

ECG N-Channel Enhancement Mode Power MOSFET

Description

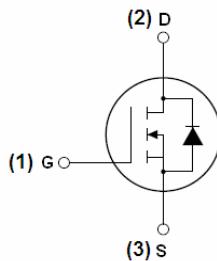
The ECG3010S uses advanced trench technology and design to provide excellent $R_{DS(ON)}$ with low gate charge. It can be used in a wide variety of applications.

General Features

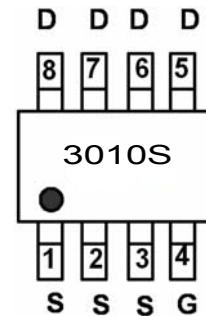
- $V_{DS} = 30V, I_D = 10A$
- $R_{DS(ON)} < 12m\Omega @ V_{GS}=10V$
- $R_{DS(ON)} < 16m\Omega @ V_{GS}=4.5V$
- High density cell design for ultra low $R_{DS(on)}$
- Fully characterized Avalanche voltage and current

Application

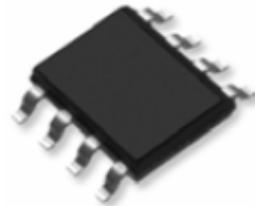
- Power switching application
- Hard Switched and High Frequency Circuits
- Uninterruptible Power Supply



Schematic diagram



Marking and pin assignment



SOP-8 top view

Package Marking and Ordering Information

Device Marking	Device	Device Package	Reel Size	Tape width	Quantity
3010S	ECG3010S	SOP-8	Ø330mm	12mm	2500 units

Absolute Maximum Ratings ($T_A=25^\circ C$ unless otherwise noted)

Parameter	Symbol	Limit	Unit
Drain-Source Voltage	V_{DS}	30	V
Gate-Source Voltage	V_{GS}	± 20	V
Drain Current-Continuous	I_D	10	A
Drain Current-Continuous($T_C=100^\circ C$)	$I_D (100^\circ C)$	6	A
Pulsed Drain Current	I_{DM}	50	A
Maximum Power Dissipation	P_D	2.5	W
Operating Junction and Storage Temperature Range	T_J, T_{STG}	-55 To 150	°C

Thermal Characteristic

Thermal Resistance, Junction-to-Case ^(Note 2)	R_{eJC}	50	°C/W
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Electrical Characteristics ($T_A=25^\circ\text{C}$ unless otherwise noted)

