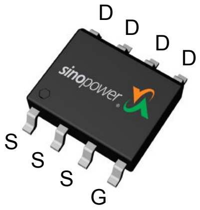
SM4833NSK

N-Channel Enhancement Mode MOSFET

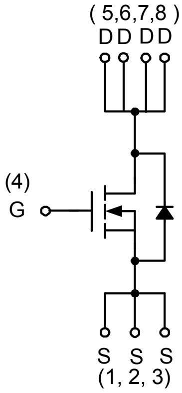
Features

- 30V/17A,
  $R_{DS(ON)}$= 4mΩ(max.) @ V_{GS}= 10V
  $R_{DS(ON)}$= 5.6mΩ(max.) @ V_{GS}= 4.5V
- Super High Dense Cell Design
- Reliable and Rugged
- Lead Free and Green Devices Available (RoHS Compliant)

Pin Description



Top View of SOP-8



N-Channel MOSFET

Applications

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

Ordering and Marking Information

SM4833NS □□-□□ □ Assembly Material Handling Code Temperature Range Package Code	Package Code K : SOP-8 Operating Junction Temperature Range C : -55 to 150 °C Handling Code TR : Tape & Reel (2500ea/reel) Assembly Material G : Halogen and Lead Free Device
SM4833NS K : SM4833 XXXXX ●	XXXXX - Lot Code

Note : SINOPOWER lead-free products contain molding compounds/die attach materials and 100% matte tin plate termination finish; which are fully compliant with RoHS. SINOPOWER lead-free products meet or exceed the lead-free requirements of IPC/JEDEC J-STD-020D for MSL classification at lead-free peak reflow temperature. SINOPOWER defines "Green" to mean lead-free (RoHS compliant) and halogen free (Br or Cl does not exceed 900ppm by weight in homogeneous material and total of Br and Cl does not exceed 1500ppm by weight).

SINOPOWER 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.

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Absolute Maximum Ratings (T$_A$ = 25°C Unless Otherwise Noted)

Symbol	Parameter		Rating	Unit
V_{DSS}	Drain-Source Voltage		30	V
V_{GSS}	Gate-Source Voltage		±20	
$I_D{}^a$	Continuous Drain Current (V_{GS}=10V)	T_A=25°C	17	A
		T_A=70°C	13	
$I_{DM}{}^a$	1.5ms Pulsed Drain Current (V_{GS}=10V)		150	
$I_S{}^a$	Diode Continuous Forward Current		3	
$I_{AS}{}^b$	Avalanche Current (Single Pulse)		15	
$E_{AS}{}^b$	Single Pulse Avalanche Energy (L=0.1mH)		28	mJ
T_J	Maximum Junction Temperature		150	°C
T_{STG}	Storage Temperature Range		-55 to 150	
$P_D{}^a$	Maximum Power Dissipation	T_A=25°C	2.5	W
		T_A=70°C	1.6	
$R_{\theta JA}{}^{a,c}$	Thermal Resistance-Junction to Ambient	$t \le 10s$	50	°C/W
$R_{\theta JL}$	Thermal Resistance-Junction to Lead	Steady State	25	

Note a : Surface Mounted on 1in^2 pad area, $t \le$ 10sec.
Note b : UIS tested and pulse width limited by maximum junction temperature 150°C (initial temperature T_J=25°C).
Note c : Maximum under Steady State conditions is 75 °C/W.

Electrical Characteristics (T$_A$ = 25°C Unless Otherwise Noted)

Symbol	Parameter	Test Conditions	SM4833NSK			Unit
			Min.	Typ.	Max.	
Static Characteristics						
BV_{DSS}	Drain-Source Breakdown Voltage	V_{GS}=0V, I_{DS}=250μA	30	-	-	V
I_{DSS}	Zero Gate Voltage Drain Current	V_{DS}=24V, V_{GS}=0V	-	-	1	μA
		T_J=85°C	-	-	30	
$V_{GS(th)}$	Gate Threshold Voltage	V_{DS}=V_{GS}, I_{DS}=250μA	1.3	1.8	2.5	V
I_{GSS}	Gate Leakage Current	V_{GS}=±20V, V_{DS}=0V	-	-	±100	nA
$R_{DS(ON)}{}^a$	Drain-Source On-state Resistance	V_{GS}=10V, I_{DS}=17A	-	3.3	4	mΩ
		V_{GS}=4.5V, I_{DS}=12A	-	4.6	5.6	
Diode Characteristics						
$V_{SD}{}^a$	Diode Forward Voltage	I_{SD}=3A, V_{GS}=0V	-	0.7	1.1	V
$t_{rr}{}^b$	Reverse Recovery Time	I_{SD}=3A, dI_{SD}/dt=100A/μs	-	40	-	ns
$Q_{rr}{}^b$	Reverse Recovery Charge		-	37	-	nC

