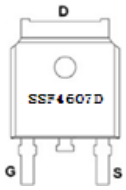
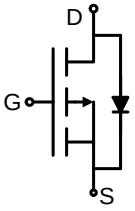
Main Product Characteristics:

V_{DSS}	-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℃ operating temperature

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

Electrical Characterizes @T_A=25℃ unless otherwise specified

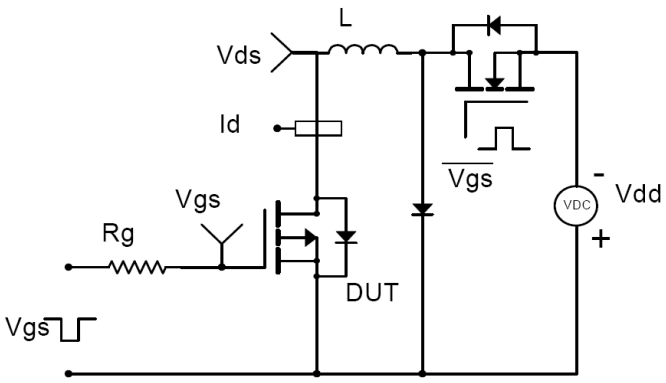
Symbol	Parameter	Min.	Typ.	Max.	Units	Conditions
$V_{(BR)DSS}$	Drain-to-Source breakdown voltage	-30	—	—	V	V_{GS} = 0V, I_D = -250μA
$R_{DS(on)}$	Static Drain-to-Source on-resistance	—	19	35	mΩ	V_{GS}=-10V,I_D = -6A
		—	29	58		V_{GS}=-4.5V,I_D=-5A
$V_{GS(th)}$	Gate threshold voltage	-1.2	—	-2.4	V	V_{DS} = V_{GS}, I_D = -250μA
		—	-1.4	—		T_J = 125℃
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,
Q_{gs}	Gate-to-Source charge	—	3.6	—		V_{DS}=-25V,
Q_{gd}	Gate-to-Drain("Miller") charge	—	9.1	—		V_{GS} = -10V
$t_{d(on)}$	Turn-on delay time	—	10.7	—	nS	V_{GS}=-10V, V_{DS} =-15V, R_L=0.75Ω,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 = 1MHz
C_{oss}	Output capacitance	—	173	—		
C_{rss}	Reverse transfer capacitance	—	139	—		

Source-Drain Ratings and Characteristics

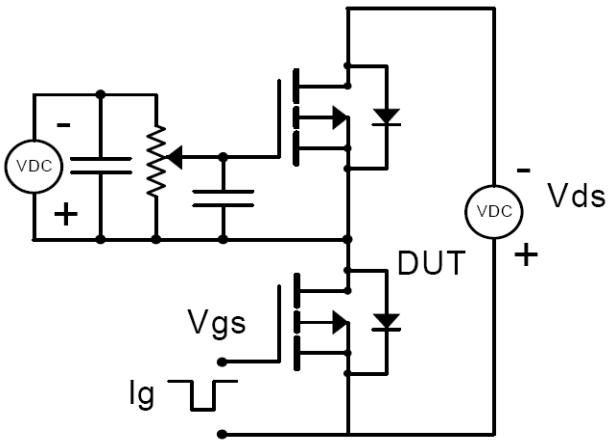
Symbol	Parameter	Min.	Typ.	Max.	Units	Conditions
I_S	Continuous Source Current (Body Diode)	—	—	-25①	A	MOSFET symbol showing the integral reverse p-n junction diode.
I_{SM}	Pulsed Source Current (Body Diode)	—	—	-100	A	
V_{sd}	Diode Forward Voltage	—	-0.77	-1	V	I_S=-1A, V_{GS}=0V
t_{rr}	Reverse Recovery Time	—	23	—	nS	T_J = 25°C, I_F =-20A, di/dt = 100A/μs
Q_{rr}	Reverse Recovery Charge	—	14	—	nC	

