

Features

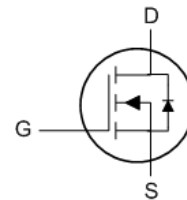
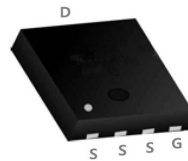
- 100% UIS + R_g Tested
- Avalanche Rated
- Reliable and Rugged
- Lead Free and Green Devices Available (RoHS Compliant)

Applications

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

Product Summary

BVDSS	RDSON	ID
25V	3.4mΩ _(max.)	70A

DFN3.3x3.3-8-EP Pin Configuration

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

Symbol	Parameter	Rating	Unit	
Common Ratings				
V _{DSS}	Drain-Source Voltage	25	V	
V _{GSS}	Gate-Source Voltage	±12		
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	70 ^a	A
I _D	Continuous Drain Current	T _C =25°C	70 ^a	
		T _C =100°C	60	
I _{DM}	Pulsed Drain Current	T _C =25°C	200 ^b	
P _D	Maximum Power Dissipation	T _C =25°C	62.5	W
		T _C =100°C	25	
R _{θJC}	Thermal Resistance-Junction to Case	Steady State	2	°C/W
I _D	Continuous Drain Current	T _A =25°C	20	A
		T _A =70°C	16	
P _D	Maximum Power Dissipation	T _A =25°C	1.78	W
		T _A =70°C	1.14	
R _{θJA}	Thermal Resistance-Junction to Ambient	t ≤ 10s	35	°C/W
		Steady State	70	
I _{AS} ^c	Avalanche Current, Single pulse	L=0.1mH	50	A
E _{AS} ^c	Avalanche Energy, Single pulse	L=0.1mH	125	mJ

Note a : Package is limited by 50A.

Note b : Pulse width is limited by maximum junction temperature.

Note c : UIS tested and pulse width is limited by maximum junction temperature 150°C (initial temperature T_J = 25°C).

Electrical Characteristics ($T_A = 25^\circ\text{C}$ Unless Otherwise Noted)

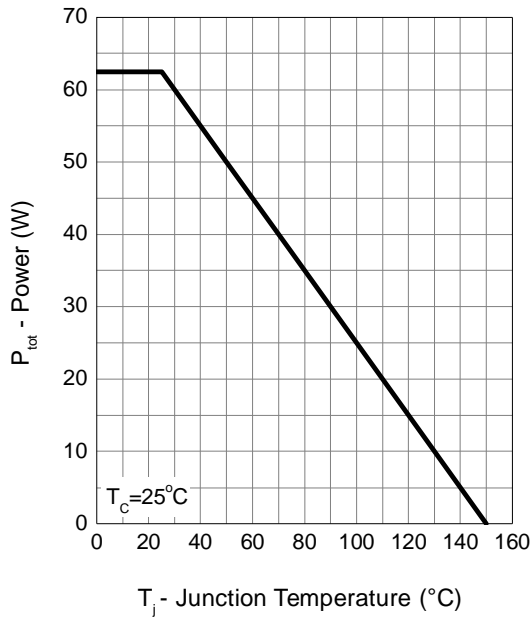
Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
Static Characteristics						
BV_{DSS}	Drain-Source Breakdown Voltage	$V_{GS}=0V, I_{DS}=250\mu A$	25	-	-	V
I_{DSS}	Zero Gate Voltage Drain Current	$V_{DS}=24V, V_{GS}=0V$ $T_J=85^\circ\text{C}$	-	-	1	μA
			-	-	30	
$V_{GS(th)}$	Gate Threshold Voltage	$V_{DS}=V_{GS}, I_{DS}=250\mu A$	0.5	0.8	1.1	V
I_{GSS}	Gate Leakage Current	$V_{GS}=\pm 12V, V_{DS}=0V$	-	-	± 10	μA
$R_{DS(ON)}^d$	Drain-Source On-state Resistance	$V_{GS}=4.5V, I_{DS}=20A$ $T_J=125^\circ\text{C}$	-	2.5	3.4	m Ω
			-	3.9	-	
		$V_{GS}=2.5V, I_{DS}=20A$	-	3.0	4.0	
Gfs	Forward Transconductance	$V_{DS}=5V, I_{DS}=20A$	-	74	-	S
Diode Characteristics						
V_{SD}^d	Diode Forward Voltage	$I_{SD}=20A, V_{GS}=0V$	-	0.7	1.1	V
t_{rr}	Reverse Recovery Time	$I_F=20A, di_{SD}/dt=100A/\mu s$	-	14.8	-	ns
t_a	Charge Time		-	7.1	-	
t_b	Discharge Time		-	7.7	-	
Q_{rr}	Reverse Recovery Charge		-	3.9	-	
Dynamic Characteristics^e						
R_G	Gate Resistance	$V_{GS}=0V, V_{DS}=0V, F=1\text{MHz}$	-	0.85	-	Ω
C_{iss}	Input Capacitance	$V_{GS}=0V,$ $V_{DS}=15V,$ Frequency=1.0MHz	-	4920	-	pF
C_{oss}	Output Capacitance		-	510	-	
C_{rss}	Reverse Transfer Capacitance		-	350	-	
$t_{d(ON)}$	Turn-on Delay Time	$V_{DD}=15V, R_L=15\Omega,$ $I_{DS}=1A, V_{GEN}=10V,$ $R_G=6\Omega$	-	16.6	31	ns
t_r	Turn-on Rise Time		-	12.2	23	
$t_{d(OFF)}$	Turn-off Delay Time		-	135	244	
t_f	Turn-off Fall Time		-	48	87	
Gate Charge Characteristics^e						
Q_g	Total Gate Charge	$V_{DS}=15V, V_{GS}=4.5V,$ $I_{DS}=20A$	-	47	66	nC
Q_g	Total Gate Charge	$V_{DS}=15V, V_{GS}=10V,$ $I_{DS}=20A$	-	96	134	
Q_{gth}	Threshold Gate Charge		-	2.75	3.8	
Q_{gs}	Gate-Source Charge		-	5.5	7.7	
Q_{gd}	Gate-Drain Charge		-	16	22	

