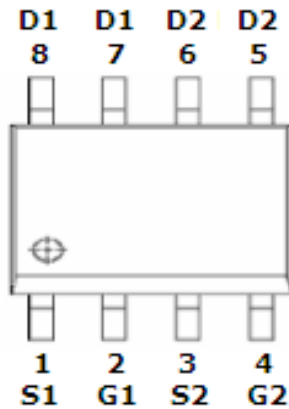


**DESCRIPTION**

The STC4606 is the N & P-Channel enhancement mode power field effect transistor using high cell density DMOS trench technology. This high density process is especially tailored to minimize on-state resistance and provide superior switching performance. This device is particularly suited for low voltage application such as notebook computer power management and other battery powered circuits, where high-side switching, low in-line power loss and resistance to transient are needed.

**PIN CONFIGURATION  
SOP-8**

**PART MARKING  
SOP-8**

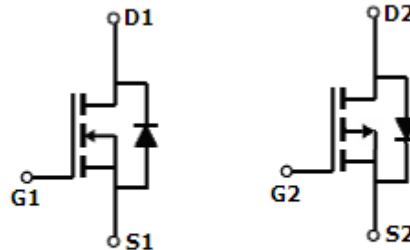

A : Year Code  
B : Produce Code  
C : Wafer Code

**FEATURE**
**N-Channel**

- 30V/6.9A,  $R_{DS(ON)} = 30m\Omega$  (Typ) @ $V_{GS} = 10V$
- 30V/6.0A,  $R_{DS(ON)} = 46m\Omega$  @ $V_{GS} = 4.5V$

**P-Channel**

- -30V/-6.0A,  $R_{DS(ON)} = 51m\Omega$  (Typ) @ $V_{GS} = -10V$
- -30V/-5.0A,  $R_{DS(ON)} = 70m\Omega$  @ $V_{GS} = -4.5V$
- Super high density cell design for extremely low  $R_{DS(ON)}$
- Exceptional on-resistance and maximum DC current capability
- SOP-8 package





**STC4606**   
Lead-free

N&P Pair Enhancement Mode MOSFET

6.0A / -6.0A

**ABSOLUTE MAXIMUM RATINGS** (Ta = 25°C Unless otherwise noted )

Parameter	Symbol	Typical		Unit
		N	P	
Drain-Source Voltage	V <sub>DSS</sub>	30	-30	V
Gate-Source Voltage	V <sub>GSS</sub>	±12	±20	V
Continuous Drain Current (T <sub>J</sub> =150°C)	I <sub>D</sub>	T <sub>A</sub> =25°C 6.0	-6.0	A
		T <sub>A</sub> =70°C 4.8	-4.0	
Pulsed Drain Current	I <sub>DM</sub>	23	-20	A
Continuous Source Current (Diode Conduction)	I <sub>S</sub>	2.0	-2.0	A
Power Dissipation	P <sub>D</sub>	T <sub>A</sub> =25°C 2.0	2.0	W
		T <sub>A</sub> =70°C 1.44	1.44	
Operation Junction Temperature	T <sub>J</sub>	150		°C
Storage Temperature Range	T <sub>STG</sub>	-55/150		°C
Thermal Resistance-Junction to Ambient	R <sub>θJA</sub>	T <sub>□</sub> 10Sec 62.5	62.5	°C/W
		Steady State 110	110	



