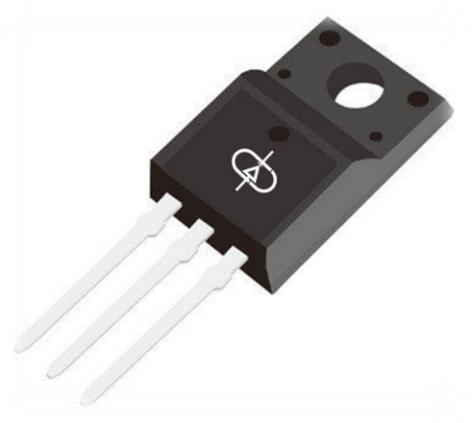
18A, 500V N-CHANNEL POWER MOSFET

DESCRIPTION:



The ALPP18N50FA is an 18A, 500V N-Channel Power MOSFET and it has High Speed Power Switching.

FEATURES:

- $R_{DS\,(ON)}$ = 280mΩ @V_{GS} =10V, $I_{D\,(MAX)}$ = 18A, V_{DS} =500V
- Fast Switching
- Enhanced Body diode dv/dt capability
- Enhanced Avalanche Ruggedness
- RoHS compliant & halogen-free.
- Suffix "-H" indicated Halogen Free part, ex. ALPP18N50FA-H

APPLICATIONS:

- Load Switch.
- PWM Application.
- Power Management.

MECHANICAL CHARACTERISTICS

- Epoxy: UL94-V0 rated flame retardant.
- Case: Molded plastic, TO-220F
- Terminals: Solder plated, solderable per MIL-STD-750, Method 2026
- Mounting Position: Any.

MAXIMUM RATINGS

MAXIMUM RATINGS @ T_A = 25 °C unless otherwise specified (Note 1)			
PARAMETER	**SYMBOL**	**RATINGS**	**UNIT**
Drain-Source Voltage	V_{DS}	500	V
Gate-Source Voltage	V_{GS}	±30	V
Continues Drain Current (DC)	I_D	18	A
Pulsed Drain Current PW≤300µs	I_{DP}	72	A
Single pulse avalanche energy	E_{AS}	1711	mJ
Power Dissipation	P_D	55	W
Junction Temperature	T_J	150	°C
Storage Temperature Range	T_{STG}	-55 to +150	°C

Note:
1. Stresses exceeding those listed in the Maximum Ratings table may damage the device. If any of these limits are exceeded, device functionality should not be assumed, damage may occur and reliability may be affected.

THERMAL CHARACHTERISTICS @ T_A = 25 °C unless otherwise specified (Note 2)			
PARAMETER	**SYMBOL**	**RATINGS**	**UNIT**
Thermal Resistance Junction to Ambient	$R_{\theta JA}$	62.5	°C/W
Thermal Resistance Junction to Case	$R_{\theta JC}$	2.5	°C/W

Note:
2. When mounted on 1-inch square copper board t ≤ 10sec the value in any given application depends on the user's specific board design.

ELECTRICAL CHARACTERISTICS @ TA = 25 °C unless otherwise specified (NOTE 3)

PARAMETER	CONDITIONS	SYMBOL	MIN	TYP.	MAX	UNIT
OFF CHARACTERISTICS						
Drain-Source Breakdown Voltage	V_{GS} = 0V, I_D=250 μA	$V_{(BR)DSS}$	500			V
Zero Gate Voltage Drain Current	V_{GS}=0V, V_{DS}=500V, T_j=25℃	I_{DSS}			100	μA
Gate-source leakage current	V_{GS} = ±30V	I_{GSS}			±100	nA
ON CHARACTERISTICS						
Gate-Threshold Voltage	V_{GS}= $V_{DS,}$ I_D = 250μA	$V_{GS(TH)}$	2.0	3.0	4.0	V
Static Drain-to-Source On-Resistance	V_{GS} = 10V, I_D = 9A	$R_{DS(ON)}$		0.28	0.36	Ω

