

N-Channel Enhancement Mode MOSFET

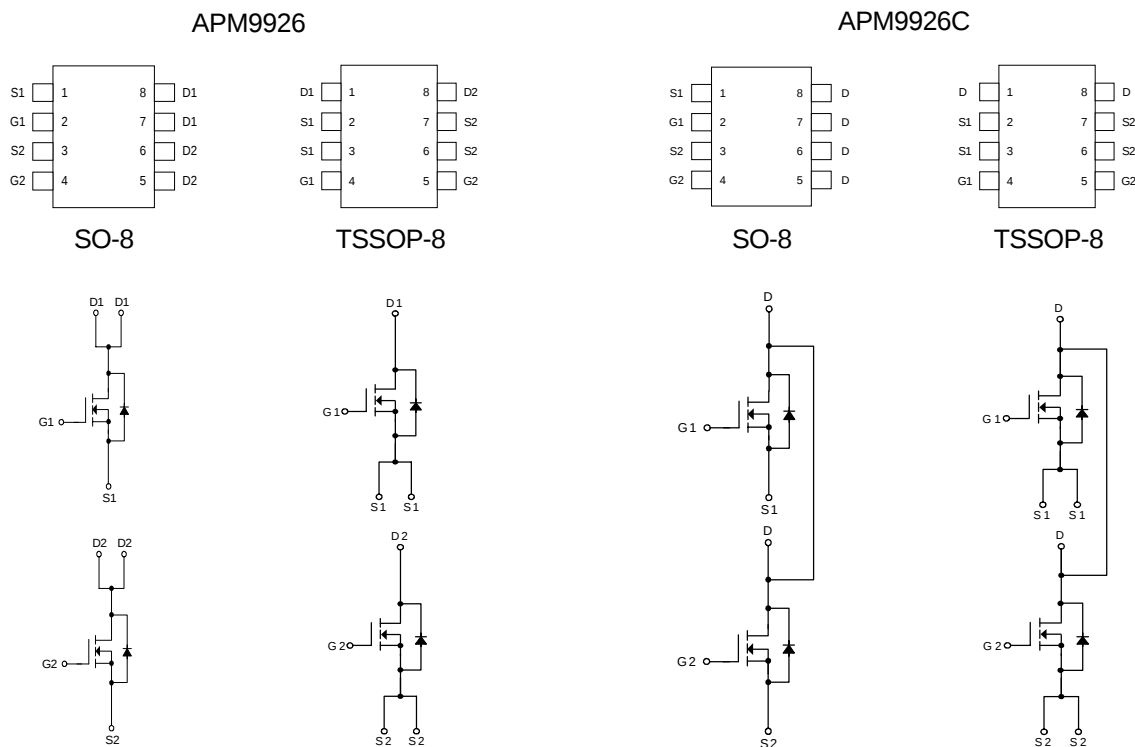
Features

- 20V/6A , $R_{DS(ON)} = 28m\Omega$ (typ.) @ $V_{GS} = 4.5V$
 $R_{DS(ON)} = 38m\Omega$ (typ.) @ $V_{GS} = 2.5V$
- Super High Dense Cell Design for Extremely Low $R_{DS(ON)}$
- Reliable and Rugged
- SO-8 and TSSOP-8 Packages

Applications

- Power Management in Notebook Computer , Portable Equipment and Battery Powered Systems.

Pin Description



ANPEC reserves the right to make changes to improve reliability or manufacturability without notice, and advise customers to obtain the latest version of relevant information to verify before placing orders.

