



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

Symbol	Parameter	Rating	Unit	
$V_{DSS}$	Drain-Source Voltage	60	V	
$V_{GSS}$	Gate-Source Voltage	$\pm 20$		
$I_D^*$	Continuous Drain Current	3	A	
$I_{DM}^*$	Pulsed Drain Current			20
$I_S^*$	Diode Continuous Forward Current	3	A	
$T_J$	Maximum Junction Temperature	150	$^\circ\text{C}$	
$T_{STG}$	Storage Temperature Range	-55 to 150		
$P_D^*$	Power Dissipation for Single Operation	$T_A=25^\circ\text{C}$	2	W
		$T_A=100^\circ\text{C}$	0.8	
$R_{\theta JA}^*$	Thermal Resistance-Junction to Ambient	62.5	$^\circ\text{C}/\text{W}$	

Note : \*Surface Mounted on 1in<sup>2</sup> pad area, t ≤ 10 sec.

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

Symbol	Parameter	Test Conditions	APM9945K			Unit
			Min.	Typ.	Max.	
<b>Static Characteristics</b>						
$BV_{DSS}$	Drain-Source Breakdown Voltage	$V_{GS}=0\text{V}, I_{DS}=250\mu\text{A}$	60	-	-	V
$I_{DSS}$	Zero Gate Voltage Drain Current	$V_{DS}=48\text{V}, V_{GS}=0\text{V}$	-	-	1	$\mu\text{A}$
$V_{GS(th)}$	Gate Threshold Voltage	$V_{DS}=V_{GS}, I_{DS}=250\mu\text{A}$	1	2	3	V
$I_{GSS}$	Gate Leakage Current	$V_{GS}=\pm 20\text{V}, V_{DS}=0\text{V}$	-	-	$\pm 100$	nA
$R_{DS(ON)}^a$	Drain-Source On-state Resistance	$V_{GS}=10\text{V}, I_{DS}=3\text{A}$	-	100	135	m $\Omega$
		$V_{GS}=4.5\text{V}, I_{DS}=2\text{A}$	-	120	160	
$V_{SD}^a$	Diode Forward Voltage	$I_{SD}=3\text{A}, V_{GS}=0\text{V}$	-	0.8	1.3	V
<b>Dynamic Characteristics<sup>b</sup></b>						
$R_G$	Gate Resistance	$V_{GS}=0\text{V}, V_{DS}=0\text{V}, F=1\text{MHz}$	-	3.4	-	$\Omega$
$C_{iss}$	Input Capacitance	$V_{GS}=0\text{V}, V_{DS}=25\text{V},$ Frequency=1.0MHz	-	390	-	pF
$C_{oss}$	Output Capacitance		-	75	-	
$C_{rss}$	Reverse Transfer Capacitance		-	20	-	
$t_{d(ON)}$	Turn-On Delay Time	$V_{DD}=15\text{V}, R_L=10\Omega,$ $I_{DS}=1\text{A}, V_{GEN}=10\text{V},$ $R_G=6\Omega$	-	8	18	ns
$T_r$	Turn-On Rise Time		-	9	20	
$t_{d(OFF)}$	Turn-Off Delay Time		-	20	40	
$T_f$	Turn-Off Fall Time		-	8	20	

