

JMSH1001MTHL

Product Summary

Parameters	Value	Unit
V_{DSS}	100	V
$V_{GS(th_Typ)}$	2.9	V
$I_D(@V_{GS}=10V)$	447	A
$R_{DS(ON_Typ)}(@V_{GS}=10V)$	1.1	mΩ

Ordering Information

Device	Marking	MSL	Form	Package	Reel(pcs)	Per Carton (pcs)
JMSH1001MTHL-13	SH1001M	1	Tape&Reel	TOLT	1800	9000

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

Symbol	Parameter	Value	Unit
V_{DS}	Drain-to-Source Voltage	100	V
V_{GS}	Gate-to-Source Voltage	± 20	V
I_D	Continuous Drain Current	$T_C = 25^\circ\text{C}$ $T_C = 100^\circ\text{C}$	A
I_{DM}	Pulsed Drain Current ⁽¹⁾	447 283	A
E_{AS}	Single Pulsed Avalanche Energy ⁽²⁾	Refer to Fig.4 1987	mJ
P_D	Power Dissipation	$T_C = 25^\circ\text{C}$ $T_C = 100^\circ\text{C}$	W
T_J, T_{STG}			$^\circ\text{C}$

Symbol	Parameter	Max	Unit
R	Thermal Resistance, Junction to Ambient ⁽³⁾	33	$^\circ\text{C/W}$
R	Thermal Resistance, Junction to Case		

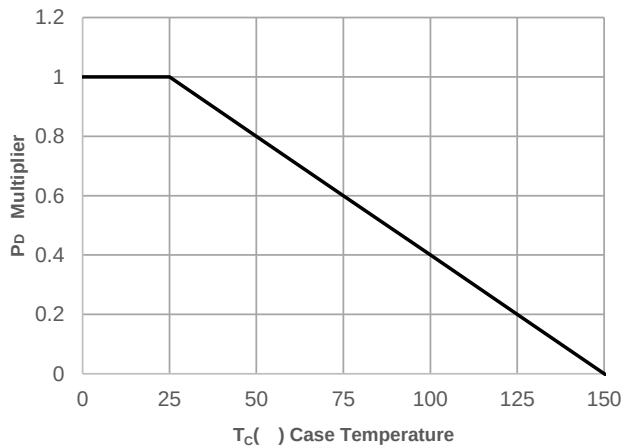
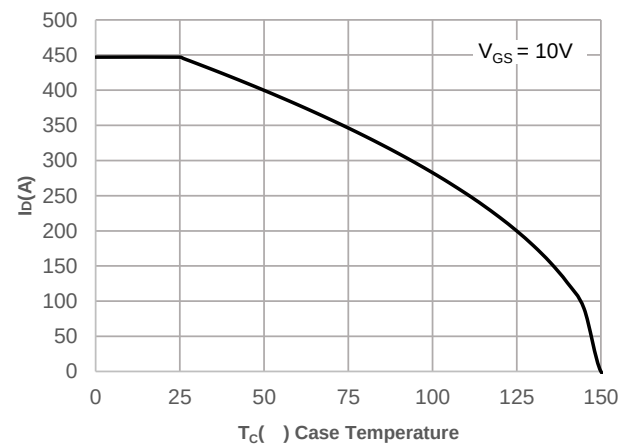
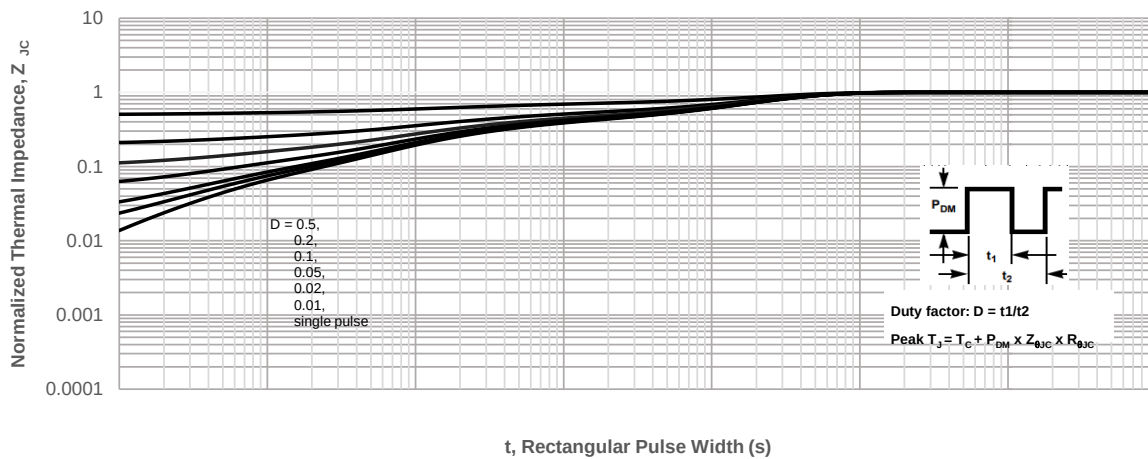
**Electrical Characteristics** ($T_J = 25^\circ\text{C}$ unless otherwise specified)

