

Product Summary

- V_{DS} 200V
- I_D 30A
- $R_{DS(ON)}$ (at $V_{GS}=10V$) $<70m\Omega$
- 100% EAS Tested
- 100% ∇V_{DS} Tested

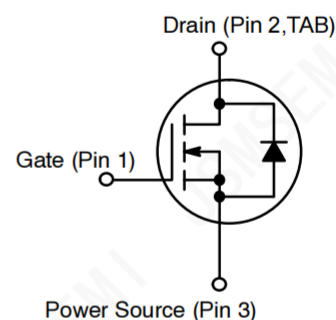


General Description

- Vertical Double-diffused 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 $T_C = 25^\circ\text{C}$, unless otherwise noted			
Parameter	Symbol	Value	Unit
Drain-Source Voltage	V_{DSS}	200	V
Continuous Drain Current	I_D	30	A
Pulsed Drain Current (note1)	I_{DM}	120	A
Gate-Source Voltage	V_{GSS}	± 20	V
Single Pulse Avalanche Energy (note1)	E_{AS}	191	mJ
Avalanche Current (note1)	I_{AS}	31	A
Repetitive Avalanche Energy (note1)	E_{AR}	124	mJ
Power Dissipation ($T_C = 25^\circ\text{C}$)	P_D	160	W
Operating Junction and Storage Temperature Range	T_J, T_{stg}	$-55\sim+150$	$^\circ\text{C}$

Thermal Resistance			
Parameter	Symbol	Value	Unit
Thermal Resistance, Junction-to-Case	R_{thJC}	1.2	$^\circ\text{C/W}$
Thermal Resistance, Junction-to-Ambient	R_{thJA}	60	

Specifications $T_J = 25^\circ\text{C}$, unless otherwise noted

Parameter	Symbol	Test Conditions	Value			Unit
			Min.	Typ.	Max.	
Static						
Drain-Source Breakdown Voltage	$V_{(BR)DSS}$	$V_{GS} = 0V, I_D = 250\mu A$	220	--	--	V
Zero Gate Voltage Drain Current	I_{DSS}	$V_{DS} = 220V, V_{GS} = 0V, T_J = 25^{\circ}C$	--	--	1	μA
		$V_{DS} = 220V, V_{GS} = 0V, T_J = 125^{\circ}C$	--	--	100	
Gate-Source Leakage	I_{GSS}	$V_{GS} = \pm 20V, V_{DS} = 0V$	--	--	± 100	nA
Gate-Source Threshold Voltage	$V_{GS(th)}$	$V_{DS} = V_{GS}, I_D = 250\mu A$	2.0	--	4.0	V
Drain-Source On-Resistance (Note4)	$R_{DS(on)}$	$V_{GS} = 10V, I_D = 20A$	--	60	70	m Ω
Forward Transconductance (Note4)	gfs	$V_{DS} = 25V, I_D = 20A$	--	16	--	S
Dynamic						
Input Capacitance	C_{iss}	$V_{GS} = 0V,$ $V_{DS} = 25V,$ $f = 1.0MHz$	--	2800	--	pF
Output Capacitance	C_{oss}		--	355	--	
Reverse Transfer Capacitance	C_{rss}		--	101	--	
Total Gate Charge	Q_g	$V_{DD} = 160V, I_D = 40A,$	--	154		nC
Gate-Source Charge	Q_{gs}		--	13	--	
Gate-Drain Charge	Q_{gd}		--	58	--	
Turn-on Delay Time	$t_{d(on)}$	$V_{DD} = 160V, I_D = 40A,$ $V_{GS} = 15V, R_G = 25\Omega$	--	46	--	ns
Turn-on Rise Time	t_r		--	54	--	
Turn-off Delay Time	$t_{d(off)}$		--	360	--	
Turn-off Fall Time	t_f		--	96	--	
Drain-Source Body Diode Characteristics						
Continuous Source Current	I_{SD}	Integral PN-diode in MOSFET	--	--	30	A
Pulsed Source Current	I_{SM}		--	--	120	
Body Forward Voltage	V_{SD}	$I_S = 20A, V_{GS} = 0V$	--	--	1.4	V
Reverse Recovery Time	t_{rr}	$V_{GS} = 0V, I_F = 10A,$ $di_F/dt = 100A/\mu s$	--	152	--	ns
Reverse Recovery Charge	Q_{rr}		--	1	--	μC