SWITCHING PARAMETERS						
PARAMETER	CONDITIONS	SYMBOL	MIN	TYP.	MAX	UNIT
Input Capacitance	V_{GS} = 0V, V_{DS} = 250V, f=1MHz	C_{iss}		2740		pF
Output Capacitance		C_{oss}		214		
Reserve Transfer Capacitance		C_{rss}		15		
Total Gate Charge	V_{DS}=400V, I_D=18A, V_{GS}=10V	Q_g		71		nC
Gate to Source Charge		Q_{gs}		10		
Gate to Drain Charge		Q_{gd}		32		
Turn-On Delay Time	V_{DS}=250V, I_D=18A, R_{GEN}=25Ω	$t_{d(on)}$		35		nS
Rise time		t_r		50		
Turn-Off Delay Time		$t_{d(off)}$		160		
Fall time		t_f		65		

SOURCE-DRAIN DIODE RATINGS AND CHARACTERISTICS						
PARAMETER	CONDITIONS	SYMBOL	MIN	TYP.	MAX	UNIT
Drain forward voltage	V_{GS} = 0V, I_{SD} = 18A	V_{FSD}	0.5	0.8	1.0	V

Note 3 : Product parametric performance is indicated in the Electrical Characteristics for the listed test conditions, unless otherwise noted. Product performance may not be indicated by the Electrical Characteristics if operated under different conditions.

