

Product Summary

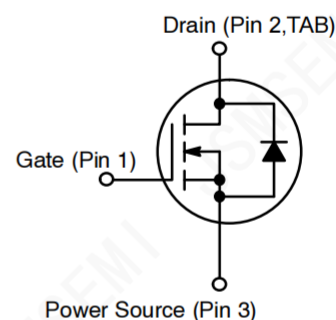
- V_{DS} 80V
- I_D 120A
- $R_{DS(ON)}$ (at $V_{GS}=10V$) $<7.0m\Omega$
- 100% EAS Tested
- 100% ∇V_{DS} Tested

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

Parameter	Symbol	Value	Unit
Drain-Source Voltage	V_{DS}	80	V
Gate-Source Voltage	V_{GS}	± 20	V
Continuous Drain Current ($T_c=25^\circ\text{C}$) ⁽¹⁾	I_D	120	A
Continuous Drain Current ($T_c=100^\circ\text{C}$)	I_D	100	A
Pulsed Drain Current ⁽¹⁾	I_{DM}	480	A
Drain Power Dissipation	P_D	180	W
Single Pulsed Avalanche Energy ⁽²⁾	E_{AS}	340	mJ
Thermal Resistance from Junction to Ambient ⁽³⁾	$R_{\theta JA}$	43	$^\circ\text{C/W}$
Thermal Resistance from Junction to Case	$R_{\theta JC}$	1.0	$^\circ\text{C/W}$
Junction Temperature	T_J	-55~ +150	$^\circ\text{C}$
Storage Temperature	T_{STG}	-55~ +150	$^\circ\text{C}$

Notes:

- 1) Repetitive Rating: pulse width limited by maximum junction temperature
- 2) EAS condition : $T_J=25^\circ\text{C}$, $V_{DD}=50V$, $V_G=10V$, $L=1.0mH$, $R_g=25\Omega$, $I_{AS}=44.7A$
- 3) The value of $R_{\theta JA}$ Mounted on FR4 Board (25.4mm*25.4mm*t1.6mm) With 2oz Copper $T_A=25^\circ\text{C}$

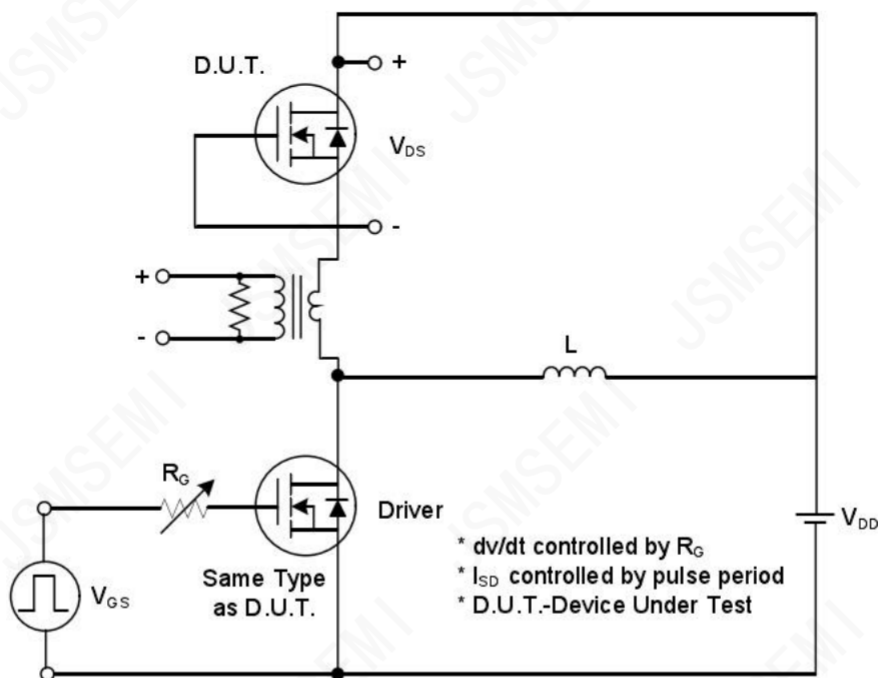
MOSFET ELECTRICAL CHARACTERISTICS($T_J=25^{\circ}\text{C}$ unless otherwise noted)

