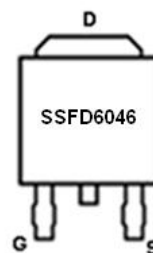


Main Product Characteristics:

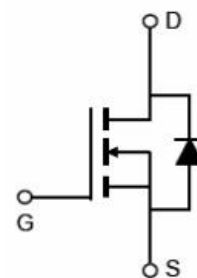
V_{DSS}	60V
$R_{DS(on)}$	27m Ω (typ.)
I_D	20A



TO-252 (DPAK)



Marking and Pin Assignments



Schematic Diagram

Features and Benefits:

- Advanced MOSFET process technology
- Special designed for PWM, load switching and general purpose applications
- Ultra low on-resistance with low gate charge
- Fast switching and reverse body recovery
- 150°C operating temperature


Description:

It utilizes the latest processing techniques to achieve the high cell density and reduces the on-resistance with high repetitive avalanche rating. These features combine to make this design an extremely efficient and reliable device for use in power switching application and a wide variety of other applications.

Absolute Max Rating:

Symbol	Parameter	Max.	Units
$I_D @ T_C = 25^\circ\text{C}$	Continuous Drain Current, $V_{GS} @ 10\text{V}^{\text{①}}$	20	A
I_{DM}	Pulsed Drain Current ^②	80	
$P_D @ T_C = 25^\circ\text{C}$	Power Dissipation ^③	27.7	W
V_{DS}	Drain-Source Voltage	60	V
V_{GS}	Gate-to-Source Voltage	± 20	V
E_{AS}	Single Pulse Avalanche Energy @ $L=0.5\text{mH}$	34	mJ
$T_J \quad T_{STG}$	Operating Junction and Storage Temperature Range	-55 to +150	$^\circ\text{C}$

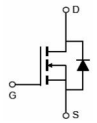
Thermal Resistance

Symbol	Characteristics	Typ.	Max.	Units
$R_{\theta JC}$	Junction-to-case ^③	—	5.4	°C/W

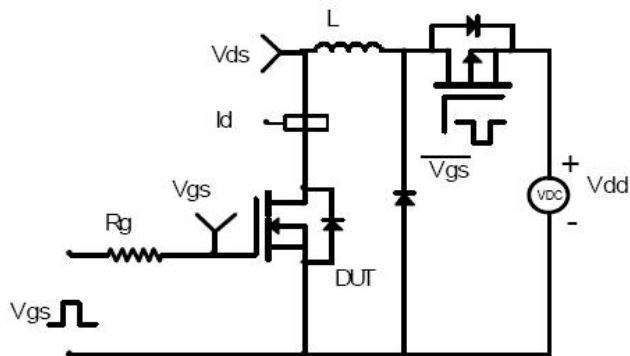
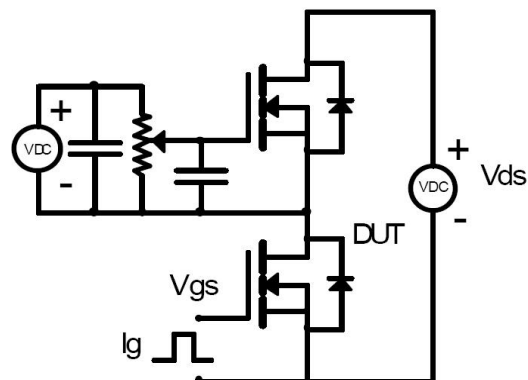
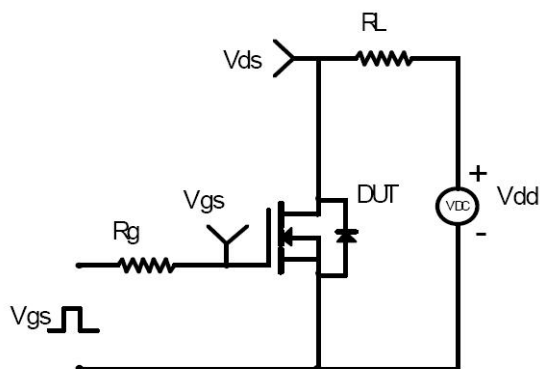
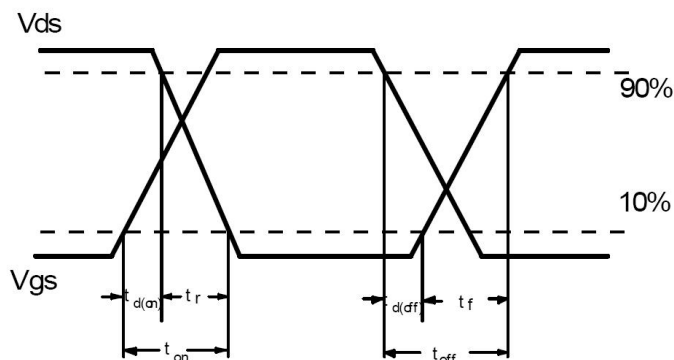
Electrical Characteristics @ $T_A=25^\circ\text{C}$ unless otherwise specified