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Electrical Characteristics (Cont.) (T$_A$ = 25°C Unless Otherwise Noted)

Symbol	Parameter	Test Conditions	SM4833NSK			Unit
			Min.	Typ.	Max.	
Dynamic Characteristics [b]						
R_G	Gate Resistance	V_{GS}=0V,V_{DS}=0V,F=1MHz	-	2.5	-	Ω
C_{iss}	Input Capacitance	V_{GS}=0V, V_{DS}=15V, Frequency=1.0MHz	-	2450	-	pF
C_{oss}	Output Capacitance		-	630	-	
C_{rss}	Reverse Transfer Capacitance		-	450	-	
$t_{d(ON)}$	Turn-on Delay Time	V_{DD}=15V, R_L=15Ω, I_{DS}=1A, V_{GEN}=10V, R_G=6Ω	-	15	27	ns
t_r	Turn-on Rise Time		-	18	35	
$t_{d(OFF)}$	Turn-off Delay Time		-	71	127	
t_f	Turn-off Fall Time		-	36	65	
Gate Charge Characteristics [b]						
Q_g	Total Gate Charge(V_{GS}=10V)	V_{DS}=15V, V_{GS}=10V, I_{DS}=17A	-	65	-	nC
	Total Gate Charge(V_{GS}=4.5V)		-	32	-	
Q_{gs}	Gate-Source Charge		-	9	-	
Q_{gd}	Gate-Drain Charge		-	15	-	

Note a : Pulse test ; pulse width ≤ 300 μs, duty cycle ≤ 2%.
Note b : Guaranteed by design, not subject to production testing.

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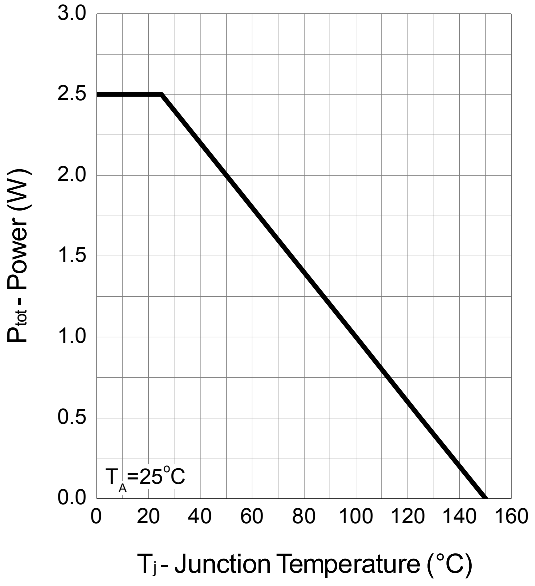
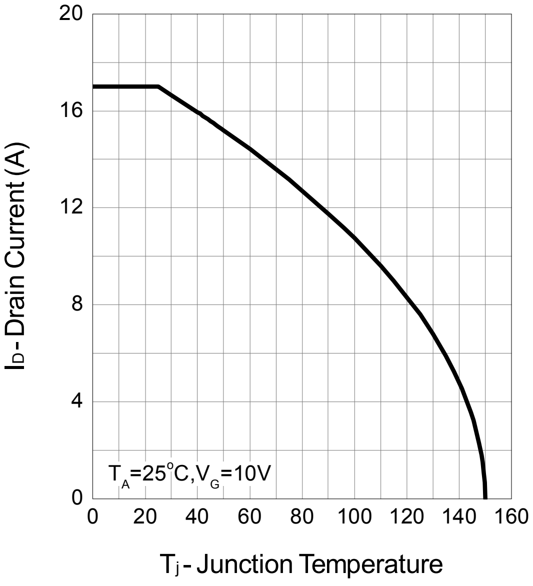
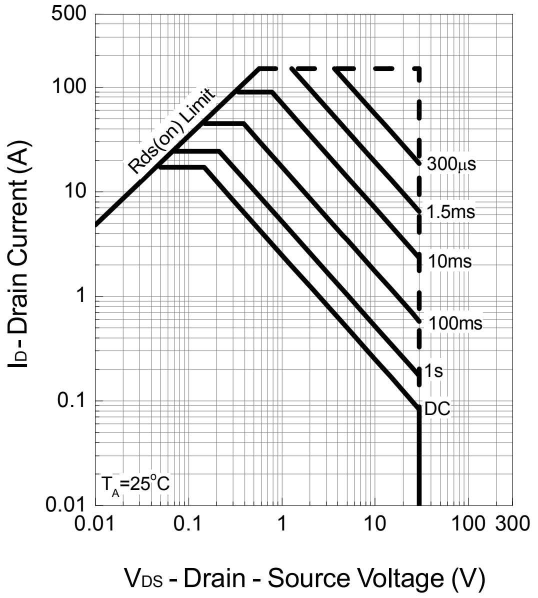
Typical Operating Characteristics



