



100V 3.1mΩ N-Ch Power MOSFET

Features

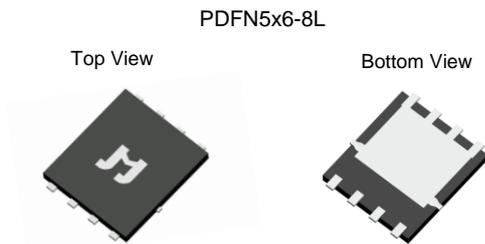
- Ultra-low $R_{DS(ON)}$
- Low Gate Charge
- 100% UIS Tested, 100% R_g Tested
- Pb-free Lead Plating
- Halogen-free and RoHS-compliant

Product Summary

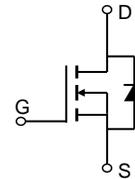
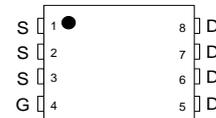
Parameter	Value	Unit
V_{DS}	100	V
$V_{GS(th)_Typ}$	3.0	V
I_D (@ $V_{GS} = 10V$) ⁽¹⁾	159	A
$R_{DS(ON)_Typ}$ (@ $V_{GS} = 10V$)	3.1	mΩ

Applications

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



Pin Configuration
Top View

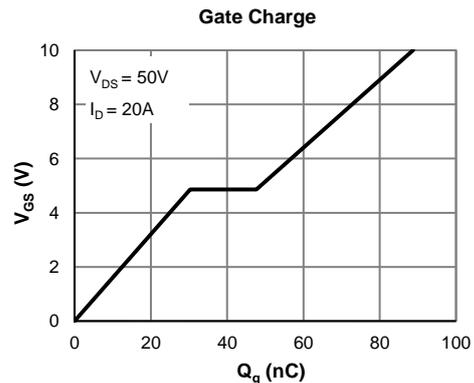
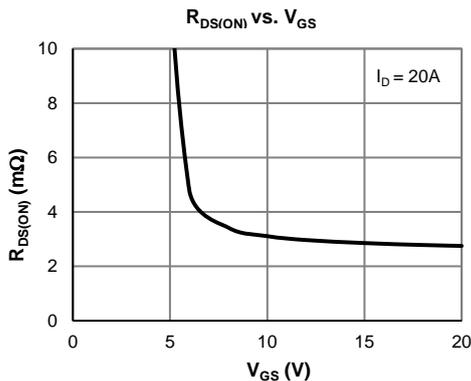


Ordering Information

Device	Package	# of Pins	Marking	MSL	T_J (°C)	Media	Quantity (pcs)
JMSH1003NG-13	PDFN5x6-8L	8	SH1003N	1	-55 to 150	13-inch Reel	5000

Absolute Maximum Ratings (@ $T_A = 25^\circ C$ 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⁾	I_D	$T_C = 25^\circ C$	159
		$T_C = 100^\circ C$	100
Pulsed Drain Current ⁽²⁾	I_{DM}	636	A
Avalanche Energy ⁽³⁾	E_{AS}	618	mJ
Power Dissipation ⁽⁴⁾	P_D	$T_C = 25^\circ C$	178
		$T_C = 100^\circ C$	71
Junction & Storage Temperature Range	T_J, T_{STG}	-55 to 150	°C



