DATA SHEET

GPMD3130A

Dual N-Channel Enhancement Mode MOSFETSFET

Preliminary

May. 05, 2014

Version 0.1

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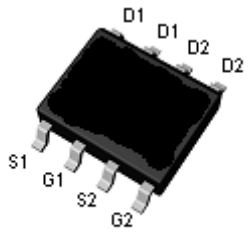
Dual N-Channel Enhancement Mode MOSFETSFET

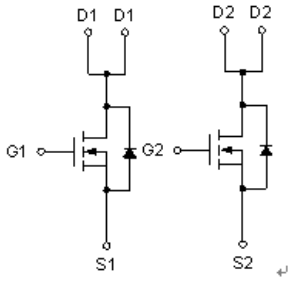
1. FEATURES

- **30V/10A,**
  - RDS(ON)=13mΩ (max.) @ VGS= 10V
  - RDS(ON)=17mΩ (max.) @ VGS= 4.5V
- **Reliable and Rugged**
- **Lead Free and Green Devices Available**

  (RoHS Compliant)
- **100% UIS Tested**
- **Applications**
  - Power Management in Notebook Computer, Portable Equipment and Battery Powered Systems.
- **Pin Description**



Top View of SOP-8



P Channel MOSFET

2. ORDERING AND MARKING INFORMATION

2.1. Ordering Information

Product Number	Package Type	Packing Information
GPMD3130A–HS01X	Green Package	Tube
GPMD3130A –T	-	Wafer
GPMD3130A–EHS01x	Green Package	Tape and Reel

GPM D3130A – H S01 1

- 1: Package serial number
- S01: SOP8 package type
- H: green package with tube packing

3. ABSOLUTE MAXIMUM RATINGS

Absolute Maximum Ratings (TA=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	10	A
		T_A=70°C	8	
I_{DM} [a]	300μs Pulsed Drain Current (V_{GS}=10V)		40	
I_S [a]	Diode Continuous Forward Current		1	
I_{AS} [b]	Avalanche Current (Single Pulse)		23	
E_{AS} [b]	Avalanche Energy, Single Pulse (L=0.1mH)		25	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	1.7	W
		T_A=70°C	1.08	
R_{JA} [a,c]	Thermal Resistance-Junction to Ambient	t ≤ 10s	48	°C/W
		Steady State	74	
R_{JL}	Thermal Resistance-Junction to Lead	Steady State	32	

Note a： Surface Mounted on 1in^2 pad area, t ≤ 10sec. Maximum Power dissipation is calculated from R_{JA} (worst) =62.5°C/W under t ≤ 10s.

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 90 °C/W.

4.ELECTRICAL CHARACTERISTICS

Electrical Characteristics (T_A=25°C Unless Otherwise Noted)

