

Absolute Maximum Ratings

Symbol	Parameter	Rating	Unit
Common Ratings ($T_A = 25^\circ\text{C}$ Unless Otherwise Noted)			
V_{DSS}	Drain-Source Voltage	25	V
V_{GSS}	Gate-Source Voltage	± 20	
T_J	Maximum Junction Temperature	150	$^\circ\text{C}$
T_{STG}	Storage Temperature Range	-55 to 150	$^\circ\text{C}$
I_S	Diode Continuous Forward Current	$T_C=25^\circ\text{C}$ 40	A
Mounted on Large Heat Sink			
I_{DP}	300 μs Pulse Drain Current Tested	$T_C=25^\circ\text{C}$ 150	A
		$T_C=100^\circ\text{C}$ 80	
I_D	Continuous Drain Current	$T_C=25^\circ\text{C}$ 60*	A
		$T_C=100^\circ\text{C}$ 50	
P_D	Maximum Power Dissipation	$T_C=25^\circ\text{C}$ 50	W
		$T_C=100^\circ\text{C}$ 20	
$R_{\theta JC}$	Thermal Resistance-Junction to Case	2.5	$^\circ\text{C/W}$
Mounted on PCB of Minimum Footprint			
I_{DP}	300 μs Pulse Drain Current Tested	$T_A=25^\circ\text{C}$ 150	A
		$T_A=100^\circ\text{C}$ 80	
I_D	Continuous Drain Current	$T_A=25^\circ\text{C}$ 12	A
		$T_A=100^\circ\text{C}$ 5.5	
P_D	Maximum Power Dissipation	$T_A=25^\circ\text{C}$ 1.25	W
		$T_A=100^\circ\text{C}$ 0.25	
$R_{\theta JA}$	Thermal Resistance-Junction to Ambient	100	$^\circ\text{C/W}$

Note:

* Current limited by bond wire.

Electrical Characteristics (T_A = 25°C unless otherwise noted)

