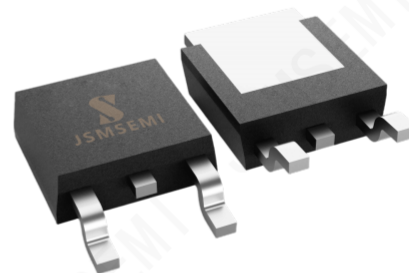


Product Summary

- V_{DS} 60V
- I_D 100A
- $R_{DS(ON)}$ (at $V_{GS}=10V$) $<6.3m\Omega$
- 100% EAS Tested
- 100% ∇V_{DS} Tested

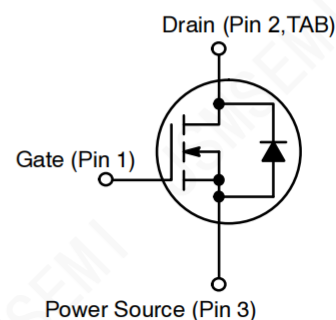


General Description

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

Parameter		Symbol	Limit	Unit
Drain-source Voltage		V_{DS}	60	V
Gate-source Voltage		V_{GS}	± 20	V
Drain Current	$T_C=25^\circ\text{C}$	I_D	100	A
	$T_C=100^\circ\text{C}$		70	
Pulsed Drain Current ^A		I_{DM}	400	A
Avalanche energy ^B		EAS	221	mJ
Total Power Dissipation ^C	$T_C=25^\circ\text{C}$	P_D	78	W
	$T_C=100^\circ\text{C}$		51	
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 ^D	Steady-State	$R_{\theta JA}$	55		$^\circ\text{C/W}$
Thermal Resistance Junction-to-Case	Steady-State	$R_{\theta JC}$	1.6		

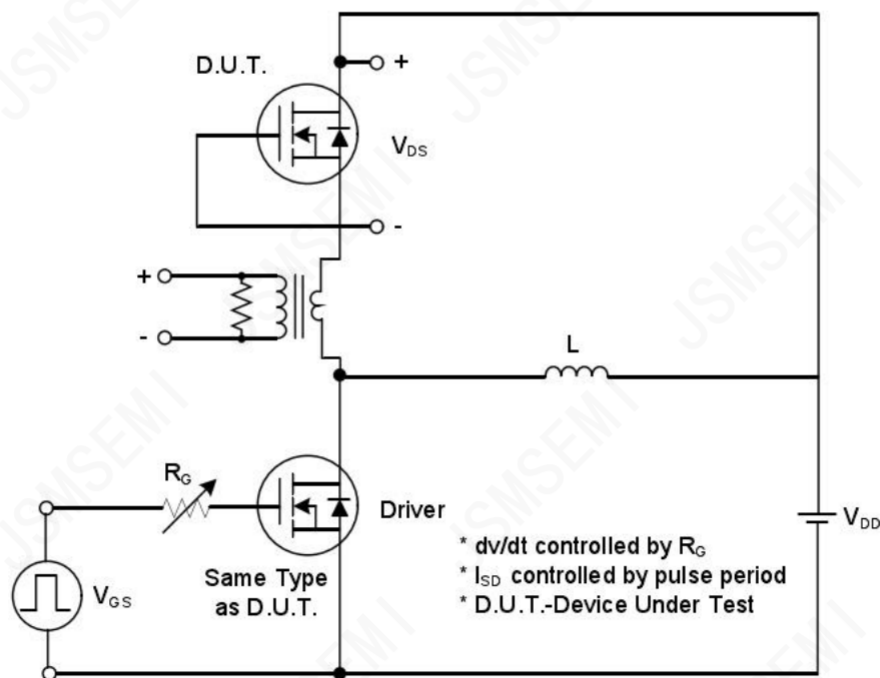
Ordering Information

Order number	Package	Marking	Operation Temperature Range	MSL Grade	Ship, Quantity	Green
IPD90N06S4L-06-JSM	TO-252	90N06S4L	-55 to 150 $^\circ\text{C}$	1	T&R,2500	RoHS

