

Product Summary

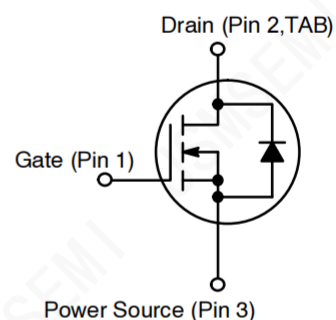
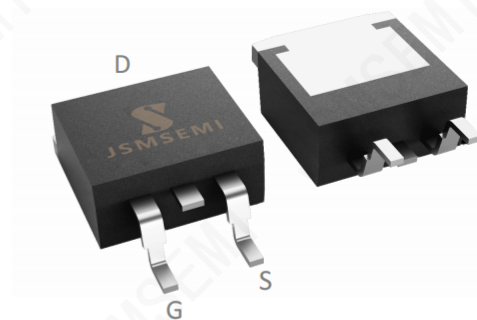
- V_{DS} 100V
- I_D 120A
- $R_{DS(ON)}$ (at $V_{GS}=10V$) $<3.8m\Omega$
- 100% EAS Tested
- 100% ∇V_{DS} Tested

General Description

- Trench Power MOSFET technologygate
- Excellent package for heat dissipation
- High density cell design for low $R_{DS(ON)}$
- Moisture Sensitivity Level 1
- Epoxy Meets UL 94 V-0 Flammability Rating
- Halogen Free

Applications

- Power switching application
- Uninterruptible power supply
- DC-DC convertor
- Motor drivers



■ Absolute Maximum Ratings ($T_A=25^\circ\text{C}$ unless otherwise noted)

Parameter		Symbol	Limit	Unit
Drain-source Voltage		V_{DS}	100	V
Gate-source Voltage		V_{GS}	± 20	V
Drain Current	$T_C=25^\circ\text{C}$	I_D	120	A
	$T_C=100^\circ\text{C}$		120	
Pulsed Drain Current ^A		I_{DM}	480	A
Avalanche energy ^B		EAS	980	mJ
Total Power Dissipation	$T_C=25^\circ\text{C}$	P_D	280	W
	$T_C=100^\circ\text{C}$		120	
Junction and Storage Temperature Range		T_J, T_{STG}	-55~+150	$^\circ\text{C}$

■ Thermal resistance

Parameter		Symbol	Typ	Max	Units
Thermal Resistance Junction-to-Ambient ^D	Steady-State	$R_{\theta JA}$		40	$^\circ\text{C/W}$
Thermal Resistance Junction-to-Case	Steady-State	$R_{\theta JC}$		0.45	

Ordering Information

Order number	Package	Marking	Operation Temperature Range	MSL Grade	Ship, Quantity	Green
SQM120N10-3M8_GE3-JSM	TO-263	M120N10-3M8	-55 to 150 $^\circ\text{C}$	1	T&R,800	RoHS

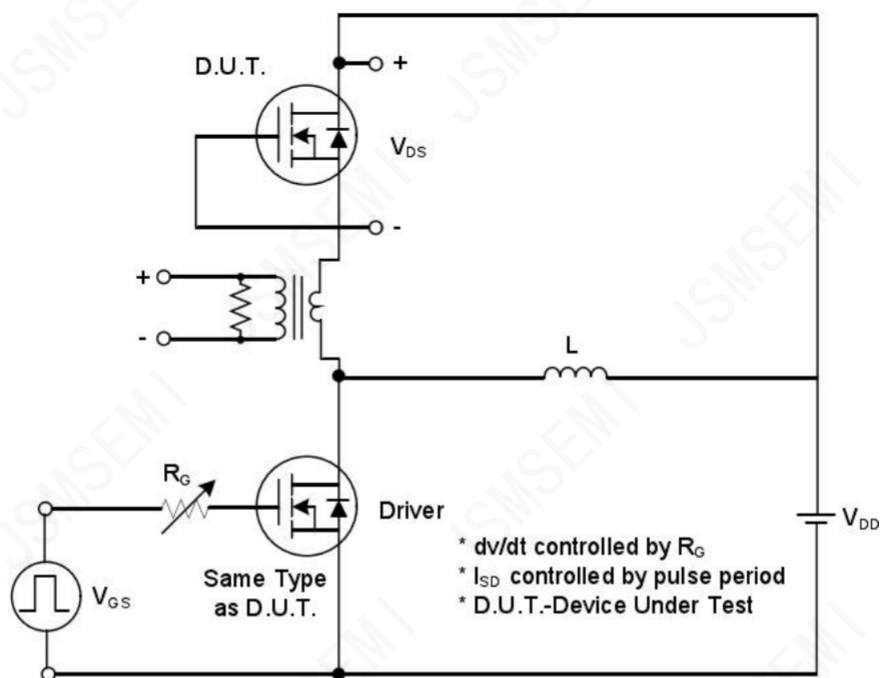
■ Electrical Characteristics ($T_J=25^{\circ}\text{C}$ unless otherwise noted)