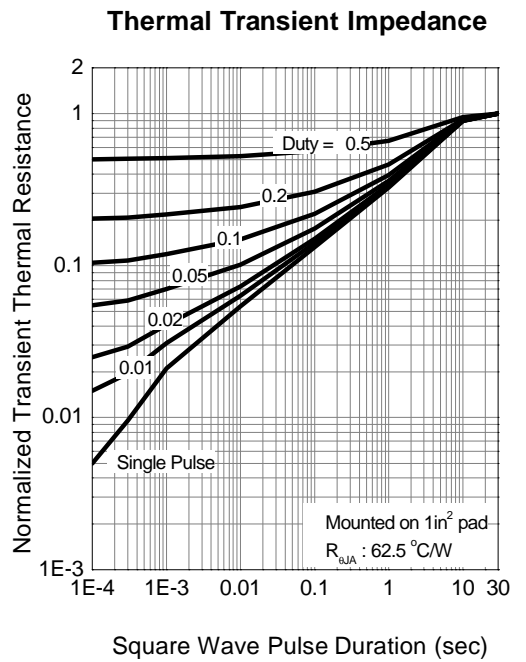
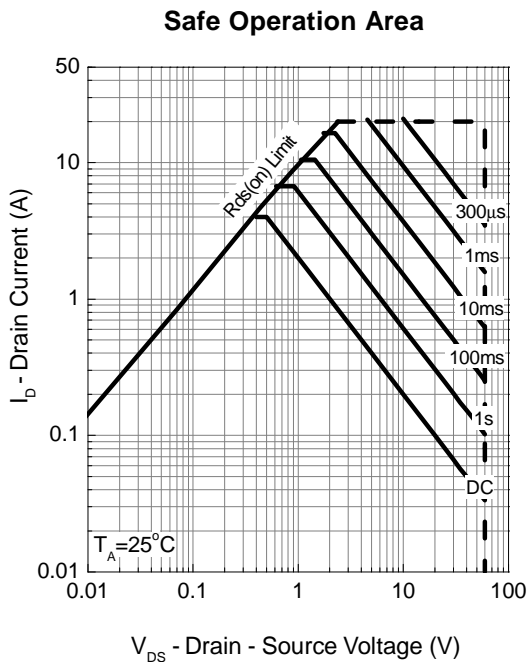
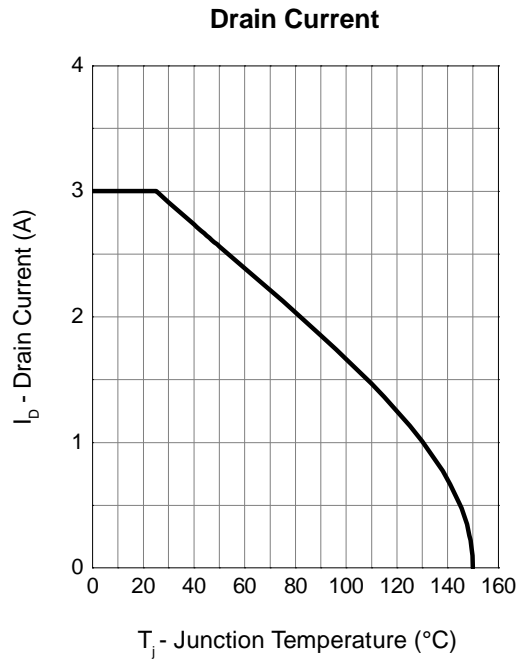
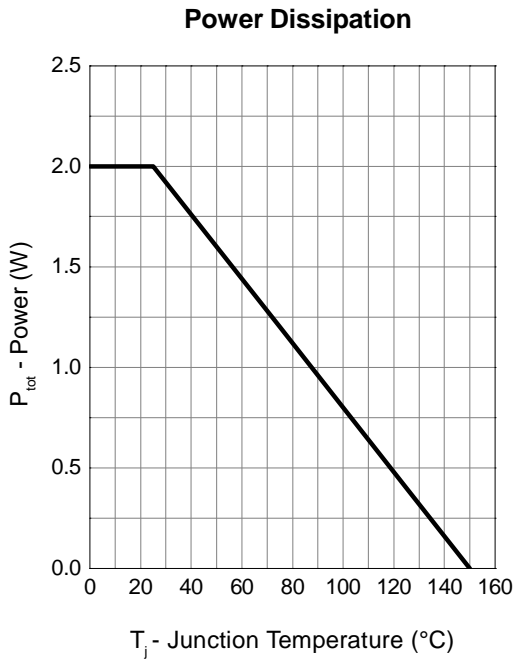
## Electrical Characteristics (Cont.) (T<sub>A</sub> = 25°C unless otherwise noted)