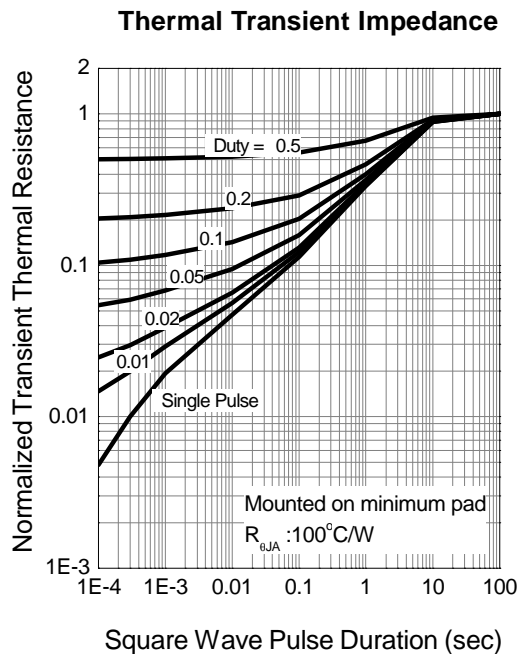
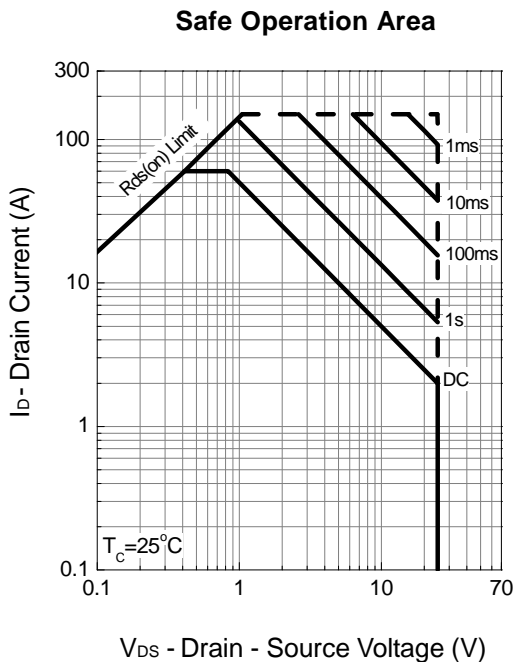
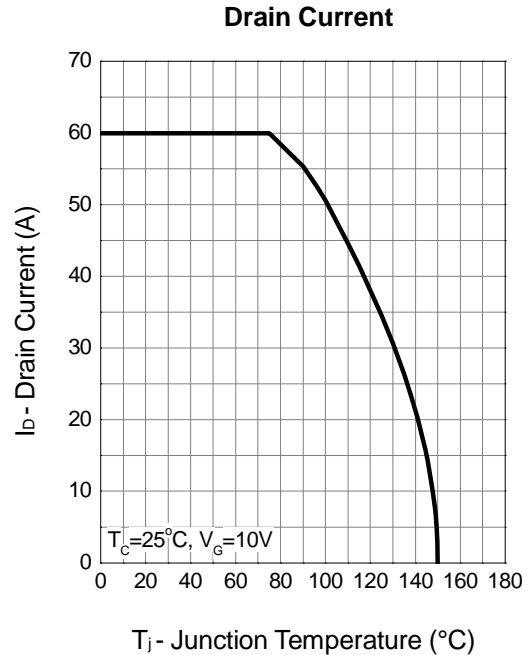
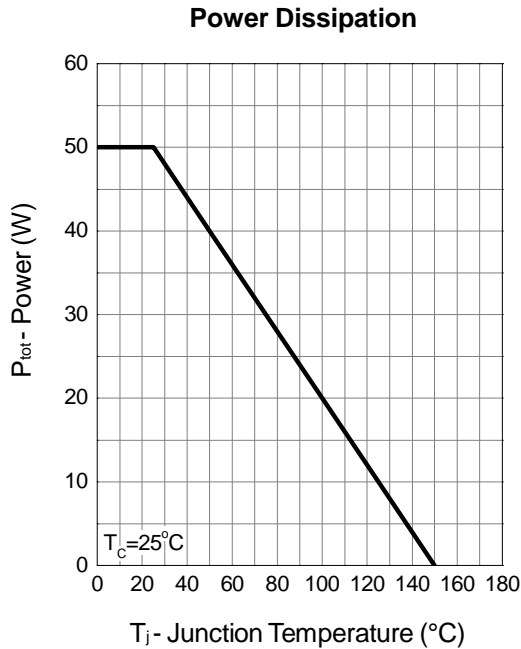
Symbol	Parameter	Test Condition	APM2506NUB			Unit
			Min.	Typ.	Max.	
Drain-Source Avalanche Ratings						
E _{AS}	Drain-Source Avalanche Energy	I _D =20A, L=0.5mH			100	mJ
Static Characteristics						
BV _{DSS}	Drain-Source Breakdown Voltage	V _{GS} =0V, I _{DS} =250μA	25			V
I _{DSS}	Zero Gate Voltage Drain Current	V _{DS} =20V, V _{GS} =0V			1	μA
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} =40A		4.8	6	mΩ
		V _{GS} =4.5V, I _{DS} =20A		7	9	
Diode Characteristics						
V _{SD} ^a	Diode Forward Voltage	I _{SD} =20A, V _{GS} =0V		0.7	1.1	V
t _{rr} ^b	Reverse Recovery Time	I _{SD} =10A, dI _{SD} /dt =100A/μs		30		ns
Q _{rr} ^b	Reverse Recovery Charge			14		nC
Dynamic Characteristics^b						
R _G	Gate Resistance	V _{GS} =0V, V _{DS} =0V, F=1MHz		1.0	2.1	Ω
C _{iss}	Input Capacitance	V _{GS} =0V, V _{DS} =15V, Frequency=1.0MHz		3100		pF
C _{oss}	Output Capacitance			680		
C _{riss}	Reverse Transfer Capacitance			520		
t _{d(ON)}	Turn-on Delay Time	V _{DD} =15V, R _L =15Ω, I _{DS} =1A, V _{GEN} =10V, R _G =6Ω		19		ns
T _r	Turn-on Rise Time			20		
t _{d(OFF)}	Turn-off Delay Time			62		
T _f	Turn-off Fall Time			43		
Gate Charge Characteristics^b						
Q _g	Total Gate Charge	V _{DS} =15V, V _{GS} =4.5V, I _{DS} =40A		37.5	56	nC
Q _{gs}	Gate-Source Charge			9.4		
Q _{gd}	Gate-Drain Charge			21		