Parameter	Symbol	Conditions	Min	Typ	Max	Units
Static Parameter						
Drain-Source Breakdown Voltage	BV _{DSS}	V _{GS} = 0V, I _D =250μA	100	-	-	V
		V _{GS} = 0V, I _D =1mA	100	-	-	V
Zero Gate Voltage Drain Current	I _{DSS}	V _{DS} =100V, V _{GS} =0V	-	-	1	μA
		V _{DS} =100V, V _{GS} =0V, T _J =150°C	-	-	100	
Gate-Body Leakage Current	I _{GSS}	V _{GS} = ±20V, V _{DS} =0V	-	-	±100	nA
Gate Threshold Voltage	V _{GS(th)}	V _{DS} = V _{GS} , I _D =250μA	2.0	3.0	4.0	V
Static Drain-Source On-Resistance	R _{DS(ON)}	V _{GS} = 10V, I _D =20A	-	3.0	3.8	mΩ
Diode Forward Voltage	V _{SD}	I _S =50A, V _{GS} =0V	-	-	1.2	V
Gate resistance	R _G	f=1MHz	-	1.7	-	Ω
Maximum Body-Diode Continuous Current	I _S		-	-	120	A
Dynamic Parameters						
Input Capacitance	C _{iss}	V _{DS} =50V, V _{GS} =0V, f=1MHz	-	7315	-	pF
Output Capacitance	C _{oss}		-	2656	-	
Reverse Transfer Capacitance	C _{rss}		-	59	-	
Switching Parameters						
Total Gate Charge	Q _g	V _{GS} =10V, V _{DS} =50V, I _D =20A	-	110	-	nC
Gate-Source Charge	Q _{gs}		-	24	-	
Gate-Drain Charge	Q _{gd}		-	35	-	
Reverse Recovery Charge	Q _{rr}	I _F =20A, di/dt=100A/us	-	209	-	nC
Reverse Recovery Time	t _{rr}		-	90	-	ns
Turn-on Delay Time	t _{D(on)}	V _{GS} =10V, V _{DD} =50V, I _D =20A R _{GEN} =3Ω	-	25	-	ns
Turn-on Rise Time	t _r		-	45	-	
Turn-off Delay Time	t _{D(off)}		-	88	-	
Turn-off fall Time	t _f		-	53	-	

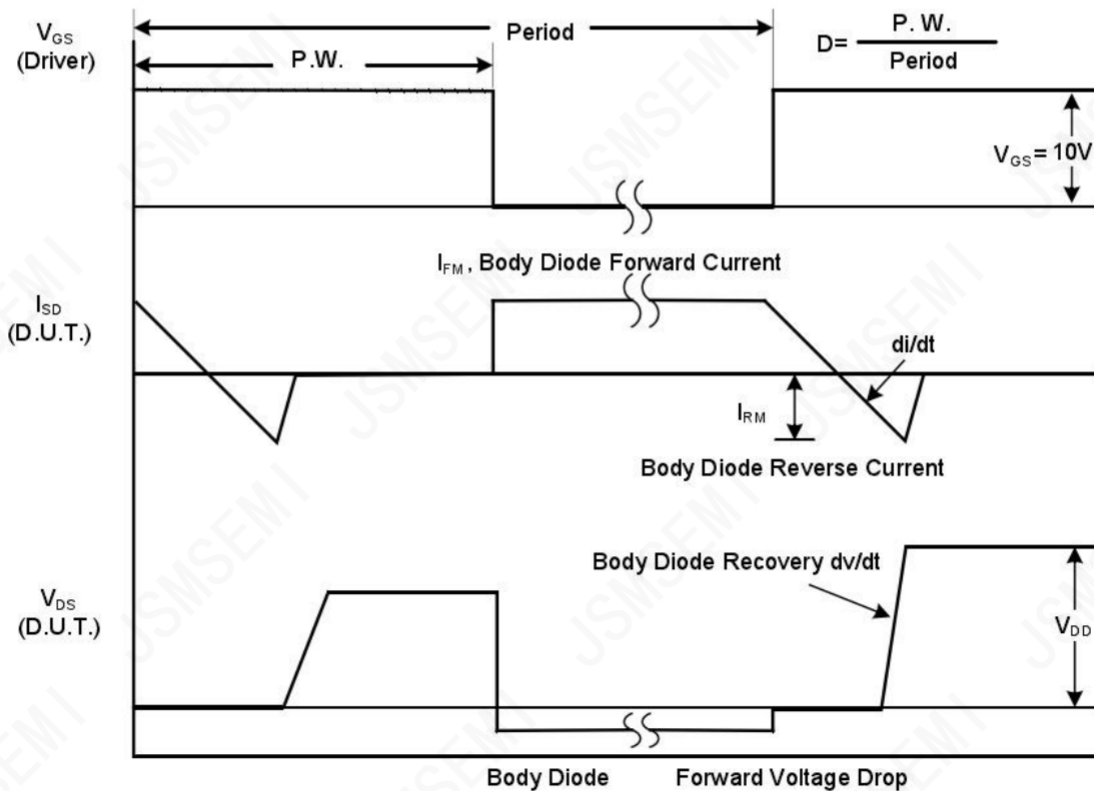
A. Repetitive rating; pulse width limited by max. junction temperature.

