

100V 3.1m N-Ch Power MOSFET

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	m

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°C unless otherwise specified)

Parameter	Symbol	Value	Unit
Drain-to-Source Voltage	V _{DS}	100	V
Gate-to-Source Voltage	V _{GS}	±20	V
			A
	I _{DM}		A
	E _{AS}		mJ
Power Dissipation ⁽⁴⁾			
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	$V_{(BR)DSS}$	$I_D = 250\text{ A}$, $V_{GS} = 0\text{ V}$	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	A
Gate-Body Leakage Current	I_{GSS}	$V_{DS} = 0\text{ V}$, $V_{GS} = \pm 20\text{ V}$			± 100	nA
Gate Threshold Voltage	$V_{GS(th)}$	$V_{DS} = V_{GS}$, $I_D = 250\text{ A}$	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	m
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		

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	$t_{D(on)}$	$V_{GS} = 10\text{ V}$, $V_{DS} = 50\text{ V}$ $R_L = 2.5\text{ }\Omega$, $R_{GEN} = 3\text{ }\Omega$		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}	$I_F = 20\text{ A}$, $di_F/dt = 100\text{ A}/\text{s}$		108		ns
Body Diode Reverse Recovery Charge	Q_{rr}	$I_F = 20\text{ A}$, $di_F/dt = 100\text{ A}/\text{s}$		138		nC