**STC4606** 

N&P Pair Enhancement Mode MOSFET

6.0A / -6.0A

**ELECTRICAL CHARACTERISTICS** ( Ta = 25°C Unless otherwise noted )

Parameter	Symbol	Condition	Min	Typ	Max	Unit
<b>Static</b>						
Drain-Source Breakdown Voltage	$V_{(BR)DSS}$	$V_{GS}=0V, I_D=250\mu A$ $V_{GS}=0V, I_D=-250\mu A$	N P	30 -30		V
Gate Threshold Voltage	$V_{GS(th)}$	$V_{DS}=V_{GS}, I_D=250\mu A$ $V_{DS}=V_{GS}, I_D=-250\mu A$	N P	0.8 -1.0	1.8 -2.0	V
Gate Leakage Current	$I_{GSS}$	$V_{DS}=0V, V_{GS}=\pm 12V$ $V_{DS}=0V, V_{GS}=\pm 20V$	N P		$\pm 100$ $\pm 100$	nA
Zero Gate Voltage Drain Current	$I_{DSS}$ $T_J=55^\circ C$	$V_{DS}=24V, V_{GS}=0V$	N		1	uA
		$V_{DS}=-24V, V_{GS}=0V$	P		-1	
Drain-source On-Resistance	$R_{DS(on)}$	$V_{GS}=10V, I_D=6.9A$ $V_{GS}=-10V, I_D=-6.0A$	N P	0.030 0.051	0.040 0.060	$\Omega$
		$V_{GS}=4.5V, I_D=5.0A$ $V_{GS}=-4.5V, I_D=-5.0A$	N P	0.046 0.070	0.055 0.082	
Forward Tran Conductance	$g_{fs}$	$V_{DS}=5V, I_D=6.9A$ $V_{DS}=-15V, I_D=-5.9A$	N P	15 13		S
Diode Forward Voltage	$V_{SD}$	$I_S=1.0A, V_{GS}=0V$	N	0.7	1.0	V
		$I_S=-1.7A, V_{GS}=0V$	P	-0.7	-1.0	
<b>Dynamic</b>						
Total Gate Charge	$Q_g$	<b>N-Channel</b> $V_{DS}=15V, V_{GS}=10V$ $I_D \equiv 6.9A$	N P	13.8 18.5	16.6 22.2	nC
Gate-Source Charge	$Q_{gs}$		N P	1.8 2.7		
Gate-Drain Charge	$Q_{gd}$	<b>P-Channel</b> $V_{DS}=-15V, V_{GS}=-10V$ $I_D \equiv 5.0A$	N P	2.0 4.5		nC
Turn-On Time	$t_{d(on)}$ $t_r$		$V_{DS}=10V, R_L=2.2\Omega$ $I_D=1A, V_{GEN}=10V$ $R_G=3\Omega$	N P	4.6 7.7	
		Turn-Off Time	$t_{d(off)}$ $t_f$	<b>P-Channel</b> $V_{DS}=-10V, R_L=2.7\Omega$ $I_D=-1A, V_{GEN}=-3V$ $R_G=2.7\Omega$	N P	20.6 20.2
				N P	5.2 9.5	8 14