 B. $T_J=25^{\circ}\text{C}$, $V_G=10\text{V}$, $R_G=25\Omega$, $L=0.5\text{mH}$

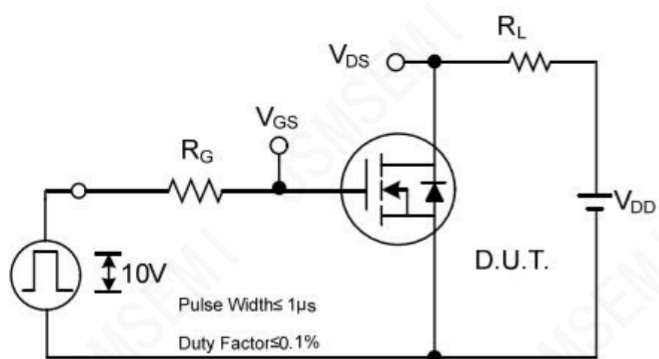
■ RATING AND CHARACTERISTIC CURVES



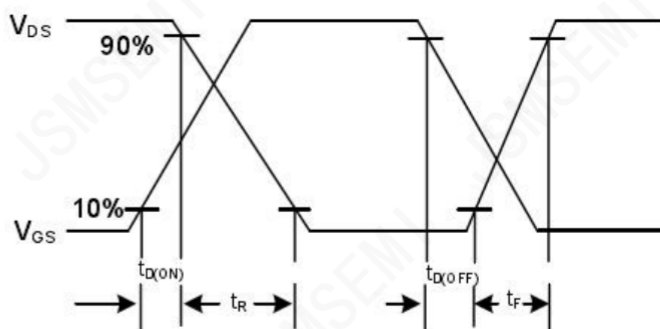
Peak Diode Recovery dv/dt Test Circuit



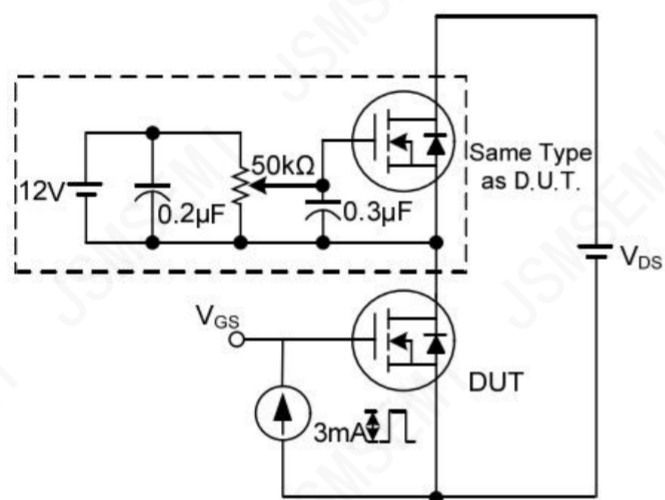
Peak Diode Recovery dv/dt Waveforms



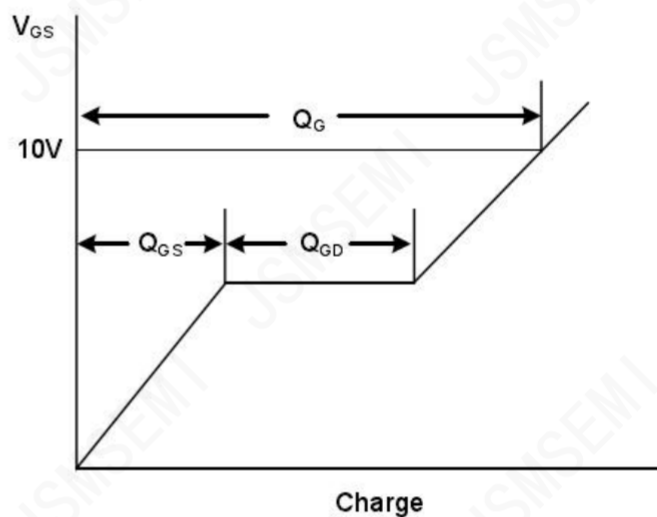
Switching Test Circuit



