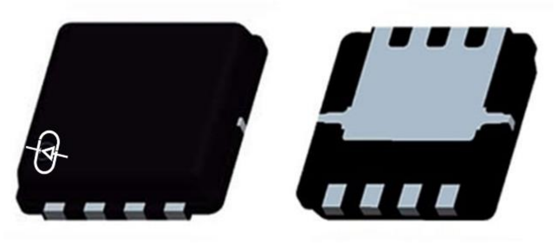
142A, 60V N-CHANNEL ENHANCEMENT MODE MOSFET

DESCRIPTION:



The ALP142N06 is an 142A, 60V N-Channel enhanced mode power MOSFET and it has fast switched speed

.

FEATURES:

- V_{DS} = 60V, I_D = 142A
- $R_{DS\,(ON)} \leq 2.6m\Omega$ @V_{GS} = 10V, I_D = 20A.
- $R_{DS\,(ON)} \leq 4.5m\Omega$ @V_{GS} = 4.5V, I_D = 10A.
- Optimized high performance of $R_{DS(ON)}$ and Q_g
- Reliable and rugged.
- Lead-free parts meet RoHS requirements
- Suffix “-H” indicated Halogen Free part, ex. ALP142N06-H

APPLICATIONS:

- DC to DC Converter.
- Load Switching.

MECHANICAL CHARACTERISTICS

- Epoxy: UL94-V0 rated flame retardant.
- Case: Molded plastic, T5060P8
- Mounting Position: Any.
- Approximate Weight: 0. 084 grams.

MAXIMUM RATINGS

MAXIMUM RATINGS @ T_A = 25 °C unless otherwise specified			
PARAMETER	**SYMBOL**	**RATINGS**	**UNIT**
Drain-Source Voltage	V_{DS}	60	V
Gate-Source Voltage	V_{GS}	±20	V
Continuous Drain Current			
T_C =25°C	I_D	142	A
T_C =100°C		100	
Pulsed Drain Current (Note 1)	I_{DM}	142	A
Avalanche current, Single pulse (L=0.1mH) (Note 2)	I_{AS}	30	A
Single pulse avalanche energy (L=0.1mH) (Note 2)	E_{AS}	45	mJ
Power Dissipation			
T_C =25°C	P_D	96	W
T_C =100°C		39	
Thermal Resistance Junction to Ambient	$R_{\theta JA}$	50	°C/W
Thermal Resistance Junction to Case	$R_{\theta JC}$	1.3	°C/W
Operating Junction Temperature	T_J	+150	°C
Storage Temperature Range	T_{STG}	-55 to +150	°C

Note:

1. Max. current is limited by bonding wire.
2. UIS tested and pulse width are limited by maximum junction temperature 150℃.

ELECTRICAL CHARACTERISTICS @ TA = 25 °C unless otherwise specified

PARAMETER	CONDITIONS	SYMBOL	MIN	TYP.	MAX	UNIT
OFF CHARACTERISTICS						
Drain-Source Breakdown Voltage	V_{GS}=0V, I_D=250 µA	BV_{DSS}	60			V
Drain-source leakage current	V_{DS}=48V, V_{GS}=0V	I_{DSS}			1.0	µA
Gate-source leakage current	V_{GS}= ±20V, V_{DS}= 0V	I_{GSS}			±100	nA
ON CHARACTERISTICS						
Gate-Threshold Voltage	V_{DS} = V_{GS}, I_D = 250µA	$V_{GS(th)}$	1.0	2.0	3.0	V
Static Drain-to-Source On-Resistance (Note 4)	V_{GS} = 10V, I_D = 20A	$R_{DS(ON)}$		2.2	2.6	mΩ
	V_{GS} = 4.5V, I_D = 10A			3.5	4.5	
Forward Trans Conductance	V_{GS} = 5V, I_D = 20A	g_{fs}		50		S

DYNAMIC CHARACTERISTICS (Note 5)

PARAMETER	CONDITIONS	SYMBOL	MIN	TYP.	MAX	UNIT
Input Capacitance	V_{DS} = 30V, V_{GS} = 0V, F_{req} = 1.0 MHz	C_{iss}		4635		pF
Output Capacitance	V_{DS} = 30V, V_{GS} = 0V, F_{req} = 1.0 MHz	C_{oss}		1714		pF
Reserve Transfer Capacitance	V_{DS} = 30V, V_{GS} = 0V, F_{req} = 1.0 MHz	C_{rss}		80		pF
Gate Resistance	V_{DS} = 0V, V_{GS} = 0V, F_{req} = 1.0 MHz	R_G		1.7		Ω

