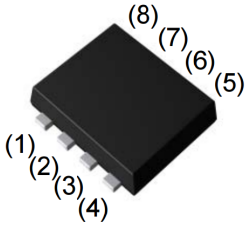
Features

- -30V/-45A,
  $R_{DS(ON)}$ = 12mΩ(max.) @ V_{GS} =-10V
  $R_{DS(ON)}$ = 17mΩ(max.) @ V_{GS} =-6V
  $R_{DS(ON)}$ = 21mΩ(max.) @ V_{GS} =-4.5V
- Reliable and Rugged
- Lead Free and Green Devices Available (RoHS Compliant)

Applications

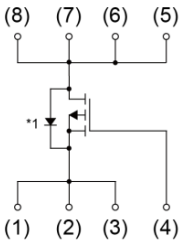
- Power Management in Notebook Computer, Portable Equipment and Battery Powered Systems.

Product Summery



DFN5X6A-8_EP

(1) Source
(2) Source
(3) Source
(4) Gate
(5) Drain
(6) Drain
(7) Drain
(8) Drain
*1 Body Diode



Absolute Maximum Ratings (T_A = 25°C Unless Otherwise Noted)

Symbol	Parameter		Rating	Unit
V_{DSS}	Drain-Source Voltage		-30	V
V_{GSS}	Gate-Source Voltage		±25	
I_D [a]	Continuous Drain Current (V_{GS}=-10V)	T_A=25°C	-15	A
		T_A=70°C	-12	
I_{DM} [a]	300μs Pulsed Drain Current (V_{GS}=-10V)		-60	
I_D [c]	Continuous Drain Current (V_{GS}=-10V)	T_C=25°C	-45	
		T_C=100°C	-26	
I_S [a]	Diode Continuous Forward Current		-4	
I_{AS} [b]	Avalanche Current, Single pulse (L=0.3mH)		-26	
E_{AS} [b]	Avalanche Energy, Single pulse (L=0.3mH)		101	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	4.2	W
		T_A=70°C	2.7	
P_D [c]	Maximum Power Dissipation	T_C=25°C	31	
		T_C=100°C	12.5	
$R_{\theta JA}$ [a]	Thermal Resistance-Junction to Ambient	t ≤ 10s	30	°C/W
		Steady State	65	
$R_{\theta JC}$ [c]	Thermal Resistance-Junction to Case	Steady State	4	

Note a : Surface Mounted on 1in^2 pad area, t ≤ 10sec.
Note b : UIS tested and pulse width limited by maximum junction temperature 150°C (initial temperature T_j=25°C).
Note c : The power dissipation P_D is based on $T_{J(MAX)}$ = 150°C, and it is useful for reducing junction-to-case thermal resistance ($R_{\theta JC}$) when additional heat sink is used.

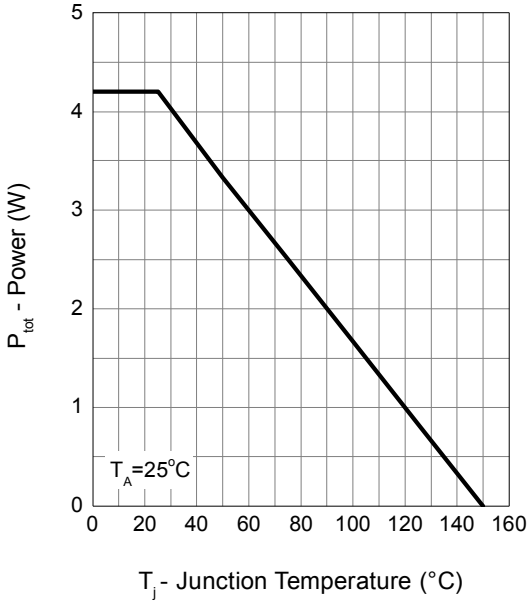
Electrical Characteristics (T_A = 25°C Unless Otherwise Noted)

