Product Summary

BV_{DSS}	$R_{DS(ON)}$ Max	I_D T_A = +25°C
-40V	11mΩ @ V_{GS} = -10V	-10.1A
	15mΩ @ V_{GS} = -4.5V	-8.8A

Description and Application

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

- DC-DC converters
- Power management functions
- Analog switches

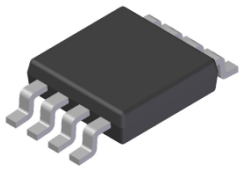
Features and Benefits

- 100% Unclamped Inductive Switch (UIS) Test in Production
- Low Input Capacitance
- **Totally Lead-Free & Fully RoHS Compliant (Notes 1 & 2)**
- **Halogen and Antimony Free. "Green" Device (Note 3)**
- **This part is qualified to JEDEC standards (as references in AEC-Q) for High Reliability.**
  https://www.diodes.com/quality/product-definitions/
- **An Automotive-Compliant Part is Available Under Separate Datasheet (DMP4015SSSQ)**

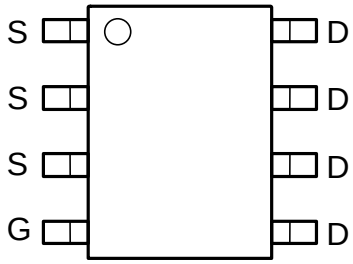
Mechanical Data

- Package: SO-8
- Package Material: Molded Plastic, "Green" Molding Compound. UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminal Connections: See Diagram
- Terminals: Finish – Matte Tin Annealed over Copper Leadframe. Solderable per MIL-STD-202, Method 208 e3
- Weight: 0.074 grams (Approximate)

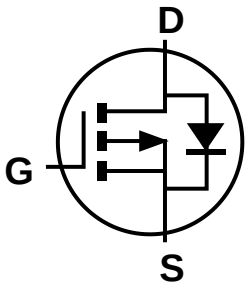
SO-8



Top View



Top View
Internal Schematic



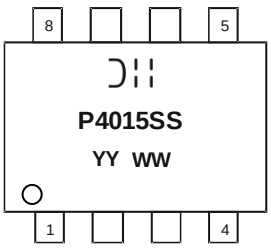
Equivalent circuit

Ordering Information (Note 4)

Part Number	Package	Packing	
		Qty.	Carrier
DMP4015SSS-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) & 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. For packaging details, go to our website at https://www.diodes.com/design/support/packaging/diodes-packaging/.

Marking Information



= Manufacturer's Marking
P4015SS = