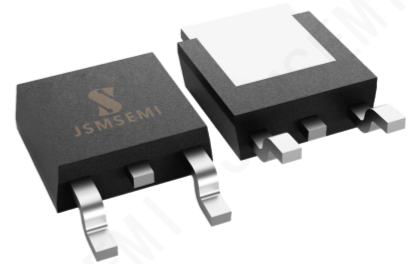


Product Summary

- V_{DS} 60V
- I_D 90A
- $R_{DS(ON)}$ (at $V_{GS}=10V$) $< 3.8m\Omega$
- 100% EAS Tested
- 100% ∇V_{DS} Tested

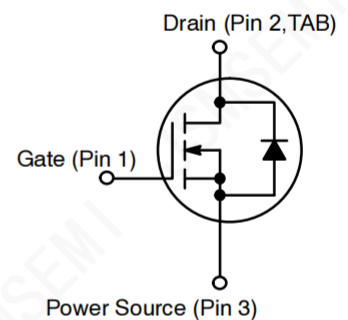


General Description

- 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	90	A
Continuous Drain Current ($T_c=100^\circ\text{C}$)	I_D	90	A
Pulsed Drain Current ⁽¹⁾	I_{DM}	360	A
Drain Power Dissipation	P_D	104	W
Single Pulsed Avalanche Energy ⁽²⁾	E_{AS}	360	mJ
Thermal Resistance from Junction to Ambient	$R_{\theta JA}$	45	$^\circ\text{C/W}$
Junction Temperature	T_J	$-55 \sim +150$	$^\circ\text{C}$
Storage Temperature	T_{STG}	$-55 \sim +150$	$^\circ\text{C}$

Notes:

- 1) Repetitive Rating: pulse width limited by maximum junction temperature
- 2) EAS condition : $T_J=25^\circ\text{C}$, $V_{DD}=20V$, $V_G=10V$, $L=1.0mH$, $R_g=25\Omega$, $I_{AS}=26.8A$

Ordering Information

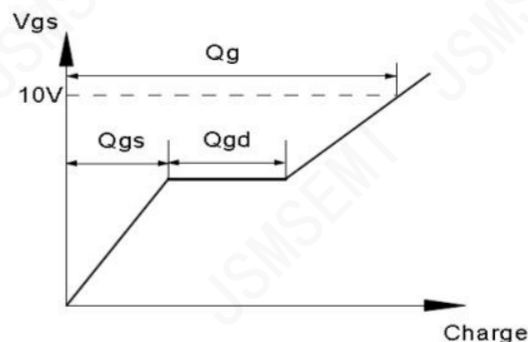
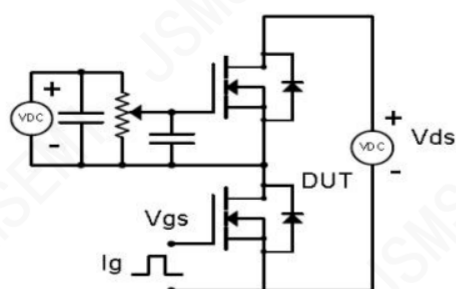
Order number	Package	Marking	Operation Temperature Range	MSL Grade	Ship, Quantity	Green
IPD038N06N3GATMA1-JSM	TO-252	035N06DGH	-55 to 150°C	1	T&R, 2500	Rohs

