

Product Summary

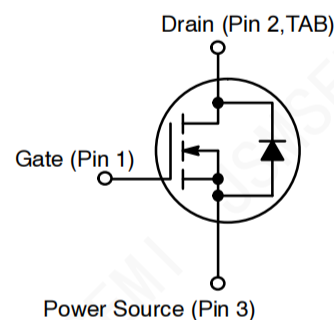
- V_{DS} 100V
- I_D 75A
- $R_{DS(ON)}$ (at $V_{GS}=10V$) $<14m\Omega$
- 100% EAS Tested
- 100% ∇V_{DS} Tested

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 $T_C = 25^\circ C$, unless otherwise noted

Parameter	Symbol	Value	Unit
		TO-220	
Drain-Source Voltage ($V_{GS} = 0V$)	V_{DSS}	100	V
Continuous Drain Current	I_D	75	A
Pulsed Drain Current (note1)	I_{DM}	300	A
Gate-Source Voltage	V_{GSS}	± 20	V
Single Pulse Avalanche Energy (note2)	E_{AS}	243	mJ
Avalanche Current (note1)	I_{AR}	40	A
Repetitive Avalanche Energy (note1)	E_{AR}	46	mJ
Power Dissipation ($T_C = 25^\circ C$)	P_D	250	W
Operating Junction and Storage Temperature Range	T_J, T_{stg}	-55 to 175	$^\circ C$

Thermal Resistance

Parameter	Symbol	Value	Unit
		TO-220	
Thermal Resistance, Junction-to-Case	R_{thJC}	0.8	$^\circ C/W$
Thermal Resistance, Junction-to-Ambient	R_{thJA}	80	

Specifications $T_J = 25^{\circ}\text{C}$, unless otherwise noted						
Parameter	Symbol	Test Conditions	Value			Unit
			Min.	Typ.	Max.	
Static						
Drain-Source Breakdown Voltage	$V_{(\text{BR})\text{DSS}}$	$V_{\text{GS}} = 0\text{V}, I_{\text{D}} = 250\mu\text{A}$	100	--	--	V
Zero Gate Voltage Drain Current	I_{DSS}	$V_{\text{DS}} = 100\text{V}, V_{\text{GS}} = 0\text{V}, T_J = 25^{\circ}\text{C}$	--	--	1	μA
		$V_{\text{DS}} = 80\text{V}, V_{\text{GS}} = 0\text{V}, T_J = 125^{\circ}\text{C}$	--	--	100	
Gate-Source Leakage	I_{GSS}	$V_{\text{GS}} = +20\text{V}, V_{\text{DS}}=0\text{V}$	--	--	100	nA
		$V_{\text{GS}}=-20\text{V}, V_{\text{DS}}=0\text{V}$	--	--	-100	
Gate-Source Threshold Voltage	$V_{\text{GS}(\text{th})}$	$V_{\text{DS}} = V_{\text{GS}}, I_{\text{D}} = 250\mu\text{A}$	2.0	--	4.0	V
Drain-Source On-Resistance (Note3)	$R_{\text{DS}(\text{on})}$	$V_{\text{GS}} = 10\text{V}, I_{\text{D}} = 40\text{A}$	--	11	14	$\text{m}\Omega$
Forward Transconductance	g_{fs}	$V_{\text{DS}} = 10\text{V}, I_{\text{D}} = 40\text{A}$		35		S
Dynamic						
Input Capacitance	C_{iss}	$V_{\text{GS}} = 0\text{V},$ $V_{\text{DS}} = 25\text{V},$ $f = 1.0\text{MHz}$	--	6100	--	pF
Output Capacitance	C_{oss}		--	410	--	
Reverse Transfer Capacitance	C_{rss}		--	260	--	
Total Gate Charge	Q_{g}	$V_{\text{DD}}=50\text{V}, I_{\text{D}} = 45\text{A},$ $V_{\text{GS}} = 0 \text{ to } 10\text{V}$	--	150	--	nC
Gate-Source Charge	Q_{gs}		--	25	--	
Gate-Drain Charge	Q_{gd}		--	75	--	
Turn-on Delay Time	$t_{\text{d}(\text{on})}$	$V_{\text{DD}} = 50\text{V},$ $I_{\text{D}} = 45\text{A},$ $V_{\text{GS}}= 10\text{V}$ $R_{\text{G}} = 2.5 \Omega$	--	28	--	ns
Turn-on Rise Time	t_{r}		--	88	--	
Turn-off Delay Time	$t_{\text{d}(\text{off})}$		--	75	--	
Turn-off Fall Time	t_{f}		--	25	--	
Drain-Source Body Diode Characteristics						
Continuous Body Diode Current	I_{S}	$T_{\text{C}} = 25^{\circ}\text{C}$	--	--	75	A
Pulsed Diode Forward Current	I_{SM}		--	--	300	
Body Diode Voltage	V_{SD}	$T_J = 25^{\circ}\text{C}, I_{\text{SD}} = 45\text{A}, V_{\text{GS}} = 0\text{V}$	--	--	1.3	V
Reverse Recovery Time	t_{rr}	$V_{\text{GS}} = 0\text{V}, I_{\text{S}} = 45\text{A},$ $di_{\text{F}}/dt = 100\text{A} / \mu\text{s}$	--	195	--	ns
Reverse Recovery Charge	Q_{rr}		--	107	--	μC

