

Product Summary

BV _{DSS}	R _{DS(ON)} Max	I _D Max T _A = +25°C
-20V	13mΩ @ V _{GS} = -10V	-9.3A
	16mΩ @ V _{GS} = -4.5V	-8.3A
	22mΩ @ V _{GS} = -2.5V	-7.2A

Description

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

Applications

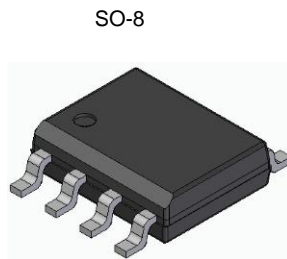
- Backlighting
- Power Management Functions
- DC-DC Converters

Features

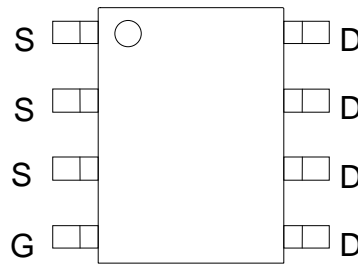
- Low On-Resistance
- Low Gate Threshold Voltage
- Low Input Capacitance
- Fast Switching Speed
- Low Input/Output Leakage
- **Totally Lead-Free & Fully RoHS Compliant (Notes 1 & 2)**
- **Halogen and Antimony Free. "Green" Device (Note 3)**
- **Qualified to AEC-Q101 Standards for High Reliability**
-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

Mechanical Data

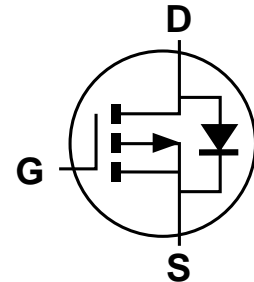
- Case: SO-8
- Case Material: Molded Plastic, "Green" Molding Compound. UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminals Connections: See Diagram
- Terminals: Finish - Matte Tin Annealed over Copper Lead Frame. Solderable per MIL-STD-202, Method 208^{Ⓔ3}
- Weight: 0.074g (Approximate)



Top View



Pin-Out Top View



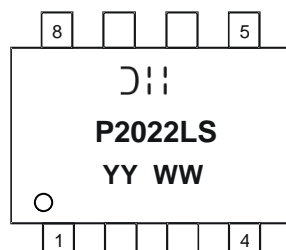
Equivalent Circuit

Ordering Information (Note 5)

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

- Notes:
1. No purposely added lead. Fully EU Directive 2002/95/EC (RoHS), 2011/65/EU (RoHS 2) & 2015/863/EU (RoHS 3) compliant.
 2. See <https://www.diodes.com/quality/lead-free/> 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. Refer to <https://www.diodes.com/quality/>.
 5. For packaging details, go to our website at <https://www.diodes.com/design/support/packaging/diodes-packaging/>.

Marking Information



☺☺☺ = Manufacturer's Marking
 P2022LS = Product Type Marking Code
 YYWW = Date Code Marking
 YY = Year (ex: 19 = 2019)
 WW = Week (01 to 53)

Maximum Ratings (@T_A = +25°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°C T _A = +70°C	I _D	-9.3 -7.4	A
Pulsed Drain Current (Note 7)			I _{DM}	-35	A
Avalanche Current, L = 0.3mH			I _{AS}	-18	A
Avalanche Energy, L = 0.3mH			E _{AS}	48.6	mJ

Thermal Characteristics

Characteristic	Symbol	Value	Unit
Total Power Dissipation (Note 6)	P _D	1.6	W
Thermal Resistance, Junction to Ambient	R _{θJA}	74	°C/W
Operating and Storage Temperature Range	T _J , T _{STG}	-55 to +150	°C