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

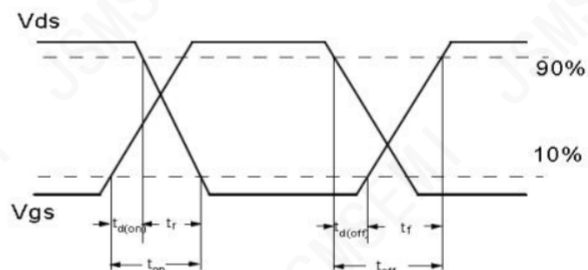
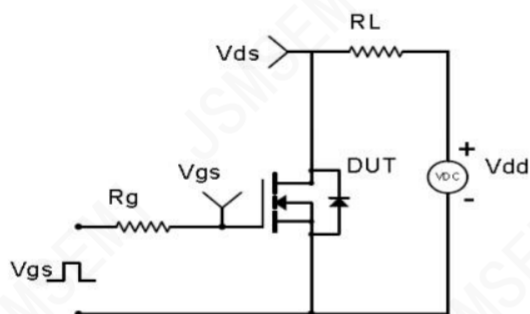
Parameter	Symbol	Test Condition	Min	Type	Max	Unit
Static Characteristics						
Drain-source breakdown voltage	V _{(BR)DSS}	V _{GS} = 0V, I _D =250μA	60	-	-	V
Zero gate voltage drain current	I _{DSS}	V _{DS} =60V, V _{GS} = 0V	-	-	1	μA
Gate-body leakage current	I _{GSS}	V _{GS} =±20V, V _{DS} = 0V	-	-	±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	-	3.1	3.8	mΩ
Forward transconductance	R _g	V _{GS} = 0V, V _{DS} = 0V, f=1.0MHz	-	1.2	-	Ω
Dynamic characteristics						
Input Capacitance	C _{iss}	V _{DS} =30V, V _{GS} =0V, f=1MHz	-	2717	-	pF
Output Capacitance	C _{OSS}		-	1089	-	
Reverse Transfer Capacitance	C _{rSS}		-	48	-	
Switching characteristics						
Turn-on delay time	t _{d(on)}	V _{DD} =30V, I _D =20A, R _G =3Ω, V _{GS} =10V	-	7.2	-	nS
Turn-on rise time	t _r		-	11	-	
Turn-off delay time	t _{d(off)}		-	24	-	
Turn-off fall time	t _f		-	11	-	
Total Gate Charge	Q _g	V _{DS} =30V, I _D =20A, V _{GS} =10V	-	45	-	nC
Gate-Source Charge	Q _{gs}		-	11.6	-	
Gate-Drain Charge	Q _{gd}		-	11.5	-	
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℃	-	-	90	A
Body Diode Reverse Recovery Time	trr	T _J =25℃, I _F =20A,di/dt=100A/us	-	43	-	nS
Body Diode Reverse Recovery Charge	Qrr		-	59	-	nC

Test Circuit & Waveform

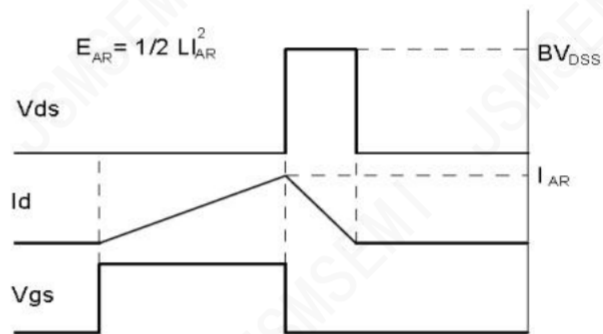
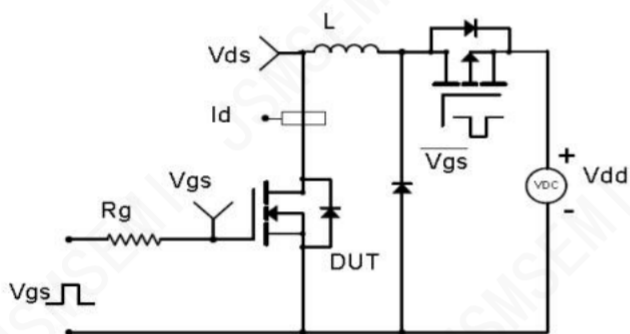
Gate Charge Test Circuit & Waveform



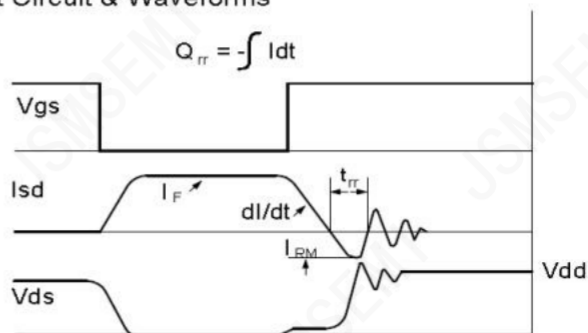
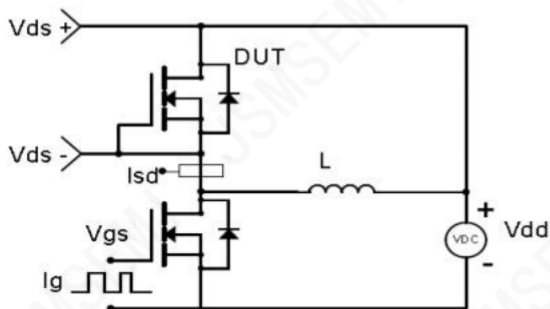
Resistive Switching Test Circuit & Waveforms



