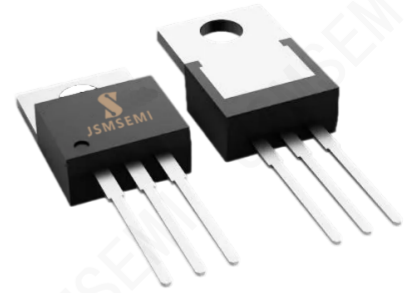


## Product Summary

- $V_{DS}$  100V
- $I_D$  110A
- $R_{DS(ON)}$  ( at  $V_{GS}=10V$ )  $<4.0m\Omega$
- 100% EAS Tested
- 100%  $\nabla V_{DS}$  Tested

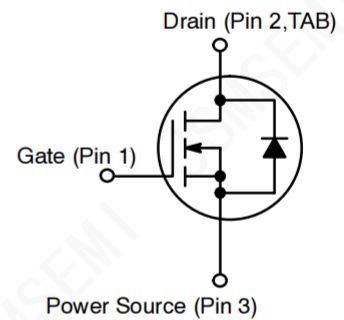


## General Description

- Trench Power MOSFET technology
- 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		$V_{GS}$	$\pm 20$	V
Drain Current	$T_C=25^\circ\text{C}$	$I_D$	110	A
	$T_C=100^\circ\text{C}$		110	
Pulsed Drain Current <sup>A</sup>		$I_{DM}$	440	A
Avalanche energy <sup>B</sup>		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 <sup>D</sup>	Steady-State	$R_{\theta JA}$		40	$^\circ\text{C}/\text{W}$
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
STP15810-JSM	TO-220-3	JSM15810	-55 to 150 $^\circ\text{C}$	1	TUBE,1000	Rohs

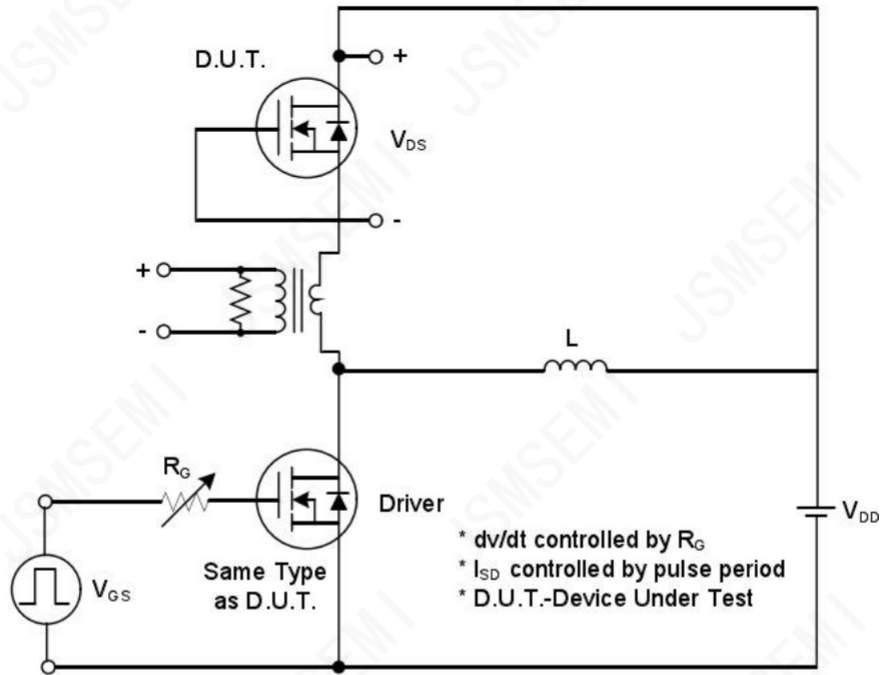
**■ Electrical Characteristics** ( $T_J=25^{\circ}\text{C}$  unless otherwise noted)

