

Absolute Maximum Ratings ($T_A = 25^\circ\text{C}$ Unless Otherwise Noted)

Symbol	Parameter		Rating	Unit
Common Ratings				
V _{DSS}	Drain-Source Voltage		120	V
V _{GSS}	Gate-Source Voltage		±20	
T _J	Maximum Junction Temperature		150	°C
T _{STG}	Storage Temperature Range		-55 to 150	
I _S	Diode Continuous Forward Current	T _C =25°C	80	A
I _D	Continuous Drain Current	T _C =25°C	120 ^a	A
		T _C =100°C	103	
I _{DM} ^b	Pulsed Drain Current	T _C =25°C	400	
P _D	Maximum Power Dissipation	T _C =25°C	313	W
		T _C =100°C	125	
R _{θJC}	Thermal Resistance-Junction to Case		0.4	°C/W
I _D	Continuous Drain Current	T _A =25°C	13.0	A
		T _A =70°C	10.4	
P _D	Maximum Power Dissipation	T _A =25°C	2.0	W
		T _A =70°C	1.28	
R _{θJA}	Thermal Resistance-Junction to Ambient		62.5	°C/W
I _{AS} ^c	Avalanche Current, Single pulse	L=0.5mH	47	A
E _{AS} ^c	Avalanche Energy, Single pulse	L=0.5mH	552	mJ

Note a : Calculated continuous current based on maximum allowable junction temperature. Bonding wire limitation current is 120A.

Note b : Pulse width limited by maximum junction temperature.

Note c : UIS tested and pulse width limited by maximum junction temperature 150°C (initial temperature $T_J=25^\circ\text{C}$).

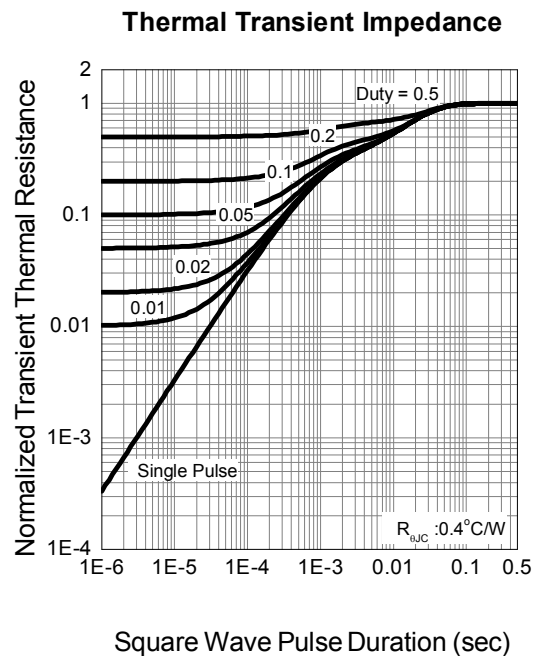
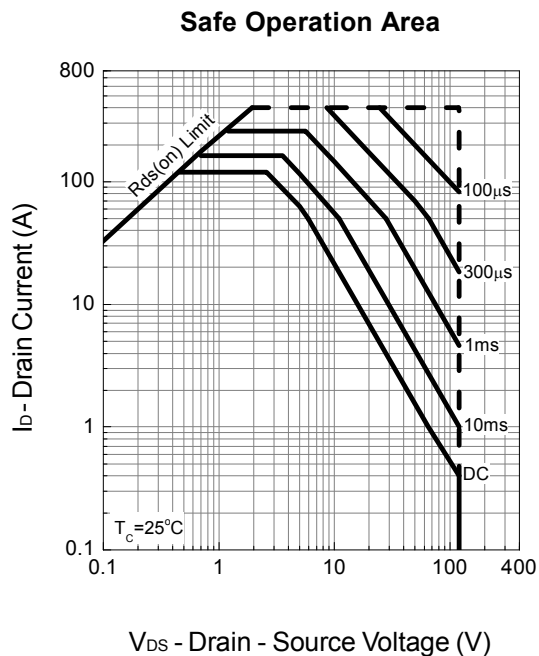
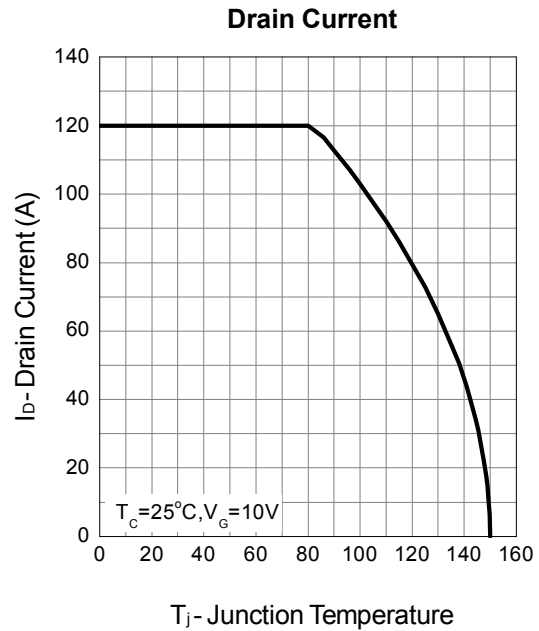
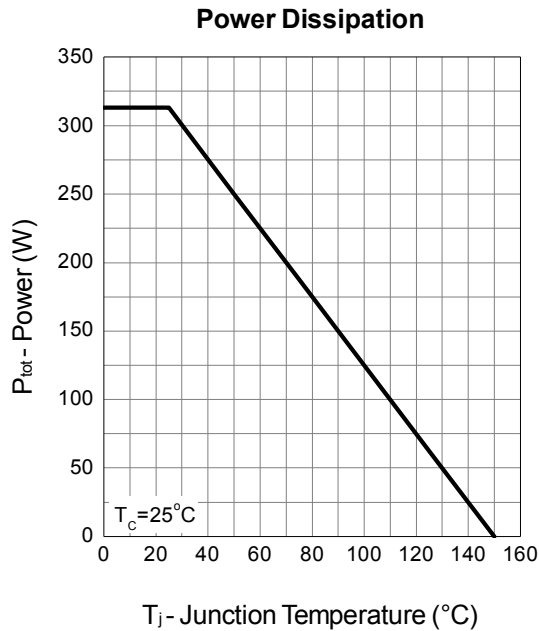
Electrical Characteristics (T_A = 25°C Unless Otherwise Noted)

