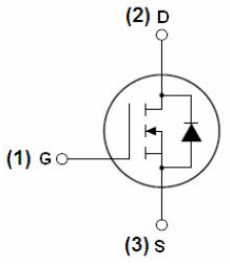
N-Channel Enhancement Mode Power MOSFET

Description

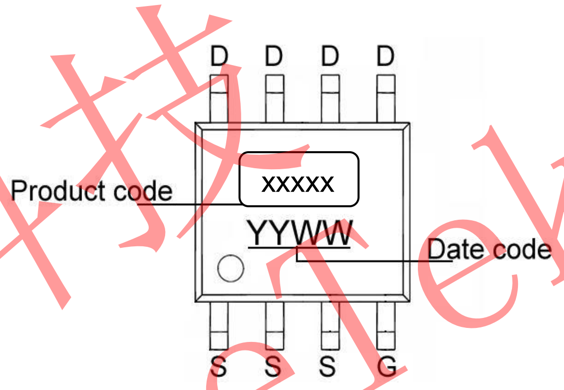
The MX6058 uses advanced trench technology and design to provide excellent RDS(ON) with low gate charge. It can be used in a wide variety of applications.



Schematic diagram

General Features

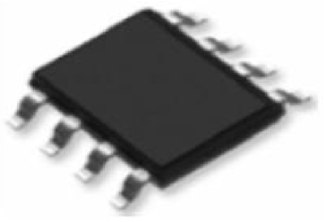
- V_{DS} =60V，I_D =8A
- $R_{DS(ON)}$(Typ.)13mΩ @ Vgs=10V
- High density cell design for ultra low Rdson
- Fully characterized Avalanche voltage and current



Marking and pin assignment

Application

Power switching application
Hard Switched and High Frequency Circuits
Uninterruptible Power Supply



SOP-8 top view

Absolute Maximum Ratings (TA=25℃ unless otherwise noted)

Parameter	Symbol	Limit	Unit
Drain-Source Voltage	V_{DS}	60	V
Gate-Source Voltage	V_{GS}	±20	V
Drain Current-Continuous	I_D	8	A
Drain Current-Continuous(T_C=100℃)	I_D (100℃)	5.5	A
Pulsed Drain Current	I_{DM}	32	A
Maximum Power Dissipation	P_D	2.5	W
Operating Junction and Storage Temperature Range	T_J,T_{STG}	-55 To 150	℃

Electrical Characteristics (TA=25℃ unless otherwise noted)

Parameter	Symbol	Condition	Min	Typ	Max	Unit
Off Characteristics						
Drain-Source Breakdown Voltage	BV_{DSS}	V_{GS}=0V I_D=250μA	60	-	-	V
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS}=60V,V_{GS}=0V	-	-	1	μA
Gate-Body Leakage Current	I_{GSS}	V_{GS}=±20V,V_{DS}=0V	-	-	±100	nA
On Characteristics (Note 3)						
Gate Threshold Voltage	$V_{GS(th)}$	V_{DS}=V_{GS},I_D=250μA	1.4	1.9	2.5	V
Drain-Source On-State Resistance	$R_{DS(ON)}$	V_{GS}=10V, I_D=8A	-	13	16	mΩ
Forward Transconductance	g_{FS}	V_{DS}=5V,I_D=7A	-	80	-	S
Dynamic Characteristics (Note4)						
Input Capacitance	C_{lss}	V_{DS}=20V,V_{GS}=0V, F=1.0MHz	-	2460	-	PF
Output Capacitance	C_{oss}		-	163	-	PF
Reverse Transfer Capacitance	C_{rss}		-	126	-	PF
Switching Characteristics (Note 4)						
Turn-on Delay Time	$t_{d(on)}$	V_{DD}=20V, R_L=6.7Ω V_{GS}=10V,R_G=3Ω	-	7.4	-	nS
Turn-on Rise Time	t_r		-	5.1	-	nS
Turn-Off Delay Time	$t_{d(off)}$		-	28.2	-	nS
Turn-Off Fall Time	t_f		-	5.5	-	nS
Total Gate Charge	Q_g	V_{DS}=20V,I_D=20A, V_{GS}=10V	-	50		nC
Gate-Source Charge	Q_{gs}		-	6		nC
Gate-Drain Charge	Q_{gd}		-	15		nC
Drain-Source Diode Characteristics						
Diode Forward Voltage (Note 3)	V_{SD}	V_{GS}=0V,I_S=20A	-		1.2	V
Diode Forward Current (Note 2)	I_S		-	-	50	A
Reverse Recovery Time	t_{rr}	TJ = 25°C, IF =20A di/dt = 100A/μs(Note3)	-	28	-	nS
Reverse Recovery Charge	Q_{rr}		-	40	-	nC
Forward Turn-On Time	t_{on}	Intrinsic turn-on time is negligible (turn-on is dominated by LS+LD)				

