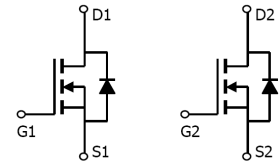


## Feature

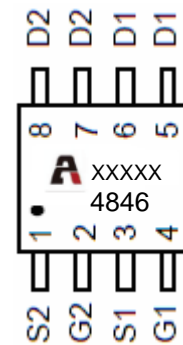
- 60V,7A  
 $R_{DS(on)} < 20m\ \Omega @ V_{GS}=10V$  TYP:15 m  $\Omega$   
 $R_{DS(on)} < 25m\ \Omega @ V_{GS}=4.5V$  TYP:19 m  $\Omega$
- Trench DMOS Power MOSFET
- Fast Switching
- Exceptional on-resistance and maximum DC current capability



Schematic diagram

## Application

- DC/DC Converter
- Load Switch for Portable Devices
- Battery Switch



Marking and pin assignment

## Package Marking and Ordering Information

Device Marking	Device	Device Package	Reel Size	Tape width	Quantity (PCS)
4846	AP4846	SOP-8	13 inch	-	4000

## ABSOLUTE MAXIMUM RATINGS ( $T_a=25^\circ\text{C}$ unless otherwise noted)

Parameter	Symbol	Value	Unit
Drain-Source Voltage	$V_{DS}$	60	V
Gate-Source Voltage	$V_{GS}$	$\pm 20$	V
Continuous Drain Current ( $T_a=25^\circ\text{C}$ )	$I_D$	7	A
Continuous Drain Current ( $T_a=100^\circ\text{C}$ )	$I_D$	5.4	A
Pulsed Drain Current <sup>(1)</sup>	$I_{DM}$	28	A
Power Dissipation	$P_D$	2	W
Thermal Resistance from Junction to Ambient	$R_{\theta JA}$	62.5	$^\circ\text{C}/\text{W}$
Junction Temperature	$T_J$	150	$^\circ\text{C}$
Storage Temperature	$T_{STG}$	-55~ +150	$^\circ\text{C}$

