

Product Summary

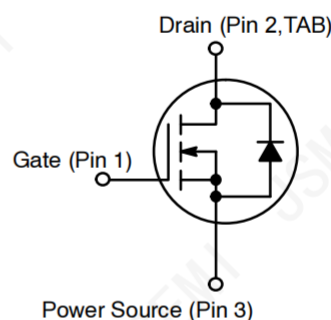
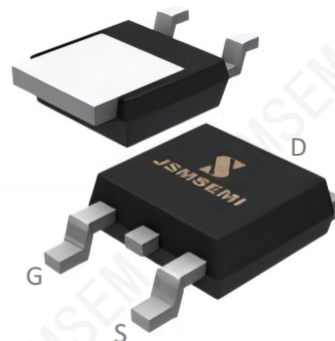
- V_{DS} 60V
- I_D 105A
- $R_{DS(ON)}$ (at $V_{GS}=10V$) $< 4.5m\Omega$
- 100% EAS Tested
- 100% ∇V_{DS} Tested

General Description

- Split gate trench 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}	60	V
Gate-Source Voltage	V_{GS}	± 20	V
Continuous Drain Current ($T_c=25^\circ\text{C}$) ⁽¹⁾	I_D	105	A
Continuous Drain Current ($T_c=100^\circ\text{C}$)	I_D	60	A
Pulsed Drain Current ⁽¹⁾	I_{DM}	420	A
Drain Power Dissipation	P_D	78	W
Single Pulsed Avalanche Energy ⁽²⁾	E_{AS}	240	mJ
Thermal Resistance from Junction to Case	$R_{\theta JC}$	1.6	$^\circ\text{C/W}$
Thermal Resistance from Junction to Ambient ⁽³⁾	$R_{\theta JA}$	44	$^\circ\text{C/W}$
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 : $T_J=25^\circ\text{C}$, $V_{DD}=50V$, $V_G=10V$, $L=0.5mH$, $R_g=25\Omega$, $I_{AS}=31A$

Ordering Information

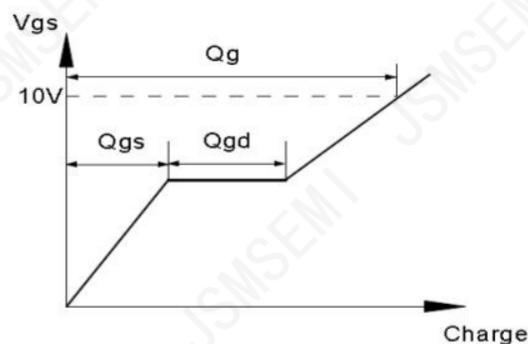
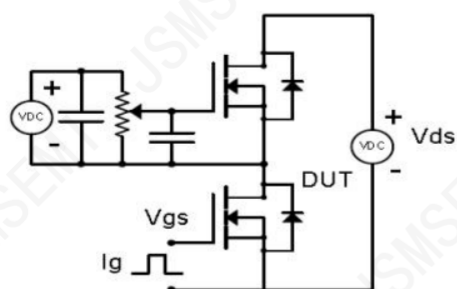
Order number	Package	Marking	Operation Temperature Range	MSL Grade	Ship,Quantity	Green
JSM045N06DGL	TO-252	045N06DGL	-55 to 150 $^\circ\text{C}$	1	T&R,2500	Rohs