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
Off Characteristics						
V _{(BR)DSS}	Drain-Source Breakdown Voltage	I _D = 250μA, V _{GS} = 0V	100	-	-	V
I _{DSS}	Zero Gate Voltage Drain Current	V _{DS} = 80V, 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	2.9	3.8	V
R _{DS(ON)}	Static Drain-Source ON-Resistance ⁽⁴⁾	V _{GS} = 10V, I _D = 20A	-	1.1	1.4	mΩ
Dynamic Characteristics						
R _g	Gate Resistance	f = 1MHz	-	3.8	-	Ω
C _{iss}	Input Capacitance	V _{GS} = 0V, V _{DS} = 50V, f = 1MHz	-	13360	20040	pF
C _{oss}	Output Capacitance		-	5113	7669	pF
C _{rss}	Reverse Transfer Capacitance		-	122	244	pF
Q _g	Total Gate Charge	V _{GS} = 0 to 10V V _{DS} = 50V, I _D = 20A	-	217	-	nC
Q _{gs}	Gate Source Charge		-	65	-	nC
Q _{gd}	Gate Drain("Miller") Charge		-	57	-	nC
Switching Characteristics						
t _{d(on)}	Turn-On DelayTime	V _{GS} = 10V, V _{DD} = 50V I _D = 20A, R _{GEN} = 3Ω	-	41	-	ns
t _r	Turn-On Rise Time		-	69	-	ns
t _{d(off)}	Turn-Off DelayTime		-	157	-	ns
t _f	Turn-Off Fall Time		-	92	-	ns
Body Diode Characteristics						
I _S	Maximum Continuous Body Diode Forward Current		-	-	447	A
I _{SM}	Maximum Pulsed Body Diode Forward Current		-	-	1788	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	65	130	196	ns
Qrr	Body Diode Reverse Recovery Charge		-	374	-	nC

- Notes:
1. Repetitive Rating: Pulse Width Limited by Maximum Junction Temperature.
 2. E_{AS} condition: Starting $T_J = 25^\circ\text{C}$, $V_{DD} = 50\text{V}$, $V_{GS} = 10\text{V}$, $R_G = 25\text{ohm}$, $L = 3\text{mH}$, $I_{AS} = 36.4\text{A}$, $V_{DD} = 0\text{V}$ during time in avalanche.
 3. R is measured with the device mounted on a 1inch^2 pad of 2oz copper FR4 PCB.
 4. Pulse Test: Pulse Width 0.5%.