Ordering and Marking Information

APM9926/C □□-□□ Handling Code Temp. Range Package Code	Package Code K : SO-8 O : TSSOP-8 Operation Junction Temp. Range C : -55 to 150°C Handling Code TR : Tape & Reel
APM9926/C K/O : APM9926/C XXXXXX	XXXXXX - Date Code

Absolute Maximum Ratings ($T_A = 25^\circ\text{C}$ unless otherwise noted)

Symbol	Parameter			Rating	Unit
V _{DSS}	Drain-Source Voltage			20	V
V _{GSS}	Gate-Source Voltage			±10	
I _D [*]	Maximum Drain Current – Continuous			6	A
I _{DM}	Maximum Drain Current – Pulsed			20	
P _D	Maximum Power Dissipation	T _A =25°C	SO-8	1.6	W
			TSSOP-8	1.0	
		T _A =100°C	SO-8	0.625	
			TSSOP-8	0.4	
T _J	Maximum Junction Temperature			150	°C
T _{STG}	Storage Temperature Range			-55 to 150	°C
R _{θJA}	Thermal Resistance – Junction to Ambient			80	°C/W

* Surface Mounted on FR4 Board, $t \leq 10$ sec.

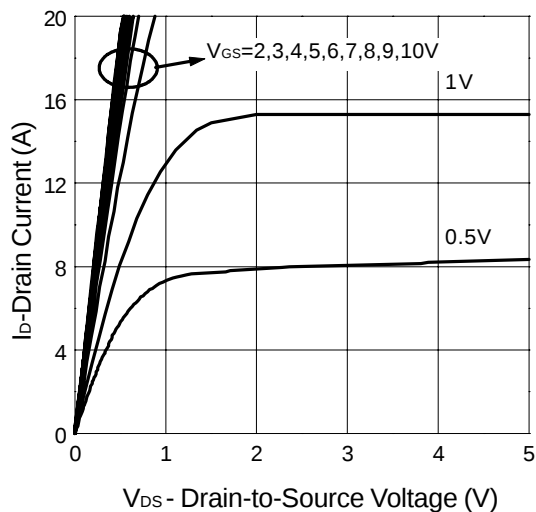
Electrical Characteristics Cont. ($T_A = 25^\circ\text{C}$ unless otherwise noted)

Symbol	Parameter	Test Condition	APM9926/C			Unit
			Min.	Typ.	Max.	
Static						
BV _{DSS}	Drain-Source Breakdown Voltage	V _{GS} =0V , I _{DS} =250μA	20			V
I _{DSS}	Zero Gate Voltage Drain Current	V _{DS} =16V , V _{GS} =0V			1	μA
V _{GS(th)}	Gate Threshold Voltage	V _{DS} =V _{GS} , I _{DS} =250μA	0.5	0.7	1.5	V
I _{GSS}	Gate Leakage Current	V _{GS} =±8V , V _{DS} =0V			±100	nA
R _{DS(ON)} ^a	Drain-Source On-state Resistance	V _{GS} =4.5V , I _{DS} =6A		28	32	mΩ
		V _{GS} =2.5V , I _{DS} =5.2A		38	45	
V _{SD} ^a	Diode Forward Voltage	I _{SD} =1.7A , V _{GS} =0V	0.6		1.3	V
Dynamic ^b						
Q _g	Total Gate Charge	V _{DS} =10V , I _{DS} = 6A V _{GS} =4.5V ,		10		nC
Q _{gs}	Gate-Source Charge			3.6		
Q _{gd}	Gate-Drain Charge			2		
t _{d(ON)}	Turn-on Delay Time	V _{DD} =10V , I _{DS} =1A , V _{GEN} =4.5V , R _G =0.2Ω		17		ns
T _r	Turn-on Rise Time			15		
t _{d(OFF)}	Turn-off Delay Time			45		
T _f	Turn-off Fall Time			25		
C _{iss}	Input Capacitance	V _{GS} =0V		520		pF
C _{oss}	Output Capacitance	V _{DS} =15V		110		
C _{rss}	Reverse Transfer Capacitance	Frequency=1.0MHz		70		