Parameter	Symbol	Conditions	Min	Typ	Max	Units
<b>Static Parameter</b>						
Drain-Source Breakdown Voltage	$BV_{DSS}$	$V_{GS}=0\text{V}, I_D=250\mu\text{A}$	100	-	-	V
		$V_{GS}=0\text{V}, I_D=1\text{mA}$	100	-	-	V
Zero Gate Voltage Drain Current	$I_{DSS}$	$V_{DS}=100\text{V}, V_{GS}=0\text{V}$	-	-	1	$\mu\text{A}$
		$V_{DS}=100\text{V}, V_{GS}=0\text{V}, T_J=150^{\circ}\text{C}$	-	-	100	
Gate-Body Leakage Current	$I_{GSS}$	$V_{GS}=\pm 20\text{V}, V_{DS}=0\text{V}$	-	-	$\pm 100$	nA
Gate Threshold Voltage	$V_{GS(th)}$	$V_{DS}=V_{GS}, I_D=250\mu\text{A}$	2.0	3.0	4.0	V
Static Drain-Source On-Resistance	$R_{DS(on)}$	$V_{GS}=10\text{V}, I_D=20\text{A}$	-	3.5	4.0	m $\Omega$
Diode Forward Voltage	$V_{SD}$	$I_S=50\text{A}, V_{GS}=0\text{V}$	-	-	1.2	V
Gate resistance	$R_G$	$f=1\text{MHz}$	-	1.7	-	$\Omega$
Maximum Body-Diode Continuous Current	$I_S$		-	-	110	A
<b>Dynamic Parameters</b>						
Input Capacitance	$C_{iss}$	$V_{DS}=50\text{V}, V_{GS}=0\text{V}, f=1\text{MHz}$	-	7315	-	$\mu\text{F}$
Output Capacitance	$C_{oss}$		-	2656	-	
Reverse Transfer Capacitance	$C_{rss}$		-	59	-	
<b>Switching Parameters</b>						
Total Gate Charge	$Q_g$	$V_{GS}=10\text{V}, V_{DS}=50\text{V}, I_D=20\text{A}$	-	110	-	nC
Gate-Source Charge	$Q_{gs}$		-	24	-	
Gate-Drain Charge	$Q_{gd}$		-	35	-	
Reverse Recovery Charge	$Q_{rr}$	$I_F=20\text{A}, di/dt=100\text{A}/\mu\text{s}$	-	209	-	nC
Reverse Recovery Time	$t_{rr}$		-	90	-	ns
Turn-on Delay Time	$t_{D(on)}$	$V_{GS}=10\text{V}, V_{DD}=50\text{V}, I_D=20\text{A}$ $R_{GEN}=3\Omega$	-	25	-	ns
Turn-on Rise Time	$t_r$		-	45	-	
Turn-off Delay Time	$t_{D(off)}$		-	88	-	
Turn-off fall Time	$t_f$		-	53	-	

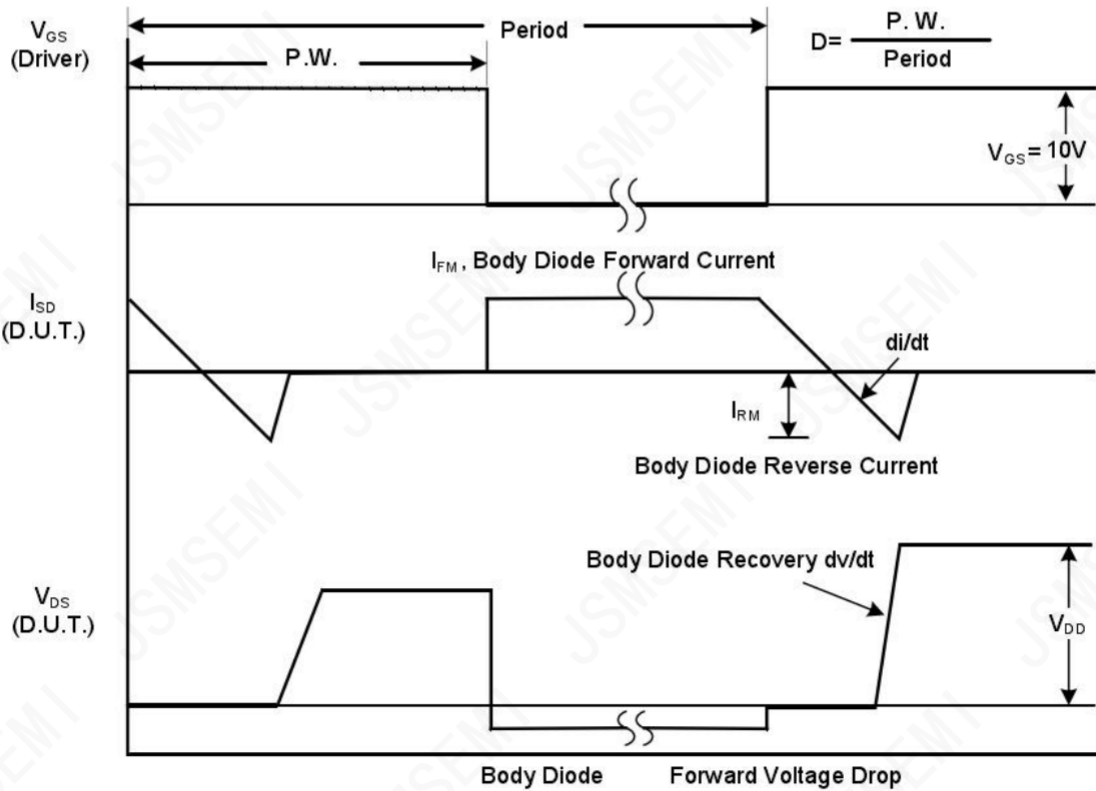
A. Repetitive rating; pulse width limited by max. junction temperature.

