

N-Channel Power MOSFET MEM2504SG

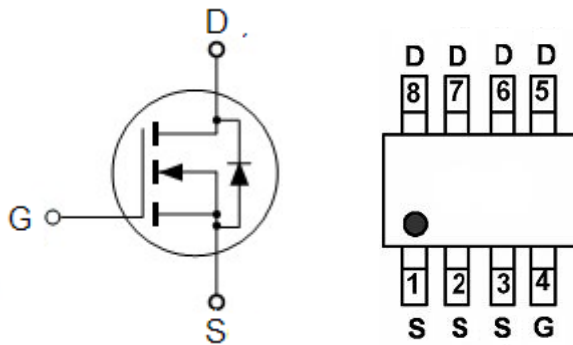
General Description

MEM2504 uses advanced trench technology and design to provide excellent $R_{DS(on)}$ with low gate charge. It can be used in a wide variety of applications.

Features

- Low On-Resistance 60V/50A
 $R_{DS(ON)} = 14m\Omega @ V_{GS}=10V, I_D=20A$
- High density cell design for ultra low $R_{DS(on)}$
- Fully characterized avalanche voltage and current
- Good stability and uniformity with high EAS.
- Special process technology for high ESD capability
- Surface mount package:SOP8

Pin Configuration



Typical Application

- Power switch circuit of adaptor and charger.
- Hard switched and high frequency circuits
- Uninterruptible power supply

Maximum Ratings ($T_A=25^\circ\text{C}$)

Parameter		Symbol	Ratings	Unit
Drain-Source Voltage		V_{DSS}	60	V
Drain Current	$T_A=25^\circ\text{C}$	I_D	50	A
	$T_A=100^\circ\text{C}$		35.4	
Pulsed Drain Current		I_{DM}	90	A
Gate-Source Voltage		V_{GS}	± 20	V
Single Pulse Avalanche Energy		E_{AS}	245	mJ
Peak Diode Recovery		dv/dt	3.0	V/ns
Total Power Dissipation	$T_A=25^\circ\text{C}$	P_d	1.78	W
Operating Junction and Storage Temperature Range		T_J, T_{stg}	150, -55~150	$^\circ\text{C}$
Maximum soldering temperature		T_L	300	$^\circ\text{C}$

Thermal Characteristics

Parameter	Symbol	Ratings	Unit
Thermal Resistance, Junction-to-Ambient ³	$R_{\theta JA}$	70	$^{\circ}\text{C/W}$