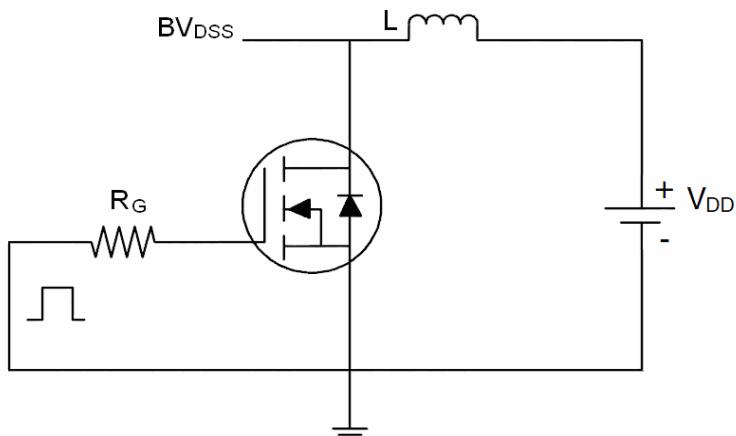
Parameter	Symbol	Condition	Min	Typ	Max	Unit
Off Characteristics						
Drain-Source Breakdown Voltage	BV_{DSS}	$V_{\text{GS}}=0\text{V}, I_{\text{D}}=250\mu\text{A}$	30	33	-	V
Zero Gate Voltage Drain Current	I_{DSS}	$V_{\text{DS}}=30\text{V}, V_{\text{GS}}=0\text{V}$	-	-	1	μA
Gate-Body Leakage Current	I_{GSS}	$V_{\text{GS}}=\pm 20\text{V}, V_{\text{DS}}=0\text{V}$	-	-	± 100	nA
On Characteristics ^(Note 3)						
Gate Threshold Voltage	$V_{\text{GS}(\text{th})}$	$V_{\text{DS}}=V_{\text{GS}}, I_{\text{D}}=250\mu\text{A}$	1	1.6	3	V
Drain-Source On-State Resistance	$R_{\text{DS}(\text{ON})}$	$V_{\text{GS}}=10\text{V}, I_{\text{D}}=10\text{A}$	-	8	12	$\text{m}\Omega$
		$V_{\text{GS}}=4.5\text{V}, I_{\text{D}}=5\text{A}$	-	11	16	
Forward Transconductance	g_{FS}	$V_{\text{DS}}=5\text{V}, I_{\text{D}}=10\text{A}$	15	-	-	S
Dynamic Characteristics ^(Note 4)						
Input Capacitance	C_{iss}	$V_{\text{DS}}=15\text{V}, V_{\text{GS}}=0\text{V}, F=1.0\text{MHz}$	-	1550	-	PF
Output Capacitance	C_{oss}		-	300	-	PF
Reverse Transfer Capacitance	C_{rss}		-	180	-	PF
Switching Characteristics ^(Note 4)						
Turn-on Delay Time	$t_{\text{d}(\text{on})}$	$V_{\text{DD}}=25\text{V}, I_{\text{D}}=1\text{A}$ $V_{\text{GS}}=10\text{V}, R_{\text{GEN}}=6\Omega$	-	30	-	nS
Turn-on Rise Time	t_r		-	20	-	nS
Turn-Off Delay Time	$t_{\text{d}(\text{off})}$		-	100	-	nS
Turn-Off Fall Time	t_f		-	80	-	nS
Total Gate Charge	Q_g	$V_{\text{DS}}=15\text{V}, I_{\text{D}}=10\text{A}, V_{\text{GS}}=5\text{V}$	-	13	-	nC
Gate-Source Charge	Q_{gs}		-	5.5	-	nC
Gate-Drain Charge	Q_{gd}		-	3.5	-	nC
Drain-Source Diode Characteristics						
Diode Forward Voltage ^(Note 3)	V_{SD}	$V_{\text{GS}}=0\text{V}, I_{\text{s}}=10\text{A}$	-	-	1.2	V
Diode Forward Current ^(Note 2)	I_{s}		-	-	10	A

Notes:

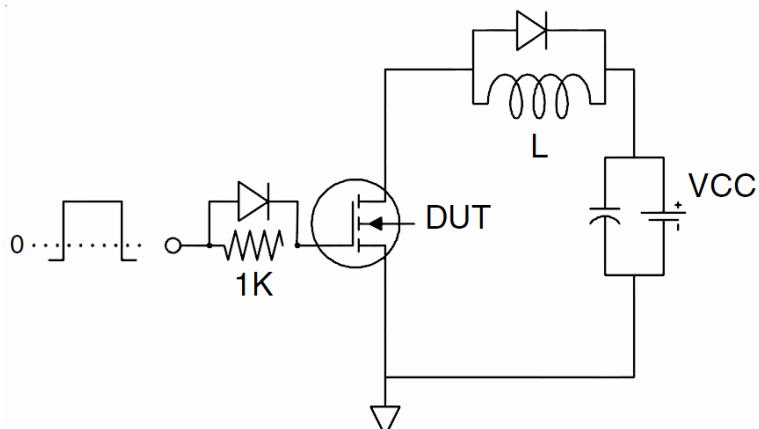
1. Repetitive Rating: Pulse width limited by maximum junction temperature.
2. Surface Mounted on FR4 Board, $t \leq 10$ sec.
3. Pulse Test: Pulse Width $\leq 300\mu\text{s}$, Duty Cycle $\leq 2\%$.
4. Guaranteed by design, not subject to production