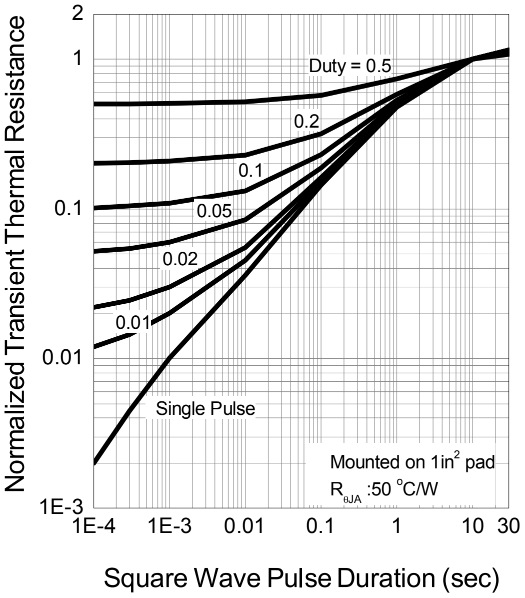
Power Dissipation



Drain Current



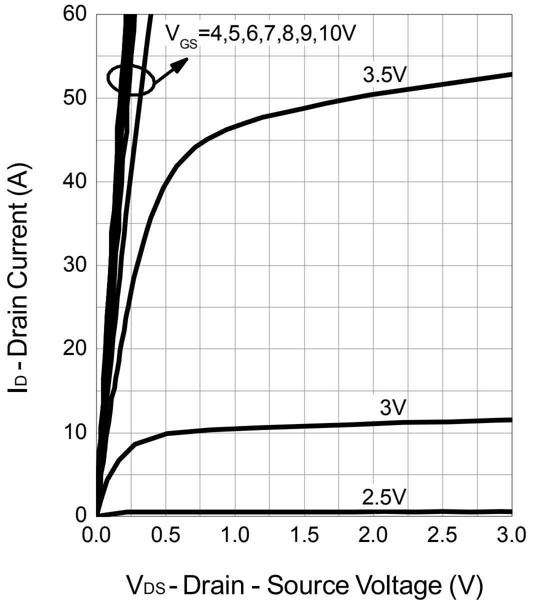
Safe Operation Area



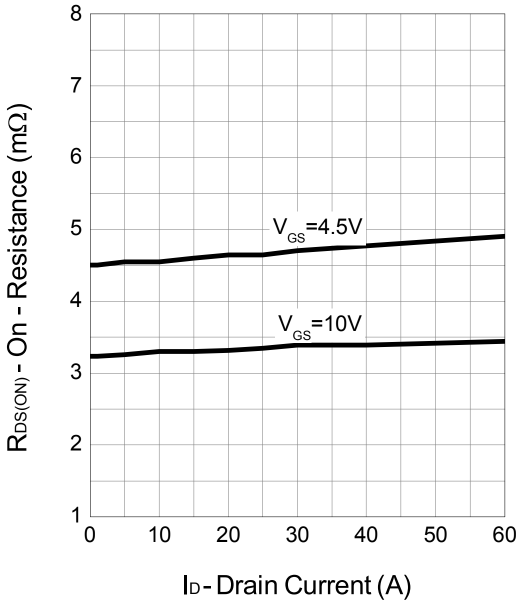
Thermal Transient Impedance

Typical Operating Characteristics (Cont.)

