

## Product Summary

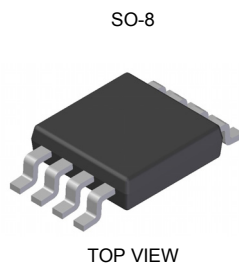
$V_{(BR)DSS}$	$R_{DS(on)}$ max	$I_D$ max $T_A = +25^\circ\text{C}$
-20V	13m $\Omega$ @ $V_{GS} = -10\text{V}$	-9.3A
	16m $\Omega$ @ $V_{GS} = -4.5\text{V}$	-8.3A
	22m $\Omega$ @ $V_{GS} = -2.5\text{V}$	-7.2A

## Description

This MOSFET has been designed to minimize the on-state resistance and yet maintain superior switching performance, making it ideal for high efficiency power management applications.

## Applications

- Backlighting
- Power Management Functions
- DC-DC Converters

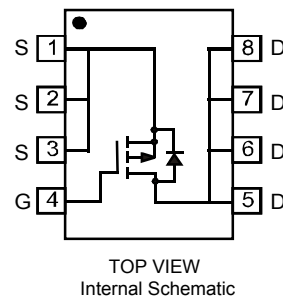


## Features

- Low On-Resistance
- Low Gate Threshold Voltage
- Low Input Capacitance
- Fast Switching Speed
- Low Input/Output Leakage
- **Lead-Free Finish; RoHS Compliant (Notes 1 & 2)**
- **Halogen and Antimony Free. "Green" Device (Note 3)**
- **Qualified to AEC-Q101 Standards for High Reliability**
- **PPAP Available (Note 4)**

## 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
- Terminals Connections: See Diagram
- Terminals: Finish - Matte Tin annealed over Copper lead frame. Solderable per MIL-STD-202, Method 208
- Weight: 0.074g (approximate)

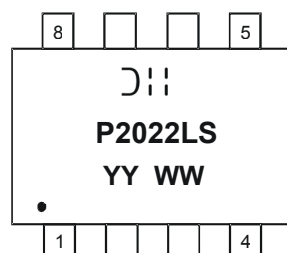


## Ordering Information (Note 5)

Part Number	Compliance	Case	Packaging
DMP2022LSSQ-13	Automotive	SO-8	2,500/Tape & Reel

- Notes:
1. EU Directive 2002/95/EC (RoHS) & 2011/65/EU (RoHS 2) compliant. All applicable RoHS exemptions applied.
  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. Automotive products are AEC-Q101 qualified and are PPAP capable. Automotive, AEC-Q101 and standard products are electrically and thermally the same, except where specified. For more information, please refer to [http://www.diodes.com/quality/product\\_grade\\_definitions/](http://www.diodes.com/quality/product_grade_definitions/).
  5. For packaging details, go to our website at <http://www.diodes.com/products/packages.html>.

## Marking Information



= Manufacturer's Marking  
 P2022LS = Product Type Marking Code  
 YYWW = Date Code Marking  
 YY = Year (ex: 13 = 2013)  
 WW = Week (01 - 53)

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

Characteristic			Symbol	Value	Unit
Drain-Source Voltage			V <sub>DSS</sub>	-20	V
Gate-Source Voltage			V <sub>GSS</sub>	±12	V
Drain Current (Note 6)	Steady State	T <sub>A</sub> = +25°C	I <sub>D</sub>	-9.3	A
		T <sub>A</sub> = +70°C		-7.4	
Pulsed Drain Current (Note 7)			I <sub>DM</sub>	-35	A

**Thermal Characteristics**

Characteristic	Symbol	Value	Unit
Total Power Dissipation (Note 6)	P <sub>D</sub>	1.6	W
Thermal Resistance, Junction to Ambient	R <sub>θJA</sub>	74	°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>	-20	—	—	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> = -20V, V <sub>GS</sub> = 0V
Gate-Source Leakage	I <sub>GSS</sub>	—	—	±100	nA	V <sub>GS</sub> = ±12V, V <sub>DS</sub> = 0V
<b>ON CHARACTERISTICS (Note 8)</b>						
Gate Threshold Voltage	V <sub>GS(th)</sub>	-0.6	-0.77	-1.1	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	13	mΩ	V <sub>GS</sub> = -10V, I <sub>D</sub> = -10A
		—	11	16		V <sub>GS</sub> = -4.5V, I <sub>D</sub> = -9A
		—	17	22		V <sub>GS</sub> = -2.5V, I <sub>D</sub> = -8A
Forward Transconductance	g <sub>fs</sub>	—	28	—	S	V <sub>DS</sub> = -10V, I <sub>D</sub> = -10A
Diode Forward Voltage (Note 8)	V <sub>SD</sub>	-0.5	-0.68	-1.2	V	V <sub>GS</sub> = 0V, I <sub>S</sub> = -3A
<b>DYNAMIC CHARACTERISTICS (Note 9)</b>						
Input Capacitance	C <sub>iss</sub>	—	2575	—	pF	V <sub>DS</sub> = -10V, V <sub>GS</sub> = 0V f = 1MHz
Output Capacitance	C <sub>oss</sub>	—	326	—	pF	
Reverse Transfer Capacitance	C <sub>rss</sub>	—	261	—	pF	
Gate Resistance	R <sub>G</sub>	—	10.9	—	Ω	V <sub>GS</sub> = 0V V <sub>DS</sub> = 0V, f = 1MHz
<b>SWITCHING CHARACTERISTICS (Note 9)</b>						
Total Gate Charge	Q <sub>g</sub>	—	28.1 60.2	—	nC	V <sub>DS</sub> = -10V, V <sub>GS</sub> = -4.5V, I <sub>D</sub> = -10A V <sub>DS</sub> = -10V, V <sub>GS</sub> = -10V, I <sub>D</sub> = -10A
Gate-Source Charge	Q <sub>gs</sub>	—	5.9	—		V <sub>DS</sub> = -10V, V <sub>GS</sub> = -10V, I <sub>D</sub> = -10A
Gate-Drain Charge	Q <sub>gd</sub>	—	7.4	—		V <sub>DS</sub> = -10V, V <sub>GS</sub> = -10V, I <sub>D</sub> = -10A
Turn-On Delay Time	t <sub>D(on)</sub>	—	4.5	15	ns	V <sub>DD</sub> = -15V, I <sub>D</sub> = -1A, V <sub>GS</sub> = -10V, R <sub>GEN</sub> = 6Ω
Turn-On Rise Time	t <sub>r</sub>	—	3.3	20		
Turn-Off Delay Time	t <sub>D(off)</sub>	—	197	216		
Turn-Off Fall Time	t <sub>f</sub>	—	60.5	153		

- Notes:
- Device mounted on 2 oz. Copper pads on FR-4 PCB.
  - Pulse width ≤10μs, Duty Cycle ≤1%.
  - Short duration pulse test used to minimize self-heating effect.
  - Guaranteed by design. Not subject to product testing.

