z nom (V)	V_Z tolerance	Note	Configuration	Series	Package	Size (mm)	P_{tot} (mW)
500	-	3.3~24	C	Eur	single	1N47xxA series	SOD66 (DO-41)	4.8 x 2.6 x 0.81	1000
	60	3.6~75				BZV85 series			
250	-	2.4~36	about 2%	special	single	NZX series	SOD27 (DO-35)	4.25 x 1.85 x 0.56	400
	40	2.4~75	B, C	Eur		BZX79 series			
400	40	2.4~75	C	Eur	single	BZV90 series	SOT223 (SC-73)	6.5 x 3.5 x 1.65	1500
250	40	2.4~75	C	Eur	single	BZV49 series	SOT89 (SC-62)	4.5 x 2.5 x 1.5	1000
250	40	2.4~75	B, C	Eur	single	BZV55 series	SOD80C (MiniMelf)	3.5 x 1.5 x 1.5	300
200	40	2.4~75	B, C	Eur	dual c.a.	BZB84 series	SOT23	2.9 x 1.3 x 1.0	250
			A, B, C		single	BZX84 series			
250	30	5~6.8	0.2 V	Ave		PLVA600A series			
			0.2 V	Ave	dual c.a.	PLVA2600A series			
250	-	3.0~30	about 2.5%	special	single	NZH series	SOD123F	2.6 x 1.6 x 1.1	830
	40	2.4~75	B, C	Eur		BZT52H series			
200	40	2.7~24	B2	Jap	dual isolated	PZUxDB2 series	SOT353 (SC-88A)	2.0 x 1.25 x 0.95	300
200	40	2.4~15	C	Eur	dual c.a.	BZB784 series	SOT323 (SC-70)	2.0 x 1.25 x 0.95	350
200	30	100	C	Eur	back-to-back	BZB100A	SOD323 (SC-76)	1.7 x 1.25 x 0.95	300
	40	2.4~36	B2	Jap	single	PDZ-B series			
250	40	2.4~75	B, C	Eur		BZX384 series			
200	40	2.4~36	B, B1, B2, B3	Jap		PZUxBA series			
200	60	100	C	Eur	single	BZX100A	SOD323F (SC-90)	1.7 x 1.25 x 0.7	550
200	40	2.4~36	B, B1, B2, B3	Jap		PZUxB series			
250	40	2.4~75	B, C	Eur		BZX84J series			
200	40	2.4~15	C	Eur	dual c.a.	BZB984 series	SOT663	1.6 x 1.2 x 0.55	350
200	40	2.4~75	B, C	Eur	single	BZX585 series	SOD523 (SC-79)	1.2 x 0.8 x 0.6	300
200	40	2.4~75	B, C	Eur	single	BZX884 series	SOD882	1.0 x 0.6 x 0.5	250
		2.4~36	B, B2	Jap		PZUxBL series			
250	180	5.6	C	Eur	single	**TDZ5V6J**	SOD323F	1.7 x 1.25 x 0.7	500

Notes:
Jap: B selection: app. 5% V_z tolerance, B1, B2, B3 selections: app. 2% V_z tolerance in sequential intervals
Eur: A selection: app. 1% V_z tolerance, B selection: app. 2% V_z tolerance, C selection: app. 5% V_z tolerance; the selections are in overlapping intervals
Ave: low voltage avalanche regulator diodes
dual c.a.: dual common anode

Zener diodes specifications

Differences in Zener specifications



Japanese spec (PZU, PDZ)

y =	B-series	B1-series	B2-series	B3-series
	± 5%	± 2%	± 2%	± 2%
	V_z (V)	V_z (V)	V_z (V)	V_z (V)
PZU2.4y	2.3 - 2.6	-	-	-
PZU2.7y	2.5 - 2.9	2.5 - 2.75	2.65 - 2.9	-
PZU3.0y	2.8 - 3.2	2.8 - 3.05	2.95 - 3.2	-
PZU3.3y	3.1 - 3.5	3.1 - 3.35	3.25 - 3.5	-
PZU3.6y	3.4 - 3.8	3.4 - 3.65	3.55 - 3.8	-
PZU3.9y	3.7 - 4.1	3.7 - 3.97	3.87 - 4.1	-
PZU4.3y	4.01 - 4.48	4.01 - 4.21	4.15 - 4.34	4.28 - 4.48
PZU4.7y	4.42 - 4.9	4.42 - 4.61	4.55 - 4.75	4.69 - 4.9
PZU5.1y	4.84 - 5.37	4.84 - 5.04	4.98 - 5.2	5.14 - 5.37
PZU5.6y	5.31 - 5.92	5.31 - 5.55	5.49 - 5.73	5.67 - 5.92
PZU6.2y	5.86 - 6.53	5.86 - 6.12	6.06 - 6.33	6.26 - 6.53
PZU6.8y	6.47 - 7.14	6.47 - 6.73	6.65 - 6.93	6.86 - 7.14
PZU7.5y	7.06 - 7.84	7.06 - 7.36	7.28 - 7.6	7.52 - 7.84
PZU8.2y	7.76 - 8.64	7.76 - 8.1	8.02 - 8.36	8.28 - 8.64
PZU9.1y	8.56 - 9.55	8.56 - 8.93	8.85 - 9.23	9.15 - 9.55
PZU10y	9.45 - 10.55	9.45 - 9.87	9.77 - 10.21	10.11 - 10.55
PZU11y	10.44 - 11.56	10.44 - 10.88	10.76 - 11.22	11.1 - 11.56
PZU12y	11.42 - 12.6	11.42 - 11.9	11.74 - 12.24	12.08 - 12.6
PZU13y	12.47 - 13.96	12.47 - 13.03	12.91 - 13.49	13.37 - 13.96
PZU14y	-	-	13.7 - 14.3	-
PZU15y	13.84 - 15.52	13.84 - 14.46	14.34 - 14.98	14.85 - 15.52
PZU16y	15.37 - 17.09	15.37 - 16.01	15.85 - 16.51	16.35 - 17.09
PZU18y	16.94 - 19.03	16.94 - 17.7	17.56 - 18.35	18.21 - 19.03
PZU20y	18.86 - 21.08	18.86 - 19.7	19.52 - 20.39	20.21 - 21.08
PZU22y	20.88 - 23.17	20.88 - 21.77	21.54 - 22.47	22.23 - 23.17
PZU24y	22.93 - 25.57	22.93 - 23.96	23.72 - 24.78	24.54 - 25.57
PZU27y	25.1 - 28.9	-	-	-
PZU30y	28 - 32	-	-	-
PZU33y	31 - 35	-	-	-
PZU36y	34 - 38	-	-	-

European spec (BZV, BZX, BZB, 1N47)

y =	C-series	B-series	A-series
	± 5%	± 2%	± 1%
	V_z (V)	V_z (V)	V_z (V)
BZX84-y2V4	2.2 - 2.6	2.35 - 2.45	2.37 - 2.43
BZX84-y2V7	2.5 - 2.9	2.65 - 2.75	2.67 - 2.73
BZX84-y3V0	2.8 - 3.2	2.94 - 3.06	2.97 - 3.03
BZX84-y3V3	3.1 - 3.5	3.23 - 3.37	3.26 - 3.34
BZX84-y3V6	3.4 - 3.8	3.53 - 3.67	3.56 - 3.64
BZX84-y3V9	3.7 - 4.1	3.82 - 3.98	3.86 - 3.94
BZX84-y4V3	4 - 4.6	4.21 - 4.39	4.25 - 4.35
BZX84-y4V7	4.4 - 5	4.61 - 4.79	4.65 - 4.75
BZX84-y5V1	4.8 - 5.4	5 - 5.2	5.04 - 5.16
BZX84-y5V6	5.2 - 6	5.49 - 5.71	5.54 - 5.66
BZX84-y6V2	5.8 - 6.6	6.08 - 6.32	6.13 - 6.27
BZX84-y6V8	6.4 - 7.2	6.66 - 6.94	6.73 - 6.87
BZX84-y7V5	7 - 7.9	7.35 - 7.65	7.42 - 7.58
BZX84-y8V2	7.7 - 8.7	8.04 - 8.36	8.11 - 8.29
BZX84-y9V1	8.5 - 9.6	8.92 - 9.28	9 - 9.2
BZX84-y10	9.4 - 10.6	9.8 - 10.2	9.9 - 10.1
BZX84-y11	10.4 - 11.6	10.8 - 11.2	10.8 - 11.11
BZX84-y12	11.4 - 12.7	11.8 - 12.2	11.88 - 12.12
BZX84-y13	12.4 - 14.1	12.7 - 13.3	12.87 - 13.13
BZX84-y15	13.8 - 15.6	14.7 - 15.3	14.85 - 15.15
BZX84-y16	15.3 - 17.1	15.7 - 16.3	15.84 - 16.16
BZX84-y18	16.8 - 19.1	17.6 - 18.4	17.82 - 18.18
BZX84-y20	18.8 - 21.2	19.6 - 20.4	19.8 - 20.2
BZX84-y22	20.8 - 23.3	21.6 - 22.4	21.78 - 22.22
BZX84-y24	22.8 - 25.6	23.5 - 24.5	23.76 - 24.24
BZX84-y27	25.1 - 28.9	26.5 - 27.5	26.73 - 27.27
BZX84-y30	28 - 32	29.4 - 30.6	29.70 - 30.30
BZX84-y33	31 - 35	32.3 - 33.7	32.67 - 33.33
BZX84-y36	34 - 38	35.3 - 36.7	35.64 - 36.36
BZX84-y39	37 - 41	38.2 - 39.8	38.61 - 39.39
BZX84-y43	40 - 46	42.1 - 43.9	42.57 - 43.43
BZX84-y47	44 - 50	46.1 - 47.9	-
BZX84-y51	48 - 54	50 - 52	50.49 - 51.51
BZX84-y56	52 - 60	54.9 - 57.1	-
BZX84-y62	58 - 66	60.8 - 63.2	-
BZX84-y68	64 - 72	66.6 - 69.4	-
BZX84-y75	70 - 79	73.5 - 76.5	74.25 - 75.75

NZX-series in SOD27

	V_z (V)		V_z (V)		V_z (V)
NZX2V4A	2.3 - 2.5	NZX6V2D	6.1 - 6.4	NZX14B	13.5 - 14
NZX2V4B	2.4 - 2.6	NZX6V2E	6.3 - 6.6	NZX14C	13.8 - 14.3
NZX2V7A	2.5 - 2.7	NZX6V8A	6.4 - 6.7	NZX15A	14.1 - 14.7
NZX2V7B	2.6 - 2.8	NZX6V8B	6.6 - 6.9	NZX15B	14.5 - 15.1
NZX2V7C	2.7 - 2.9	NZX6V8C	6.7 - 7	NZX15C	14.9 - 15.5
NZX3V0A	2.8 - 3	NZX6V8D	6.9 - 7.2	NZX15X	14.35 - 15.09
NZX3V0B	2.9 - 3.1	NZX7V5A	7 - 7.3	NZX16A	15.3 - 15.9
NZX3V0C	3 - 3.2	NZX7V5B	7.2 - 7.6	NZX16B	15.7 - 16.5
NZX3V3A	3.1 - 3.3	NZX7V5C	7.3 - 7.7	NZX16C	16.3 - 17.1
NZX3V3B	3.2 - 3.4	NZX7V5D	7.5 - 7.9	NZX18A	16.9 - 17.7
NZX3V3C	3.3 - 3.5	NZX7V5X	7.07 - 7.45	NZX18B	17.5 - 18.3
NZX3V6A	3.4 - 3.6	NZX8V2A	7.7 - 8.1	NZX18C	18.1 - 19
NZX3V6B	3.5 - 3.7	NZX8V2B	7.9 - 8.3	NZX20A	18.8 - 19.7
NZX3V6C	3.6 - 3.8	NZX8V2C	8.1 - 8.5	NZX20B	19.5 - 20.4
NZX3V9A	3.7 - 3.9	NZX8V2D	8.3 - 8.7	NZX20C	20.2 - 21.2
NZX3V9B	3.8 - 4	NZX9V1A	8.5 - 8.9	NZX22A	20.9 - 21.9
NZX3V9C	3.9 - 4.1	NZX9V1B	8.7 - 9.1	NZX22B	21.6 - 22.6
NZX4V3A	4 - 4.2	NZX9V1C	8.9 - 9.3	NZX22C	22.3 - 23.3
NZX4V3B	4.1 - 4.3	NZX9V1D	9.1 - 9.5	NZX24A	22.9 - 24
NZX4V3C	4.2 - 4.4	NZX9V1E	9.3 - 9.7	NZX24B	23.6 - 24.7
NZX4V3D	4.3 - 4.5	NZX10A	9.5 - 9.9	NZX24C	24.3 - 25.5
NZX4V7A	4.4 - 4.6	NZX10B	9.7 - 10.1	NZX24X	22.61 - 23.77
NZX4V7B	4.5 - 4.7	NZX10C	9.9 - 10.3	NZX27A	25.2 - 26.6
NZX4V7C	4.6 - 4.8	NZX10D	10.2 - 10.6	NZX27B	26.2 - 27.6
NZX4V7D	4.7 - 4.9	NZX11A	10.4 - 10.8	NZX27C	27.2 - 28.6
NZX5V1A	4.8 - 5	NZX11B	10.7 - 11.1	NZX27X	26.99 - 28.39
NZX5V1B	4.9 - 5.1	NZX11C	10.9 - 11.3	NZX30A	28.2 - 29.6
NZX5V1C	5 - 5.2	NZX11D	11.1 - 11.6	NZX30B	29.2 - 30.6
NZX5V1D	5.1 - 5.3	NZX12A	11.4 - 11.9	NZX30C	30.2 - 31.6
NZX5V6A	5.2 - 5.5	NZX12B	11.6 - 12.1	NZX30X	29.02 - 30.51
NZX5V6B	5.3 - 5.6	NZX12C	11.9 - 12.4	NZX33A	31.2 - 32.6
NZX5V6C	5.4 - 5.7	NZX12D	12.2 - 12.7	NZX33B	32.2 - 33.6
NZX5V6D	5.5 - 5.8	NZX12X	11.44 - 12.03	NZX33C	33.2 - 34.5
NZX5V6E	5.6 - 5.9	NZX13A	12.4 - 12.9	NZX36A	34.2 - 35.7
NZX6V2A	5.7 - 6	NZX13B	12.6 - 13.1	NZX36B	35.3 - 36.8
NZX6V2B	5.8 - 6.1	NZX13C	12.9 - 13.4	NZX36C	36.4 - 38
NZX6V2C	6 - 6.3	NZX14A	13.2 - 13.7	NZX36X	35.36 - 37.19

Switching diodes

General purpose switching diodes ≤ 100 V

types in **bold** represent new products

V_R max (V)	V_F max (V)	@ I_F (mA)	I_R max (nA)	@ V_R (V)	t_{rr} max (ns)	Package	SOD27 (DO-35)	SOD68 (DO-34)	SOD80C (MiniMelf)	SOT23	SOT143B	SOD123F		SOT323 (SC-70)	SOT363 (SC-88)	SOD323 (SC-76)	SOD323F (SC-90)	SOT666	SOT416 (SC-75)	SOD523 (SC-79)	SOD882	SOT883 (SC-101)	SOD882D
						Size (mm)	4.25 x 1.85 x 0.56	3.04 x 1.6 x 0.55	3.5 x 1.5 x 1.5	2.9 x 1.3 x 1.0	2.9 x 1.3 x 1.0	2.6 x 1.6 x 1.1		2.0 x 1.25 x 0.95	2.0 x 1.25 x 0.95	1.7 x 1.25 x 0.95	1.7 x 1.25 x 0.7	1.6 x 1.2 x 0.55	1.6 x 0.8 x 0.77	1.2 x 0.8 x 0.6	1.0 x 0.6 x 0.5	1.0 x 0.6 x 0.5	1.0 x 0.6 x 0.37
						P_{tot} (mW)	500	500	500	250	250	830		200	300	400	550	180	170	500	250	250	250
50	1	50	100	50	4					BAL74													
										BAV74													
70	1	50	1000	70	4					BAL99													
75	1	10	25	20	4			1N4531															
		50	1000	75	4						BAS28												
		100	5000	75	4				BAS32L														
90	1	50	500	80	4					BAW56				BAW56W					BAW56T			BAW56M	
															BAW56S								
															BAV756S								
100	1	10	25	20	4		1N4148																
		50	500	80	4							BAS16H				BAS316	BAS16J						
										BAS16				BAS16W					BAS16T				
																				BAS516	BAS16L		**BAS16LD**
															BAS16VY			BAS16VV					
										BAV70				BAV70W					BAV70T			BAV70M	
															BAV70S								
										BAV99				BAV99W									
															BAV99S								

General purpose switching diodes > 100 V

V_R max (V)	V_F max (V)	@ I_F (mA)	I_R max (nA)	@ V_R (V)	t_{rr} max (ns)	Package	SOD27 (DO-35)	SOD80C (MiniMelf)	SOT457 (SC-74)	SOT23	SOT143B	SOD123F	SOT323 (SC-70)	SOT363 (SC-88)	SOD323 (SC-76)	SOD323F (SC-90)	SOD523 (SC-79)
						Size (mm)	4.25 x 1.85 x 0.56	3.5 x 1.5 x 1.5	2.9 x 1.5 x 1.0	2.9 x 1.3 x 1.0	2.9 x 1.3 x 1.0	2.6 x 1.6 x 1.1	2.0 x 1.25 x 0.95	2.0 x 1.25 x 0.95	1.7 x 1.25 x 0.95	1.7 x 1.25 x 0.7	1.2 x 0.8 x 0.6
						P_{tot} (mW)	500	300	500	250	250	830	350	300	400	550	500
150	1	100	100	150	50		BAV20										
≥ 200	1	100	100	150	50		BAV21	BAV103				BAS21H			BAS321		
				200	50					BAS21			BAS21W				
											BAV23						
										BAV23A			BAS21AW				
										BAV23C							
										BAV23S			BAS21SW				
									BAS21VD								
300	1.1	100	150	250	50											BAS21J	BAS521
										BAS101							
										BAS101S							
											BAW101						
														BAW101S			

Controlled avalanche switching diodes

V_R max (V)	V_F max (V)	@ I_F (mA)	I_R max (nA) @ V_R max	I_{FSM} max (A)	I_{FRM} max (mA)	C_d max (pF)	t_{rr} max (ns)	Package	SOT23	SOT143B
								Size (mm)	2.9 x 1.3 x 1.0	2.9 x 1.3 x 1.0
								P_{tot} (mW)	250	250
60	1	200	100	9	600	2.5	6			BAS56
90	1	200	100	10	600	35	50		BAS29	
									BAS31	
									BAS35	

Low leakage current switching diodes

V_R max (V)	V_F max (V)	@ I_F (mA)	I_R max (nA) @ V_R max	t_{rr} max (µs)	Package	SOD80C (MiniMelf)	SOD68 (DO-34)	SOT23	SOD123F	SOT323 (SC-70)	SOD323 (SC-76)	SOT416 (SC-75)	SOD523 (SC-79)
					Size (mm)	3.5 x 1.5 x 1.5	3.04 x 1.6 x 0.55	2.9 x 1.3 x 1.0	2.6 x 1.6 x 1.1	2.0 x 1.25 x 0.95	1.7 x 1.25 x 0.95	1.6 x 0.8 x 0.77	1.2 x 0.8 x 0.6
					P_{tot} (mW)	300	500	250	830	250	400	170	500
75	1	10	5	3					BAS116H		BAS416		BAS716
								BAS116				BAS116T	
								BAV199		BAV199W			
								BAW156					
								BAV170					
125	1	100	1	1.5 typ		BAS45AL	BAS45A						

Ultrafast recovery power diodes

types in **bold** represent new products

V_{RRM} (V)	$I_{F(AV)}$ (A)	V_F (typ) @ 150C (V)	@ I_F (A)	t_{rr} (typ) @ 25C (ns)	SOD59 (TO220AC)	SOD113 (2-pin SOT186A)	SOT78 (TO220AB)	SOT186A (isolated TO220AB)	SOT223	SOT226 (I²PAK)	SOT404 (D²PAK)	SOT428 (DPAK)
100	8	0.8	8	20	BYW29E-100							
	2 x 10	0.72	8	20			BYV32E-100					
150	2 x 0.75	0.5	0.5	10					BYV40E-150			
	8	0.8	8	20	BYW29E-150							
	2 x 10	0.72	8	20			BYV32E-150					
	2 x 15	0.78	15	20			BYV42E-150					
200	8	0.8	8	20	BYW29E-200	BYW29EX-200						BYW29ED-200
	2 x 5	0.8	5	15			BYQ28E-200	BYQ28X-200				BYQ28ED-200
	14	0.83	14	20	BYV79E-200							
	2 x 8	0.84	8	20			BYQ30E-200					
	2 x 10	0.72	8	20			BYV32E-200			**BYV32G-200**	BYV32EB-200	
	2 x 15	0.78	15	20			BYV42E-200			**BYV42G-200**	BYV42EB-200	
300	2 x 5	0.95	5	50			BYT28-300					
400	9	0.9	8	50	BYV29-400							
	2 x 10	0.87	10	50			BYV34-400					
500	9	0.9	8	50	BYV29-500	BYV29X-500					BYV29B-500	
	2 x 5	0.95	5	50			BYT28-500					
	15	0.9	15	50	BYT79-500							
	2 x 10	0.87	10	50			BYV34-500					
	2 x 15	0.95	15	50			BYV44-500					
600	5	0.97	5	50		BYV25X-600				BYV25G-600		BYV25D-600
	8	1.07	8	60	BYR29-600	BYR29X-600						
	9	0.97	8	50	BYV29-600	BYV29X-600				BYV29G-600	BYV29B-600	
	15	1	15	50	BYT79-600	BYT79X-600						
	2 x 10	0.92	10	50			BYV34-600	BYV34X-600		BYV34G-600		
	5	1.1	5	17.5		**BYV25FX-600**	**BYV25F-600**				**BYV25FB-600**	**BYV25FD-600**
	9	1.25	8	17.5		BYV29FX-600	**BYV29F-600**				**BYV29FB-600**	**BYV29FD-600**
	2 x 10	1.3	10	20			BYV410-600	BYV410X-600				
800	8	1.07	8	60	BYR29-800	BYR29X-800						

Hyperfast power diodes

types in **bold** represent new products

V_{RRM} (V)	$I_{F(AV)}$ (A)	V_F (typ) @ 150C (V)	@ I_F (A)	t_{rr} (typ) @ 25C (ns)	SOD59 (TO220AC)	SOD113 (2-pin SOT186A)	SOT78 (TO220AB)	SOT404 (D²PAK)
600	5	1.4	5	19	BYC5-600	BYC5X-600		BYC5B-600
	8	1.4	8	19	BYC8-600	BYC8X-600		BYC8B-600
	8	1.4	8	19	**BYC8D-600**	**BYC8DX-600**		
	8	2	8	12.5		BYC58X-600		
	10	1.4	10	19	BYC10-600	BYC10X-600		BYC10B-600
	2 x 5	1.4	5	19			BYC10-600CT	
	15	1.4	15	19	BYC15-600	BYC15X-600		
	20	1.4	20	19	BYC20-600	BYC20X-600		

Protection and signal conditioning

Standard ESD protection devices 22

Low capacitance ESD protection devices 24

ESD protection for very high speed interfaces (< 2 pF) 28

Application specific ESD and ESD/EMI solutions 32

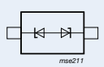
Audio interfaces 32
Video interfaces 32
Multichannel EMI filters, ESD protection for LCD and camera 36
SD-, SIM-card and MMC 42
Battery and charger protection 42
USB, SATA, LAN 43
Automotive LIN/CAN/FlexRay 47

TVS diodes 48

TVS diodes, 24 W/40 W 48
TVS diodes, 400 W 48
TVS diodes, 600 W 49

Standard ESD protection devices

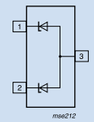
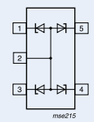
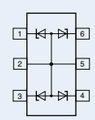
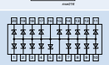
types in **bold** represent new products

Number of protected lines		V_{RWM} (V)	C_{line} typ (pF)	C_{line} max (pF)	P_{pp} [1] max (W)	ESD rating [2] max (kV)	I_R max (µA) @ V_{RWM}	Configuration	Type	Package	Size (mm)
Unidirectional	Bidirectional										
1	0	3.3	207	300	150	30	2		PESD3V3S1UL	SOD882	1.0 x 0.6 x 0.5
		5	152	200	150	30	1		PESD5V0S1UL		
		12	38	75	150	30	0.05		PESD12VS1UL		
		15	32	70	150	30	0.05		PESD15VS1UL		
		24	23	50	150	23	0.05		PESD24VS1UL		
		5	152	200	150	30	1		**PESD5V0S1ULD**	SOD882D	1.0 x 0.6 x 0.37
		12	38	75	150	30	0.05		**PESD12VS1ULD**		
		15	32	70	150	30	0.05		**PESD15VS1ULD**		
		24	23	50	150	23	0.05		**PESD24VS1ULD**		
		3.3	207	300	330	30	2		PESD3V3S1UB	SOD523 (SC-79)	1.2 x 0.8 x 0.6
		5	152	200	260	30	1		PESD5V0S1UB		
		12	38	75	180	30	0.05		PESD12VS1UB		
		15	32	70	160	30	0.05		PESD15VS1UB		
		24	23	50	160	23	0.05		PESD24VS1UB		
		5	480	530	890	30	4		PESD5V0S1UA	SOD323 (SC-76)	1.7 x 1.25 x 0.95
		12	160	180	600	30	0.1		PESD12VS1UA		
		24	23	50	160	23	0.05		**PESD24VS1UA**		
		5	480	530	890	30	4		PESD5V0S1UJ	SOD323F (SC-90)	1.7 x 1.25 x 0.7
		12	160	180	600	30	0.1		PESD12VS1UJ		
		2.5	229	300	260	30	6		PESD5Z2.5	SOD523 (SC-79)	1.2 x 0.8 x 0.6
		3.3	172	200	260	30	0.05		PESD5Z3.3		
		5	89	150	180	30	0.05		PESD5Z5.0		
		6	78	150	180	30	0.01		PESD5Z6.0		
		7	69	150	180	30	0.01		PESD5Z7.0		
		12	35	75	200	30	0.01		PESD5Z12		
		5	68	75	150	30	1		PESD9X5.0L	SOD882	1.0 x 0.6 x 0.5
		7	62	70	150	30	1		PESD9X7.0L		
0	1	5	35	45	130	30	0.1		PESD5V0S1BL		
		5	35	45	130	30	0.1		**PESD5V0S1BLD**	SOD882D	1.0 x 0.6 x 0.37
		5	35	45	130	30	0.1		PESD5V0S1BB	SOD523 (SC-79)	1.2 x 0.8 x 0.6
		5	35	45	130	30	0.1		PESD5V0S1BA	SOD323 (SC-76)	1.7 x 1.25 x 0.95
		5.5	35	45	100	30	0.1		**PESD5V0S1BSF**	SOD962	0.6 x 0.3 x 0.3

[1] 8/20 µs surge pulse acc. to IEC 61000-4-5 [2] acc. to IEC 61000-4-2 (contact discharge)

Standard ESD protection devices

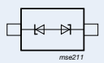
types in **bold** represent new products

Number of protected lines		V_{RWM} (V)	C_{line} typ (pF)	C_{line} max (pF)	P_{pp} [1] max (W)	ESD rating [2] max (kV)	I_R max (µA) @ V_{RWM}	Configuration	Type	Package	Size (mm)
Unidirectional	Bidirectional										
2	1	3.3	200	275	150	23	3		PESD3V3S2UQ	SOT663	1.6 x 1.2 x 0.55
		5	150	215	150	30	0.3		PESD5V0S2UQ		
		12	38	100	150	30	0.03		PESD12VS2UQ		
		15	32	70	150	30	0.05		PESD15VS2UQ		
		24	23	50	150	23	0.05		PESD24VS2UQ		
		3.3	207	300	330	30	2		PESD3V3S2UT	SOT23	2.9 x 1.3 x 1.0
		5.2	152	200	260	30	1		PESD5V2S2UT		
		12	38	75	180	30	1		PESD12VS2UT		
		15	32	70	160	30	1		PESD15VS2UT		
		24	23	50	160	23	1		PESD24VS2UT		
		36	17	35	160	30	1 (@ 30 V)		PESD36VS2UT		
		3.3	207	300	330	30	2		PESD3V3S2UAT		
		5	152	200	260	30	1		PESD5V0S2UAT		
		12	38	75	180	30	0.05		PESD12VS2UAT		
		15	32	70	160	30	0.05		PESD15VS2UAT		
		24	23	50	160	23	0.05		PESD24VS2UAT		
4	3	5.5	45	60	-	15	0.1	-	**IP4342CX5/LF**	CSP5, staggered compressed	1.06 x 0.76 x 0.61
		5.5	30	40	-	15	0.1		**IP4042CX5/LF**	CSP5, staggered compressed	1.28 x 0.91 x 0.65
		3.3	110	300	110	30	1 (@ 3 V)		PESD3V3S4UF	SOT886 (XSON6)	1.45 x 1.0 x 0.5
		5	85	220	110	30	0.1 (@ 4.3 V)		PESD5V0S4UF		
		3	107	125	-	8	1		BZA956A	SOT665	1.6 x 1.2 x 0.55
		4	90	105	-	8	0.5		BZA962A		
		4.3	78	90	-	8	0.1		BZA968A		
		3	200	240	-	8	2		BZA856A	SOT353 (SC-88A)	2.0 x 1.25 x 0.95
		3	107	125	-	8	1		BZA856AL		
		4	165	200	-	8	0.7		BZA862A		
		4	90	105	-	8	0.5		BZA862AL		
		4.3	145	180	-	8	0.2		BZA868A		
		4.3	78	90	-	8	0.1		BZA868AL		
		15	37	50	-	8	0.1		BZA820A		
		3	200	240	-	8	2		BZA456A	SOT457 (SC-74)	2.9 x 1.5 x 1.0
		4	165	200	-	15	0.7		BZA462A		
		14	37	48	-	8	0.075		BZA418A		
		15	37	48	-	8	0.1		BZA420A		
		3.3	215	300	200	30	0.8		PESD3V3S4UD		
		5	165	220	200	30	0.2		PESD5V0S4UD		
		12	73	100	200	30	0.015		PESD12VS4UD		
		15	60	90	200	30	0.015		PESD15VS4UD		
		24	40	70	200	23	0.015		PESD24VS4UD		
5	4	3.3	215	300	200	30	0.8		PESD3V3S5UD		
		5	165	220	200	30	0.2		PESD5V0S5UD		
		12	73	100	200	30	0.015		PESD12VS5UD		
		15	60	90	200	30	0.015		PESD15VS5UD		
		24	45	70	200	23	0.015		PESD24VS5UD		
0	4	5	45	75	-	15	0.1		BZA408B		
18	17	5.2	100	120	-	8	2		BZA100	SOT163 (SO20)	12.8 x 7.5 x 2.65

[1] 8/20 µs surge pulse acc. to IEC 61000-4-5 [2] acc. to IEC 61000-4-2 (contact discharge)

Low capacitance ESD protection devices

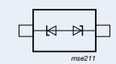
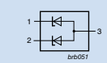
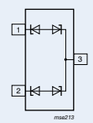
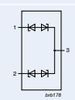
types in **bold** represent new products

Number of protected lines		V_{RWM} (V)	C_{line} typ (pF)	C_{line} max (pF)	P_{pp} [1] max (W)	ESD rating [2] max (kV)	I_R max (µA) @ V_{RWM}	Configuration	Type	Package	Size (mm)
Unidirectional	Bidirectional										
1	0	3.3	34	40	45	30	0.3		PESD3V3L1UL	SOD882	1.0 x 0.6 x 0.5
		5	25	30	42	26	0.1		PESD5V0L1UL		
		5	25	30	42	26	0.1		**PESD5V0L1ULD**	SOD882D	1.0 x 0.6 x 0.37
		3.3	34	40	45	30	0.3		PESD3V3L1UB	SOD523 (SC-79)	1.2 x 0.8 x 0.6
		5	25	30	42	26	0.1		PESD5V0L1UB		
		3.3	34	40	45	30	0.3		PESD3V3L1UA	SOD323 (SC-76)	1.7 x 1.25 x 0.95
		5	25	30	42	26	0.1		PESD5V0L1UA		
		3.3	2.6	3.1	-	9	0.1 (@ 3 V)		PESD3V3U1UL	SOD882	1.0 x 0.6 x 0.5
		5	2	2.6	-	9	0.1		PESD5V0U1UL		
		3.3	2.6	3.1	-	9	0.1 (@ 3 V)		PESD3V3U1UB	SOD523 (SC-79)	1.2 x 0.8 x 0.6
		5	2	2.6	-	9	0.1		PESD5V0U1UB		
		3.3	2.6	3.1	-	9	0.1 (@ 3 V)		PESD3V3U1UA	SOD323 (SC-76)	1.7 x 1.25 x 0.95
		5	2	2.6	-	9	0.1		PESD5V0U1UA		
0	1	3.3	101	-	500	30	2		PESD3V3L1BA		
		5	75	-	500	30	1		PESD5V0L1BA		
		12	19	-	200	30	0.05		PESD12VL1BA		
		15	16	-	200	30	0.05		PESD15VL1BA		
		24	11	-	200	23	0.05		PESD24VL1BA		
		5.5	12	15.4	35	30	0.1		**PESD5V0L1BSF**	SOD962	0.6 x 0.3 x 0.3
		5	11	13	45	30	0.01		PESD5V0V1BL	SOD882	1.0 x 0.6 x 0.5
		5	11	13	45	30	0.01		**PESD5V0V1BLD**	SOD882D	1.0 x 0.6 x 0.37
		5	11	13	45	30	0.01		PESD5V0V1BB	SOD523 (SC-79)	1.2 x 0.8 x 0.6
		5	11	13	45	30	0.01		PESD5V0V1BA	SOD323 (SC-76)	1.7 x 1.25 x 0.95
		5.5	3.5	4.5	8	15	0.1		**PESD5V0V1BSF**	SOD962	0.6 x 0.3 x 0.3
		15	8	10	-	15	0.1		**IP4302CX2/A**	CSP2	0.7 x 0.52 x 0.40

[1] 8/20 µs surge pulse acc. to IEC 61000-4-5 [2] acc. to IEC 61000-4-2 (contact discharge)

Low capacitance ESD protection devices

types in **bold** represent new products

Number of protected lines		V_{RWM} (V)	C_{line} typ (pF)	C_{line} max (pF)	P_{pp} [1] max (W)	ESD rating [2] max (kV)	I_R max (µA) @ V_{RWM}	Configuration	Type	Package	Size (mm)
Unidirectional	Bidirectional										
0	1	5	2.9	3.5	-	10	0.1		PESD5V0U1BL	SOD882	1.0 x 0.6 x 0.5
		5	2.9	3.5	-	10	0.1		**PESD5V0U1BLD**	SOD882D	1.0 x 0.6 x 0.37
		5	2.9	3.5	-	10	0.1		PESD5V0U1BB	SOD523 (SC-79)	1.2 x 0.8 x 0.6
		5	2.9	3.5	-	10	0.1		PESD5V0U1BA	SOD323 (SC-76)	1.7 x 1.25 x 0.95
2	1	3.3	22	28	30	15	0.3		PESD3V3L2UM	SOT883 (SC-101)	1.0 x 0.6 x 0.5
		5	16	19	30	15	0.025		PESD5V0L2UM		
		5	38	46	70	30	0.09 (@ 4 V)		PESD5V0L2UU	SOT323 (SC-70)	2.0 x 1.25 x 0.95
		6	34	40	60	30	0.018 (@ 4.3 V)		PESD6V0L2UU		
0	2	3.3	101	-	350	30	2		PESD3V3L2BT	SOT23	2.9 x 1.3 x 1.0
		5	75	-	350	30	1		PESD5V0L2BT		
		12	19	-	200	30	0.05		PESD12VL2BT		
		15	16	-	200	30	0.05		PESD15VL2BT		
		24	11	-	200	23	0.05		PESD24VL2BT		
		5	35	45	130	30	0.1		PESD5V0S2BT		
		5	2.9	3.5	-	10	0.1		PESD5V0U2BT		
		5	2.9	3.5	-	10	0.1		PESD5V0U2BM	SOT883 (SC-101)	1.0 x 0.6 x 0.5
		15	13	15	-	15	0.1	-	IP4303CX4/P	CSP4	0.76 x 0.76 x 0.40

[1] 8/20 µs surge pulse acc. to IEC 61000-4-5 [2] acc. to IEC 61000-4-2 (contact discharge)

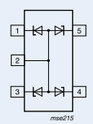
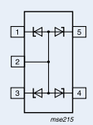
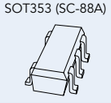
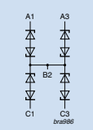
In the Spotlight

New innovative ultra-small package SOD882D

- Ultra-low package height of only 0.37 mm typ.
- Tin plated solderable side pads
- Fully compatible with standard 0402 inch / 1006 mm packages
- AEC-Q101 qualified
- Portfolio of 10 ESD diodes covering all applications and segments

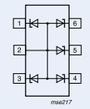
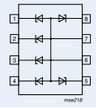
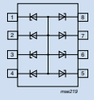
Low capacitance ESD protection devices

types in **bold** represent new products

Number of protected lines		V_{RWM} (V)	C_{line} typ (pF)	C_{line} max (pF)	P_{pp} [1] max (W)	ESD rating [2] max (kV)	I_R max (µA) @ V_{RWM}	Configuration	Type	Package	Size (mm)
Unidirectional	Bidirectional										
3	0	5.5	3	4	-	15	0.1	-	**IP4059CX5/LF**	CSP5, staggered compressed	1.34 x 0.96 x 0.65
4	3	3.3	22	28	30	20	0.3		PESD3V3L4UF	SOT886 (XSON6)	1.45 x 1.0 x 0.5
		5	16	19	30	20	0.025		PESD5V0L4UF		
		3.3	22	28	30	20	0.3		PESD3V3L4UW	SOT665	1.6 x 1.2 x 0.55
		5	16	19	30	20	0.025		PESD5V0L4UW		
		3.3	22	28	30	20	0.3		PESD3V3L4UG	SOT353 (SC-88A)	2.0 x 1.25 x 0.95
		5	16	19	30	20	0.025		PESD5V0L4UG		
		3.3	13	17	25	10	1		PESD3V3V4UK	SOT891 (XSON6)	1.0 x 1.0 x 0.5
		5	12	15	25	15	0.3		PESD5V0V4UK		
		9	6.5	10	28	8	0.1		PESD9V0V4UK		
		3.3	15	18	16	12	0.3		PESD3V3V4UF	SOT886 (XSON6)	1.45 x 1.0 x 0.5
		5	12	15	16	12	0.025		PESD5V0V4UF		
		3.3	15	18	16	12	0.3		PESD3V3V4UW	SOT665	1.6 x 1.2 x 0.55
		5	12	15	16	12	0.025		PESD5V0V4UW		
		3.3	15	18	16	12	0.3		PESD3V3V4UG	SOT353 (SC-88A) 	2.0 x 1.25 x 0.95
		5	12	15	16	12	0.025		PESD5V0V4UG		
		5.5	18	20	-	15	0.1	-	**IP4142CX5/LF**	5 ball CSP, staggered compressed	1.28 x 0.91 x 0.65
0	4	5.5	18	20	-	15	0.1		**IP4343CX5/LF**	5 ball CSP	1.06 x 0.76 x 0.61
		5.5	18	20	-	15	0.1		IP4043CX5/LF	5 ball CSP	1.12 x 1.12 x 0.65

[1] 8/20 µs surge pulse acc. to IEC 61000-4-5 [2] acc. to IEC 61000-4-2 (contact discharge)

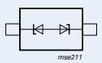
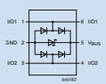
Low capacitance ESD protection devices

Number of protected lines		V_{RWM} (V)	C_{line} typ (pF)	C_{line} max (pF)	P_{pp} [1] max (W)	ESD rating [2] max (kV)	I_R max (µA) @ V_{RWM}	Configuration	Type	Package	Size (mm)
Unidirectional	Bidirectional										
0	4	5	2.9	3.5	-	10	0.1		PESD5V0U4BF	SOT886 (XSON6)	1.45 x 1.0 x 0.5
		5	2.9	3.5	-	10	0.1		PESD5V0U4BW	SOT665	1.6 x 1.2 x 0.55
5	4	3.3	20	24	28	15	2		PESD3V3L5UK	SOT891 (XSON6)	1.0 x 1.0 x 0.5
		5	18.5	22	30	20	0.5		PESD5V0L5UK		
		3.3	22	28	25	20	0.3		PESD3V3L5UF	SOT886 (XSON6)	1.45 x 1.0 x 0.5
		5	16	19	25	20	0.025		PESD5V0L5UF		
		3.3	22	28	25	20	0.3		PESD3V3L5UV	SOT666	1.6 x 1.2 x 0.55
		5	16	19	25	20	0.025		PESD5V0L5UV		
		3.3	22	28	25	20	0.3		PESD3V3L5UY	SOT363 (SC-88)	2.0 x 1.25 x 0.95
		5	16	19	25	20	0.025		PESD5V0L5UY		
0	5	5	2.9	3.5	-	10	0.1		PESD5V0U5BF	SOT886 (XSON6)	1.45 x 1.0 x 0.5
		5	2.9	3.5	-	10	0.1		PESD5V0U5BV	SOT666	1.6 x 1.2 x 0.55
6	5	5	16	19	35	20	0.025		PESD5V0L6US	SOT96 (SO8)	4.9 x 3.9 x 1.75
0	7	5	8	10	35	10	0.025		PESD5V0L7BS		

[1] 8/20 µs surge pulse acc. to IEC 61000-4-5 [2] acc. to IEC 61000-4-2 (contact discharge)

ESD protection for very high-speed interfaces (< 2 pF)

types in **bold** represent new products

Number of protected lines		V_{RWM} (V)	C_{line} typ (pF)	C_{line} max (pF)	ESD rating [1] max (kV)	Configuration	Type	Package	Size (mm)
Unidirectional	Bidirectional								
1	0	5	1.55	1.75	15		**PESD5V0X1ULD**	SOD882D	1.0 x 0.6 x 0.37
		5	0.95	1.15	8		**PESD5V0X1UALD**		
		5	0.95	1.15	8		**PESD5V0X1UB**	SOD523 (SC-79)	1.2 x 0.8 x 0.6
		5	1.55	1.75	15		**PESD5V0X1UAB**		
		16	0.83	0.98	8		PESD16VX1UL	SOD882	1.0 x 0.6 x 0.5
		5.5	1	1.5	8		PRTR5V0U1T	SOT23	2.9 x 1.3 x 1.0
		80	0.6	0.75	30		NUP1301		
		80	0.6	0.75	30		**NUP1301U**	SOT323	2.0 x 1.25 x 0.95
0	1	5.5	0.4	0.55	10		PESD5V0F1BL	SOD882	1.0 x 0.6 x 0.5
		16	0.5	0.65	8		**PESD16VF1BL**		
		3.3	1.3	1.6	9		PESD3V3X1BL		
		5	0.9	1.3	9		PESD5V0X1BL		
		5.5	0.25	0.3	28		**PESD5V0F1BSF**	SOD962	0.6 x 0.3 x 0.3
2	1	5	0.9	1.3	9		PESD5V0X1BQ	SOT663	1.6 x 1.2 x 0.55
		5	0.9	1.3	9		PESD5V0X1BT	SOT23	2.9 x 1.3 x 1.0
	0	5.5	1	1.5	8		PRTR5V0U2X	SOT143B	2.9 x 1.3 x 1.0
		5.5	1.8	-	12		PRTR5V0U2AX		
		5.5	1	1.5	8		PRTR5V0U2K	SOT891 (XSON6)	1.0 x 1.0 x 0.5
		5.5	1	1.5	8		PRTR5V0U2D	SOT457 (SC-74)	2.9 x 1.5 x 1.0
		5.5	1	1.5	8		PRTR5V0U2F	SOT886 (XSON6)	1.45 x 1.0 x 0.5

[1] acc. to IEC 61000-4-2 (contact discharge)

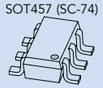
ESD protection for very high-speed interfaces (< 2 pF)

In the Spotlight

Ultra low clamping ESD protection diodes in SOD523

- Ultra-low clamping voltage of V_{CL} = 10 V
- Ultra-low capacitance of C_d = 0.95 / 1.8 pF (high robustness version)
- Ultra-low dynamical resistance r_{dyn} = 0.25 / 0.15 Ω
- IEC 61000-4-2; level 4 (ESD)
- AEC-Q101 qualified

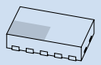
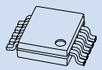
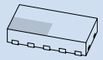
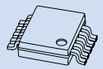
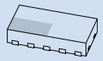
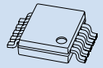
types in **bold** represent new products

Number of protected lines		V_{RWM} (V)	C_{line} typ (pF)	C_{line} max (pF)	ESD rating [1] max (kV)	Configuration	Type	Package	Size (mm)
Unidirectional	Bidirectional								
2	0	5.5	2	-	15		IP4234CZ6	SOT457 (SC-74) 	2.9 x 1.5 x 1.0
		5.5	0.7	-	8		IP4282CZ6	SOT886 (XSON6)	1.45 x 1.0 x 0.5
		5.5	1.3	-	15		IP4359CX4/LF	CSP4	0.76 x 0.76 x 0.61
3	2	5.5	1.4	1.5	15	-	**IP4356CX4**		
4	0	5.5	1.4	1.5	15	-	**IP4319CX10**	CSP10, staggered compressed	1.56 x 1.05 x 0.61
		5.5	1	-	8		IP4220CZ6	SOT457 (SC-74)	2.9 x 1.5 x 1.0
		5.5	1	-	8		IP4221CZ6-S	SOT886 (XSON6)	1.45 x 1.0 x 0.5
		5.5	1	-	8		IP4221CZ6-XS	SOT891 (XSON6)	1.0 x 1.0 x 0.5
		5.5	1	-	8		**IP4233CZ6**	SOT363 (SC-88)	2.0 x 1.25 x 0.95

[1] acc. to IEC 61000-4-2 (contact discharge)

ESD protection for very high-speed interfaces (< 2 pF)

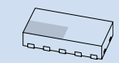
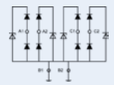
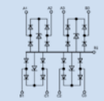
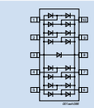
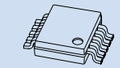
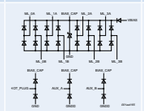
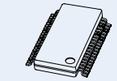
types in **bold** represent new products

Number of protected lines		V_{RWM} (V)	C_{line} typ (pF)	C_{line} max (pF)	ESD rating [1] max (kV)	Configuration	Type	Package	Size (mm)
Unidirectional	Bidirectional								
4	0	5.5	1	-	8		PRTR5V0U4D	SOT457 (SC-74)	2.9 x 1.5 x 1.0
		5.5	1	-	8		PRTR5V0U4Y	SOT363 (SC-88)	2.0 x 1.25 x 0.95
		5.5	0.8	-	12		**IP4285CZ9-TBB**	SOT1178 (XSON9) 	1.0 x 2.1 x 0.5
		5.5	0.7	-	8		IP4280CZ10	SOT552 (TSSOP10) 	3.0 x 3.0 x 1.1
		5.5	0.6	-	8		**IP4283CZ10-TBA**	SOT1165 (XSON10)	1.0 x 2.5 x 0.5
		5.5	0.6	-	8		**IP4283CZ10-TBR**	SOT1176 (XSON10) 	1.0 x 2.5 x 0.5
		5.5	0.6	-	8		IP4283CZ10-TT	SOT552 (TSSOP10) 	3.0 x 3.0 x 1.1
		5.5	0.5	-	8		**IP4284CZ10-TBR**	SOT1176 (XSON10) 	1.0 x 2.5 x 0.5
		5.5	0.5	-	8		**IP4284CZ10-TT**	SOT552 (TSSOP10) 	3.0 x 3.0 x 1.1
		5.5	0.6	-	8		**IP4286CZ6-TBF**	SOT886 (XSON6)	1.45 x 1.0 x 0.5
		5.5	0.6	-	8		**IP4286CZ6-TTY**	SOT363 (SC-88)	2.0 x 1.25 x 0.95

