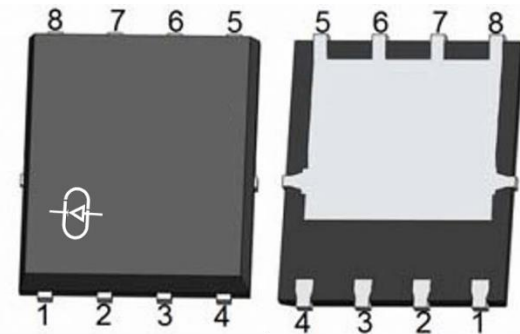


110A, 100V N-CHANNEL SUPER TRENCH POWER MOSFET

DESCRIPTION:



The ALP110N10S is an 110A, 100V N-Channel Super Trench Power MOSFET and it has fast a High density cell design for low $R_{DS(on)}$

FEATURES:

- $V_{(BR)DSS} = 100V$, $I_D = 110A$
- $R_{DS(ON)MAX} = 5.0m\Omega$ @ $V_{GS} = 10V$, $I_D = 110A$.
- $R_{DS(ON)MAX} = 6.5m\Omega$ @ $V_{GS} = 4.5V$, $I_D = 110A$.
- Split gate trench MOSFET technology
- High density cell design for low $R_{DS(on)}$.
- Excellent package for heat dissipation.
- Lead-free parts meet RoHS requirements
- Suffix "-H" indicated Halogen Free part, ex. ALP110N10S-H

APPLICATIONS:

- DC to DC Converter.
- Power switching application.
- Uninterruptible power supply.

MECHANICAL CHARACTERISTICS

- Case: Molded plastic, DFN5X6-8L
- Mounting Position: Any.

MAXIMUM RATINGS

MAXIMUM RATINGS @ $T_A = 25\text{ }^{\circ}\text{C}$ unless otherwise specified			
PARAMETER	SYMBOL	RATINGS	UNIT
Drain-Source Voltage	V_{DS}	100	V
Gate-Source Voltage	V_{GS}	± 20	V
Continuous Drain Current $T_C = 25^{\circ}\text{C}$ $T_C = 100^{\circ}\text{C}$	I_D	110 70	A
Pulsed Drain Current (Note 1)	I_{DM}	440	A
Power Dissipation $T_C = 25^{\circ}\text{C}$ (Note 2)	P_D	113	W
Thermal Resistance Junction to Ambient (Note 4)	$R_{\theta JA}$	53	$^{\circ}\text{C/W}$
Thermal Resistance Junction to Case	$R_{\theta JC}$	1.1	$^{\circ}\text{C/W}$
Single pulse avalanche energy (Note 3)	E_{AS}	400	mJ
Operating Junction Temperature	T_J	+150	$^{\circ}\text{C}$
Storage Temperature Range	T_{STG}	-55 to +150	$^{\circ}\text{C}$
Note: 1. Repetitive rating; pulse width limited by max. junction temperature. 2. P_d is based on max. junction temperature, using junction-case thermal resistance. 3. EAS condition: $T_J = 25^{\circ}\text{C}$, $V_{DD} = 50\text{V}$, $V_{GS} = 10\text{V}$, $R_G = 2.5\Omega$, $L = 2\text{mH}$, $I_{AS} = 20\text{A}$ 4. The value of $R_{\theta JA}$ is measured with the device mounted on 1in2 FR-4 board with 2oz. Copper, in a still air environment with $T_A = 25^{\circ}\text{C}$.			

ELECTRICAL CHARACTERISTICS @ TA = 25 °C unless otherwise specified

PARAMETER	CONDITIONS	SYMBOL	MIN	TYP.	MAX	UNIT
OFF CHARACTERISTICS						
Drain-Source Breakdown Voltage	$V_{GS}=0V, I_D=250\mu A$	$V_{(BR)DSS}$	100			V
Zero gate voltage drain current	$V_{DS}=100V, V_{GS}=0V$	I_{DSS}			1.0	μA
Gate-body leakage current	$V_{GS}= \pm 20V, V_{DS}= 0V$	I_{GSS}			± 100	nA
ON CHARACTERISTICS						
Gate-Threshold Voltage	$V_{DS} = V_{GS}, I_D = 250\mu A$	$V_{GS(th)}$	1.0	1.7	2.5	V
Drain-to-Source On-Resistance	$V_{GS} = 10V, I_D = 20A$	$R_{DS(ON)}$		3.8	5.0	m Ω
	$V_{GS} = 4.5V, I_D = 20A$			4.8	6.5	

