



N-CHANNEL Trench Power MOSFET MEM2404

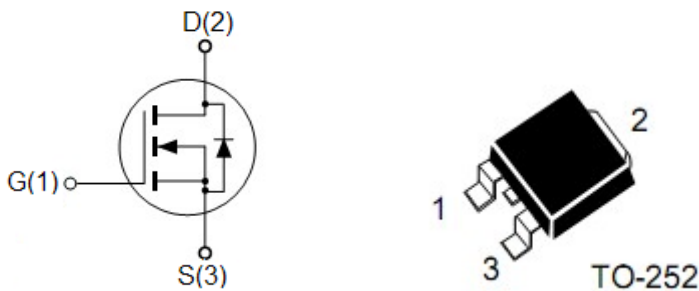
General Description

The MEM2404 combines advanced trench MOSFET technology with a low resistance package to provide extremely low RDS(ON). This device is ideal for power switching application and LED backlighting.

Features

- VDS=100V, ID=11A
- RDS(ON)<140mΩ@VGS=10V(Typ:68 mΩ)
- Ultra Low On-Resistance
- PACKAGE : TO252

Pin Configuration



MEM2404K3G

Application

- Power switching application
- LED backlighting

Maximum Ratings(Ta=25°C)

Parameter	Symbol	Ratings	Unit
Drain-Source Voltage(VGS=0V)	V _{DSS}	100V	V
Gate-Source Voltage(VDS=0V)	V _{GSS}	±20	V
Drain Current	I _D	T _A =25°C	11
		T _A =100°C	7.7
Pulsed Drain Current (Note1)	I _{DM}	44	A
Total Power Dissipation	P _d	45	W
Single Pulse Avalanche Energy (Note2)	EAS	16	mJ
Operating Temperature Range	T _{Opr}	-55-175	°C
Storage Temperature Range	T _{stg}	-55-175	°C

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

2.EAS condition Topr =25°C, VDD=50V, V_G=10V, R_G=25Ω

Thermal Characteristics

Parameter	Symbol	TYP.	MAX.	Unit
Thermal Resistance,Junction-to-Case	R _{θJC}	-	3.3	°C/W

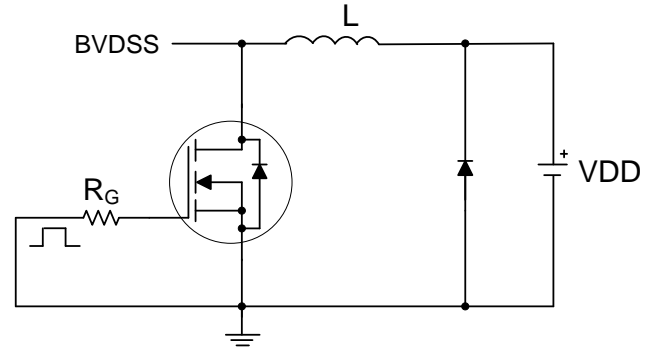
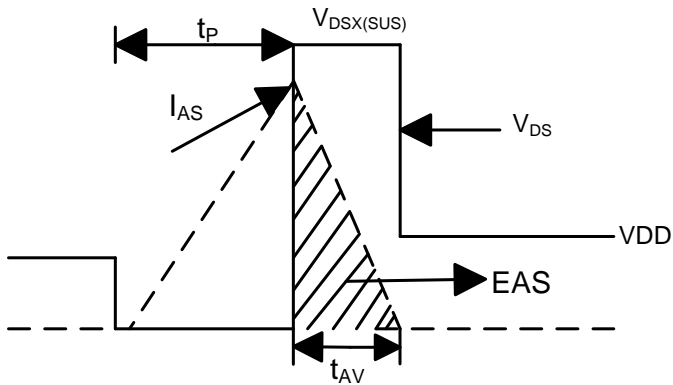
Electrical Characteristics(Ta=25°C)