Parameter	Symbol	Test Condition	Min	Type	Max	Unit
Static Characteristics						
Drain-source breakdown voltage	$V_{(BR)DSS}$	$V_{GS} = 0V, I_D = 250\mu A$	100	-	-	V
Zero gate voltage drain current	I_{DSS}	$V_{DS} = 100V, V_{GS} = 0V$	-	-	1	μA
Gate-body leakage current	I_{GSS}	$V_{GS} = \pm 20V, V_{DS} = 0V$	-	-	± 100	nA
Gate threshold voltage	$V_{GS(th)}$	$V_{DS} = V_{GS}, I_D = 250\mu A$	2.0	3.0	4.0	V
Drain-source on-resistance	$R_{DS(on)}$	$V_{GS} = 10V, I_D = 20A$	-	6.0	7.0	m Ω
Forward transconductance	R_g	$V_{GS} = 0V, V_{DS} = 0V, f = 1.0MHz$	-	2.0	-	Ω
Dynamic characteristics						
Input Capacitance	C_{iss}	$V_{DS} = 50V, V_{GS} = 0V, f = 1MHz$	-	4628	-	pF
Output Capacitance	C_{oss}		-	1624	-	
Reverse Transfer Capacitance	C_{rss}		-	19	-	
Switching characteristics						
Turn-on delay time	$t_{d(on)}$	$V_{DD} = 50V, I_D = 20A, R_G = 3\Omega, V_{GS} = 10V$	-	12	-	nS
Turn-on rise time	t_r		-	26	-	
Turn-off delay time	$t_{d(off)}$		-	38	-	
Turn-off fall time	t_f		-	31	-	
Total Gate Charge	Q_g	$V_{DS} = 50V, I_D = 20A, V_{GS} = 10V$	-	61	-	nC
Gate-Source Charge	Q_{gs}		-	19.5	-	
Gate-Drain Charge	Q_{gd}		-	8.7	-	
Source-Drain Diode characteristics						
Diode Forward voltage	V_{SD}	$T_J = 25^{\circ}C, V_{GS} = 0V, I_S = 20A$	-	0.8	1.2	V
Diode Forward current	I_S	$T_C = 25^{\circ}C$	-	-	120	A
Body Diode Reverse Recovery Time	t_{rr}	$T_J = 25^{\circ}C, I_F = 20A, di/dt = 100A/us$	-	77	-	nS
Body Diode Reverse Recovery Charge	Q_{rr}		-	189	-	nC