DYNAMIC CHARACTERISTICS (Note 2)

PARAMETER	CONDITIONS	SYMBOL	MIN	TYP.	MAX	UNIT
Input Capacitance	$V_{DS} = 50V, V_{GS} = 0V, F_{req} = 1.0\text{ MHz}$	C_{iss}		4300		pF
Output Capacitance	$V_{DS} = 50V, V_{GS} = 0V, F_{req} = 1.0\text{ MHz}$	C_{oss}		1800		pF
Reverse Transfer Capacitance	$V_{DS} = 50V, V_{GS} = 0V, F_{req} = 1.0\text{ MHz}$	C_{rss}		30		pF

SWITCHING CHARACTERISTICS

PARAMETER	CONDITIONS	SYMBOL	MIN	TYP.	MAX	UNIT
Total Gate Charge	$V_{DS} = 50V, V_{GS} = 10V, I_D = 55A$	Q_g		50		nC
Gate to Source Charge	$V_{DS} = 50V, V_{GS} = 10V, I_D = 55A$	Q_{gs}		4.5		nC
Gate to Drain Charge	$V_{DS} = 50V, V_{GS} = 10V, I_D = 55A$	Q_{gd}		7		nC
Turn-On Delay Time	$V_{DS} = 50V, V_{GS} = 10V, I_D = 55A, R_G=2.2\Omega$	$t_{d(on)}$		22		nS
Turn-On Rise time	$V_{DS} = 50V, V_{GS} = 10V, I_D = 55A, R_G=2.2\Omega$	t_r		110		nS
Turn-Off Delay Time	$V_{DS} = 50V, V_{GS} = 10V, I_D = 55A, R_G=2.2\Omega$	$t_{d(off)}$		38		nS
Turn-Off Fall time	$V_{DS} = 50V, V_{GS} = 10V, I_D = 55A, R_G=2.2\Omega$	t_f		8		nS

SOURCE-DRAIN DIODE RATINGS AND CHARACTERISTICS

PARAMETER	CONDITIONS	SYMBOL	MIN	TYP.	MAX	UNIT
Diode forward Current		I_S			110	A
Diode forward Voltage	$I_S = 55A, V_{GS} = 0V$	V_{DS}			1.2	V
Reverse recovery time	$T_J = 25^\circ C, I_F = 55A, dI_F/dt = 100A/\mu s$	t_{rr}		48		nS
Reverse recovery charge	$T_J = 25^\circ C, I_F = 55A, dI_F/dt = 100A/\mu s$	Q_{rr}		150		nC

TYPICAL DEVICE RATING AND CHARACTERISTICS CURVES ($T_A = 25^\circ\text{C}$ unless otherwise noted)

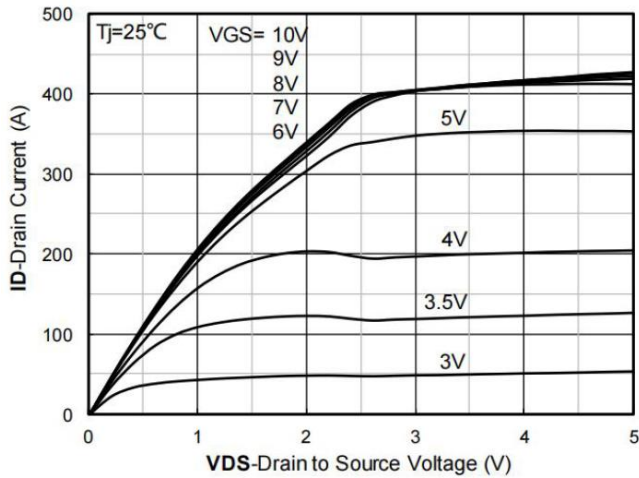


Fig.1 OUTPUT CHARACTERISTICS

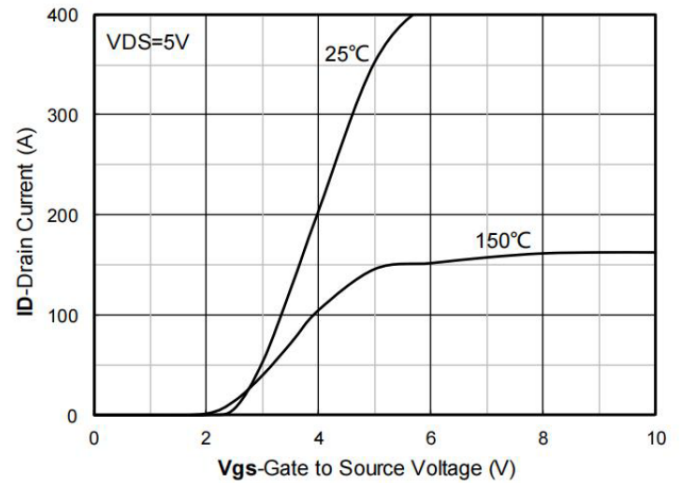


Fig.2 TRANSFER CHARACTERISTICS

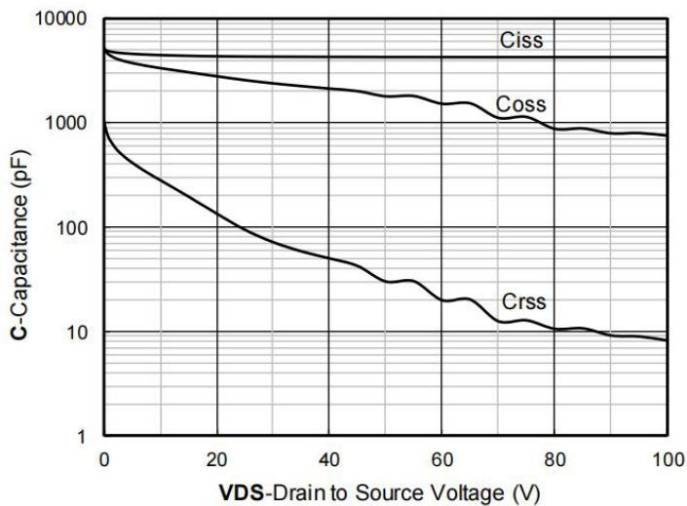


Fig.3 CAPACITANCE CHARACTERISTICS

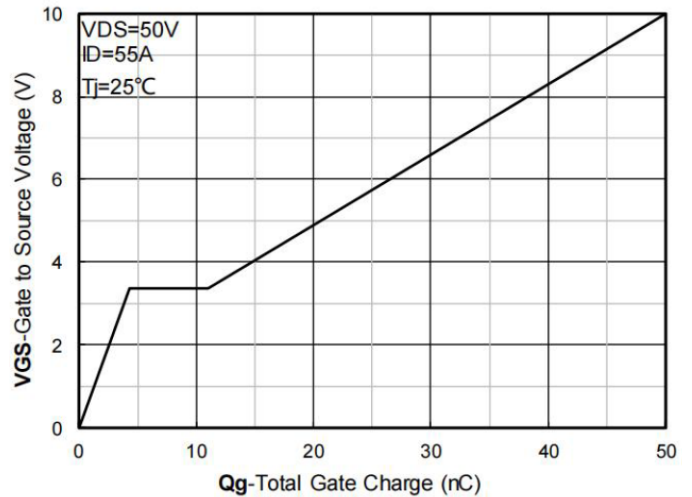


Fig.4 GATE CHARGE