SWITCHING CHARACTERISTICS

PARAMETER	CONDITIONS	SYMBOL	MIN	TYP.	MAX	UNIT
Total Gate Charge	V_{DS} = 15V, V_{GS} = 10V, I_D = 20A	Q_g		76.2		nC
Gate to Source Charge	V_{DS} = 15V, V_{GS} = 10V, I_D = 20A	Q_{gs}		13.4		nC
Gate to Drain Charge	V_{DS} = 15V, V_{GS} = 10V, I_D = 20A	Q_{gd}		17.5		nC
Turn-On Delay Time	V_{DS} = 30V, I_D = 1A, V_{GS} = 10V, R_G = 6Ω	$t_{d(on)}$		13.8		ns
Rise time	V_{DS} = 30V, I_D = 1A, V_{GS} = 10V, R_G = 6Ω	t_r		35		ns
Turn-Off Delay Time	V_{DS} = 30V, I_D = 1A, V_{GS} = 10V, R_G = 6Ω	$t_{d(off)}$		70		ns
Fall time	V_{DS} = 30V, I_D = 1A, V_{GS} = 10V, R_G = 6Ω	t_f		45		ns

SOURCE-DRAIN DIODE RATINGS AND CHARACTERISTICS

PARAMETER	CONDITIONS	SYMBOL	MIN	TYP.	MAX	UNIT
Drain-source diode forward voltage (Note 4)	I_S = 20A, V_{GS} = 0V (Note 4)	V_{SD}		0.8	1.1	V
Body diode reverse recovery time	V_R = 30V, I_F = 20A, dI_F/dt =100A/µs	t_{rr}		27.6		ns
Body diode reverse recovery charge	V_R = 30V, I_F = 20A, dI_F/dt =100A/µs	Q_{rr}		20.8		nC

Note:

3. Surface mounted on 1in FR-4 board with 1oz. 2
4. Pulse test (pulse width ≤ 300µs, Duty cycle ≤ 2%.
5. Guaranteed by design, not subject to production testing.

TYPICAL DEVICE RATING AND CHARACTERISTICS CURVES (T_A = 25 °C unless otherwise noted)