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

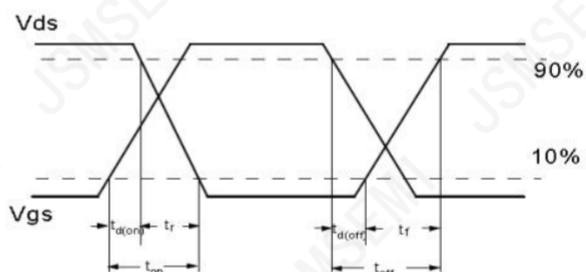
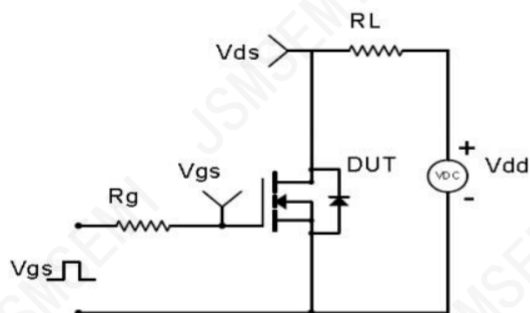
Parameter	Symbol	Test Condition	Min	Type	Max	Unit
Static Characteristics						
Drain-source breakdown voltage	$V_{(BR)DSS}$	$V_{GS} = 0V, I_D = 250\mu A$	60	-	-	V
Zero gate voltage drain current	I_{DSS}	$V_{DS} = 60V, V_{GS} = 0V$	-	-	1	μA
Gate-body leakage current	I_{GSS}	$V_{GS} = \pm 20V, V_{DS} = 0V$	-	-	± 100	nA
Gate threshold voltage	$V_{GS(th)}$	$V_{DS} = V_{GS}, I_D = 250\mu A$	1.0	1.6	2.5	V
Drain-source on-resistance	$R_{DS(on)}$	$V_{GS} = 10V, I_D = 20A$	-	3.5	4.5	m Ω
		$V_{GS} = 4.5V, I_D = 15A$	-	4.7	5.8	m Ω
Forward transconductance	R_g	$f = 1.0MHz$	-	1.7	-	Ω
Dynamic characteristics						
Input Capacitance	C_{iss}	$V_{DS} = 30V, V_{GS} = 0V, f = 1MHz$	-	2293	-	pF
Output Capacitance	C_{oss}		-	900	-	
Reverse Transfer Capacitance	C_{rss}		-	31	-	
Switching characteristics						
Turn-on delay time	$t_{d(on)}$	$V_{DD} = 30V, I_D = 20A, R_G = 3\Omega, V_{GS} = 10V$	-	5.5	-	ns
Turn-on rise time	t_r		-	9.5	-	
Turn-off delay time	$t_{d(off)}$		-	26	-	
Turn-off fall time	t_f		-	16	-	
Total Gate Charge	Q_g	$V_{DS} = 30V, I_D = 20A, V_{GS} = 10V$	-	33	-	nC
Gate-Source Charge	Q_{gs}		-	5.5	-	
Gate-Drain Charge	Q_{gd}		-	7.3	-	
Source-Drain Diode characteristics						
Diode Forward voltage	V_{SD}	$T_J = 25^{\circ}C, V_{GS} = 0V, I_S = 20A$	-	0.7	1.2	V
Diode Forward current	I_S	$T_C = 25^{\circ}C$	-	-	105	A
Body Diode Reverse Recovery Time	T_{rr}	$di/dt = 100A/\mu s, I_F = 20A$	-	40	-	ns
Body Diode Reverse Recovery Charge	Q_{rr}	$di/dt = 100A/\mu s, I_F = 20A$	-	48	-	nC

Test Circuit & Waveform

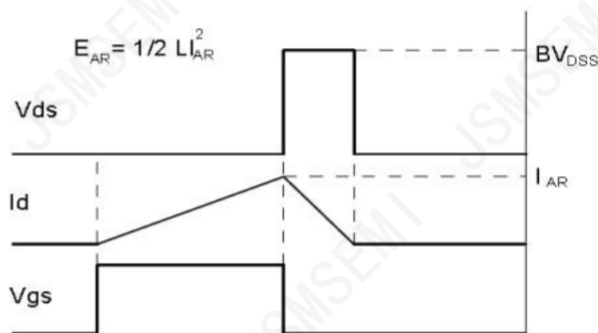
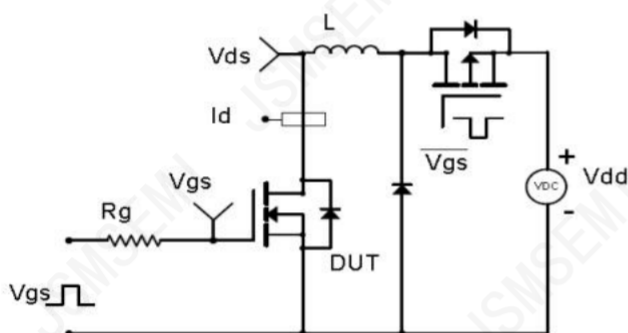
Gate Charge Test Circuit & Waveform



