

JMSH0401MGQ

Product Summary

Parameters	Value	Unit
V_{DSS}	40	V
$V_{GS(th)_{Typ}}$	2.7	V
$I_D(@V_{GS}=10V)$	223	A
$R_{DS(ON)_{Typ}}(@V_{GS}=10V)$	1.4	m

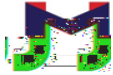
Ordering Information

Device	Marking	MSL	Form	Package	Reel(pcs)	Per Carton (pcs)
JMSH0401MGQ-13	SH0401MQ	1	Tape&Reel	PDFN5x6-8L	5000	50000

Absolute Maximum Ratings (@ $T_C = 25^{\circ}C$ 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	$T_C = 25^{\circ}C$ $T_C = 100^{\circ}C$	A
I_{DM}	Pulsed Drain Current ⁽¹⁾	Refer to Fig.4	A
E_{AS}	Single Pulsed Avalanche Energy ⁽²⁾	459	mJ
P_D	Power Dissipation	$T_C = 25^{\circ}C$ $T_C = 100^{\circ}C$	W
T_J STG			$^{\circ}C$

Symbol	Parameter	Max	Unit
R	Thermal Resistance, Junction to Ambient ⁽³⁾	42	$^{\circ}C/W$
R	Thermal Resistance, Junction to Case	1.0	

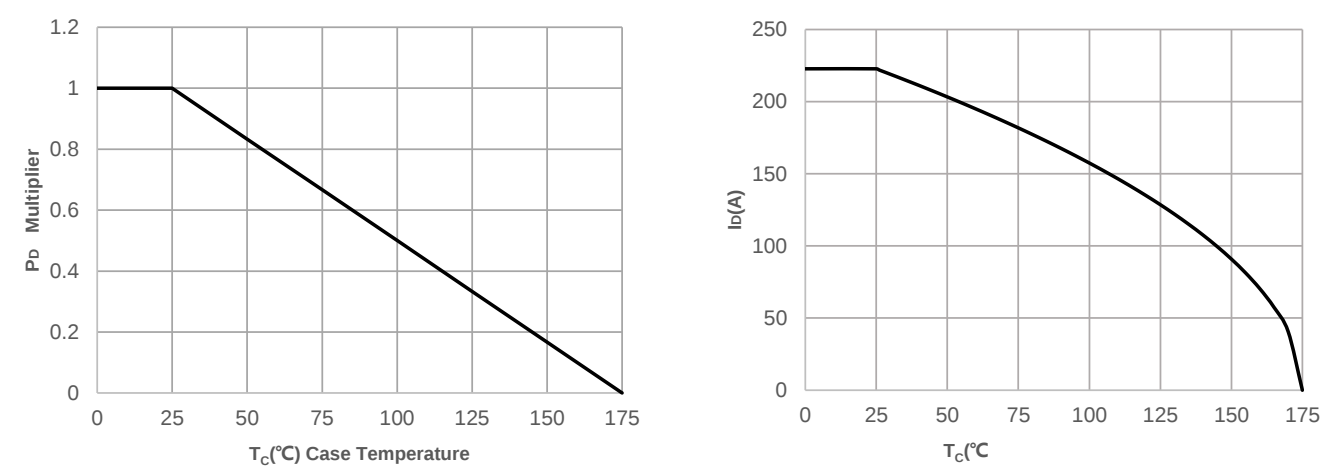
**Electrical Characteristics** ($T_J = 25^\circ\text{C}$ unless otherwise specified)