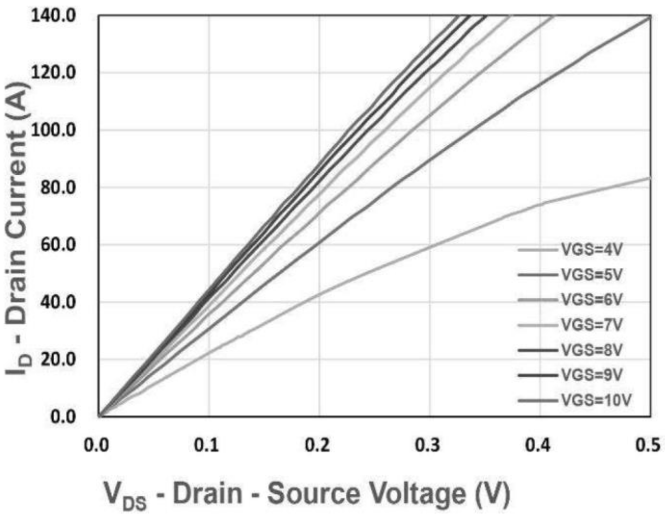


Fig.1 OUTPUT CHARACTERISTICS

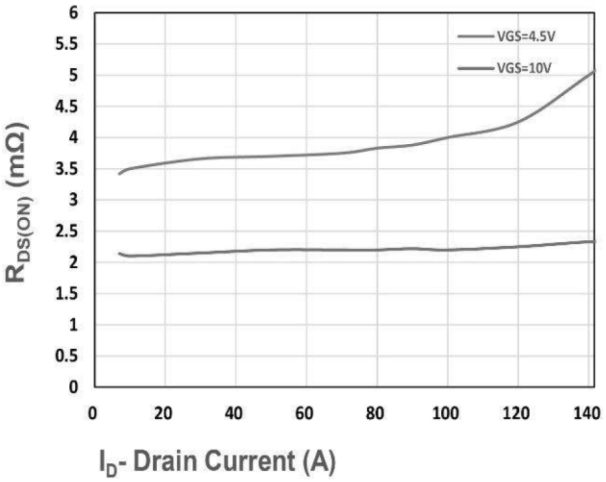


Fig.2 ON-RESISTANCE Vs. ID

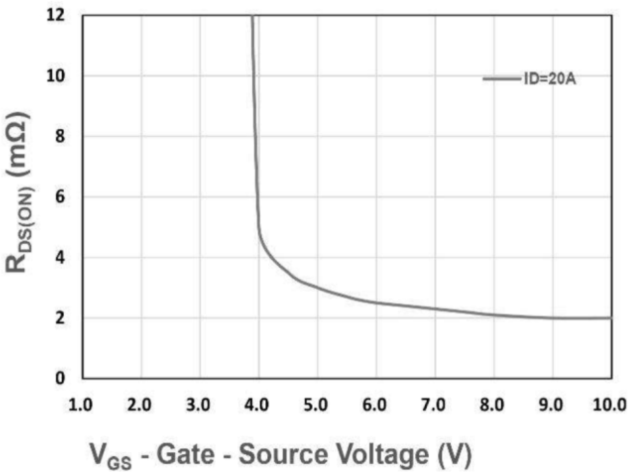


Fig.3 ON-RESISTANCE Vs. VGS

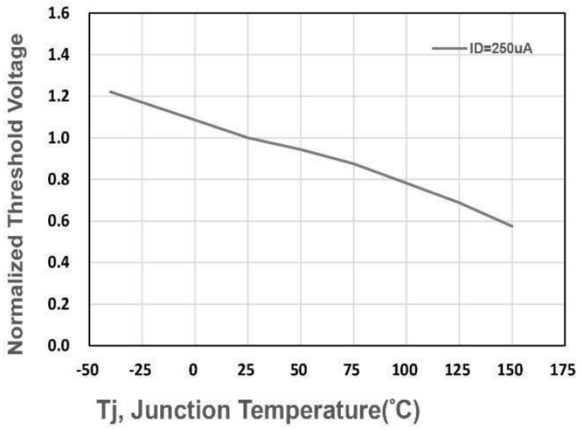


Fig.4 GATE THRESHOLD VOLTAGE

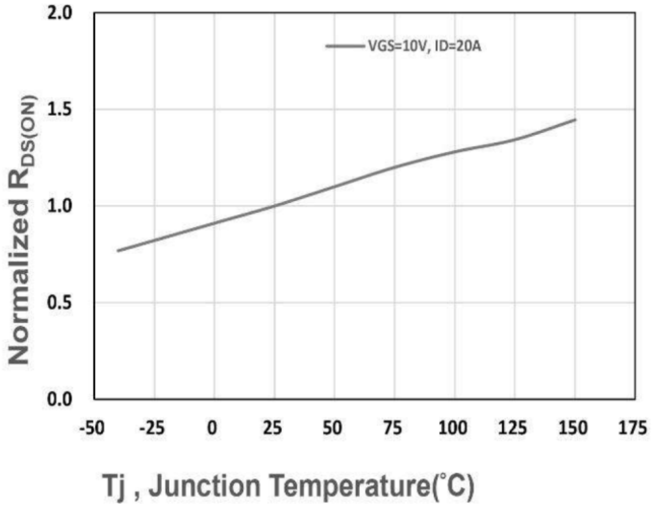


Fig.5 DRAIN-SOURCE ON RESISTANCE