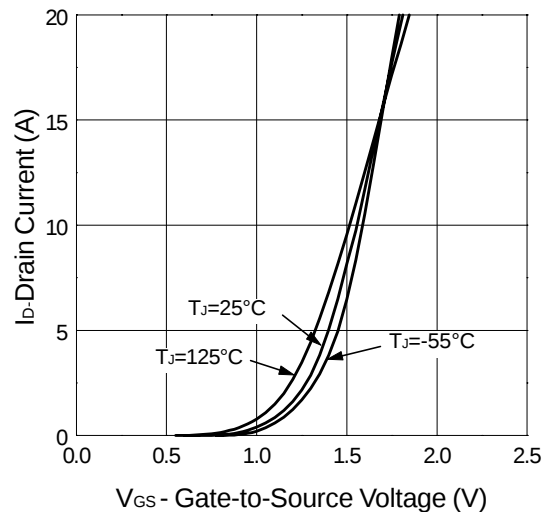
Notes
^a : Pulse test ; pulse width $\leq 300\mu s$, duty cycle $\leq 2\%$
^b : Guaranteed by design, not subject to production testing

Typical Characteristics

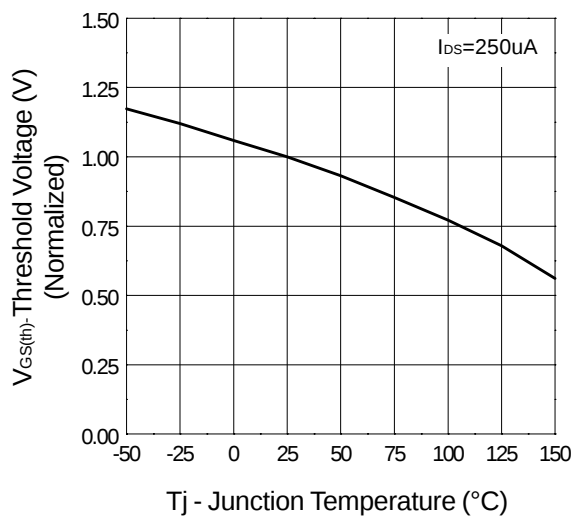
Output Characteristics



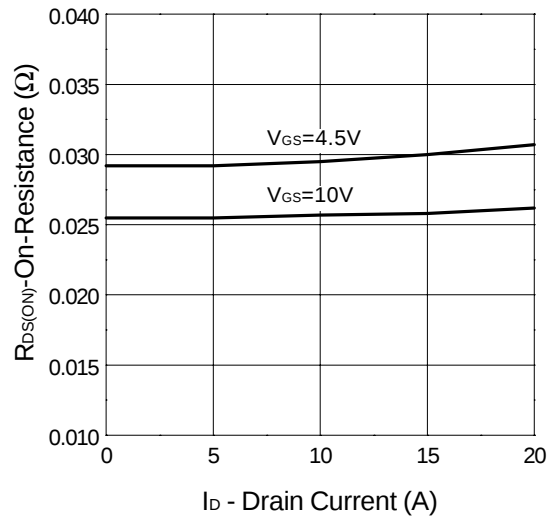
