

Product Summary

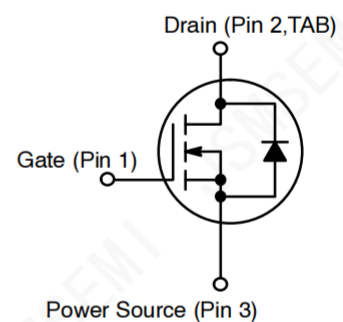
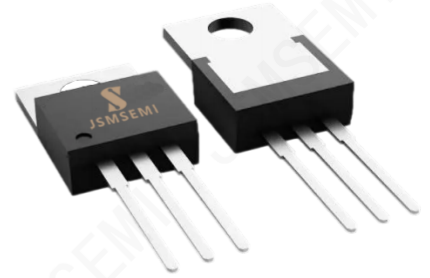
- V_{DS} 100V
- I_D 80A
- $R_{DS(ON)}$ (at $V_{GS}=10V$) $<4.5m\Omega$
- 100% EAS Tested
- 100% ∇V_{DS} Tested

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}	100	V
Gate-Source Voltage	V_{GS}	± 20	V
Continuous Drain Current ($T_c=25^\circ\text{C}$) ⁽¹⁾	I_D	80	A
Continuous Drain Current ($T_c=100^\circ\text{C}$)	I_D	56	A
Pulsed Drain Current ⁽¹⁾	I_{DM}	320	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 $T_A=25^\circ\text{C}$

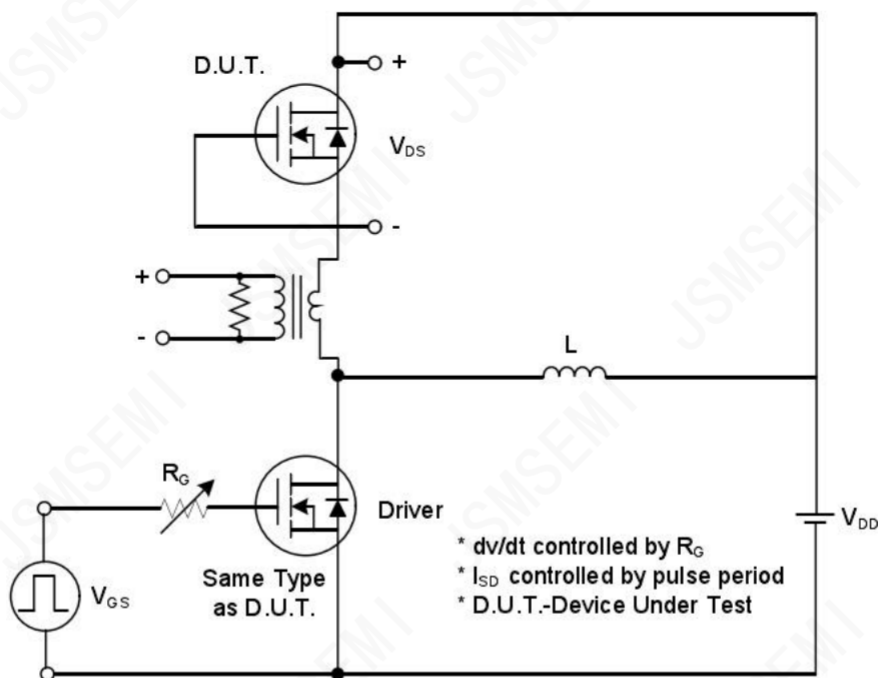
MOSFET ELECTRICAL CHARACTERISTICS(T_J=25°C unless otherwise noted)

Parameter	Symbol	Test Condition	Min	Type	Max	Unit
Static Characteristics						
Drain-source breakdown voltage	V _{(BR)DSS}	V _{GS} = 0V, I _D =250μA	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} =±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
Drain-source on-resistance	R _{DS(on)}	V _{GS} =10V, I _D =20A	-	4.0	4.5	mΩ
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, VGS=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 =3Ω, 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℃, V _{GS} =0V, I _S =20A	-	0.8	1.2	V
Diode Forward current	I _S	T _C =25℃	-	-	80	A
Body Diode Reverse Recovery Time	t _{rr}	T _J =25℃, I _F =20A, di/dt=100A/us	-	77	-	nS
Body Diode Reverse Recovery Charge	Q _{rr}		-	189	-	nC

