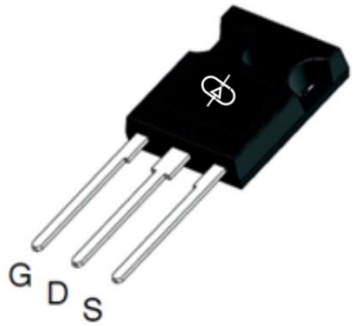
15.0A 650V N-CHANNEL PLANAR POWER MOSFET

DESCRIPTION:



The ALPPRPW15N65 is a 15.0A, 650V N-Channel Planar Power MOSFET and it a new technology for high voltage device in small package with low on resistance and conduction losses.

FEATURES:

- V_{DS} = 650V, I_D=15A
- $R_{DS\ (ON)\ TYP}$ ≤ 190mΩ @V_{GS} =10V, I_D = 9.8A
- Optimized for synchronous rectification
- Low input capacitance and low miller capacitance
- Felly characterized capacitance and avalanche
- Lead-free parts meet RoHS requirements
- Halogen-free (IEC61249-2-21)
- Suffix “H” indicated Halogen Free part, ex. ALPPRPW15N65H

APPLICATIONS:

- BLDC motor drive applications and synchronous rectifiers applications
- Battery powered circuits
- Resonant mode power supplies

MECHANICAL CHARACTERISTICS

- Epoxy: UL94-V0 rated flame retardant.
- Case: Molded plastic, TO-247
- Terminals: Solder plated, solderable per MIL-STD-750, Method 2026
- Mounting Position: Any.

ORDERING PART NUMBER

PART NUMBER	ORDERING PART NUMBER
ALPPRPW15N65	ALPPRPW15N65-FM
ALPPRPW15N65H	ALPPRPW15N65H-FM

MAXIMUM RATINGS

MAXIMUM RATINGS @ T_A = 25 °C unless otherwise specified				
PARAMETER		**SYMBOL**	**RATINGS**	**UNIT**
Drain-Source Voltage		V_{DS}	650	V
Gate-Source Voltage		V_{GS}	±30	V
Continues Drain Current [3]	T_C = 25°C	I_D	15	A
	T_C = 125°C		9	
Pulsed Drain Current [1]		I_{DM}	45	A
Single pulse avalanche energy [2]		E_{AS}	490	mJ
Power Dissipation	T_C = 25°C	P_D	130	W
Operating Junction Temperature Range		T_J	-55 to +150	°C
Storage Temperature Range		T_{STG}	-55 to +150	°C

Note:

1. Pulse test: Pulse width ≤ 10ms, duty cycle ≤ 1%.
2. Starting T_J =25°C, L=20mH, V_D=50V, V_{GS}=10V.
3. The maximum current rating is package limited.

THERMAL CHARACHTERISTICS @ T_A = 25 °C unless otherwise specified			
PARAMETER	**SYMBOL**	**RATINGS**	**UNIT**
Thermal Resistance Junction to Ambient	$R_{\theta JA}$	62	°C/W
Thermal Resistance Junction to Case	$R_{\theta JC}$	0.96	°C/W

Note:

For surface-mounted devices, both $R_{\theta JA}$ and $R_{\theta JC}$ care measured with the device mounted on approximately 1"x1" FR-4 PCBs. In actual applications, many factors including the PCB material and layout, many affect the thermal resistance of the device-board assembly. For best result, characterize the thermal resistance directly in the application circuit.

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}	650			V
Drain-source leakage current	V_{GS}=0V, V_{DS}=650V, T_j=25°C	I_{DSS}			1	µA
	V_{GS}=0V, V_{DS}=650V, T_j=125°C				100	
Gate-source leakage current	V_{GS} = ±30V, V_{DS}=0V	I_{GSS}			±100	nA
ON CHARACTERISTICS						
Gate-Threshold Voltage	V_{GS}= V_{DS}, I_D = 250µA	$V_{GS(TH)}$	3.5		4.5	V
Static drain-source on-state resistance	V_{GS} = 10V, I_D = 9.8A	$R_{DS(ON)}$		170	190	mΩ

DYNAMIC PARAMETERS						
PARAMETER	CONDITIONS	SYMBOL	MIN	TYP.	MAX	UNIT
Input Capacitance	V_{GS} = 0V, V_{DS} = 100V, f=100MHz	C_{iss}		1700		pF
Output Capacitance		C_{oss}		56		
Reserve Transfer Capacitance		C_{rss}		1.5		
Gate resistance	V_{GS} = 0V, V_{DS} = 0V, f=1.0MHz	R_g		3.8		Ω
SWITCHING PARAMETERS						
Total Gate Charge	V_{DS}=480V, I_D=9.8A, V_{GS}=10V	Q_g		9.3		nC
Gate to Source Charge		Q_{gs}		13.8		
Gate to Drain Charge		Q_{gd}		35.6		
Turn-On Delay Time	V_{DS}=480V, V_{GS}=18V, I_D=9.8A, R_{GEN}=3Ω	$t_{d(on)}$		21.3		nS
Rise time		t_r		72.8		
Turn-Off Delay Time		$t_{d(off)}$		48.5		
Fall time		t_f		18.2		

