

Product Summary

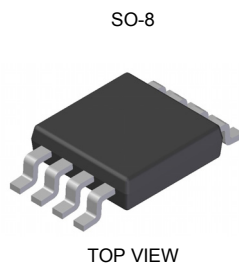
$V_{(BR)DSS}$	$R_{DS(on) \max}$	$I_D \max$ $T_A = +25^\circ\text{C}$
-20V	13m Ω @ $V_{GS} = -10\text{V}$	-9.3A
	16m Ω @ $V_{GS} = -4.5\text{V}$	-8.3A
	22m Ω @ $V_{GS} = -2.5\text{V}$	-7.2A

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

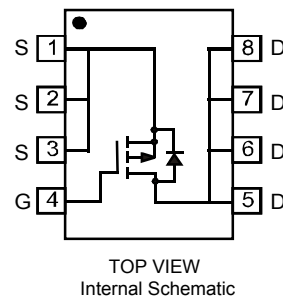


Features

- 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)

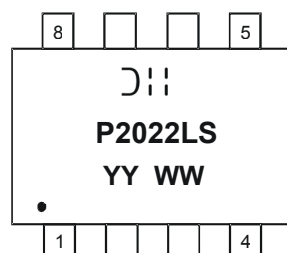


Ordering Information (Note 5)

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 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/.
 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 (@ $T_A = +25^\circ\text{C}$, unless otherwise specified.)

Characteristic			Symbol	Value	Unit
Drain-Source Voltage			V_{DSS}	-20	V
Gate-Source Voltage			V_{GSS}	± 12	V
Drain Current (Note 6)	Steady State	$T_A = +25^\circ\text{C}$	I_D	-9.3	A
		$T_A = +70^\circ\text{C}$		-7.4	
Pulsed Drain Current (Note 7)			I_{DM}	-35	A

Thermal Characteristics

Characteristic	Symbol	Value	Unit
Total Power Dissipation (Note 6)	P_D	1.6	W
Thermal Resistance, Junction to Ambient	$R_{\theta JA}$	74	$^\circ\text{C}/\text{W}$
Operating and Storage Temperature Range	T_J, T_{STG}	-55 to +150	$^\circ\text{C}$

Electrical Characteristics (@ $T_A = +25^\circ\text{C}$, unless otherwise specified.)

Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
OFF CHARACTERISTICS (Note 8)						
Drain-Source Breakdown Voltage	BV_{DSS}	-20	—	—	V	$V_{GS} = 0\text{V}, I_D = -250\mu\text{A}$
Zero Gate Voltage Drain Current	I_{DSS}	—	—	-1	μA	$V_{DS} = -20\text{V}, V_{GS} = 0\text{V}$
Gate-Source Leakage	I_{GSS}	—	—	± 100	nA	$V_{GS} = \pm 12\text{V}, V_{DS} = 0\text{V}$
ON CHARACTERISTICS (Note 8)						
Gate Threshold Voltage	$V_{GS(th)}$	-0.6	-0.77	-1.1	V	$V_{DS} = V_{GS}, I_D = -250\mu\text{A}$
Static Drain-Source On-Resistance	$R_{DS(on)}$	—	8	13	m Ω	$V_{GS} = -10\text{V}, I_D = -10\text{A}$
		—	11	16		$V_{GS} = -4.5\text{V}, I_D = -9\text{A}$
		—	17	22		$V_{GS} = -2.5\text{V}, I_D = -8\text{A}$
Forward Transconductance	g_{fs}	—	28	—	S	$V_{DS} = -10\text{V}, I_D = -10\text{A}$
Diode Forward Voltage (Note 8)	V_{SD}	-0.5	-0.68	-1.2	V	$V_{GS} = 0\text{V}, I_S = -3\text{A}$
DYNAMIC CHARACTERISTICS (Note 9)						
Input Capacitance	C_{iss}	—	2575	—	pF	$V_{DS} = -10\text{V}, V_{GS} = 0\text{V}$ $f = 1\text{MHz}$
Output Capacitance	C_{oss}	—	326	—	pF	
Reverse Transfer Capacitance	C_{rss}	—	261	—	pF	
Gate Resistance	R_G	—	10.9	—	Ω	$V_{GS} = 0\text{V}, V_{DS} = 0\text{V}, f = 1\text{MHz}$
SWITCHING CHARACTERISTICS (Note 9)						
Total Gate Charge	Q_g	—	28.1 60.2	—	nC	$V_{DS} = -10\text{V}, V_{GS} = -4.5\text{V}, I_D = -10\text{A}$ $V_{DS} = -10\text{V}, V_{GS} = -10\text{V}, I_D = -10\text{A}$
Gate-Source Charge	Q_{gs}	—	5.9	—		$V_{DS} = -10\text{V}, V_{GS} = -10\text{V}, I_D = -10\text{A}$
Gate-Drain Charge	Q_{gd}	—	7.4	—		$V_{DS} = -10\text{V}, V_{GS} = -10\text{V}, I_D = -10\text{A}$
Turn-On Delay Time	$t_{D(on)}$	—	4.5	15	ns	$V_{DD} = -15\text{V}, I_D = -1\text{A}, V_{GS} = -10\text{V},$ $R_{GEN} = 6\Omega$
Turn-On Rise Time	t_r	—	3.3	20		
Turn-Off Delay Time	$t_{D(off)}$	—	197	216		
Turn-Off Fall Time	t_f	—	60.5	153		