Note d : Pulse test; pulse width $\leq 300 \mu s$, duty cycle $\leq 2\%$.

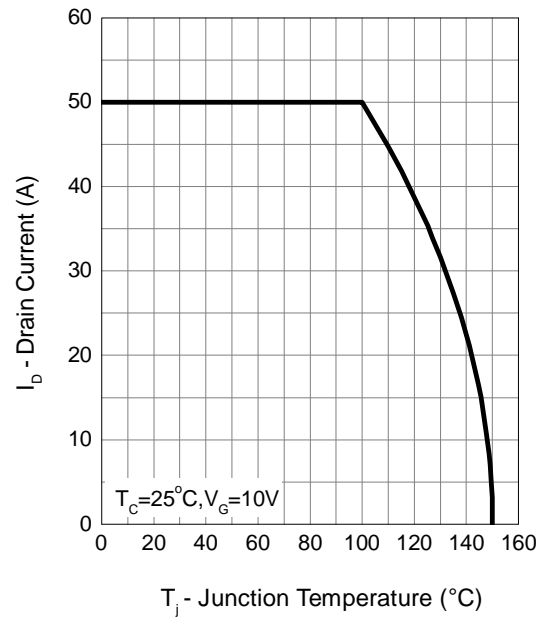
Note e : Guaranteed by design, not subject to production testing.

