

## Product Summary

$V_{(BR)DSS}$	$R_{DS(ON)}$ max	$I_D$ max $T_A = +25^\circ\text{C}$
60V	18m $\Omega$ @ $V_{GS} = 10\text{V}$	9.2 A
	28m $\Omega$ @ $V_{GS} = 4.5\text{V}$	7.5 A

## Description and Applications

This MOSFET is designed to minimize the on-state resistance ( $R_{DS(ON)}$ ) and maintain superior switching performance, making it ideal for high efficiency power management applications.

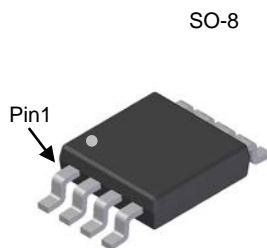
- Load Switch
- Adaptor Switch
- Notebook PC

## Features and Benefits

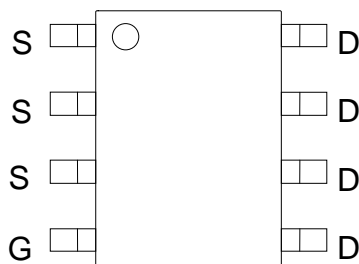
- Low On-Resistance
- Low Input Capacitance
- Fast Switching Speed
- **Totally Lead-Free & Fully RoHS Compliant (Notes 1 & 2)**
- **Halogen and Antimony Free. "Green" Device (Note 3)**

## Mechanical Data

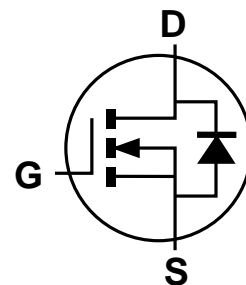
- Case: SO-8
- Case Material: Molded Plastic, "Green" Molding Compound. UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminal Connections Indicator: See diagram
- Terminals: Finish — Matte Tin annealed over Copper Leadframe. Solderable per MIL-STD-202, Method 208  $\text{e3}$
- Weight: 0.076 grams (approximate)



Top View



Pin-Out  
Top View



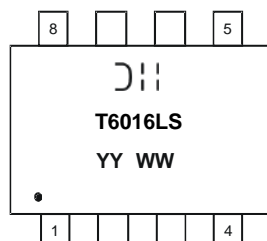
Equivalent Circuit

## Ordering Information (Note 4)

Part Number	Case	Packaging
DMT6016LSS-13	SO-8	2500/Tape & Reel

- Notes:
1. No purposely added lead. Fully EU Directive 2002/95/EC (RoHS) & 2011/65/EU (RoHS 2) compliant.
  2. See [http://www.diodes.com/quality/lead\\_free.html](http://www.diodes.com/quality/lead_free.html) for more information about Diodes Incorporated's definitions of Halogen- and Antimony-free, "Green" and Lead-free.
  3. Halogen- and Antimony-free "Green" products are defined as those which contain <900ppm bromine, <900ppm chlorine (<1500ppm total Br + Cl) and <1000ppm antimony compounds.
  4. For packaging details, go to our website at <http://www.diodes.com/products/packages.html>.

## Marking Information



$\text{D}|||$  = Manufacturer's Marking  
 T6016LS = Product Type Marking Code  
 YYWW = Date Code Marking  
 YY or YY = Year (ex: 14 = 2014)  
 WW = Week (01 - 53)