- Notes:
- Device mounted on 2 oz. Copper pads on FR-4 PCB.
 - Pulse width $\leq 10\mu\text{s}$, Duty Cycle $\leq 1\%$.
 - Short duration pulse test used to minimize self-heating effect.
 - Guaranteed by design. Not subject to product testing.

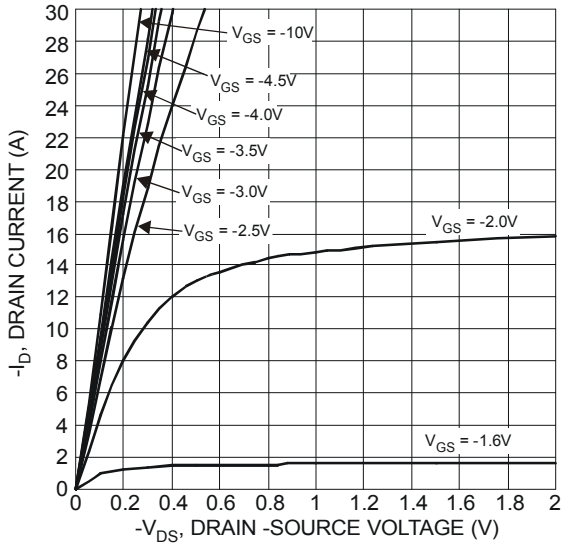


Figure 1 Typical Output Characteristics

