N-CHANNEL Trench Power MOSFET MEM2402

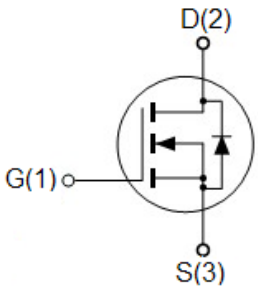
General Description

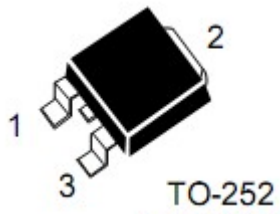
The MEM2402 combines advanced trench MOSFET technology with a low resistance package to provide extremely low RDS(ON). Those devices are suitable for use in PWM, load switching and general purpose applications.

Features

- VDS=60V，ID=15A
- RDS(ON)<40mΩ@VGS=10V(Typ:36 mΩ)
- Ultra Low On-Resistance
- PACKAGE : TO252

Pin Configuration





MEM2402K3G

Application

- Power switching application
- Load switching

Maximum Ratings(Ta=25℃)

Parameter		Symbol	Ratings	Unit
Drain-Source Voltage(VGS=0V)		V_{DSS}	60V	V
Gate-Source Voltage(VDS=0V)		V_{GSS}	±20	V
Drain Current	T_A=25℃	I_D	15	A
	T_A=100℃		10.5	
Pulsed Drain Current (Note1)		I_{DM}	60	A
Total Power Dissipation	T_A=25℃	Pd	23	W
Single Pulse Avalanche Energy (Note2)		EAS	25	mJ
Operating Temperature Range		T_{Opr}	-55-175	℃
Storage Temperature Range		T_{stg}	-55-175	℃

Notes: 1.Repetivive Rating :Pulse width limited by maximum junction temperature.

2.EAS condition Topr =25℃,VDD=30V, V_G=10V,R_G=25Ω

Thermal Characteristics

Parameter	Symbol	TYP.	MAX.	Unit
Thermal Resistance,Junction-to-Case	RθJC	-	6.6	℃/W

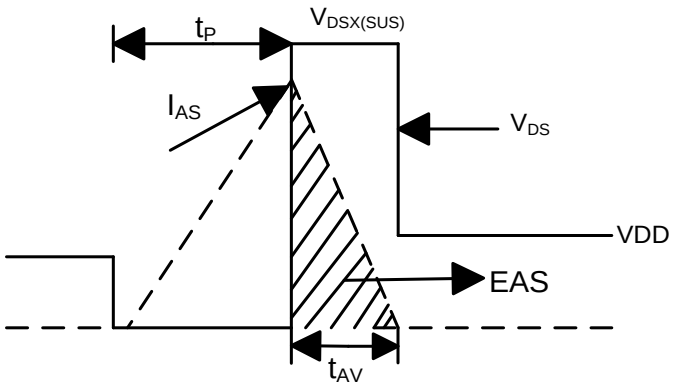
Electrical Characteristics(Ta=25℃)