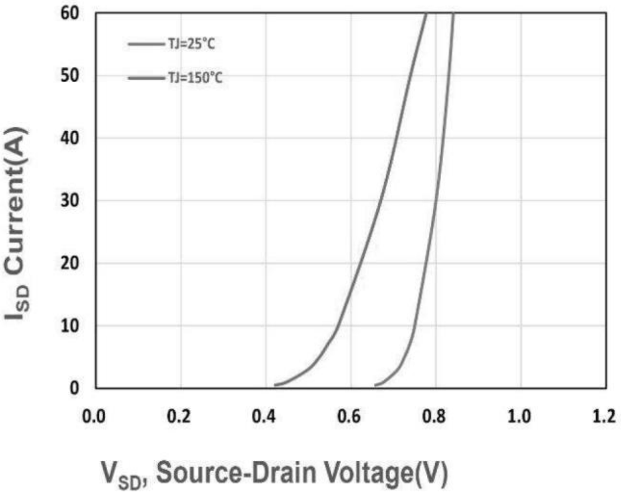


Fig.6 SOURCE-DRAIN DIODE FORWARD

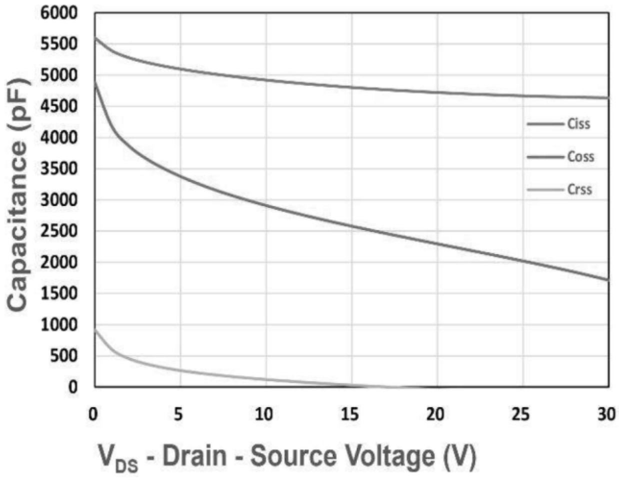


Fig.7 CAPACITANCE

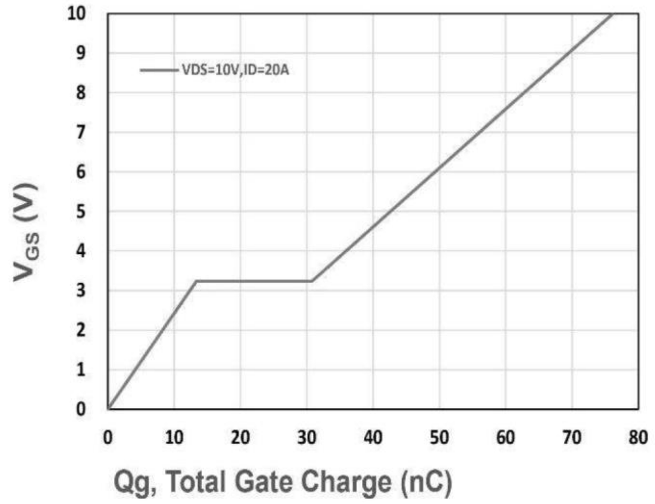


Fig.8 GATE CHARGE CHARACTERISTICS

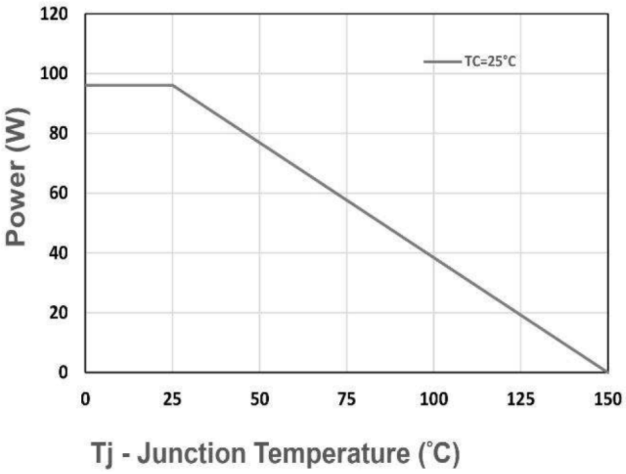


Fig.9 POWER DISSIPATION

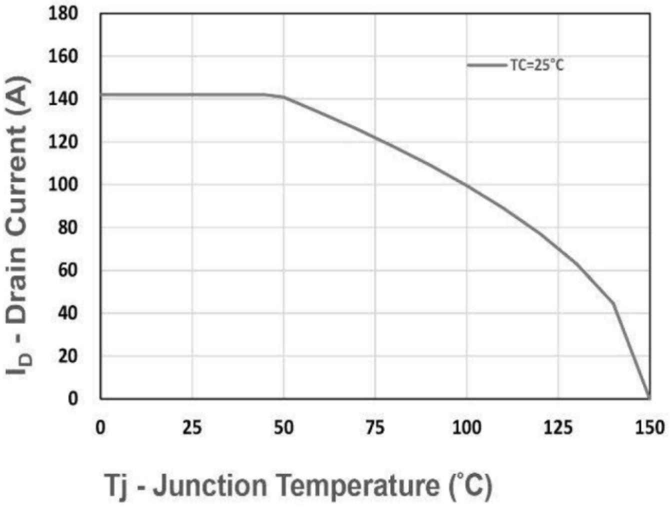


Fig.10 DRAIN CURRENT

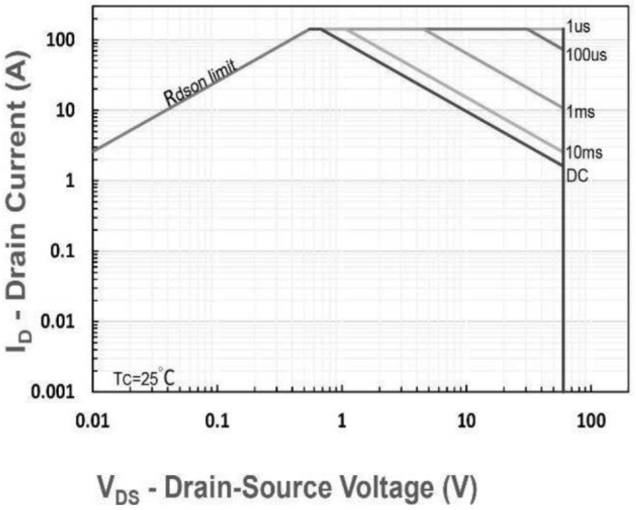