Parameter	Symbol	Test Condition	Min	Type	Max	Unit	
Static Characteristics							
Drain-Source Breakdown Voltage	$V_{(BR)DSS}$	$V_{GS}=0V, I_D=250\mu A$	100	-	-	V	
Gate Threshold Voltage	$V_{GS(th)}$	$V_{DS}=V_{GS}, I_D=250\mu A$	1.0	2.0	3.0	V	
Gate-Body Leakage	I_{GSS}	$V_{DS}=0V, V_{GS}=\pm 20V$	-	-	± 100	nA	
Zero Gate Voltage Drain Current	I_{DSS}	$V_{DS}=100V$ $V_{GS}=0V$	$T_A=25^\circ C$	-	-	1	μA
			$T_A=100^\circ C$	-	-	5	μA
Static Drain-Source On-Resistance	$R_{DS(ON)}$	$V_{GS}=10V, I_D=4.5A$	-	68	140	m Ω	
		$V_{GS}=4.5V, I_D=3A$	-	82	152	m Ω	
Dynamic Characteristics							
Forward Transconductance	g_{FS}	$V_{DS}=5V, I_D=4.5A$	12	-	-	S	
Input Capacitance	C_{iss}	$V_{DS}=50V,$ $V_{GS}=0V,$ $f=1MHz$	-	690	-	pF	
Output Capacitance	C_{oss}		-	44	-		
Reverse Transfer Capacitance	C_{rss}		-	30	-		
Total Gate Charge	Q_g	$V_{DS}=50V,$ $V_{GS}=10V,$ $I_D=4.5A$	-	13.4	-	nC	
Gate-Source Charge	Q_{gs}		-	3.2	-		
Gate-Drain Charge	Q_{gd}		-	6.2	-		
Source-Drain Diode Characteristics							
Source-Drain Current(Body Diode)	I_{SD}		-	11	-	A	
Pulsed Source-Drain Current(Body Diode)	I_{SD}		-	44	-	A	
Source-drain (diode forward) voltage(Note1)	V_{SD}	$T_A=25^\circ C, V_{GS}=0V, I_{SD}=1A$	-	0.75	1.0	V	
Reverse Recovery Time(Note1)	t_{rr}	$T_A=25^\circ C, I_F=4.5A, di/dt=100A/\mu A$	-	11	-	nS	
Reverse Recovery Charge(Note1)	Q_{rr}		-	14	-	nC	
Forward Turn-on Time	t_{on}	Intrinsic turn-on time is negligible(turn-on) is dominated by L_S+L_D					
Switching Characteristics							
Turn-On Delay Time	$t_{d(on)}$	$V_{DS}=50V,$ $R_G=8.6\Omega$ $V_{GS}=10V,$ $R_L=3\Omega$	-	7	-	nS	
Rise Time	t_r		-	12	-		
Turn-Off Delay Time	$t_{d(off)}$		-	24	-		
Fall-Time	t_f		-	11	-		

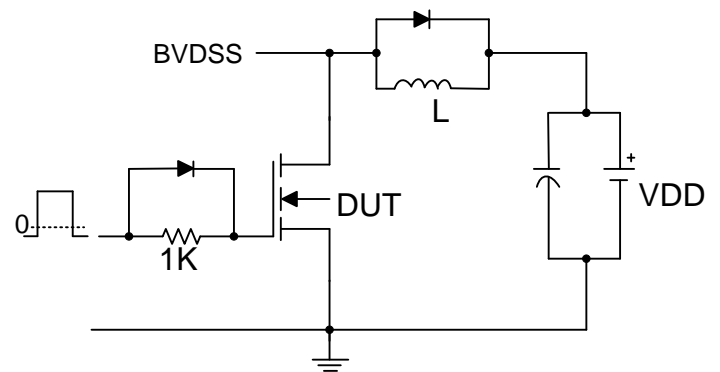
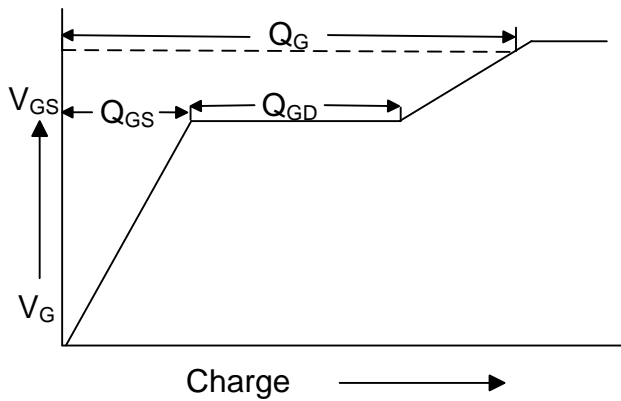
Notes 1. Pulse Test width $\leq 300\mu S$, Duty Cycle $\leq 1.5\%$, Starting $T_A=25^\circ C$