Symbol	Parameter	Test Condition	APM9945K			Unit
			Min.	Typ.	Max.	
<b>Gate Charge Characteristics<sup>b</sup></b>						
Q <sub>g</sub>	Total Gate Charge	V <sub>DS</sub> =15V, V <sub>GS</sub> =10V, I <sub>DS</sub> =3A	-	20	26	nC
Q <sub>gs</sub>	Gate-Source Charge		-	5	-	
Q <sub>gd</sub>	Gate-Drain Charge		-	5	-	

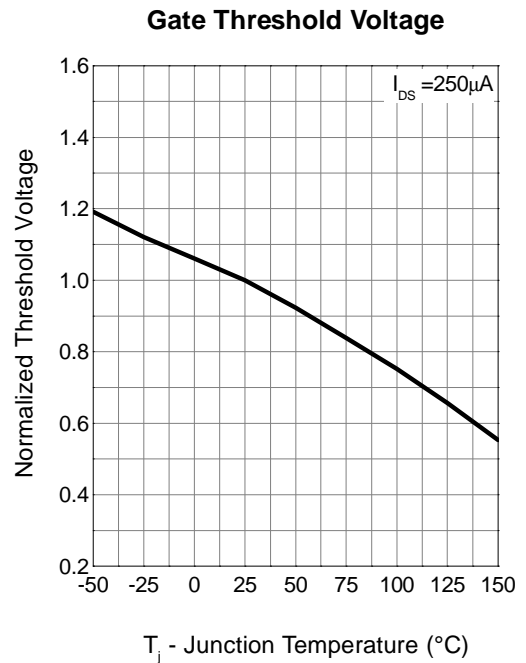
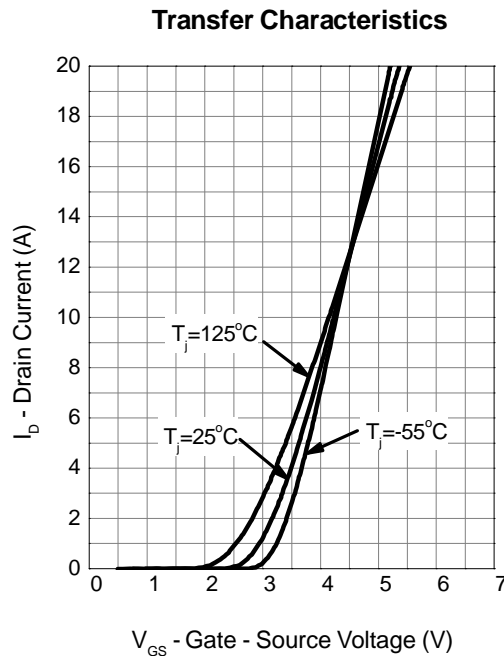
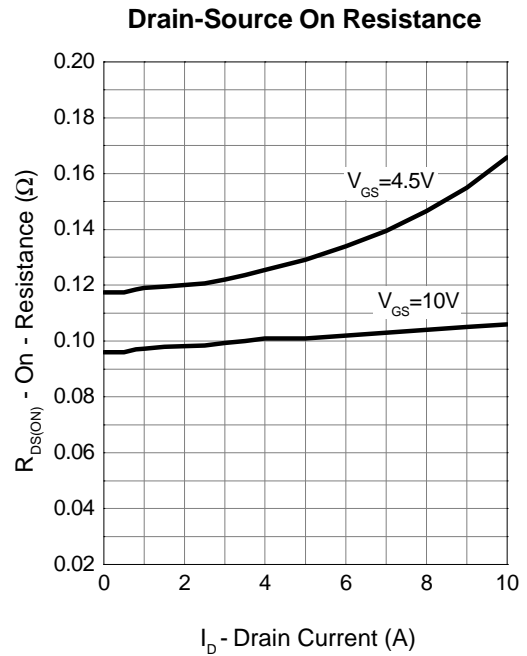
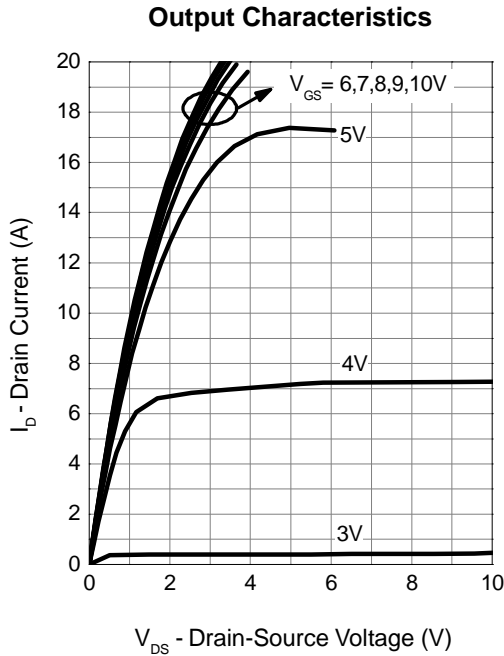
Note a : Pulse test ; pulse width ≤ 300μs, duty cycle ≤ 2%.

