100V 10.4mΩ Dual N-Ch Power MOSFET

Features

- Ultra-low $R_{DS(ON)}$
- Low Gate Charge
- High Current Capability
- 100% UIS Tested, 100% R_g Tested

Applications

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

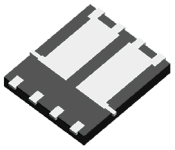
Product Summary

Parameter	Value	Unit
V_{DS}	100	V
$V_{GS(th)\_Typ}$	1.7	V
I_D (@ V_{GS} = 10V) (1)	48	A
$R_{DS(ON)\_Typ}$ (@ V_{GS} = 10V)	10.4	mΩ
$R_{DS(ON)\_Typ}$ (@ V_{GS} = 4.5V)	12.9	mΩ

PDFN5x6-8L-D

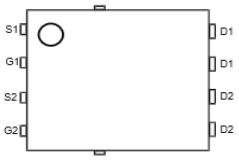
Top View

Bottom View

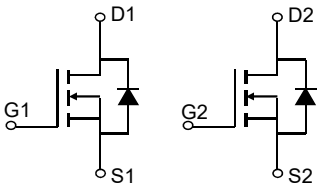


Pin Configuration

Top View



Chip-1 & Chip-2



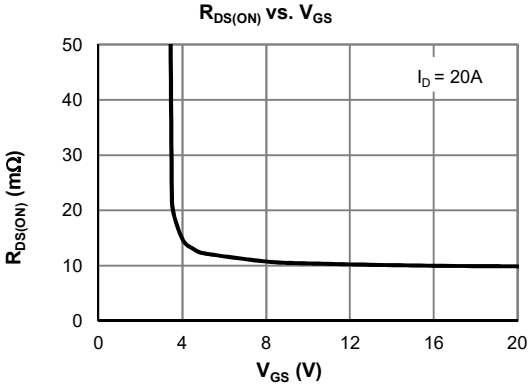
Ordering Information

Device	Package	# of Pins	Marking	MSL	T_J (°C)	Media	Quantity (pcs)
JMSL1013AGD-13	PDFN5x6-8L-D	8	L1013AG	1	-55 to 150	13-inch Reel	3000

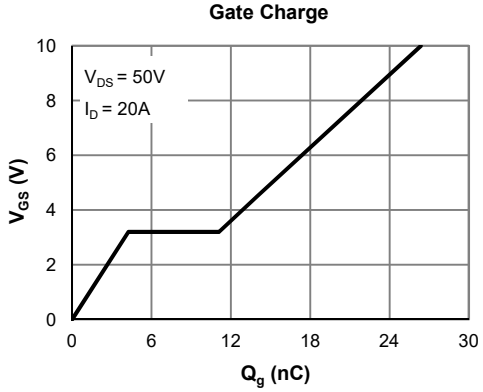
Absolute Maximum Ratings (@ T_A = 25°C unless otherwise specified)

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	48	A
	T_C = 100°C		30	
Pulsed Drain Current (2)		I_{DM}	191	A
Avalanche Current (3)		I_{AS}	37	A
Avalanche Energy (3)		E_{AS}	68	mJ
Power Dissipation (4)	T_C = 25°C	P_D	54	W
	T_C = 100°C		22	
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	1.7	2.5	V
Static Drain-Source ON-Resistance	$R_{DS(ON)}$	V_{GS} = 10V, I_D = 20A		10.4	13.0	mΩ
		V_{GS} = 4.5V, I_D = 15A		12.9	16.8	mΩ
Forward Transconductance	g_{FS}	V_{DS} = 5V, I_D = 20A		57		S
Diode Forward Voltage	V_{SD}	I_S = 1A, V_{GS} = 0V		0.68	1.0	V
Diode Continuous Current	I_S	T_C = 25°C			54	A
DYNAMIC PARAMETERS (5)						
Input Capacitance	C_{iss}	V_{GS} = 0V, V_{DS} = 50V, f = 1MHz		1535		pF
Output Capacitance	C_{oss}			335		pF
Reverse Transfer Capacitance	C_{rss}			8.2		pF
Gate Resistance	R_g	V_{GS} = 0V, V_{DS}= 0V, f = 1MHz		1.8		Ω
SWITCHING PARAMETERS (5)						
Total Gate Charge (@ V_{GS} = 10V)	Q_g	V_{GS} = 0 to 10V V_{DS} = 50V, I_D = 20A		26		nC
Total Gate Charge (@ V_{GS} = 4.5V)	Q_g			14.0		nC
Gate Source Charge	Q_{gs}			4.3		nC
Gate Drain Charge	Q_{gd}			6.8		nC
Turn-On DelayTime	$t_{D(on)}$	V_{GS} = 10V, V_{DS} = 50V R_L = 2.5Ω, R_{GEN} = 6Ω		7.5		ns
Turn-On Rise Time	t_r			15.8		ns
Turn-Off DelayTime	$t_{D(off)}$			31		ns
Turn-Off Fall Time	t_f			28		ns
Body Diode Reverse Recovery Time	t_{rr}	I_F = 15A, dI_F/dt = 100A/μs		43		ns
Body Diode Reverse Recovery Charge	Q_{rr}	I_F = 15A, dI_F/dt = 100A/μs		35		nC