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
Static Characteristics						
BV _{DSS}	Drain-Source Breakdown Voltage	V _{GS} =0V, I _{DS} =250μA	120	-	-	V
I _{DSS}	Zero Gate Voltage Drain Current	V _{DS} =96V, V _{GS} =0V T _J =85°C	- -	- -	1 30	μA
V _{GS(th)}	Gate Threshold Voltage	V _{DS} =V _{GS} , I _{DS} =250μA	2	3	4	V
I _{GSS}	Gate Leakage Current	V _{GS} =±20V, V _{DS} =0V	-	-	±100	nA
R _{DS(ON)} ^d	Drain-Source On-state Resistance	V _{GS} =10V, I _{DS} =40A	-	3.9	4.7	mΩ
Diode Characteristics						
V _{SD} ^d	Diode Forward Voltage	I _{SD} =40A, V _{GS} =0V	-	0.8	1.3	V
t _{rr}	Reverse Recovery Time	I _{SD} =40A, dI _{SD} /dt=100A/μs	-	90	-	ns
Q _{rr}	Reverse Recovery Charge		-	350	-	nC
Dynamic Characteristics ^e						
R _G	Gate Resistance	V _{GS} =0V, V _{DS} =0V, f=1MHz	-	1	-	Ω
C _{iss}	Input Capacitance	V _{GS} =0V, V _{DS} =30V, Frequency=1.0MHz	-	6810	8850	pF
C _{oss}	Output Capacitance		-	2000	-	
C _{rss}	Reverse Transfer Capacitance		-	150	-	
t _{d(ON)}	Turn-on Delay Time	V _{DD} =30V, R _L =30Ω, I _{DS} =1A, V _{GEN} =10V, R _G =6Ω	-	32	58	ns
t _r	Turn-on Rise Time		-	25	45	
t _{d(OFF)}	Turn-off Delay Time		-	97	175	
t _f	Turn-off Fall Time		-	170	306	
Gate Charge Characteristics ^e						
Q _g	Total Gate Charge	V _{DS} =60V, V _{GS} =10V, I _{DS} =40A	-	120	168	nC
Q _{gs}	Gate-Source Charge		-	38	-	
Q _{gd}	Gate-Drain Charge		-	27	-	