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

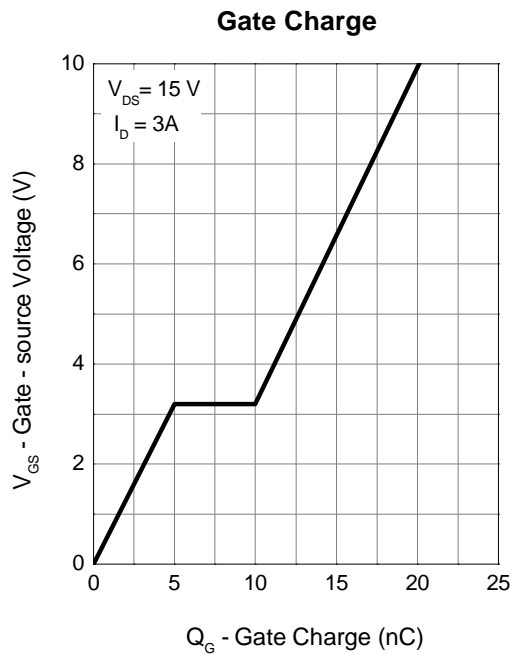
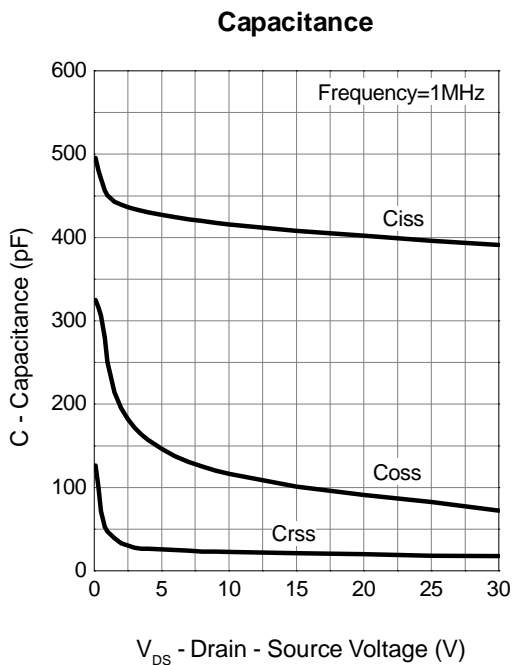
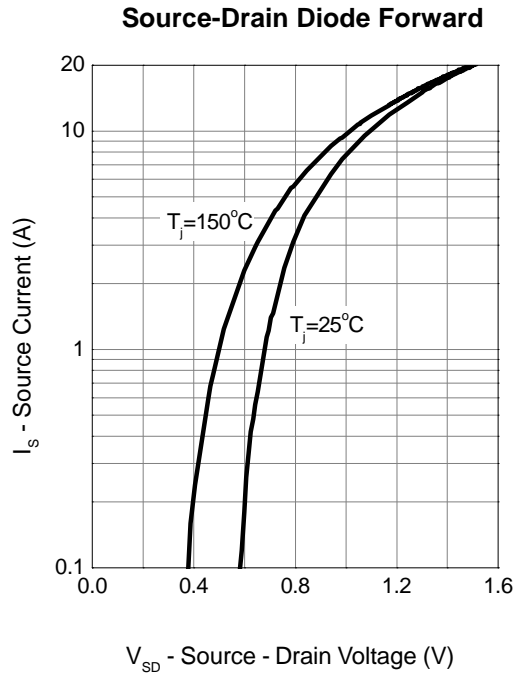
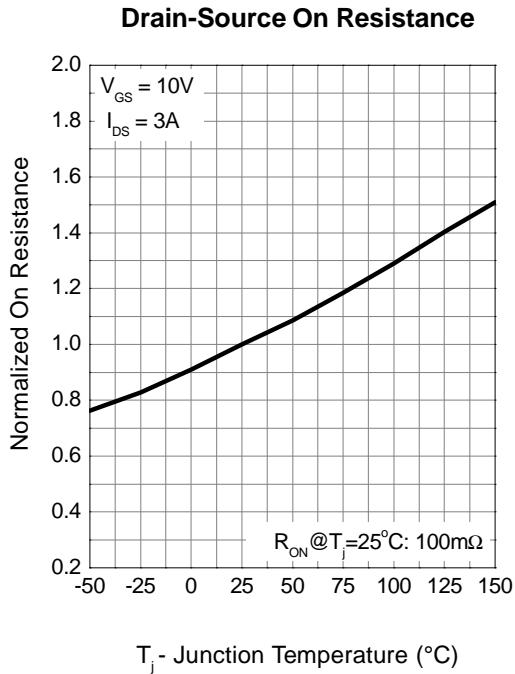
### Typical Operating Characteristics