Notes:

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

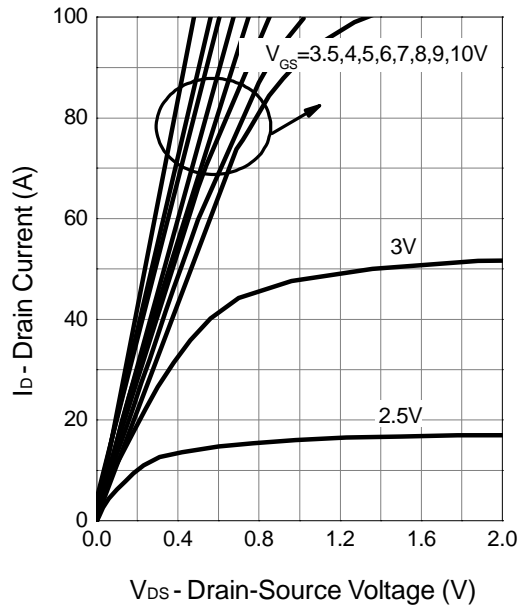
b : Guaranteed by design, not subject to production testing.

Typical Characteristics

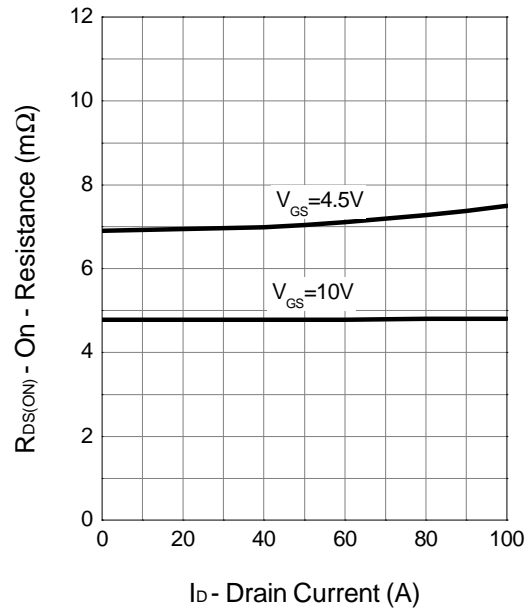


Typical Characteristics (Cont.)

