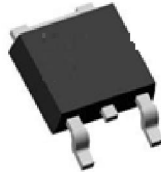
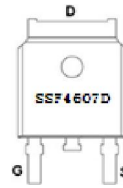


Main Product Characteristics

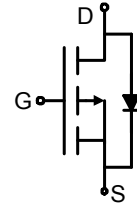
V_{DS}	-30V
$R_{DS(on)}$	19mΩ(typ.)
I_D	-25A ①



TO-252



Marking and Pin Assignment



Schematic Diagram

Features and Benefits

- Advanced trench 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
- Lead free product



Description

It utilizes the latest trench 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 @ TC = 25°C	Continuous Drain Current, V_{GS} @ 10V(Silicon Limited)	-25 ①	A
I_D @ TC = 100°C	Continuous Drain Current, V_{GS} @ 10V	-20 ①	
I_{DM}	Pulsed Drain Current ②	-60	
P_D @TC = 25°C	Power Dissipation	41	W
V_{DS}	Drain-Source Voltage	-30	V
V_{GS}	Gate-to-Source Voltage	± 20	V
T_J T_{STG}	Operating Junction and Storage Temperature Range	-55 to + 150	°C

Thermal Resistance

Symbol	Characteristics	Typ.	Max.	Units
$R_{\theta JC}$	Junction-to-case③	—	3	°C/W
$R_{\theta JA}$	Junction-to-ambient (t ≤ 10s) ④	—	25	°C/W
	Junction-to-Ambient (PCB mounted, steady-state) ④	—	50	°C/W

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

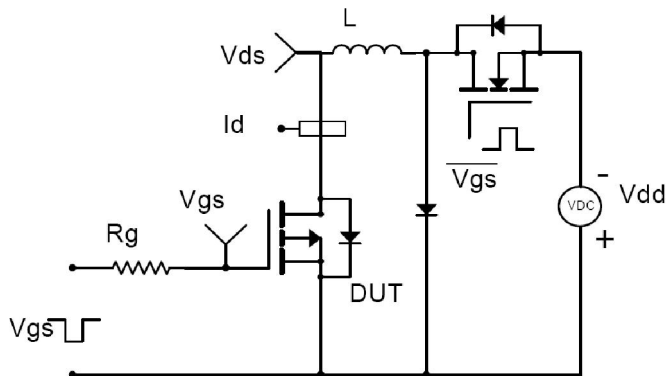
Symbol	Parameter	Min.	Typ.	Max.	Units	Conditions
$V_{(BR)DSS}$	Drain-to-Source breakdown voltage	-30	—	—	V	$V_{GS} = 0V, I_D = -250\mu A$
$R_{DS(on)}$	Static Drain-to-Source on-resistance	—	19	35	$m\Omega$	$V_{GS}=-10V, I_D = -6A$
		—	29	58		$V_{GS}=-4.5V, I_D=-5A$
$V_{GS(th)}$	Gate threshold voltage	-1.2	—	-2.4	V	$V_{DS} = V_{GS}, I_D = -250\mu A$
		—	-1.4	—		$T_J = 125^{\circ}\text{C}$
I_{DSS}	Drain-to-Source leakage current	—	—	-1	μA	$V_{DS} = -24V, V_{GS} = 0V$
I_{GSS}	Gate-to-Source forward leakage	—	—	100	nA	$V_{GS} = 20V$
		—	—	-100		$V_{GS} = -20V$
Q_g	Total gate charge	—	27	—	nC	$I_D = -20A,$ $V_{DS}=-25V,$ $V_{GS} = -10V$
Q_{gs}	Gate-to-Source charge	—	3.6	—		
Q_{gd}	Gate-to-Drain("Miller") charge	—	9.1	—		
$t_{d(on)}$	Turn-on delay time	—	10.7	—	nS	$V_{GS}=-10V, V_{DS}=-15V,$ $R_L=0.75\Omega, I_D=-20A$
t_r	Rise time	—	39	—		
$t_{d(off)}$	Turn-Off delay time	—	25.8	—		
t_f	Fall time	—	6.4	—		
C_{iss}	Input capacitance	—	1188	—	pF	$V_{GS} = 0V,$ $V_{DS}=-15V,$ $f = 1\text{MHz}$
C_{oss}	Output capacitance	—	173	—		
C_{rss}	Reverse transfer capacitance	—	139	—		

