

4.8A, 20V Dual N-CHANNEL MOSFET**DESCRIPTION:**

The ALP048N02I is a 4.8A, 20V Dual N-Channel MOSFET and it has fast switching speed with low on-resistance.

FEATURES:

- $V_{DS} = 20V$, $I_D = 4.8A$
 - $R_{DS(ON)} < 30m\Omega$ @ $V_{GS} = 4.5V$
 - $R_{DS(ON)} < 40m\Omega$ @ $V_{GS} = 2.5V$
- Trench Power MOSFET
- Fast Switching Speed
- Low On-Resistance
- Green Device Available
- RoHS Complaint
- Suffix “-H” indicated Halogen Free part, ex. ALP048N02I-H

APPLICATIONS:

- Switching.

MECHANICAL CHARACTERISTICS

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



beyond boundaries...

ALP048N02I

SOP-8L

MAXIMUM RATINGS

MAXIMUM RATINGS @ $T_A = 25^\circ\text{C}$ unless otherwise specified			
PARAMETER	SYMBOL	RATINGS	UNIT
Drain-Source Voltage	V_{DS}	20	V
Gate-Source Voltage	V_{GS}	± 12	V
Continuous Drain Current @ $T_C = 25^\circ\text{C}$	I_D	4.8	A
Pulsed Drain Current (Note 2)	I_{DM}	30	A
Total Power Dissipation $T_C = 25^\circ\text{C}$	P_D	1.25	W
Thermal Resistance Junction to Ambient (Note 1)	$R_{\theta JA}$	100	$^\circ\text{C/W}$
Operating Junction Temperature	T_J	-55 to +150	$^\circ\text{C}$
Storage Temperature Range	T_{STG}	-55 to +150	$^\circ\text{C}$

ELECTRICAL CHARACTERISTICS @ TA = 25 °C unless otherwise specified

PARAMETER	CONDITIONS	SYMBOL	MIN	TYP.	MAX	UNIT
OFF CHARACTERISTICS						
Drain-Source Breakdown Voltage	$V_{GS}=0V, I_D=250\mu A$	$V_{(BR)DSS}$	20			V
Zero gate voltage drain current	$V_{DS}=20V, V_{GS}=0V$	I_{DSS}			1.0	μA
Gate-body leakage current	$V_{GS}= \pm 12V, V_{DS}= 0V$	I_{GSS}			± 100	nA
ON CHARACTERISTICS						
Gate-Threshold Voltage (Note 3)	$V_{DS} = V_{GS}, I_D = 250\mu A$	$V_{GS(th)}$	0.5	0.7	1.2	V
Drain-to-Source On-Resistance (Note 3)	$V_{GS} = 4.5V, I_D = 4.8A$	$R_{DS(ON)}$		20	30	m Ω
	$V_{DS} = 2.5V, I_D = 4A$			25	40	

DYNAMIC CHARACTERISTICS						
PARAMETER	CONDITIONS	SYMBOL	MIN	TYP.	MAX	UNIT
Input Capacitance	$V_{DS} = 10V, V_{GS} = 0V, F_{req} = 1.0\text{ MHz}$	C_{iss}		515		pF
Output Capacitance	$V_{DS} = 10V, V_{GS} = 0V, F_{req} = 1.0\text{ MHz}$	C_{oss}		73		pF
Reverse Transfer Capacitance	$V_{DS} = 10V, V_{GS} = 0V, F_{req} = 1.0\text{ MHz}$	C_{rss}		65		pF