Unclamped Inductive Switching (UIS) Test Circuit & Waveforms



Diode Recovery Test Circuit & Waveforms



Typical Characteristics

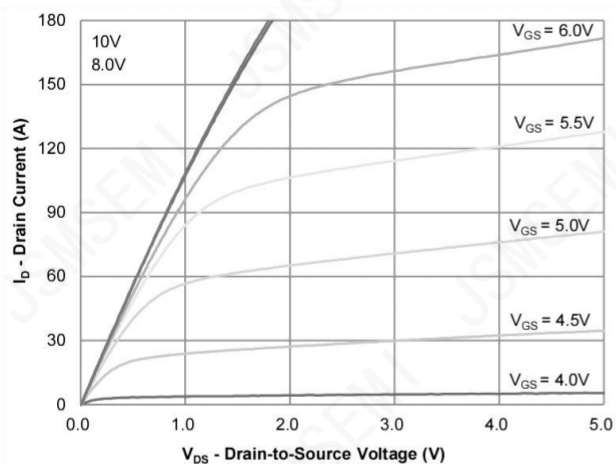


Figure 1: Output Characteristics

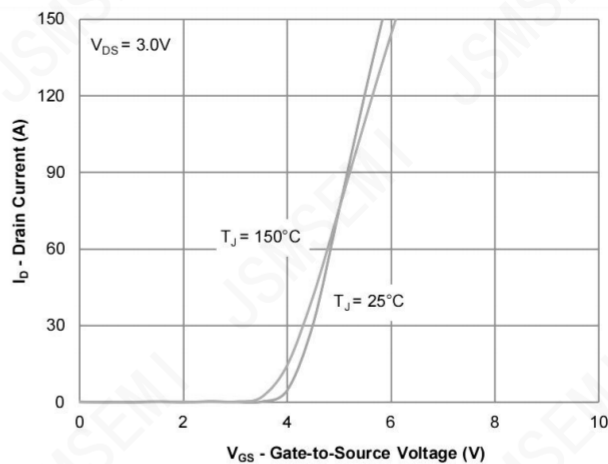


Figure 2: Transfer Characteristics

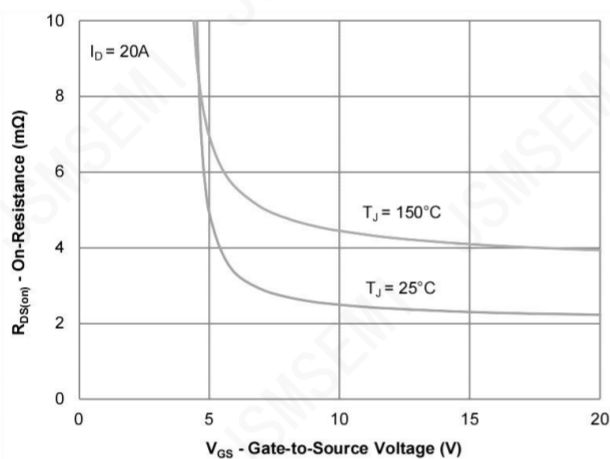


Figure 3: On-Resistance vs. Gate-Source Voltage