Symbol	Parameter	Min.	Typ.	Max.	Units	Conditions
$V_{(BR)DSS}$	Drain-to-Source breakdown voltage	60	—	—	V	$V_{GS} = 0V, I_D = 250\mu A$
$R_{DS(on)}$	Static Drain-to-Source on-resistance	—	27	37	mΩ	$V_{GS}=10V, I_D=4.5A$
		—	36	48		$V_{GS}=4.5V, I_D=3A$
$V_{GS(th)}$	Gate threshold voltage	1	—	2.5	V	$V_{DS} = V_{GS}, I_D = 250\mu A$
I_{DSS}	Drain-to-Source leakage current	—	—	1	μA	$V_{DS} = 60V, V_{GS} = 0V$
I_{GSS}	Gate-to-Source forward leakage	—	—	100	nA	$V_{GS} = 20V$
		—	—	-100		$V_{GS} = -20V$
Q_g	Total gate charge	—	20	—	nC	$I_D = 10A,$ $V_{DS}=30V,$ $V_{GS} = 10V$
Q_{gs}	Gate-to-Source charge	—	3.5	—		
Q_{gd}	Gate-to-Drain("Miller") charge	—	5	—		
$t_{d(on)}$	Turn-on delay time	—	7.9	—	ns	$V_{GS}=10V, V_{DS}=30V,$ $R_{GEN}=3\Omega$ $I_D = 20A$
t_r	Rise time	—	22.1	—		
$t_{d(off)}$	Turn-Off delay time	—	21.1	—		
t_f	Fall time	—	3.3	—		
C_{iss}	Input capacitance	—	824	—	pF	$V_{GS} = 0V$ $V_{DS} = 60V$ $f = 1MHz$
C_{oss}	Output capacitance	—	42	—		
C_{riss}	Reverse transfer capacitance	—	35	—		