Test Circuit

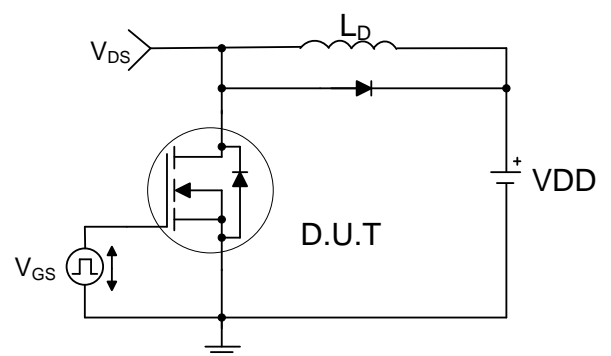
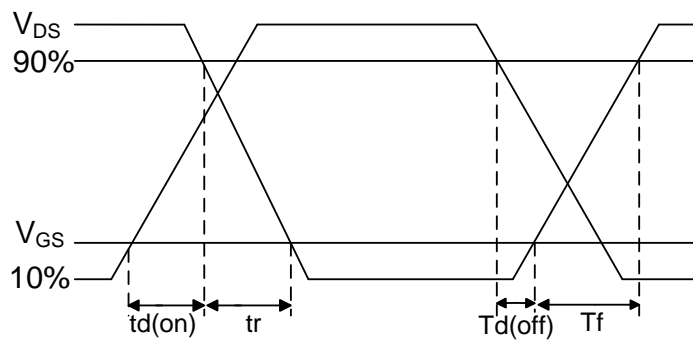
1. EAS Test Circuits



