SIPMOS® Small-Signal-Transistor

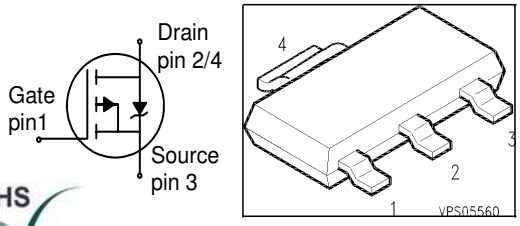
Feature

- P-Channel
- Enhancement mode
- Logic Level
- d*v*/d*t* rated
- Pb-free lead plating; RoHS compliant
- Qualified according to AEC Q101
- Halogen-free according to IEC61249-2-21

Product Summary

V_{DS}	-100	V
$R_{DS(on)}$	1.8	Ω
I_D	-0.68	A

PG-SOT223-4-1



Halogen-Free AEC Qualified RoHS

Type	Package	Tape and Reel Information	Marking	Packaging
BSP316P	PG-SOT223-4-1	H6327: 1000 pcs/reel	BSP316P	Non dry

Maximum Ratings, at T_j = 25 °C, unless otherwise specified

Parameter	Symbol	Value	Unit
Continuous drain current	I_D		A
T_A=25°C		-0.68	
T_A=70°C		-0.54	
Pulsed drain current	$I_{D\ puls}$	-2.72	
T_A=25°C			
Reverse diode d*v*/d*t*	d*v*/d*t*	6	kV/µs
I_S=-0.68A, V_{DS}=-48V, d*i*/d*t*=-200A/µs, T_{jmax}=150°C			
Gate source voltage	V_{GS}	±20	V
Power dissipation	P_{tot}	1.8	W
T_A=25°C			
Operating and storage temperature	T_j , T_{stg}	-55... +150	°C
IEC climatic category; DIN IEC 68-1		55/150/56	
ESD Class JESD22-A114-HBM		Class 1a	

Thermal Characteristics

Parameter	Symbol	Values			Unit
		min.	typ.	max.	
Characteristics					
Thermal resistance, junction - soldering point (Pin 4)	R_{thJS}	-	15	25	K/W
SMD version, device on PCB:	R_{thJA}				
@ min. footprint		-	80	115	
@ 6 cm^2 cooling area [1)]		-	48	70	

Electrical Characteristics, at T_j = 25 °C, unless otherwise specified

Parameter	Symbol	Values			Unit
		min.	typ.	max.	
Static Characteristics					
Drain-source breakdown voltage V_{GS}=0, I_D=-250µA	$V_{(BR)DSS}$	-100	-	-	V
Gate threshold voltage, V_{GS} = V_{DS} I_D=-170µA	$V_{GS(th)}$	-1	-1.5	-2	
Zero gate voltage drain current	I_{DSS}				µA
V_{DS}=-100V, V_{GS}=0, T_j=25°C		-	-0.1	-0.2	
V_{DS}=-100V, V_{GS}=0, T_j=150°C		-	-10	-100	
Gate-source leakage current V_{GS}=-20V, V_{DS}=0	I_{GSS}	-	-10	-100	nA
Drain-source on-state resistance V_{GS}=-4.5V, I_D=-0.61A	$R_{DS(on)}$	-	1.5	2.3	Ω
Drain-source on-state resistance V_{GS}=-10V, I_D=-0.68A	$R_{DS(on)}$	-	1.4	1.8	