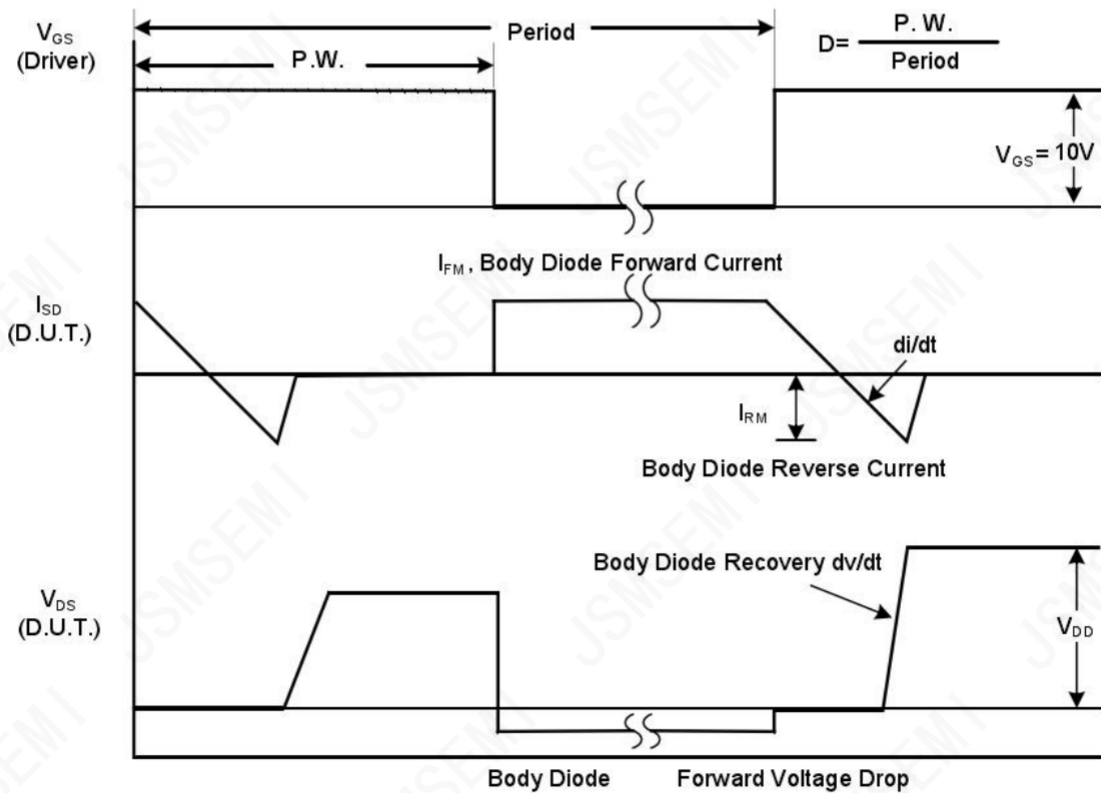
Ordering Information

Order number	Package	Marking	Operation Temperature Range	MSL Grade	Ship, Quantity	Green
STP140NF75-JSM	TO-220-3	P140NF75	-55 to 150 $^{\circ}\text{C}$	1	T&R, 800	RoHS