Source-Drain Ratings and Characteristics

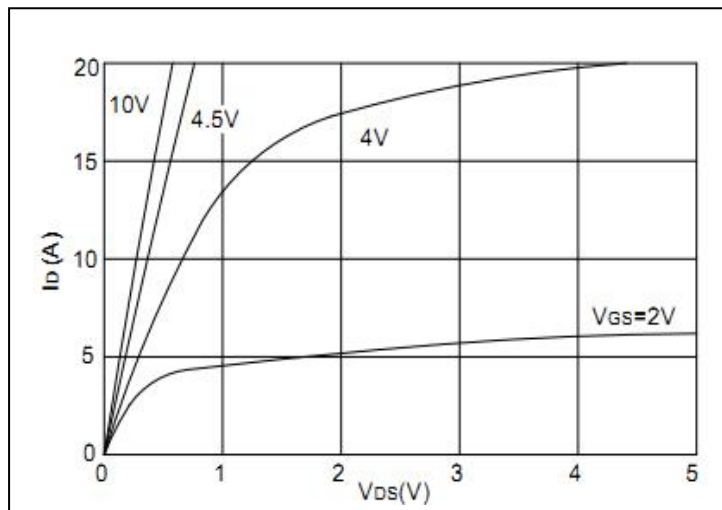
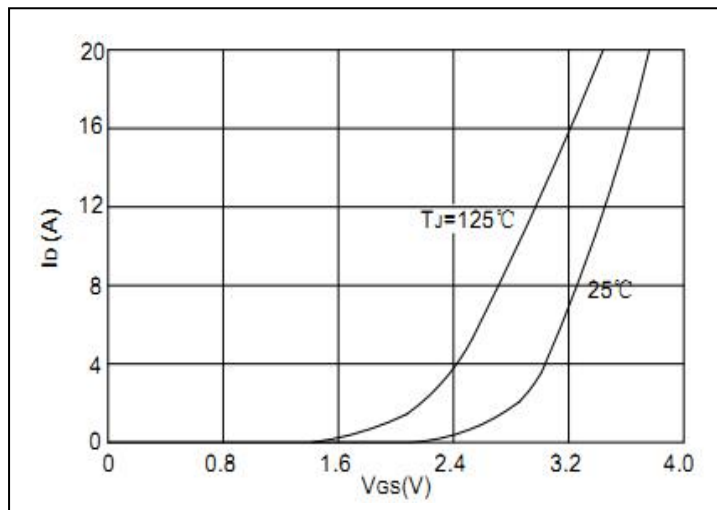
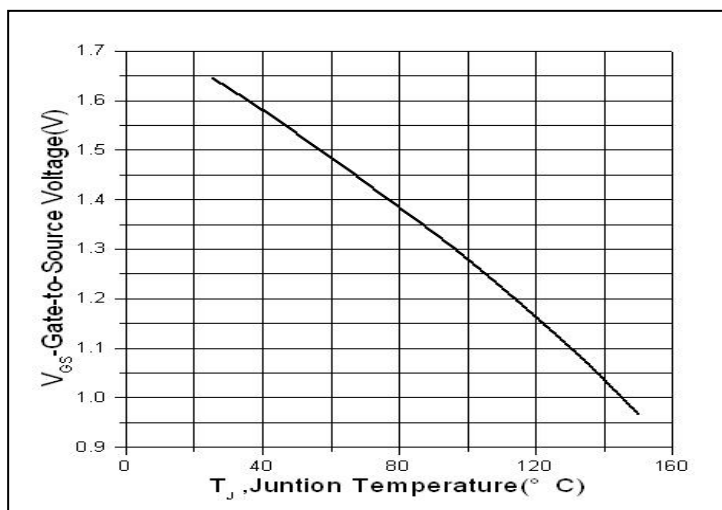
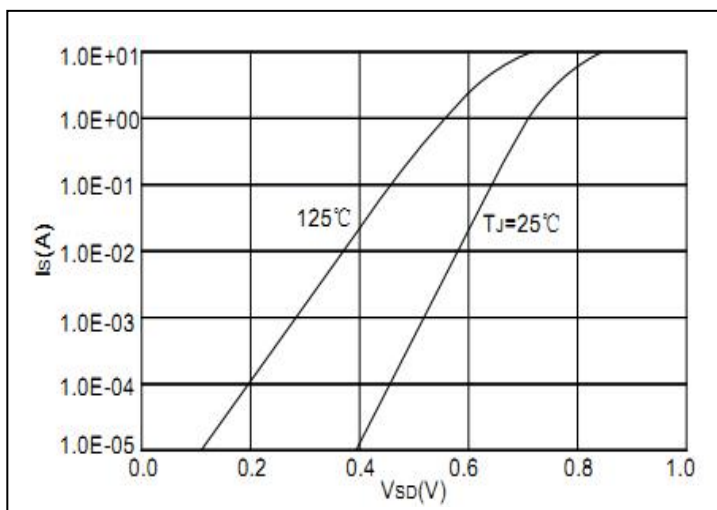
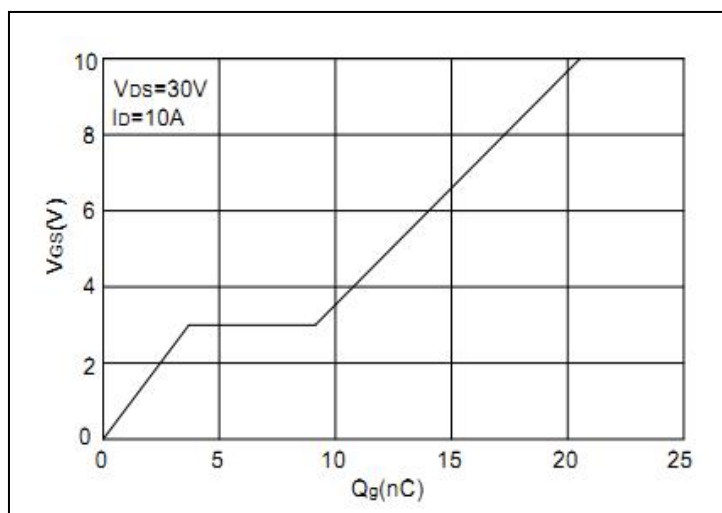
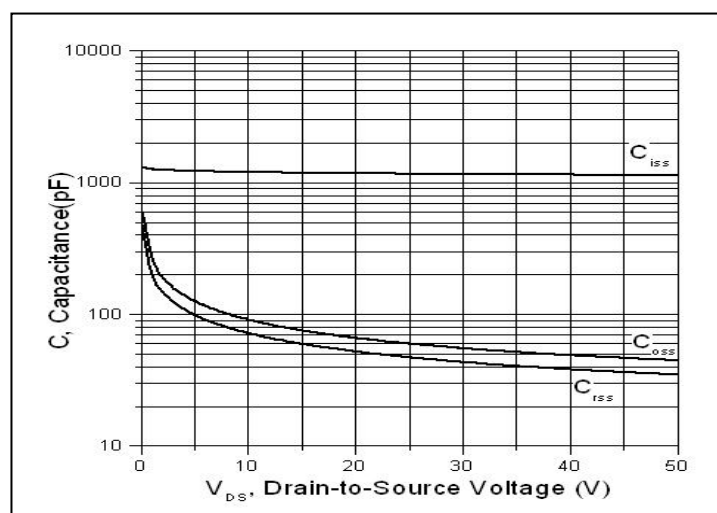
Symbol	Parameter	Min.	Typ.	Max.	Units	Conditions
I_S	Continuous Source Current (Body Diode)	—	—	20	A	MOSFET symbol showing the integral reverse p-n junction diode. 
I_{SM}	Pulsed Source Current (Body Diode)	—	—	80	A	
V_{SD}	Diode Forward Voltage	—	—	1.2	V	$I_S=1.7A, V_{GS}=0V$
t_{rr}	Reverse Recovery Time	—	30	—	ns	$I_S=20A, di/dt=100A/\mu s$
Q_{rr}	Reverse Recovery Charge	—	40	—	nC	