Source-Drain Ratings and Characteristics

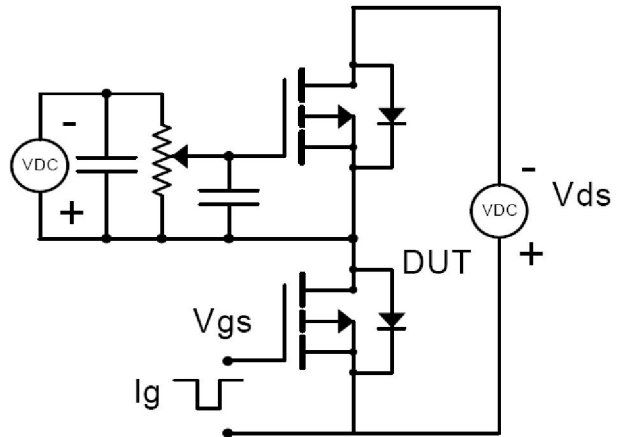
Symbol	Parameter	Min.	Typ.	Max.	Units	Conditions
I_S	Continuous Source Current (Body Diode)	—	—	-25 ^①	A	MOSFET symbol showing the integral reverse p-n junction diode.
I_{SM}	Pulsed Source Current (Body Diode)	—	—	-100	A	
V_{SD}	Diode Forward Voltage	—	-0.77	-1	V	$I_S=-1A, V_{GS}=0V$
t_{rr}	Reverse Recovery Time	—	23	—	nS	$T_J = 25^{\circ}\text{C}, I_F = -20A, di/dt =$ $100A/\mu s$
Q_{rr}	Reverse Recovery Charge	—	14	—	nC	

Test Circuits and Waveforms

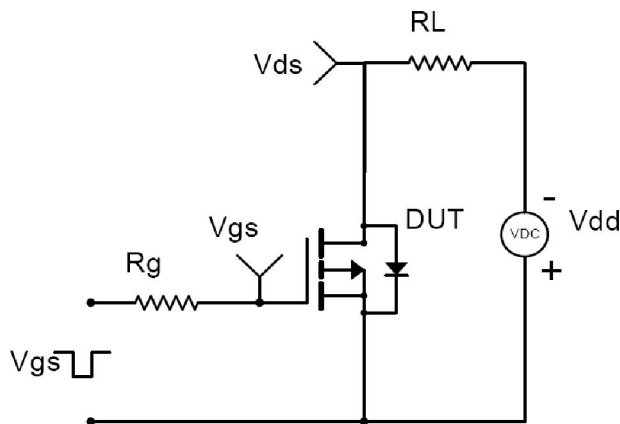
EAS test circuit:



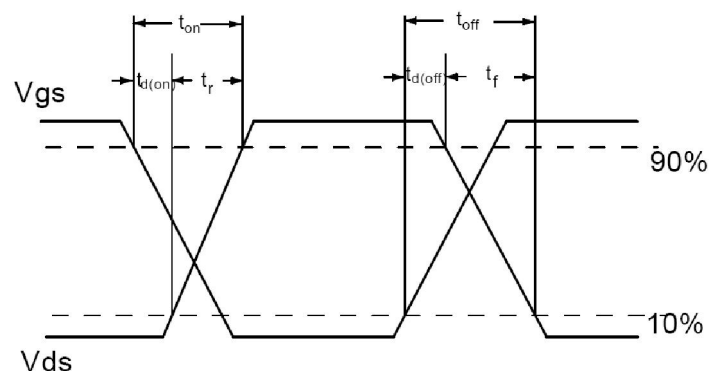
Gate charge test circuit:



Switching time test circuit:



Switch Waveforms:



Notes:

- ① Calculated continuous current based on maximum allowable junction temperature.
- ② Repetitive rating; pulse width limited by max junction temperature.
- ③ The value of $R_{\theta JA}$ is measured with the device mounted on 1 in 2 FR-4 board with 2oz. Copper, in a still air environment with $T_A = 25^\circ\text{C}$
- ④ These curves are based on the junction-to-case thermal impedance which is measured with the device mounted to a large heatsink, assuming a maximum junction temperature of $T_{J(MAX)} = 150^\circ\text{C}$.