**Electrical Characteristics** (@ $T_J = 25^\circ\text{C}$ unless otherwise specified)

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
STATIC PARAMETERS						
Drain-Source Breakdown Voltage	$V_{(BR)DSS}$	$I_D = 250\mu\text{A}, V_{GS} = 0\text{V}$	100			V
Zero Gate Voltage Drain Current	I_{DSS}	$V_{DS} = 80\text{V}, V_{GS} = 0\text{V}$ $T_J = 55^\circ\text{C}$			1.0 5.0	μA
Gate-Body Leakage Current	I_{GSS}	$V_{DS} = 0\text{V}, V_{GS} = \pm 20\text{V}$			± 100	nA
Gate Threshold Voltage	$V_{GS(th)}$	$V_{DS} = V_{GS}, I_D = 250\mu\text{A}$	2.0	3.0	4.0	V
Static Drain-Source ON-Resistance	$R_{DS(ON)}$	$V_{GS} = 10\text{V}, I_D = 20\text{A}$		3.1	3.7	$\text{m}\Omega$
Forward Transconductance	g_{FS}	$V_{DS} = 5\text{V}, I_D = 20\text{A}$		37		S
Diode Forward Voltage	V_{SD}	$I_S = 1\text{A}, V_{GS} = 0\text{V}$		0.66	1.0	V
Diode Continuous Current	I_S	$T_C = 25^\circ\text{C}$			159	A

DYNAMIC PARAMETERS ⁽⁵⁾

Input Capacitance	C_{iss}	$V_{GS} = 0\text{V}, V_{DS} = 50\text{V}, f = 1\text{MHz}$		6172		pF
Output Capacitance	C_{oss}			854		pF
Reverse Transfer Capacitance	C_{rss}			17		pF
Gate Resistance	R_g	$V_{GS} = 0\text{V}, V_{DS} = 0\text{V}, f = 1\text{MHz}$		2.5		Ω