Test Circuit

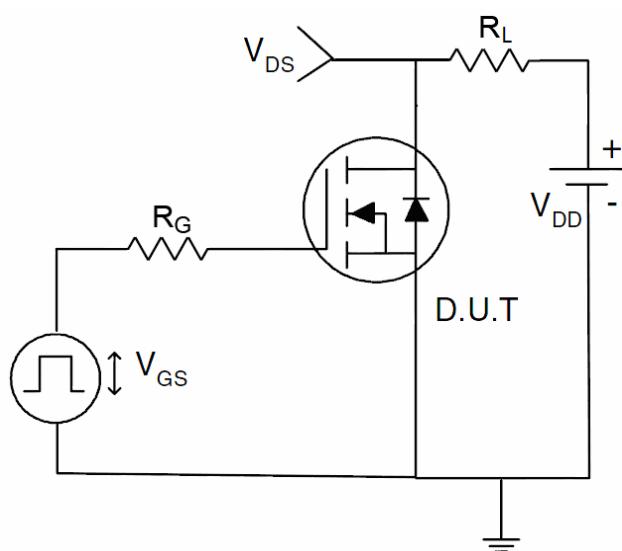
1) E_{AS} Test Circuits

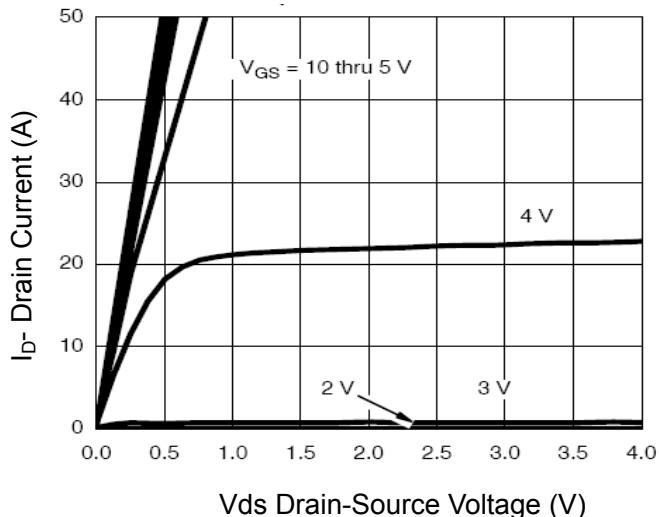
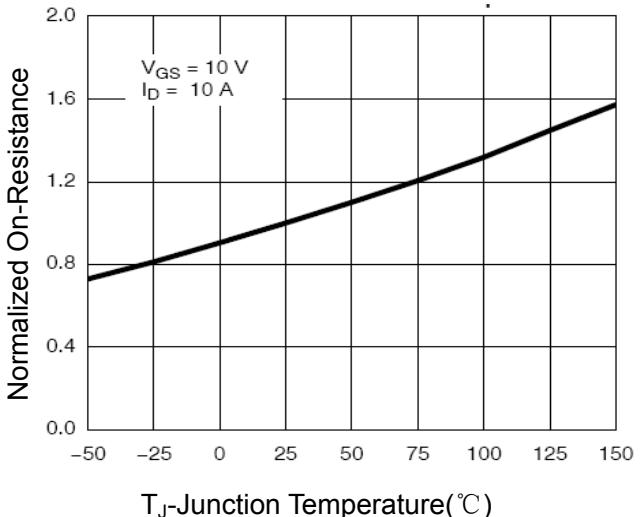