Thermal Characteristic

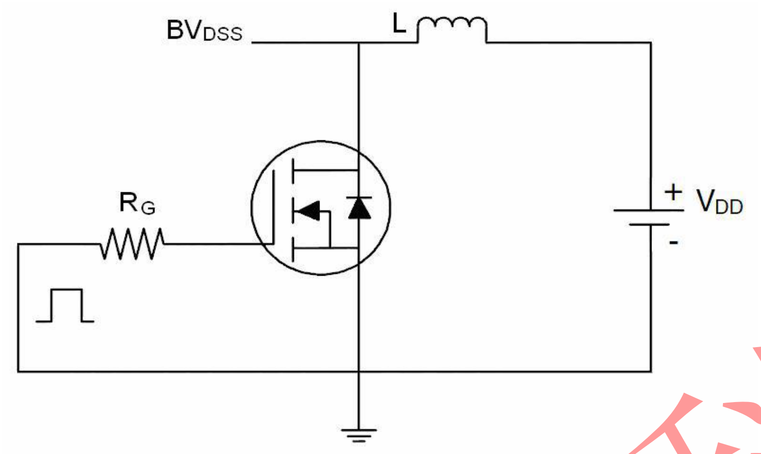
Thermal Resistance,Junction-to-Ambient (Note 2)	$R_{θJA}$	50	℃/W

Notes:

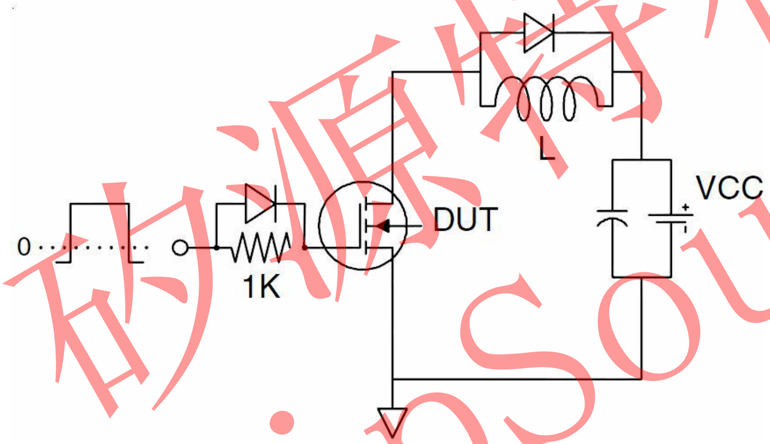
1. Repetitive Rating: Pulse width limited by maximum junction temperature.
2. Surface Mounted on FR4 Board, t ≤ 10 sec.
3. Pulse Test: Pulse Width ≤ 300μs, Duty Cycle ≤ 2%.
4. Guaranteed by design, not subject to production