Transfer Characteristics



Threshold Voltage vs. Junction Temperature

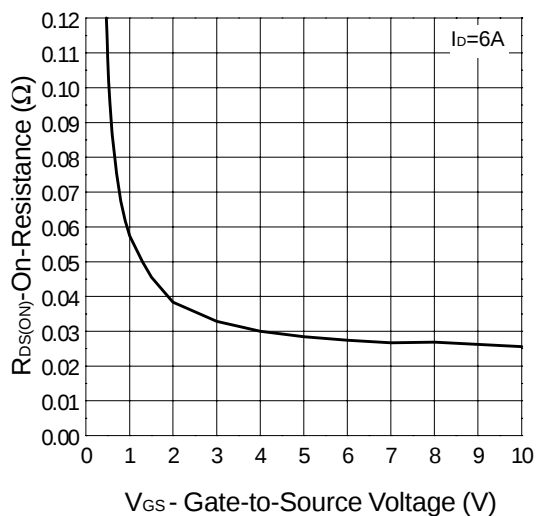


On-Resistance vs. Drain Current

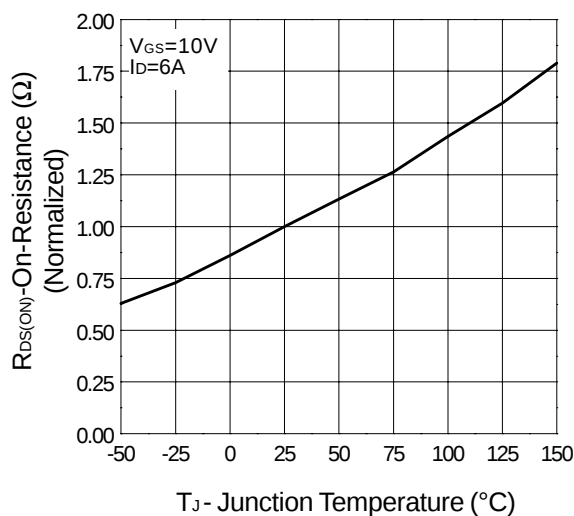


Typical Characteristics

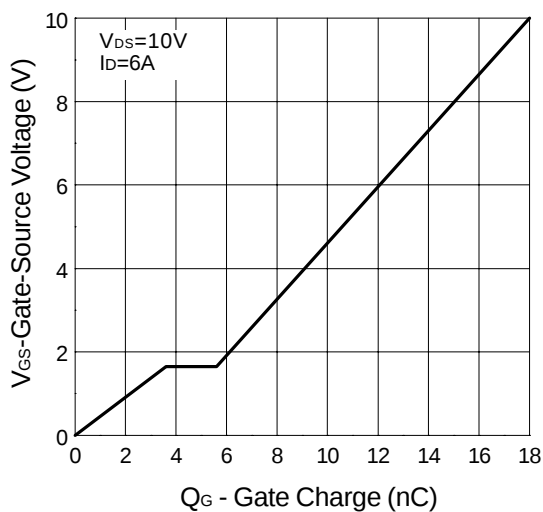
On-Resistance vs. Gate-to-Source Voltage