SWITCHING CHARACTERISTICS (Note 4)						
PARAMETER	CONDITIONS	SYMBOL	MIN	TYP.	MAX	UNIT
Total Gate Charge	$V_{DS} = 10V, V_{GS} = 4.5V, I_D = 3A$	Q_g		10		nC
Gate to Source Charge	$V_{DS} = 10V, V_{GS} = 4.5V, I_D = 3A$	Q_{gs}		1.5		nC
Gate to Drain Charge	$V_{DS} = 10V, V_{GS} = 4.5V, I_D = 3A$	Q_{gd}		1.6		nC
Turn-On Delay Time	$V_{DD} = 10V, V_{GEN} = 4.5V, I_D = 1A, R_G=6\Omega$	$t_{d(on)}$		8		nS
Turn-On Rise time	$V_{DD} = 10V, V_{GEN} = 4.5V, I_D = 1A, R_G=6\Omega$	t_r		9		nS
Turn-Off Delay Time	$V_{DD} = 10V, V_{GEN} = 4.5V, I_D = 1A, R_G=6\Omega$	$t_{d(off)}$		15		nS
Turn-Off Fall time	$V_{DD} = 10V, V_{GEN} = 4.5V, I_D = 1A, R_G=6\Omega$	t_f		4		nS

SOURCE-DRAIN DIODE RATINGS AND CHARACTERISTICS						
PARAMETER	CONDITIONS	SYMBOL	MIN	TYP.	MAX	UNIT
Diode forward Voltage (Note 3)	$I_S = 1.7A, V_{GS} = 0V$	V_{DS}			1.2	V
Note: 1. Repetitive rating: Pulse width limited by junction temperature. 2. Surface mounted on FR4 board, $t \leq 10s$. 3. Pulse Test: Pulse Width $\leq 80\mu s$, Duty Cycle $\leq 0.5\%$. 4. Guaranteed by design, not subject to production.						