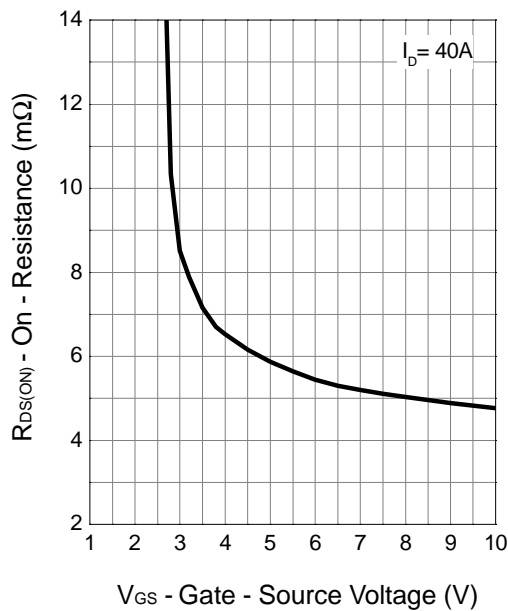
Output Characteristics



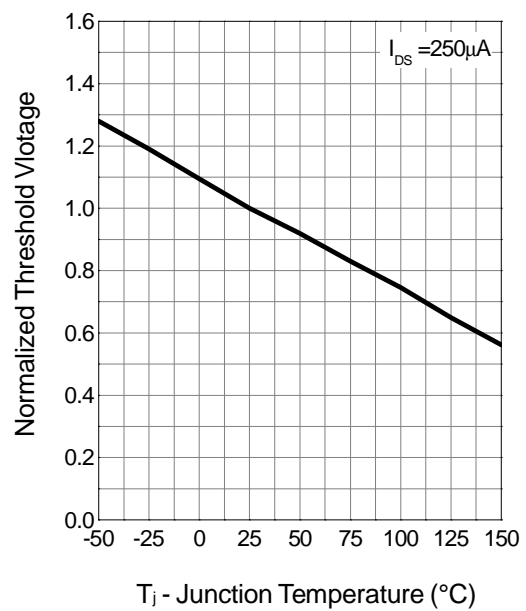
Drain-Source On Resistance



Drain-Source On Resistance

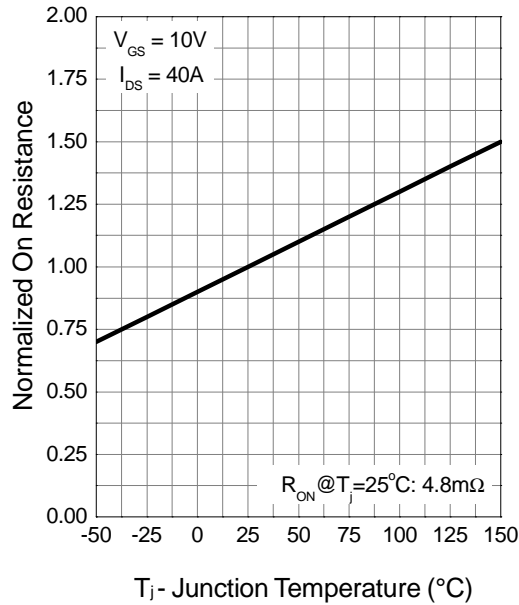


Gate Threshold Voltage

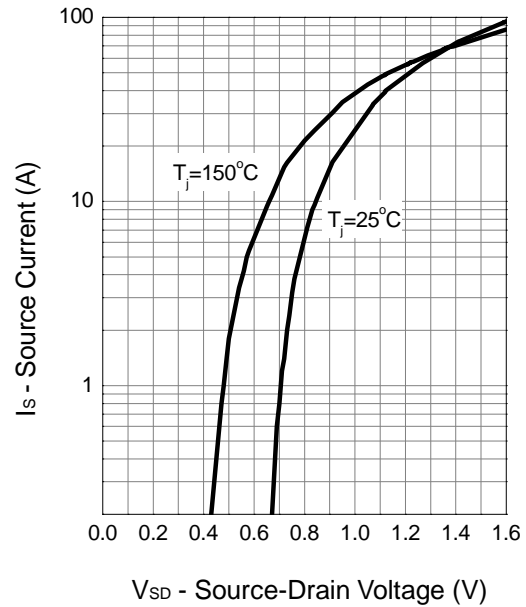


Typical Characteristics (Cont.)