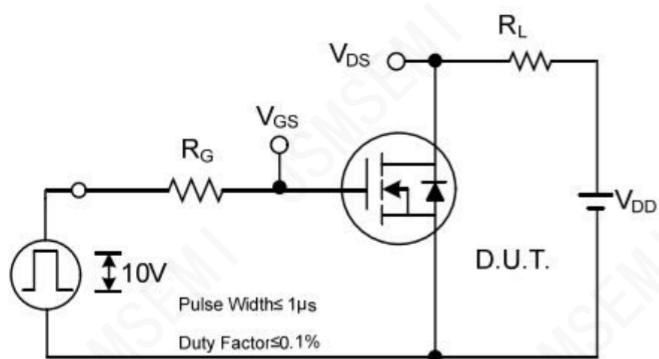
■ RATING AND CHARACTERISTIC CURVES



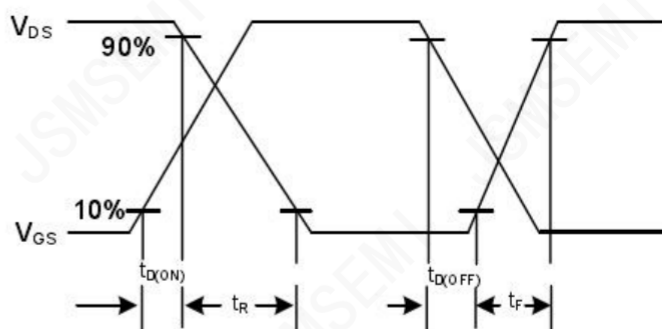
Peak Diode Recovery dv/dt Test Circuit



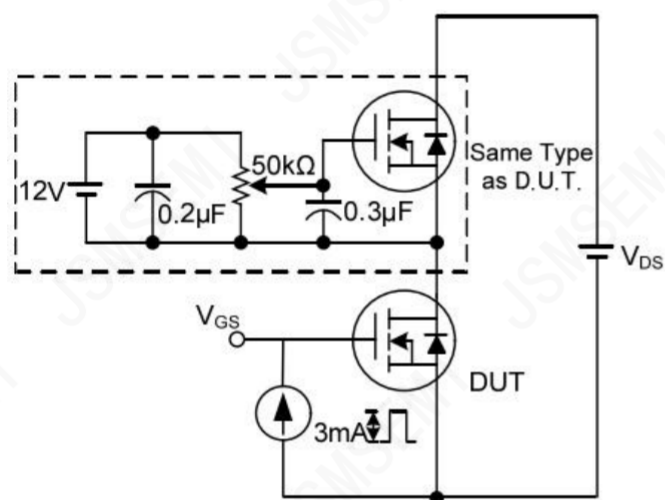
Peak Diode Recovery dv/dt Waveforms



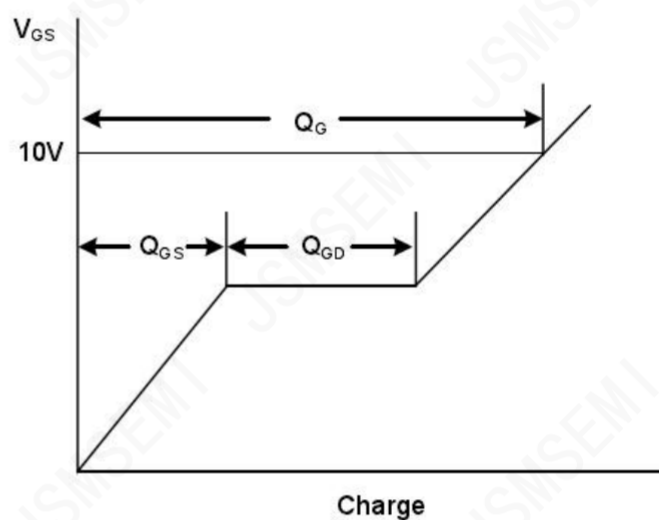
Switching Test Circuit



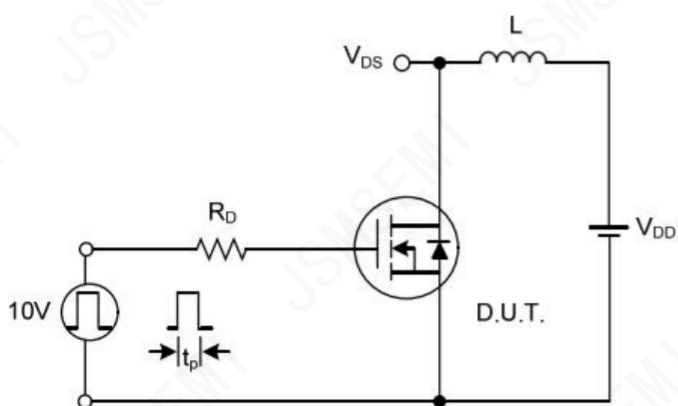
Switching Waveforms