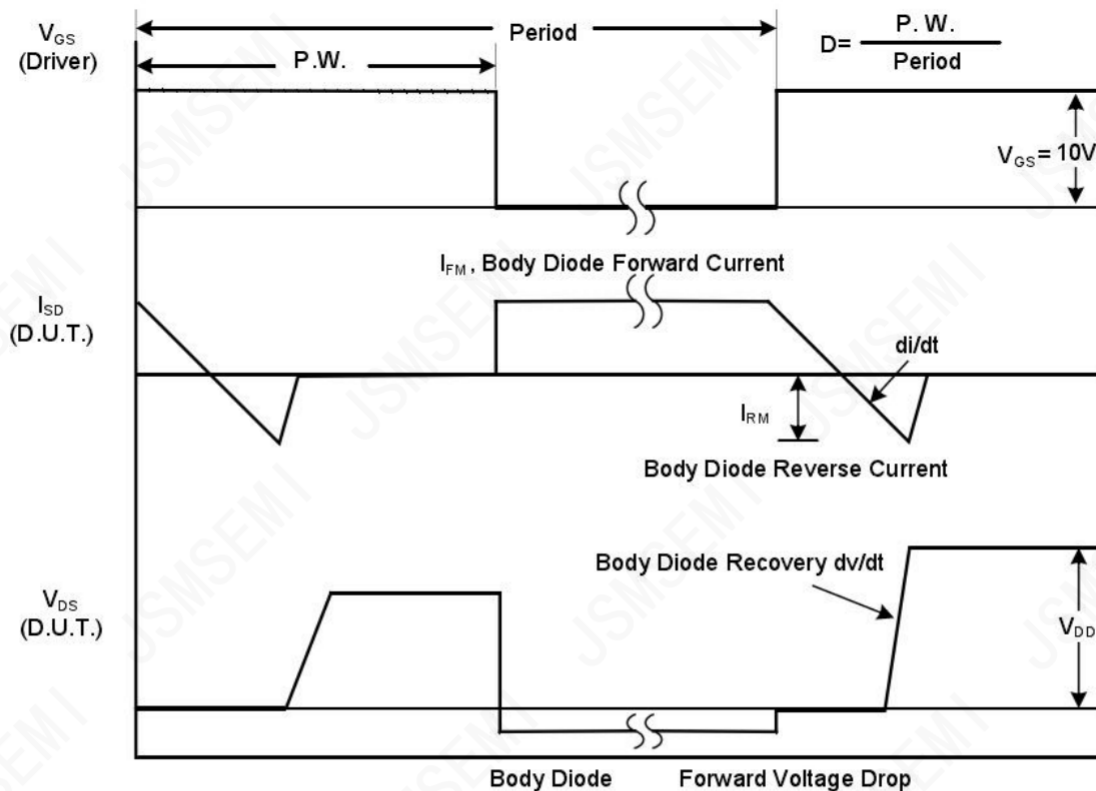
■ Electrical Characteristics ($T_J=25^{\circ}\text{C}$ unless otherwise noted)