Test Circuit

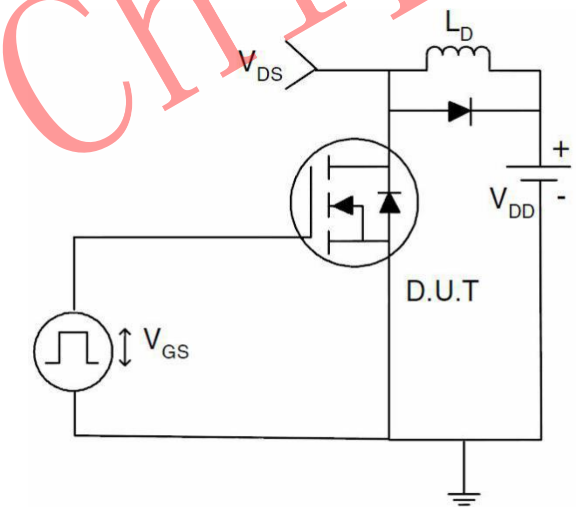
1) E_{AS} Test Circuits



2) Gate Charge Test Circuit:



3）Switch Time Test Circuit：



Typical Electrical and Thermal Characteristics (Curves)

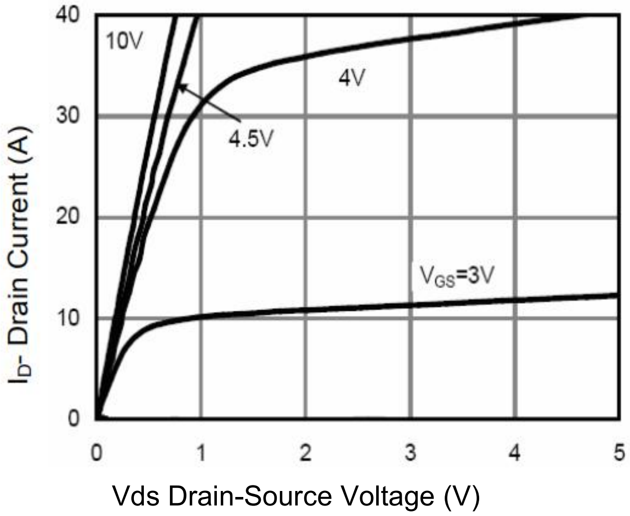


Figure 1 Output Characteristics

