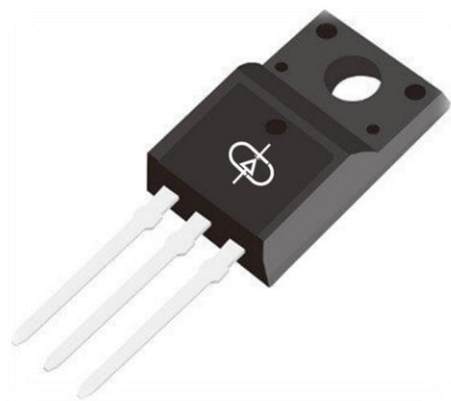


5A, 900V N-CHANNEL SUPER-JUNCTION MOSFET

DESCRIPTION:



The ALP05N90 is an 5A, 900V N-Channel Super Junction MOSFET and it has fast switched speed.

FEATURES:

- $V_{DS}=900V$, $I_D = 5A$
- $R_{DS(ON)} \leq 3.3m\Omega$ @ $V_{GS}=10V$, $I_D=2.5A$.
- Low reverse transfer capacitance.
- Fast switching capability.
- Improved dv/dt capability, high ruggedness.
- RoHS compliant & halogen-free.
- Suffix "-H" indicated Halogen Free part, ex. ALP05N90-H

APPLICATIONS:

- Switching Power Supply.
- Inverter motor applications.
- High power inverter system.

MECHANICAL CHARACTERISTICS

- Epoxy: UL94-V0 rated flame retardant.
- Case: Molded plastic, ITO-220AB.
- Terminals: Solder plated, solderable per MIL-STD-750, Method 2026
- 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}	900	V
Gate-Source Voltage	V_{GS}	± 30	V
Continuous Drain Current	I_D	5	A
Pulsed Drain Current (Note 2)	I_{DM}	10	A
Single pulse avalanche energy (Note 3)	E_{AS}	240	mJ
Peak diode recovery dv/dt (Note 4)	dv/dt	3.1	V/ns
Power Dissipation ($T_C = 25\text{ }^{\circ}\text{C}$)	P_D	36	W
Thermal Resistance Junction to Ambient	$R_{\theta JA}$	62.5	$^{\circ}\text{C/W}$
Thermal Resistance Junction to Case	$R_{\theta JC}$	3.66	$^{\circ}\text{C/W}$
Operating Junction Temperature	T_J	+150	$^{\circ}\text{C}$
Storage Temperature Range	T_{STG}	-55 to +150	$^{\circ}\text{C}$
Note: 1. Absolute maximum ratings are those values beyond which the device could be permanently damaged. Absolute maximum ratings are stress ratings only and functional device operation is not implied. 2. Repetitive rating: pulse width limited by maximum junction temperature. 3. $L = 30\text{mH}$, $I_{AS} = 4.0\text{A}$, $V_{DD} = 50\text{V}$, $R_G = 25\Omega$ Starting $T_J = 25\text{ }^{\circ}\text{C}$. 4. $I_{SD} \leq 5.0\text{A}$, $di/dt \leq 200\text{A}/\mu\text{s}$, $V_{DD} \leq BV_{DSS}$, Starting $T_J = 25\text{ }^{\circ}\text{C}$. 5. Device mounted on FR-4 substrate PC board, 2oz copper, with 1inch square copper plate.			

ELECTRICAL CHARACTERISTICS @ TA = 25 °C unless otherwise specified

PARAMETER	CONDITIONS	SYMBOL	MIN	TYP.	MAX	UNIT
OFF CHARACTERISTICS						
Drain-Source Breakdown Voltage	$I_D = 250 \mu A$, $V_{GS} = 0V$	BV_{DSS}	900			V
Drain-source leakage current	$V_{DS} = 900V$, $V_{GS} = 0V$	I_{DSS}			1.0	μA
Gate-source leakage current	$V_{GS} = \pm 30V$, $V_{DS} = 0V$	I_{GSS}			± 100	nA
ON CHARACTERISTICS						
Gate-Threshold Voltage	$V_{DS} = V_{GS}$, $I_D = 250 \mu A$	$V_{GS(TH)}$	3.0		5.0	V
Static Drain-to-Source On-Resistance (Note 4)	$V_{GS} = 10V$, $I_D = 2.5A$	$R_{DS(ON)}$			3.3	Ω

