

## Product Summary

$V_{(BR)DSS}$	$R_{DS(ON)} \text{ max}$	$I_D \text{ max}$ $T_A = +25^\circ\text{C}$
30V	11m $\Omega$ @ $V_{GS} = 10\text{V}$	10.3A
	15m $\Omega$ @ $V_{GS} = 4.5\text{V}$	9.3A

## Description

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


## Applications

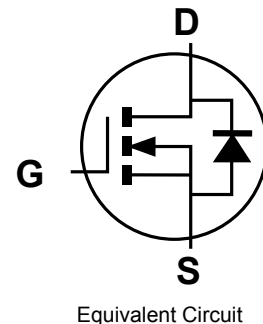
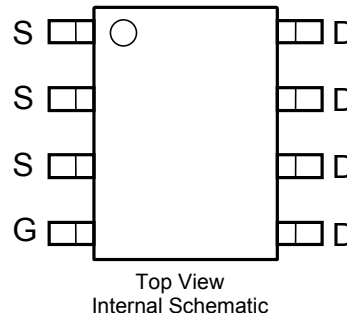
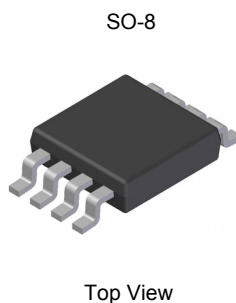
- Backlighting
- Power Management Functions
- DC-DC Converters

## Features and Benefits

- 100% Unclamped Inductive Switch (UIS) test in production
- 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)**
- **Qualified to AEC-Q101 Standards for High Reliability**

## 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 
- Weight: 0.008 grams (approximate)

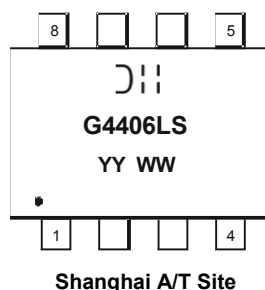
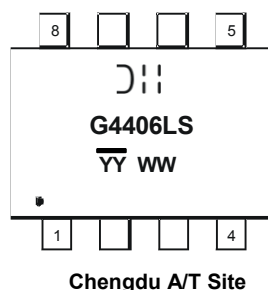



## Ordering Information (Note 4)

Part Number	Case	Packaging
DMG4406LSS-13	SO-8	2,500/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



 = Manufacturer's Marking  
 G4406LS = Product Type Marking Code  
 YYWW = Date Code Marking  
 YY or YY = Year (ex: 13 = 2013)  
 WW = Week (01 - 53)  
 YY = Date Code Marking for SAT (Shanghai Assembly/ Test site)  
 YY = Date Code Marking for CAT (Chengdu Assembly/ Test site)