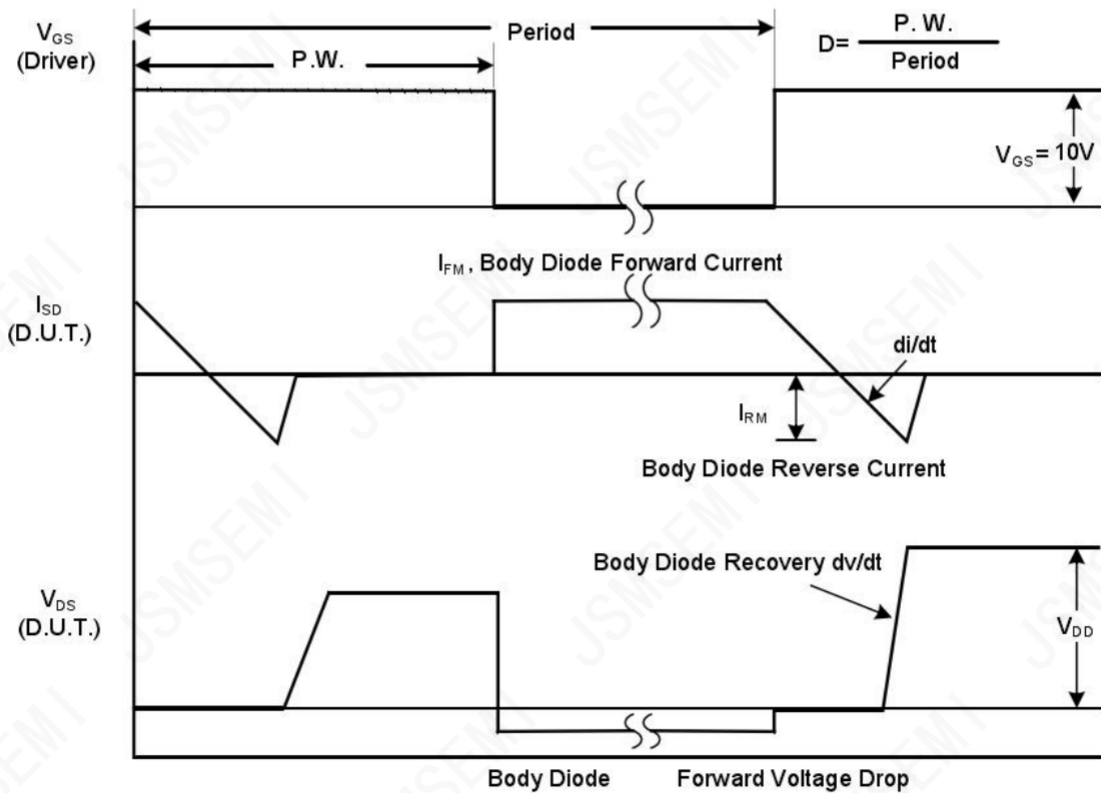
Ordering Information

Order number	Package	Marking	Operation Temperature Range	MSL Grade	Ship, Quantity	Green
TK65E10N1,S1X-JSM	TO-220-3	TK65E10N1	-55 to 150°C	1	T&R,800	Rohs