**TYPICAL CHARACTERISTICS (N MOS)**

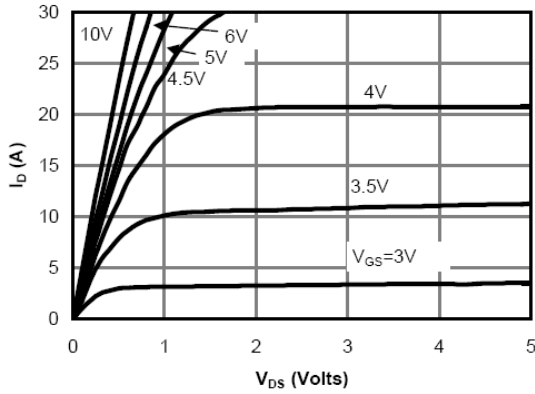


Fig 1: On-Region Characteristics

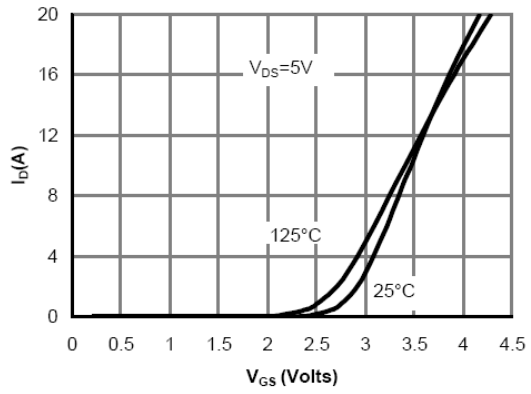


Figure 2: Transfer Characteristics

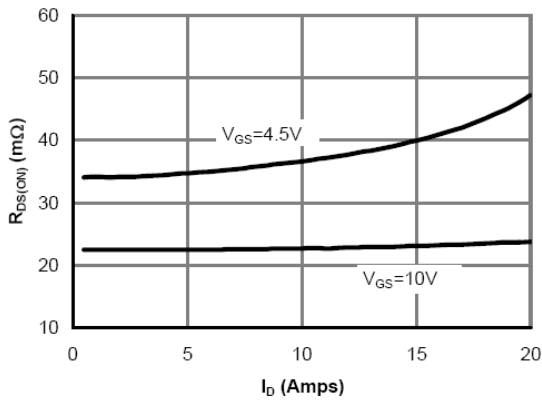


Figure 3: On-Resistance vs. Drain Current and Gate Voltage

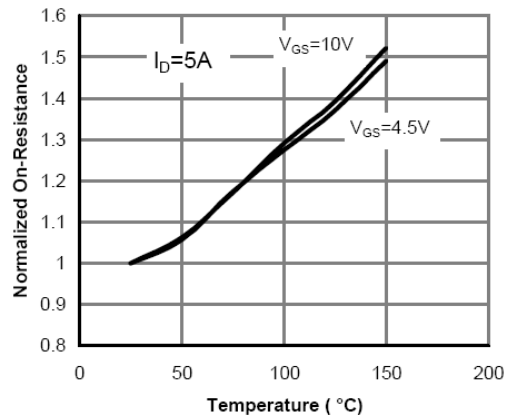


Figure 4: On-Resistance vs. Junction Temperature

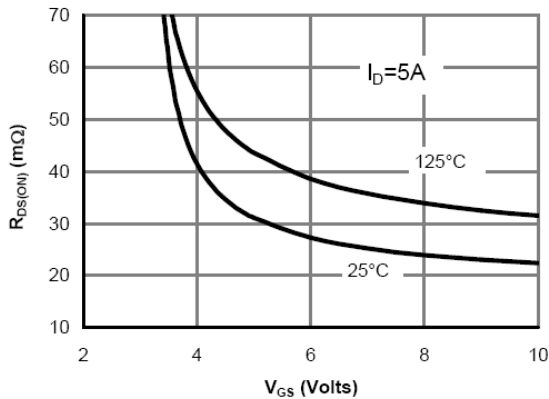


Figure 5: On-Resistance vs. Gate-Source Voltage