Test Circuits and Waveforms

EAS Test Circuit:

Gate Charge Test Circuit:

Switching Time Test Circuit:

Switching Waveforms:


Notes:

- ① Calculated continuous current based on maximum allowable junction temperature.
- ② Repetitive rating; pulse width limited by max. junction temperature.
- ③ The power dissipation PD is based on max. junction temperature, using junction-to-case thermal resistance.

Typical Electrical and Thermal Characteristics

Figure1. Typical Output Characteristics

Figure2. Transfer Characteristics

Figure3. Gate to Source Cut-off Voltage

Figure4. Body Diode Characteristics

Figure5. Gate Charge

Figure6. Capacitance

Typical Electrical and Thermal Characteristics

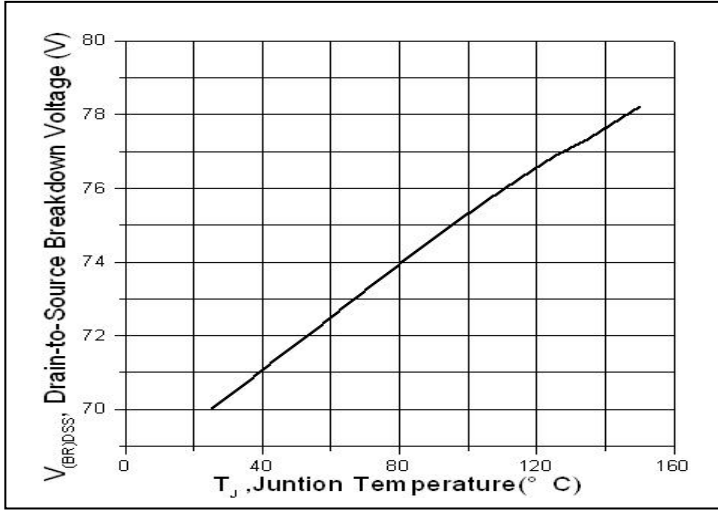