SWITCHING PARAMETERS ⁽⁵⁾

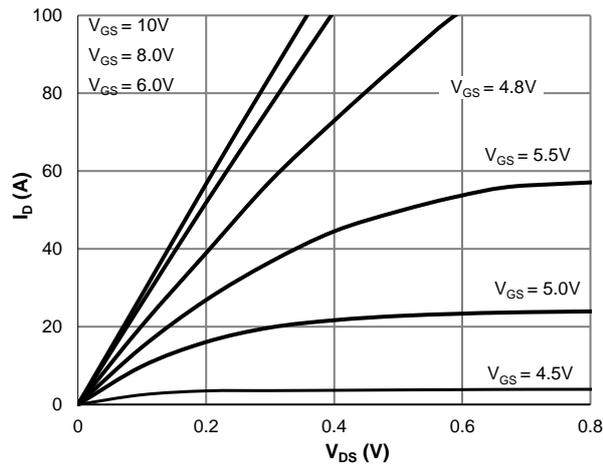
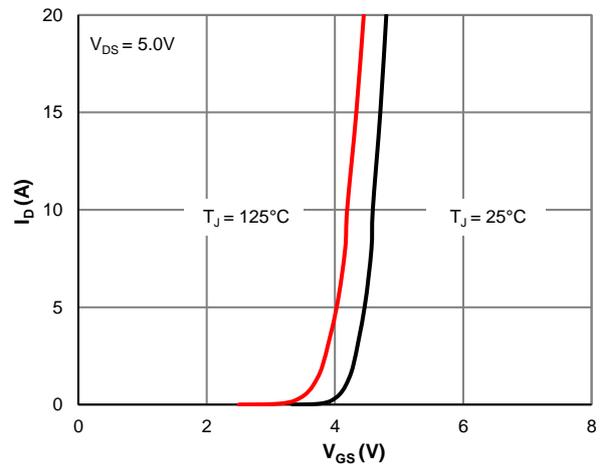
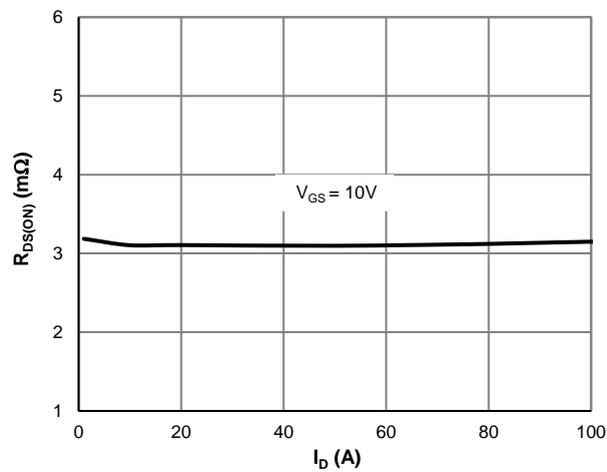
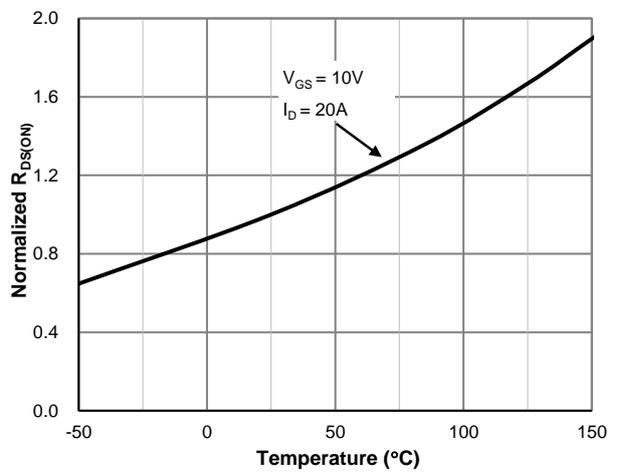
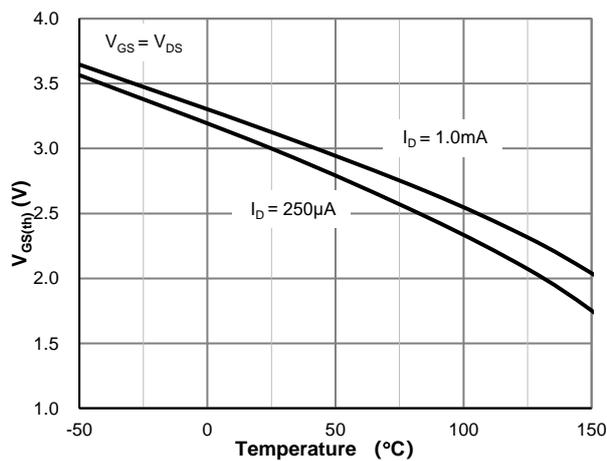
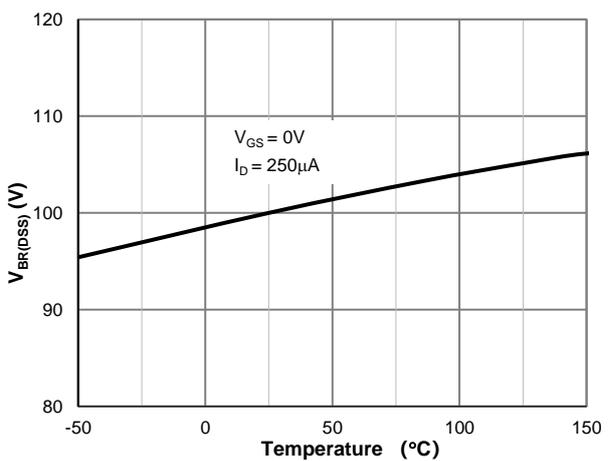
Total Gate Charge (@ $V_{GS} = 10\text{V}$)	Q_g	$V_{GS} = 0 \text{ to } 10\text{V}$ $V_{DS} = 50\text{V}, I_D = 20\text{A}$		89		nC
Total Gate Charge (@ $V_{GS} = 6.0\text{V}$)	Q_g			56		nC
Gate Source Charge	Q_{gs}			30		nC
Gate Drain Charge	Q_{gd}			17		nC
Turn-On DelayTime	$t_{D(on)}$	$V_{GS} = 10\text{V}, V_{DS} = 50\text{V}$ $R_L = 2.5\Omega, R_{GEN} = 3\Omega$		25		ns
Turn-On Rise Time	t_r			34		ns
Turn-Off DelayTime	$t_{D(off)}$			59		ns
Turn-Off Fall Time	t_f			27		ns
Body Diode Reverse Recovery Time	t_{rr}	$I_F = 20\text{A}, di_F/dt = 100\text{A}/\mu\text{s}$		108		ns
Body Diode Reverse Recovery Charge	Q_{rr}	$I_F = 20\text{A}, di_F/dt = 100\text{A}/\mu\text{s}$		138		nC