Typical Operating Characteristics

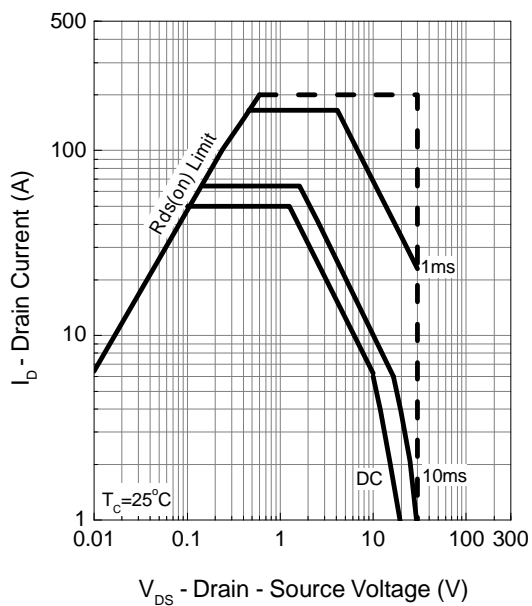
Power Dissipation



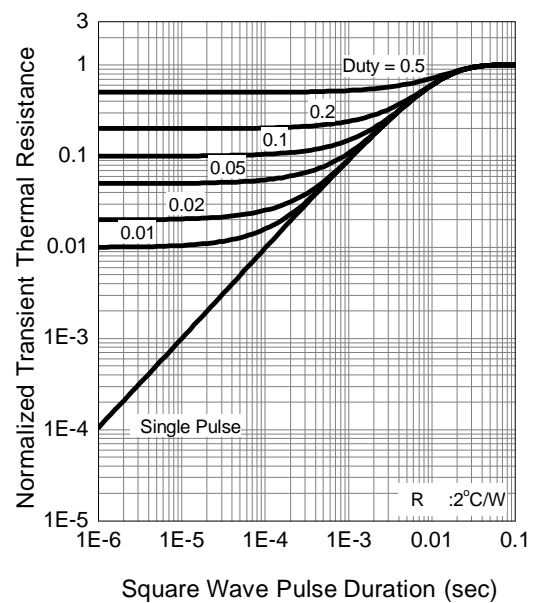
Drain Current



Safe Operation Area

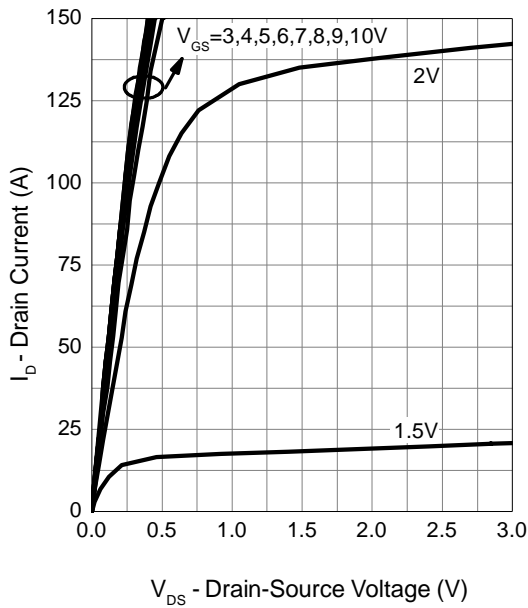


Thermal Transient Impedance

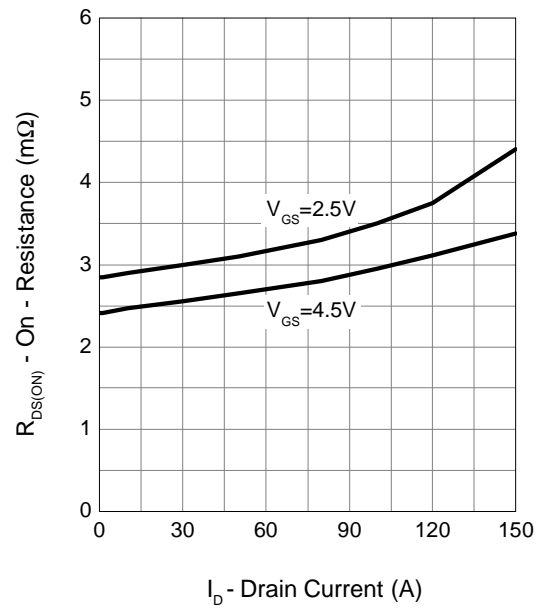


Typical Operating Characteristics (Cont.)