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

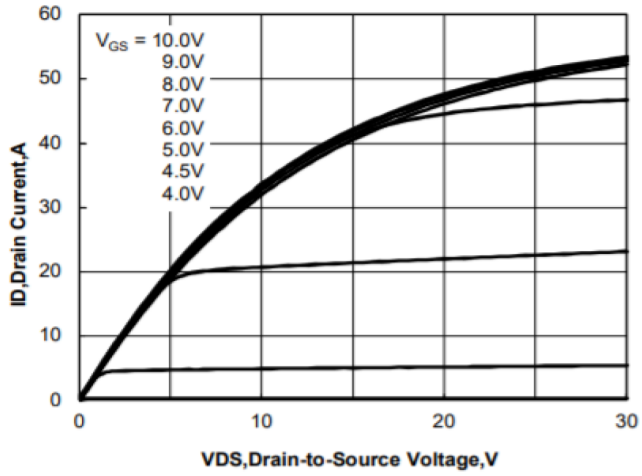


Fig.1 OUTPUT CHARACTERISTICS

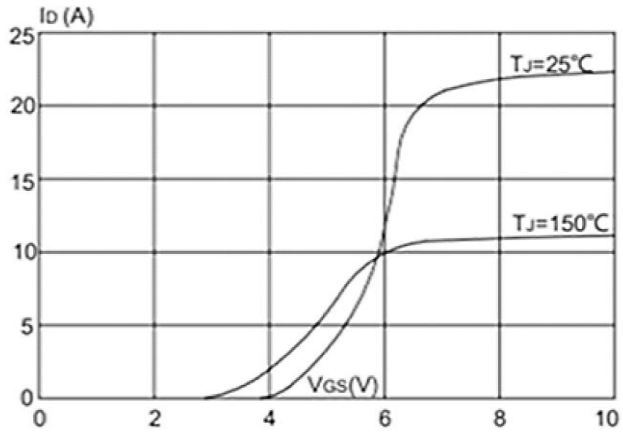


Fig.2 TRANSFER CHARACTERISTICS

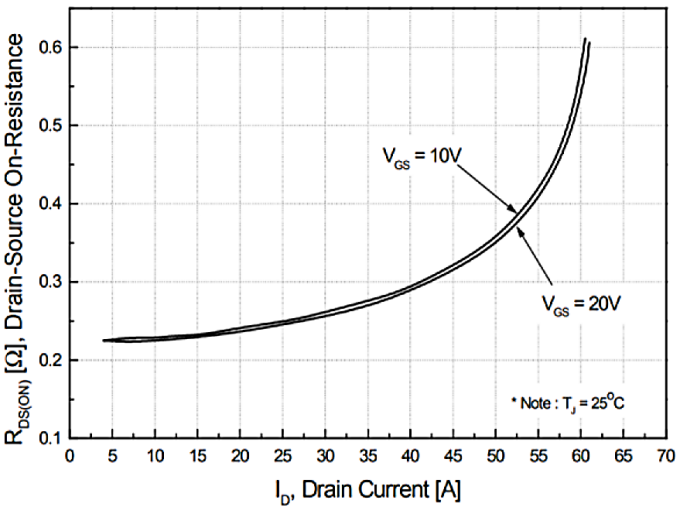


Fig.3 R_{dson} Vs. DRAIN CURRENT

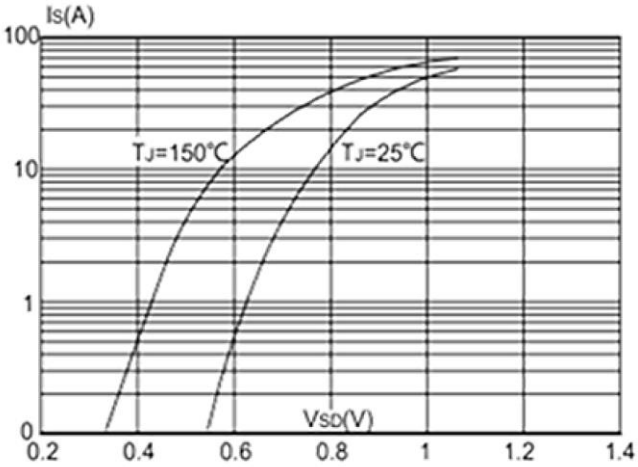


Fig.4 BODY DIODE CHARACTERISTIC