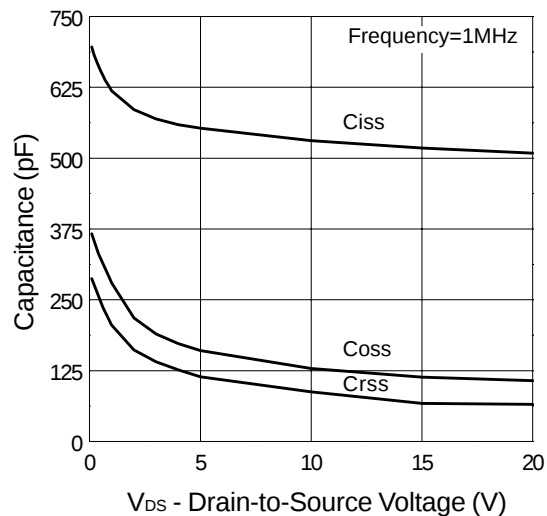
On-Resistance vs. Junction Temperature



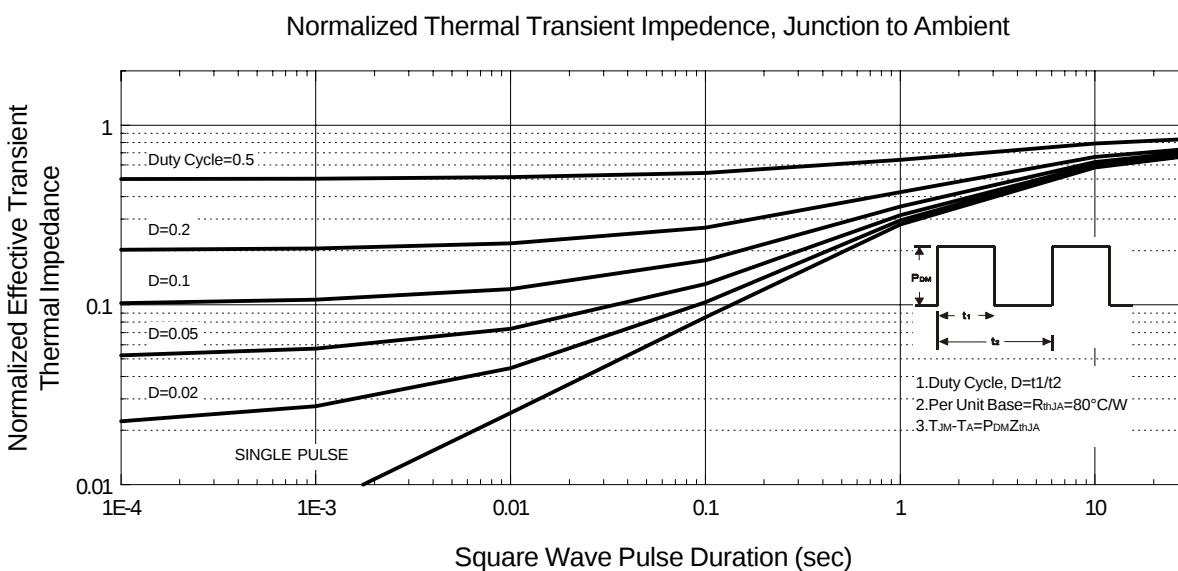
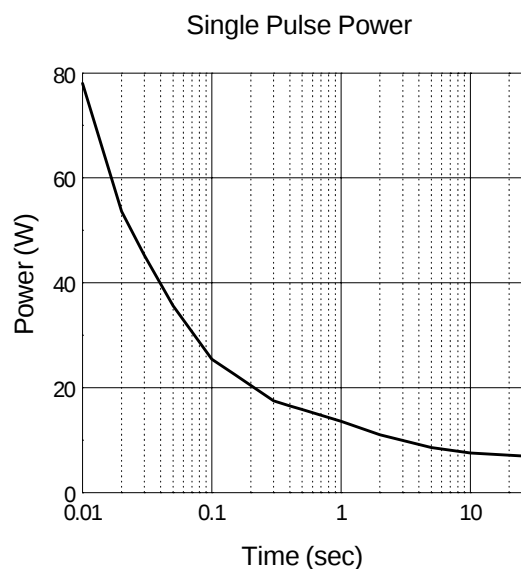
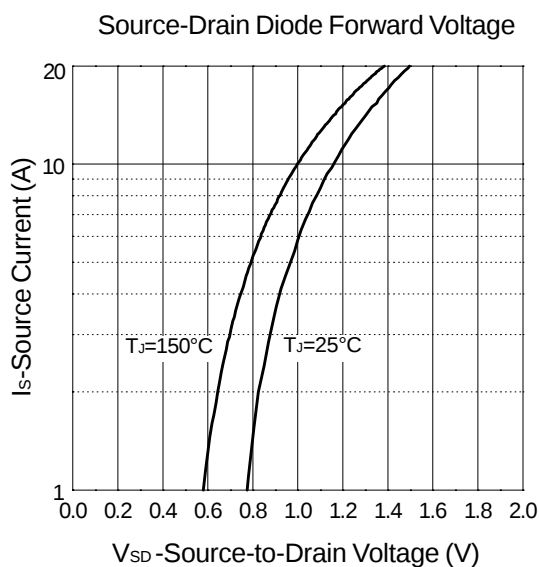
Gate Charge