Thermal Performance

Parameter	Symbol	Typ.	Max.	Unit
Thermal Resistance, Junction-to-Ambient	$R_{\theta JA}$	55	65	°C/W
Thermal Resistance, Junction-to-Case	$R_{\theta JC}$	1.8	2.3	°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_{DS} = 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

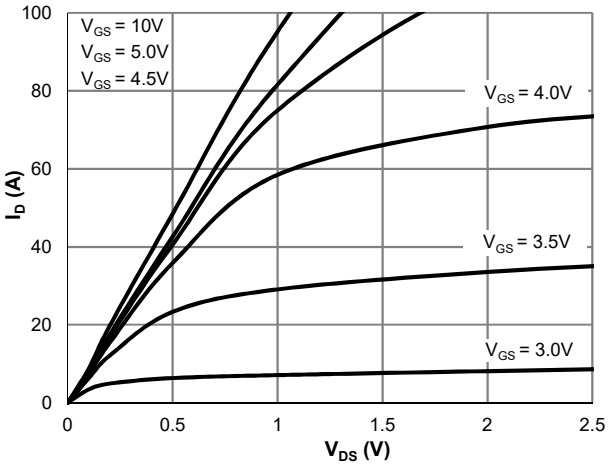


Figure 1: Saturation Characteristics

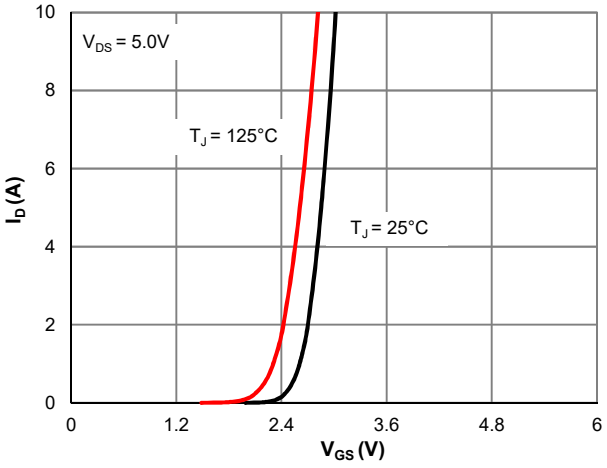


Figure 2: Transfer Characteristics

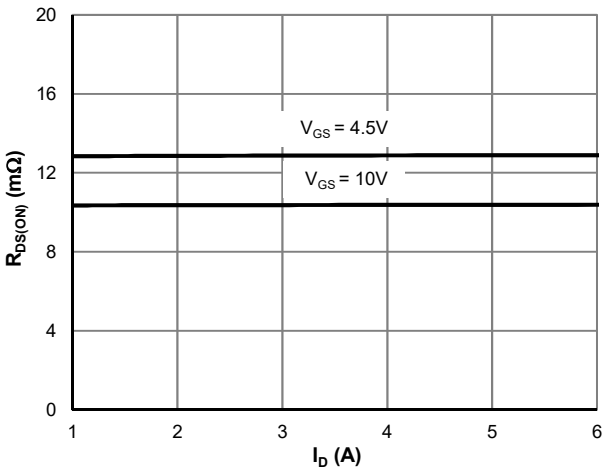