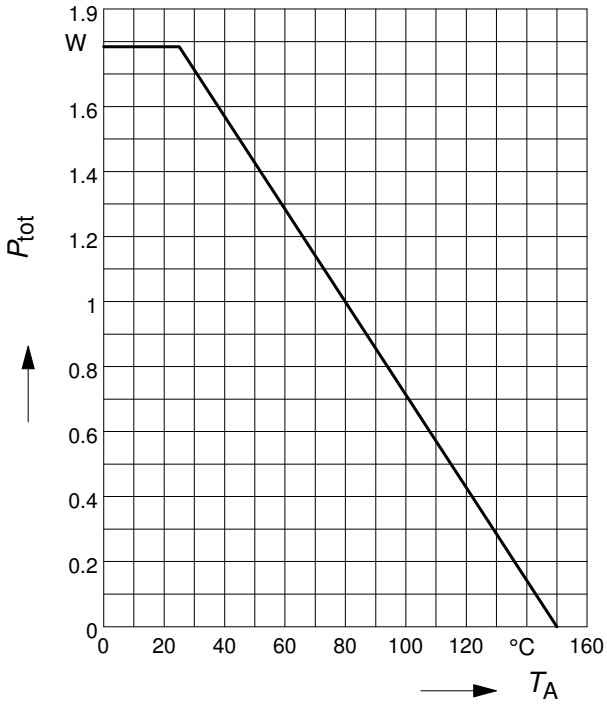
[1]Device on 40mm*40mm*1.5mm epoxy PCB FR4 with 6cm² (one layer, 70 µm thick) copper area for drain connection. PCB is vertical without blown air.

Electrical Characteristics, at T_j = 25 °C, unless otherwise specified

Parameter	Symbol	Conditions	Values			Unit
			min.	typ.	max.	
Dynamic Characteristics						
Transconductance	g_{fs}	$\lvert V_{DS}\rvert \geq 2^* \lvert I_D\rvert ^* R_{DS(on)max}$, I_D=-0.54A	0.5	1	-	S
Input capacitance	C_{iss}	V_{GS}=0, V_{DS}=-25V, f=1MHz	-	117	146	pF
Output capacitance	C_{oss}		-	27.7	34.5	
Reverse transfer capacitance	C_{rss}		-	12	15	
Turn-on delay time	$t_{d(on)}$	V_{DD}=-50V, V_{GS}=-10V, I_D=-0.68A, R_G=6Ω	-	4.7	7	ns
Rise time	t_r		-	7.5	11.2	
Turn-off delay time	$t_{d(off)}$		-	67.4	101	
Fall time	t_f		-	25.9	38.9	
Gate Charge Characteristics						
Gate to source charge	Q_{gs}	V_{DD}=-80V, I_D=-0.68A	-	-0.2	-0.3	nC
Gate to drain charge	Q_{gd}		-	-1.87	-2.8	
Gate charge total	Q_g	V_{DD}=-80V, I_D=-0.68A, V_{GS}=0 to -10V	-	-5.1	-6.4	
Gate plateau voltage	$V_{(plateau)}$	V_{DD}=-80V, I_D=-0.68A	-	-2.7	-	V
Reverse Diode						
Inverse diode continuous forward current	I_S	T_A=25°C	-	-	-0.68	A
Inv. diode direct current, pulsed	I_{SM}		-	-	-2.72	
Inverse diode forward voltage	V_{SD}	V_{GS}=0, I_F=-0.68A	-	-0.85	-1.2	V
Reverse recovery time	t_{rr}	V_R=-50V, I_F=I_S, di_F/dt=100A/µs	-	44.2	55.3	ns
Reverse recovery charge	Q_{rr}		-	56.3	70.4	nC