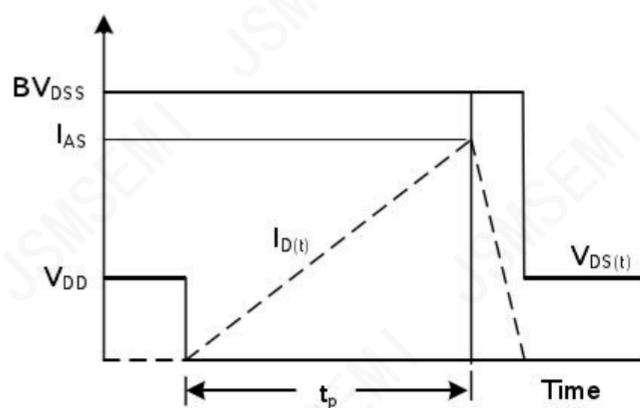
Gate Charge Test Circuit



Gate Charge Waveform



Unclamped Inductive Switching Test Circuit



Unclamped Inductive Switching Waveforms

Typical Characteristics

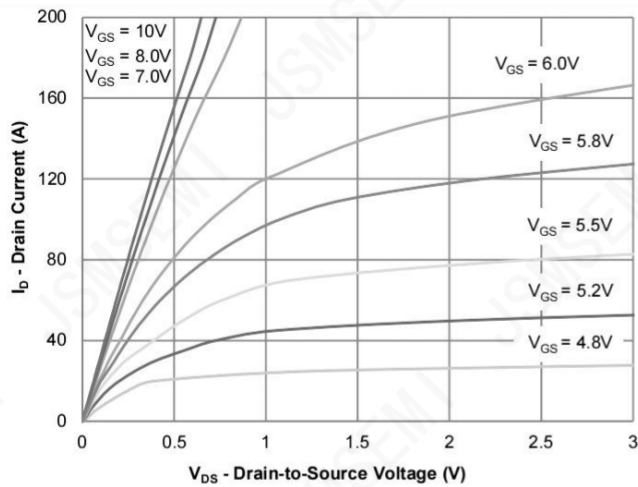


Figure 1: Output Characteristics

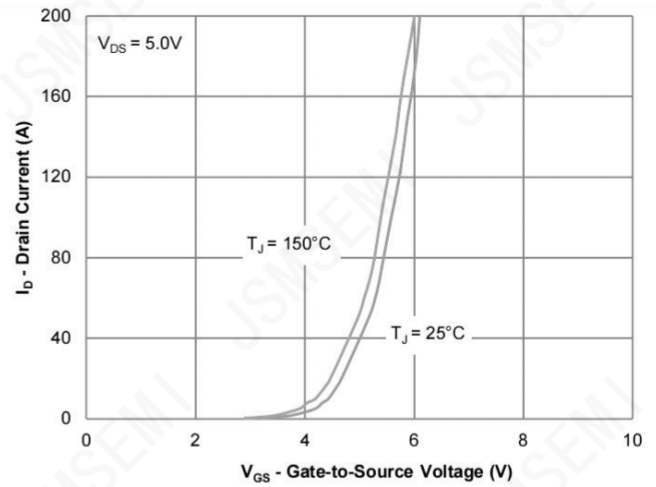


Figure 2: Transfer Characteristics

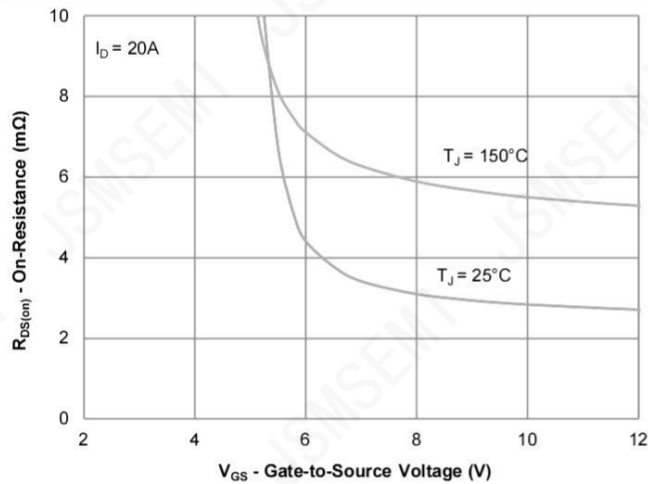