[1] acc. to IEC 61000-4-2 (contact discharge)

ESD protection for very high-speed interfaces (< 2 pF)

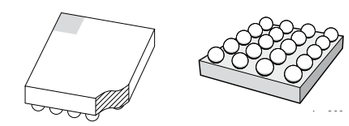
types in **bold** represent new products

Number of protected lines		V_{RWM} (V)	C_{line} typ (pF)	C_{line} max (pF)	ESD rating [1] max (kV)	I_R max (µA) @ V_{RWM}	Configuration	Type	Package	Size (mm)
Unidirectional	Bidirectional									
4	0	5.5	0.5	-	8	-		**IP4292CZ10-TBR**	SOT1176 (XSON10) 	1.0 x 2.5 x 0.5
5	0	5.5	1.3	-	15	-		**IP4358CX6**	CSP	0.76 x 1.16 x 0.61
8	0	5.5	1.3	-	15	-		**IP4309CX9**	CSP	1.16 x 1.16 x 0.61
		5.5	1	-	8	-		PRTR5V0U8S	SOT552 (TSSOP10) 	3.0 x 3.0 x 1.1
11	0	5.5	0.7	-	8	-		IP4790CZ38	SOT510 (TSSOP38) 	9.7 x 4.4 x 1.1

[1] acc. to IEC 61000-4-2 (contact discharge)

NXP Wafer-Level Chip Scale Package (WL-CSP)

- Smallest possible solution for ESD and EMI circuits, saving maximum of space
- Lowest parasitic inductance to GND contact, ensures best performance
- High mechanical robustness



Audio interfaces

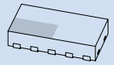
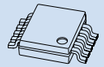
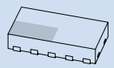
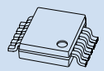
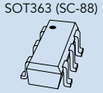
types in **bold** represent new products

Baseband interface	Number of protected lines	Line small-signal equivalents		Digital interface clock speed (MHz)	Remark	Type	Package	Size (mm)
		R_{line}	C_{line} (pF)					
Audio	2	0.9 Ω	290	-	Low-ohmic speaker (< ~8 Ω)	IP4047CX6/LF	6 ball CSP	1.56 x 1.01 x 0.65
		10 Ω	200	-	Low-ohmic speaker (> ~8 Ω)	IP4048CX5/LF	5 ball CSP	0.91 x 1.28 x 0.65
		68 Ω	110	-	Single-ended or differential microphone	IP4049CX5/LF		
		470 Ω	35	-	Single-ended or differential microphone	IP4055CX6/LF	6 ball CSP	1.56 x 1.03 x 0.65
		470 Ω	20	-	Single-ended or differential microphone	IP4355CX6/LF		1.16 x 0.76 x 0.65
		50 Ω / 2.2 kΩ	2000	-	Single-ended to quasi-differential microphone channel with integrated biasing network	IP5002CX8/LF	8 ball CSP	1.67 x 1.67 x 0.65
		0.25 Ω, 3 nH	-	-	Inductive, low-ohmic differntial channel LC filter	**IP3047CX6**	6 ball CSP	1.60 x 1.15 x 0.65
		0.25 Ω, 3 nH	-	-	Inductive, low-ohmic differntial channel LC filter	**IP3048CX5**	5 ball CSP	1.51 x 1.15 x 0.65
	6	40 Ω / 1450 Ω / 10 Ω	50 / 20 / 200	-	Fully integrated audio interface protection for differential microphone and differential speaker, including EMI filtering and pull up resistors	IP4027CX20/LF	20 ball CSP	1.91 x 2.52 x 0.65

ESD protection acc. to IEC 61000-4-2 (level 4)

Video interfaces

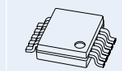
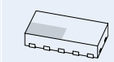
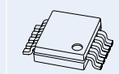
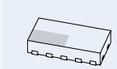
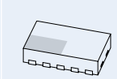
types in **bold** represent new products

Baseband interface	Number of protected lines	C_{line} (pF)	Remark	Type	Package	Size (mm)
Display port	4	0.6	ESD protection for ultra high-speed interfaces	IP4283CZ10-TBR	SOT1176 (XSON10) 	1.0 x 2.5 x 0.5
		0.6	ESD protection for ultra high-speed interfaces	IP4283CZ10-TT	SOT552 (TSSOP10) 	3.0 x 3.0 x 1.1
		0.5	ESD protection for ultra high-speed interfaces	IP4284CZ10-TBR	SOT1176 (XSON10) 	1.0 x 2.5 x 0.5
		0.5	ESD protection for ultra high-speed interfaces	**IP4284CZ10-TT**	SOT552 (TSSOP10) 	3.0 x 3.0 x 1.1
		0.5	ESD protection for ultra high-speed interfaces	**IP4292CZ10-TBR**	SOT1176 (XSON10)	1.0 x 2.5 x 0.5
		0.8	ESD protection for ultra high-speed interfaces	**IP4285CZ9-TBB**	SOT1178 (XSON9)	1.0 x 2.1 x 0.5
		0.6	ESD protection for ultra high-speed interfaces	IP4286CZ6-TBF	SOT886 (XSON6)	1.45 x 1.0 x 0.5
			ESD protection for ultra high-speed interfaces	IP4286CZ6-TTY	SOT363 (SC-88) 	2.0 x 1.25 x 0.95
	11	0.7	ESD protection for display port	IP4790CZ38	SOT510 (TSSOP38)	9.7 x 4.4 x 1.1

ESD protection acc. to IEC 61000-4-2 (level 4)

Video interfaces

types in **bold** represent new products

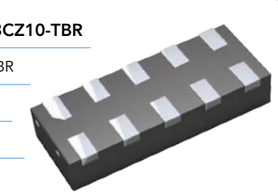
Baseband interface	Number of protected lines	C_{line} (pF)	Remark	Type	Package	Size (mm)
HDMI	2	0.7	ESD protection for ultra high-speed interfaces	IP4282CZ6	SOT886 (XSON6)	1.45 x 1.0 x 0.5
	4	0.7	ESD protection for ultra high-speed interfaces	IP4280CZ10	SOT552 (TSSOP10) 	3.0 x 3.0 x 1.1
		0.6	ESD protection for ultra high-speed interfaces	**IP4283CZ10-TBA**	SOT1165 (XSON10)	1.0 x 2.5 x 0.5
		0.6	ESD protection for ultra high-speed interfaces	**IP4283CZ10-TBR**	SOT1176 (XSON10) 	1.0 x 2.5 x 0.5
		0.6	ESD protection for ultra high-speed interfaces	**IP4283CZ10-TT**	SOT552 (TSSOP10) 	3.0 x 3.0 x 1.1
		0.6	ESD protection for ultra high-speed interfaces	IP4286CZ6-TBF	SOT886 (XSON6)	1.45 x 1.0 x 0.5
		0.6	ESD protection for ultra high-speed interfaces	IP4286CZ6-TTY	SOT363 (SC-88)	2.0 x 1.25 x 0.95
		0.5	ESD protection for ultra high-speed interfaces	**IP4284CZ10-TBR**	SOT1176 (XSON10) 	1.0 x 2.5 x 0.5
		0.8	ESD protection for ultra high-speed interfaces	**IP4285CZ9-TBB**	SOT1178 (XSON10) 	1.0 x 2.1 x 0.5

ESD protection acc. to IEC 61000-4-2 (level 4)

In the Spotlight

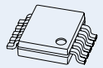
HDMI: High-speed 4 channel ESD protection – IP4283CZ10-TBR

- Low capacitance 4 channel ESD protection array: IP4283CZ10-TBR
- Optimized for high level ESD protection of HDMI ports
- Straight through routing → best signal integrity
- 10 pin QFN package with exposed leads (SOT1176)



Video interfaces

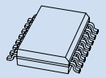
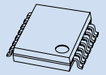
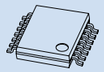
types in **bold** represent new products

Baseband interface	Number of protected lines	Buffer	Level shifter	C_{line} (pF)	Resistor (Ω)	Remark	Type	Package	Size (mm)
HDMI	4	-	-	0.5	-	ESD protection for ultra high-speed interfaces	IP4284CZ10-TT	SOT552 (TSSOP10) 	3.0 x 3.0 x 1.1
		-	-	0.5	-	ESD protection for ultra high-speed interfaces	**IP4292CZ10-TBR**	SOT1176 (XSON10)	1.0 x 2.5 x 0.5
	5	-	-	10	1.75 k, 100 k	HDMI, DDC, CEC, hot plug ESD protection and biasing	**IP4310CX8/P**	8 ball CSP	1.16 x 1.16 x 0.61
		yes	yes	-	internal	Fully integrated solution for HDMI low-speed signals, buffer and level shifter for DDC, CEC, HP	**IP4791CZ12**	SOT1156	2.5 x 2.1 x 0.5
	8	-	-	1.3	-	HDMI, TMDS line ESD protection	**IP4309CX9**	9 ball CSP	1.16 x 1.16 x 0.61
	12	-	yes	0.7	-	ESD protection and level shifting for a complete HDMI port	IP4776CZ38	SOT510 (TSSOP38)	9.7 x 4.4 x 1.1
		yes	yes	0.7	-	ESD protection, DDC buffering, noise reduction and hot plug application for a complete HDMI source port	IP4777CZ38		
		yes	yes	0.7	-	ESD protection, DDC buffering, noise reduction and hot plug application for a complete HDMI sink port	IP4778CZ38		
	13	yes	yes	100 Ω differential impedance	internal	Fully integrated HDMI solution with current limiter, buffer and level shifter for DDC, CEC, HP	**IP4786CZ32**	SOT617	5.0 x 5.0 x 1.0
LVDS	2	-	-	30	10	EMI filter with ESD protection for MIPI or MDDI	**IP3348CX5**	CSP5, staggered compressed	0.76 x 1.06 x 0.61
	4	-	-	30	10	EMI filter with ESD protection for MIPI or MDDI	**IP3348CX10**	CSP10, staggered compressed	1.56 x 1.06 x 0.61
	6	-	-	30	10	EMI filter with ESD protection for MIPI or MDDI	**IP3348CX15**	CSP15, staggered compressed	2.36 x 1.06 x 0.61
	8	-	-	30	10	EMI filter with ESD protection for MIPI or MDDI	**IP3348CX20**	CSP20, staggered compressed	3.16 x 1.06 x 0.61

ESD protection acc. to IEC 61000-4-2 (level 4)

Video interfaces

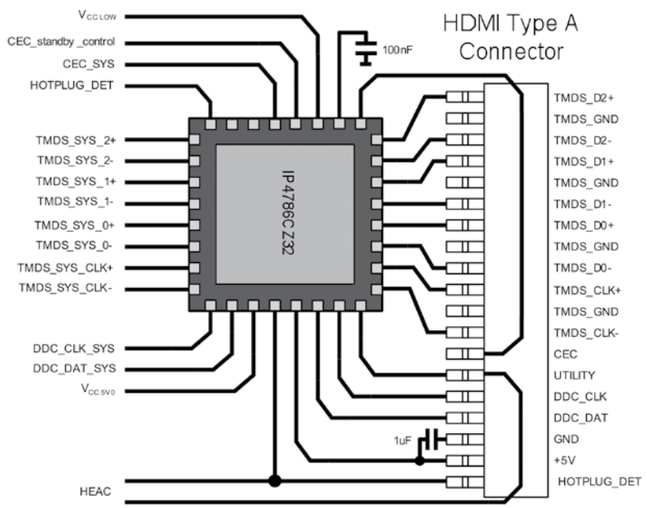
types in **bold** represent new products

Baseband interface	Number of protected lines	Buffer	Level shifter	C_{line} (pF)	Resistor (Ω)	Remark	Type	Package	Size (mm)
VGA	7	yes	yes	5	55	H&V sync buffer, DDC level shifter	IP4770CZ16	SOT519 (SSOP16) 	4.9 x 3.9 x 1.73
		yes	yes	5	65	H&V sync buffer, DDC level shifter	IP4771CZ16		
		yes	yes	5	10	H&V sync buffer, DDC level shifter	IP4772CZ16		
		yes	no	4	10	VGA receivers and transmitters, H&V sync buffer	IP4773CZ14	SOT337 (SSOP14) 	6.2 x 5.3 x 2.0
		yes	no	4	10	VGA receivers and transmitters, H sync buffer	IP4774CZ14		
		no	yes	4	1.3 - 2.4	VGA receivers and transmitters, DDC level shifter	**IP4769CZ14**	SOT402-1 (TSSOP14) 	5.0 x 4.4 x 1.1

ESD protection acc. to IEC 61000-4-2 (level 4)

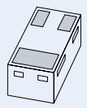
Please find more ESD protection diodes for ultra high-speed interfaces on pages 28 - 31

Transmitter HDMI companion chip IP4786CZ32



Multichannel EMI filters, ESD protection for LCD and camera

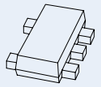
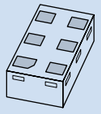
types in **bold** represent new products

Baseband interface	Number of protected lines	Line small-signal equivalents			Digital interface clock speed (MHz)	Insertion Loss S21~ -3 dB (MHz)	Type	Package	Size (mm)
		R_{line} (Ω)	C_{line} (pF)	L_{line} (nH)					
LCD display, camera, keypad	1	75	36	-	~50	155	IP4307CX4/LF	4 ball CSP	0.76 x 0.76 x 0.61
		20	40	-	~50	153	**PEMI1QFN/CT**	SOT883 (SC-101) 	1.0 x 0.6 x 0.5
		20	36	-	~55	170	**PEMI1QFN/CR**		
		20	32	-	~60	185	**PEMI1QFN/CP**		
		20	28	-	~70	218	**PEMI1QFN/CM**		
		20	23	-	~90	264	**PEMI1QFN/CK**		
		20	19	-	~105	317	**PEMI1QFN/CG**		
		20	15	-	~130	397	**PEMI1QFN/CE**		
		45	40	-	~50	145	**PEMI1QFN/HT**		
		45	36	-	~55	161	**PEMI1QFN/HR**		
		45	32	-	~60	175	**PEMI1QFN/HP**		
		45	28	-	~70	206	**PEMI1QFN/HM**		
		45	23	-	~80	249	**PEMI1QFN/HK**		
		45	19	-	~100	300	**PEMI1QFN/HG**		
		45	15	-	~125	376	**PEMI1QFN/HE**		
		65	40	-	~45	139	**PEMI1QFN/LT**		
		65	36	-	~50	155	**PEMI1QFN/LR**		
		65	32	-	~55	168	**PEMI1QFN/LP**		
		65	28	-	~65	197	**PEMI1QFN/LM**		
		65	23	-	~80	239	**PEMI1QFN/LK**		
		65	19	-	~95	288	**PEMI1QFN/LG**		
		65	15	-	~120	361	**PEMI1QFN/LE**		
		100	40	-	~45	131	**PEMI1QFN/RT**		
		100	36	-	~50	145	**PEMI1QFN/RR**		
		100	32	-	~55	159	**PEMI1QFN/RP**		
		100	28	-	~60	187	**PEMI1QFN/RM**		
		100	30	-	~65	200	**IP4256CZ3-M**		
		100	23	-	~75	227	**PEMI1QFN/RK**		
		100	19	-	~90	272	**PEMI1QFN/RG**		
		100	15	-	~115	343	**PEMI1QFN/RE**		
		200	40	-	~40	119	**PEMI1QFN/WT**		
		200	36	-	~45	132	**PEMI1QFN/WR**		
		200	32	-	~50	143	**PEMI1QFN/WP**		
		200	28	-	~55	169	**PEMI1QFN/WM**		
		200	23	-	~70	205	**PEMI1QFN/WK**		
		200	19	-	~80	247	**PEMI1QFN/WG**		
		200	15	-	~105	311	**PEMI1QFN/WE**		
	2	10	35	15	~115	350	**IP3348CX5**	5 ball CSP	0.76 x 1.06 x 0.61
		18	65	40	~60	175	**IP3088CX5**		0.96 x 1.28 x 0.65
		100	45	35	~50	150	**IP3053CX5**		
		20	40	-	~50	153	**PEMI2STD/CT**	SOT665	1.6 x 1.2 x 0.5
		20	36	-	~55	170	**PEMI2STD/CR**		
		20	32	-	~60	185	**PEMI2STD/CP**		
		20	28	-	~70	218	**PEMI2STD/CM**		

ESD protection acc. to IEC 61000-4-2 (level 4)

Multichannel EMI filters, ESD protection for LCD and camera

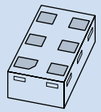
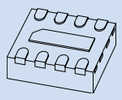
types in **bold** represent new products

Baseband interface	Number of protected lines	Line small-signal equivalents			Digital interface clock speed (MHz)	Insertion Loss S21~ -3 dB (MHz)	Type	Package	Size (mm)
		R_{line} (Ω)	C_{line} (pF)	L_{line} (nH)					
LCD display, camera, keypad	2	20	23	-	~90	264	**PEMI2STD/CK**	SOT665 	1.6 x 1.2 x 0.5
		20	19	-	~105	317	**PEMI2STD/CG**		
		20	15	-	~130	397	**PEMI2STD/CE**		
		45	40	-	~50	145	**PEMI2STD/HT**		
		45	36	-	~55	161	**PEMI2STD/HR**		
		45	32	-	~60	175	**PEMI2STD/HP**		
		45	28	-	~70	206	**PEMI2STD/HM**		
		45	23	-	~80	249	**PEMI2STD/HK**		
		45	19	-	~100	300	**PEMI2STD/HG**		
		45	15	-	~125	376	**PEMI2STD/HE**		
		65	40	-	~45	139	**PEMI2STD/LT**		
		65	36	-	~50	155	**PEMI2STD/LR**		
		65	32	-	~55	168	**PEMI2STD/LP**		
		65	28	-	~65	197	**PEMI2STD/LM**		
		65	23	-	~80	239	**PEMI2STD/LK**		
		65	19	-	~95	288	**PEMI2STD/LG**		
		65	15	-	~120	361	**PEMI2STD/LE**		
		100	40	-	~45	131	**PEMI2STD/RT**		
		100	36	-	~50	145	**PEMI2STD/RR**		
		100	32	-	~55	159	**PEMI2STD/RP**		
		100	30	-	~65	200	IP4256CZ5-W		
		100	28	-	~60	187	**PEMI2STD/RM**		
		100	23	-	~75	227	**PEMI2STD/RK**		
		100	19	-	~90	272	**PEMI2STD/RG**		
		100	15	-	~115	343	**PEMI2STD/RE**		
		200	40	-	~40	119	**PEMI2STD/WT**		
		200	36	-	~45	132	**PEMI2STD/WR**		
		200	32	-	~50	143	**PEMI2STD/WP**		
		200	28	-	~55	169	**PEMI2STD/WM**		
		200	23	-	~70	205	**PEMI2STD/WK**		
		200	19	-	~80	247	**PEMI2STD/WG**		
		200	15	-	~105	311	**PEMI2STD/WE**		
		20	40	-	~50	153	**PEMI2QFN/CT**	SOT886 (XSON6) 	1.45 x 1.0 x 0.5
		20	36	-	~55	170	**PEMI2QFN/CR**		
		20	32	-	~60	185	**PEMI2QFN/CP**		
		20	28	-	~70	218	**PEMI2QFN/CM**		
		20	23	-	~90	264	**PEMI2QFN/CK**		
		20	19	-	~105	317	**PEMI2QFN/CG**		
		20	15	-	~130	397	**PEMI2QFN/CE**		
		45	40	-	~50	145	**PEMI2QFN/HT**		
		45	36	-	~55	161	**PEMI2QFN/HR**		
		45	32	-	~60	175	**PEMI2QFN/HP**		
		45	28	-	~70	206	**PEMI2QFN/HM**		

ESD protection acc. to IEC 61000-4-2 (level 4)

Multichannel EMI filters, ESD protection for LCD and camera

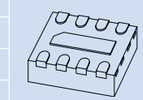
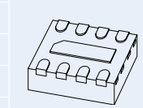
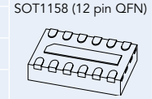
types in **bold** represent new products

Baseband interface	Number of protected lines	Line small-signal equivalents			Digital interface clock speed (MHz)	Insertion Loss S21~ -3 dB (MHz)	Type	Package	Size (mm)
		R_{line} (Ω)	C_{line} (pF)	L_{line} (nH)					
LCD display, camera, keypad	2	45	23	-	~80	249	**PEMI2QFN/HK**	SOT886 (XSON6) 	1.45 x 1.0 x 0.5
		45	19	-	~100	300	**PEMI2QFN/HG**		
		45	15	-	~125	376	**PEMI2QFN/HE**		
		65	40	-	~45	139	**PEMI2QFN/LT**		
		65	36	-	~50	155	**PEMI2QFN/LR**		
		65	32	-	~55	168	**PEMI2QFN/LP**		
		65	28	-	~65	197	**PEMI2QFN/LM**		
		65	23	-	~80	239	**PEMI2QFN/LK**		
		65	19	-	~95	288	**PEMI2QFN/LG**		
		65	15	-	~120	361	**PEMI2QFN/LE**		
		100	40	-	~45	131	**PEMI2QFN/RT**		
		100	36	-	~50	145	**PEMI2QFN/RR**		
		100	32	-	~55	159	**PEMI2QFN/RP**		
		100	30	-	~65	200	IP4256CZ6-F		
		100	28	-	~60	187	**PEMI2QFN/RM**		
		100	23	-	~75	227	**PEMI2QFN/RK**		
		100	19	-	~90	272	**PEMI2QFN/RG**		
		100	15	-	~115	343	**PEMI2QFN/RE**		
		200	40	-	~40	119	**PEMI2QFN/WT**		
		200	36	-	~45	132	**PEMI2QFN/WR**		
		200	32	-	~50	143	**PEMI2QFN/WP**		
		200	28	-	~55	169	**PEMI2QFN/WM**		
		200	23	-	~70	205	**PEMI2QFN/WK**		
		200	19	-	~80	247	**PEMI2QFN/WG**		
		200	15	-	~105	311	**PEMI2QFN/WE**		
	4	10	35	15	~115	350	**IP3348CX10**	10 ball CSP	1.56 x 1.06 x 0.61
		18	65	40	~60	175	**IP3088CX10**		1.96 x 1.28 x 0.65
		100	54	-	~30	98	**PEMI4CSP/RW**		1.56 x 1.06 x 0.61
		100	45	35	~20	150	**IP3053CX10**		1.96 x 1.28 x 0.65
		100	41	-	~40	125	**PEMI4CSP/RT**		1.56 x 1.06 x 0.61
		20	40	-	~50	153	**PEMI4QFN/CT**	SOT1157 (8 pin QFN) 	1.7 x 1.2 x 0.5
		20	36	-	~55	170	**PEMI4QFN/CR**		
		20	32	-	~60	185	**PEMI4QFN/CP**		
		20	28	-	~70	218	**PEMI4QFN/CM**		
		20	23	-	~90	264	**PEMI4QFN/CK**		
		20	19	-	~105	317	**PEMI4QFN/CG**		
		20	15	-	~130	397	**PEMI4QFN/CE**		
		45	40	-	~50	145	**PEMI4QFN/HT**		
		45	36	-	~55	161	**PEMI4QFN/HR**		
		45	32	-	~60	175	**PEMI4QFN/HP**		
		45	28	-	~70	206	**PEMI4QFN/HM**		
		45	23	-	~80	249	**PEMI4QFN/HK**		
		45	19	-	~100	300	**PEMI4QFN/HG**		

ESD protection acc. to IEC 61000-4-2 (level 4)

Multichannel EMI filters, ESD protection for LCD and camera

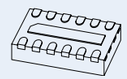
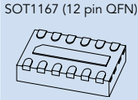
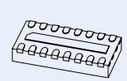
types in **bold** represent new products

Baseband interface	Number of protected lines	Line small-signal equivalents			Digital interface clock speed (MHz)	Insertion Loss S21~ -3 dB (MHz)	Type	Package	Size (mm)
		R_{line} (Ω)	C_{line} (pF)	L_{line} (nH)					
LCD display, camera, keypad	4	45	15	-	~125	376	**PEMI4QFN/HE**	SOT1157 (8 pin QFN) 	1.7 x 1.2 x 0.5
		65	40	-	~45	139	**PEMI4QFN/LT**		
		65	36	-	~50	155	**PEMI4QFN/LR**		
		65	32	-	~55	168	**PEMI4QFN/LP**		
		65	28	-	~65	197	**PEMI4QFN/LM**		
		65	23	-	~80	239	**PEMI4QFN/LK**		
		65	19	-	~95	288	**PEMI4QFN/LG**		
		65	15	-	~120	361	**PEMI4QFN/LE**		
		100	40	-	~45	131	**PEMI4QFN/RT**		
		100	36	-	~50	145	**PEMI4QFN/RR**		
		100	32	-	~55	159	**PEMI4QFN/RP**		
		100	28	-	~60	187	**PEMI4QFN/RM**		
		100	23	-	~75	227	**PEMI4QFN/RK**		
		100	19	-	~90	272	**PEMI4QFN/RG**		
		100	15	-	~115	343	**PEMI4QFN/RE**		
		200	40	-	~40	119	**PEMI4QFN/WT**		
		200	36	-	~45	132	**PEMI4QFN/WR**		
		200	32	-	~50	143	**PEMI4QFN/WP**		
		200	28	-	~55	169	**PEMI4QFN/WM**		
		200	23	-	~70	205	**PEMI4QFN/WK**		
		200	19	-	~80	247	**PEMI4QFN/WG**		
		200	15	-	~105	311	**PEMI4QFN/WE**		
		15	43	12	~60	175	**IP3253CZ8-4-TTL**	SOT1166 (8 pin QFN) 	1.7 x 1.35 x 0.5
		15	50	18	~50	145	**IP3254CZ8-4-TTL**		
		40	18	-	~100	300	**IP4252CZ8-4 -TTL**		
		100	45	-	~40	130	**IP4254CZ8-4-TTL**		
		100	15	-	~110	330	**IP4251CZ8-4-TTL**		
		200	45	-	~35	110	**IP4253CZ8-4-TTL**		
	6	10	35	15	~115	350	**IP3348CX15**	15 ball CSP	2.36 x 1.06 x 0.61
		18	65	40	~60	175	**IP3088CX15**		2.96 x 1.28 x 0.65
		100	60	-	~40	120	IP4053CX15/LF		2.96 x 1.32 x 0.65
		100	60	-	~40	120	IP4353CX15/LF		2.38 x 1.05 x 0.61
		100	54	-	~30	98	**PEMI6CSP/RW**		2.36 x 1.06 x 0.61
		100	45	35	~20	150	**IP3053CX15**		2.96 x 1.28 x 0.65
		100	41	-	~40	125	**PEMI6CSP/RT**		2.36 x 1.06 x 0.61
		100	30	-	~70	210	IP4153CX15/LF		2.91 x 1.28 x 0.65
		20	40	-	~50	153	**PEMI6QFN/CT**	SOT1158 (12 pin QFN) 	2.5 x 1.2 x 0.5
		20	36	-	~55	170	**PEMI6QFN/CR**		
		20	32	-	~60	185	**PEMI6QFN/CP**		
		20	28	-	~70	218	**PEMI6QFN/CM**		
		20	23	-	~90	264	**PEMI6QFN/CK**		
		20	19	-	~105	317	**PEMI6QFN/CG**		
		20	15	-	~130	397	**PEMI6QFN/CE**		
		45	40	-	~50	145	**PEMI6QFN/HT**		

ESD protection acc. to IEC 61000-4-2 (level 4)

Multichannel EMI filters, ESD protection for LCD and camera

types in **bold** represent new products

Baseband interface	Number of protected lines	Line small-signal equivalents			Digital interface clock speed (MHz)	Insertion Loss S21~ -3 dB (MHz)	Type	Package	Size (mm)
		R_{line} (Ω)	C_{line} (pF)	L_{line} (nH)					
LCD display, camera, keypad	6	45	36	-	~55	161	**PEMI6QFN/HR**	SOT1158 (12 pin QFN) 	2.5 x 1.2 x 0.5
		45	32	-	~60	175	**PEMI6QFN/HP**		
		45	28	-	~70	206	**PEMI6QFN/HM**		
		45	23	-	~80	249	**PEMI6QFN/HK**		
		45	19	-	~100	300	**PEMI6QFN/HG**		
		45	15	-	~125	376	**PEMI6QFN/HE**		
		65	40	-	~45	139	**PEMI6QFN/LT**		
		65	36	-	~50	155	**PEMI6QFN/LR**		
		65	32	-	~55	168	**PEMI6QFN/LP**		
		65	28	-	~65	197	**PEMI6QFN/LM**		
		65	23	-	~80	239	**PEMI6QFN/LK**		
		65	19	-	~95	288	**PEMI6QFN/LG**		
		65	15	-	~120	361	**PEMI6QFN/LE**		
		100	40	-	~45	131	**PEMI6QFN/RT**		
		100	36	-	~50	145	**PEMI6QFN/RR**		
		100	32	-	~55	159	**PEMI6QFN/RP**		
		100	28	-	~60	187	**PEMI6QFN/RM**		
		100	23	-	~75	227	**PEMI6QFN/RK**		
		100	19	-	~90	272	**PEMI6QFN/RG**		
		100	15	-	~115	343	**PEMI6QFN/RE**		
		200	40	-	~40	119	**PEMI6QFN/WT**		
		200	36	-	~45	132	**PEMI6QFN/WR**		
		200	32	-	~50	143	**PEMI6QFN/WP**		
		200	28	-	~55	169	**PEMI6QFN/WM**		
		200	23	-	~70	205	**PEMI6QFN/WK**		
		200	19	-	~80	247	**PEMI6QFN/WG**		
		200	15	-	~105	311	**PEMI6QFN/WE**		
		15	50	18	~50	145	**IP3254CZ12-6-TTL**	SOT1167 (12 pin QFN) 	2.5 x 1.35 x 0.5
		15	43	12	~60	175	**IP3253CZ12-6-TTL**		
		40	18	-	~100	300	**IP4252CZ12-6-TTL**		
		100	45	-	~40	130	**IP4254CZ12-6-TTL**		
		100	15	-	~110	330	**IP4251CZ12-6-TTL**		
		200	45	-	~35	110	**IP4253CZ12-6-TTL**		
	7	70	25	-	~75	220	IP4337CX18/LF	18 ball CSP	1.96 x 1.61 x 0.61
		125	25	60	~60	180	IP3337CX18/LF		2.06 x 1.66 x 0.61
	8	10	35	15	~115	350	**IP3348CX20**	20 ball CSP	3.16 x 1.06 x 0.61
		18	65	40	~60	175	**IP3088CX20**		3.96 x 1.28 x 0.65
		100	54	-	~30	98	**PEMI8CSP/RW**		3.16 x 1.06 x 0.61
		100	50	-	~40	120	IP4088CX20/LF		3.91 x 1.28 x 0.65
		100	45	35	~20	150	**IP3053CX20**		3.96 x 1.28 x 0.65
		100	41	-	~40	125	**PEMI8CSP/RT**		3.16 x 1.06 x 0.61
		20	40	-	~50	153	**PEMI8QFN/CT**	SOT1159 (16 pin QFN) 	3.3 x 1.2 x 0.5
		20	36	-	~55	170	**PEMI8QFN/CR**		
		20	32	-	~60	185	**PEMI8QFN/CP**		
		20	28	-	~70	218	**PEMI8QFN/CM**		
		20	23	-	~90	264	**PEMI8QFN/CK**		
		20	19	-	~105	317	**PEMI8QFN/CG**		
		20	15	-	~130	397	**PEMI8QFN/CE**		

ESD protection acc. to IEC 61000-4-2 (level 4)

Multichannel EMI filters, ESD protection for LCD and camera

types in **bold** represent new products

Baseband interface	Number of protected lines	Line small-signal equivalents			Digital interface clock speed (MHz)	Insertion Loss S21~ -3 dB (MHz)	Type	Package	Size (mm)
		R_{line} (Ω)	C_{line} (pF)	L_{line} (nH)					
LCD display, camera, keypad	8	45	40	-	~50	145	**PEMI8QFN/HT**	SOT1159 (16 pin QFN)	3.3 x 1.2 x 0.5
		45	36	-	~55	161	**PEMI8QFN/HR**		
		45	32	-	~60	175	**PEMI8QFN/HP**		
		45	28	-	~70	206	**PEMI8QFN/HM**		
		45	23	-	~80	249	**PEMI8QFN/HK**		
		45	19	-	~100	300	**PEMI8QFN/HG**		
		45	15	-	~125	376	**PEMI8QFN/HE**		
		65	40	-	~45	139	**PEMI8QFN/LT**		
		65	36	-	~50	155	**PEMI8QFN/LR**		
		65	32	-	~55	168	**PEMI8QFN/LP**		
		65	28	-	~65	197	**PEMI8QFN/LM**		
		65	23	-	~80	239	**PEMI8QFN/LK**		
		65	19	-	~95	288	**PEMI8QFN/LG**		
		65	15	-	~120	361	**PEMI8QFN/LE**		
		100	40	-	~45	131	**PEMI8QFN/RT**		
		100	36	-	~50	145	**PEMI8QFN/RR**		
		100	32	-	~55	159	**PEMI8QFN/RP**		
		100	28	-	~60	187	**PEMI8QFN/RM**		
		100	23	-	~75	227	**PEMI8QFN/RK**		
		100	19	-	~90	272	**PEMI8QFN/RG**		
		100	15	-	~115	343	**PEMI8QFN/RE**		
		200	40	-	~40	119	**PEMI8QFN/WT**		
		200	36	-	~45	132	**PEMI8QFN/WR**		
		200	32	-	~50	143	**PEMI8QFN/WP**		
		200	28	-	~55	169	**PEMI8QFN/WM**		
		200	23	-	~70	205	**PEMI8QFN/WK**		
		200	19	-	~80	247	**PEMI8QFN/WG**		
		200	15	-	~105	311	**PEMI8QFN/WE**		
		15	43	12	~60	175	**IP3253CZ16-8-TTL**	SOT1168 (16 pin QFN)	3.3 x 1.35 x 0.5
		15	50	18	~50	145	**IP3254CZ16-8-TTL**		
		40	18	-	~100	300	**IP4252CZ16-8-TTL**		
		100	45	-	~40	130	**IP4254CZ16-8-TTL**		
		100	15	-	~110	330	**IP4251CZ16-8-TTL**		
		200	45	-	~35	110	**IP4253CZ16-8-TTL**		
	10	70	25	-	~75	220	IP4338CX24/LF	24 ball CSP	1.96 x 2.01 x 0.61
		125	25	60	~60	180	IP3338CX24/LF		2.11 x 2.11 x 0.61
		1000	50	-	~7	22	IP4035CX24/LF		2.41 x 2.41 x 0.65
		80	40	-	~30	100	IP4032CX25/LF	25 ball CSP	2.41 x 2.41 x 0.65
		200	50	-	~35	105	IP4041CX25/LF		

ESD protection acc. to IEC 61000-4-2 (level 4)

PEMI-series nomenclature

PEMI--x--yyy/zz ESD protection and multichannel EMI filters (1-, 2-, 4-, 6-, and 8-channels)

x: no. of channels

zz: R-, C- or L- value

yyy:
QFN: Plastic Quad Flat No-leads package
CSP: Wafer-level Chip-Scale-Package
STD: Standard Leaded Package

SD-, SIM-card and MMC

types in **bold** represent new products

Baseband interface	Number of protected lines	Line small-signal equivalents		Digital interface clock speed (MHz)	Remark	Type	Package	Size (mm)
		R_{line}	C_{line} (pF)					
SIM card	3 + 2	47 Ω / 100 Ω	10	~20	Integrated low capacitance SIM-card passive filter array & USB ESD protection	**IP4365CX11**	11 ball CSP	1.16 x 1.56 x 0.61
	3	47 Ω / 100 Ω	40	~12	Integrated SIM-card EMI filter and ESD protection	IP4044CX8/LF	8 ball CSP	1.46 x 1.49 x 0.65
		47 Ω / 100 Ω	20	~20	Integrated SIM-card EMI filter and ESD protection	IP4064CX8/LF/P		1.41 x 1.41 x 0.65
		47 Ω / 100 Ω	20	~20	Smaller size, integrated SIM-card EMI filter and ESD protection	IP4364CX8/LF/P		1.16 x 1.16 x 0.61
		47 Ω / 100 Ω	10	~20	Smaller size, low capacitance integrated SIM-card EMI filter and ESD protection	IP4366CX8/P		
		47 Ω / 100 Ω	40	~12	Integrated SIM-card EMI filter and ESD protection	IP4264CZ8-40-TTL	SOT1166 (8 pin QFN)	1.7 x 1.35 x 0.5
		47 Ω / 100 Ω	20	~20	Integrated SIM-card EMI filter and ESD protection	IP4264CZ8-20-TTL		
		47 Ω / 100 Ω	10	~20	Integrated SIM-card EMI filter and ESD protection	**IP4264CZ8-10-TTL**		
		-	1	~240	Quad channel low capacitance ESD protection	IP4221CZ6-S	SOT886 (XSON6)	1.45 x 1.0 x 0.5
SD-card / MMC	4	47 Ω / 13 kΩ / 56 kΩ	25	~30	MMC ESD protection, pull-up resistors	IP4051CX11/LF	11 ball CSP	1.44 x 1.96 x 0.65
		50 Ω / 75 kΩ / 7 kΩ	18	~50	High-speed MMC ESD protection, pull-up resistors	IP4060CX16/LF	16 ball CSP	1.96 x 1.97 x 0.65
	6	40 Ω	12	>52	(Mini) SD card/trans flash ESD protection, EMI filter	**IP4252CZ12-6-TTL**	SOT1167 (12 pin QFN)	2.5 x 1.35 x 0.5
	6 + 2	40 Ω	12	>52	(Mini) SD card/trans flash ESD protection, EMI filter	**IP4252CZ16-8-TTL**	SOT1168 (16 pin QFN)	3.3 x 1.35 x 0.5
	7	40 Ω / 50 kΩ / 25 kΩ	18	~20	(Mini) SD/trans flash card ESD protection, EMI filter, pull-up resistors	IP4052CX20/LF	20 ball CSP	2.54 x 1.96 x 0.65
		-	5	~24	Memory stick PRO ESD protection	IP4067CX9/LF	9 ball CSP	1.46 x 1.52 x 0.65
	6 (+3)	15 Ω / 50 kΩ / 15 kΩ	8	>52	Very low capacitance, low channel resistance (mini) SD card/trans flash ESD protection EMI filter, pull-up resistor	IP4350CX24/LF	24 ball CSP	1.95 x 2.11 x 0.61
		40 Ω / 50 kΩ / 15 kΩ	20	>52	(Mini) SD card/trans flash ESD protection, EMI filter, pull-up resistor	IP4352CX24/LF		2.02 x 2.01 x 0.61
		-	-	>52	(Mini) SD/SDIO memory card level shifter, can be combined with IP4352CX24/LF	IP4852CX25/LF	25 ball CSP	2.01 x 2.01 x 0.61
		40 Ω / 50 kΩ / 15 kΩ	-	>52	(Mini) SD/SDIO memory card level shifter, and voltage regular, incl. ESD and EMI filter	IP4853CX24/P	24 ball CSP	

ESD protection acc. to IEC 61000-4-2 (level 4)

Please find more ESD protection diodes for ultra high-speed interfaces on pages 28 - 31

Battery and charger protection

types in **bold** represent new products

Baseband interface	Number of protected lines	C_{line} (pF)	Diode voltage	Remark	Type	Package	Size (mm)
Battery & charger protection	1	180	Breakdown 16 V	Power diode	IP4085CX4	4 ball CSP	0.91 x 0.91 x 0.65
		450	Breakdown 7 V	Power diode	IP4385CX4		0.76 x 0.76 x 0.61
		160	Breakdown 16 V	Power diode	**IP4386CX4**		
		290	Breakdown 10 V	Power diode	**IP4387CX4**		
		160	V_{RWM} = 12 V	Power diode with 2 A integrated fuse	**IP4389CX4**		
		160	V_{RWM} = 12 V	Power diode	PESD12VS1UJ	SOD323F (SC-90)	1.7 x 1.25 x 0.7
		160	V_{RWM} = 12 V	Power diode	PESD12VS1UA	SOD323 (SC-76)	1.7 x 1.25 x 0.95
		480	V_{RWM} = 5 V	Power diode	PESD5V0S1UJ	SOD323F (SC-90)	1.7 x 1.25 x 0.7
		480	V_{RWM} = 5 V	Power diode	PESD5V0S1UA	SOD323 (SC-76)	1.7 x 1.25 x 0.95

ESD protection acc. to IEC 61000-4-2 (level 4)

USB, SATA, LAN

types in **bold** represent new products

Baseband interface	Number of protected lines	R_{line}	C_{line} (pF)	Digital interface clock speed (MHz)	Remark	Type	Package	Size (mm)
USB (CSP package)	2	33 Ω / 1.3 kΩ	30	>6	Fully integrated USB low / fullspeed interface with EMI filter, ESD protection, pull-up resistors and impedance matching	IP4056CX8/LF	8 ball CSP	1.27 x 1.83 x 0.65
		33 Ω / 1.3 kΩ / 10 kΩ	30	>6	Fully integrated USB low / fullspeed interface with EMI filter, ESD protection, pull-up resistors and impedance matching	IP4057CX10/LF	10 ball CSP	1.56 x 1.91 x 0.65
		33 Ω / 1.3 kΩ / 17 kΩ / 15 kΩ	27	>6	Fully integrated USB low / fullspeed interface with EMI filter, ESD protection, pull-up resistors and impedance matching	IP4065CX11/LF	11 ball CSP	1.47 x 1.97 x 0.65
		33 Ω / 1.5 kΩ	35	>6	Fully integrated USB low / fullspeed interface with EMI filter, ESD protection, pull-up resistors and impedance matching	IP4058CX8/LF	8 ball CSP	0.91 x 1.91 x 0.65
		17 Ω / 1.5 kΩ	35	>6	Fully integrated USB low / fullspeed interface with EMI filter, ESD protection, pull-up resistors and impedance matching	IP4158CX8/LF		
		33 Ω	35	>6	Fully integrated USB low / fullspeed interface with EMI filter, ESD protection and impedance matching	IP4078CX6/LF	6 ball CSP	0.91 x 1.41 x 0.65
		-	1.3	~1 GHz	USB2.0 high-speed ESD protection	**IP4359CX4/LF**	4 ball CSP	0.76 x 0.76 x 0.61
	3	-	1.3	~1 GHz	USB2.0 high-speed ESD protection	**IP4356CX4**	4 ball CSP	0.76 x 0.76 x 0.61
	3+2	47 Ω / 100 Ω	10	~20/6	Integrated low capacitance SIM-Card & USB passive filter array with ESD protection	IP4365CX11/P	11 ball CSP	1.16 x 1.56 x 0.61
	4	33 Ω / 1.5 kΩ / 20 kΩ	17	>6	Fully integrated USB low / fullspeed interface with EMI filter, ESD protection, pull-up resistors and impedance matching	IP4368CX9/P	5 ball CSP	1.16 x 1.16 x 0.61
		-	3	>240	USB2.0 high-speed ESD protection	IP4059CX5/LF	5 ball CSP	0.96 x 1.34 x 0.65
			1.3	~1 GHz	USB2.0 high-speed ESD protection	**IP4358CX6**	6 ball CSP	0.76 x 1.16 x 0.41
		-	1.3	~1 GHz	USB2.0 high-speed ESD protection	**IP4319CX10**	10 ball CSP	1.56 x 1.05 x 0.61
USB2.0 (Plastic package)	2	0.5	2	-	>15 kV IEC contact ESD protection with pi-filter	IP4234CZ6	SOT457 (SC-74)	2.9 x 1.5 x 1.0
		-	1.0	-	ESD protection for up to 2 ultra high-speed datalines	PRTR5V0U2X	SOT143B	2.9 x 1.3 x 1.0
		-	1.8	-	ESD protection for up to 2 ultra high-speed datalines with 12 kV ESD robustness	PRTR5V0U2AX		
		-	0.7	-	ESD protection for ultra high-speed interfaces	IP4282CZ6	SOT886 (XSON6)	1.45 x 1.0 x 0.5

ESD protection acc. to IEC 61000-4-2 (level 4)

USB, SATA, LAN

types in **bold** represent new products

Baseband interface	Number of protected lines	R_{line}	C_{line} (pF)	Remark	Type	Package	Size (mm)
USB2.0 (Plastic package)	2	-	1	ESD protection for up to 2 ultra high-speed datalines	PRTR5V0U2K	SOT891 (XSON6)	1.0 x 1.0 x 0.5
		-	1	ESD protection for up to 2 ultra high-speed datalines	PRTR5V0U2D	SOT457 (SC-74)	2.9 x 1.5 x 1.0
		-	1	ESD protection for up to 2 ultra high-speed datalines	PRTR5V0U2F	SOT886 (XSON6)	1.45 x 1.0 x 0.5
	3 + 1	-	0.8	USB protection for USB OTG with 5.5 V Vbat protection	**PUSBM5V5X4-TL**	SOT1189 (HXSON6)	1.6 x 1.6 x 0.5
		-	0.8	USB protection for USB OTG with 12 V Vbat protection	**PUSBM12VX4-TL**		
		-	0.8	USB protection for USB OTG with 15 V Vbat protection	**PUSBM15VX4-TL**		
		-	0.8	USB protection for USB OTG with 27 V Vbat protection	**PUSBM27VX4-TL**		
	4	-	1	Dual ESD protection for USB2.0 high-speed, SD-card, SIM card	IP4220CZ6	SOT457 (SC-74)	2.9 x 1.5 x 1.0
		-	1	Dual ESD protection for USB2.0 high-speed, SD-card, SIM card	PRTR5V0U4D		
		-	1	Dual ESP protection for USB2.0 high-speed, SD-card, SIM card	PRTR5V0U4Y	SOT363 (SC-88)	2.0 x 1.25 x 0.95
		-	1	ESD protection for USB2.0 high-speed, SD-card, SIM card	IP4221CZ6-S	SOT886 (XSON6)	1.45 x 1.0 x 0.5
		-	1	ESD protection for USB2.0 high-speed, SD-card, SIM card	IP4221CZ6-XS	SOT891 (XSON6)	1.0 x 1.0 x 0.5
		1	3	>15 kV IEC contact ESD protection with pi-filter	IP4225CZ10	SOT457 (SC-74)	2.9 x 1.5 x 1.0

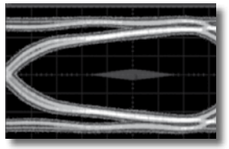
ESD protection acc. to IEC 61000-4-2 (level 4)

USB, SATA, LAN

In the Spotlight

USB3.0: Ultra high-speed 4 channel ESD protection – IP4292CZ10-TBR

- Low clamping voltage ensures best protection of the System Chip
- Low Cline and high ESD protecion level
- Straight through routing → best signal integrity
- Clean eye diagrams
- 10 pin QFN package with exposed leads (SOT1176)



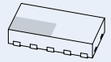
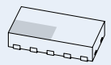
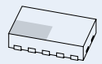
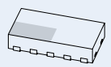
types in **bold** represent new products

Baseband interface	Number of protected lines	R_{line}	C_{line} (pF)	Remark	Type	Package	Size (mm)
USB3.0 SuperSpeed USB	4	-	0.5	ESD protection for ultra high-speed interfaces	**IP4284CZ10-TBR**	SOT1176 (XSON10)	1.0 x 2.5 x 0.5
		-	0.5	ESD protection for ultra high-speed interfaces	IP4284CZ10-TT	SOT552 (TSSOP10)	3.0 x 3.0 x 1.1
		-	0.5	ESD protection for ultra high-speed interfaces	**IP4292CZ10-TBR**	SOT1176 (XSON10)	1.0 x 2.5 x 0.5

ESD protection acc. to IEC 61000-4-2 (level 4)