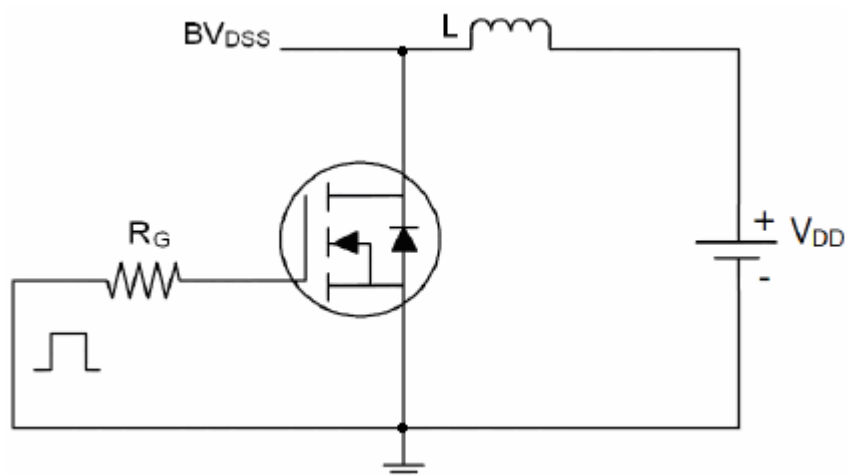
Electrical Characteristics

Parameter	Symbol	Test Condition	Min	Type	Max	Unit
Static Characteristics						
Drain-Source Breakdown Voltage	V _{(BR)DSS}	V _{GS} =0V, I _D =250μA	60	-	-	V
Gate Threshold Voltage	V _{GS(th)}	V _{DS} = V _{GS} , I _D =250μA	1.4	-	2.5	V
Gate-Body Leakage	I _{GSS}	V _{DS} =0V, V _{GS} =20V	-	-	100	nA
		V _{DS} =0V, V _{GS} =-20V	-	-	-100	nA
Zero Gate Voltage Drain Current	I _{DSS}	V _{DS} =60V V _{GS} =0V	-	-	1	μA
Static Drain-Source On-Resistance	R _{DS(ON)}	V _{GS} =10V, I _D =20A	-	14	20	mΩ
Forward Trans conductance	g _{FS}	V _{DS} =5V, I _D = 20A	18	-	-	S
Drain-Source Diode Forward Continuous Current	I _s	V _{GS} =0V	-	-	50	A
Source-drain (diode forward) voltage	V _{SD}	V _{GS} =0V,I _S =8A	-	-	1.2	V
Dynamic Characteristics						
Input Capacitance	C _{iss}	V _{DS} = 30 V, V _{GS} = 0 V, f = 1.0 MHz	-	2050	-	pF
Output Capacitance	C _{oss}		-	158	-	
Reverse Transfer Capacitance	C _{rss}		-	120	-	
Switching Characteristics						
Turn-On Delay Time	td(on)	V _{DD} = 30 V, R _G = 3Ω V _{GS} = 10V, RL = 6.7Ω	-	7.4	-	ns
Rise Time	tr		-	5.1	-	
Turn-Off Delay Time	td(off)		-	28.2	-	
Fall-Time	tf		-	5.5	-	
Total Gate Charge	Qg	V _{DD} = 30V, V _{GS} = 10V, I _D = 20A		50	-	nc
Gate-Source Charge	Qgs		-	6	-	
Gate-Drain Charge	Qgd		-	15	-	

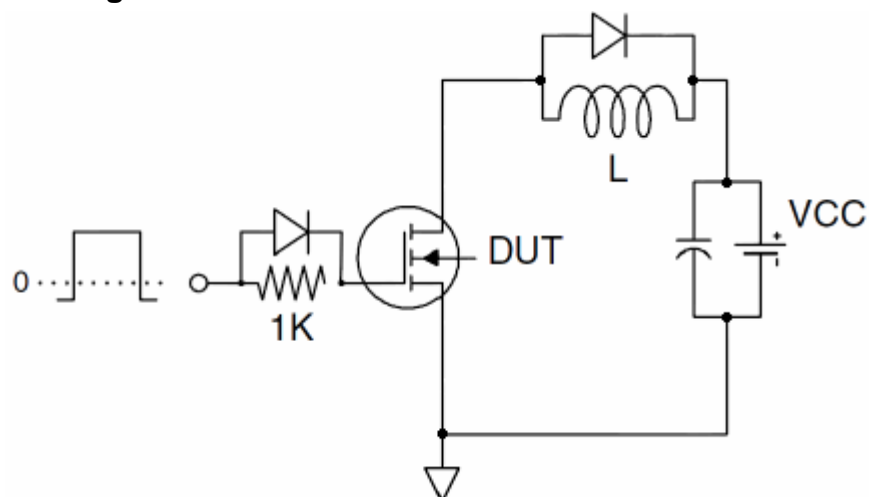
- 1、Repetitive rating, pulse width limited by junction temperature.
- 2、 $L=10.0\text{mH}, I_D=8A, \text{Start } T_J=25^{\circ}\text{C}$
- 3、 $I_{SD}=8A, di/dt \leq 100A/\mu s, V_{DD} \leq BV_{DS}, \text{Start } T_J=25^{\circ}\text{C}$
- 4、EAS condition: $T_J=25^{\circ}\text{C}, V_{DD}=30V, V_G=10V, L=0.5\text{mH}, R_g=25\Omega$

