

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

Symbol	Parameter	Rating	Unit
Common Ratings ($T_A = 25^\circ\text{C}$ Unless Otherwise Noted)			
V_{DSS}	Drain-Source Voltage	-40	V
V_{GSS}	Gate-Source Voltage	± 25	
I_D^*	Continuous Drain Current	$V_{GS} = -10\text{V}$ -7.5	A
I_{DM}^*	300 μs Pulse Drain Current		
		-30	
I_S^*	Diode Continuous Forward Current	-2.5	$^\circ\text{C}$
T_J	Maximum Junction Temperature	150	
T_{STG}	Storage Temperature Range	-55 to 150	
P_D^*	Maximum Power Dissipation	$T_C = 25^\circ\text{C}$ 2	W
		$T_C = 100^\circ\text{C}$ 0.8	
$R_{\theta JA}^*$	Thermal Resistance-Junction to Ambient	62.5	$^\circ\text{C/W}$

Note : *Surface Mounted on 1in2 pad area, $t \leq 10\text{sec}$.

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

Symbol	Parameter	Test Conditions	APM4015K			Unit
			Min.	Typ.	Max.	
Static Characteristics						
BV _{DSS}	Drain-Source Breakdown Voltage	V _{GS} =0V, I _{DS} =-250μA	-40	-	-	V
I _{DSS}	Zero Gate Voltage Drain Current	V _{DS} =-32V, 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	-2	-2.5	V
I _{GSS}	Gate Leakage Current	V _{GS} =±25V, V _{DS} =0V	-	-	±100	nA
R _{DS(ON)} ^a	Drain-Source On-state Resistance	V _{GS} =-10V, I _{DS} =-7.5A	-	18	23	mΩ
		V _{GS} =-4.5V, I _{DS} =-6A	-	25	33	
Diode Characteristics						
V _{SD} ^a	Diode Forward Voltage	I _{SD} =-2.5A, V _{GS} =0V	-	-0.75	-1.3	V
t _{rr}	Reverse Recovery Time	I _{SD} =-7.5A,	-	20	-	ns
Q _{rr}	Reverse Recovery Charge	dl _{sp} /dt=100A/μs	-	15	-	nC

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

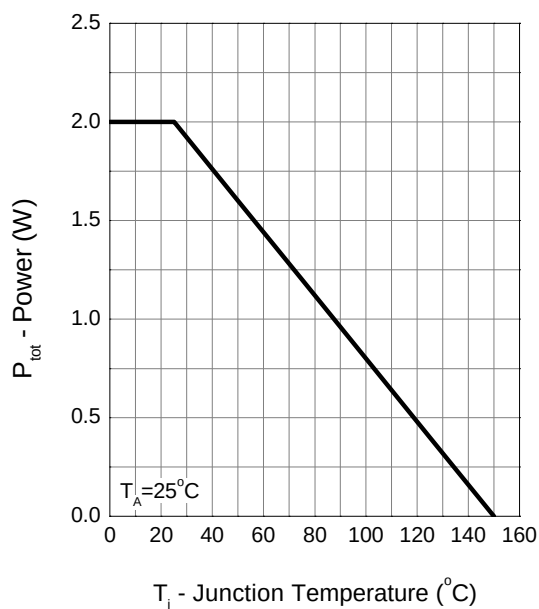
Symbol	Parameter	Test Conditions	APM4015K			Unit
			Min.	Typ.	Max.	
Dynamic Characteristics ^b						
R _G	Gate Resistance	V _{GS} =0V, V _{DS} =0V, F=1MHz	-	4	-	Ω
C _{ISS}	Input Capacitance	V _{GS} =0V, V _{DS} =-20V, Frequency=1.0MHz	-	1910	-	pF
C _{OSS}	Output Capacitance		-	340	-	
C _{ISS}	Reverse Transfer Capacitance		-	220	-	
t _{d(ON)}	Turn-on Delay Time	V _{DD} =-20V, R _L =20Ω, I _{DS} =-1A, V _{GEN} =-10V, R _G =6Ω	-	13	24	ns
t _r	Turn-on Rise Time		-	15	28	
t _{d(OFF)}	Turn-off Delay Time		-	64	116	
t _f	Turn-off Fall Time		-	26	48	
Gate Charge Characteristics ^b						
Q _g	Total Gate Charge	V _{DS} =-20V, V _{GS} =-10V, I _{DS} =-7.5A	-	40	56	nC
Q _{gs}	Gate-Source Charge		-	6	-	
Q _{gd}	Gate-Drain Charge		-	10	-	

Note a : Pulse test ; pulse width $\leq 300\mu\text{s}$, duty cycle $\leq 2\%$.