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

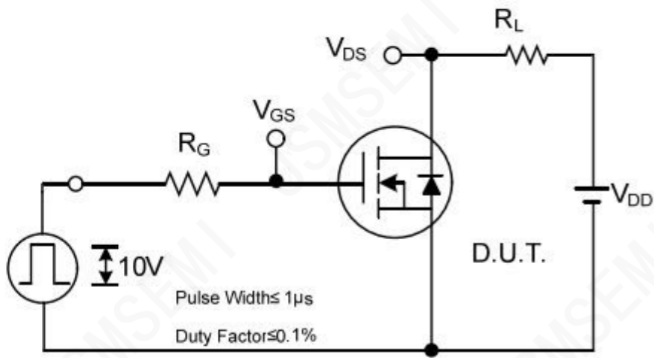
■ RATING AND CHARACTERISTIC CURVES



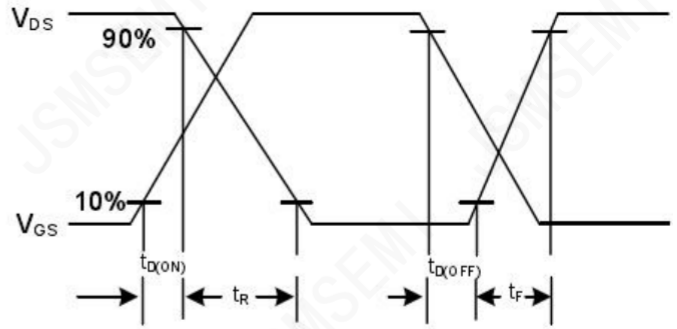
Peak Diode Recovery  $dv/dt$  Test Circuit