Typical Operating Characteristics (Cont.)

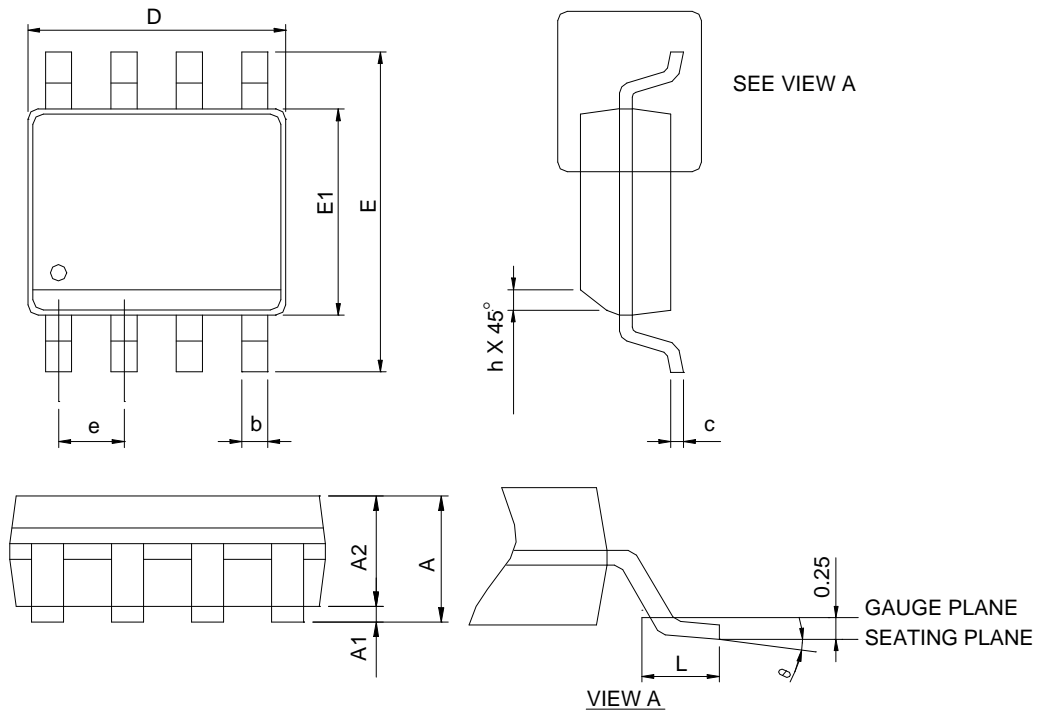


Typical Operating Characteristics (Cont.)