Typical Performance Characteristics

Figure 1: Power De-rating

Figure 2: Current De-rating

Figure 3: Normalized Maximum Transient Thermal Impedance

Figure 4: Peak Current Capacity


Typical Performance Characteristics

Figure 5: Output Characteristics

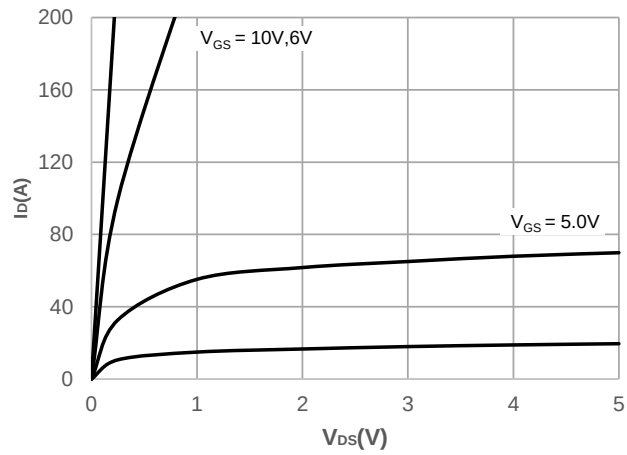


Figure 6: Typical Transfer Characteristics

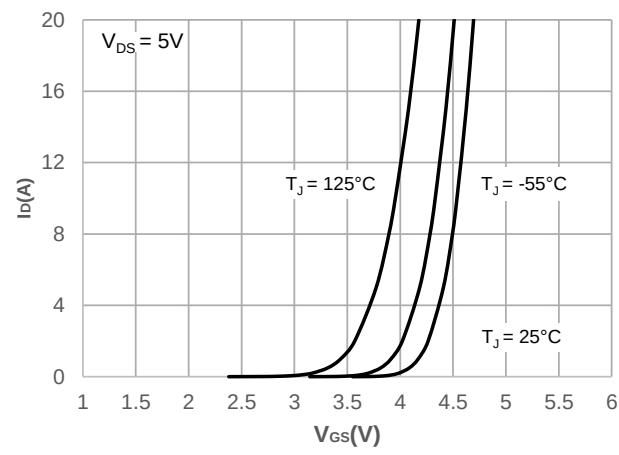


Figure 7: On-resistance vs. Drain Current

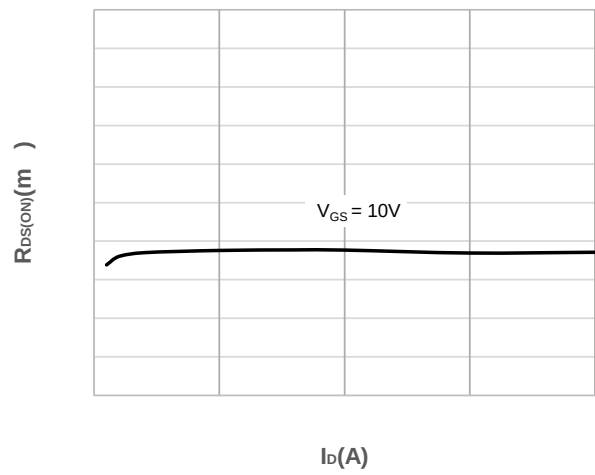


Figure 8: Body Diode Characteristics

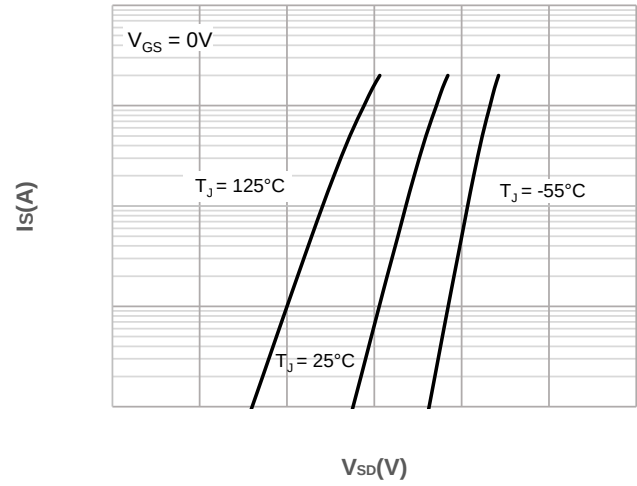
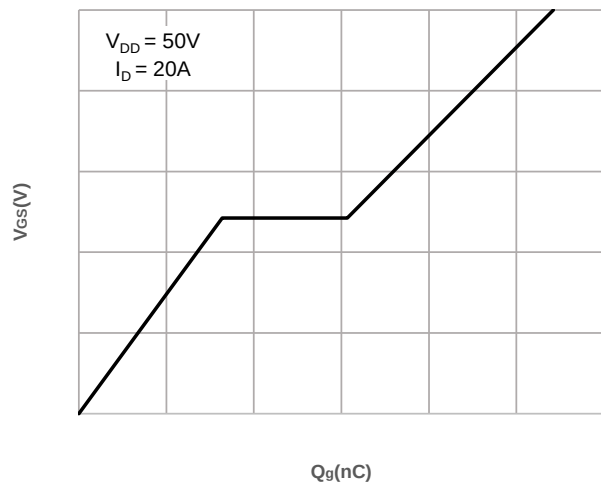
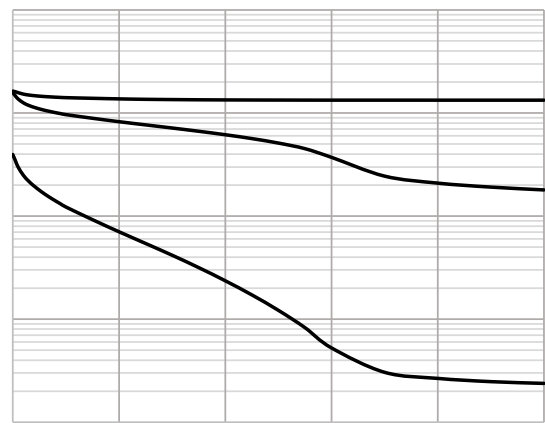