Parameter	Symbol	Value			Unit	Test Condition
		min.	typ.	max.		
Static Characteristic						
Drain-source breakdown voltage	BV_{DSS}	60	-	-	V	$V_{GS}=0V, I_D=250\mu A$
Gate threshold voltage	$V_{GS(th)}$	1.2	-	2.5	V	$V_{DS}=V_{GS}, I_D=250\mu A$
Zero gate voltage drain current	I_{DSS}	-	0.02	1	μA	$V_{DS}=60V, V_{GS}=0V$ $T_J=25^{\circ}C$ $T_J=150^{\circ}C$
Gate-source leakage current	I_{GSS}	-	± 10	± 100	nA	$V_{GS}=\pm 20V, V_{DS}=0V$
Drain-source on-state resistance	$R_{DS(on)}$	-	5.0	6.3	m Ω	$V_{gs}=10V, I_d=20A$
		-	4.8	6.5	m Ω	$V_{gs}=4.5V, I_d=20A$
Dynamic Characteristic						
Input Capacitance	C_{iss}	-	2240	-	pF	$V_{GS}=0V,$ $V_{DS}=25V,$ $f=300KHz$
Output Capacitance	C_{oss}	-	850	-		
Reverse Transfer Capacitance	C_{rss}	-	20	-		
Gate Total Charge	Q_G	-	33	-	nC	$V_{ds}=30V, I_d=20A, V_{gs}=10V$
Gate-Source charge	Q_{gs}	-	4.5	-		
Gate-Drain charge	Q_{gd}	-	5	-		
Turn-on delay time	$t_{d(on)}$	-	6.5	-	ns	$V_{GS}=10V,$ $V_{DD}=30V,$ $R_{G_ext}=5\Omega, I_D=20A$
Rise time	t_r	-	8	-		
Turn-off delay time	$t_{d(off)}$	-	38	-		
Fall time	t_f	-	16	-		
Body Diode Characteristic						
Parameter	Symbol	Value			Unit	Test Condition
		min.	typ.	max.		
Body Diode Forward Voltage	V_{SD}	-	0.77	1.2	V	$V_{GS}=0V, I_{SD}=30A$
Body Diode Continuous Forward Current	I_S	-	-	100	A	$TC=25^{\circ}C$
Body Diode Pulsed Current	I_S pulse	-	-	260	A	$TC=25^{\circ}C$
Body Diode Reverse Recovery Time	t_{rr}	-	39	-	ns	$I_F=1A,$ $diF/dt=100A/\mu s$
Body Diode Reverse Recovery Charge	Q_{rr}	-	45	-	nC	