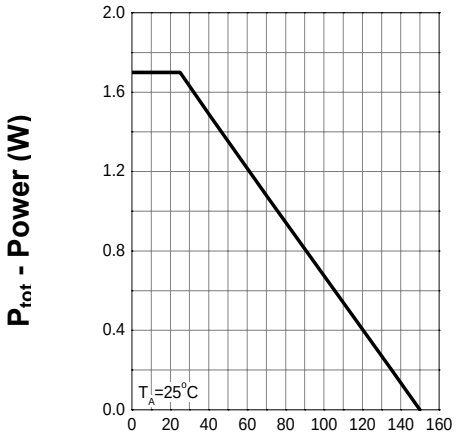
Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
Static Characteristics						
BV_{DSS}	Drain-Source Breakdown Voltage	V_{GS}=0V, I_{DS}=250μA	30	-	-	V
I_{DSS}	Zero Gate Voltage Drain Current	V_{DS}=24V, V_{GS}=0V	-	-	1	μA
		T_J=85°C	-	-	30	
$V_{GS(th)}$	Gate Threshold Voltage	V_{DS}=V_{GS}, I_{DS}=250μA	1.3	1.9	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}=12A	-	10.5	13	mΩ
		V_{GS}=4.5V, I_{DS}=10A	-	13	17	
Gfs	Forward Transconductance	V_{DS}=5V, I_{DS}=20A	-	50	-	S
Diode Characteristics						
V_{SD} [a]	Diode Forward Voltage	I_{SD}=1A, V_{GS}=0V	-	0.7	1.1	V
t_{rr} [b]	Reverse Recovery Time	I_{SD}=10A, dI_{SD}/dt=100A/μs	-	19	-	ns
Q_{rr} [b]	Reverse Recovery Charge		-	10	-	nC
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,	-	770	-	pF
C_{oss}	Output Capacitance	V_{DS}=15V,	-	130	-	
C_{rss}	Reverse Transfer Capacitance	Frequency=1.0MHz	-	76	-	
$t_{d(ON)}$	Turn-on Delay Time	V_{DD}=15V, R_L=15Ω, I_{DS}=1A, V_{GEN}=10V, R_G=6Ω	-	8	14	ns
t_r	Turn-on Rise Time		-	10	17	
$t_{d(OFF)}$	Turn-off Delay Time		-	23	42	
t_f	Turn-off Fall Time		-	4.5	12	
Gate Charge Characteristics[b]						
Q_g	Total Gate Charge	V_{DS}=15V, V_{GS}=10V, I_{DS}=10A	-	14	18	nC
	Total Gate Charge	V_{DS}=15V, V_{GS}=4.5V, I_{DS}=10A	-	6.3	-	
Q_{gs}	Gate-Source Charge		-	2.9	-	
Q_{gd}	Gate-Drain Charge		-	2	-	

Note a : Pulse test ; pulse width ≤ 300 s, duty cycle ≤ 2%.

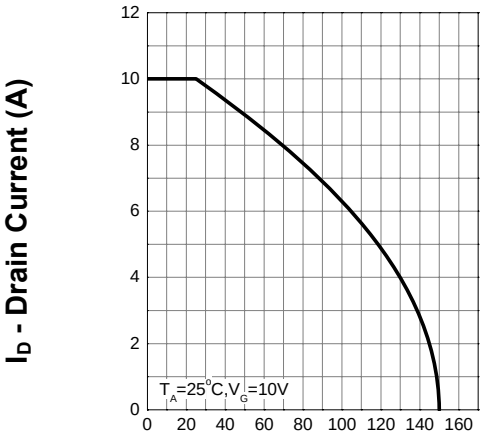
Note b : Guaranteed by design, not subject to production testing.

