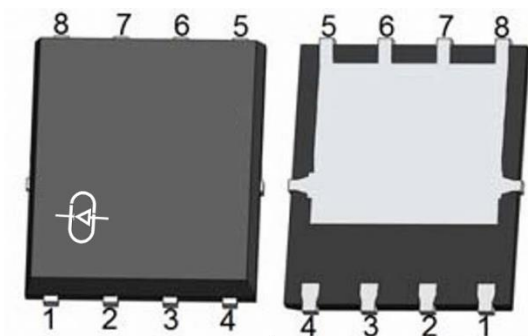


130A, 40V N-CHANNEL SUPER TRENCH POWER MOSFET

DESCRIPTION:



The ALP130N04S is an 130A, 40V N-Channel Super Trench Power MOSFET and it has fast a High density cell design for low $R_{DS(on)}$

FEATURES:

- $V_{(BR)DSS} = 40V$, $I_D = 130A$
- $R_{DS(ON)MAX} = 1.75m\Omega$ @ $V_{GS} = 10V$, $I_D = 130A$.
- $R_{DS(ON)MAX} = 2.5m\Omega$ @ $V_{GS} = 4.5V$, $I_D = 130A$.
- High density cell design for low $R_{DS(on)}$.
- Split Gate Trench MOSFET technology
- Excellent package for heat dissipation.
- Lead-free parts meet RoHS requirements
- Suffix “-H” indicated Halogen Free part, ex. ALP130N04S-H

APPLICATIONS:

- Consumer electronic power supply
- Motor control
- Synchronous-rectification
- Inverters

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}	40	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	130 82	A
Pulsed Drain Current (Note 1)	I_{DM}	390	A
Power Dissipation $T_C = 25^{\circ}\text{C}$	P_D	115	W
Thermal Resistance Junction to Ambient	$R_{\theta JA}$	50	$^{\circ}\text{C/W}$
Thermal Resistance Junction to Case	$R_{\theta JC}$	1.09	$^{\circ}\text{C/W}$
Single pulse avalanche energy	E_{AS}	720	mJ
Operating Junction Temperature	T_J	+150	$^{\circ}\text{C}$
Storage Temperature Range	T_{STG}	-55 to +150	$^{\circ}\text{C}$
Note: 1. Max. current is limited by bonding wire. 2. UIS tested and pulse width are limited by maximum junction temperature 150°C .			

ELECTRICAL CHARACTERISTICS @ TA = 25 °C unless otherwise specified

PARAMETER	CONDITIONS	SYMBOL	MIN	TYP.	MAX	UNIT
OFF CHARACTERISTICS						
Drain-Source Breakdown Voltage	$V_{GS}=0V, I_D=250\mu A$	$V_{(BR)DSS}$	40			V
Zero gate voltage drain current	$V_{DS}=40V, V_{GS}=0V$	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	1.8	2.5	V
Drain-to-Source On-Resistance (Note 1)	$V_{GS} = 10V, I_D = 20A$	$R_{DS(ON)}$		1.45	1.75	m Ω
	$V_{GS} = 4.5V, I_D = 20A$			1.9	2.5	

DYNAMIC CHARACTERISTICS (Note 2)						
PARAMETER	CONDITIONS	SYMBOL	MIN	TYP.	MAX	UNIT
Input Capacitance	$V_{DS} = 25V, V_{GS} = 0V, F_{req} = 1.0\text{ MHz}$	C_{iss}		7100		pF
Output Capacitance	$V_{DS} = 25V, V_{GS} = 0V, F_{req} = 1.0\text{ MHz}$	C_{oss}		1298		pF
Reverse Transfer Capacitance	$V_{DS} = 25V, V_{GS} = 0V, F_{req} = 1.0\text{ MHz}$	C_{rss}		55		pF