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

Characteristic			Symbol	Value	Units
Drain-Source Voltage			V <sub>DSS</sub>	30	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>	10.3 8.3	A
	t < 10s	T <sub>A</sub> = +25°C T <sub>A</sub> = +70°C	I <sub>D</sub>	13.4 10.6	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>	9.3 7.3	A
	t < 10s	T <sub>A</sub> = +25°C T <sub>A</sub> = +70°C	I <sub>D</sub>	12.0 9.5	A
Maximum Continuous Body Diode Forward Current (Note 6)			I <sub>S</sub>	2.5	A
Pulsed Drain Current (10µs pulse, duty cycle = 1%)			I <sub>DM</sub>	90	A
Avalanche Current (Note 7) L = 0.1mH			I <sub>AR</sub>	22	A
Repetitive Avalanche Energy (Note 7) L = 0.1mH			E <sub>AR</sub>	24	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>	80	°C/W
	t < 10s		48	°C/W
Total Power Dissipation (Note 6)		P <sub>D</sub>	2.0	W
Thermal Resistance, Junction to Ambient (Note 6)	Steady State	R <sub>θJA</sub>	61	°C/W
	t < 10s		37	°C/W
Thermal Resistance, Junction to Case		R <sub>θJC</sub>	6.4	°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>	30	—	—	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> = 30V, 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>	1.4	—	2.0	V	V <sub>DS</sub> = V <sub>GS</sub> , I <sub>D</sub> = 250µA
Static Drain-Source On-Resistance	R <sub>DS(on)</sub>	—	8	11	mΩ	V <sub>GS</sub> = 10V, I <sub>D</sub> = 12A
		—	12	15		V <sub>GS</sub> = 4.5V, I <sub>D</sub> = 10A
Forward Transfer Admittance	Y <sub>fs</sub>	—	32	-	S	V <sub>DS</sub> = 5V, I <sub>D</sub> = 12A
Diode Forward Voltage	V <sub>SD</sub>	—	0.70	1.0	V	V <sub>GS</sub> = 0V, I <sub>S</sub> = 1A
<b>DYNAMIC CHARACTERISTICS (Note 9)</b>						
Input Capacitance	C <sub>iss</sub>	—	1281	—	pF	V <sub>DS</sub> = 15V, V <sub>GS</sub> = 0V, f = 1.0MHz
Output Capacitance	C <sub>oss</sub>	—	145	—		
Reverse Transfer Capacitance	C <sub>rss</sub>	—	125	—		
Gate resistance	R <sub>g</sub>	—	1.2	—	Ω	V <sub>DS</sub> = 0V, V <sub>GS</sub> = 0V, f = 1.0MHz
Total Gate Charge (V <sub>GS</sub> = 4.5V)	Q <sub>g</sub>	—	12.5	—	nC	V <sub>DS</sub> = 15V, I <sub>D</sub> = 12A
Total Gate Charge (V <sub>GS</sub> = 10V)	Q <sub>g</sub>	—	26.7	—		
Gate-Source Charge	Q <sub>gs</sub>	—	3.6	—		
Gate-Drain Charge	Q <sub>gd</sub>	—	4.4	—		
Turn-On Delay Time	t <sub>D(on)</sub>	—	5.2	—	ns	V <sub>DD</sub> = 15V, V <sub>GS</sub> = 10V, R <sub>L</sub> = 1.25Ω, R <sub>G</sub> = 3Ω,
Turn-On Rise Time	t <sub>r</sub>	—	21.2	—		
Turn-Off Delay Time	t <sub>D(off)</sub>	—	22.3	—		
Turn-Off Fall Time	t <sub>f</sub>	—	5.1	—	ns	IF = 12A, di/dt = 500A/µs
Reverse Recovery Time	t <sub>rr</sub>	—	8.5	—		
Reverse Recovery Charge	Q <sub>rr</sub>	—	7.0	—	nC	

- Notes:
- Device mounted on FR-4 substrate PC board, 2oz copper, with minimum recommended pad layout.
  - Device mounted on FR-4 substrate PC board, 2oz copper, with 1inch square copper plate.
  - I<sub>AR</sub> and E<sub>AR</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.