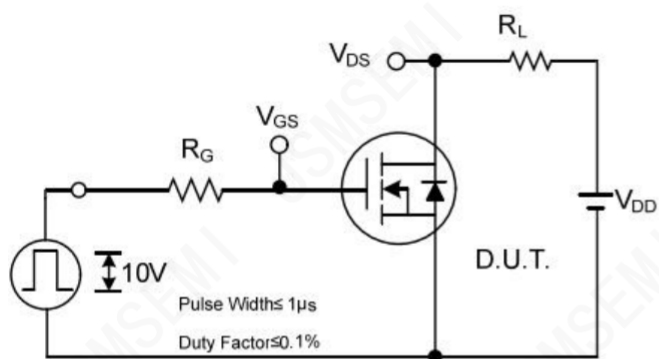
■ RATING AND CHARACTERISTIC CURVES



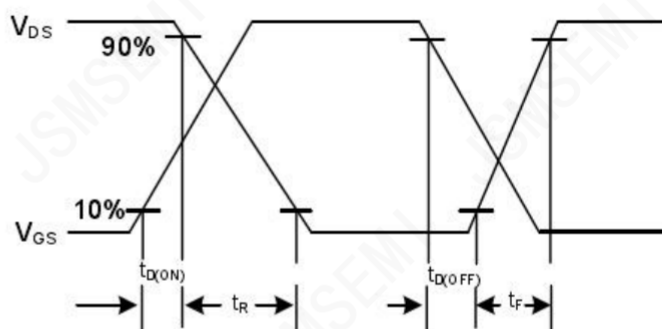
Peak Diode Recovery dv/dt Test Circuit



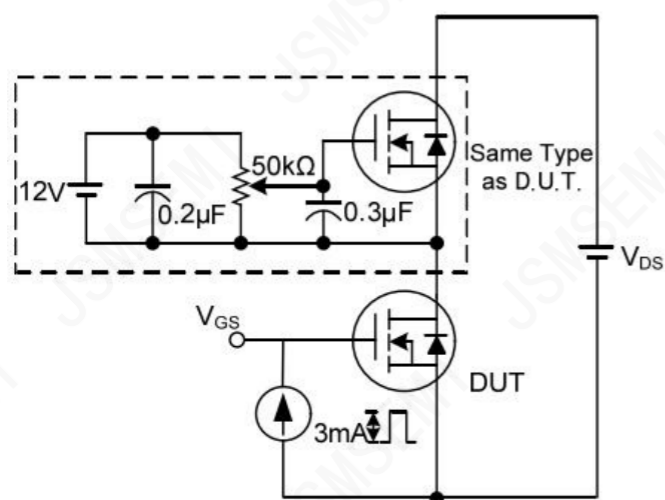
Peak Diode Recovery dv/dt Waveforms



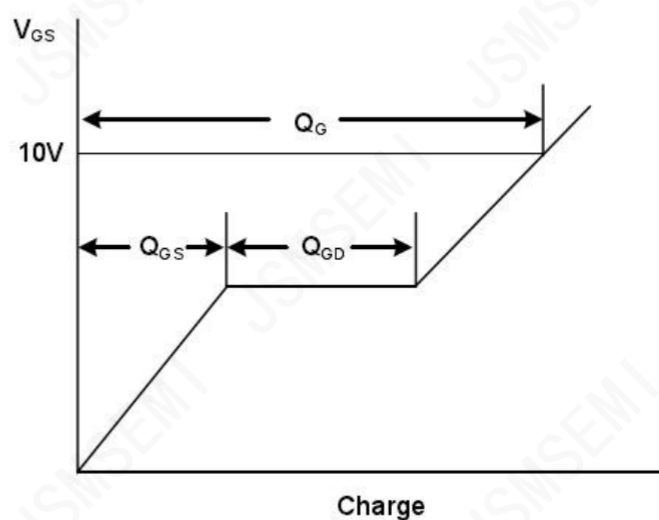
Switching Test Circuit



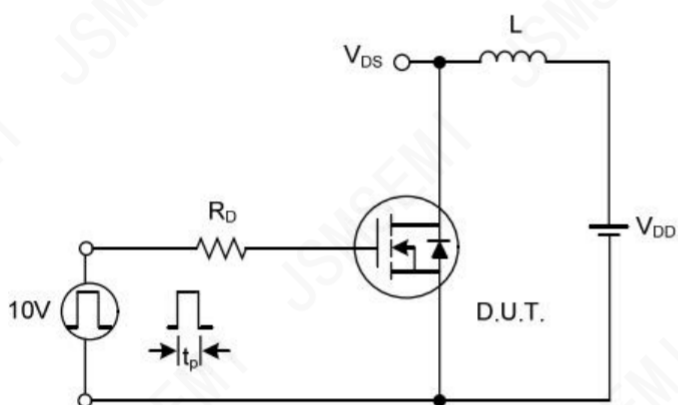