Test Circuit

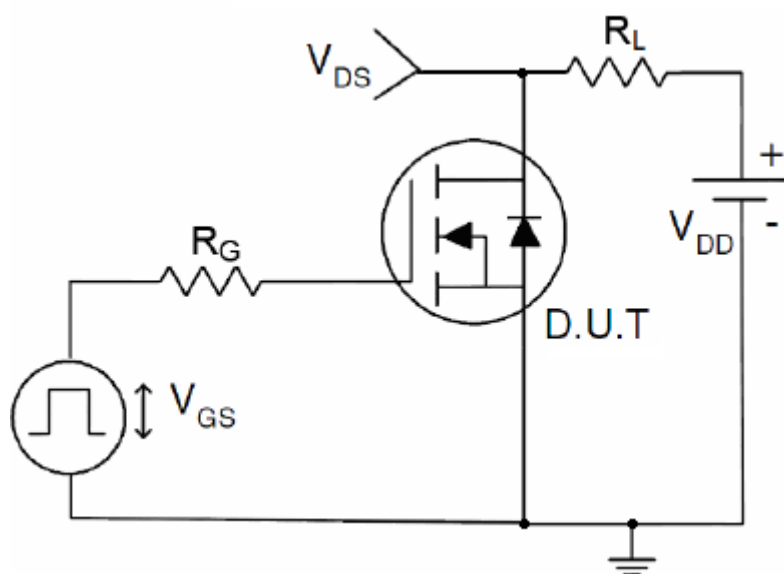
1. E_{AS} test Circuit



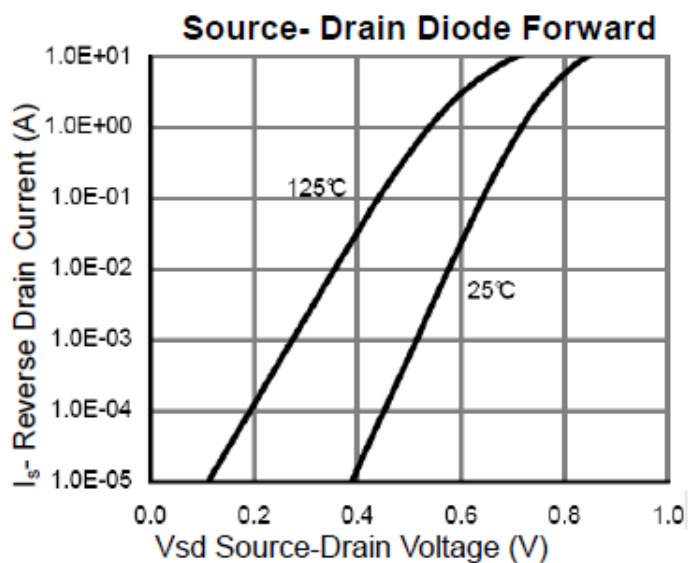
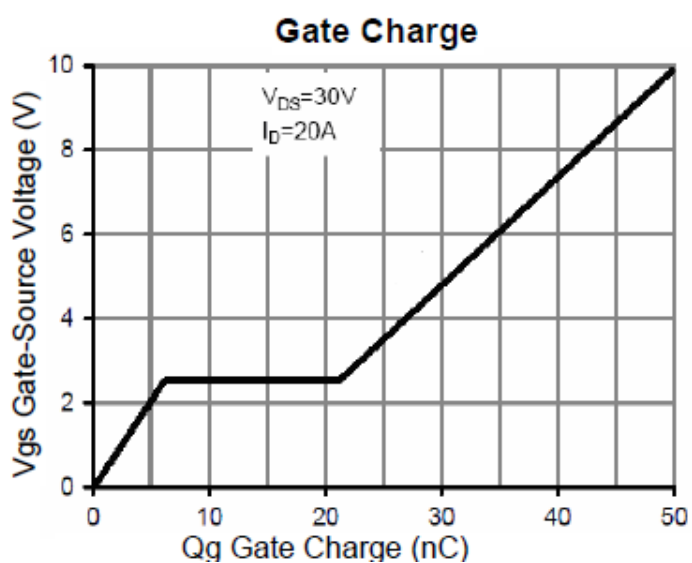