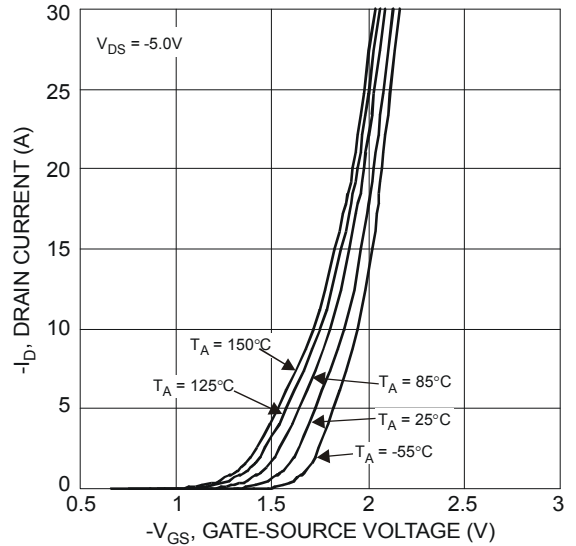


Figure 2 Typical Transfer Characteristics

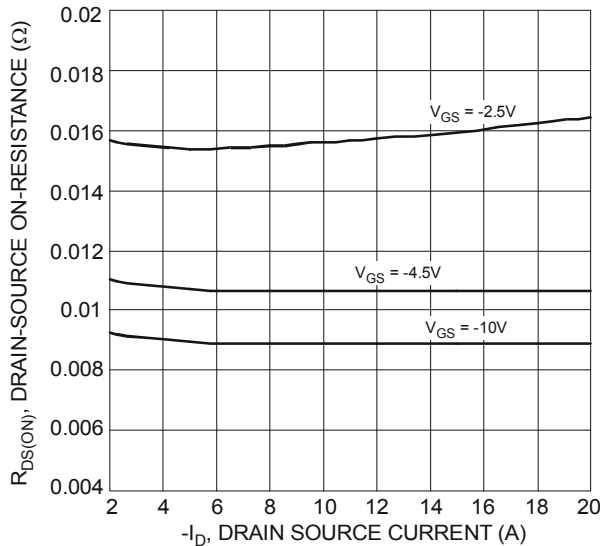


Figure 3 Typical On-Resistance vs. Drain Current and Gate Voltage

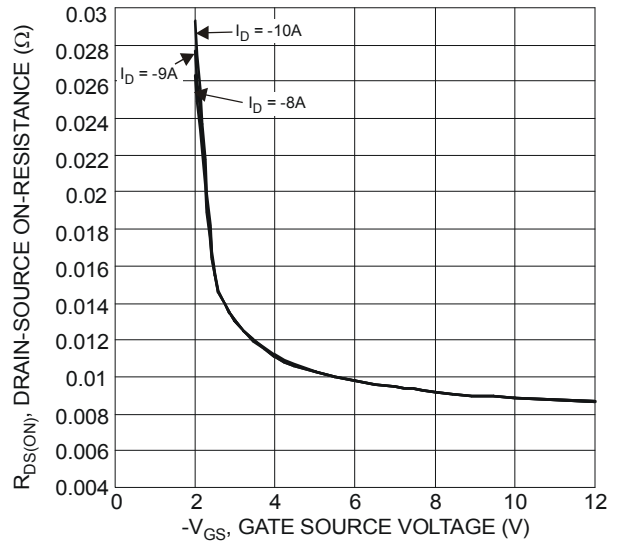


Figure 4 Typical Transfer Characteristics

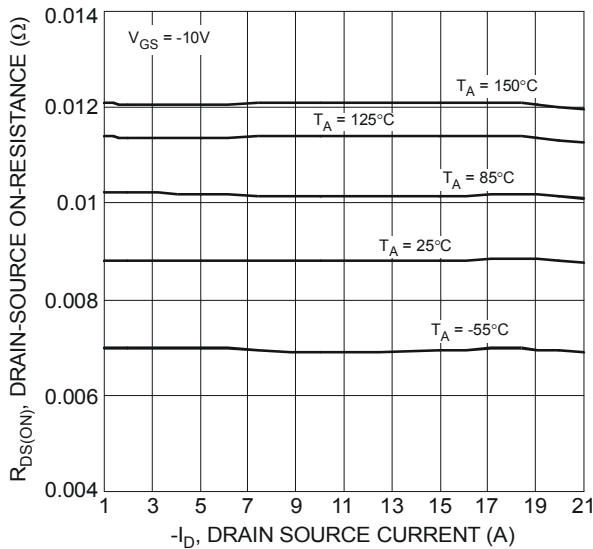