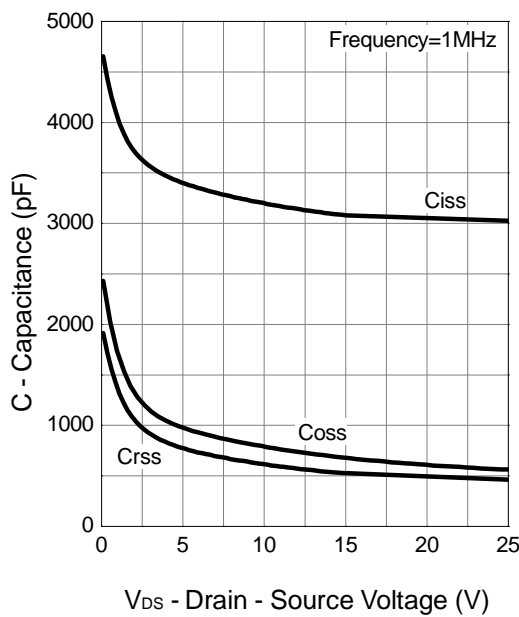
Drain-Source On Resistance



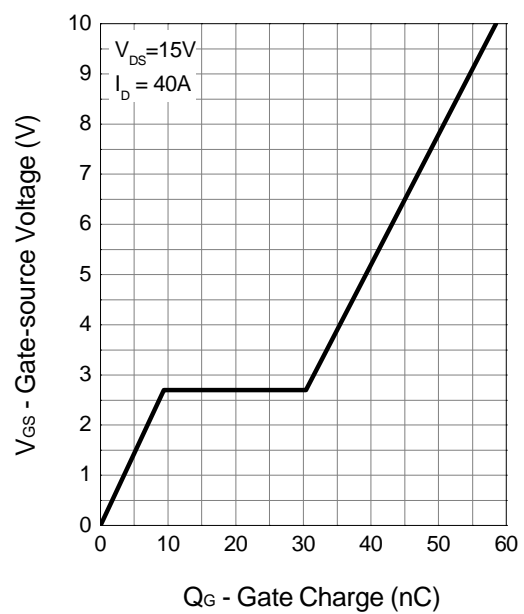
Source-Drain Diode Forward



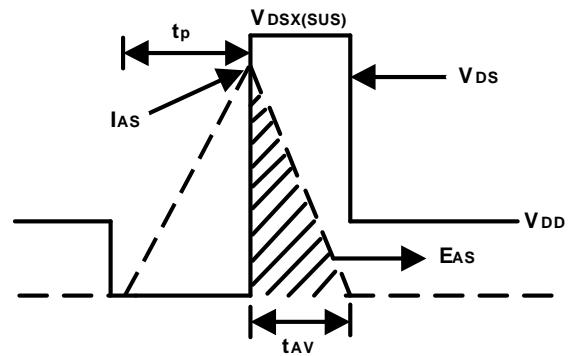
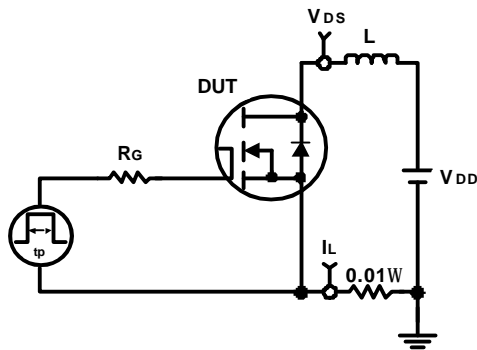
Capacitance



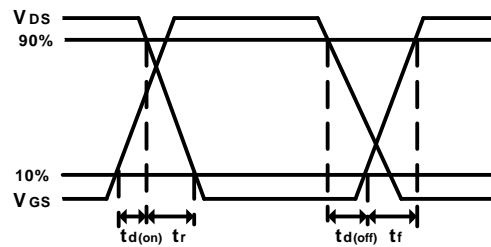
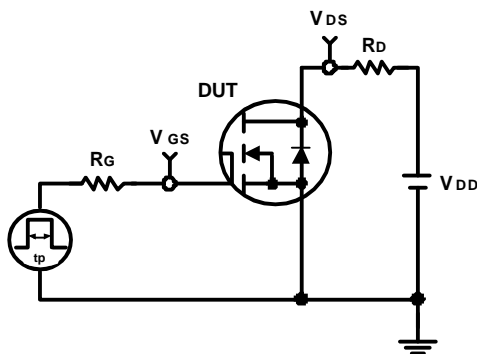
Gate Charge



