100V 31mΩ Dual N-Ch Power MOSFET

Features

- Low $R_{DS(ON)}$
- Low Gate Charge
- 100% UIS Tested, 100% R_g Tested
- Pb-free Lead Plating
- Halogen-free and RoHS-compliant

Product Summary

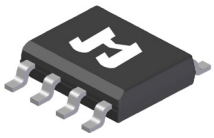
Parameter	Value	Unit
V_{DS}	100	V
$V_{GS(th)\_Typ}$	2.0	V
I_D (@ V_{GS} = 10V) (1)	12.3	A
$R_{DS(ON)\_Typ}$ (@ V_{GS} = 10V)	31	mΩ
$R_{DS(ON)\_Typ}$ (@ V_{GS} = 4.5V)	40	mΩ

Applications

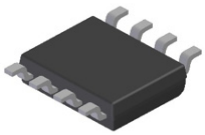
- Power Managerment in Telecom., Industrial Automation, CE
- Current Switching in DC/DC & AC/DC Sub-systems
- Motor Driving in Power Tool, E-vehicle, Robotics

SOP-8L

Top View

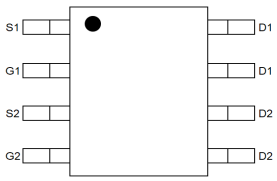


Bottom View

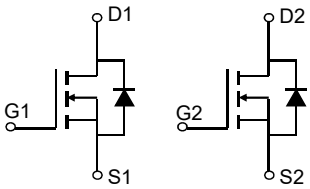


Pin Configuration

Top View



Chip-1 & Chip-2



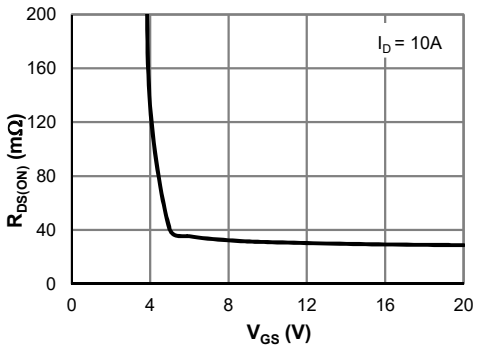
Ordering Information

Device	Package	# of Pins	Marking	MSL	T_J (°C)	Media	Quantity (pcs)
JMSL1040APD-13	SOP-8L	8	L1040AD	3	-55 to 150	13-inch Reel	4000

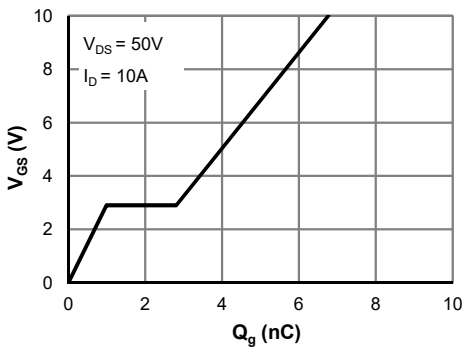
Absolute Maximum Ratings (@ T_A = 25°C unless otherwise specified)

Parameter		Symbol	Value	Unit
Drain-to-Source Voltage		V_{DS}	100	V
Gate-to-Source Voltage		V_{GS}	±20	V
Continuous Drain Current (1)	T_C = 25°C	I_D	12.3	A
	T_C = 100°C		7.8	
Pulsed Drain Current (2)		I_{DM}	49	A
Avalanche Current (3)		I_{AS}	15.0	A
Avalanche Energy (3)		E_{AS}	11.3	mJ
Power Dissipation (4)	T_C = 25°C	P_D	11.4	W
	T_C = 100°C		4.5	
Junction & Storage Temperature Range		T_J, T_{STG}	-55 to 150	°C

$R_{DS(ON)}$ vs. V_{GS}



Gate Charge



Electrical Characteristics (@ T_J = 25°C unless otherwise specified)