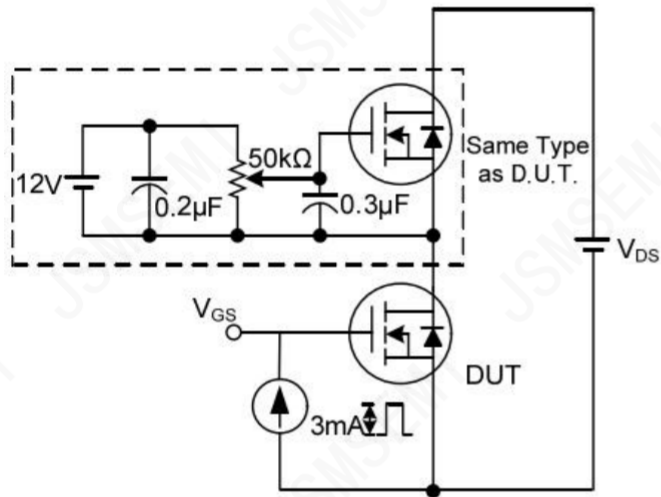
Peak Diode Recovery  $dv/dt$  Waveforms



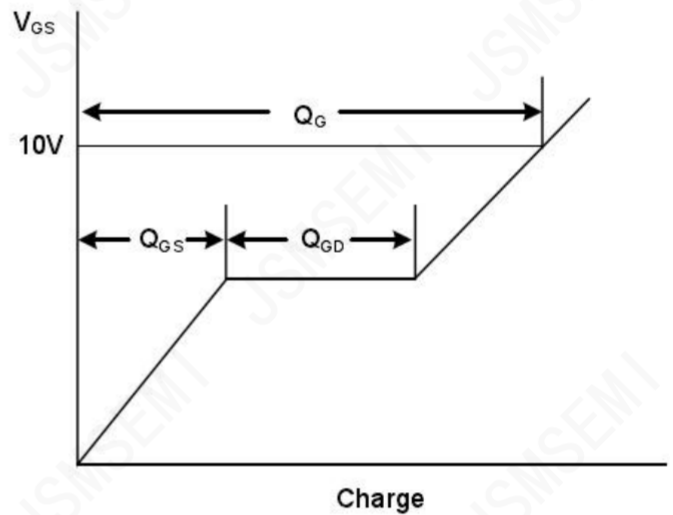
**Switching Test Circuit**



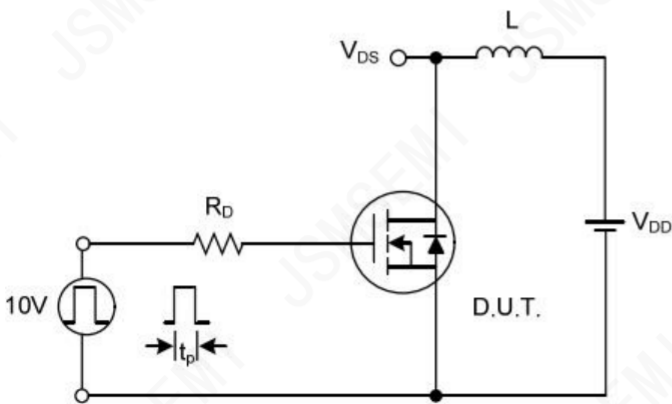
**Switching Waveforms**



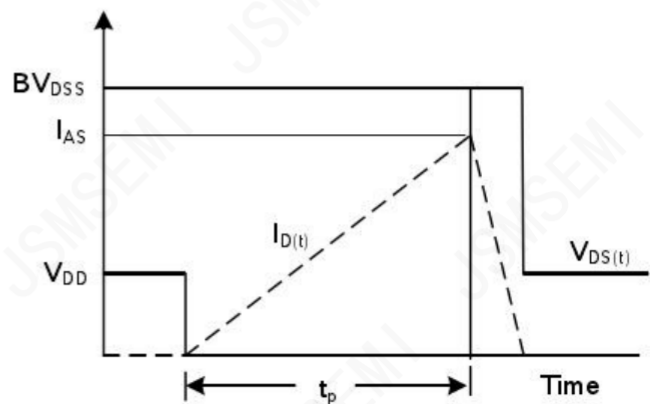
**Gate Charge Test Circuit**



**Gate Charge Waveform**



**Unclamped Inductive Switching Test Circuit**



**Unclamped Inductive Switching Waveforms**

■ Typical Electrical and Thermal Characteristics Diagrams