SWITCHING PARAMETERS

PARAMETER	CONDITIONS	SYMBOL	MIN	TYP.	MAX	UNIT
Input Capacitance	$V_{DS} = 25V$, $V_{GS} = 0V$, $F_{req} = 1.0 \text{ MHz}$	C_{iss}		780		pF
Output Capacitance		C_{oss}		75		
Reverse Transfer Capacitance		C_{rss}		2		
Total Gate Charge (Note 1)	$V_{DS} = 720V$, $V_{GS} = 10V$, $I_D = 5A$, $I_G = 1mA$ (Note 1, 2)	Q_g		14		nC
Gate to Source Charge		Q_{gs}		5		
Gate to Drain Charge		Q_{gd}		1.2		
Turn-On Delay Time (Note 1)	$V_{DS} = 100V$, $I_D = 5A$, $V_{GS} = 10V$, $R_G = 25\Omega$ (Note 1, 2)	$t_{d(on)}$		10		nS
Rise time		t_r		18		
Turn-Off Delay Time		$t_{d(off)}$		35		
Fall time		t_f		26		

SOURCE-DRAIN DIODE RATINGS AND CHARACTERISTICS

PARAMETER	CONDITIONS	SYMBOL	MIN	TYP.	MAX	UNIT
Continuous source current	Integral PN - diode in MOSFET	I_S			5	A
Pulsed source current		I_{SM}			10	
Drain-source diode forward voltage (Note 1)	$I_{SD} = 5A$, $V_{GS} = 0V$	V_{SD}			1.4	V
Reverse recovery time (Note 1)	$V_{GS} = 0V$, $I_S = 5A$, $di/dt = 100A/\mu s$	t_{rr}		450		ns
Reverse recovery charge		Q_{rr}		8.5		μC

Note:

1. Pulse test (pulse width $\leq 300\mu s$, Duty cycle $\leq 2\%$).
2. Essentially independent of operating temperature.

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

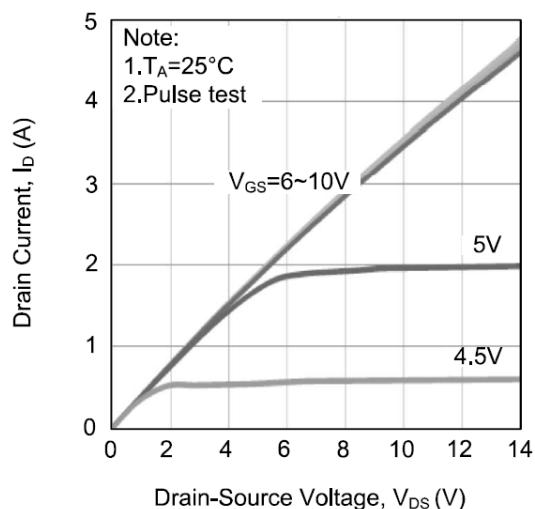


Fig.1 Drain Current Vs. Drain-Source Voltage

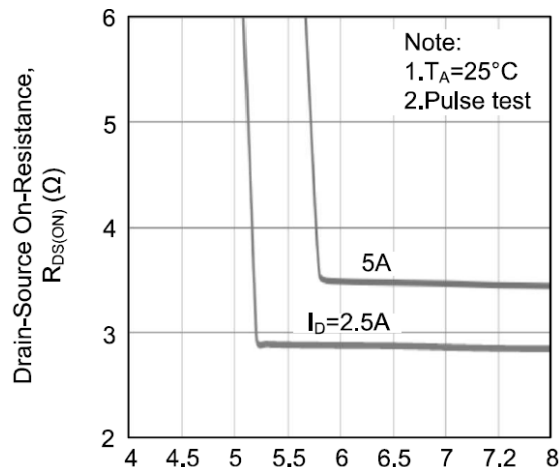


Fig.2 Drain Source On-Resistance Vs. Gate-Source Voltage

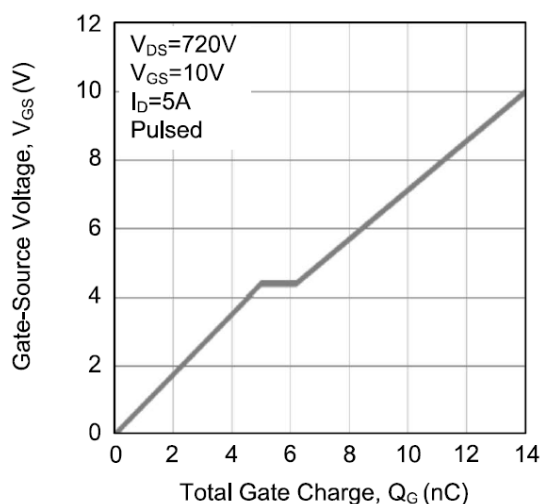


Fig.3 Gate Charge Characteristics