5. TYPICAL OPERATING CHARACTERISTICS

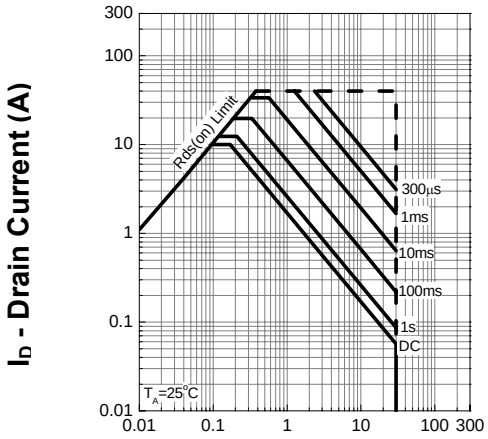
Power Dissipation



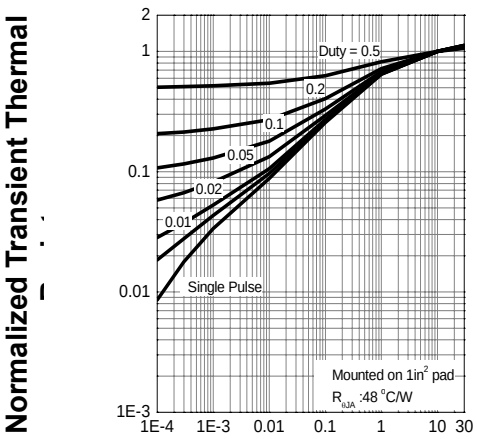
Drain Current



Safe Operation Area

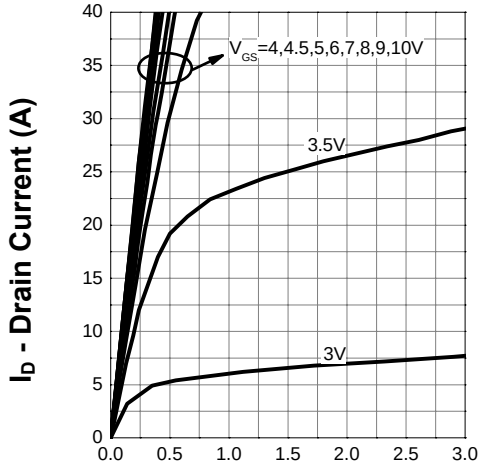


Thermal Transient Impedance



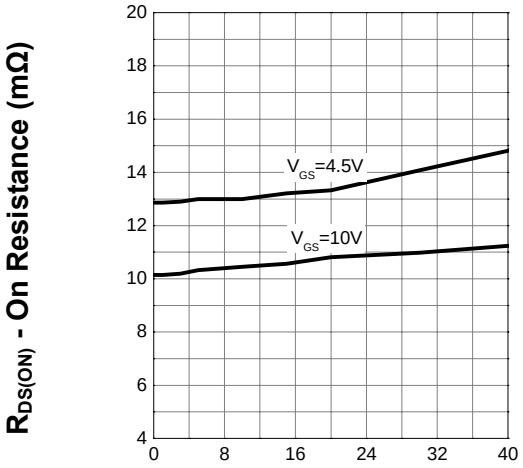
6. TYPICAL OPERATING CHARACTERISTICS (Cont.)

Output Characteristics



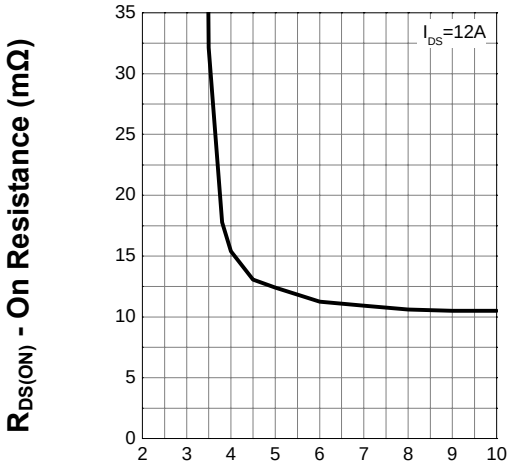
$-V_{DS}$ - Drain-Source Voltage (V)

Drain-Source On Resistance



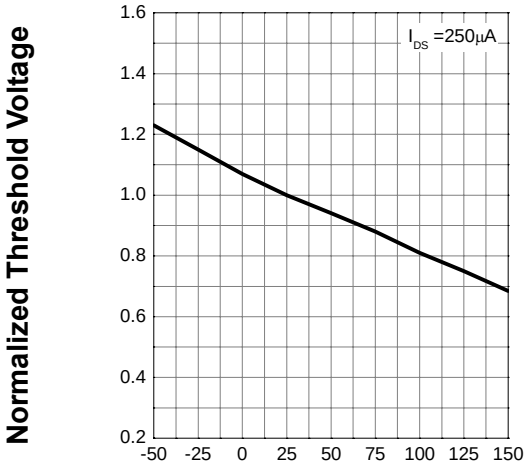
I_D - Drain Current (A)

Gate-Source On Resistance



V_{GS} - Gate-Source Voltage (V)