Figure 1: Power De-rating

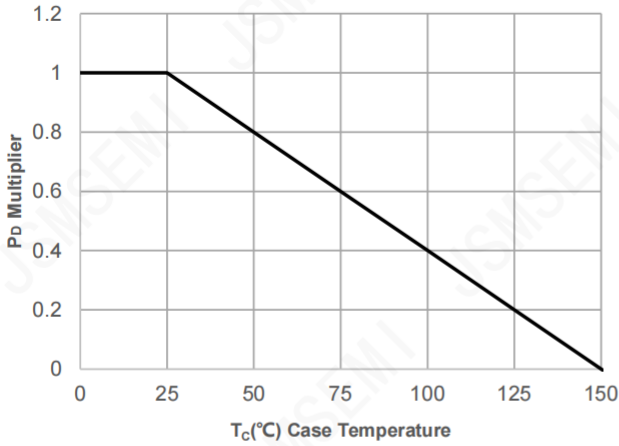


Figure 2: Current De-rating

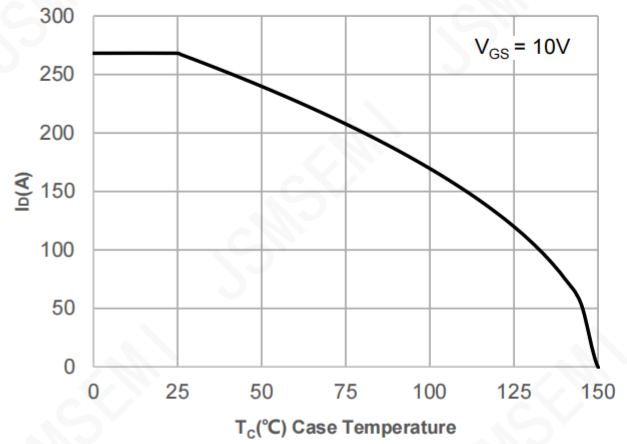


Figure 3: Normalized Maximum Transient Thermal Impedance

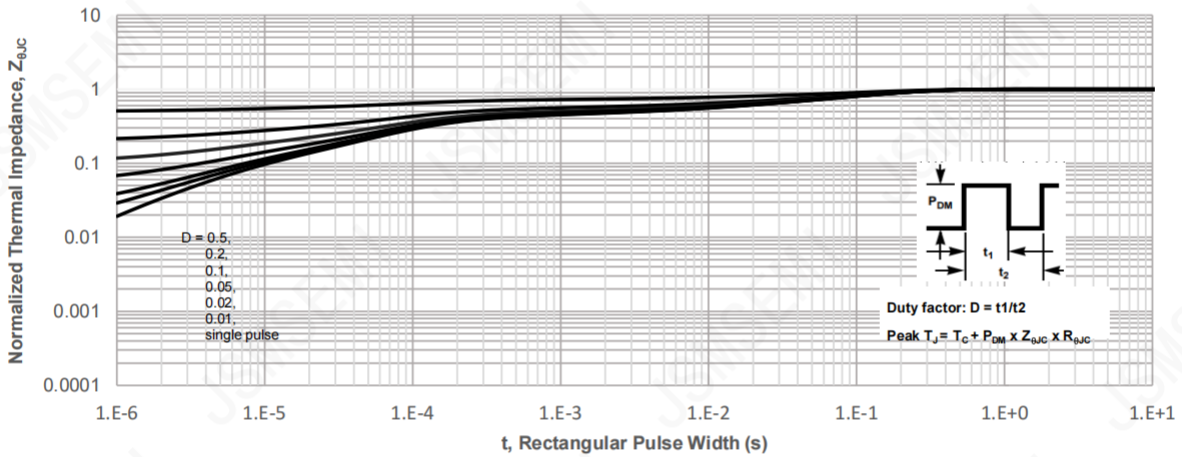


Figure 4: Peak Current Capacity

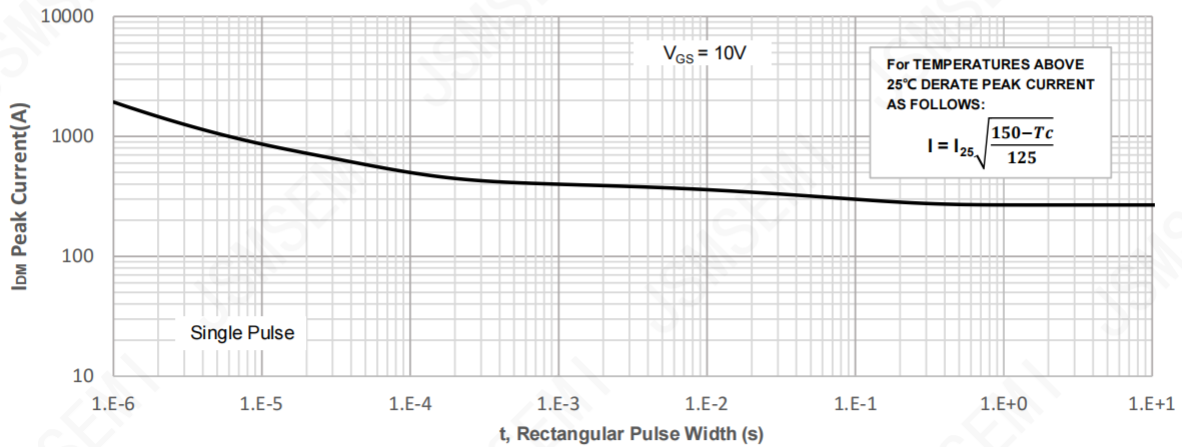


Figure 5: Output Characteristics

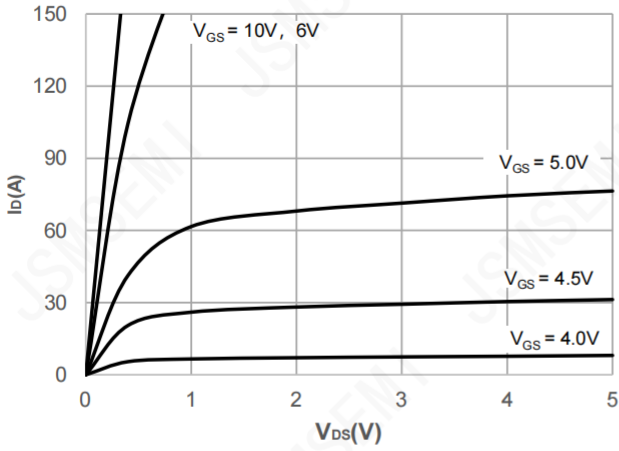


Figure 6: Typical Transfer Characteristics