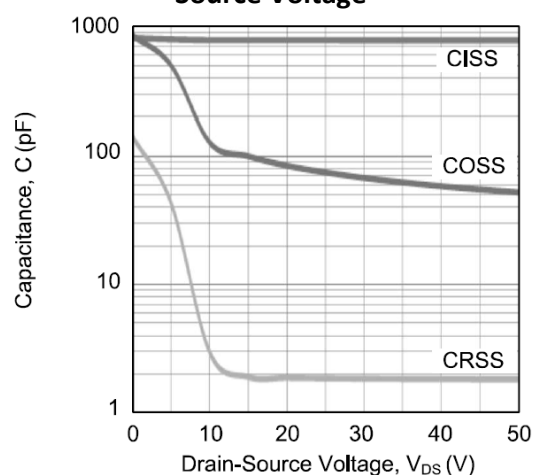


Fig.4 Capacitance Characteristics

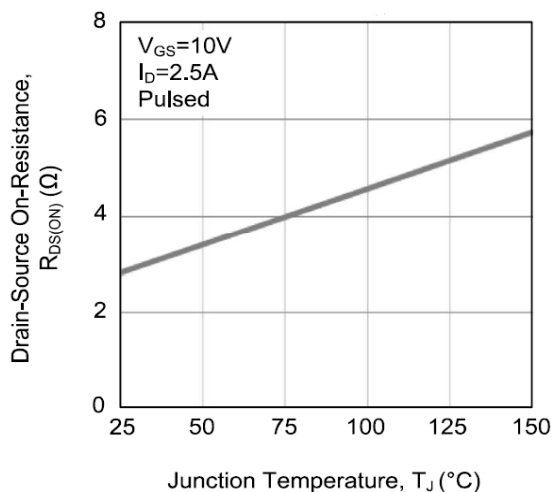


Fig.5 Drain-Source On-Resistance Vs. Junction Temperature

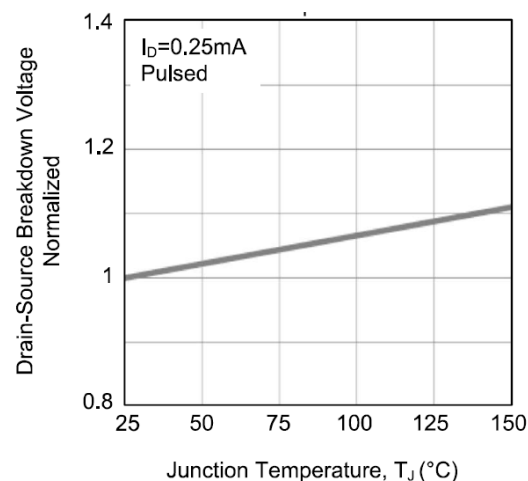


Fig.6 Breakdown Voltage Vs. Junction Temperature

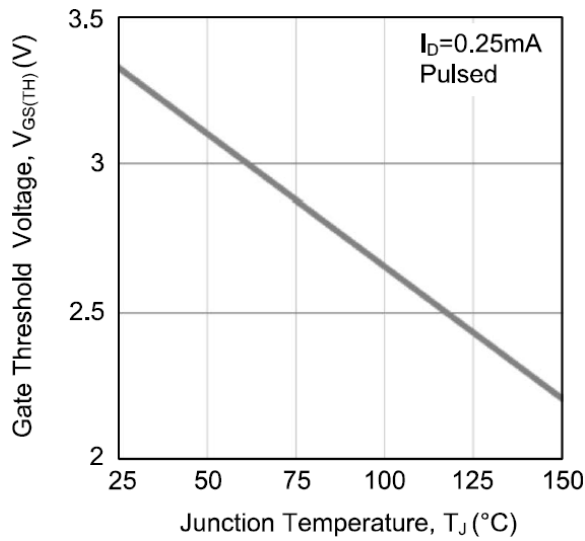


Fig.7 Gate Threshold Voltage Vs. Junction Temperature

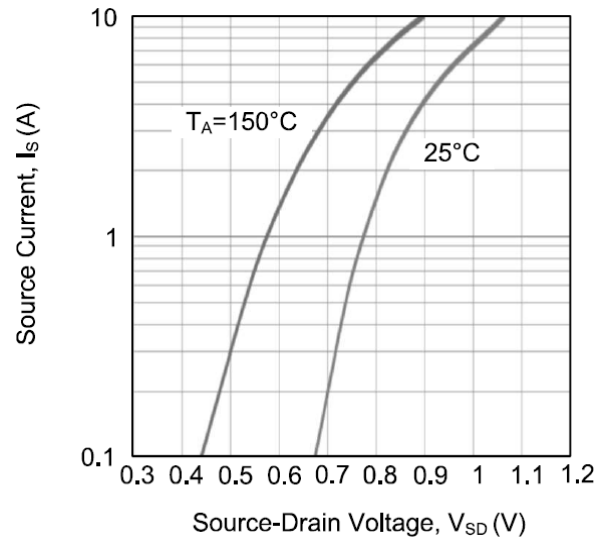


Fig.8 Source Current Vs. Source-Drain Voltage