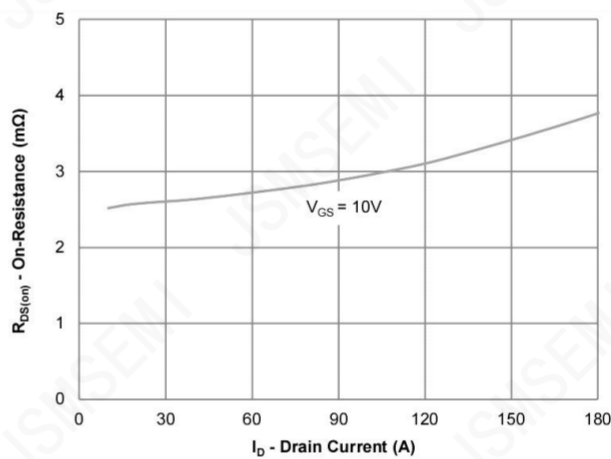


Figure 4: On-Resistance vs. Drain Current

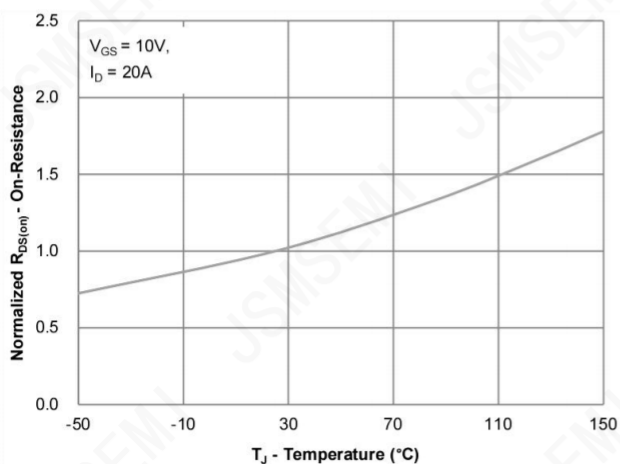


Figure 5: On-Resistance vs. Junction Temperature

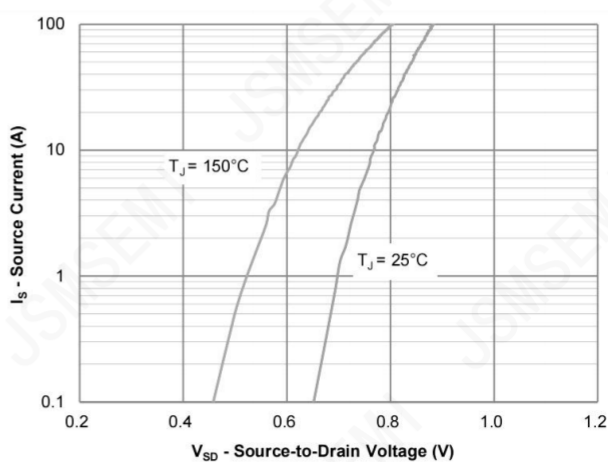


Figure 6: Source-Drain Diode Forward Voltage

Typical Characteristics

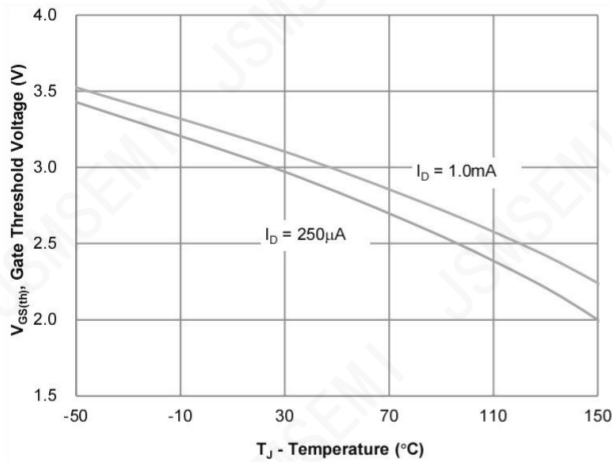


Figure 7: Gate Threshold Variation vs. Junction Temperature