SOURCE-DRAIN DIODE RATINGS AND CHARACTERISTICS						
PARAMETER	CONDITIONS	SYMBOL	MIN	TYP.	MAX	UNIT
Drain-source diode forward voltage	V_{GS}=0V, I_F=9.8A	V_{SD}		0.83	1.09	V
Reverse recovery time	V_{DD}=400V, I_F=6.7A, di/dt=100A/µs	t_{rr}		284.3		nS
Reverse recovery charge		Q_{rr}		4.25		nC

PINNING INFORMATION

SIMPLIFIED OUTLINE	SCHEMATIC DIAGRAM

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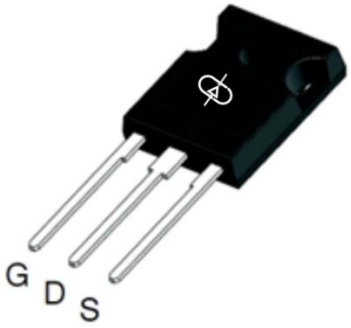

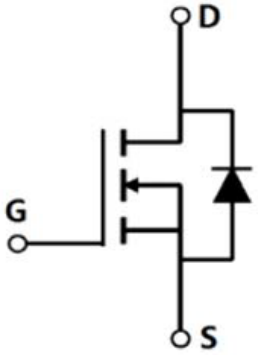

PACKAGE INFORMATION

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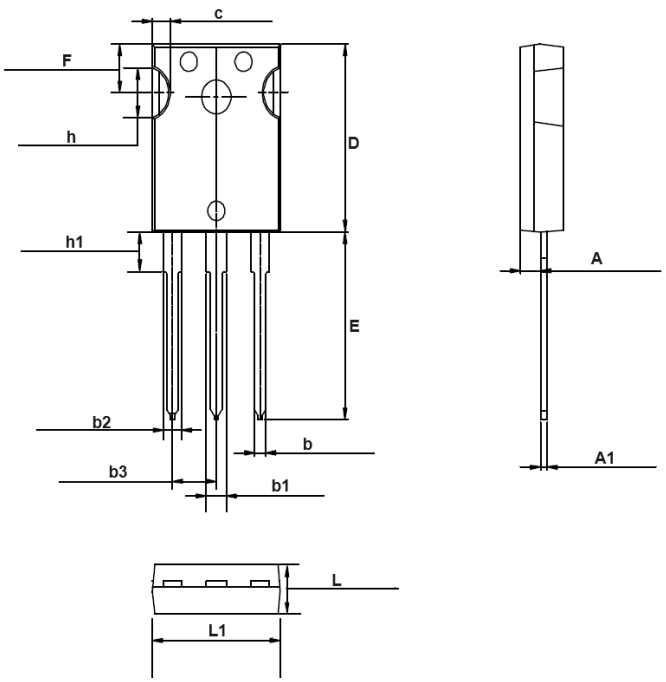
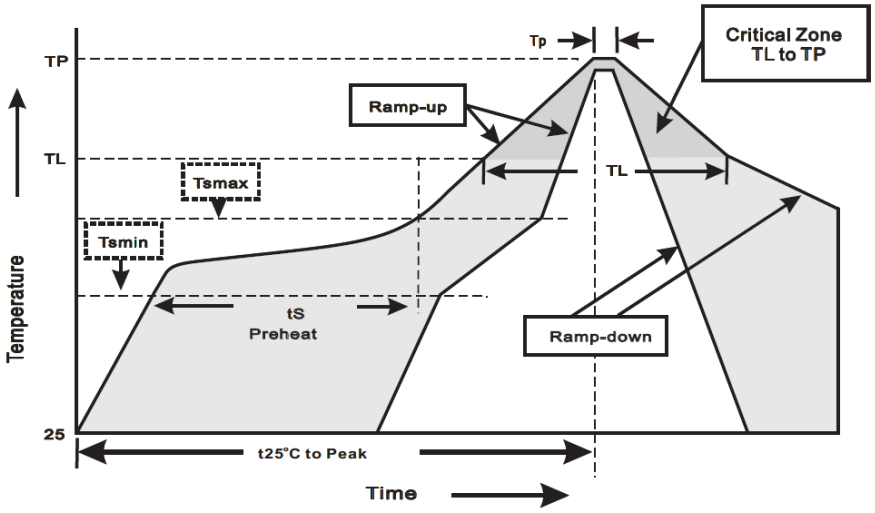


OUTLINE DIMENSIONS				
SYMBOL	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	2.20	2.50	0.087	0.098
A1	0.41	0.79	0.016	0.031
b	1.00	1.40	0.039	0.055
b1	2.87	3.22	0.113	0.127
b2	1.90	2.39	0.075	0.094
b3	5.44 BSC.		0.214 BSC.	
c	4.32	5.49	0.170	0.205
D	20.80	21.20	0.819	0.835
E	19.70	20.32	0.776	0.800
F	5.80 Typ.		0.228 Typ.	
h	4.32	5.49	0.189	0.205
h1	4.00	4.40	0.157	0.173
L	4.80	5.21	0.189	0.205
L1	15.50	16.13	0.610	0.635

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:

DISCLAIMER

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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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