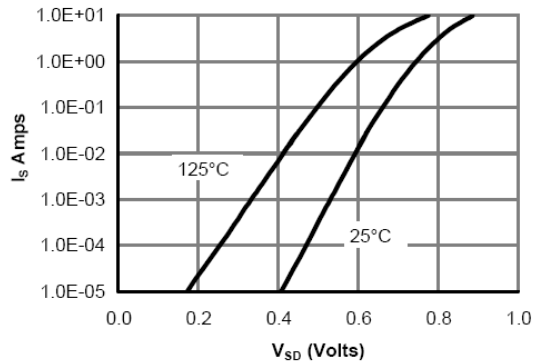


Figure 6: Body diode characteristics

**TYPICAL CHARACTERISTICS (N MOS)**

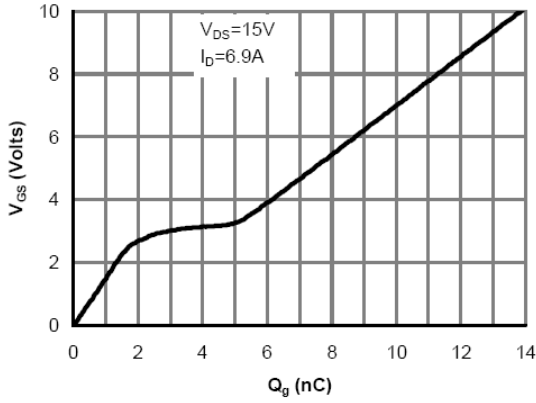


Figure 7: Gate-Charge characteristics

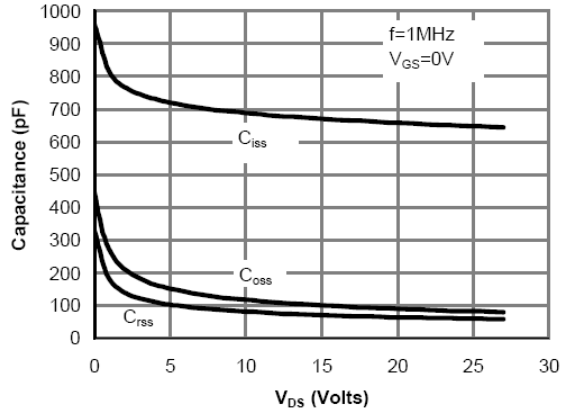


Figure 8: Capacitance Characteristics

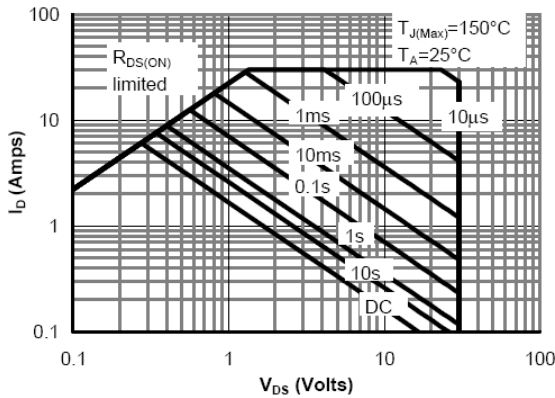


Figure 9: Maximum Forward Biased Safe Operating Area (Note E)

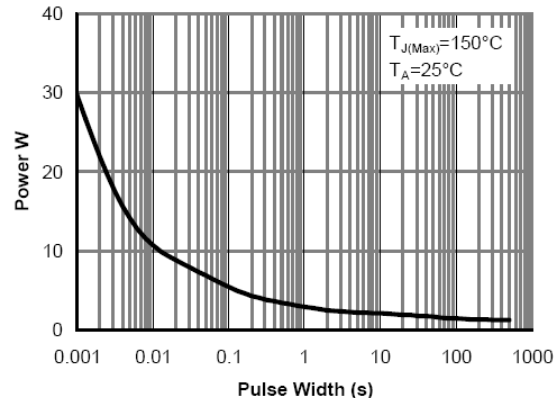


Figure 10: Single Pulse Power Rating Junction-to-Ambient (Note E)