**Maximum Ratings** (@T<sub>A</sub> = +25°C, unless otherwise specified.)

Characteristic			Symbol	Value	Units
Drain-Source Voltage			V <sub>DSS</sub>	60	V
Gate-Source Voltage			V <sub>GSS</sub>	±20	V
Continuous Drain Current (Note 6) V <sub>GS</sub> = 10V	Steady State	T <sub>A</sub> = +25°C T <sub>A</sub> = +70°C	I <sub>D</sub>	9.2 7.4	A
	t<10s	T <sub>A</sub> = +25°C T <sub>A</sub> = +70°C	I <sub>D</sub>	11.9 9.5	A
Continuous Drain Current (Note 6) V <sub>GS</sub> = 4.5V	Steady State	T <sub>A</sub> = +25°C T <sub>A</sub> = +70°C	I <sub>D</sub>	7.5 6.0	A
	t<10s	T <sub>A</sub> = +25°C T <sub>A</sub> = +70°C	I <sub>D</sub>	9.7 7.7	A
Pulsed Drain Current (10µs pulse, duty cycle = 1%)			I <sub>DM</sub>	60	A
Maximum Continuous Body Diode Forward Current (Note 6)			I <sub>S</sub>	2	A
Avalanche Current (Note 7) L = 0.1mH			I <sub>AS</sub>	15.3	A
Avalanche Energy (Note 7) L = 0.1mH			E <sub>AS</sub>	11.7	mJ

**Thermal Characteristics** (@T<sub>A</sub> = +25°C, unless otherwise specified.)

Characteristic			Symbol	Value	Units
Total Power Dissipation (Note 5)			P <sub>D</sub>	1.5	W
Thermal Resistance, Junction to Ambient (Note 5)	Steady State		R <sub>θJA</sub>	85	°C/W
	t<10s		R <sub>θJA</sub>	45	°C/W
Total Power Dissipation (Note 6)			P <sub>D</sub>	2.1	W
Thermal Resistance, Junction to Ambient (Note 6)	Steady State		R <sub>θJA</sub>	74	°C/W
	t<10s		R <sub>θJA</sub>	37	°C/W
Thermal Resistance, Junction to Case			R <sub>θJC</sub>	13	°C/W
Operating and Storage Temperature Range			T <sub>J</sub> , T <sub>STG</sub>	-55 to 150	°C

**Electrical Characteristics** (@T<sub>A</sub> = +25°C, unless otherwise specified.)

Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
<b>OFF CHARACTERISTICS (Note 8)</b>						
Drain-Source Breakdown Voltage	BV <sub>DSS</sub>	60	—	—	V	V <sub>GS</sub> = 0V, I <sub>D</sub> = 250µA
Zero Gate Voltage Drain Current	I <sub>DSS</sub>	—	—	1	µA	V <sub>DS</sub> = 48V, V <sub>GS</sub> = 0V
Gate-Source Leakage	I <sub>GSS</sub>	—	—	±100	nA	V <sub>GS</sub> = ±20V, V <sub>DS</sub> = 0V
<b>ON CHARACTERISTICS (Note 8)</b>						
Gate Threshold Voltage	V <sub>GS(th)</sub>	1	—	2.5	V	V <sub>DS</sub> = V <sub>GS</sub> , I <sub>D</sub> = 250µA
Static Drain-Source On-Resistance	R <sub>DS(ON)</sub>	—	—	18	mΩ	V <sub>GS</sub> = 10V, I <sub>D</sub> = 10A
		—	—	28		V <sub>GS</sub> = 4.5V, I <sub>D</sub> = 6A
Diode Forward Voltage (Note 7)	V <sub>SD</sub>	—	0.7	1.2	V	V <sub>GS</sub> = 0V, I <sub>S</sub> = 1A
<b>DYNAMIC CHARACTERISTICS (Note 9)</b>						
Input Capacitance	C <sub>iSS</sub>	—	864	—	pF	V <sub>DS</sub> = 30V, V <sub>GS</sub> = 0V, f = 1MHz
Output Capacitance	C <sub>oss</sub>	—	282	—		
Reverse Transfer Capacitance	C <sub>rSS</sub>	—	27	—		
Gate resistance	R <sub>g</sub>	—	1.3	—	Ω	V <sub>DS</sub> = 0V, V <sub>GS</sub> = 0V, f = 1MHz
Total Gate Charge (V <sub>GS</sub> = 4.5V)	Q <sub>g</sub>	—	8.4	—	nC	V <sub>DS</sub> = 30V, I <sub>D</sub> = 10A
Total Gate Charge (V <sub>GS</sub> = 10V)	Q <sub>g</sub>	—	17	—		
Gate-Source Charge	Q <sub>gs</sub>	—	3.1	—		
Gate-Drain Charge	Q <sub>gd</sub>	—	4.3	—		
Turn-On Delay Time	t <sub>D(on)</sub>	—	3.4	—	ns	V <sub>GS</sub> = 10V, V <sub>DS</sub> = 30V, R <sub>G</sub> = 6Ω, I <sub>D</sub> = 10A
Turn-On Rise Time	t <sub>r</sub>	—	5.2	—		
Turn-Off Delay Time	t <sub>D(off)</sub>	—	13	—		
Turn-Off Fall Time	t <sub>f</sub>	—	7	—		
Reverse Recovery Time	T <sub>rr</sub>	—	22	—	ns	I <sub>F</sub> = 10A, di/dt = 100A/µs
Reverse Recovery Charge	Q <sub>rr</sub>	—	11	—	nC	