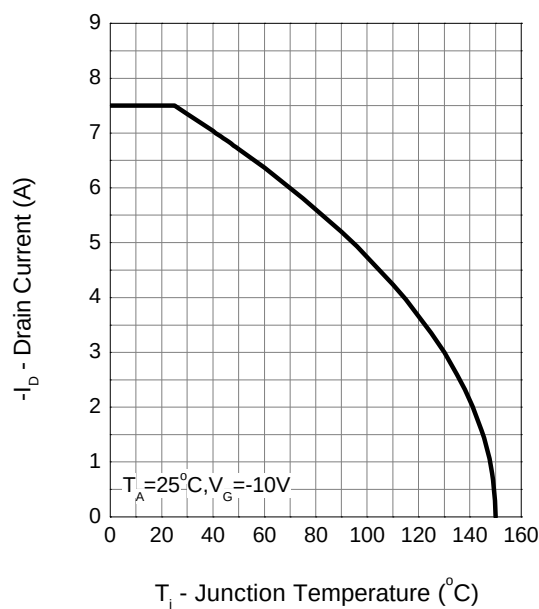
Note b : Guaranteed by design, not subject to production testing.

Typical Operating Characteristics

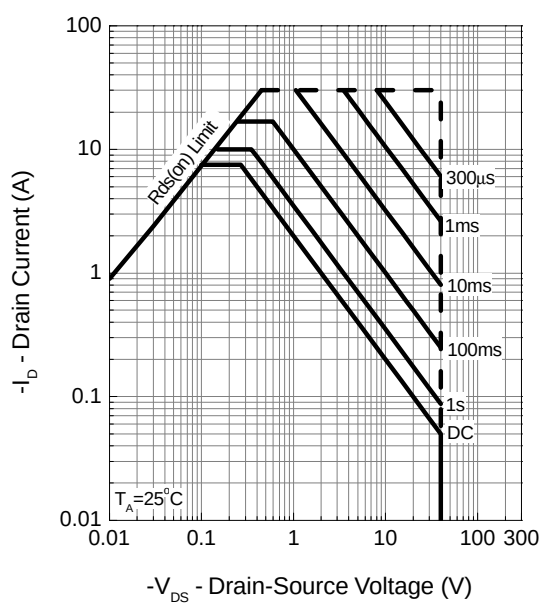
Power Dissipation



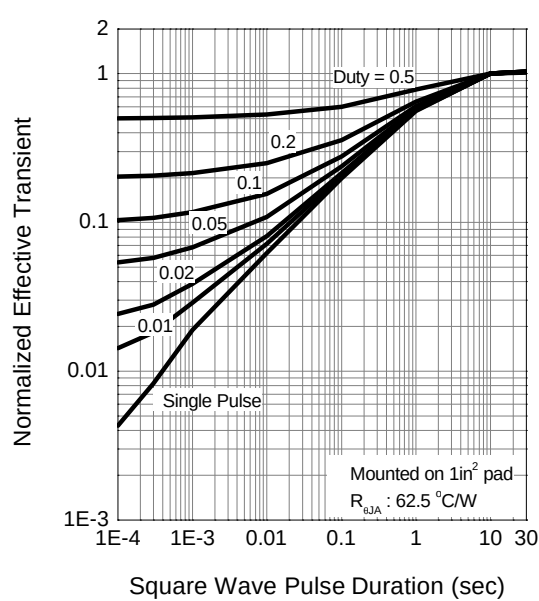
Drain Current



Safe Operation Area

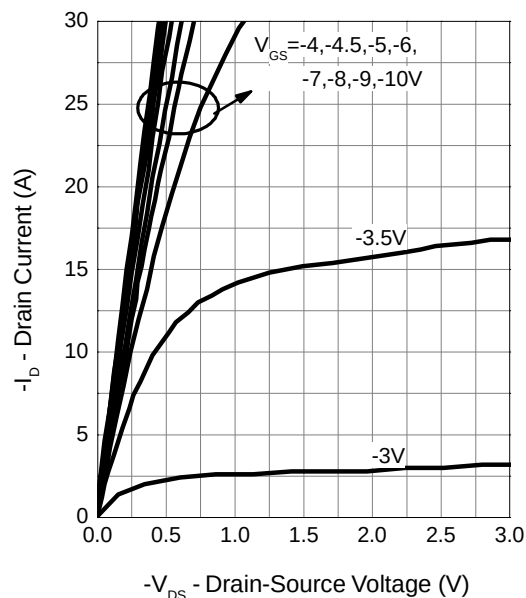


Thermal Transient Impedance

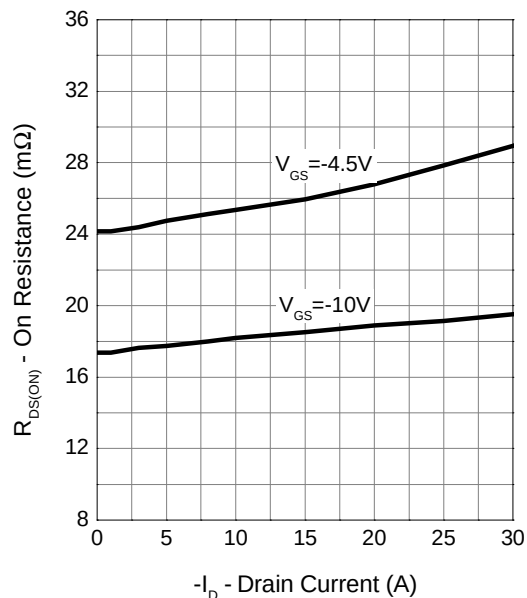


Typical Operating Characteristics (Cont.)

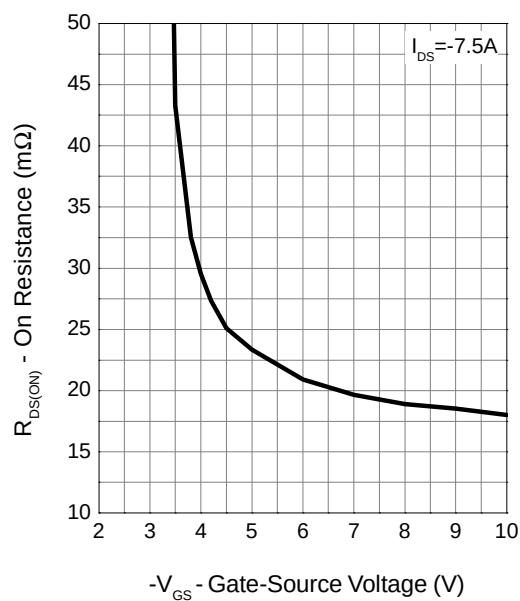
Output Characteristics



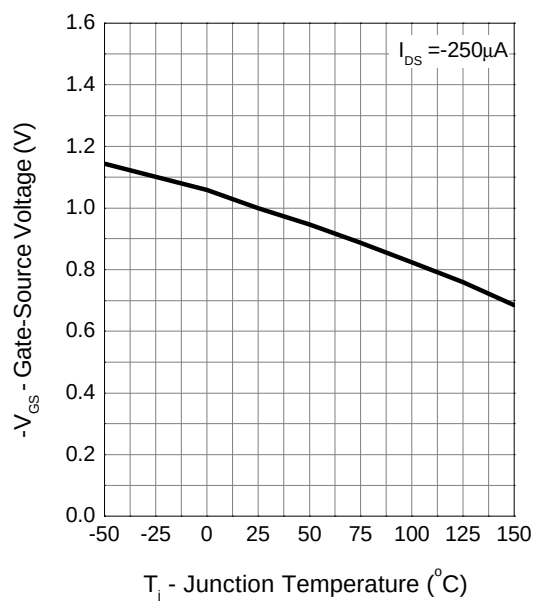
Drain-Source On Resistance



Gate-Source On Resistance

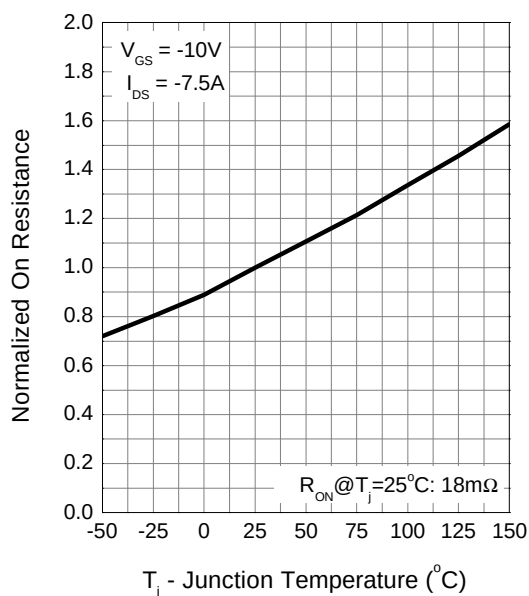


Gate Threshold Voltage

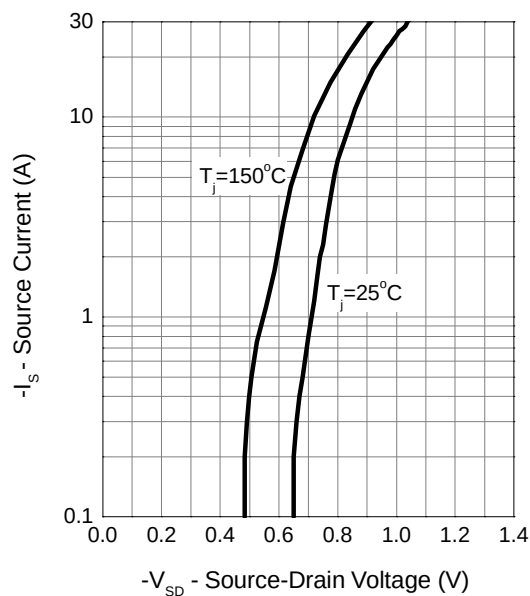


Typical Operating Characteristics (Cont.)