# Package Information

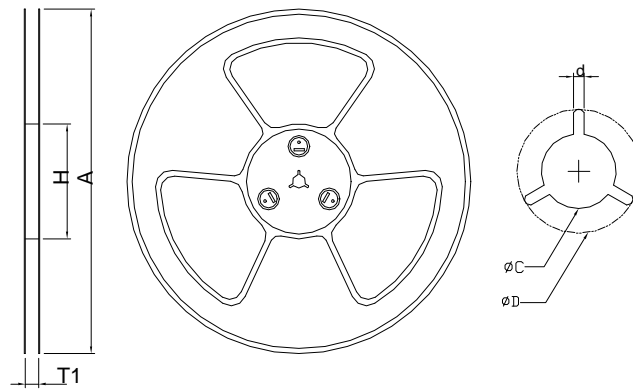
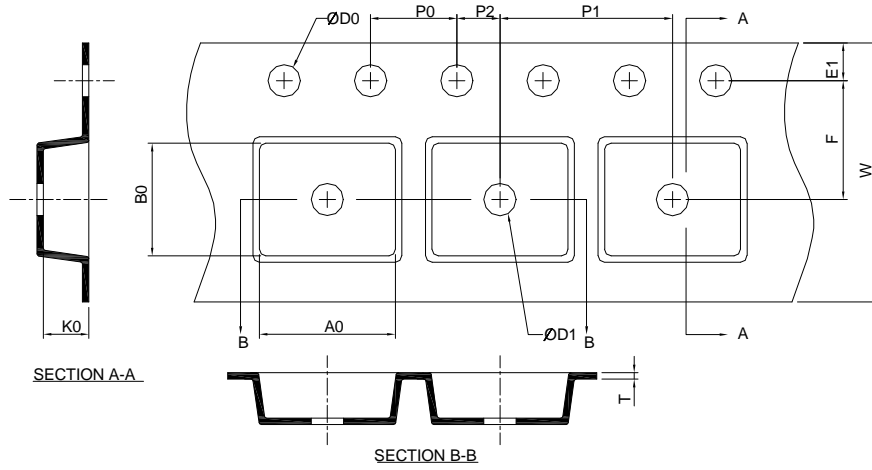
## SOP-8



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
$\theta$	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.