**MOSFET ELECTRICAL CHARACTERISTICS**( $T_a=25^{\circ}\text{C}$  unless otherwise noted)

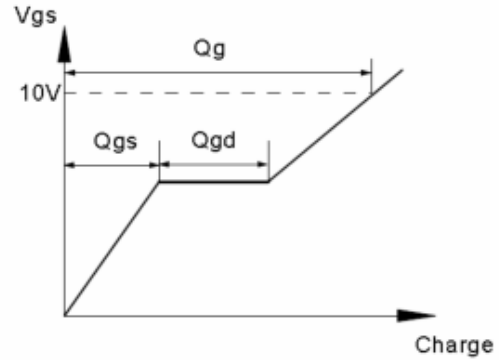
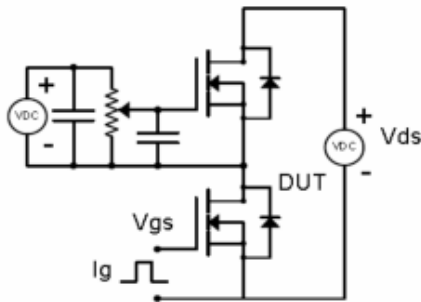
Parameter	Symbol	Test Condition	Min	Type	Max	Unit
<b>Static Characteristics</b>						
Drain-source breakdown voltage	$V_{(BR)DSS}$	$V_{GS} = 0V, I_D = 250\mu A$	60	-	-	V
Zero gate voltage drain current	$I_{DSS}$	$V_{DS} = 60V, V_{GS} = 0V$	-	-	1	$\mu A$
Gate-body leakage current	$I_{GSS}$	$V_{GS} = \pm 20V, V_{DS} = 0V$	-	-	$\pm 100$	nA
Gate threshold voltage <sup>(2)</sup>	$V_{GS(th)}$	$V_{DS} = V_{GS}, I_D = 250\mu A$	1	1.6	2.5	V
Drain-source on-resistance <sup>(2)</sup>	$R_{DS(on)}$	$V_{GS} = 10V, I_D = 7A$	-	15	20	m $\Omega$
		$V_{GS} = 4.5V, I_D = 5A$	-	19	25	
<b>Dynamic characteristics</b>						
Input Capacitance	$C_{iss}$	$V_{DS} = 25V, V_{GS} = 0V, f = 1MHz$	-	2600	-	pF
Output Capacitance	$C_{oss}$		-	125	-	
Reverse Transfer Capacitance	$C_{rss}$		-	105	-	
<b>Switching characteristics</b>						
Turn-on delay time	$t_{d(on)}$	$V_{DD} = 30V, I_D = 7A$ $V_{GS} = 10V, R_G = 6\Omega$	-	4	-	ns
Turn-on rise time	$t_r$		-	8	-	
Turn-off delay time	$t_{d(off)}$		-	27	-	
Turn-off fall time	$t_f$		-	20	-	
Total Gate Charge	$Q_g$	$V_{DS} = 30V, I_D = 7A$ $V_{GS} = 10V$	-	51	-	nC
Gate-Source Charge	$Q_{gs}$		-	8	-	
Gate-Drain Charge	$Q_{gd}$		-	8	-	
<b>Source-Drain Diode characteristics</b>						
Diode Forward voltage <sup>(2)</sup>	$V_{DS}$	$V_{GS} = 0V, I_S = 5A$	-	-	1.2	V
Diode Forward current <sup>(3)</sup>	$I_S$		-	-	7	A
Reverse recovery time	$T_{rr}$	$I_S = 7A, V_{GS} = 0V, dI_F/dt = 100A/\mu s$		21		ns
Reverse recovery charge	$Q_{rr}$	$I_S = 7A, V_{GS} = 0V, dI_F/dt = 100A/\mu s$		18		nC

**Notes:**

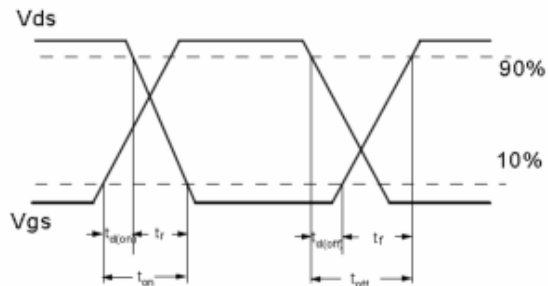
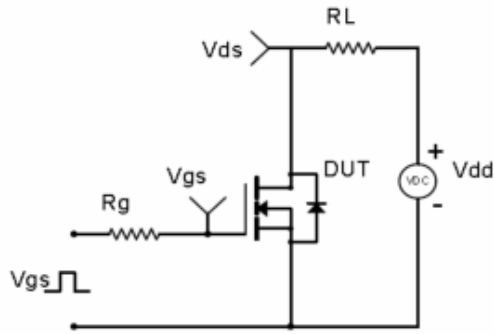
1. Repetitive Rating: pulse width limited by maximum junction temperature
2. Pulse Test: pulse width  $\leq 300\mu s$ , duty cycle  $\leq 2\%$
3. Surface Mounted on FR4 Board,  $t \leq 10$  sec

**Test Circuit & Waveform**

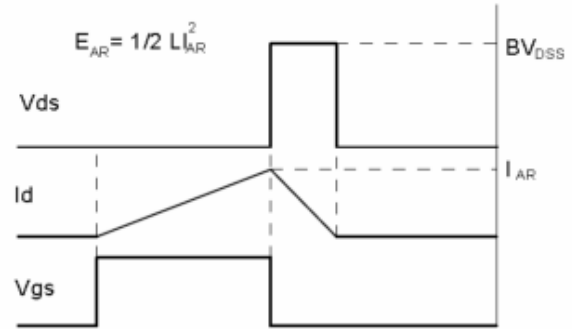
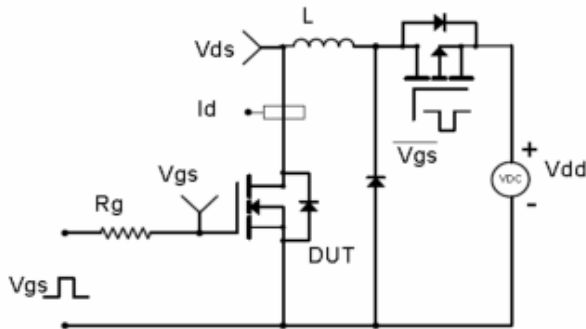
Gate Charge Test Circuit & Waveform