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

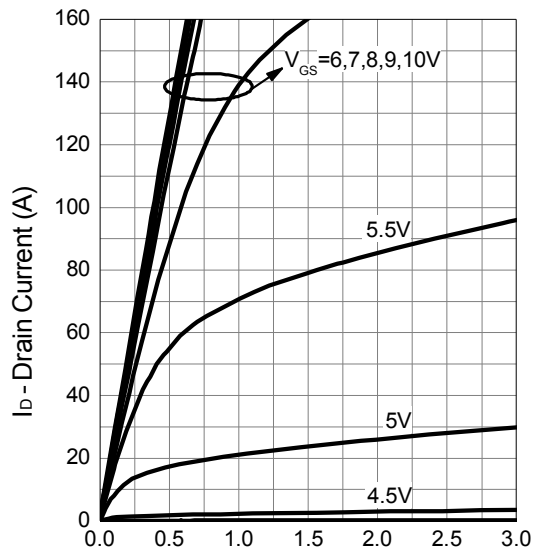
Note e : Guaranteed by design, not subject to production testing.

Typical Operating Characteristics



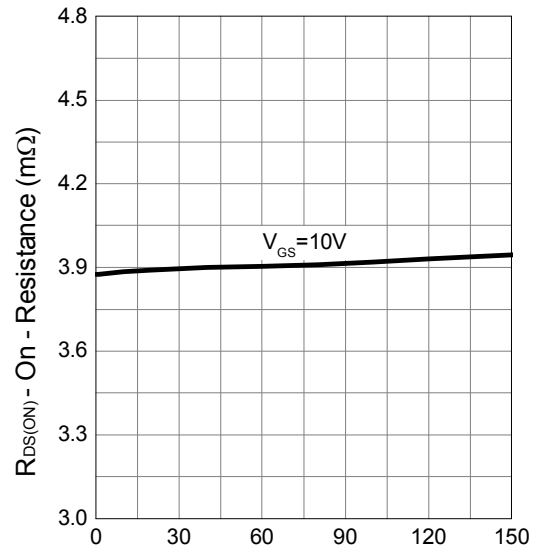
Typical Operating Characteristics (Cont.)

Output Characteristics



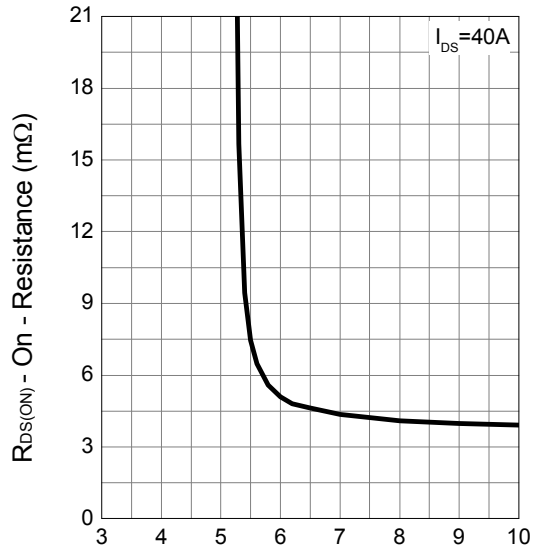
V_{DS} - Drain - Source Voltage (V)