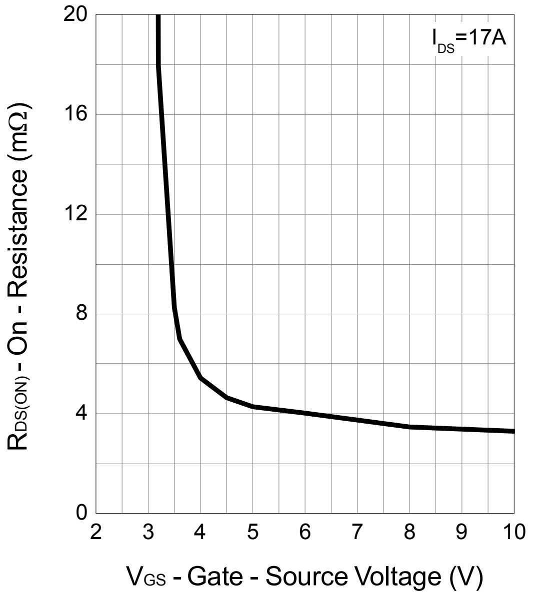
Output Characteristics



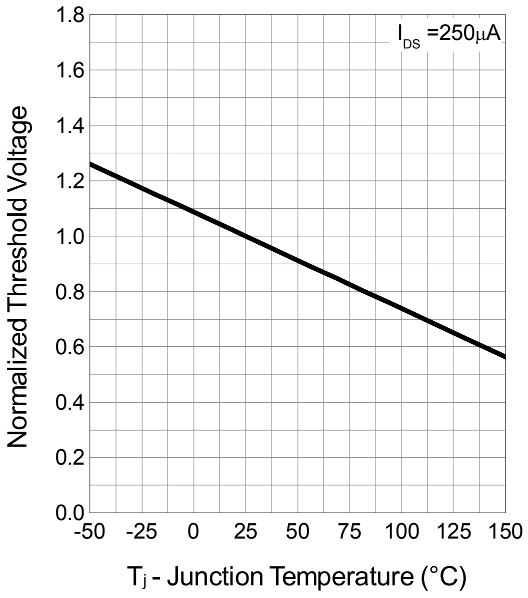
Drain-Source On Resistance



Gate-Source On Resistance

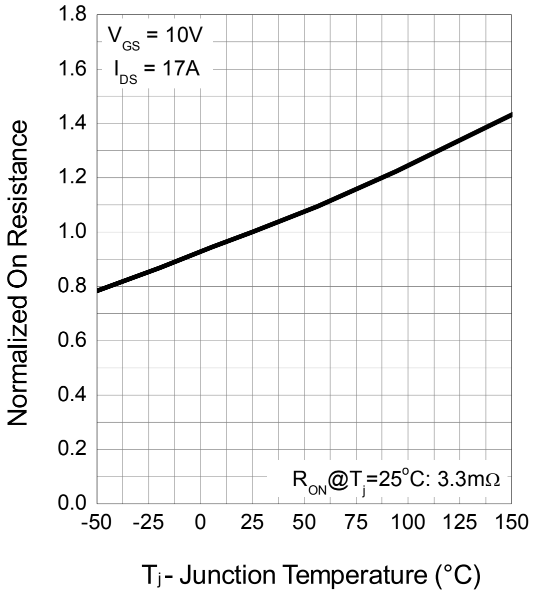


Gate Threshold Voltage

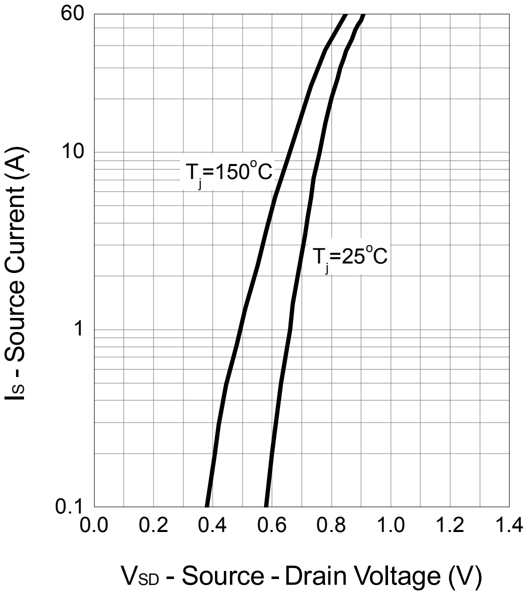


Typical Operating Characteristics (Cont.)