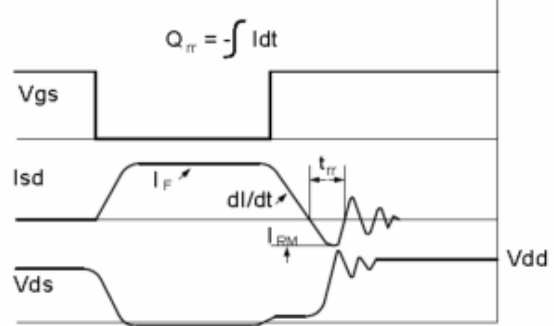
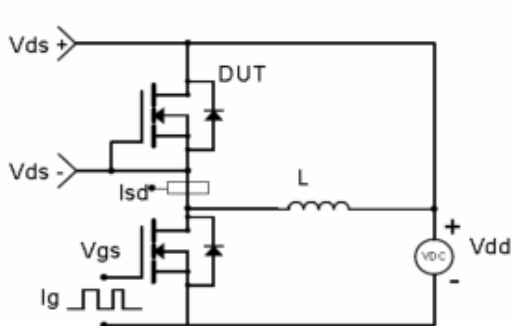
Resistive Switching Test Circuit & Waveforms



Unclamped Inductive Switching (UIS) Test Circuit & Waveforms



Diode Recovery Test Circuit & Waveforms



Typical Characteristics (@  $T_J = 25^\circ\text{C}$ , unless otherwise specified.)