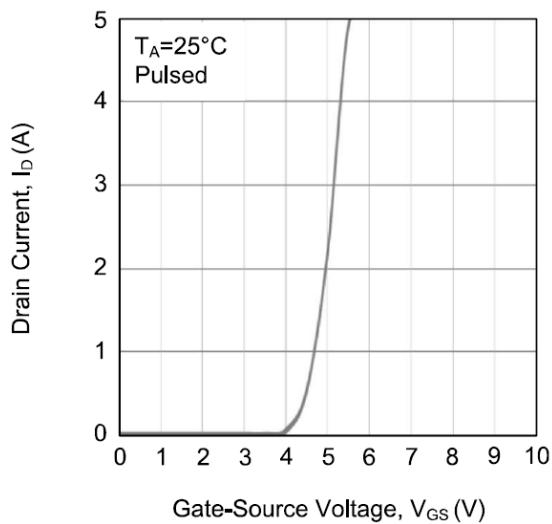


Fig.9 Drain Current Vs. Gate-Source Voltage

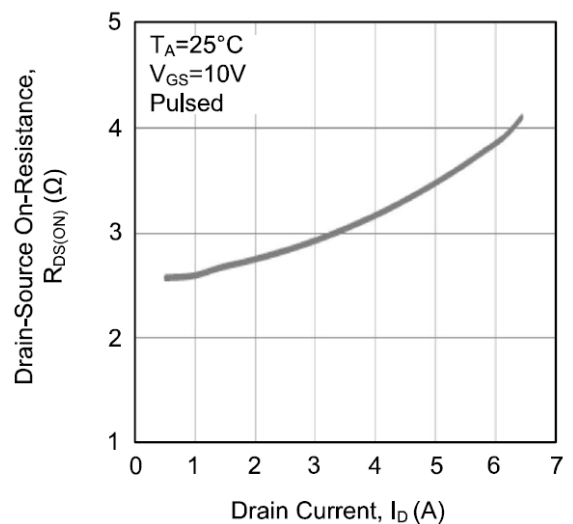


Fig.10 Drain-Source On-Resistance Vs. Drain Current

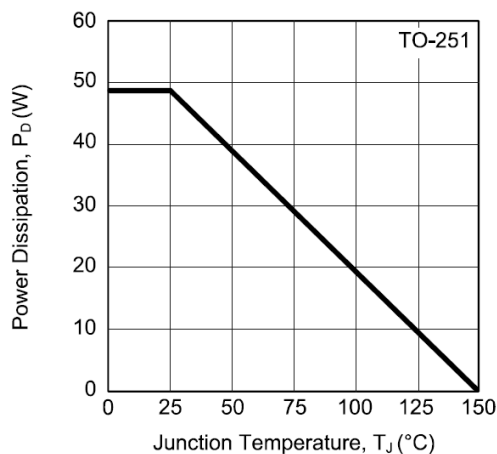


Fig.11 Power Dissipation Vs. Junction Temperature

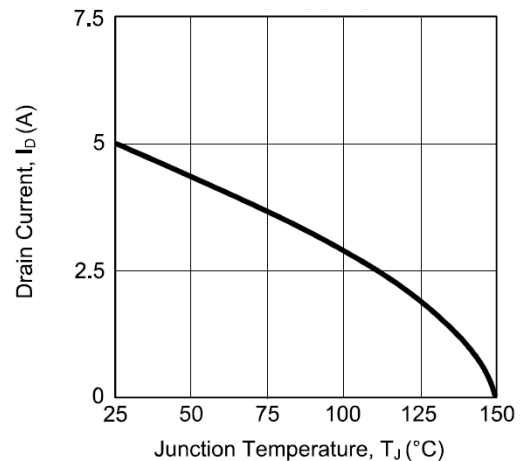


Fig.12 Drain Current Vs. Junction Temperature

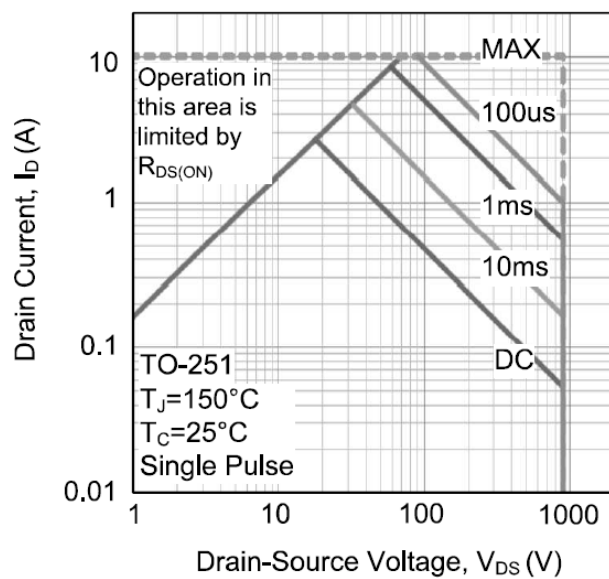
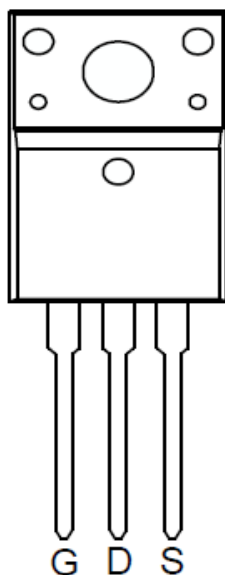