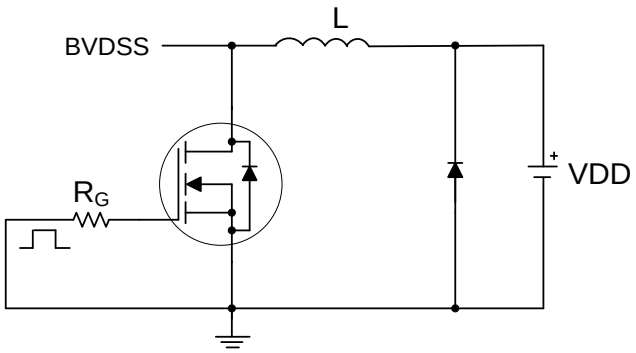
Parameter	Symbol	Test Condition		Min	Type	Max	Unit
Static Characteristics							
Drain-Source Breakdown Voltage	$V_{(BR)DSS}$	V_{GS}=0V, I_D=250uA		60	-	-	V
Gate Threshold Voltage	$V_{GS(th)}$	V_{DS}= V_{GS}, I_D=250uA		1.0	2.2	3.0	V
Gate-Body Leakage	I_{GSS}	V_{DS}=0V， V_{GS}=±20V		-	-	±100	nA
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS}=60V	T_A=25℃	-	-	1	uA
		V_{GS}=0V	T_A=100℃	-	-	5	uA
Static Drain-Source On-Resistance	$R_{DS(ON)}$	V_{GS}=10V, I_D=12A		-	36	45	mΩ
		V_{GS}=4.5V, I_D=6A		-	37	50	mΩ
Dynamic Characteristics							
Forward Transconductance	g_{FS}	V_{DS} =10V, I_D= 15A		12	-	-	S
Input Capacitance	Ciss	V_{DS} = 30 V, V_{GS} = 0 V, f = 1 MHz		-	778	-	pF
Output Capacitance	Coss			-	66	-	
Reverse Transfer Capacitance	Crss			-	41	-	
Total Gate Charge	Qg	V_{DS} = 30V, V_{GS} = 10V, I_D = 15A		-	13.5	-	nc
Gate-Source Charge	Qgs			-	3.2	-	
Gate-Drain Charge	Qgd			-	6.2	-	
Source-Drain Diode Characteristics							
Source-Drain Current(Body Diode)	I_{SD}			-	15	-	A
Pulsed Source-Drain Current(Body Diode)	I_{SD}			-	60	-	A
Source-drain (diode forward) voltage(Note1)	V_{SD}	T_A=25℃,V_{GS}=0V,I_{SD}=1A		-	0.75	1.0	V
Reverse Recovery Time(Note1)	trr	T_A=25℃,I_F=15A,di/dt=100A/uA		-	27	-	nS
Reverse Recovery Charge(Note1)	Qrr			-	30	-	nC
Forward Turn-on Time	ton	Intrinsic turn-on time is negligible(turn-on) is dominated by L_S+L_D					
Switching Characteristics							
Turn-On Delay Time	td(on)	V_{DS} = 30 V, R_G = 3Ω, V_{GS} = 10V, R_L = 2.5Ω		-	4.2	-	ns
Rise Time	tr			-	3.4	-	
Turn-Off Delay Time	td(off)			-	16	-	
Fall-Time	tf			-	2	-	