- Notes**
1. Repetitive Rating: Pulse width limited by maximum junction temperature
 2. $I_{AS} = 30A, V_{DD} = 50V, R_G = 25 \Omega$, Starting $T_J = 25^\circ\text{C}$
 3. Pulse Test: Pulse width $\leq 300\mu s$, Duty Cycle $\leq 1\%$

Ordering Information

Order number	Package	Marking	Operation Temperature Range	MSL Grade	Ship, Quantity	Green
HUFA75645P3-JSM	TO-220-3	75645P	-55 to 175 $^\circ\text{C}$	1	TUBE,1000	Rohs

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

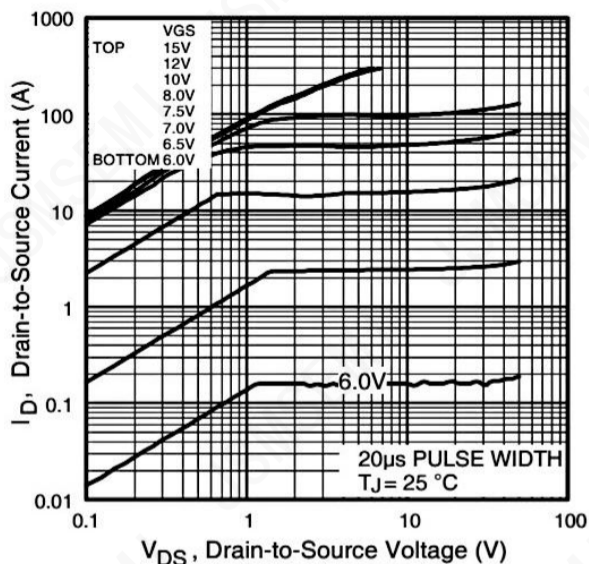