Switching Waveforms



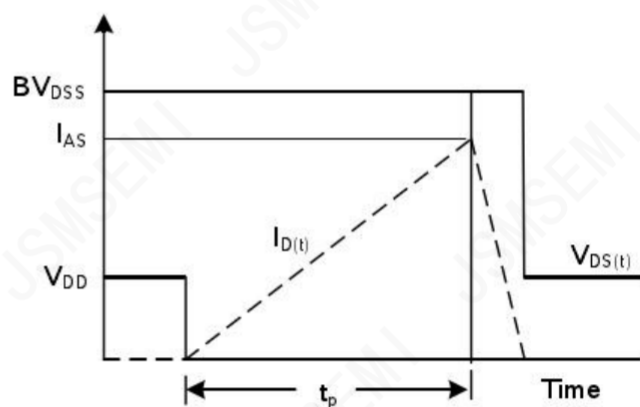
Gate Charge Test Circuit



Gate Charge Waveform



Unclamped Inductive Switching Test Circuit



Unclamped Inductive Switching Waveforms

■ Typical Electrical and Thermal Characteristics Diagrams

Figure 1: Output Characteristics

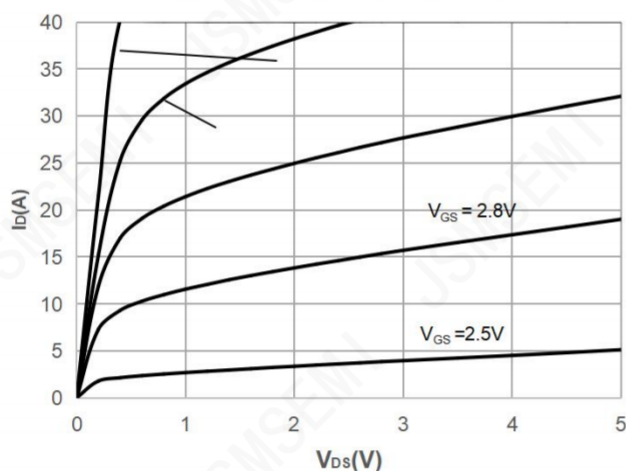