Notes 1. Pulse Test width≤300uS,Duty Cycle ≤1.5%,Starting T_A=25℃

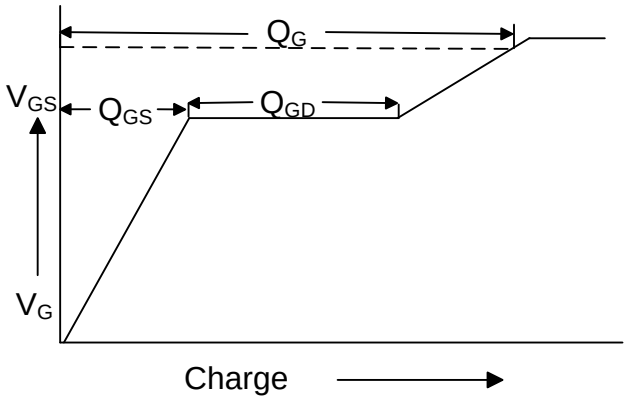
Test Circuit

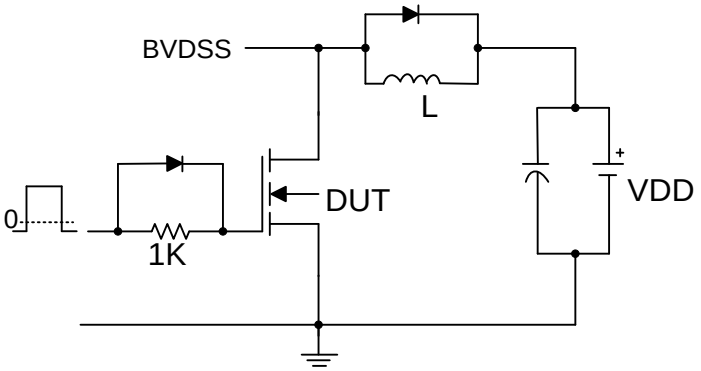
1. EAS Test Circuits



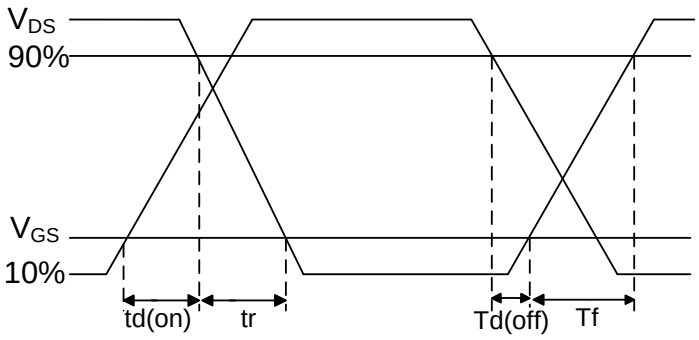


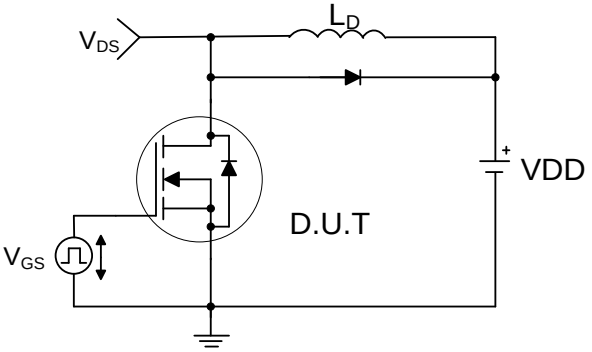
2. Gate Charge Test Circuits





3. Switch Time Test Circuits





Typical performance characteristics