SWITCHING CHARACTERISTICS						
PARAMETER	CONDITIONS	SYMBOL	MIN	TYP.	MAX	UNIT
Total Gate Charge	$V_{DS} = 20V, V_{GS} = 10V, I_D = 20A$	Q_g		132		nC
Gate to Source Charge	$V_{DS} = 20V, V_{GS} = 10V, I_D = 20A$	Q_{gs}		25		nC
Gate to Drain Charge	$V_{DS} = 20V, V_{GS} = 10V, I_D = 20A$	Q_{gd}		24.6		nC
Turn-On Delay Time	$V_{DS} = 20V, V_{GS} = 10V, I_D = 20A$	$t_{d(on)}$		18.8		nS
Turn-On Rise time	$V_{DS} = 20V, V_{GS} = 10V, I_D = 20A, R_G=3\Omega$	t_r		70.1		nS
Turn-Off Delay Time	$V_{DS} = 20V, V_{GS} = 10V, I_D = 20A, R_G=3\Omega$	$t_{d(off)}$		136.8		nS
Turn-Off Fall time	$V_{DS} = 20V, V_{GS} = 10V, I_D = 20A, R_G=3\Omega$	t_f		92.3		nS

SOURCE-DRAIN DIODE RATINGS AND CHARACTERISTICS						
PARAMETER	CONDITIONS	SYMBOL	MIN	TYP.	MAX	UNIT
Diode forward Current (Note 1)		I_S			130	A
Diode forward Voltage	$I_S = 20A, V_{GS} = 0V$	V_{DS}			1.3	V
Reverse recovery time	$T_J = 25^\circ C, I_F = 20A, dI_F/dt = 100A/\mu s$ (Note 1)	t_{rr}		56		nS
Reverse recovery charge	$T_J = 25^\circ C, I_F = 20A, dI_F/dt = 100A/\mu s$ (Note 1)	Q_{rr}		54		nC

Note:

1. Pulse test (pulse width $\leq 300\mu s$, Duty cycle $\leq 2\%$).
2. Guaranteed by design, not subject to production testing.