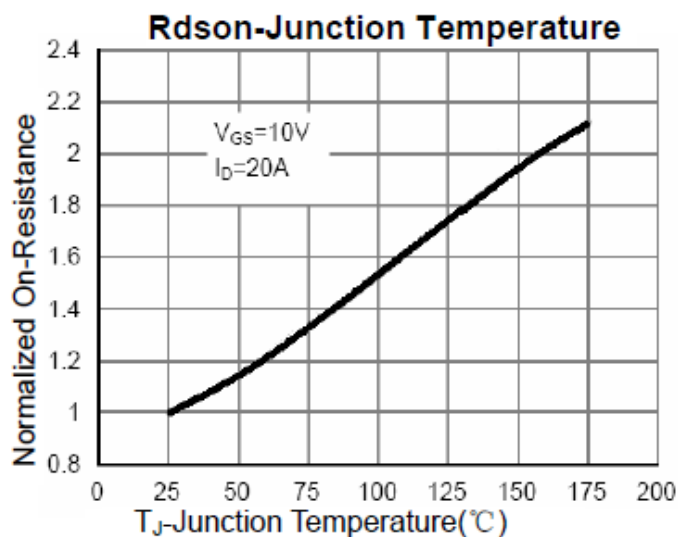
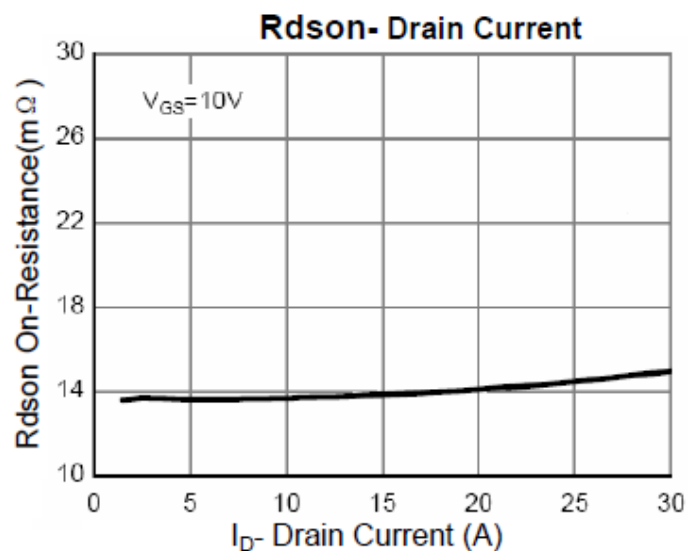
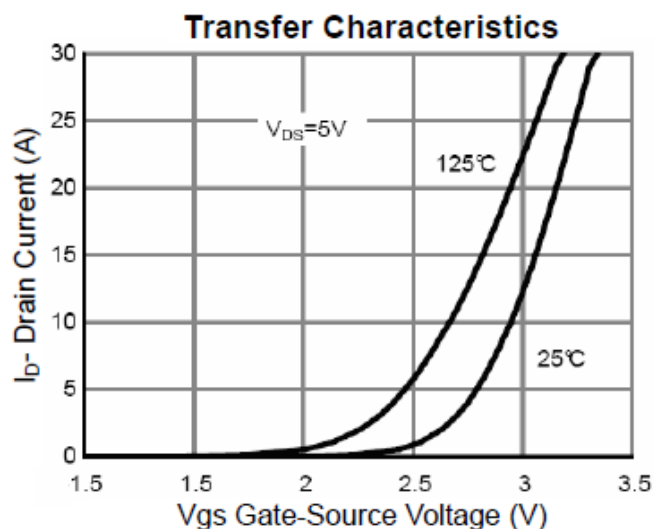
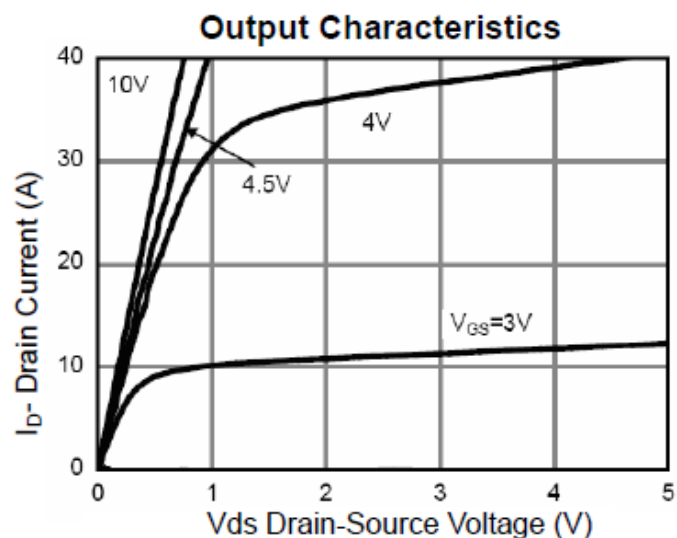
2. Gate charge test Circuit