Typical Electrical and Thermal Characteristics

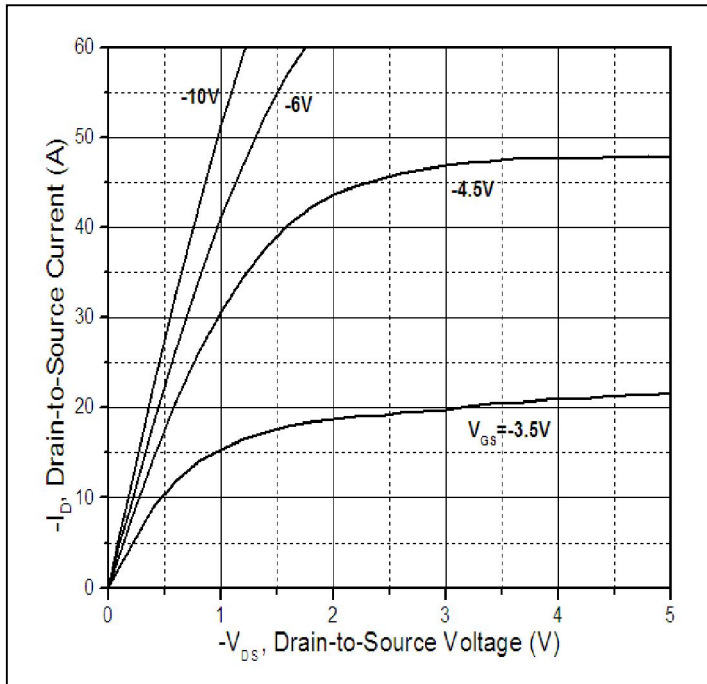


Figure 1: Typical Output Characteristics

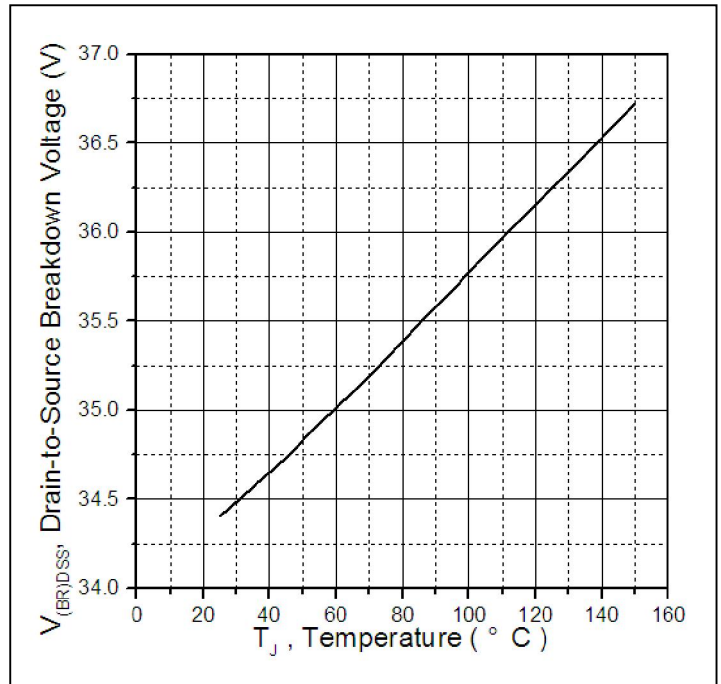


Figure 2: Drain-to-Source Breakdown Voltage vs. Temperature