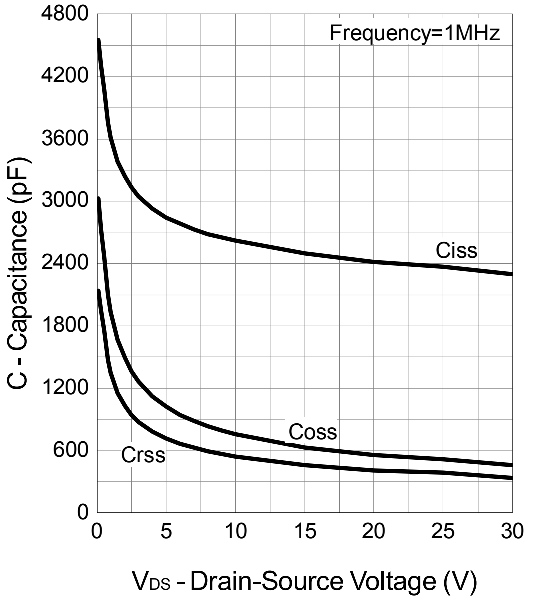
Drain-Source On Resistance



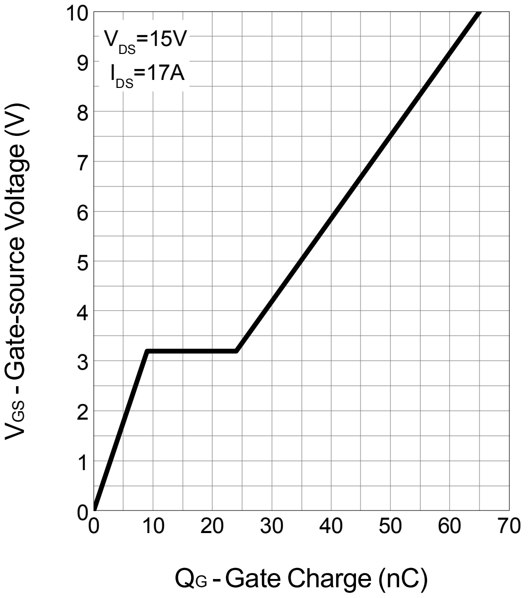
Source-Drain Diode Forward



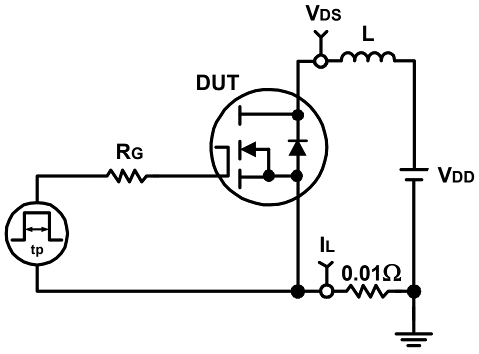
Capacitance

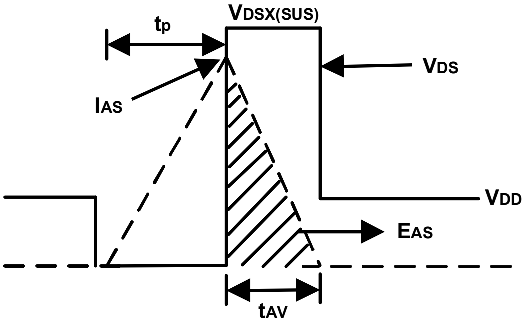


Gate Charge

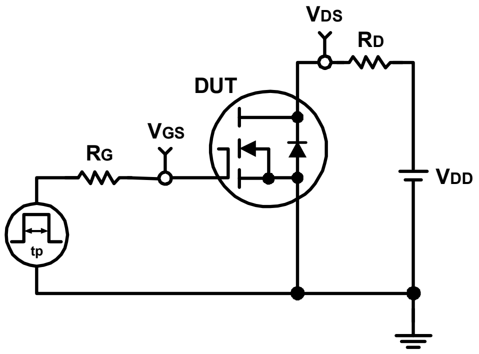


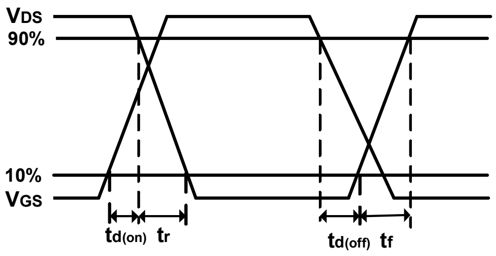
Avalanche Test Circuit and Waveforms





Switching Time Test Circuit and Waveforms





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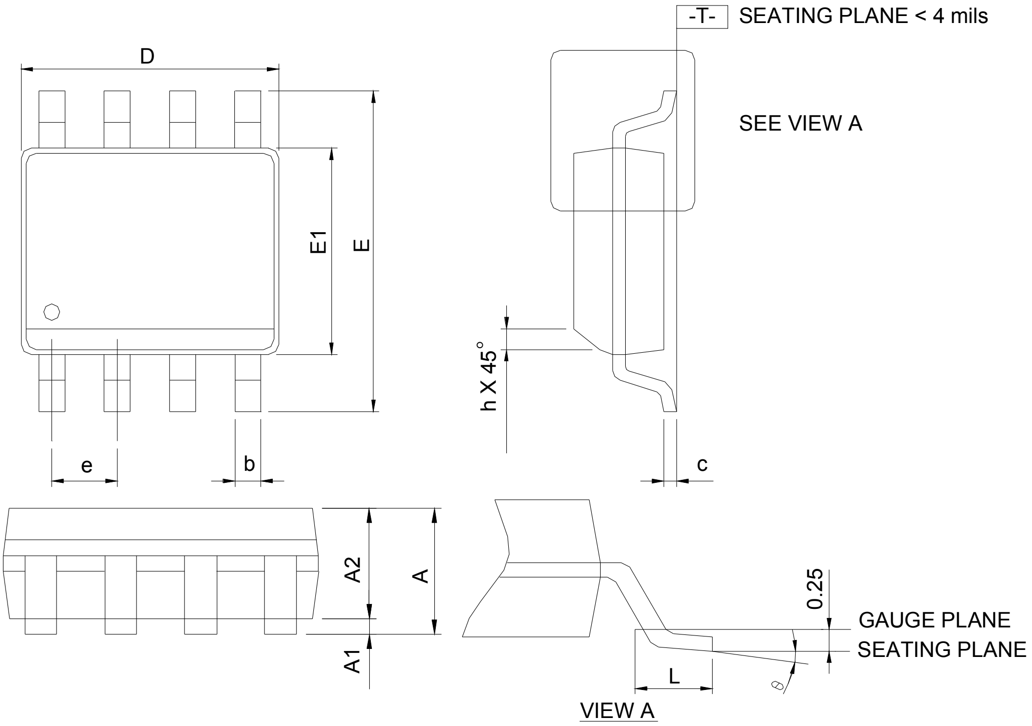