Electrical Characteristics (@T_A = +25°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} = 0V, I _D = -250μA
Zero Gate Voltage Drain Current	I _{DSS}	—	—	-1	μA	V _{DS} = -20V, V _{GS} = 0V
Gate-Source Leakage	I _{GSS}	—	—	±100	nA	V _{GS} = ±12V, V _{DS} = 0V
ON CHARACTERISTICS (Note 8)						
Gate Threshold Voltage	V _{GS(TH)}	-0.6	-0.77	-1.1	V	V _{DS} = V _{GS} , I _D = -250μA
Static Drain-Source On-Resistance	R _{DS(ON)}	—	8	13	mΩ	V _{GS} = -10V, I _D = -10A
		—	11	16		V _{GS} = -4.5V, I _D = -9A
		—	17	22		V _{GS} = -2.5V, I _D = -8A
Forward Transconductance	g _{fs}	—	28	—	S	V _{DS} = -10V, I _D = -10A
Diode Forward Voltage (Note 8)	V _{SD}	-0.5	-0.68	-1.2	V	V _{GS} = 0V, I _S = -3A
DYNAMIC CHARACTERISTICS (Note 9)						
Input Capacitance	C _{iss}	—	2575	—	pF	V _{DS} = -10V, V _{GS} = 0V f = 1MHz
Output Capacitance	C _{oss}	—	326	—	pF	
Reverse Transfer Capacitance	C _{rss}	—	261	—	pF	
Gate Resistance	R _G	—	10.9	—	Ω	V _{GS} = 0V, V _{DS} = 0V, f = 1MHz
SWITCHING CHARACTERISTICS (Note 9)						
Total Gate Charge	Q _g	—	28.1 60.2	—	nC	V _{DS} = -10V, V _{GS} = -4.5V, I _D = -10A V _{DS} = -10V, V _{GS} = -10V, I _D = -10A
Gate-Source Charge	Q _{gs}	—	5.9	—		V _{DS} = -10V, V _{GS} = -10V, I _D = -10A
Gate-Drain Charge	Q _{gd}	—	7.4	—		V _{DS} = -10V, V _{GS} = -10V, I _D = -10A
Turn-On Delay Time	t _{D(ON)}	—	4.5	15	ns	V _{DD} = -15V, I _D = -1A, V _{GS} = -10V, R _{GEN} = 6Ω
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 ≤10μs, Duty Cycle ≤1%.
 - Short duration pulse test used to minimize self-heating effect.
 - Guaranteed by design. Not subject to product testing.