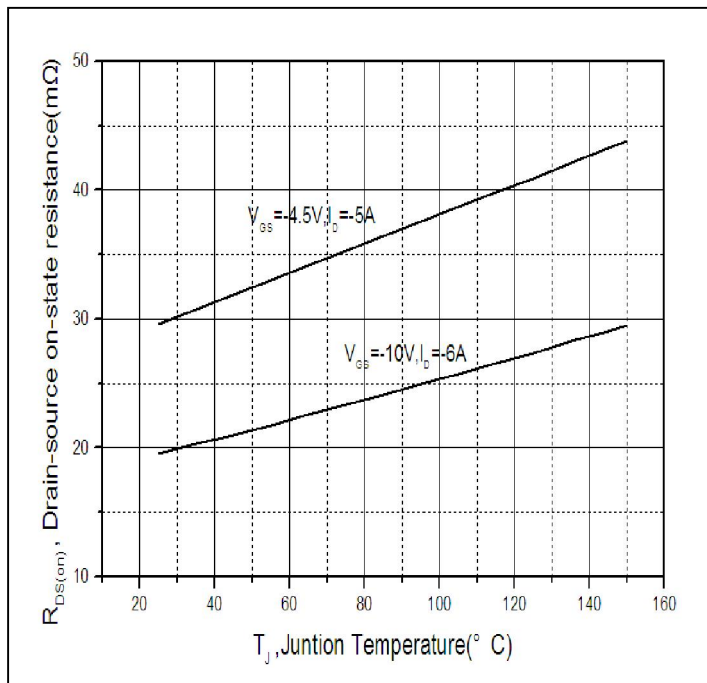


Figure 3: Normalized On-Resistance Vs. Case Temperature

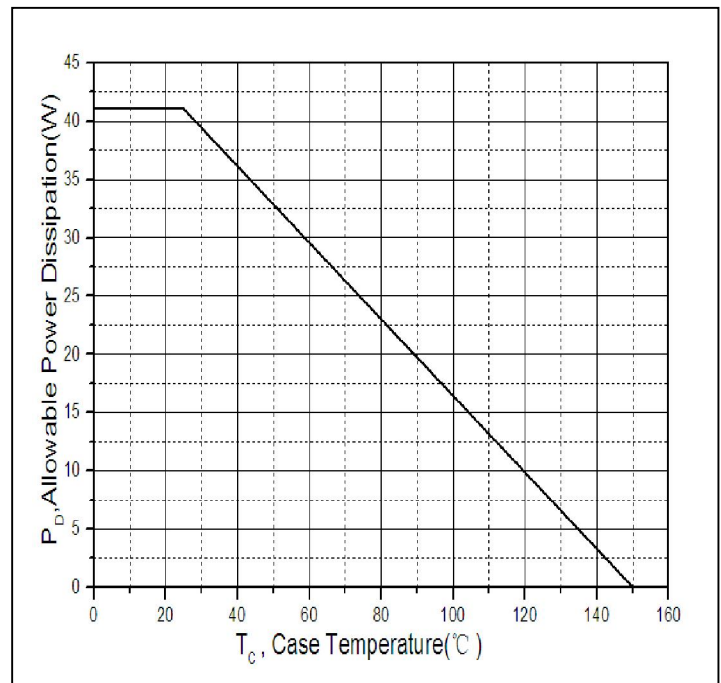


Figure 4: Power Dissipation Vs. Case Temperature

