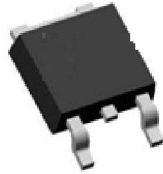
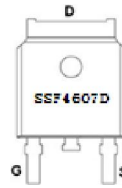


Main Product Characteristics

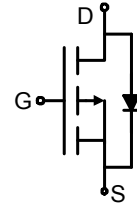
V_{DSS}	-30V
$R_{DS(on)}$	19m Ω (typ.)
I_D	-25A ①



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

Thermal Resistance

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

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

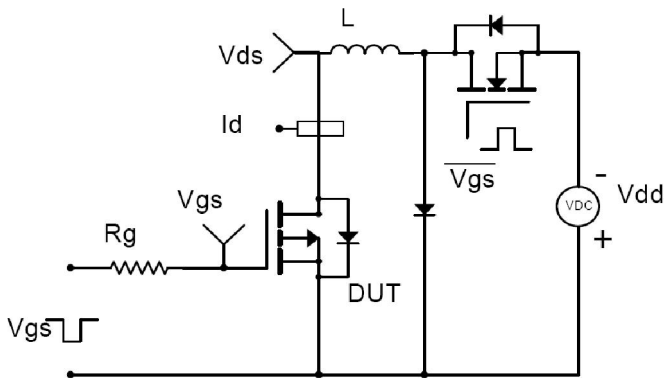
Symbol	Parameter	Min.	Typ.	Max.	Units	Conditions
$V_{(BR)DSS}$	Drain-to-Source breakdown voltage	-30	—	—	V	$V_{GS} = 0V, I_D = -250\mu A$
$R_{DS(on)}$	Static Drain-to-Source on-resistance	—	19	35	m Ω	$V_{GS}=-10V, I_D = -6A$
		—	29	58		$V_{GS}=-4.5V, I_D=-5A$
$V_{GS(th)}$	Gate threshold voltage	-1.2	—	-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

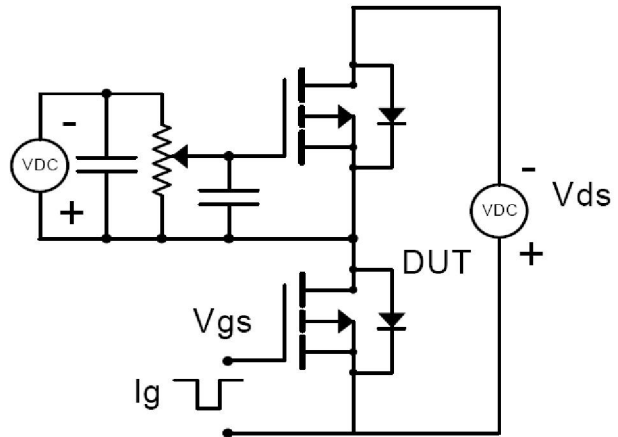
Symbol	Parameter	Min.	Typ.	Max.	Units	Conditions
I_S	Continuous Source Current (Body Diode)	—	—	-25 ^①	A	MOSFET symbol showing the integral reverse p-n junction diode.
I_{SM}	Pulsed Source Current (Body Diode)	—	—	-100	A	
V_{SD}	Diode Forward Voltage	—	-0.77	-1	V	$I_S=-1A, V_{GS}=0V$
t_{rr}	Reverse Recovery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

Test Circuits and Waveforms

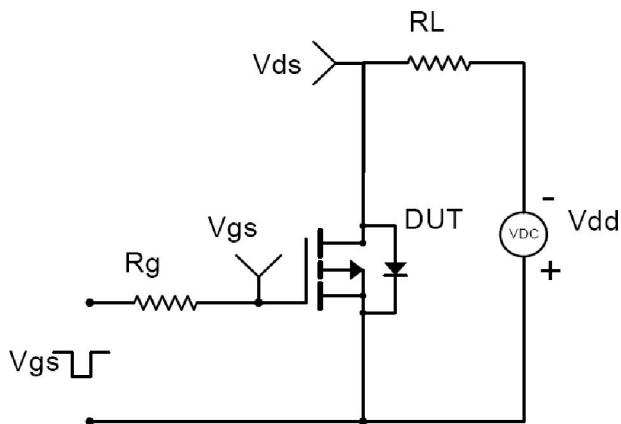
EAS test circuit:



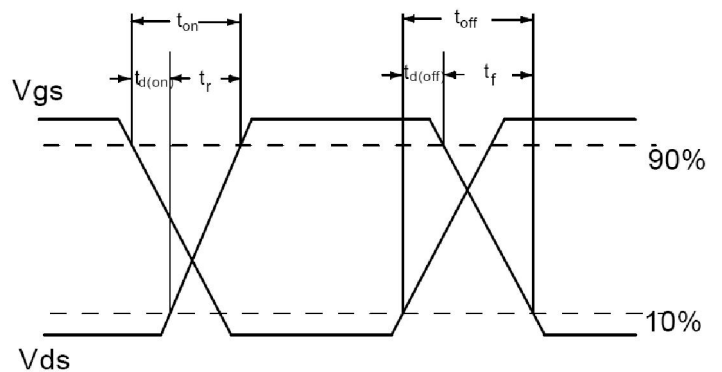
Gate charge test circuit:



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

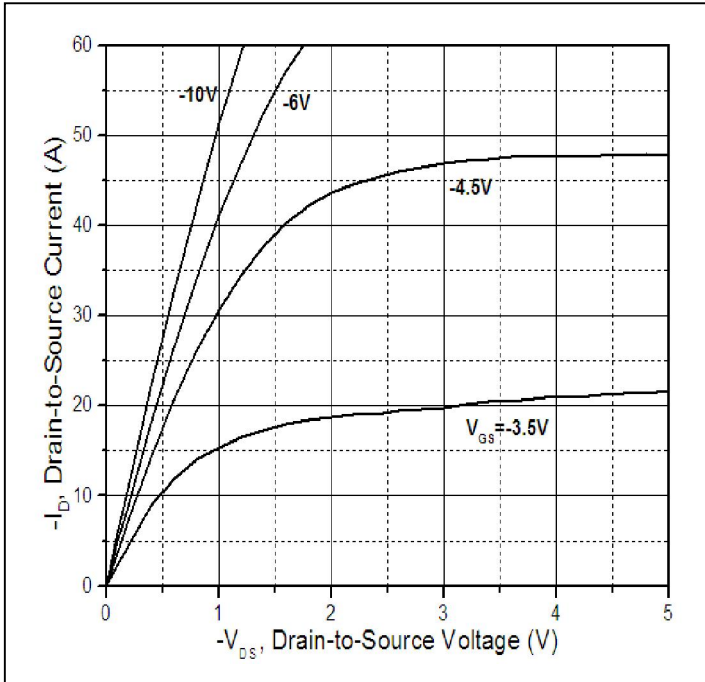


Figure 1: Typical Output Characteristics