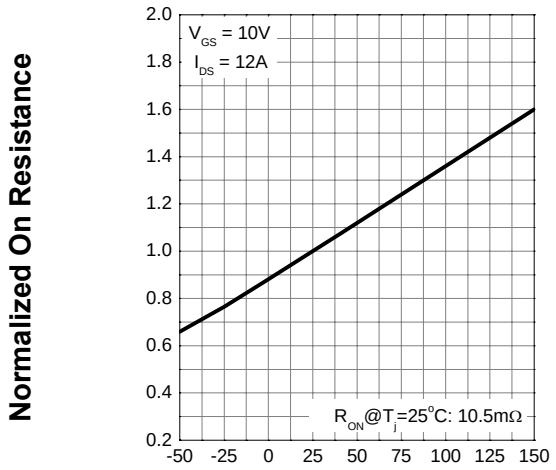
Gate Threshold Voltage



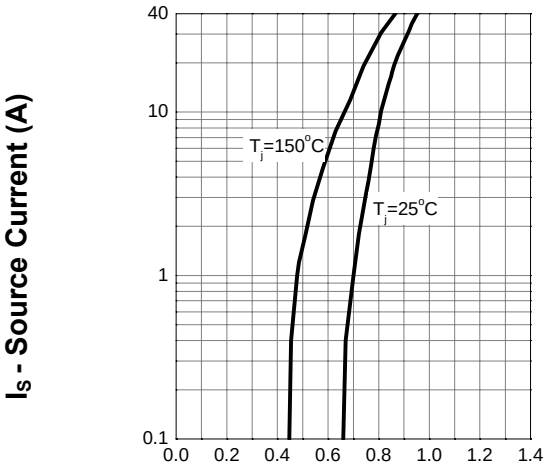
T_j - Junction Temperature (°C)