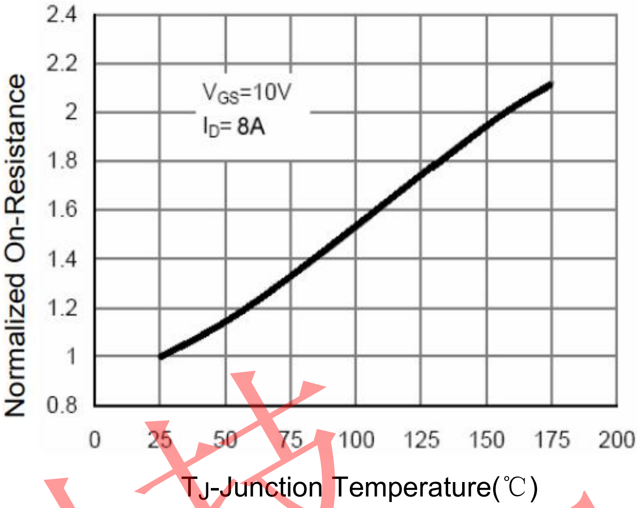


Figure 4 Rdson-JunctionTemperature

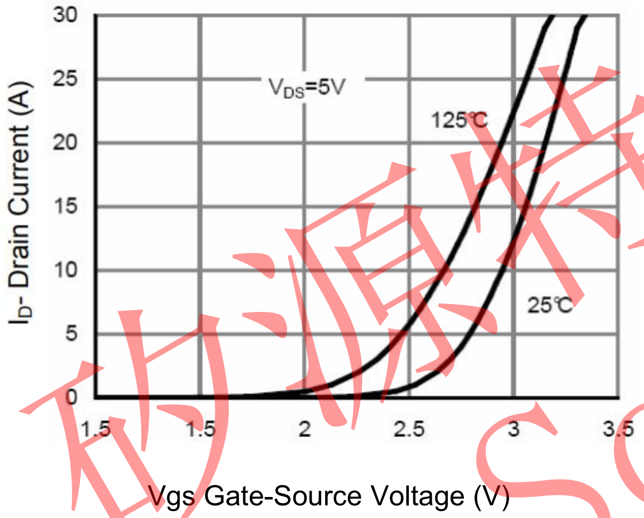


Figure 2 Transfer Characteristics

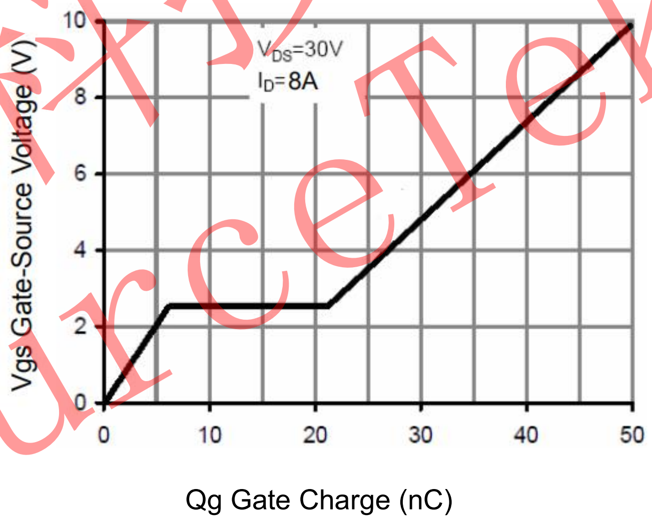


Figure 5 Gate Charge

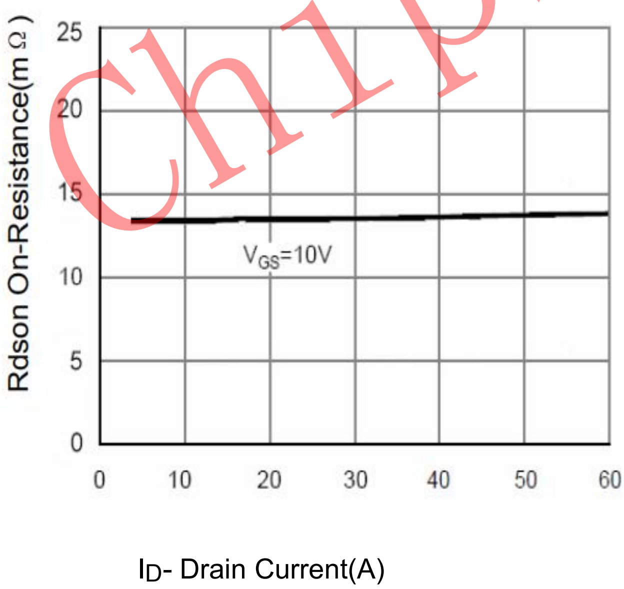


Figure 3 Rdson- Drain Current