Figure 5 Typical On-Resistance vs. Drain Current and Temperature

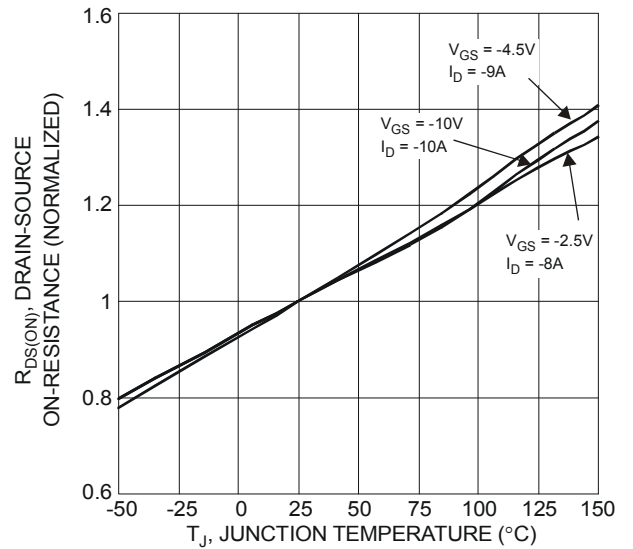


Figure 6 On-Resistance Variation with Temperature

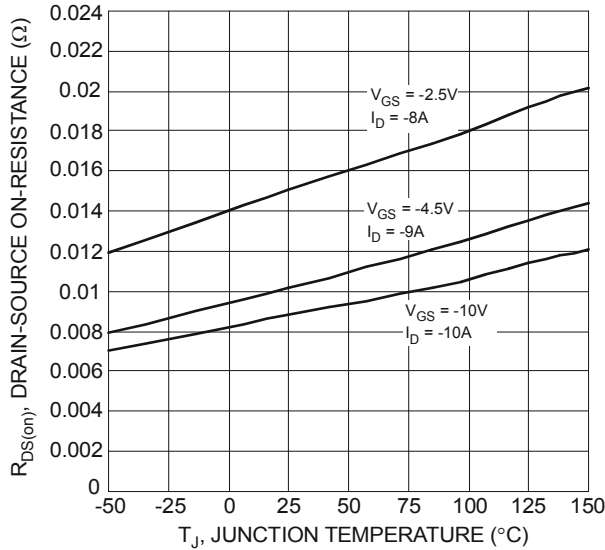


Figure 7 On-Resistance Variation with Temperature

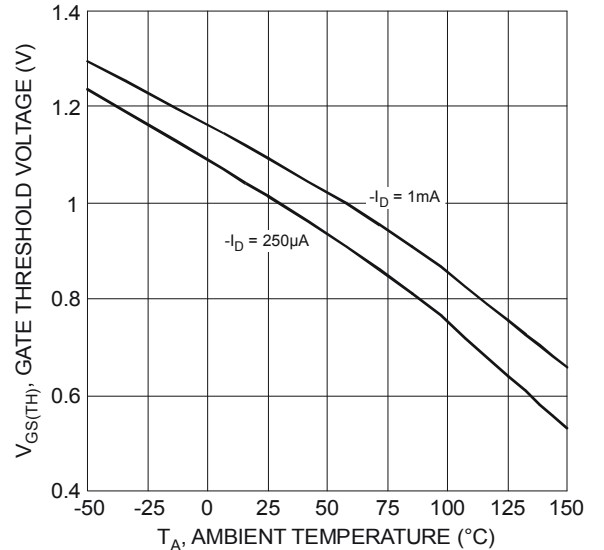