7. TYPICAL OPERATING CHARACTERISTICS (Cont.)

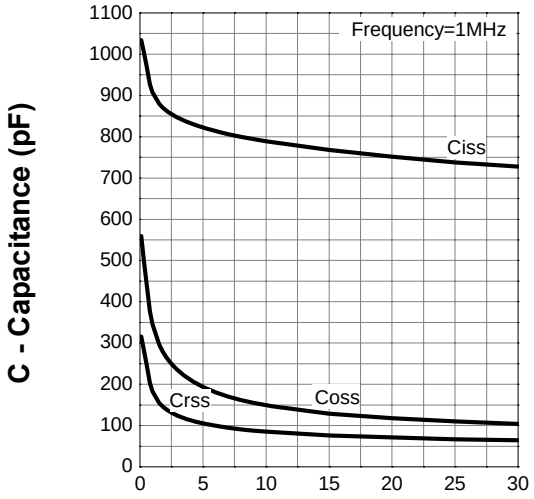
Drain-Source On Resistance



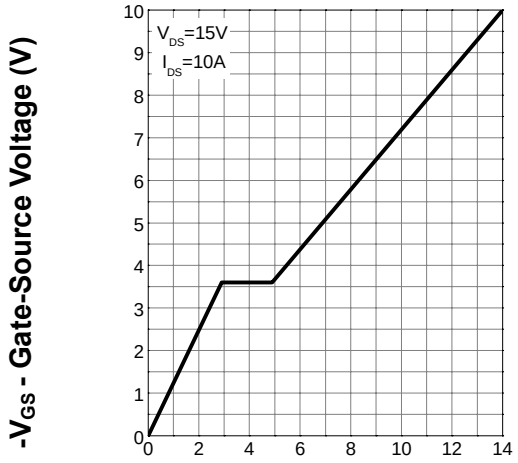
Source-Drain Diode Forward



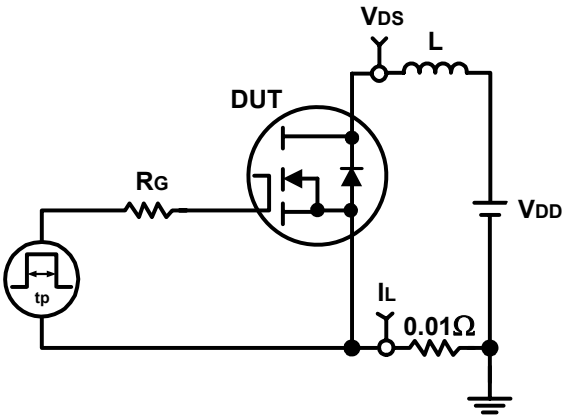
Capacitance

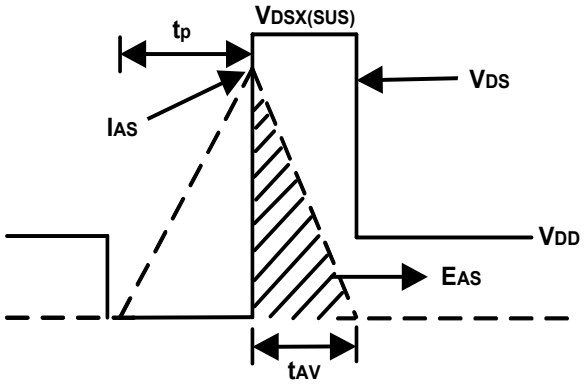


Gate Charge

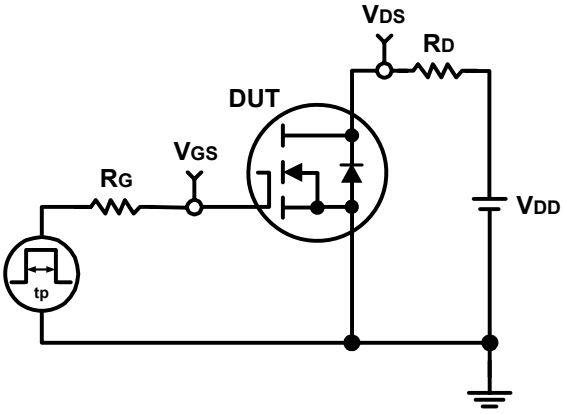


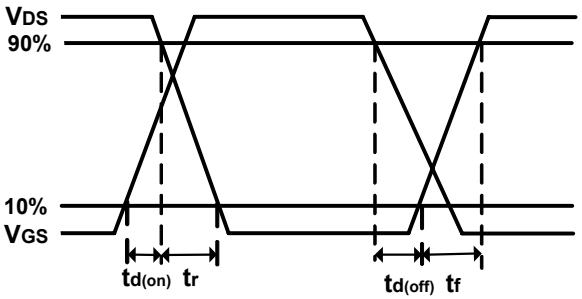
8. AVALANCHE TEST CIRCUIT AND WAVEFORMS





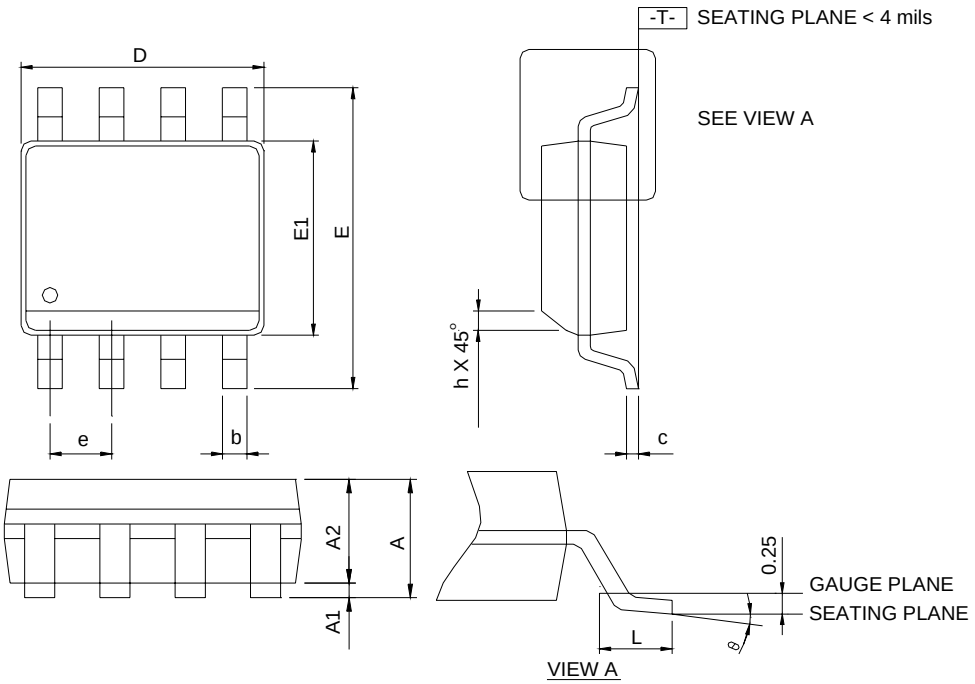
9. SWITCHING TIME TEST CIRCUIT AND WAVEFORMS