Figure 7. Drain-to-Source Breakdown Voltage vs. Temperature

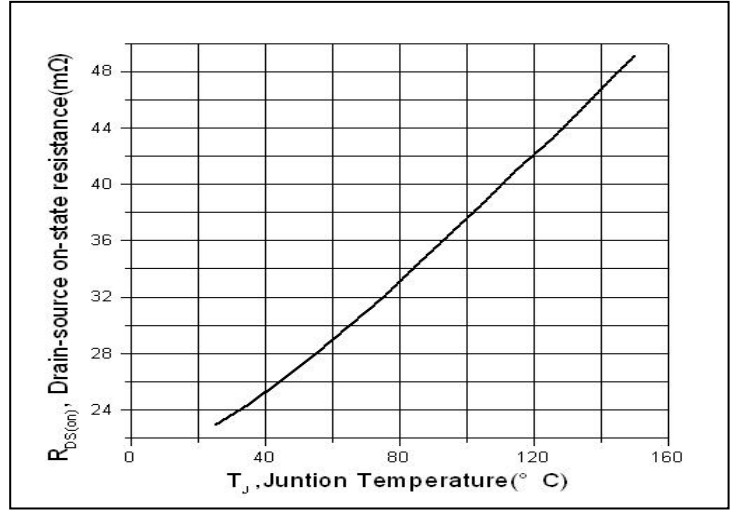


Figure 8. Normalized On-Resistance vs. Junction Temperature

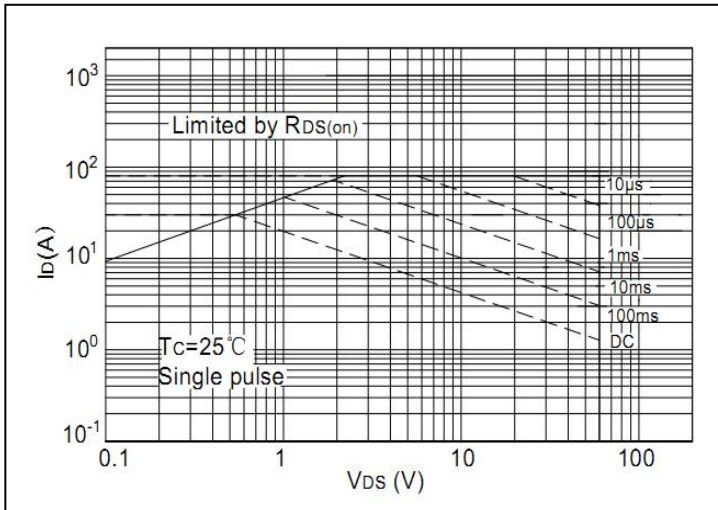


Figure 9. Safe Operating Area

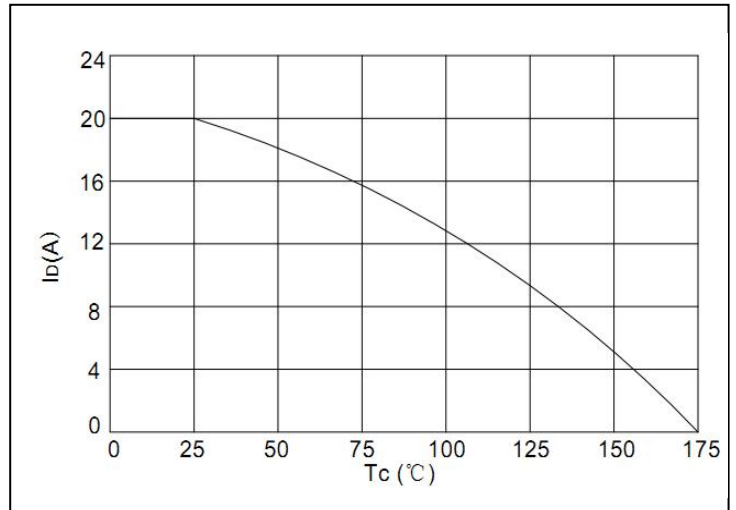


Figure 10. Drain Current vs. Case Temperature

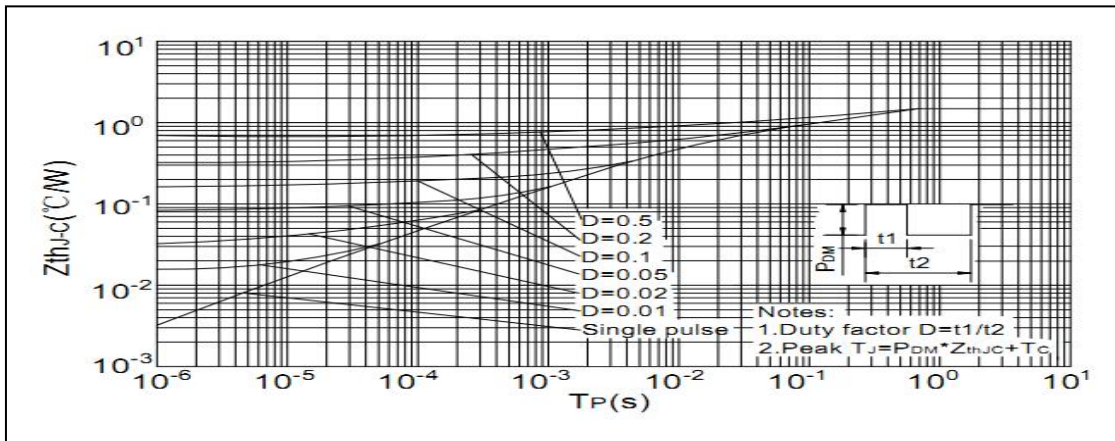
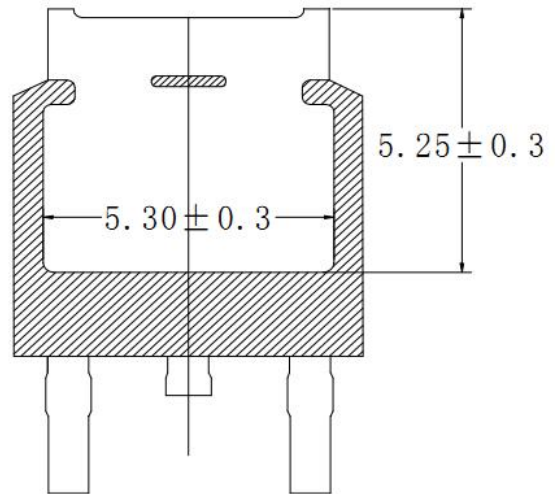
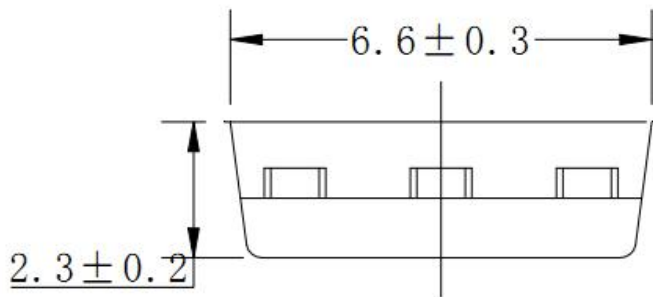
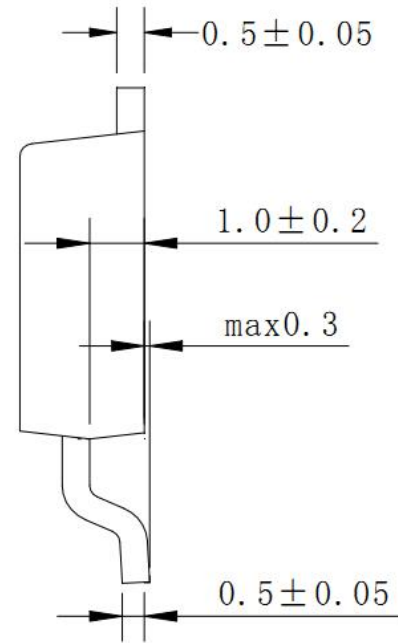
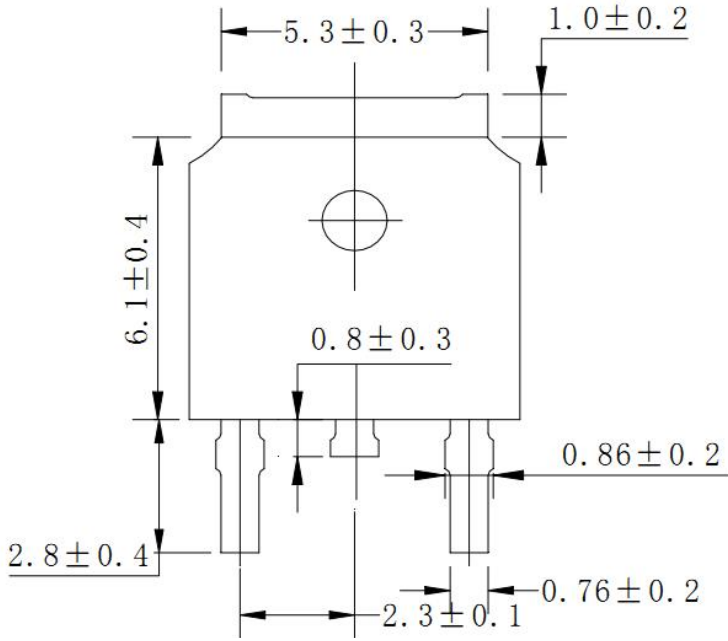


Figure 11. Normalized Maximum Transient Thermal Impedance

Mechanical Data:

TO-252 Package Outline (Unit : mm)



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