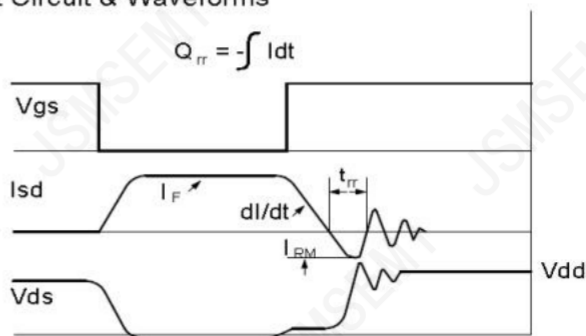
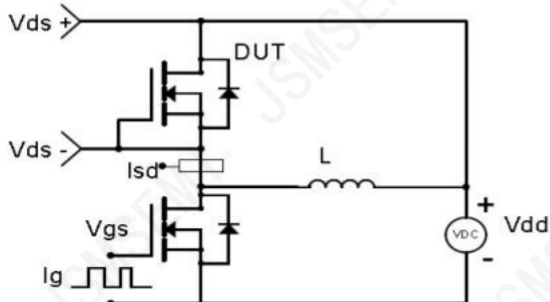
Resistive Switching Test Circuit & Waveforms



Unclamped Inductive Switching (UIS) Test Circuit & Waveforms



Diode Recovery Test Circuit & Waveforms



Typical Characteristics

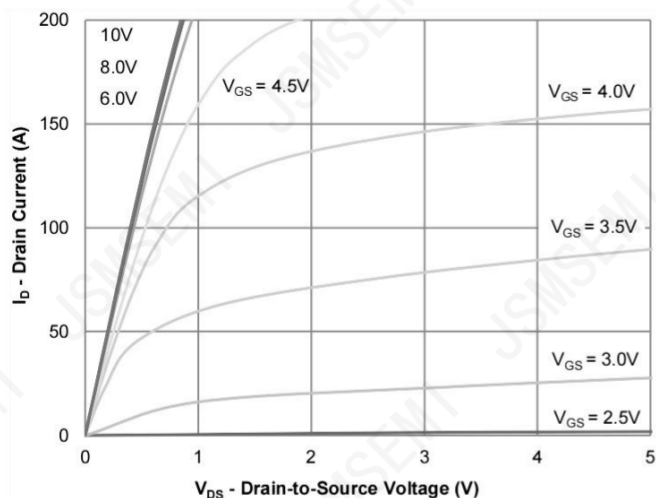


Figure 1: Output Characteristics