10. PACKAGING INFORMATION

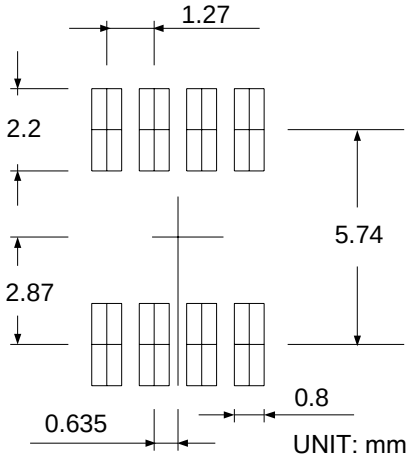
SOP-8



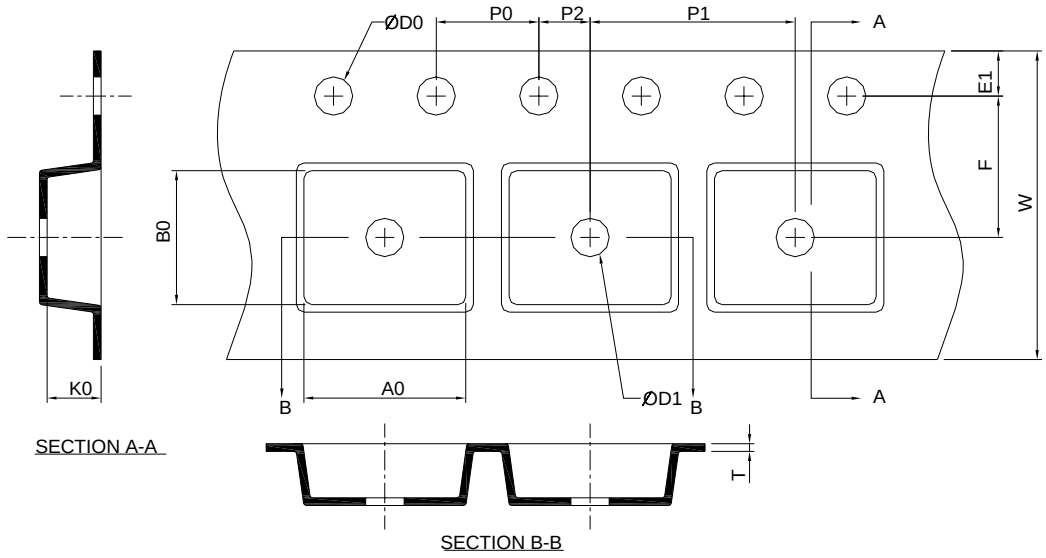
SYMBOL	SOP-8			
	MILLIMETERS		INCHES	
	MIN.	MAX.	MIN.	MAX.
A	-	1.75	-	0.069
A1	0.10	0.25	0.004	0.010
A2	1.25	-	0.049	-
b	0.31	0.51	0.012	0.020
c	0.17	0.25	0.007	0.010
D	4.80	5.00	0.189	0.197
E	5.80	6.20	0.228	0.244
E1	3.80	4.00	0.150	0.157
e	1.27 BSC		0.050 BSC	
h	0.25	0.50	0.010	0.020
L	0.40	1.27	0.016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