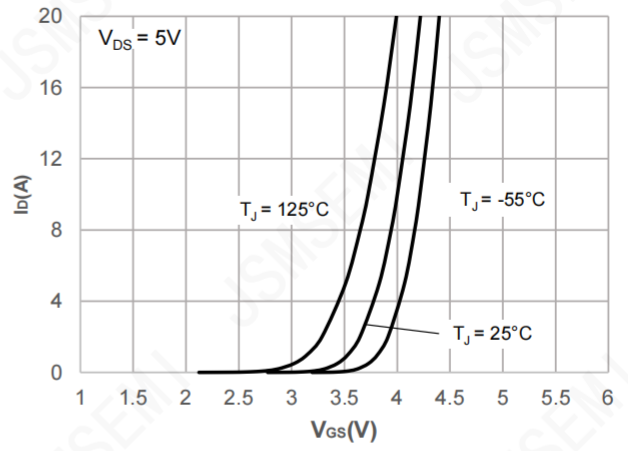


Figure 7: On-resistance vs. Drain Current

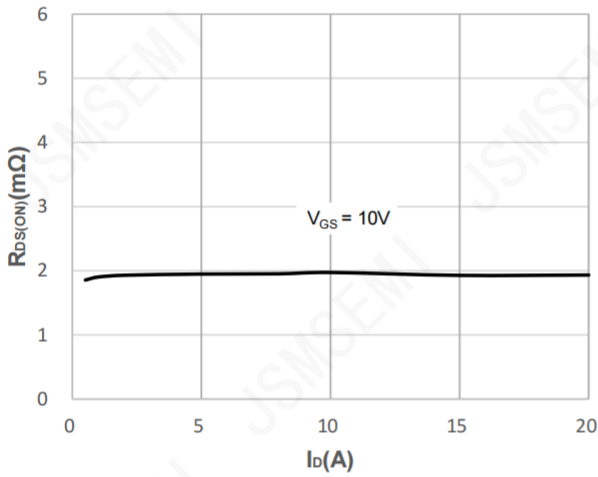


Figure 8: Body Diode Characteristics

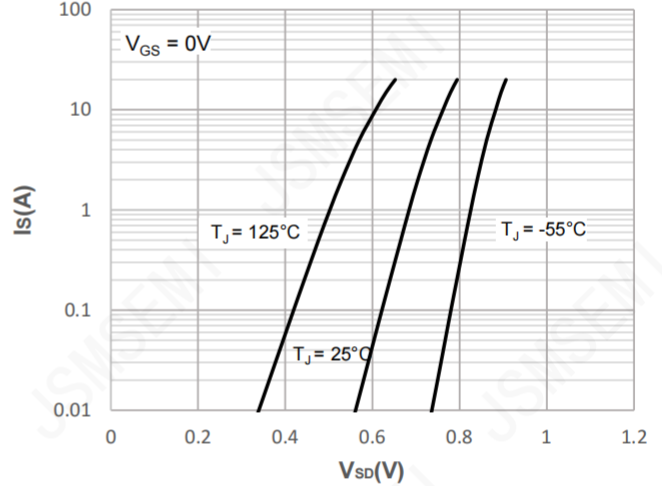


Figure 9: Gate Charge Characteristics

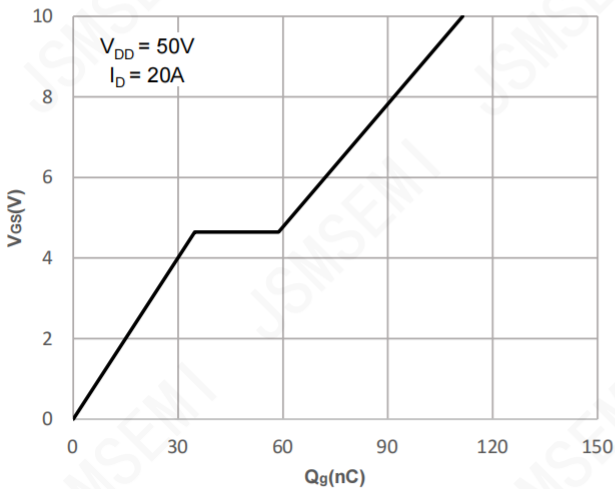


Figure 10: Capacitance Characteristics

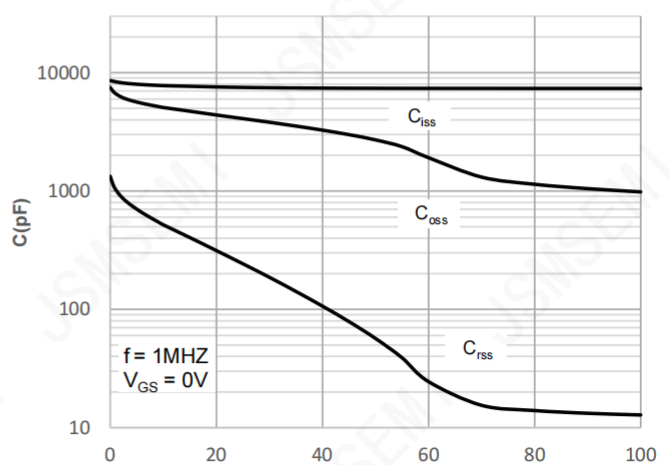


Figure 11: Normalized Breakdown voltage vs. Junction Temperature

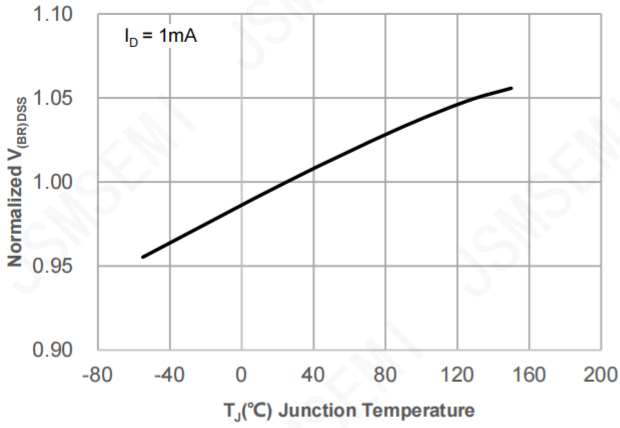