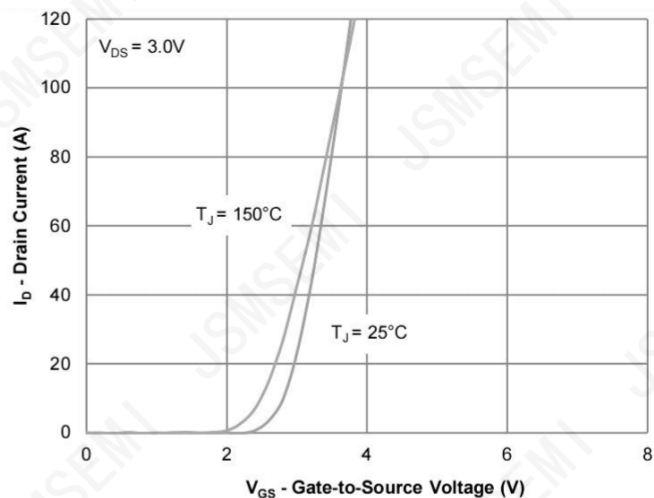


Figure 2: Transfer Characteristics

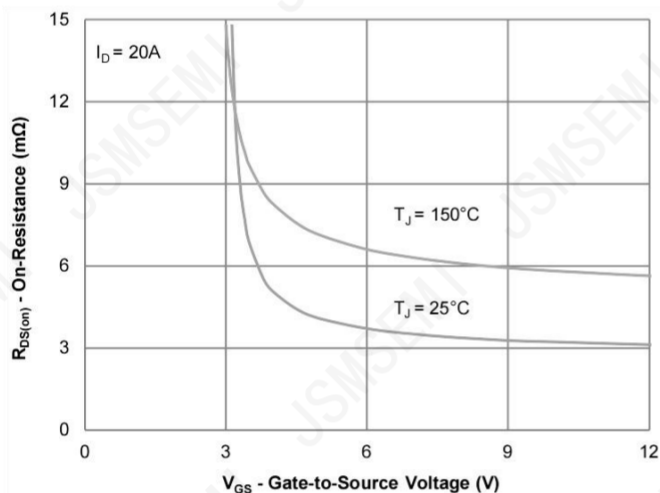


Figure 3: On-Resistance vs. Gate-Source Voltage

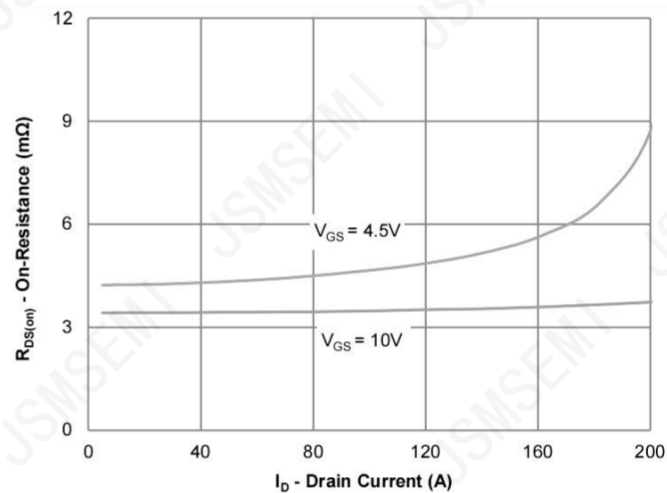


Figure 4: On-Resistance vs. Drain Current

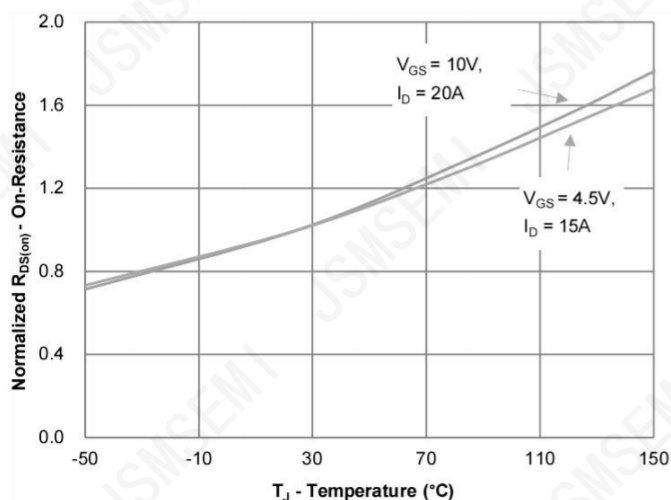