Figure 3: On-Resistance vs. Gate-Source Voltage

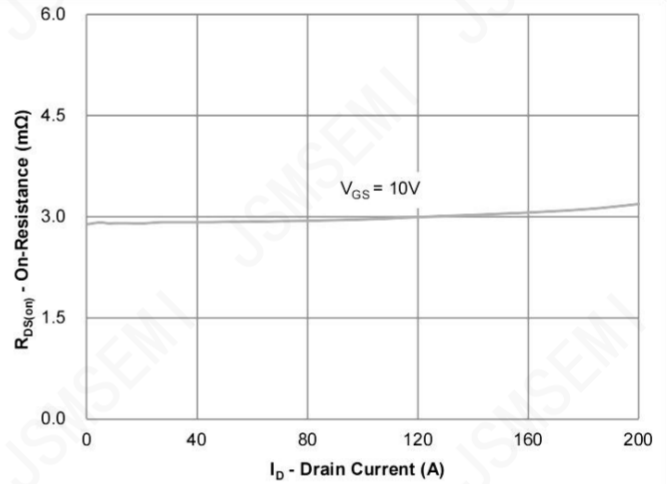


Figure 4: On-Resistance vs. Drain Current

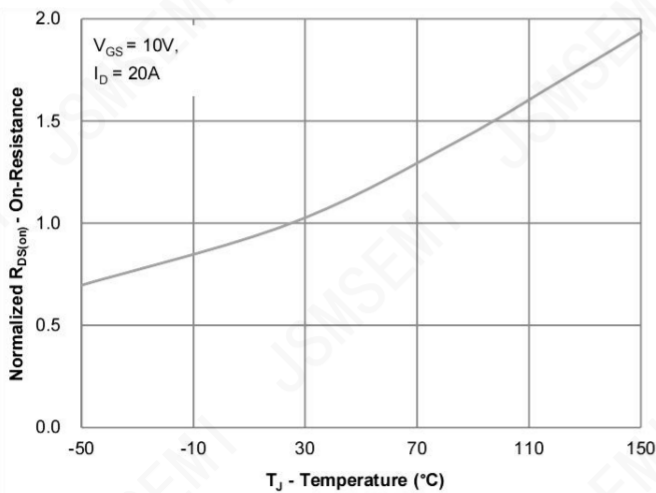


Figure 5: On-Resistance vs. Junction Temperature

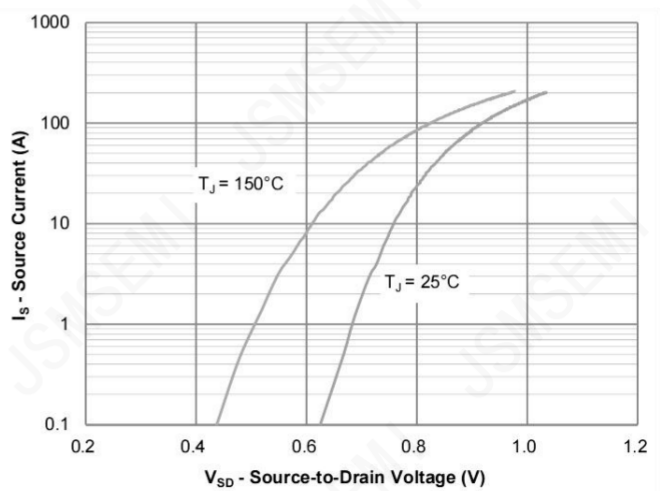


Figure 6: Source-Drain Diode Forward Voltage

Typical Characteristics

