

JMSH04060G3L

Features

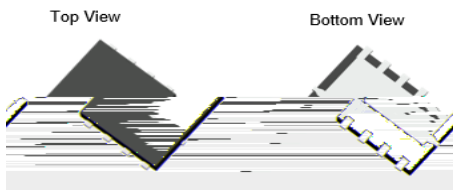
- Excellent $R_{DS(ON)}$ and Low Gate Charge
- 100% UIS Tested
- 100% Vds Tested
- Halogen-free; RoHS-compliant

Applications

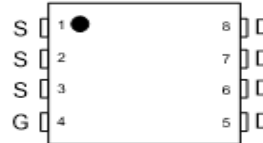
- Load Switch
- PWM Application
- Power Management

Product Summary

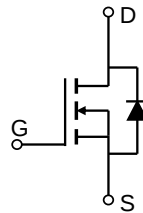
Parameters	Value	Unit
V_{DSS}	40	V
$V_{GS(th_Typ)}$	2.8	V
$I_D(@V_{GS}=10V)$	87	A
$R_{DS(ON_Typ)}(@V_{GS}=10V)$	4.8	mΩ



PDFN5X6-8L



Pin Assignment



Schematic Diagram

Ordering Information

Device	Marking	MSL	Form	Package	Reel(pcs)	Per Carton (pcs)
JMSH04060G3L-13	SH040603L	1	Tape&Reel	PDFN5x6-8L	5000	50000

Absolute Maximum Ratings (@ $T_C = 25^\circ\text{C}$ unless otherwise specified)

Symbol	Parameter	Value	Unit
V_{DS}	Drain-to-Source Voltage	40	V
V_{GS}	Gate-to-Source Voltage	± 20	V
I_D	Continuous Drain Current	$T_C = 25^\circ\text{C}$: 87 $T_C = 100^\circ\text{C}$: 62	A
I_{DM}	Pulsed Drain Current ⁽¹⁾	Refer to Fig.4	A
E_{AS}	Single Pulsed Avalanche Energy ⁽²⁾	106	mJ
P_D	Power Dissipation	$T_C = 25^\circ\text{C}$: 83 $T_C = 100^\circ\text{C}$: 42	W
T_J, T_{STG}	Junction & Storage Temperature Range	-55 to 175	$^\circ\text{C}$

Thermal Characteristics

Symbol	Parameter	Max	Unit
R_{JA}	Thermal Resistance, Junction to Ambient ⁽³⁾	45	$^\circ\text{C/W}$
R_{JC}	Thermal Resistance, Junction to Case	1.8	$^\circ\text{C/W}$

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

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
Off Characteristics						
V _{(BR)DSS}	Drain-Source Breakdown Voltage	I _D = 250μA, V _{GS} = 0V	40	-	-	V
I _{DSS}	Zero Gate Voltage Drain Current	V _{DS} = 32V, V _{GS} = 0V	-	-	1.0	μA
I _{GSS}	Gate-Body Leakage Current	V _{DS} = 0V, V _{GS} = ±20V	-	-	±100	nA
On Characteristics						
V _{GS(th)}	Gate Threshold Voltage	V _{DS} = V _{GS} , I _D = 250μA	2.0	2.8	4.0	V
R _{DS(ON)}	Static Drain-Source ON-Resistance ⁽⁴⁾	V _{GS} = 10V, I _D = 20A	-	4.8	6.0	mΩ
Dynamic Characteristics						
R _g	Gate Resistance	f = 1MHz	-	1.6	-	Ω
C _{iss}	Input Capacitance	V _{GS} = 0V, V _{DS} = 20V, f = 1MHz	-	1068	1450	pF
C _{oss}	Output Capacitance		-	355	480	pF
C _{rss}	Reverse Transfer Capacitance		-	10	20	pF
Q _g	Total Gate Charge	V _{GS} = 0 to 10V V _{DS} = 20V, I _D = 20A	-	15	-	nC
Q _{gs}	Gate Source Charge		-	6	-	nC
Q _{gd}	Gate Drain("Miller") Charge		-	2	-	nC
Switching Characteristics						
t _{d(on)}	Turn-On DelayTime	V _{GS} = 10V, V _{DD} = 20V I _D = 20A, R _{GEN} = 3Ω	-	10	-	ns
t _r	Turn-On Rise Time		-	28	-	ns
t _{d(off)}	Turn-Off DelayTime		-	15	-	ns
t _f	Turn-Off Fall Time		-	3	-	ns
Body Diode Characteristics						
I _S	Maximum Continuous Body Diode Forward Current		-	-	87	A
I _{SM}	Maximum Pulsed Body Diode Forward Current		-	-	350	A
V _{SD}	Body Diode Forward Voltage	V _{GS} = 0V, I _S = 20A	-		1.2	V
trr	Body Diode Reverse Recovery Time	I _F = 20A, di/dt = 100A/us	11	22	32	ns
Qrr	Body Diode Reverse Recovery Charge		-	12	-	nC