USB, SATA, LAN

types in **bold** represent new products

Baseband interface	Number of protected lines	R_{line}	C_{line} (pF)	Remark	Type	Package	Size (mm)
Display port	4	-	0.6	ESD protection for ultra high-speed interfaces	IP4286CZ6-TTY	SOT363 (SC-88)	2.0 x 1.25 x 0.95
	11	-	0.7	ESD protection	IP4790CZ38	SOT510 (TSSOP38)	9.7 x 4.4 x 1.1
SATA	2	-	0.7	ESD protection for ultra high-speed interfaces	**IP4282CZ6**	SOT886 (XSON6)	1.45 x 1.0 x 0.5
		-	0.6	ESD protection for ultra high-speed interfaces	IP4286CZ6-TBF		
					IP4286CZ6-TTY	SOT363 (SC-88)	2.0 x 1.25 x 0.95
	4	-	0.6	ESD protection for ultra high-speed interfaces	**IP4283CZ10-TBR**	SOT1176 (XSON10) 	1.0 x 2.5 x 0.5
		-	0.6	ESD protection for ultra high-speed interfaces	IP4283CZ10-TT	SOT552 (TSSOP10)	3.0 x 3.0 x 1.1
		-	0.5	ESD protection for ultra high-speed interfaces	**IP4284CZ10-TBR**	SOT1176 (XSON10) 	1.0 x 2.5 x 0.5
		-	0.5	ESD protection for ultra high-speed interfaces	IP4284CZ10-TT	SOT552 (TSSOP10)	3.0 x 3.0 x 1.1
		-	0.8	ESD protection for ultra high-speed interfaces	**IP4285CZ9-TBB**	SOT1178 (XSON9) 	1.0 x 2.5 x 0.1
		-	0.5	ESD protection for ultra high-speed interfaces	**IP4292CZ10-TBR**	SOT1176 (XSON10) 	1.0 x 2.5 x 0.5

ESD protection acc. to IEC 61000-4-2 (level 4)

USB, SATA, LAN

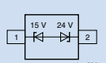
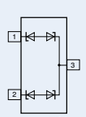
types in **bold** represent new products

Baseband interface	Number of protected lines	R_{line}	C_{line} (pF)	Remark	Type	Package	Size (mm)
LAN	1	-	0.6	Ethernet ESD protection V_{RWM} = 3.3 V	PESD3V3U1UT	SOT23	2.9 x 1.3 x 1.0
		-	0.6	Ethernet ESD protection V_{RWM} = 5.0 V	PESD5V0U1UT		
		-	0.6	Ethernet ESD protection V_{RWM} = 12 V	PESD12VU1UT		
		-	0.6	Ethernet ESD protection V_{RWM} = 15 V	PESD15VU1UT		
		-	0.6	Ethernet ESD protection V_{RWM} = 24 V	PESD24VU1UT		
	4	-	1	Ethernet ESD protection	IP4220CZ6	SOT457 (SC-74)	2.9 x 1.5 x 1.0
		-	1	Ethernet line surge ESD protection	**IP4233CZ6**	SOT363 (SC-88)	2.0 x 1.25 x 0.95

ESD protection acc. to IEC 61000-4-2 (level 4)

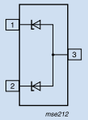
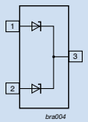
Please find more ESD protection diodes for ultra high-speed interfaces on pages 28 - 31

Automotive LIN/CAN/FlexRay

Number of protected lines bidirectional	V_{RWM} (V)	C_{line} typ (pF)	C_{line} max (pF)	P_{PP} [1] max (W)	ESD rating [2] max (kV)	I_r max [µA] @ V_{RWM}	Configuration	Type	Package	Size (mm)
1	15 (diode 1) 24 (diode 2)	13	17	160	23	0.05		PESD1LIN	SOD323 (SC-76)	1.7 x 1.25 x 0.95
2	24	11	17	200	23	0.05		PESD1CAN	SOT23	2.9 x 1.3 x 1.0
		25	30	230	30	0.01		PESD2CAN		
		11	17	200	23	0.05		PESD1FLEX		

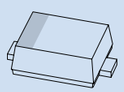
[1] 8/20 µs surge pulse acc. to IEC 61000-4-5 [2] acc. to IEC 61000-4-2 (contact discharge)

TVS diodes, 24 W / 40 W

Power (W) (10/1000 µs waveform) [1]	V_{RWM} (V)	V_{BR} min (V) @ I_R	V_{BR} typ (V) @ I_R	V_{BR} max (V) @ I_R	I_R (mA)	ESD rating [2] max (kV)	C_{line} typ (pF)	V_{CL} max (V) @ I_{PP}	I_{PP} (A)	I_{RM} max (µA) @ V_{RWM}	Configuration	Type	Package	Size (mm)
24	3	5.32	5.6	5.88	20	30	210	8	3	5		MMBZ5V6AL	SOT23	2.9 x 1.3 x 1.0
	3	5.89	6.2	6.51	1	30	175	8.7	2.76	0.2		MMBZ6V2AL		
	4.5	6.48	6.8	7.14	1	30	150	9.6	2.5	0.3		MMBZ6V8AL		
	6	8.65	9.1	9.56	1	30	155	14	1.7	0.1		MMBZ9V1AL		
	6.5	9.5	10	10.5	1	30	130	14.2	1.7	0.02		MMBZ10VAL		
40	8.5	11.4	12	12.6	1	30	110	17	2.35	0.005		MMBZ12VAL		
	12	14.25	15	15.75	1	30	85	21	1.9	0.005		MMBZ15VAL		
	14.5	17.1	18	18.9	1	30	70	25	1.6	0.005		MMBZ18VAL		
	17	19	20	21	1	30	65	28	1.4	0.005		MMBZ20VAL		
	22	25.65	27	28.35	1	30	48	40	1	0.005		MMBZ27VAL		
	26	31.35	33	34.65	1	30	45	46	0.87	0.005		MMBZ33VAL		
	8.5	11.4	12	12.6	1	30	110	17	2.35	0.005		MMBZ12VDL		
	12.8	14.3	15	15.8	1	30	85	21.2	1.9	0.005		MMBZ15VDL		
	14.5	17.1	18	18.9	1	30	70	25	1.6	0.005		MMBZ18VCL		
	17	19	20	21	1	30	65	28	1.4	0.005		MMBZ20VCL		
	22	25.65	27	28.35	1	30	48	38	1	0.005		MMBZ27VCL		
	26	31.35	33	34.65	1	30	45	46	0.87	0.005		MMBZ33VCL		

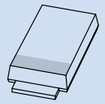
[1] acc. to IEC 61643-321 [2] acc. to IEC 61000-4-2 (contact discharge)

TVS diodes, 400 W

Power (W) (10/1000 µs waveform) [1]	V_{RWM} (V)	V_{BR} min (V) @ I_R	V_{BR} typ (V) @ I_R	V_{BR} max (V) @ I_R	I_R (mA)	V_{CL} max (V) @ I_{PP}	I_{PP} (A)	I_{RM} typ (µA) @ V_{RWM}	I_{RM} max (µA) @ V_{RWM}	Type	Package	Size (mm)
350	3.5	5.20	5.60	6.00	10	8.0	43.8	5	600	PTVS3V3S1UR	SOD123W 	2.6 x 1.7 x 1.0
400	5.0	6.40	6.70	7.00	10	9.2	43.5	5	400	PTVS5V0S1UR		
	6.0	6.67	7.02	7.37	10	10.3	38.8	5	400	PTVS6V0S1UR		
	6.5	7.22	7.60	7.98	10	11.2	35.7	5	250	PTVS6V5S1UR		
	7.0	7.78	8.20	8.60	10	12.0	33.3	3	100	PTVS7V0S1UR		
	7.5	8.33	8.77	9.21	1	12.9	31.0	0.2	50	PTVS7V5S1UR		
	8.0	8.89	9.36	9.83	1	13.6	29.4	0.03	25	PTVS8V0S1UR		
	8.5	9.44	9.92	10.40	1	14.4	27.8	0.01	10	PTVS8V5S1UR		
	9.0	10.00	10.55	11.10	1	15.4	26.0	0.005	5	PTVS9V0S1UR		
	10	11.10	11.70	12.30	1	17.0	23.5	0.005	2.5	PTVS10VS1UR		
	11	12.20	12.85	13.50	1	18.2	22.0	0.005	2.5	PTVS11VS1UR		
	12	13.30	14.00	14.70	1	19.9	20.1	0.005	2.5	PTVS12VS1UR		
	13	14.40	15.15	15.90	1	21.5	18.6	0.001	0.1	PTVS13VS1UR		
	14	15.60	16.40	17.20	1	23.2	17.2	0.001	0.1	PTVS14VS1UR		
	15	16.70	17.60	18.50	1	24.4	16.4	0.001	0.1	PTVS15VS1UR		
	16	17.80	18.75	19.70	1	26.0	15.4	0.001	0.1	PTVS16VS1UR		
	17	18.90	19.90	20.90	1	27.6	14.5	0.001	0.1	PTVS17VS1UR		
	18	20.00	21.00	22.10	1	29.2	13.7	0.001	0.1	PTVS18VS1UR		
	20	22.20	23.35	24.50	1	32.4	12.3	0.001	0.1	PTVS20VS1UR		
	22	24.40	25.60	26.90	1	35.5	11.3	0.001	0.1	PTVS22VS1UR		
	24	26.70	28.10	29.50	1	38.9	10.3	0.001	0.1	PTVS24VS1UR		
	26	28.90	30.40	31.90	1	42.1	9.5	0.001	0.1	PTVS26VS1UR		
	28	31.10	32.80	34.40	1	45.4	8.8	0.001	0.1	PTVS28VS1UR		
	30	33.30	35.10	36.80	1	48.4	8.3	0.001	0.1	PTVS30VS1UR		
	33	36.70	38.70	40.60	1	53.3	7.5	0.001	0.1	PTVS33VS1UR		
	36	40.00	42.10	44.20	1	58.1	6.9	0.001	0.1	PTVS36VS1UR		
	40	44.40	46.80	49.10	1	64.5	6.2	0.001	0.1	PTVS40VS1UR		
	43	47.80	50.30	52.80	1	69.4	5.8	0.001	0.1	PTVS43VS1UR		
	45	50.00	52.65	55.30	1	72.7	5.5	0.001	0.1	PTVS45VS1UR		
	48	53.30	56.10	58.90	1	77.4	5.2	0.001	0.1	PTVS48VS1UR		
	51	56.70	59.70	62.70	1	82.4	4.9	0.001	0.1	PTVS51VS1UR		
	54	60.00	63.15	66.30	1	87.1	4.6	0.001	0.1	PTVS54VS1UR		
	58	64.40	67.80	71.20	1	93.6	4.3	0.001	0.1	PTVS58VS1UR		
	60	66.70	70.20	73.70	1	96.8	4.1	0.001	0.1	PTVS60VS1UR		
	64	71.10	74.85	78.60	1	103.0	3.9	0.001	0.1	PTVS64VS1UR		

[1] 10/1000 µs acc. to IEC 61643-321

TVS diodes, 600 W

Power (W) (10/1000 µs waveform) [1]	V_{RWM} (V)	V_{BR} min (V) @ I_R	V_{BR} typ (V) @ I_R	V_{BR} max (V) @ I_R	I_R (mA)	V_{CL} max (V) @ I_{PP}	I_{PP} (A)	I_{RM} typ (µA) @ V_{RWM}	I_{RM} max (µA) @ V_{RWM}	Type	Package	Size (mm)
600	3.5	5.20	5.60	6.00	10	8	75	5	600	PTVS3V3P1UP	SOD128 	3.8 x 2.6 x 1.0
	5	6.40	6.70	7.00	10	9.2	65.2	5	400	PTVS5V0P1UP		
	6	6.67	7.02	7.37	10	10.3	58.3	5	400	PTVS6V0P1UP		
	6.5	7.22	7.60	7.98	10	11.2	53.6	5	250	PTVS6V5P1UP		
	7	7.78	8.20	8.60	10	12	50	3	100	PTVS7V0P1UP		
	7.5	8.33	8.77	9.21	1	12.9	46.5	0.2	50	PTVS7V5P1UP		
	8	8.89	9.36	9.83	1	13.6	44.1	0.03	25	PTVS8V0P1UP		
	8.5	9.44	9.92	10.40	1	14.4	41.7	0.01	10	PTVS8V5P1UP		
	9	10.00	10.55	11.10	1	15.4	39	0.005	5	PTVS9V0P1UP		
	10	11.10	11.70	12.30	1	17	35.3	0.005	2.5	PTVS10VP1UP		
	11	12.20	12.85	13.50	1	18.2	33	0.005	2.5	PTVS11VP1UP		
	12	13.30	14.00	14.70	1	19.9	30.2	0.005	2.5	PTVS12VP1UP		
	13	14.40	15.15	15.90	1	21.5	27.9	0.001	0.1	PTVS13VP1UP		
	14	15.60	16.40	17.20	1	23.2	25.9	0.001	0.1	PTVS14VP1UP		
	15	16.70	17.60	18.50	1	24.4	24.6	0.001	0.1	PTVS15VP1UP		
	16	17.80	18.75	19.70	1	26	23.1	0.001	0.1	PTVS16VP1UP		
	17	18.90	19.90	20.90	1	27.6	21.7	0.001	0.1	PTVS17VP1UP		
	18	20.00	21.00	22.10	1	29.2	20.5	0.001	0.1	PTVS18VP1UP		
	20	22.20	23.35	24.50	1	32.4	18.5	0.001	0.1	PTVS20VP1UP		
	22	24.40	25.60	26.90	1	35.5	16.9	0.001	0.1	PTVS22VP1UP		
	24	26.70	28.10	29.50	1	38.9	15.4	0.001	0.1	PTVS24VP1UP		
	26	28.90	30.40	31.90	1	42.1	14.2	0.001	0.1	PTVS26VP1UP		
	28	31.10	32.80	34.40	1	45.4	13.2	0.001	0.1	PTVS28VP1UP		
	30	33.30	35.10	36.80	1	48.4	12.4	0.001	0.1	PTVS30VP1UP		
	33	36.70	38.70	40.60	1	53.3	11.3	0.001	0.1	PTVS33VP1UP		
	36	40.00	42.10	44.20	1	58.1	10.3	0.001	0.1	PTVS36VP1UP		
	40	44.40	46.80	49.10	1	64.5	9.3	0.001	0.1	PTVS40VP1UP		
	43	47.80	50.30	52.80	1	69.4	8.6	0.001	0.1	PTVS43VP1UP		
	45	50.00	52.65	55.30	1	72.7	8.3	0.001	0.1	PTVS45VP1UP		
	48	53.30	56.10	58.90	1	77.4	7.8	0.001	0.1	PTVS48VP1UP		
	51	56.70	59.70	62.70	1	82.4	7.3	0.001	0.1	PTVS51VP1UP		
	54	60.00	63.15	66.30	1	87.1	6.9	0.001	0.1	PTVS54VP1UP		
	58	64.40	67.80	71.20	1	93.6	6.4	0.001	0.1	PTVS58VP1UP		
	60	66.70	70.20	73.70	1	96.8	6.2	0.001	0.1	PTVS60VP1UP		
	64	71.10	74.85	78.60	1	103	5.8	0.001	0.1	PTVS64VP1UP		

[1] 10/1000 µs acc. to IEC 61643-321

In the Spotlight

600 / 400 W TVS series – PTVSxP1UP & PTVSxS1UR

- Industry's smallest packages in the 600 / 400 W surge protection class
- Small FlatPower packages SOD123W/128, only 1 mm high
- AEC-Q101 qualified
- Low reverse leakage current (down to 1 nA typical)

Protection and signal conditioning nomenclature

PESD 5V0 S 1 UL

NXP

ESD (ESD protection)
RTR (Rail-to-rail ESD protection)
TVS (10/1000 µs pulse spec.)

Reverse stand-off voltage

Uni-directional*
Bi-directional*
*not for rail-to-rail devices

Number of protected lines

For ESD – Capacitance class

>50 pF	Standard capacitance
<=50 pF	Low capacitance
<=20 pF	Very low capacitance
<=5 pF	Ultra low capacitance
<=1 pF	X-extremely low capacitance
<=0.6 pF	Femtofarad capacitance

For TVS – Power class
S 400 Watt series
P 600 Watt series

Packages

A	SOD323
B	SOD523
D	SOT457
F	SOT886
G	SOT353
K	SOT891
L	SOD882
LD	SOD882D
M	SOT883
P	SOD128
Q	SOT663
R	SOD123W
T	SOT23
U	SOT323
V	SOT666
W	SOT665
X	SOT143B
Y	SOT363

IP - - - - - - - - xx - - - - yy - - - - CX - - - - zz

IP: Integrated Discretes

yy: identifier

zz: no. of balls/pins

CX: chip scale package (CSP)
CZ: plastic package

xx:

30:	passive ESD protection/EMI filter with integrated coils in 0.5 mm pitch CSP
32:	passive ESD protection/EMI filter with integrated coils in plastic package
33:	passive ESD protection/EMI filter with integrated coils in 0.4 mm pitch CSP
40, 41:	passive ESD protection/EMI filter in 0.5 mm pitch CSP
42:	passive ESD protection/EMI filter in plastic package
43:	passive ESD protection/EMI filter in 0.4 mm pitch CSP
47:	active device in plastic package with ESD protection/EMI filter
48:	active ESD protection/EMI filter in 0.4 mm pitch CSP

Bipolar transistors

General purpose bipolar transistors 52
Single transistors NPN 52
Single transistors PNP 52
Double transistors 53
Single and double switching transistors 53
Medium power general purpose transistors 54
High voltage transistors 54
Low noise transistors 54
Matched pair transistors 55
Darlington transistors 56
Schmitt trigger 56
MOSFET driver 57
Medium frequency transistors 57

Resistor-equipped transistors (RETs) 58
RETs 100 mA single 58
RETs 100 mA double 59
RETs 500 mA 59
Low V_{CEsat} (BISS) RETs 59

Low V_{CEsat} (BISS) transistors 60
Low V_{CEsat} (BISS) transistors single NPN 60
Low V_{CEsat} (BISS) transistors single PNP 62
Low V_{CEsat} (BISS) double transistors 64
Low V_{CEsat} (BISS) load switches 65
High voltage low V_{CEsat} (BISS) transistors 66
Low V_{CEsat} (BISS) RETs 66
Low V_{CEsat} (BISS) transistor PNP – N-channel MOSFET combination 67
Advantages of low V_{CEsat} (BISS) technology 67

High voltage power bipolar transistors 68
High voltage bipolar transistors for lighting, SMPS and industrial applications 68

Single transistors NPN

types in **bold** represent new products

Package					SOT23	SOT323 (SC-70)	SOT416 (SC-75)	SOT883 (SC-101)
Size (mm)					2.9 x 1.3 x 1.0	2.0 x 1.25 x 0.95	1.6 x 0.8 x 0.77	1.0 x 0.6 x 0.5
P_{tot} (mW)					250	200	150	250
V_{CEO} (V)	I_C (mA)	h_{FE} min	h_{FE} max	f_T min (MHz)				
25	100	450	1200	100		PMST5089		
30	100	110 - 200	450 - 800	100	BC848B	BC848W		
		350	900	100		PMST5088		
32	100	110 - 420	220 - 800	100	BCW31 / 32 / 33			
		180 - 380	310 - 630	250	BCW60B / C / D			
40	100	120 - 270	270 - 560	100				2PC4617QM / RM
45	100	110 - 420	220 - 800	100	BC847 / A / B / C	BC847W / AW / BW / CW	BC847T / AT / BT / CT	BC847AM / BM / CM
		120 - 380	220 - 630	100	BCX70G / H / J / K			
		110 - 200	220 - 450	100	BCW71 / 72			
		500	1250	100	PMBT6429	PMST6429		
50	100	210 - 290	340 - 460	100 - 150	2PD601ART 2PD601ARL 2PD601ASL	2PD601ARW / SW		
		250	650	100	PMBT6428	PMST6428		
60	100	110 - 200	220 - 450	100	BCV71 / 72			
65	100	110 - 200	220 - 450	100	BC846 / A / B	BC846W / AW / BW	BC846T / AT / BT	
80	100	20	80	60	BSS64			
50	150	120 - 270	270 - 560	100		2PC4081Q / R / S	2PC4617Q / R	
	200	210	340	100	**2PD601BRL**			
		290	460	100	**2PD601BSL**			
45	500	100 - 250	250 - 600	100	BC817 / -16 / -25 / -40	BC817W / -16W / -25W / -40W		
		100	600	100	BCX19			
50	500	85 - 170	170 - 340	140 - 180	2PD602AQL 2PD602ARL 2PD602ASL	2PD1820AR / S		
60	500	50	-	100		PMSTA05		

Single transistors PNP

types in **bold** represent new products

Package					SOT23	SOT323 (SC-70)	SOT416 (SC-75)	SOT883 (SC-101)
Size (mm)					2.9 x 1.3 x 1.0	2.0 x 1.25 x 0.95	1.6 x 0.8 x 0.77	1.0 x 0.6 x 0.5
P_{tot} (mW)					250	200	150	250
V_{CEO} (V)	I_C (mA)	h_{FE} min	h_{FE} max	f_T min (MHz)				
80	500	100	-	100	PMBTA06	PMSTA06		
30	100	125 - 220	500 - 800	100	BC858B	BC858W		
32	100	120 - 215	260 - 500	100	BCW29 / 30			
		180 - 380	310 - 630	100	BCW61B / C / D			
40	100	120 - 270	270 - 560	100				2PA1774QM / RM / SM
45	100	210 - 290	340 - 460	70 - 80	2PB709ART 2PB709ARL 2PB709ASL	2PB709ARW / SW		
		180 - 380	310 - 630	100	BCX71H / J / K			
		120 - 215	260 - 500	100	BCW69 / 70			
		125 - 420	250 - 800	100	BC857 / A / B / C	BC857W / AW / BW / CW	BC857T / AT / BT / CT	BC857AM / BM / CM
60	100	120	260	150	BCW89			
65	100	125 - 200	250 - 475	100	BC856 / A / B	BC856W / AW / BW	BC856T / AT / BT	
100	100	30	-	50	BSS63			
50	150	120 - 270	270 - 560	100		2PA1576Q / R / S	2PA1774Q / R / S	
	200	210	340	100	**2PD601BRL**			
		290	460	100	**2PD601BSL**			
25	500	100	600	80	BCX18			
45	500	100 - 250	250 - 600	80	BC807 / -16 / -25 / -40	BC807W / -16W / -25W / -40W		
		100	600	80	BCX17			
50	500	85 - 170	170 - 340	100 - 140	2PB710ARL 2PB710ASL	2PB1219AQ / R / S		
60	500	100	-	50		PMSTA55		
80	500	100	-	50	PMBTA56	PMSTA56		

Double transistors

Package						SOT457 (SC-74)	SOT363 (SC-88)	SOT666
Size (mm)						2.9 x 1.5 x 1.0	2.0 x 1.25 x 0.95	1.6 x 1.2 x 0.55
P_{tot} (mW)						600	300	300
Polarity	V_{CEO} (V)	I_C (mA)	h_{FE} min	h_{FE} max	f_T min (MHz)			
NPN	40	100	120	450	100		PUMX1	PEMX1
	45	100	200	450	100	BC847DS	BC847BS	BC847BV
	65	100	110	-	100		BC846S	
			200	450	100	BC846DS	BC846BS	
	50	150	120	560	100		PUMX2	
	45	500	160	400	80	BC817DS		
PNP	40	100	120	450	100	PIMT1	PUMT1	PEMT1
	45	100	200	450	100		BC857BS	BC857BV
	65	100	110	-	100		BC856S	
			200	450	100		BC856BS	
	45	500	160	400	80	BC807DS		
NPN/PNP	40	100	120	450	100		PUMZ1	PEMZ1
	45	100	200	450	100		BC847BPN	BC847BVN
	50	100	120	560	100	PIMZ2	PUMZ2	
	65	100	200	450	100		BC846BPN	
	12	500	200	-	250/100			PEMZ7
	45	500	160	400	100/80	BC817DPN		

Single and double switching transistors

Package							SOT223 (SC-73)	SOT89 (SC-62)	SOT23	SOT323 (SC-70)	SOT363 (SC-88)	SOT666	SOT883 (SC-101)
Size (mm)							6.5 x 3.5 x 1.65	4.5 x 2.5 x 1.5	2.9 x 1.3 x 1.0	2.0 x 1.25 x 0.95	2.0 x 1.25 x 0.95	1.6 x 1.2 x 0.55	1.0 x 0.6 x 0.5
P_{tot} (mW)							1700	1300	250	200	300	300	250
Configuration							single	single	single	single	double	double	single
Polarity	V_{CEO} (V)	I_C (mA)	h_{FE} min	h_{FE} max	f_T min (MHz)	t_{off} (ns)							
NPN	12	100	40	120	400	20			BSV52				
	40	100	100	300	180	1200			PMBS3904	PMSS3904			
					300	250		PXT2222A					
	15	200	40	120	500	20			PMBT2369	PMST2369			
	40	200	100	300	300	250			MMBT3904				
									PMBT3904	PMST3904	PMBT3904YS	PMBT3904VS	PMBT3904M
	30	600	100	300	250	250			PMBT2222	PMST2222			
	40	600	100	300	250	250	PZT4401	PXT4401	PMBT4401	PMST4401			
					300	250			MMBT2222A				
							PZT2222A		PMBT2222A	PMST2222A			
	40	800	100	300	300	250			BSR14				
PNP	40	100	100	300	150	700			PMBS3906	PMSS3906			
	40	200	100	300	250	300			MMBT3906				
									PMBT3906	PMST3906	PMBT3906YS	PMBT3906VS	PMBT3906M
	40	600	100	300	200	350	PZT4403	PXT4403	PMBT4403	PMST4403			
						365			PMBT2907				
	60	600	100	300	200	300				PMST2907A			
						365			BSR16				
							PZT2907A	PXT2907A	PMBT2907A				
NPN/PNP	40	200	100	300	300/250	250/300					PMBT3946YPN	PMBT3946VPN	

Medium power general purpose transistors

Package						SOT223 (SC-73)	SOT89 (SC-62)
Size (mm)						6.5 x 3.5 x 1.65	4.5 x 2.5 x 1.5
P_{tot} (mW)						1700	1300
Polarity	V_{CEO} (V)	I_C (mA)	h_{FE} min	h_{FE} max	f_T min (MHz)		
NPN	20	1000	85 - 160	375	40	BCP68 / -25	BC868 / -25
	45	1000	63 - 100	160 - 250	100	BCP54 / -10 / -16	BCX54 / -10 / -16
	60	1000	63 - 100	160 - 250	100	BCP55 / -10 / -16	BCX55 / -10 / -16
			100	300	100	BSP41	BSR41
	80	1000	63 - 100	160 - 250	100	BCP56 / -10 / -16	BCX56 / -10 / -16
			40 - 100	120 - 300	100	BSP43	BSR42 / 43
PNP	20	1000	85 - 160	250 - 375	40	BCP69 / -16 / -25	BC869 / -16 / -25
	45	1000	63 - 100	160 - 250	115 [1] - 145 [1]	BCP51 / -10 / -16	BCX51 / -10 / -16
	60	1000	63 - 100	160 - 250	100	BCP52 / -10 / -16	BCX52 / -10 / -16
			40 - 100	120 - 300	100	BSP31	BSR30 / 31
	80	1000	63 - 100	160 - 250	115 [1] - 145 [1]	BCP53 / -10 / -16	BCX53 / -10 / -16
			40 - 100	120 - 300	100	BSP32 / 33	BSR33

[1] typical value

High voltage transistors

Package						SOT223 (SC-73)	SOT89 (SC-62)	SOT457 (SC-74)	SOT23	SOT323 (SC-70)
Size (mm)						6.5 x 3.5 x 1.65	4.5 x 2.5 x 1.5	2.9 x 1.5 x 1.0	2.9 x 1.3 x 1.0	2.0 x 1.25 x 0.95
P_{tot} (mW)						1700	1300	600	250	200
Polarity	V_{CEO} (V)	I_C (mA)	h_{FE} min	h_{FE} max	f_T min (MHz)					
NPN	80	100	20	-	60				BSS64	
	140	100	60	250	100				PMBT5550	PMST5550
	160	300	80	250	100				PMBT5551/BSR19A	PMST5551
	250	100	50	-	60	BF722	BF622		BF822	
	300	100	50	-	60	BF720	BF620		BF820	BF820W
			40	-	50	PZTA42	PXTA42		PMBTA42	PMSTA42
	350	100	40	-	70	BSP19	BST39			
	400	300	50	200	20	PZTA44			PMBTA44	
PNP	100	100	30	-	50				BSS63	
	250	100	50	-	60	BF723				
			50	-	60		BF623		BF823	
	300	100	50	-	60		BF621		BF821	
			40	-	50	PZTA92	PXTA92		PMBTA92	PMSTA92
2 x NPN	300	100	40	-	50			PMBTA42DS		

For high voltage transistors with increased performance please refer to our high voltage low V_{CEsat} (BISS) transistor portfolio on page 66.

Low noise transistors

Package							SOT23	SOT323 (SC-70)
Size (mm)							2.9 x 1.3 x 1.0	2.0 x 1.25 x 0.95
P_{tot} (mW)							250	200
Polarity	V_{CEO} (V)	I_C (mA)	NF max (dB)	h_{FE} min	h_{FE} max	f_T min (MHz)		
NPN	30	100	4	200	450	100	BC849B	BC849BW
				420	800	100	BC849C	BC849CW
	45	100	4	200	450	100	BC850B	BC850BW
				420	800	100	BC850C	BC850CW
PNP	30	100	4	220	475	100	BC859B	BC859BW
				420	800	100	BC859C	BC859CW
	45	100	4	220	475	100	BC860B	BC860BW
				420	800	100	BC860C	BC860CW

Matched pair transistors

Package							SOT143B	SOT457 (SC-74)	SOT353 (SC-88A)	SOT363 (SC-88)		SOT666	
Size (mm)							2.9 x 1.3 x 1.0	2.9 x 1.5 x 1.0	2.0 x 1.25 x 0.95	2.0 x 1.25 x 0.95		1.6 x 1.2 x 0.55	
P_{tot} (mW)							250	380	300	300		300	
Polarity	V_{CEO} (V)	I_C (mA)	h_{FE} min	h_{FE} max	h_{FE1}/h_{FE2}	V_{BE1} - V_{BE2} (mV)							
NPN	30	100	110	800	0.7 [1]	n.a.	BCV61/A/B/C [1]						
	45	100	200	450	0.9 [1]	n.a.	BCM61B [1]						
						2		BCM847DS		BCM847BS		BCM847BV	
					0.95	2			PMP4501G		PMP4501Y		PMP4501V
					0.98	2			PMP4201G		PMP4201Y		PMP4201V
	Configuration												
PNP	30	100	100	800	0.7 [1]	n.a.	BCV62/A/B/C [1]						
	45	100	200	450	0.9 [1]	n.a.	BCM62B [1]						
						2		BCM857DS		BCM857BS		BCM857BV	
					0.95	2			PMP5501G		PMP5501Y		PMP5501V
					0.98	2			PMP5201G		PMP5201Y		PMP5201V
	65	100	200	450	0.9	2		BCM856DS		BCM856BS			
	Configuration												

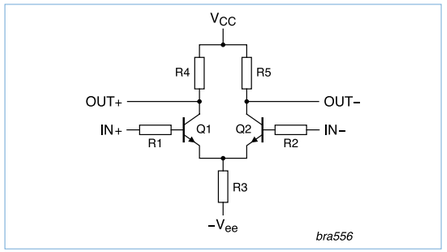
[1] I_{C1}/I_{E2}

Key features
- Current gain matching to 10%, 5% or 2%
- Base-emitter voltage matching to 2 mV
- Choice of standard double transistor pinout or application-optimized pinout
- Common-emitter configuration for 5-pin type
- Range of small, very small and ultra small packages

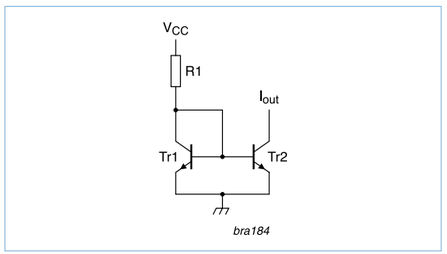
Key benefits
- Improved performance of current mirror and differential amplifier circuits
- Drop-in replacement for standard double transistors (BCM series)
- Simplified board layout (PMP series)
- Eliminates the need for costly additional trimming

Key applications
- Current mirrors
- Differential and instrumentation amplifiers
- Logarithmic amplifiers
- Comparators

Differential amplifier



Current mirror



Darlington transistors

Package					SOT223 (SC-73)	SOT89 (SC-62)	SOT23
Size (mm)					6.5 x 3.5 x 1.65	4.5 x 2.5 x 1.5	2.9 x 1.3 x 1.0
P_{tot} (mW)					1700	1300	250
Polarity	V_{CEO} (V)	I_C (mA)	h_{FE} min	f_T min (MHz)			
NPN	30	500	10000	125			PMBTA13
			20000	125	PZTA14	PXTA14	PMBTA14
				220		BCV29	BCV27
	45	1000	2000	200	BSP50	BST50	
	60	500	10000	220		BCV49	BCV47
		1000	2000	200	BSP51	BST51	
	80	1000	2000	200	BSP52	BST52	
PNP	30	500	20000	125			PMBTA64
				220		BCV28	BCV26
	45	1000	2000	200	BSP60	BST60	
	60	500	10000	220		BCV48	BCV46
		1000	2000	200	BSP61	BST61	
	80	1000	2000	200	BSP62	BST62	

Schmitt trigger

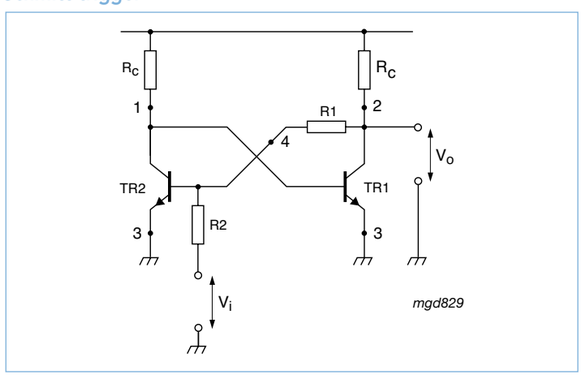
Package						SOT143B
Size (mm)						2.9 x 1.3 x 1.0
P_{tot} (mW)						250
Polarity	V_{CEO} (V) TR1	V_{CEO} (V) TR2	I_C (mA)	h_{FE} min	h_{FE} max	V_{CEsat} typ (mV)
NPN	30	6	100	110	800	250	BCV63 / B
PNP	30	6	100	220	475	250	BCV64B

Key features
- Low current (max. 100 mA)
- Low voltage (max. 30 and 6 V)

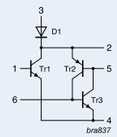
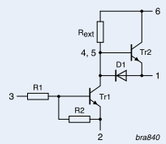
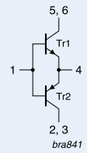
Key benefits
- Reduced component count and pick-and-place costs
- Smaller designs

Key applications
- General purpose switching and amplification
- Schmitt trigger applications

Schmitt trigger



MOSFET driver

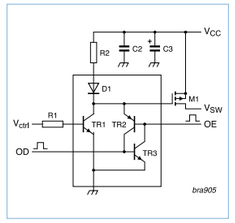
Package			SOT457 (SC-74)			
Size (mm)			2.9 x 1.5 x 1.0			
P_{tot} (mW)			400	400		580
Configuration						
Contains	I_C (A)	I_{CM} (A)		R1 = R2 (kΩ)		
General purpose transistors	0.1	0.2	PMD9050D	-	PMD9010D	BCV65 (SOT143B)
				2.2	PMD9001D	
				4.7	PMD9002D	
				10	PMD9003D	
Switching transistors - reduced storage time	0.6	1.0		-		PMD2001D
Low V_{CEsat} (BISS) transistors - Low V_{CEsat}, high h_{FE} and I_C	1.0	2.0		-		PMD3001D

Key features
- Three different configurations
- Types available with standard, switching and low V_{CEsat} (BISS) transistors
- Small footprint packages

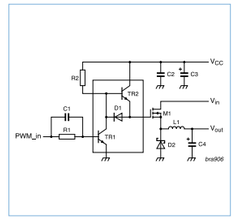
Key benefits
- Reduced component count
- Smaller end products

Key applications
- MOSFET driver
- Bipolar power transistor driver
- Push-pull driver

MOSFET driver with hardware output disable function



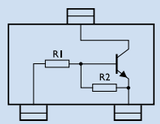
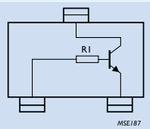
High-side MOSFET driver with level shifter function

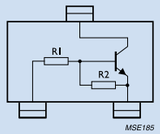
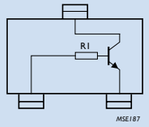


Medium frequency transistors

Package						SOT23	SOT323 (SC-70)
Size (mm)						2.9 x 1.3 x 1.0	2.0 x 1.25 x 0.95
P_{tot} (mW)						250	200
Polarity	V_{CEO} (V)	I_C (mA)	h_{FE} min	h_{FE} max	f_T typ (MHz)		
NPN	15	100	40	-	500	BF570	
	20	25	40	85	>275	BFS20	BFS20W
		30	65	225	260	BFS19	
	40	25	67	220	380	BF840	
PNP	30	25	25	50	250	BF824	BF824W
	40	25	50	-	>325	BF550	

RETs 100 mA single

Package					SOT23		SOT323 (SC-70)	
Size (mm)					2.9 x 1.3 x 1.0		2.0 x 1.25 x 0.95	
P_{tot} (mW)					250		200	
V_{CEO} (V)	I_C (mA)	Configuration	R1 (kΩ)	R2 (kΩ)	NPN	PNP	NPN	PNP
50	100		1	1		PDTA113EET		PDTA113EU
			2.2	2.2	PDTC123ET	PDTA123ET	PDTC123EU	PDTA123EU
			4.7	4.7	PDTC143ET	PDTA143ET	PDTC143EU	PDTA143EU
			10	10	PDTC114ET	PDTA114ET	PDTC114EU	PDTA114EU
			22	22	PDTC124ET	PDTA124ET	PDTC124EU	PDTA124EU
			47	47	PDTC144ET	PDTA144ET	PDTC144EU	PDTA144EU
			100	100	PDTC115ET	PDTA115ET	PDTC115EU	PDTA115EU
			1	10		PDTA113ZT		PDTA113ZU
			2.2	10	PDTC123YT	PDTA123YT	PDTC123YU	PDTA123YU
			2.2	47	PDTC123JT	PDTA123JT	PDTC123JU	PDTA123JU
			4.7	10	PDTC143XT	PDTA143XT	PDTC143XU	PDTA143XU
			4.7	47	PDTC143ZT	PDTA143ZT	PDTC143ZU	PDTA143ZU
			10	47	PDTC114YT	PDTA114YT	PDTC114YU	PDTA114YU
			22	47	PDTC124XT	PDTA124XT	PDTC124XU	PDTA124XU
			47	10	PDTC144VT	PDTA144VT	PDTC144VU	PDTA144VU
			47	22	PDTC144WT	PDTA144WT	PDTC144WU	PDTA144WU
			2.2	-	PDTC123TT	PDTA123TT	PDTC123TU	PDTA123TU
			4.7	-	PDTC143TT	PDTA143TT	PDTC143TU	PDTA143TU
			10	-	PDTC114TT	PDTA114TT	PDTC114TU	PDTA114TU
			22	-	PDTC124TT	PDTA124TT	PDTC124TU	PDTA124TU
			47	-	PDTC144TT	PDTA144TT	PDTC144TU	PDTA144TU
			100	-	PDTC115TT	PDTA115TT	PDTC115TU	PDTA115TU

Package					SOT416 (SC-75)		SOT883 (SC-101)	
Size (mm)					1.6 x 0.8 x 0.77		1.0 x 0.6 x 0.5	
P_{tot} (mW)					150		250	
V_{CEO} (V)	I_C (mA)	Configuration	R1 (kΩ)	R2 (kΩ)	NPN	PNP	NPN	PNP
50	100		1	1		PDTA113EE		PDTA113EM
			2.2	2.2	PDTC123EE	PDTA123EE	PDTC123EM	PDTA123EM
			4.7	4.7	PDTC143EE	PDTA143EE	PDTC143EM	PDTA143EM
			10	10	PDTC114EE	PDTA114EE	PDTC114EM	PDTA114EM
			22	22	PDTC124EE	PDTA124EE	PDTC124EM	PDTA124EM
			47	47	PDTC144EE	PDTA144EE	PDTC144EM	PDTA144EM
			100	100	PDTC115EE	PDTA115EE	PDTC115EM	PDTA115EM
			1	10		PDTA113ZE		PDTA113ZM
			2.2	10	PDTC123YE	PDTA123YE	PDTC123YM	PDTA123YM
			2.2	47	PDTC123JE	PDTA123JE	PDTC123JM	PDTA123JM
			4.7	10	PDTC143XE	PDTA143XE	PDTC143XM	PDTA143XM
			4.7	47	PDTC143ZE	PDTA143ZE	PDTC143ZM	PDTA143ZM
			10	47	PDTC114YE	PDTA114YE	PDTC114YM	PDTA114YM
			22	47	PDTC124XE	PDTA124XE	PDTC124XM	PDTA124XM
			47	10	PDTC144VE	PDTA144VE	PDTC144VM	PDTA144VM
			47	22	PDTC144WE	PDTA144WE	PDTC144WM	PDTA144WM
			2.2	-	PDTC123TE	PDTA123TE	PDTC123TM	PDTA123TM
			4.7	-	PDTC143TE	PDTA143TE	PDTC143TM	PDTA143TM
			10	-	PDTC114TE	PDTA114TE	PDTC114TM	PDTA114TM
			22	-	PDTC124TE	PDTA124TE	PDTC124TM	PDTA124TM
			47	-	PDTC144TE	PDTA144TE	PDTC144TM	PDTA144TM
			100	-	PDTC115TE	PDTA115TE	PDTC115TM	PDTA115TM

RETs 100 mA double

Package					SOT457 (SC-74)		SOT363 (SC-88)			SOT666		
Size (mm)					2.9 x 1.5 x 1.0		2.0 x 1.25 x 0.95			1.6 x 1.2 x 0.55		
P_{tot} (mW)					600		300			300		
V_{CEO} (V)	I_C (mA)		R1 (kΩ)	R2 (kΩ)	NPN/NPN	NPN/PNP	NPN/NPN	NPN/PNP	PNP/PNP	NPN/NPN	NPN/PNP	PNP/PNP
50	100	R1 = R2	2.2	2.2			PUMH20	PUMD20	PUMB20	PEMH20	PEMD20	PEMB20
			4.7	4.7			PUMH15	PUMD15	PUMB15	PEMH15	PEMD15	PEMB15
			10	10		PIMD3	PUMH11	PUMD3	PUMB11	PEMH11	PEMD3	PEMB11
			22	22		PIMD2	PUMH1	PUMD2	PUMB1	PEMH1	PEMD2	PEMB1
			47	47			PUMH2	PUMD12	PUMB2	PEMH2	PEMD12	PEMB2
			100	100			PUMH24	PUMD24	PUMB24	PEMH24	PEMD24	PEMB24
		R1 ≠ R2	2.2	47			PUMH10	PUMD10	PUMB10	PEMH10	PEMD10	PEMB10
			4.7	10			PUMH18	PUMD18	PUMB18	PEMH18	PEMD18	PEMB18
			4.7	47			PUMH13	PUMD13	PUMB13	PEMH13	PEMD13	PEMB13
			10	47	PIMH9		PUMH9	PUMD9	PUMB9	PEMH9	PEMD9	PEMB9
			22	47			PUMH16	PUMD16	PUMB16	PEMH16	PEMD16	PEMB16
			47	22			PUMH17	PUMD17	PUMB17	PEMH17	PEMD17	PEMB17
			47/2.2	47/47				PUMD48			PEMD48	
		Only R1	2.2	-			PUMH30	PUMD30	PUMB30	PEMH30	PEMD30	PEMB30
			4.7	-			PUMH7	PUMD6	PUMB3	PEMH7	PEMD6	PEMB3
			10	-			PUMH4	PUMD4	PUMB4	PEMH4	PEMD4	PEMB4
			22	-			PUMH19	PUMD19	PUMB19	PEMH19	PEMD19	PEMB19
			47	-			PUMH14	PUMD14	PUMB14	PEMH14	PEMD14	PEMB14

RETs 500 mA

Package					SOT457 (SC-74)		SOT23	
Size (mm)					2.9 x 1.5 x 1.0		2.9 x 1.3 x 1.0	
P_{tot} (mW)					600		250	
V_{CEO} (V)	I_C (mA)		R1 (kΩ)	R2 (kΩ)	NPN/NPN	NPN/PNP	NPN	PNP
50	500	R1 = R2	1.0	1.0			PDTD113ET	PDTB113ET
			2.2	2.2			PDTD123ET	PDTB123ET
		R1 ≠ R2	1.0	10	PIMN31	PIMC31	PDTD113ZT	PDTB113ZT
			2.2	10			PDTD123YT	PDTB123YT
		Only R1	2.2	-			PDTD123TT	PDTB123TT

Low V_{CEsat} (BISS) RETs

Package						SOT23
Size (mm)						2.9 x 1.3 x 1.0
P_{tot} (mW)						250
Polarity	V_{CEO} (V)	I_C (mA)		R1 (kΩ)	R2 (kΩ)	
NPN	40	600	R1 = R2	1	1	PBRN113ET
				2.2	2.2	PBRN123ET
			R1 ≠ R2	1	10	PBRN113ZT
				2.2	10	PBRN123YT
PNP	40	600	R1 = R2	1	1	PBRP113ET
				2.2	2.2	PBRP123ET
			R1 ≠ R2	1	10	PBRP113ZT
				2.2	10	PBRP123YT