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
STATIC PARAMETERS						
Drain-Source Breakdown Voltage	$V_{(BR)DSS}$	I_D = 250μA, V_{GS} = 0V	100			V
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS} =80V, V_{GS} = 0V			1.0	μA
		T_J = 55°C			5.0	
Gate-Body Leakage Current	I_{GSS}	V_{DS} = 0V, V_{GS} = ±20V			±100	nA
Gate Threshold Voltage	$V_{GS(th)}$	V_{DS} = V_{GS}, I_D = 250μA	1.2	2.0	3.0	V
Static Drain-Source ON-Resistance	$R_{DS(ON)}$	V_{GS} = 10V, I_D = 10A		31	40	mΩ
		V_{GS} = 4.5V, I_D = 6A		40	52	mΩ
Forward Transconductance	g_{FS}	V_{DS} = 5V, I_D = 10A		28		S
Diode Forward Voltage	V_{SD}	I_S = 1A, V_{GS} = 0V		0.70	1.0	V
Diode Continuous Current	I_S	T_C = 25°C			11	A
DYNAMIC PARAMETERS (5)						
Input Capacitance	C_{iss}	V_{GS} = 0V, V_{DS} = 50V, f = 1MHz		363		pF
Output Capacitance	C_{oss}			85		pF
Reverse Transfer Capacitance	C_{rss}			3.0		pF
Gate Resistance	R_g	V_{GS} = 0V, V_{DS}= 0V, f = 1MHz		2.6		Ω
SWITCHING PARAMETERS (5)						
Total Gate Charge (@ V_{GS} = 10V)	Q_g	V_{GS} = 0 to 10V V_{DS} = 50V, I_D = 10A		6.8		nC
Total Gate Charge (@ V_{GS} = 4.5V)	Q_g			3.7		nC
Gate Source Charge	Q_{gs}			1.0		nC
Gate Drain Charge	Q_{gd}			1.8		nC
Turn-On DelayTime	$t_{D(on)}$	V_{GS} = 10V, V_{DS} = 50V R_L = 5.0Ω, R_{GEN} = 6Ω		4.9		ns
Turn-On Rise Time	t_r			16.6		ns
Turn-Off DelayTime	$t_{D(off)}$			11.2		ns
Turn-Off Fall Time	t_f			4.9		ns
Body Diode Reverse Recovery Time	t_{rr}	I_F = 10A, dI_F/dt = 100A/μs		33		ns
Body Diode Reverse Recovery Charge	Q_{rr}	I_F = 10A, dI_F/dt = 100A/μs		45		nC

Thermal Performance

Parameter	Symbol	Typ.	Max.	Unit
Thermal Resistance, Junction-to-Ambient (t≤10s)	$R_{\theta JA}$	40	50	°C/W
Thermal Resistance, Junction-to-Ambient (steady state)	$R_{\theta JA}$	70	85	°C/W

Notes:

1. Computed continuous current assumes the condition of T_{J_Max} while the actual continuous current depends on the thermal & electro-mechanical application board design.
2. This single-pulse measurement was taken under T_{J_Max} = 150°C.
3. This single-pulse measurement was taken under the following condition [L = 100μH, V_{GS} = 10V, V_{DD} = 50V] while its value is limited by T_{J_Max} = 150°C.
4. The power dissipation P_D is based on T_{J_Max} = 150°C.
5. This value is guaranteed by design hence it is not included in the production test.