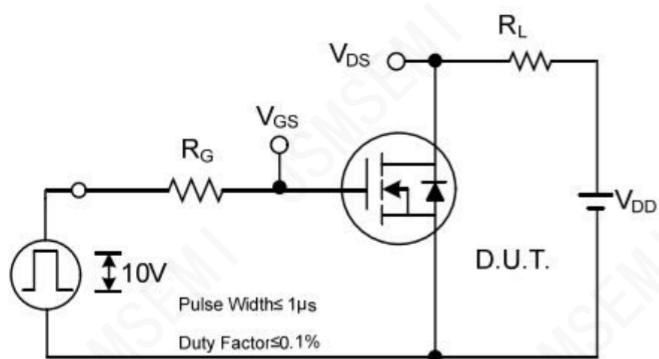
■ RATING AND CHARACTERISTIC CURVES



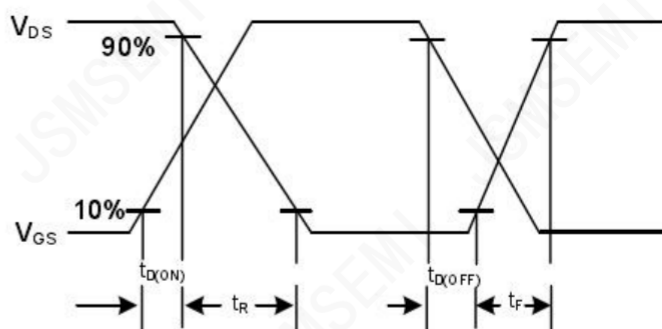
Peak Diode Recovery dv/dt Test Circuit



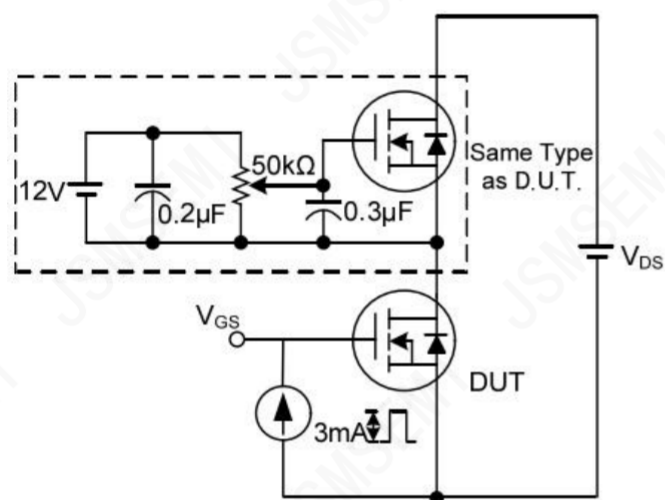
Peak Diode Recovery dv/dt Waveforms



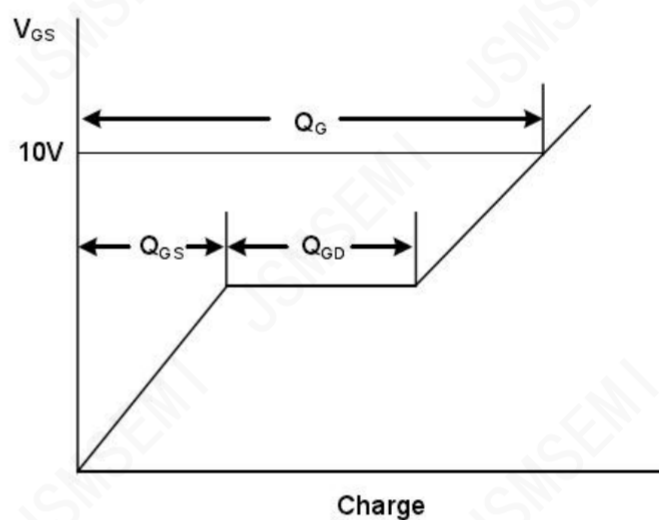
Switching Test Circuit