- Notes:
- Device mounted on FR-4 PC board, with minimum recommended pad layout, single sided.
  - Device mounted on FR-4 substrate PC board, 2oz copper, with thermal bias to bottom layer 1 inch square copper plate.
  - I<sub>AS</sub> and E<sub>AS</sub> rating are based on low frequency and duty cycles to keep T<sub>J</sub> = +25°C.
  - Short duration pulse test used to minimize self-heating effect.
  - Guaranteed by design. Not subject to product testing.

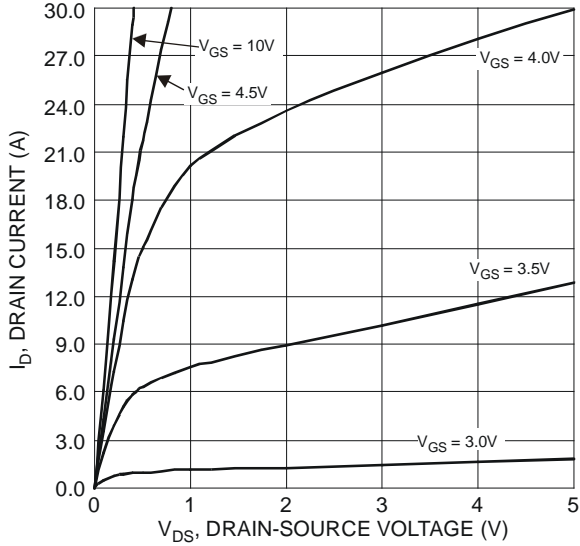


Figure 1 Typical Output Characteristics

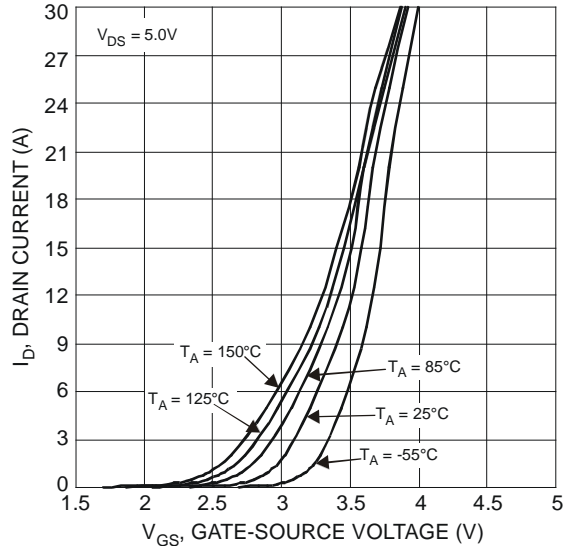


Figure 2 Typical Transfer Characteristics

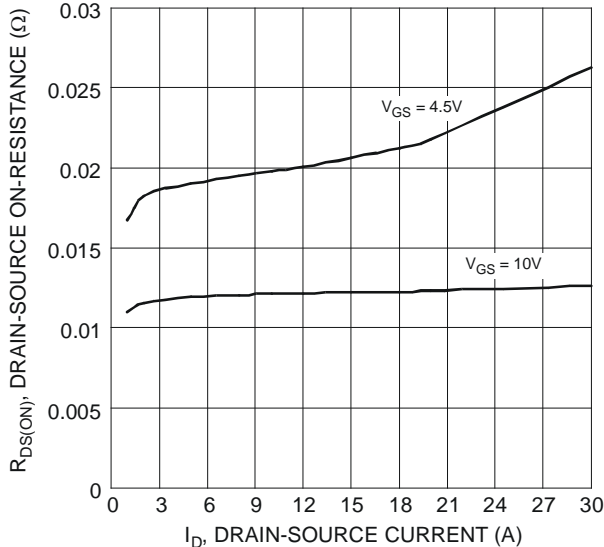


Figure 3 Typical On-Resistance vs. Drain Current and Gate Voltage

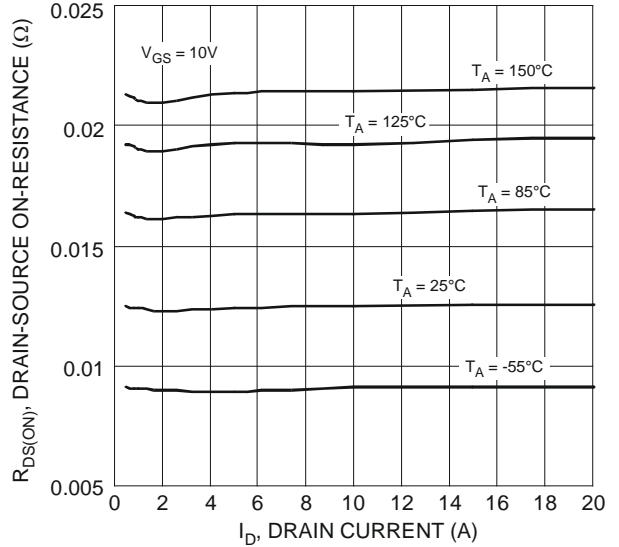


Figure 4 Typical On-Resistance vs. Drain Current and Temperature

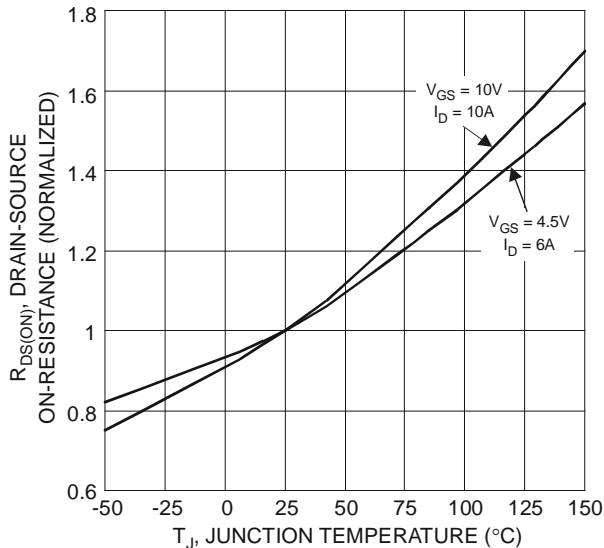