Figure 3: $R_{DS(ON)}$ vs. Drain Current

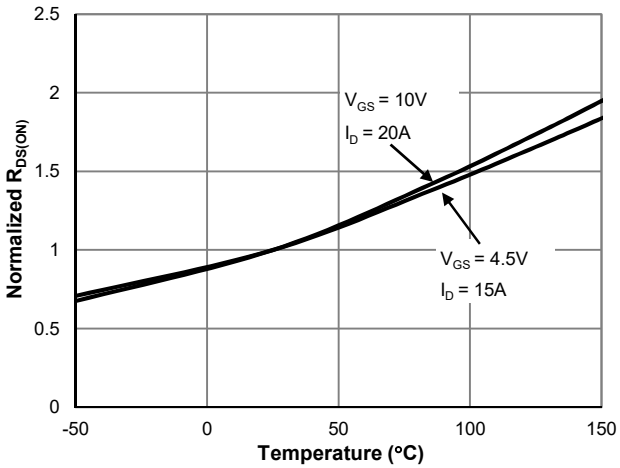


Figure 4: $R_{DS(ON)}$ vs. Junction Temperature

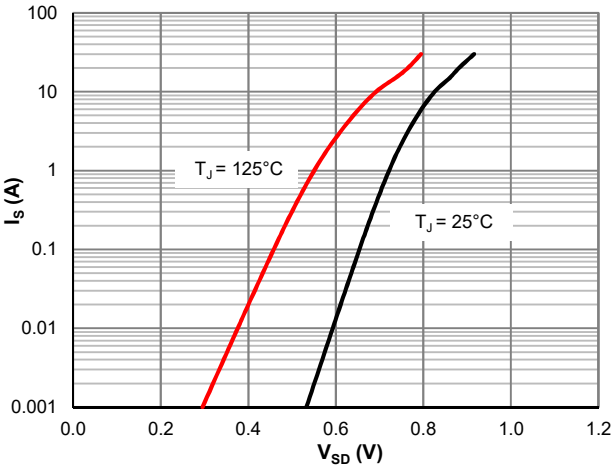


Figure 5: Body-Diode Characteristics

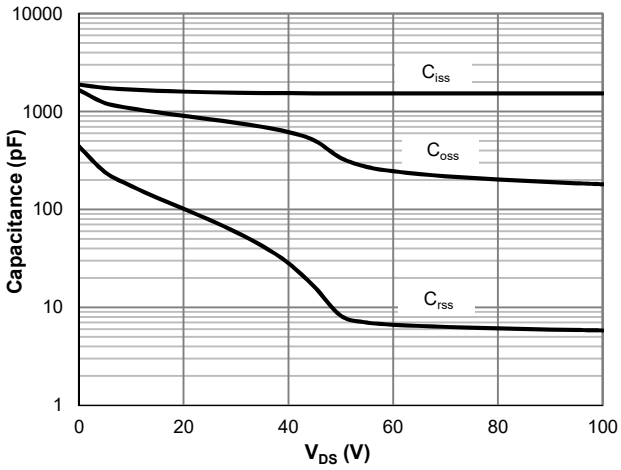


Figure 6: Capacitance Characteristics

Typical Electrical & Thermal Characteristics

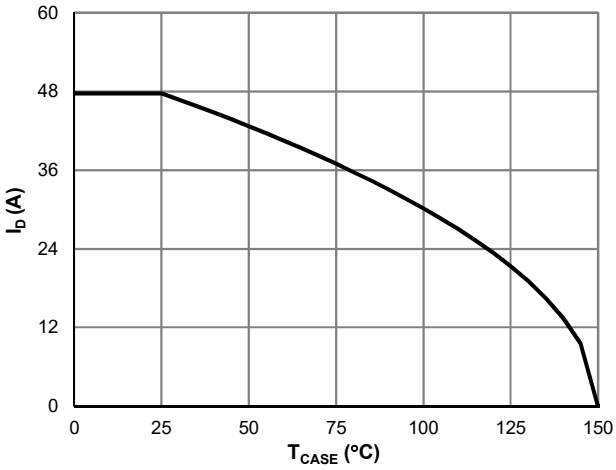


Figure 7: Current De-rating

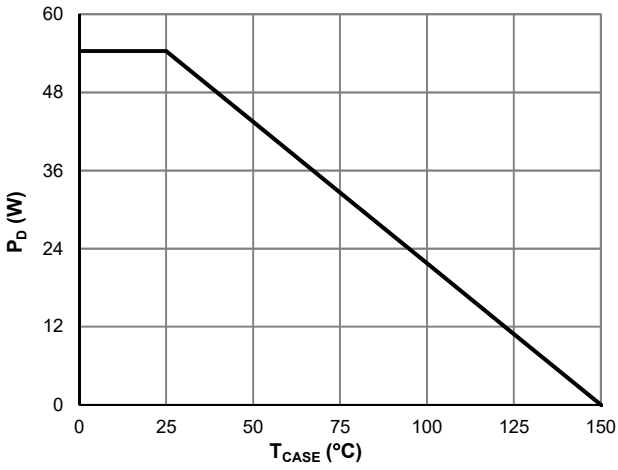


Figure 8: Power De-rating

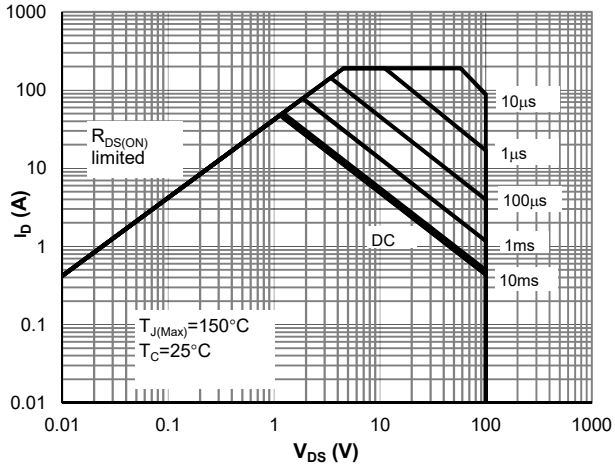