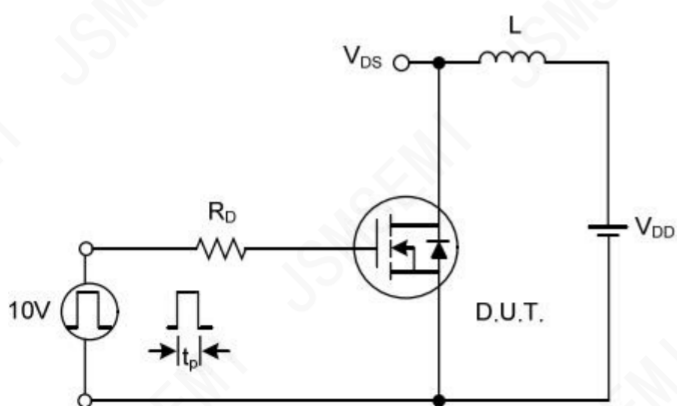
Switching Waveforms



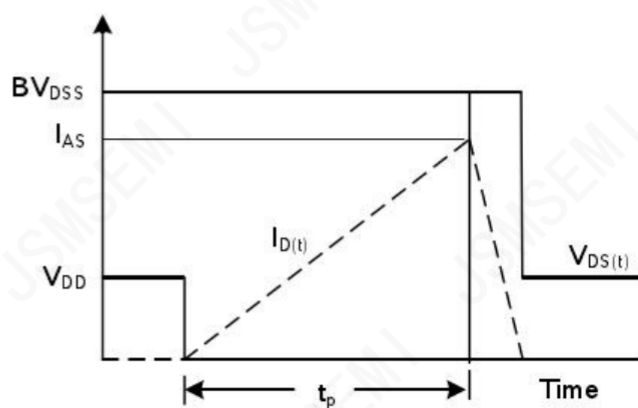
Gate Charge Test Circuit



Gate Charge Waveform



Unclamped Inductive Switching Test Circuit



Unclamped Inductive Switching Waveforms

■ Typical Electrical and Thermal Characteristics Diagrams

Figure 1: Power De-rating

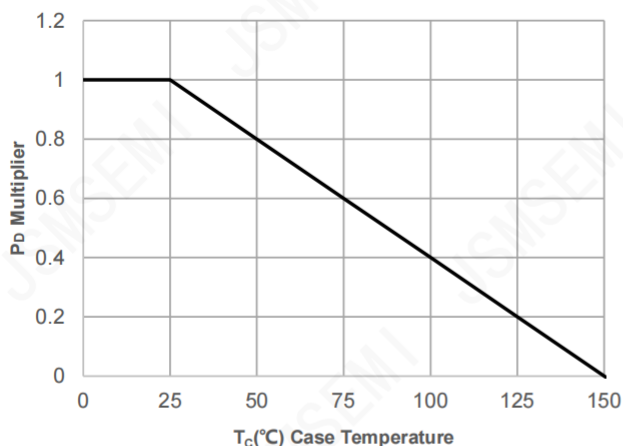


Figure 2: Current De-rating