1 Power dissipation

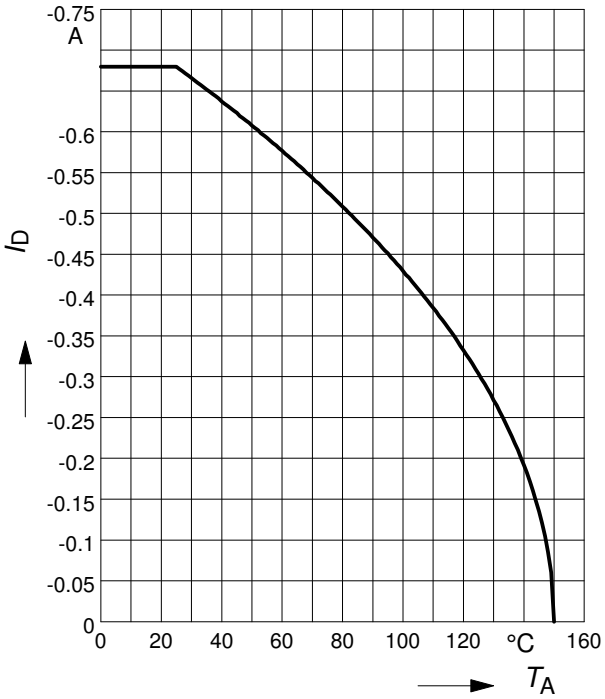
$P_{tot} = f(T_A)$



2 Drain current

$I_D = f(T_A)$

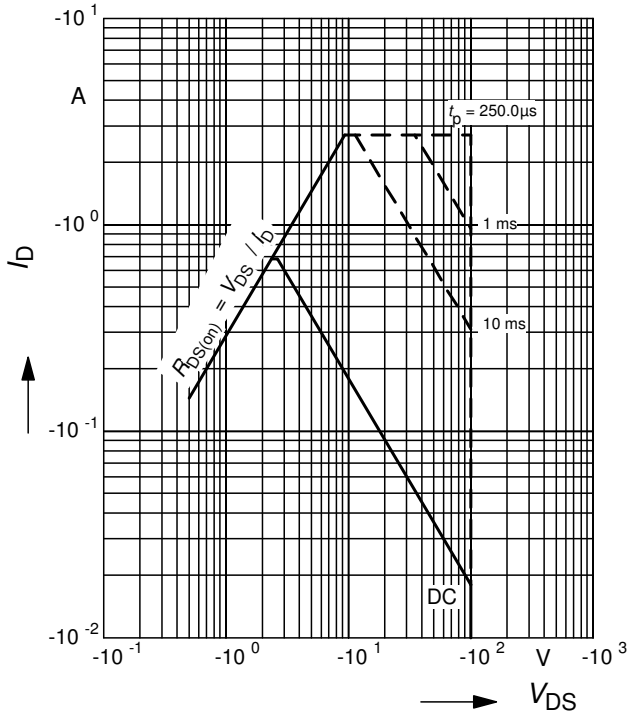
parameter: $|V_{GS}| \geq 10V$



3 Safe operating area

$I_D = f(V_{DS})$

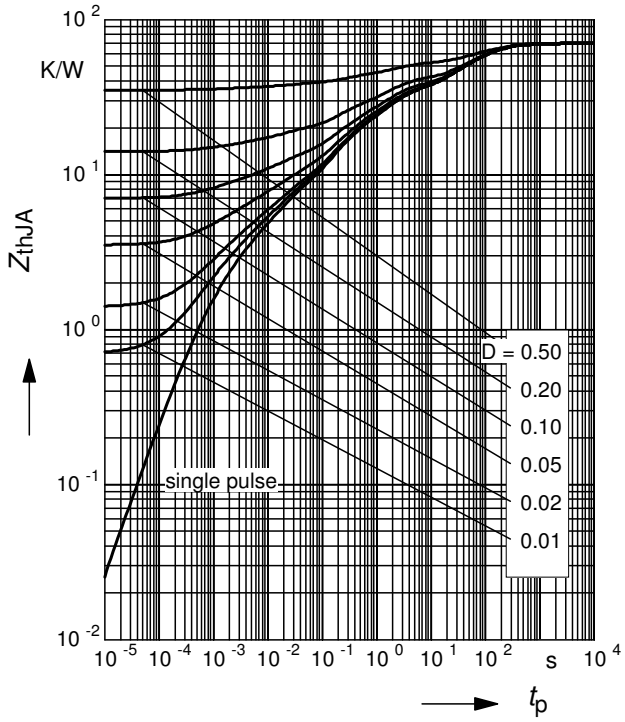