Fig 1. Typical Output Characteristics

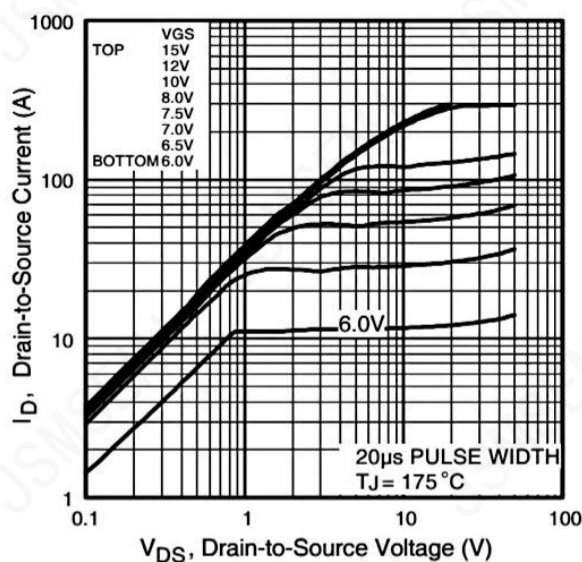


Fig 2. Typical Output Characteristics

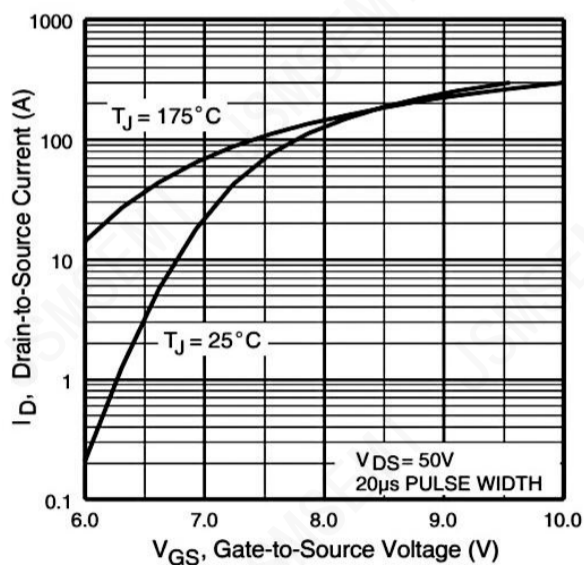


Fig 3. Typical Transfer Characteristics

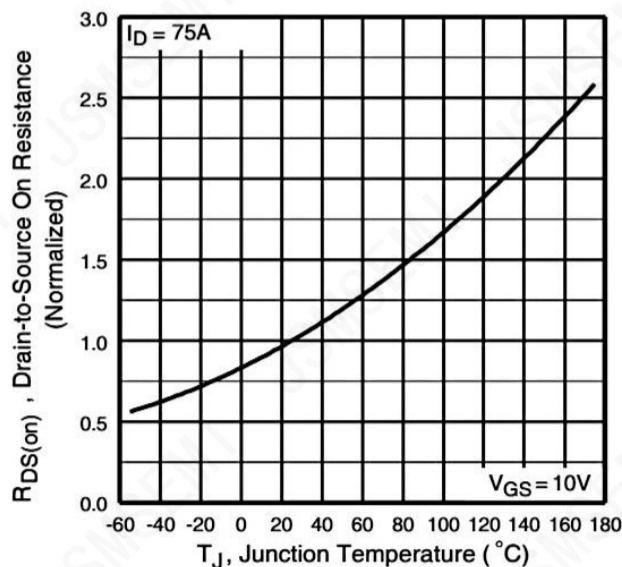


Fig 4. Normalized On-Resistance Vs. Temperature

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

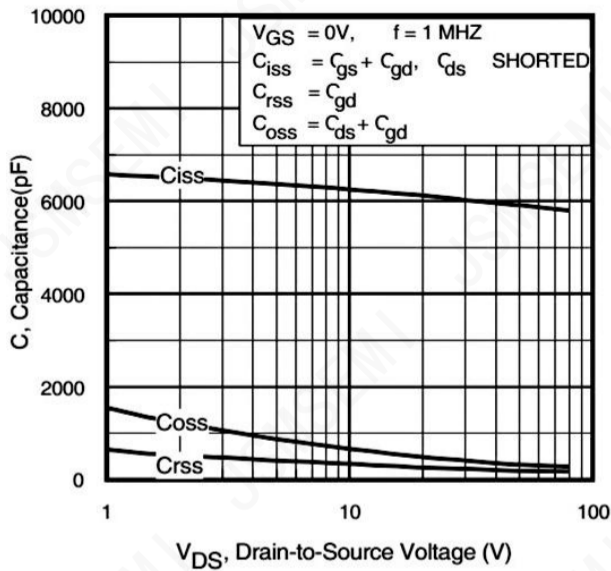


Fig 5. Typical Capacitance Vs. Drain-to-Source Voltage

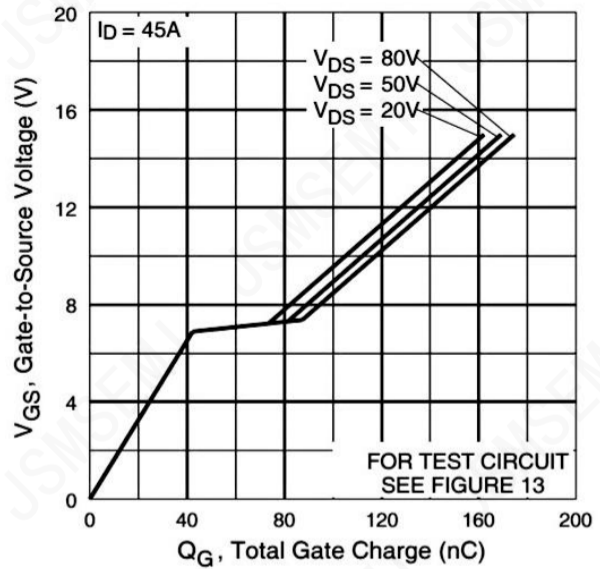


Fig 6. Typical Gate Charge Vs. Gate-to-Source Voltage