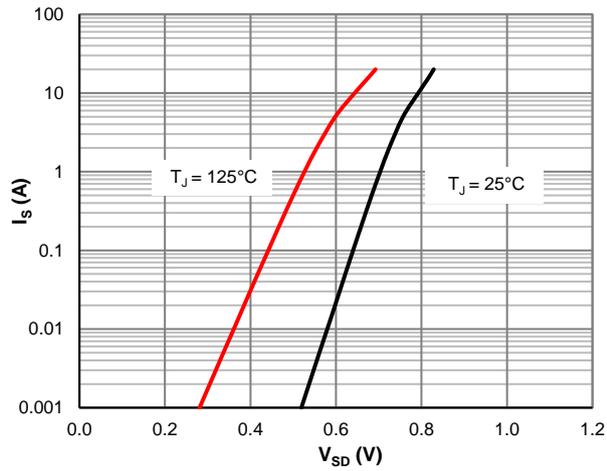
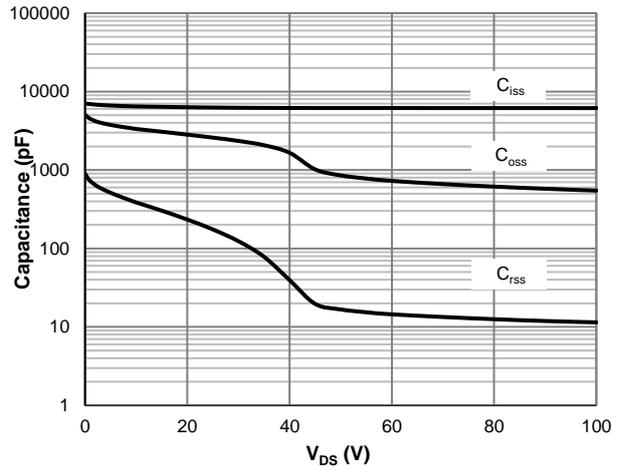
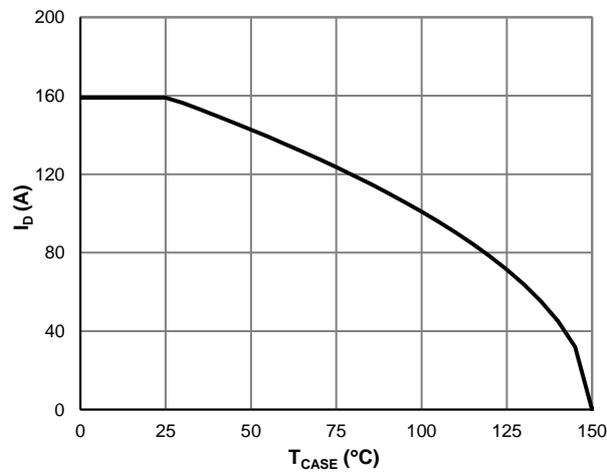
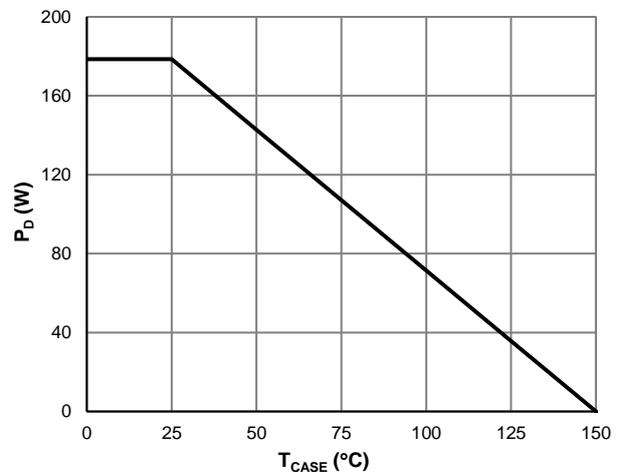
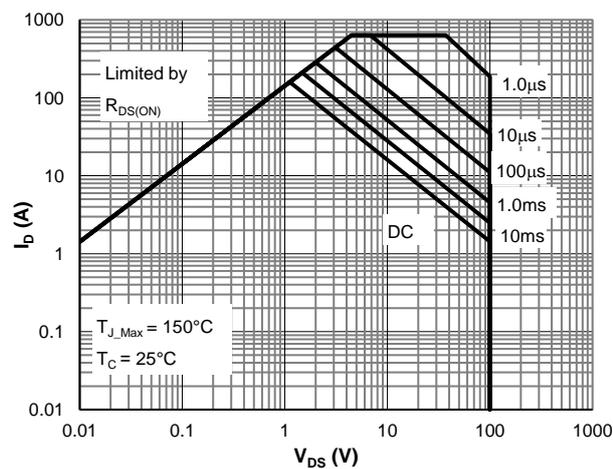
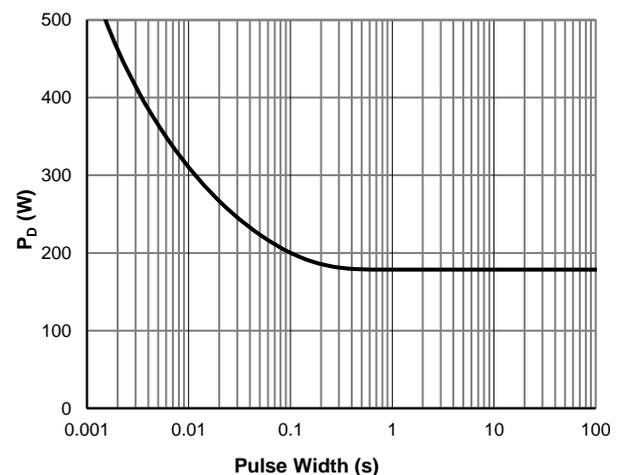
Thermal Performance