Test circuits and Waveforms

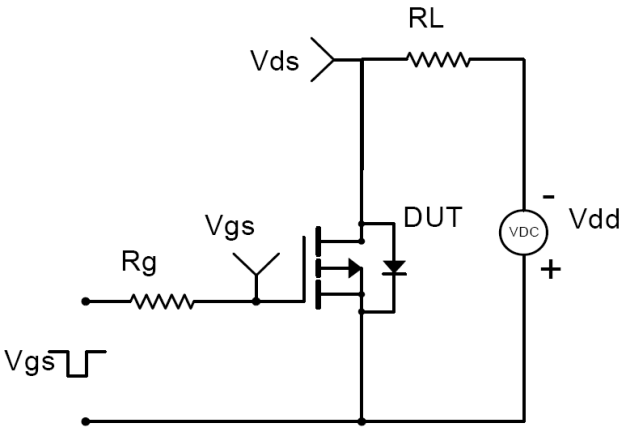
EAS test circuit:



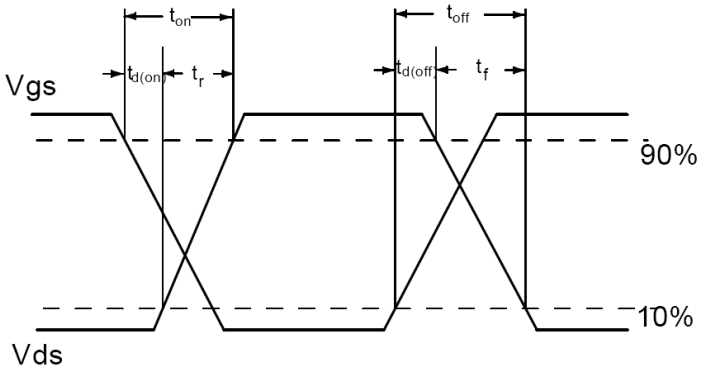
Gate charge test circuit:



Switching time test circuit:



Switch Waveforms:



Notes:

①Calculated continuous current based on maximum allowable junction temperature.

②Repetitive rating; pulse width limited by max junction temperature.

③The 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 TA =25°C

④These curves are based on the junction-to-case thermal impedence which is measured with the device mounted to a large heatsink, assuming a maximum junction temperature of $T_{J(MAX)}$=150°C.