Notes:

1. Repetitive Rating: Pulse width limited by maximum junction temperature
2. $L = 1mH, V_{DD} = 30V, R_G = 25\Omega$, Starting $T_J = 25^\circ\text{C}$
3. Pulse Test: Pulse width $\leq 300\mu s$, Duty Cycle $\leq 1\%$

Ordering Information

Ordernumber	Package	Marking	Operation Temperature Range	MSL Grade	Ship, Quantity	Green
STP30NF20-JSM	TO-220-3	P30NF20	-55 to 150°C	1	TUBE, 1000	RoHS

Typical Characteristics $T_J = 25^\circ\text{C}$, unless otherwise noted

Figure 1. Output Characteristics ($T_J = 25^\circ\text{C}$)

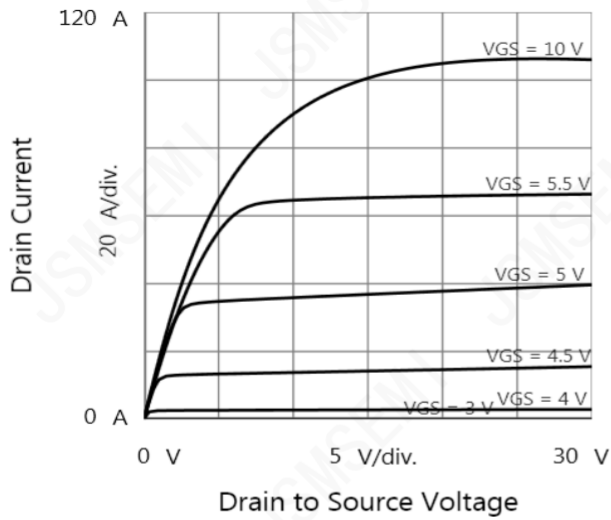


Figure 2. Transfer Characteristics

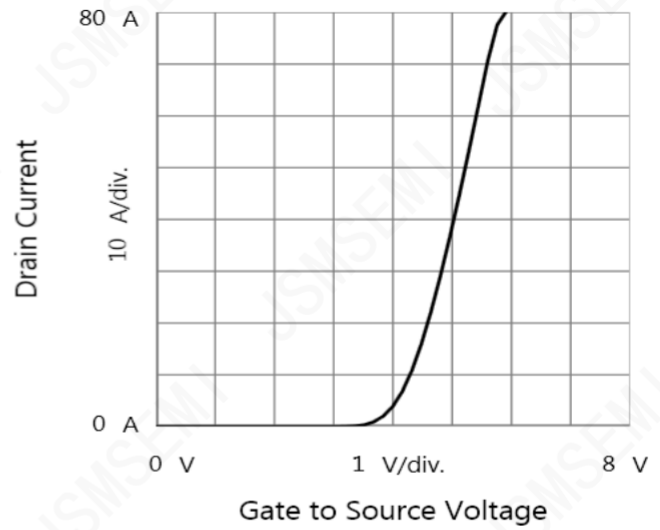


Figure 3. Drain to Source Resistance vs. Drain Current

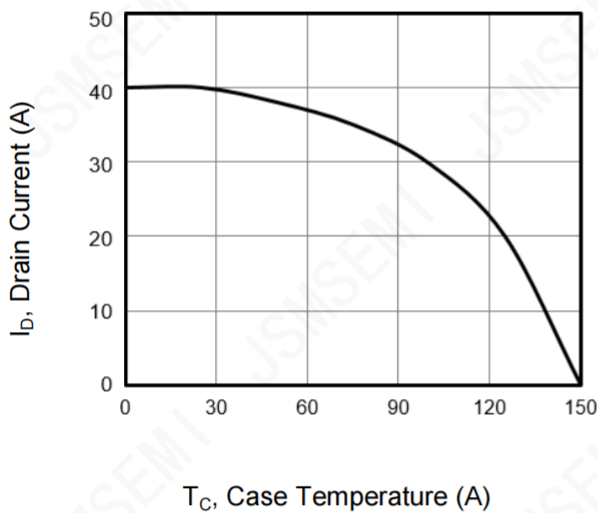


Figure 4. BV_{DSS} Variation vs. Temperature

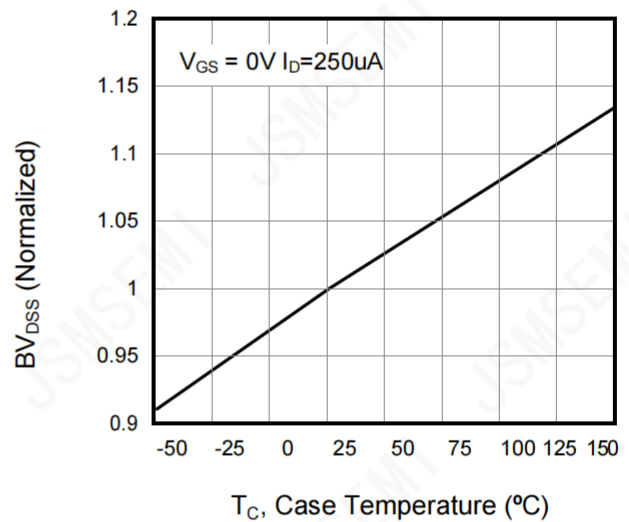


Figure 5. Drain to Source Voltage vs. Gate to Source Voltage

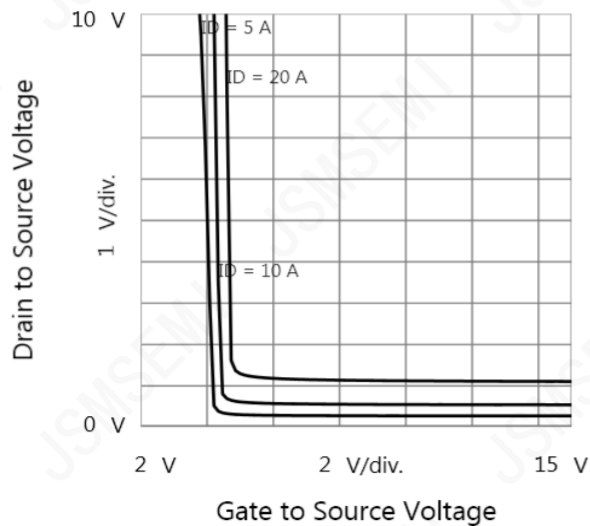
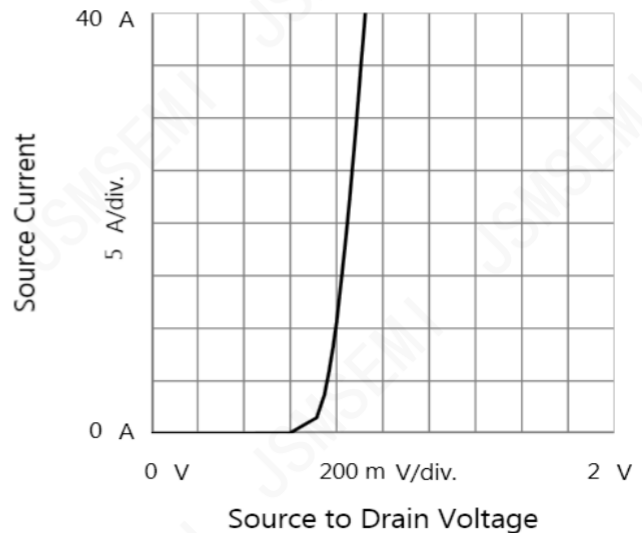