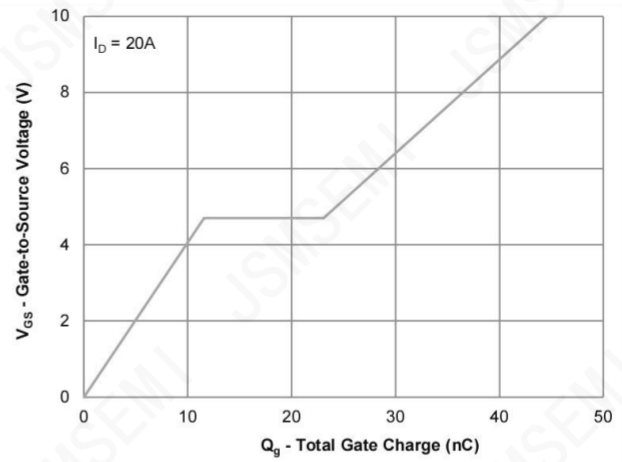


Figure 8: Gate Charge Characteristics

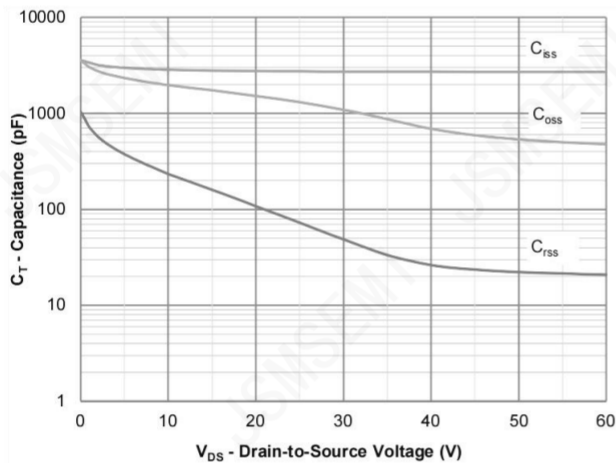


Figure 9: Capacitance Characteristics

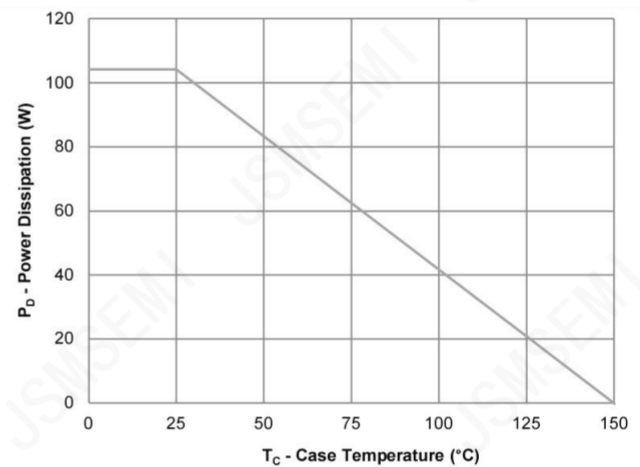


Figure 10: Power Derating

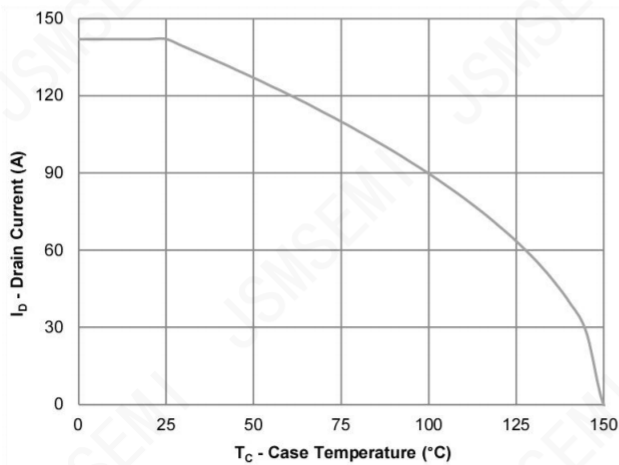


Figure 11: Current Derating

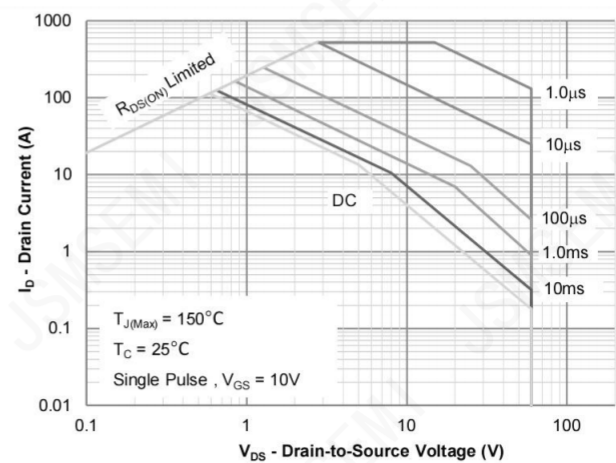