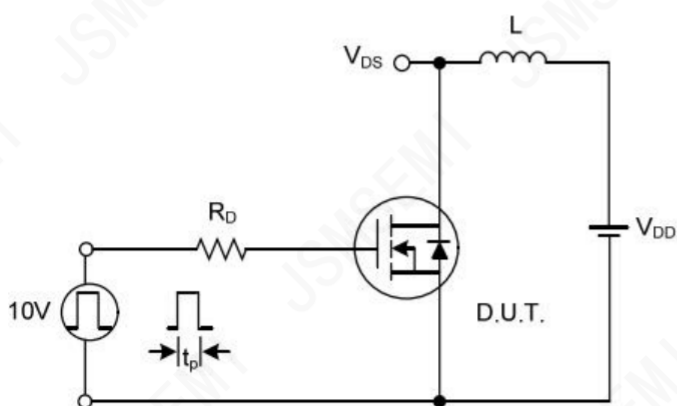
Switching Waveforms



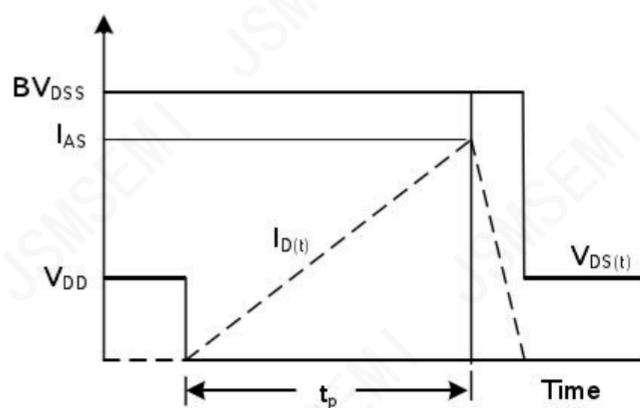
Gate Charge Test Circuit



Gate Charge Waveform



Unclamped Inductive Switching Test Circuit



Unclamped Inductive Switching Waveforms

Typical Characteristics

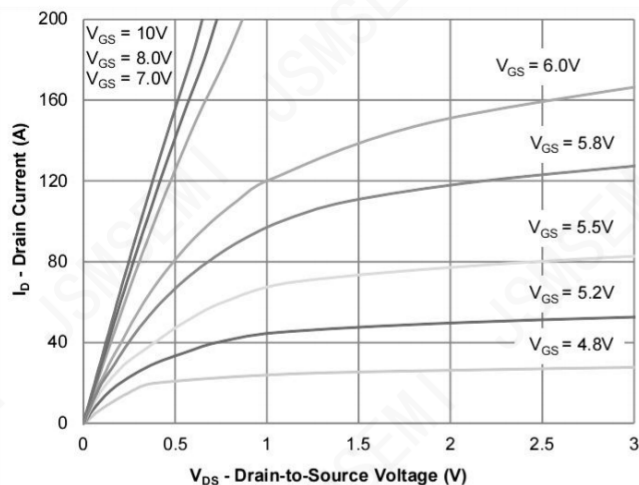