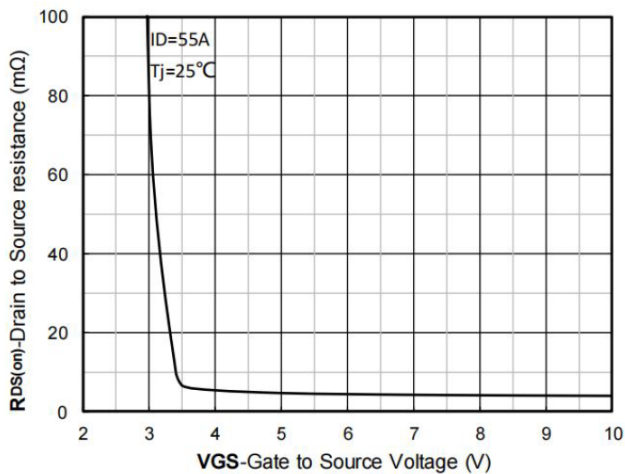


Fig.5 ON-RESISTANCE Vs. GATE TO SOURCE VOLTAGE

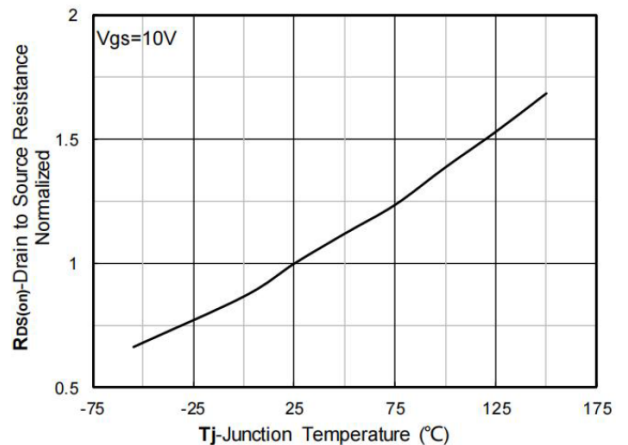


Fig.6 NORMALIZED ON-RESISTANCE

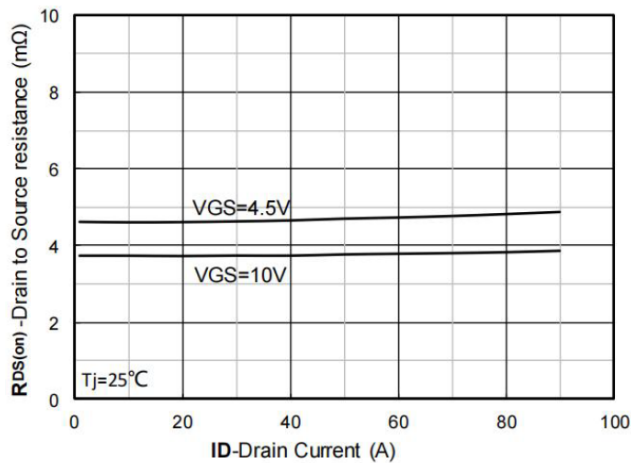


Fig.7 $R_{DS(ON)}$ Vs. DRAIN CURRENT

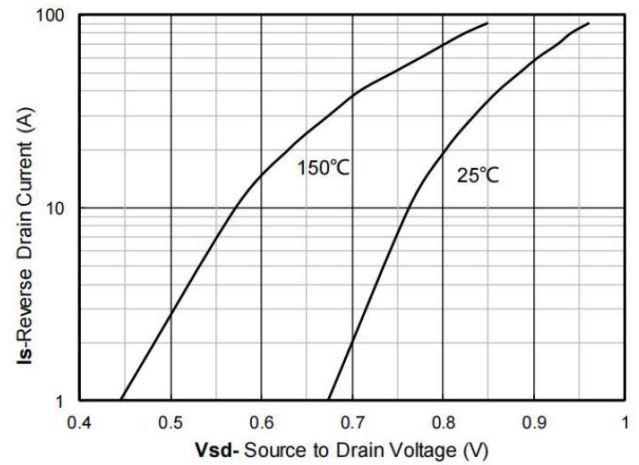