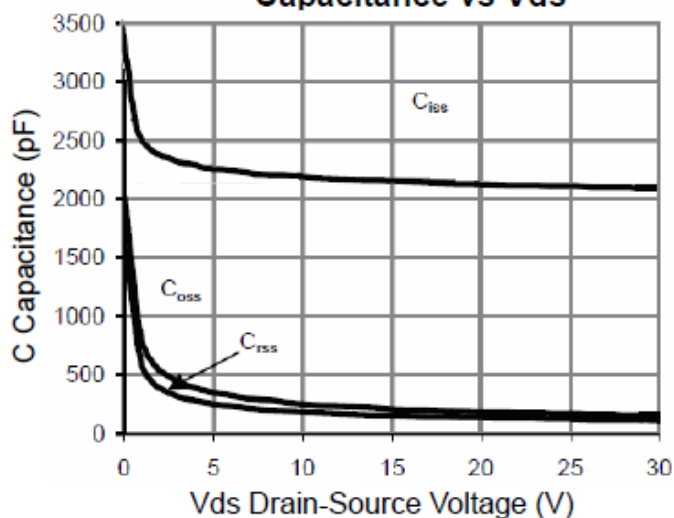
3. Switch Time Test Circuit



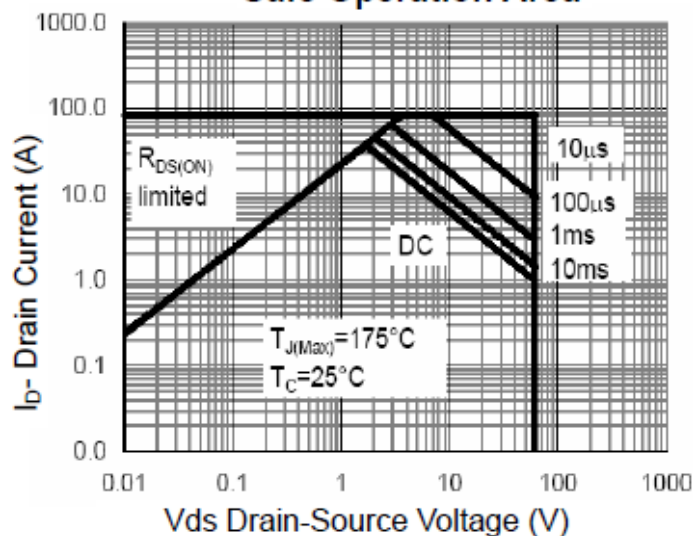
Typical performance characteristics



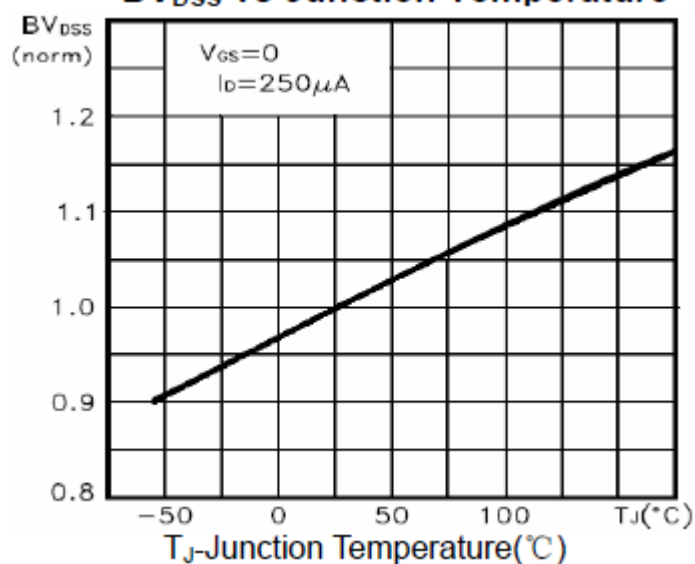
Capacitance vs Vds



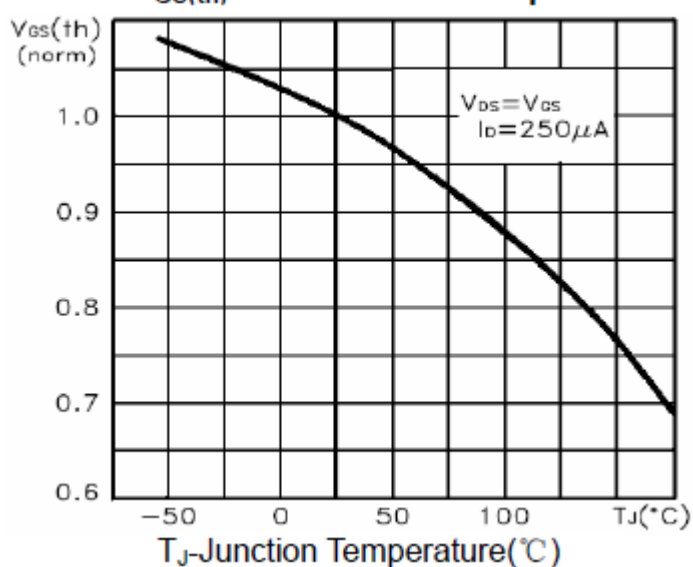
Safe Operation Area



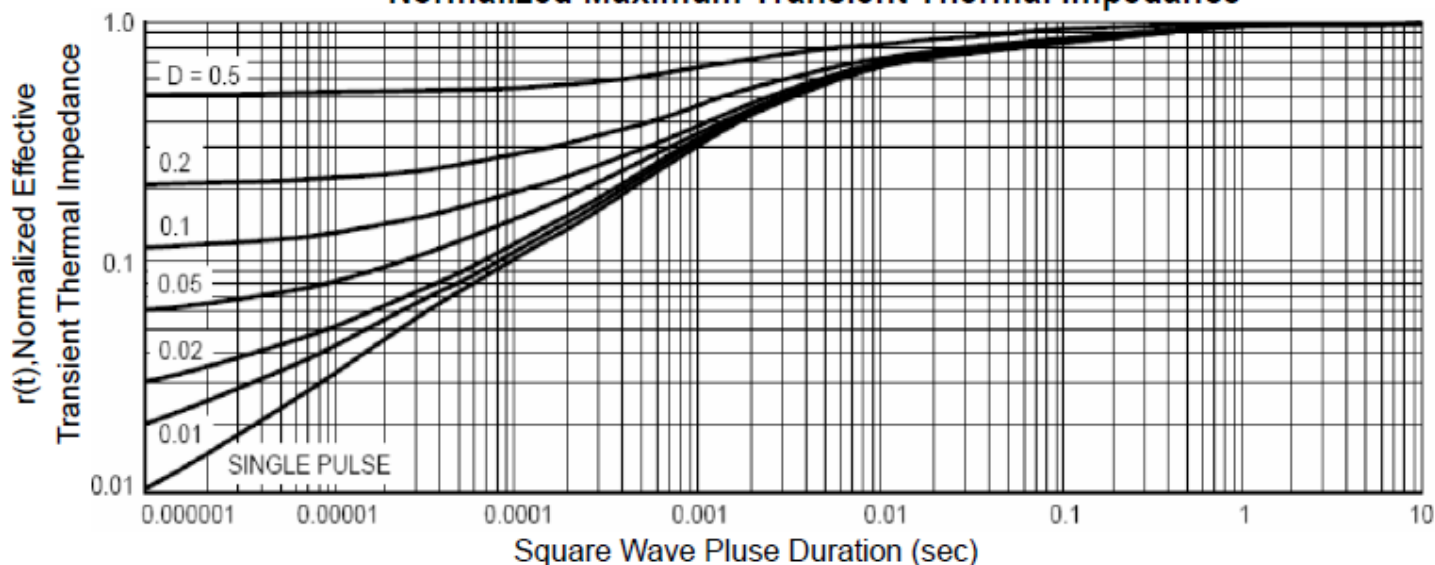