Figure 1: Output Characteristics

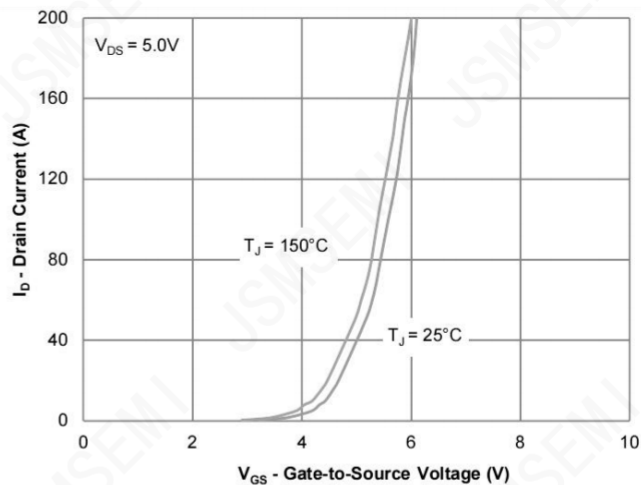


Figure 2: Transfer Characteristics

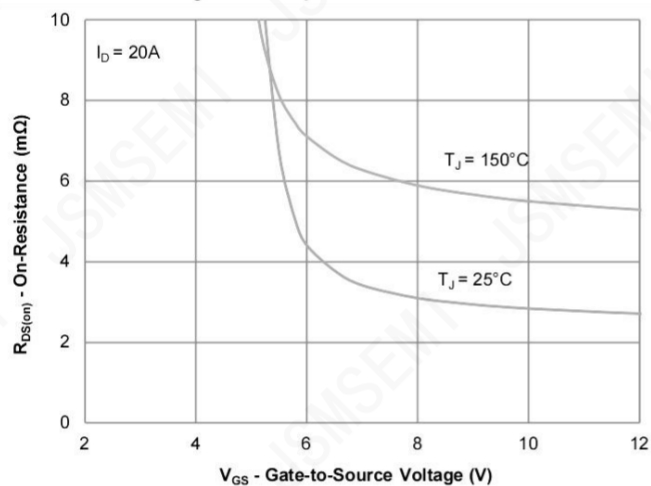


Figure 3: On-Resistance vs. Gate-Source Voltage

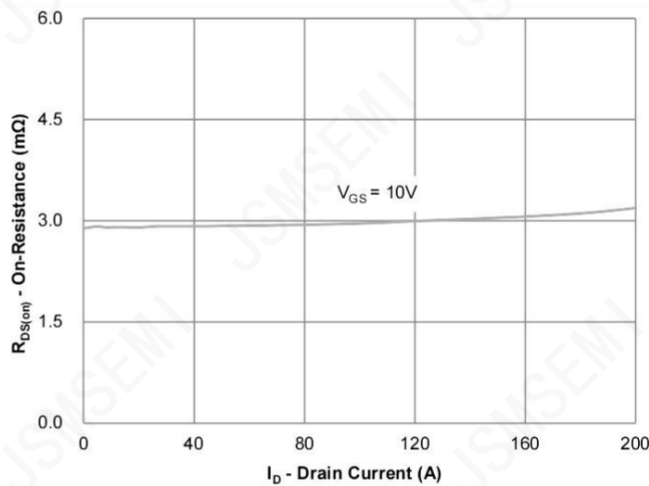


Figure 4: On-Resistance vs. Drain Current

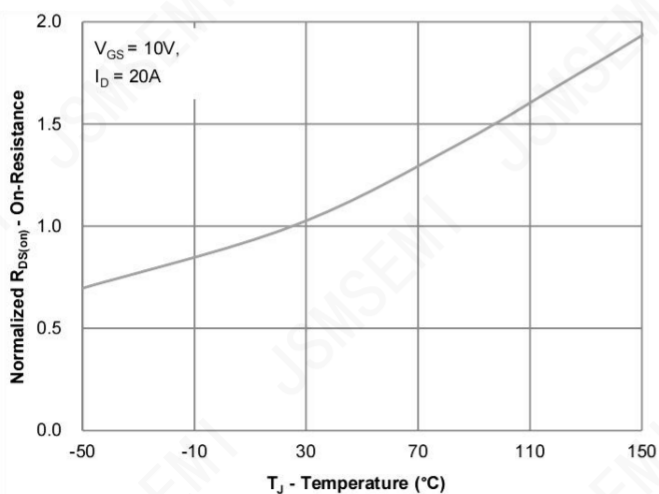