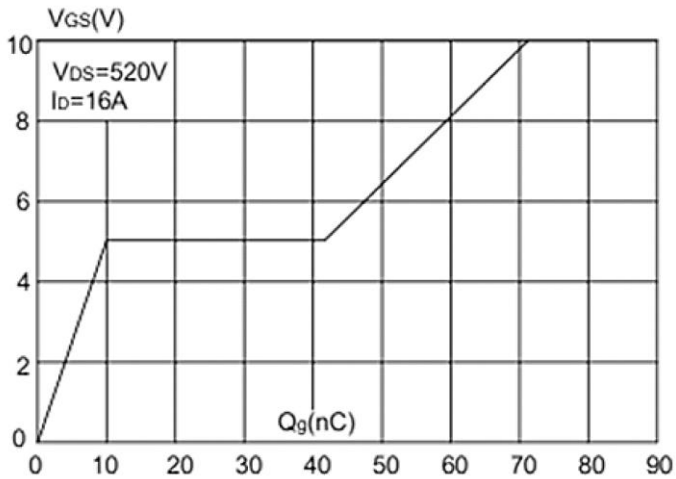


Fig.5 GATE CHARGE

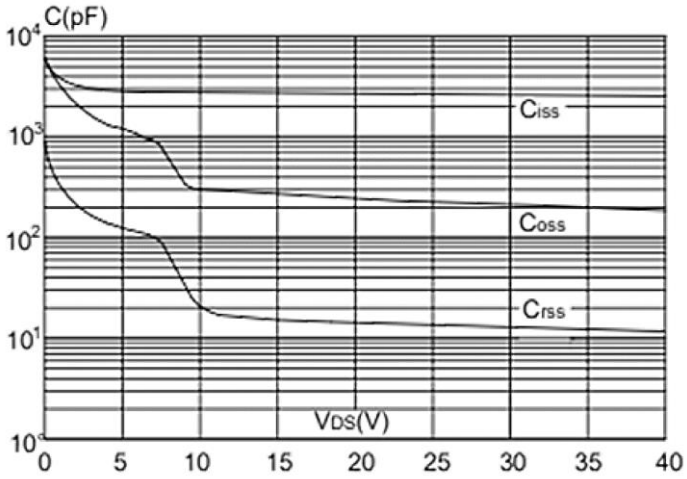


Fig.6 CAPACITANCE CHARACTERISTICS

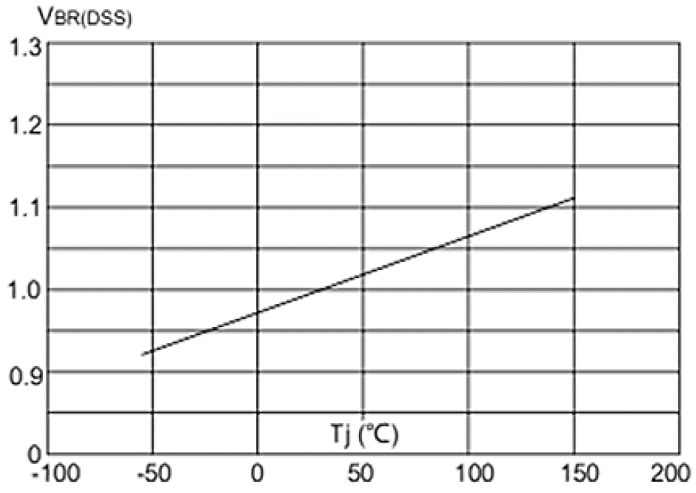


Fig.7 NORMALIZED BREAKDOWN VOLTAGE VS. JUNCTION TEMPERATURE

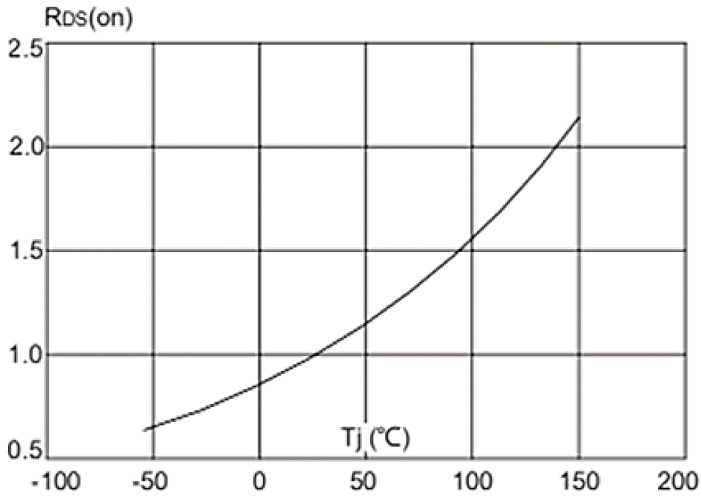


Fig.8 NORMALIZED ON RESISTANCE VS. JUNCTION TEMPERATURE