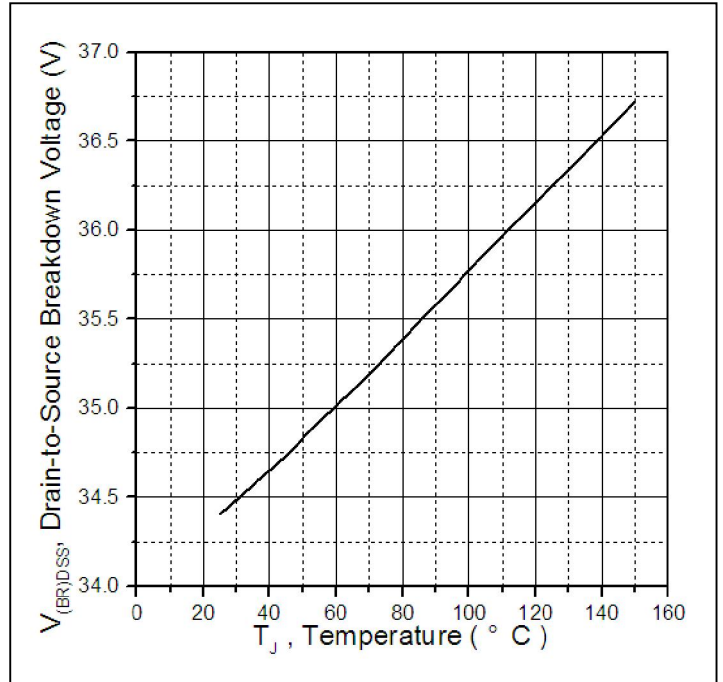


Figure 2: Drain-to-Source Breakdown Voltage vs. Temperature

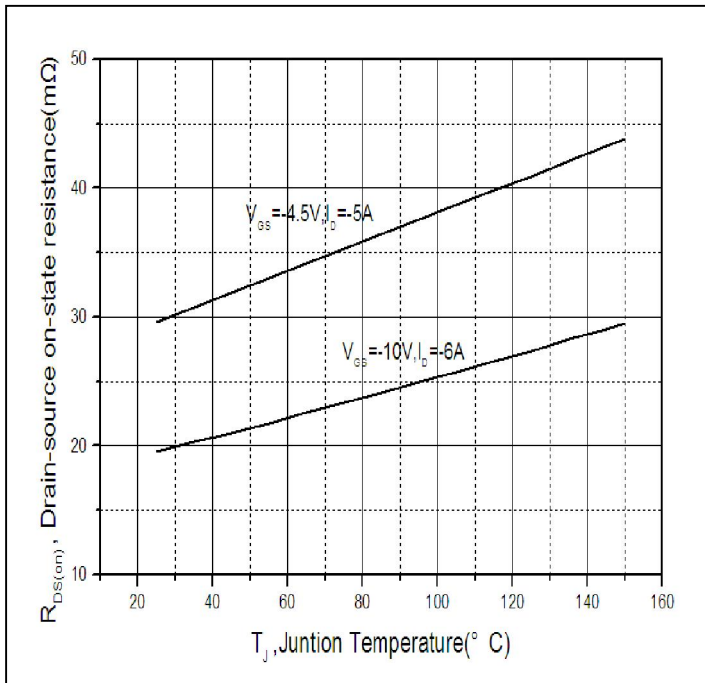


Figure 3: Normalized On-Resistance Vs. Case Temperature

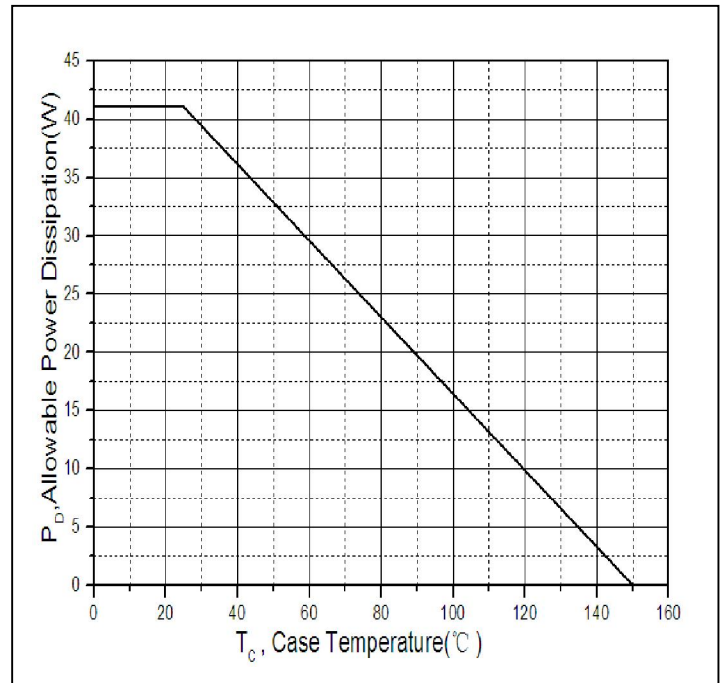