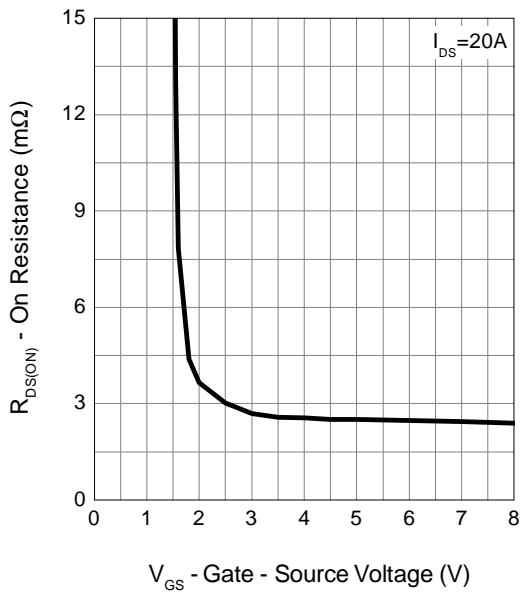
Output Characteristics



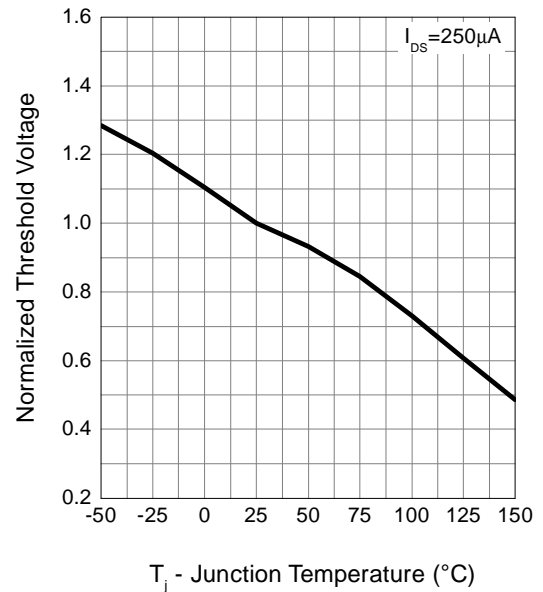
Drain-Source On Resistance



Gate-Source On Resistance

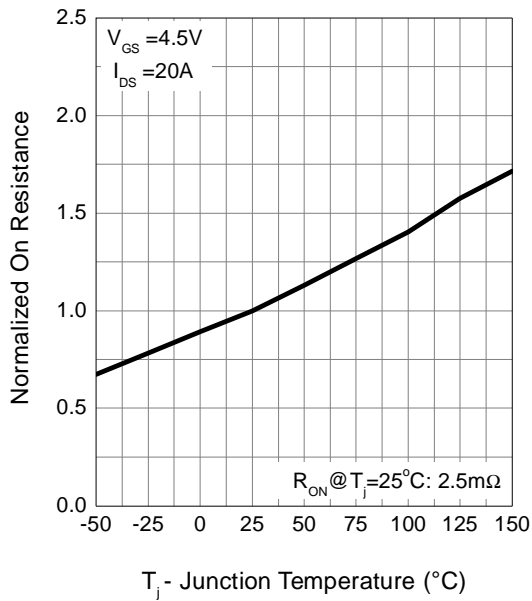


Gate Threshold Voltage

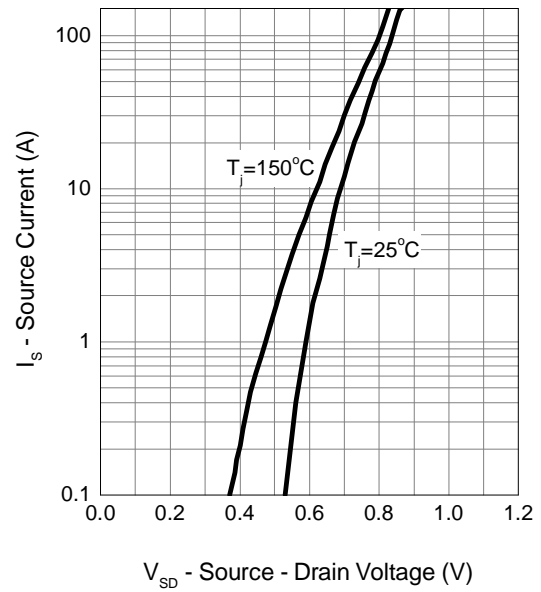


Typical Operating Characteristics (Cont.)