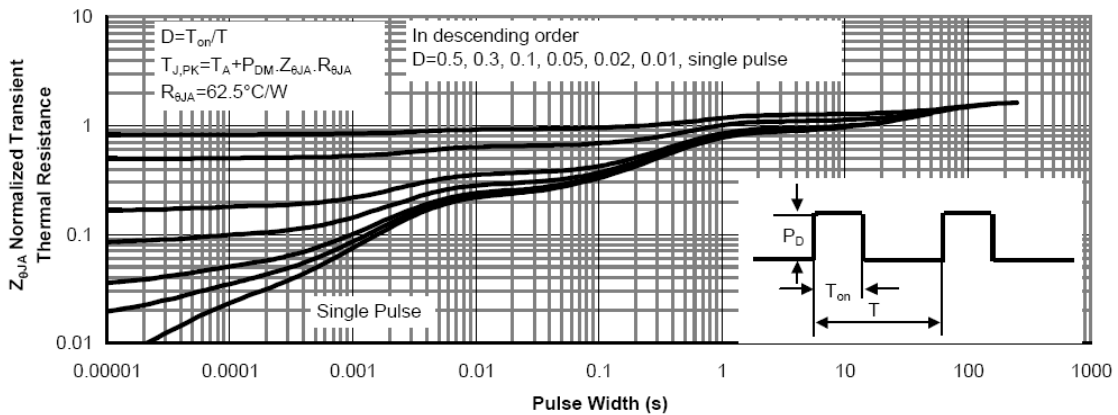


Figure 11: Normalized Maximum Transient Thermal Impedance

**TYPICAL CHARACTERISTICS (P MOS)**

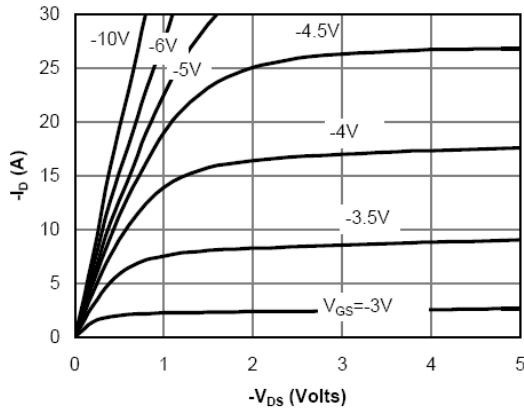


Fig 1: On-Region Characteristics

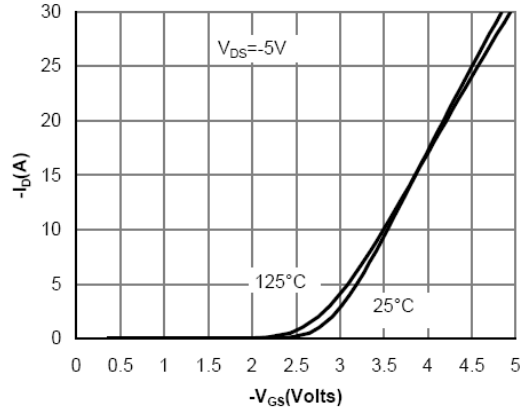


Figure 2: Transfer Characteristics

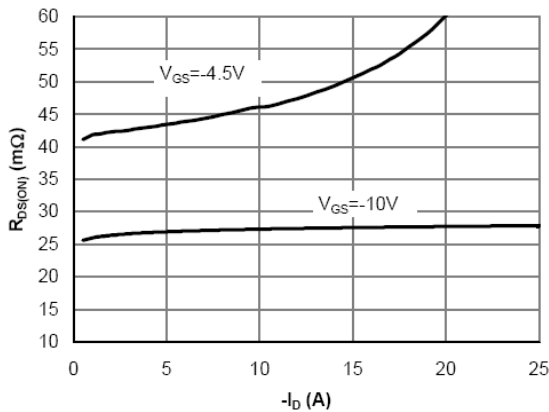


Figure 3: On-Resistance vs. Drain Current and Gate Voltage

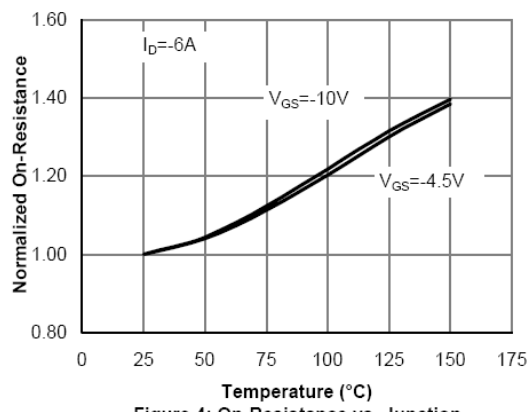


Figure 4: On-Resistance vs. Junction Temperature

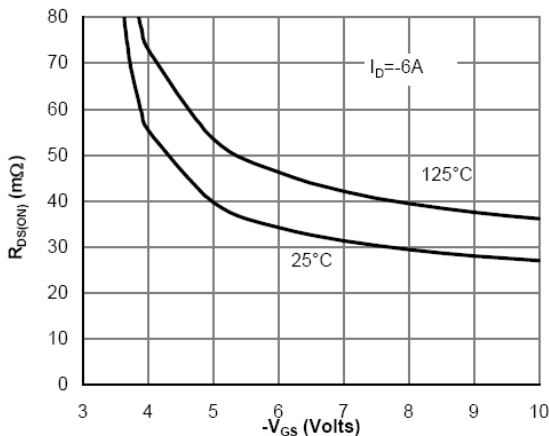