Figure 6. Body Diode Forward Characteristics



Typical Characteristics $T_J = 25^\circ\text{C}$, unless otherwise noted

Figure 7. Capacitance

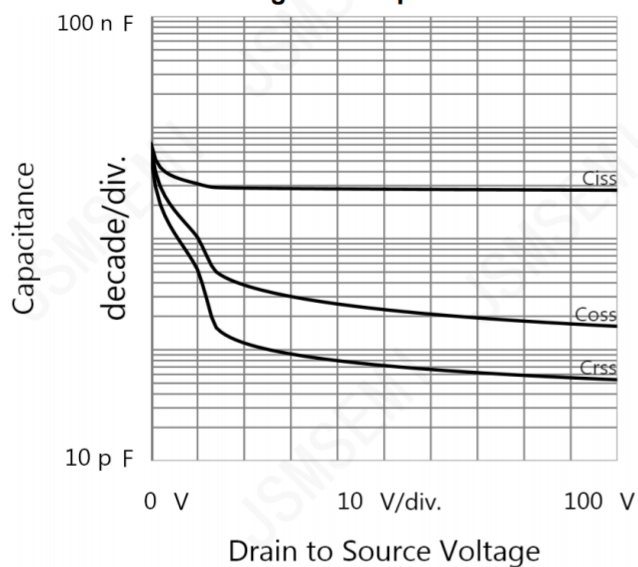


Figure 8. Gate Charge