2. Gate Charge Test Circuits



3. Switch Time Test Circuits



Typical performance characteristics

Figure1. On-Region Characteristics

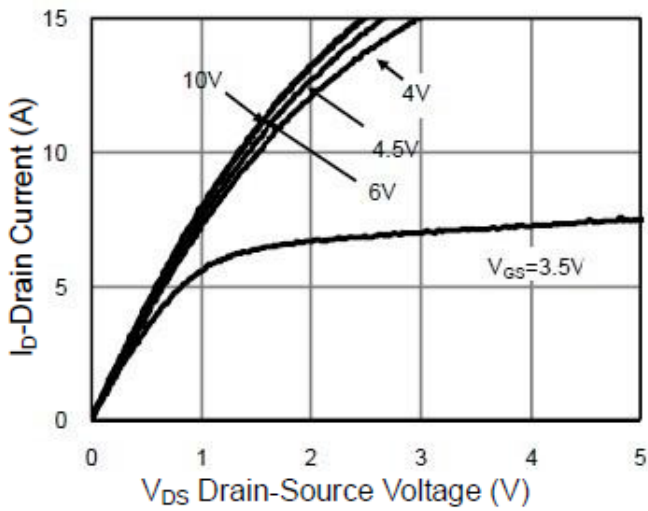


Figure 2: Transfer Characteristics

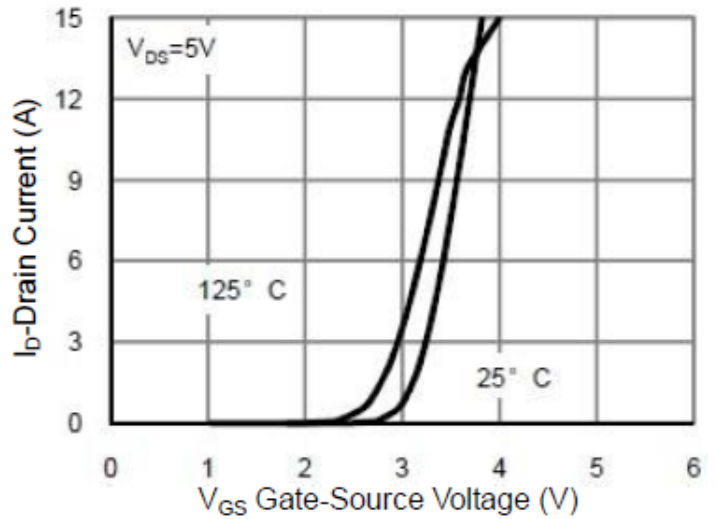


Figure3. ID vs Junction Temperature

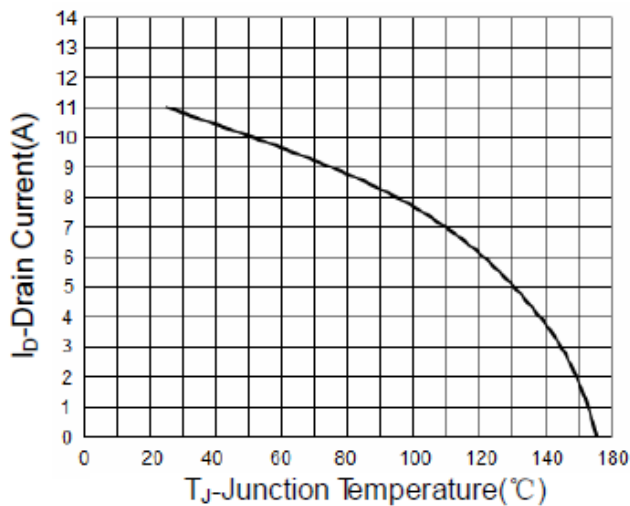


Figure4. On-Resistance vs. Junction Temperature