Package Information

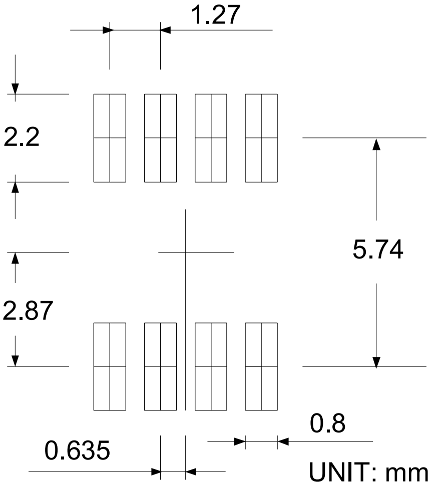
SOP-8



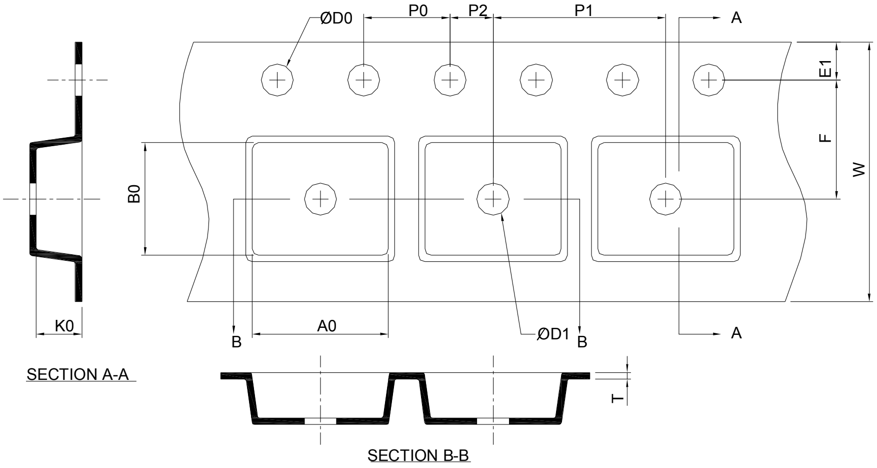
SYMBOL	SOP-8			
	MILLIMETERS		INCHES	
	MIN.	MAX.	MIN.	MAX.
A	-	1.75	-	0.069
A1	0.10	0.25	0.004	0.010
A2	1.25	-	0.049	-
b	0.31	0.51	0.012	0.020
c	0.17	0.25	0.007	0.010
D	4.80	5.00	0.189	0.197
E	5.80	6.20	0.228	0.244
E1	3.80	4.00	0.150	0.157
e	1.27 BSC		0.050 BSC	
h	0.25	0.50	0.010	0.020
L	0.40	1.27	0.016	0.050
θ	0°	8°	0°	8°