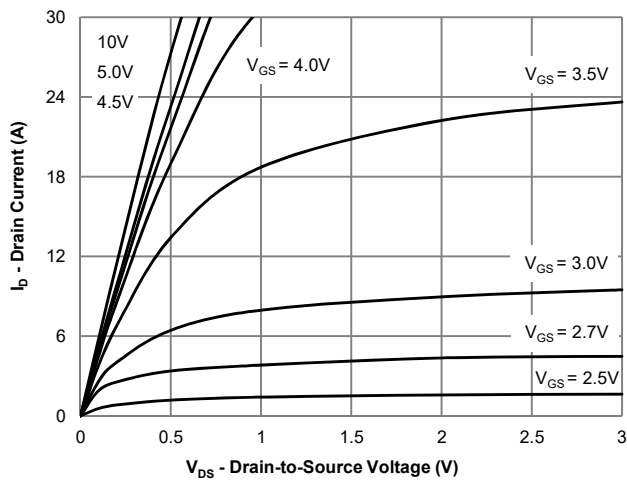


Figure 1: Output Characteristics

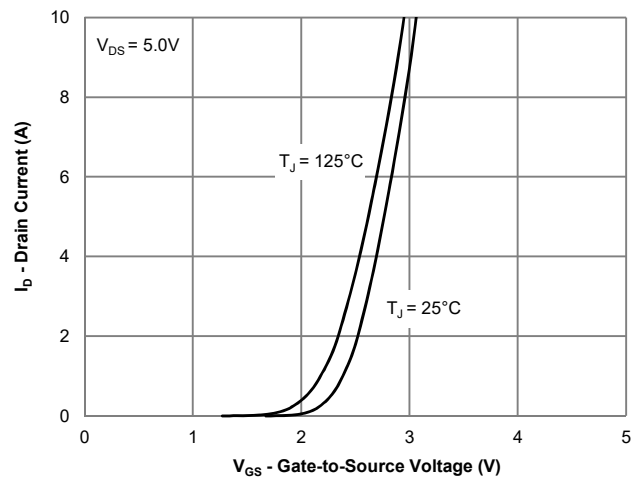


Figure 2: Transfer Characteristics

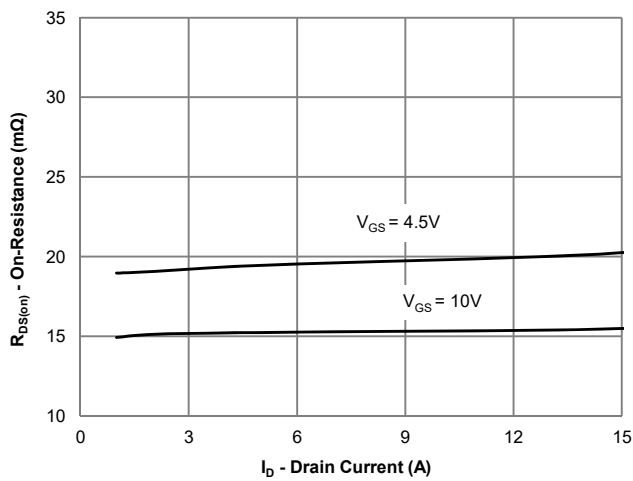


Figure 3: On-Resistance vs. Gate-Source Voltage

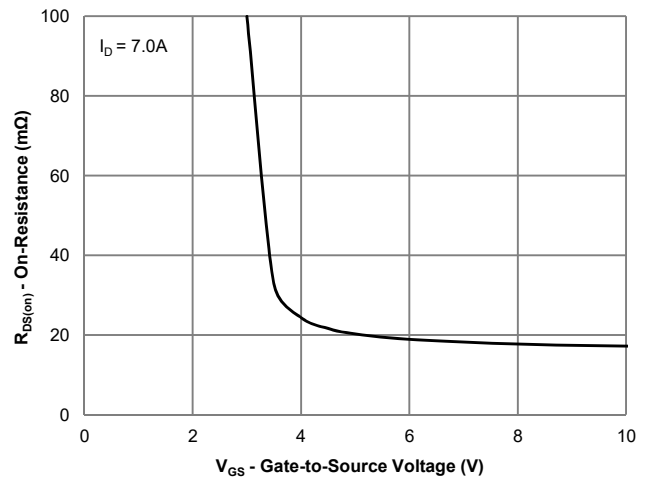