Bipolar transistors

Low V_{CEsat} (BISS) transistors

Low V_{CEsat} (BISS) transistors single NPN

Package											SOT223 (SC-73)	SOT89 (SC-62)	SOT457 (SC-74)		SOT23	SOT1061	SOT323 (SC-70)	SOT363 (SC-88)	SOT416 (SC-75)	SOT666	SOT883 (SC-101)
Size (mm)											6.5 x 3.5 x 1.65	4.5 x 2.5 x 1.5	2.9 x 1.5 x 1.0		2.9 x 1.3 x 1.0	2.0 x 2.0 x 0.65	2.0 x 1.25 x 0.95	2.0 x 1.25 x 0.95	1.6 x 0.8 x 0.77	1.6 x 1.2 x 0.55	1.0 x 0.6 x 0.5
P_{tot} (mW)											1700	1650	750		480	1400	350	430	250	500	250
V_{CEO} (V)	I_C (A)	I_{CM} (A)	h_{FE} min/typ	@ I_C (A)	@ V_{CE} (V)	R_{CEsat} typ (mΩ); I_C/I_B = 10	V_{CEsat} typ (mV); I_C = 0.5 A; I_B = 0.05 A	V_{CEsat} max (mV)	@ I_C (A)	@ I_B (A)											
12	5.3	10.6	300/530	0.5	2	27 [1]	18	200	5.3	0.265		PBSS301NX									
	5.8	11.6	300/530	0.5	2	29 [1]	18	235	5.8	0.29	PBSS301NZ										
	6.0	7.0	280/440	0.5	2	33 [1]	20	275	6	0.3						PBSS4612PA					
15	0.5	1.0	200/325	0.01	2	360	-	250	0.5	0.05											PBSS2515M
			200/425	0.01	2	300	200	250	0.5	0.05									PBSS2515E		
20	1.0	3.0	350/470	0.1	2	220	110 [2]	250	1	0.05					PBSS4120T						
	2.0	4.0	220/410	0.5	2	140	70	350	2	0.2										PBSS4220V	
		5.0	220/330	0.1	2	80	45	310	3	0.3					PBSS4320T						
	3.0	5.0	220/390	0.5	2	85	40	310	3	0.3		PBSS4320X									
	4.0	15.0	300/450	0.5	2	50	30	280	4	0.4			PBSS301ND								
	4.3	8.0	300/550	0.5	2	36	21	220	4	0.2					PBSS4021NT						
	5.0	10.0	300/450	0.5	2	32	35	220	5	0.5		PBSS4520X									
	5.3	10.6	300/570	0.5	2	27 [1]	20	200	5.3	0.265		PBSS302NX									
	5.8	10.2	300/570	0.5	2	30 [1]	20	250	5.8	0.29	PBSS302NZ										
	6.0	7.0	280/440	0.5	2	33 [1]	20	275	6	0.3						PBSS4620PA					
	7.0	15.0	300/550	0.5	2	19	12	210	7	0.35		PBSS4021NX									
	8.0	20.0	300/550	0.5	2	14	9	170	8	0.4	PBSS4021NZ										
30	1.0	3.0	300/450	0.5	2	240	120 [2]	270	1	0.05					PBSS4130T						
	2.0	3.0	300/450	0.5	2	120	70	320	2	0.2					PBSS4230T						
	2.6	5.0	300/500	0.5	2	76	80	320	3	0.3					PBSS4032NT [3]						
	3.0	5.0	300/490	0.5	2	80	45	300	3	0.3		PBSS4330X									
	3.0	5.0	300/465	0.5	2	75	40	300	3	0.3						PBSS4330PA					
	3.5	6.0	300/500	0.5	2	50	70	300	4	0.4			PBSS4032ND [3]								
	4.7	10.0	300/500	0.5	2	45	57	250	4	0.4		PBSS4032NX [3]									
	5.1	10.2	300/480	0.5	2	30 [1]	20	220	5.1	0.255		PBSS303NX									
	5.4	10.0	300/500	0.5	2	45	57	340	4.9	0.27	PBSS4032NZ [3]										
	5.5	11.0	300/480	0.5	2	31 [1]	20	240	5.5	0.275	PBSS303NZ										
	6.0	7.0	280/450	0.5	2	35 [1]	21	275	6	0.3						PBSS4630PA					
40	0.5	1.0	200/550	0.01	2	380	200 [2]	250	0.5	0.05											PBSS2540M
			200/350	0.01	2	380	190	250	0.5	0.05									PBSS2540E		
	1.0	3.0	300/ -	0.5	5	150	70	440	2	0.2										PBSS4140V	
		2.0	300/440	0.5	5	240	130	500	1	0.1							PBSS4140U				
			300/510	0.5	5	230	120	500	1	0.1					PMMT491A						
			300/420	0.5	5	150	130	500	1	0.1					PBSS4140T						
	2.0	3.0	300/400	0.5	5	150	70	400	2	0.2										PBSS4240V	
			350/470	0.1	2	120	70	320	2	0.2								PBSS4240Y			
			300/450	0.5	2	120	70	320	2	0.2					PBSS4240T						
	4.0	15.0	300/520	0.5	2	55	35	300	4	0.4			PBSS302ND								
		10.0	300/500	0.5	2	40	21	355	5	0.5		PBSS4540X									
	5.0	10.0	300/500	0.5	2	42	25	355	5	0.5	PBSS4540Z										
50	2.0	5.0	300/495	0.5	2	100	60	260	2	0.2					PBSS4350T						
			300/ -	0.5	2	160	90 [2]	320	2	0.2		PBSS4250X									
	3.0	5.0	200/280	0.5	2	110	65	290	2	0.2			PBSS4350D								
			300/460	0.5	2	75	50	370	3	0.3		PBSS4350X									
			200/280	0.5	2	110	60 [1]	290	2	0.2	PBSS4350Z										
60	1.0	2.0	200/400	0.5	5	200	110	250	1	0.1										PBSS4160V	
			200/420	0.5	5	230	120	280	1	0.1							PBSS4160U				
			200/350	0.5	5	200	110	250	1	0.1					PBSS4160T						
	3.0	6.0	345/570	0.5	2	65	40	260	3	0.3			PBSS303ND								
	3.8	8.0	300/500	0.5	2	46	29	200	3	0.3					PBSS4041NT						
	4.7	9.4	300/520	0.5	2	37 [1]	25	245	4.7	0.235		PBSS304NX									
	5.2	10.4	300/520	0.5	2	39 [1]	25	280	5.2	0.26	PBSS304NZ										
	6.0	7.0	280/440	0.5	2	34 [1]	22	290	6	0.3						PBSS4560PA					
	6.2	15.0	300/500	0.5	2	25	17	230	6	0.3		PBSS4041NX									
	7.0	15.0	300/500	0.5	2	17.5	13	195	7	0.35	PBSS4041NZ										
80	3.0	6.0	240/360	0.5	2	67	40	255	3	0.3			PBSS304ND								
	4.0	10.0	250/400	0.5	2	43 [1]	25	230	4	0.2		PBSS4480X									
	4.6	9.2	300/470	0.5	2	37 [1]	25	240	4.6	0.23		PBSS305NX									
	5.1	10.2	300/470	0.5	2	38 [1]	25	270	5.1	0.255	PBSS305NZ										
	5.6	7.0	270/425	0.5	2	40 [1]	25	320	5.6	0.28						PBSS4580PA					
100	1.0	3.0	150/400	0.25	10	160	80	200	1	0.1								PBSS8110Y			
			150/300	0.25	10	165	70	200	1	0.1					PBSS8110T						
			150/290	0.25	10	160	75	200	1	0.1			PBSS8110D								
			150/290	0.25	10	165	73	200	1	0.1		PBSS8110X									
			150/290	0.25	10	160	73	200	1	0.1	PBSS8110Z										
	3.0	4.0	170/275	0.5	2	72	45	360	4	0.4			PBSS305ND								
	4.5	9.0	200/330	0.5	2	38 [1]	27	245	4.5	0.225		PBSS306NX									
	5.1	10.2	200/330	0.5	2	43 [1]	27	300	5.1	0.255	PBSS306NZ										
	5.2	6.0	180/285	0.5	2	48 [1]	30	340	5.2	0.26						PBSS8510PA					

[1] I_C/I_B = 20
[2] V_{CEsat} (max)
[3] optimized for high speed switching

Low V_{CEsat} (BISS) transistors

Low V_{CEsat} (BISS) transistors single PNP

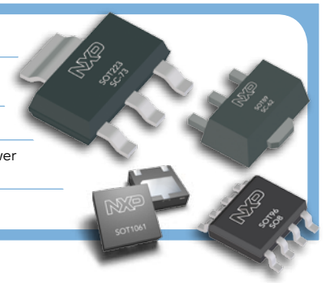
Package											SOT223 (SC-73)	SOT89 (SC-62)	SOT457 (SC-74)		SOT23	SOT1061	SOT323 (SC-70)	SOT363 (SC-88)	SOT416 (SC-75)	SOT666	SOT883 (SC-101)
Size (mm)											6.5 x 3.5 x 1.65	4.5 x 2.5 x 1.5	2.9 x 1.5 x 1.0		2.9 x 1.3 x 1.0	2.0 x 2.0 x 0.65	2.0 x 1.25 x 0.95	2.0 x 1.25 x 0.95	1.6 x 0.8 x 0.77	1.6 x 1.2 x 0.55	1.0 x 0.6 x 0.5
P_{tot} (mW)											1700	1650	750		480	1400	350	430	250	500	250
V_{CEO} (V)	I_C (A)	I_{CM} (A)	h_{FE} min/typ	@ I_C (V)	@ V_{CE} (V)	R_{CEsat} typ (mΩ); I_C/I_B = 10	V_{CEsat} typ (mV); I_C = 0.5 A; I_B = 0.05 A	V_{CEsat} max (mV)	@ I_C (A)	@ I_B (A)											
12	5.3	10.6	250/400	0.5	2	28 [1]	20	210	5.3	0.265		PBSS301PX									
	5.7	11.4	250/400	0.5	2	30 [1]	20	245	5.7	0.285	PBSS301PZ										
	6.0	7.0	220/335	0.5	2	33 [1]	20	300	6	0.3						PBSS5612PA					
15	0.5	1.0	200/260	0.01	2	300	150	250	0.5	0.05											PBSS3515M
			200/325	0.01	2	300	150	250	0.5	0.05									PBSS3515E		
20	1.0	2.0	300/450	0.1	2	250	125 [2]	250	1	0.05					PBSS5120T						
	2.0	4.0	220/440	0.1	2	140	75	390	2	0.2										PBSS5220V	
		3.0	225/ -	0.5	2	115	80 [2]	225	2	0.2					PBSS5220T						
		5.0	220/420	0.5	2	75	50	210	2	0.2					PBSS5320T						
	3.0	5.0	200/ -	0.5	2	85	80 [2]	400	3	0.3			PBSS5320D								
			220/450	0.5	2	90	50	300	3	0.3		PBSS5320X									
	3.5	8.0	250/400	0.5	2	55	35	375	4	0.2					PBSS4021PT						
	4.0	15.0	250/400	0.5	2	50	35	280	4	0.4			PBSS301PD								
	5.0	10.0	300/430	0.5	2	34	45	270	5	0.5		PBSS5520X									
	5.1	10.2	250/370	0.5	2	32 [1]	25	230	5.1	0.255		PBSS302PX									
	5.5	11.0	250/370	0.5	2	34 [1]	25	265	5.5	0.275	PBSS302PZ										
	6.0	7.0	230/345	0.5	2	39 [1]	25	350	6	0.3						PBSS5620PA					
	6.2	15.0	250/400	0.5	2	23	18	240	6	0.3		PBSS4021PX									
	6.6	20.0	250/400	0.5	2	22	16	240	7	0.35	PBSS4021PZ										
30	1.0	3.0	260/350	0.5	2	220	110	225	1	0.05					PBSS5130T						
	2.0	3.0	300/450	0.1	2	160	70	350	2	0.2					PBSS5230T						
	2.4	5.0	200/320	0.5	2	110	95	330	2	0.2					PBSS4032PT [3]						
	2.7	5.0	200/350	0.5	2	88	87	395	3	0.3			PBSS4032PD [3]								
	3.0	5.0	200/380	0.5	2	80	50	320	3	0.3		PBSS5330X									
	3.0	5.0	200/320	0.5	2	75	45	320	3	0.3						PBSS5330PA					
	4.2	10.0	200/350	0.5	2	58	70	345	4	0.4		PBSS4032PX [3]									
	4.4	10.0	200/350	0.5	2	58	70	400	4	0.2	PBSS4032PZ [3]										
	5.1	10.2	250/400	0.5	2	32 [1]	25	230	5.1	0.255		PBSS303PX									
	5.3	10.6	250/400	0.5	2	35 [1]	25	265	5.3	0.265	PBSS303PZ										
	6.0	7.0	200/335	0.5	2	39 [1]	25	350	6	0.3						PBSS5630PA					
40	0.5	1.0	200/380	0.01	2	440	220	350	0.5	0.05											PBSS3540M
			200/380	0.01	2	440	230	350	0.5	0.05									PBSS3540E		
	1.0	2.0	300/ -	0.1	5	200	120	310	1	0.1										PBSS5140V	
			300/520	0.1	5	230	130	500	1	0.1							PBSS5140U				
			300/800	0.1	5	250	130	500	1	0.1					PMMT591A						
			300/510	0.1	5	230	130	500	1	0.1					PBSS5140T						
	1.8	3.0	300/450	0.1	5	185	100	530	2	0.2										PBSS5240V	
	2.0	3.0	300/ -	0.1	2	200	110 [2]	350	2	0.2								PBSS5240Y			
			300/450	0.1	2	150	70	350	2	0.2					PBSS5240T						
	4.0	15.0	200/310	0.5	2	55	46	300	4	0.4			PBSS302PD								
		10.0	250/370	0.5	2	45	33	375	5	0.5		PBSS5540X									
	5.0	10.0	250/350	0.5	2	55	40 [1]	160	2	0.2	PBSS5540Z										
50	2.0	3.0	200/ -	0.5	2	150	90 [2]	300	2	0.1					PBSS5250T						
		5.0	200/360	0.5	2	90	55	270	2	0.2					PBSS5350T						
			200/ -	0.5	2	160	90 [2]	320	2	0.2		PBSS5250X									
	3.0	5.0	200/300	0.5	2	120	70	300	2	0.2			PBSS5350D								
			200/375	0.5	2	120	70	390	3	0.3		PBSS5350X									
			200/300	0.5	2	120	70	300	2	0.2	PBSS5350Z										
60	1.0	2.0	150/250	0.5	5	220	120	330	1	0.1										PBSS5160V	
			150/250	0.5	5	255	135	340	1	0.1							PBSS5160U				
			150/250	0.5	5	220	120	330	1	0.1					PBSS5160T						
	2.7	8.0	200/300	0.5	2	80	49	360	3	0.3					PBSS4041PT						
	3.0	6.0	180/265	0.5	2	70	55	290	3	0.3			PBSS303PD								
	4.2	8.4	200/295	0.5	2	53 [1]	35	310	4.2	0.21		PBSS304PX									
	4.5	9.0	200/295	0.5	2	59 [1]	35	375	4.5	0.225	PBSS304PZ										
	5.0	6.0	170/260	0.5	2	35 [1]	35	450	5	0.25						PBSS5560PA					
		15.0	200/300	0.5	2	40	30	300	5	0.5		PBSS4041PX									
	5.7	15.0	200/300	0.5	2	29	22	285	6	0.3	PBSS4041PZ										
80	3.0	5.0	155/225	0.5	2	71	55	290	3	0.3			PBSS304PD								
	4.0	5.0	180/265	0.5	2	65 [1]	40	420	4	0.2						PBSS5580PA					
		10.0	200/300	0.5	2	50	35	380	5	0.5		PBSS5480X									
		8.0	200/280	0.5	2	43	36	240	4	0.4		PBSS305PX									
	4.5	9.0	200/280	0.5	2	69 [1]	36	450	4.5	0.225	PBSS305PZ										
100	1.0	3.0	150/ -	0.25	5	170	93	320	1	0.1								PBSS9110Y			
			150/350	0.5	5	170	95	320	1	0.1					PBSS9110T						
			150/350	0.5	5	170	100	320	1	0.1			PBSS9110D								
			150/350	0.5	5	170	90	320	1	0.1		PBSS9110X									
			150/ -	0.5	5	170	90	320	1	0.1	PBSS9110Z										
	2.0	3.0	175/275	0.5	2	88	65	250	2	0.2			PBSS305PD								
	2.7	4.0	180/295	0.5	2	110 [1]	45	450	2.7	0.135						PBSS9410PA					
	3.7	7.4	200/300	0.5	2	52	45	300	4	0.4		PBSS306PX									
	4.1	8.2	200/300	0.5	5	57	45	325	4.1	0.41	PBSS306PZ										

[1] I_C/I_B = 20
[2] V_{CEsat} (max)
[3] optimized for high speed switching

In the Spotlight

New low V_{CEsat} (BISS) transistors

- Industry's first combination of reduced switching times (down to 125 ns) with minimized saturation voltage (below 50 mV)
- Voltage range from 12 V to 100 V
- Flexible package options, from standard SMD to brand new medium power leadless package SOT1061 (2 x 2 x 0.65 mm)
- Benchmark for reduced on-state-resistance



Low V_{CEsat} (BISS) double transistors

Package										SOT96 (SO8)	SOT457 (SC-74)	SOT363 (SC-88)	SOT666
Size (mm)										4.9 x 3.9 x 1.75	2.9 x 1.5 x 1.0	2.0 x 1.25 x 0.95	1.6 x 1.2 x 0.55
P_{tot} (mW)										2000 [2]	750	430	500
V_{CEO} (V)	I_C (A)	Polarity	h_{FE} min	@ I_C (A)	@ V_{CE} (V)	V_{CEsat} typ (mV); I_C = 0.5 A; I_B = 0.05 A	V_{CEsat} max (mV)	@ I_C (A)	@ I_B (A)				
15	0.5	2 x NPN	200	0.01	2	170 [1]	250	0.5	0.05				PBSS3515VS
		2 x PNP	200	0.01	2	170 [1]	250	0.5	0.05				PBSS2515VPN
		NPN/PNP	200	0.01	2	170 [1]	250	0.5	0.05			PBSS2515YPN	
20	7.5	NPN/NPN	300	0.5	2	15	150	4	0.2	PBSS4021SN			
	6.3	PNP/PNP	250	0.5	2	24	225	4	0.2	PBSS4021SP			
	7.5 / 6.3	NPN/PNP	300/250	0.5	2	15/24	150/225	4	0.2	PBSS4021SPN			
30	5.7	NPN/NPN	300	0.5	2	57	250	4	0.4	PBSS4032SN [3]			
	4.8	PNP/PNP	200	0.5	2	70	390	4	0.4	PBSS4032SP [3]			
	5.7 / 4.8	NPN/PNP	300/200	0.5	2	57/70	250/390	4	0.4	PBSS4032SPN [3]			
40	1.0	NPN/PNP	300/250	0.5	5	130/150	500	1	0.1		PBSS4140DPN		
	2.0	NPN/PNP	300/250	0.5	5	80/100	400/530	2	0.2		PBSS4240DPN		
50	2.7	2 x NPN	300	0.5	2	50	340	2.7	0.27	PBSS4350SS			
		2 x PNP	200	0.5	2	60	370	2.7	0.27	PBSS5350SS			
		NPN/PNP	300/200	0.5	2	50/60	340/370	2.7	0.27	PBSS4350SPN			
60	1.0	2 x NPN	200	0.5	5	115	250	1	0.1		PBSS4160DS		
		2 x PNP	150	0.5	5	120	330	1	0.1		PBSS5160DS		
		NPN/PNP	200/150	0.5	5	115/120	250/330	1	0.1		PBSS4160DPN		
	6.7	NPN/NPN	300	0.5	2	20	190	4	0.2	PBSS4041SN			
	5.9	PNP/PNP	200	0.5	2	35	330	4	0.2	PBSS4041SP			
	6.7 / 5.9	NPN/PNP	300/200	0.5	2	20/35	190/330	4	0.2	PBSS4041SPN			

[1] I_c/I_b=20
[2] Device mounted on a ceramic PCB, Al2O3, standard footprint.
[3] Optimized for high speed switching

Low V_{CEsat} (BISS) load switches

Package				SOT96 (SO8)	SOT457 (SC-74)		SOT363 (SC-88)	SOT666
Size (mm)				4.9 x 3.9 x 1.75	2.9 x 1.5 x 1.0		2.0 x 1.25 x 0.95	1.6 x 1.2 x 0.55
P_{tot} (mW)				1500 [1]	750 [1]	600 [1]	300 [2]	300 [2]
V_{CEO} (V)	I_C (A)	V_{CEsat} max (mV); I_C = 0.5 A; I_B = 0.05 A	R1, R2 (kΩ)					
15	0.5	250	2.2				PBLS1501Y	PBLS1501V
			4.7				PBLS1502Y	PBLS1502V
			10				PBLS1503Y	PBLS1503V
			22				PBLS1504Y	PBLS1504V
20	1	150	2.2			PBLS2001D		
			4.7			PBLS2002D		
			10			PBLS2003D		
			22			PBLS2004D		
	1.8	70	2.2		PBLS2021D			
			4.7		PBLS2022D			
			10		PBLS2023D			
			22		PBLS2024D			
	3	75	2.2	PBLS2001S				
			4.7	PBLS2002S				
			10	PBLS2003S				
40	0.5	350	2.2				PBLS4001Y	PBLS4001V
			4.7				PBLS4002Y	PBLS4002V
			10				PBLS4003Y	PBLS4003V
			22				PBLS4004Y	PBLS4004V
			47				PBLS4005Y	PBLS4005V
	1	170	2.2			PBLS4001D		
			4.7			PBLS4002D		
			10			PBLS4003D		
			22			PBLS4004D		
			47			PBLS4005D		
60	1	180	2.2			PBLS6001D		
			4.7			PBLS6002D		
			10			PBLS6003D		
			22			PBLS6004D		
			47			PBLS6005D		
	1.5	100	2.2		PBLS6021D			
			4.7		PBLS6022D			
			10		PBLS6023D			
			22		PBLS6024D			

[1] Device mounted on a ceramic PCB, Al_2O_3, standard footprint
[2] Device mounted on an FR4 PCB, single-sided copper, tin-plated and standard footprint

Key features

- Low V_{CEsat} (BISS) transistor and resistor-equipped transistor (RET) in one package
- Low saturation voltage
- Low 'threshold' voltage (<1 V) compared to MOSFET
- Low drive power required
- Range of small, very small and ultra small packages

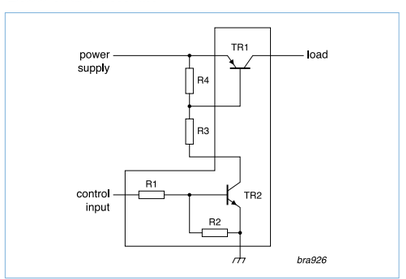
Key benefits

- Smaller end products
- Reduced component count
- Less sourcing effort
- Fewer solder points increase reliability
- Cost reduction
- More efficient, cooler running systems

Key applications

- Supply line switch
- Battery charger
- High-side switch for LEDs, drivers and backlights
- Portable equipment

BISS load switch



High voltage low V_{CEsat} (BISS) transistors

types in **bold** represent new products

Package				SOT223 (SC-73)	SOT89 (SC-62)	SOT23
Size (mm)				6.5 x 3.5 x 1.65	4.5 x 2.5 x 1.5	2.9 x 1.3 x 1.0
P_{tot} (mW)				1700	1300	250
Polarity	**V_{CESM} [1]**	**V_{CEO} (V)**	**I_C (A)**			
NPN	-	150	1	PBHV8115Z		PBHV8115T
			2	PBHV8215Z		
		180	1			**PBHV8118T**
	500	400	0.5	PBHV8540Z		PBHV8540T
			1	PBHV8140Z		
		500	0.15			PMBTA45
PNP	-	150	1	PBHV9115Z	PBHV9115X	PBHV9115T
			2	PBHV9215Z		
	500	400	0.25	PBHV9040Z		PBHV9040T
			0.5	PBHV9540Z		
		500	0.15			PBHV9050T
			0.25	PBHV9050Z		

[1] Collector-emitter peak voltage

In the Spotlight

High voltage low V_{CEsat} (BISS) transistors in SOT223 & SOT23

- Voltage V_{CEO} up to 500 V
- Current I_C up to 1 A (continuous), 2 A (peak)
- V_{CEsat} down to 33 mV at I_B = 20 mA
- AEC-Q101 qualified

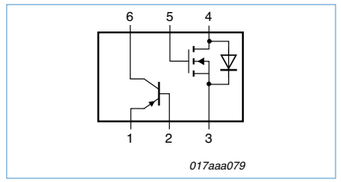
Low V_{CEsat} (BISS) RETs

Package					SOT23	
Size (mm)					2.9 x 1.3 x 1.0	
P_{tot} (mW)					250	
V_{CEO} (V)	**I_C (mA)**		**R1 (kΩ)**	**R2 (kΩ)**	NPN	PNP
40	600	R1 = R2	1	1	PBRN113ET	PBRP113ET
			2.2	2.2	PBRN123ET	PBRP123ET
		R1 ≠ R2	1	10	PBRN113ZT	PBRP113ZT
			2.2	10	PBRN123YT	PBRP123YT

Low V_{CEsat} (BISS) transistor PNP – N-channel MOSFET combination

types in **bold** represent new products

Package											SOT1118
Size (mm)											2.0 x 2.0 x 0.65
P_{tot} (mW)											1300
V_{CEO} (V)	**I_C (A)**	**h_{FE} min**	**h_{FE} max**	**@ I_C (mA)**	**@ V_{CE} (V)**	**R_{CEsat} typ (mΩ)**	**V_{DS} (V)**	**V_{GS} (V)**	**I_D (A)**	**R_{Dson} typ (mΩ)**	
40	2	300	800	100	5	240	30	0.7	0.66	390	**PBSM5240PF**



Combination of Low V_{CEsat} transistor with N-channel MOSFET in the very small and ultra thin leadless package SOT1118

Advantages of low V_{CEsat} (BISS) technology

Our BISS (Breakthrough In Small-Signal) transistors show lowest V_{CEsat} values due to an innovative mesh-emitter technology and further technology improvement. Benefit from:

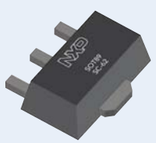
Reduction in board space

- Stable performance at smaller footprint
- I_C = 0.5 A; V_{CEO} = 40 – 45 V

SOT23	SOT416 (SC-75)	SOT883 (SC-101)
8.15 mm²	4.4 mm²	1.17 mm²
BC817xx	PBSS2540E	PBSS2540M
General purpose transistor	BISS transistor technology	BISS transistor technology

Improved collector current capabilities

- 17.87 mm² footprint



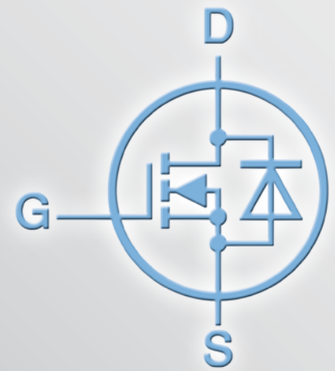
SOT89 (SC-62)	SOT89 (SC-62)	SOT89 (SC-62)
1 A	3 A	6.2 A
BCX51	PBSS5350X	PBSS4021PX
General purpose transistor	BISS transistor technology	BISS transistor technology

High voltage bipolar transistors for lighting, SMPS and industrial applications

types in **bold** represent new products

V_{CESM} (V)	$I_{C(DC)}$ (max) (A)	25 °C ind. t_f (typ) (ns)	@ I_C (A)	h_{FE} (typ)	@ I_C (A)	SOT54 (TO92)	SOT78 (TO220AB)	SOT186A (isolated TO220AB)	SOT404 (D²PAK)	SOT428 (DPAK)
700	1	80	1	7.5	0.8	BUJ100LR				
	1	80	1	7.5	0.8	PHE13003A				
	1	50	1	14	0.75	BUJ100				
	1.5	100	0.5	9	1	PHE13003C				
	1.5	100	0.5	9	1	PHD13003C[1]				
	4	30	2	12.5	3		BUJ103A	BUJ103AX		BUJ103AD
	4	30	2	12.5	3					BUJD103AD[1]
	4	100	2	17	2		PHE13005	PHE13005X		
	4	100	2	17	2		PHD13005[1]			
	8	20	5	11	4		BUJ105A		BUJ105AB	BUJ105AD
	8	20	5	11	4					BUJD105AD[1]
	8	40	5	9	5		PHE13007			
	10	20	5	11	6		BUJ106A			
	12	100	5	6 min - 30 max	8		PHE13009			
850	4	30	2	12.5	3		**BUJD203A[1]**	**BUJD203AX[1]**		**BUJD203AD[1]**
1000	5	145	2.5	12	3		BUJ303A	**BUJ303AX**		**BUJ303AD**
1050	4	520	2	41	0.8		**BUJ302A**	**BUJ302AX**		**BUJ302AD**
	5	200	2.5	10.5	3		BUJ303B			
1200	6	170	2.5	15.5	3		BUJ403A			

[1] Integrated freewheeling diode



MOSFETs

Small-signal MOSFETs 70

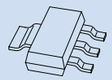
Small-signal MOSFETs single (N-channel) < 50 V 70
Small-signal MOSFETs single (N-channel) ≥ 50 V 72
Small-signal MOSFETs dual (N-channel) 74
Small-signal MOSFETs single (P-Channel) 74
Small-signal MOSFET – Schottky combination 76
Small-signal MOSFETs dual (P-channel) 76

Power MOSFETs 77

12 V - 25 V N-channel MOSFETs 77
30 V N-channel MOSFETs 78
40 V - 55 V N-channel MOSFETs 79
60 V - 80 V N-channel MOSFETs 80
100 V - 110 V N-channel MOSFETs 81
150 V - 300 V N-channel MOSFETs 82
P-channel MOSFETs 83
Multi-chip MOSFETs 83

Small-signal MOSFETs

Small-signal MOSFETs single (N-channel) < 50 V

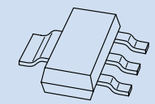
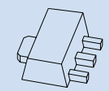
Package													SOT223 (SC-73)		TSOP6 SOT457 (SC-74)	SOT23	SOT363 (SC-88)	SOT323 (SC-70)	SOT416 (SC-75)	SOT883 (SC-101)
																				
Size (mm)													6.5 x 3.5 x 1.65		2.9 x 1.5 x 1.0	2.9 x 1.3 x 1.0	2.0 x 1.25 x 0.95	2.0 x 1.25 x 0.95	1.6 x 0.8 x 0.77	1.0 x 0.6 x 0.5
P_{tot} (mW)													1700		600	250	300	200	150	250
V_{DS} (V)	V_{GS} (V)	I_D (A)	V_{GS}(th) min (V)	V_{GS}(th) max (V)	t_{on} typ (ns)	t_{off} typ (ns)	Q_G typ (nC)	ESD protection (kV)	R_{DSon} typ (mΩ) @ V_{GS} = 10 V	4.5 V	2.5 V	1.8 V								
12	8	5.7	0.4	-	23	67	10.1	-	-	28	-	39			PMN28UN					
20	8	tbd	tbd	tbd	tbd	tbd	tbd	-	-	16	tbd	tbd				PMV16UN *				
		6.3	2	4	23	71	10.6	-	-	23	-	37			PMN23UN					
		5.7	0.4	-	23	71	10.6	-	-	27	-	39			PMN27UN					
		tbd	tbd	tbd	tbd	tbd	tbd	-	-	28	tbd	tbd				PMV28UN *				
		5.7	0.45	-	20	66	7.4	-	-	30	-	44				PMV30UN [1]				
		3.76	0.65	-	35	84	5.4	-	-	56	77	-				PMV56XN [1]				
		2.5	0.65	-	35	84	5.4	-	-	56	77	-				SI2302DS				
		1.05	0.4	-	6.5	65	-	-	-	140	-	240				BSH105				
		2.28	0.45	0.95	14.5	23.5	0.89	-	-	250	-	420								PMZ250UN
		1	0.45	1	14.5	23.5	0.89	-	-	280	-	460						PMF280UN	PMR280UN	
	12	tbd	tbd	tbd	tbd	tbd	tbd	-	-	30	tbd	-				PMV30XN *				
		5.9	0.5	1.5	25	37	5.8	-	-	31	44	-				PMV31XN [1]				
		2.15	0.5	1.5	16	17	0.72	-	-	270	440	-								PMZ270XN
		1	0.5	1.5	16	17	0.72	-	-	290	460	-						PMF290XN	PMR290XN	
	15	5.7	1	2	24	35	13.1	-	28	34	-	-			PMN34LN					
		4.1	1	2	24	35	13.1	-	55	70	-	-			PMN55LN					
30	8	4.9	0.45	-	22	60	9.9	-	-	38	-	54			PMN34UN					
		4.9	0.45	-	18	50	9.3	-	-	40	-	55				PMV40UN [1]				
		1.78	0.45	0.95	11.5	22.5	0.89	-	-	390	-	550								PMZ390UN
		0.85	0.4	-	6	27	-	-	-	400 [2]	-	600 [2]				BSH103				
		0.8	0.45	1	11.5	22.5	0.89	-	-	400	-	580						PMF400UN	PMR400UN	
	12	tbd	tbd	tbd	tbd	tbd	tbd	-	-	20	tbd	-				PMV20XN *				
		tbd	tbd	tbd	tbd	tbd	tbd	-	-	250	tbd	-						PMF250XN *		
		1.87	0.5	1.5	16	19.5	0.65	-	-	350	520	-								PMZ350XN
		0.87	0.35	-	16	19.5	-	-	-	370	550	-						PMF370XN		
		0.9	0.5	-	16	19.5	0.65	-	-	370	550	-					PMG370XN		PMR370XN	
	15	5.4	1	2	12	27	13.8	-	32	40	-	-			PMN40LN					
	20	tbd	tbd	tbd	tbd	tbd	tbd	-	tbd	15	tbd	-			PMN15EN *					
		tbd	tbd	tbd	tbd	tbd	tbd	-	tbd	18	tbd	-				PMV18EN *				
		10	1	2.8	18	44	24	-	20	30	-	-	BSP030							
		tbd	tbd	tbd	tbd	tbd	tbd	-	tbd	31	tbd	-				PMV31EN *				
		tbd	tbd	tbd	tbd	tbd	tbd	-	tbd	35	tbd	-			PMN35EN *					
		5.4	1	2	33	44	6.1	-	31	38	-	-			PMN38EN					
		5.2	1	2	33	44	6.1	-	32	42	-	-			PMN45EN					
		5.4	1	2	12	21.5	9.4	-	35	45	-	-				PMV45EN [1]				
		4.6	1	2	8.4	17.8	8.8	-	40	49	-	-			PMN49EN					
		4.7	1	2	12	23.5	9.4	-	47	60	-	-				PMV60EN [1]				
		1.9	1	2	11	41	6.4	-	77	102	-	-				BSH108				
		2.5	1.5	-	12	23.5	4.6	-	74	117	-	-				PMV117EN				
		6	1	2.8	14	36	-	-	80	120	-	-	BSP100							
		1.7	1.5	-	11.5	31	4.6	-	117 [2]	190 [2]	-	-				SI2304DS				

[1] Enhanced thermal capability
[2] Max values
* Products to be released in 2011. For new product information, please check **http://standardproducts.nxp.com/mosfets**

Small-signal MOSFETs

Small-signal MOSFETs single (N-channel) ≥ 50 V

types in **bold** represent new products

Package													SOT223 (SC-73)		SOT89 (SC-62)	SOT23	SOT323 (SC-70)	SOT416 (SC-75)	SOT883 (SC-101)
																			
Size (mm)													6.5 x 3.5 x 1.65		4.5 x 2.5 x 1.5	2.9 x 1.3 x 1.0	2.0 x 1.25 x 0.95	1.6 x 0.8 x 0.77	1.0 x 0.6 x 0.5
P_{tot} (mW)													1700		1300	250	200	150	250
V_{DS} (V)	V_{GS} (V)	I_D (A)	V_{GS}(th) min (V)	V_{GS}(th) max (V)	t_{on} typ (ns)	t_{off} typ (ns)	Q_G typ (nC)	ESD protection (kV)	R_{DSon} typ (mΩ) @ V_{GS} = 10 V	4.5 V	2.5 V	1.8 V							
50	20	0.1	0.4	1.8	2	5	-	-	2800	3800 [3]	-	-				BSN20			
55	8	0.3	0.4	1.3	4	11	1	-	-	2300	2400	3100					BSH121		
	10	0.335	0.4	1.3	4	11	1	-	-	2300	2400	3100				BSH111			
	13	2.5	2	4	-	-	-	2	120	-	-	-	PHT6N06T						
		3.5	1	2	-	-	-	2	-	65	-	-	PHT8N06LT						
		2.5	1	2	-	-	-	2	-	120	-	-	PHT6N06LT						
60	15	0.26	1	3.3	3	9	-	1	2800	3800	-	-					PMF3800SN		
	20	0.25	0.8	3	-	-	-	-	2500	-	-	-				PMBF170			
		0.36	0.9	1.5	5	13	0.72	-	900	1000	-	-				**BSS138P**	**BSS138PW**		
		1.22	1	3	6	7.2	1.05	-	760	1100	-	-							PMZ760SN
		0.57	1	-	6	7.2	-	-	780	1100	-	-					PMF780SN		
		0.55	1	3	6	7.2	1.05	-	780	1100	-	-						PMR780SN	
		0.3	1	2.5	7	15	0.6	-	1000	1300	-	-				**2N7002P**	**2N7002PW**	**2N7002PT**	
		0.3	1	2.5	11	19	0.5	2	1000	1300	-	-				**2N7002BK**	**2N7002BKW**	**2N7002BKT**	**2N7002BKM**
		0.3	1	2.5	16	60	1.09	3	1100	1300	-	-				**2N7002CK**			
		0.34	1	-	3	9	-	1	2800	3800	-	-				2N7002K			
	30	0.385	1	2.5	2.5	11	0.69	-	780	1200	-	-				2N7002E			
		0.475	1	2.5	2.5	11	0.69	-	780	1200	-	-				2N7002F			
		0.3	1	2.5	2.5	11	-	-	2800	3800	-	-				2N7002			
100	16	3.5	1	2	14	73	-	-	-	200	-	-	PHT4NQ10LT						
	20	3	2	4	-	-	-	-	57	-	-	-	PHT6NQ10T						
		3.5	2	4	21	31	7.4	-	200	-	-	-	PHT4NQ10T						
		0.85	2	4	19	13	4.6	-	400	-	-	-				BSH114			
		0.15	1	2.8	3	12	-	-	3500	-	-	-				BSS123			
		0.19	1	-	3	12	-	-	-	5000	-	-				BST82			
		0.52	1	-	3	12	-	-	-	5000	-	-	BSP110						
	30	1.9	2	4	10.5	12.5	7	-	213	-	-	-				PMV213SN [1]			
200	20	0.4	0.8	2.8	6	49	-	-	1600	-	-	-			BSS87				
		0.55	0.4	2	10	45	-	-	1700	-	3000	-	BSP122						
240	20	0.375	0.8	2	6	47	-	-	2800	7500 [2]	-	-	BSP89						
250	20	0.35	0.8	2	6	47	-	-	2800	-	-	-	BSP126						
300	20	0.35	0.8	2	6	46	-	-	3700	-	4800	-	BSP130						

[1] Enhanced thermal capability
[2] Max values
[3] @ V_{gs} = 5 V

In the Spotlight

2N7002BKx - 2N7002 ESD-protected 60 V N-channel MOSFET-series in several SMD packages

- ESD protection up to 2 kV in several SMD packages
- Available in single and dual configuration
- Very fast switching
- TrenchMOS technology
- AEC-Q101 qualified

MOSFETs

Small-signal MOSFETs

Small-signal MOSFETs dual (N-channel)

types in **bold** represent new products

Package													SOT363 (SC-88)	SOT666 (SC-88)
Size (mm)													2.0 x 1.25 x 0.95	1.6 x 1.2 x 0.55
P_{tot} (mW)													300	300
V_{DS} (V)	V_{GS} (V)	I_D (A)	V_{GS}(th) min (V)	V_{GS}(th) max (V)	t_{on} typ (ns)	t_{off} typ (ns)	Q_G typ (nC)	ESD protection (kV)	R_{DSon} typ (mΩ) @ V_{GS} = 10 V	4.5 V	2.5 V	1.8 V		
20	8	0.87	0.45	1	14.5	23.5	-	-	-	280	-	460	PMGD280UN	
	12	0.86	0.5	1.5	16	17	0.72	-	-	290	460	-	PMGD290XN	
30	8	0.71	0.45	1	11.5	22.5	0.89	-	-	400	-	580	PMGD400UN	
	12	0.74	0.5	1.5	17	19.5	0.65	-	-	370	550	-	PMGD370XN	
	15	0.125	0.8	1.5	17	22	0.35	-	-	1800	2900	-	PMGD8000LN	
60	20	0.49	1	-	6	7.2	1.05	-	780	1100	-	-	PMGD780SN	
		0.36	0.9	1.5	5	13	0.72	-	900	1000	-	-	**BSS138PS**	
		0.3	1	2.5	7	15	0.6	-	1000	1300	-	-	**2N7002PS**	**2N7002PV**
		0.3	1	2.5	11	19	0.5	2	1000	1300	-	-	**2N7002BKS**	**2N7002BKV**

In the Spotlight

20 V, 100 mΩ P-channel enhancement mode Field-Effect Transistor (FET) – NX2301P

- Housed in a small SMD plastic package SOT23
- Very fast switching
- TrenchMOS technology
- AEC-Q101 qualified
- 1.8 V R_{DSon} rated for Low Voltage Gate Drive

Small-signal MOSFETs single (P-channel)

types in **bold** represent new products

Package													SOT223 (SC-73)	SOT89 (SC-62)	TSOP6 SOT457 (SC-74)	SOT23	SOT363 (SC-88)	SOT323 (SC-70)	SOT416 (SC-75)	SOT883 (SC-101)
Size (mm)													6.5 x 3.5 x 1.65	4.5 x 2.5 x 1.5	2.9 x 1.5 x 1.0	2.9 x 1.3 x 1.0	2.0 x 1.25 x 0.95	2.0 x 1.25 x 0.95	1.6 x 0.8 x 0.77	1.0 x 0.6 x 0.5
P_{tot} (mW)													1700	1300	600	250	300	200	150	250
V_{DS} (V)	V_{GS} (V)	I_D (A)	V_{GS}(th) min (V)	V_{GS}(th) max (V)	t_{on} typ (ns)	t_{off} typ (ns)	Q_G typ (nC)	ESD protection (kV)	R_{DSon} typ (mΩ) @ V_{GS} = 10 V	4.5 V	2.5 V	1.8 V								
12	8	1.52	0.4	-	6.5	65	-	-	-	80	-	140			BSH207					
		0.75	0.4	-	6.5	65	-	-	-	180	-	420				BSH205 [1]				
20	8	tbd	tbd	tbd	tbd	tbd	tbd	-	-	21	tbd	tbd			PMN21UP*					
		tbd	tbd	tbd	tbd	tbd	tbd	-	-	27	tbd	tbd			PMN27UP*	PMV27UP*				
		2	0.5	1.1	7	50	6	-	-	100	-	-				**NX2301P**				
	12	4.8	0.55	0.95	16	117	10	-	-	48	65	-			PMN50XP					
		3.5	0.75	1.25	24	84	8.5	-	-	48	71	-			PMN48XP*	**PMV48XP**				
		3.9	0.55	0.95	28	101	7.6	-	-	65	90	-				PMV65XP [1]				
		3.5	0.75	1.25	tbd	tbd	tbd	-	-	85	tbd	tbd					PMG85XP*			
		3.5	0.75	1.25	tbd	tbd	tbd	-	-	170	tbd	tbd						PMF170XP*		
30	8	0.47	0.4	-	6.5	65	-	-	-	660	-	1100				BSH203				
	20	3	1	2.8	20	50	-	-	220	330	-	-	BSP250							
		0.52	1	-	6.5	65	-	-	630	890	-	-				BSH202				
50	20	0.2	tbd	tbd	tbd	tbd	tbd	1	5300	6000	-	-				BSS84AK*		BSS84AKW*	BSS84AKT*	BSS84AKM*
		0.13	0.8	2	3	7	-	-	6000	-	-	-				BSS84				
60	20	0.3	1	-	6.5	65	-	-	2100	2700	-	-				BSH201				
200	20	0.225	0.8	2.8	5	20	-	-	10000	-	-	-	BSP220							
240	20	0.2	0.8	2.8	5	20	-	-	10000	-	-	-		BSS192						
250	20	0.225	0.8	2.8	5	10	-	-	10000	-	-	-	BSP225							
300	20	0.21	1.95	2.8	5	15	-	-	17000 [2]	-	-	-	BSP230							

[1] Enhanced thermal capability
[2] Max values
* Products to be released in 2011. For new product information, please check **http://standardproducts.nxp.com/mosfets**

Small-signal MOSFET – Schottky combination

types in **bold** represent new products

Package																SOT1118
Size (mm)																2.0 x 2.0 x 0.65
P_{tot} (mW)																1250
Configuration	V_{DS} (V)	V_{GS} (V)	I_D (A)	$V_{GS}(th)$ min (V)	$V_{GS}(th)$ max (V)	t_{on} typ (ns)	t_{off} typ (ns)	Q_G typ (nC)	ESD protection (kV)	I_F (A)	V_R (V)	V_F typ. (mA)	R_{DSon} typ (mΩ) @ V_{GS} = 4.5 V	2.5 V	1.8 V	
single + schottky	20	8	3.3	0.5	1.5	15	92	4.5	1	2	30	455	58	72	100	**PMFPB6545UP**
			3.3	0.5	1.5	15	92	4.5	1	2.2	30	325	58	72	100	**PMFPB6532UP**

Small-signal MOSFETs dual (P-channel)

types in **bold** represent new products

Package													SOT363 (SC-88)	SOT666 (SC-88)	SOT1118
Size (mm)													2.0 x 1.25 x 0.95	1.6 x 1.2 x 0.55	2.0 x 2.0 x 0.65
P_{tot} (mW)													300	300	1250
V_{DS} (V)	V_{GS} (V)	I_D (A)	$V_{GS}(th)$ min (V)	$V_{GS}(th)$ max (V)	t_{on} typ (ns)	t_{off} typ (ns)	Q_G typ (nC)	ESD protection (kV)	R_{DSon} typ (mΩ) @ V_{GS} = 10 V	4.5 V	2.5 V	1.8 V			
20	8	3.3	0.5	1.5	15	92	4.5	1	-	58	72	100			**PMDPB65UP**
50	20	0.2	tbd	tbd	tbd	tbd	tbd	1	5300	6000	-	-	BSS84AKS*	BSS84AKV*	

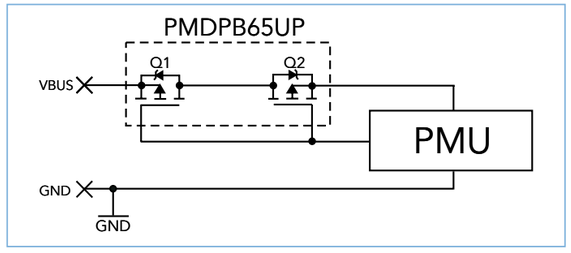
* Products to be released in 2011. For new product information, please check **http://standardproducts.nxp.com/mosfets**

In the Spotlight

Dual P-channel ESD protected MOSFET in small 0.65 mm flat, 2 x 2 mm leadless package (PMDPB65UP)

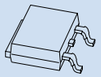
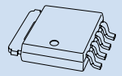
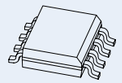
- ESD protected MOSFET of >1 kV HBM
- Very low R_{DSon} of <70 mΩ at V_{GS} = 4.5 V
- 1.8 V R_{DSon} rating for operation at low voltage gate drive levels
- Best-in-class thermal performance due to extra heatsink
- Smallest 2 x 2 mm leadless package dual P-channel; 0.65 mm package height

USB OTG Vbus protection



12 V - 25 V N-channel MOSFETs

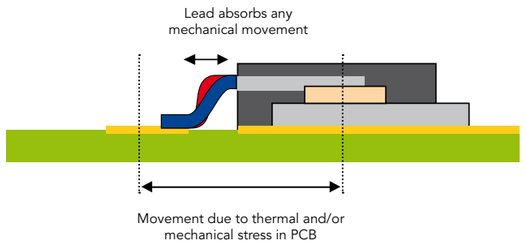
types in **bold** represent new products

Package		Typenumber	V_{DS} [max] (V)	R_{DSon} [max] @ V_{GS} = 10 V (mΩ)	R_{DSon} [max] @ V_{GS} = 4.5 V (mΩ)	I_D [max] (A)	$Q_{g(tot)}$ [typ] (nC)
D²PAK (SOT404)		PHB66NQ03LT	25	10.5	-	66	12
DPAK (SOT428)		PHD38N02LT	20	-	-	44.7	15.1
		PHD97NQ03LT	25	6.3	10.6	75	11.7
IPAK (SOT533)		PHU97NQ03LT	25	6.6	-	75	-
Power-SO8 (LFPAK)		PH2520U	20	-	2.7	100	78
		PH3120L	20	2.65	3.7	100	48.5
		PH2925U	25	-	3	100	92
		PSMN1R2-25YL	25	1.2	1.85	100	50.6
		PSMN1R5-25YL	25	1.5	2.2	100	36
SO8 (SOT96-1)		PHKD6N02LT	20	-	-	10.9	15.3
		PSMN006-20K	20	-	5	32	32

For the most up to date product information, please visit **http://standardproducts.nxp.com/mosfets**

LFPAK for mechanical & thermal ruggedness

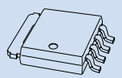
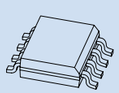
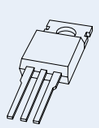
NXP LFPAK



LFPAK pins provide compliance and allow for thermal expansion due to temperature difference between the MOSFET & PCB and also mechanical strain due to PCB bending & flexing

30 V N-channel MOSFETs

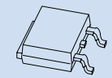
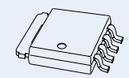
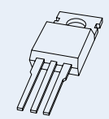
types in **bold** represent new products