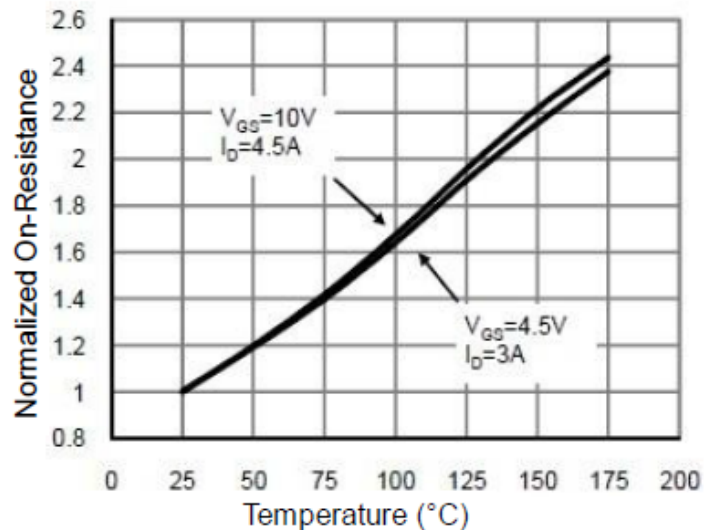


Figure5. On-Resistance vs. Gate-Source Voltage

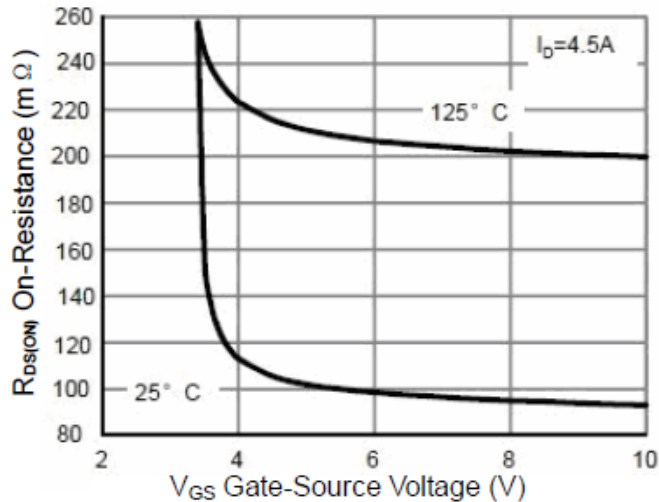


Figure6. Body-Diode Characteristics

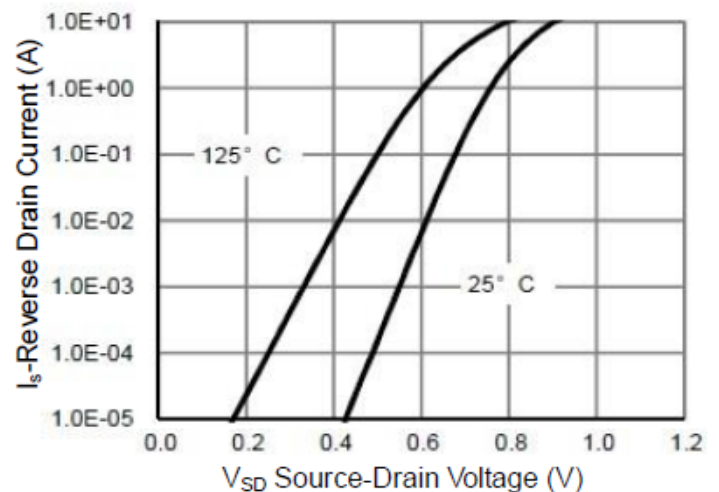


Figure 7. Gate-Charge Characteristics

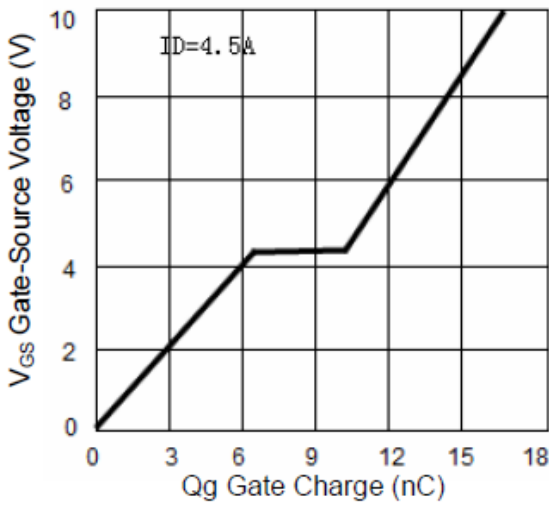


Figure 8. Capacitance Characteristics

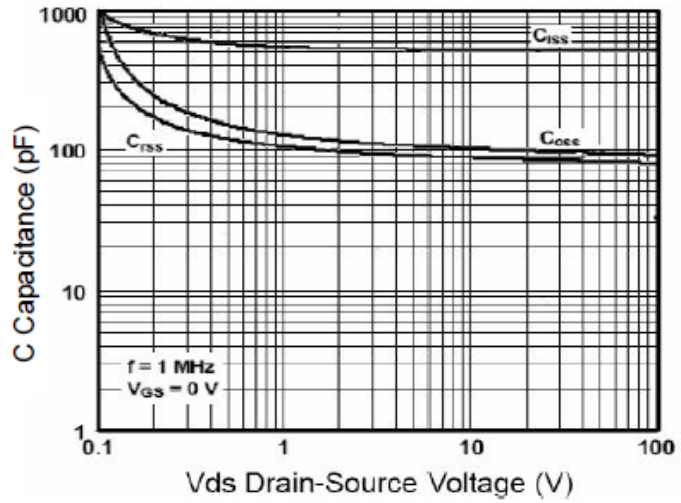


Figure 9. Maximum Forward Biased Safe Operating Area