BV_{DSS} vs Junction Temperature



V_{GS(th)} vs Junction Temperature

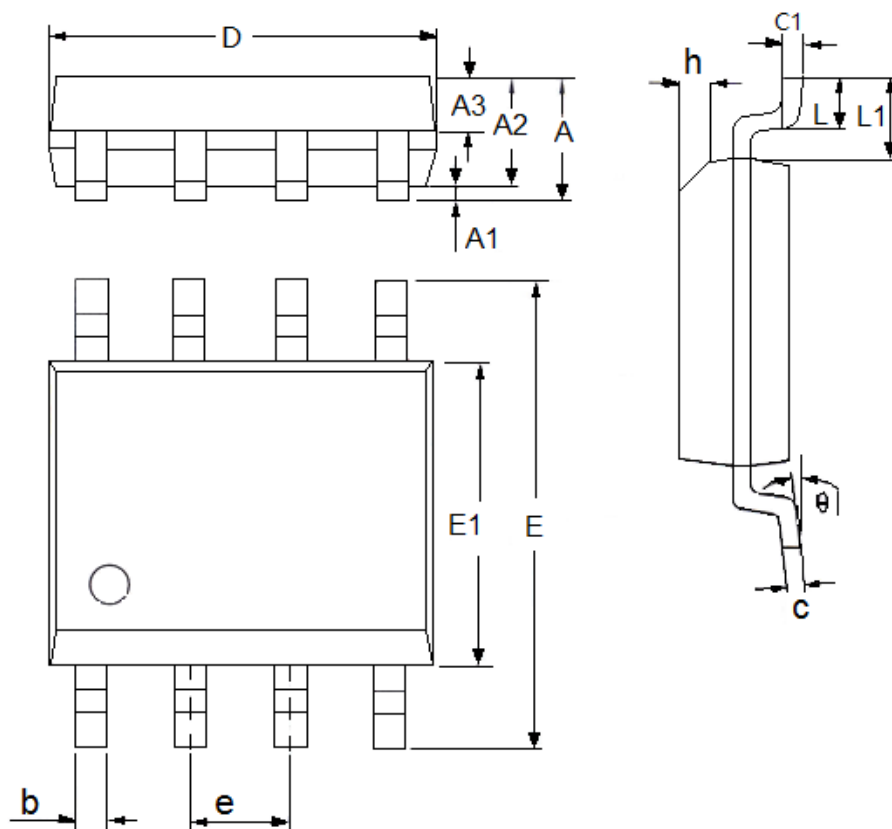


Normalized Maximum Transient Thermal Impedance



Package Information

- Package Type:SOP8



DIM	Millimeters		Inches	
	Min	Max	Min	Max
A	1.3	1.8	0.0512	0.0709
A1	0.05	0.25	0.002	0.0098
A2	1.25	1.65	0.0492	0.065
A3	0.5	0.7	0.0197	0.0276
b	0.3	0.51	0.0118	0.0201
c	0.17	0.25	0.0067	0.0098
D	4.7	5.1	0.185	0.2008
E	5.8	6.2	0.2283	0.2441
E1	3.8	4	0.1496	0.1575
e	1.27(TYP)		0.05(TYP)	
h	0.25	0.5	0.0098	0.0197
L	0.4	1.27	0.0157	0.05
L1	1.04(TYP)		0.0409(TYP)	
θ	0	8°	0	8°
c1	0.25(TYP)		0.0098(TYP)	

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