Figure 4: Power Dissipation Vs. Case Temperature

Typical Electrical and Thermal Characteristics

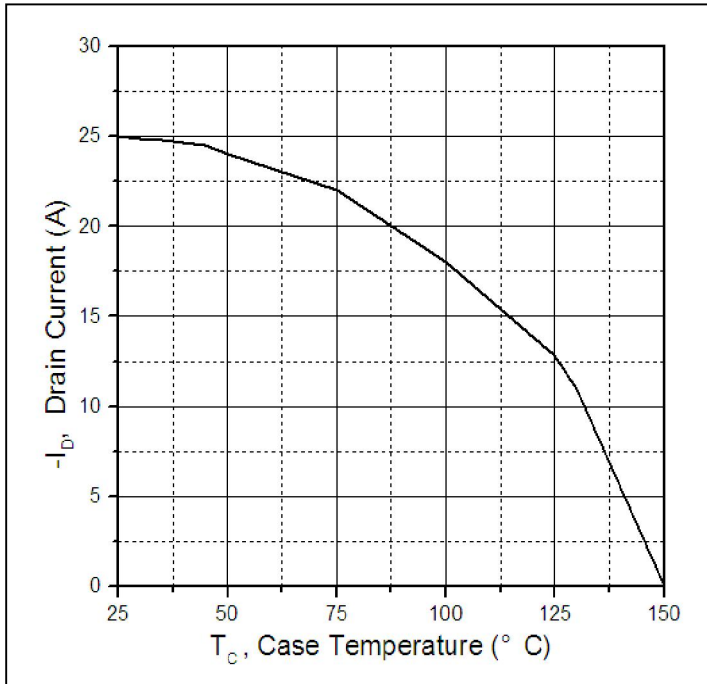


Figure 5. Maximum Drain Current Vs Case Temperature