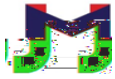
Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
Off Characteristics						
V _{(BR)DSS}	Drain-Source Breakdown Voltage	I _D = 250 A, V _{GS} = 0V	40	-	-	V
I _{DSS}	Zero Gate Voltage Drain Current	V _{DS} = 32V, V _{GS} = 0V	-	-	1.0	
I _{GSS}	Gate-Body Leakage Current	V _{DS} = 0V, V _{GS} = ±20V	-	-	±100	
On Characteristics						
V _{GS(th)}	Gate Threshold Voltage	V _{DS} = V _{GS} , I _D = 250 A	1.9	2.7	3.5	V
R _{DS(ON)}	Static Drain-Source ON-Resistance ⁽⁴⁾	V _{GS} = 10V, I _D = 20A	-	1.4	1.7	m
Dynamic Characteristics						
R _g	Gate Resistance	f = 1MHz	-	0.9	-	
C _{iss}	Input Capacitance	V _{GS} = 0V, V _{DS} = 20V, f = 1MHz	2589	3625	4893	pF
C _{oss}	Output Capacitance		1413	1979	2671	pF
C _{rss}	Reverse Transfer Capacitance		113	158	213	pF
Q _g	Total Gate Charge	V _{GS} = 0 to 10V V _{DS} = 20V, I _D = 20A	42	59	80	nC
Q _{gs}	Gate Source Charge		11	15	21	nC
Q _{gd}	Gate Drain("Miller") Charge		12	16	22	nC
Switching Characteristics						
t _{d(on)}	Turn-On DelayTime	V _{GS} = 10V, V _{DD} = 20V I _D = 20A, R _{GEN} = 3	-	16	-	ns
t _r	Turn-On Rise Time		-	29	-	ns
t _{d(off)}	Turn-Off DelayTime		-	35	-	ns
t _f	Turn-Off Fall Time		-	13	-	ns
Body Diode Characteristics						
I _S	Maximum Continuous Body Diode Forward Current		-	-	223	A
I _{SM}	Maximum Pulsed Body Diode Forward Current		-	-	891	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	37	52	70	ns
Qrr	Body Diode Reverse Recovery Charge		-	66	-	nC

- Notes:
1. Repetitive Rating: Pulse Width Limited by Maximum Junction Temperature.
 2. E_{AS} condition: Starting $T_J = 25^\circ\text{C}$, $V_{DD} = 20\text{ V}$, $V_{GS} = 10\text{ V}$, $R_G = 25\text{ ohm}$, $L = 3\text{ mH}$, $I_{AS} = 17.5\text{ A}$, $V_{DD} = 0\text{ V}$ during time in avalanche.
 3. R is measured with the device mounted on a 1 inch^2 pad of 2oz copper FR4 PCB.
 4. Pulse Test: Pulse Width 0.5%.