Typical electrical and thermal characteristics

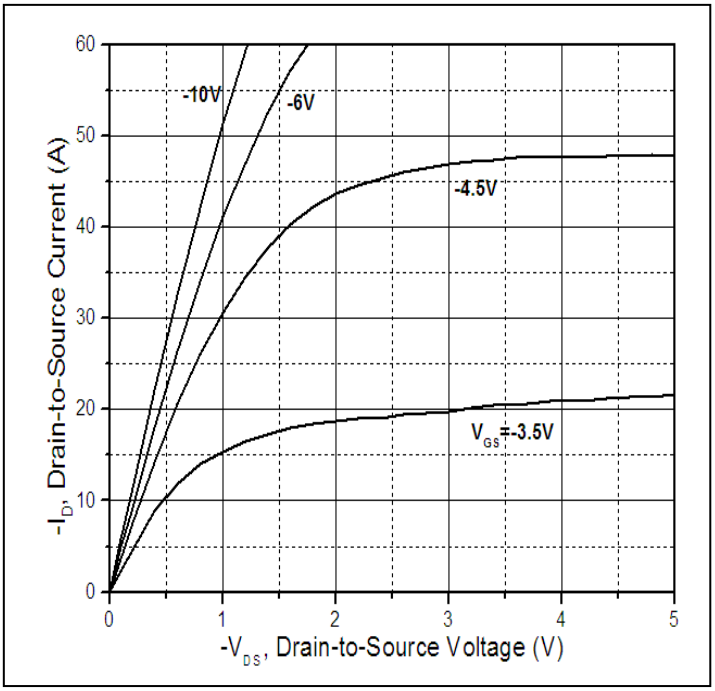


Figure 1: Typical Output Characteristics

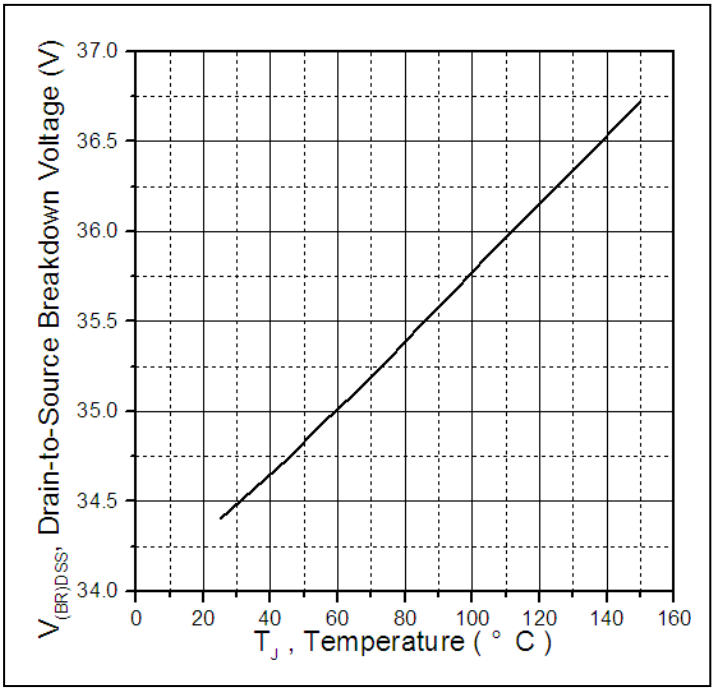


Figure 2. Drain-to-Source Breakdown Voltage vs. Temperature

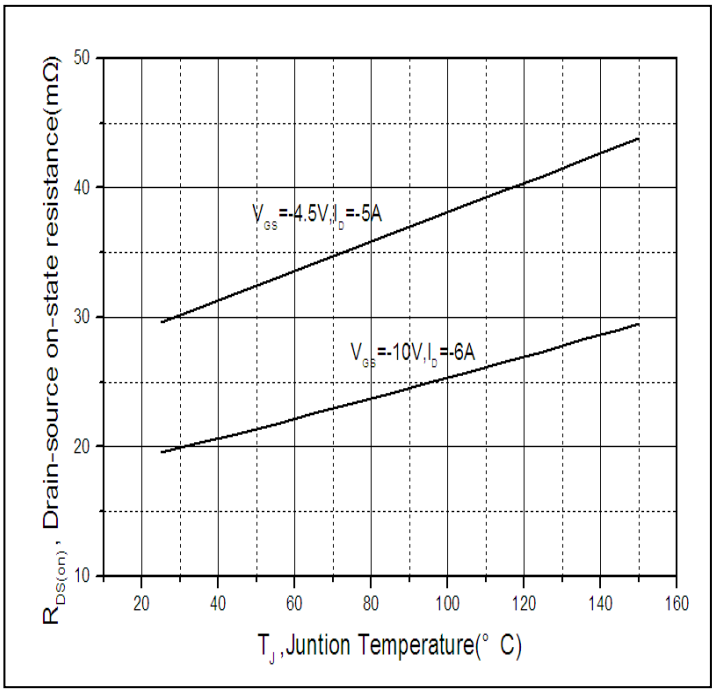


Figure 3. Normalized On-Resistance Vs. Case Temperature