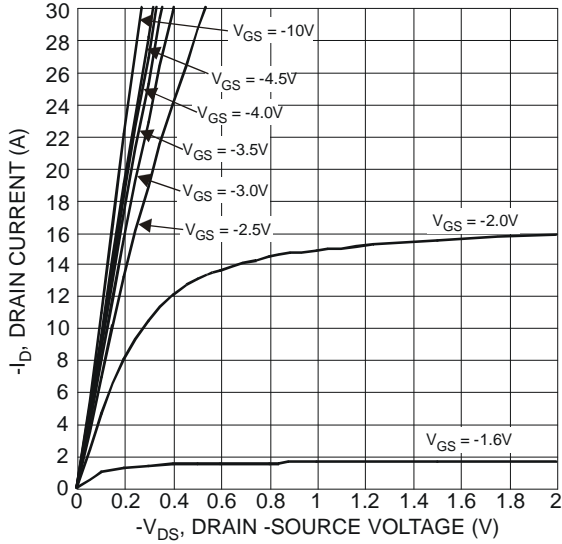


Figure 1 Typical Output Characteristics

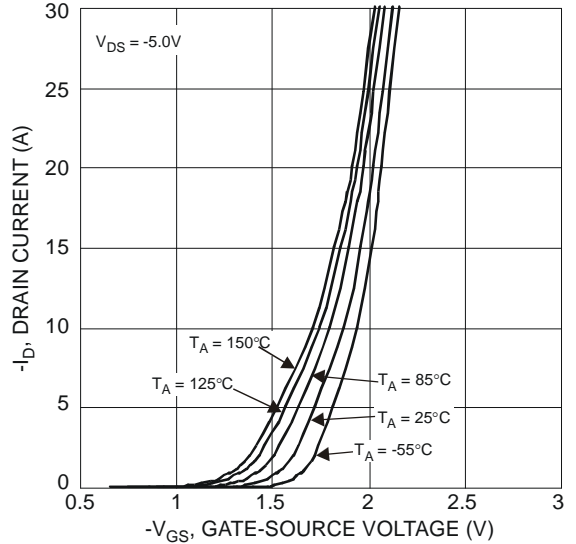


Figure 2 Typical Transfer Characteristics

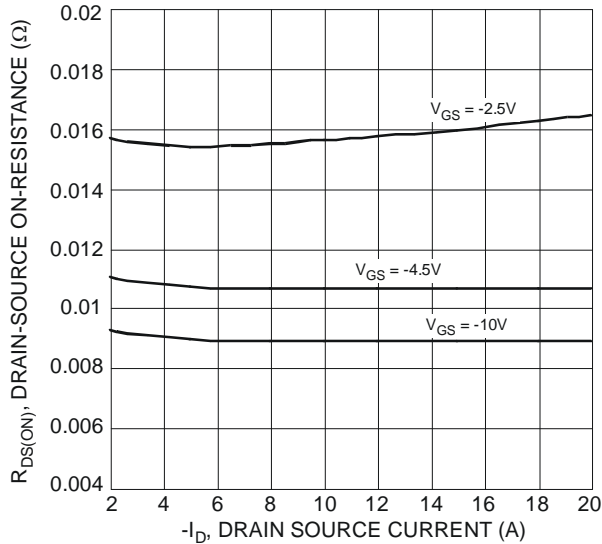


Figure 3 Typical On-Resistance vs. Drain Current and Gate Voltage

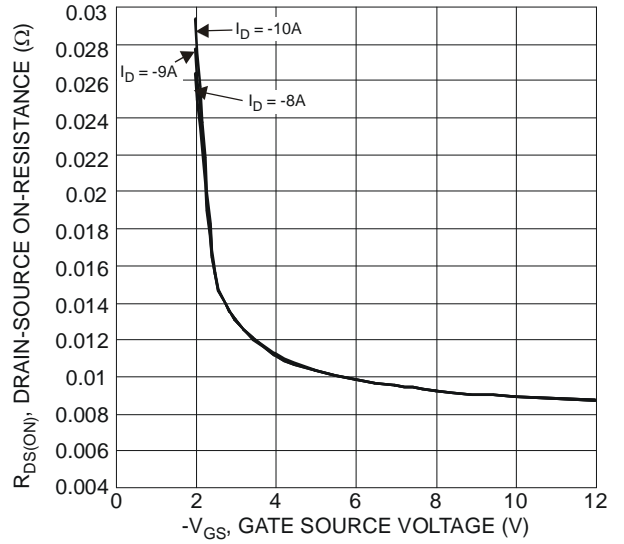


Figure 4 Typical Transfer Characteristics