Figure 8 Gate Threshold Variation vs. Ambient Temperature

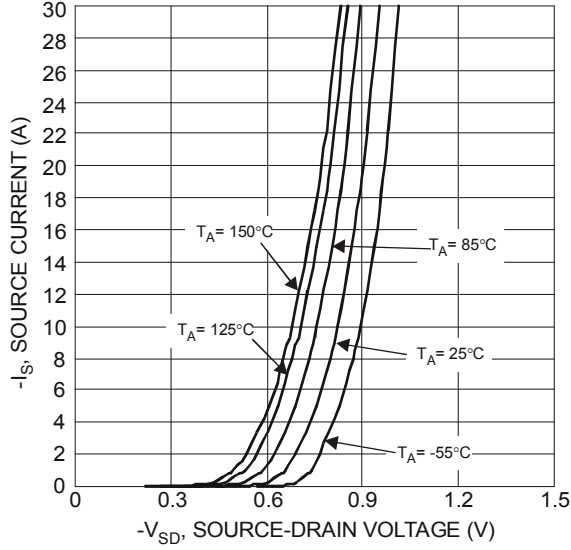


Figure 9 Diode Forward Voltage vs. Current

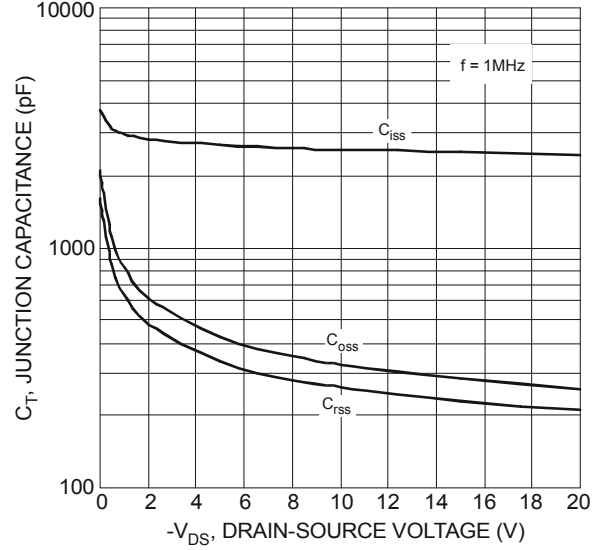


Figure 10 Typical Junction Capacitance

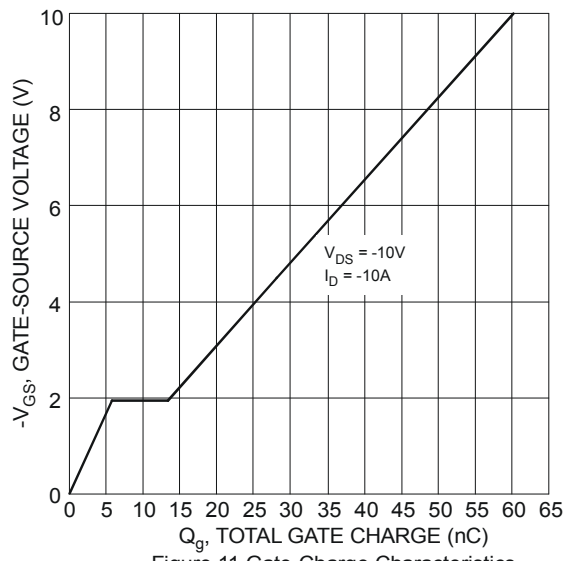


Figure 11 Gate-Charge Characteristics