Figure 2: Typical Transfer Characteristics

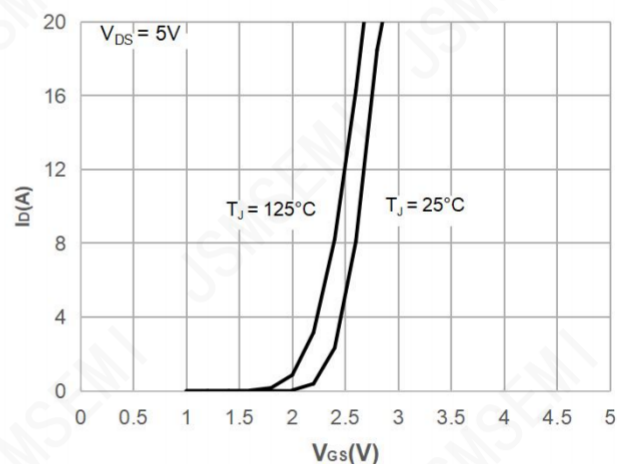


Figure 3: On-resistance vs. Drain Current

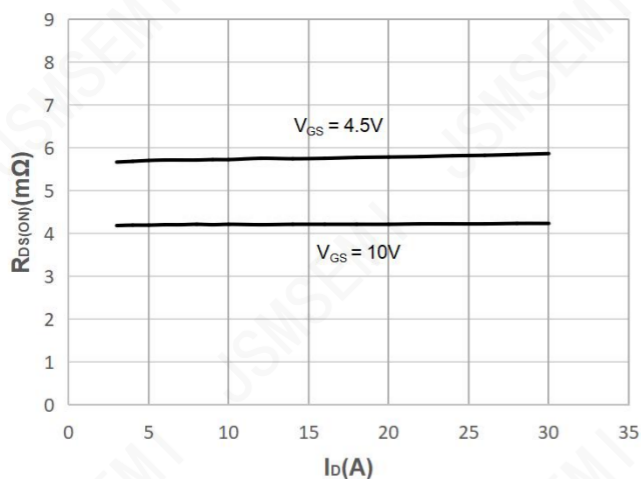


Figure 4: Body Diode Characteristics

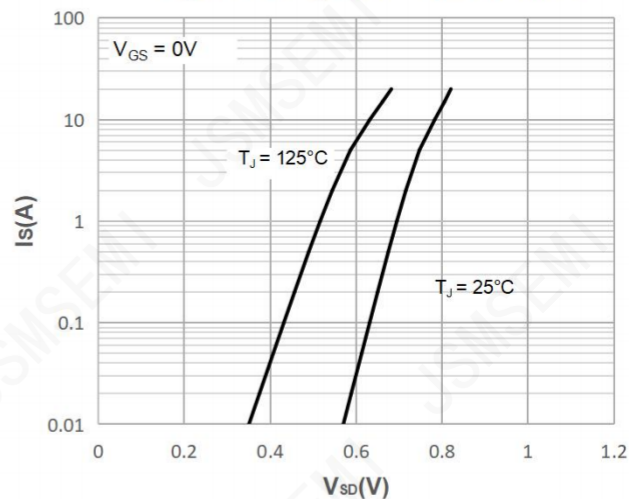


Figure 5: Gate Charge Characteristics

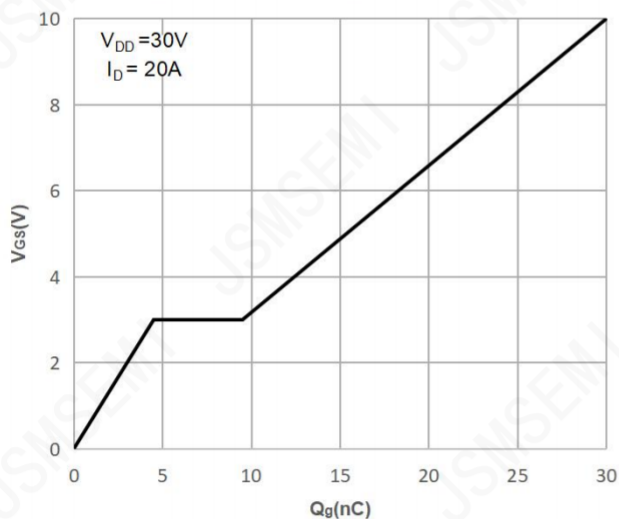


Figure 6: Capacitance Characteristics