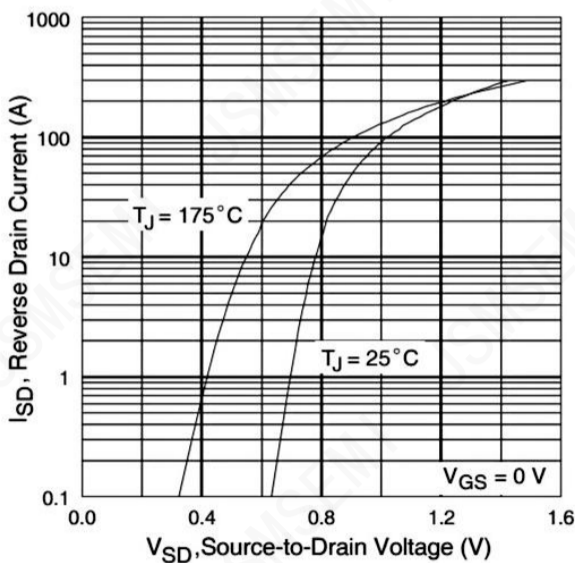


Fig 7. Typical Source-Drain Diode Forward Voltage

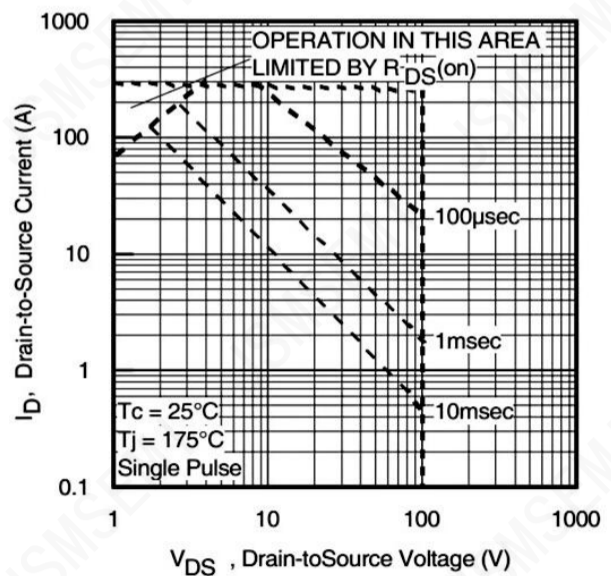


Fig 8. Maximum Safe Operating Area

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

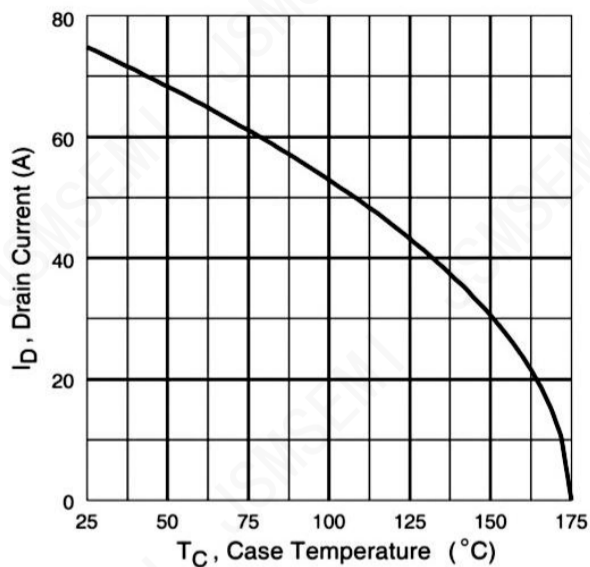


Fig 9. Maximum Drain Current Vs. Case Temperature

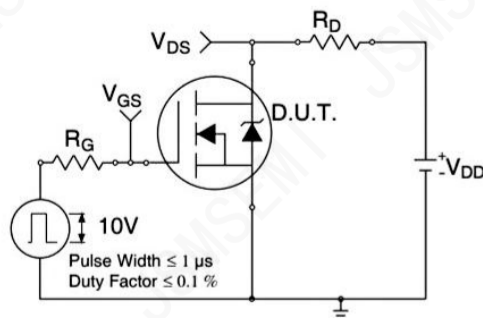


Fig 10a. Switching Time Test Circuit

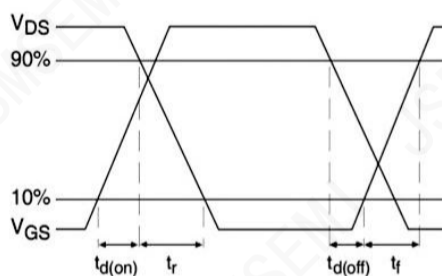
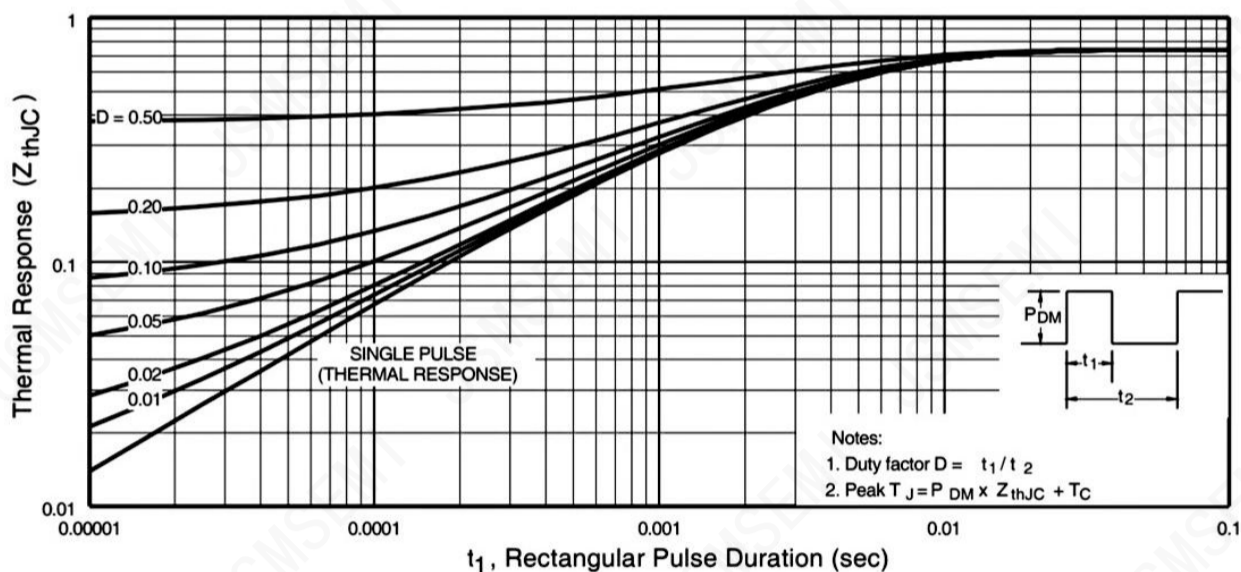
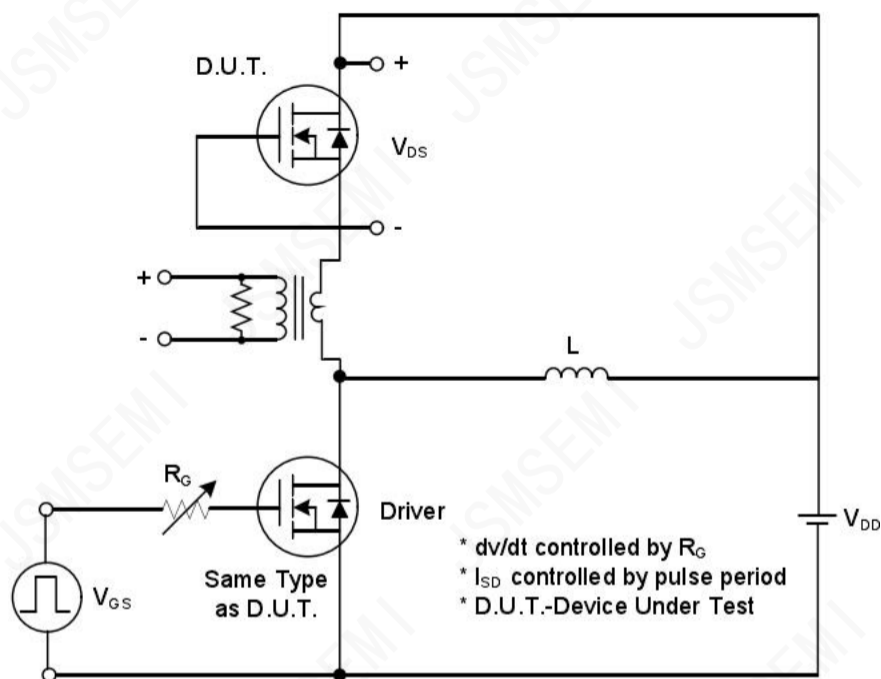