Typical Electrical & Thermal Characteristics

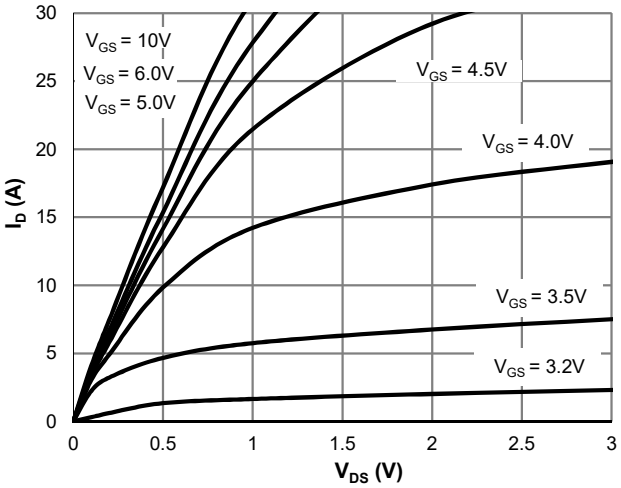


Figure 1: Saturation Characteristics

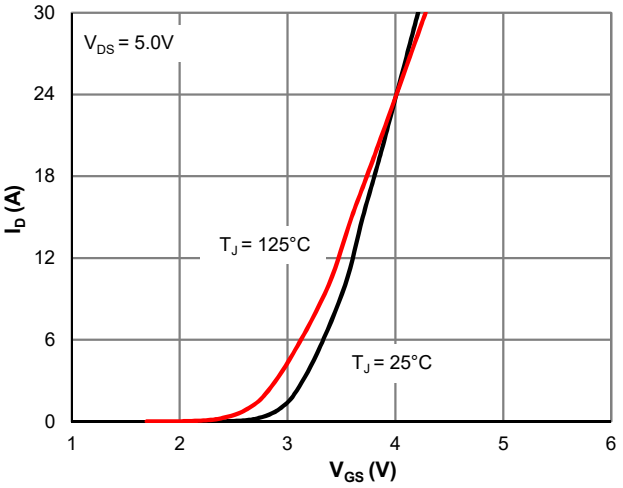


Figure 2: Transfer Characteristics

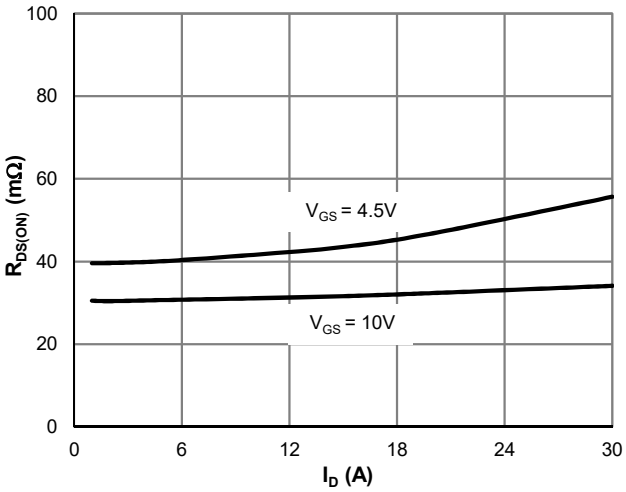


Figure 3: $R_{DS(ON)}$ vs. Drain Current

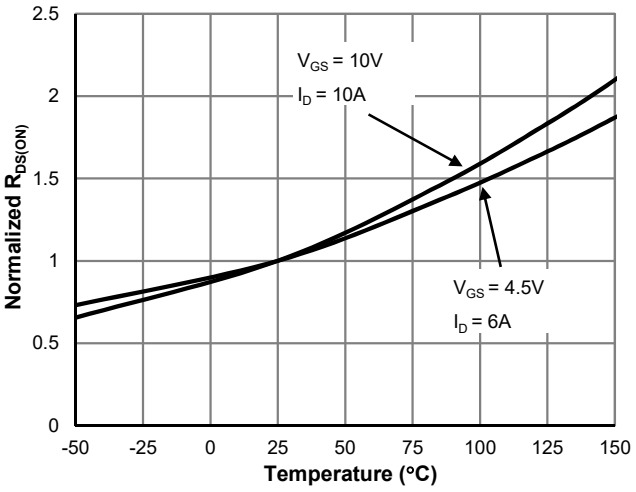


Figure 4: $R_{DS(ON)}$ vs. Junction Temperature