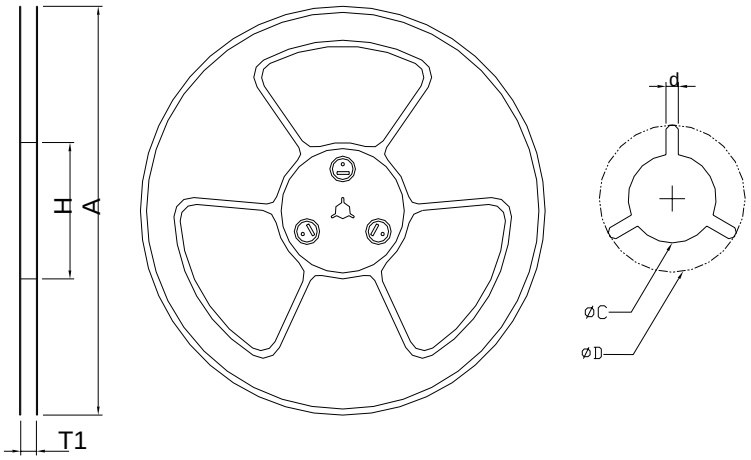
Note: 1. Follow JEDEC MS-012 AA.
2. Dimension “D” does not include mold flash, protrusions or gate burrs. Mold flash, protrusion or gate burrs shall not exceed 6 mil per side.
3. Dimension “E” does not include inter-lead flash or protrusions. Inter-lead flash and protrusions shall not exceed 10 mil per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

RECOMMENDED LAND PATTERN



11. CARRIER TAPE & REEL DIMENSIONS



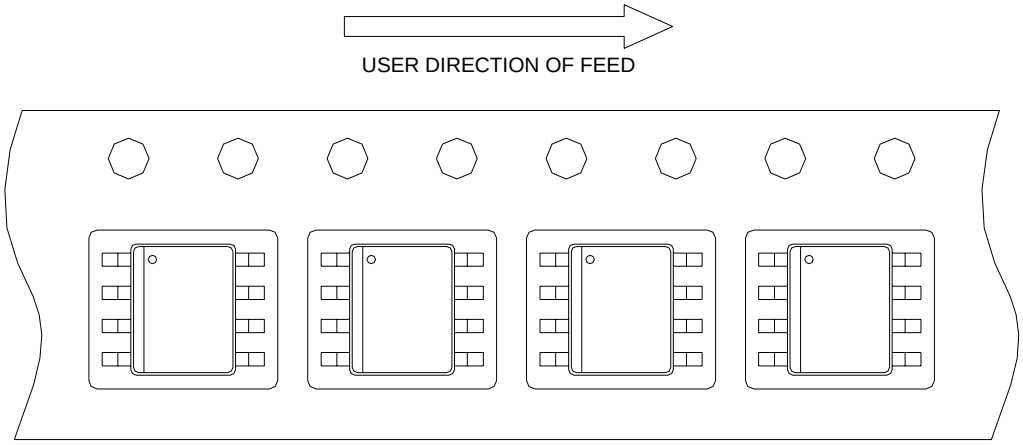


Application	A	H	T1	C	d	D	W	E1	F
SOP-8	330.0±2.00	50 MIN.	12.4+2.00 -0.00	13.0+0.50 -0.20	1.5 MIN.	20.2 MIN.	12.0±0.30	1.75±0.10	5.5±0.05
	P0	**P1**	**P2**	**D0**	**D1**	**T**	**A0**	**B0**	**K0**
	4.0±0.10	8.0±0.10	2.0±0.05	1.5+0.10 -0.00	1.5 MIN.	0.6+0.00 -0.40	6.40±0.20	5.20±0.20	2.10±0.20