Figure 5 On-Resistance Variation with Temperature

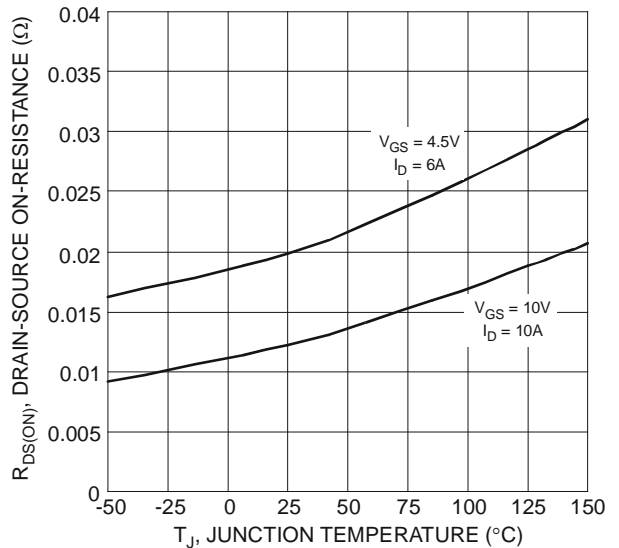


Figure 6 On-Resistance Variation with Temperature

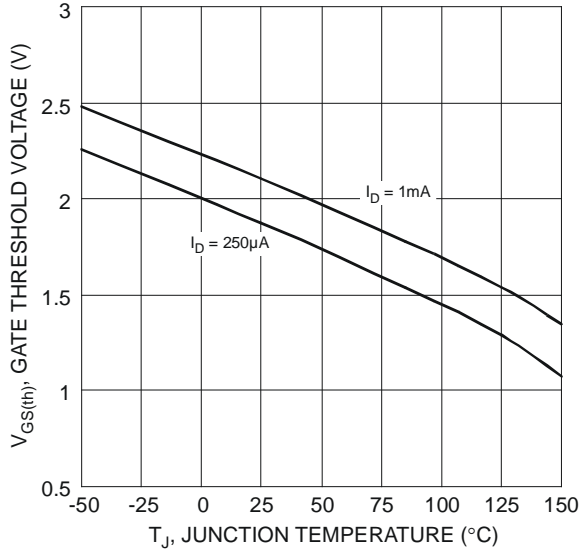


Figure 7 Gate Threshold Variation vs. Ambient Temperature

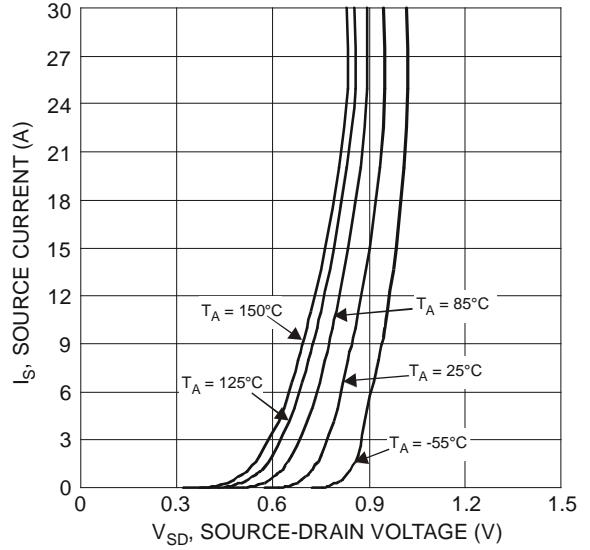


Figure 8 Diode Forward Voltage vs. Current

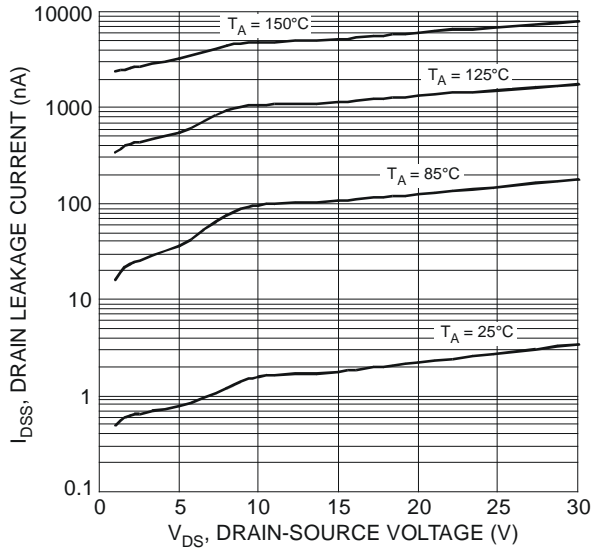


Figure 9 Typical Drain-Source Leakage Current vs. Voltage

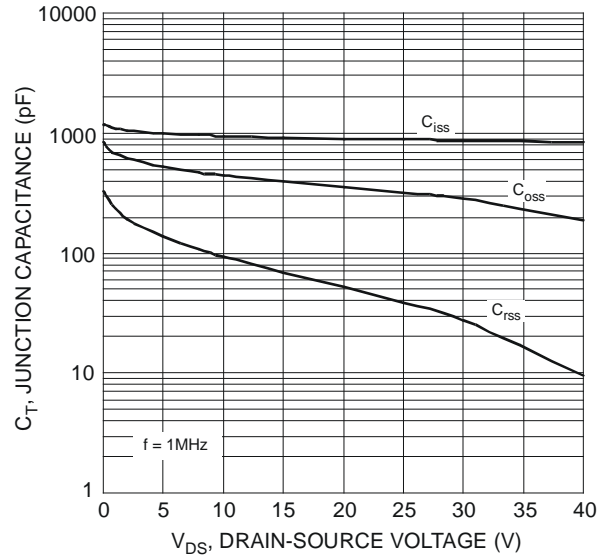