parameter : $D = 0$, $T_A = 25°C$



4 Transient thermal impedance

$Z_{thJA} = f(t_p)$

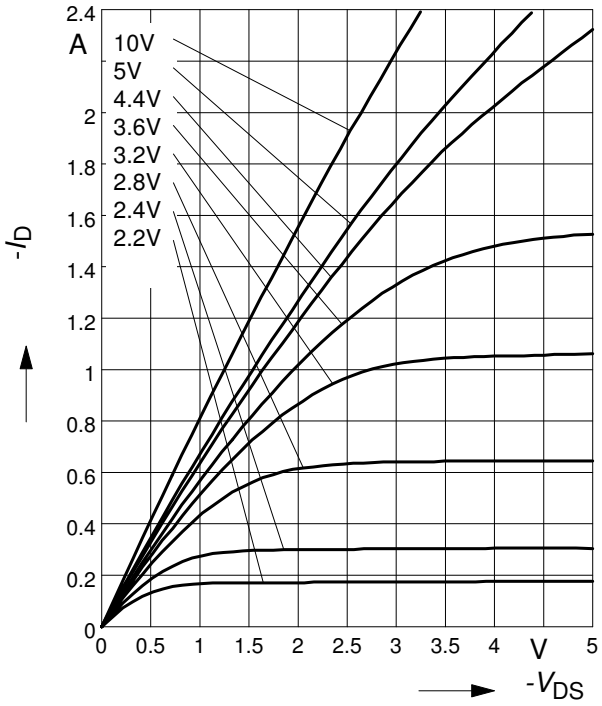
parameter : $D = t_p/T$



5 Typ. output characteristic

$I_D = f(V_{DS})$

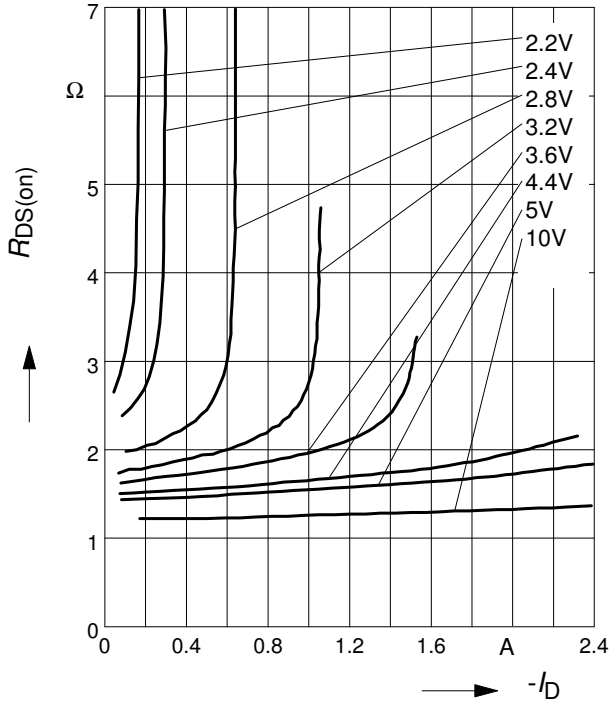
parameter: T_j =25°C, $-V_{GS}$