Typical Performance Characteristics

Figure 1: Power De-rating





Typical Performance Characteristics

Figure 5: Output Characteristics

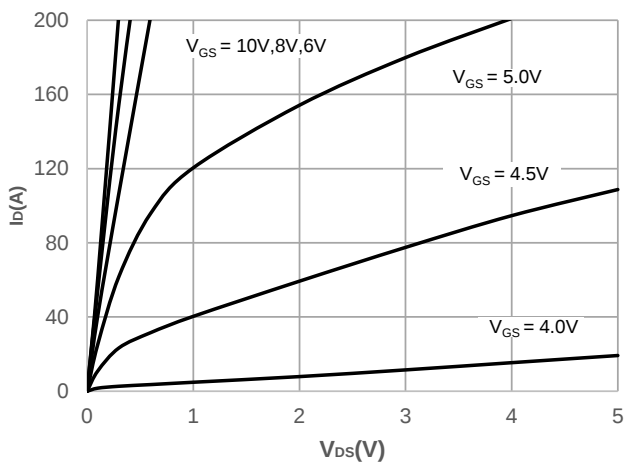


Figure 6: Typical Transfer Characteristics

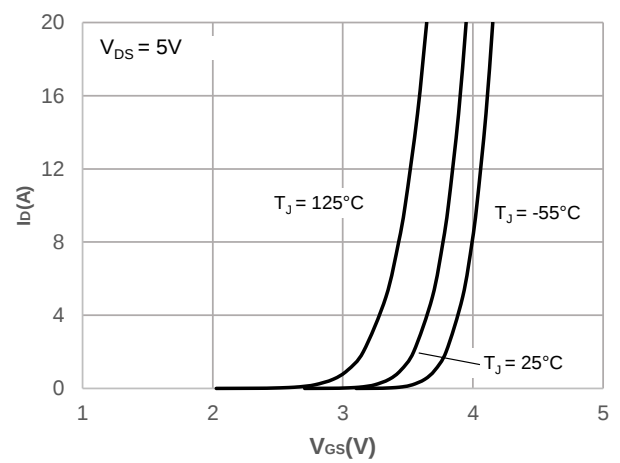


Figure 7: On-resistance vs. Drain Current

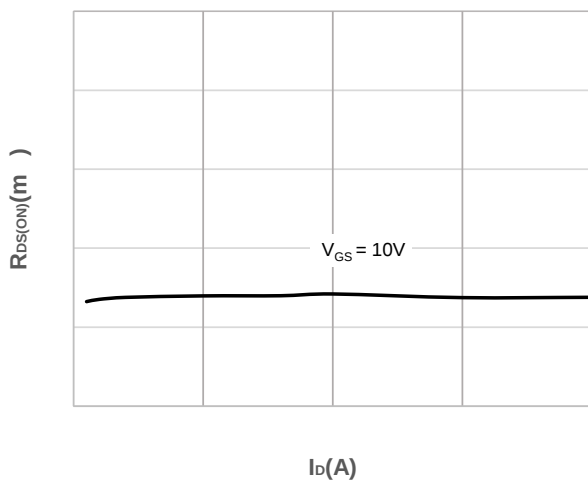


Figure 8: Body Diode Characteristics

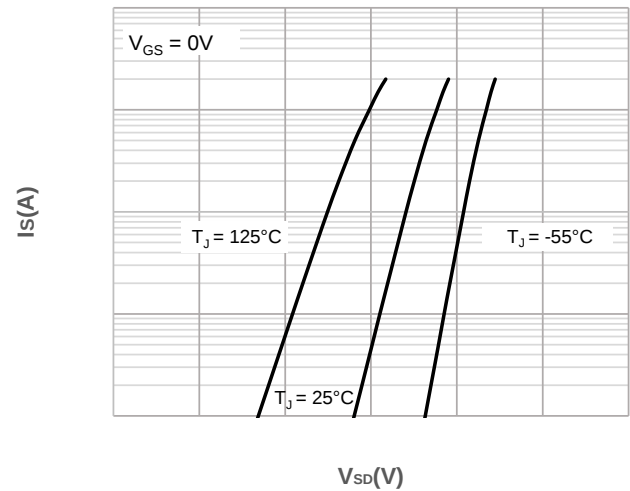


Figure 9: Gate Charge Characteristics

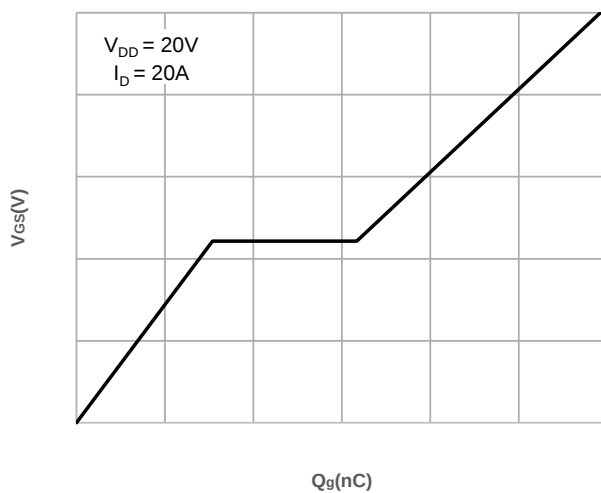
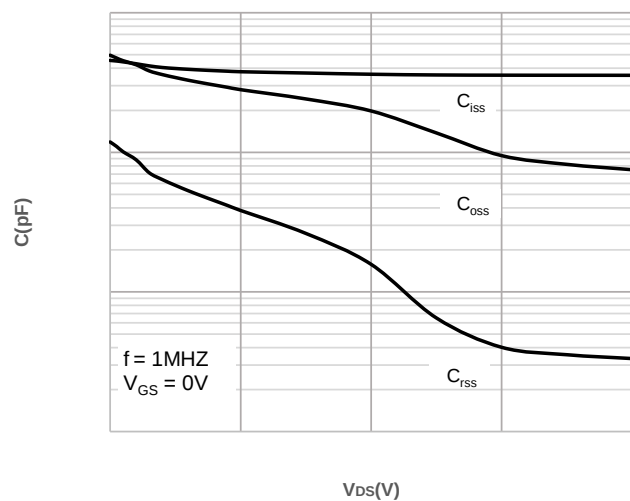