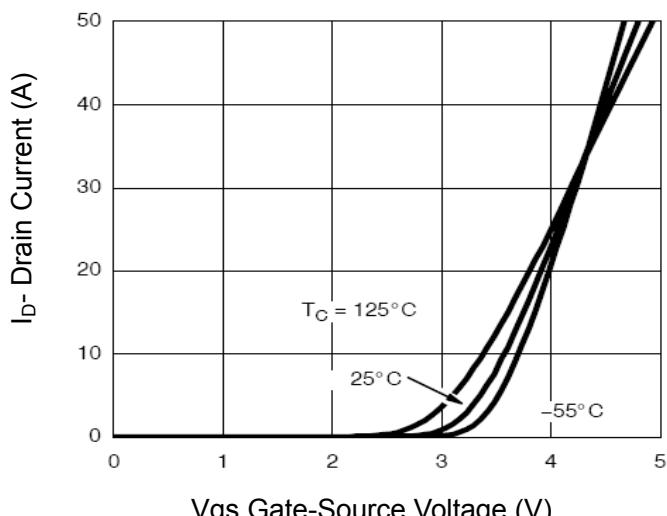
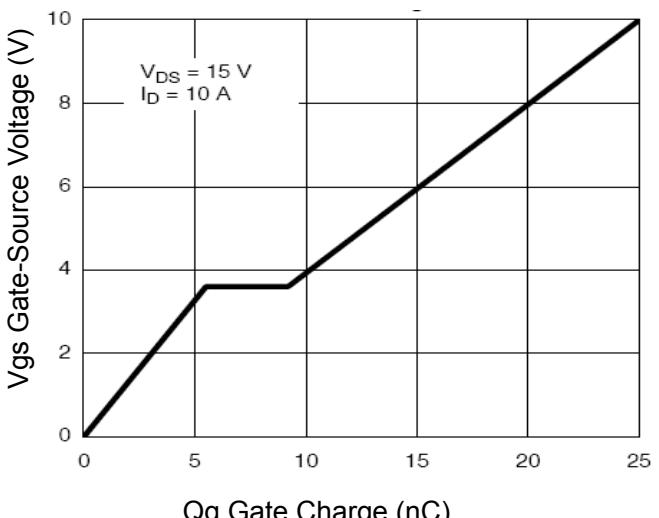
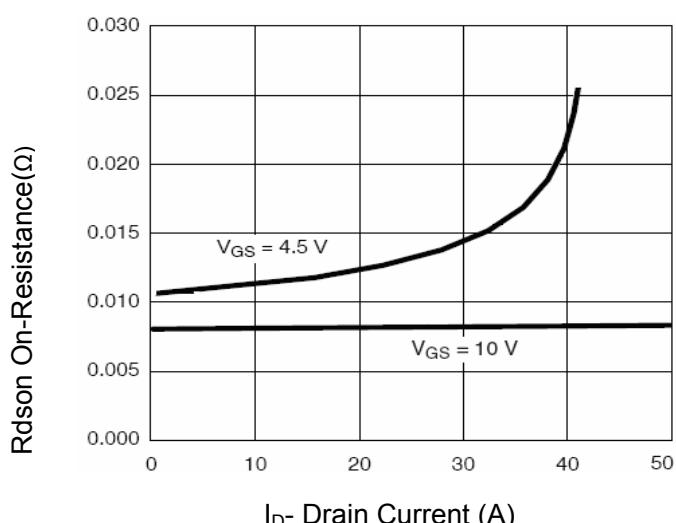
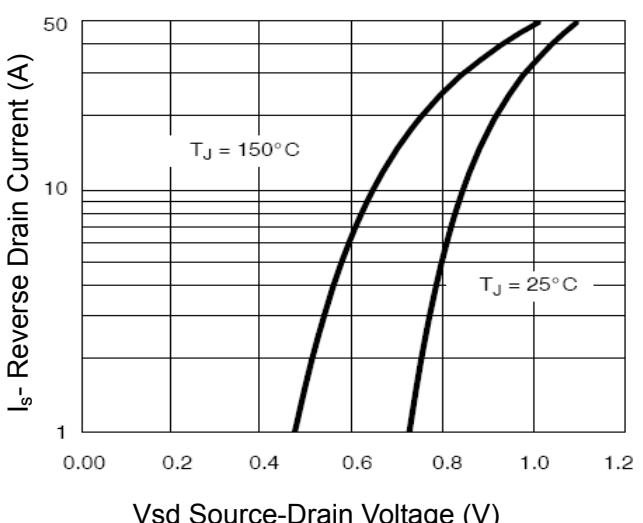