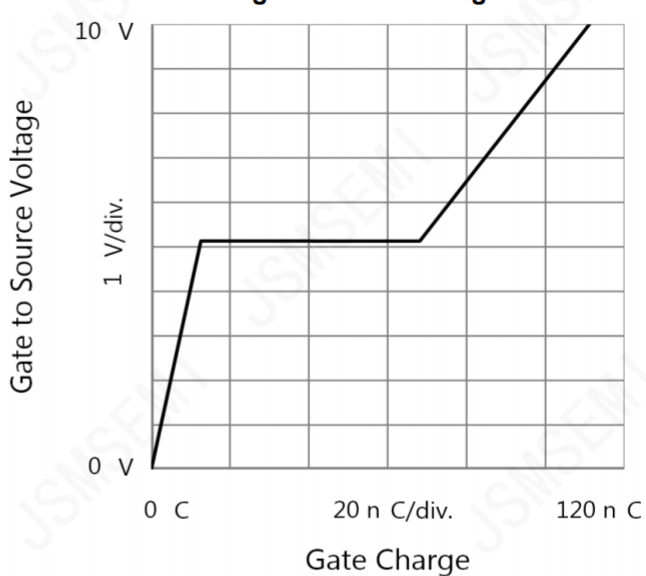


Figure 9. Transient Thermal Impedance

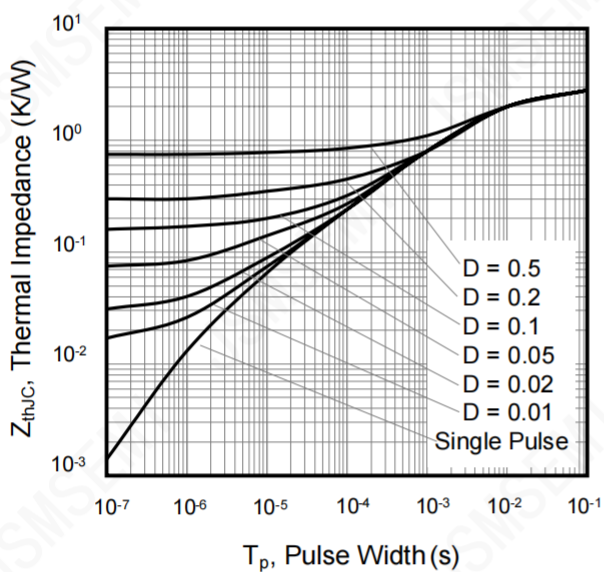


Figure A: Gate Charge Test Circuit and Waveform

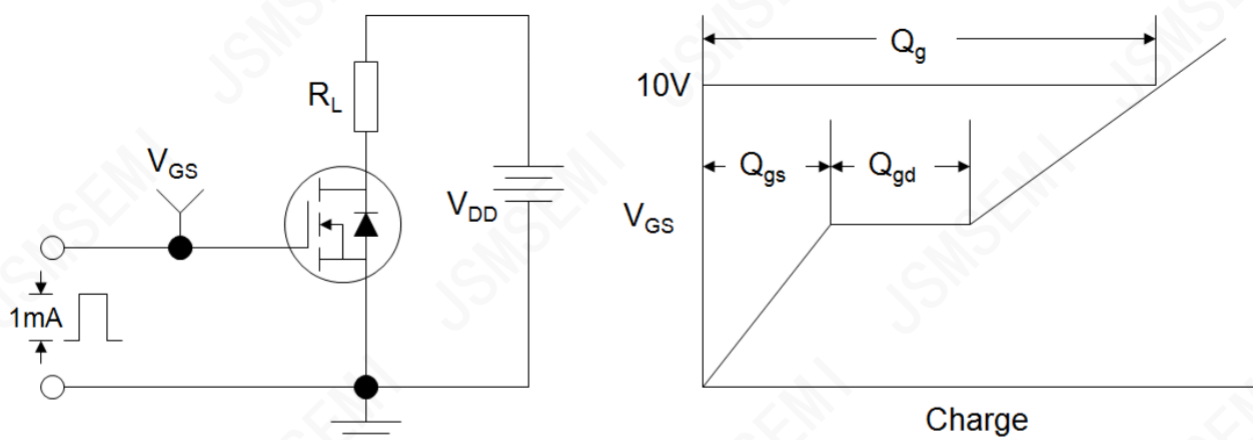