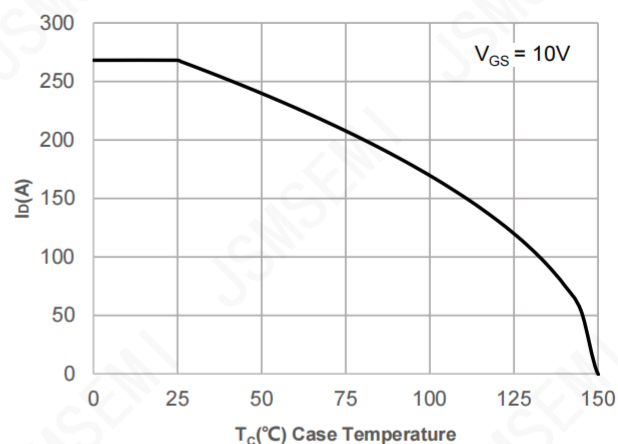


Figure 3: Normalized Maximum Transient Thermal Impedance

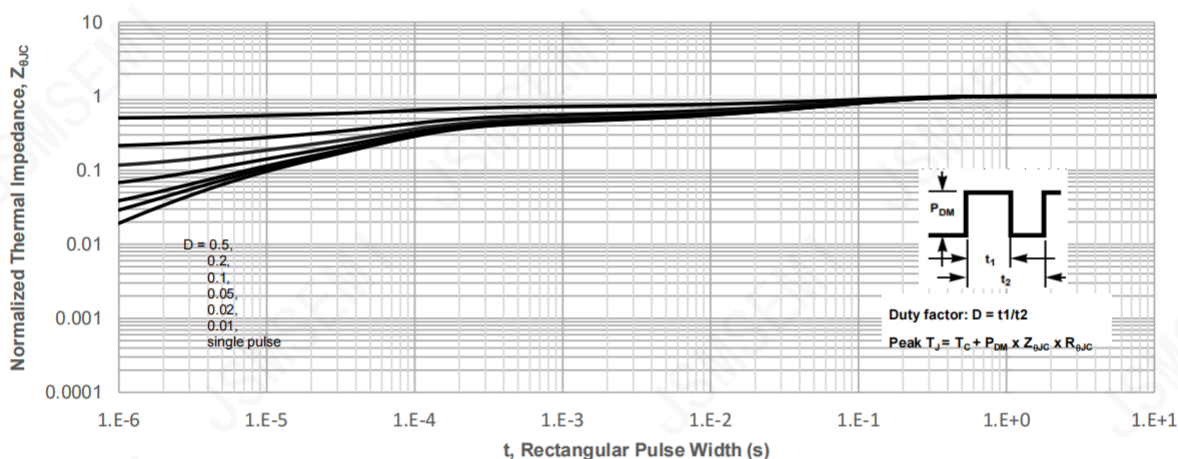


Figure 4: Peak Current Capacity

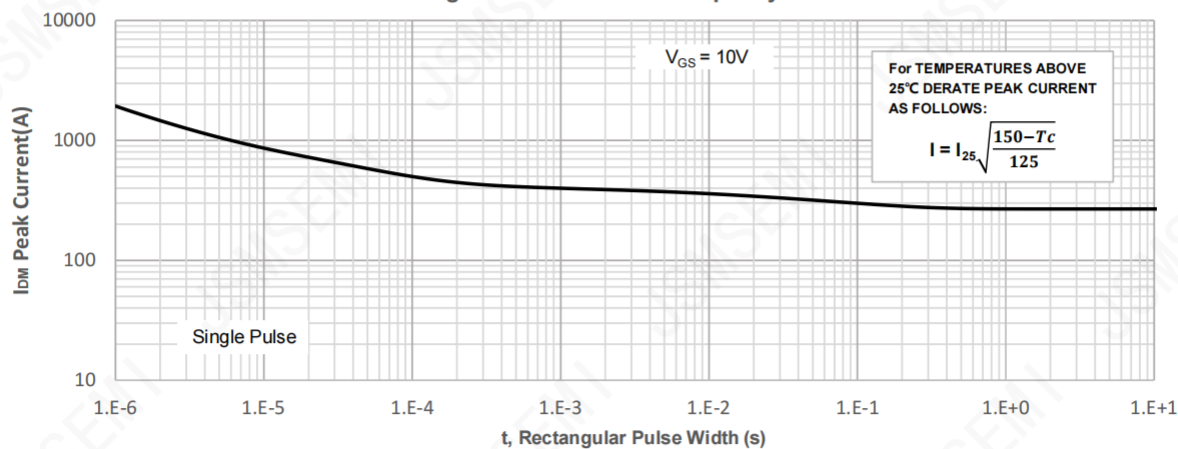


Figure 5: Output Characteristics

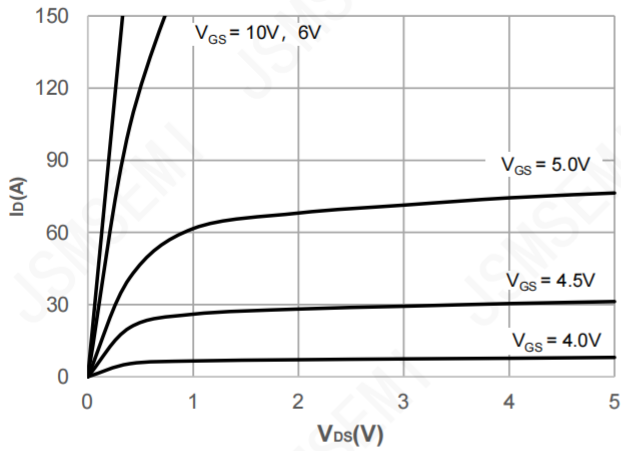


Figure 6: Typical Transfer Characteristics

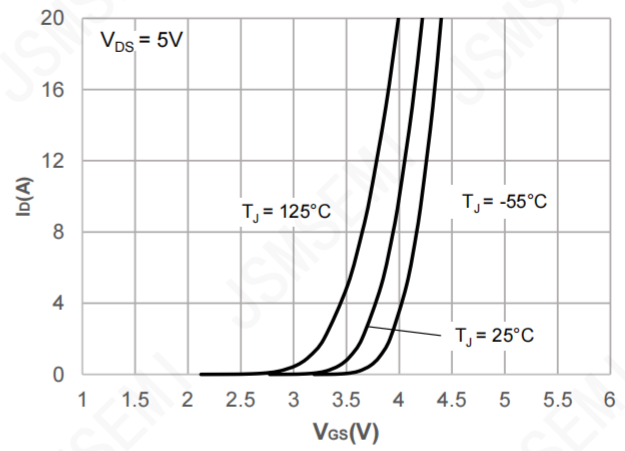


Figure 7: On-resistance vs. Drain Current