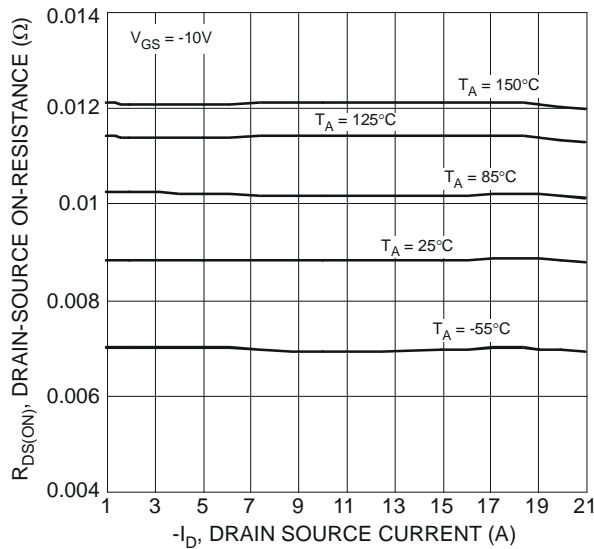


Figure 5 Typical On-Resistance vs. Drain Current and Temperature

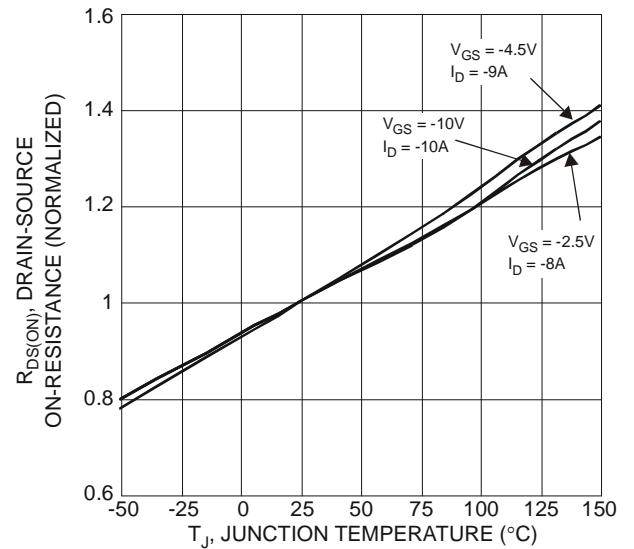


Figure 6 On-Resistance Variation with Temperature

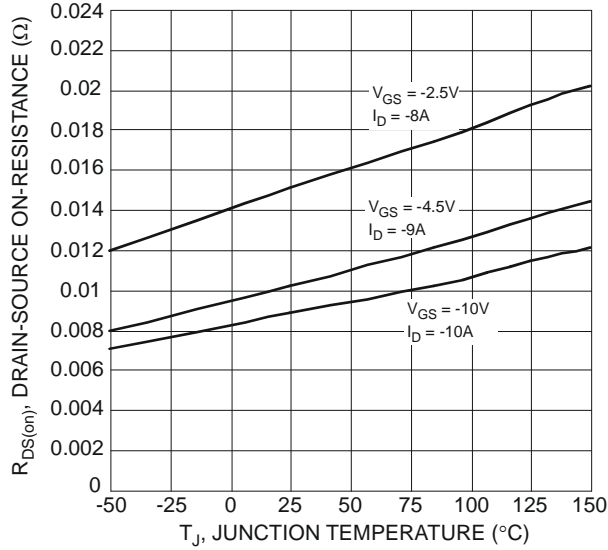


Figure 7 On-Resistance Variation with Temperature

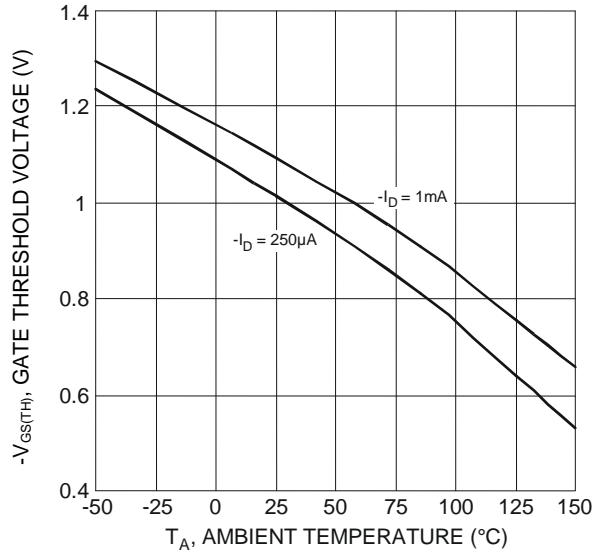