Fig.8 FORWARD CHARACTERISTICS OF REVERSE DIODE

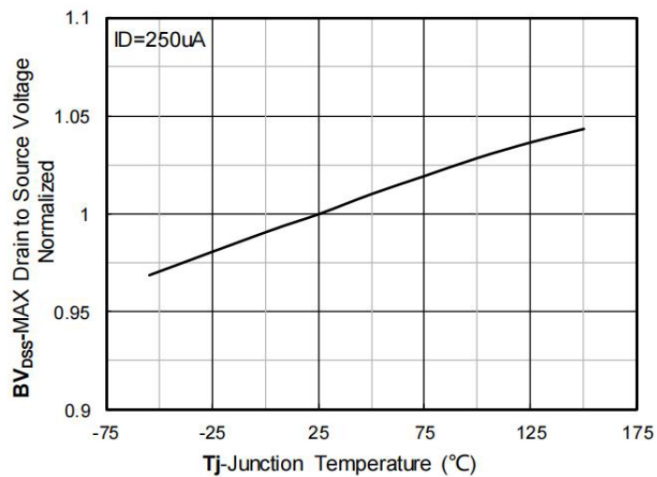


Fig.9 NORMALIZED BREAKDOWN VOLTAGE

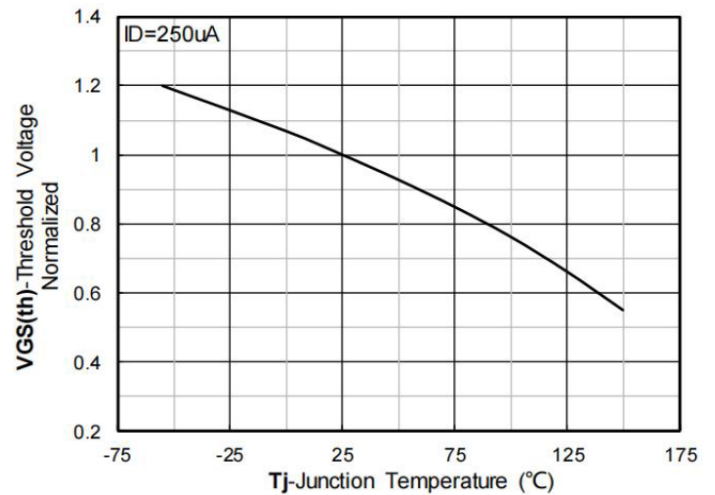


Fig.10 NORMALIZED THRESHOLD VOLTAGE

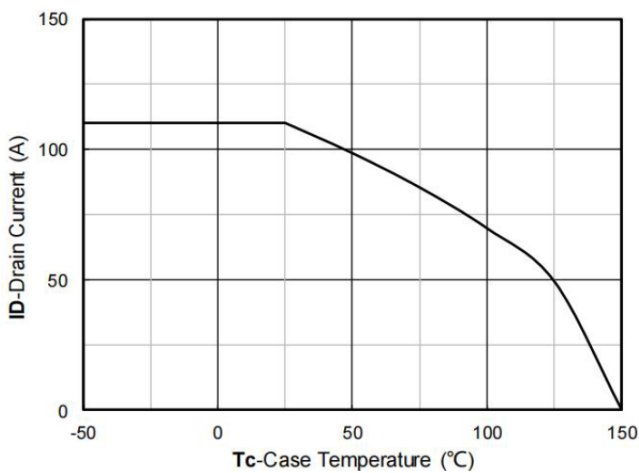


Fig.11 CURRENT DISSIPATION