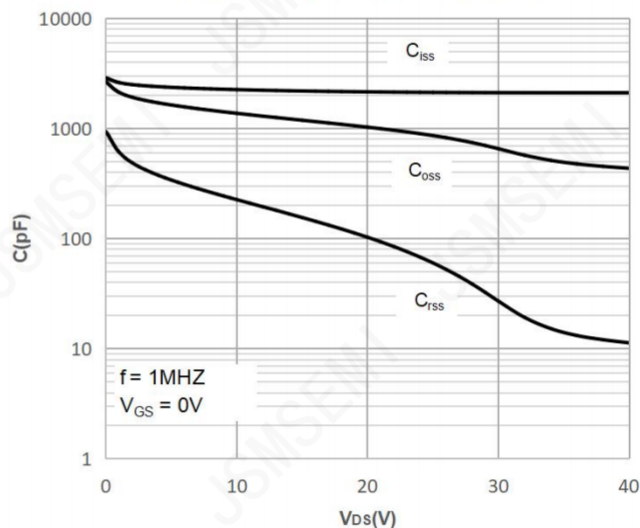
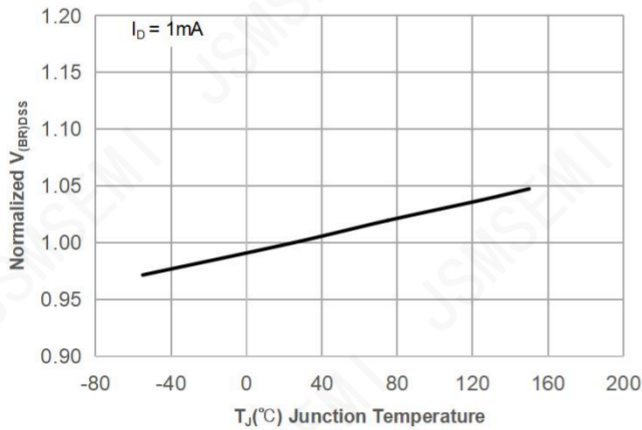
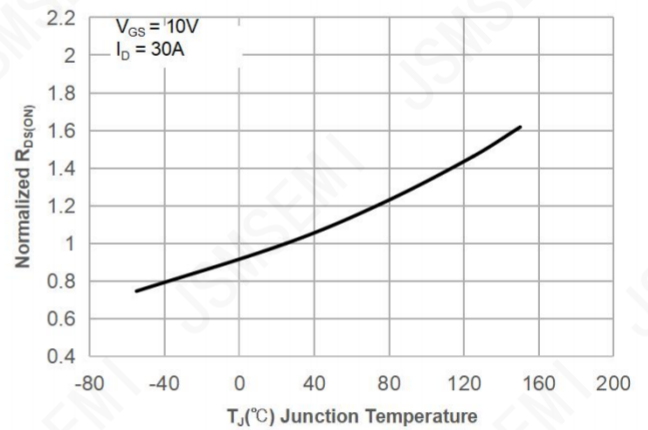
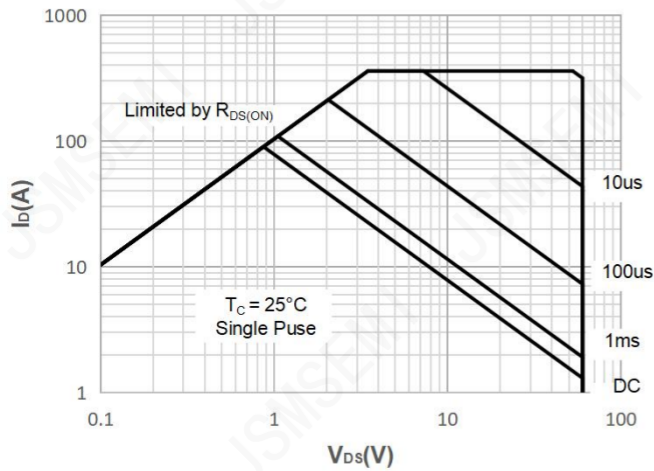
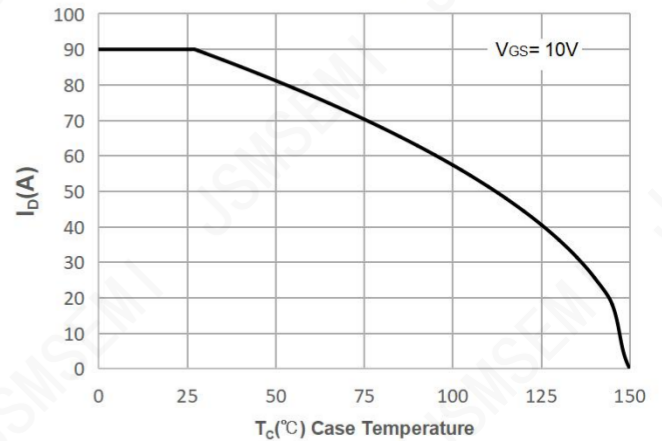
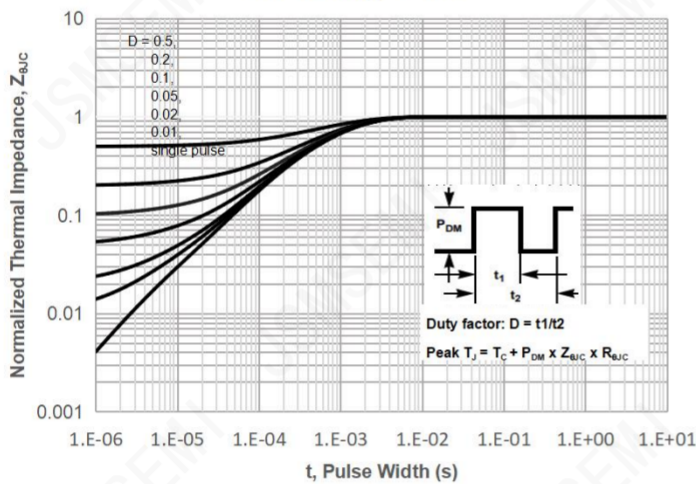
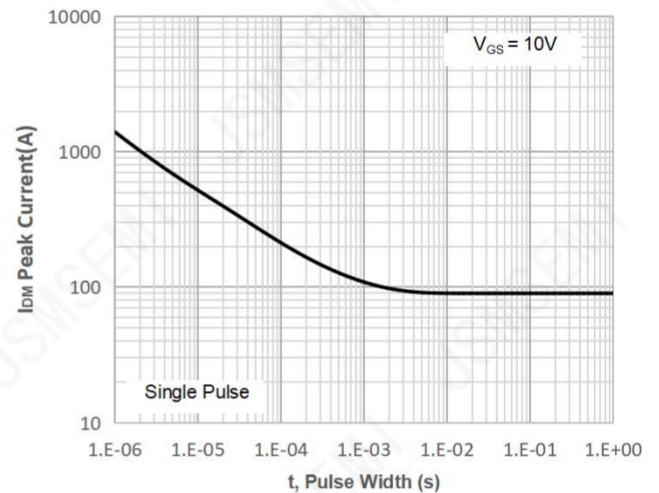
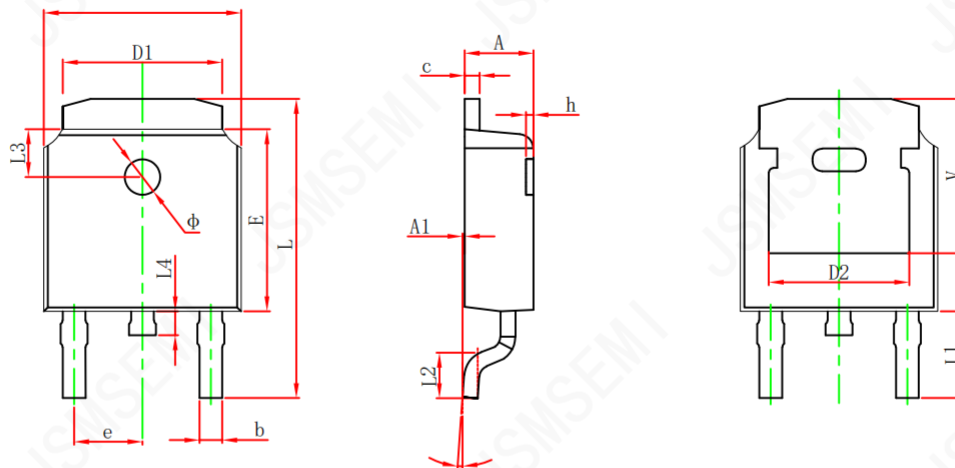