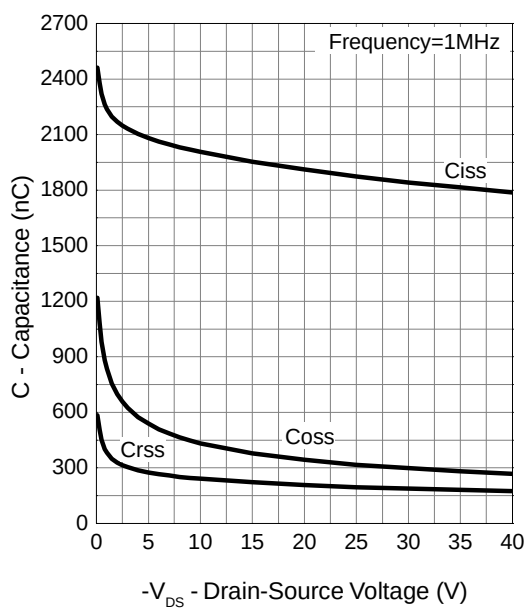
Drain-Source On Resistance



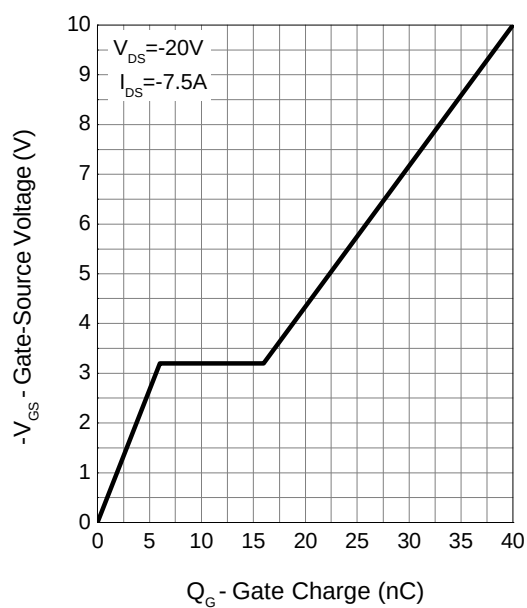
Source-Drain Diode Forward



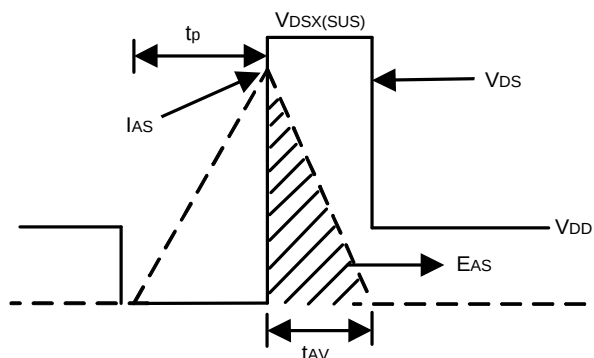
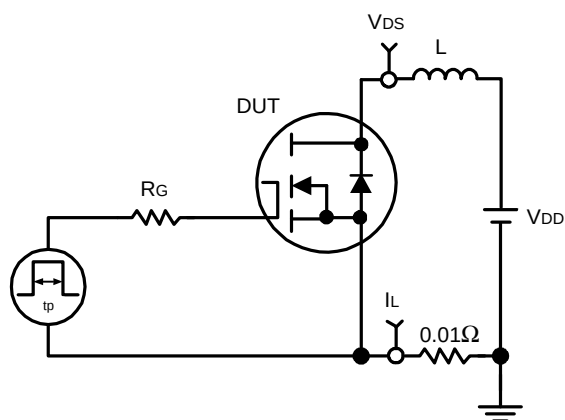
Capacitance



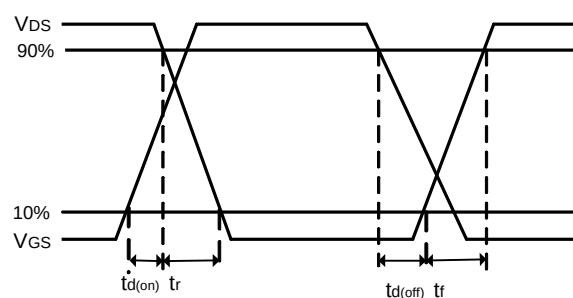
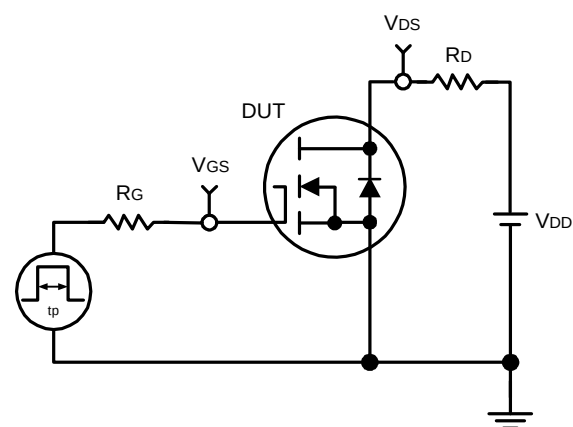
Gate Charge