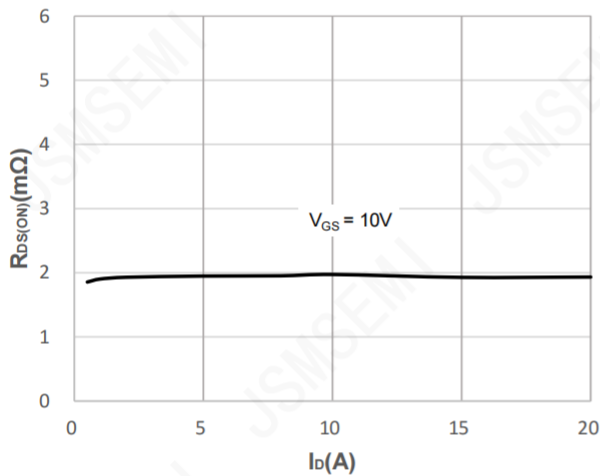


Figure 8: Body Diode Characteristics

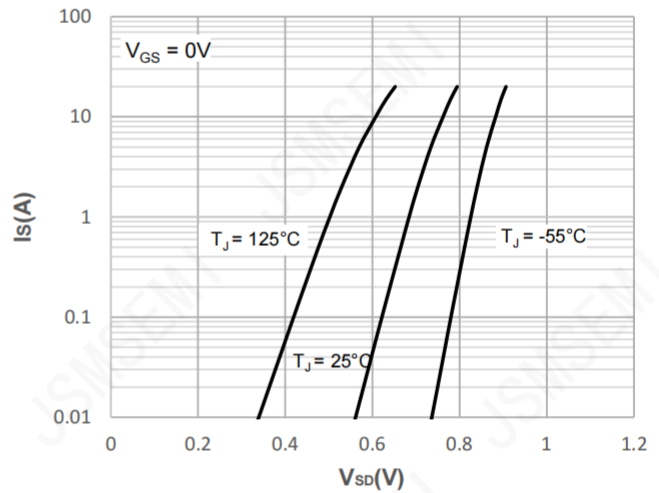


Figure 9: Gate Charge Characteristics

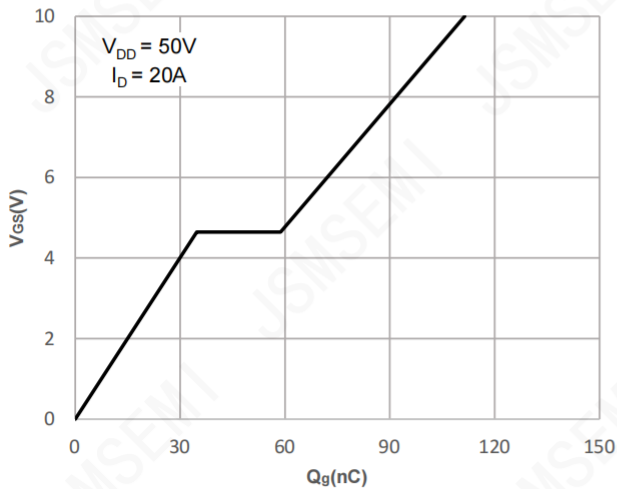


Figure 10: Capacitance Characteristics

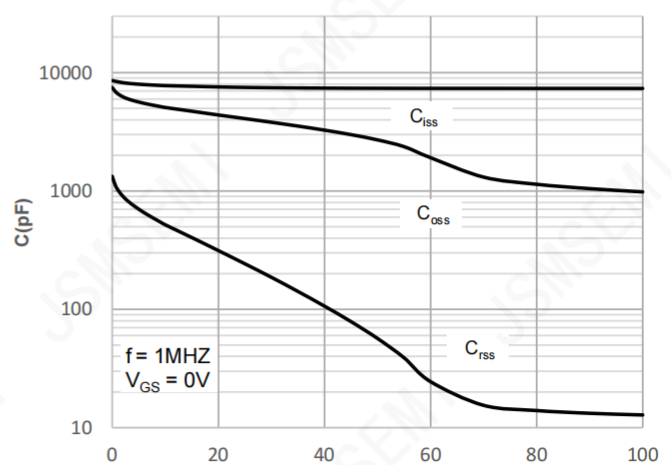


Figure 11: Normalized Breakdown voltage vs. Junction Temperature

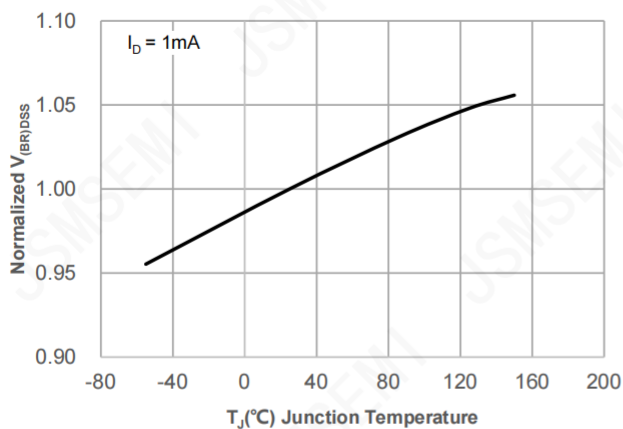