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	-1.5	-2	-2.5	V
I_{GSS}	Gate Leakage Current	V_{GS}=±25V, V_{DS}=0V	-	-	±100	nA
$R_{DS(ON)}$ [d]	Drain-Source On-state Resistance	V_{GS}=-10V, I_{DS}=-15A	-	9.6	12	mΩ
		V_{GS}=-6V, I_{DS}=-10A	-	13	17	
		V_{GS}=-4.5V, I_{DS}=-5A	-	15	21	
Diode Characteristics						
V_{SD} [d]	Diode Forward Voltage	I_{SD}=-1A, V_{GS}=0V	-	-0.7	-1	V
t_{rr} [e]	Reverse Recovery Time	I_{SD}=-15A, di_{SD}/dt=100A/μs	-	22	-	ns
Q_{rr} [e]	Reverse Recovery Charge		-	15	-	nC
Dynamic Characteristics [e]						
R_g	Gate Resistance	V_{GS}=0V, V_{DS}=0V,F=1MHz	-	2	-	Ω
C_{iss}	Input Capacitance	V_{GS}=0V, V_{DS}=-15V, Frequency=1.0MHz	-	1550	-	pF
C_{oss}	Output Capacitance		-	315	-	
C_{rss}	Reverse Transfer Capacitance		-	245	-	
$t_{d(ON)}$	Turn-on Delay Time	V_{DD}=-15V, R_L=15Ω, I_{DS}=-1A, V_{GEN}=-10V, R_G=6Ω	-	13	-	ns
t_r	Turn-on Rise Time		-	15	-	
$t_{d(OFF)}$	Turn-off Delay Time		-	50	-	
t_f	Turn-off Fall Time		-	29	-	
Gate Charge Characteristics [e]						
Q_g	Total Gate Charge	V_{DS}=-15V, V_{GS}=-10V, I_{DS}=-15A	-	31	-	nC
Q_{gs}	Gate-Source Charge		-	4.3	-	
Q_{gd}	Gate-Drain Charge		-	10	-	

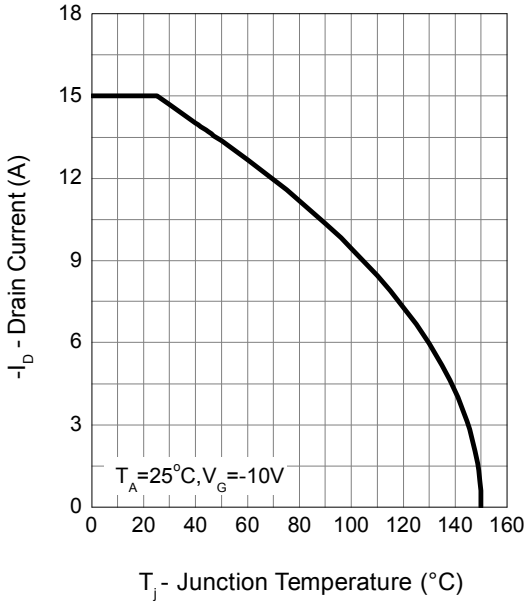
Note d : Pulse test ; pulse width≤300μs, duty cycle≤2%.
Note e : Guaranteed by design, not subject to production testing.