Parameter	Symbol	Typ.	Max.	Unit
Thermal Resistance, Junction-to-Ambient	$R_{\theta JA}$	50	60	$^\circ\text{C}/\text{W}$
Thermal Resistance, Junction-to-Case	$R_{\theta JC}$	0.70	0.91	$^\circ\text{C}/\text{W}$

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 $T_{J_Max} = 150^\circ\text{C}$.
3. EAS of 618 mJ is based on starting $T_J = 25^\circ\text{C}$, $L = 3\text{mH}$, $I_{AS} = 20.3\text{A}$, $V_{GS} = 10\text{V}$, $V_{DD} = 50\text{V}$.
4. The power dissipation P_D is based on $T_{J_Max} = 150^\circ\text{C}$.
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: $V_{GS(th)}$ vs. Junction Temperature

Figure 6: $V_{BR(DSS)}$ vs. Junction Temperature

Typical Electrical & Thermal Characteristics

Figure 7: Body-Diode Characteristics

Figure 8: Capacitance Characteristics

Figure 9: Current De-rating

Figure 10: Power De-rating

Figure 11: Maximum Safe Operating Area

Figure 12: Single Pulse Power Rating, Junction-to-Case

Typical Electrical & Thermal Characteristics

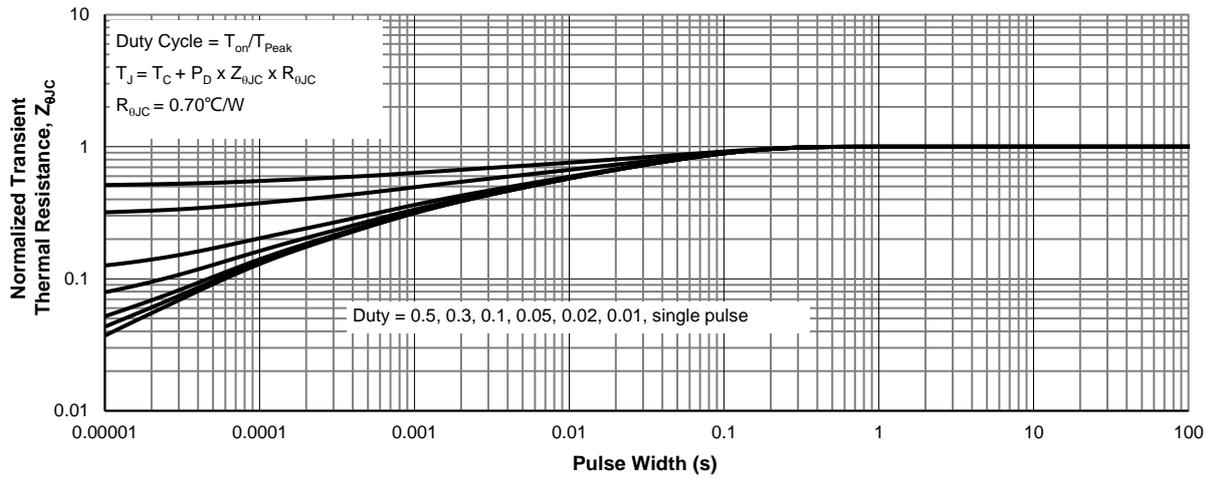
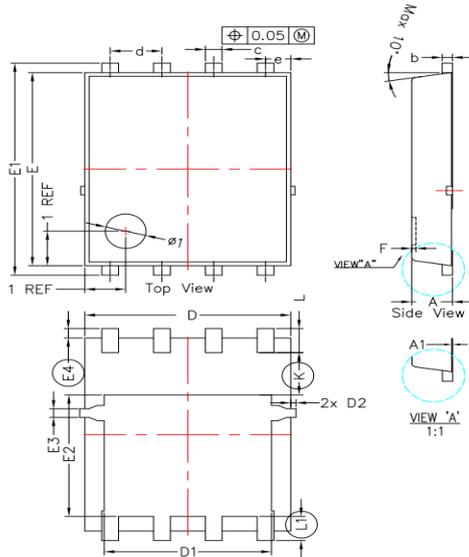


Figure 13: Normalized Maximum Transient Thermal Impedance

PDFN5x6-8L Package Information


SYMBOLS	DIMENSION IN MM			DIMENSION IN INCHES		
	MIN	NOM	MAX	MIN	NOM	MAX
*A	0.900	1.000	1.150	0.035	0.039	0.045
A1	0.000	----	0.050	0.000	----	0.002
b	0.246	0.254	0.350	0.010	0.010	0.014
*C	0.310	0.410	0.510	0.012	0.016	0.020
d	1.27BSC			0.050BSC		
*D	4.950	5.050	5.150	0.195	0.199	0.203
D1	4.000	4.100	4.200	0.157	0.161	0.165
*D2	0.125REF			0.005REF		
e	0.62BSC			0.024BSC		
*E	5.500	5.600	5.700	0.217	0.220	0.224
*E1	6.050	6.150	6.250	0.238	0.242	0.246
E2	3.425	3.525	3.625	0.135	0.139	0.143
E3	0.250REF			0.010REF		
*E4	0.275REF			0.011REF		
F	-	-	0.100	-	-	0.004
*L	0.500	0.600	0.700	0.02	0.02	0.03
L1	0.600	0.700	0.800	0.02	0.03	0.03
K	1.225REF			0.05REF		

Recommended Soldering Footprint