Figure 5: On-Resistance vs. Junction Temperature

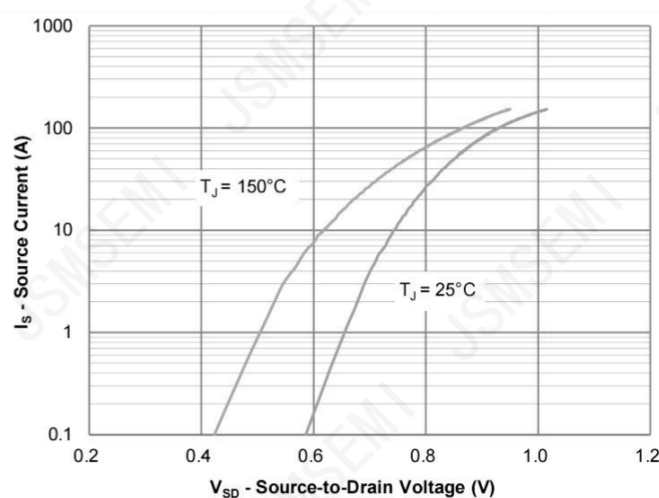


Figure 6: Source-Drain Diode Forward Voltage

Typical Characteristics

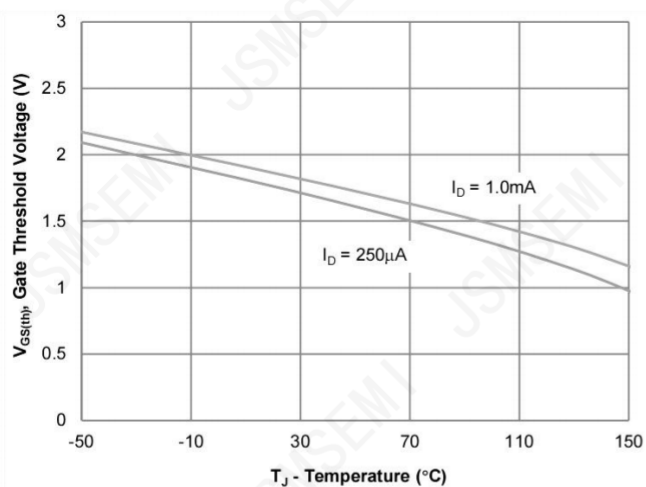


Figure 7: Gate Threshold Variation vs. Junction Temperature

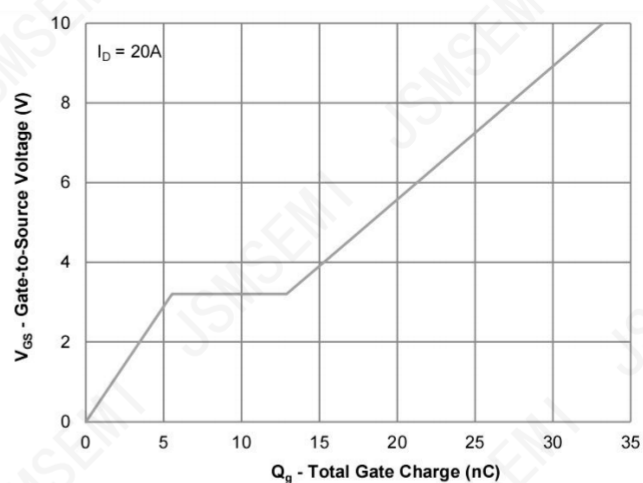


Figure 8: Gate Charge Characteristics