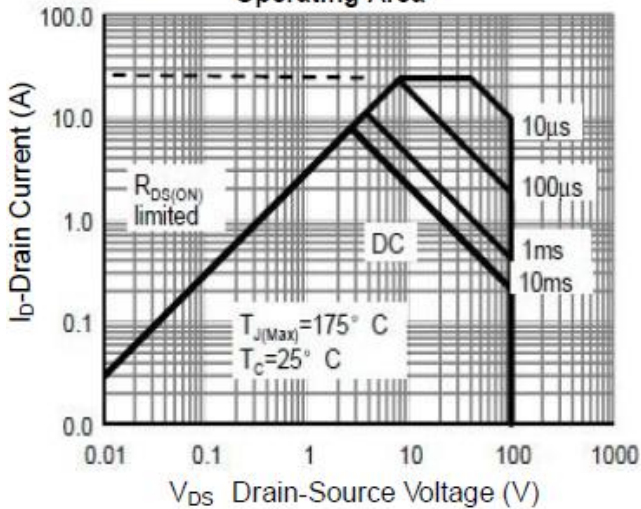


Figure 10. Single Pulse Power Rating Junction-to-Case

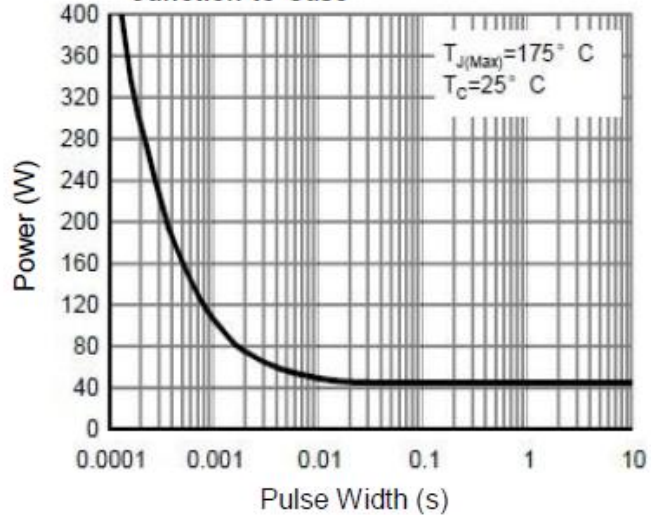
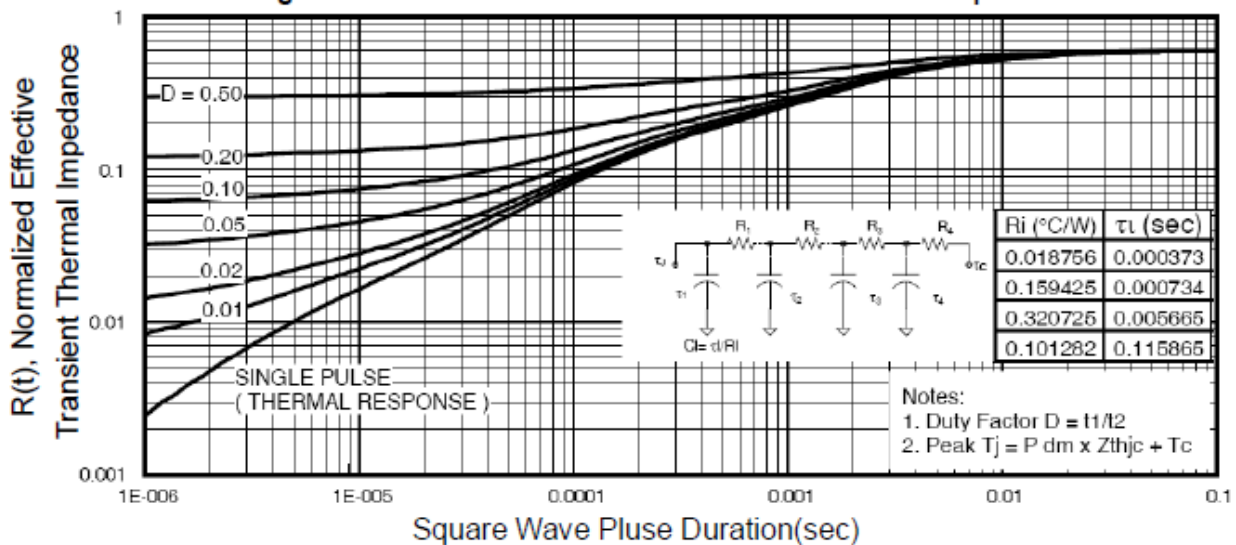
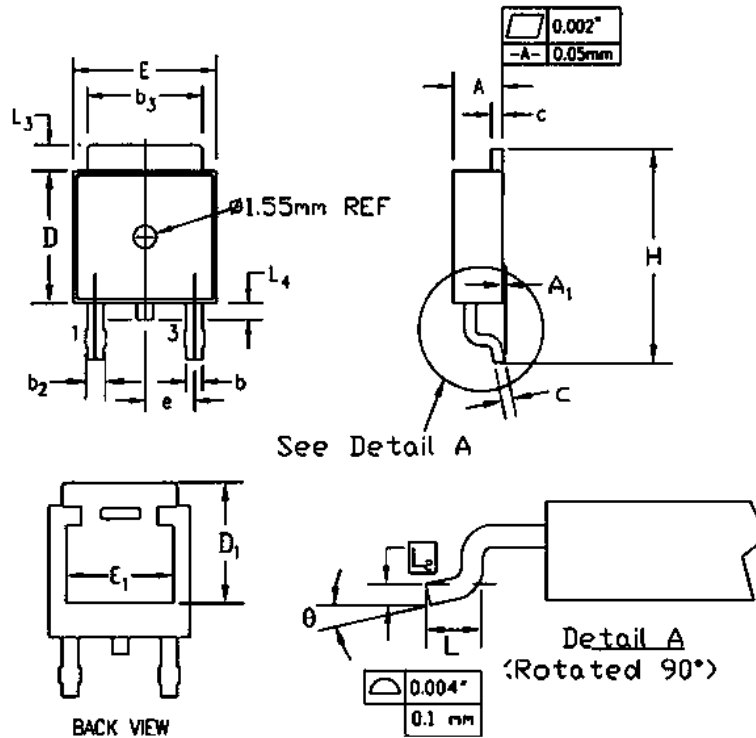


Figure 11. Normalized Maximum Transient Thermal Impedance



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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