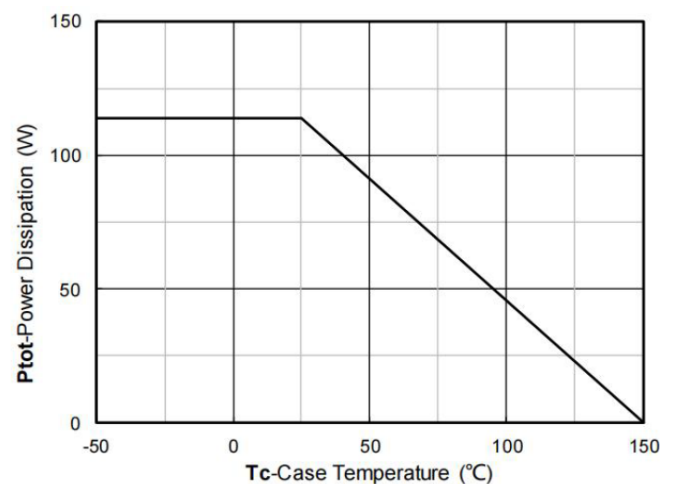


Fig.12 POWER DISSIPATION

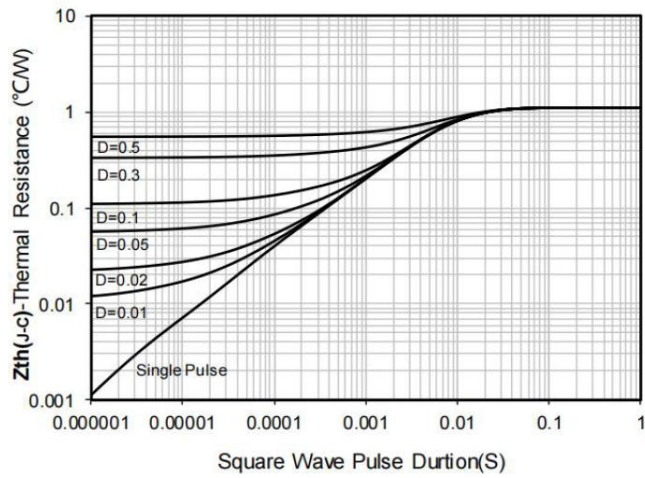


Fig.13 MAXIMUM TRANSIENT THERMAL IMPEDANCE

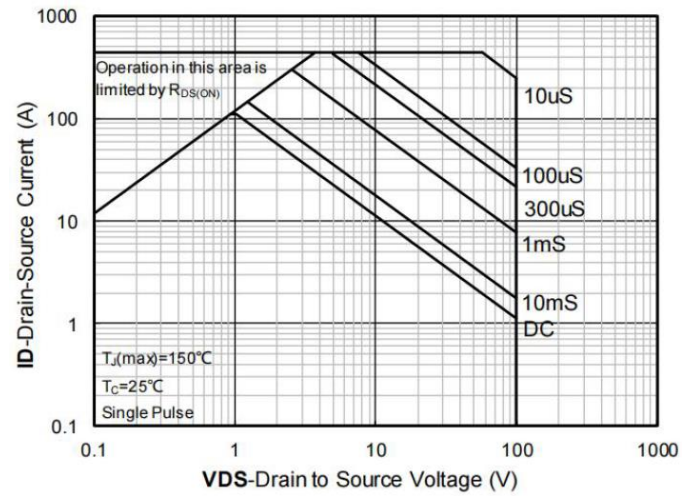
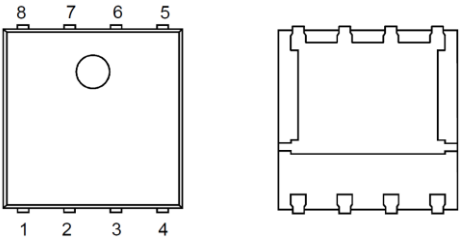
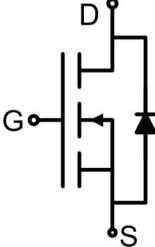