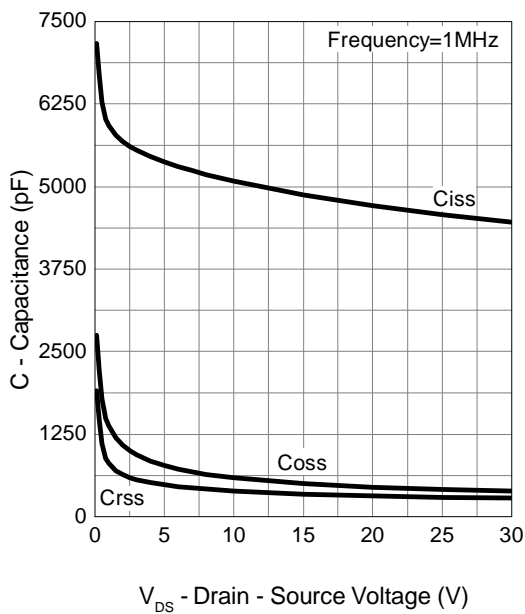
Drain-Source On Resistance



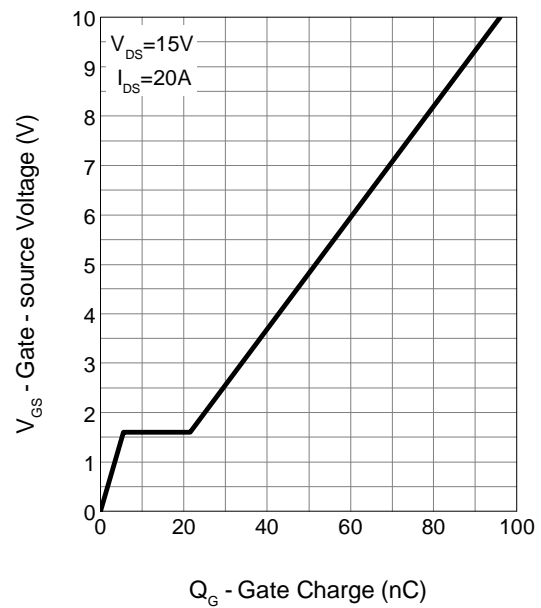
Source-Drain Diode Forward



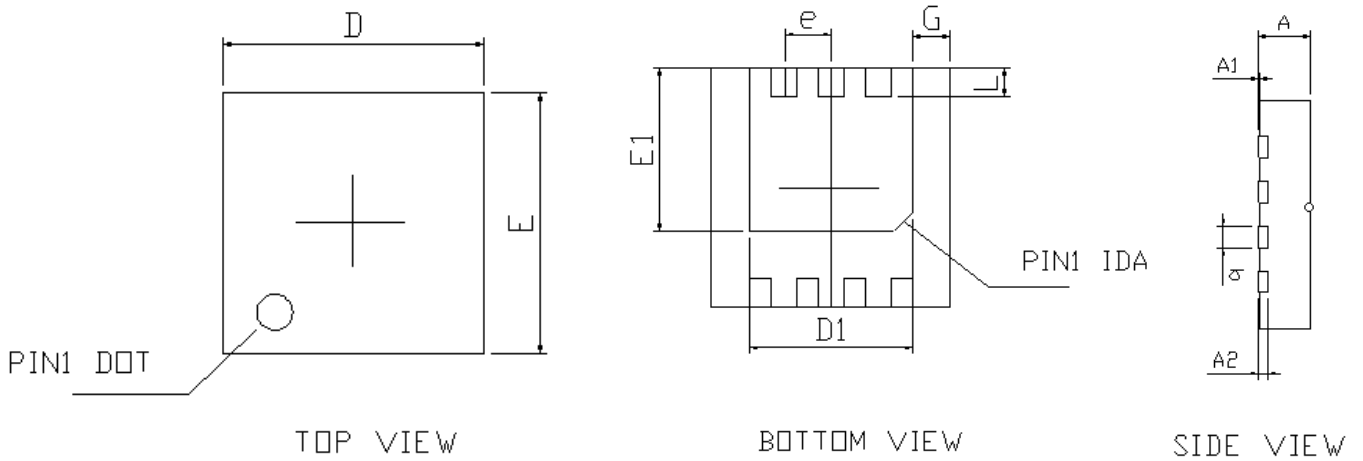
Capacitance



Gate Charge

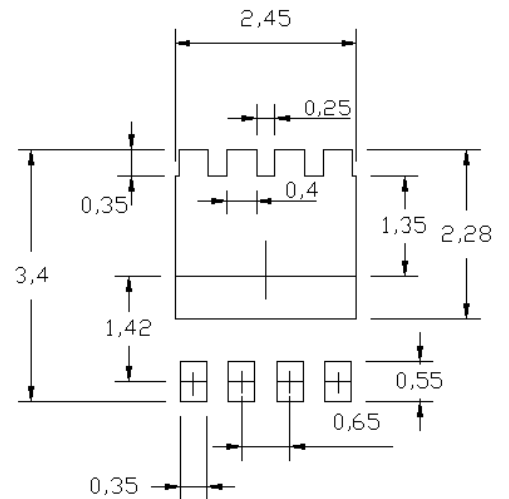


DFN3.3x3.3B-8_EP1-S

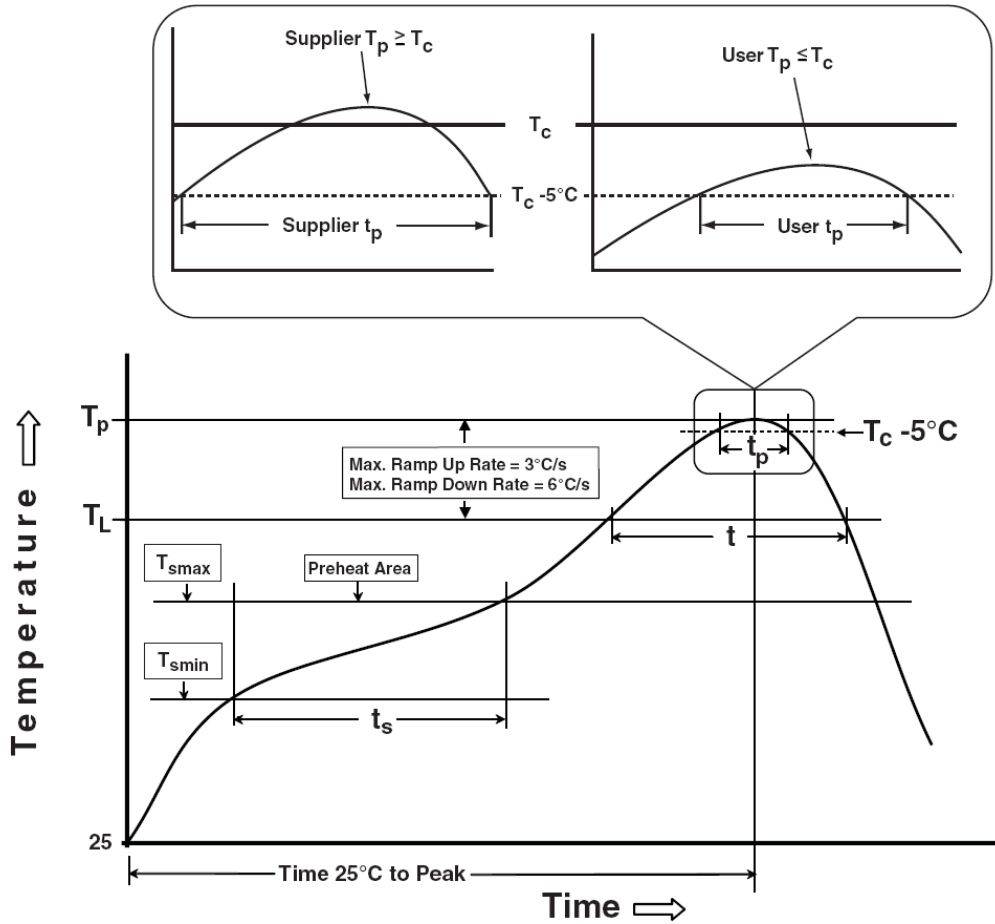


SYMBOLS	DFN3.3x3.3B-8_EP1_S			
	MILLIMETERS		INCHES	
	MIN.	MAX.	MIN.	MAX.
A	0.700	0.800	0.028	0.032
A1	0.000	0.050	0.000	0.002
A2	0.100	0.250	0.004	0.010
b	0.240	0.350	0.009	0.014
D	3.150	3.400	0.124	0.134
D1	2.100	2.350	0.083	0.093
E	3.150	3.400	0.124	0.134
E1	2.150	2.350	0.850	0.093
e	0.600	0.700	0.024	0.028
G	0.475	0.575	0.019	0.023
L	0.350	0.450	0.014	0.018

RECOMMENDED LAND PATTERN



Classification Profile



Classification Reflow Profiles

Profile Feature	Sn-Pb Eutectic Assembly	Pb-Free Assembly
Preheat & Soak		
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 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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