Capacitance

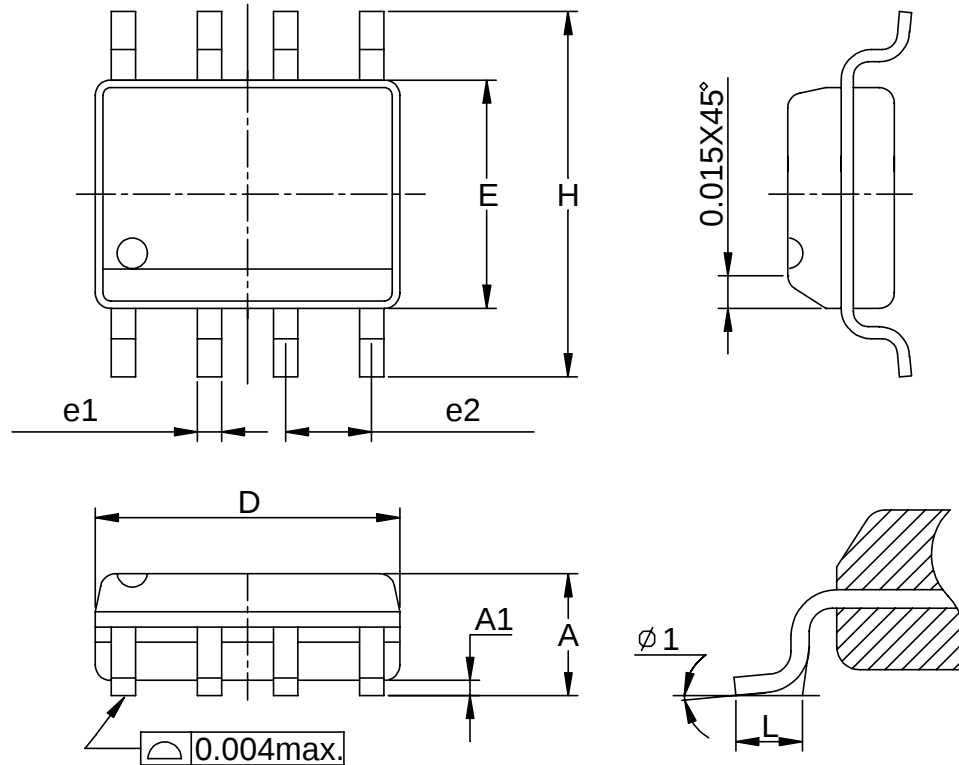


Typical Characteristics



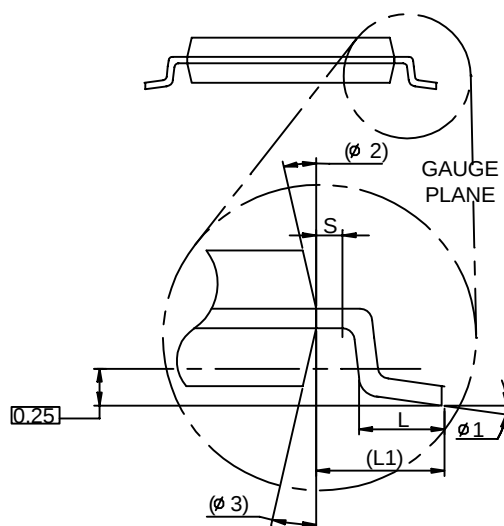
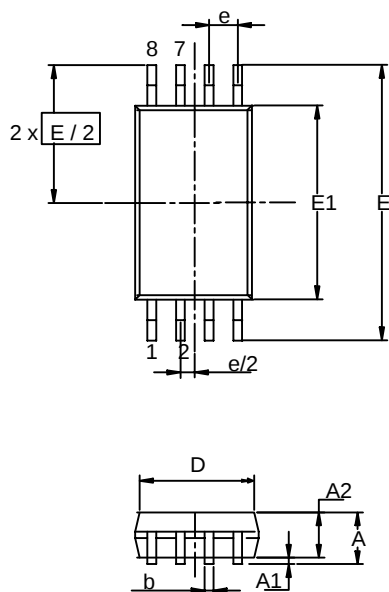
Packaging Information

SOP-8 pin (Reference JEDEC Registration MS-012)



Dim	Millimeters		Inches	
	Min.	Max.	Min.	Max.
A	1.35	1.75	0.053	0.069
A1	0.10	0.25	0.004	0.010
D	4.80	5.00	0.189	0.197
E	3.80	4.00	0.150	0.157
H	5.80	6.20	0.228	0.244
L	0.40	1.27	0.016	0.050
e1	0.33	0.51	0.013	0.020
e2	1.27BSC		0.50BSC	
Ø 1	8°		8°	