Figure 4: On-Resistance vs. Gate-Source Voltage

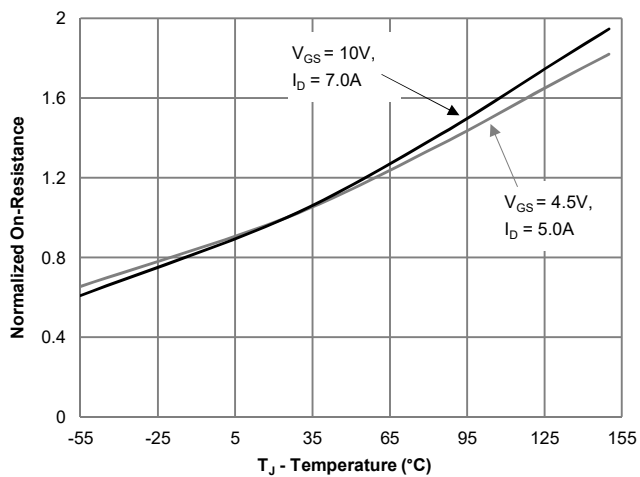


Figure 5: On-Resistance vs. Junction Temperature

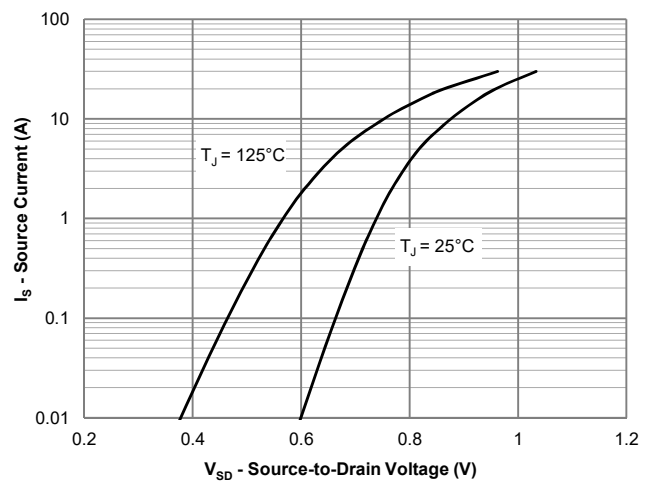


Figure 6: Source-Drain Diode Forward Voltage

Typical Characteristics (@  $T_J = 25^\circ\text{C}$ , unless otherwise specified.)