Typical Operating Characteristics

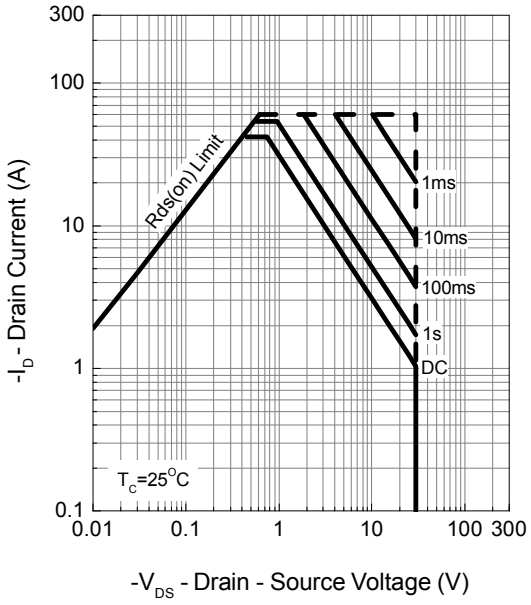
Power Dissipation



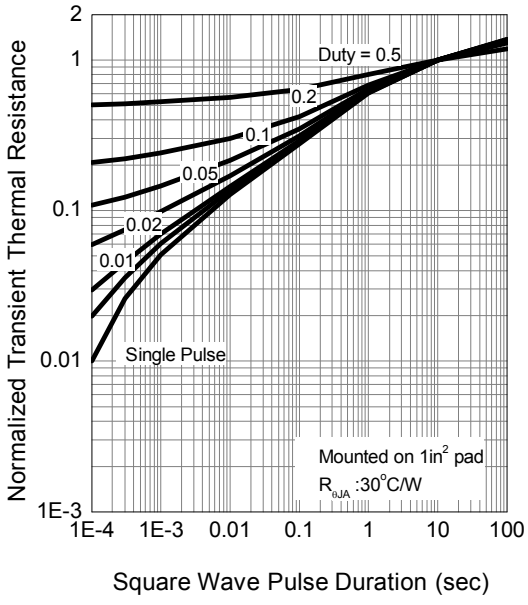
Drain Current



Safe Operation Area

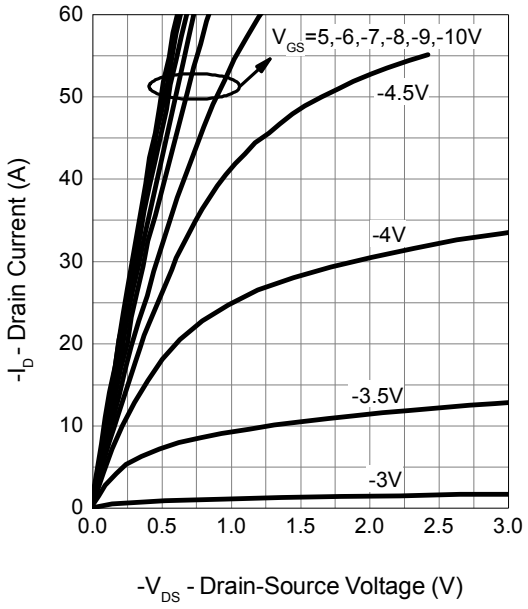


Thermal Transient Impedance

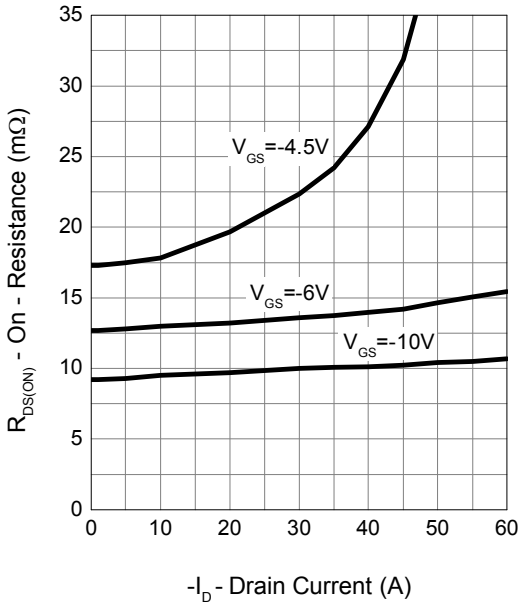


Typical Operating Characteristics (Cont.)