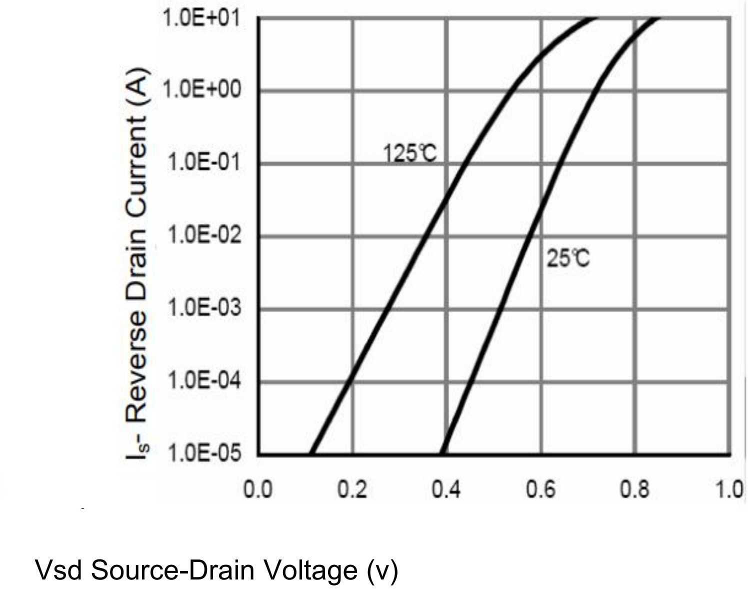


Figure 6 Source- Drain Diode Forward

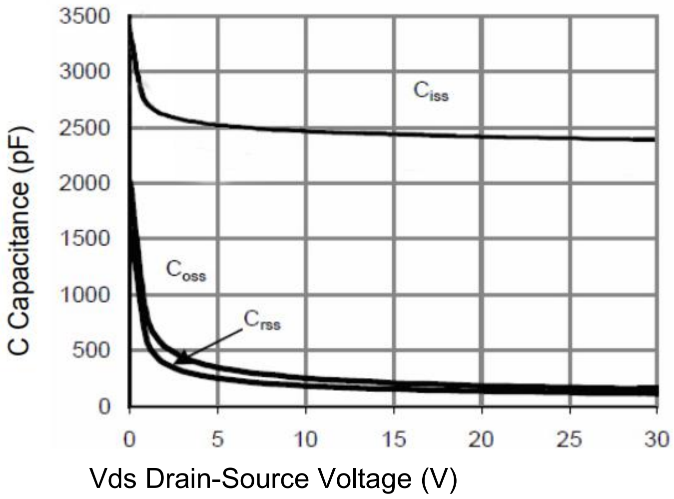


Figure 7 Capacitance vs Vds

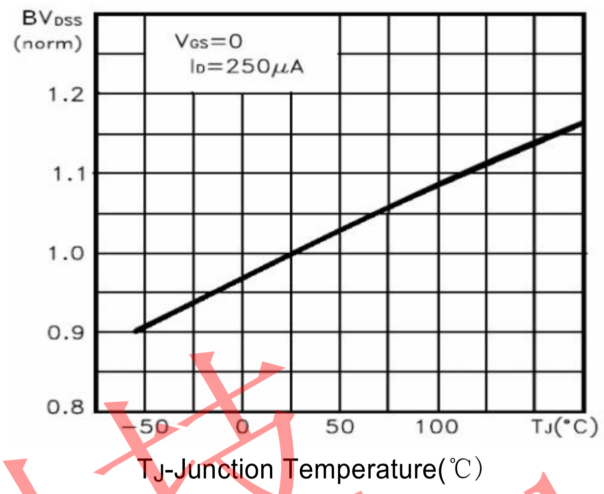


Figure 9 BV$_{DSS}$ vs Junction Temperature

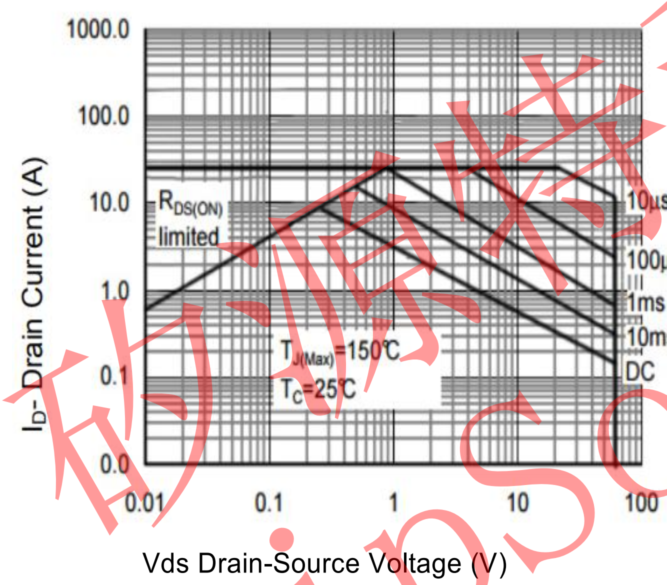


Figure 8 Safe Operation Area