Figure 5: On-Resistance vs. Gate-Source Voltage

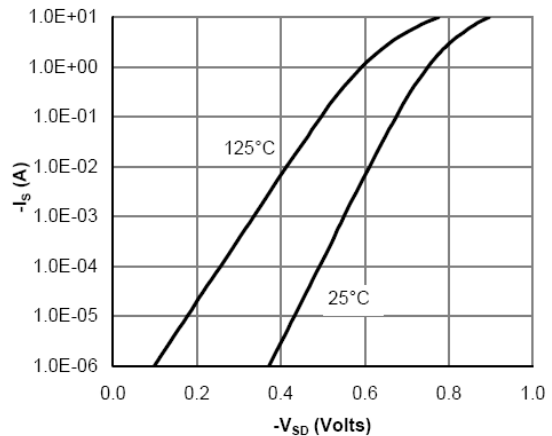


Figure 6: Body-Diode Characteristics

**TYPICAL CHARACTERISTICS (P MOS)**

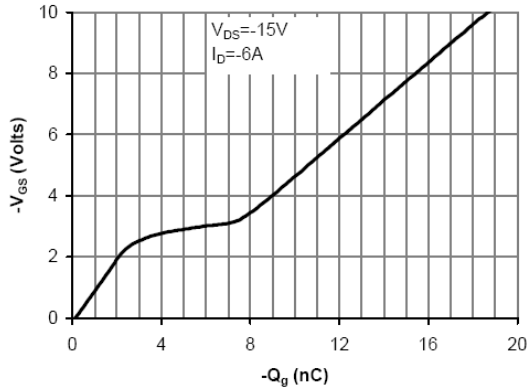


Figure 7: Gate-Charge Characteristics

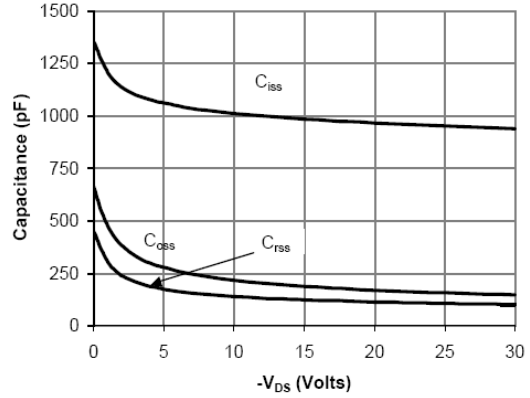


Figure 8: Capacitance Characteristics

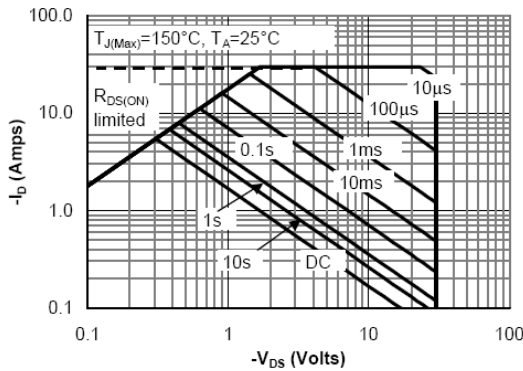


Figure 9: Maximum Forward Biased Safe Operating Area (Note E)

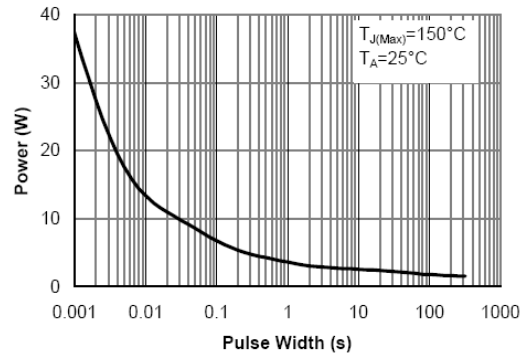


Figure 10: Single Pulse Power Rating Junction-to-Ambient (Note E)