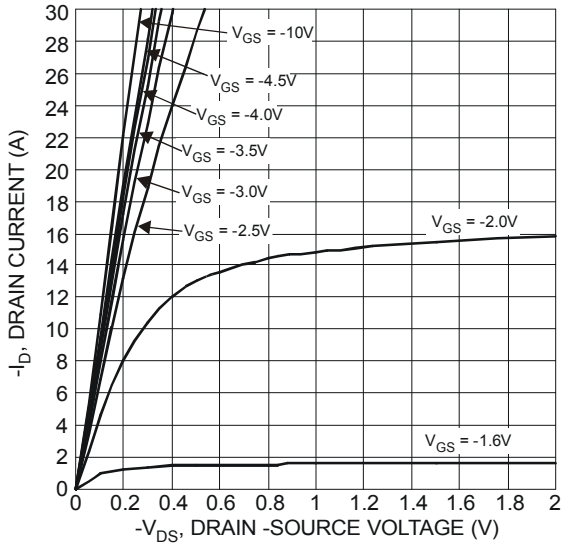


Figure 1 Typical Output Characteristics

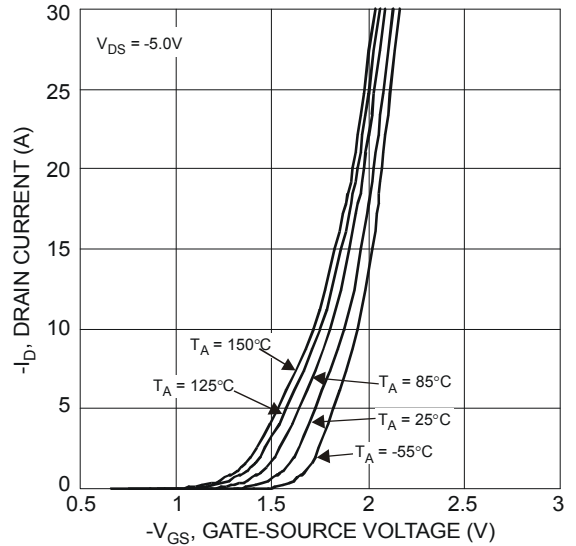


Figure 2 Typical Transfer Characteristics

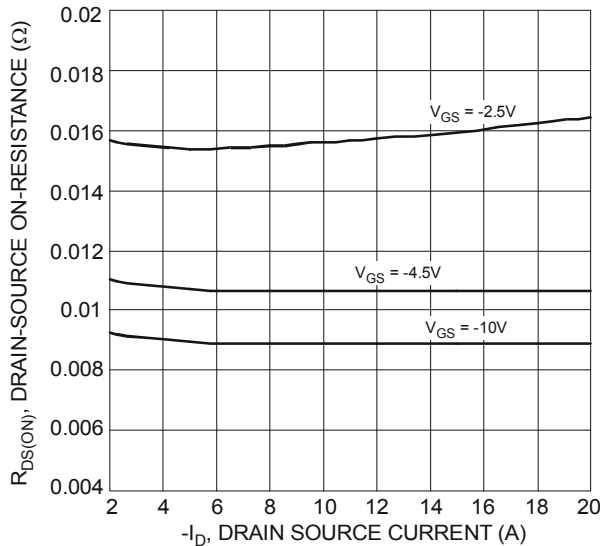


Figure 3 Typical On-Resistance vs. Drain Current and Gate Voltage

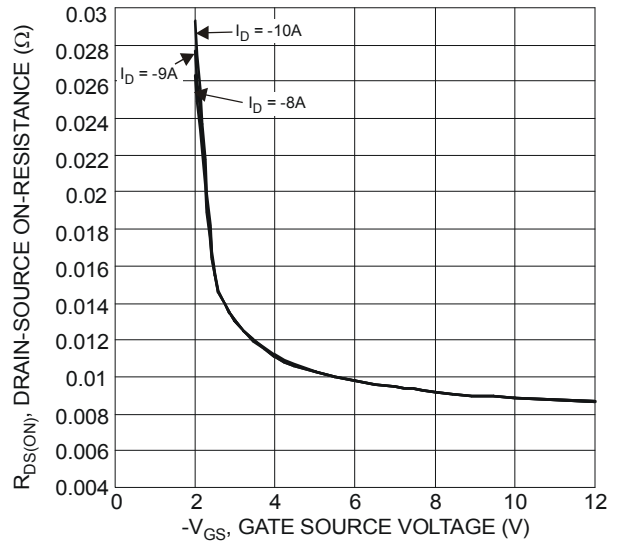


Figure 4 Typical Transfer Characteristics

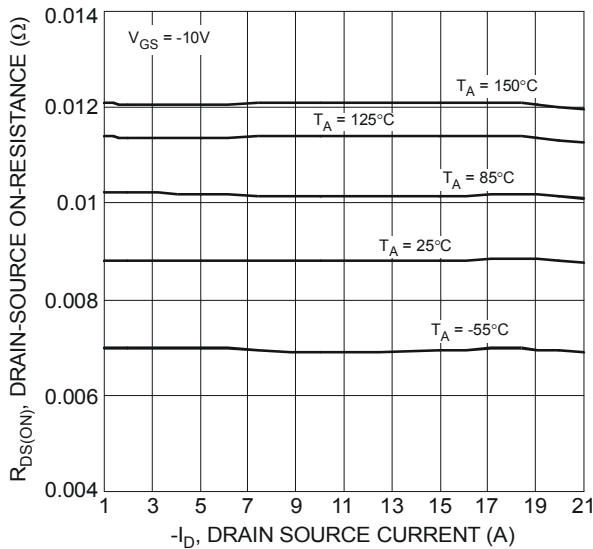