### 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)

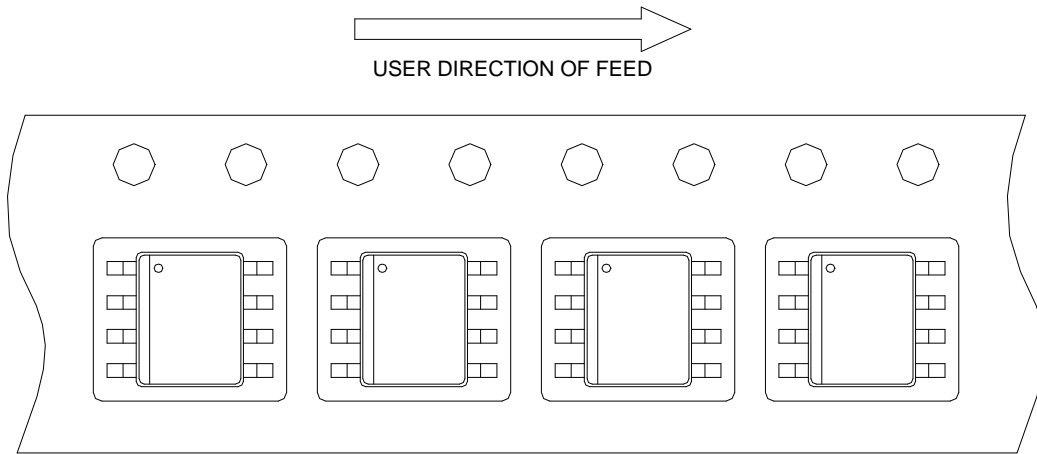
### Devices Per Unit

Package Type	Unit	Quantity
SOP-8	Tape & Reel	2500

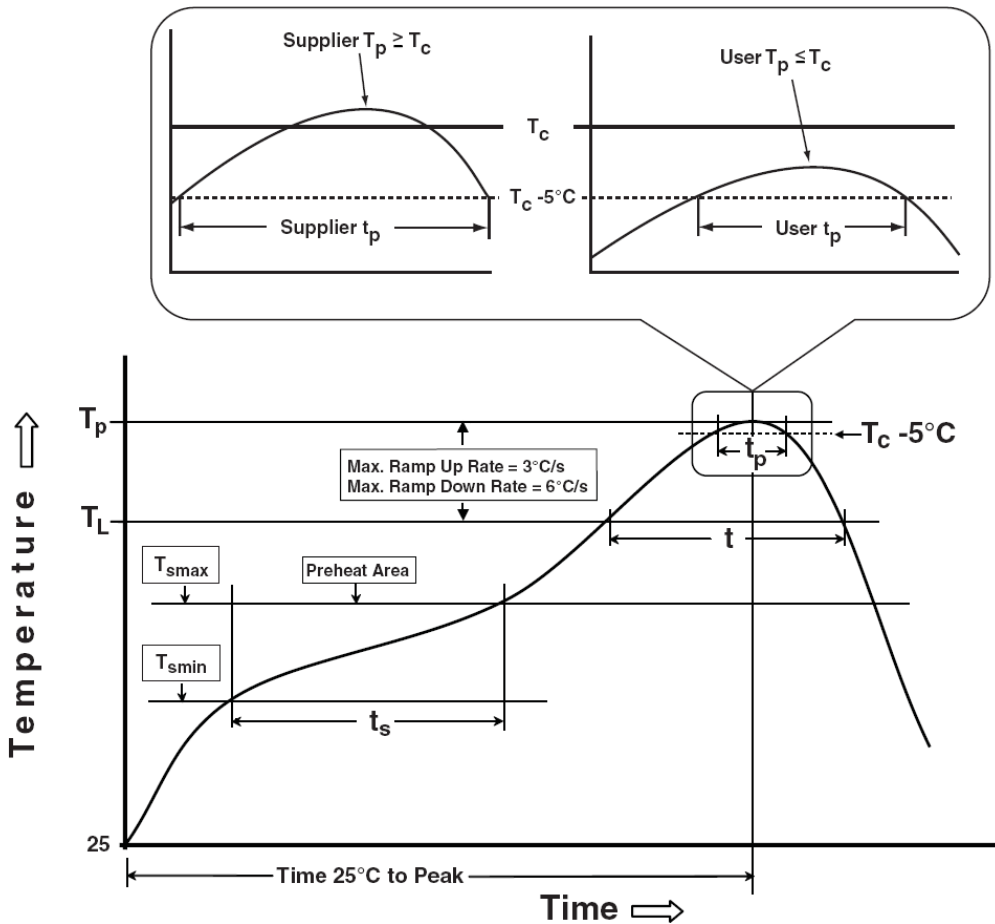


## Taping Direction Information

SOP-8



## Classification Profile



## Classification Reflow Profiles

Profile Feature	Sn-Pb Eutectic Assembly	Pb-Free Assembly
<b>Preheat &amp; Soak</b>		
Temperature min ( $T_{smin}$ )	100 °C	150 °C
Temperature max ( $T_{smax}$ )	150 °C	200 °C
Time ( $T_{smin}$ to $T_{smax}$ ) ( $t_s$ )	60-120 seconds	60-120 seconds
Average ramp-up rate ( $T_{smax}$ to $T_p$ )	3 °C/second max.	3°C/second max.
Liquidous temperature ( $T_L$ )	183 °C	217 °C
Time at liquidous ( $t_L$ )	60-150 seconds	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 ( $T_c$ )

Package Thickness	Volume mm <sup>3</sup> <350	Volume mm <sup>3</sup> ≥350
<2.5 mm	235 °C	220 °C
≥2.5 mm	220 °C	220 °C

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

Package Thickness	Volume mm <sup>3</sup> <350	Volume mm <sup>3</sup> 350-2000	Volume mm <sup>3</sup> >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
HOLT	JESD-22, A108	1000 Hrs, Bias @ 125°C
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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## Customer Service

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