Figure 5: On-Resistance vs. Junction Temperature

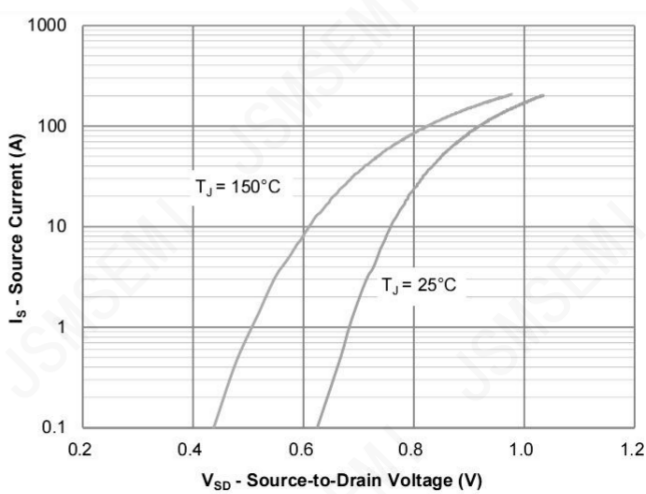


Figure 6: Source-Drain Diode Forward Voltage

Typical Characteristics

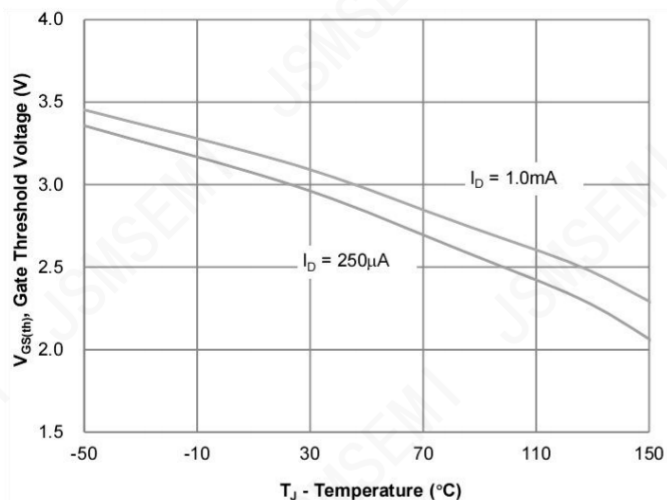


Figure 7: Gate Threshold Variation vs. Junction Temperature

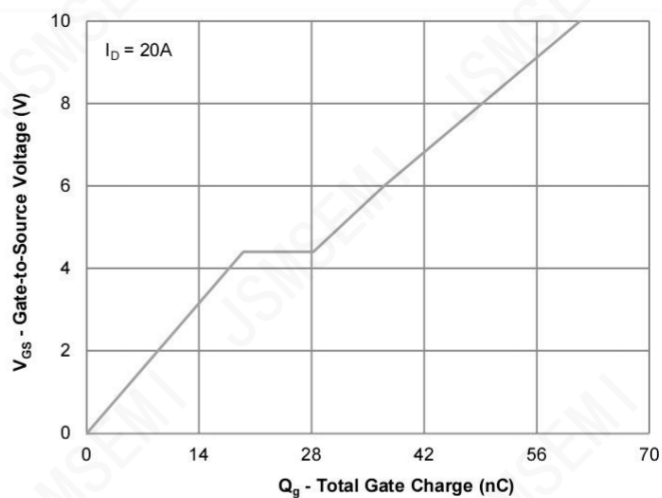