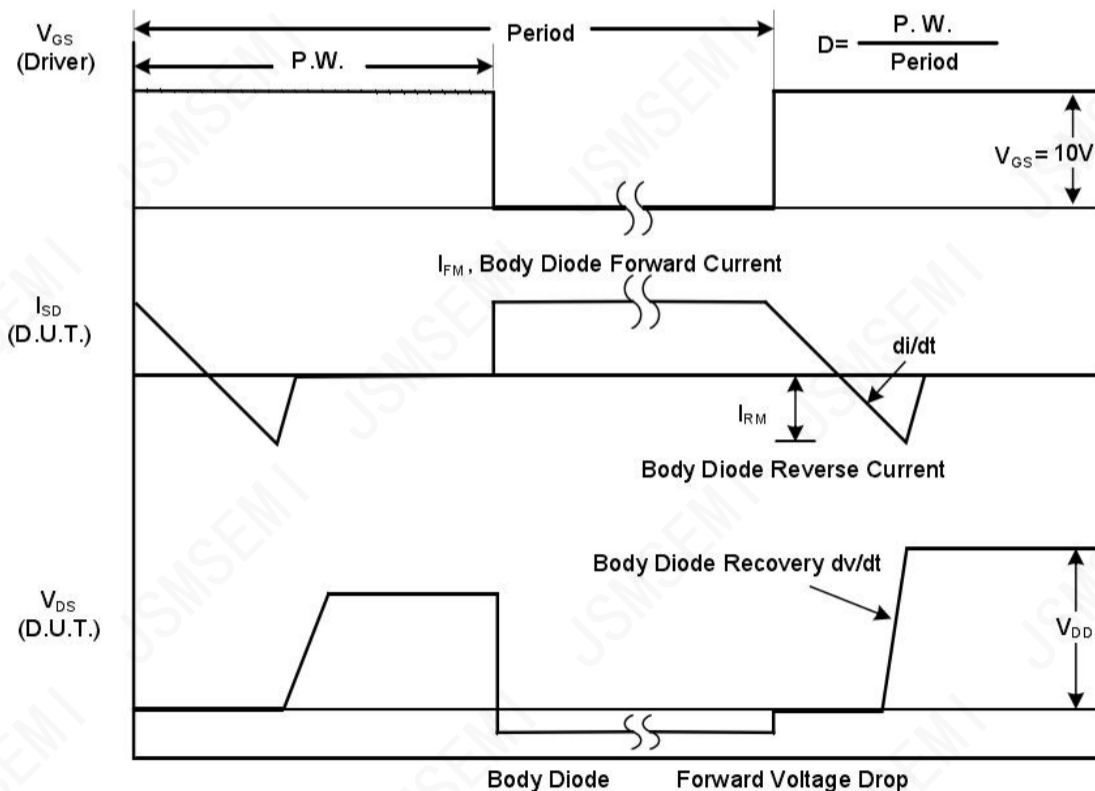
Fig 10b. Switching Time Waveforms



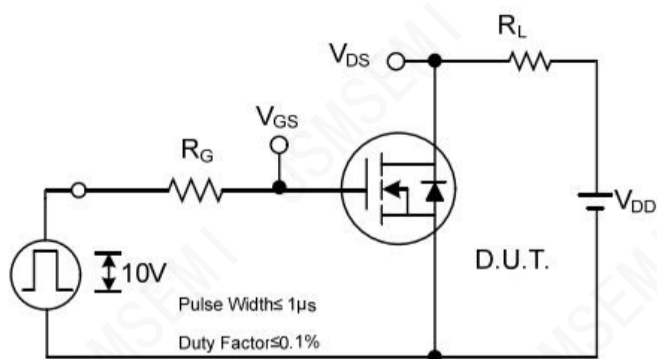
RATING AND CHARACTERISTIC CURVES



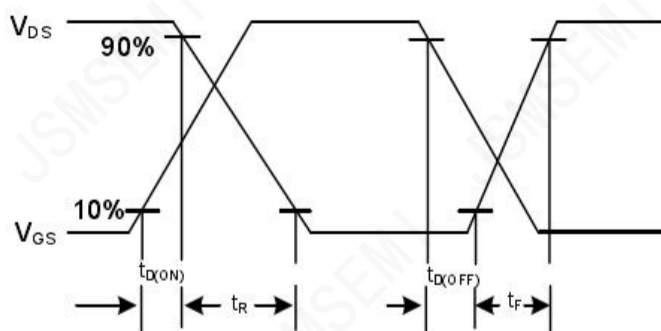
Peak Diode Recovery dv/dt Test Circuit



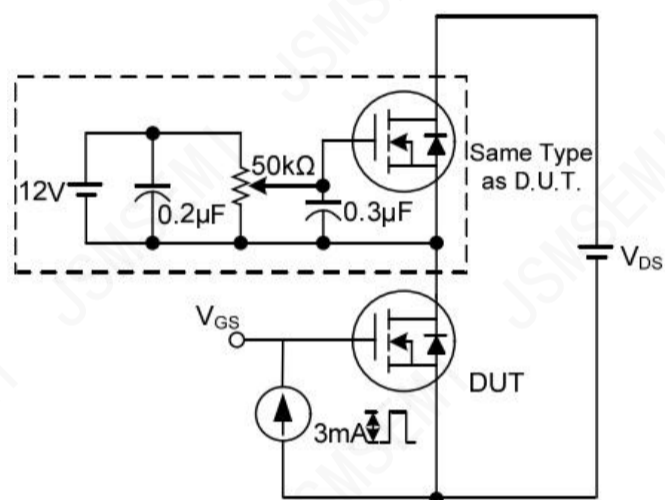