Figure 12: Normalized on Resistance vs. Junction Temperature

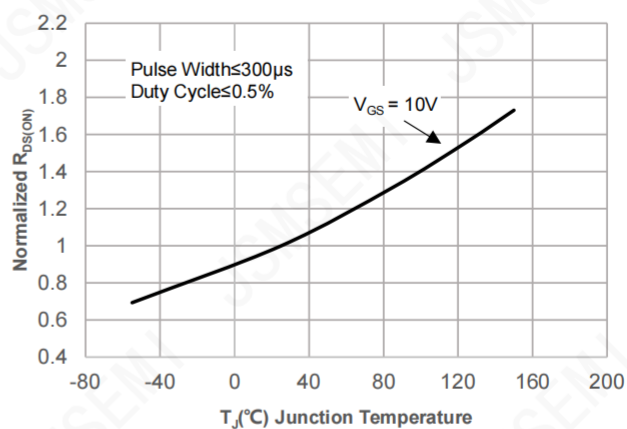


Figure 13: Normalized Threshold Voltage vs. Junction Temperature

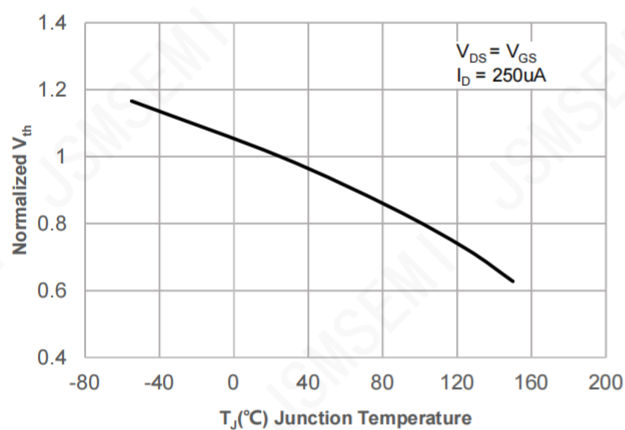


Figure 14: $R_{DS(ON)}$ vs. V_{GS}

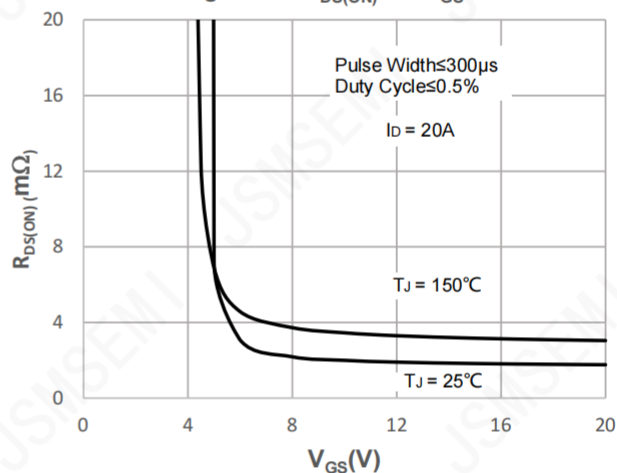
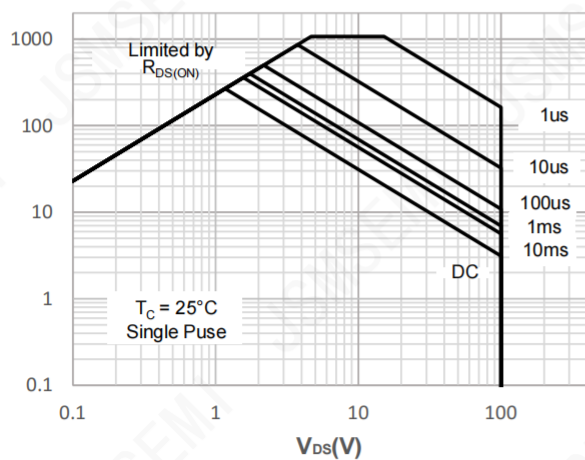
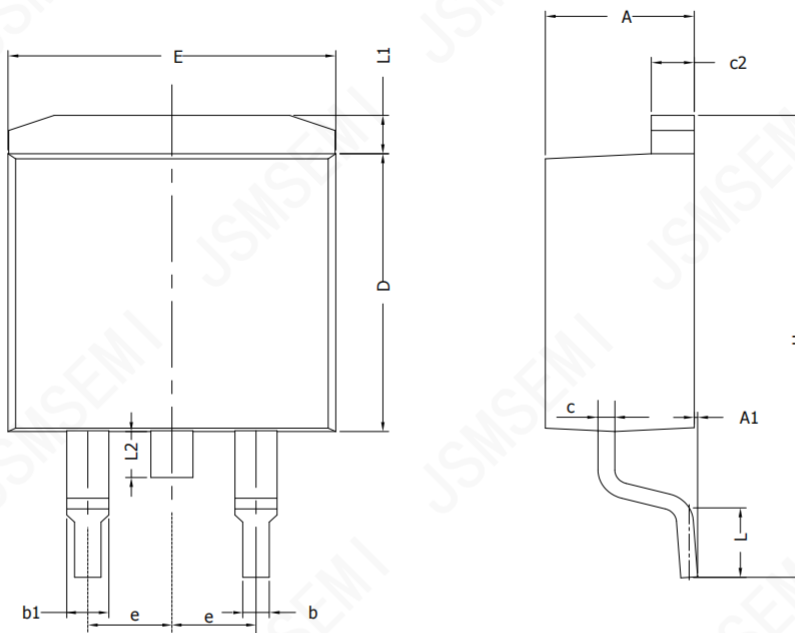


Figure 15: Maximum Safe Operating Area



Package Information

TO-263



SYMBOL	MIN	NOM	MAX
A	4.30	4.57	4.72
A1	0	0.10	0.25
b	0.71	0.81	0.91
c	0.30	---	0.60
c2	1.17	1.27	1.37
D	8.50	---	9.35
E	9.80	---	10.45
e	2.54BSC		
H	14.70	---	15.75
L	2.00	2.30	2.74
L1	1.12	1.27	1.42
L2	---	---	1.75

Revision History

Rev.	Change	Date
V1.0	Initial version	6/27/2021

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