Avalanche Test Circuit and Waveforms

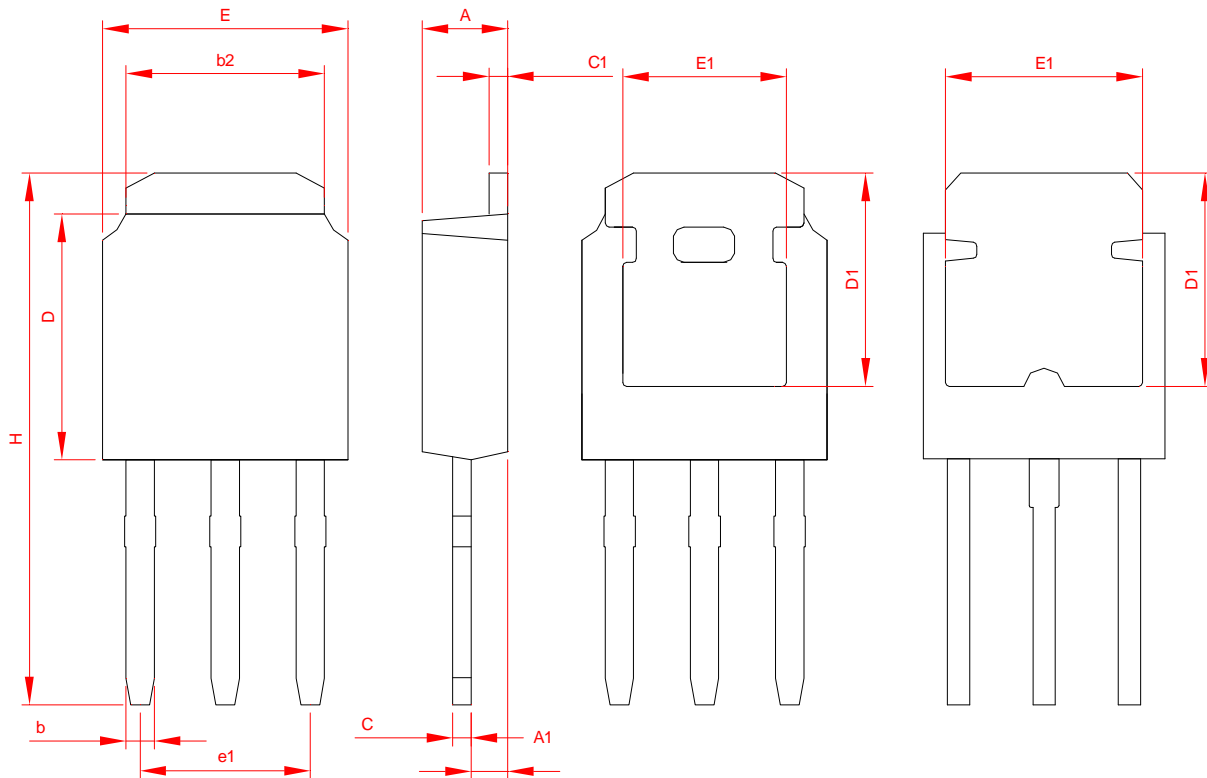


Switching Time Test Circuit and Waveforms



Packaging Information

TO-251

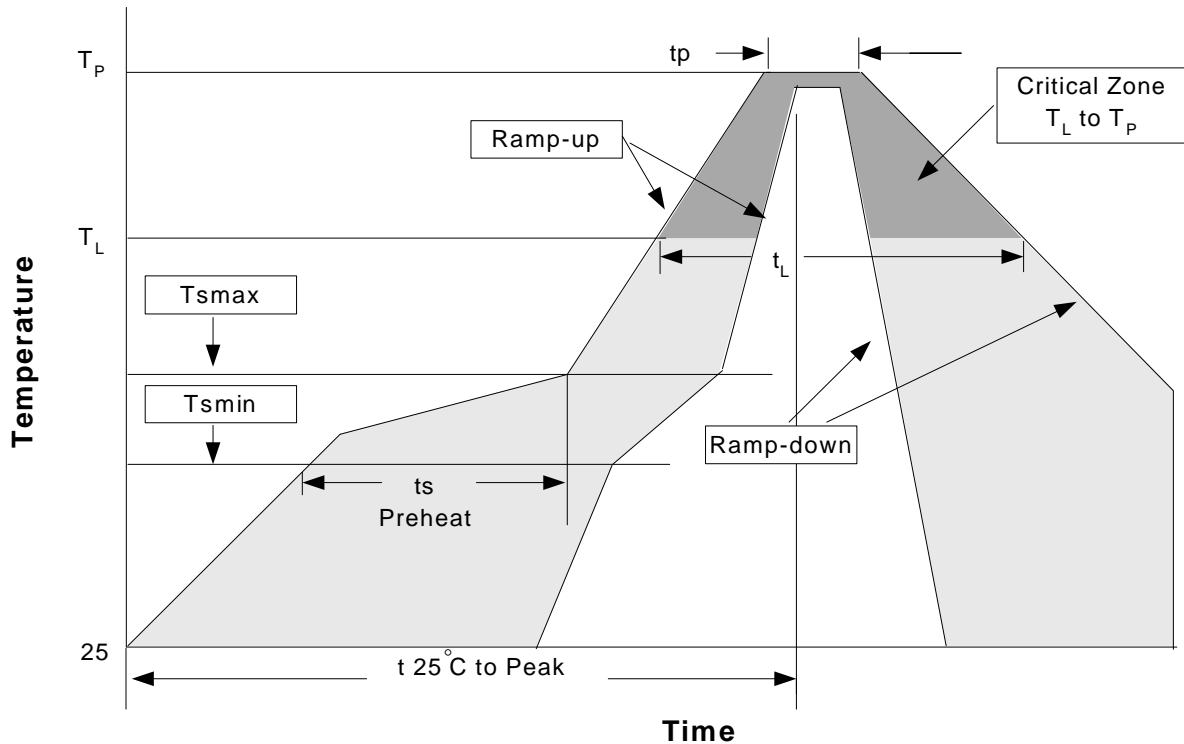


Dim	Millimeters		Inches	
	Min.	Max.	Min.	Max.
A	2.20	2.40	0.087	0.094
A1	1.02	1.27	0.040	0.050
b	0.50	0.88	0.020	0.035
b2	5.20	5.46	0.205	0.215
C	0.40	0.60	0.016	0.024
C1	0.40	0.60	0.016	0.024
D	5.40	6.20	0.213	0.244
D1	5.30	--	0.209	--
E	6.35	6.70	0.250	0.264
E1	4.40	5.40	0.173	0.213
e1	4.50	4.70	0.177	0.185
H	12.90	15.25	0.508	0.600

Physical Specifications

Terminal Material	Solder-Plated Copper (Solder Material : 90/10 or 63/37 SnPb), 100%Sn
Lead Solderability	Meets EIA Specification RSI86-91, ANSI/J-STD-002 Category 3.

Reflow Condition (IR/Convection or VPR Reflow)



Classification Reflow Profiles

Profile Feature	Sn-Pb Eutectic Assembly	Pb-Free Assembly
Average ramp-up rate (T _L to T _P)	3°C/second max.	3°C/second max.
Preheat		
- Temperature Min (T _{smin})	100°C	150°C
- Temperature Max (T _{smax})	150°C	200°C
- Time (min to max) (t _s)	60-120 seconds	60-180 seconds
Time maintained above:		
- Temperature (T _L)	183°C	217°C
- Time (t _L)	60-150 seconds	60-150 seconds