Peak Diode Recovery dv/dt Waveforms



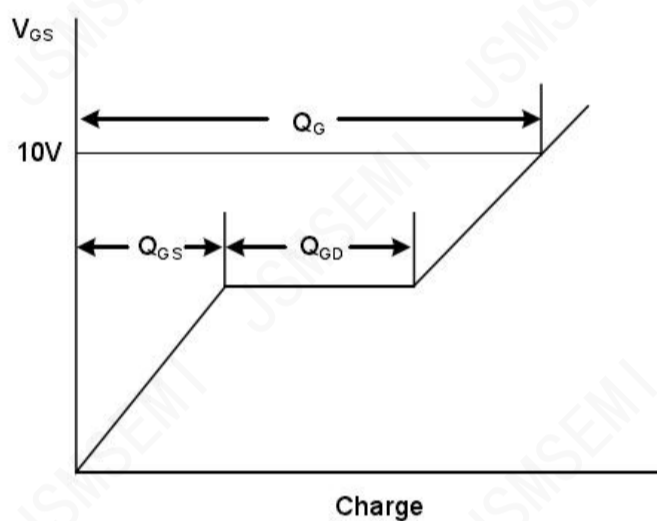
Switching Test Circuit



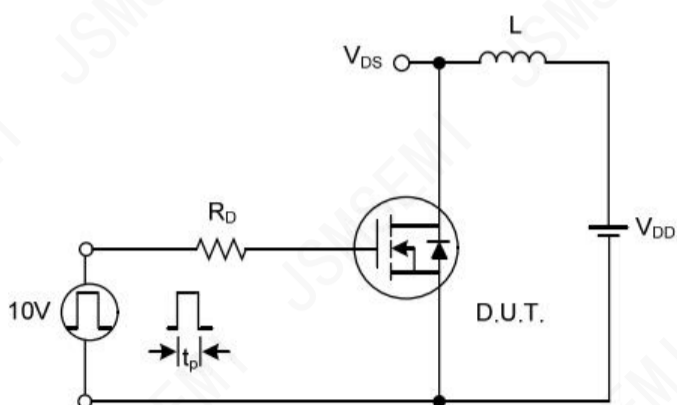
Switching Waveforms



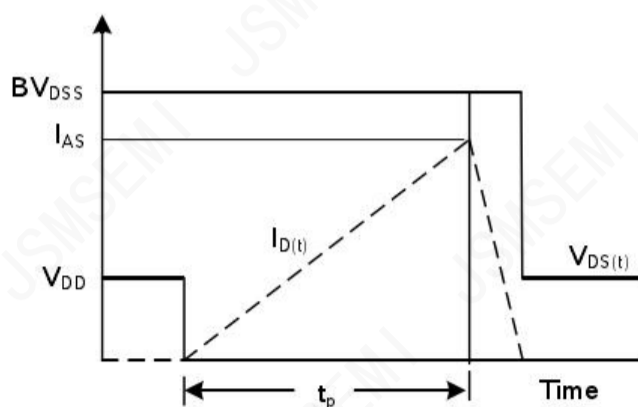
Gate Charge Test Circuit



Gate Charge Waveform