Figure1. On-Region Characteristics

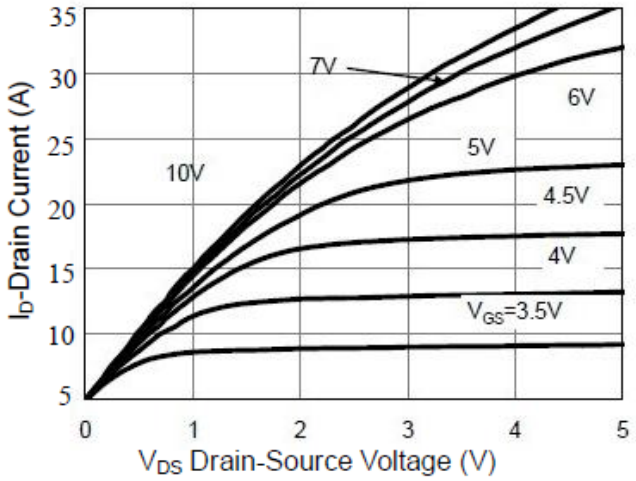


Figure 2: Transfer Characteristics

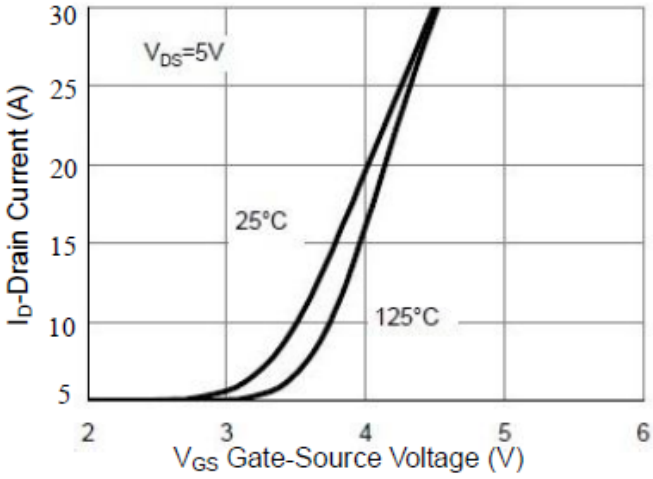


Figure3. ID vs Junction Temperature

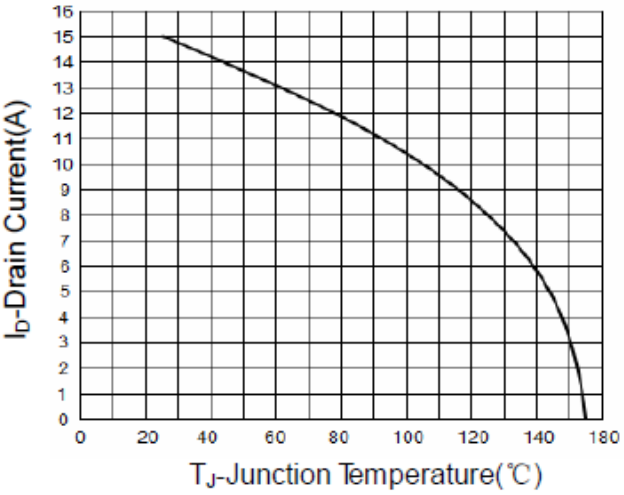


Figure4. On-Resistance vs. Junction Temperature

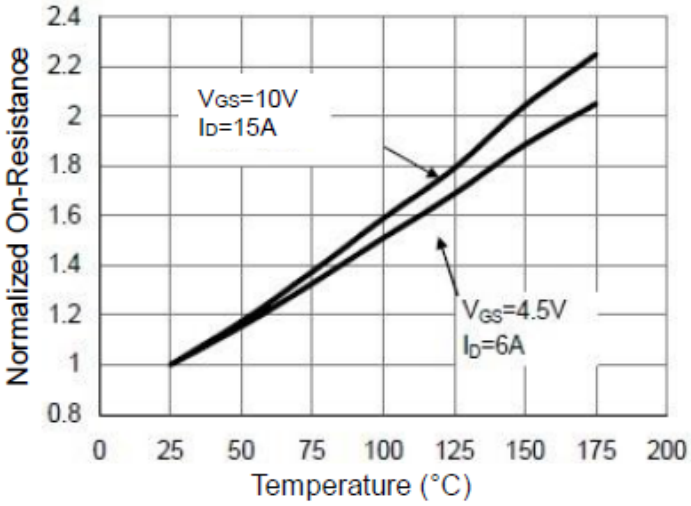


Figure5. On-Resistance vs. Gate-Source Voltage