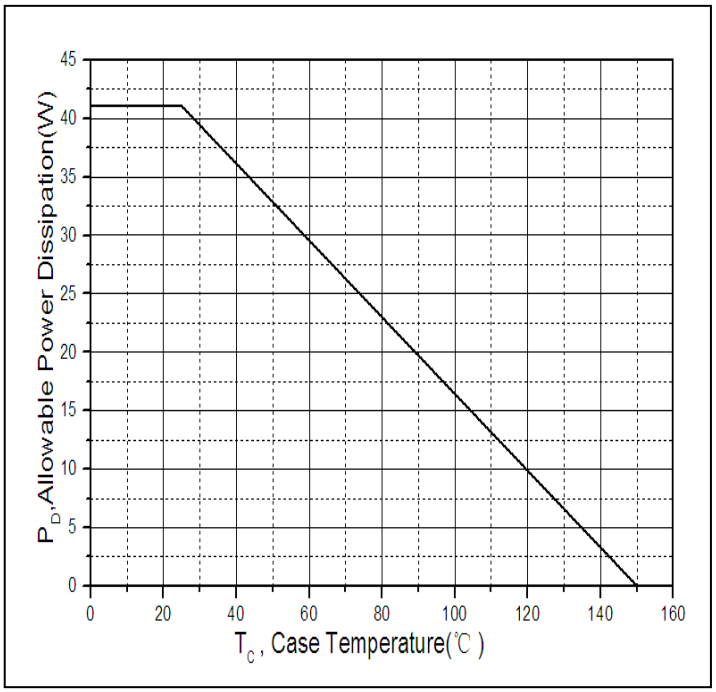


Figure 4: Power Dissipation Vs. Case Temperature

Typical electrical and thermal characteristics

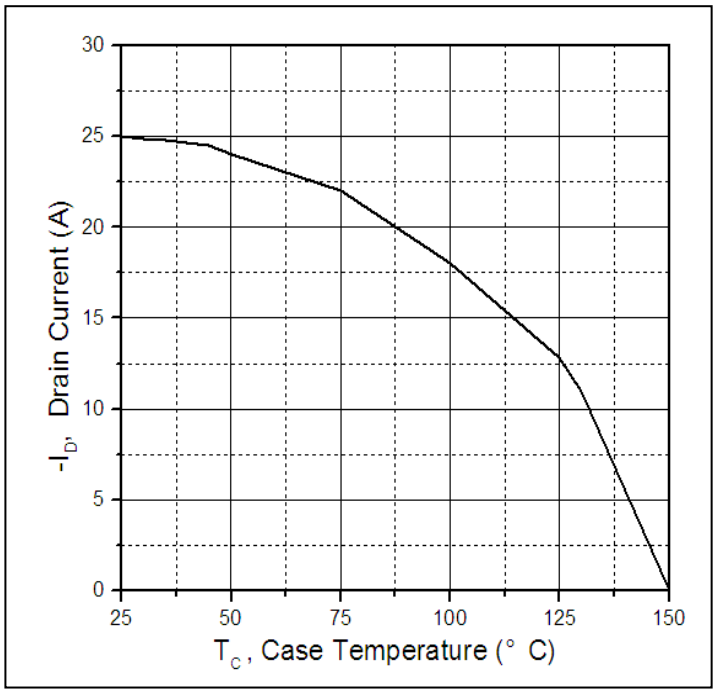


Figure 5. Maximum Drain Current Vs Case Temperature

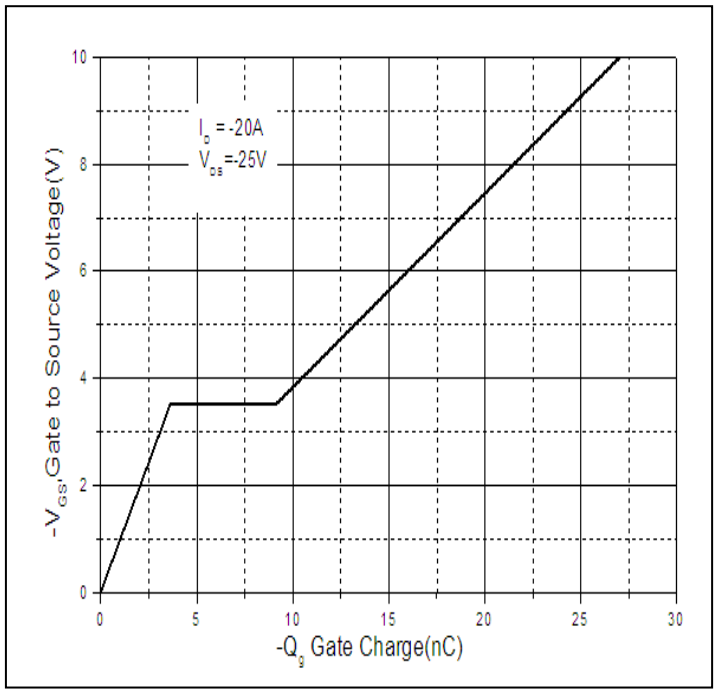