Avalanche Test Circuit and Waveforms

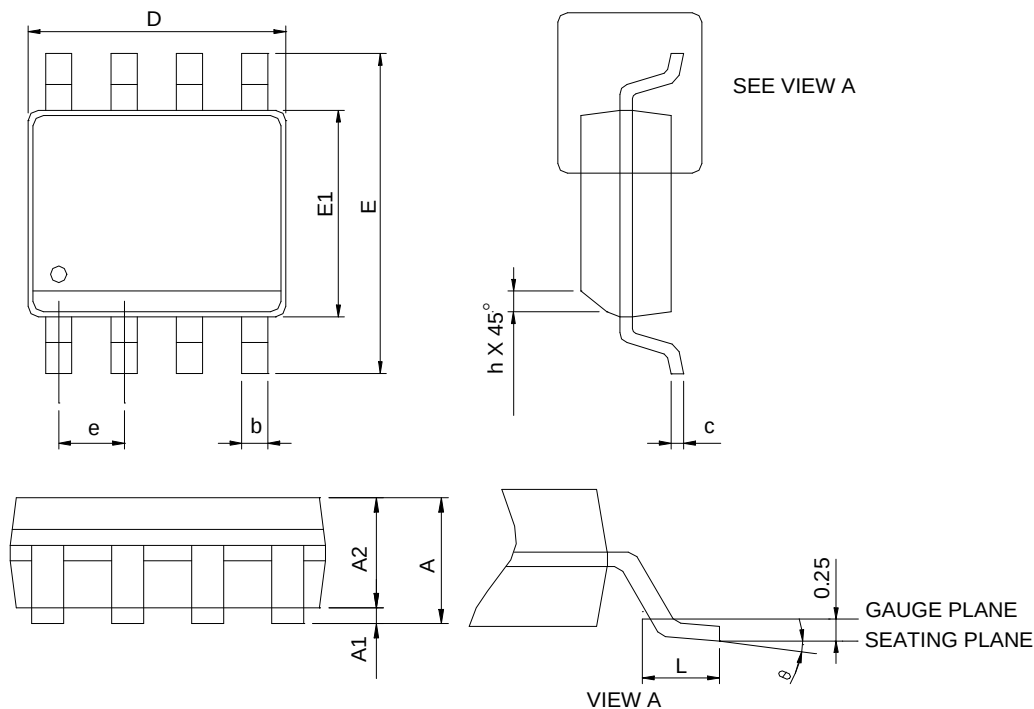


Switching Time Test Circuit and Waveforms



Package Information

SOP-8



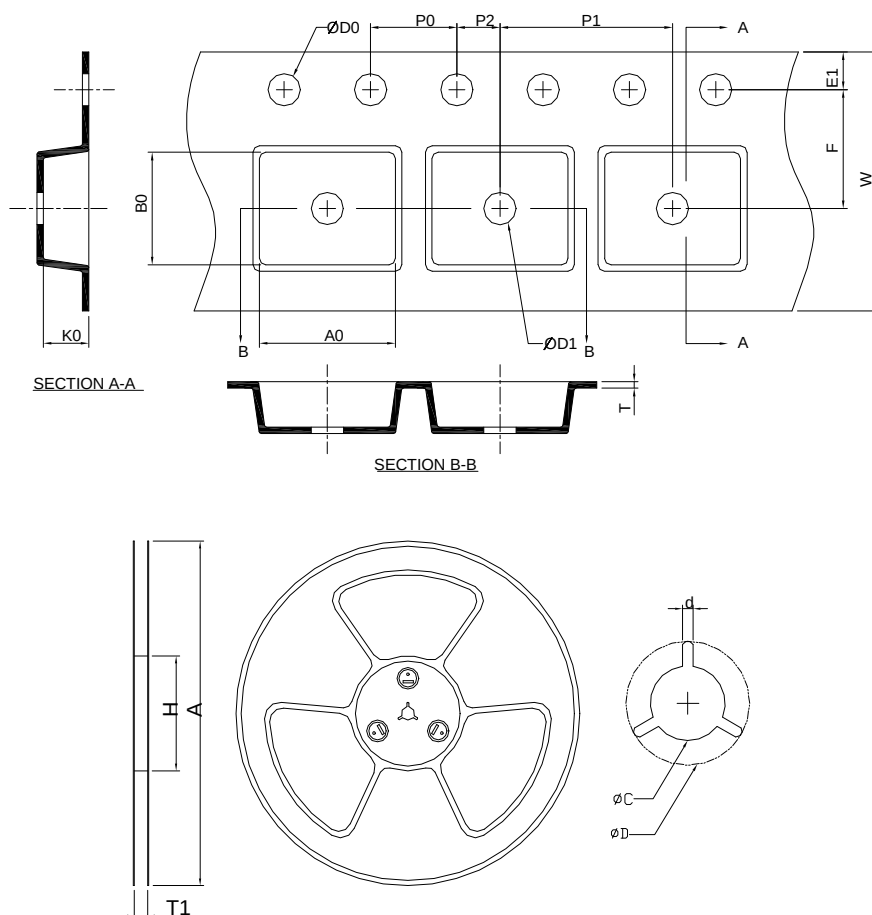
SYMBOL	SOP-8			
	MILLIMETERS		INCHES	
	MIN.	MAX.	MIN.	MAX.
A		1.75		0.069
A1	0.10	0.25	0.004	0.010
A2	1.25		0.049	
b	0.31	0.51	0.012	0.020
c	0.17	0.25	0.007	0.010
D	4.80	5.00	0.189	0.197
E	5.80	6.20	0.228	0.244
E1	3.80	4.00	0.150	0.157
e	1.27 BSC		0.050 BSC	
h	0.25	0.50	0.010	0.020
L	0.40	1.27	0.016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