6 Typ. drain-source on resistance

$R_{DS(on)} = f(I_D)$

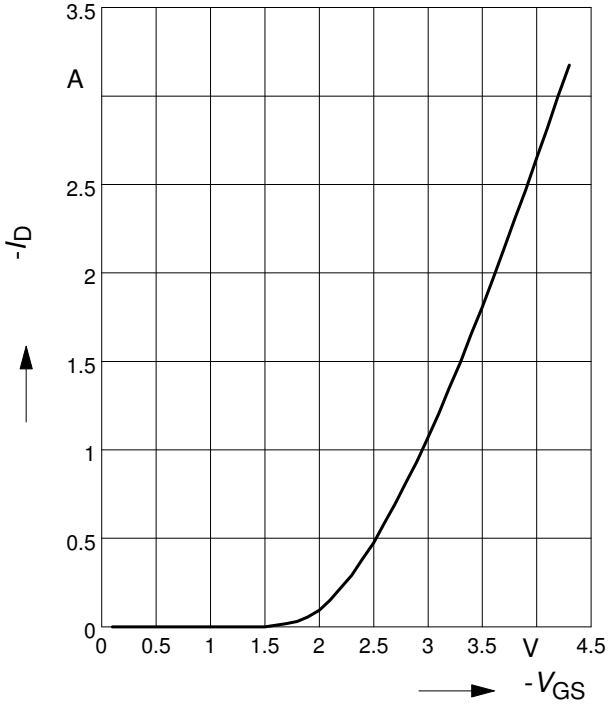
parameter: T_j =25°C, $-V_{GS}$



7 Typ. transfer characteristics

$I_D = f(V_{GS})$; $|V_{DS}| \geq 2 \times |I_D| \times R_{DS(on)max}$

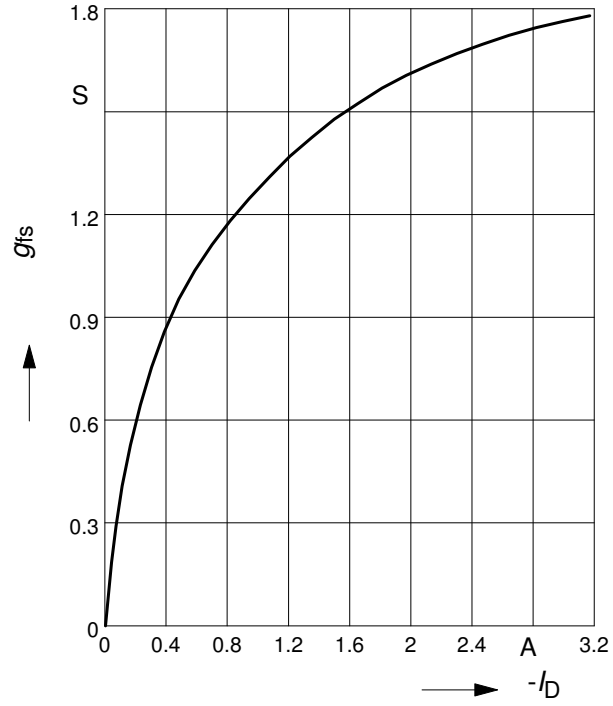