Figure 10: Capacitance Characteristics



Typical Performance Characteristics

Figure 11: Normalized Breakdown voltage vs. Junction Temperature

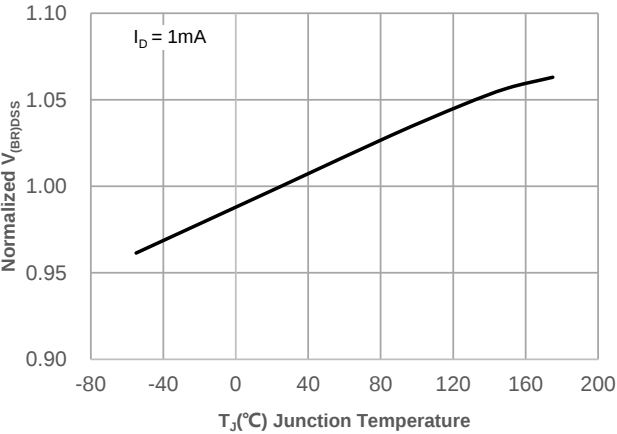


Figure 12: Normalized on Resistance vs. Junction Temperature

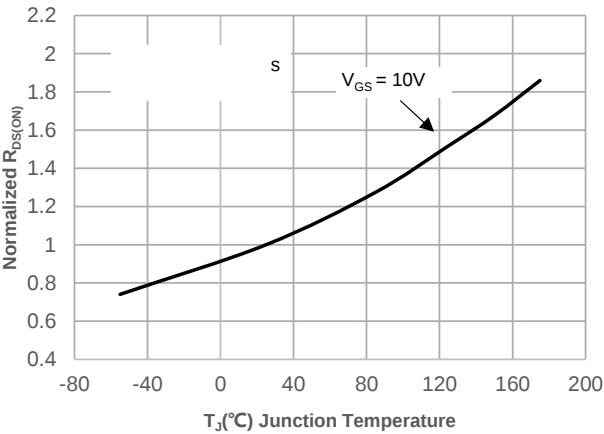
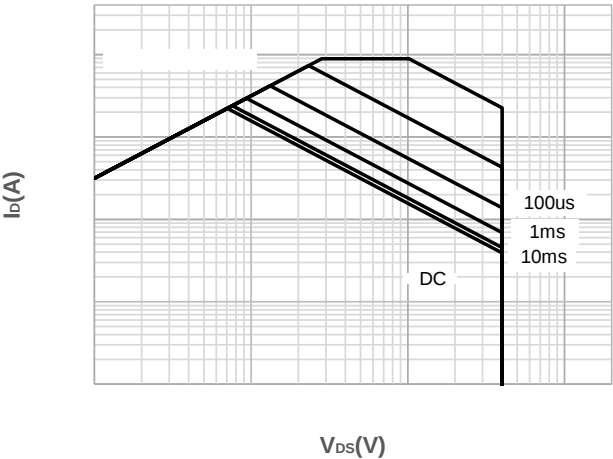


Figure 15: Maximum Safe Operating Area



Test Circuit

Figure 1: Gate