- Notes:
1. Repetitive Rating: Pulse Width Limited by Maximum Junction Temperature.
 2. E_{AS} condition: Starting $T_J = 25^\circ\text{C}$, $V_{DD} = 20\text{V}$, $V_{GS} = 10\text{V}$, $R_G = 25\text{ohm}$, $L = 3\text{mH}$, $I_{AS} = 8.4\text{A}$, $V_{DD} = 0\text{V}$ during time in avalanche.
 3. $R_{\theta JA}$ is measured with the device mounted on a 1inch^2 pad of 2oz copper FR4 PCB.
 4. Pulse Test: Pulse Width $\leq$ $\leq 0.5\%$.

Typical Performance Characteristics

Figure 1: Power De-rating

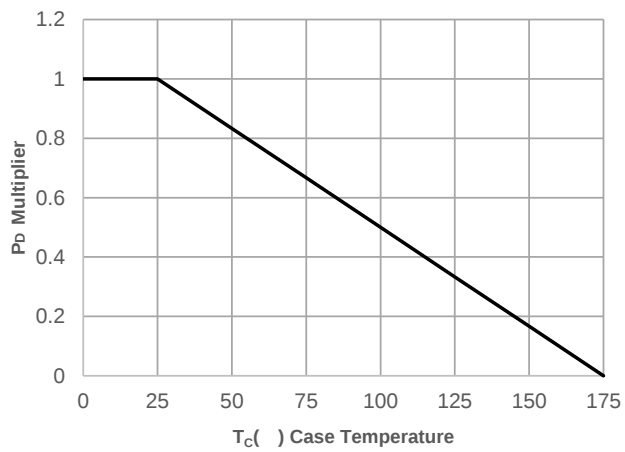
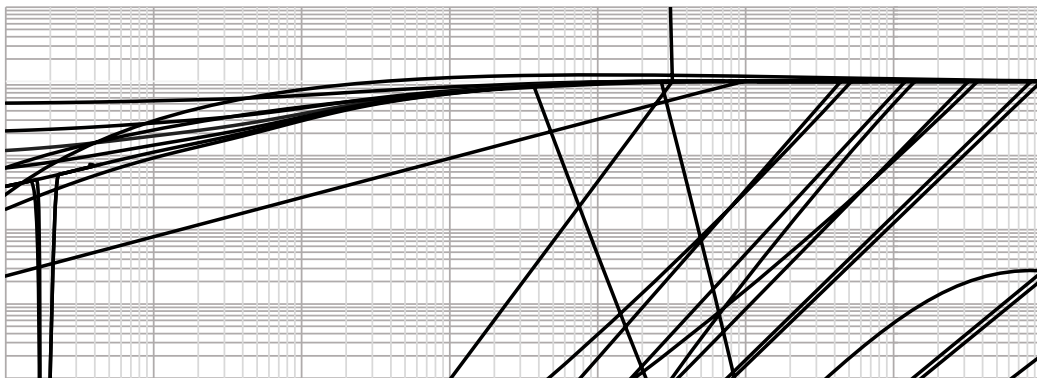
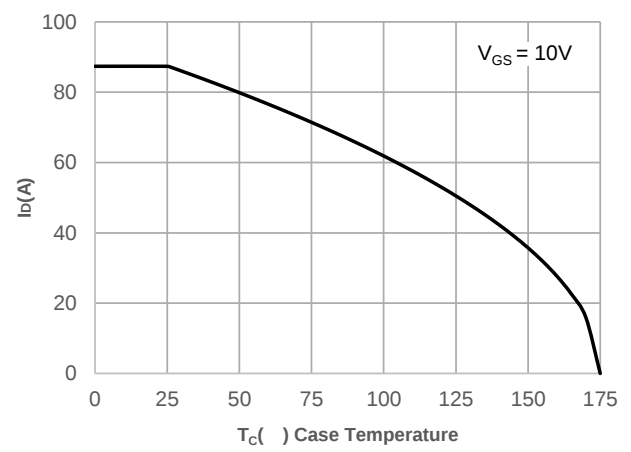
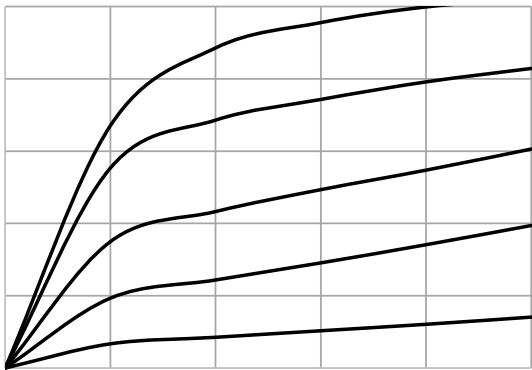