Package	Typenumber	V_{DS} [max] (V)	R_{DSon} [max] @ V_{GS} = 10 V (mΩ)	R_{DSon} [max] @ V_{GS} = 4.5 V (mΩ)	I_D [max] (A)	$Q_{g(tot)}$ [typ] (nC)
DPAK (SOT428)	PHD71NQ03LT	30	10	-	75	13.2
	PHD36N03LT	30	17	22	43.4	18.5
Power-SO8 (LFPAK) 	**PSMN1R0-30YLC**	30	1.15	1.4	100	50
	PSMN1R3-30YL	30	1.3	1.95	100	46.6
	PSMN1R5-30YL	30	1.5	1.9	100	36.2
	PSMN1R7-30YL	30	1.7	2.1	100	36.2
	PSMN2R0-30YL	30	2	2.63	100	30
	PSMN2R5-30YL	30	2.4	3.16	100	27
	PSMN3R0-30YL	30	3	4.04	100	21
	PSMN3R5-30YL	30	3.5	4.61	100	19
	PSMN4R0-30YL	30	4	5.25	100	17.6
	PSMN4R5-30YLC	30	4.8	6.1	84	9.6
	PSMN5R0-30YL	30	5	6.7	91	14.1
	PSMN6R0-30YL	30	6	7.87	79	11
	PSMN7R0-30YL	30	7	9.1	76	10
	PSMN9R0-30YL	30	8	11.03	61	8.7
QFN3333 (SOT873-1)	**PSMN3R5-30LL**	30	3.6	5.6	40	18
	PSMN3R8-30LL	30	3.7	5.8	40	38
	PSMN5R8-30LL	30	5.8	8	40	24
	PSMN9R0-30LL	30	9	13	21	20.6
	PSMN013-30LL	30	13	19	21	12.2
	PSMN017-30LL	30	17	25	15	10
SO8 (SOT96-1) 	PHK12NQ03LT	30	-	14	11.8	-
	PSMN3R2-30KL	30	3.5	3.8	30	70.3
	PHK31NQ03LT	30	4.4	-	30.4	-
	PSMN005-30K	30	5.5	8	-	34
	PHK28NQ03LT	30	6.5	7.7	23.7	30.3
	PHK18NQ03LT	30	8.9	-	20.3	-
	SI4410DY	30	13.5	20	10	21.5
	PHK13N03LT	30	20	26	13.8	10.7
	PHKD13N03LT	30	20	26	10.4	10.7
	PHN203	30	30	55	6.3	14.6
	PHN210T	30	100	200	3.4	-
TO-220AB (SOT78) 	**PSMN1R6-30PL**	30	1.7	2.1	100	101
	PSMN1R8-30PL	30	1.8	2.3	100	83
	PSMN2R0-30PL	30	2.1	2.8	100	55
	PSMN2R7-30PL	30	2.7	3.6	100	32
	PSMN3R4-30PL	30	3.4	4.1	100	31
	PSMN4R3-30PL	30	4.3	6.2	100	19
	PHP36N03LT	30	17	22	43.4	18.5
	PSMN022-30PL	30	22	34	30	4.4

For the most up to date product information, please visit **http://standardproducts.nxp.com/mosfets**

40 V - 55 V N-channel MOSFETs

types in **bold** represent new products

Package	Typenumber	V_{DS} [max] (V)	R_{DSon} [max] @ V_{GS} = 10 V (mΩ)	R_{DSon} [max] @ V_{GS} = 4.5 V (mΩ)	I_D [max] (A)	$Q_{g(tot)}$ [typ] (nC)
D²PAK (SOT404)	PHB191NQ06LT	55	3.7	4.4	75	95.6
	PHB21N06LT	55	70	-	19	-
	PHB20N06T	55	75	-	20.3	11
DPAK (SOT428) 	PHD20N06T	55	77	-	18	11
Power-SO8 (LFPAK) 	**PSMN2R6-40YS**	40	2.8	-	100	63
	PSMN3R3-40YS	40	3.3	-	100	49
	PSMN4R0-40YS	40	4.2	-	100	38
	PSMN5R8-40YS	40	5.7	-	90	28.8
	PSMN8R3-40YS	40	8.6	-	70	20
	PSMN014-40YS	40	14	-	46	12
QFN3333 (SOT873-1)	**PSMN7R0-40LS**	40	7	-	40	21.4
TO-220AB (SOT78) 	**PSMN2R2-40PS**	40	2.1	-	100	110
	PSMN2R8-40PS	40	2.8	-	100	71
	PSMN4R5-40PS	40	4.6	-	100	35
	PSMN8R0-40PS	40	7.6	-	77	17
	PHP191NQ06LT	55	3.7	4.4	75	95.6
	PHP20N06T	55	75	-	20.3	11

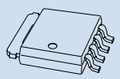
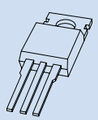
For the most up to date product information, please visit **http://standardproducts.nxp.com/mosfets**

Part numbering for PSMN types

P S M	N	1 R 7	-	3 0	Y	S
MOSFET Brand name	**MOSFET type N -ch or P -ch**	**MOSFET on - resistance R_{DSon}**	**-**	**MOSFET voltage BV_{DSS}**	**Package type**	**Gate threshold voltage**
Power Silicon Max	N = N -ch	R95 = 0.95 mΩ	-	25 = 25 V	B = D²PAK SOT404	X = Extremely low
	P = P -ch	1R7 = 1.7 mΩ	-	30 = 30 V	D = DPAK SOT428	L = logic level
	X = Dual N -ch	014 = 14 mΩ	-	40 = 40 V	E = I²PAK SOT226	S = standard level
	X = Dual P -ch	125 = 125 mΩ	-	60 = 60 V	K = SO8 SOT96	
	Z = N -ch + P -ch		-	80 = 80 V	L = QFN3333 SOT873	
			-	100 = 100 V	P = TO220 SOT78	
			-	110 = 110 V	Y = LFPAK SOT669 & SOT1023	

60 V - 80 V N-channel MOSFETs

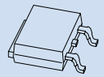
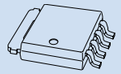
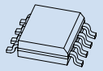
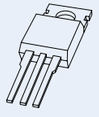
types in **bold** represent new products

Package	Typenumber	V_{DS} [max] (V)	R_{DSon} [max] @ V_{GS} = 10 V (mΩ)	I_D [max] (A)	$Q_{g(tot)}$ [typ] (nC)
D²PAK (SOT404)	PSMN004-60B	60	3.6	75	168
	PHB32N06LT	60	37	34	17
	PHB29N08T	75	-	27	19
	PSMN005-75B	75	5	75	165
	PSMN008-75B	75	8.5	75	122.8
	PHB110NQ08T	75	9	75	113.1
Power-SO8 (LFPAK) 	**PSMN5R5-60YS**	60	5.2	100	56
	PSMN7R0-60YS	60	6.4	89	45
	PSMN8R5-60YS	60	8	76	39
	PSMN012-60YS	60	11.1	59	28.4
	PSMN017-60YS	60	15.7	44	20
	PSMN030-60YS	60	24.7	29	13
	PSMN8R2-80YS	80	8.5	82	55
	PSMN011-80YS	80	11	67	45
	PSMN013-80YS	80	12.9	60	37
	PSMN018-80YS	80	18	45	26
	PSMN026-80YS	80	27.5	34	20
	PSMN045-80YS	80	45	24	12.5
QFN3333 (SOT873-1)	**PSMN014-60LS**	60	14	40	19.6
	PSMN023-80LS	80	23	34	21
TO-220AB (SOT78) 	**PSMN3R0-60PS**	60	3	100	130
	PSMN4R6-60PS	60	4.6	100	70.8
	PSMN7R6-60PS	60	7.8	92	38.7
	PSMN015-60PS	60	14.8	50	20.9
	PHP29N08T	75	-	27	19
	PSMN008-75P	75	8.5	75	122.8
	PHP79NQ08LT	75	16	73	30
	PSMN4R4-80PS	80	4.1	100	112
	PSMN5R0-80PS	80	4.7	100	87
	PSMN6R5-80PS	80	6.9	100	71
	PSMN8R7-80PS	80	8.7	90	52
	PSMN012-80PS	80	11	74	36
	PSMN017-80PS	80	17	50	26
	PSMN050-80PS	80	46	22	9

For the most up to date product information, please visit **http://standardproducts.nxp.com/mosfets**

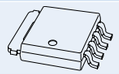
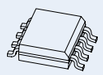
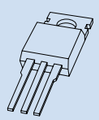
100 V - 110 V N-channel MOSFETs

types in **bold** represent new products

Package	Typenumber	V_{DS} [max] (V)	R_{DSon} [max] @ V_{GS} = 10 V (mΩ)	I_D [max] (A)	$Q_{g(tot)}$ [typ] (nC)
D²PAK (SOT404)	PSMN009-100B	100	8.8	75	156
	PSMN015-100B	100	15	75	90
	PHB45NQ10T	100	25	47	61
	PHB47NQ10T	100	28	47	66
	PHB27NQ10T	100	50	28	-
	PHB18NQ10T	100	90	18	-
DPAK (SOT428) 	PSMN025-100D	100	25	47	61
I²PAK (SOT226)	**PSMN7R0-100ES**	100	6.8	100	125
	PSMN013-100ES	100	13.9	68	59
Power-SO8 (LFPAK) 	**PSMN012-100YS**	100	12	60	64
	PSMN016-100YS	100	16.3	51	54
	PSMN020-100YS	100	20.5	43	41
	PSMN028-100YS	100	27.5	42	33
	PSMN039-100YS	100	39.5	28.1	23
	PSMN069-100YS	100	72.4	17	14
QFN3333 (SOT873-1)	**PSMN035-100LS**	100	32	27	23
SO8 (SOT96-1) 	PHK12NQ10T	100	28	11.6	35
	PSMN038-100K	100	38	-	43
	PHKD3NQ10T	100	90	3	-
TO-220AB (SOT78) 	**PSMN5R6-100PS**	100	5.6	100	141
	PSMN7R0-100PS	100	6.8	100	125
	PSMN009-100P	100	8.8	75	156
	PSMN9R5-100PS	100	9.6	89	82
	PSMN013-100PS	100	13.9	68	59
	PSMN015-100P	100	15	75	90
	PSMN015-110P	110	15	75	90
	PSMN016-100PS	100	16	96	49
	PHP45NQ10T	100	25	47	61
	PHP45NQ11T	105	25	47	60
	PSMN027-100PS	100	26.8	37	30
	PSMN034-100PS	100	34.5	32	23.8
	PHP27NQ11T	110	50	27.6	30
	PHP23NQ11T	110	70	23	22
	PHP18NQ10T	100	90	18	
	PHP18NQ11T	110	90	18	21

For the most up to date product information, please visit **http://standardproducts.nxp.com/mosfets**

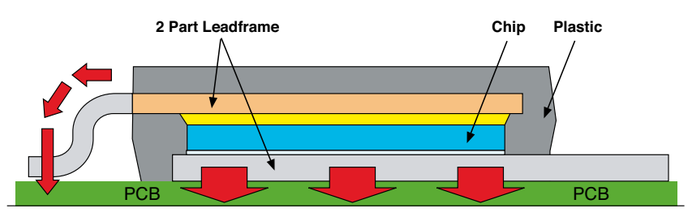
150 V - 300 V N-channel MOSFETs

Package	Typenumber	V_{DS} [max] (V)	R_{DSon} [max] @ V_{GS} = 10 V (mΩ)	I_D [max] (A)	$Q_{g(tot)}$ [typ] (nC)
D²PAK (SOT404)	PSMN030-150B	150	30	55.5	-
	PSMN035-150B	150	35	50	79
	PHB45NQ15T	150	42	45.1	32
	PSMN057-200B	200	57	39	-
	PSMN070-200B	200	70	35	-
	PHB33NQ20T	200	77	32.7	32.2
	PHB20NQ20T	200	130	20	-
DPAK (SOT428)	PSMN063-150D	150	63	29	55
	PSMN130-200D	200	130	20	-
	PHD9NQ20T	200	400	8.7	-
Power-SO8 (LFPAK) 	PSMN059-150Y	150	59	43	-
	PSMN102-200Y	200	102	21.5	-
QFN3333 (SOT873-1)	PML260SN	200	294	8.8	13.3
	PML340SN	220	386	7.3	13.2
SO8 (SOT96-1) 	PHK5NQ15T	150	75	5	29
	PSMN085-150K	150	85	-	40
	PSMN165-200K	200	165	-	40
TO-220AB (SOT78) 	PSMN030-150P	150	30	55.5	-
	PSMN035-150P	150	35	50	79
	PHP30NQ15T	150	63	29	55
	PHP28NQ15T	150	65	28.5	24
	PSMN057-200P	200	57	39	-
	PSMN070-200P	200	70	35	-
	PHP33NQ20T	200	77	32.7	32.2
	PHP20NQ20T	200	130	20	-
	PHP9NQ20T	200	400	8.7	-

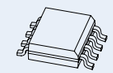
For the most up to date product information, please visit **http://standardproducts.nxp.com/mosfets**

Power-SO8 (LFPAK) Design

- Low Thermal resistance
- Low Electrical resistance
- Low Inductance

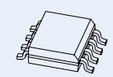


P-channel MOSFETs

Package	Typenumber	V_{DS} [max] (V)	R_{DSon} [max] @ V_{GS} = 10 V (mΩ)	R_{DSon} [max] @ V_{GS} = 4.5 V (mΩ)	I_D [max] (A)	$Q_{g(tot)}$ [typ] (nC)
SO8 (SOT96-1) 	PHK04P02T	-16	-	120	-4.66	-
	PMK50XP	-20	-	50	-7.9	10
	PMK30EP	-30	19	30	-14.9	50
	PMK35EP	-30	19	35	-14.9	42
	PHP225	-30	250	-	-	-

For the most up to date product information, please visit **http://standardproducts.nxp.com/mosfets**

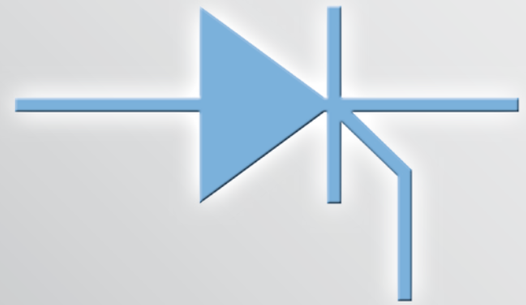
Multi-chip MOSFETs

Package	Typenumber	V_{DS} [max] (V)	R_{DSon} [max] @ V_{GS} = 10 V (mΩ)	R_{DSon} [max] @ V_{GS} = 4.5 V (mΩ)	I_D [max] (A)	$Q_{g(tot)}$ [typ] (nC)
SO8 (SOT96-1) 	PHKD6N02LT	20	-	20 @ 5 V	10.9	dual N-channel
	PHKD13N03LT	30	20	26	10.4	dual N-channel
	PHN203	30	30	-	6.3	dual N-channel
	PHC21025	30, -30	100, 250	-	3.5, -2.3 @ 80 °C	complementary pair
	PHP225	-30	250	-	-2.3 @ 80 °C	dual P-channel
	PHKD3NQ10T	100	90	-	3	dual N-channel

For the most up to date product information, please visit **http://standardproducts.nxp.com/mosfets**

Part numbering for PH types

P	H	P	4	4	N	Q	0	3	L	T
MOSFET Brand name		Package type	Current rating I_D (A)		MOSFET type N-ch or P-ch	Q-Trench	MOSFET voltage V_{DSS}		Gate threshold voltage	Trench MOS
PH		B = D²PAK	44 = 44 A		N = N-ch	Q = low gate charge Q_{GD}	02 = 20 V		'Blank' = Standard level	T = Trench
PH		D = DPAK	33 = 33 A		P = P-ch		03 = 25 - 30 V		L = logic level	
PH		P = TO220AB	20 = 20 A				06 = 55 - 60 V			
PH		T = SOT223	12 = 12 A				08 = 75 - 80 V			
PH		X = SOT186A (isolated TO220AB)					10 = 100 V			
PH		K = SO8					11 = 110 V			
PH		KD = Dual SO8					15 = 150 V			



Thyristors

4-Quadrant Triacs 86

3-Quadrant Triacs 88

AC Thyristors 89

Silicon Controlled Rectifiers 89

4-Quadrant Triacs

types in **bold** represent new products

$I_{T(RMS)}$ (A)	V_{DRM} (V)	I_{GT} (max) (mA)	SOT54 (TO92)	SOT78 (TO220AB)	SOT78D (internally insulated TO220AB)	SOT82	SOT186A (isolated TO220AB)	SOT223	SOT404 (D^2PAK)	SOT428 (DPAK)
0.6	400	5/5/5/7	MAC97A6							
	600	5/5/5/7	MAC97A8							
	400 / 600	5/5/5/7	BT1306-D							
0.8	400 / 600	5/5/5/7	BT1308-D					BT1308W-D		
	600	5/5/5/7	Z00607MA							
1	600	3/3/3/7						BT131W		
	600 / 800	3/3/3/7	BT131							
	600 / 800	5/5/5/7	BT131-D							
	600 / 800	10/10/10/10	BT131-E							
	600 / 800	3/3/3/5	Z0103MA/NA					Z0103MN/NN		
	600 / 800	5/5/5/7	Z0107MA/NA					Z0107MN/NN		
	600 / 800	10/10/10/10	Z0109MA/NA					Z0109MN/NN		
	600 / 800	3/3/3/5	**Z0103MA0/NA0****					**Z0103MN0/NN0****		
	600 / 800	5/5/5/7	**Z0107MA0/NA0****					**Z0107MN0/NN0****		
	600 / 800	10/10/10/10	**Z0109MA0/NA0****					**Z0109MN0/NN0****		
	600	5/5/5/10	BT132-D*							
4	600	D/E/-/G				BT134				
	800	E/-				BT134				
	600	D/-		BT136			BT136X			BT136S
	600	F					BT136X			BT136S
	600 / 800	E		BT136			BT136X		BT136B	BT136S
	800	F								BT136S
	800	-					BT136X			BT136S
6	600	F/-/G					BT236X			
	800	-/G					BT236X			
8	600	D/-/G		BT137			BT137X			BT137S
	600	E		BT137			BT137X		BT137B	BT137S
	600	F					BT137X		BT137B	BT137S
	800	E		BT137			BT137X			BT137S
	800	F							BT137B	BT137S
	800	-		BT137			BT137X		BT137B	
	800	G							BT137B	BT137S
12	600	D		BT138			BT138X			
	600	-/G		BT138			BT138X		BT138B	
	600	F					BT138X		BT138B	
	600 / 800	E		BT138	BT138Y		BT138X		BT138B	
	800	F					BT138X			
	800	-		BT138			BT138X			
	800	G		BT138						

* Large chip / high I_{TSM}
** Enhanced immunity to false triggering

4-Quadrant Triacs

$I_{T(RMS)}$ (A)	V_{DRM} (V)	I_{GT} (max) (mA)	SOT78 (TO220AB)	SOT186A (isolated TO220AB)	SOT404 (D^2PAK)
16	600	E/-	BT139	BT139X	BT139B
	600	F		BT139X	BT139B
	600	G		BT139X	BT139B
	800	E	BT139		BT139B
	800	F			BT139B
	800	-	BT139	BT139X	BT139B
	800	G	BT139		BT139B
20	600	50/50/50/75		MAC223A8X	
25	400	50/50/50/75	MAC223A6		
	600 / 800	-	BTA140		

* Large chip / high I_{TSM}
** Enhanced immunity to false triggering

4-Quadrant Triacs part numbering

Type number → **BT137X-600D**

V_{DRM} (V) → 600

Package identifier

- **-** = TO220AB (SOT78)
- **B** = D^2PAK (SOT404)
- **S** = DPAK (SOT428)
- **W** = SOT223
- **X** = SOT186A (isolated TO220AB)
- **Y** = SOT78D (internally insulated TO220)

BT131, BT132D use TO92 (SOT54) package
BT134 uses SOT82 package

Gate sensitivity I_{GT}max

- **D** = 5, 5, 5, 10 mA
- **E** = 10, 10, 10, 25 mA
- **F** = 25, 25, 25, 70 mA
- **-** = 35, 35, 35, 70 mA
- **G** = 50,50,50,100 mA

MSD850

Thyristors

3-Quadrant Triacs

types in **bold** represent new products

$I_{T(RMS)}$ (A)	V_{DRM} (V)	I_{GT} (max) (mA)	SOT54 (TO92)	SOT78 (TO220AB)	SOT78D (internally insulated TO220AB)	SOT186A (isolated TO220AB)	SOT223	SOT404 (D^2PAK)	SOT428 (DPAK)
0.8	600 / 800	D/E	BTA2008						
1	600 / 800	B/E/ER	BTA201						
	600 / 800	E					BTA201W		
2	600 / 800	D/E				BTA202X			
4	600	B/C/D/E/F		BTA204		BTA204X			BTA204S
	800	B/C/E		BTA204		BTA204X			BTA204S
	1000	C				**BTA204X**			**BTA204S**
8	600	B/D/E/F		BTA208		BTA208X			BTA208S
	800	B/E		BTA208		BTA208X			BTA208S
	800	F		**BTA208**		BTA208X			**BTA208S**
	1000	B				BTA208X			
	1000	C				BTA208X		BTA208B	
	1000	5 min - 35 max				BTA208X-1000C0			
12	600	D		BTA312		BTA312X		BTA312B	
	600	CT		BTA312		BTA312X		BTA312B	
	600 / 800	B/C/E		BTA312		BTA312X		BTA312B	
	600 / 800	C			BTA312Y				
	800	ET		BTA312				BTA312B	
	600 / 800	B/C			BTA412Y				
16	600	BT/D		BTA316					
	600 / 800	B/C/E		BTA316		BTA316X		BTA316B	
	600 / 800	ET		**BTA316**					
	800	10 min - 50 max				**BTA316X-800B0**			
	600 / 800	B/C			BTA416Y				
25	600	BT		BTA225					
	600 / 800	B		BTA225				BTA225B	

* Large chip / high I_{TSM}
T: high $T_j$max 150 °C

3-Quadrant Triacs part numbering

Type number — V_{DRM} (V) — T = High temperature, R = Reversed pinning

BTA312B-600CT

Package identifier
- **-** = TO220AB (SOT78)
- **B** = D^2PAK (SOT404)
- **S** = DPAK (SOT428)
- **W** = SOT223
- **X** = SOT186A (isolated TO220AB)
- **Y** = SOT78D (internally insulated TO220)

BTA2008, BTA201 use TO92 (SOT54) package

Gate sensitivity I_{GT}max
- **D** = 5, 5, 5 mA
- **E** = 10, 10, 10 mA
- **F** = 25, 25, 25 mA
- **C** = 35, 35, 35 mA
- **C0** = I_{GT} 5-35 mA
- **B** = 50, 50, 50 mA

MSD849

AC Thyristors

types in **bold** represent new products

$I_{T(RMS)}$ (A)	V_{DRM} (V)	I_{GT} (max) (mA)	SOT54 (TO92)	SOT223	SO8
0.2	600	D			**ACT102H**
0.8	600	D	**ACT108**	**ACT108W**	
	600	E	ACT108	ACT108W	

AC Thyristors part numbering

Type number — V_{DRM} (V)

ACT108W-600E

Package identifier
- **-** = TO92 (SOT54)
- **W** = SOT223
- **H** = SO8

Gate sensitivity I_{GT}max
- **E** = 10, 10 mA

Silicon Controlled Rectifiers

types in **bold** represent new products

$I_{T(RMS)}$ (A)	V_{DRM} & V_{RRM} (V)	I_{GT} (max) (mA)	SOT54 (TO92)	SOT78 (TO220AB)	SOT82	SOT186A (isolated TO220AB)	SOT223	SOT404 (D^2PAK)	SOT428 (DPAK)	SOT533 (IPAK)
0.8	400	0.012	EC103D1							
	400 (V_{DRM} only)	0.2	NXL0840							
	200 / 400 / 600	0.2	BT149B/D/G							
	200 / 400 / 600	0.2	BT169B/D/G							
	400	0.05	BT169D-L							
	800	0.1	BT169H							
	500 / 600	0.02 min - 0.2 max	BT168E/G							
	200	0.2					MCR08BT1			
1	600	0.02 min - 0.2 max					BT168GW			
	600	0.07 min - 0.45 max					**BT168GWF****			
	600	0.2					BT148W-R*			
4	400 / 500 / 600	0.2			BT148-R					
	600	0.2							BT150S-R	
	500	0.2		BT150-R						
8	800	0.05							BT258S-LT	
	500 / 600 / 800	0.2		BT258-R		BT258X-R				
	600	0.2								BT258U-R
	800	0.2							BT258S-R	
	600	5							BT300S-R	
12	500 / 650	5		BT151-L					BT151S-L	
	500 / 650 / 800	15		BT151-R		BT151X-R			BT151S-R	
	650	15							BTH151S-R	
	500 / 650 / 800	15		BT151-C		BT151X-C				BT151U-C
	500 / 1000	15		BT151-RT						
20	400 / 600 / 800	32		BT152-R		BT152X-R		BT152B-R		
	500	32		BT152-RT						
25	800	35		BT145-R						

* Large chip / high I_{TSM} ** Hi-Com / fast turn-off T: high $T_j$max 150 °C

SCRs part numbering

Type number — V_{DRM} (V) — High temperature

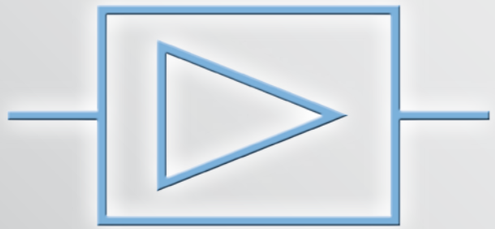
BT151 -500RT

Package identifier
- **-** = TO220AB (SOT78)
- **B** = D^2PAK (SOT404)
- **S** = DPAK (SOT428)
- **U** = IPAK (SOT533/TO251)
- **W** = SOT223
- **X** = SOT186A (isolated TO220AB)

BT149, BT168 & BT169 use TO92 (SOT54) package
BT148 uses SOT82 package

MSD848

Thyristors



Standard & advanced linear products

Adjustable shunt voltage regulator TL431 92

Adjustable shunt voltage regulator TLVH431 93

Discrete voltage regulator / Constant current source 94

Low-dropout regulator 95

Advanced linear ultra low-dropout voltage regulators 96

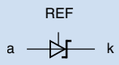
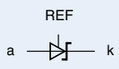
Adjustable shunt voltage regulator TL431

types in **bold** represent new products

Package					SOT23	
Size (mm)					2.9 x 1.3 x 1.0	
P_{tot} (mW)					580	
Pinning configuration					Normal pinning*	Mirrored pinning*
V_{KA} (V)	I_K (mA)	V_{ref}		T_{amb} (°C)		
36	100	2.495	2%	0 to 70	TL431CDBZR [1]	
				-40 to 85	TL431IDBZR [1]	
				-40 to 125	TL431QDBZR [1]	
					TL431FDT [2]	**TL431MFDT [2]**
					TL431SDT [3]	TL431MSDT [3]
			1%	0 to 70	TL431ACDBZR [1]	
				-40 to 85	TL431AIDBZR [1]	
				-40 to 125	TL431AQDBZR [1]	
					TL431AFDT [2]	**TL431AMFDT [2]**
					TL431ASDT [3]	TL431AMSDT [3]
			0.5%	0 to 70	TL431BCDBZR [1]	
				-40 to 85	TL431BIDBZR [1]	
				-40 to 125	TL431BQDBZR [1]	
					TL431BFDT [2]	**TL431BMFDT [2]**
					TL431BSDT [3]	TL431BMSDT [3]

[1] Offers enhanced stability area and very low load capacity requirement
[2] Offers higher ElectroMagnetic Interference (EMI) ruggedness, e.g. for Switch Mode Power Supply
[3] Is designed for standard requirements and linear applications

* Normal pinning vs. mirrored pinning for TL431

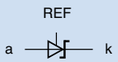
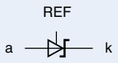
	Pin	Symbol	Description	Simplified outline	Grafic symbol
Normal pinning	1	k	cathode		
	2	REF	reference		
	3	a	anode		
Mirrored pinning	1	REF	reference		
	2	k	cathode		
	3	a	anode		

Adjustable shunt voltage regulator TLVH431

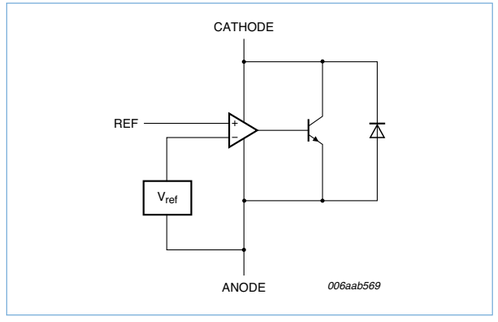
types in **bold** represent new products

Package					SOT23	
Size (mm)					2.9 x 1.3 x 1.0	
P_{tot} (mW)					580	
Pinning configuration					Normal pinning*	Mirrored pinning*
V_{KA} (V)	I_K (mA)	V_{ref}		T_{amb} (°C)		
20	80	1.24	1.5%	0 to 70	**TLVH431CDBZR**	
				-40 to 85	**TLVH431IDBZR**	
				-40 to 125	**TLVH431QDBZR**	**TLVH431MQDBZR**
			1%	0 to 70	**TLVH431ACDBZR**	
				-40 to 85	**TLVH431AIDBZR**	
				-40 to 125	**TLVH431AQDBZR**	**TLVH431AMQDBZR**
			0.5%	0 to 70	**TLVH431BCDBZR**	
				-40 to 85	**TLVH431BIDBZR**	
				-40 to 125	**TLVH431BQDBZR**	**TLVH431BMQDBZR**

* Normal pinning vs. mirrored pinning for TLVH431

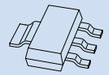
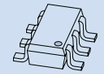
	Pin	Symbol	Description	Simplified outline	Grafic symbol
Normal pinning	1	REF	reference		
	2	k	cathode		
	3	a	anode		
Mirrored pinning	1	k	cathode		
	2	REF	reference		
	3	a	anode		

Functional diagram



Standard & advanced linear products

Discrete voltage regulator

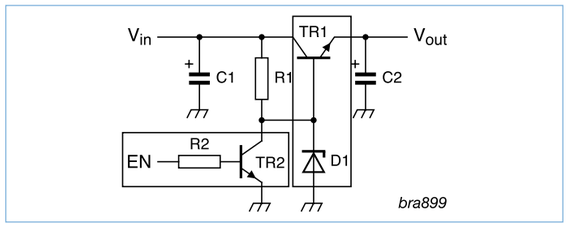
Package					SOT223 (SC-73)	SOT457 (SC-74)
						
Size (mm)					6.5 x 3.5 x 1.65	2.9 x 1.5 x 1.0
P_{tot} (mW)					1300	380
Zener diode		Transistor				
V_{out} (V)	V_z min - V_z max (V) @ I_z = 5 mA	V_{CEO} (V)	I_C (A)	h_{FE} min @ I_C = 100 mA		
2.5	3.23 - 3.37	45	0.1	160	PVR100AZ-B2V5	PVR100AD-B2V5
3.0	3.53 - 3.67	45	0.1	160	PVR100AZ-B3V0	PVR100AD-B3V0
3.3	3.82 - 3.98	45	0.1	160	PVR100AZ-B3V3	PVR100AD-B3V3
5.0	5.49 - 5.71	45	0.1	160	PVR100AZ-B5V0	PVR100AD-B5V0
12.3	12.7 - 13.3	45	0.1	160	PVR100AZ-B12V	PVR100AD-B12V

Key features
- A bipolar transistor and an integrated Zener diode, internally connected to build a voltage regulator
- Output voltage options V_{out}: 2.5 V, 3 V, 3.3 V, 5 V and 12 V

Key benefits
- Component count reduction
- Board space reduction
- Improved reliability

Key applications
- Linear voltage regulation

Discrete voltage regulator. PVR-series already include TR1 and D1, internally connected. A resistor-equipped transistor (RET) adds an output enable function.



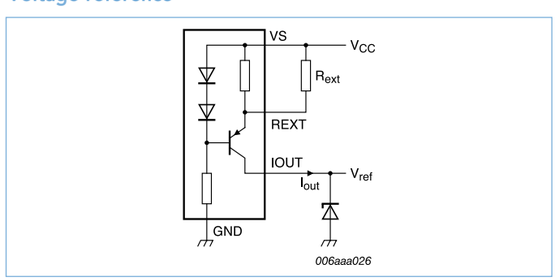
Constant current source

Package	SOT353 (SC-88A)						
Size (mm)	2.0 x 1.25 x 0.95						
P_{tot} (mW)	335						
Type	PSSI2021SAY						
Description	maximum supply voltage	maximum supply current	typical stabilized output current	minimum stabilized output current	maximum stabilized output current	typical load stability of stabilized output current	typical output current change over ambient temperature
Parameter	V_s max (V)	I_s max (mA)	I_{out} typ (µA)	I_{out} min (mA)	I_{out} max (mA)	$\Delta I_{out}/I_{out}$ typ (%)	$\Delta I_{out}/(I_{out} \cdot \Delta T_{amb})$ typ (%/K)
Condition		@ V_s = 12 V; I_{out} = 15 µA; V_{out} = 1 V to 10 V	@ V_s = 12 V; V_{out} = 1 V to 10 V; R_{ext} = open			@ V_s = 12 V; V_{out} = 1 V to 10 V	@ V_s = 12 V; V_{out} = 1 V; T_{amb} = -55 °C to 150 °C
Value	75	2.2	15	0.015	50	0.5	0.15

Key features and benefits
- Single-chip constant current source with reduced component count
- Output current set by an external resistor
- Very small footprint package for smaller designs

Key applications
- Constant current LED driver
- Generic constant current source
- Active bias control for audio amplifiers

Voltage reference

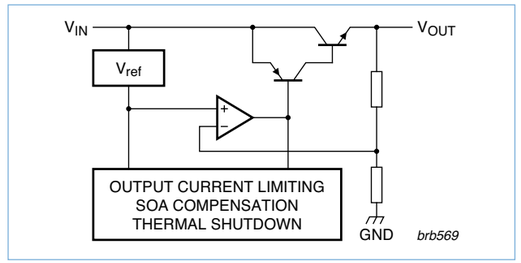


Low-dropout adjustable and fixed linear voltage regulator NX1117

types in **bold** represent new products

Package					SOT223 (SC-73)
Size (mm)					6.5 x 3.5 x 1.65
P_{tot} (mW)					1700
V_{max} (V)	I_{max} (A)	V_{out} drop (V) @ 800 mA	V_{out} (V)	$V_{out\ tolerance}$	T_{amb} (°C)
					-40 to 125
20	1	1.1	1.25 adj	1%	**NX1117CADJZ**
			1.2		**NX1117C12Z**
			1.5		**NX1117C15Z**
			1.8		**NX1117C18Z**
			1.9		**NX1117C19Z**
			2.0		**NX1117C20Z**
			2.5		**NX1117C25Z**
			2.85		**NX1117C285Z**
			3.3		**NX1117C33Z**
			5.0		**NX1117C50Z**
			12.0		**NX1117C120Z**

Functional diagram: fixed output voltage version



Key applications
- Post regulator for switching DC/DC converter
- High efficiency linear regulators
- Battery charger
- Battery powered instrumentation
- Low voltage micro-controller
- PC motherboard
- LCD TV, set top box
- DVD player

In the Spotlight

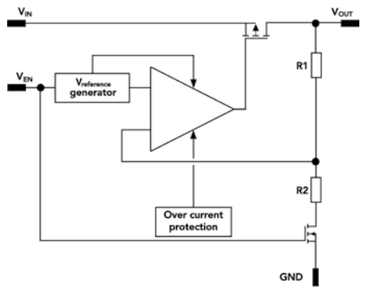
Low-dropout linear voltage regulator NX1117

- Adjustable or fixed output voltage version in SOT223 package
- Output voltage accuracy of 1%
- Wide input voltage range up to 20 V
- Maximum output current of 1 A
- Output current limiting and thermal shutdown
- Temperature range −40 °C to 125 °C

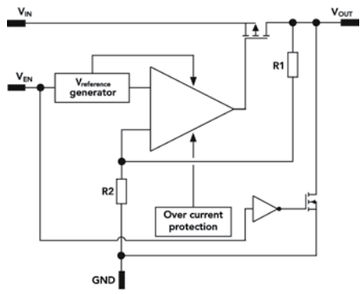
LD6805 Ultra low-dropout voltage regulators – 150 mA

types in **bold** represent new products

Package							SOT1194	
Size (mm)							1.0 x 1.0 x 0.55	
P_{tot} @ °C						mW	400	
							V_{OUT_nom}	
V_{in} (V)	I_{out} typ (mA)	Quiescent current (uA)	V_{out} drop @ 150 mA (mV)	output noise µVrms (typ)	PSRR @ 1 kHz dB	Output voltage (V)	LD6805K/vvH High ohmic output stage	LD6805K/vvP Pull down output stage
2.3 - 5.5	150	35	250	50	75	1.2	**LD6805K/12H**	**LD6805K/12P**
						1.4	**LD6805K/14H**	**LD6805K/14P**
						1.6	**LD6805K/16H**	**LD6805K/16P**
						1.7	**LD6805K/17H**	**LD6805K/17P**
						1.8	**LD6805K/18H**	**LD6805K/18P**
						2.2	**LD6805K/22H**	**LD6805K/22P**
						2.3	**LD6805K/23H**	**LD6805K/23P**
						2.5	**LD6805K/25H**	**LD6805K/25P**
						2.8	**LD6805K/28H**	**LD6805K/28P**
						2.9	**LD6805K/29H**	**LD6805K/29P**
						3.0	**LD6805K/30H**	**LD6805K/30P**
						3.3	**LD6805K/33H**	**LD6805K/33P**
						3.6	**LD6805K/36H**	**LD6805K/36P**



Remark: Version with high-ohmic (tri-stated) output during disable



Remark: output with pull-down switch for disable

Key features
- High power supply ripple rejection (PSRR)
- Ultra low-dropout voltage and low noise
- Very small package size

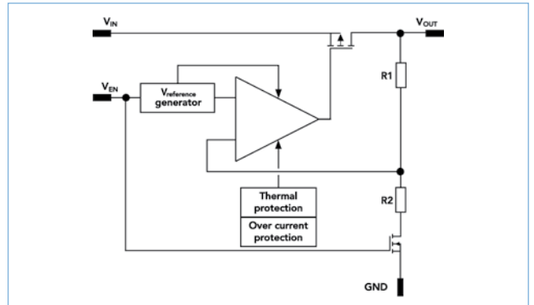
Key benefits
- No additional noise bypass capacitor needed
- Very low-dropout voltage for extended battery usage
- Lower power dissipation

Key applications
- Mobile phone handsets, cordless telephones, personal digital devices (applications requiring component miniaturization)

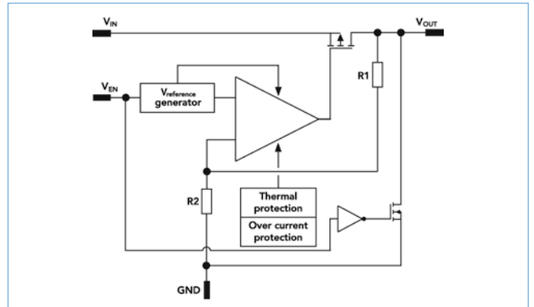
LD6806 Ultra low-dropout voltage regulators – 200 mA

types in **bold** represent new products

Package							SOT886		CSP 4	
Size (mm)							1.45 x 1.0 x 0.5		0.76 × 0.76 × 0.47	
P_{tot} @°C						mW	450		600	
V_{in} (V)	I_{out} typ (mA)	Quiescent current (uA)	V_{out} drop @ 200 mA (mV)	output noise µVrms (typ)	PSRR @ 1 kHz dB	Output voltage (V)	LD6806F/vvH	LD6806F/vvP	LD6806CX4/vvH	LD6806CX4/vvP
2.3 - 5.5	200	70	60	30	55	1.2	**LD6806F/12H**	**LD6806F/12P**	**LD6806CX4/12H**	**LD6806CX4/12P**
						1.4	**LD6806F/14H**	**LD6806F/14P**	**LD6806CX4/14H**	**LD6806CX4/14P**
						1.6	**LD6806F/16H**	**LD6806F/16P**	**LD6806CX4/16H**	**LD6806CX4/16P**
						1.7	**LD6806F/17H**	**LD6806F/17P**	**LD6806CX4/17H**	**LD6806CX4/17P**
						1.8	**LD6806F/18H**	**LD6806F/18P**	**LD6806CX4/18H**	**LD6806CX4/18P**
						2.2	**LD6806F/22H**	**LD6806F/22P**	**LD6806CX4/22H**	**LD6806CX4/22P**
						2.3	**LD6806F/23H**	**LD6806F/23P**	**LD6806CX4/23H**	**LD6806CX4/23P**
						2.5	**LD6806F/25H**	**LD6806F/25P**	**LD6806CX4/25H**	**LD6806CX4/25P**
						2.8	**LD6806F/28H**	**LD6806F/28P**	**LD6806CX4/28H**	**LD6806CX4/28P**
						2.9	**LD6806F/29H**	**LD6806F/29P**	**LD6806CX4/29H**	**LD6806CX4/29P**
						3.0	**LD6806F/30H**	**LD6806F/30P**	**LD6806CX4/30H**	**LD6806CX4/30P**
						3.3	**LD6806F/33H**	**LD6806F/33P**	**LD6806CX4/33H**	**LD6806CX4/33P**
						3.6	**LD6806F/36H**	**LD6806F/36P**	**LD6806CX4/36H**	**LD6806CX4/36P**



Remark: Version with high-ohmic (tri-stated) output during disable



Remark: output with pull-down switch for disable

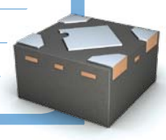
Key benefits
- Ultra low-dropout voltage (60mV@200mA) for extended battery usage
- No additional noise bypass capacitor needed
- Smallest CSP package
- Lower power dissipation

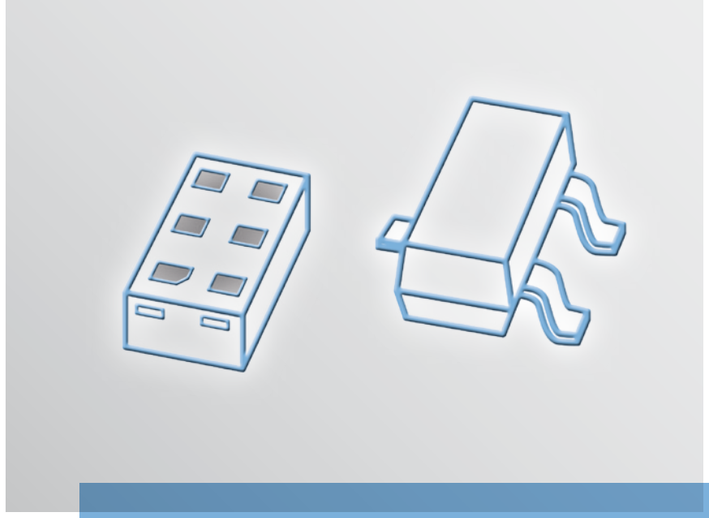
Key applications
- Mobile phone handsets, cordless telephones, personal digital devices (applications requiring component miniaturization)

In the Spotlight

Ultra low-dropout voltage regulators – LD680x

- Typical output current 150 mA (LD6805) and 200 mA LDOs (LD6806)
- Ultra low-dropout voltage → 60 mV @ 200 mA (LD6806)
- Ultra high power supply ripple rejection (PSRR): 75 dB (LD6805)
- Low noise → 30 µVrms for LD6806 and 50µVrms for LD6805
- Smallest packages (WLCSP and Plastic SMD)





Packages

Package cross reference 100

Packing methods 102

Minimized outline drawings and reflow soldering footprint 108

Package cross reference

Pins / leads	NXP	Industry standard names	Size (l x w x h) (mm)	P_{tot} (mW)	Package	Competitor synonyms								
						Rohm	Toshiba	ON Semi	Renesas	Infineon	Diodes Inc	KEC	Vishay	Semtech
2	**SOD27**	DO-35	4.25 x 1.85 x 0.56	500		GSD			DO-35		DO-35		DO-204AH	
	SOD66	DO-41	4.8 x 2.6 x 0.81	1300		GSR	DO-41				DO-41		DO-204AL	
	SOD68	DO-34	3.04 x 1.6 x 0.55	500		MSD								
	SOD80C	MiniMelf	3.5 x 1.5 x 1.5	300		LLDS			LLD		MiniMELF		MiniMELF	
	SOD123F	-	2.6 x 1.6 x 1.1	830		PMDU	S-Flat	SOD-123-FL			PowerDI123	SMF		
	SOD123W	-	2.6 x 1.7 x 1.0	900			S-Flat	SOD-123-FL			PowerDI123			
	SOD128	-	3.8 x 2.5 x 1.0	1000		PMDT	M-Flat							
	SOD323	SC-76	1.7 x 1.25 x 0.95	400			USC	SOD-323	URP	SOD323	SOD-323	USC	SOD323	
	SOD323F	SC-90	1.7 x 1.25 x 0.7	830		UMD2	US-Flat				PowerDI323			
	SOD523	SC-79	1.2 x 0.8 x 0.6	500		EMD2	ESC/TESC	SOD-523	UFP	SC79		ESC	SOD523	
	SOD882	-	1.0 x 0.6 x 0.5	250			CTS2			TSLP-2	DFN1006-2			
	SOD882D	-	1.0 x 0.6 x 0.37	250						TSLP-2-7	DFN1006H4-2			
3	**SOT1061**	HUSON3	2.0 x 2.0 x 0.65	1300				WDFN3			DFN2020-3		PowerPAK SC706L	
	SOT23	-	2.9 x 1.3 x 1.0	250		SSD3/SST3		SOT-23		SOT23	SOT-23	SOT-23	SOT23	
	SOT323	SC-70	2.0 x 1.25 x 0.95	200		UMD3/ UMT3	USM	SC-70	CMAK/CM-PAK	SOT323	SOT-323	USM	SC-70 3 leads	
	SOT416	SC-75	1.6 x 0.8 x 0.77	150		EMD3/EMT3	SSM	SC-75	SMPAK	SC75			SC-75A	
	SOT883	SC-101	1.0 x 0.6 x 0.5	250			SS CSP2			TSLP-3-1	DFN1006-3			
	SOT89	SC-62	4.5 x 2.5 x 1.5	1300		MPT3	PW-Mini	SOT-89	UPAK (SOT89)	SOT89		SOT-89		
4	**SOT143B**	-	2.9 x 1.3 x 1.0	250			CP4		MPAK-4R	SOT143	SOT-143			
	SOT223	SC-73	6.5 x 3.5 x 1.65	1700				SOT-223		SOT223	SOT-223	SOT-223	SOT223	
5	**SOT353**	SC-88A	2.0 x 1.25 x 0.95	300		UMD5/ UMT5	USV	SC-88A	CMPAK-5(T)			USV	SOT353	
	SOT665	-	1.6 x 1.2 x 0.55	300		EMD5/EMT5	ESV	SOT-553	VSON-5			TESV		
6	**SOT363**	SC-88	2.0 x 1.25 x 0.95	300		UMD6/ UMT6	US6	SC-88	CMPAK-6	SOT363	SOT-363	US6	SOT363	
	SOT457	SC-74	2.9 x 1.5 x 1.0	750		SMD6/SMT6	SM6	SC-74	TSOP-6	SC74		TSOP6	TSOP-6	
	SOT666	-	1.6 x 1.2 x 0.55	300		EMD6/EMT6	ES6	SOT-563	SMFPAK-6	SOT666	SOT563	TES6	SC89-6lead	
	SOT1118	-	2.0 x 2.0 x 0.65	1300				6 Lead DFN			DFN2020B-6			
	SOT886	XSON6	1.45 x 1.0 x 0.5	250										SLP1510N6
	SOT891	XSON6	1.0 x 1.0 x 0.5	-			CS6							