Figure 12: Safe Operating Area

Typical Characteristics

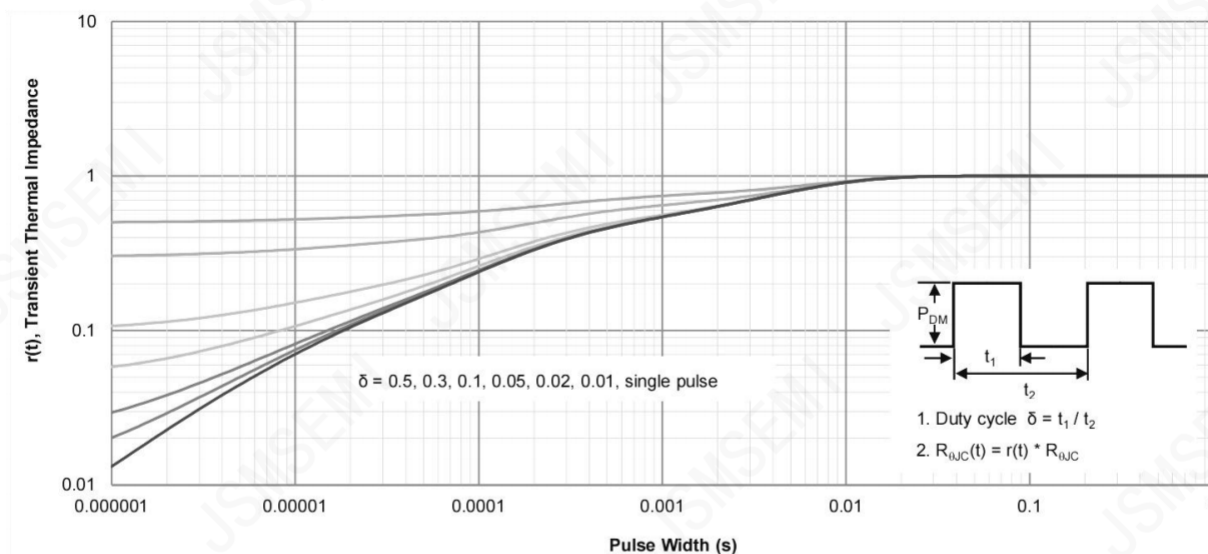
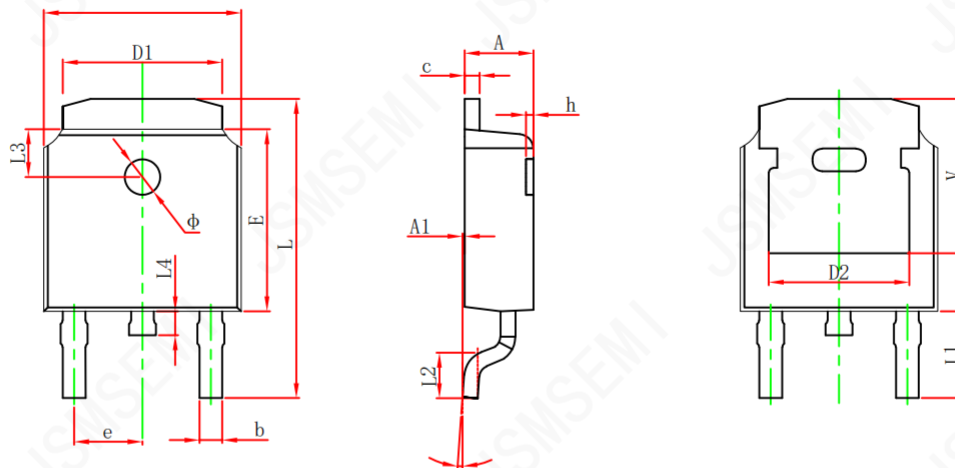


Figure 13: Normalized Maximum Transient Thermal Impedance

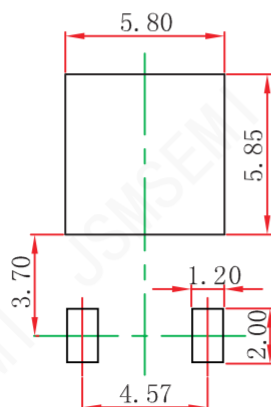
Package Information

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	8/21/2021

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