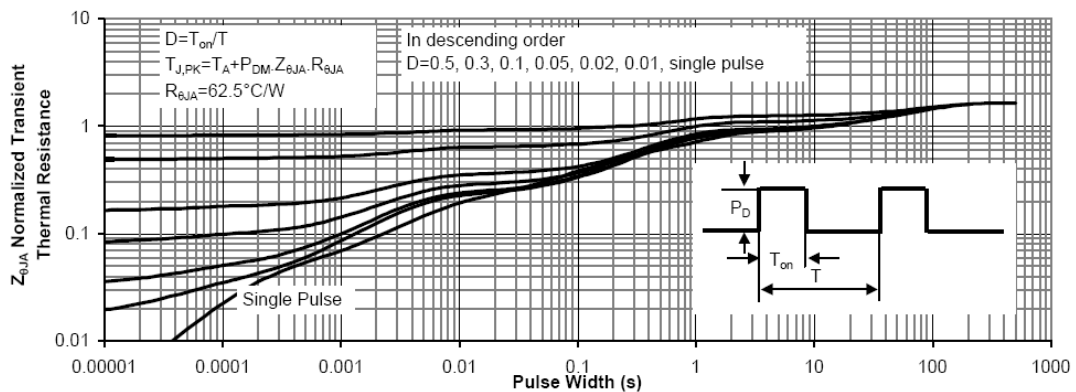
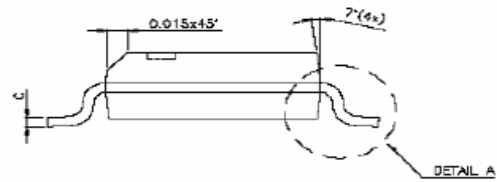
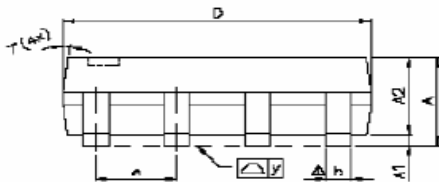
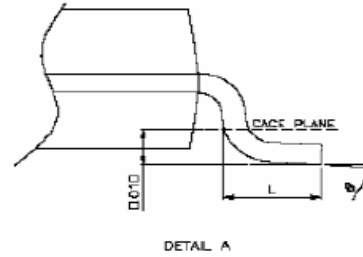
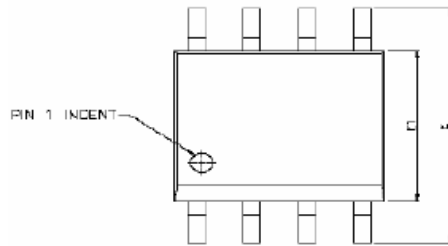


Figure 11: Normalized Maximum Transient Thermal Impedance

**SOP-8 PACKAGE OUTLINE**



SYMBOLS	DIMENSIONS IN MILLIMETERS			DIMENSIONS IN INCHES		
	MIN	NOM	MAX	MIN	NOM	MAX
A	1.47	1.60	1.73	0.058	0.063	0.068
A1	0.10	—	0.25	0.004	—	0.010
A2	—	1.45	—	—	0.057	—
b	0.33	0.41	0.51	0.013	0.016	0.020
C	0.19	0.20	0.25	0.0075	0.008	0.0098
D	4.80	4.85	4.95	0.189	0.191	0.195
E	5.80	6.00	6.20	0.228	0.236	0.244
E1	3.80	3.90	4.00	0.150	0.154	0.157
e	—	1.27	—	—	0.050	—
L	0.38	0.71	1.27	0.015	0.028	0.050
$\Delta$ y	—	—	0.076	—	—	0.003
$\varnothing$	0°	—	8°	0°	—	8°