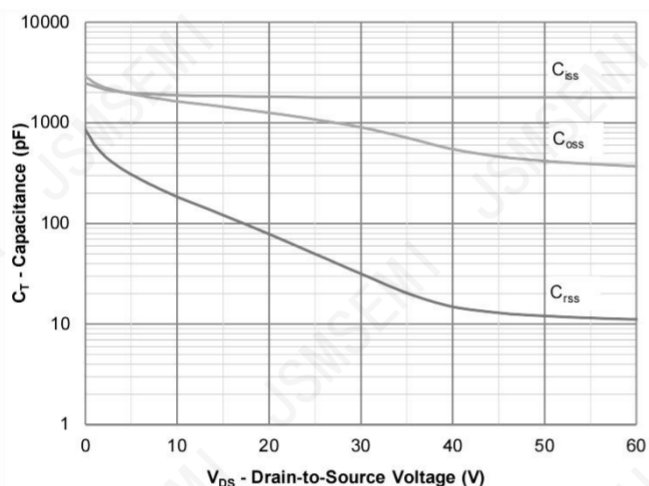


Figure 9: Capacitance Characteristics

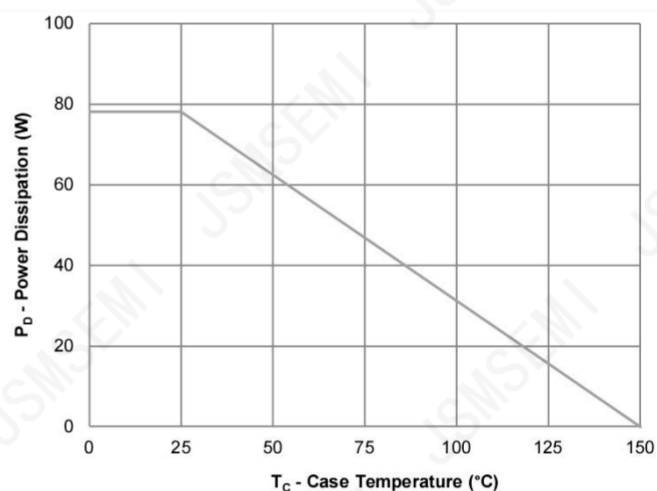


Figure 10: Power Derating

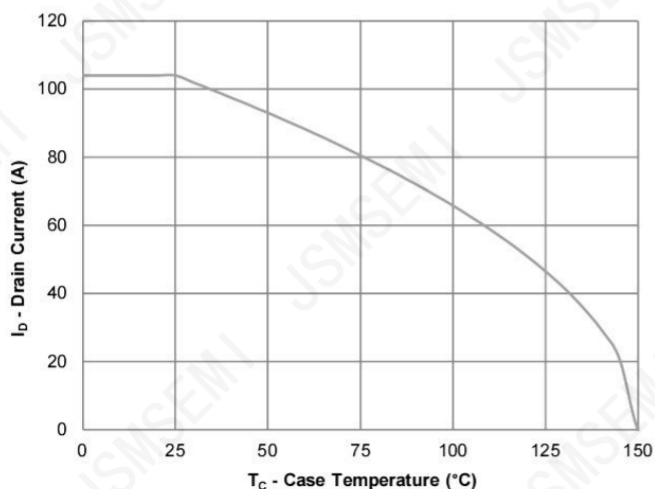


Figure 11: Current Derating

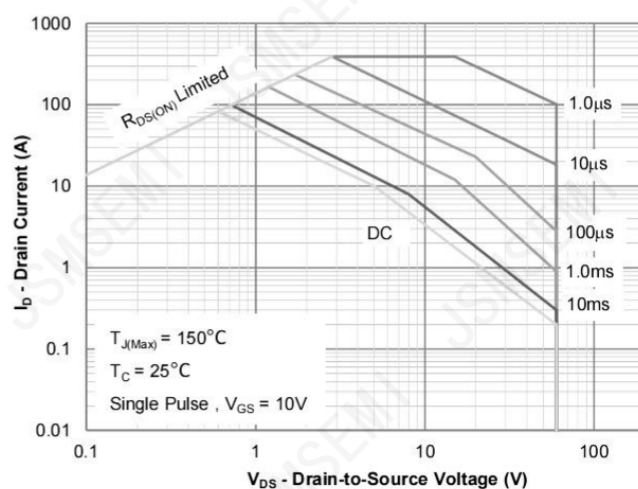


Figure 12: Safe Operating Area

Typical Characteristics