Figure 5 Typical On-Resistance vs. Drain Current and Temperature

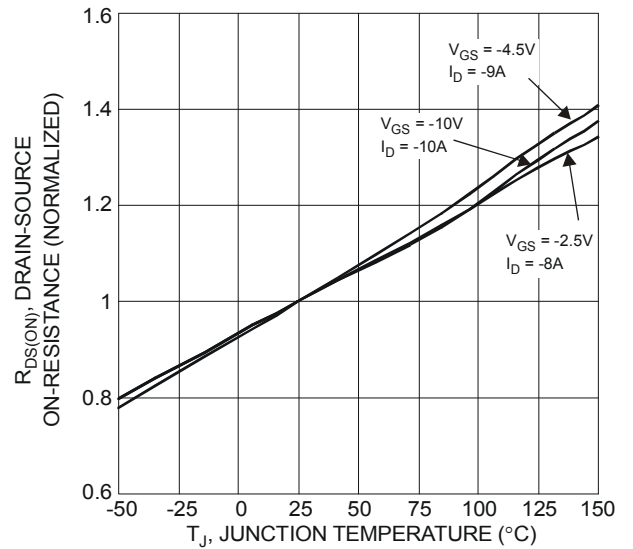


Figure 6 On-Resistance Variation with Temperature

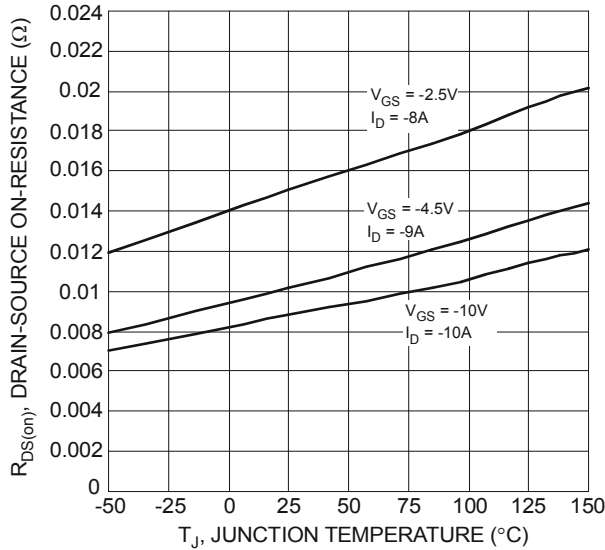


Figure 7 On-Resistance Variation with Temperature

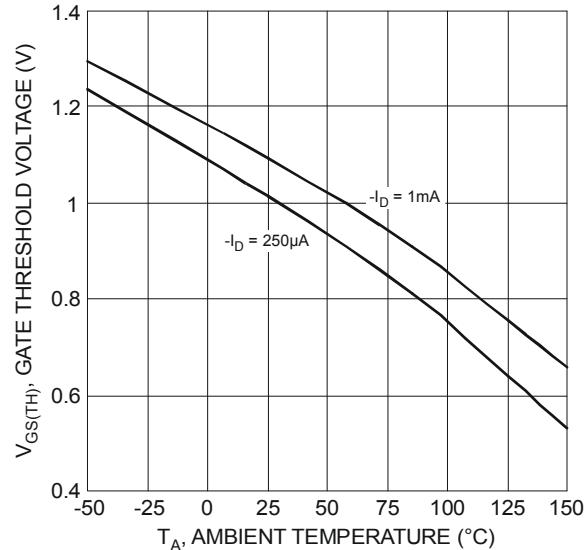


Figure 8 Gate Threshold Variation vs. Ambient Temperature

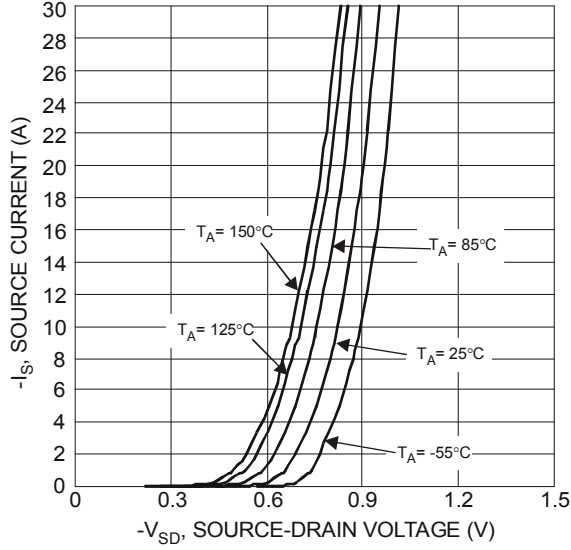


Figure 9 Diode Forward Voltage vs. Current