Fig.13 Safe Operating Area

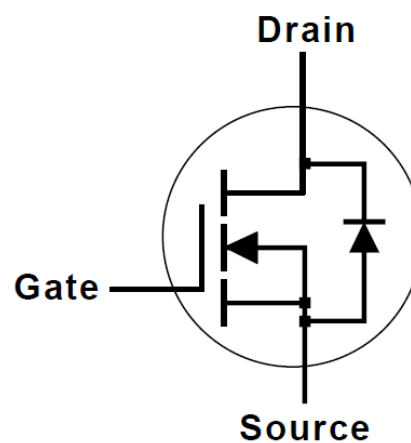
PINNING INFORMATION

SIMPLIFIED OUTLINE

ITO-220AB

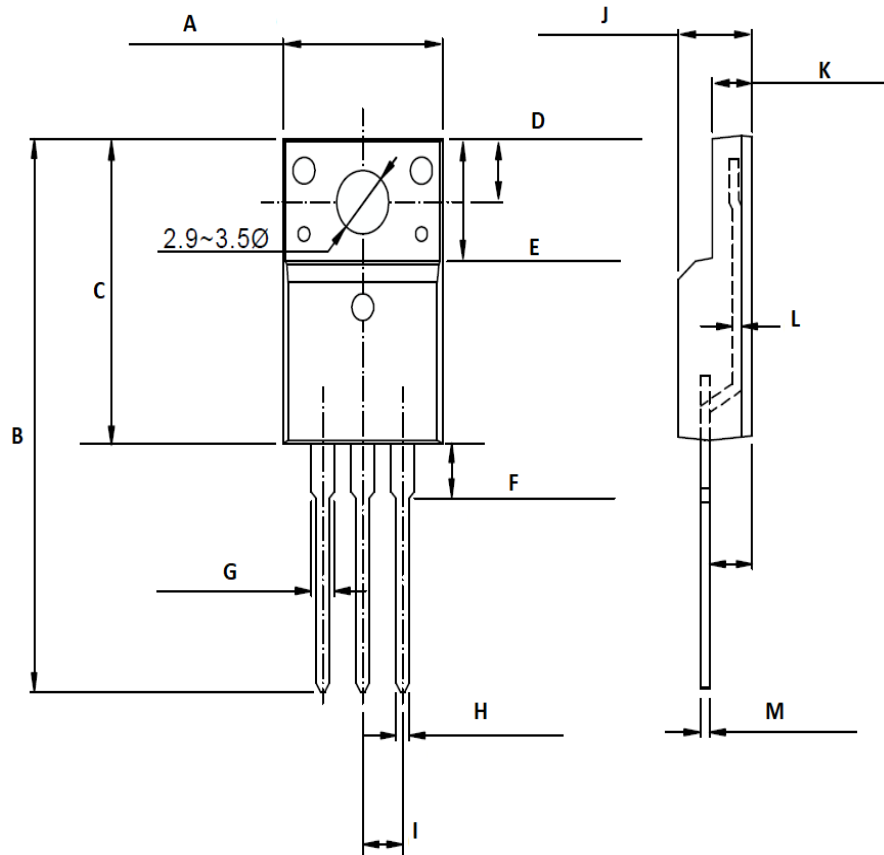


SYMBOL



PACKAGE INFORMATION

ITO-220AB

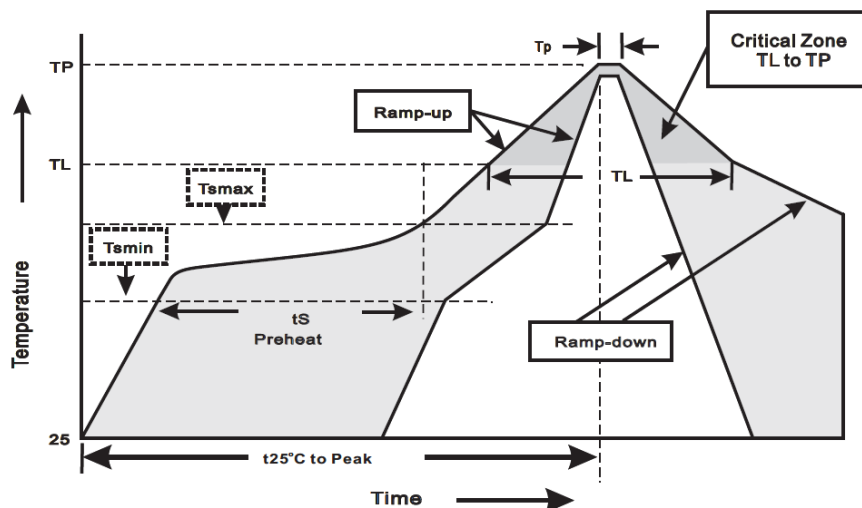


OUTLINE DIMENSIONS				
SYMBOL	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	9.86	10.46	0.388	0.412
B	28.20	29.20	1.110	1.150
C	15.40	16.40	0.606	0.646
D	3.05	3.55	0.120	0.140
E	6.40	7.00	0.252	0.276
F	2.95	3.55	0.116	0.140
G	1.10	1.50	0.043	0.059
H	0.60	1.00	0.024	0.039
I	2.54 Typ.		0.100 Typ.	
J	4.40	5.00	0.173	0.197
K	2.30	2.80	0.091	0.110
L	0.6 Ref.			
M	0.30	0.70	0.012	0.028

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})	150 °C
- Temperature Max (T_{smax})	200 °C
- Time (min to max) (t_s)	60 ~ 120 sec
T_{smax} to T_L	
- Ramp-upRate	<3 °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	<3 °C/sec
Time 25 °C to Peak Temperature	<6 minutes



beyond boundaries...

ALP05N90
ITO-220AB

CUSTOMER NOTE:

DISCLAIMER

The product information and the selection guide facilitates the selection of the ALPINESEMI™'s Semiconductor Device(s) best suited for application in your product(s) as per your requirement. It is recommended that you completely review the Data sheet(s) so as to confirm that the Device(s) meets functionality parameters for your application. The information furnished on the Data Sheet and the ALPINESEMI™'s Web Site is believed to be accurate and reliable at the time of preparation of this document. ALPINESEMI™ however, does not assume any inaccuracies that may arise when the components are mounted and removed. Furthermore, ALPINESEMI™ does not assume liability whatsoever, arising out of the application or the use of any of ALPINESEMI™'s product(s). Neither, does it convey any license under its patent rights nor the rights of others. These products are not