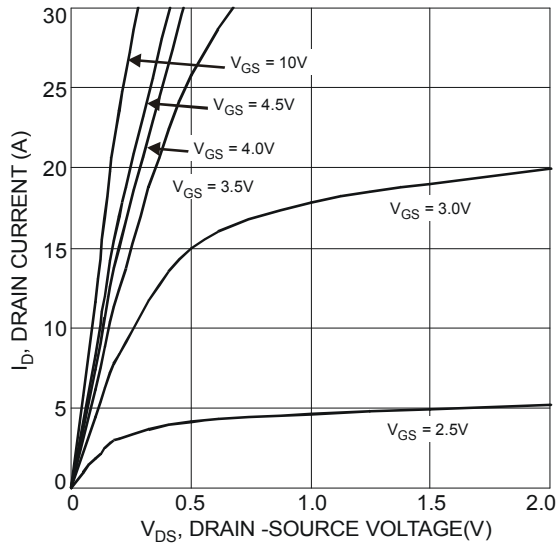


Fig. 1 Typical Output Characteristics

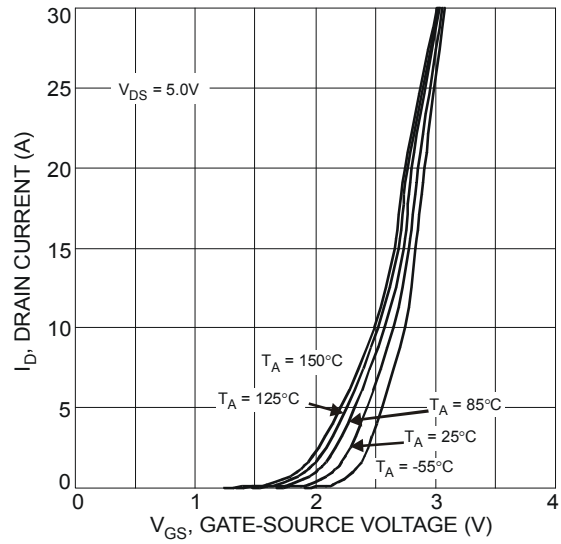


Fig. 2 Typical Transfer Characteristics

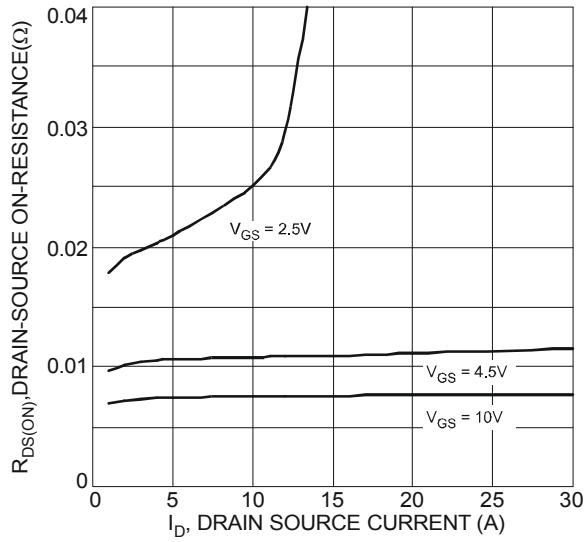


Fig. 3 Typical On-Resistance vs. Drain Current and Gate Voltage

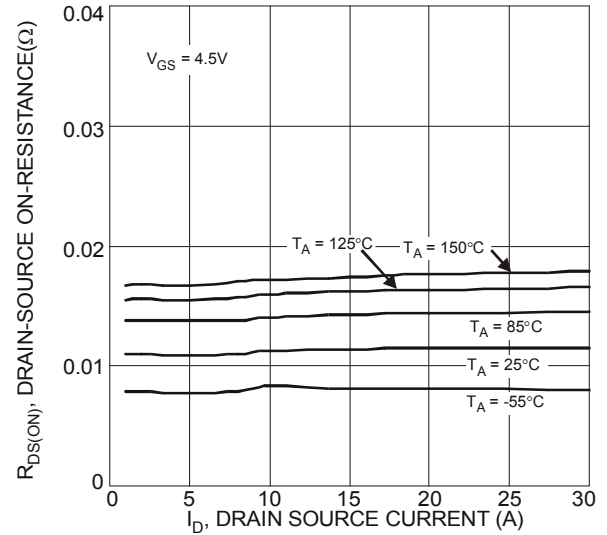


Fig. 4 Typical On-Resistance vs. Drain Current and Temperature

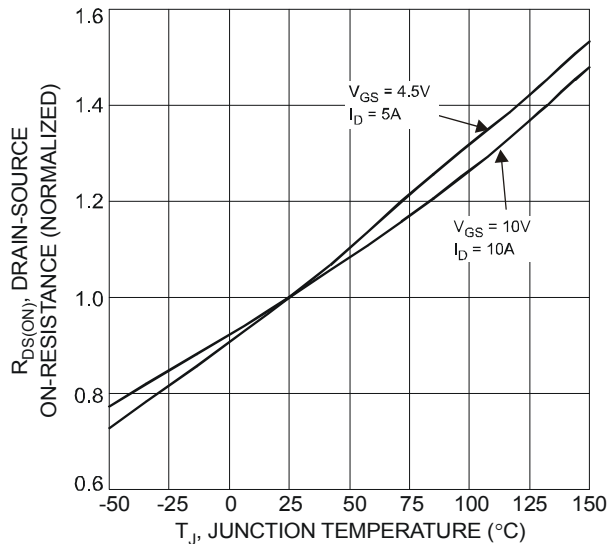