Figure 9: Gate Charge Characteristics



Typical Performance Characteristics

Figure 11: Normalized Breakdown voltage vs. Junction Temperature

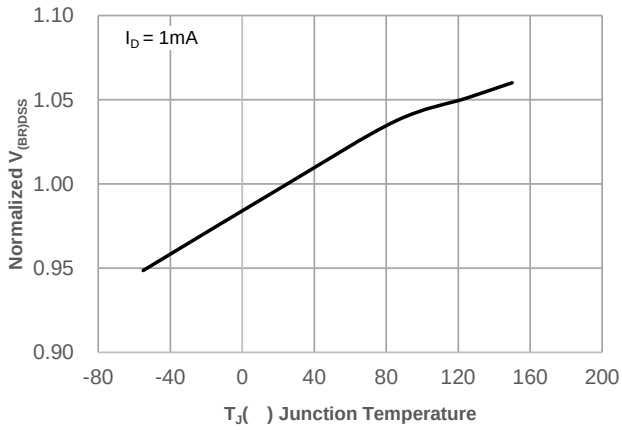


Figure 12: Normalized on Resistance vs. Junction Temperature

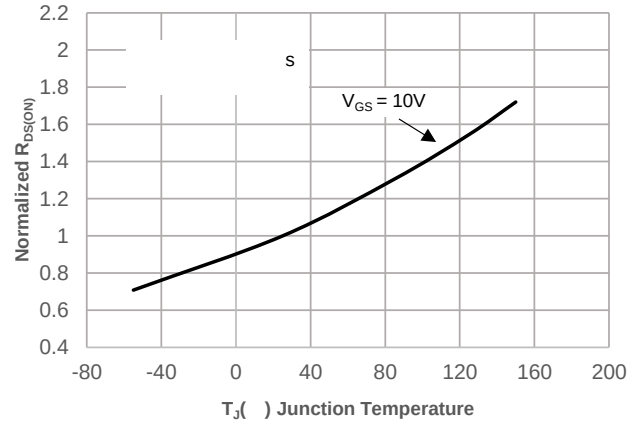


Figure 13: Normalized Threshold Voltage vs. Junction Temperature

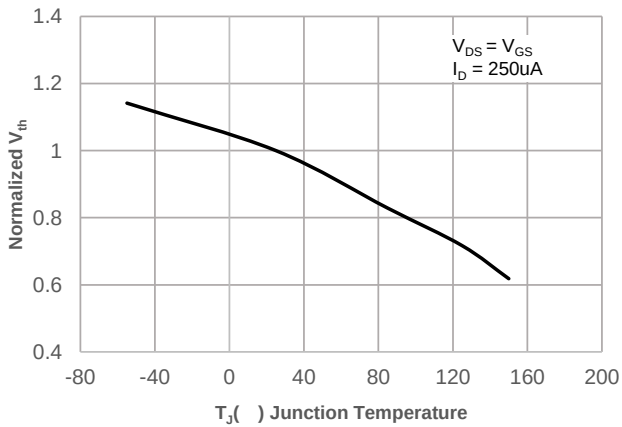


Figure 14: $R_{DS(ON)}$ vs. V_{GS}

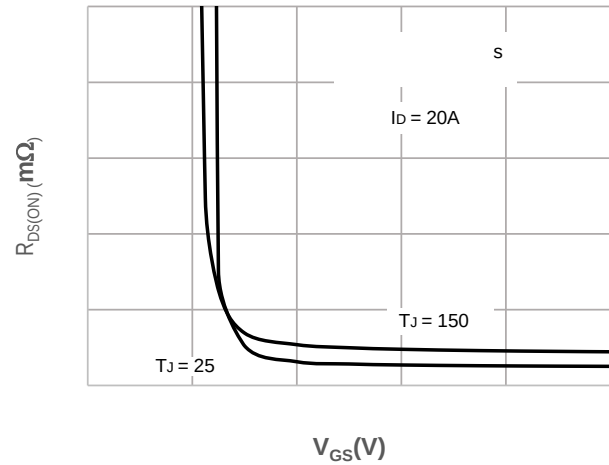
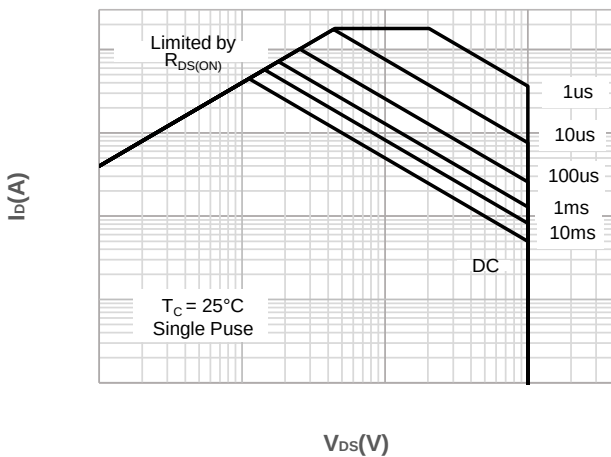