Typical Electrical and Thermal Characteristics

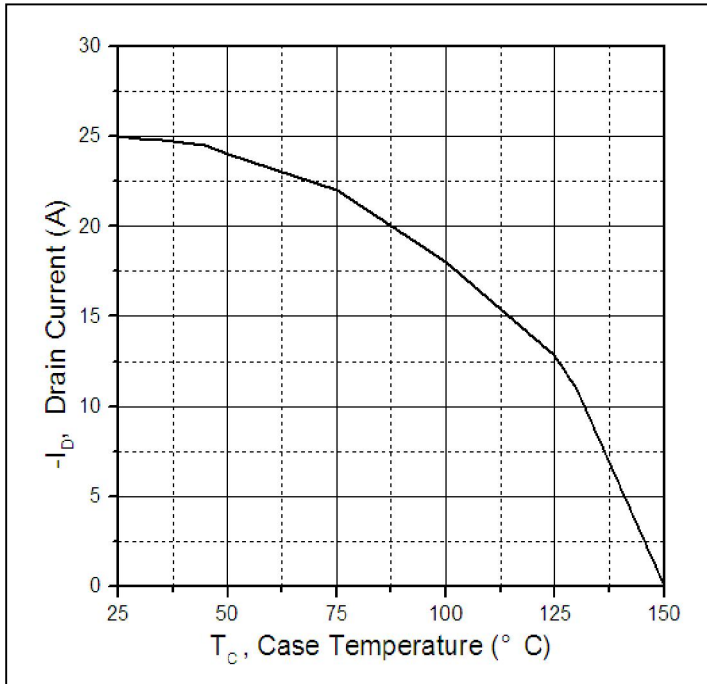


Figure 5. Maximum Drain Current Vs Case Temperature

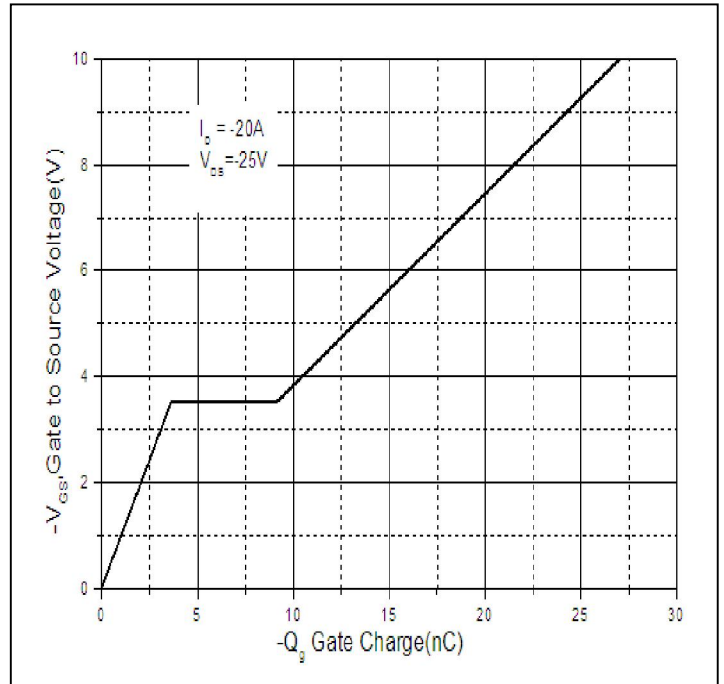


Figure 6. Gate-Charge Characteristics

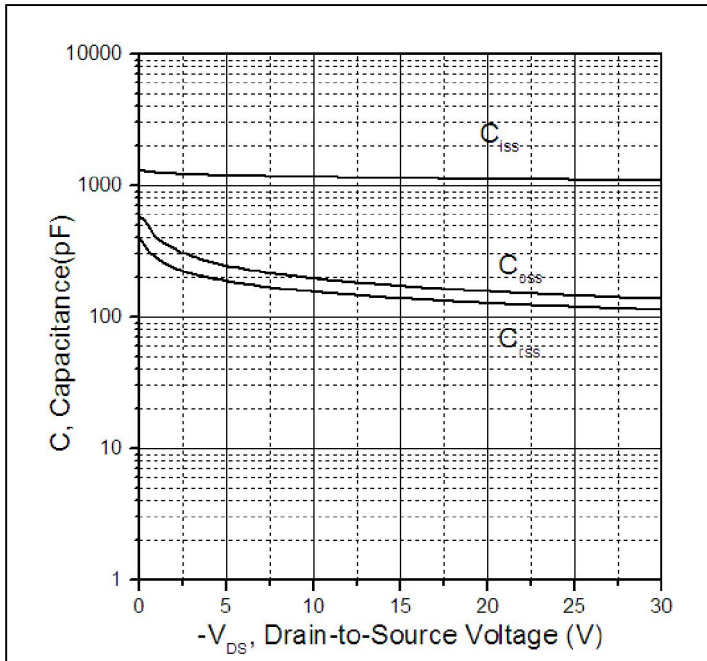


Figure 7. Typical Capacitance Vs. Drain-to-Source Voltage

Typical Electrical and Thermal Characteristics

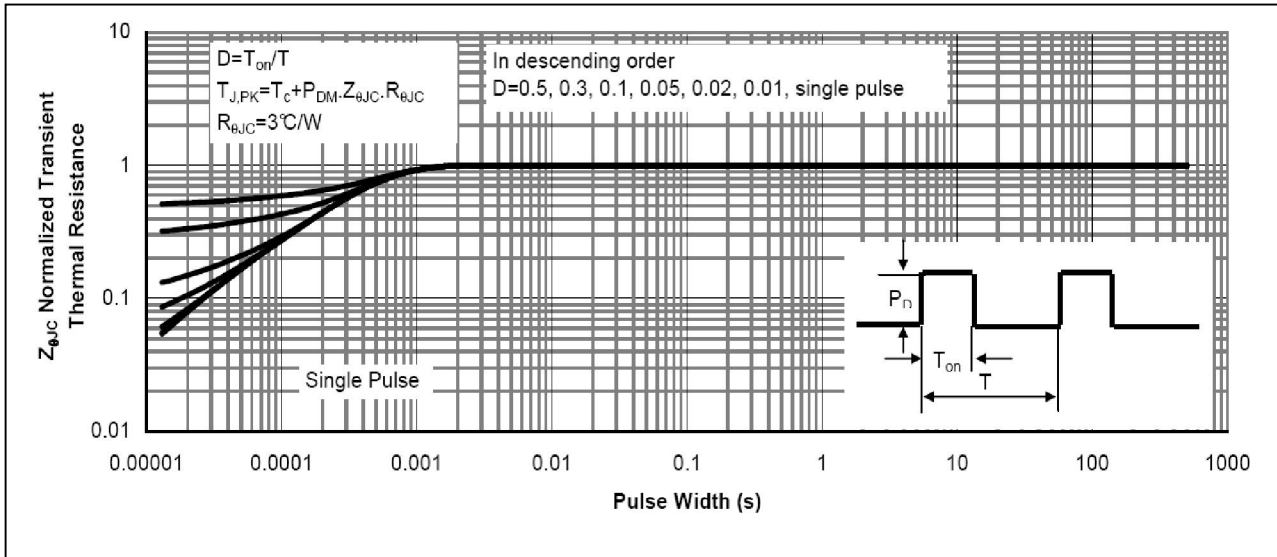
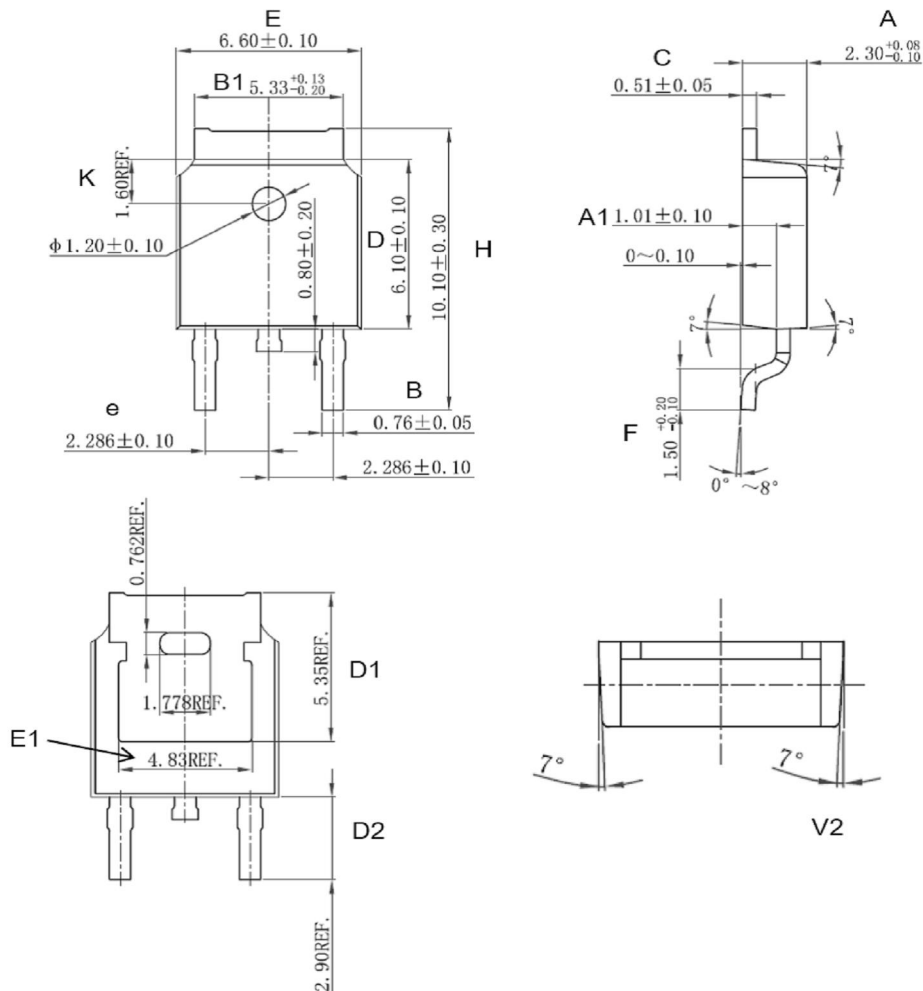