Fig. 5 On-Resistance Variation with Temperature

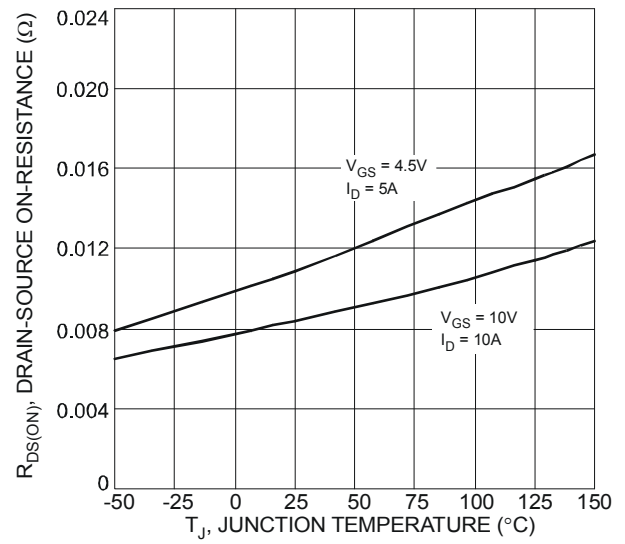


Fig. 6 On-Resistance Variation with Temperature

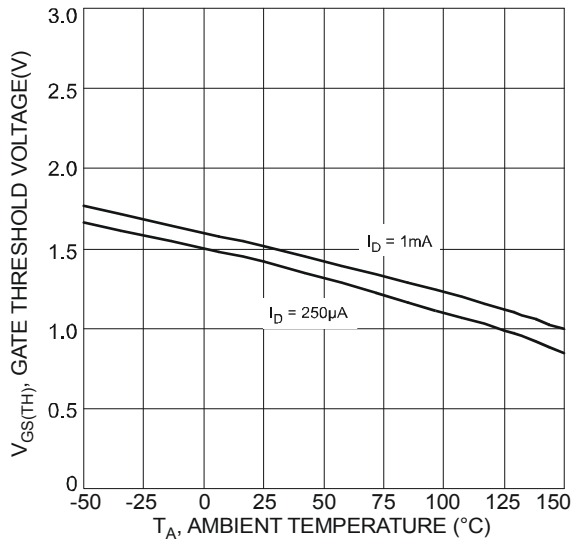


Fig. 7 Gate Threshold Variation vs. Ambient Temperature

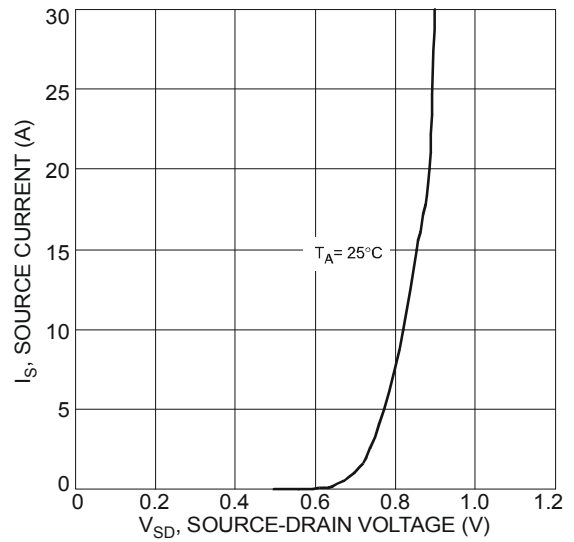


Fig. 8 Diode Forward Voltage vs. Current

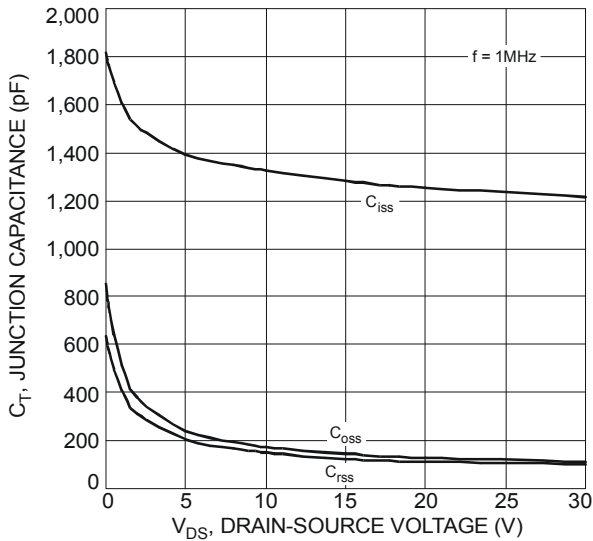


Fig. 9 Typical Junction Capacitance