Drain-Source On Resistance



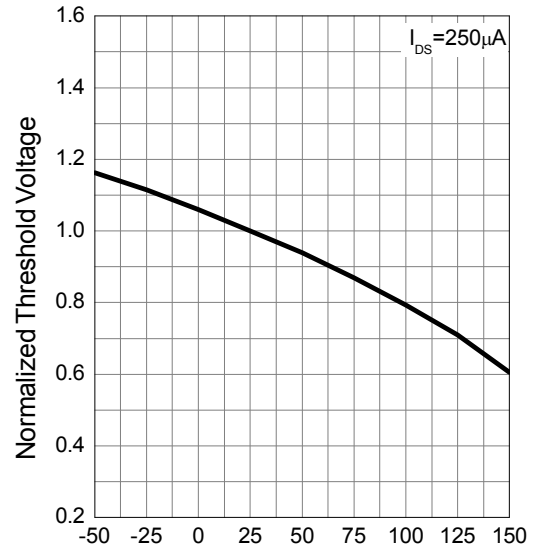
I_D - Drain Current (A)

Gate-Source On Resistance



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

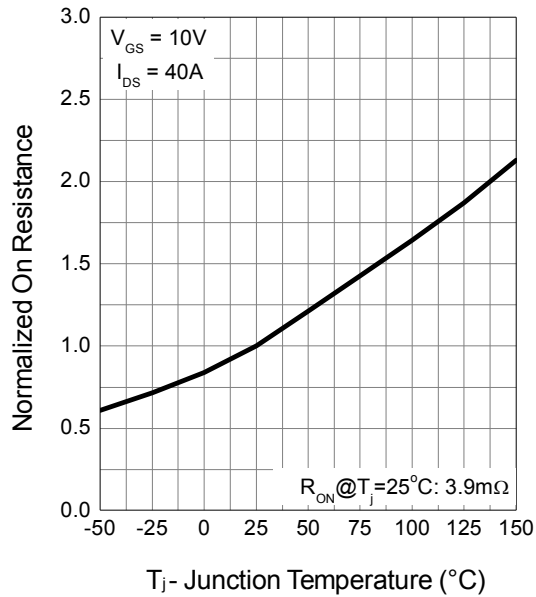
Gate Threshold Voltage



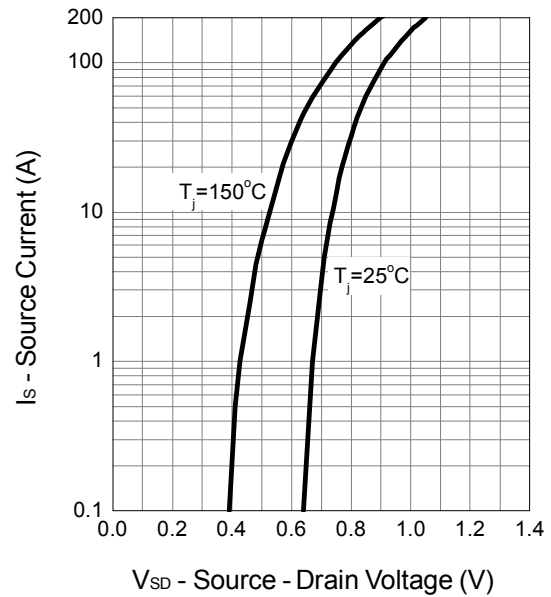
T_J - Junction Temperature ($^{\circ}C$)

Typical Operating Characteristics (Cont.)