Figure8.Normalized Maximum Transient Thermal Impedance

Mechanical Data

TO-252 PACKAGE OUTLINE DIMENSION



Symbol	Dimension In Millimeters			Dimension In Inches		
	Min	Nom	Max	Min	Nom	Max
A	2.200	2.300	2.380	0.087	0.091	0.094
A1	0.910	1.010	1.110	0.036	0.040	0.044
B	0.710	0.760	0.810	0.028	0.030	0.032
B1	5.130	5.330	5.460	0.202	0.210	0.215
C	0.460	0.510	0.560	0.018	0.020	0.022
D	6.000	6.100	6.200	0.236	0.240	0.244
D1	5.350 (REF)			0.211 (REF)		
D2	2.900 (REF)			0.114 (REF)		
E	6.500	6.600	6.700	0.256	0.260	0.264
E1	4.83 (REF)			0.190 (REF)		
e	2.186	2.286	2.386	0.086	0.090	0.094
H	9.800	10.100	10.400	0.386	0.398	0.409
F	1.400	1.500	1.700	0.055	0.059	0.067
K	1.600 (REF)			0.063 (REF)		
V2	8° (REF)			8° (REF)		

Ordering and Marking Information

Device Marking: SSF4607D

Package (Available)
TO-252(DPAK)
Operating Temperature Range
C : -55 to 150 °C

Devices per Unit

Package Type	Units/Tape	Tapes/Inner Box	Units/Inner Box	Inner Boxes/Carton Box	Units/Carton Box
TO-252	2500	1	2500	5	12500

Reliability Test Program

Test Item	Conditions	Duration	Sample Size
High Temperature Reverse Bias(HTRB)	Tj=125°C to 150°C @ 80% of Max V _{DSS} /V _{CES} /V _R	168 hours 500 hours 1000 hours	3 lots x 77 devices
High Temperature Gate Bias(HTGB)	Tj=150°C @ 100% of Max V _{GSS}	168 hours 500 hours 1000 hours	3 lots x 77 devices