TSSOP-8

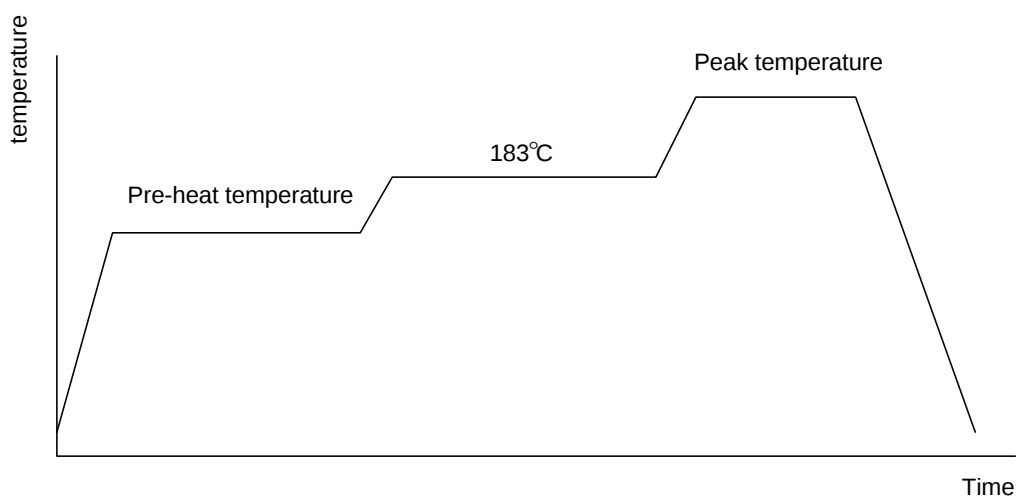


Dim	Millimeters		Inches	
	Min.	Max.	Min.	Max.
A		1.2		0.047
A1	0.00	0.15	0.000	0.006
A2	0.80	1.05	0.031	0.041
b	0.19	0.30	0.007	0.012
D	2.9	3.1	0.114	0.122
e	0.65 BSC		0.026 BSC	
E	6.40 BSC		0.252 BSC	
E1	4.30	4.50	0.169	0.177
L	0.45	0.75	0.018	0.030
L1	1.0 REF		0.039 REF	
R	0.09		0.004	
R1	0.09		0.004	
S	0.2		0.008	
φ1	0°	8°	0°	8°
φ2	12° REF		12° REF	
φ3	12° REF		12° REF	

Physical Specifications

Terminal Material	Solder-Plated Copper (Solder Material : 90/10 or 63/37 SnPb)
Lead Solderability	Meets EIA Specification RSI86-91, ANSI/J-STD-002 Category 3.

Reflow Condition (IR/Convection or VPR Reflow)



Classification Reflow Profiles

	Convection or IR/ Convection	VPR
Average ramp-up rate(183°C to Peak)	3°C/second max.	10 °C /second max.
Preheat temperature 125 ± 25°C)	120 seconds max	
Temperature maintained above 183°C	60 – 150 seconds	
Time within 5°C of actual peak temperature	10 – 20 seconds	60 seconds
Peak temperature range	220 +5/-0°C or 235 +5/-0°C	215-219°C or 235 +5/-0°C
Ramp-down rate	6 °C /second max.	10 °C /second max.
Time 25°C to peak temperature	6 minutes max.	