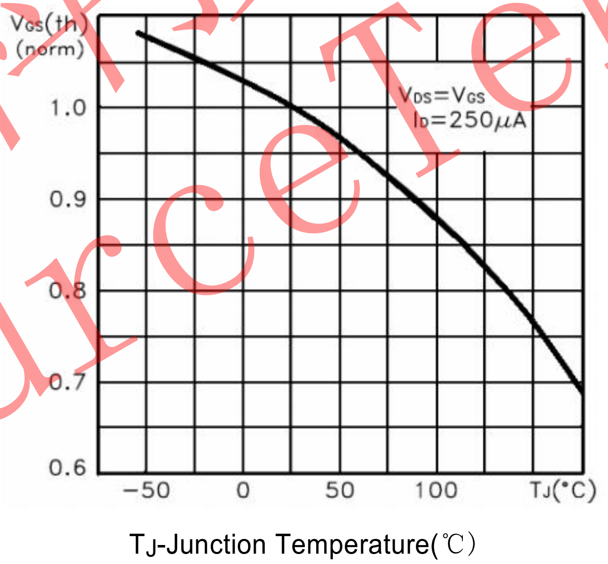


Figure 10 V$_{GS(th)}$ vs Junction Temperature

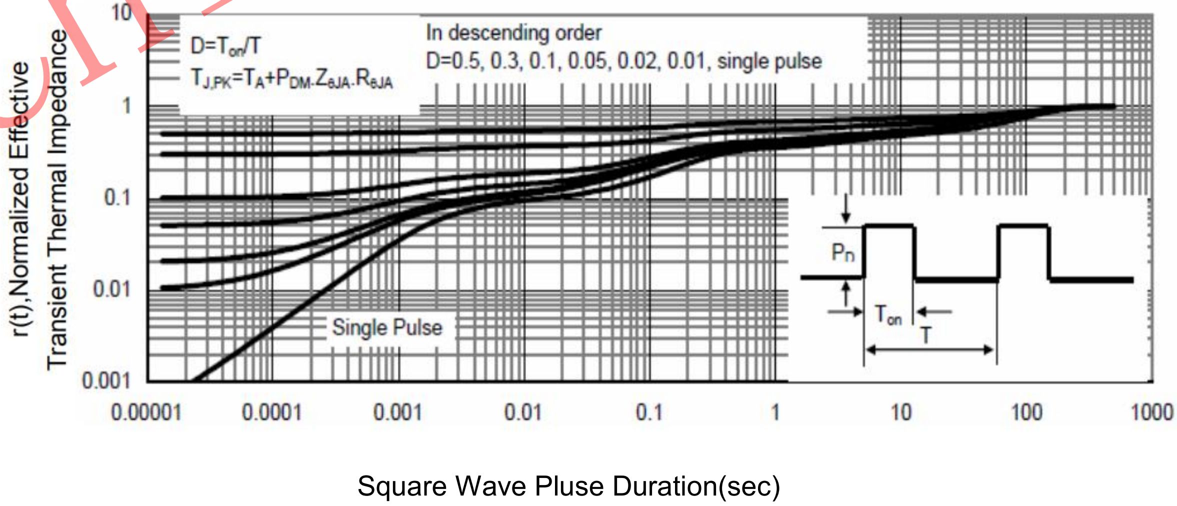
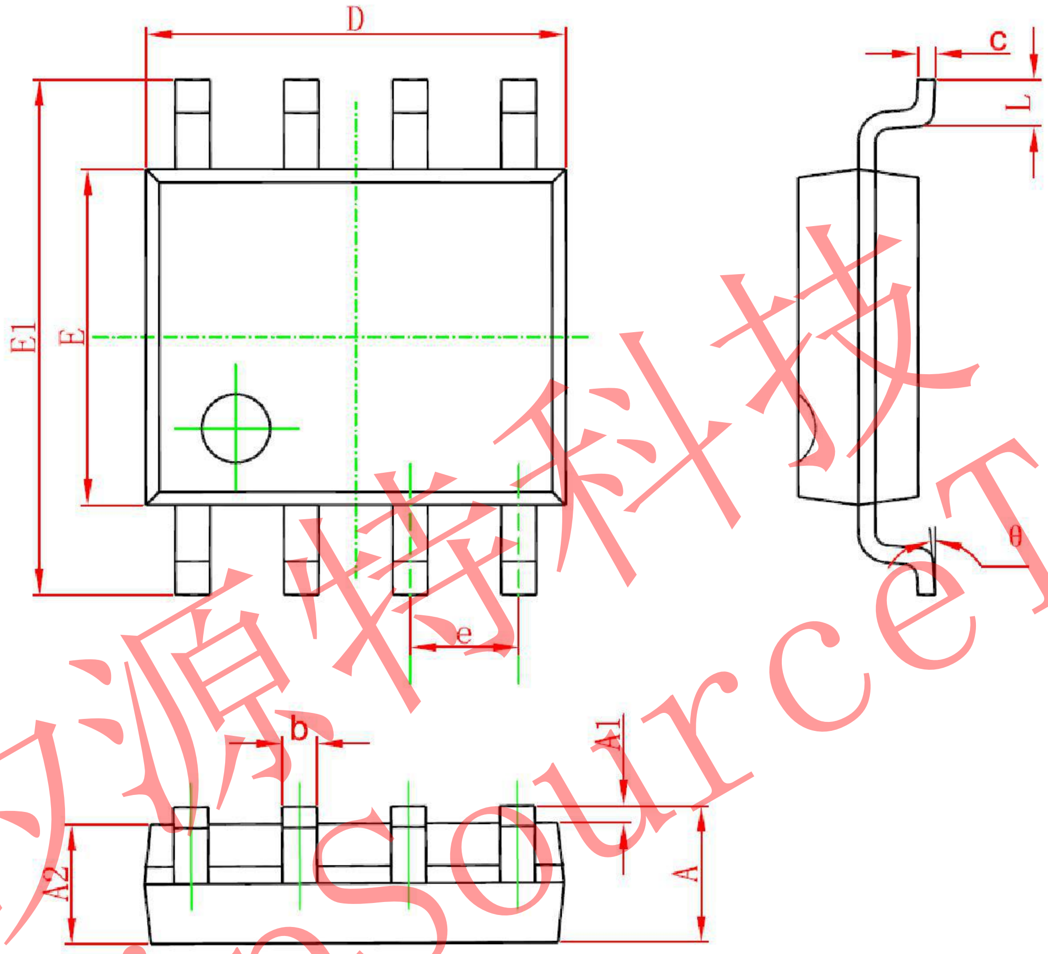


Figure 11 Normalized Maximum Transient Thermal Impedance

SOP-8 Package Information



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A	1.350	1.750	0.053	0.069
A1	0.100	0.250	0.004	0.010
A2	1.350	1.550	0.053	0.061
b	0.330	0.510	0.013	0.020
c	0.170	0.250	0.006	0.010
D	4.700	5.100	0.185	0.200
E	3.800	4.000	0.150	0.157
E1	5.800	6.200	0.228	0.244
e	1.270(BSC)		0.050(BSC)	
L	0.400	1.270	0.016	0.050
θ	0°	8°	0°	8°