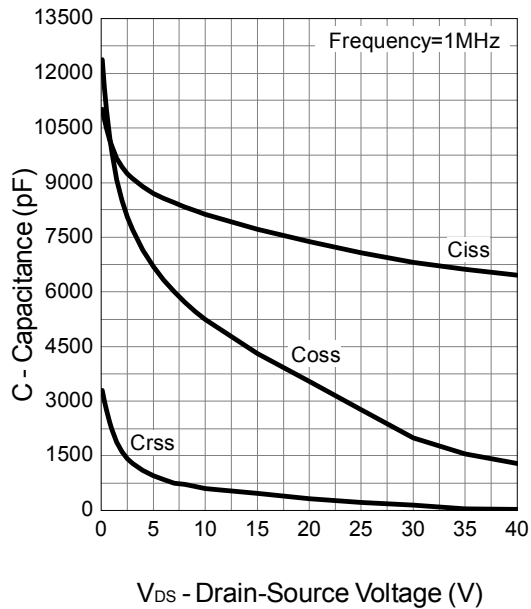
Drain-Source On Resistance



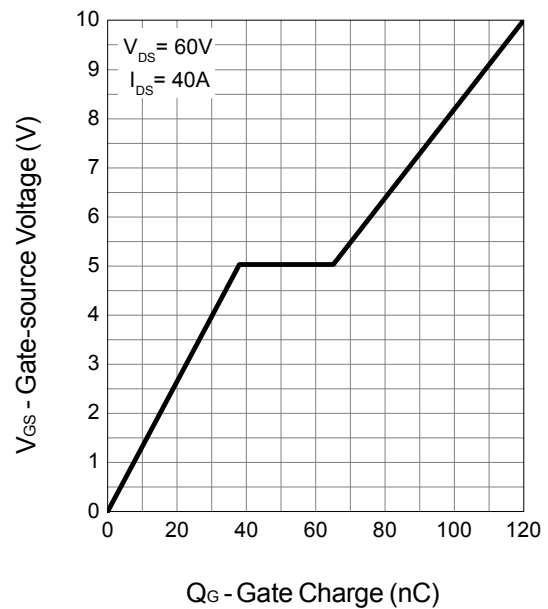
Source-Drain Diode Forward



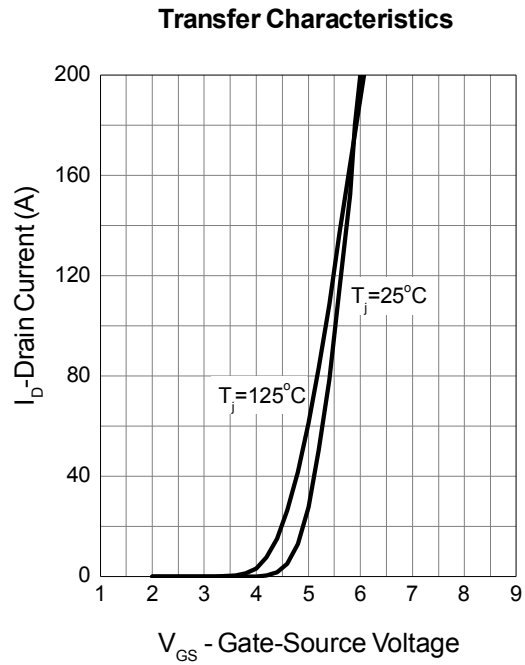
Capacitance



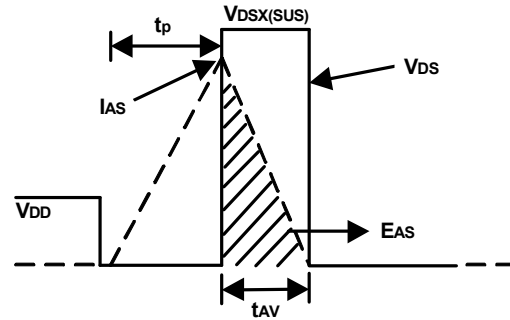
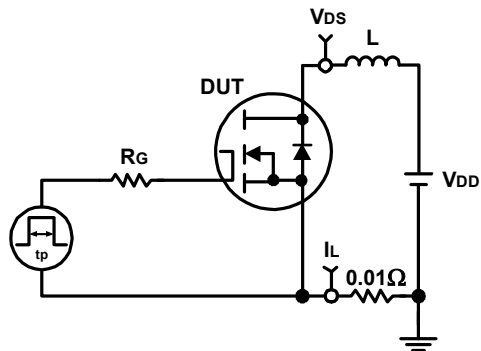
Gate Charge