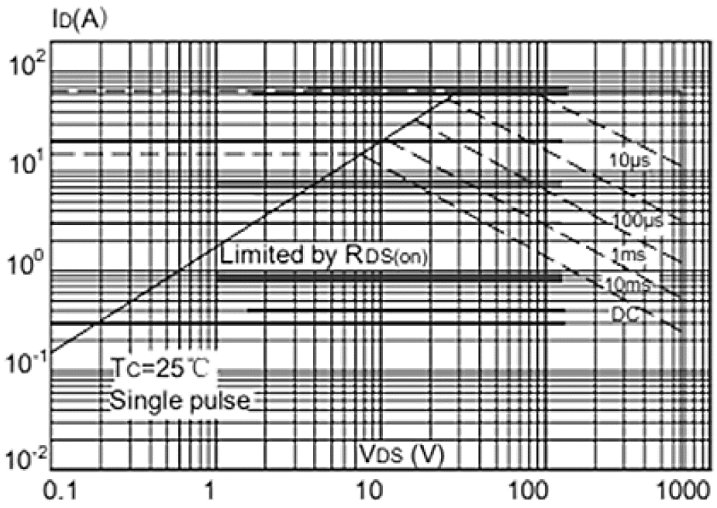


Fig.9 MAXIMUM SAFE OPERATING AREA

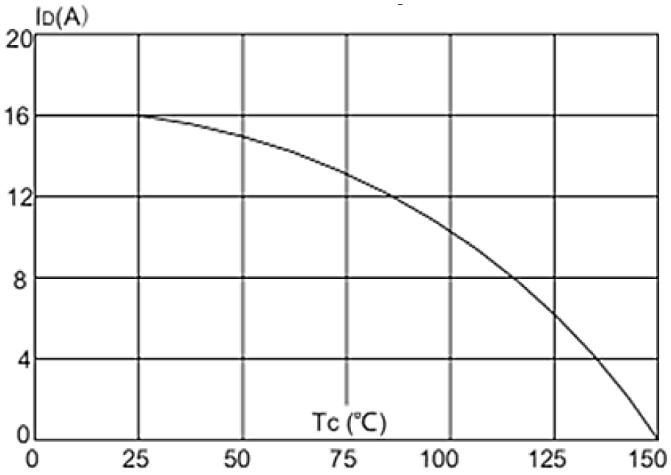


Fig.10 MAXIMUM CONTINUOUS DRAIN CURRENT VS. CASE TEMPERATURE

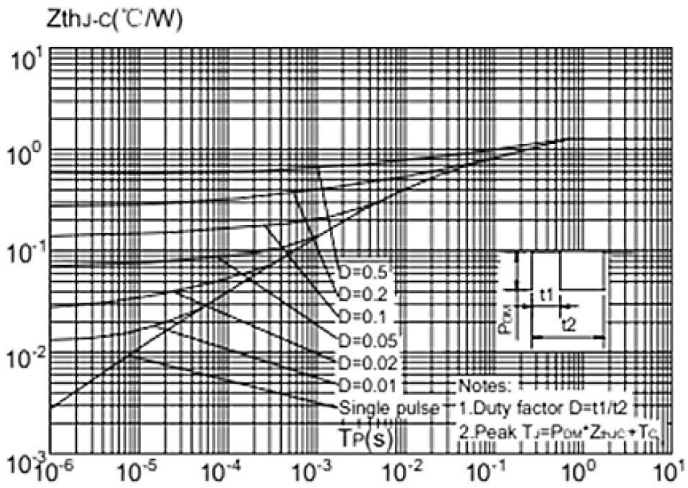
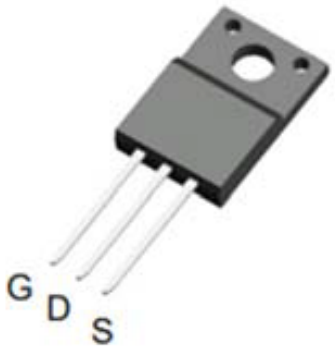


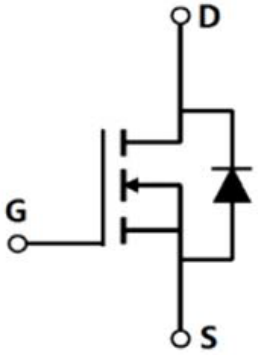
Fig.11 MAXIMUM EFFECTIVE TRANSIENT THERMAL IMPEDANCE, JUNCTION-TO-CASE