Figure 8 Gate Threshold Variation vs. Ambient Temperature

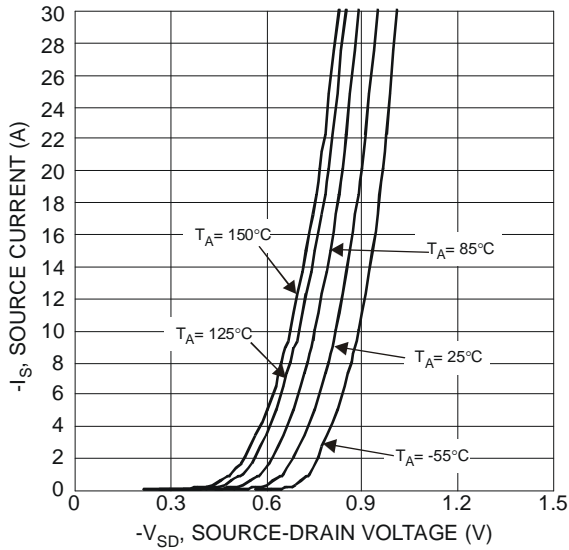


Figure 9 Diode Forward Voltage vs. Current

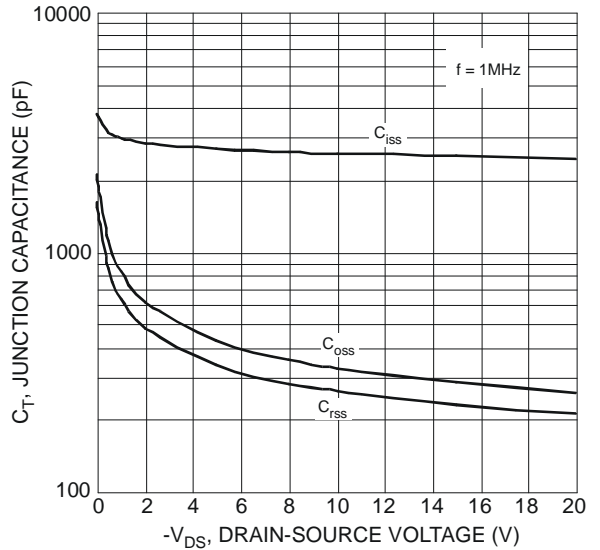


Figure 10 Typical Junction Capacitance

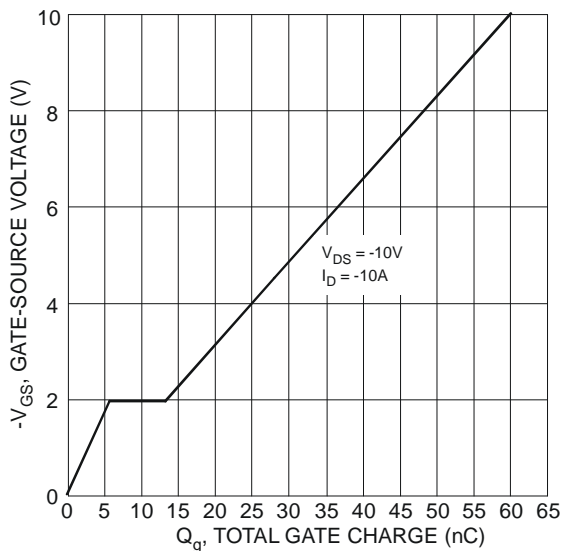


Figure 11 Gate-Charge Characteristics

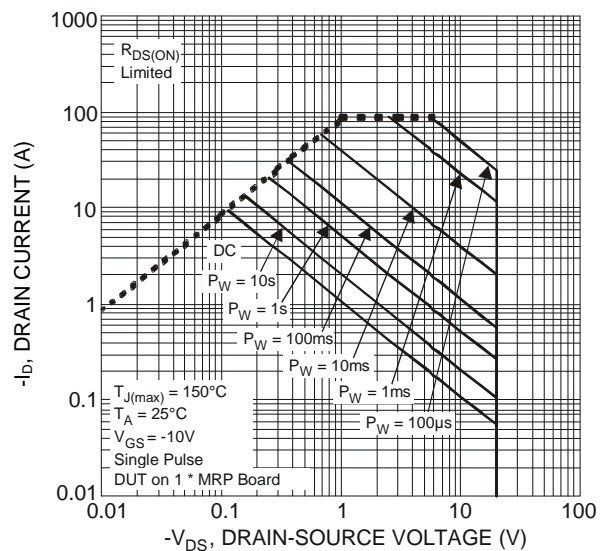
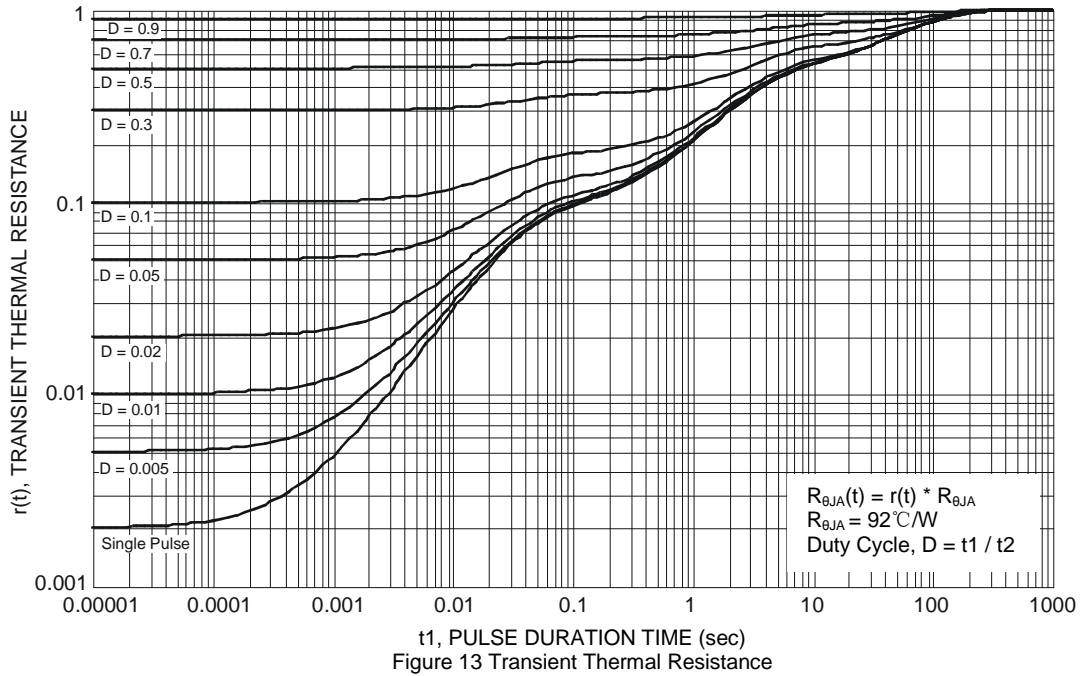