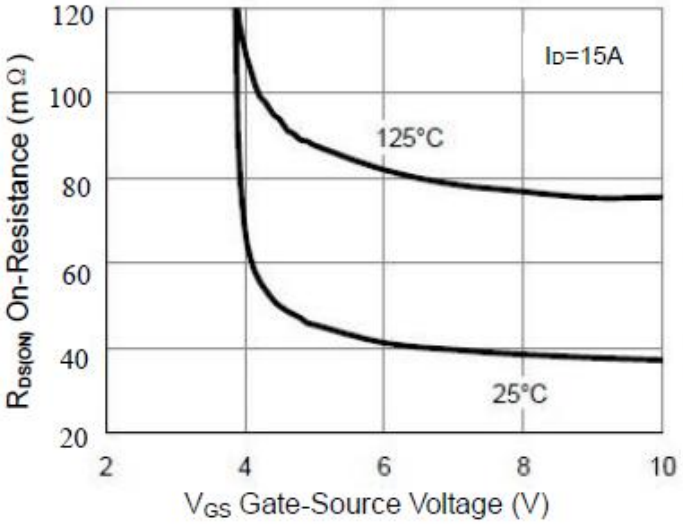


Figure6. Body-Diode Characteristics

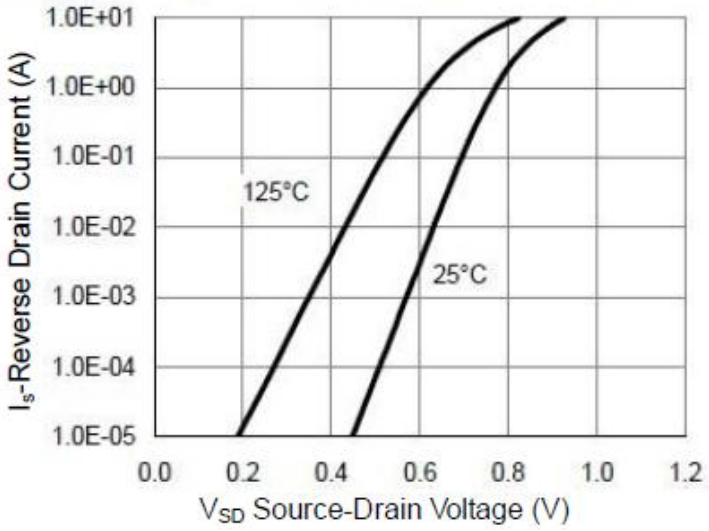


Figure7. Gate-Charge Characteristics

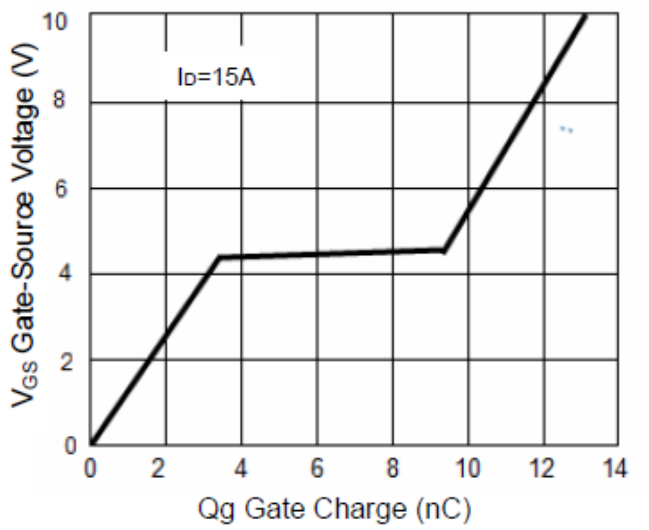


Figure 8. Capacitance Characteristics

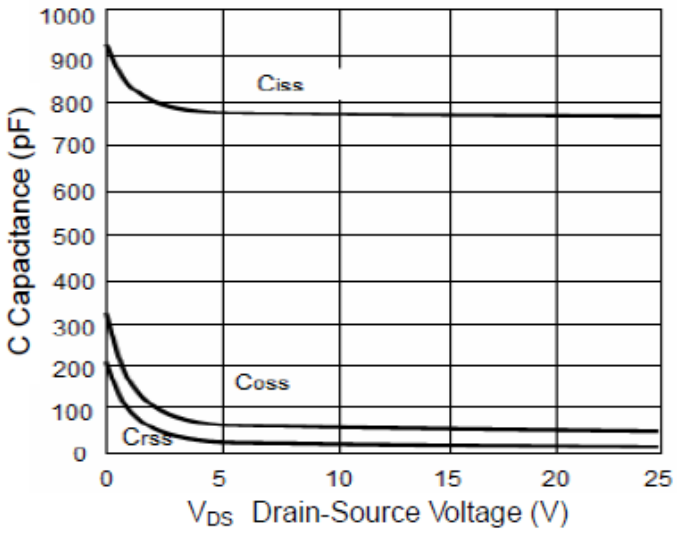


Figure 9. Maximum Forward Biased Safe Operating Area

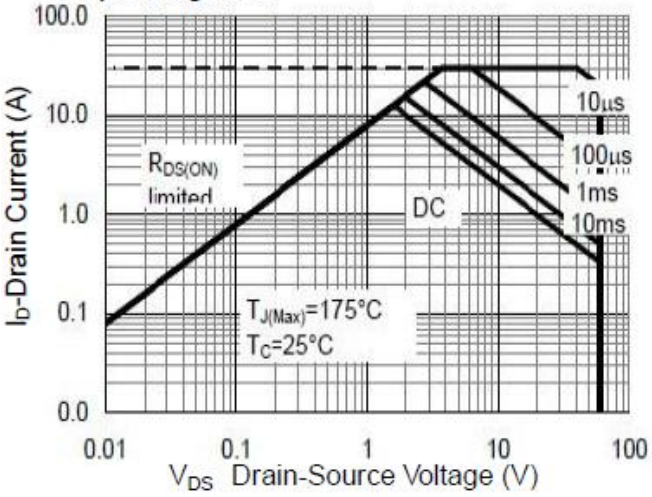