parameter: T_j = 25 °C



8 Typ. forward transconductance

$g_{fs} = f(I_D)$

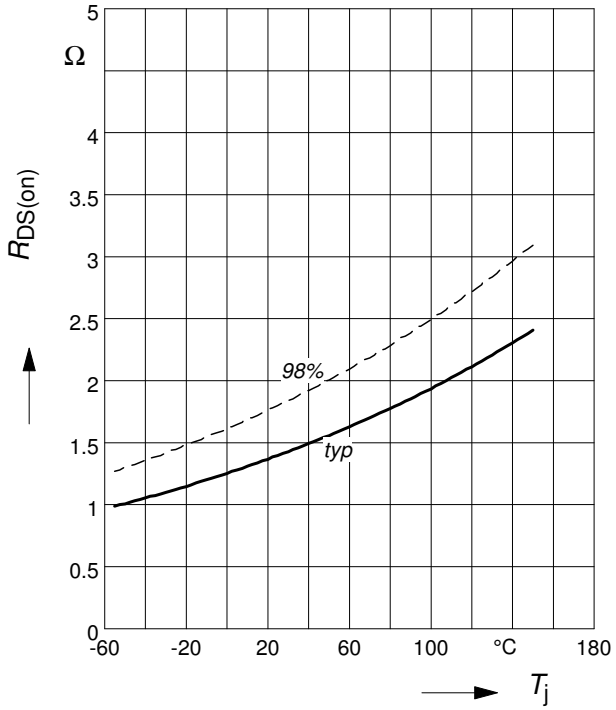
parameter: T_j =25°C



9 Drain-source on-state resistance

$R_{DS(on)} = f(T_j)$

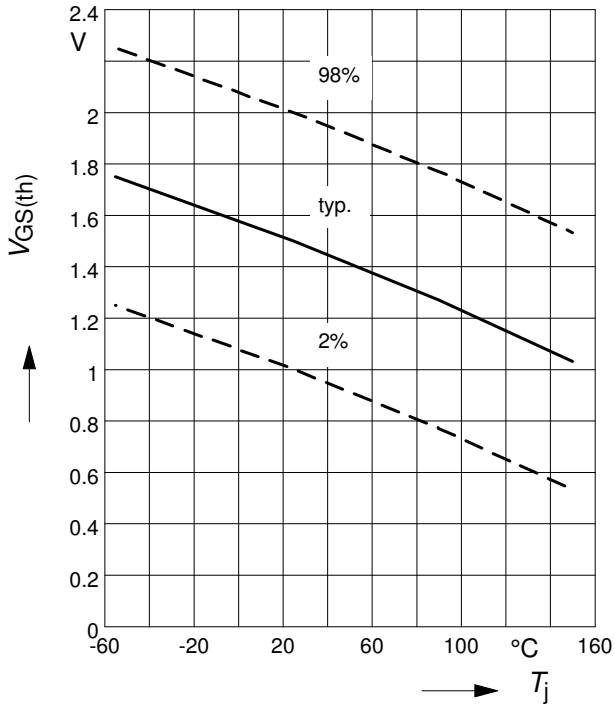
parameter : I_D = -0.68 A, V_{GS} = -10 V