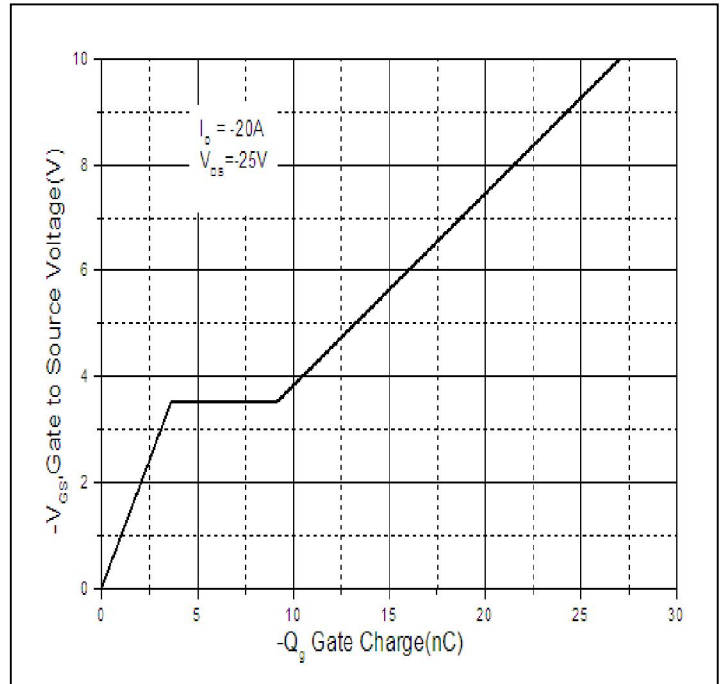


Figure 6. Gate-Charge Characteristics

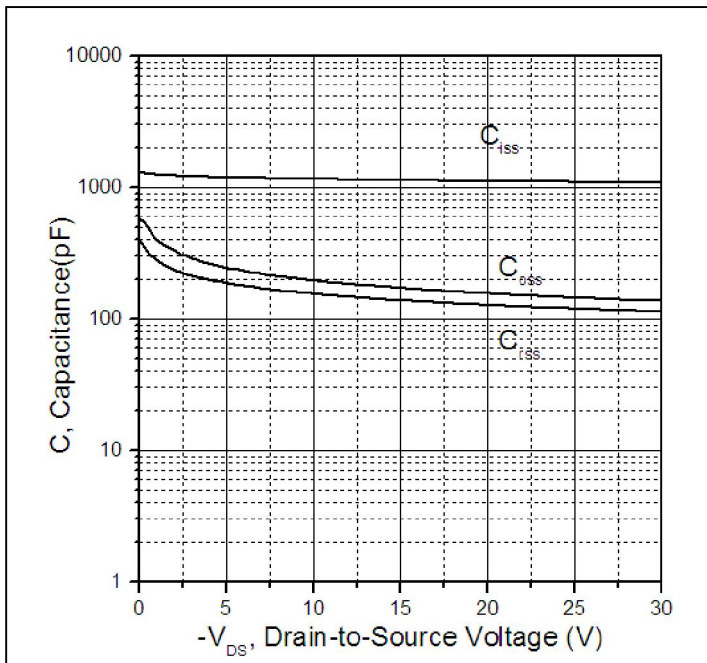


Figure 7. Typical Capacitance Vs. Drain-to-Source Voltage

Typical Electrical and Thermal Characteristics