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

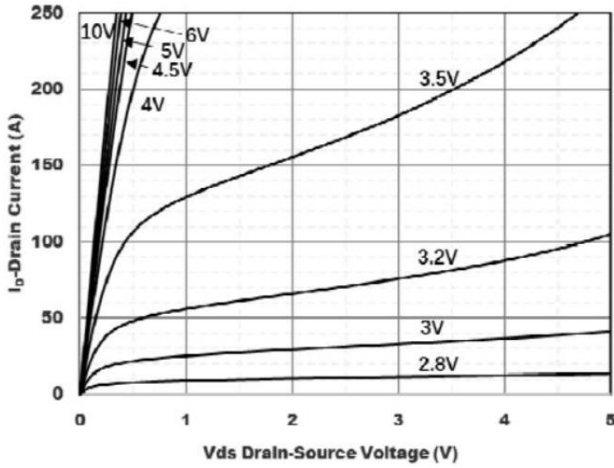


Fig.1 OUTPUT CHARACTERISTICS

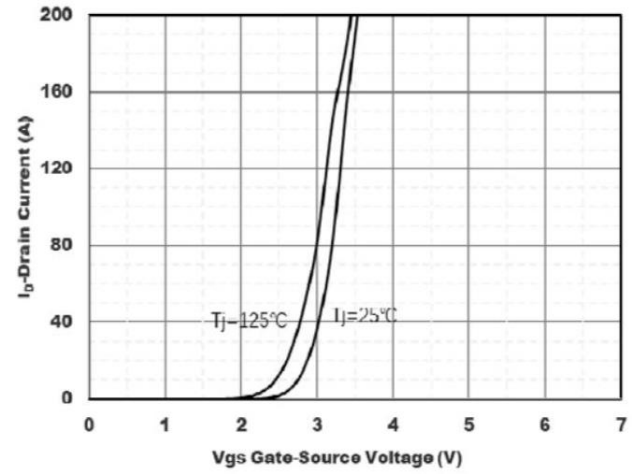


Fig.2 TRANSFER CHARACTERISTICS

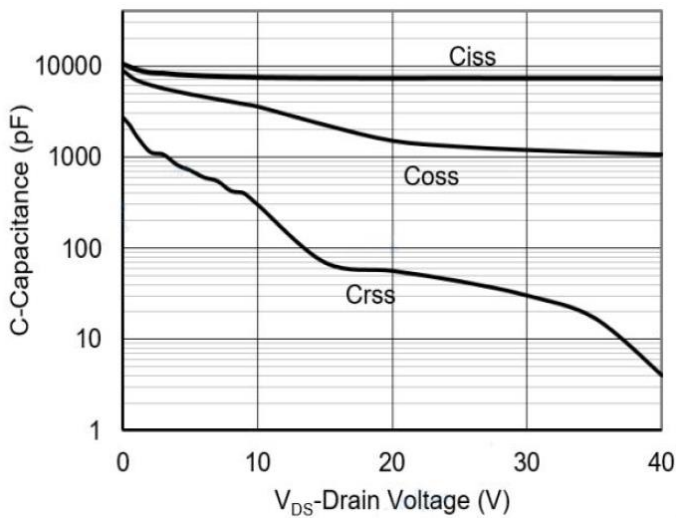


Fig.3 CAPACITANCE CHARACTERISTICS

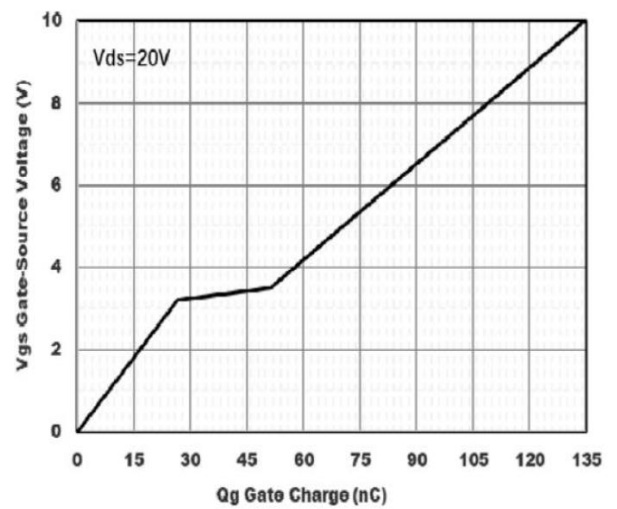


Fig.4 GATE CHARGE

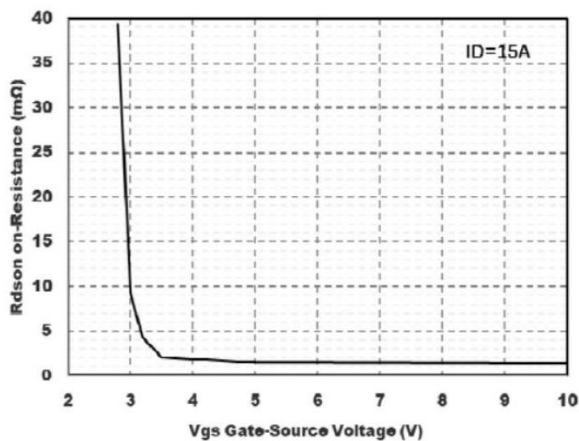