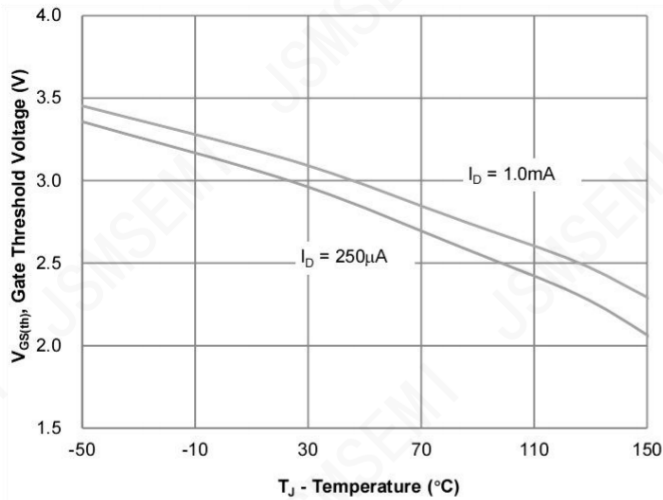


Figure 7: Gate Threshold Variation vs. Junction Temperature

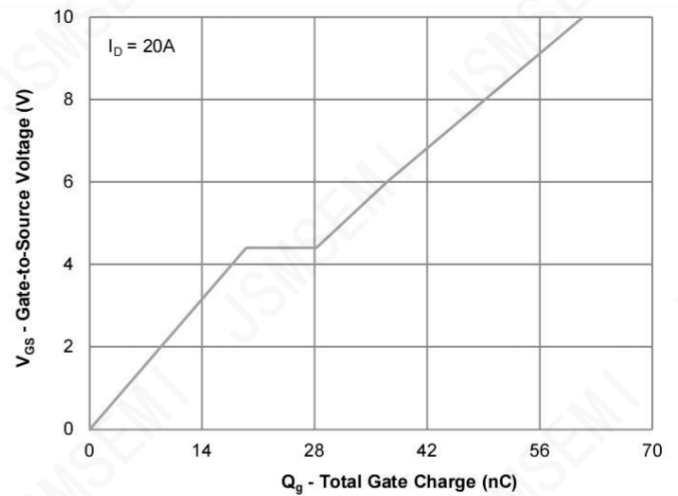


Figure 8: Gate Charge Characteristics

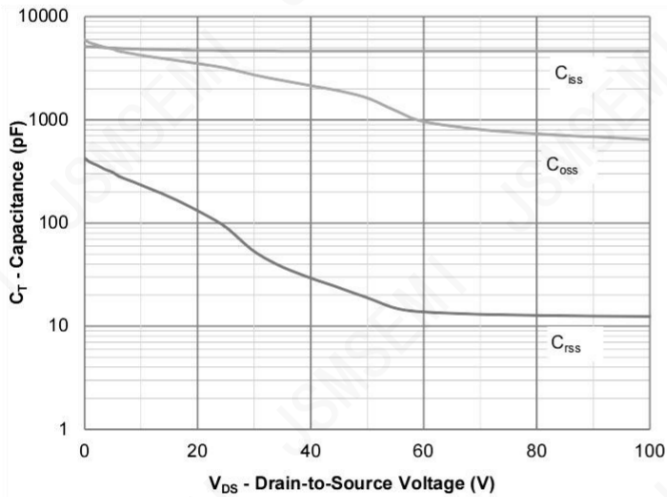


Figure 9: Capacitance Characteristics

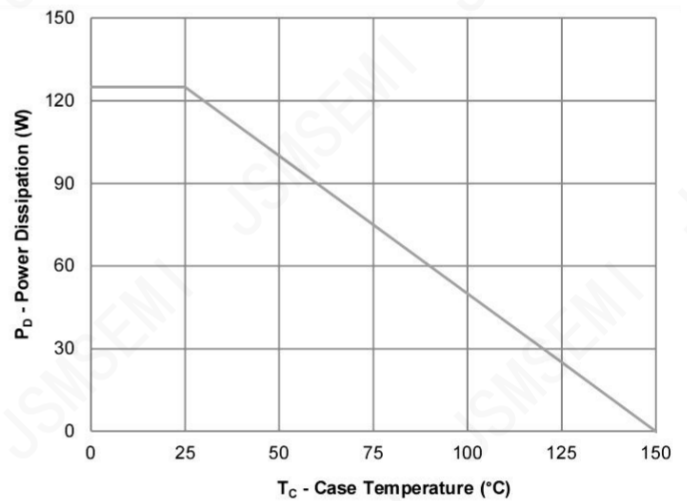


Figure 10: Power Derating

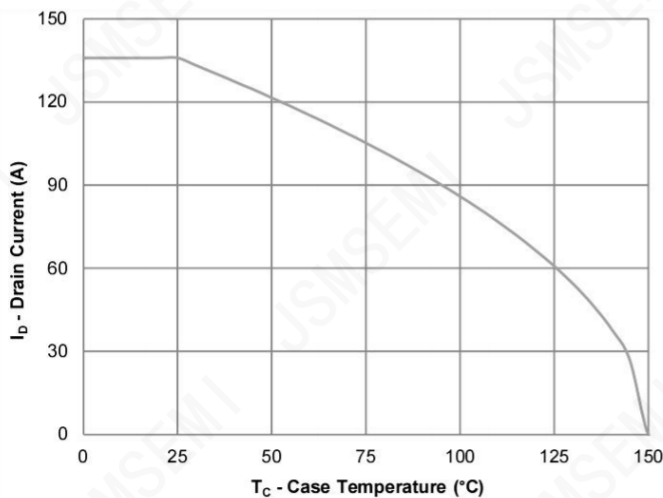