Fig.11 SAFE OPERATING AREA

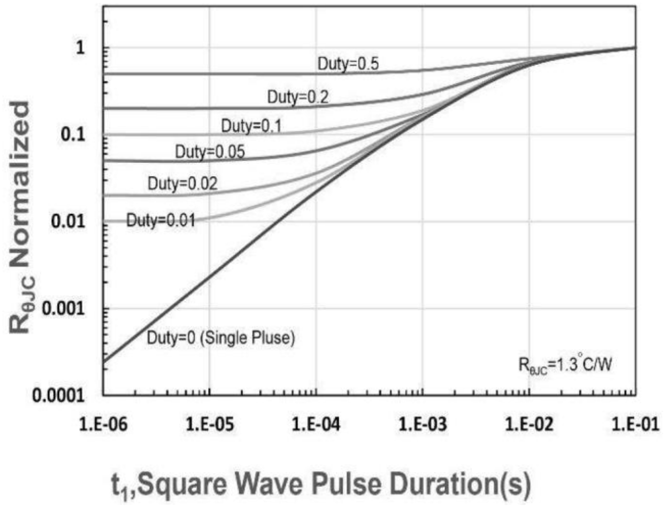
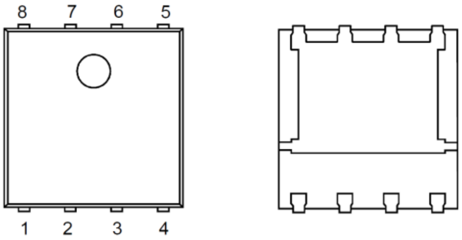
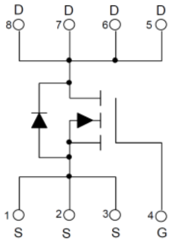


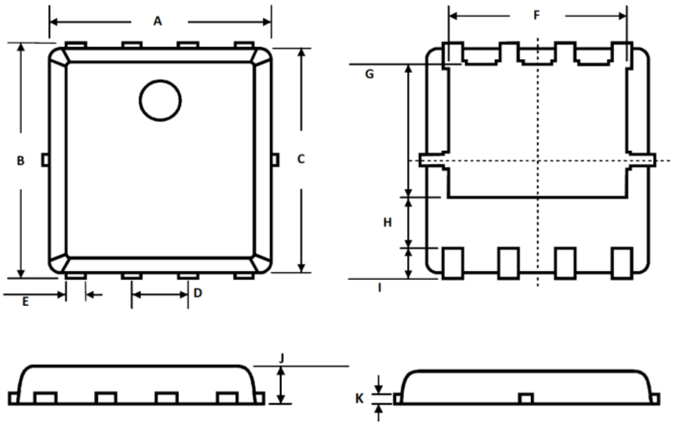
Fig.12 $R_{ΘJC}$ TRANSIENT THERMAL IMPEDANCE

PINNING INFORMATION

PIN	SIMPLIFIED OUTLINE	SYMBOL
Pin1 Source Pin2 Source Pin3 Source Pin4 Gate Pin5 Drain Pin6 Drain Pin7 Drain Pin8 Drain		