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

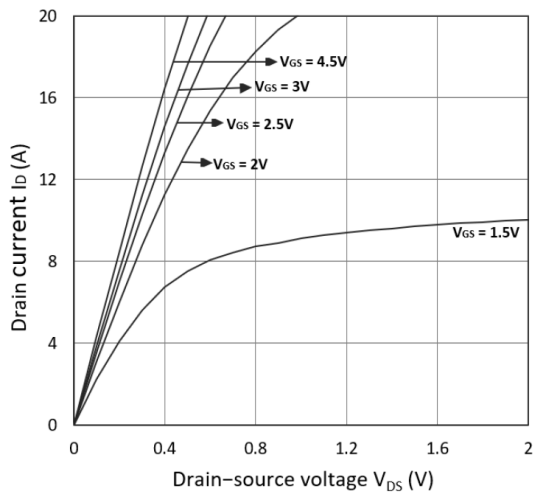


Fig.1 OUTPUT CHARACTERISTICS

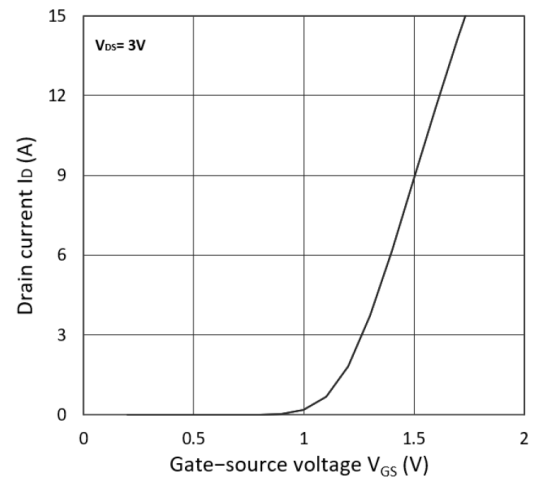


Fig.2 TRANSFER CHARACTERISTICS

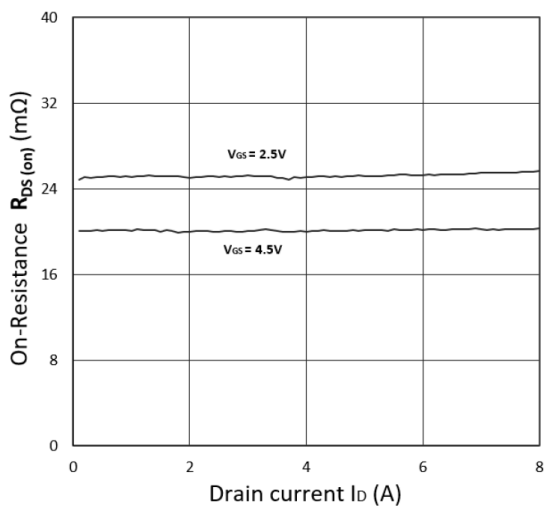


Fig.3 $R_{DS(on)}$ vs. I_D

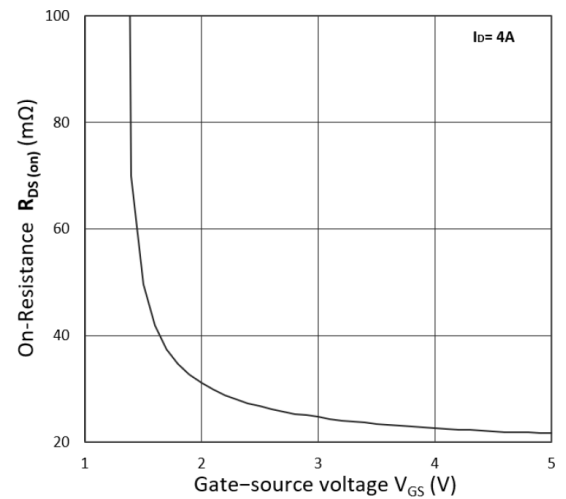


Fig.4 $R_{DS(on)}$ vs. V_{GS}

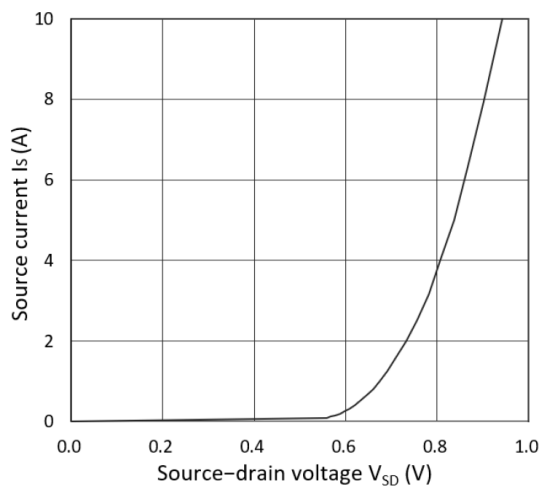


Fig.5 I_S vs. V_{SD}

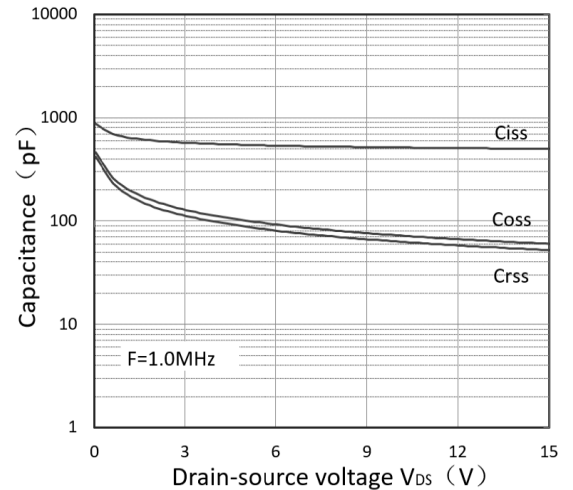
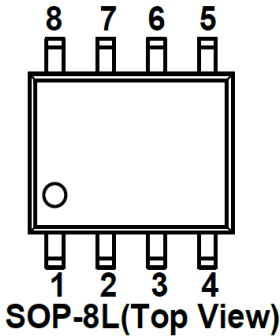
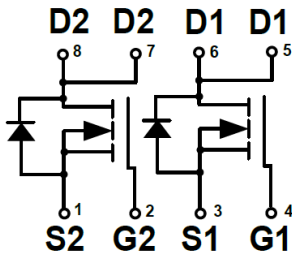