2) Gate Charge Test Circuit:



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

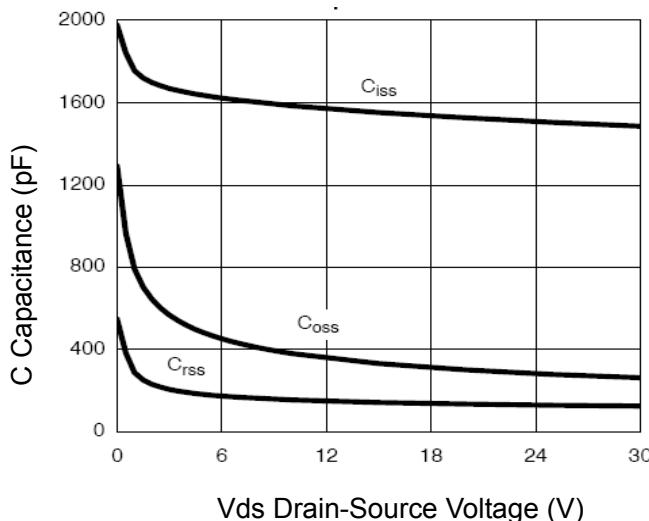


Figure 7 Capacitance vs Vds

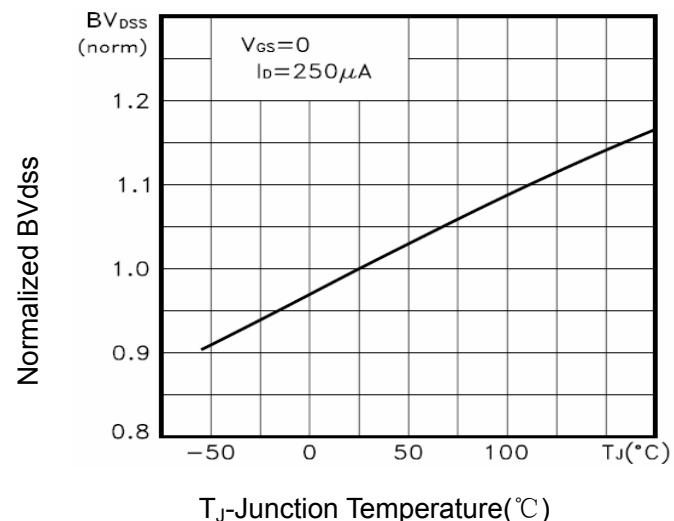


Figure 9 BV_{dss} vs Junction Temperature

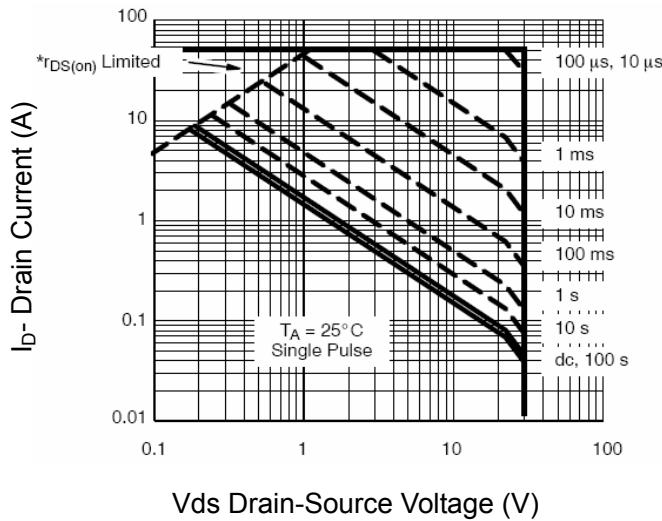