Figure10. Single Pulse Power Rating Junction-to-Case

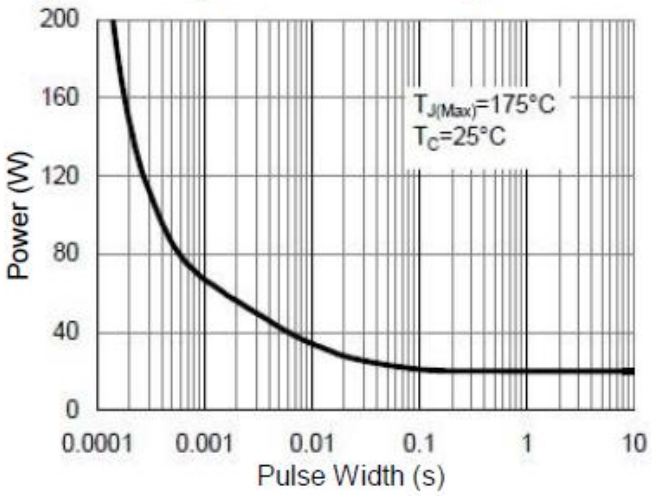
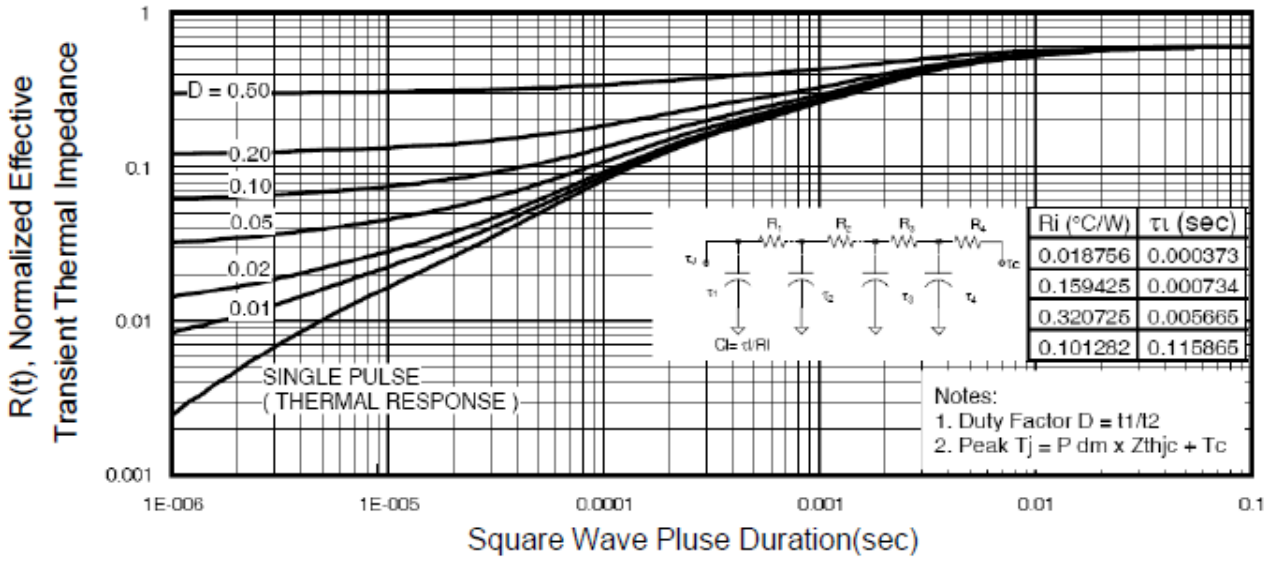
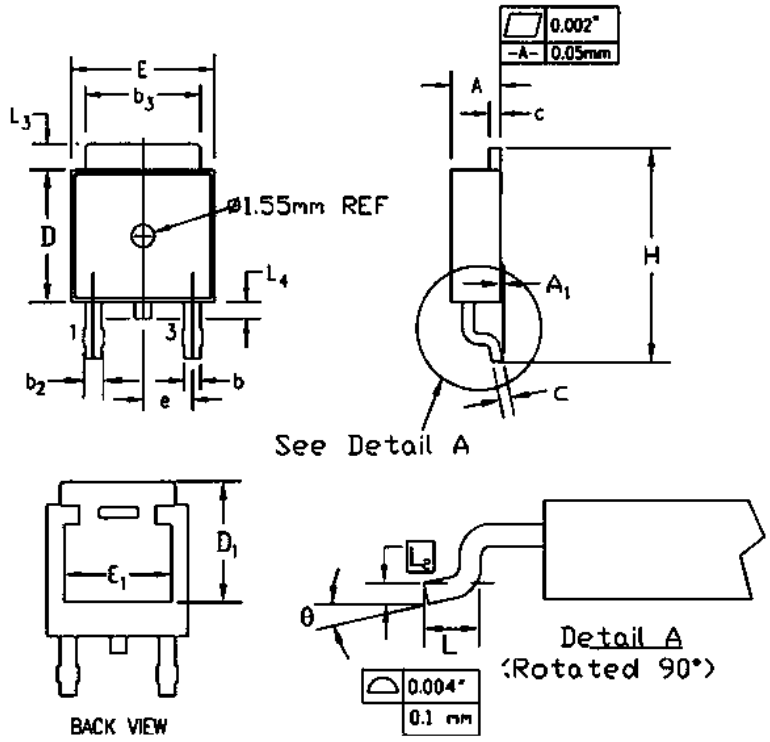


Figure11. Normalized Maximum Transient Thermal Impedance



Package Information

Package Type:TO-252



DIM	Millimeters		Inches	
	Min	Max	Min	Max
A	2.19	2.38	0.086	0.094
A1	-	0.13	-	0.005
b	0.64	0.89	0.025	0.035
b2	0.84	1.14	0.033	0.045
b3	5.21	5.46	0.205	0.215
c	0.46	0.61	0.018	0.024
D	5.97	6.22	0.235	0.250
D1	5.21	-	0.205	-
E	6.35	6.73	0.250	0.265
E1	4.83	-	0.190	-
e	2.29REF		0.090REF	
H	9.65	10.41	0.380	0.410
L	1.40	1.78	0.055	0.070
L2	0.51REF		0.020REF	
L3	0.89	1.27	0.035	0.050
L4	0.64	1.01	0.025	0.040
θ	0°	8°	0°	8°

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