Fig.5 ON-RESISTANCE VS. DRAIN CURRENT AND GATE VOLTAGE

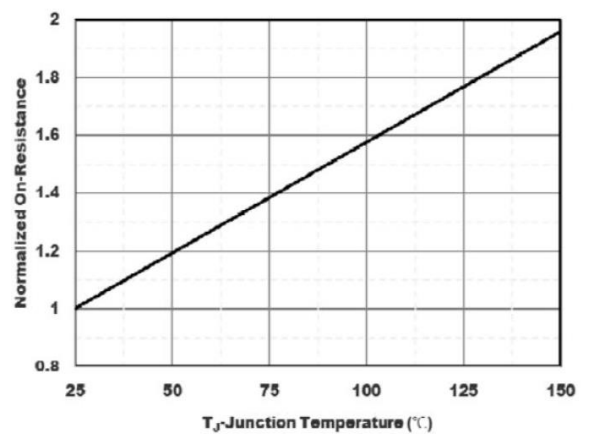


Fig.6 NORMALIZED ON-RESISTANCE

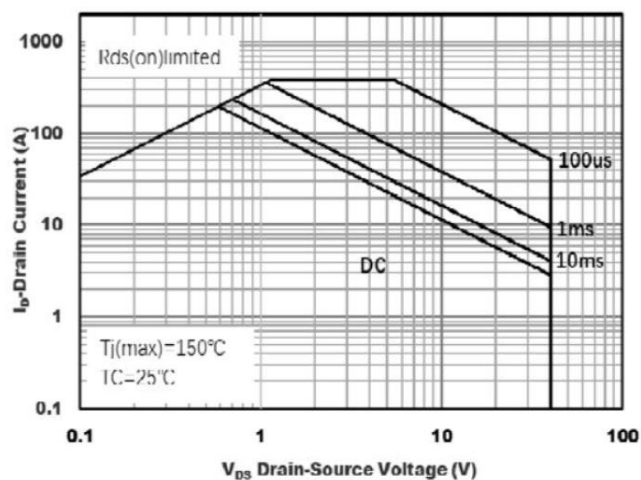


Fig.7 SAFE OPERING AREA

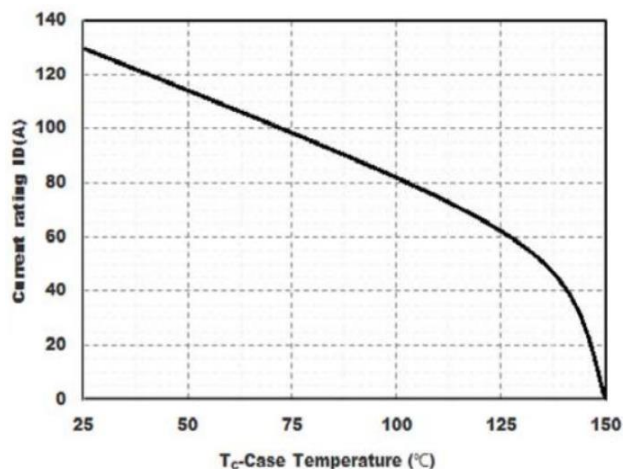


Fig.8 DRAIN CURRENT

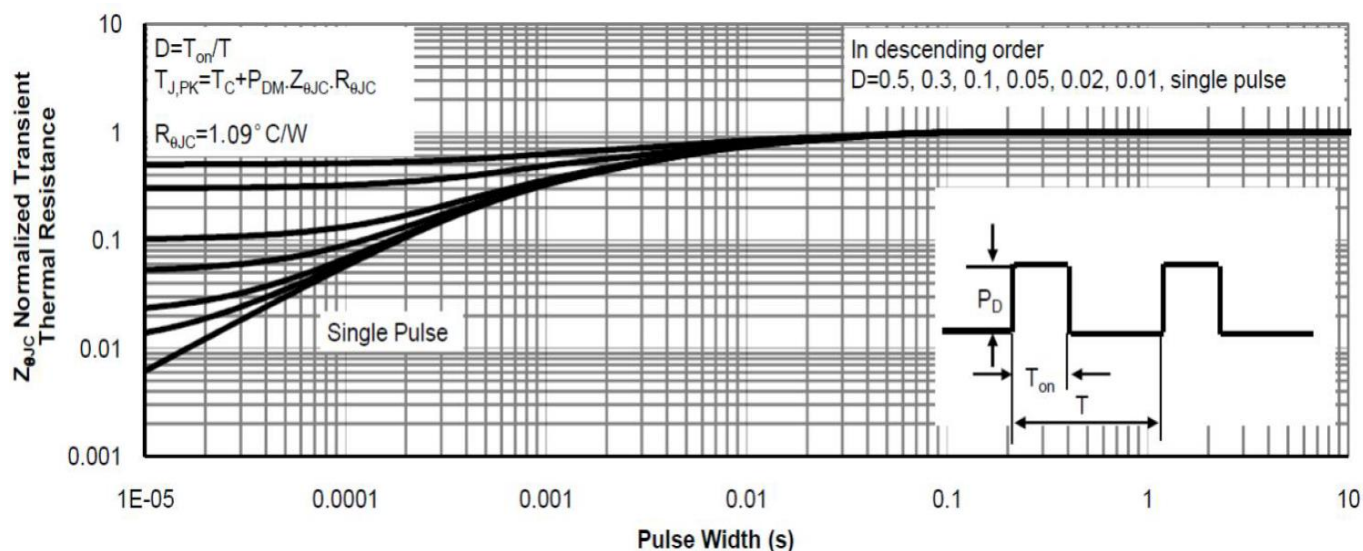
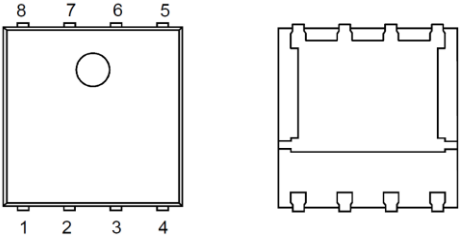
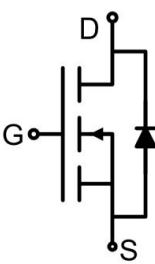