Figure 8 Safe Operation Area

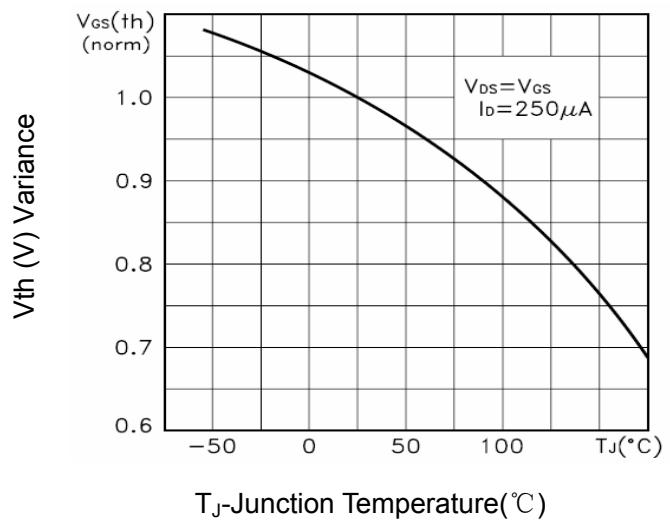


Figure 10 $V_{GS(th)}$ vs Junction Temperature

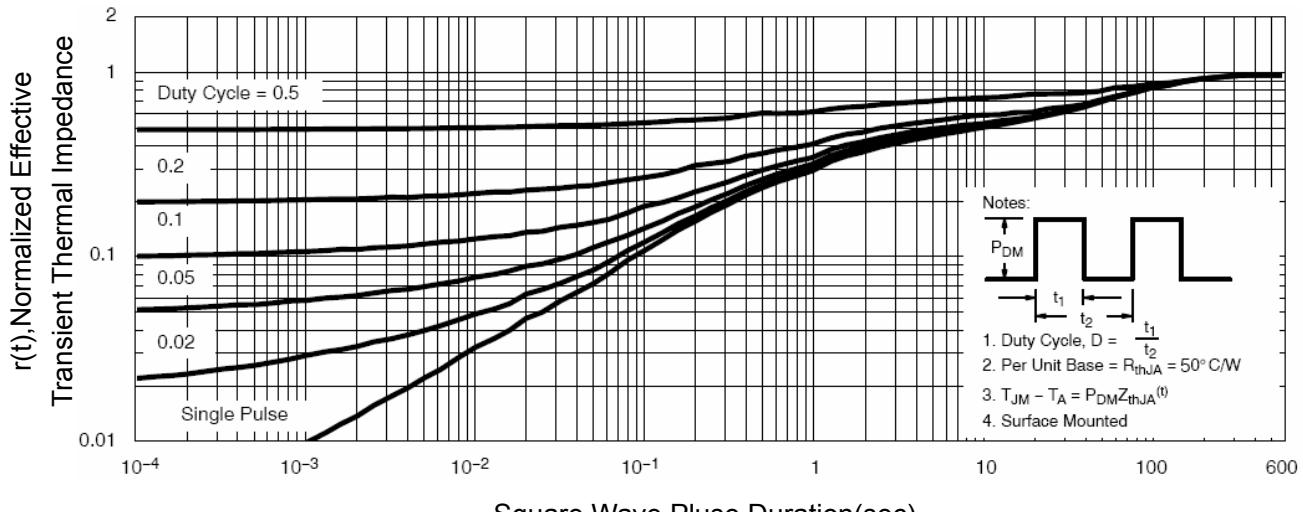
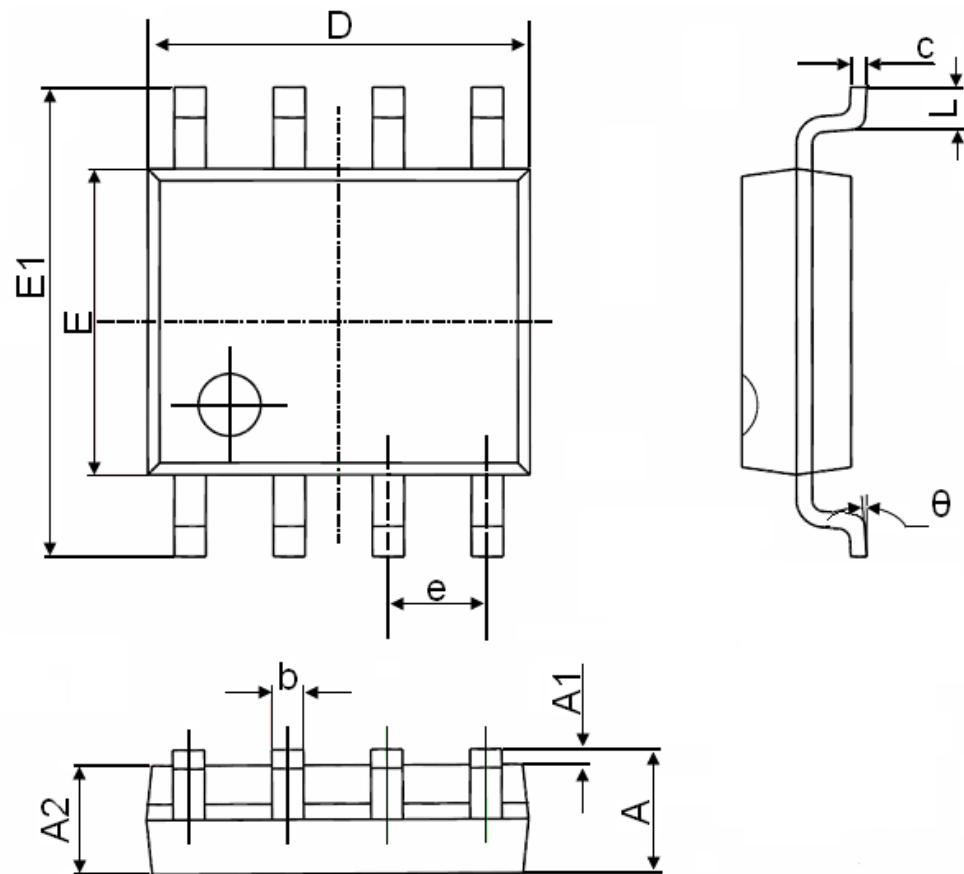


Figure 11 Normalized Maximum Transient Thermal Impedance

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°	