Figure 15: Maximum Safe Operating Area



Test Circuit



Figure 1: Gate Charge Test Circuit & Waveform

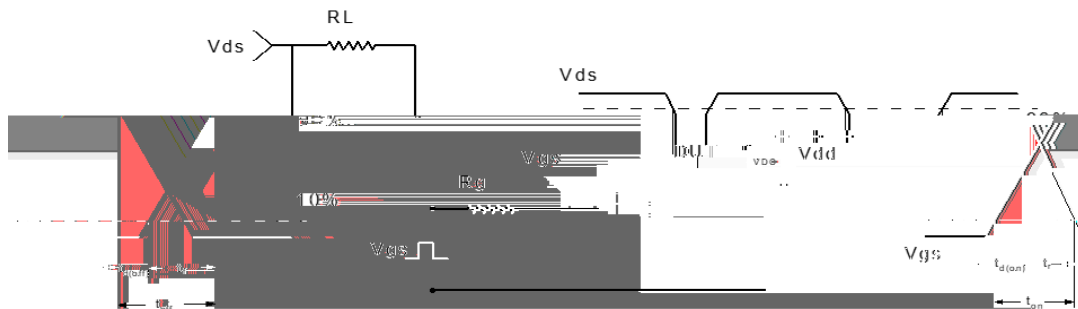


Figure 2: Resistive Switching Test Circuit & Waveform

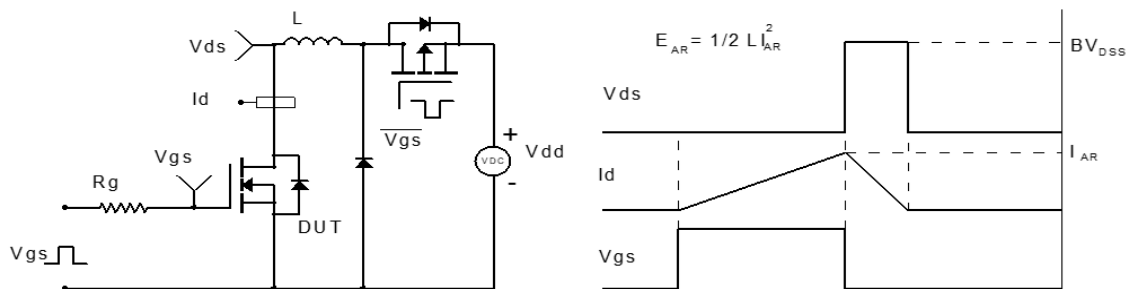


Figure 3: Unclamped Inductive Switching Test Circuit & Waveform

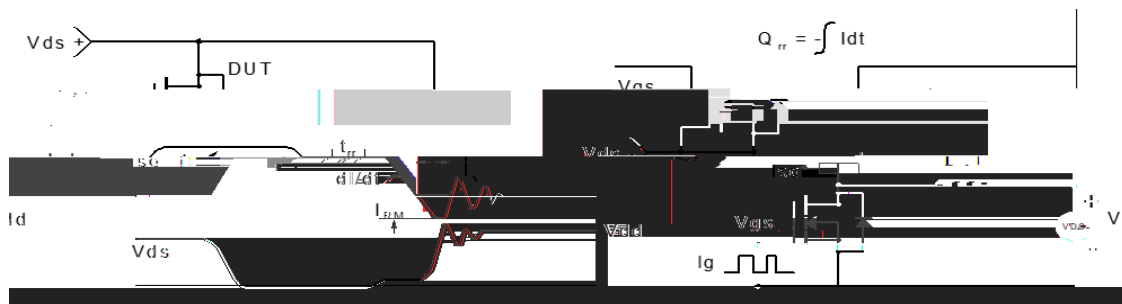
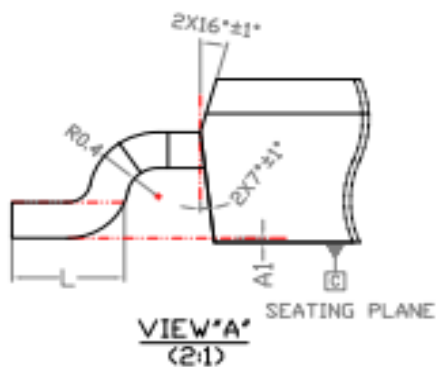


Figure 4: Diode Recovery Test Circuit & Waveform

[illegible]

DIMENSION IN INCHES			DIMENSION IN MM			
MIN	NOM	MAX	SYMBOLS	MIN	NOM	MAX
0.087	0.091	0.094	*A	2.200	2.300	2.400
0.0004		0.002	A1	0.010		0.050
0.059	0.061	0.063	A2	1.500	1.540	1.580
0.024	0.028	0.031	*B	0.600	0.700	0.800
0.016	0.020	0.024	C	0.400	0.500	0.600
0.382	0.390	0.398	*D	9.700	9.900	10.100
	0.327 REF		D1		8.300 REF	
	0.372 REF		D2		9.460 REF	
0.583	0.591	0.598	E	14.800	15.000	15.200
0.398	0.398	0.406	*E1	10.000	10.100	10.300
0.219		0.227	E2	5.570		5.720
	0.085 REF		E3		2.240 REF	
	0.079 REF		E4		2.000 REF	
	0.047 BSC		*F		1.200 BSC	
	0.331 BSC		F3		8.400 BSC	
	0.030 BSC		F2		0.750 BSC	
0.191	0.199	0.207	H	4.850	5.050	5.250
	0.101 REF		K		2.570 REF	
0.058	0.058	0.062	*L	1.363	1.463	1.563
0.089	0.096	0.104	L1	2.250	2.450	2.650
0.114	0.118	0.122	P	2.900	3.000	3.100
			Ø	Ø	4"	8"



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