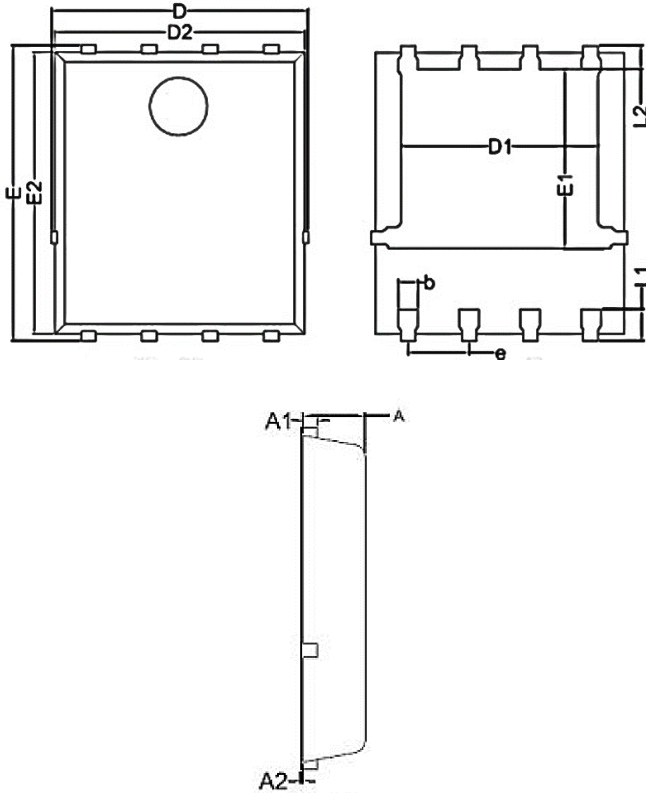
Fig.9 NORMALIZED MAXIMUM TRANSIENT THERMAL IMPEDANCE

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

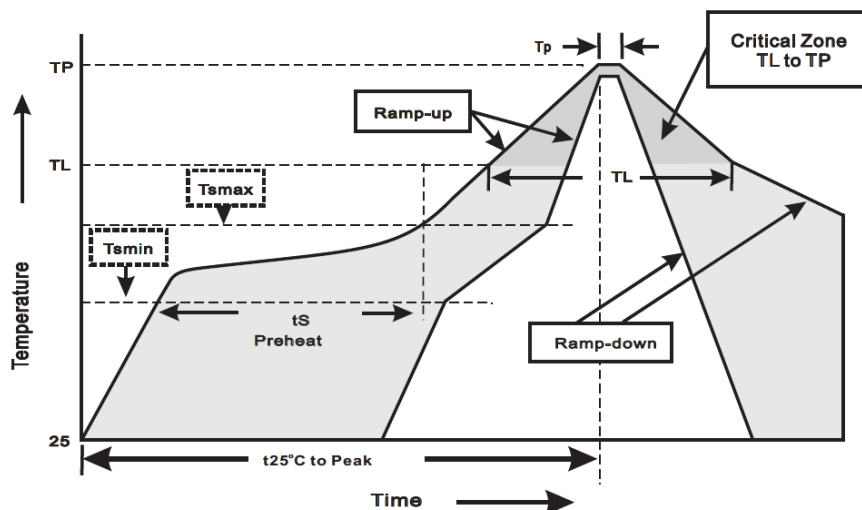


OUTLINE DIMENSIONS				
SYMBOL	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	1.000	1.200	0.039	0.047
A1	0.254BSC.		0.010BSC.	
A2	0.000	0.100	0.000	0.004
b	0.310	0.510	0.012	0.020
D	5.150	5.550	0.203	0.219
D1	3.920	4.320	0.154	0.170
D2	5.000	5.400	0.197	0.213
E	5.950	6.350	0.234	0.250
E1	3.520	3.920	0.139	0.154
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 °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	<6 °C/sec
Time 25 °C to Peak Temperature	<6 minutes



beyond boundaries...

ALP130N04S

DFN5X6-8L

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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