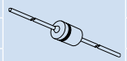
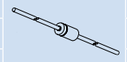
Pins / leads	NXP	Industry standard names	Size (l x w x h) (mm)	P_{tot} (mW)	Package	Competitor synonyms							
						Rohm	Toshiba	ON Semi	Renesas	Infineon	KEC	Vishay	Semtech
8	**SOT505**	TSSOP8	3.0 x 3.0 x 1.1	-				TSSOP-8			TSSOP8		
	SOT96	SO8	4.9 x 3.9 x 1.75	1500		SOP8	FM8	SOIC-8 NB	SOP-8		FLP-8	SO8	
8 + 1	**SOT983**	HXSON8	1.7 x 1.35 x 0.5	-				UDFN 1.7 x 1.35, 0.4P					SLP1713P8
	SOT1157	HXSON8	1.2 x 1.7 x 0.5	-				UDFN8, 1.8 x 1.2, 0.4P					
	SOT1166	HUSON8	1.35 x 1.7 x 0.55	-									SLP1713P8
9	**SOT1178**	XSON9	1.0 x 2.1 x 0.5	-									SLP2010P8T
10	**SOT1165**	XSON10	1.0 x 2.5 x 0.5	-				UDFN10 2.5 x 1, 0.5P		TSLP-9-1			SLP1610P4
	SOT1176	XSON10	1.0 x 2.5 x 0.5	-				UDFN10 2.5 x 1, 0.5P		TSLP-9-1			SLP1610P4
	SOT552	TSSOP10	3.0 x 3.0 x 1.1	-				Micro10		TSSOP10			MSOP-10L
12+1	**SOT984**	HXSON12	2.5 x 1.35 x 0.5	-									SLP2513P12
	SOT1158	HXSON12	1.2 x 2.5 x 0.5	-				UDFN12, 2.5 x 1.2, 0.4P					
	SOT1167	HUSON12	1.35 x 2.5 x 0.55	-				UDFN12, 2.5 x 1.35, 0.4P					SLP2513P12
14	**SOT108**	SO14	8.65 x 3.9 x 1.75	-		SOP14				DSO14			
16 + 1	**SOT985**	HXSON16	3.3 x 1.35 x 0.5	-				UDFN16, 3.3 x 1.35, 0.4P					SLP3313P16
	SOT1159	HXSON16	1.2 x 3.3 x 0.5	-				UDFN16, 3.5 x 1.2, 0.4P					
	SOT1168	HUSON16	1.35 x 3.3 x 0.55	-									SLP3313P16
20	**SOT360**	TSSOP20	6.5 x 4.4 x 1.1	-				TSSOP20		TSSOP20			
38	**SOT510**	TSSOP38	9.7 x 4.4 x 1.1	-						TSSOP38			

Packing methods SMD

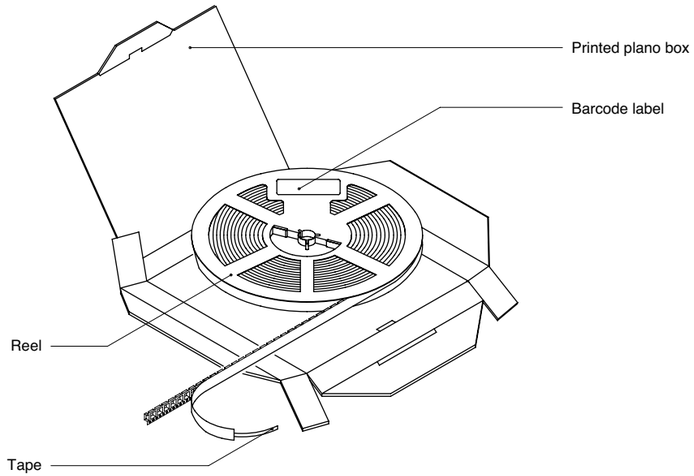
Pins / leads	Package	Packing method and tape dimension	Reel dimension (d x w) (mm)	Taping	Package	Packing quantity and ordering code (12 NC ending)							
						800	1000	2500	3000	4000	8000	9000	10000
2	SOD80C	4 mm pitch, 8 mm tape and reel	180 x 8	-		-	-	-115	-	-	-	-	-
		4 mm pitch, 8 mm tape and reel	330 x 8	-		-	-	-	-	-	-	-	-135
	SOD123F	4 mm pitch, 8 mm tape and reel	180 x 8	-		-	-	-	-115	-	-	-	-
	SOD123W	4 mm pitch, 8 mm tape and reel	180 x 8	-		-	-	-	-115	-	-	-	-
	SOD128	4 mm pitch, 12 mm tape and reel	180 x 12	-		-	-	-	-115	-	-	-	-
	SOD323	4 mm pitch, 8 mm tape and reel	180 x 8	-		-	-	-	-115	-	-	-	-
		4 mm pitch, 8 mm tape and reel	286 x 8	-		-	-	-	-	-	-	-	-135
	SOD323F	4 mm pitch, 8 mm tape and reel	180 x 8	-		-	-	-	-115	-	-	-	-
	SOD523	2 mm pitch, 8 mm tape and reel	180 x 8	-		-	-	-	-	-	-315	-	-
		4 mm pitch, 8 mm tape and reel	180 x 8	-		-	-	-	-115	-	-	-	-
		4 mm pitch, 8 mm tape and reel	286 x 8	-		-	-	-	-	-	-	-	-135
	SOD882	2 mm pitch, 8 mm tape and reel	180 x 8	-		-	-	-	-	-	-	-	-315
	SOD882D	2 mm pitch, 8 mm tape and reel	180 x 8	-		-	-	-	-	-	-	-	-315
	SOD962	2 mm pitch, 8 mm tape and reel	180 x 8	-		-	-	-	-	-	-	-315	-
3	SOT23	4 mm pitch, 8 mm tape and reel	180 x 8	-		-	-	-	-215	-	-	-	-
		4 mm pitch, 8 mm tape and reel	286 x 8	-		-	-	-	-	-	-	-	-235
	SOT89	8 mm pitch, 12 mm tape and reel	180 x 12	T1		-	-115	-	-	-	-	-	-
		8 mm pitch, 12 mm tape and reel	330 x 12	T1		-	-	-	-	-135	-	-	-
		8 mm pitch, 12 mm tape and reel	180 x 12	T3		-	-146	-	-	-	-	-	-
		8 mm pitch, 12 mm tape and reel	180 x 12	T4		-	-147	-	-	-	-	-	-
	SOT323	4 mm pitch, 8 mm tape and reel	180 x 8	-		-	-	-	-115	-	-	-	-
		4 mm pitch, 8 mm tape and reel	286 x 8	-		-	-	-	-	-	-	-	-135
	SOT404	16 mm pitch, 24 mm tape and reel	330 x 24	-		-118	-	-	-	-	-	-	-
	SOT416	4 mm pitch, 8 mm tape and reel	180 x 8	-		-	-	-	-115	-	-	-	-
		4 mm pitch, 8 mm tape and reel	286 x 8	-		-	-	-	-	-	-	-	-135
	SOT428	8 mm pitch, 16 mm tape and reel	330 x 16	-		-	-	-118	-	-	-	-	-
	SOT663	4 mm pitch, 8 mm tape and reel	180 x 8	-		-	-	-	-	-115	-	-	-
	SOT883	2 mm pitch, 8 mm tape and reel	180 x 8	-		-	-	-	-	-	-	-	-315
	SOT1061	4 mm pitch, 8 mm tape and reel	180 x 8	-		-	-	-	-115	-	-	-	-
4	SOT143B	4 mm pitch, 8 mm tape and reel	180 x 8	-		-	-	-	-215	-	-	-	-
		4 mm pitch, 8 mm tape and reel	286 x 8	-		-	-	-	-	-	-	-	-235
	SOT223	8 mm pitch, 12 mm tape and reel	180 x 12	-		-	-115	-	-	-	-	-	-
		8 mm pitch, 12 mm tape and reel	330 x 12	-		-	-	-	-	-135	-	-	-

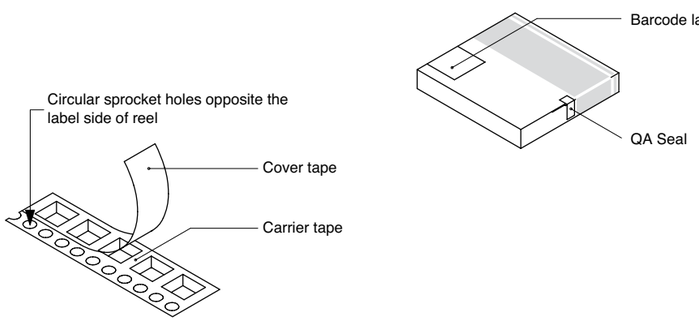
Pins / leads	Package	Packing method and tape dimension	Reel dimension (d x w) (mm)	Taping	Package	Packing quantity and ordering code (12 NC ending)							
						1000	1400	2500	3000	4000	5000	8000	10000
5	SOT353	4 mm pitch, 8 mm tape and reel	180 x 8	T1		-	-	-	-115	-	-	-	-
		4 mm pitch, 8 mm tape and reel	286 x 8	T1		-	-	-	-	-	-	-	-135
		4 mm pitch, 8 mm tape and reel	180 x 8	T2		-	-	-	-125	-	-	-	-
		4 mm pitch, 8 mm tape and reel	286 x 8	T2		-	-	-	-	-	-	-	-165
	SOT665	2 mm pitch, 8 mm tape and reel	180 x 8	-		-	-	-	-	-	-	-315	-
		4 mm pitch, 8 mm tape and reel	180 x 8	-		-	-	-	-	-115	-	-	-
6	SOT363	4 mm pitch, 8 mm tape and reel	180 x 8	T1		-	-	-	-115	-	-	-	-
		4 mm pitch, 8 mm tape and reel	286 x 8	T1		-	-	-	-	-	-	-	-135
		4 mm pitch, 8 mm tape and reel	180 x 8	T2		-	-	-	-125	-	-	-	-
		4 mm pitch, 8 mm tape and reel	286 x 8	T2		-	-	-	-	-	-	-	-165
	SOT457	4 mm pitch, 8 mm tape and reel	180 x 8	T1		-	-	-	-115	-	-	-	-
		4 mm pitch, 8 mm tape and reel	286 x 8	T1		-	-	-	-	-	-	-	-135
		4 mm pitch, 8 mm tape and reel	180 x 8	T2		-	-	-	-125	-	-	-	-
		4 mm pitch, 8 mm tape and reel	286 x 8	T2		-	-	-	-	-	-	-	-165
	SOT666	2 mm pitch, 8 mm tape and reel	180 x 8	-		-	-	-	-	-	-	-315	-
		4 mm pitch, 8 mm tape and reel	180 x 8	-		-	-	-	-	-115	-	-	-
	SOT1118	4 mm pitch, 8 mm tape and reel	180 x 8	-		-	-	-	-115	-	-	-	-
	SOT886	4 mm pitch, 8 mm tape and reel	180 x 8	T1		-	-	-	-	-	-115	-	-
		4 mm pitch, 8 mm tape and reel	180 x 8	T4		-	-	-	-	-	-132	-	-
	SOT891	4 mm pitch, 8 mm tape and reel	180 x 8	T4		-	-	-	-	-	-132	-	-
8	SOT505	8 mm pitch, 12 mm tape and reel	330 x 12	-		-	-	-118	-	-	-	-	-
	SOT873	8 mm pitch, 12 mm tape and reel	180 x 12	-		-	-118	-	-	-	-	-	-
	SOT96	8 mm pitch, 12 mm tape and reel	180 x 12	-		-115	-	-	-	-	-	-	-
		8 mm pitch, 12 mm tape and reel	330 x 12	-		-	-	-118	-	-	-	-	-

Packing methods glass diodes and through hole packages

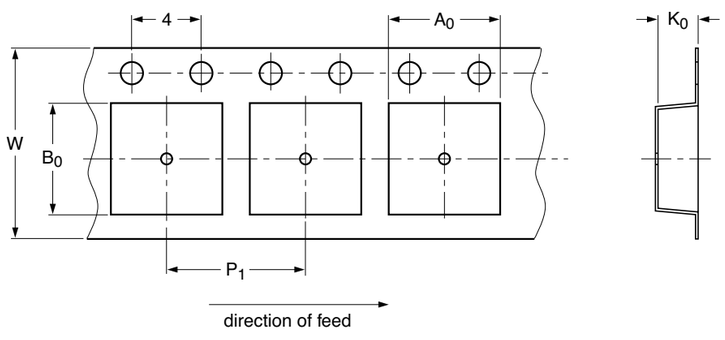
Pins / leads	Package	Packing method and tape/reel/tube dimensions	Package	Ordering code (12 NC ending)	Packing quantity
2	SOD27	26 mm tape ammo pack, axial		-143	5000 pcs
		52 mm tape ammo pack, axial		-133	10000 pcs
		52 mm reel pack, axial		-113	10000 pcs
	SOD59	Rail packing, 50 pcs/tube, tube length = 520 mm		-127	20 tubes x 50 pcs
	SOD66	52 mm tape ammo pack, axial		-133	10000 pcs
		52 mm reel pack, axial		-113	10000 pcs
	SOD68	26 mm tape ammo pack, axial		-143	5000 pcs
		52 mm reel pack, axial		-113	10000 pcs
		52 mm tape ammo pack, axial		-133	10000 pcs
	SOD113	Rail packing, 50 pcs/tube, tube length = 520 mm		-127	20 tubes x 50 pcs
3	SOT54	Bulk pack, 1000 pcs/carrier		-112	5 carriers x 1000 pcs
		55 mm reel packing, 2000 pcs/reel, reel dimensions = 380 x 55 mm		-116	5 reels x 2000 pcs
		Ammo packing, 18 mm tape, 2000 pcs/carrier, reel dimensions = 350 x 55 mm		-126	5 carriers x 2000 pcs
		Bulk pack, 1000 pcs/carrier		-412	5 carriers x 1000 pcs
	SOT78	Rail packing, 50 pcs/tube, tube length = 520 mm		-127	20 tubes x 50 pcs
	SOT78D	Rail packing, 50 pcs/tube, tube length = 520 mm		-127	20 tubes x 50 pcs
	SOT82	Rail packing, 50 pcs/tube, tube length = 390 mm		-127	20 tubes x 50 pcs
	SOT186A	Rail packing, 50 pcs/tube, tube length = 520 mm		-127	20 tubes x 50 pcs
	SOT226	Rail packing, 50 pcs/tube, tube length = 520 mm		-127	20 tubes x 50 pcs
	SOT533	Rail packing		-127	75 tubes x 50 pcs

Tape and reel pack for SMD packages





Carrier tape - tape and reel

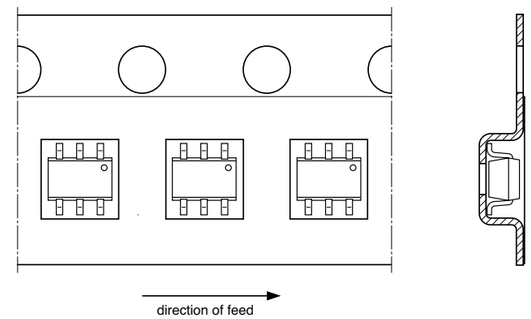


P1 = pitch (see table packing methods)
W = tape width (see table packing methods)

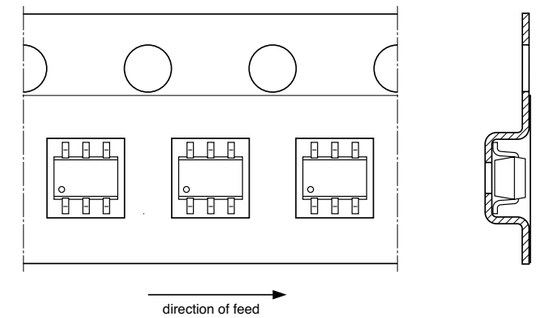
Compartment width (A_0), length (B_0) and depth (K_0) depending on package

Product orientation (tape and reel pack) T1-T4

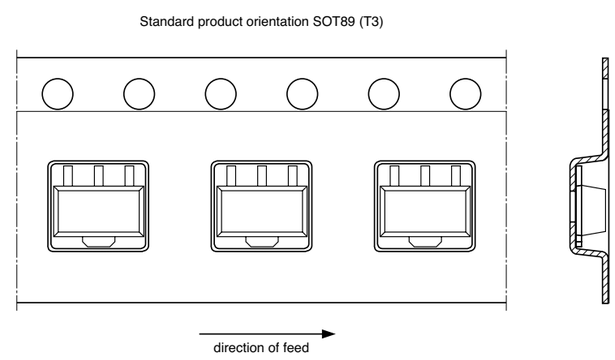
T1 taping



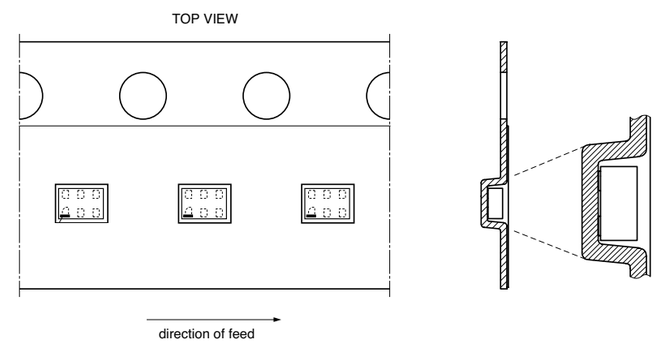
T2 taping



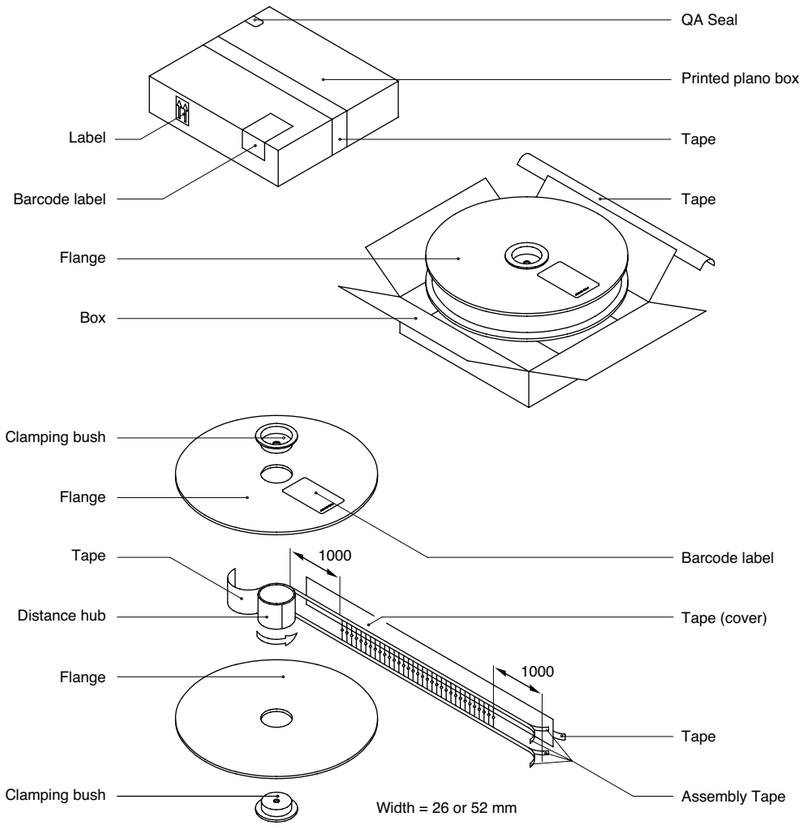
T3 taping

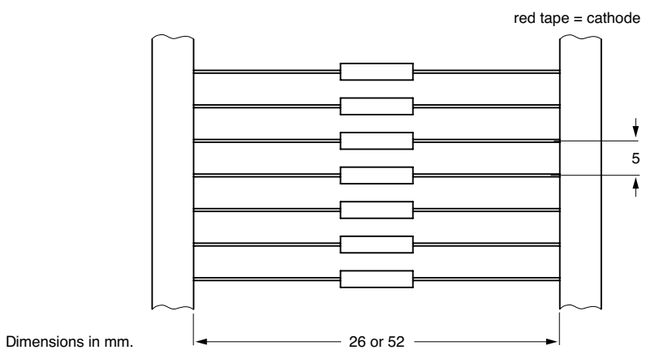


T4 taping

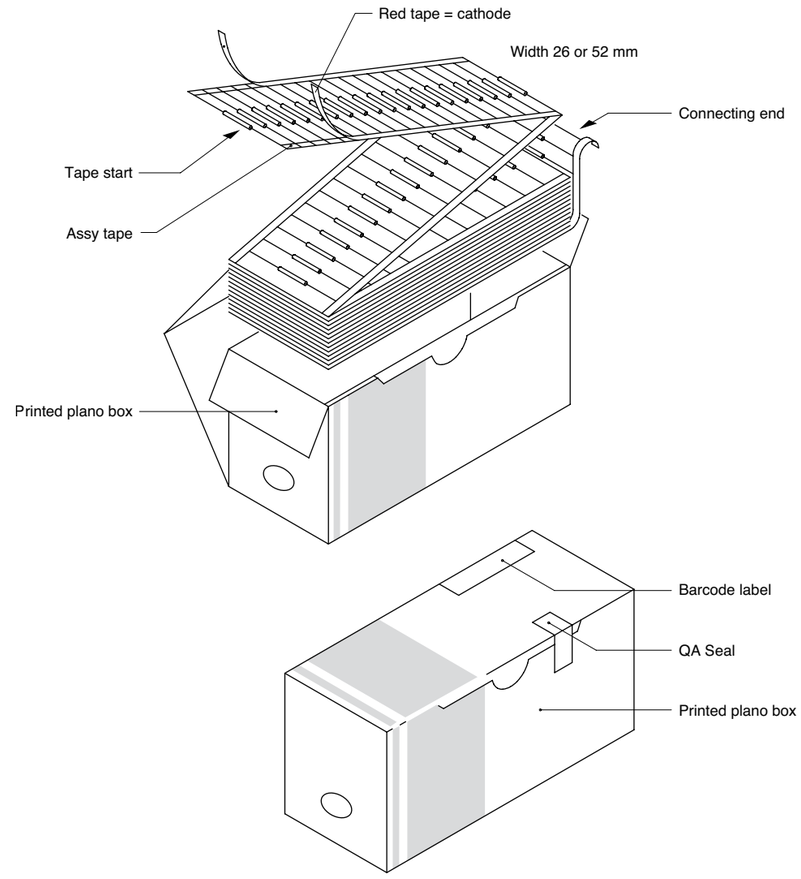


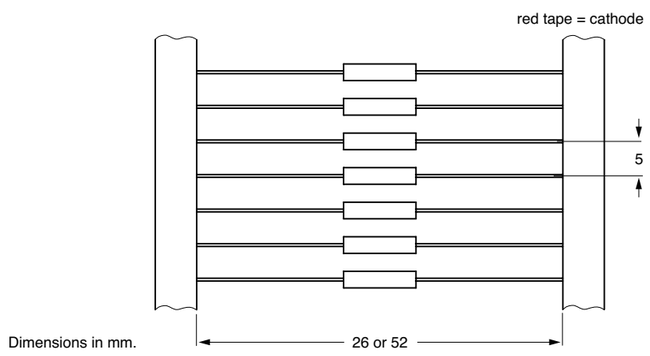
Reel pack axial tape for glass diodes



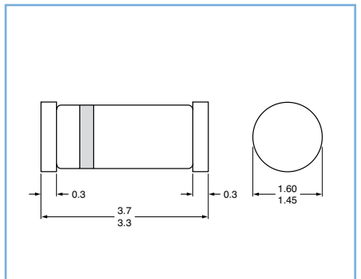


Ammo pack axial tape for glass diodes

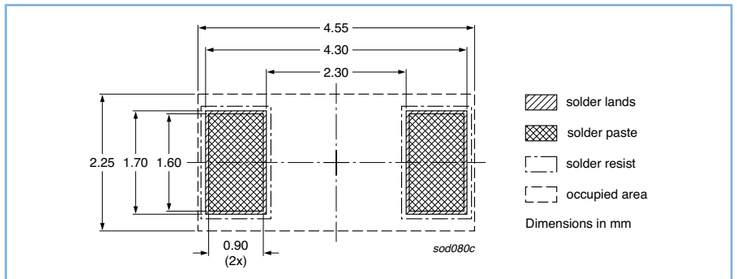




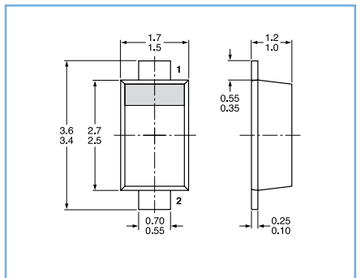
2-Pin SMD Packages



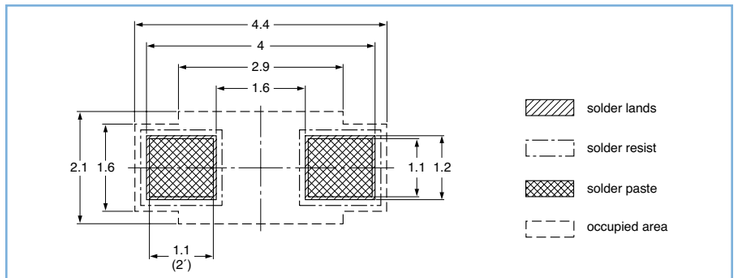
SOD80C



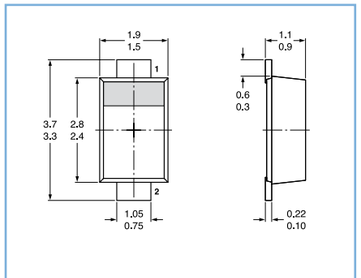
SOD80C



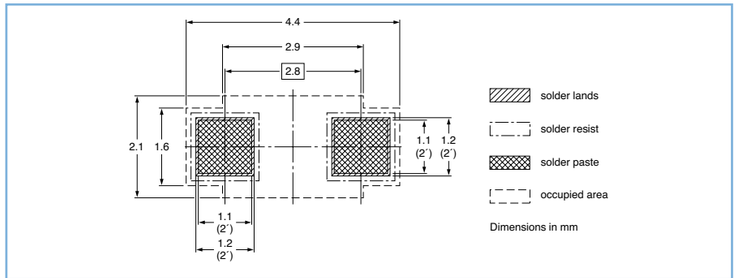
SOD123F



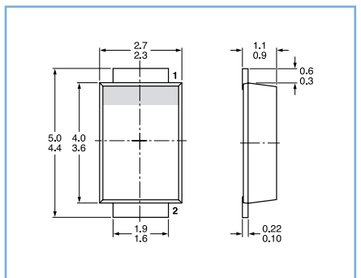
SOD123F



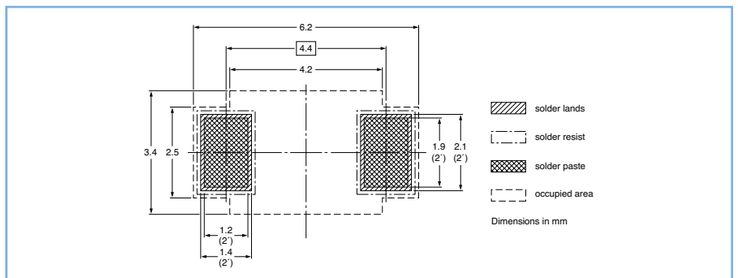
SOD123W



SOD123W

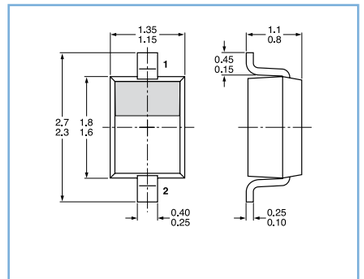


SOD128

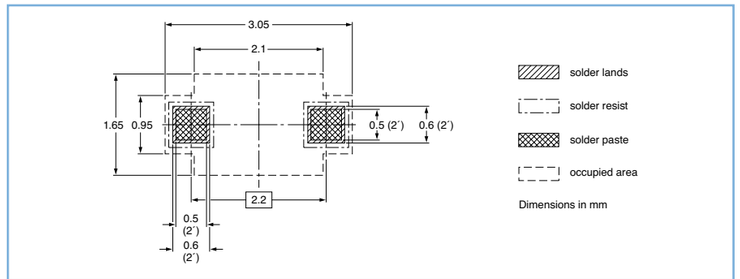


SOD128

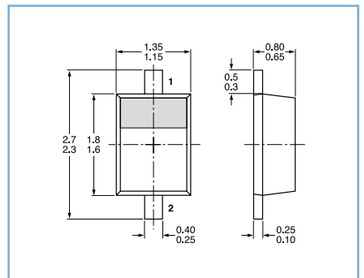
Dimensions in mm



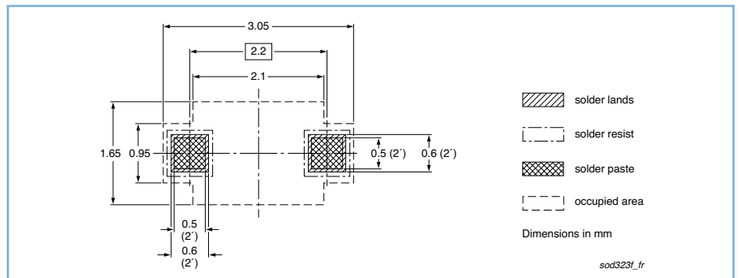
SOD323 (SC-76)



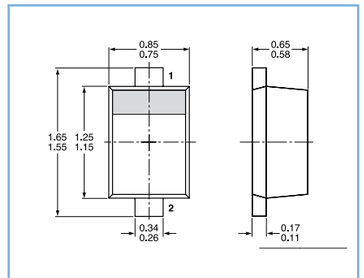
SOD323 (SC-76)



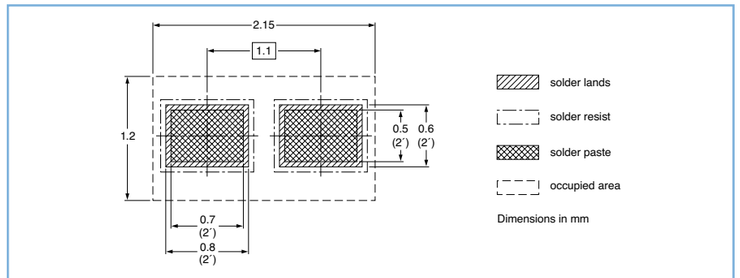
SOD323F (SC-90)



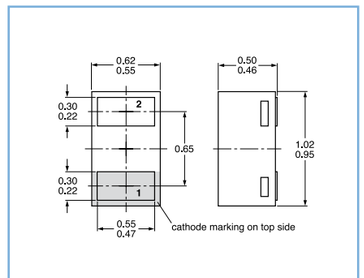
SOD323F (SC-90)



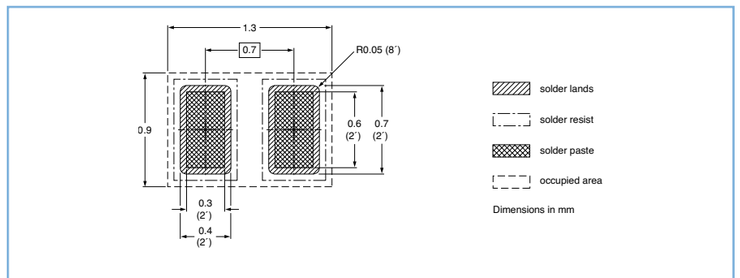
SOD523 (SC-79)



SOD523 (SC-79)

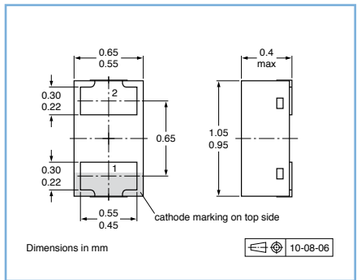


SOD882

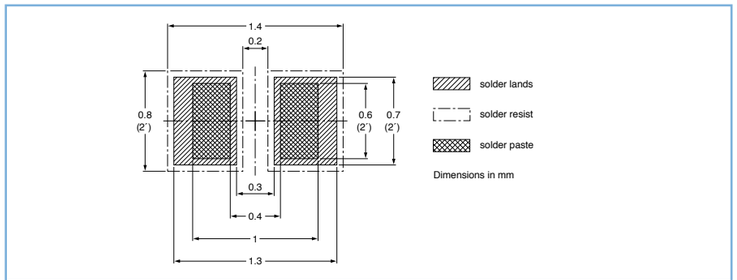


SOD882

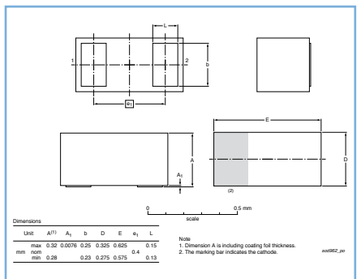
Dimensions in mm



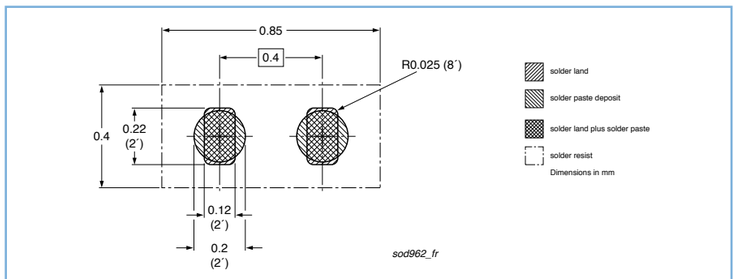
SOD882D



SOD882D

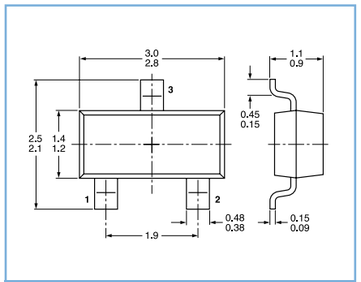


SOD962

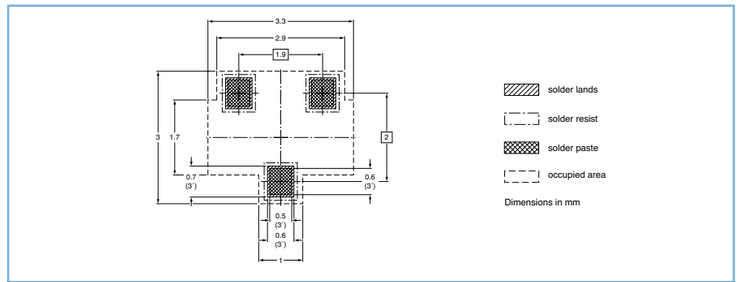


SOD962

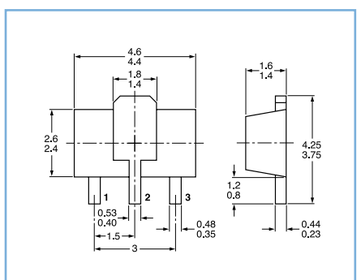
3-Pin SMD Packages



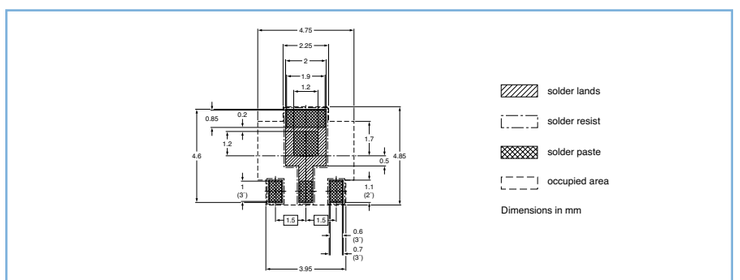
SOT23



SOT23

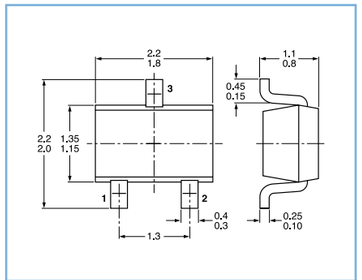


SOT89 (SC-62)

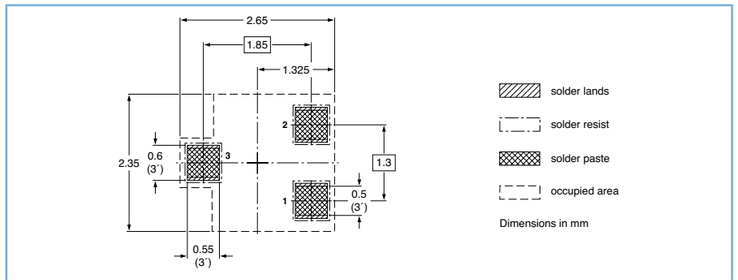


SOT89 (SC-62)

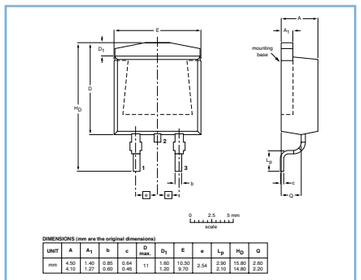
Dimensions in mm



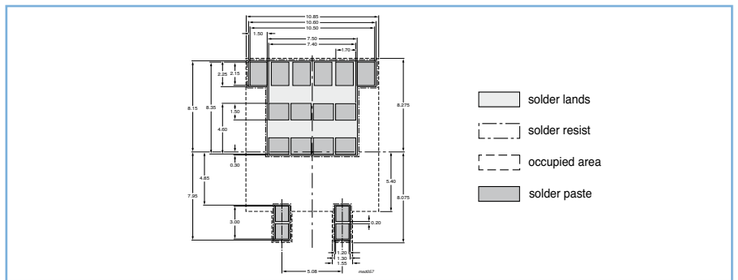
SOT323 (SC-70)



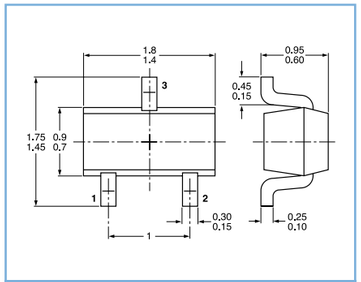
SOT323 (SC-70)



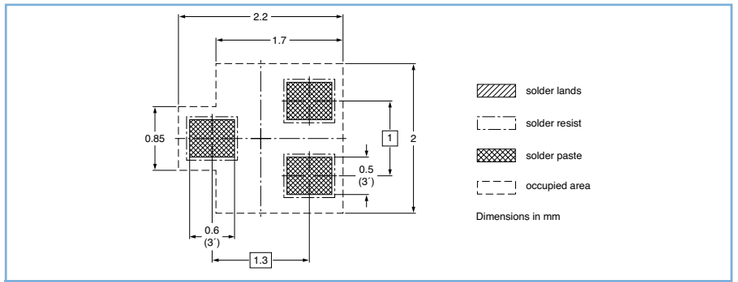
SOT404



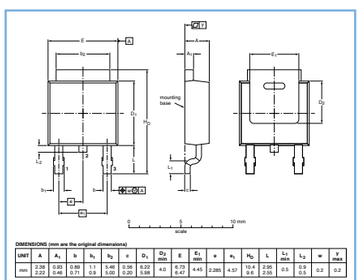
SOT404



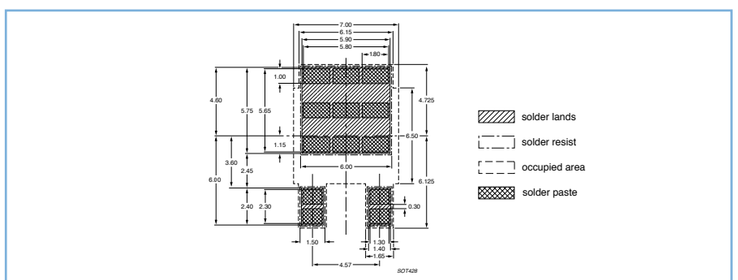
SOT416 (SC-75)



SOT416 (SC-75)



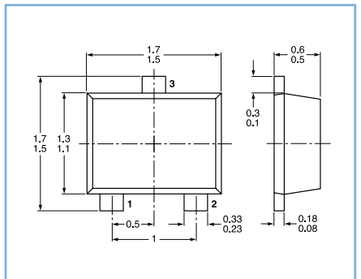
SOT428



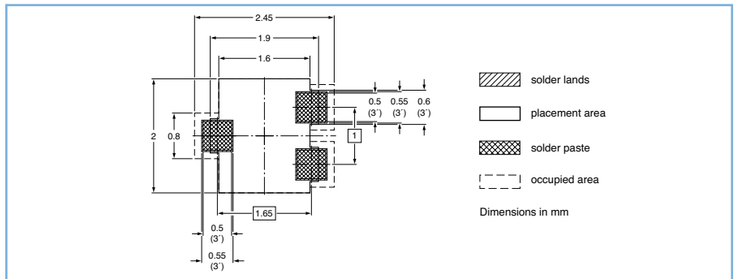
SOT428

Dimensions in mm

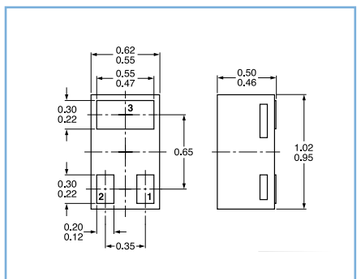
Packages



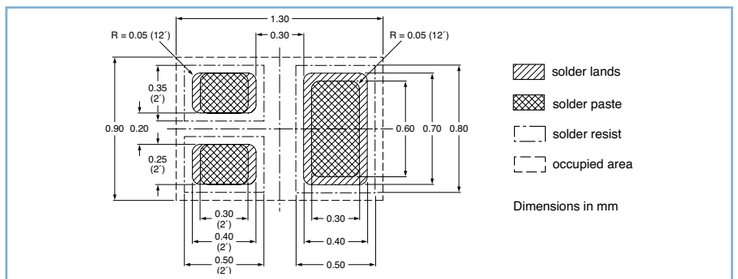
SOT663



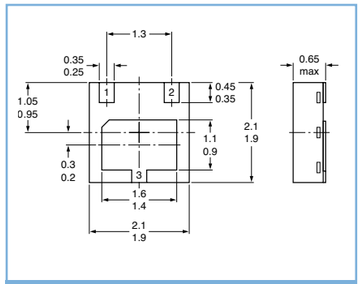
SOT663



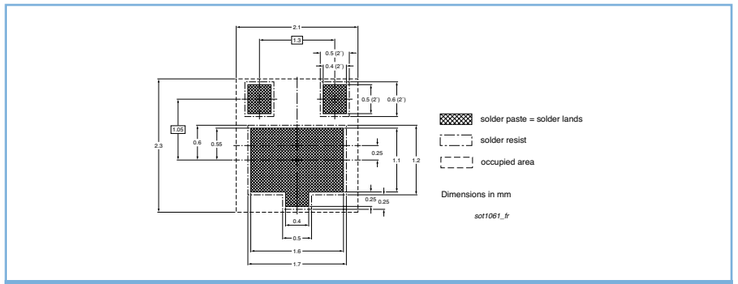
SOT883 (SC-101)



SOT883 (SC-101)

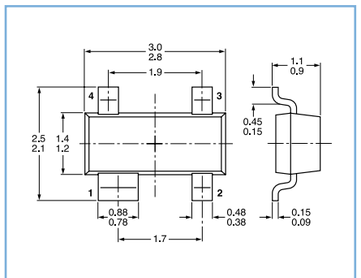


SOT1061

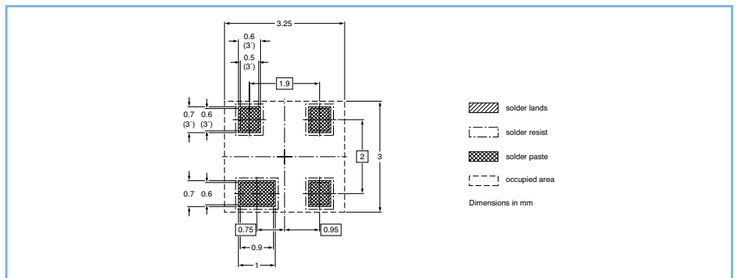


SOT1061

4-/5-Pin SMD Packages



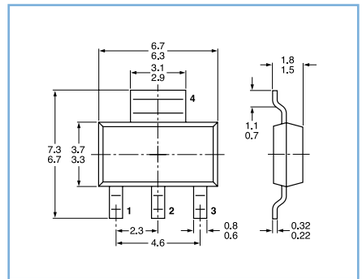
SOT143B



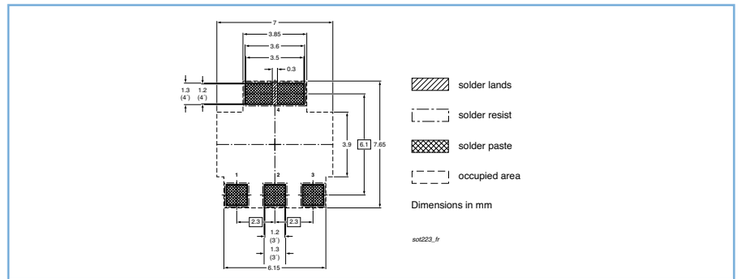
SOT143B

Dimensions in mm

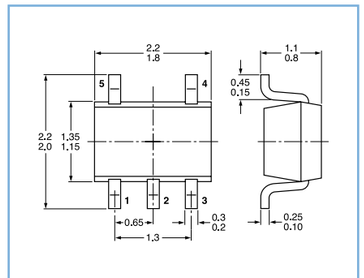
Minimized outline drawings and reflow soldering footprint



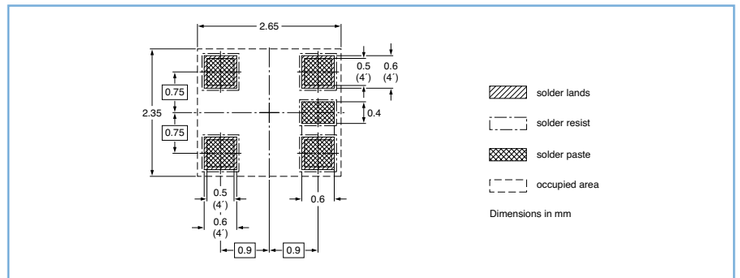
SOT223 (SC-73)



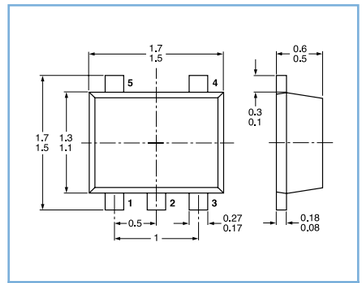
SOT223 (SC-73)



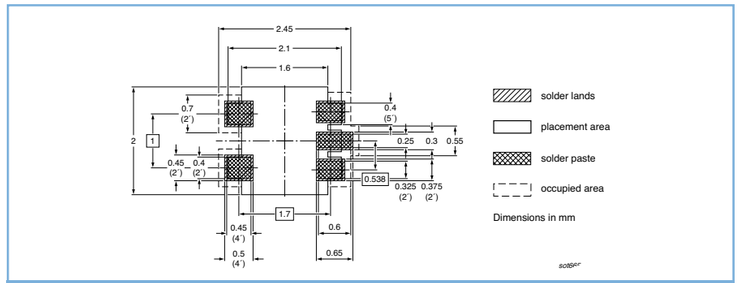
SOT353 (SC-88A)



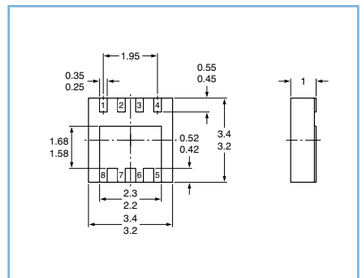
SOT353 (SC-88A)



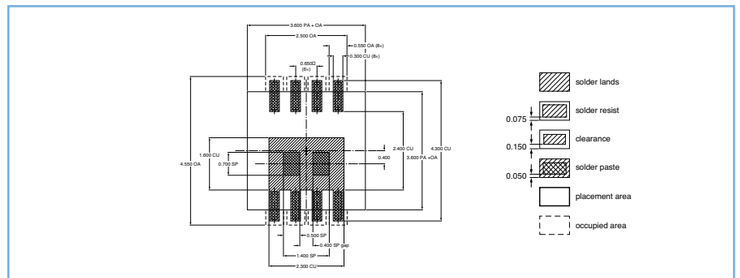
SOT665



SOT665



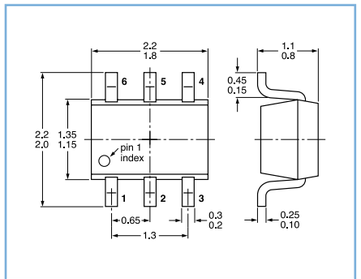
SOT873 (HVSON8)