Figure 9: Maximum Safe Operating Area

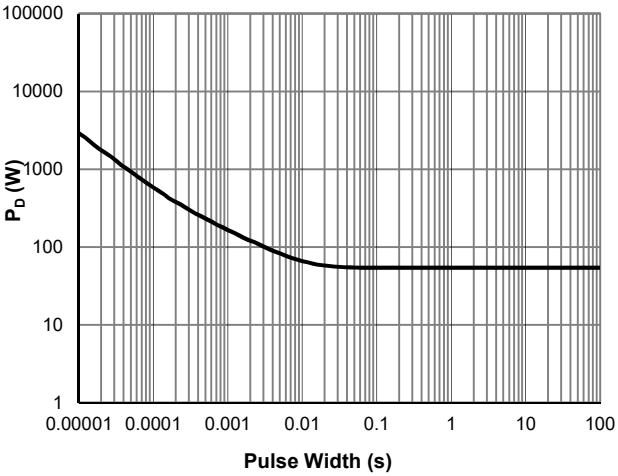


Figure 10: Single Pulse Power Rating, Junction-to-Case

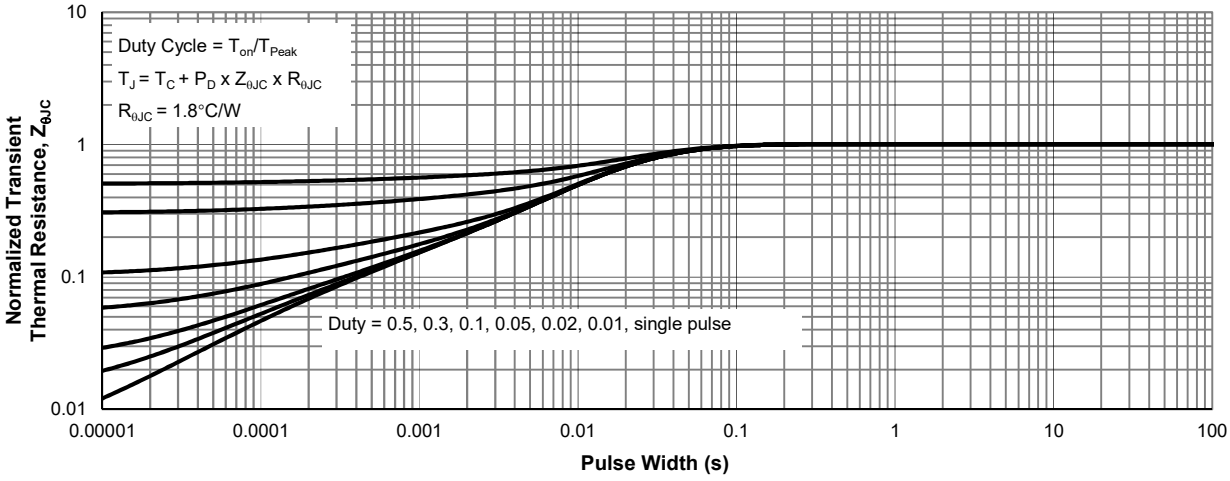
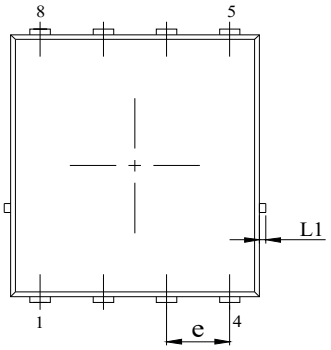


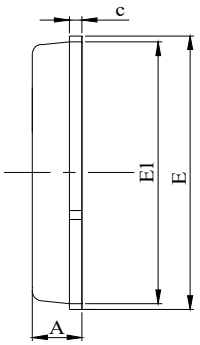
Figure 11: Normalized Maximum Transient Thermal Impedance

PDFN5x6-8L-D Package Information

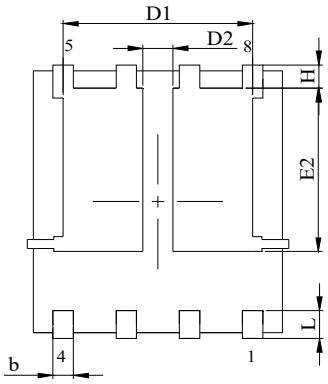
Package Outline



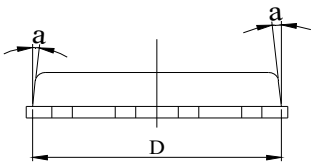
Top View



Side View