Unclamped Inductive Switching Test Circuit



Unclamped Inductive Switching Waveforms

Figure A: Gate Charge Test Circuit and Waveform

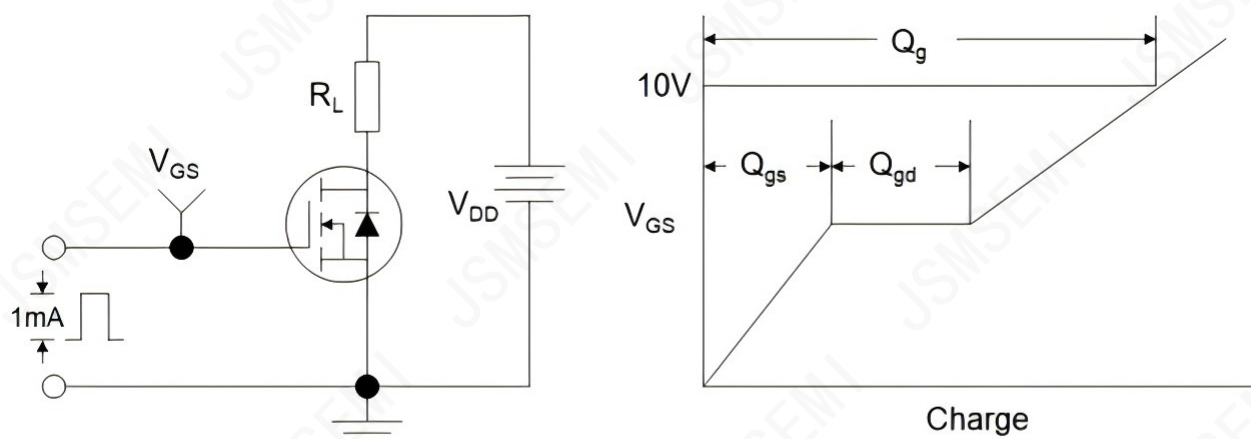


Figure B: Resistive Switching Test Circuit and Waveform

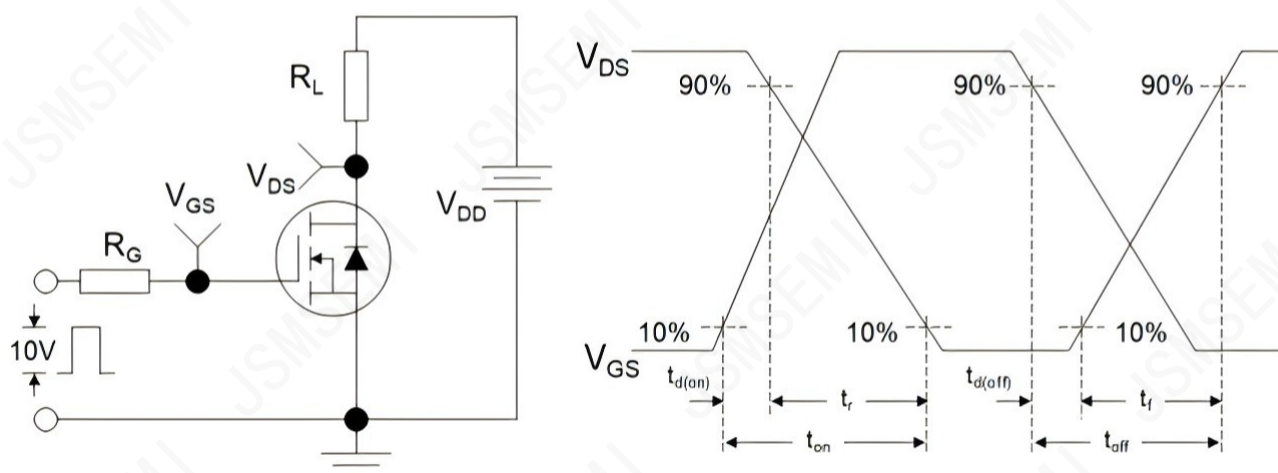
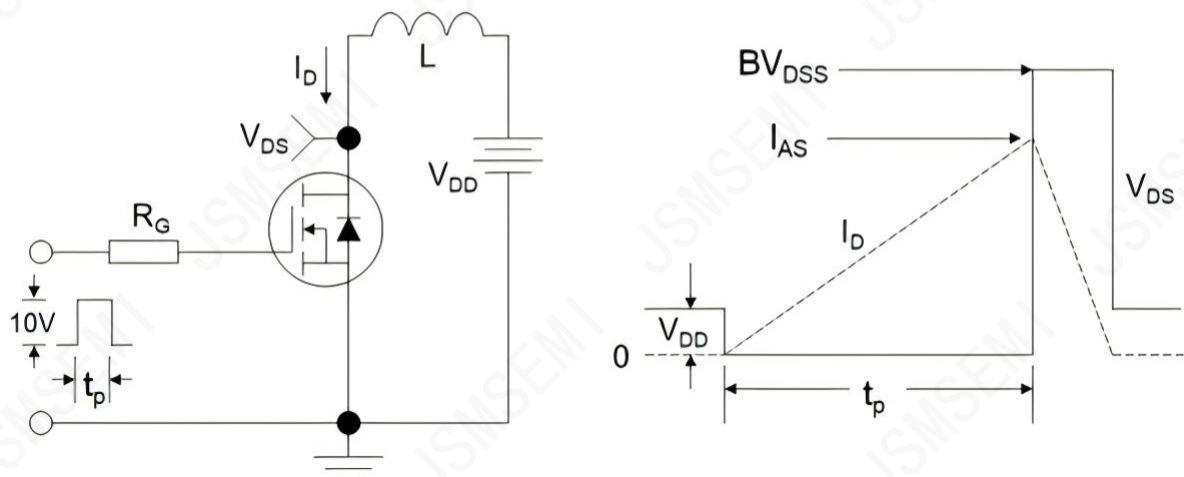