10 Typ. gate threshold voltage

$V_{GS(th)} = f(T_j)$

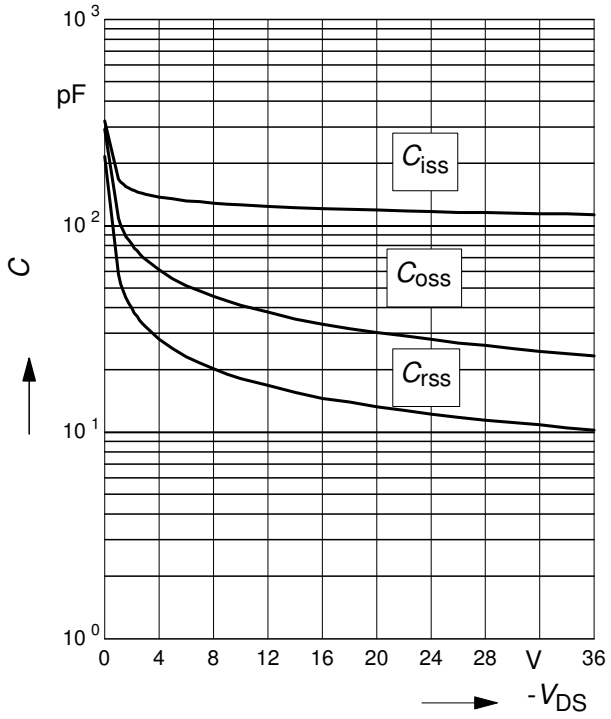
parameter: $V_{GS} = V_{DS}$



11 Typ. capacitances

$C = f(V_{DS})$

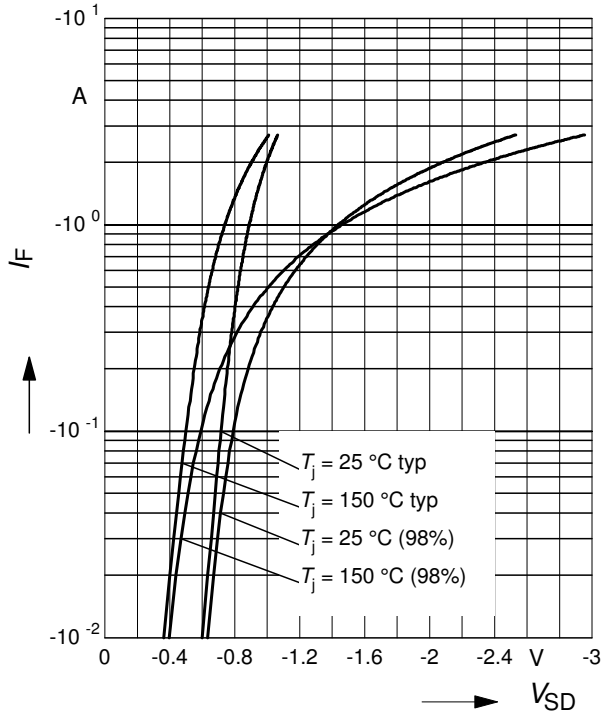
parameter: V_{GS}=0, f=1 MHz, T_j = 25 °C