Bottom View



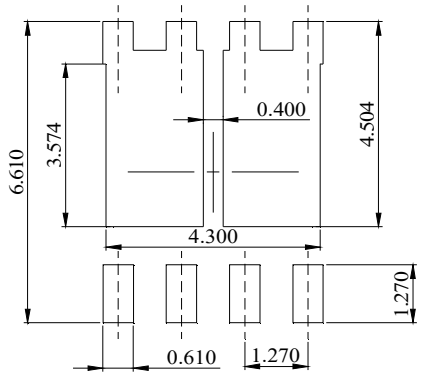
Front View

NOTES:

1. Dimension and tolerance per ASME Y14.5M, 1994.
2. All dimensions in millimeter (angle in degree).
3. Dimensions D and E1 do not include mold flash protrusions or gate burrs.

DIM.	MILLIMETER	
	MIN.	MAX.
A	0.90	1.10
b	0.33	0.51
c	0.23	0.33
D	4.80	5.40
D1	3.61	4.25
D2	0.50	0.70
E	5.90	6.25
E1	5.55	5.80
E2	3.35	3.78
e	1.27 BSC	
H	0.41	0.80
L	0.51	0.80
L1	-	0.15
a	0°	12°

Recommended Soldering Footprint



DIMENSIONS: MILLIMETERS