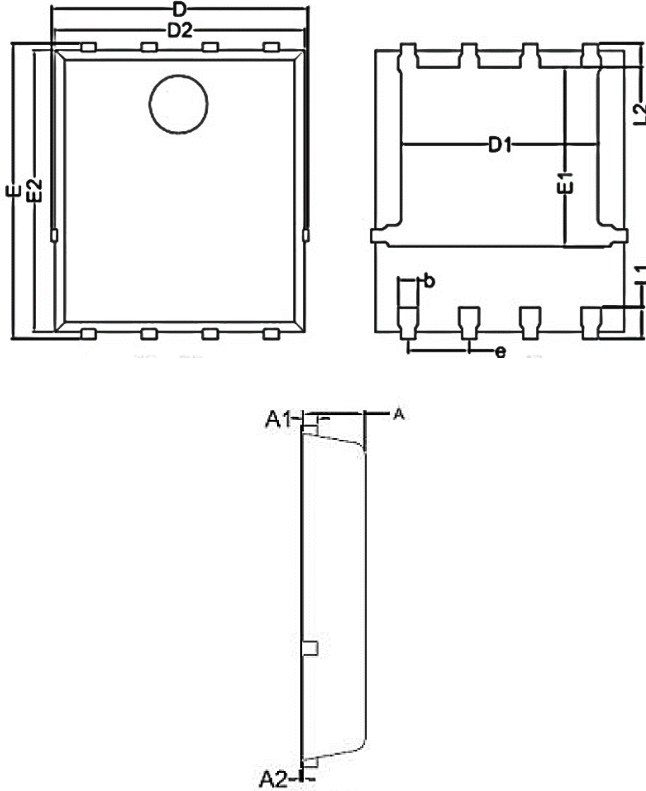
Fig.14 SAFE OPERATION AREA

PINNING INFORMATION

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

PACKAGE INFORMATION

DFN5X6-8L

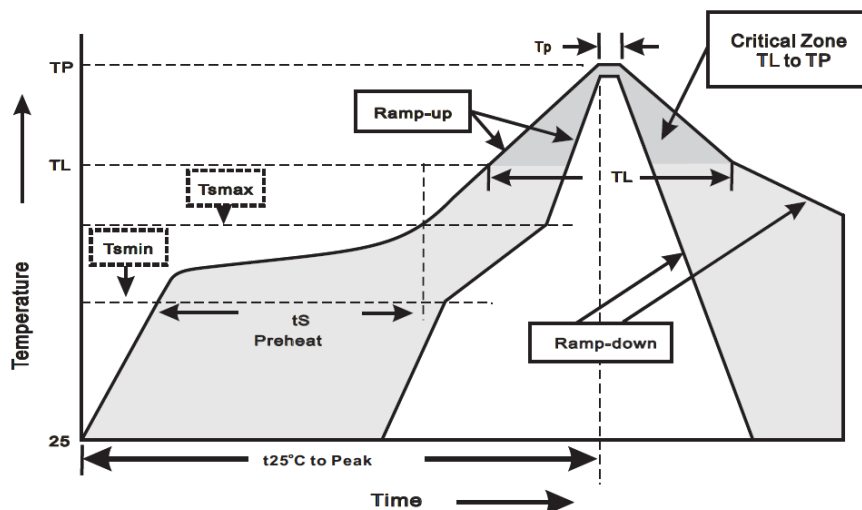


OUTLINE DIMENSIONS				
SYMBOL	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	1.000	1.200	0.039	0.047
A1	0.254BSC.		0.010BSC.	
A2	0.000	0.100	0.000	0.004
b	0.310	0.510	0.012	0.020
D	5.150	5.550	0.202	0.219
D1	3.920	4.320	0.154	0.170
D2	5.000	5.400	0.197	0.212
E	5.950	6.350	0.234	0.250
E1	3.520	3.920	0.139	0.154
E2	5.660	6.060	0.223	0.239
e	1270BSC.		0.050BSC.	
L1	0.560	0.760	0.022	0.030
L2	0.500BSC.		0.020BSC.	

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)	$<3\text{ °C/sec}$
Preheat	
- Temperature Min (T_{smmin})	150 °C
- Temperature Max (T_{smmax})	200 °C
- Time (min to max) (t_S)	60 ~ 120 sec
T_{smmax} to T_L	
- Ramp-upRate	$<3\text{ °C/sec}$
Time maintained above:	
- Temperature (T_L)	217 °C
- Time(t_L)	60 ~ 260 sec
Peak Temperature (T_P)	255 °C-0/+5 °C
Time within 5 °C of actual Peak Temperature(t_P)	10 ~ 30 sec
Ramp-down Rate	$<6\text{ °C/sec}$
Time 25 °C to Peak Temperature	$<6\text{ minutes}$



beyond boundaries...

ALP110N10S

DFN5X6-8L

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



sales@alpinesemi.com
www.alpinesemi.com