Figure B: Resistive Switching Test Circuit and Waveform

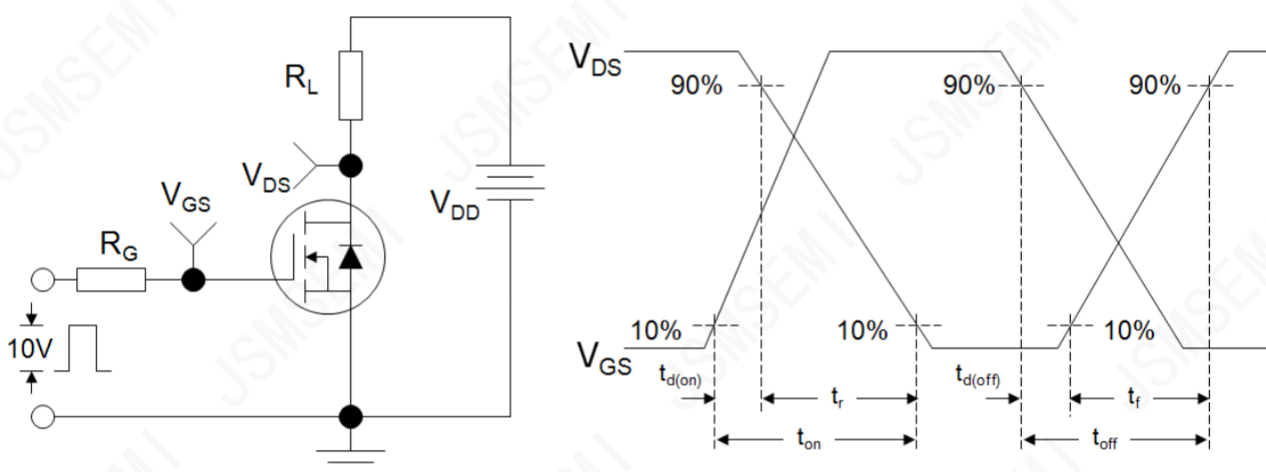
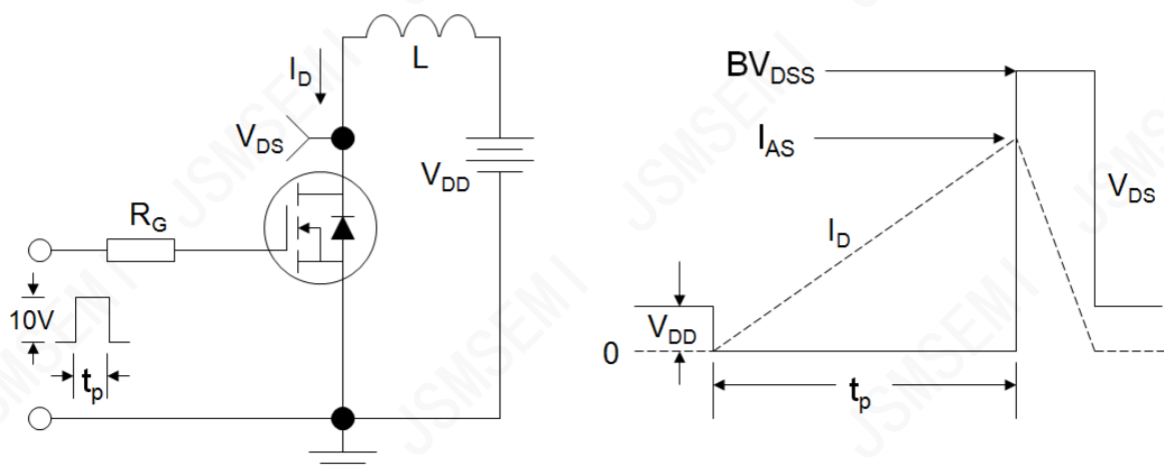
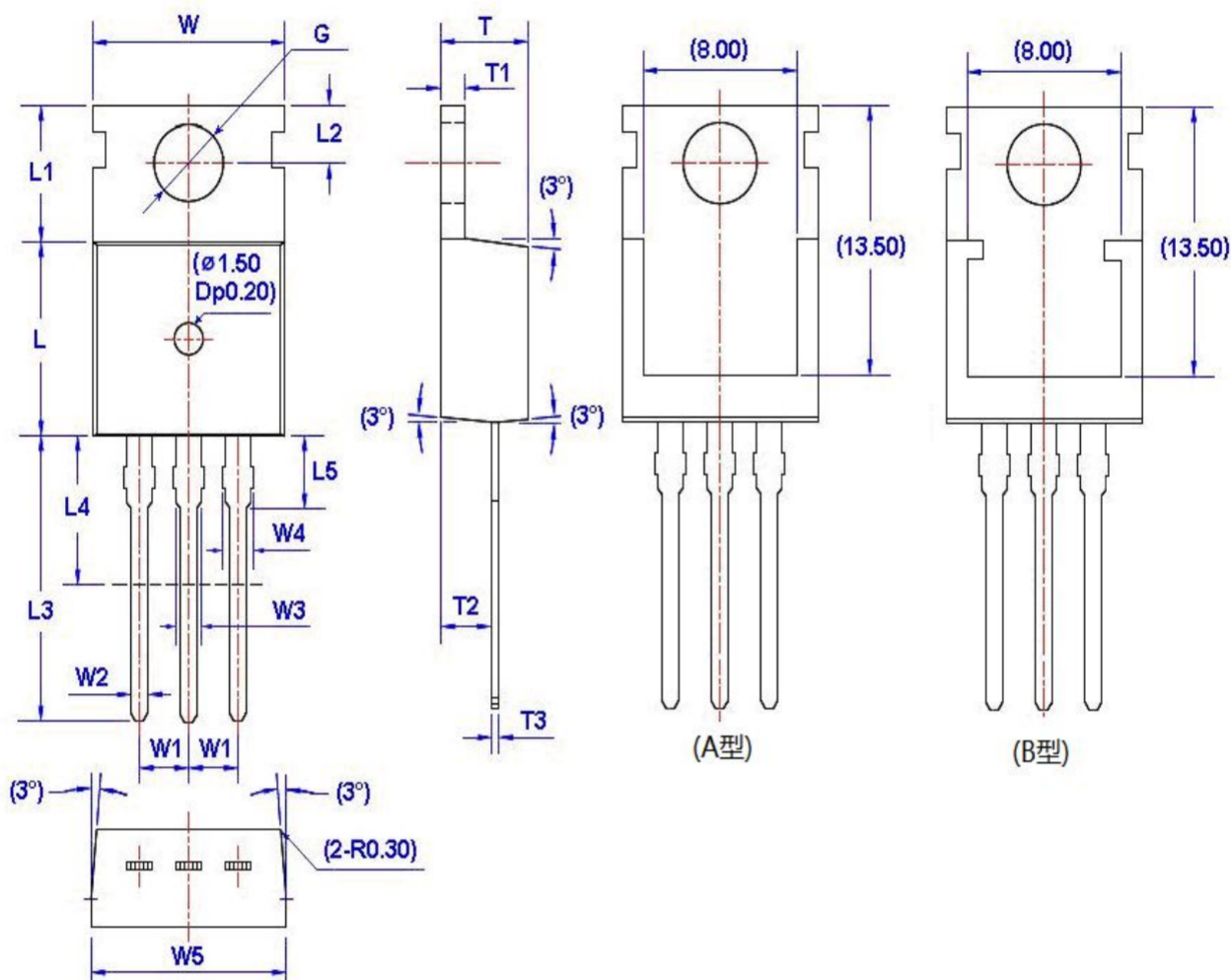