Figure 8: Gate Charge Characteristics

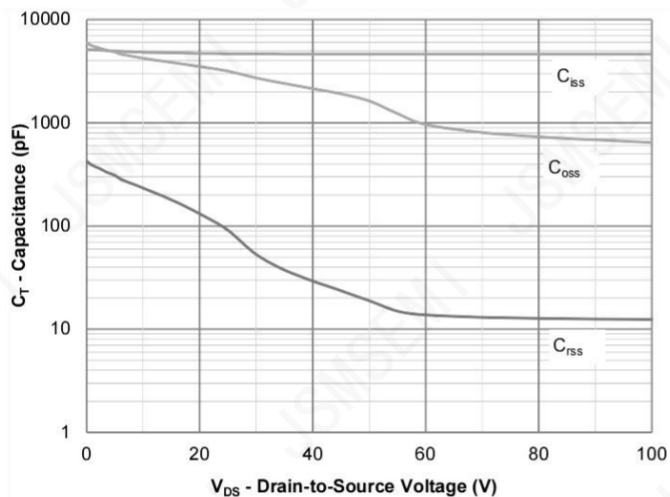


Figure 9: Capacitance Characteristics

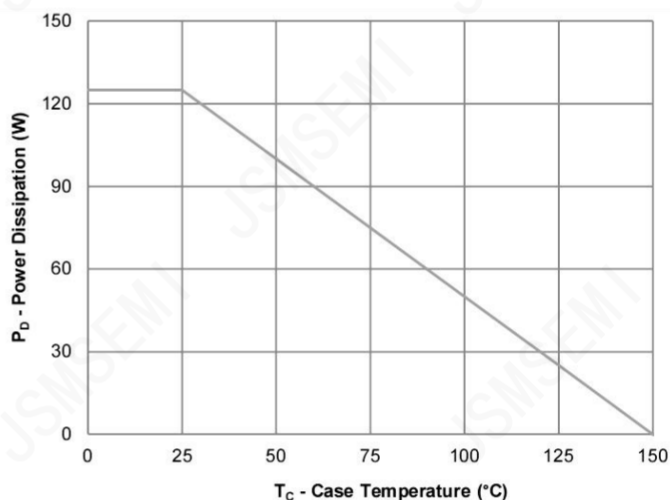


Figure 10: Power Derating

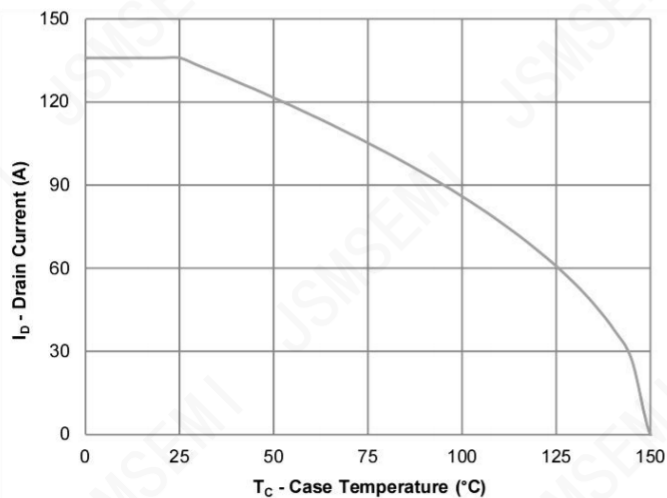


Figure 11: Current Derating

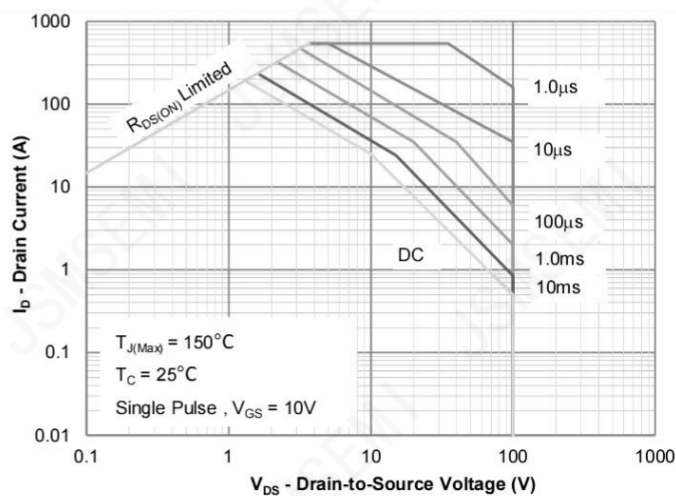