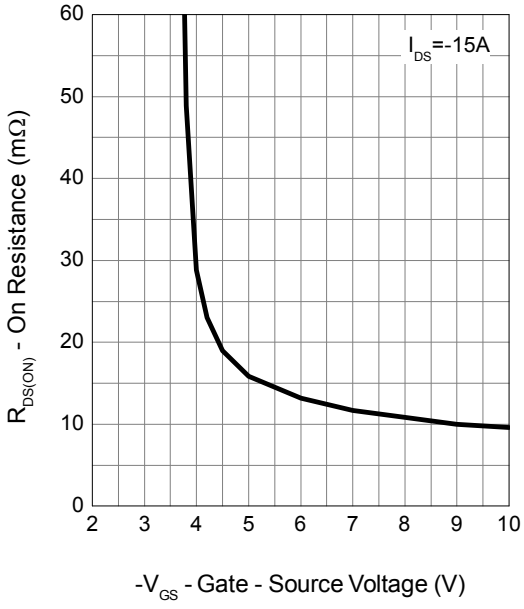
Output Characteristics



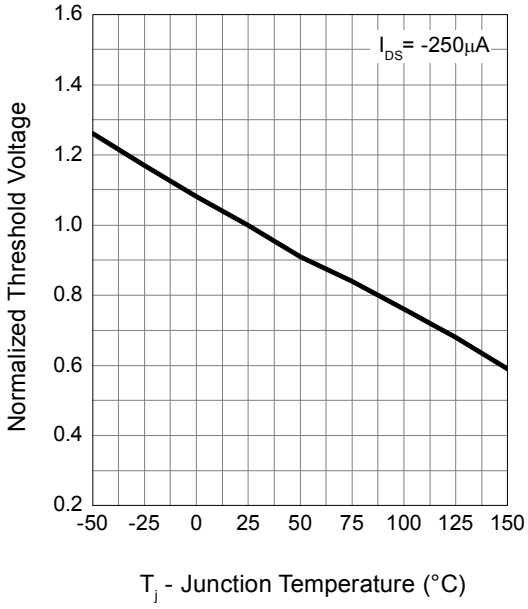
Drain-Source On Resistance



Gate-Source On Resistance

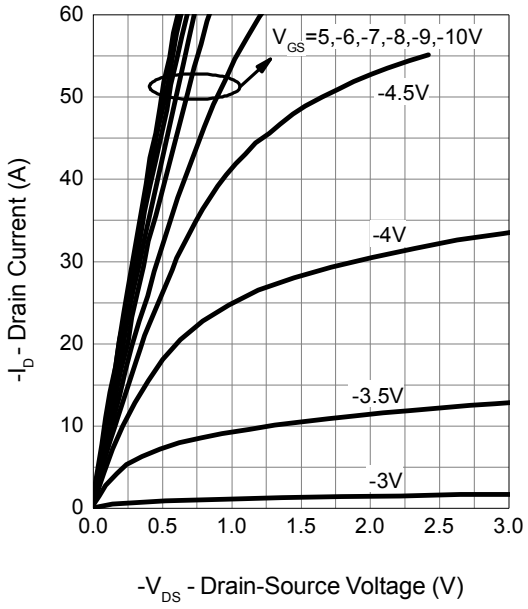


Gate Threshold Voltage

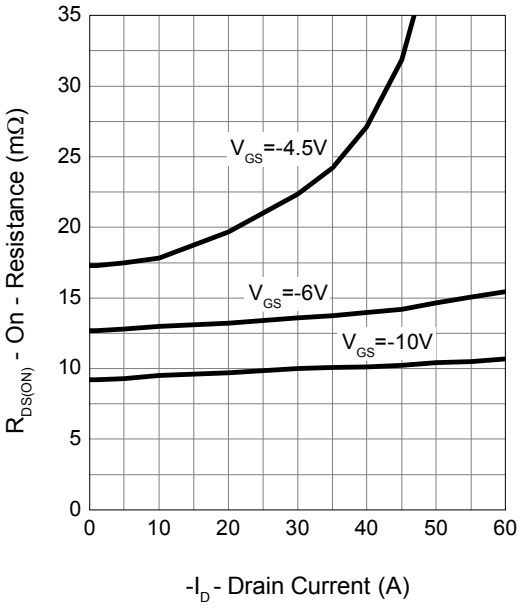


Typical Operating Characteristics (Cont.)