Thermal Performance

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

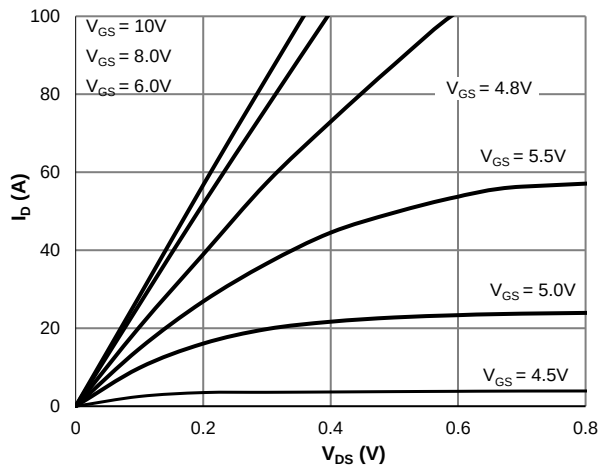


Figure 1: Saturation Characteristics

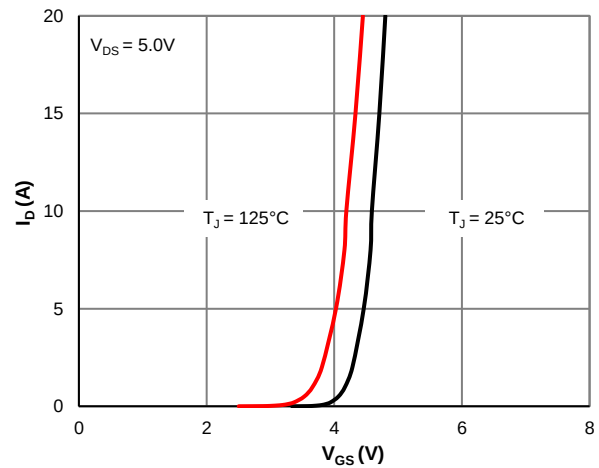


Figure 2: Transfer Characteristics

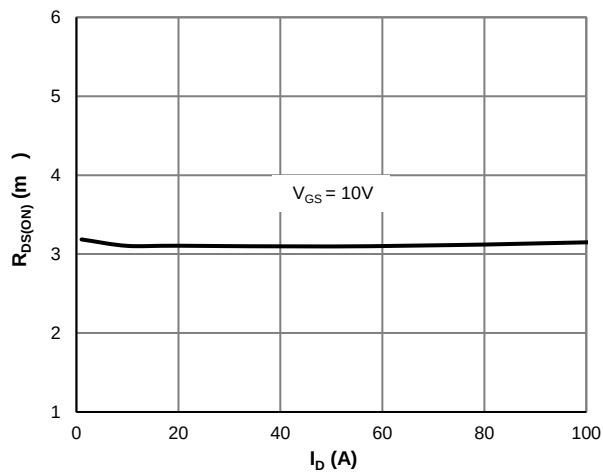


Figure 3: $R_{DS(ON)}$ vs. Drain Current

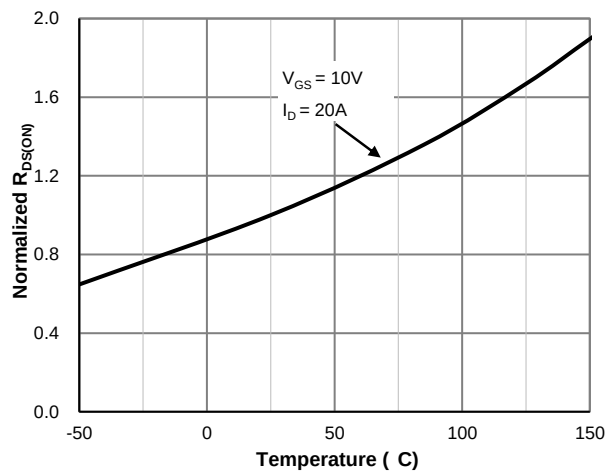


Figure 4: $R_{DS(ON)}$ vs. Junction Temperature

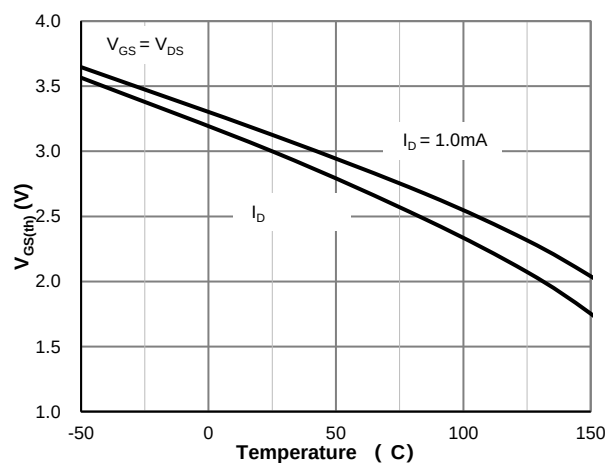


Figure 5: $V_{GS(th)}$ vs. Junction Temperature

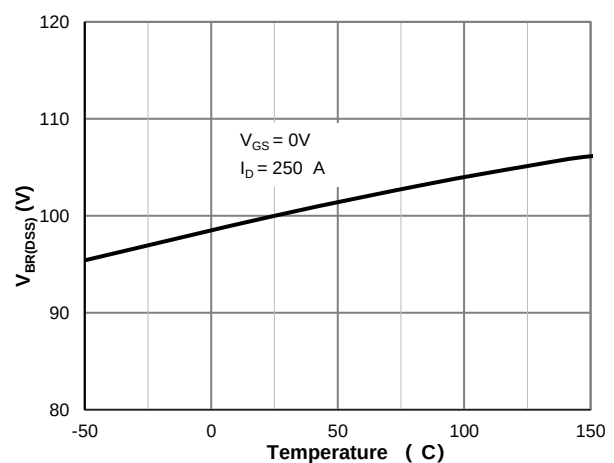


Figure 6: $V_{BR(DSS)}$ vs. Junction Temperature