Figure 12: Safe Operating Area

Typical Characteristics

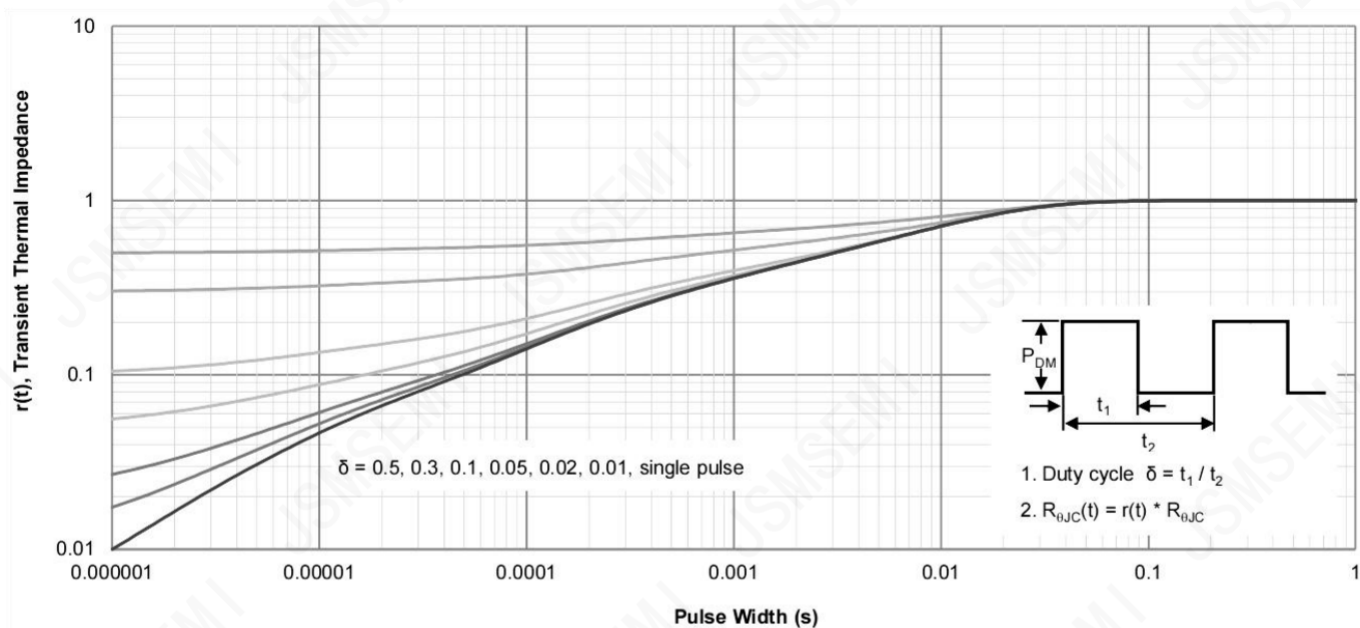
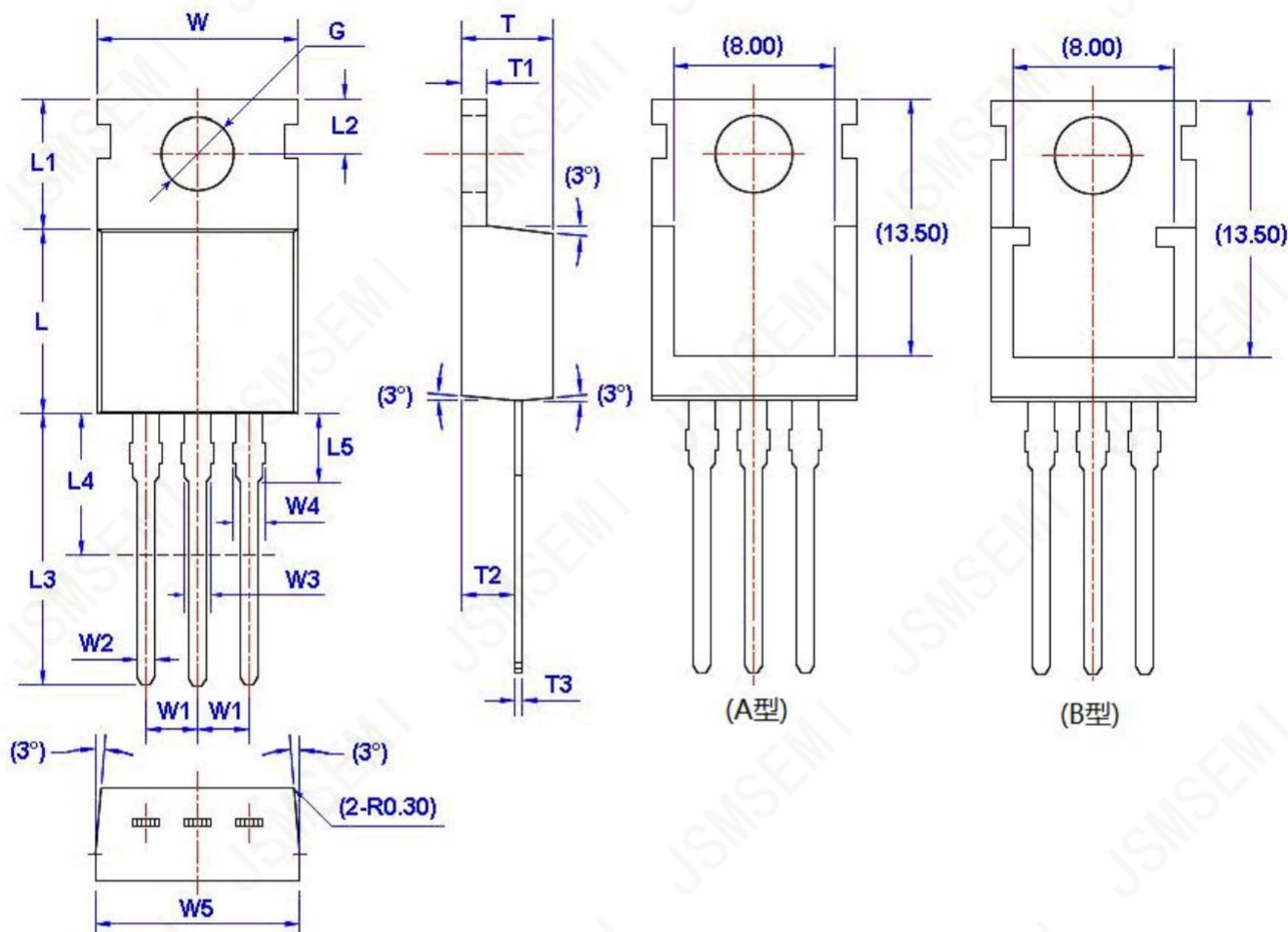


Figure 13: Normalized Maximum Transient Thermal Impedance

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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