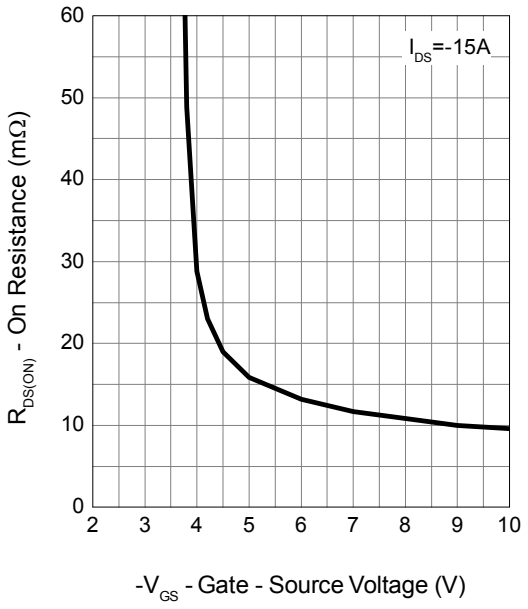
Output Characteristics



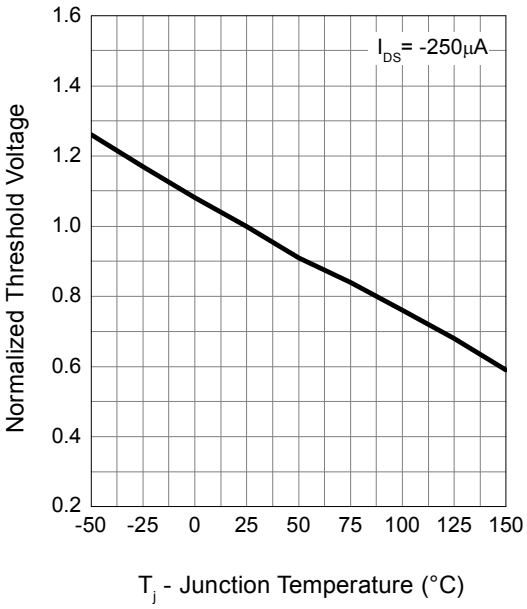
Drain-Source On Resistance



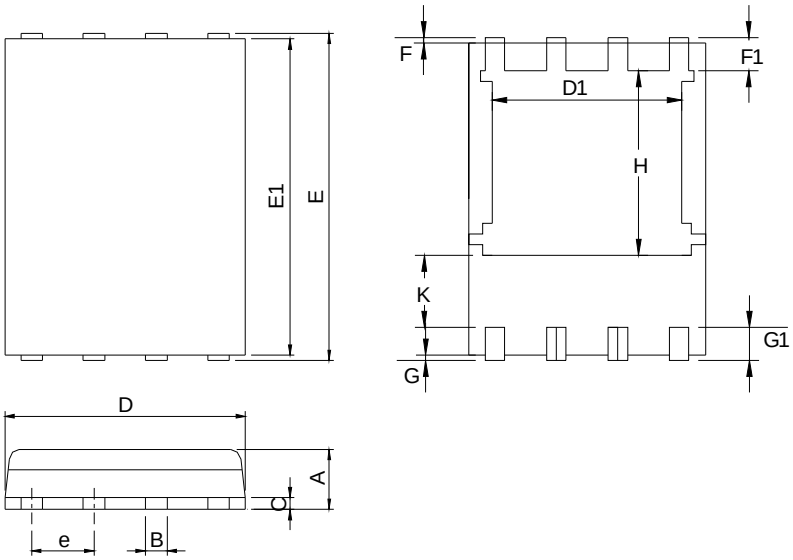
Gate-Source On Resistance



Gate Threshold Voltage



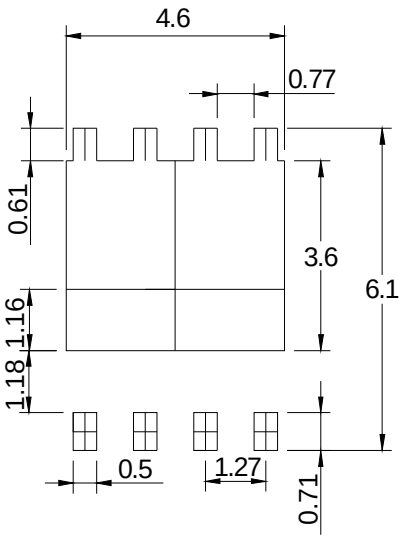
Package Information



SYMBOL	DFN5x6A-8_EP			
	MILLIMETERS		INCHES	
	MIN.	MAX.	MIN.	MAX.
A	0.90	1.20	0.035	0.047
B	0.3	0.51	0.012	0.020
C	0.19	0.25	0.007	0.010
D	4.80	5.30	0.189	0.209
D1	4.00	4.40	0.157	0.173
E	5.90	6.20	0.232	0.244
E1	5.50	5.80	0.217	0.228
e	1.27 BSC		0.050 BSC	