Figure 10 Typical Junction Capacitance

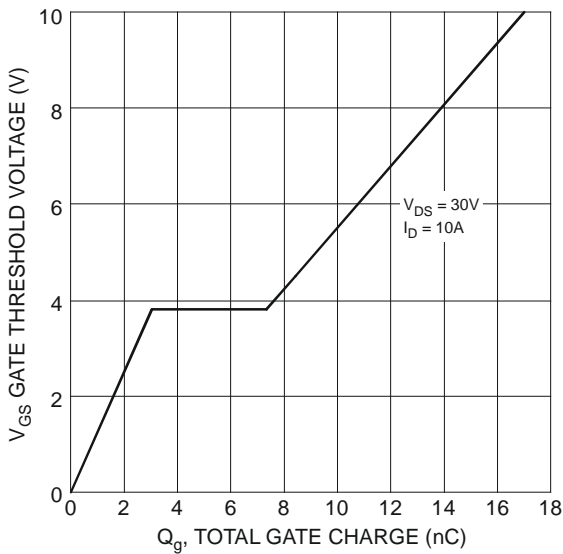


Figure 11 Gate Charge

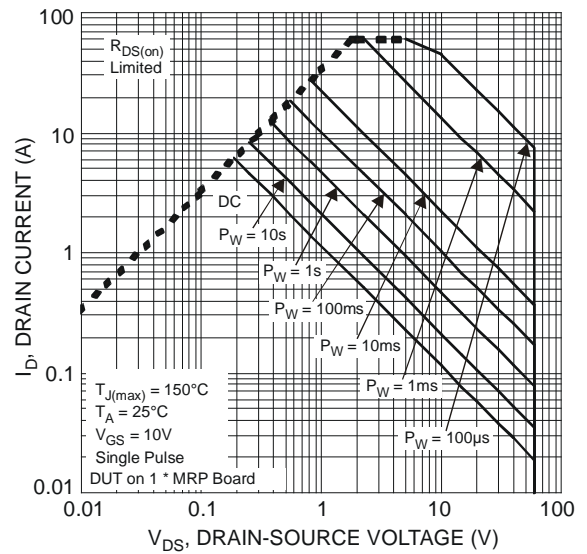


Figure 12 SOA, Safe Operation Area

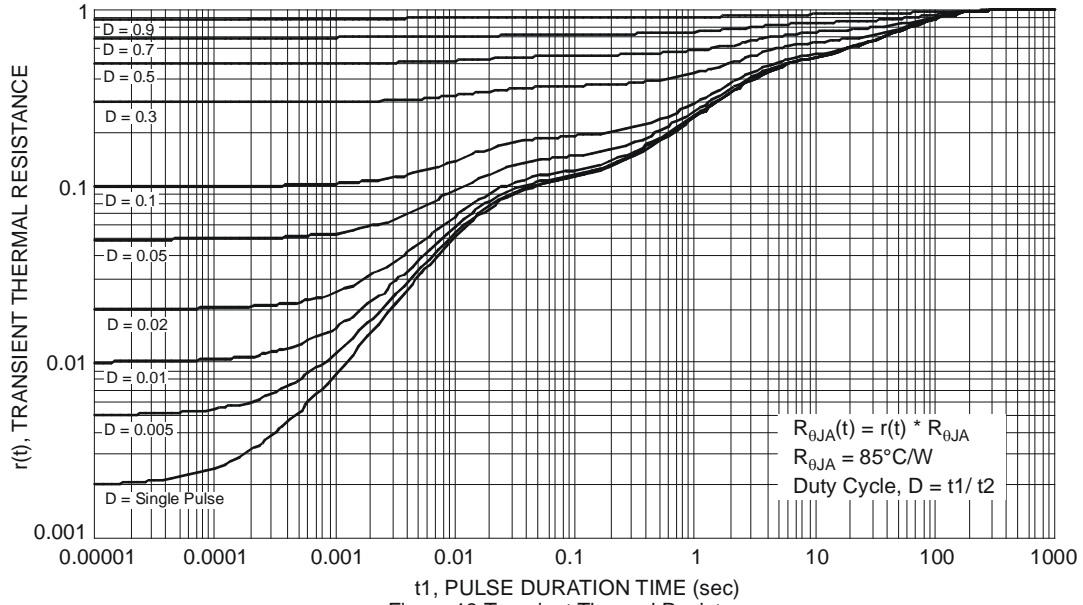
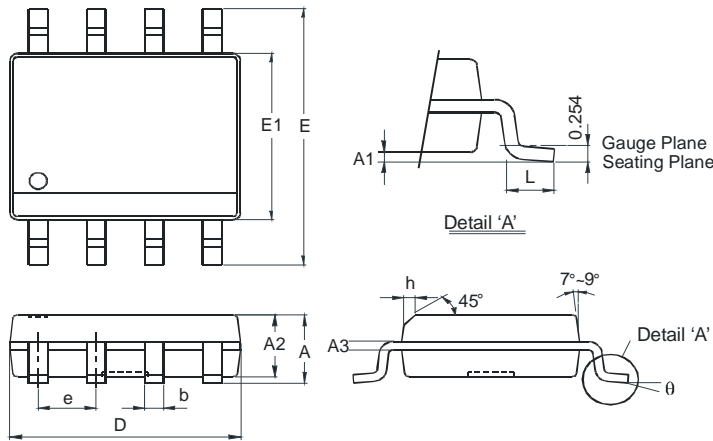


Figure 13 Transient Thermal Resistance

**Package Outline Dimensions**

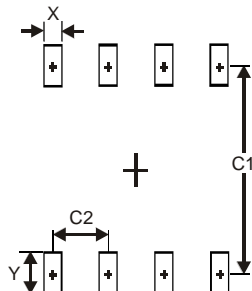
Please see AP02002 at <http://www.diodes.com/datasheets/ap02002.pdf> for the latest version.



SO-8		
Dim	Min	Max
A	-	1.75
A1	0.10	0.20
A2	1.30	1.50
A3	0.15	0.25
b	0.3	0.5
D	4.85	4.95
E	5.90	6.10
E1	3.85	3.95
e	1.27 Typ	
h	-	0.35
L	0.62	0.82
θ	0°	8°
All Dimensions in mm		

**Suggested Pad Layout**

Please see AP02002 at <http://www.diodes.com/datasheets/ap02002.pdf> for the latest version.



Dimensions	Value (in mm)
X	0.60
Y	1.55
C1	5.4
C2	1.27

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