Typical Electrical & Thermal Characteristics

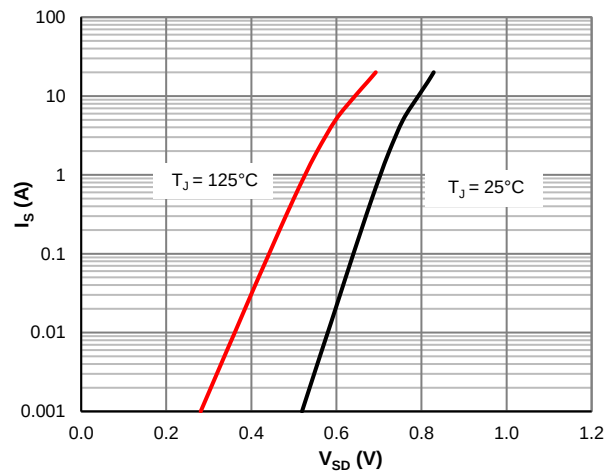


Figure 7: Body-Diode Characteristics

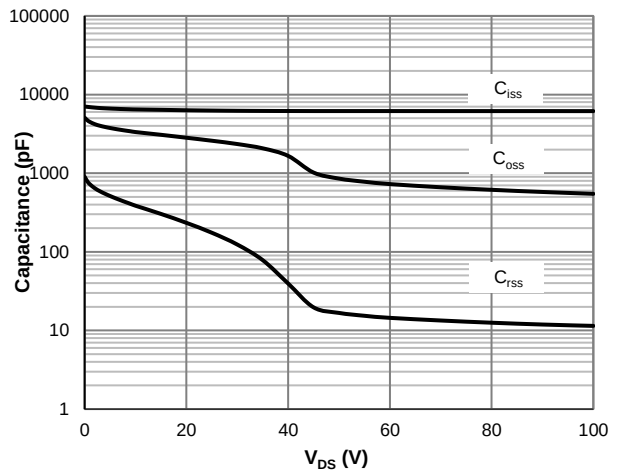


Figure 8: Capacitance Characteristics

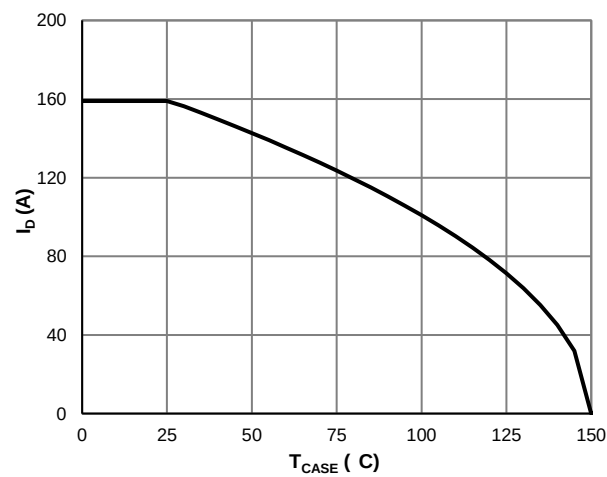


Figure 9: Current De-rating

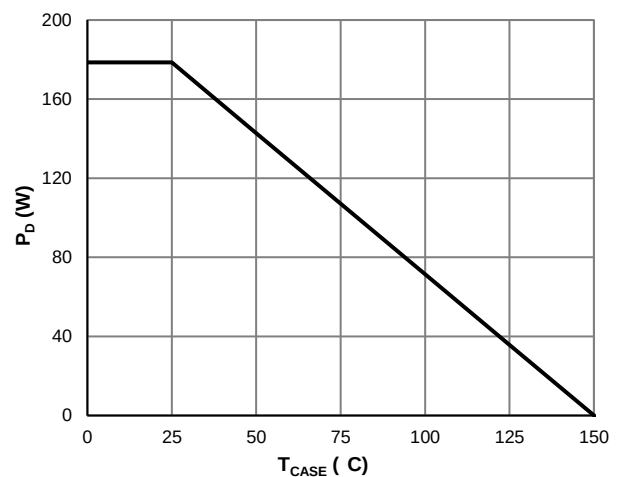


Figure 10: Power De-rating

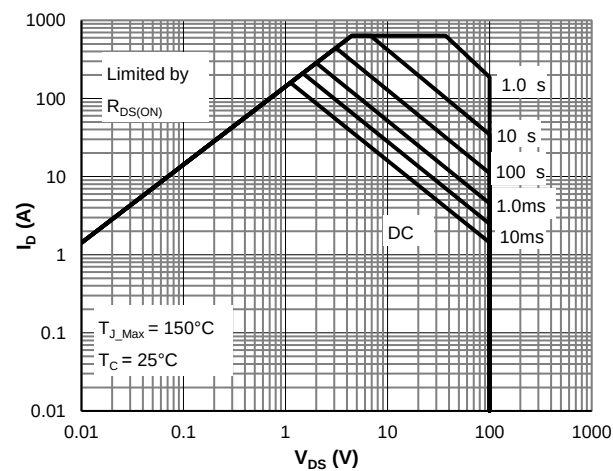


Figure 11: Maximum Safe Operating Area

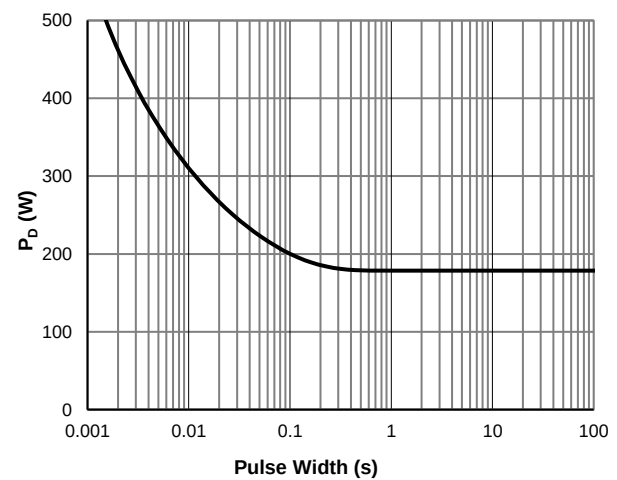


Figure 12: Single Pulse Power Rating, Junction-to-Case

Typical Electrical & Thermal Characteristics

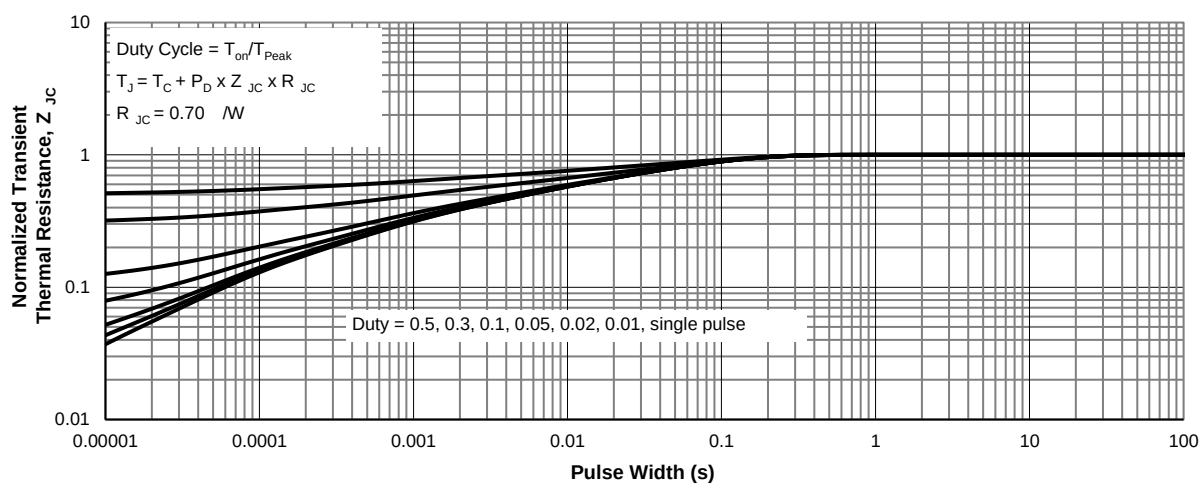