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

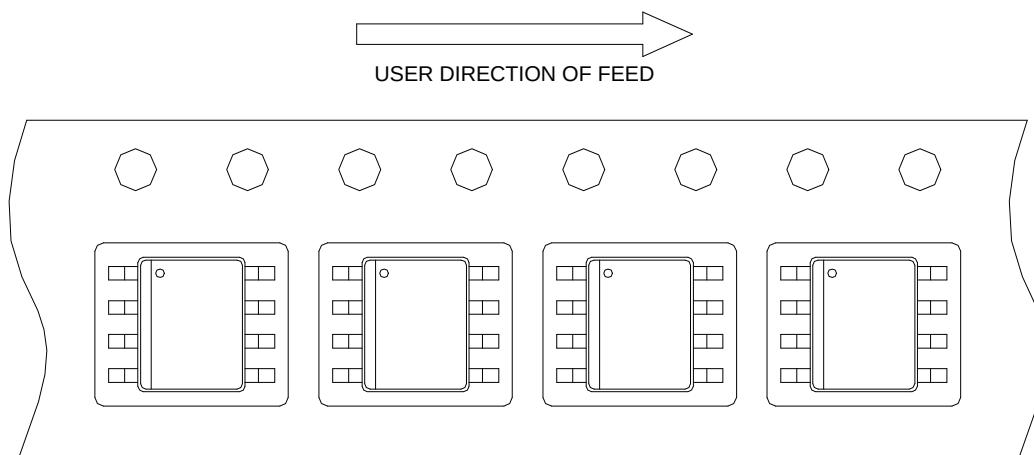
(mm)

Devices Per Unit

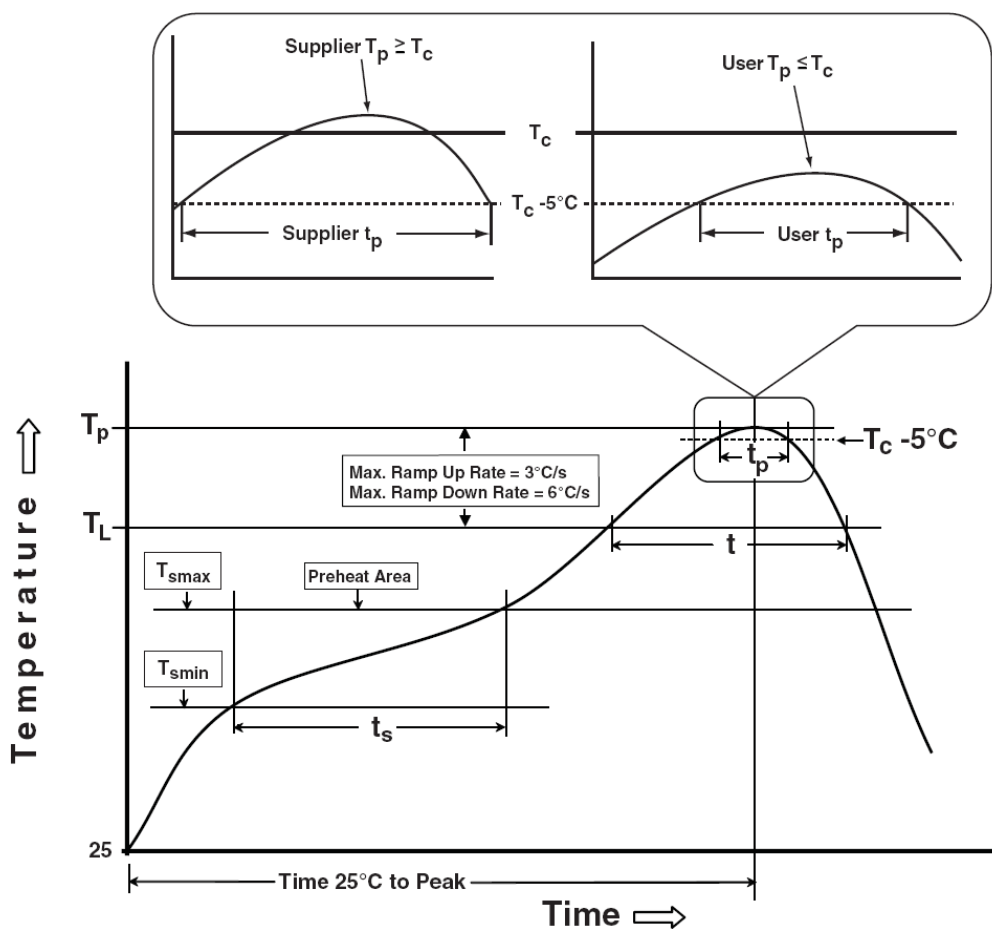
Package Type	Unit	Quantity
SOP-8	Tape & Reel	2500

Taping Direction Information

SOP-8



Classification Profile



Classification Reflow Profiles

Profile Feature	Sn-Pb Eutectic Assembly	Pb-Free Assembly
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 (T_c)

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 (T_c)

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
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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