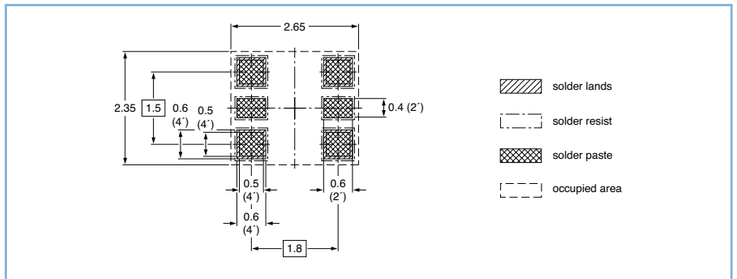
SOT873 (HVSON8)

Dimensions in mm

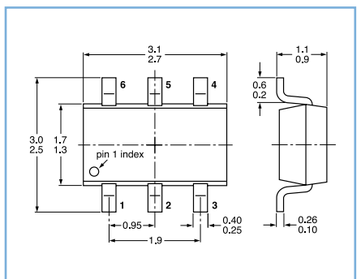
6-Pin SMD Packages



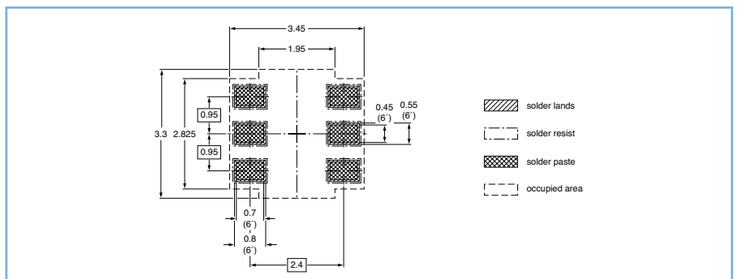
SOT363 (SC-88)



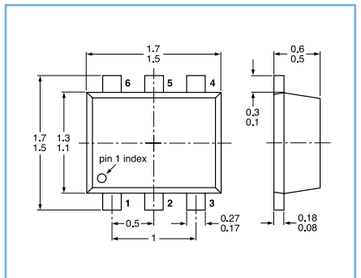
SOT363 (SC-88)



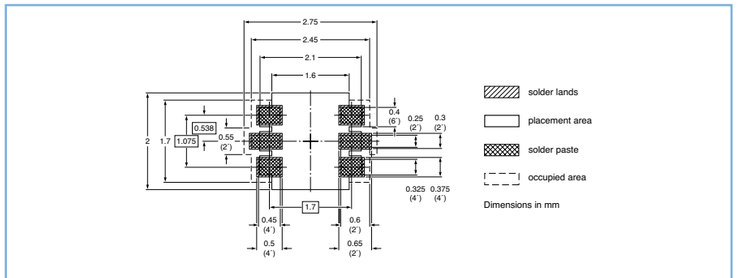
SOT457 (SC-74)



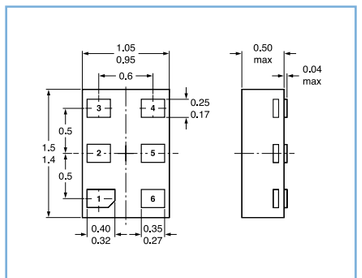
SOT457 (SC-74)



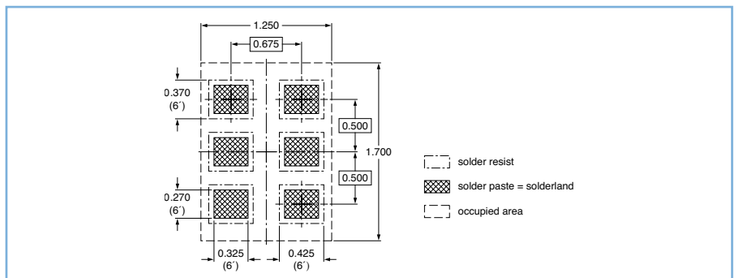
SOT666



SOT666

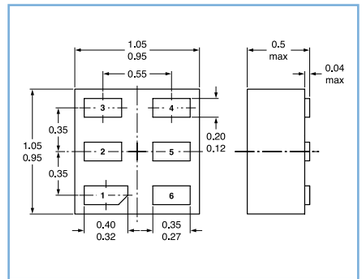


SOT886 (XSON6)

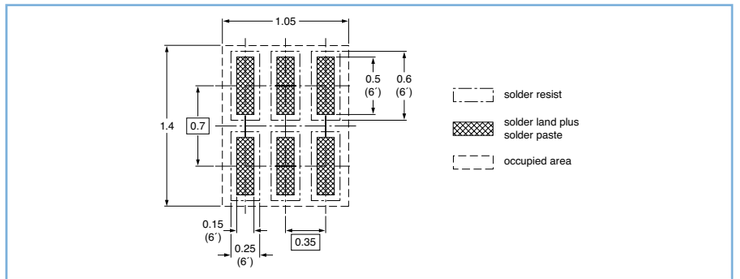


SOT886 (XSON6)

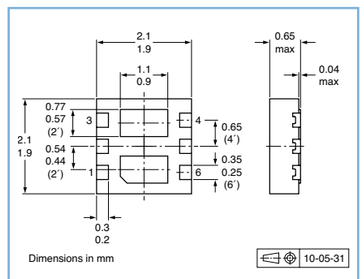
Dimensions in mm



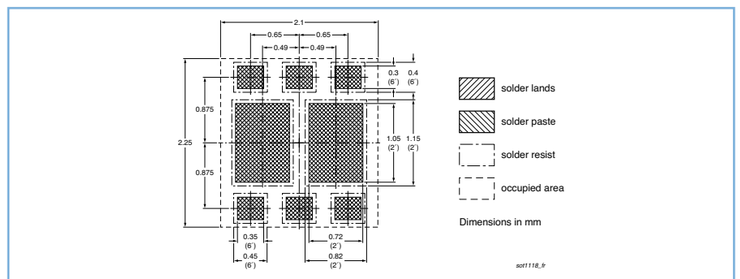
SOT891 (XSON6)



SOT891 (XSON6)

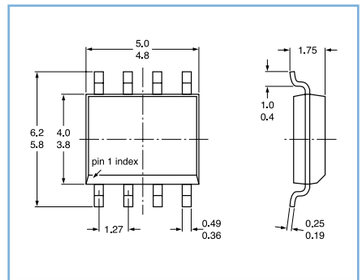


SOT1118

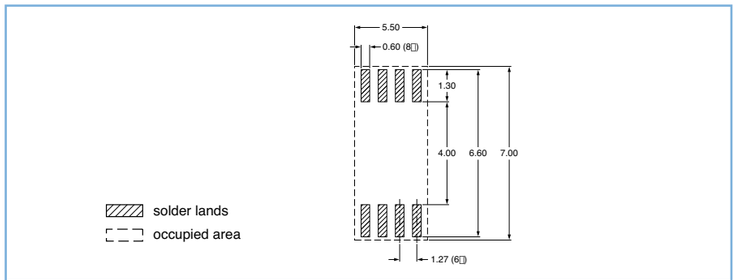


SOT1118

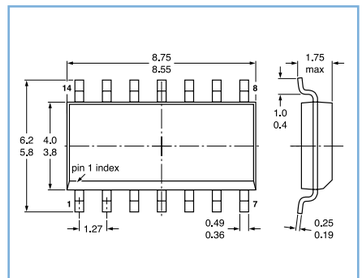
Multi-Pin SMD Packages



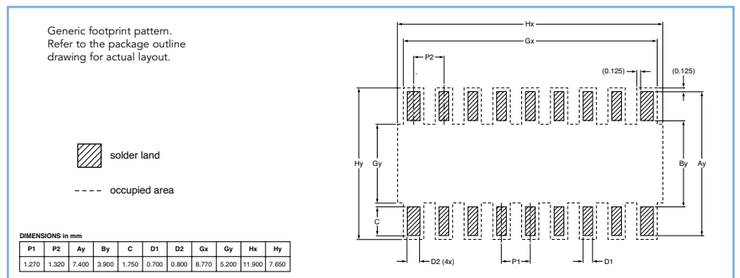
SOT96 (SO8)



SOT96 (SO8)

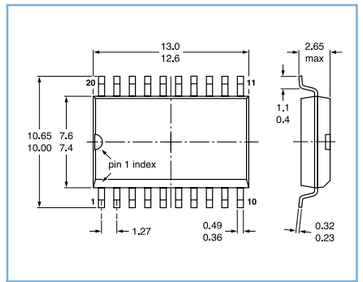


SOT108 (SO14)

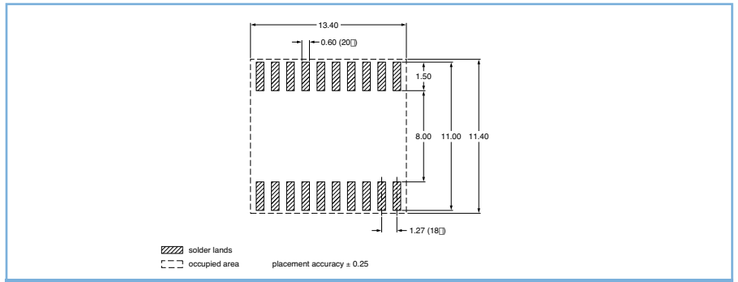


SOT108 (SO14)

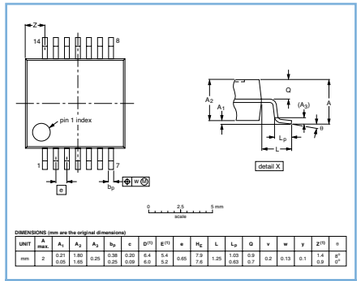
Dimensions in mm



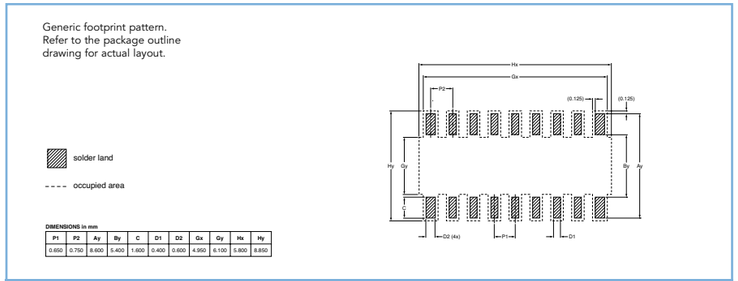
SOT163 (SO20)



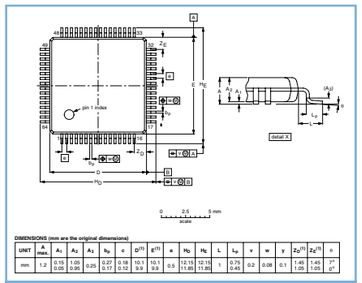
SOT163 (SO20)



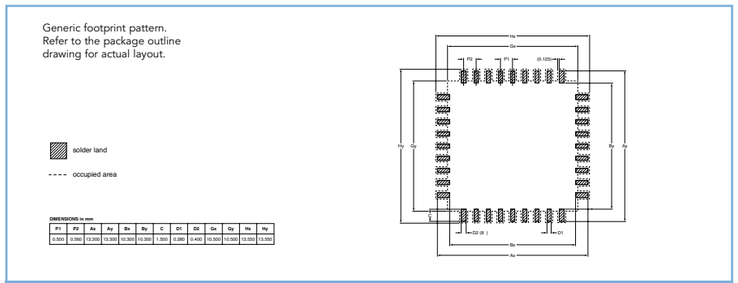
SOT337 (SSOP14)



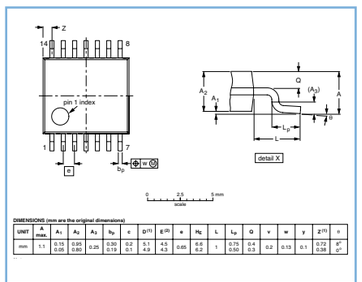
SOT337 (SSOP14)



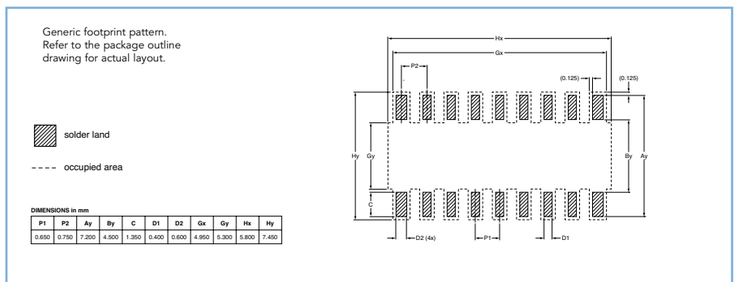
SOT357



SOT357

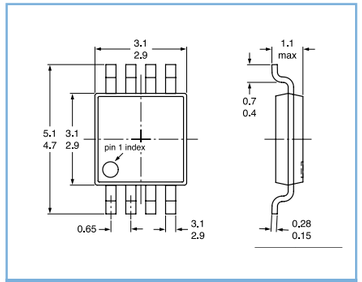


SOT402 (TSSOP14)

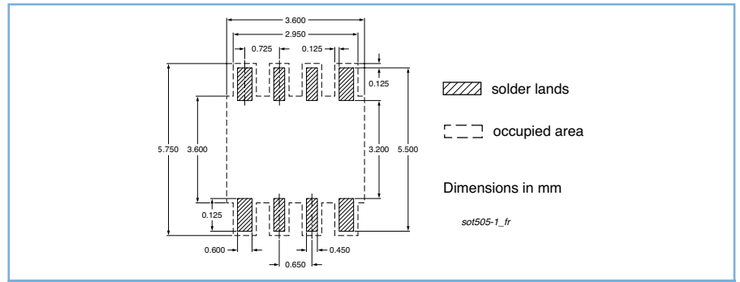


SOT402 (TSSOP14)

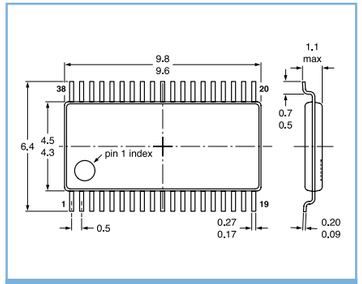
Dimensions in mm



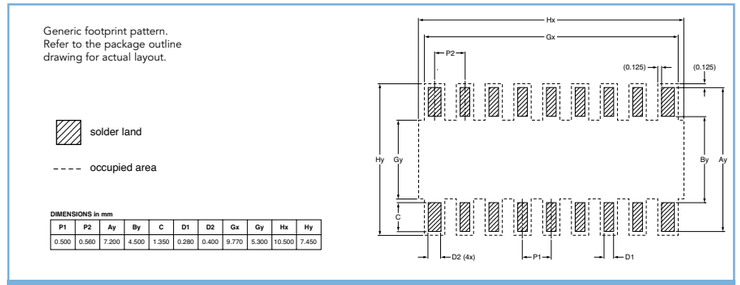
SOT505 (TSSOP8)



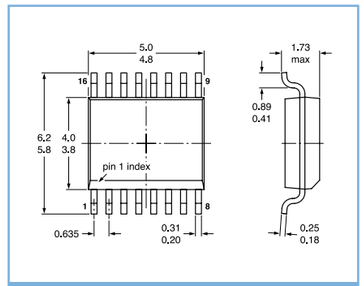
SOT505 (TSSOP8)



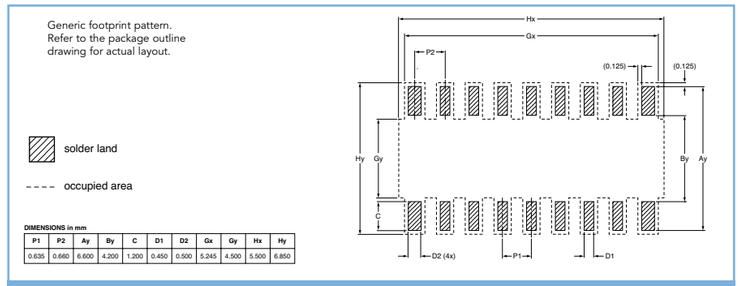
SOT510 (TSSOP38)



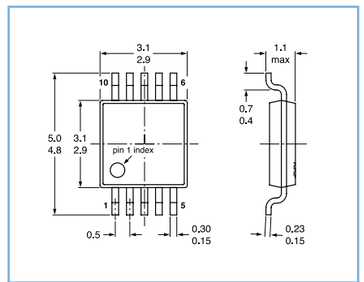
SOT510 (TSSOP38)



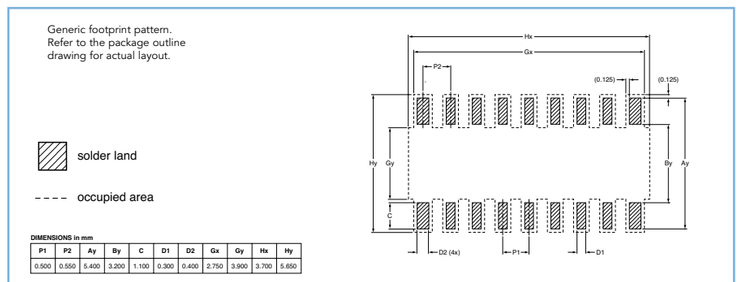
SOT519 (SSOP16)



SOT519 (SSOP16)

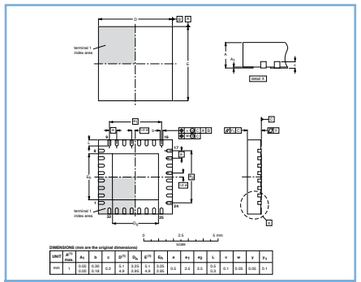


SOT552 (TSSOP10)

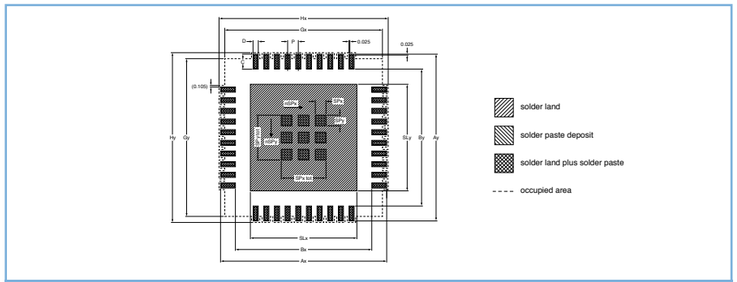


SOT552 (TSSOP10)

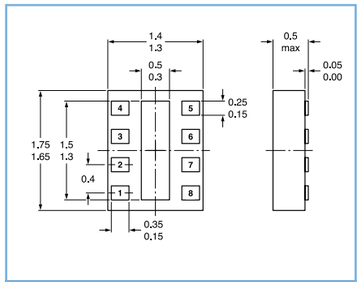
Dimensions in mm



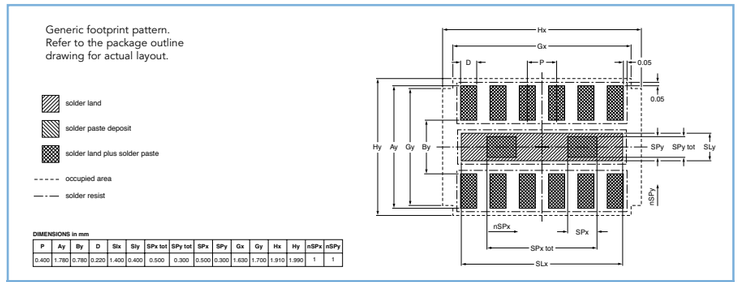
SOT617



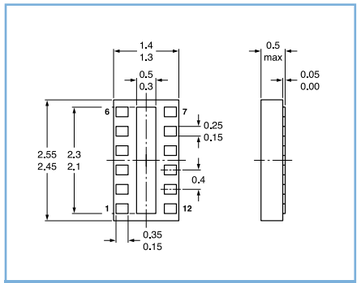
SOT617



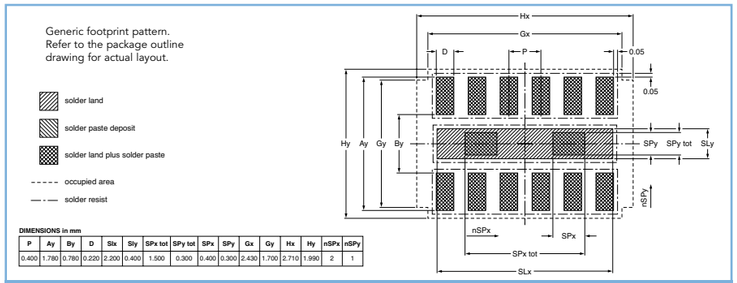
SOT983 (HXSON8)



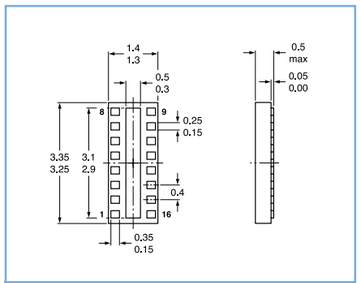
SOT983 (HXSON8)



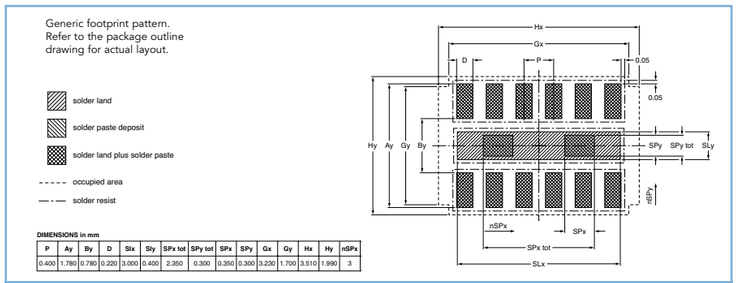
SOT984 (HXSON12)



SOT984 (HXSON12)

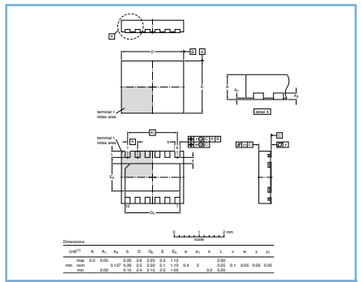


SOT985 (HXSON16)

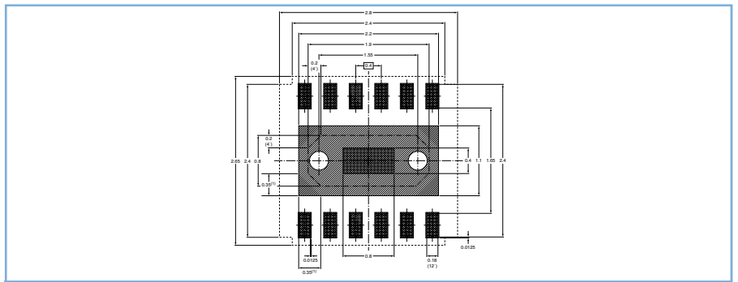


SOT985 (HXSON16)

Dimensions in mm

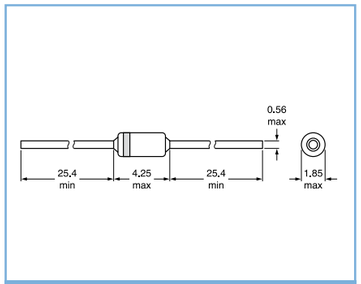


SOT1156

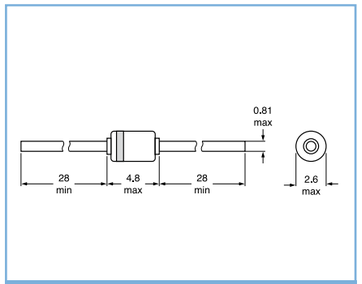


SOT1156

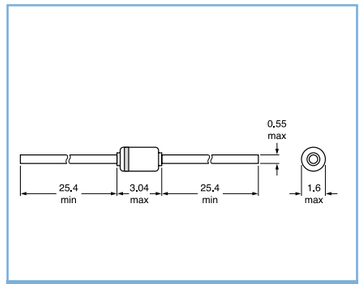
Glass diodes



SOD27 (DO-35)

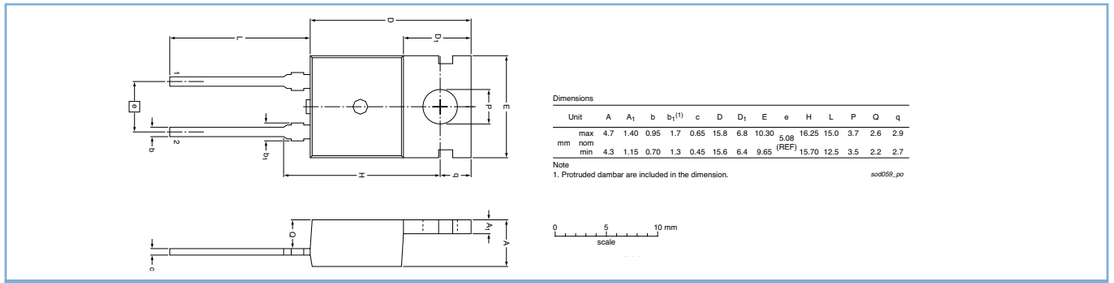


SOD66 (DO-41)

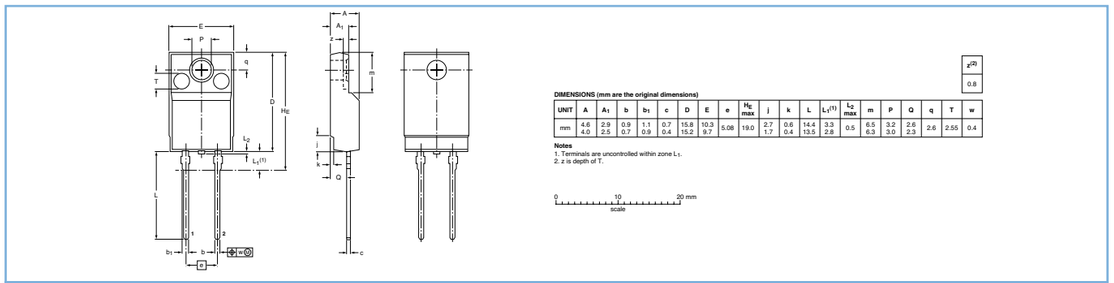


SOD68 (DO-34)

Through Hole Packages



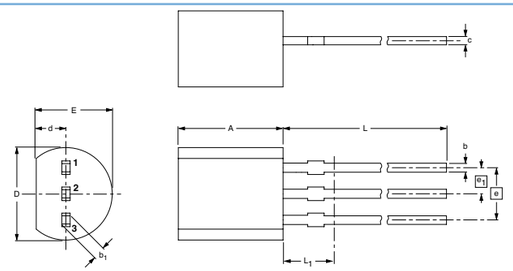
SOD59



SOD113

Dimensions in mm

Packages



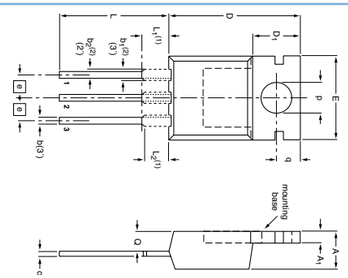
DIMENSIONS (mm are the original dimensions)

UNIT	A	b	b_1	c	D	d	E	e	e_1	L	L_1 (1) max.
mm	5.2 5.0	0.48 0.40	0.66 0.55	0.45 0.38	4.8 4.4	1.7 1.4	4.2 3.6	2.54	1.27	14.5 12.7	2.5

Note
1. Terminal dimensions within this zone are uncontrolled to allow for flow of plastic and terminal irregularities.

0 2.5 5 mm
scale

SOT54



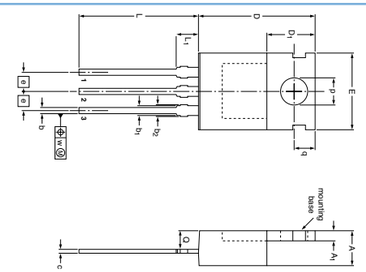
DIMENSIONS (mm are the original dimensions)

UNIT	A	A_1	b	b_1(2)	b_2(2)	c	D	D_1	E	e	L	L_1(1)	L_2(1) max.	p	q	Q
mm	4.7 4.1	1.40 1.25	0.9 0.6	1.6 1.0	1.3 1.0	0.7 0.4	16.0 15.2	6.6 5.9	10.3 9.7	2.54	15.0 12.8	3.30 2.79	3.0	3.8 3.5	3.0 2.7	2.6 2.2

Notes
1. Lead shoulder designs may vary.
2. Dimension includes excess dambar.

0 5 10 mm
scale

SOT78

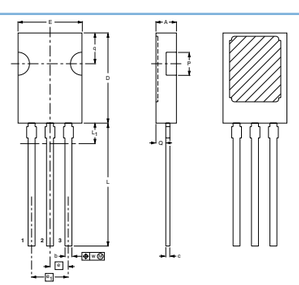


DIMENSIONS (mm are the original dimensions)

UNIT	A	A_1	b	b_1	b_2	c	D	D_1 ref	E	e	L	L_1 ref	p	Q	q	w
mm	4.7 4.3	1.40 1.25	0.9 0.6	1.4 1.1	1.72 1.32	0.6 0.4	16.0 15.2	6.5	10.3 9.7	2.54	14.0 12.8	3.0	3.7 3.5	2.6 2.2	3.0 2.7	0.2

0 5 10 mm
scale

SOT78D



DIMENSIONS (mm are the original dimensions)

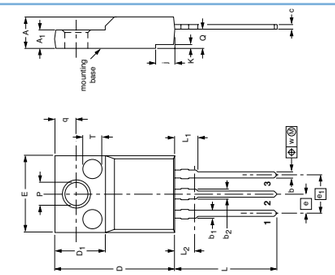
UNIT	A	b	c	D	E	e	e_1	L	L_1 (1) max.	P	Q	q	w
mm	2.8 2.3	0.88 0.65	0.58 0.47	11.1 10.5	7.8 7.2	2.29	4.58	16.5 15.3	2.54	3.1 2.5	1.5 0.9	3.9 3.5	0.254

Note
1. Terminal dimensions within this zone are uncontrolled to allow for body and terminal irregularities.

0 2.5 5 mm
scale

SOT82

Minimized outline drawings



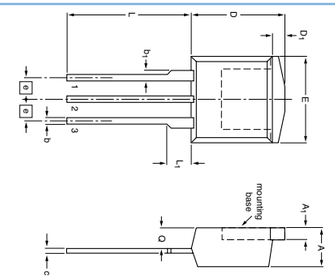
DIMENSIONS (mm are the original dimensions)

UNIT	A	A_1	b	b_1	b_2	c	D	D_1	E	e	e_1	j	K	L	L_1	L_2 (1) max.	P	Q	q	T(2)	w
mm	4.6 4.0	2.9 2.5	0.9 0.7	1.1 0.9	1.4 1.0	0.7 0.4	15.8 15.2	6.5 6.3	10.3 9.7	2.54	5.08	2.7 1.7	0.6 0.4	14.4 13.5	3.30 2.79	3	3.2 3.0	2.6 2.3	3.0 2.6	2.5	0.4

Notes
1. Terminal dimensions within this zone are uncontrolled.
2. Both recesses are Æ 2.5 ˚ 0.8 max. depth

0 5 10 mm
scale

SOT186A

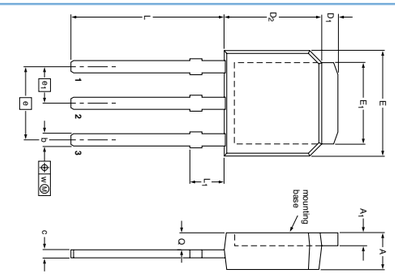


DIMENSIONS (mm are the original dimensions)

UNIT	A	A_1	b	b_1	c	D max	D_1	E	e	L	L_1	Q
mm	4.5 4.1	1.40 1.27	0.85 0.60	1.3 1.0	0.7 0.4	11	1.6 1.2	10.3 9.7	2.54	15.0 13.5	3.30 2.79	2.6 2.2

0 5 10 mm
scale

SOT226



DIMENSIONS (mm are the original dimensions)

UNIT	A	A_1	b	c	D_1	D_2	E	E_1	e	e_1	L	L_1(2) max	Q	w
mm	2.38 2.22	0.93 0.46	0.89 0.71	0.56 0.46	1.10 0.96	6.22 5.98	6.73 6.47	5.21 5.00	4.57 BSC(1)	2.285 BSC(1)	9.6 9.2	2.7	1.1 1.0	0.3

Notes
1. Basic spacing between centers.
2. Terminal dimensions are uncontrolled within zone L_1.

0 2.5 5 mm
scale

SOT533

Type Number	Page Number
1N4148	16
1N4531	16
1N47xxA series	14
1PS66SB17	9
1PS66SB82	9
1PS70SB20	11
1PS70SB82	9
1PS70SB84	9
1PS70SB85	9
1PS70SB86	9
1PS74SB23	10
1PS75SB45	9
1PS76SB10	9
1PS76SB17	9
1PS76SB21	9
1PS76SB40	9
1PS76SB70	9
1PS79SB10	9
1PS79SB17	9
1PS79SB30	9
1PS79SB31	9
1PS79SB40	9
1PS79SB70	9
1PS88SB48	9
1PS88SB82	9
2N7002	73
2N7002BK	73
2N7002BKM	73
2N7002BKS	75
2N7002BKT	73
2N7002BKV	75
2N7002BKW	73
2N7002CK	73
2N7002E	73
2N7002F	73
2N7002K	73
2N7002P	73
2N7002PS	75
2N7002PT	73
2N7002PV	75
2N7002PW	73
2PA1576Q / R / S	52
2PA1774Q / R / S	52
2PA1774QM / RM / SM	52
2PB1219AQ / R / S	52
2PB709ARL	52
2PB709ART	52
2PB709ARW / SW	52
2PB709ASL	52
2PB710ARL	52
2PB710ASL	52
2PC4081Q / R / S	52
2PC4617Q / R	52
2PC4617QM / RM	52
2PD1820AR / S	52
2PD601ARL	52
2PD601ART	52
2PD601ARW / SW	52
2PD601ASL	52
2PD601BRL	52

Type Number	Page Number
2PD601BSL	52
2PD602AQL	52
2PD602ARL	52
2PD602ASL	52
ACT102H	89
ACT108	89
ACT108W	89
BAL74	16
BAL99	16
BAS101	18
BAS101S	18
BAS116	19
BAS116H	19
BAS116T	19
BAS16	16
BAS16H	16
BAS16J	17
BAS16L	17
BAS16LD	17
BAS16T	17
BAS16VV	17
BAS16VY	17
BAS16W	17
BAS21	18
BAS21AW	18
BAS21H	18
BAS21J	18
BAS21SW	18
BAS21VD	18
BAS21W	18
BAS28	16
BAS29	19
BAS31	19
BAS316	17
BAS321	18
BAS32L	16
BAS35	19
BAS40	8
BAS40-04	8
BAS40-04W	9
BAS40-05	8
BAS40-05V	9
BAS40-05W	9
BAS40-06	8
BAS40-06W	9
BAS40-07	8
BAS40-07V	9
BAS40H	9
BAS40L	9
BAS40W	9
BAS40XY	9
BAS416	19
BAS45A	19
BAS45AL	19
BAS516	17
BAS521	18
BAS56	19
BAS70	8
BAS70-04	8
BAS70-04W	9

Type Number	Page Number
BAS70-05	8
BAS70-05W	9
BAS70-06	8
BAS70-06W	9
BAS70-07	8
BAS70-07S	9
BAS70-07V	9
BAS70H	9
BAS70L	9
BAS70VV	9
BAS70W	9
BAS70XY	9
BAS716	19
BAS85	8
BAS86	8
BAT120A	12
BAT120C	12
BAT120S	12
BAT160A	12
BAT160C	12
BAT160S	12
BAT17	9
BAT46WH	9
BAT46WJ	9
BAT54	8
BAT54A	8
BAT54AW	9
BAT54C	8
BAT54CM	9
BAT54CV	9
BAT54CW	9
BAT54H	9
BAT54J	9
BAT54L	9
BAT54S	8
BAT54SW	9
BAT54T	9
BAT54VV	9
BAT54W	9
BAT54XY	9
BAT720	10
BAT721	8
BAT721A	8
BAT721C	8
BAT721S	8
BAT74	8
BAT74S	9
BAT74V	9
BAT754	8
BAT754A	8
BAT754C	8
BAT754L	9
BAT754S	8
BAT760	11
BAT85	8
BAT854AW	9
BAT854CW	9
BAT854SW	9
BAT854W	9
BAT86	8

Type Number	Page Number
BAT960	11
BAV103	18
BAV170	19
BAV199	19
BAV199W	19
BAV20	18
BAV21	18
BAV23	18
BAV23A	18
BAV23C	18
BAV23S	18
BAV70	16
BAV70M	17
BAV70S	17
BAV70T	17
BAV70W	17
BAV74	16
BAV756S	17
BAV99	16
BAV99S	17
BAV99W	17
BAW101	18
BAW101S	18
BAW156	19
BAW56	16
BAW56M	17
BAW56S	17
BAW56T	17
BAW56W	17
BC807 / -16 / -25 / -40	52
BC807DS	53
BC807W / -16W / -25W / -40W	52
BC817 / -16 / -25 / -40	52
BC817DPN	53
BC817DS	53
BC817W / -16W / -25W / -40W	52
BC846 / A / B	52
BC846BPN	53
BC846BS	53
BC846DS	53
BC846S	53
BC846T / AT / BT	52
BC846W / AW / BW	52
BC847 / A / B / C	52
BC847AM / BM / CM	52
BC847BPN	53
BC847BS	53
BC847BV	53
BC847BVN	53
BC847DS	53
BC847T / AT / BT / CT	52
BC847W / AW / BW / CW	52
BC848B	52
BC848W	52
BC849B	54
BC849BW	54
BC849C	54
BC849CW	54
BC850B	54
BC850BW	54

Type Number	Page Number
BC850C	54
BC850CW	54
BC856 / A / B	52
BC856BS	53
BC856S	53
BC856T / AT / BT	52
BC856W / AW / BW	52
BC857 / A / B / C	52
BC857AM / BM / CM	52
BC857BS	53
BC857BV	53
BC857T / AT / BT / CT	52
BC857W / AW / BW / CW	52
BC858B	52
BC858W	52
BC859B	54
BC859BW	54
BC859C	54
BC859CW	54
BC860B	54
BC860BW	54
BC860C	54
BC860CW	54
BC868 / -25	54
BC869 / -16 / -25	54
BCM61B	55
BCM62B	55
BCM847BS	55
BCM847BV	55
BCM847DS	55
BCM856BS	55
BCM856DS	55
BCM857BS	55
BCM857BV	55
BCM857DS	55
BCP51 / -10 / -16	54
BCP52 / -10 / -16	54
BCP53 / -10 / -16	54
BCP54 / -10 / -16	54
BCP55 / -10 / -16	54
BCP56 / -10 / -16	54
BCP68 / -25	54
BCP69 / -16 / -25	54
BCV26	56
BCV27	56
BCV28	56
BCV29	56
BCV46	56
BCV47	56
BCV48	56
BCV49	56
BCV61/A/B/C	55
BCV62/A/B/C	55
BCV63 / B	56
BCV64B	56
BCV65	57
BCV71 / 72	52
BCV29 / 30	52
BCW31 / 32 / 33	52
BCW60B / C / D	52

Type Number	Page Number
BCW61B / C / D	52
BCW69 / 70	52
BCW71 / 72	52
BCW89	52
BCX17	52
BCX18	52
BCX19	52
BCX51 / -10 / -16	54
BCX52 / -10 / -16	54
BCX53 / -10 / -16	54
BCX54 / -10 / -16	54
BCX55 / -10 / -16	54
BCX56 / -10 / -16	54
BCX70G / H / J / K	52
BCX71H / J / K	52
BF550	57
BF570	57
BF620	54
BF621	54
BF622	54
BF623	54
BF720	54
BF722	54
BF723	54
BF820	54
BF820W	54
BF821	54
BF822	54
BF823	54
BF824	57
BF824W	57
BF840	57
BFS19	57
BFS20	57
BFS20W	57
BSH103	71
BSH105	71
BSH108	71
BSH111	73
BSH114	73
BSH121	73
BSH201	75
BSH202	75
BSH203	75
BSH205	75
BSH207	75
BSN20	73
BSP030	70
BSP100	70
BSP110	72
BSP122	72
BSP126	72
BSP130	72
BSP19	54
BSP220	75
BSP225	75
BSP230	75
BSP250	75
BSP31	54
BSP32 / 33	54

Type Number	Page Number
BSP41	54
BSP43	54
BSP50	56
BSP51	56
BSP52	56
BSP60	56
BSP61	56
BSP62	56
BSP89	72
BSR14	53
BSR16	53
BSR19A	54
BSR30 / 31	54
BSR33	54
BSR41	54
BSR42 / 43	54
BSS123	73
BSS138P	73
BSS138PS	75
BSS138PW	73
BSS192	75
BSS63	52
BSS64	52
BSS84	75
BSS84AK	75
BSS84AKM	75
BSS84AKS	76
BSS84AKT	75
BSS84AKV	76
BSS84AKW	75
BSS87	73
BST39	54
BST50	56
BST51	56
BST52	56
BST60	56
BST61	56
BST62	56
BST82	73
BSV52	53
BT1306-D	86
BT1308-D	86
BT1308W-D	86
BT131	86
BT131-D	86
BT131-E	86
BT131W	86
BT132-D	86
BT134	86
BT136	86
BT136B	86
BT136S	86
BT136X	86
BT137	86
BT137B	86
BT137S	86
BT137X	86
BT138	86
BT138B	86
BT138X	86

Type Number	Page Number
BT138Y	86
BT139	87
BT139B	87
BT139X	87
BT145-R	89
BT148-R	89
BT148W-R	89
BT149B/D/G	89
BT150-R	89
BT150S-R	89
BT151-C	89
BT151-L	89
BT151-R	89
BT151-RT	89
BT151S-L	89
BT151S-R	89
BT151U-C	89
BT151X-C	89
BT151X-R	89
BT152-R	89
BT152-RT	89
BT152B-R	89
BT152X-R	89
BT168E/G	89
BT168GW	89
BT168GWF	89
BT169B/D/G	89
BT169D-L	89
BT169H	89
BT258-R	89
BT258S-LT	89
BT258S-R	89
BT258U-R	89
BT258X-R	89
BT300S-R	89
BTA140	87
BTA2008	88
BTA201	88
BTA201W	88
BTA202X	88
BTA204	88
BTA204S	88
BTA204X	88
BTA208	88
BTA208B	88
BTA208S	88
BTA208X	88
BTA208X-1000C0	88
BTA225	88
BTA225B	88
BTA312	88
BTA312B	88
BTA312X	88
BTA312Y	88
BTA316	88
BTA316B	88
BTA316X	88
BTA316X-800B0	88
BTA412Y	88
BTA416Y	88

Type Number	Page Number
BTH151S-R	89
BUJ100	68
BUJ100LR	68
BUJ103A	68
BUJ103AD	68
BUJ103AX	68
BUJ105A	68
BUJ105AB	68
BUJ105AD	68
BUJ106A	68
BUJ302A	68
BUJ302AD	68
BUJ302AX	68
BUJ303A	68
BUJ303AD	68
BUJ303AX	68
BUJ303B	68
BUJ403A	68
BUJD103AD	68
BUJD105AD	68
BUJD203A	68
BUJD203AD	68
BUJD203AX	68
BYC10-600	20
BYC10-600CT	20
BYC10B-600	20
BYC10X-600	20
BYC15-600	20
BYC15X-600	20
BYC20-600	20
BYC20X-600	20
BYC5-600	20
BYC58X-600	20
BYC5B-600	20
BYC5X-600	20
BYC8-600	20
BYC8B-600	20
BYC8D-600	20
BYC8DX-600	20
BYC8X-600	20
BYQ28E-200	20
BYQ28ED-200	20
BYQ28X-200	20
BYQ30E-200	20
BYR29-600	20
BYR29-800	20
BYR29X-600	20
BYR29X-800	20
BYT28-300	20
BYT28-500	20
BYT79-500	20
BYT79-600	20
BYT79X-600	20
BYV25D-600	20
BYV25F-600	20
BYV25FB-600	20
BYV25FD-600	20
BYV25FX-600	20
BYV25G-600	20
BYV25X-600	20

Type Number	Page Number
BYV29-400	20
BYV29-500	20
BYV29-600	20
BYV29B-500	20
BYV29B-600	20
BYV29F-600	20
BYV29FB-600	20
BYV29FD-600	20
BYV29FX-600	20
BYV29G-600	20
BYV29X-500	20
BYV29X-600	20
BYV32E-100	20
BYV32E-150	20
BYV32E-200	20
BYV32EB-200	20
BYV32G-200	20
BYV34-400	20
BYV34-500	20
BYV34-600	20
BYV34G-600	20
BYV34X-600	20
BYV40E-150	20
BYV410-600	20
BYV410X-600	20
BYV42E-150	20
BYV42E-200	20
BYV42EB-200	20
BYV42G-200	20
BYV44-500	20
BYV79E-200	20
BYW29E-100	20
BYW29E-150	20
BYW29E-200	20
BYW29ED-200	20
BYW29EX-200	20
BZA100	23
BZA408B	23
BZA418A	23
BZA420A	23
BZA456A	23
BZA462A	23
BZA820A	23
BZA856A	23
BZA856AL	23
BZA862A	23
BZA862AL	23
BZA868A	23
BZA868AL	23
BZA956A	23
BZA962A	23
BZA968A	23
BZB100A	14
BZB784 series	14
BZB84 series	14
BZB984 series	14
BZT52H series	14
BZV49 series	14
BZV55 series	14
BZV85 series	14

Type Number	Page Number
BZV90 series	14
BZX100A	14
BZX384 series	14
BZX585 series	14
BZX79 series	14
BZX84 series	14
BZX84J series	14
BZX884 series	14
EC103D1	89
IP3047CX6	32
IP3048CX5	32
IP3053CX10	38
IP3053CX15	39
IP3053CX20	40
IP3053CX5	36
IP3088CX10	38
IP3088CX15	39
IP3088CX20	40
IP3088CX5	36
IP3253CZ12-6-TTL	40
IP3253CZ16-8-TTL	41
IP3253CZ8-4-TTL	39
IP3254CZ12-6-TTL	40
IP3254CZ16-8-TTL	41
IP3254CZ8-4-TTL	39
IP3337CX18/LF	40
IP3338CX24/LF	41
IP3348CX10	34
IP3348CX15	34
IP3348CX20	34
IP3348CX5	34
IP4027CX20/LF	32
IP4032CX25/LF	41
IP4041CX25/LF	41
IP4042CX5/LF	23
IP4043CX5/LF	26
IP4044CX8/LF	42
IP4047CX6/LF	32
IP4048CX5/LF	32
IP4049CX5/LF	32
IP4051CX11/LF	42
IP4052CX20/LF	42
IP4053CX15/LF	39
IP4055CX6/LF	32
IP4056CX8/LF	43
IP4057CX10/LF	43
IP4058CX8/LF	43
IP4059CX5/LF	26, 43
IP4060CX16/LF	42
IP4064CX8/LF/P	42
IP4065CX11/LF	43
IP4067CX9/LF	42
IP4078CX6/LF	43
IP4085CX4	42
IP4088CX20/LF	40
IP4142CX5/LF	26
IP4153CX15/LF	39
IP4158CX8/LF	43
IP4220CZ6	29, 44, 47
IP4221CZ6-S	29