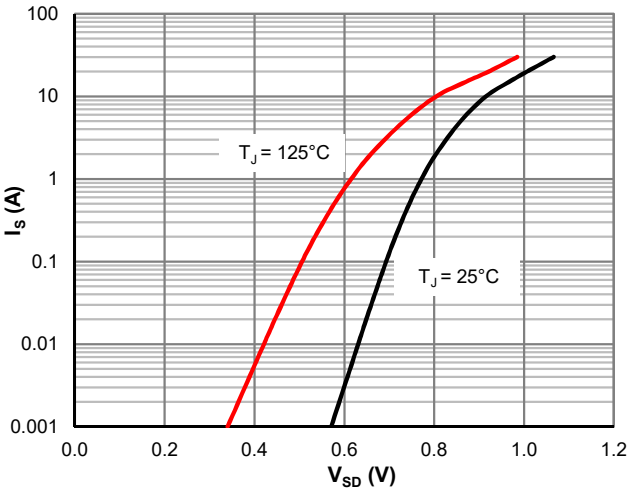


Figure 5: Body-Diode Characteristics

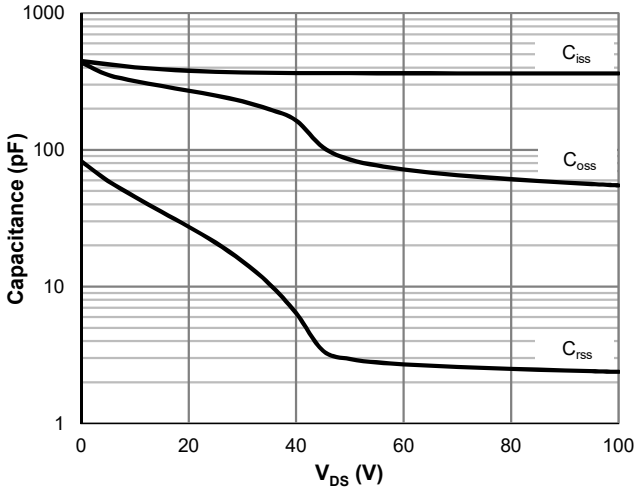


Figure 6: Capacitance Characteristics

Typical Electrical & Thermal Characteristics

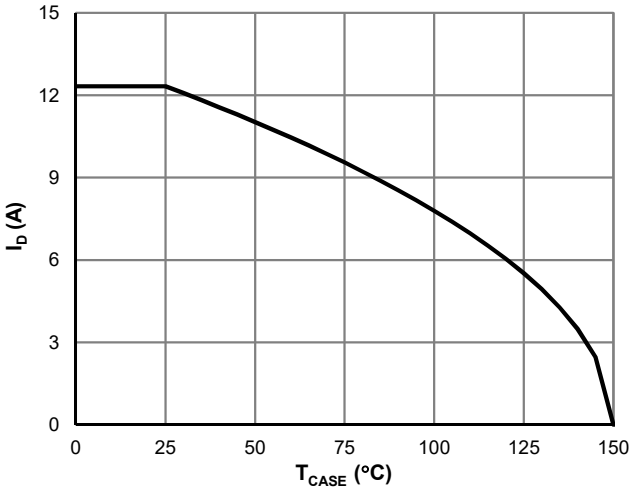


Figure 7: Current De-rating

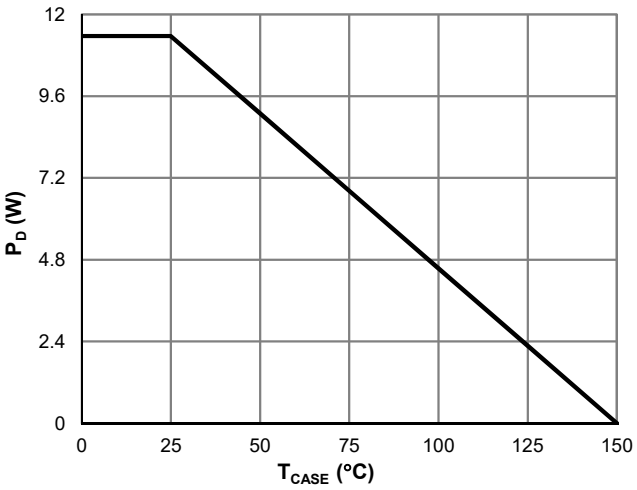


Figure 8: Power De-rating

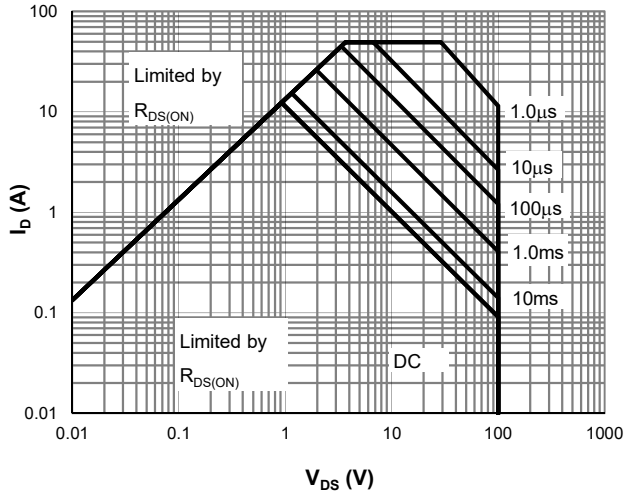