Figure 2: Current De-rating



Typical Performance Characteristics



Typical Performance Characteristics

Figure 11: Normalized Breakdown Voltage vs. Junction Temperature

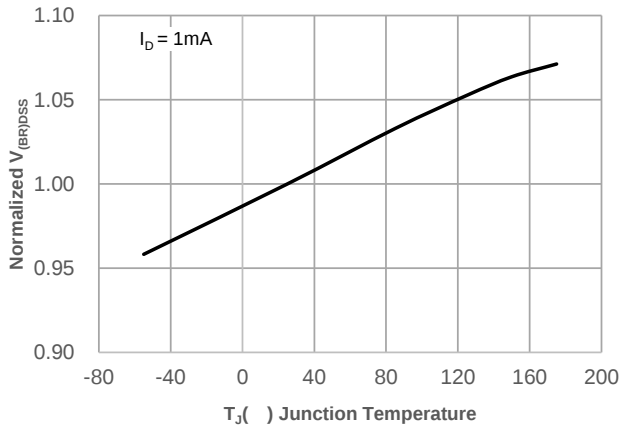


Figure 12: Normalized on Resistance vs. Junction Temperature

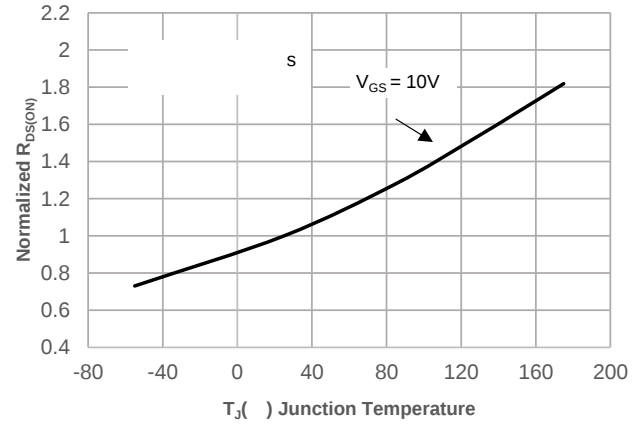


Figure 13: Normalized Threshold Voltage vs. Junction Temperature

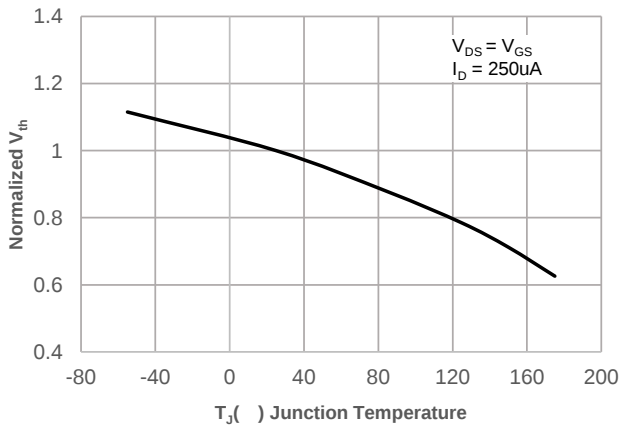


Figure 14: $R_{DS(ON)}$ vs. V_{GS}

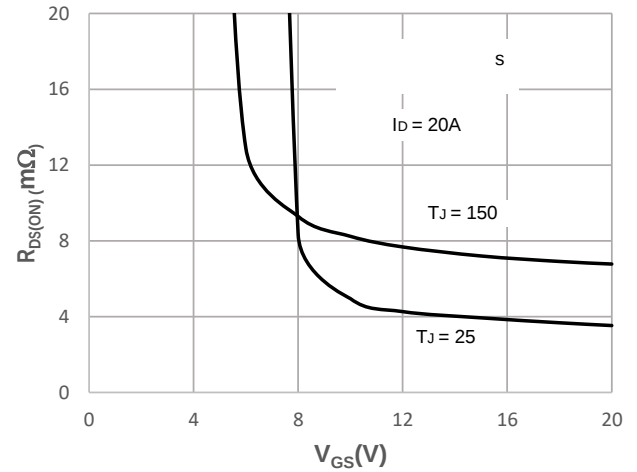
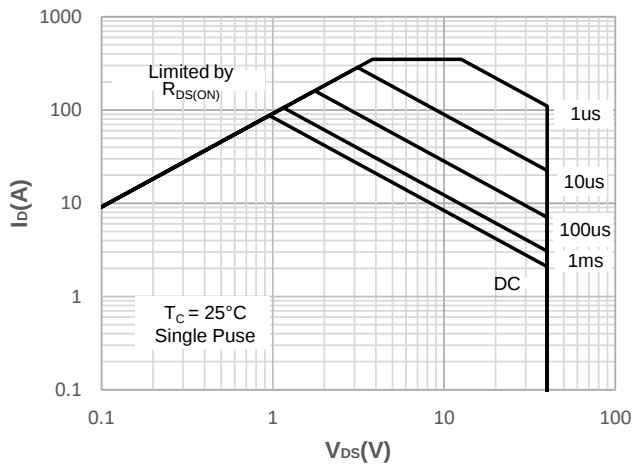