PINNING INFORMATION

SIMPLIFIED OUTLINE	SCHEMATIC DIAGRAM

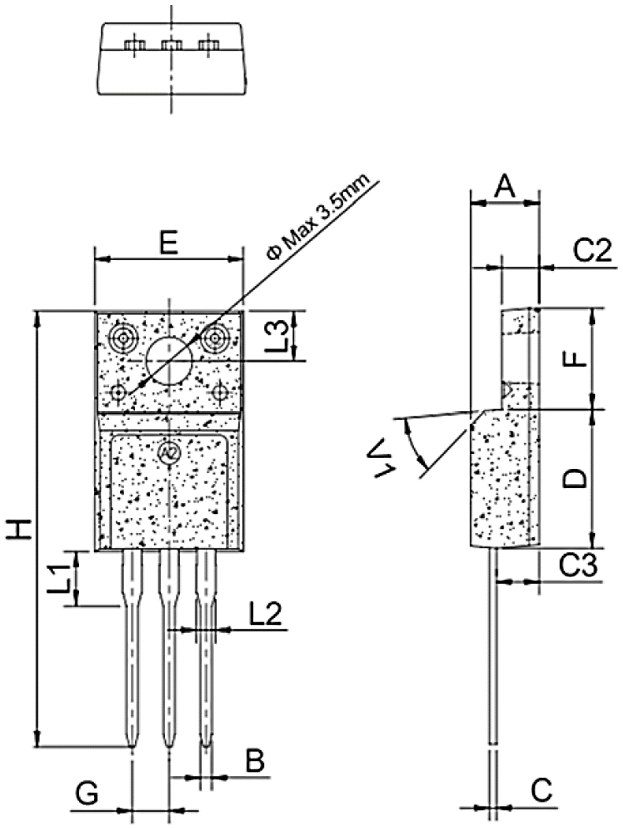
TO-220F





PACKAGE INFORMATION

TO-220F



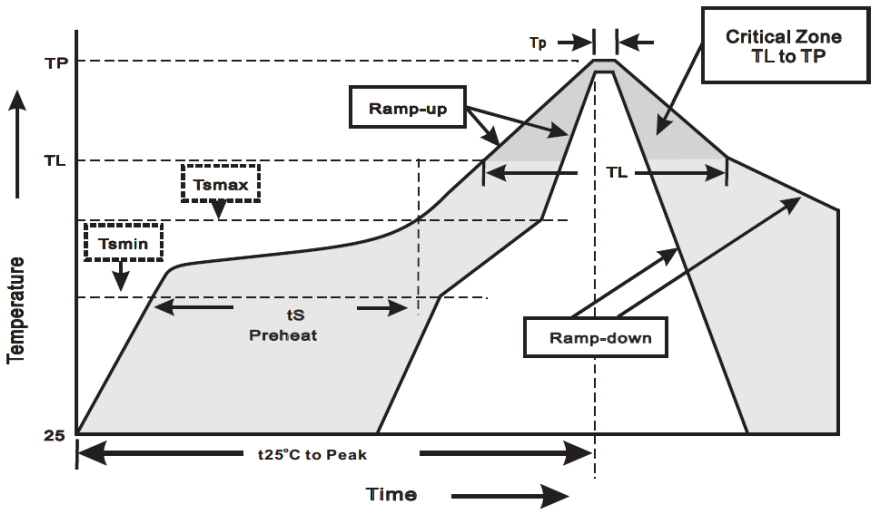
OUTLINE DIMENSIONS						
SYMBOL	MILLIMETERS			INCHES		
	MIN	NOM	MAX	MIN	NOM	MAX
A	4.50	-	4.90	0.177	-	0.193
B	0.74	0.80	0.83	0.029	0.031	0.033
C	0.47	-	0.65	0.019	-	0.026
C2	2.45	-	2.75	0.096	-	0.108
C3	2.60	-	3.00	0.102	-	0.118
D	8.80	-	9.30	0.346	-	0.366
E	9.80	-	10.40	0.386	-	0.410
F	6.40	-	6.80	0.252	-	0.268
G	-	2.54	-	-	0.100	-
H	28.00	-	29.80	1.102	-	1.173
L1	-	3.63	-	-	0.143	-
L2	1.14	-	1.70	0.045	-	0.067
L3	-	3.30	-	-	0.130	-
V1	-	45°	-	-	45°	-

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	<3 °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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