Peak/Classification Temperature (T _p)	See table 1	See table 2
Time within 5°C of actual Peak Temperature (t _p)	10-30 seconds	20-40 seconds
Ramp-down Rate	6°C/second max.	6°C/second max.
Time 25°C to Peak Temperature	6 minutes max.	8 minutes max.

Notes: All temperatures refer to topside of the package .Measured on the body surface.

Classification Reflow Profiles(Cont.)

Table 1. SnPb Eutectic Process – Package Peak Reflow Temperatures

Package Thickness	Volume mm ³ <350	Volume mm ³ ≥350
<2.5 mm	240 +0/-5°C	225 +0/-5°C
≥2.5 mm	225 +0/-5°C	225 +0/-5°C

Table 2. Pb-free Process – Package Classification Reflow Temperatures

Package Thickness	Volume mm ³ <350	Volume mm ³ 350-2000	Volume mm ³ >2000
<1.6 mm	260 +0°C*	260 +0°C*	260 +0°C*
1.6 mm – 2.5 mm	260 +0°C*	250 +0°C*	245 +0°C*
≥2.5 mm	250 +0°C*	245 +0°C*	245 +0°C*

*Tolerance: The device manufacturer/supplier **shall** assure process compatibility up to and including the stated classification temperature (this means Peak reflow temperature +0°C. For example 260°C+0°C) at the rated MSL level.

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

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