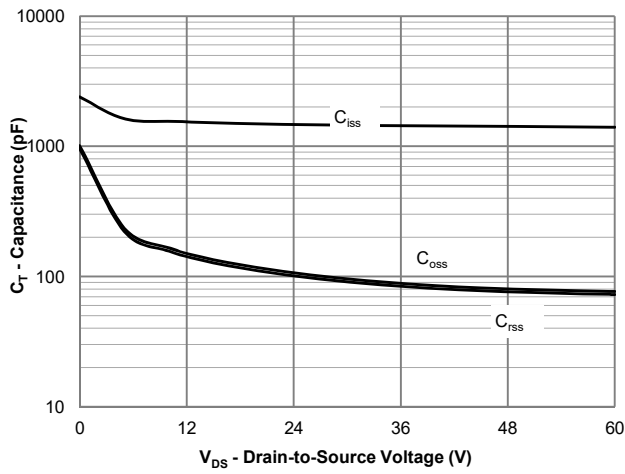


Figure 7: Capacitance Characteristics

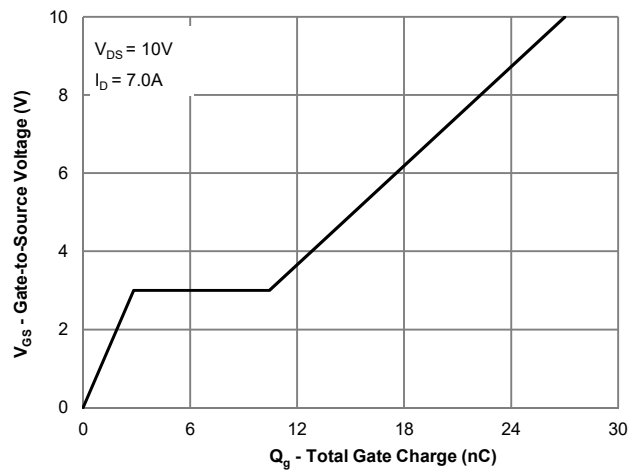


Figure 8: Gate Charge Characteristics

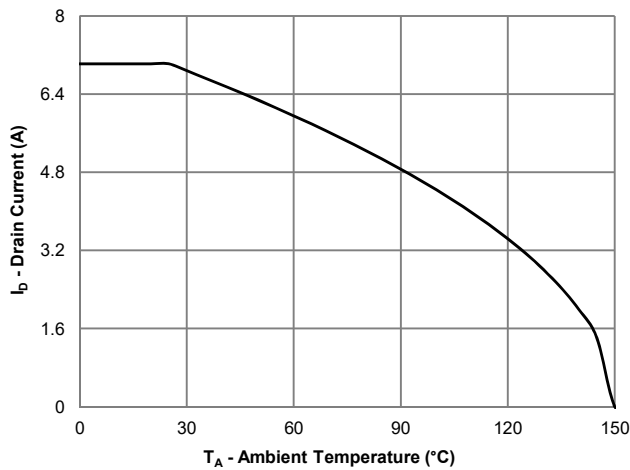


Figure 9: Current Derating

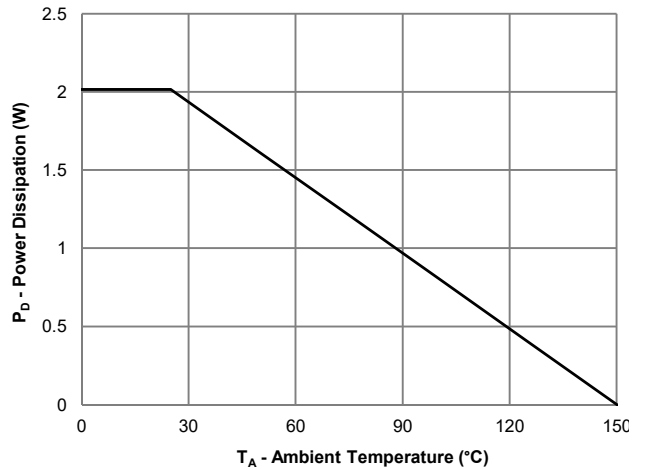


Figure 10: Power Derating

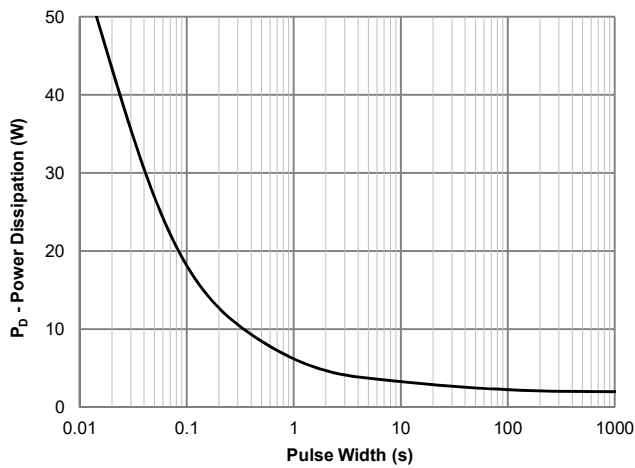


Figure 11: Single Pulse Power, Junction-to-Ambient

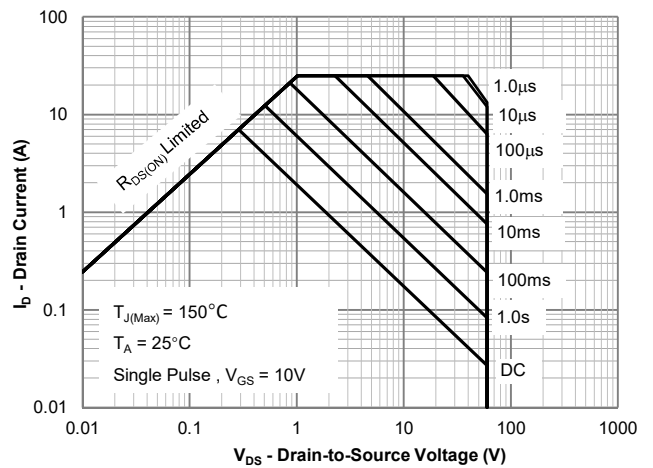


Figure 12: Safe Operating Area

Typical Characteristics (@  $T_J = 25^\circ\text{C}$ , unless otherwise specified.)