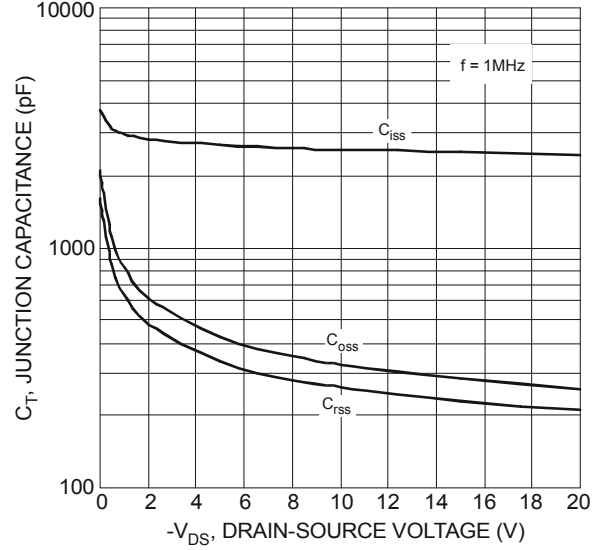


Figure 10 Typical Junction Capacitance

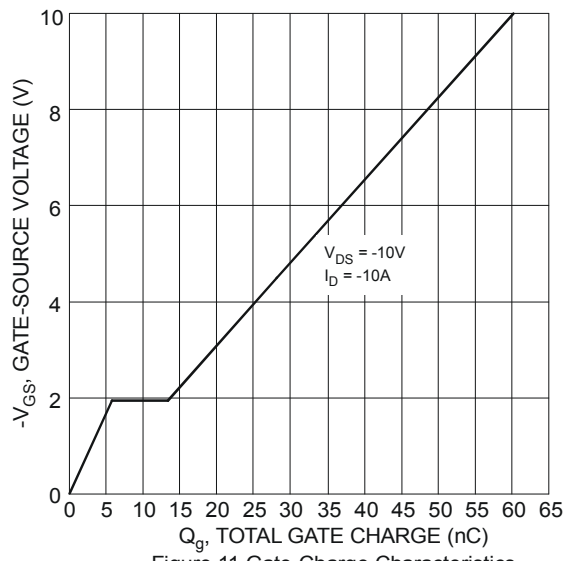


Figure 11 Gate-Charge Characteristics

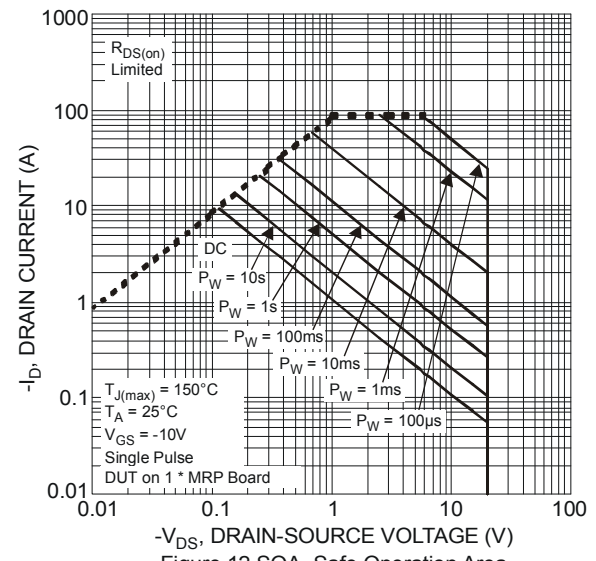
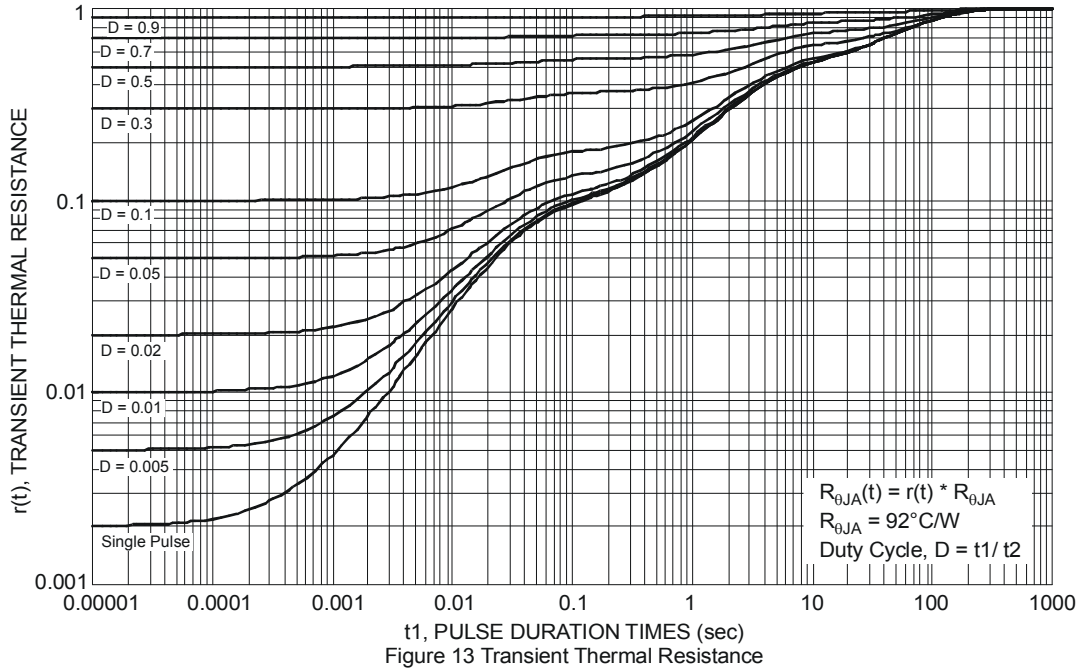
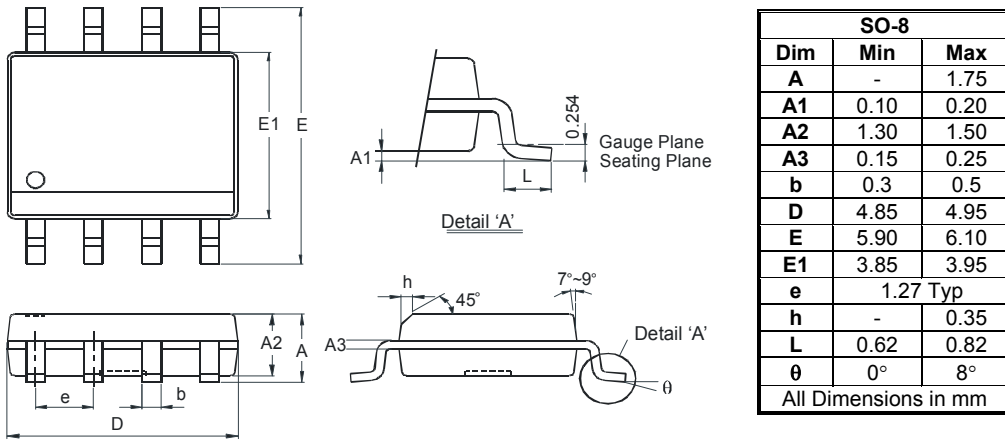


Figure 12 SOA, Safe Operation Area



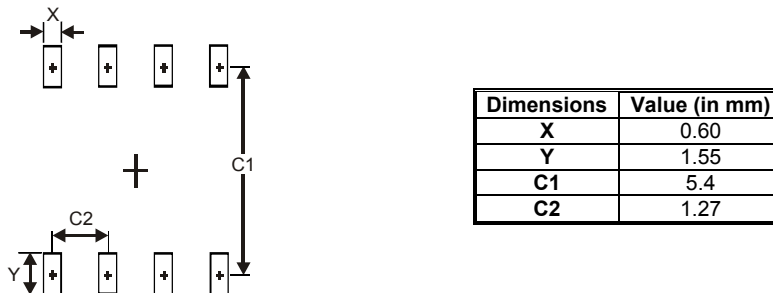
**Package Outline Dimensions**

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



**Suggested Pad Layout**

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



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Телефон: 8 (812) 309-75-97 (многоканальный)

Факс: 8 (812) 320-03-32

Электронная почта: [ocean@oceanchips.ru](mailto:ocean@oceanchips.ru)

Web: <http://oceanchips.ru/>

Адрес: 198099, г. Санкт-Петербург, ул. Калинина, д. 2, корп. 4, лит. А