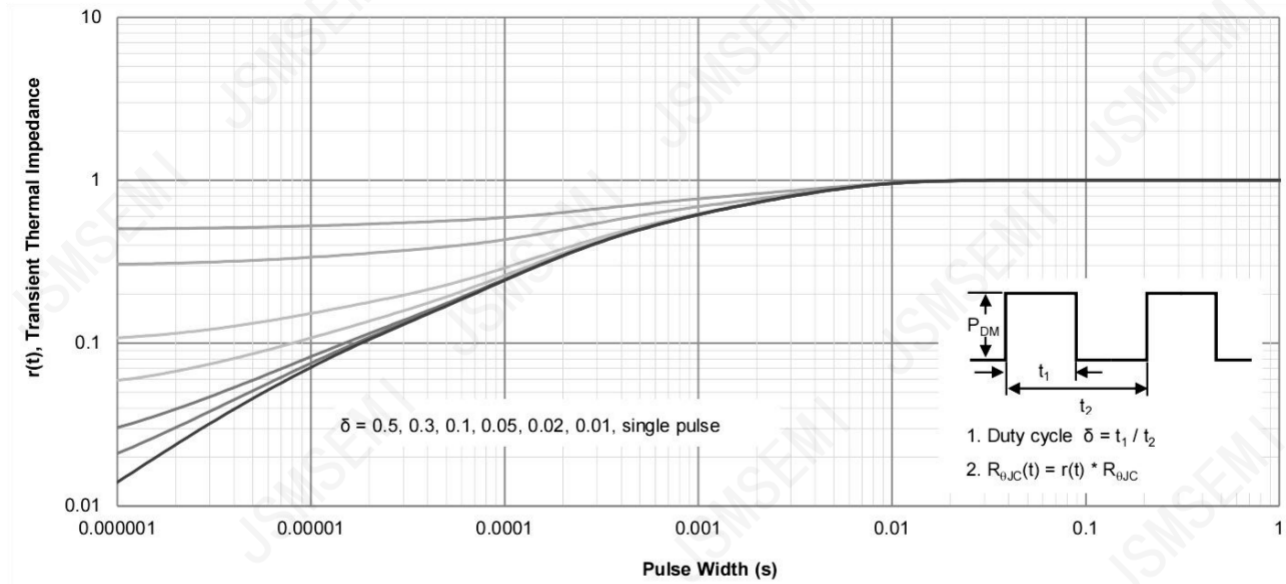
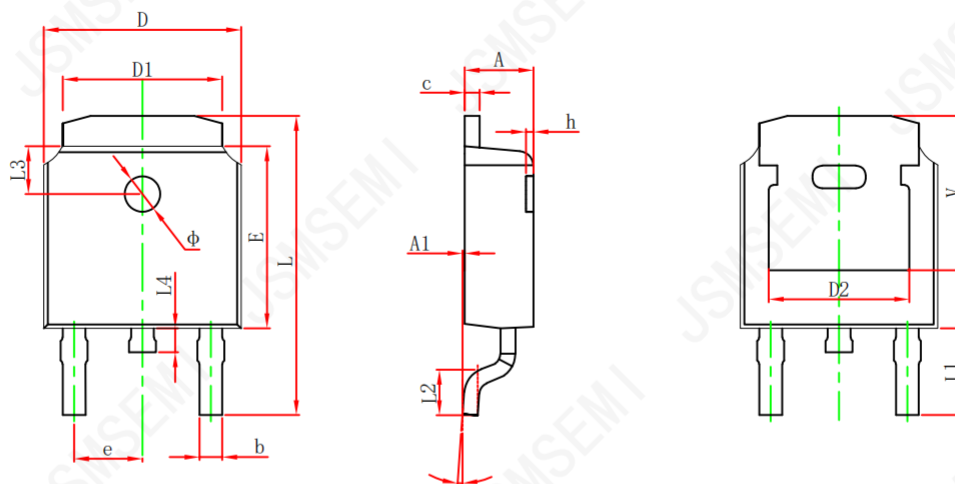


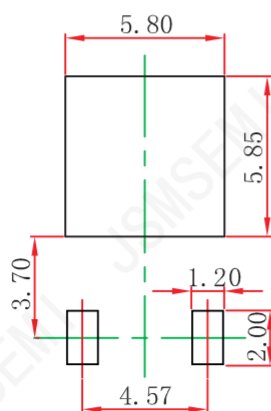
Figure 13: Normalized Maximum Transient Thermal Impedance

TO-252-2L Package Outline Dimensions



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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