Type Number	Page Number
IP4221CZ6-XS	29, 44
IP4225CZ10	44
IP4233CZ6	29, 47
IP4234CZ6	29, 43
IP4251CZ12-6-TTL	40
IP4251CZ16-8-TTL	41
IP4251CZ8-4-TTL	39
IP4252CZ12-6-TTL	40
IP4252CZ16-8-TTL	41
IP4252CZ8-4 -TTL	39
IP4253CZ12-6-TTL	40
IP4253CZ16-8-TTL	41
IP4253CZ8-4-TTL	39
IP4254CZ12-6-TTL	40
IP4254CZ16-8-TTL	41
IP4254CZ8-4-TTL	39
IP4256CZ3-M	36
IP4256CZ5-W	37
IP4256CZ6-F	38
IP4264CZ8-10-TTL	42
IP4264CZ8-20-TTL	42
IP4264CZ8-40-TTL	42
IP4280CZ10	30, 33
IP4282CZ6	29, 33, 43, 46
IP4283CZ10-TBA	30, 33
IP4283CZ10-TBR	30, 32, 33, 46
IP4283CZ10-TT	30, 32, 33, 46
IP4284CZ10-TBR	32, 33, 45, 46
IP4284CZ10-TT	30, 32, 33, 45, 46
IP4285CZ9-TBB	30, 32, 33, 46
IP4286CZ6-TBF	30, 32, 33, 46
IP4286CZ6-TTY	30, 32, 33, 46
IP4292CZ10-TBR	31, 32, 34, 45, 46
IP4302CX2/A	24
IP4303CX4/P	25
IP4307CX4/LF	36
IP4309CX9	31, 34
IP4310CX8/P	34
IP4319CX10	29, 43
IP4337CX18/LF	40
IP4338CX24/LF	41
IP4342CX5/LF	23
IP4343CX5/LF	26
IP4350CX24/LF	42
IP4352CX24/LF	42
IP4353CX15/LF	39
IP4355CX6/LF	32
IP4356CX4	29, 43
IP4358CX6	31, 43
IP4359CX4/LF	29, 43
IP4364CX8/LF/P	42
IP4365CX11	42
IP4365CX11/P	43
IP4366CX8/P	42
IP4368CX9/P	43
IP4385CX4	42
IP4386CX4	42
IP4387CX4	42
IP4389CX4	42
IP4769CZ14	35

Type Number	Page Number
IP4770CZ16	35
IP4771CZ16	35
IP4772CZ16	35
IP4773CZ14	35
IP4774CZ14	35
IP4776CZ38	34
IP4777CZ38	34
IP4778CZ38	34
IP4786CZ32	34
IP4790CZ38	31, 32, 46
IP4791CZ12	34
IP4852CX25/LF	42
IP4853CX24/P	42
IP5002CX8/LF	32
LD6805K/12H	96
LD6805K/12P	96
LD6805K/14H	96
LD6805K/14P	96
LD6805K/16H	96
LD6805K/16P	96
LD6805K/17H	96
LD6805K/17P	96
LD6805K/18H	96
LD6805K/18P	96
LD6805K/22H	96
LD6805K/22P	96
LD6805K/23H	96
LD6805K/23P	96
LD6805K/25H	96
LD6805K/25P	96
LD6805K/28H	96
LD6805K/28P	96
LD6805K/29H	96
LD6805K/29P	96
LD6805K/30H	96
LD6805K/30P	96
LD6805K/33H	96
LD6805K/33P	96
LD6805K/36H	96
LD6805K/36P	96
LD6806CX4/12H	97
LD6806CX4/12P	97
LD6806CX4/14H	97
LD6806CX4/14P	97
LD6806CX4/16H	97
LD6806CX4/16P	97
LD6806CX4/17H	97
LD6806CX4/17P	97
LD6806CX4/18H	97
LD6806CX4/18P	97
LD6806CX4/22H	97
LD6806CX4/22P	97
LD6806CX4/23H	97
LD6806CX4/23P	97
LD6806CX4/25H	97
LD6806CX4/25P	97
LD6806CX4/28H	97
LD6806CX4/28P	97
LD6806CX4/29H	97
LD6806CX4/29P	97

Type Number	Page Number
LD6806CX4/30H	97
LD6806CX4/30P	97
LD6806CX4/33H	97
LD6806CX4/33P	97
LD6806CX4/36H	97
LD6806CX4/36P	97
LD6806F/12H	97
LD6806F/12P	97
LD6806F/14H	97
LD6806F/14P	97
LD6806F/16H	97
LD6806F/16P	97
LD6806F/17H	97
LD6806F/17P	97
LD6806F/18H	97
LD6806F/18P	97
LD6806F/22H	97
LD6806F/22P	97
LD6806F/23H	97
LD6806F/23P	97
LD6806F/25H	97
LD6806F/25P	97
LD6806F/28H	97
LD6806F/28P	97
LD6806F/29H	97
LD6806F/29P	97
LD6806F/30H	97
LD6806F/30P	97
LD6806F/33H	97
LD6806F/33P	97
LD6806F/36H	97
LD6806F/36P	97
MAC223A6	87
MAC223A8X	87
MAC97A6	86
MAC97A8	86
MCR08BT1	89
MMBT2222A	53
MMBT3904	53
MMBT3906	53
MMBZ10VAL	48
MMBZ12VAL	48
MMBZ12VDL	48
MMBZ15VAL	48
MMBZ15VDL	48
MMBZ18VAL	48
MMBZ18VCL	48
MMBZ20VAL	48
MMBZ20VCL	48
MMBZ27VAL	48
MMBZ27VCL	48
MMBZ33VAL	48
MMBZ33VCL	48
MMBZ5V6AL	48
MMBZ6V2AL	48
MMBZ6V8AL	48
MMBZ9V1AL	48
NUP1301	28
NUP1301U	28
NX1117C120Z	95

Type Number	Page Number
NX1117C12Z	95
NX1117C15Z	95
NX1117C18Z	95
NX1117C19Z	95
NX1117C20Z	95
NX1117C25Z	95
NX1117C285Z	95
NX1117C33Z	95
NX1117C50Z	95
NX1117CADJZ	95
NX2301P	75
NXL0840	89
NZH series	14
NZX series	14
PBHV8115T	66
PBHV8115Z	66
PBHV8118T	66
PBHV8140Z	66
PBHV8215Z	66
PBHV8540T	66
PBHV8540Z	66
PBHV9040T	66
PBHV9040Z	66
PBHV9050T	66
PBHV9050Z	66
PBHV9115T	66
PBHV9115X	66
PBHV9115Z	66
PBHV9215Z	66
PBHV9540Z	66
PBLS1501V	65
PBLS1501Y	65
PBLS1502V	65
PBLS1502Y	65
PBLS1503V	65
PBLS1503Y	65
PBLS1504V	65
PBLS1504Y	65
PBLS2001D	65
PBLS2001S	65
PBLS2002D	65
PBLS2002S	65
PBLS2003D	65
PBLS2003S	65
PBLS2004D	65
PBLS2021D	65
PBLS2022D	65
PBLS2023D	65
PBLS2024D	65
PBLS4001D	65
PBLS4001V	65
PBLS4001Y	65
PBLS4002D	65
PBLS4002V	65
PBLS4002Y	65
PBLS4003D	65
PBLS4003V	65
PBLS4003Y	65
PBLS4004D	65
PBLS4004V	65

Type Number	Page Number
PBLS4004Y	65
PBLS4005D	65
PBLS4005V	65
PBLS4005Y	65
PBLS6001D	65
PBLS6002D	65
PBLS6003D	65
PBLS6004D	65
PBLS6005D	65
PBLS6021D	65
PBLS6022D	65
PBLS6023D	65
PBLS6024D	65
PBRN113ET	59, 66
PBRN113ZT	59, 66
PBRN123ET	59, 66
PBRN123YT	59, 66
PBRP113ET	59, 66
PBRP113ZT	59, 66
PBRP123ET	59, 66
PBRP123YT	59, 66
PBSM5240PF	67
PBSS2515E	61
PBSS2515M	61
PBSS2515VPN	64
PBSS2515VS	64
PBSS2515YPN	64
PBSS2540E	61
PBSS2540M	61
PBSS301ND	60
PBSS301NX	60
PBSS301NZ	60
PBSS301PD	62
PBSS301PX	62
PBSS301PZ	62
PBSS302ND	60
PBSS302NX	60
PBSS302NZ	60
PBSS302PD	62
PBSS302PX	62
PBSS302PZ	62
PBSS303ND	60
PBSS303NX	60
PBSS303NZ	60
PBSS303PD	62
PBSS303PX	62
PBSS303PZ	62
PBSS304ND	60
PBSS304NX	60
PBSS304NZ	60
PBSS304PD	62
PBSS304PX	62
PBSS304PZ	62
PBSS305ND	60
PBSS305NX	60
PBSS305NZ	60
PBSS305PD	62
PBSS305PX	62
PBSS305PZ	62
PBSS306NX	60

Type Number	Page Number
PBSS306NZ	60
PBSS306PX	62
PBSS306PZ	62
PBSS3515E	63
PBSS3515M	63
PBSS3515VS	64
PBSS3540E	63
PBSS3540M	63
PBSS4021NT	61
PBSS4021NX	60
PBSS4021NZ	60
PBSS4021PT	63
PBSS4021PX	62
PBSS4021PZ	62
PBSS4021SN	64
PBSS4021SP	64
PBSS4021SPN	64
PBSS4032ND	60
PBSS4032NT	61
PBSS4032NX	60
PBSS4032NZ	60
PBSS4032PD	62
PBSS4032PT	63
PBSS4032PX	62
PBSS4032PZ	62
PBSS4032SN	64
PBSS4032SP	64
PBSS4032SPN	64
PBSS4041NT	61
PBSS4041NX	60
PBSS4041NZ	60
PBSS4041PT	63
PBSS4041PX	62
PBSS4041PZ	62
PBSS4041SN	64
PBSS4041SP	64
PBSS4120T	61
PBSS4130T	61
PBSS4140DPN	64
PBSS4140T	61
PBSS4140U	61
PBSS4140V	61
PBSS4160DPN	64
PBSS4160DS	64
PBSS4160T	61
PBSS4160U	61
PBSS4160V	61
PBSS4220V	61
PBSS4230T	61
PBSS4240DPN	64
PBSS4240T	61
PBSS4240V	61
PBSS4240Y	61
PBSS4250X	60
PBSS4320T	61
PBSS4320X	60
PBSS4330PA	61
PBSS4330X	60
PBSS4350D	60
PBSS4350SPN	64

Type Number	Page Number
PBSS4350SS	64
PBSS4350T	61
PBSS4350X	60
PBSS4350Z	60
PBSS4480X	60
PBSS4520X	60
PBSS4540X	60
PBSS4540Z	60
PBSS4560PA	61
PBSS4580PA	61
PBSS4612PA	61
PBSS4620PA	61
PBSS4630PA	61
PBSS5120T	63
PBSS5130T	63
PBSS5140T	63
PBSS5140U	63
PBSS5140V	63
PBSS5160DS	64
PBSS5160T	63
PBSS5160U	63
PBSS5160V	63
PBSS5220T	63
PBSS5220V	63
PBSS5230T	63
PBSS5240T	63
PBSS5240V	63
PBSS5240Y	63
PBSS5250T	63
PBSS5250X	62
PBSS5320D	62
PBSS5320T	63
PBSS5320X	62
PBSS5330PA	63
PBSS5330X	62
PBSS5350D	62
PBSS5350SS	64
PBSS5350T	63
PBSS5350X	62
PBSS5350Z	62
PBSS5480X	62
PBSS5520X	62
PBSS5540X	62
PBSS5540Z	62
PBSS5560PA	63
PBSS5580PA	63
PBSS5612PA	63
PBSS5620PA	63
PBSS5630PA	63
PBSS8110D	60
PBSS8110T	61
PBSS8110X	60
PBSS8110Y	61
PBSS8110Z	60
PBSS8510PA	61
PBSS9110D	62
PBSS9110T	63
PBSS9110X	62
PBSS9110Y	63
PBSS9110Z	62

Type Number	Page Number
PBSS9410PA	63
PDTA113EE	58
PDTA113EM	58
PDTA113EU	58
PDTA113ZE	58
PDTA113ZM	58
PDTA113ZT	58
PDTA113ZU	58
PDTA114EE	58
PDTA114EM	58
PDTA114ET	58
PDTA114EU	58
PDTA114TE	58
PDTA114TM	58
PDTA114TT	58
PDTA114TU	58
PDTA114YE	58
PDTA114YM	58
PDTA114YT	58
PDTA114YU	58
PDTA115EE	58
PDTA115EM	58
PDTA115ET	58
PDTA115EU	58
PDTA115TE	58
PDTA115TM	58
PDTA115TT	58
PDTA115TU	58
PDTA123EE	58
PDTA123EM	58
PDTA123ET	58
PDTA123EU	58
PDTA123JE	58
PDTA123JM	58
PDTA123JT	58
PDTA123JU	58
PDTA123TE	58
PDTA123TM	58
PDTA123TT	58
PDTA123TU	58
PDTA123YE	58
PDTA123YM	58
PDTA123YT	58
PDTA123YU	58
PDTA124EE	58
PDTA124EM	58
PDTA124ET	58
PDTA124EU	58
PDTA124TE	58
PDTA124TM	58
PDTA124TT	58
PDTA124TU	58
PDTA124XE	58
PDTA124XM	58
PDTA124XT	58
PDTA124XU	58
PDTA143EE	58
PDTA143EM	58
PDTA143ET	58
PDTA143EU	58

Type Number	Page Number
PDTA143TE	58
PDTA143TM	58
PDTA143TT	58
PDTA143TU	58
PDTA143XE	58
PDTA143XM	58
PDTA143XT	58
PDTA143XU	58
PDTA143ZE	58
PDTA143ZM	58
PDTA143ZT	58
PDTA143ZU	58
PDTA144EE	58
PDTA144EM	58
PDTA144ET	58
PDTA144EU	58
PDTA144TE	58
PDTA144TM	58
PDTA144TT	58
PDTA144TU	58
PDTA144VE	58
PDTA144VM	58
PDTA144VT	58
PDTA144VU	58
PDTA144WE	58
PDTA144WM	58
PDTA144WT	58
PDTA144WU	58
PDTB113ET	59
PDTB113ZT	59
PDTB123ET	59
PDTB123TT	59
PDTB123YT	59
PDTC114EE	58
PDTC114EM	58
PDTC114ET	58
PDTC114EU	58
PDTC114TE	58
PDTC114TM	58
PDTC114TT	58
PDTC114TU	58
PDTC114YE	58
PDTC114YM	58
PDTC114YT	58
PDTC114YU	58
PDTC115EE	58
PDTC115EM	58
PDTC115ET	58
PDTC115EU	58
PDTC115TE	58
PDTC115TM	58
PDTC115TT	58
PDTC115TU	58
PDTC123EE	58
PDTC123EM	58
PDTC123ET	58
PDTC123EU	58
PDTC123JE	58
PDTC123JM	58
PDTC123JT	58

Type Number	Page Number
PDTC123JU	58
PDTC123TE	58
PDTC123TM	58
PDTC123TT	58
PDTC123TU	58
PDTC123YE	58
PDTC123YM	58
PDTC123YT	58
PDTC123YU	58
PDTC124EE	58
PDTC124EM	58
PDTC124ET	58
PDTC124EU	58
PDTC124TE	58
PDTC124TM	58
PDTC124TT	58
PDTC124TU	58
PDTC124XE	58
PDTC124XM	58
PDTC124XT	58
PDTC124XU	58
PDTC143EE	58
PDTC143EM	58
PDTC143ET	58
PDTC143EU	58
PDTC143TE	58
PDTC143TM	58
PDTC143TT	58
PDTC143TU	58
PDTC143XE	58
PDTC143XM	58
PDTC143XT	58
PDTC143XU	58
PDTC143ZE	58
PDTC143ZM	58
PDTC143ZT	58
PDTC143ZU	58
PDTC144EE	58
PDTC144EM	58
PDTC144ET	58
PDTC144EU	58
PDTC144TE	58
PDTC144TM	58
PDTC144TT	58
PDTC144TU	58
PDTC144VE	58
PDTC144VM	58
PDTC144VT	58
PDTC144VU	58
PDTC144WE	58
PDTC144WM	58
PDTC144WT	58
PDTC144WU	58
PDTD113ET	59
PDTD113ZT	59
PDTD123ET	59
PDTD123TT	59
PDTD123YT	59
PDZ-B series	14
PEMB1	59

Type Number	Page Number
PEMB10	59
PEMB11	59
PEMB13	59
PEMB14	59
PEMB15	59
PEMB16	59
PEMB17	59
PEMB18	59
PEMB19	59
PEMB2	59
PEMB20	59
PEMB24	59
PEMB3	59
PEMB30	59
PEMB4	59
PEMB9	59
PEMD10	59
PEMD12	59
PEMD13	59
PEMD14	59
PEMD15	59
PEMD16	59
PEMD17	59
PEMD18	59
PEMD19	59
PEMD2	59
PEMD20	59
PEMD24	59
PEMD3	59
PEMD30	59
PEMD4	59
PEMD48	59
PEMD6	59
PEMD9	59
PEMH1	59
PEMH10	59
PEMH11	59
PEMH13	59
PEMH14	59
PEMH15	59
PEMH16	59
PEMH17	59
PEMH18	59
PEMH19	59
PEMH2	59
PEMH20	59
PEMH24	59
PEMH30	59
PEMH4	59
PEMH7	59
PEMH9	59
PEMI1QFN/CE	36
PEMI1QFN/CG	36
PEMI1QFN/CK	36
PEMI1QFN/CM	36
PEMI1QFN/CP	36
PEMI1QFN/CR	36
PEMI1QFN/CT	36
PEMI1QFN/HE	36
PEMI1QFN/HG	36

Type Number	Page Number
PEMI1QFN/HK	36
PEMI1QFN/HM	36
PEMI1QFN/HP	36
PEMI1QFN/HR	36
PEMI1QFN/HT	36
PEMI1QFN/LE	36
PEMI1QFN/LG	36
PEMI1QFN/LK	36
PEMI1QFN/LM	36
PEMI1QFN/LP	36
PEMI1QFN/LR	36
PEMI1QFN/LT	36
PEMI1QFN/RE	36
PEMI1QFN/RG	36
PEMI1QFN/RK	36
PEMI1QFN/RM	36
PEMI1QFN/RP	36
PEMI1QFN/RR	36
PEMI1QFN/RT	36
PEMI1QFN/WE	36
PEMI1QFN/WG	36
PEMI1QFN/WK	36
PEMI1QFN/WM	36
PEMI1QFN/WP	36
PEMI1QFN/WR	36
PEMI1QFN/WT	36
PEMI2QFN/CE	37
PEMI2QFN/CG	37
PEMI2QFN/CK	37
PEMI2QFN/CM	37
PEMI2QFN/CP	37
PEMI2QFN/CR	37
PEMI2QFN/CT	37
PEMI2QFN/HE	38
PEMI2QFN/HG	38
PEMI2QFN/HK	38
PEMI2QFN/HM	37
PEMI2QFN/HP	37
PEMI2QFN/HR	37
PEMI2QFN/HT	37
PEMI2QFN/LE	38
PEMI2QFN/LG	38
PEMI2QFN/LK	38
PEMI2QFN/LM	38
PEMI2QFN/LP	38
PEMI2QFN/LR	38
PEMI2QFN/LT	38
PEMI2QFN/RE	38
PEMI2QFN/RG	38
PEMI2QFN/RK	38
PEMI2QFN/RM	38
PEMI2QFN/RP	38
PEMI2QFN/RR	38
PEMI2QFN/RT	38
PEMI2QFN/WE	38
PEMI2QFN/WG	38
PEMI2QFN/WK	38
PEMI2QFN/WM	38
PEMI2QFN/WP	38
PEMI2QFN/WR	38

Type Number	Page Number
PEMI2QFN/WT	38
PEMI2STD/CE	37
PEMI2STD/CG	37
PEMI2STD/CK	37
PEMI2STD/CM	36
PEMI2STD/CP	36
PEMI2STD/CR	36
PEMI2STD/CT	36
PEMI2STD/HE	37
PEMI2STD/HG	37
PEMI2STD/HK	37
PEMI2STD/HM	37
PEMI2STD/HP	37
PEMI2STD/HR	37
PEMI2STD/HT	37
PEMI2STD/LE	37
PEMI2STD/LG	37
PEMI2STD/LK	37
PEMI2STD/LM	37
PEMI2STD/LP	37
PEMI2STD/LR	37
PEMI2STD/LT	37
PEMI2STD/RE	37
PEMI2STD/RG	37
PEMI2STD/RK	37
PEMI2STD/RM	37
PEMI2STD/RP	37
PEMI2STD/RR	37
PEMI2STD/RT	37
PEMI2STD/WE	37
PEMI2STD/WG	37
PEMI2STD/WK	37
PEMI2STD/WM	37
PEMI2STD/WP	37
PEMI2STD/WR	37
PEMI2STD/WT	37
PEMI4CSP/RT	38
PEMI4CSP/RW	38
PEMI4QFN/CE	38
PEMI4QFN/CG	38
PEMI4QFN/CK	38
PEMI4QFN/CM	38
PEMI4QFN/CP	38
PEMI4QFN/CR	38
PEMI4QFN/CT	38
PEMI4QFN/HE	39
PEMI4QFN/HG	38
PEMI4QFN/HK	38
PEMI4QFN/HM	38
PEMI4QFN/HP	38
PEMI4QFN/HR	38
PEMI4QFN/HT	38
PEMI4QFN/LE	39
PEMI4QFN/LG	39
PEMI4QFN/LK	39
PEMI4QFN/LM	39
PEMI4QFN/LP	39
PEMI4QFN/LR	39
PEMI4QFN/LT	39
PEMI4QFN/RE	39

Type Number	Page Number
PEMI4QFN/RG	39
PEMI4QFN/RK	39
PEMI4QFN/RM	39
PEMI4QFN/RP	39
PEMI4QFN/RR	39
PEMI4QFN/RT	39
PEMI4QFN/WE	39
PEMI4QFN/WG	39
PEMI4QFN/WK	39
PEMI4QFN/WM	39
PEMI4QFN/WP	39
PEMI4QFN/WR	39
PEMI4QFN/WT	39
PEMI6CSP/RT	39
PEMI6CSP/RW	39
PEMI6QFN/CE	39
PEMI6QFN/CG	39
PEMI6QFN/CK	39
PEMI6QFN/CM	39
PEMI6QFN/CP	39
PEMI6QFN/CR	39
PEMI6QFN/CT	39
PEMI6QFN/HE	40
PEMI6QFN/HG	40
PEMI6QFN/HK	40
PEMI6QFN/HM	40
PEMI6QFN/HP	40
PEMI6QFN/HR	40
PEMI6QFN/HT	39
PEMI6QFN/LE	40
PEMI6QFN/LG	40
PEMI6QFN/LK	40
PEMI6QFN/LM	40
PEMI6QFN/LP	40
PEMI6QFN/LR	40
PEMI6QFN/LT	40
PEMI6QFN/RE	40
PEMI6QFN/RG	40
PEMI6QFN/RK	40
PEMI6QFN/RM	40
PEMI6QFN/RP	40
PEMI6QFN/RR	40
PEMI6QFN/RT	40
PEMI6QFN/WE	40
PEMI6QFN/WG	40
PEMI6QFN/WK	40
PEMI6QFN/WM	40
PEMI6QFN/WP	40
PEMI6QFN/WR	40
PEMI6QFN/WT	40
PEMI8CSP/RT	40
PEMI8CSP/RW	40
PEMI8QFN/CE	40
PEMI8QFN/CG	40
PEMI8QFN/CK	40
PEMI8QFN/CM	40
PEMI8QFN/CP	40
PEMI8QFN/CR	40
PEMI8QFN/CT	40
PEMI8QFN/HE	41

Type Number	Page Number
PEMI8QFN/HG	41
PEMI8QFN/HK	41
PEMI8QFN/HM	41
PEMI8QFN/HP	41
PEMI8QFN/HR	41
PEMI8QFN/HT	41
PEMI8QFN/LE	41
PEMI8QFN/LG	41
PEMI8QFN/LK	41
PEMI8QFN/LM	41
PEMI8QFN/LP	41
PEMI8QFN/LR	41
PEMI8QFN/LT	41
PEMI8QFN/RE	41
PEMI8QFN/RG	41
PEMI8QFN/RK	41
PEMI8QFN/RM	41
PEMI8QFN/RP	41
PEMI8QFN/RR	41
PEMI8QFN/RT	41
PEMI8QFN/WE	41
PEMI8QFN/WG	41
PEMI8QFN/WK	41
PEMI8QFN/WM	41
PEMI8QFN/WP	41
PEMI8QFN/WR	41
PEMI8QFN/WT	41
PEMT1	53
PEMX1	53
PEMZ1	53
PEMZ7	53
PESD12VL1BA	24
PESD12VL2BT	25
PESD12VS1UA	22
PESD12VS1UB	22
PESD12VS1UJ	22
PESD12VS1UL	22
PESD12VS1ULD	22
PESD12VS2UAT	23
PESD12VS2UQ	23
PESD12VS2UT	23
PESD12VS4UD	23
PESD12VS5UD	23
PESD12VU1UT	47
PESD15VL1BA	24
PESD15VL2BT	25
PESD15VS1UB	22
PESD15VS1UL	22
PESD15VS1ULD	22
PESD15VS2UAT	23
PESD15VS2UQ	23
PESD15VS2UT	23
PESD15VS4UD	23
PESD15VS5UD	23
PESD15VU1UT	47
PESD16VF1BL	28
PESD16VX1UL	28
PESD1CAN	47
PESD1FLEX	47
PESD1LIN	47

Type Number	Page Number
PESD24VL1BA	24
PESD24VL2BT	25
PESD24VS1UA	22
PESD24VS1UB	22
PESD24VS1UL	22
PESD24VS1ULD	22
PESD24VS2UAT	23
PESD24VS2UQ	23
PESD24VS2UT	23
PESD24VS4UD	23
PESD24VS5UD	23
PESD24VU1UT	47
PESD2CAN	47
PESD36VS2UT	23
PESD3V3L1BA	24
PESD3V3L1UA	24
PESD3V3L1UB	24
PESD3V3L1UL	24
PESD3V3L2BT	25
PESD3V3L2UM	25
PESD3V3L4UF	26
PESD3V3L4UG	26
PESD3V3L4UW	26
PESD3V3L5UF	27
PESD3V3L5UK	27
PESD3V3L5UV	27
PESD3V3L5UY	27
PESD3V3S1UB	22
PESD3V3S1UL	22
PESD3V3S2UAT	23
PESD3V3S2UQ	23
PESD3V3S2UT	23
PESD3V3S4UD	23
PESD3V3S4UF	23
PESD3V3S5UD	23
PESD3V3U1UA	24
PESD3V3U1UB	24
PESD3V3U1UL	24
PESD3V3U1UT	47
PESD3V3V4UF	26
PESD3V3V4UG	26
PESD3V3V4UK	26
PESD3V3V4UW	26
PESD3V3X1BL	28
PESD5V0F1BL	28
PESD5V0F1BSF	28
PESD5V0L1BA	24
PESD5V0L1BSF	24
PESD5V0L1UA	24
PESD5V0L1UB	24
PESD5V0L1UL	24
PESD5V0L1ULD	24
PESD5V0L2BT	25
PESD5V0L2UM	25
PESD5V0L2UU	25
PESD5V0L4UF	26
PESD5V0L4UG	26
PESD5V0L4UW	26
PESD5V0L5UF	27
PESD5V0L5UK	27

Type Number	Page Number
PESD5V0L5UV	27
PESD5V0L5UY	27
PESD5V0L6US	27
PESD5V0L7BS	27
PESD5V0S1BA	22
PESD5V0S1BB	22
PESD5V0S1BL	22
PESD5V0S1BLD	22
PESD5V0S1BSF	22
PESD5V0S1UA	22
PESD5V0S1UB	22
PESD5V0S1UJ	22
PESD5V0S1UL	22
PESD5V0S1ULD	22
PESD5V0S2BT	25
PESD5V0S2UAT	23
PESD5V0S2UQ	23
PESD5V0S4UD	23
PESD5V0S4UF	23
PESD5V0S5UD	23
PESD5V0U1BA	25
PESD5V0U1BB	25
PESD5V0U1BL	25
PESD5V0U1BLD	25
PESD5V0U1UA	24
PESD5V0U1UB	24
PESD5V0U1UL	24
PESD5V0U1UT	47
PESD5V0U2BM	25
PESD5V0U2BT	25
PESD5V0U4BF	27
PESD5V0U4BW	27
PESD5V0U5BF	27
PESD5V0U5BV	27
PESD5V0V1BA	24
PESD5V0V1BB	24
PESD5V0V1BL	24
PESD5V0V1BLD	24
PESD5V0V1BSF	24
PESD5V0V4UF	26
PESD5V0V4UG	26
PESD5V0V4UK	26
PESD5V0V4UW	26
PESD5V0X1BL	28
PESD5V0X1BQ	28
PESD5V0X1BT	28
PESD5V0X1UAB	28
PESD5V0X1UALD	28
PESD5V0X1UB	28
PESD5V0X1ULD	28
PESD5V2S2UT	23
PESD5Z12	22
PESD5Z2.5	22
PESD5Z3.3	22
PESD5Z5.0	22
PESD5Z6.0	22
PESD5Z7.0	22
PESD6V0L2UU	25
PESD9V0V4UK	26
PESD9X5.0L	22

Type Number	Page Number
PESD9X7.0L	22
PH2520U	77
PH2925U	77
PH3120L	77
PHB110NQ08T	80
PHB18NQ10T	81
PHB191NQ06LT	79
PHB20N06T	79
PHB20NQ20T	82
PHB21N06LT	79
PHB27NQ10T	81
PHB29N08T	80
PHB32N06LT	80
PHB33NQ20T	82
PHB45NQ10T	81
PHB45NQ15T	82
PHB47NQ10T	81
PHB66NQ03LT	77
PHC21025	83
PHD13003C	68
PHD13005	68
PHD20N06T	79
PHD36N03LT	78
PHD38N02LT	77
PHD71NQ03LT	78
PHD97NQ03LT	77
PHD9NQ20T	82
PHE13003A	68
PHE13003C	68
PHE13005	68
PHE13005X	68
PHE13007	68
PHE13009	68
PHK04P02T	83
PHK12NQ03LT	78
PHK12NQ10T	81
PHK13N03LT	78
PHK18NQ03LT	78
PHK28NQ03LT	78
PHK31NQ03LT	78
PHK5NQ15T	82
PHKD13N03LT	78
PHKD13N03LT	83
PHKD3NQ10T	81
PHKD3NQ10T	83
PHKD6N02LT	77
PHKD6N02LT	83
PHN203	78
PHN203	83
PHN210T	78
PHP18NQ10T	81
PHP18NQ11T	81
PHP191NQ06LT	79
PHP20N06T	79
PHP20NQ20T	82
PHP225	83
PHP23NQ11T	81
PHP27NQ11T	81
PHP28NQ15T	82
PHP29N08T	80

Type Number	Page Number
PHP30NQ15T	82
PHP33NQ20T	82
PHP36N03LT	78
PHP45NQ10T	81
PHP45NQ11T	81
PHP79NQ08LT	80
PHP9NQ20T	82
PHT4NQ10LT	72
PHT4NQ10T	72
PHT6N06LT	72
PHT6N06T	72
PHT6NQ10T	72
PHT8N06LT	72
PHU97NQ03LT	77
PIMC31	59
PIMD2	59
PIMD3	59
PIMH9	59
PIMN31	59
PIMT1	53
PIMZ2	53
PLVA2600A series	14
PLVA600A series	14
PMBD353	9
PMBD354	9
PMBF170	73
PMBS3904	53
PMBS3906	53
PMBT2222	53
PMBT2222A	53
PMBT2369	53
PMBT2907	53
PMBT2907A	53
PMBT3904	53
PMBT3904M	53
PMBT3904VS	53
PMBT3904YS	53
PMBT3906	53
PMBT3906M	53
PMBT3906VS	53
PMBT3906YS	53
PMBT3946VPN	53
PMBT3946YPN	53
PMBT4401	53
PMBT4403	53
PMBT5550	54
PMBT5551	54
PMBT6428	52
PMBT6429	52
PMBTA06	52
PMBTA13	56
PMBTA14	56
PMBTA42	54
PMBTA42DS	54
PMBTA44	54
PMBTA45	66
PMBTA56	52
PMBTA64	56
PMBTA92	54
PMD2001D	57

Type Number	Page Number
PMD3001D	57
PMD9001D	57
PMD9002D	57
PMD9003D	57
PMD9010D	57
PMD9050D	57
PMDPB65UP	76
PMEG1020EA	11
PMEG1020EH	10
PMEG1020EJ	11
PMEG1020EV	11
PMEG1030EH	10
PMEG1030EJ	11
PMEG2005AEA	11
PMEG2005AEL	11
PMEG2005AELD	11
PMEG2005AEV	11
PMEG2005CT	12
PMEG2005EB	11
PMEG2005EH	10
PMEG2005EJ	11
PMEG2005EL	11
PMEG2005ELD	11
PMEG2005ET	10
PMEG2010AEB	11
PMEG2010AEH	10
PMEG2010AEJ	11
PMEG2010AET	10
PMEG2010BEA	11
PMEG2010BER	10
PMEG2010BEV	11
PMEG2010EA	11
PMEG2010EH	10
PMEG2010EJ	11
PMEG2010EPA	11
PMEG2010ER	10
PMEG2010ET	10
PMEG2010EV	11
PMEG2015EA	11
PMEG2015EH	10
PMEG2015EJ	11
PMEG2015EV	11
PMEG2020AEA	11
PMEG2020CPA	12
PMEG2020EH	10
PMEG2020EJ	11
PMEG2020EPA	11
PMEG3002AEB	11
PMEG3002AEL	11
PMEG3002AELD	11
PMEG3002EJ	11
PMEG3002TV	12
PMEG3005AEA	11
PMEG3005AEV	11
PMEG3005CT	12
PMEG3005EB	11
PMEG3005EH	10
PMEG3005EJ	11
PMEG3005EL	11
PMEG3005ELD	11

Type Number	Page Number
PMEG3005ET	10
PMEG3010BEA	11
PMEG3010BEP	10
PMEG3010BER	10
PMEG3010BEV	11
PMEG3010CEH	10
PMEG3010CEJ	11
PMEG3010EB	11
PMEG3010EH	10
PMEG3010EJ	11
PMEG3010EP	10
PMEG3010ER	10
PMEG3010ET	10
PMEG3015EH	10
PMEG3015EJ	11
PMEG3015EV	11
PMEG3020BEP	10
PMEG3020BER	10
PMEG3020CEP	10
PMEG3020CPA	12
PMEG3020DEP	10
PMEG3020EH	10
PMEG3020EJ	11
PMEG3020EP	10
PMEG3020EPA	11
PMEG3020ER	10
PMEG3030BEP	10
PMEG3030EP	10
PMEG3050BEP	10
PMEG3050EP	10
PMEG4002EB	11
PMEG4002EJ	11
PMEG4002EL	11
PMEG4002ELD	11
PMEG4005AEA	11
PMEG4005AEV	11
PMEG4005CT	12
PMEG4005EH	10
PMEG4005EJ	11
PMEG4005ET	10
PMEG4010BEA	11
PMEG4010BEV	11
PMEG4010CEH	10
PMEG4010CEJ	11
PMEG4010CPA	12
PMEG4010EH	10
PMEG4010EJ	11
PMEG4010EP	10
PMEG4010ER	10
PMEG4010ET	10
PMEG4020EP	10
PMEG4020EPA	11
PMEG4020ER	10
PMEG4030EP	10
PMEG4030ER	10
PMEG4050EP	10
PMEG6002EB	11
PMEG6002EJ	11
PMEG6002TV	12
PMEG6010AED	10

Type Number	Page Number
PMEG6010CEH	10
PMEG6010CEJ	11
PMEG6010CPA	12
PMEG6010EP	10
PMEG6010ER	10
PMEG6020EP	10
PMEG6020EPA	11
PMEG6020ER	10
PMEG6030EP	10
PMF170XP	75
PMF250XN	71
PMF280UN	71
PMF290XN	71
PMF370XN	71
PMF3800SN	73
PMF400UN	71
PMF780SN	73
PMFPB6532UP	76
PMFPB6545UP	76
PMG370XN	71
PMG85XP	75
PMGD280UN	75
PMGD290XN	75
PMGD370XN	75
PMGD400UN	75
PMGD780SN	75
PMGD8000LN	75
PMK30EP	83
PMK35EP	83
PMK50XP	83
PML260SN	82
PML340SN	82
PMMT491A	61
PMMT591A	63
PMN15EN	71
PMN21UP	75
PMN23UN	71
PMN27UN	71
PMN27UP	75
PMN28UN	71
PMN34LN	71
PMN34UN	71
PMN35EN	71
PMN38EN	71
PMN40LN	71
PMN45EN	71
PMN48XP	75
PMN49EN	71
PMN50XP	75
PMN55LN	71
PMP4201G	55
PMP4201V	55
PMP4201Y	55
PMP4501G	55
PMP4501V	55
PMP4501Y	55
PMP5201G	55
PMP5201V	55
PMP5201Y	55
PMP5501G	55

Type Number	Page Number
PMP5501V	55
PMP5501Y	55
PMR280UN	71
PMR290XN	71
PMR370XN	71
PMR400UN	71
PMR780SN	73
PMSS3904	53
PMSS3906	53
PMST2222	53
PMST2222A	53
PMST2369	53
PMST2907A	53
PMST3904	53
PMST3906	53
PMST4401	53
PMST4403	53
PMST5088	52
PMST5089	52
PMST5550	54
PMST5551	54
PMST6428	52
PMST6429	52
PMSTA05	52
PMSTA06	52
PMSTA42	54
PMSTA55	52
PMSTA56	52
PMSTA92	54
PMV117EN	71
PMV16UN	71
PMV18EN	71
PMV20XN	71
PMV213SN	73
PMV27UP	75
PMV28UN	71
PMV30UN	71
PMV30XN	71
PMV31EN	71
PMV31XN	71
PMV40UN	71
PMV45EN	71
PMV48XP	75
PMV56XN	71
PMV60EN	71
PMV65XP	75
PMZ250UN	71
PMZ270XN	71
PMZ350XN	71
PMZ390UN	71
PMZ760SN	73
PRTR5V0U1T	28
PRTR5V0U2AX	28, 43
PRTR5V0U2D	28, 44
PRTR5V0U2F	28, 44
PRTR5V0U2K	28, 44
PRTR5V0U2X	28, 43
PRTR5V0U4D	30, 44
PRTR5V0U4Y	30, 44
PRTR5V0U8S	31

Type Number	Page Number
PSMN004-60B	80
PSMN005-30K	78
PSMN005-75B	80
PSMN006-20K	77
PSMN008-75B	80
PSMN008-75P	80
PSMN009-100B	81
PSMN009-100P	81
PSMN011-80YS	80
PSMN012-100YS	81
PSMN012-60YS	80
PSMN012-80PS	80
PSMN013-100ES	81
PSMN013-100PS	81
PSMN013-30LL	78
PSMN013-80YS	80
PSMN014-40YS	79
PSMN014-60LS	80
PSMN015-100B	81
PSMN015-100P	81
PSMN015-110P	81
PSMN015-60PS	80
PSMN016-100PS	81
PSMN016-100YS	81
PSMN017-30LL	78
PSMN017-60YS	80
PSMN017-80PS	80
PSMN018-80YS	80
PSMN020-100YS	81
PSMN022-30PL	78
PSMN023-80LS	80
PSMN025-100D	81
PSMN026-80YS	80
PSMN027-100PS	81
PSMN028-100YS	81
PSMN030-150B	82
PSMN030-150P	82
PSMN030-60YS	80
PSMN034-100PS	81
PSMN035-100LS	81
PSMN035-150B	82
PSMN035-150P	82
PSMN038-100K	81
PSMN039-100YS	81
PSMN045-80YS	80
PSMN050-80PS	80
PSMN057-200B	82
PSMN057-200P	82
PSMN059-150Y	82
PSMN063-150D	82
PSMN069-100YS	81
PSMN070-200B	82
PSMN070-200P	82
PSMN085-150K	82
PSMN102-200Y	82
PSMN130-200D	82
PSMN165-200K	82
PSMN1R0-30YLC	78
PSMN1R2-25YL	77
PSMN1R3-30YL	78

Type Number	Page Number
PSMN1R5-25YL	77
PSMN1R5-30YL	78
PSMN1R6-30PL	78
PSMN1R7-30YL	78
PSMN1R8-30PL	78
PSMN2R0-30PL	78
PSMN2R0-30YL	78
PSMN2R2-40PS	79
PSMN2R5-30YL	78
PSMN2R6-40YS	79
PSMN2R7-30PL	78
PSMN2R8-40PS	79
PSMN3R0-30YL	78
PSMN3R0-60PS	80
PSMN3R2-30KL	78
PSMN3R3-40YS	79
PSMN3R4-30PL	78
PSMN3R5-30LL	78
PSMN3R5-30YL	78
PSMN3R8-30LL	78
PSMN4R0-30YL	78
PSMN4R0-40YS	79
PSMN4R3-30PL	78
PSMN4R4-80PS	80
PSMN4R5-30YLC	78
PSMN4R5-40PS	79
PSMN4R6-60PS	80
PSMN5R0-30YL	78
PSMN5R0-80PS	80
PSMN5R5-60YS	80
PSMN5R6-100PS	81
PSMN5R8-30LL	78
PSMN5R8-40YS	79
PSMN6R0-30YL	78
PSMN6R5-80PS	80
PSMN7R0-100ES	81
PSMN7R0-100PS	81
PSMN7R0-30YL	78
PSMN7R0-40LS	79
PSMN7R0-60YS	80
PSMN7R6-60PS	80
PSMN8R0-40PS	79
PSMN8R2-80YS	80
PSMN8R3-40YS	79
PSMN8R5-60YS	80
PSMN8R7-80PS	80
PSMN9R0-30LL	78
PSMN9R0-30YL	78
PSMN9R5-100PS	81
PTVS10VP1UP	49
PTVS10VS1UR	48
PTVS11VP1UP	49
PTVS11VS1UR	48
PTVS12VP1UP	49
PTVS12VS1UR	48
PTVS13VP1UP	49
PTVS13VS1UR	48
PTVS14VP1UP	49
PTVS14VS1UR	48
PTVS15VP1UP	49

Type Number	Page Number
PTVS15VS1UR	48
PTVS16VP1UP	49
PTVS16VS1UR	48
PTVS17VP1UP	49
PTVS17VS1UR	48
PTVS18VP1UP	49
PTVS18VS1UR	48
PTVS20VP1UP	49
PTVS20VS1UR	48
PTVS22VP1UP	49
PTVS22VS1UR	48
PTVS24VP1UP	49
PTVS24VS1UR	48
PTVS26VP1UP	49
PTVS26VS1UR	48
PTVS28VP1UP	49
PTVS28VS1UR	48
PTVS30VP1UP	49
PTVS30VS1UR	48
PTVS33VP1UP	49
PTVS33VS1UR	48
PTVS36VP1UP	49
PTVS36VS1UR	48
PTVS3V3P1UP	49
PTVS3V3S1UR	48
PTVS40VP1UP	49
PTVS40VS1UR	48
PTVS43VP1UP	49
PTVS43VS1UR	48
PTVS45VP1UP	49
PTVS45VS1UR	48
PTVS48VP1UP	49
PTVS48VS1UR	48
PTVS51VP1UP	49
PTVS51VS1UR	48
PTVS54VP1UP	49
PTVS54VS1UR	48
PTVS58VP1UP	49
PTVS58VS1UR	48
PTVS5V0P1UP	49
PTVS5V0S1UR	48
PTVS60VP1UP	49
PTVS60VS1UR	48
PTVS64VP1UP	49
PTVS64VS1UR	48
PTVS6V0P1UP	49
PTVS6V0S1UR	48
PTVS6V5P1UP	49
PTVS6V5S1UR	48
PTVS7V0P1UP	49
PTVS7V0S1UR	48
PTVS7V5P1UP	49
PTVS7V5S1UR	48
PTVS8V0P1UP	49
PTVS8V0S1UR	48
PTVS8V5P1UP	49
PTVS8V5S1UR	48
PTVS9V0P1UP	49
PTVS9V0S1UR	48
PUMB1	59

Type Number	Page Number
PUMB10	59
PUMB11	59
PUMB13	59
PUMB14	59
PUMB15	59
PUMB16	59
PUMB17	59
PUMB18	59
PUMB19	59
PUMB2	59
PUMB20	59
PUMB24	59
PUMB3	59
PUMB30	59
PUMB4	59
PUMB9	59
PUMD10	59
PUMD12	59
PUMD13	59
PUMD14	59
PUMD15	59
PUMD16	59
PUMD17	59
PUMD18	59
PUMD19	59
PUMD2	59
PUMD20	59
PUMD24	59
PUMD3	59
PUMD30	59
PUMD4	59
PUMD48	59
PUMD6	59
PUMD9	59
PUMH1	59
PUMH10	59
PUMH11	59
PUMH13	59
PUMH14	59
PUMH15	59
PUMH16	59
PUMH17	59
PUMH18	59
PUMH19	59
PUMH2	59
PUMH20	59
PUMH24	59
PUMH30	59
PUMH4	59
PUMH7	59
PUMH9	59
PUMT1	53
PUMX1	53
PUMX2	53
PUMZ1	53
PUMZ2	53
PUSBM12VX4-TL	44
PUSBM15VX4-TL	44
PUSBM27VX4-TL	44
PUSBM5V5X4-TL	44

Type Number	Page Number
PVR100AD-B12V	94
PVR100AD-B2V5	94
PVR100AD-B3V0	94
PVR100AD-B3V3	94
PVR100AD-B5V0	94
PVR100AZ-B12V	94
PVR100AZ-B2V5	94
PVR100AZ-B3V0	94
PVR100AZ-B3V3	94
PVR100AZ-B5V0	94
PXT2222A	53
PXT2907A	53
PXT4401	53
PXT4403	53
PXTA14	56
PXTA42	54
PXTA92	54
PZT2222A	53
PZT2907A	53
PZT4401	53
PZT4403	53
PZTA14	56
PZTA42	54
PZTA44	54
PZTA92	54
PZUxB series	14
PZUxBA series	14
PZUxBL series	14
PZUxDB2 series	14
RB520CS30L	9
RB520S30	9
RB521CS30L	9
RB521S30	9
RB751CS40	9
RB751S40	9
RB751V40	9
SI2302DS	71
SI2304DS	71
SI4410DY	78
TDZ5V6J	14
TL431ACDBZR	92
TL431AFDT	92
TL431AIDBZR	92
TL431AMFDT	92
TL431AMSDT	92
TL431AQDBZR	92
TL431ASDT	92
TL431BCDBZR	92
TL431BFDT	92
TL431BIDBZR	92
TL431BMFDT	92
TL431BMSDT	92
TL431BQDBZR	92
TL431BSDT	92
TL431CDBZR	92
TL431FDT	92
TL431IDBZR	92
TL431MFDT	92
TL431MSDT	92
TL431QDBZR	92

Type Number	Page Number
TL431SDT	92
TLVH431ACDBZR	93
TLVH431AIDBZR	93
TLVH431AMQDBZR	93
TLVH431AQDBZR	93
TLVH431BCDBZR	93
TLVH431BIDBZR	93
TLVH431BMQDBZR	93
TLVH431BQDBZR	93
TLVH431CDBZR	93
TLVH431IDBZR	93
TLVH431MQDBZR	93
TLVH431QDBZR	93
Z00607MA	86
Z0103MA/NA	86
Z0103MA0/NA0	86
Z0103MN/NN	86
Z0103MN0/NN0	86
Z0107MA/NA	86
Z0107MA0/NA0	86
Z0107MN/NN	86
Z0107MN0/NN0	86
Z0109MA/NA	86
Z0109MA0/NA0	86
Z0109MN/NN	86
Z0109MN0/NN0	86

Notes

www.nxp.com

© 2011 NXP Semiconductors N.V.

All rights reserved. Reproduction in whole or in part is prohibited without the prior written consent of the copyright owner. The information presented in this document does not form part of any quotation or contract, is believed to be accurate and reliable and may be changed without notice. No liability will be accepted by the publisher for any consequence of its use. Publication thereof does not convey nor imply any license under patent- or other industrial or intellectual property rights.

Date of release: January 2011
Document order number: 9397 750 17022
Printed in the Netherlands

POLYBONE