Figure 7: Normalized Breakdown voltage vs. Junction Temperature

Figure 8: Normalized on Resistance vs. Junction Temperature

Figure 9: Maximum Safe Operating Area

Figure 10: Maximum Continuous Drain Current vs. Case Temperature

Figure 11: Normalized Maximum Transient Thermal Impedance

Figure 12: Peak Current Capacity


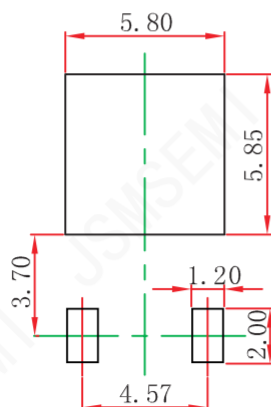
Package Information

TO-252-2



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	2.200	2.400	0.087	0.094
A1	0.000	0.127	0.000	0.005
b	0.635	0.770	0.025	0.030
c	0.460	0.580	0.018	0.023
D	6.500	6.700	0.256	0.264
D1	5.100	5.460	0.201	0.215
D2	4.830 REF.		0.190 REF.	
E	6.000	6.200	0.236	0.244
e	2.186	2.386	0.086	0.094
L	9.712	10.312	0.382	0.406
L1	2.900 REF.		0.114 REF.	
L2	1.400	1.700	0.055	0.067
L3	1.600 REF.		0.063 REF.	
L4	0.600	1.000	0.024	0.039
Φ	1.100	1.300	0.043	0.051
θ	0°	8°	0°	8°
h	0.000	0.300	0.000	0.012
V	5.250 REF.		0.207 REF.	

TO-252-2L Suggested Pad Layout



Note:

1. Controlling dimension: in millimeters.
2. General tolerance: $\pm 0.05\text{mm}$.
3. The pad layout is for reference purposes only.

Revision History

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

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