Figure 15: Maximum Safe Operating Area



Test Circuit



Figure 1: Gate Charge Test Circuit & Waveform

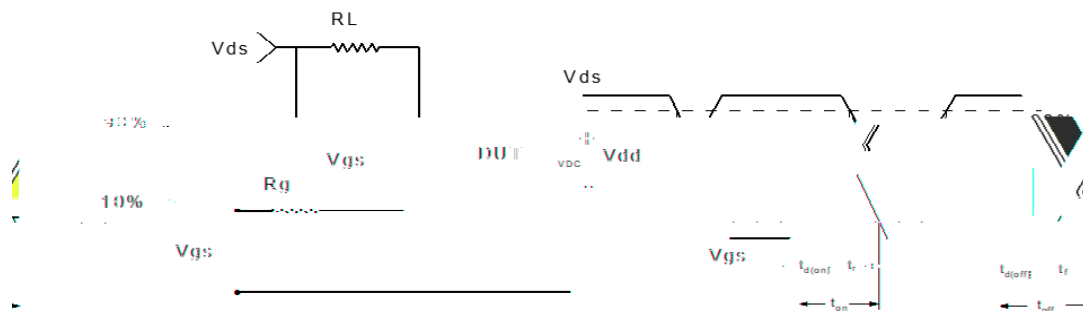


Figure 2: Resistive Switching Test Circuit & Waveform

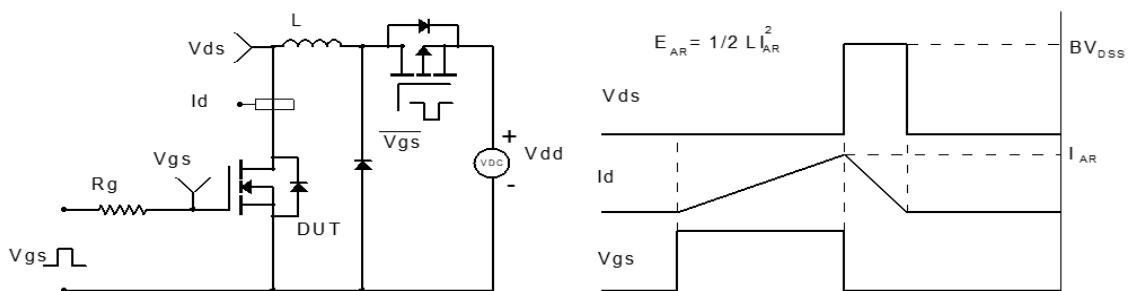


Figure 3: Unclamped Inductive Switching Test Circuit & Waveform

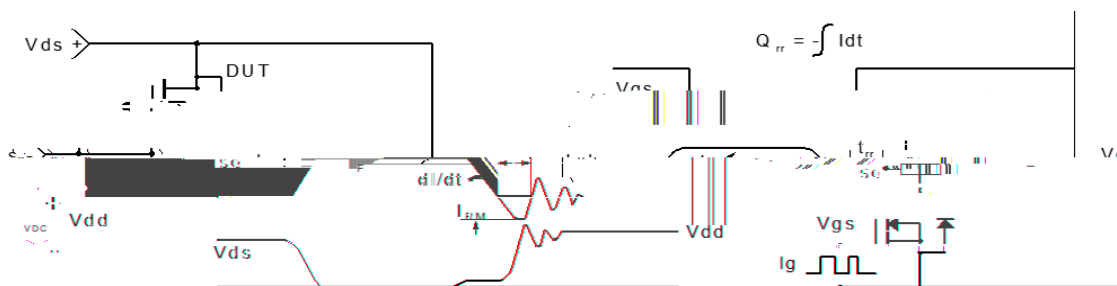
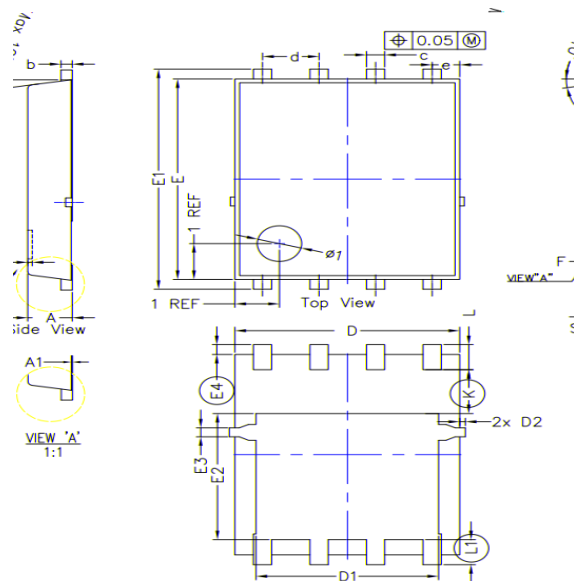


Figure 4: Diode Recovery Test Circuit & Waveform

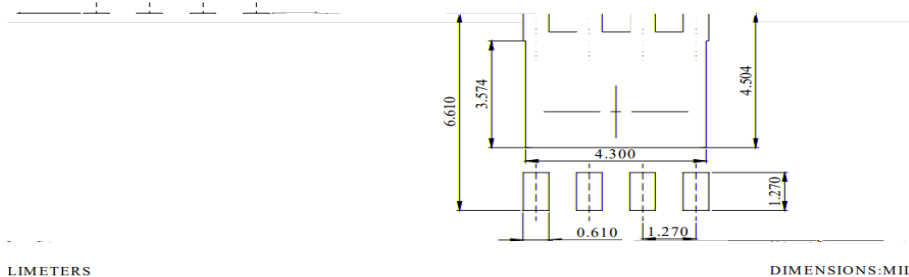


Package Mechanical Data(PDFN5X6-8L)



DIMENSIONS IN INCHES			DIMENSIONS IN MILLIMETERS		
SYMBOL	MIN	MAX	MIN	MAX	MAX
*A	0.000	1.600	1.150	0.000	0.000
A1	0.000	0.000	0.000	0.000	0.000
b	0.246	0.254	0.000	0.010	0.004
c	0.000	0.000	0.000	0.000	0.000
d	0.000	0.000	0.000	0.000	0.000
e	0.000	0.000	0.000	0.000	0.000
E	0.000	0.000	0.000	0.000	0.000
E1	0.000	0.000	0.000	0.000	0.000
E2	0.000	0.000	0.000	0.000	0.000
E3	0.000	0.000	0.000	0.000	0.000
E4	0.000	0.000	0.000	0.000	0.000
F	0.000	0.000	0.000	0.000	0.000
L	0.000	0.000	0.000	0.000	0.000
L1	0.000	0.000	0.000	0.000	0.000
K	0.000	0.000	0.000	0.000	0.000

Recommended Soldering Footprint



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