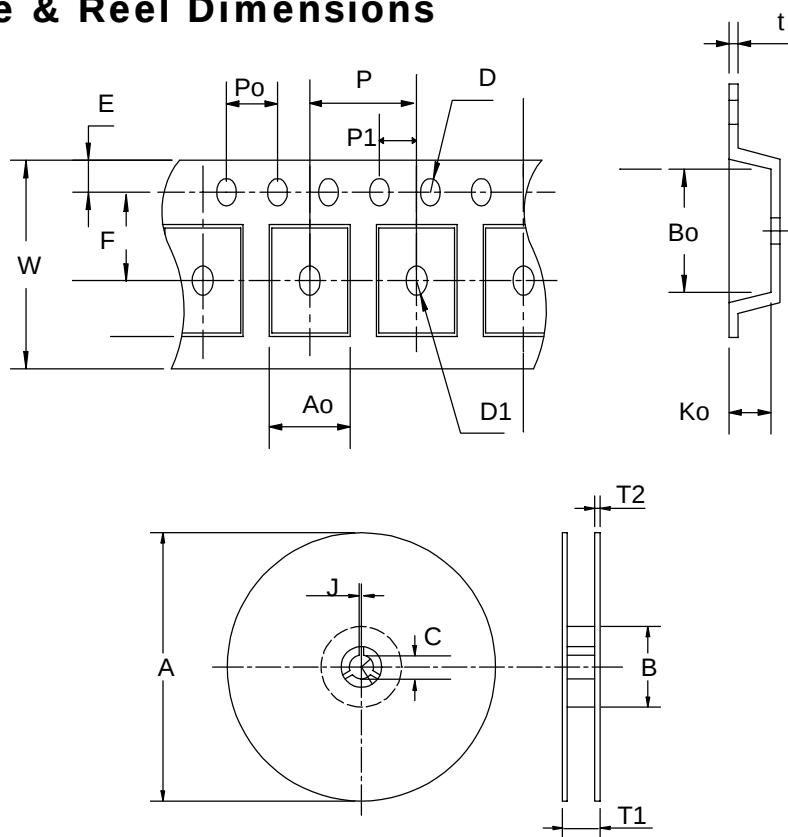
Package Reflow Conditions

pkg. thickness ≥ 2.5mm and all bgas	pkg. thickness < 2.5mm and pkg. volume ≥ 350 mm ³	pkg. thickness < 2.5mm and pkg. volume < 350mm ³
Convection 220 +5/-0 °C		Convection 235 +5/-0 °C
VPR 215-219 °C		VPR 235 +5/-0 °C
IR/Convection 220 +5/-0 °C		IR/Convection 235 +5/-0 °C

Reliability test program

Test item	Method	Description
SOLDERABILITY	MIL-STD-883D-2003	245°C, 5 SEC
HOLT	MIL-STD 883D-1005.7	1000 Hrs Bias @ 125°C
PCT	JESD-22-B, A102	168 Hrs, 100% RH, 121°C
TST	MIL-STD 883D-1011.9	-65°C ~ 150°C, 200 Cycles

Carrier Tape & Reel Dimensions



Application	A	B	C	J	T1	T2	W	P	E
SOP- 8	330 ± 1	62 +1.5	12.75+ 0.15	2 ± 0.5	12.4 ± 0.2	2 ± 0.2	12± 0. 3	8± 0.1	1.75±0.1
	F	D	D1	P0	P1	A0	B0	Ko	t
	5.5± 1	1.55 +0.1	1.55+ 0.25	4.0 ± 0.1	2.0 ± 0.1	6.4 ± 0.1	5.2± 0. 1	2.1± 0.1	0.3±0.013
Application	A	B	C	J	T1	T2	W	P	E
TSSOP-8	330 ± 1	62 +1.5	12.75+ 0.15	2 + 0.5	12.4 ± 0.2	2 ± 0.2	12± 0. 3	8± 0.1	1.75±0.1
	F	D	D1	P0	P1	A0	B0	Ko	t
	5.5 ± 0. 1	1.5 + 0.1	1.5 + 0.1	4.0 ± 0.1	2.0 ± 0.1	7.0 ± 0.1	3.6 ± 0.3	1.6 ± 0.1	0.3±0.013

Cover Tape Dimensions

Application	Carrier Width	Cover Tape Width	Devices Per Reel
SOP- 8	12	9.3	2500
TSSOP- 8	12	9.3	2500

Customer Service

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