Figure 12: Normalized on Resistance vs. Junction Temperature

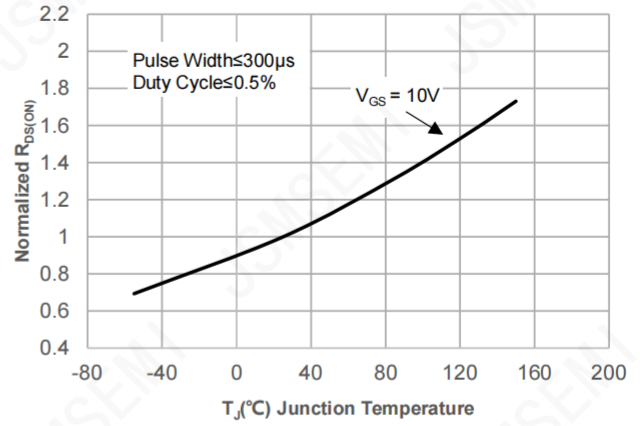


Figure 13: Normalized Threshold Voltage vs. Junction Temperature

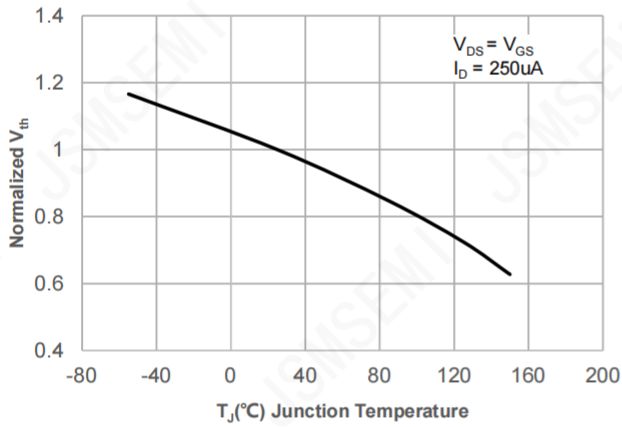


Figure 14:  $R_{DS(ON)}$  vs.  $V_{GS}$

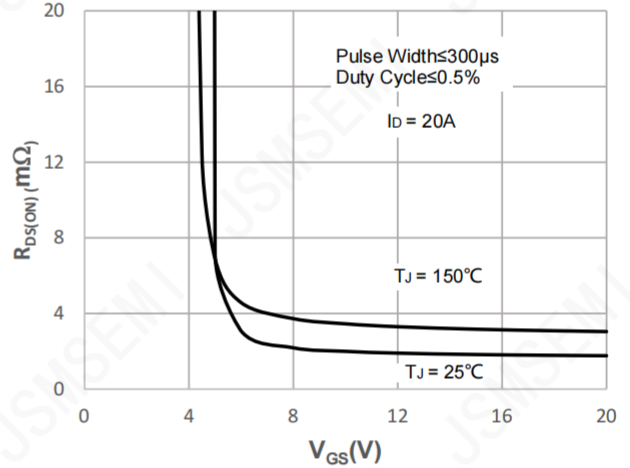
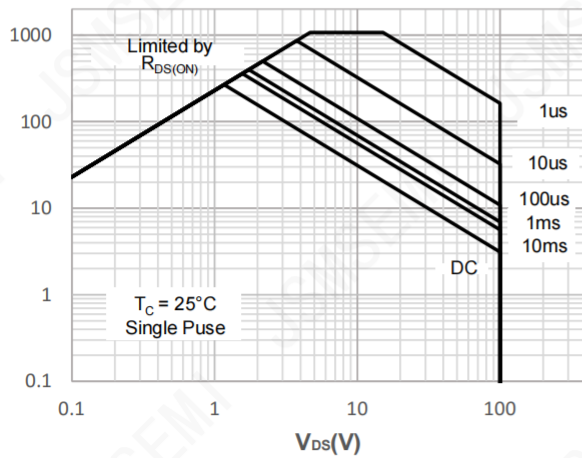
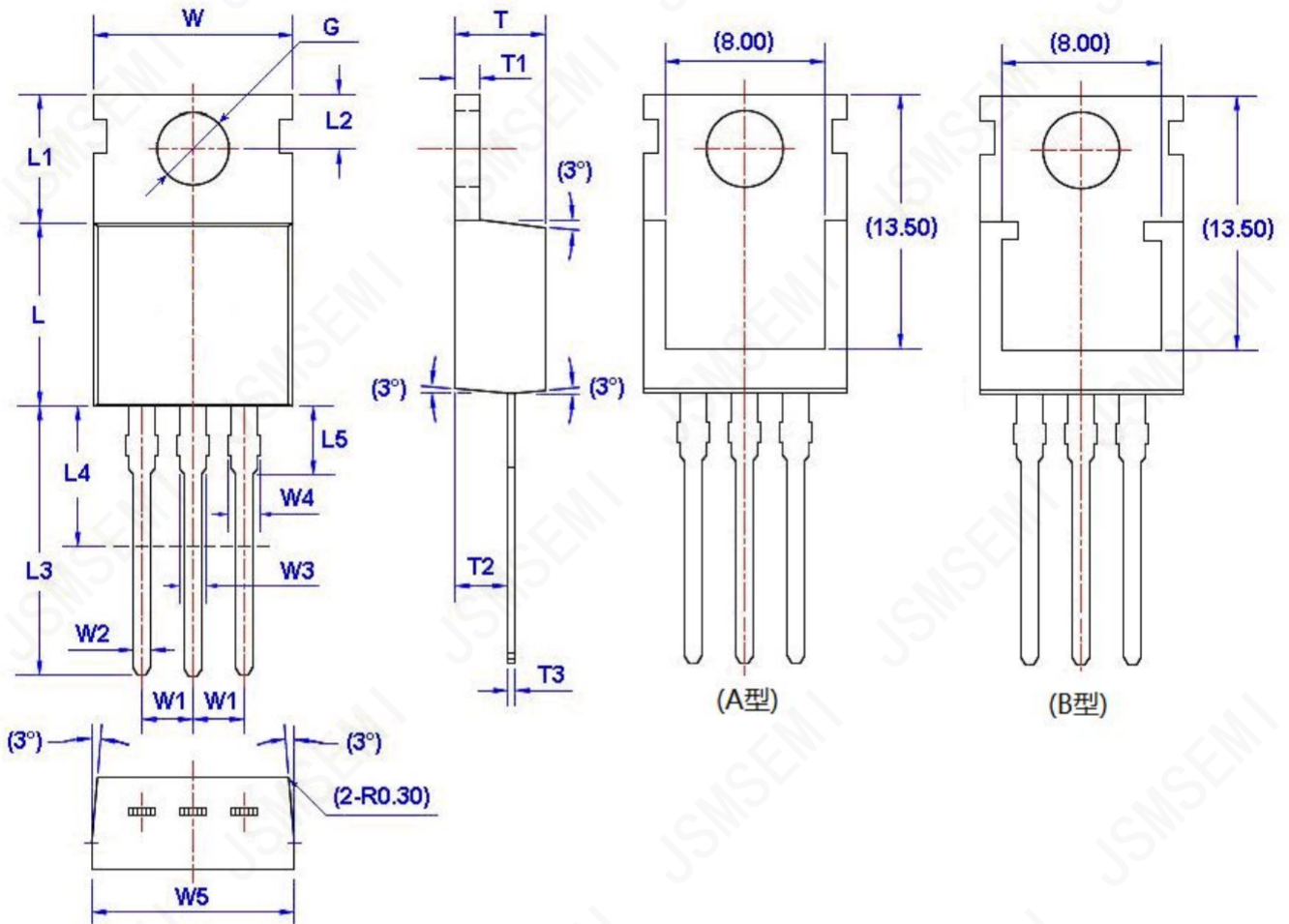


Figure 15: Maximum Safe Operating Area



Package Information

TO-220-3



Unit: mm

Symbol	Size		Symbol	Size		Symbol	Size		Symbol	Size	
	Min	Max		Min	Max		Min	Max		Min	Max
W	9.66	10.28	W5	9.80	10.20	L4**	6.20	6.60	T3	0.45	0.60
W1	2.54 (TYP)		L	9.00	9.40	L5	2.79	3.30	G(Φ)	3.50	3.70
W2	0.70	0.95	L1	6.40	6.80	T	4.30	4.70			
W3	1.17	1.37	L2	2.70	2.90	T1	1.15	1.40			
W4*	1.32	1.72	L3	12.70	14.27	T2	2.20	2.60			

## Revision History

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

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