Figure 9: Maximum Safe Operating Area

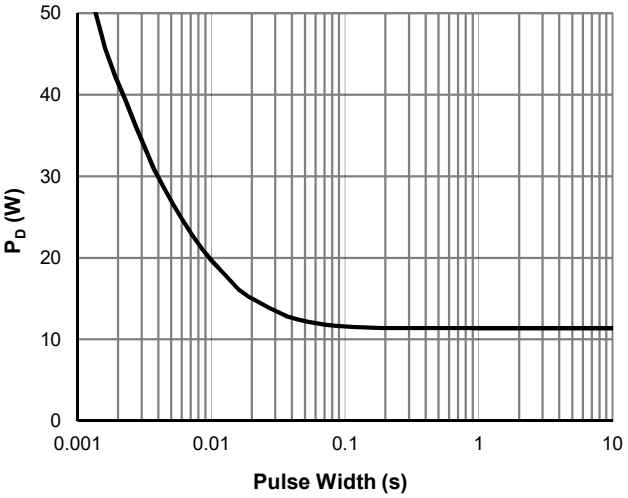


Figure 10: Single Pulse Power Rating, Junction-to-Case

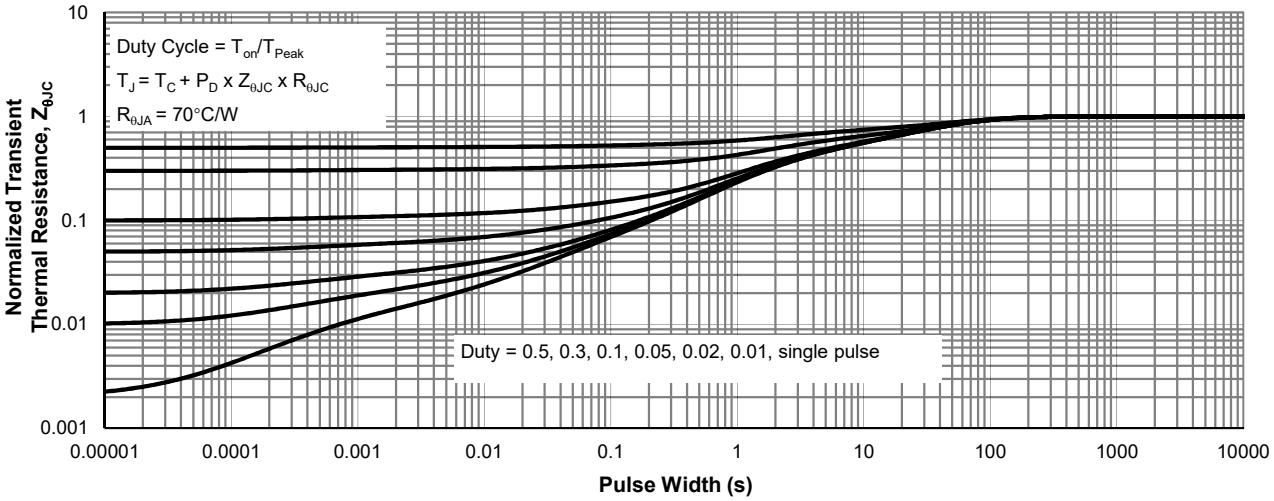
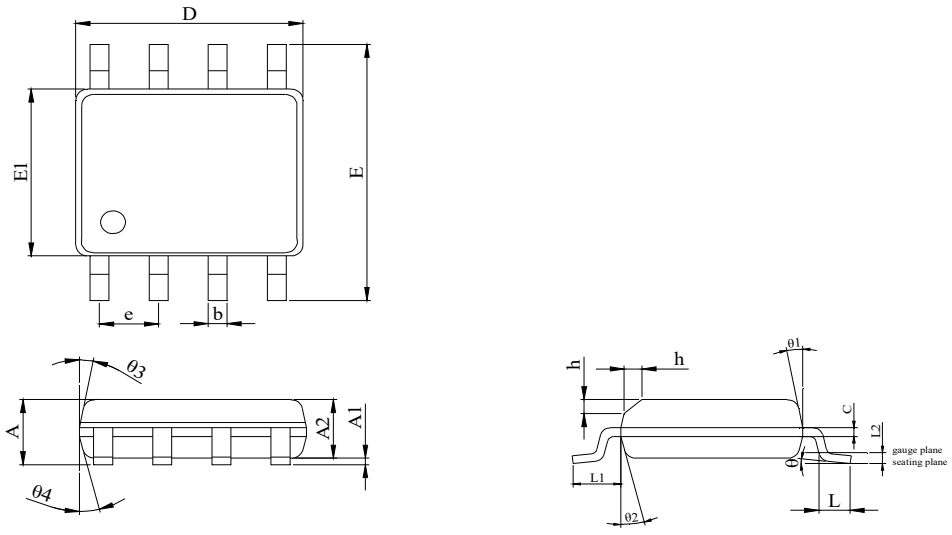


Figure 11: Normalized Maximum Transient Thermal Impedance

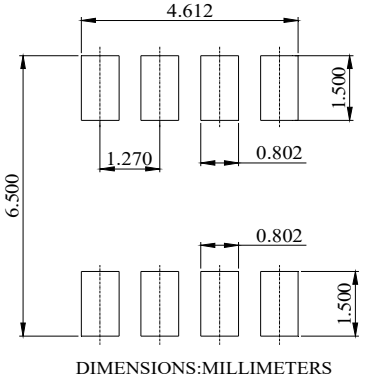
SOP-8L Package Information

Package Outline



DIM	MILLIMETER		
	MIN.	NOM.	MAX.
A	1.35	1.50	1.65
A1	0.05	0.10	0.15
A2	1.35	1.40	1.50
b	0.38	--	0.50
c	0.17	--	0.25
D	4.80	4.90	5.00
E	5.80	6.00	6.20
E1	3.80	3.90	4.00
e	1.27(BSC)		
L	0.45	0.60	0.80
L1	1.04 REF		
L2	0.25 BSC		
h	0.30	0.40	0.50
θ	0°	--	8°
θ_1	10°	12°	14°
θ_2	8°	10°	12°
θ_3	10°	12°	14°
θ_4	8°	10°	12°

Recommend Soldering Footprint



DIMENSIONS:MILLIMETERS