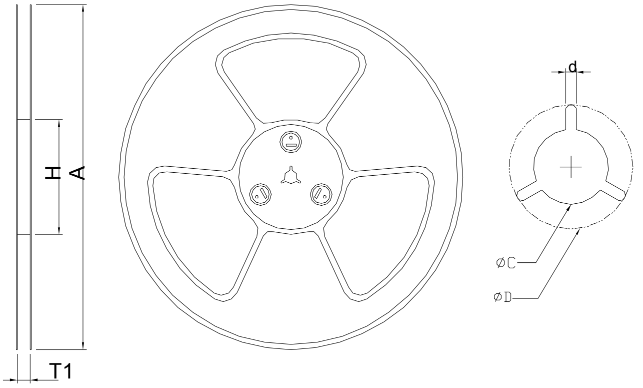
Note: 1. Follow JEDEC MS-012 AA.
2. Dimension “D” does not include mold flash, protrusions or gate burrs. Mold flash, protrusion or gate burrs shall not exceed 6 mil per side.
3. Dimension “E” does not include inter-lead flash or protrusions. Inter-lead flash and protrusions shall not exceed 10 mil per side.

RECOMMENDED LAND PATTERN



Carrier Tape & Reel Dimensions



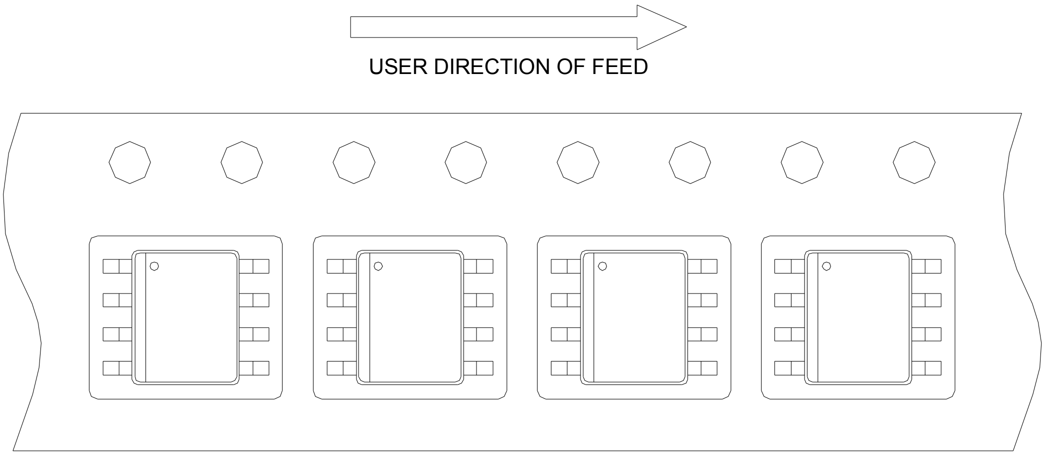


Application	A	H	T1	C	d	D	W	E1	F
SOP-8	330.0± 2.00	50 MIN.	12.4+2.00 -0.00	13.0+0.50 -0.20	1.5 MIN.	20.2 MIN.	12.0±0.30	1.75±0.10	5.5±0.05
	P0	**P1**	**P2**	**D0**	**D1**	**T**	**A0**	**B0**	**K0**
	4.0±0.10	8.0±0.10	2.0±0.05	1.5+0.10 -0.00	1.5 MIN.	0.6+0.00 -0.40	6.40±0.20	5.20±0.20	2.10±0.20