Figure 11: Current Derating

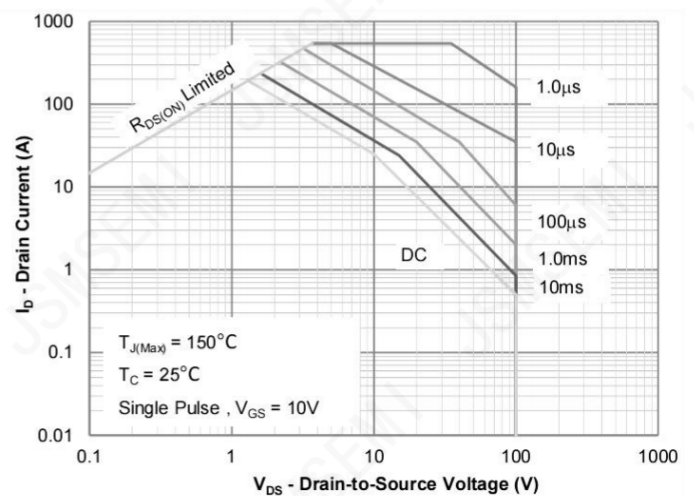


Figure 12: Safe Operating Area

Typical Characteristics

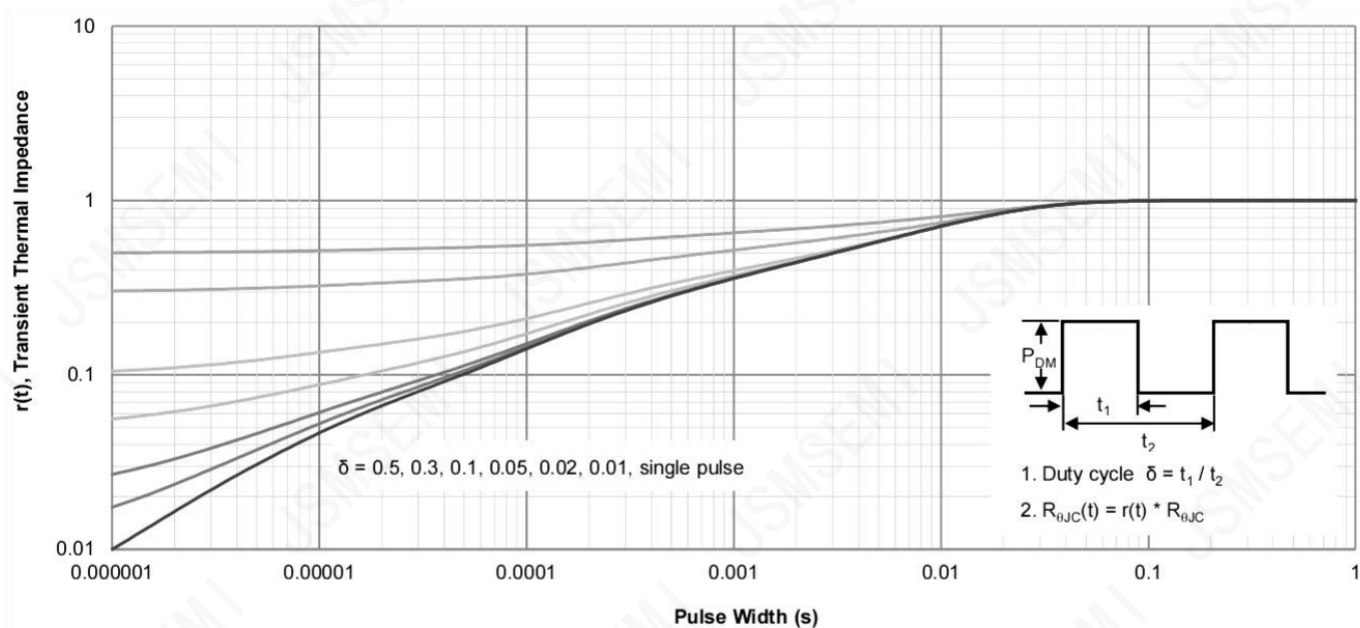
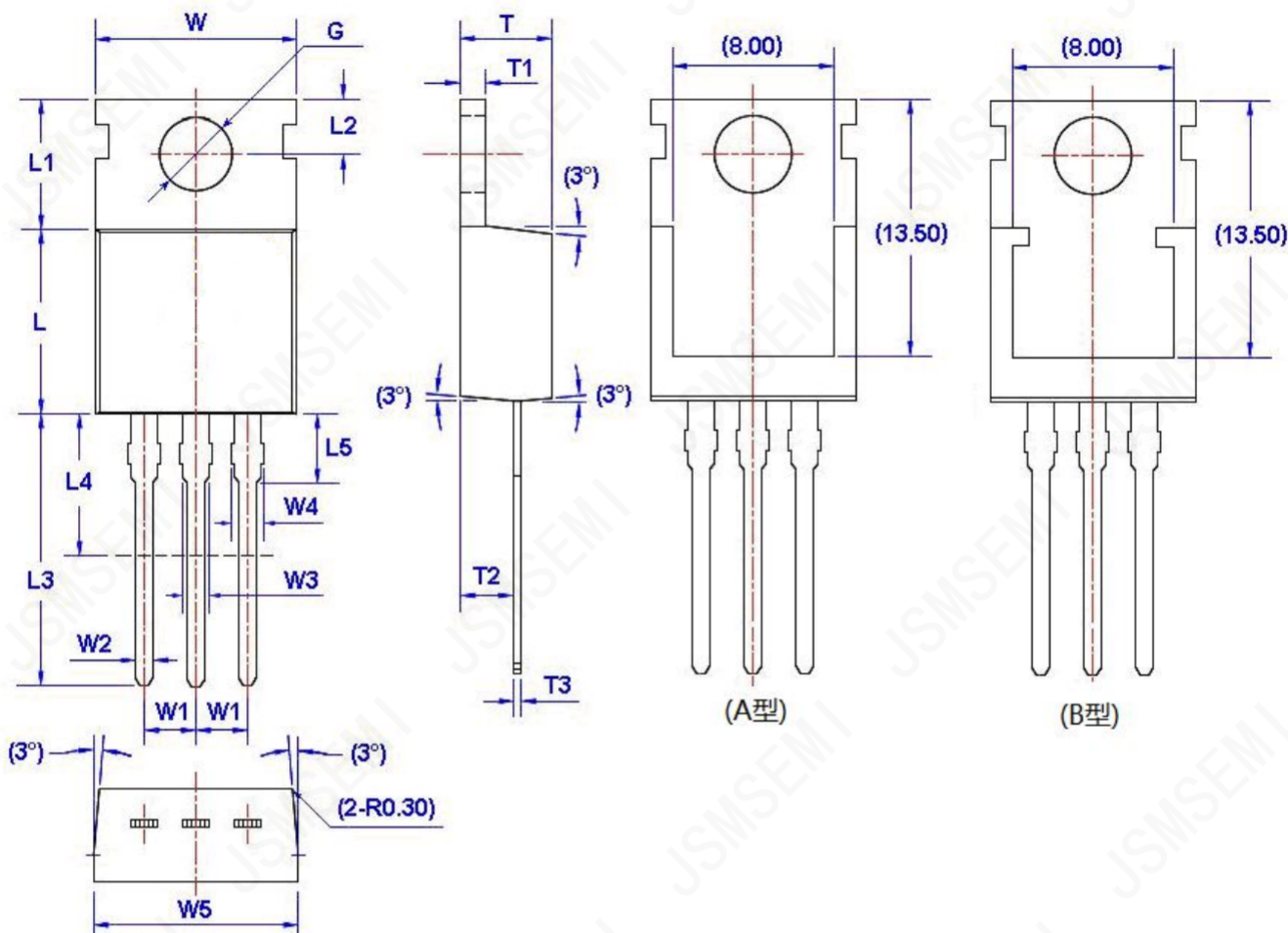


Figure 13: Normalized Maximum Transient Thermal Impedance

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	9/17/2020

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