F	0.05	0.30	0.002	0.012
F1	0.35	0.75	0.014	0.030
G	0.05	0.30	0.002	0.012
G1	0.35	0.75	0.014	0.030
H	3.34	3.9	0.131	0.154
K	0.762	-	0.03	-

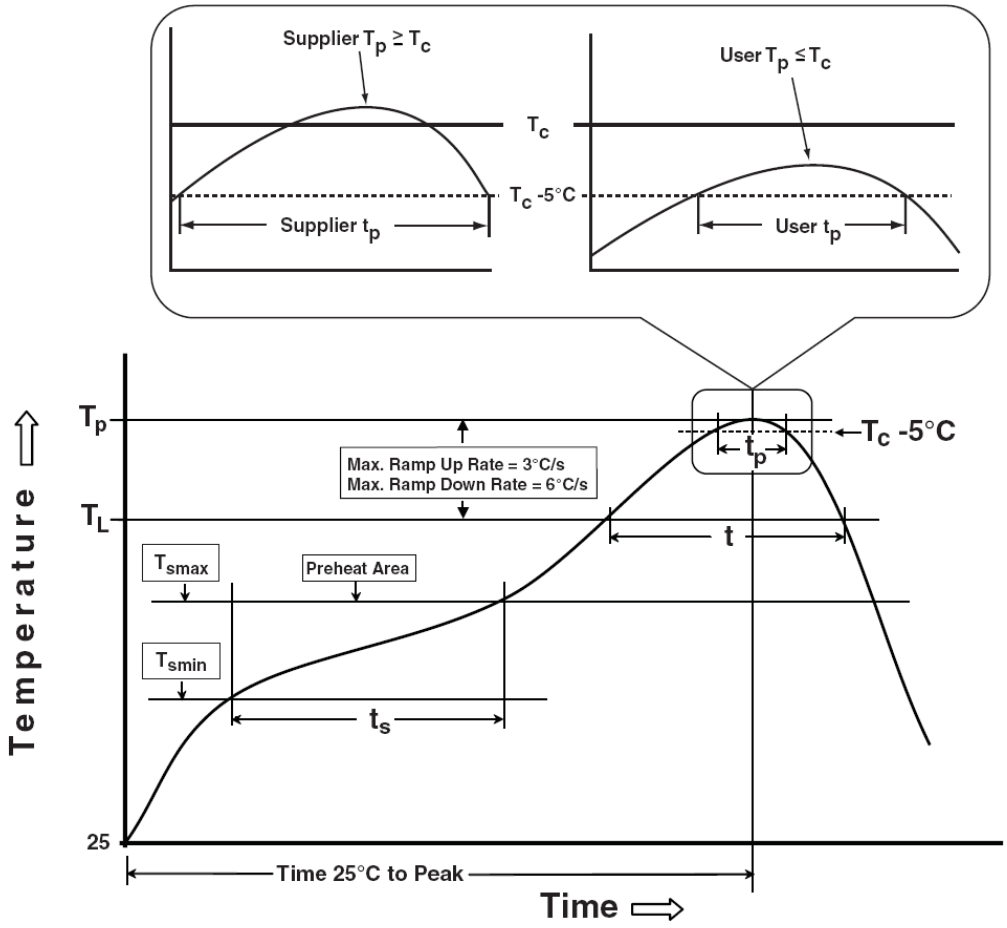
Note : 1.Dimension D, D1,D2 and E1 do not include mold flash or protrusions.
Mold flash or protrusions shall not exceed 10 mil.

RECOMMENDED LAND PATTERN



UNIT: mm

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 (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

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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