Figure 6. Gate-Charge Characteristics

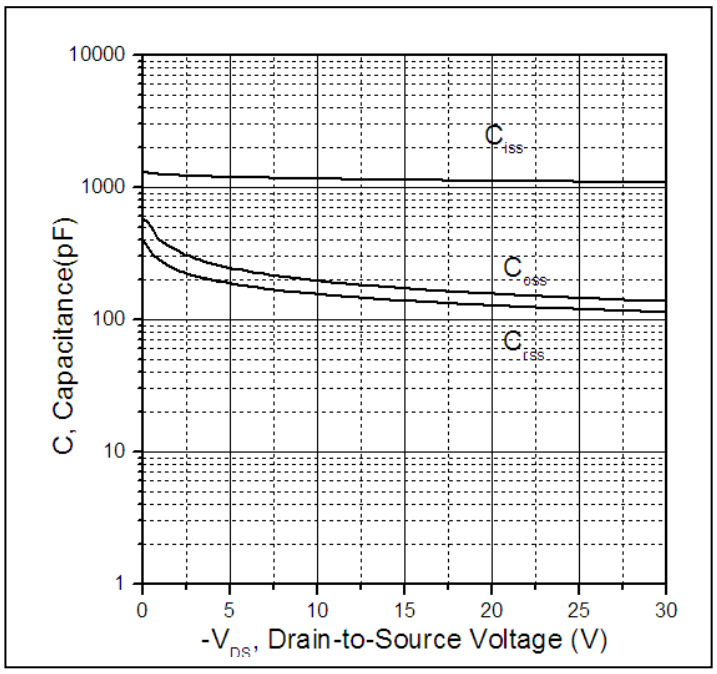


Figure 7. Typical Capacitance Vs. Drain-to-Source Voltage

Typical electrical and thermal characteristics

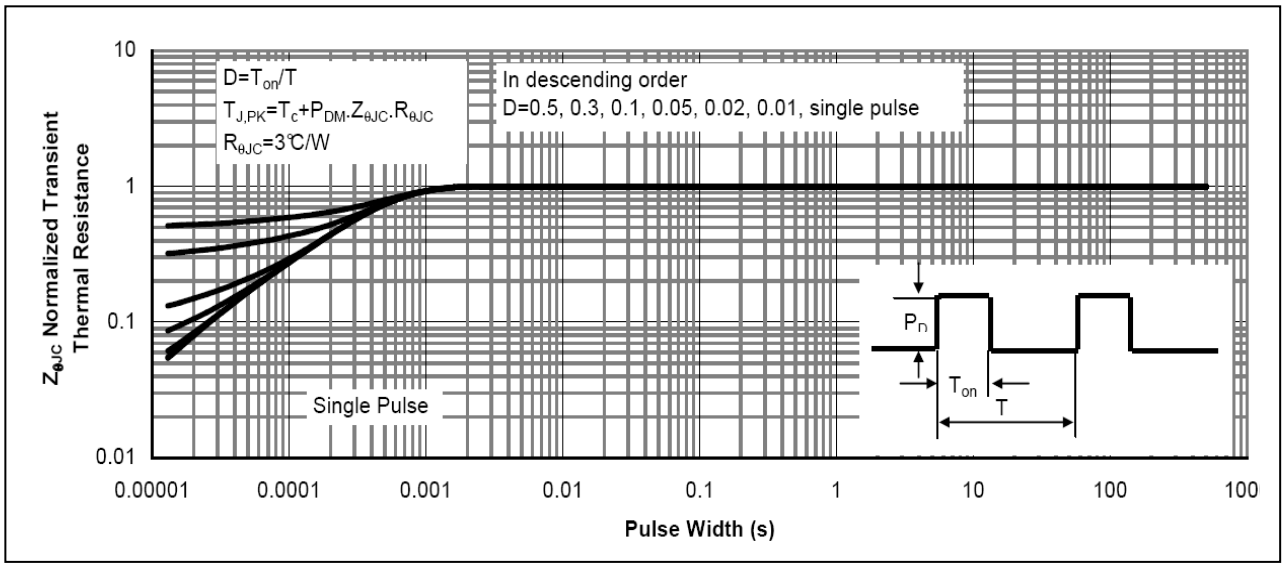
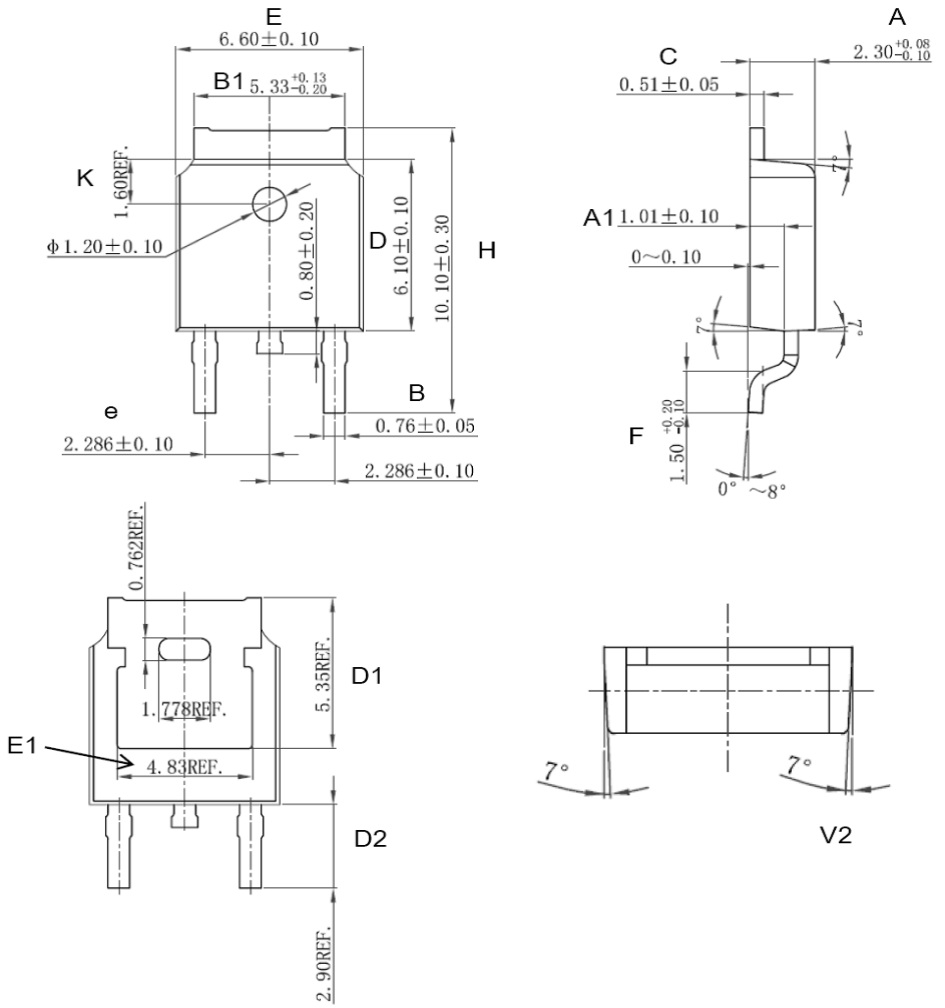


Figure8.Normalized Maximum Transient Thermal Impedance

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	8^0 (REF)			8^0 (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℃ to 150℃ @ 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℃@ 100% of Max V_{GSS}	168 hours 500 hours 1000 hours	3 lots x 77 devices

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