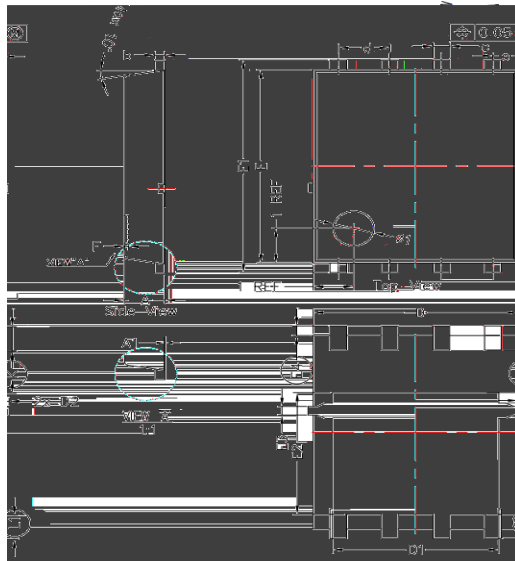


Figure 13: Normalized Maximum Transient Thermal Impedance

PDFN5x6-8L Package Information



SYMBOLS	MIN.	NOM.	MAX.	MIN.	NOM.	MAX.
*A	0.000	1.000	1.150	0.035	0.035	0.045
A1	0.000	0.000	0.250	0.000	0.000	0.002
b	0.245	0.254	0.350	0.010	0.010	0.040
c	0.195	0.198	0.203	0.000	0.000	0.000
D	0.152	0.165	0.165	0.000	0.000	0.000
D1	0.000	0.000	0.000	0.000	0.000	0.000
d	0.000	0.000	0.000	0.000	0.000	0.000
E	0.000	0.000	0.000	0.000	0.000	0.000
F	0.000	0.000	0.000	0.000	0.000	0.000
L	0.000	0.000	0.000	0.000	0.000	0.000
K	0.000	0.000	0.000	0.000	0.000	0.000