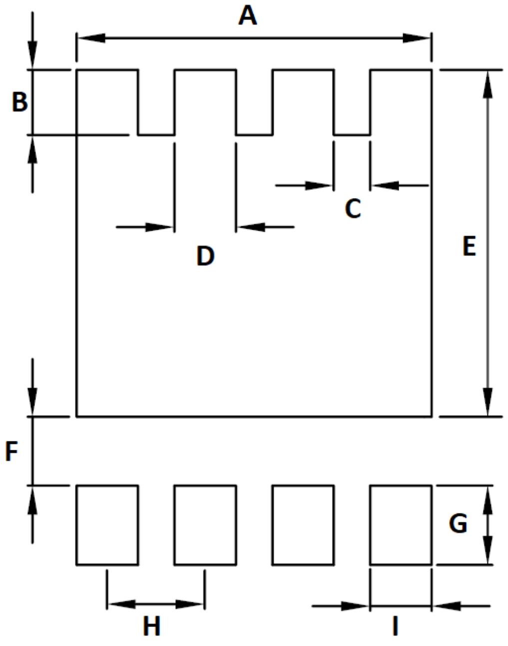
PACKAGE INFORMATION

T5060P8



OUTLINE DIMENSIONS				
SYMBOL	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	4.80	5.10	0.189	0.200
B	5.95	6.20	0.234	0.244
C	5.67	5.90	0.223	0.232
D	0.35	0.51	0.014	0.020
E	1.27 BSC		0.05 BSC	
F	3.61	4.11	0.142	0.162
G	3.38	3.78	0.133	0.149
H	1.40 REF		0.055 REF	
I	0.51	0.71	0.020	0.028
J	0.80	1.10	0.031	0.043
K	0.25 REF		0.010 REF	

SUGGESTED SOLDER PAD LAYOUT



OUTLINE DIMENSIONS	
SYMBOL	MILLIMETERS
A	4.60
B	0.85
C	0.80
D	0.47
E	4.50
F	0.90
G	1.00
H	1.27
I	0.80

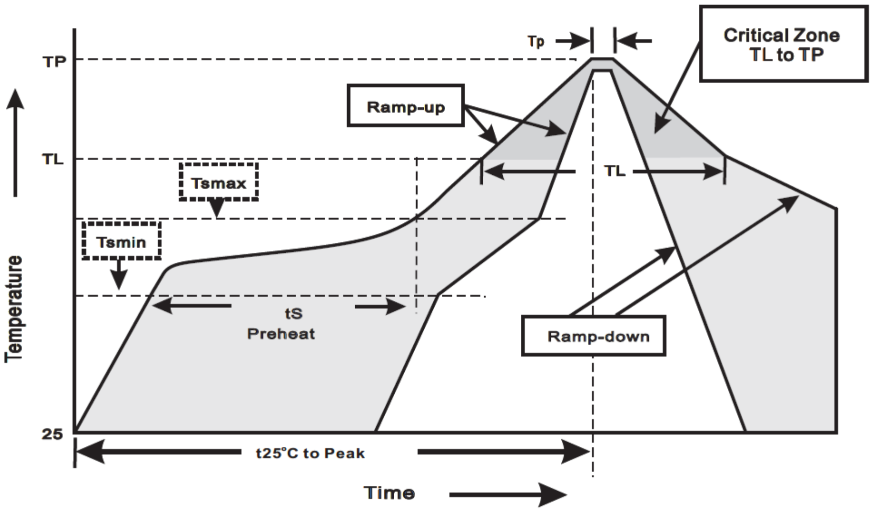
Note:

1. Controlling dimension: in millimeters.
2. General tolerance: ±0.05mm
3. The pad layout is for reference purposes only.

SOLDERING PARAMETERS

SUGGESTED THERMAL PROFILES FOR SOLDERING PROCESSES

1. Storage environment: Temperature=5 °C~40 °C Humidity=55% ±25%
2. Reflow soldering of surface-mount devices



3. Reflow soldering

PROFILE FEATURE	SOLDERING CONDITION
Average ramp-up rate (T_L to T_P)	<3 °C/sec
Preheat - Temperature Min (T_{smin}) - Temperature Max (T_{smax}) - Time (min to max) (t_s)	 150 °C 200 °C 60 ~ 120 sec
T_{smax} to T_L - Ramp-upRate	 <3 °C/sec
Time maintained above: - Temperature (T_L) - Time(tL)	 217 °C 60 ~ 260 sec
Peak Temperature (T_P)	255 °C-0/+5 °C
Time within 5 °C of actual Peak Temperature(tP)	10 ~ 30 sec
Ramp-down Rate	<6 °C/sec
Time 25 °C to Peak Temperature	<6 minutes

CUSTOMER NOTE:

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2. In Europe, please dispose as per EU Directive 2002/96/EC on Waste Electrical and Electronic Equipment (WEEE).

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