guaranteed for use in life saving/support appliances or systems. ALPINESEMI™'s customers using these products (either as individual Semiconductor Devices or incorporated in their end products), in any life saving/support appliances or systems or applications do so at their own risk and ALPINESEMI™ will not be responsible in any way(s) for any damage(s) resulting from such use.

Please check the website **www.alpinesemi.com** for continues updates and revision of datasheets.

DESIGN CHANGES: ALPINESEMI™ strives for continuous improvement and reserves the right to change the specifications of its products without prior notice. ALPINESEMI™ reserves the right to discontinue product lines without prior notice. Any product selection is a recommendation based on best understanding of such product(s) by our engineers. However, buyers are advised to rely on their own judgment for such selection of the products.

ALPINESEMI™ makes no warranty, representation or guarantee regarding the suitability of its products for any particular applications. Neither does ALPINESEMI™ assume any liability arising out of the applications nor the use of such products. ALPINESEMI™ specifically disclaims all liabilities either consequential or incidental.

All rights of the product and datasheet are reserved to ALPINESEMI™.

All logos and information provided in the datasheets are for reference only. Any registered and/or trademark/logos belonging to respective companies be the property of those companies. ALPINESEMI™ extends the courtesy to them, if any of the information found in its datasheet.

Component Disposal Instructions

1. ALPINESEMI™ Semiconductor Devices are RoHS compliant and hence customers are requested to dispose as per the prevailing Environmental Legislation put forth in their specific country.
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