Figure C: Unclamped Inductive Switching Test Circuit and Waveform



Package Information

TO-220-3



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

Important Notice

JSMSEMI Semiconductor (JSMSEMI) PRODUCTS ARE NEITHER DESIGNED NOR INTENDED FOR USE IN MILITARY AND/OR AEROSPACE, AUTOMOTIVE OR MEDICAL DEVICES OR SYSTEMS UNLESS THE SPECIFIC JSMSEMI PRODUCTS ARE SPECIFICALLY DESIGNATED BY JSMSEMI FOR SUCH USE. BUYERS ACKNOWLEDGE AND AGREE THAT ANY SUCH USE OF JSMSEMI PRODUCTS WHICH JSMSEMI HAS NOT DESIGNATED FOR USE IN MILITARY AND/OR AEROSPACE, AUTOMOTIVE OR MEDICAL DEVICES OR SYSTEMS IS SOLELY AT THE BUYER' S RISK.

JSMSEMI assumes no liability for application assistance or customer product design. Customers are responsible for their products and applications using JSMSEMI products.

Resale of JSMSEMI products or services with statements diferent from or beyond the parameters stated by JSMSEMI for that product or service voids all express and any implied warranties for the associated JSMSEMI product or s ervice. JSMSEMI is not responsible or liable for any such statements.

JSMSEMI All Rights Reserved. Information and data in this document are owned by JSMSEMI wholly and may not be edited, reproduced, or redistributed in any way without the express written consent from JSMSEMI.

Any and all information described or contained herein are subject to change without notice due to product/technology improvement, etc. When designing equipment, refer to the "Delivery Specification" for the JSMSEMI product that you intend to use.

For additional information please contact Kevin@jsmsemi.com or visit www.jsmsemi.com