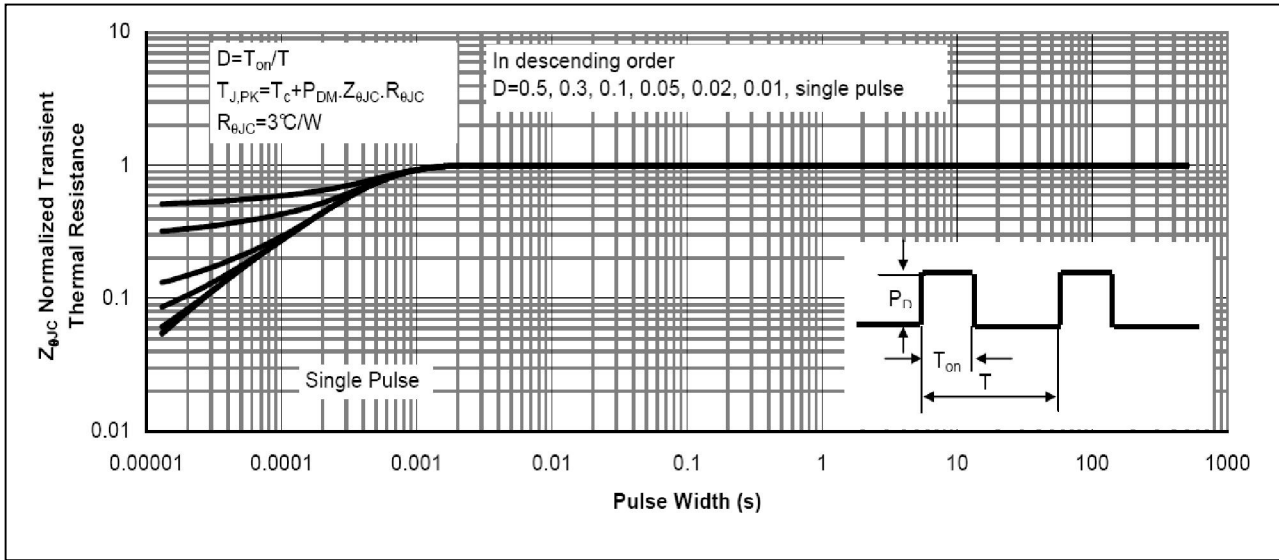
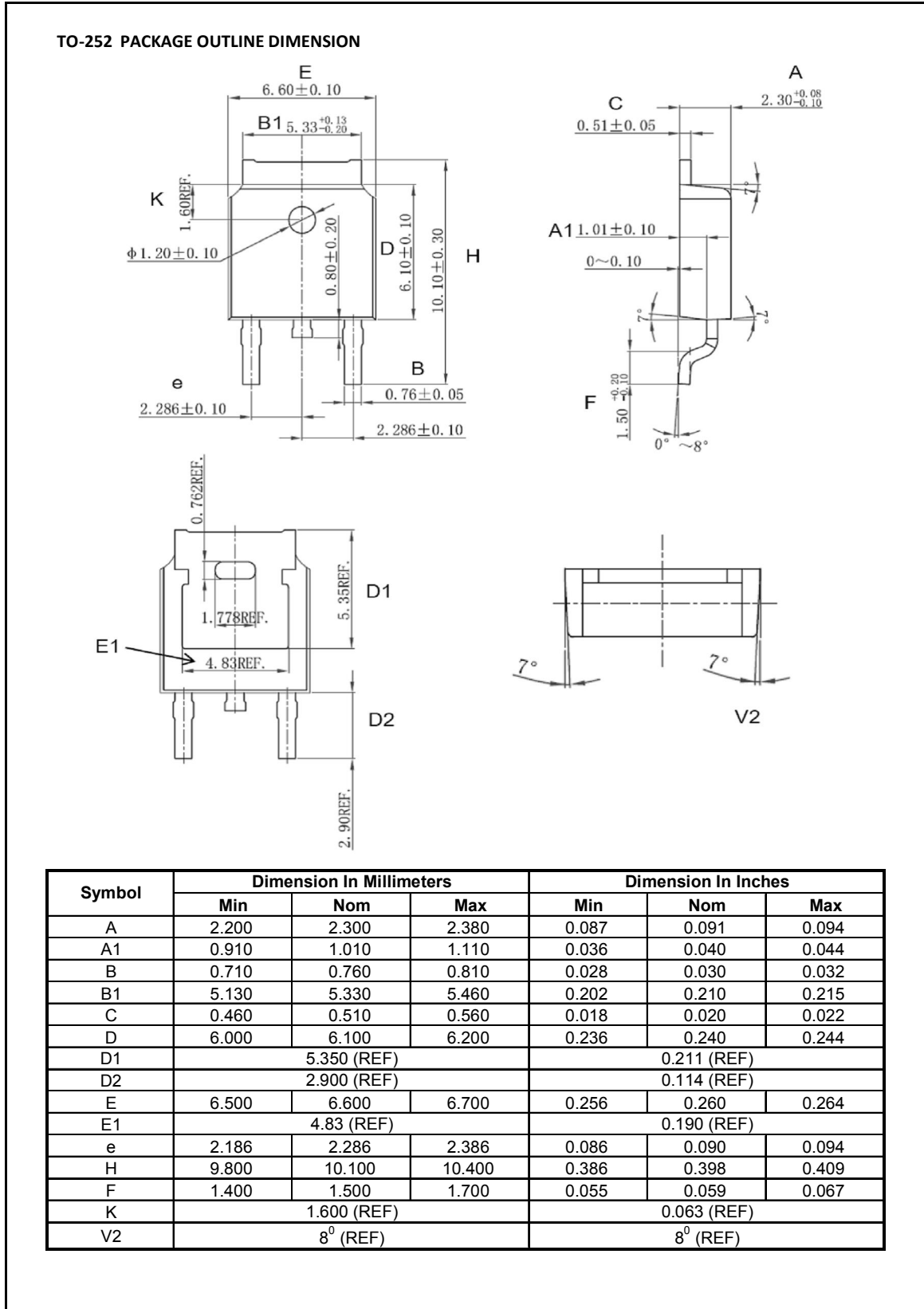


Figure8. Normalized Maximum Transient Thermal Impedance

Mechanical Data





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