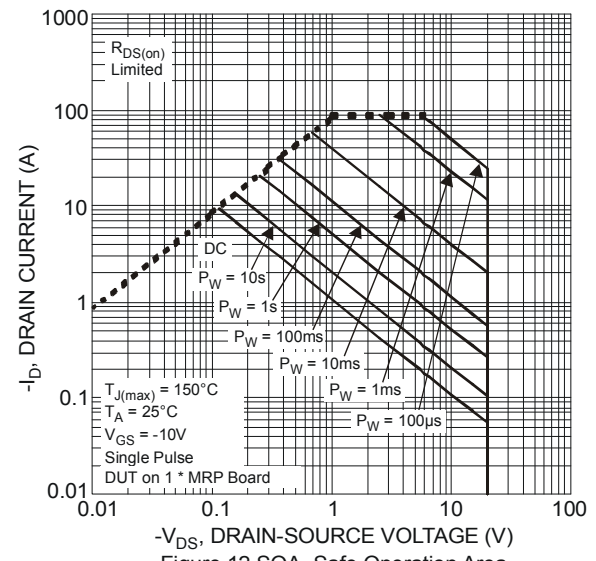
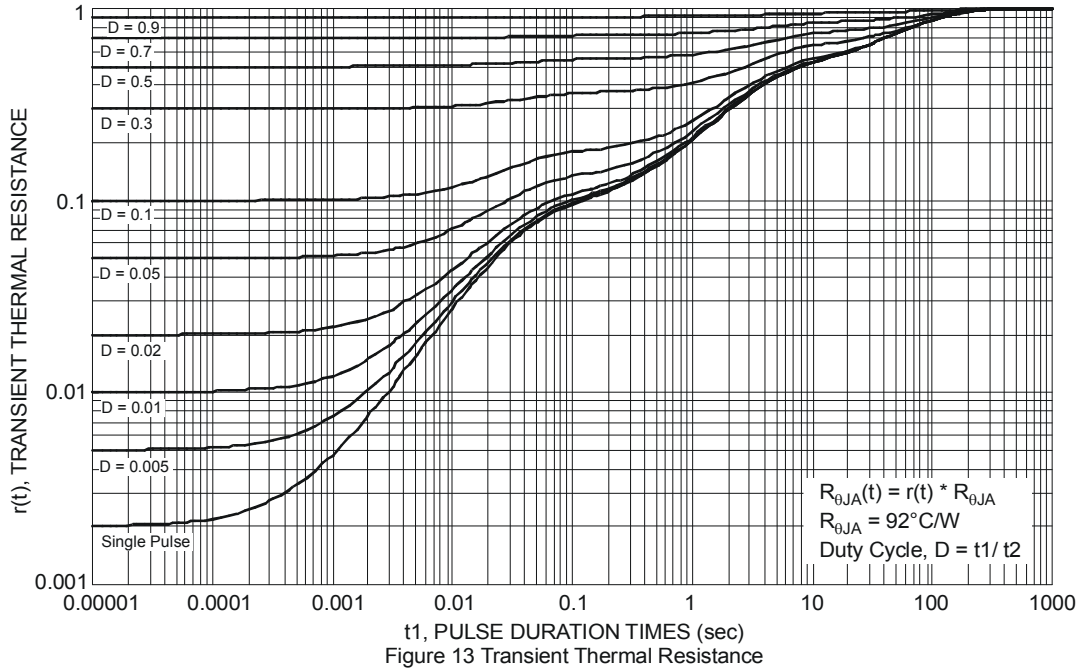
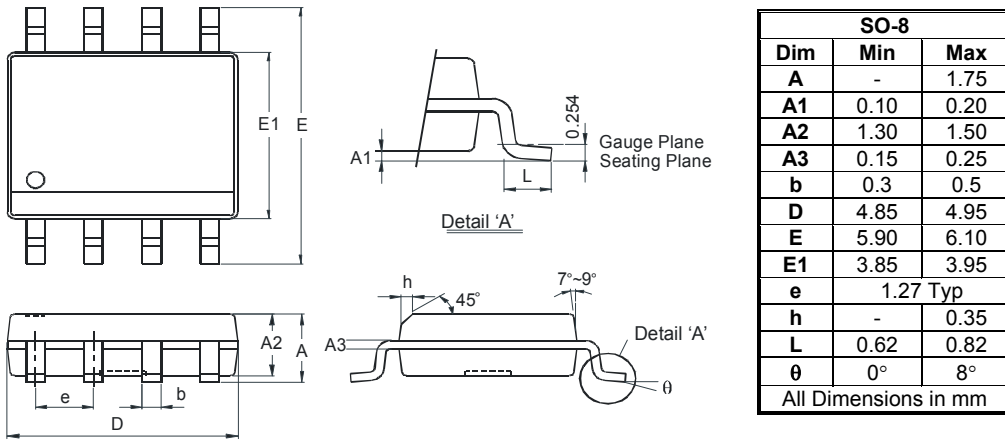


Figure 12 SOA, Safe Operation Area



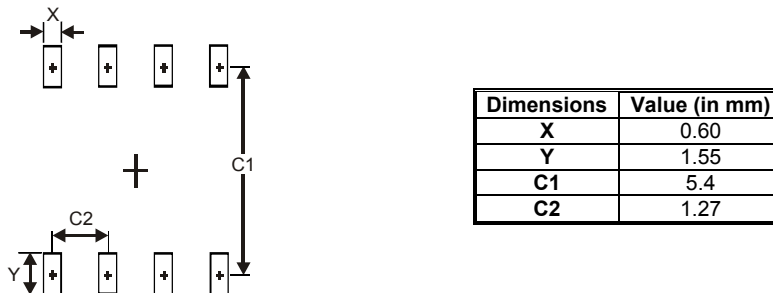
Package Outline Dimensions

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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