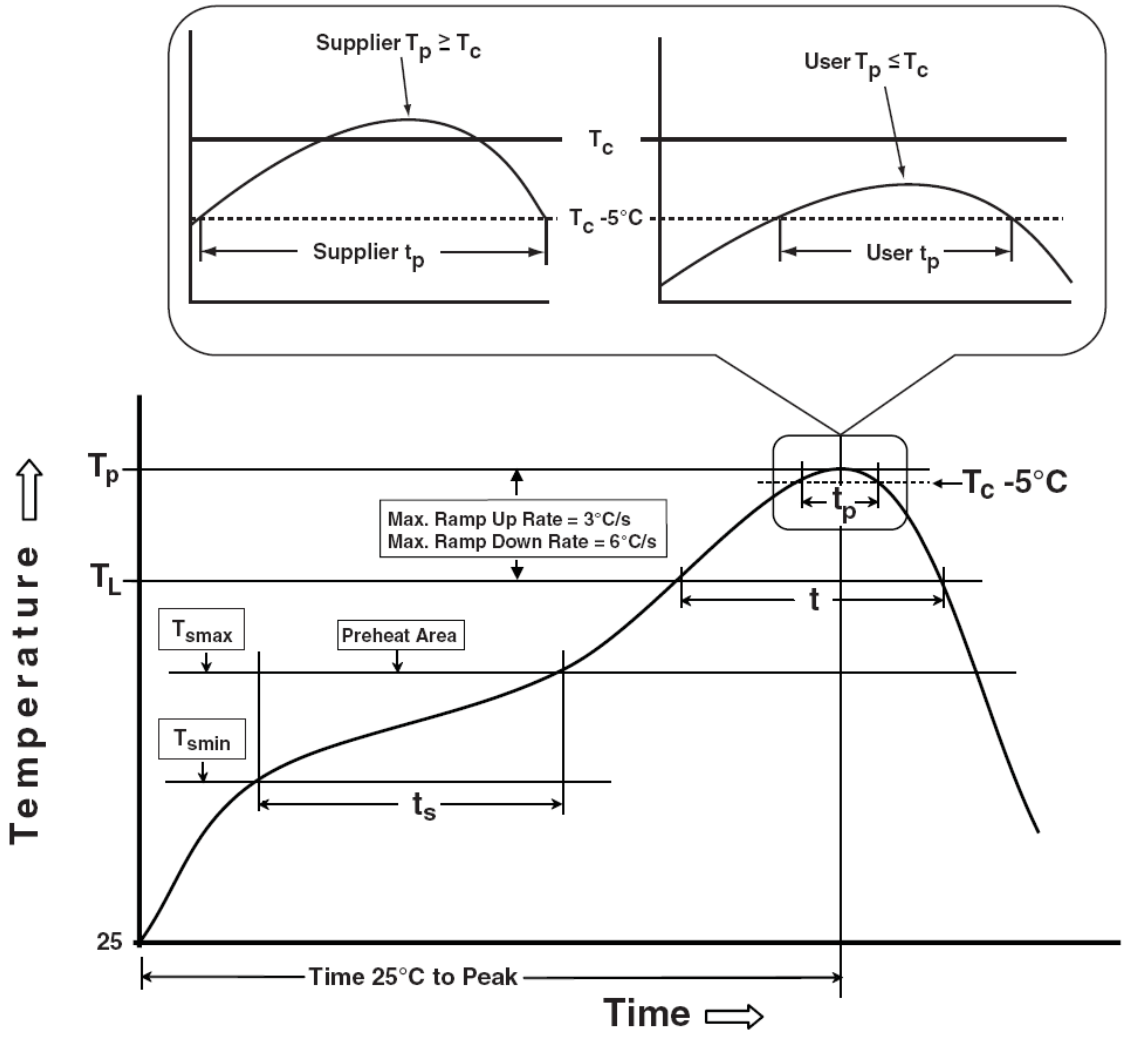
(mm)

12. TAPING DIRECTION INFORMATION

SOP-8



13. CLASSIFICATION PROFILE



14. 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

15. 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

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17. REVISION HISTORY

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