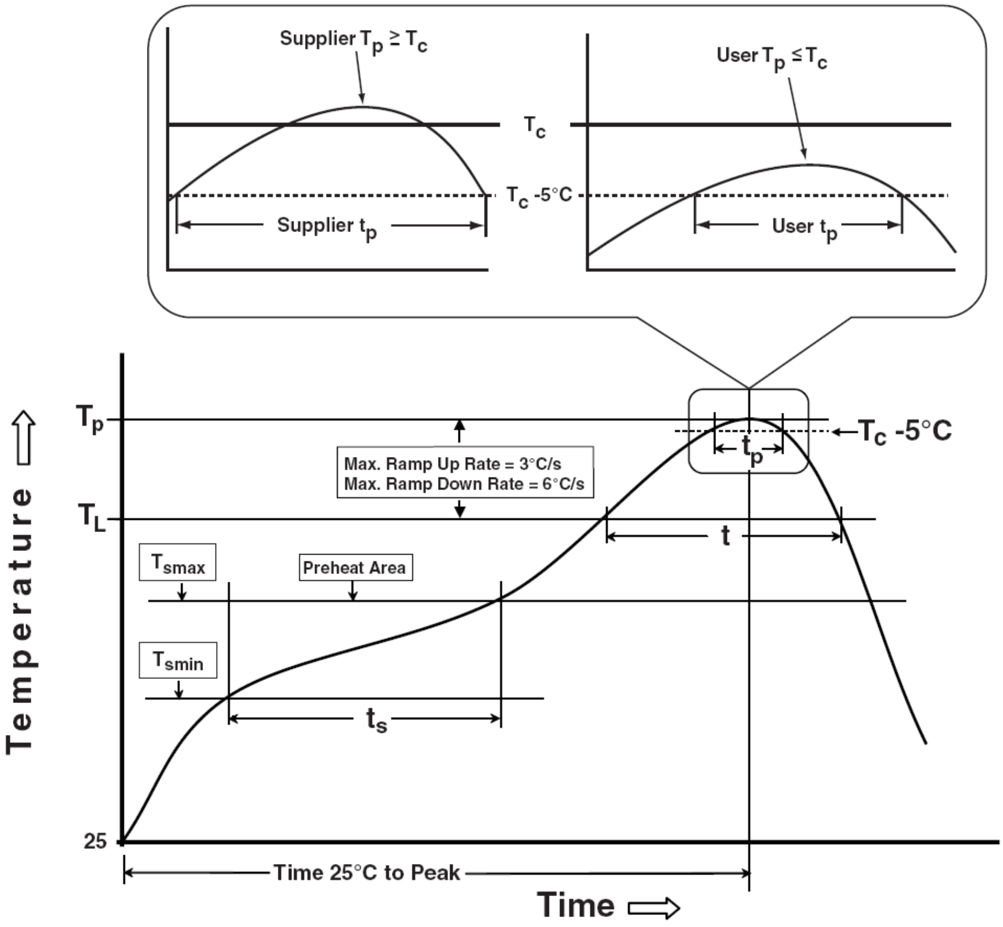
(mm)

Taping Direction Information

SOP-8



Classification Profile



Classification Reflow Profiles

Profile Feature	Sn-Pb Eutectic Assembly	Pb-Free Assembly
Preheat & Soak Temperature min (T_{smin}) Temperature max (T_{smax}) Time (T_{smin} to T_{smax}) (t_s)	100 °C 150 °C 60-120 seconds	150 °C 200 °C 60-120 seconds
Average ramp-up rate (T_{smax} to T_P)	3 °C/second max.	3°C/second max.
Liquidous temperature (T_L) Time at liquidous (t_L)	183 °C 60-150 seconds	217 °C 60-150 seconds
Peak package body Temperature (T_p)*	See Classification Temp in table 1	See Classification Temp in table 2
Time (t_P)** within 5°C of the specified classification temperature (T_c)	20** seconds	30** seconds
Average ramp-down rate (T_p to T_{smax})	6 °C/second max.	6 °C/second max.
Time 25°C to peak temperature	6 minutes max.	8 minutes max.

* Tolerance for peak profile Temperature (T_p) is defined as a supplier minimum and a user maximum.
** Tolerance for time at peak profile temperature (t_p) is defined as a supplier minimum and a user maximum.

Table 1. SnPb Eutectic Process – Classification Temperatures (Tc)

Package Thickness	Volume mm^3 <350	Volume mm^3 ≥350
<2.5 mm	235 °C	220 °C
≥2.5 mm	220 °C	220 °C

Table 2. Pb-free Process – Classification Temperatures (Tc)

Package Thickness	Volume mm^3 <350	Volume mm^3 350-2000	Volume mm^3 >2000
<1.6 mm	260 °C	260 °C	260 °C
1.6 mm – 2.5 mm	260 °C	250 °C	245 °C
≥2.5 mm	250 °C	245 °C	245 °C

Reliability Test Program

Test item	Method	Description
SOLDERABILITY	JESD-22, B102	5 Sec, 245°C
HTRB	JESD-22, A108	1000 Hrs, 80% of VDS max @ Tjmax
HTGB	JESD-22, A108	1000 Hrs, 100% of VGS max @ Tjmax
PCT	JESD-22, A102	168 Hrs, 100%RH, 2atm, 121°C
TCT	JESD-22, A104	500 Cycles, -65°C~150°C

Customer Service

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