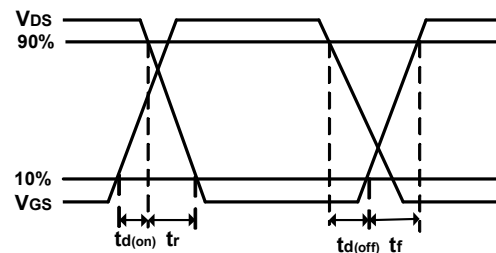
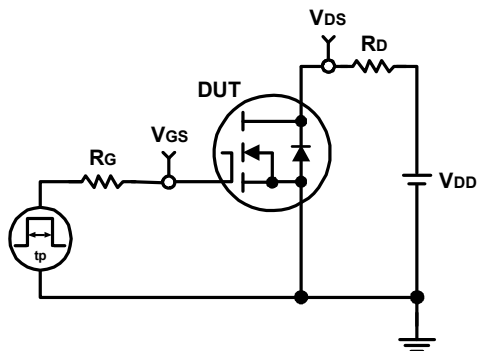
Typical Operating Characteristics (Cont.)



Avalanche Test Circuit and Waveforms



Switching Time Test Circuit and Waveforms



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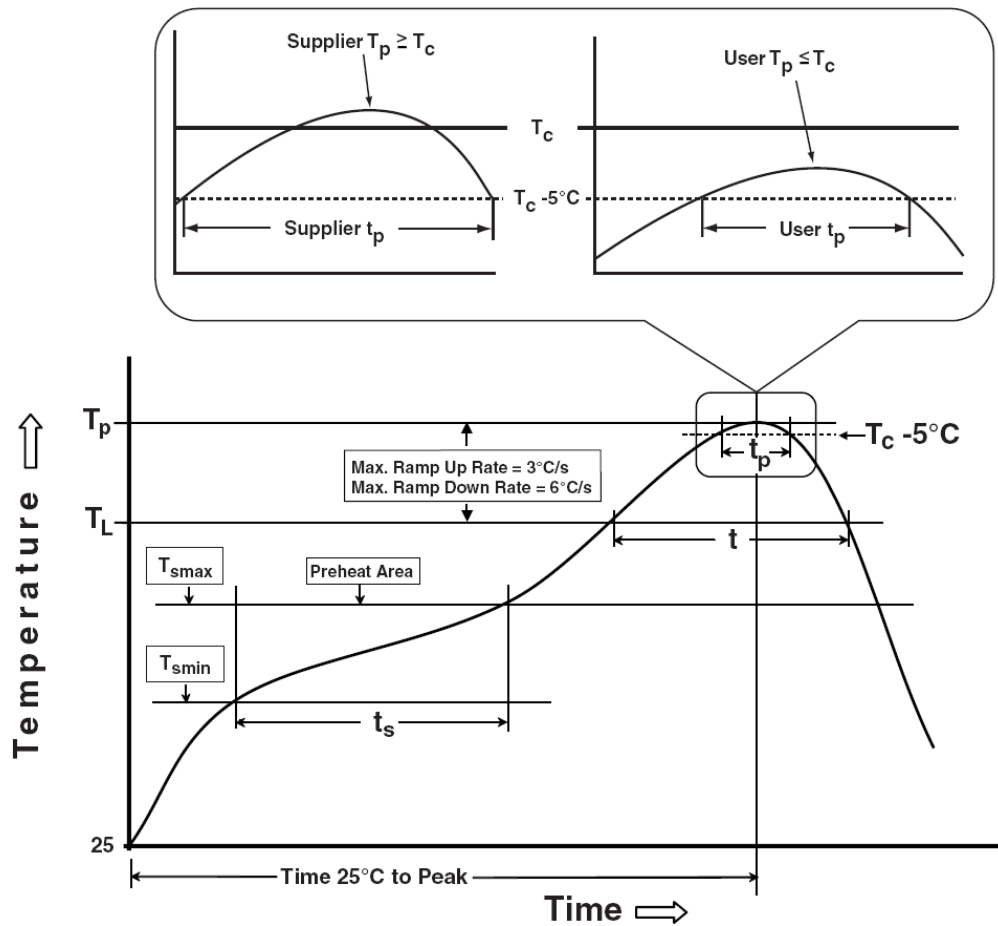
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Classification Profile



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
HTRB	JESD-22, A108	1000 Hrs, 80% of VDS max @ T_{jmax}
HTGB	JESD-22, A108	1000 Hrs, 100% of VGS max @ T_{jmax}
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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