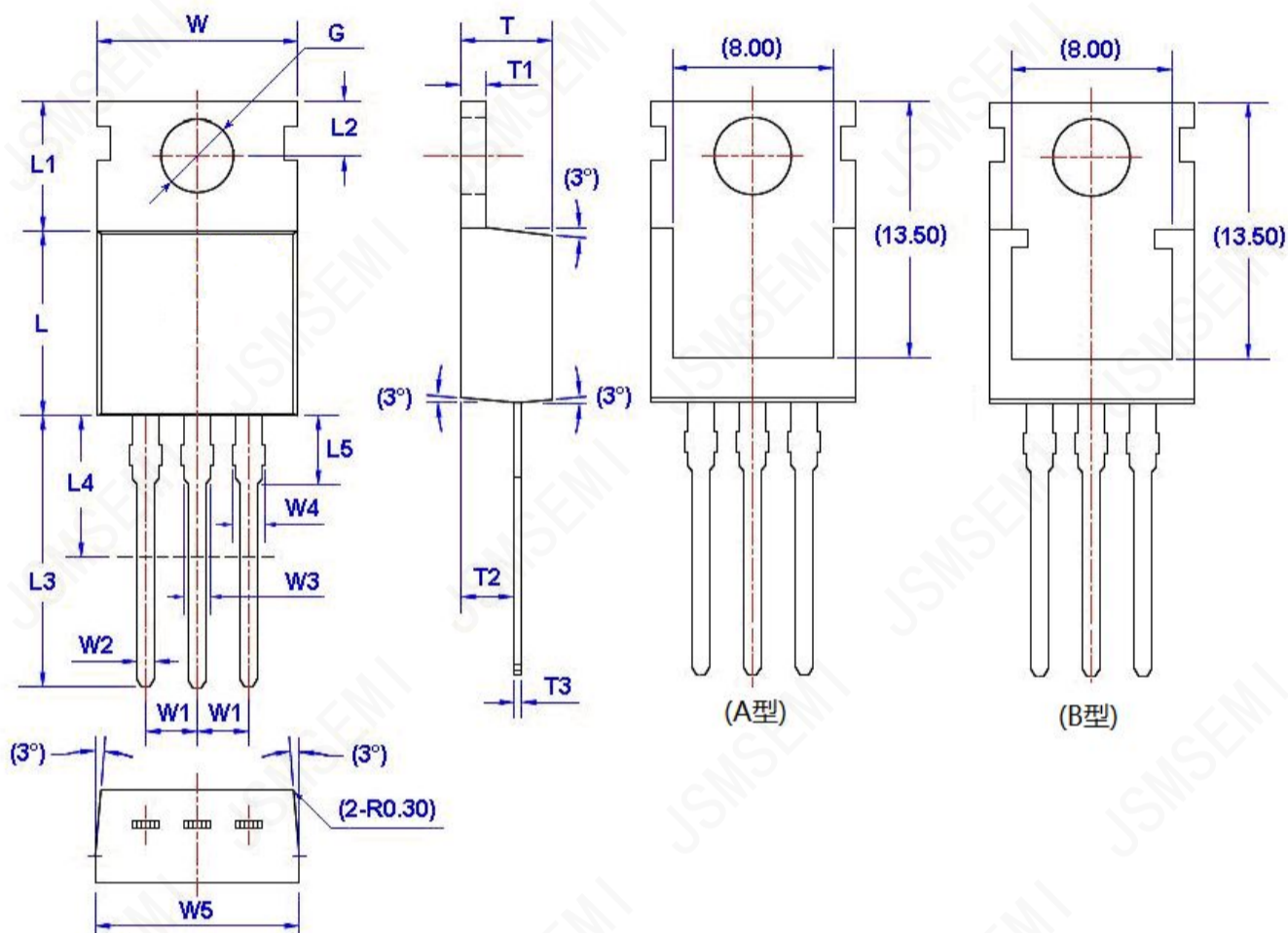


Figure C: Unclamped Inductive Switching Test Circuit and Waveform



Package Information

TO-220-3



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	3/11/2019

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