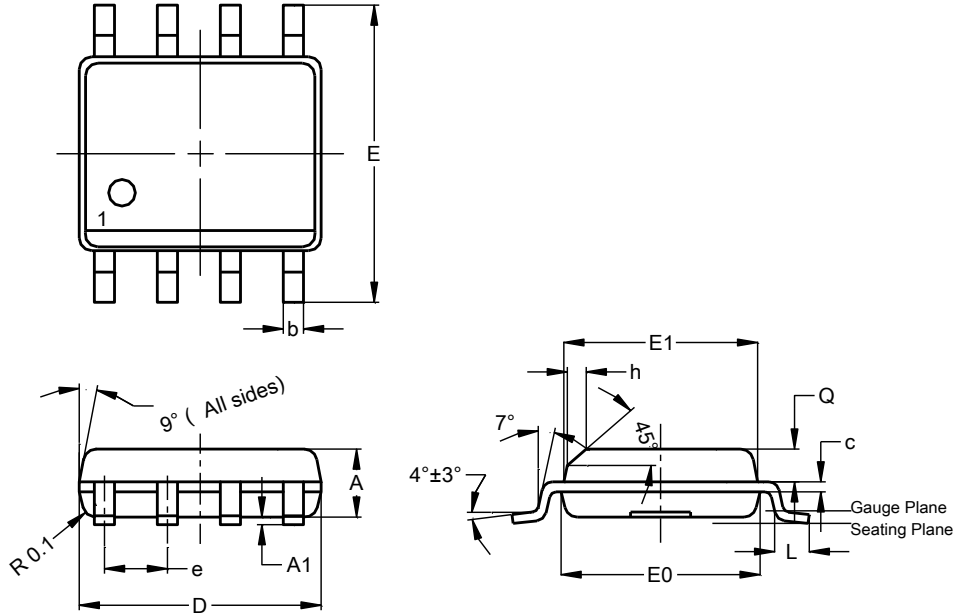
Figure 12 SOA, Safe Operation Area



Package Outline Dimensions

Please see <http://www.diodes.com/package-outlines.html> for the latest version.

SO-8



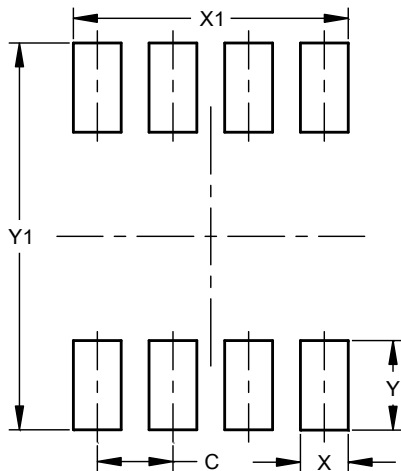
SO-8			
Dim	Min	Max	Typ
A	1.40	1.50	1.45
A1	0.10	0.20	0.15
b	0.30	0.50	0.40
c	0.15	0.25	0.20
D	4.85	4.95	4.90
E	5.90	6.10	6.00
E1	3.80	3.90	3.85
E0	3.85	3.95	3.90
e	--	--	1.27
h	-	--	0.35
L	0.62	0.82	0.72
Q	0.60	0.70	0.65

All Dimensions in mm

Suggested Pad Layout

Please see <http://www.diodes.com/package-outlines.html> for the latest version.

SO-8



Dimensions	Value (in mm)
C	1.27
X	0.802
X1	4.612
Y	1.505
Y1	6.50

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