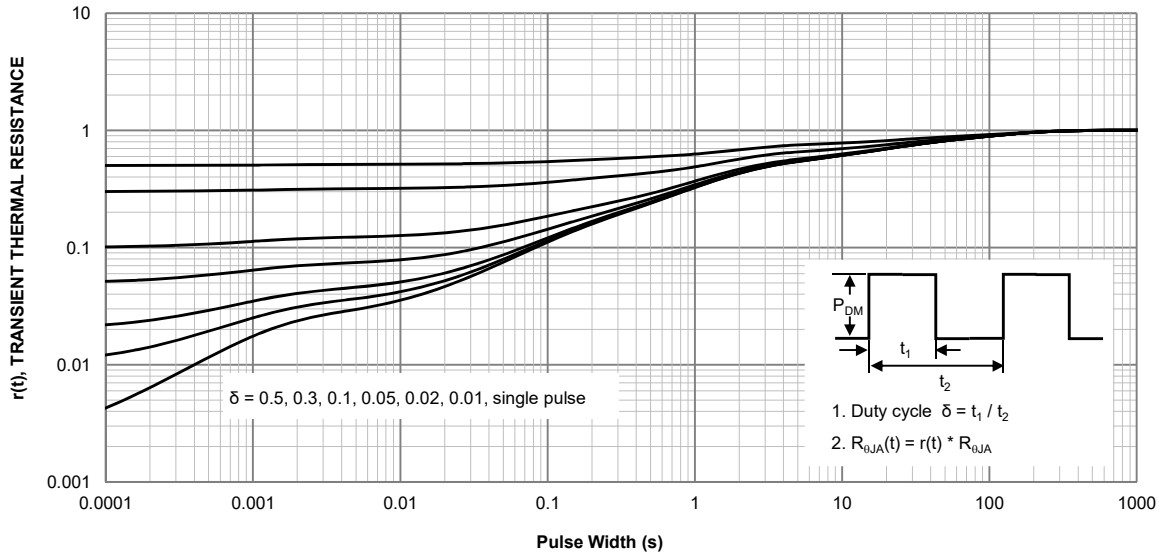
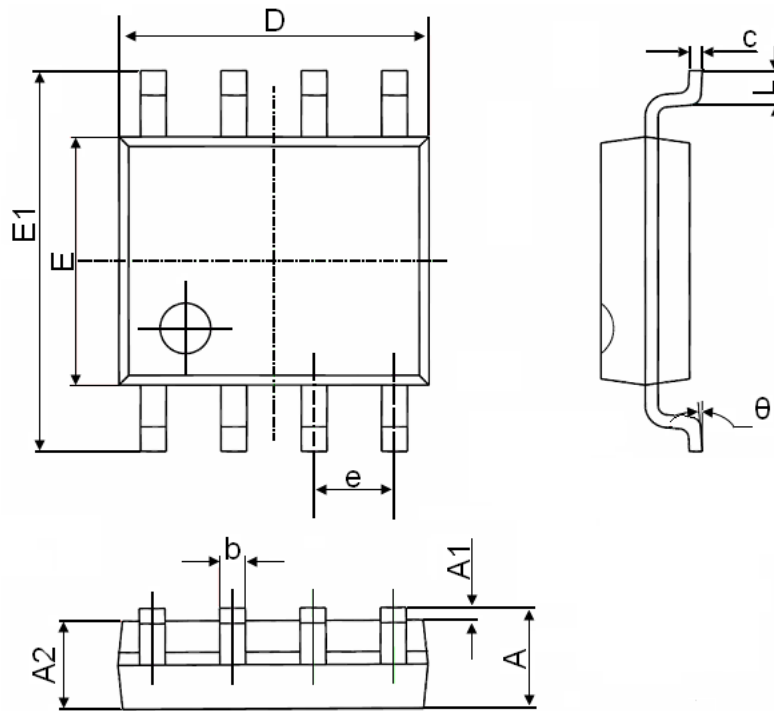


Figure 13: Normalized Thermal Transient Impedance

**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
theta	0°	8°	0°	8°

## **Disclaimer**

The information given in this document describes the independent performance of the product, but similar performance is not guaranteed under other working conditions, and cannot be guaranteed when installed with other products or equipment. To achieve the required performance of the product in actual scenarios, the customer should conduct a complete application test to assess the functionality of the product.

ALLPOWER assumes no responsibility for equipment failures result from using products at values that exceed the ratings, operating conditions, or other parameters listed in the product specifications.

The product described in this specification is not applicable for aerospace or other applications which requires high reliability. Customers using or selling these products for use in medical, life-saving, or life-sustaining applications do so at their own risk and agree to fully indemnify.

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