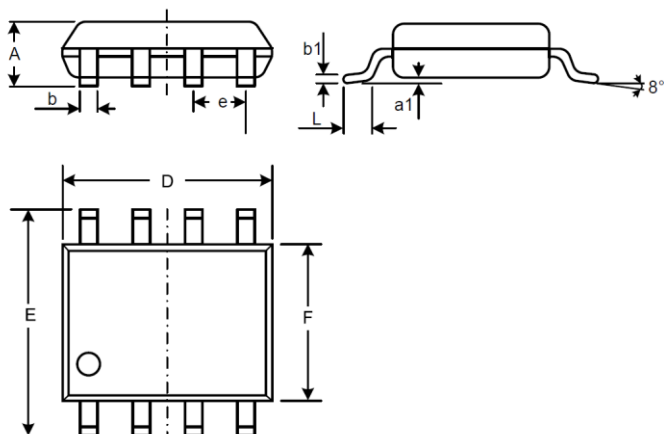
Fig.6 CAPACITANCE CHARACTERISTICS

PINNING INFORMATION

PIN	SIMPLIFIED OUTLINE	CIRCUIT DIAGRAM
Pin1 Source 2 Pin2 Gate 2 Pin3 Source 1 Pin4 Gate 1 Pin5 Drain 1 Pin6 Drain 1 Pin7 Drain 2 Pin8 Drain 2	 SOP-8L(Top View)	

PACKAGE INFORMATION

SOP-8L

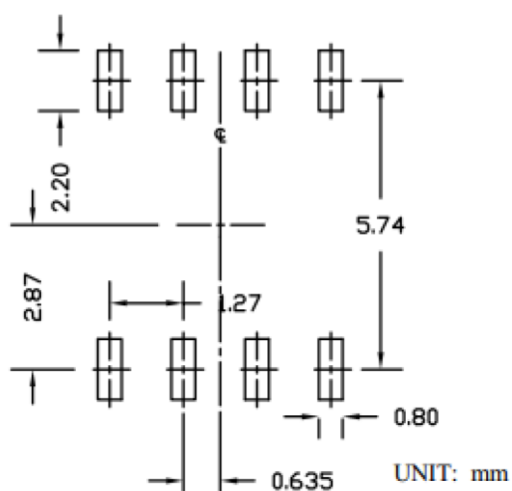


SYMBOL	OUTLINE DIMENSIONS			
	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	1.23	1.75	0.048	0.069
a1	0.05	0.25	0.002	0.010
b	0.31	0.51	0.012	0.020
b1	0.16	0.25	0.006	0.010
D	4.70	5.15	0.185	0.203
E	5.75	6.25	0.226	0.246
e	1.07	1.47	0.042	0.058
F	3.70	4.10	0.146	0.161
L	0.40	1.27	0.016	0.050

Notes

1. Dimensioning and tolerances per ANSI Y14.5M, 1985.
2. Controlling Dimension: Inches
3. Dimensions are exclusive of mold flash and metal burrs.

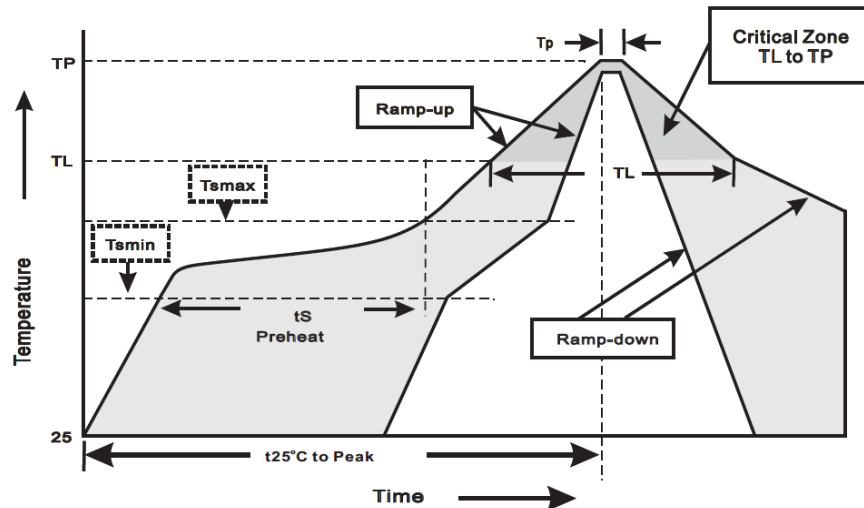
SOLDERING PAD



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...

ALP048N02I

SOP-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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