12 Forward character. of reverse diode

$I_F = f(V_{SD})$

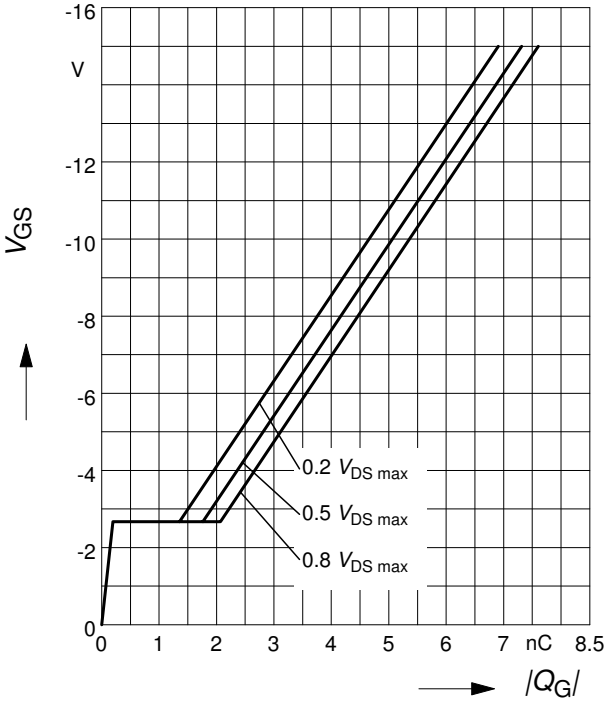
parameter: T_j



13 Typ. gate charge

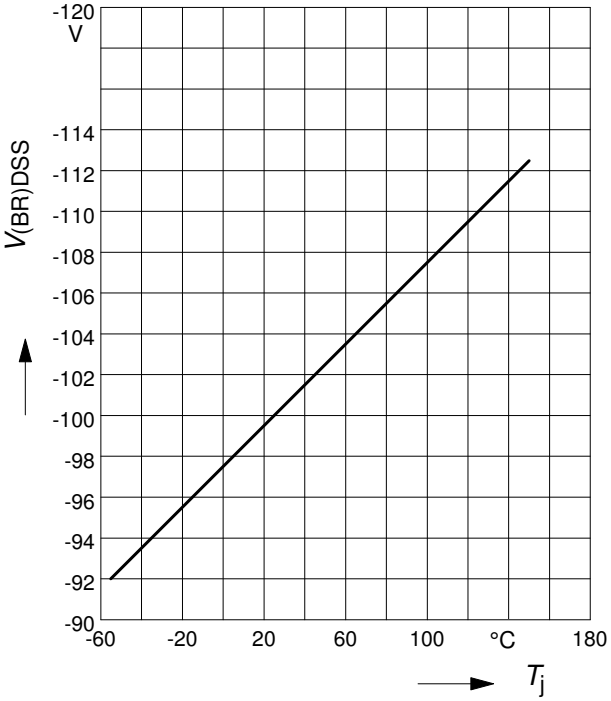
$V_{GS} = f\ (Q_{Gate})$

parameter: I_D = -0.68 A pulsed, T_j = 25 °C

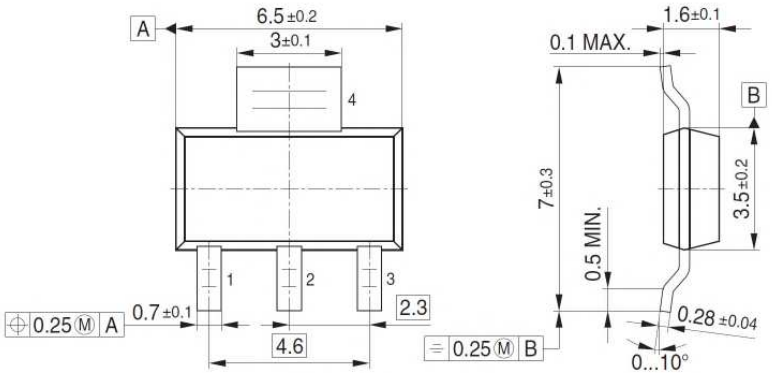


14 Drain-source breakdown voltage

$V_{(BR)DSS} = f\ (T_j)$

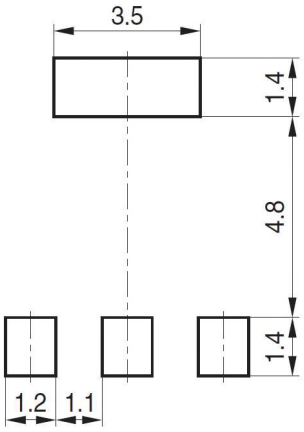


Package Outline SOT-223

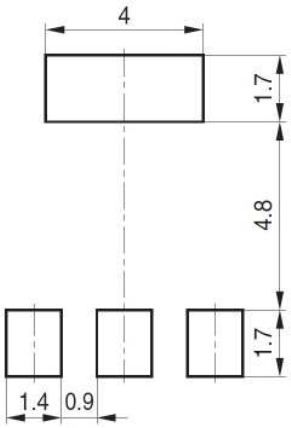


Footprint

Soldering type: Reflow soldering



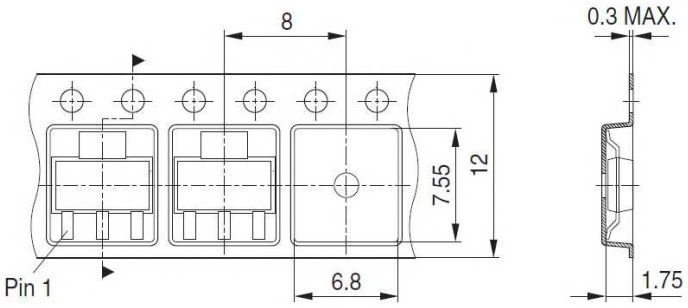
Soldering type: Wave soldering



Tape and Reel

Reel ø180 mm: 1.000 Pieces/Reel
Reels/Box: 1 x 1.000 = 1.000

Reel ø330 mm: 4.000 Pieces/Reel
Reels/Box: 1 x 4.000 = 4.000



Dimensions in mm

Revision History

BSP316P

Revision: 2016-06-10, Rev. 2.0

Previous Revision		
Revision	Date	Subjects (major changes since last revision)
2.0	2016-06-10	Release of final version

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