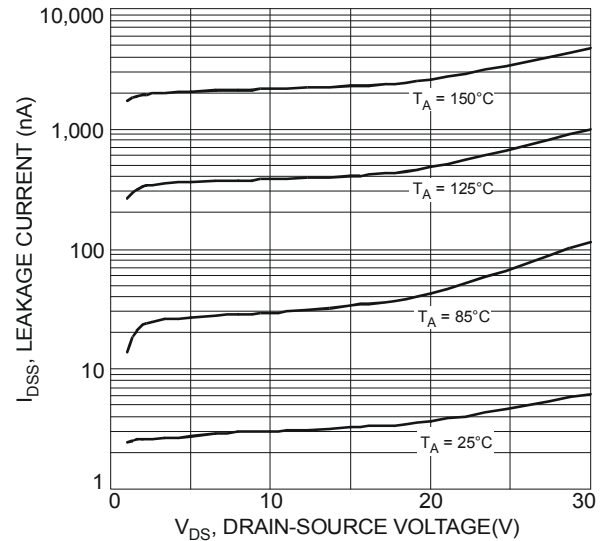


Fig. 10 Typical Drain-Source Leakage Current vs. Voltage

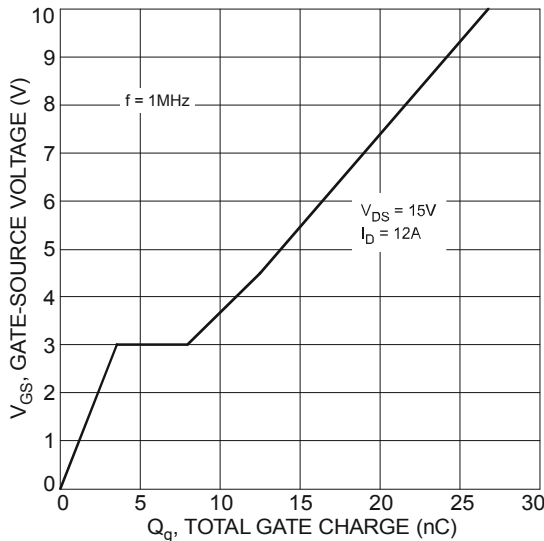


Fig. 11 Gate-Charge Characteristics

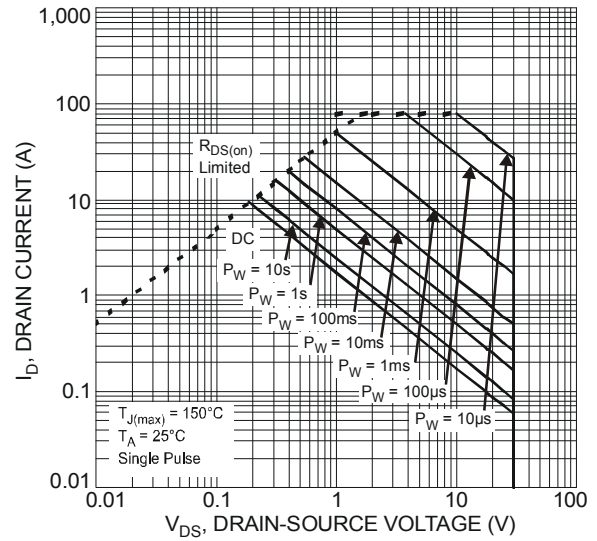
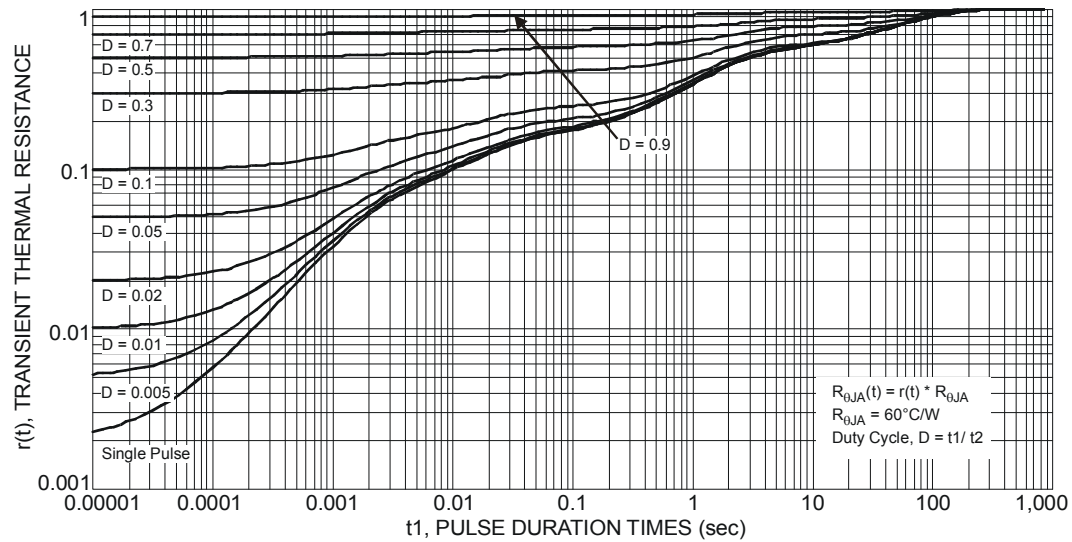
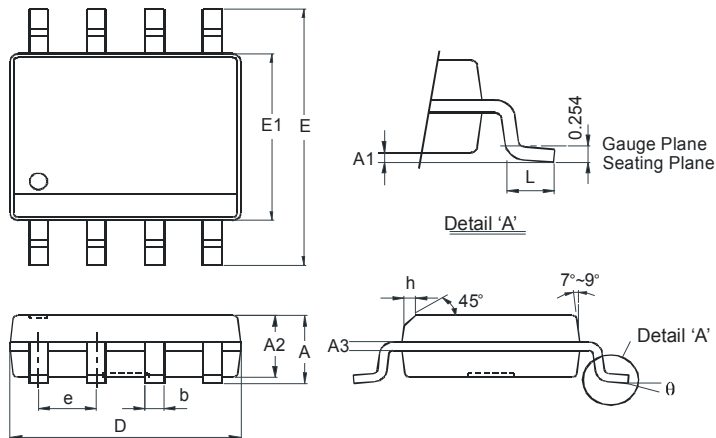


Fig. 12 SOA, Safe Operation Area



## Package Outline Dimensions

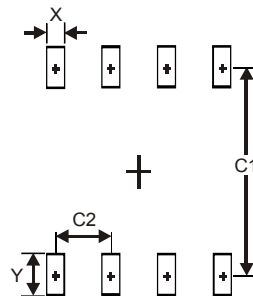
Please see AP02002 at <http://www.diodes.com/datasheets/ap02002.pdf> for latest version.



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

## Suggested Pad Layout

Please see AP02001 at <http://www.diodes.com/datasheets/ap02001.pdf> for latest version.



Dimensions	Value (in mm)
<b>X</b>	0.60
<b>Y</b>	1.55
<b>C1</b>	5.4
<b>C2</b>	1.27

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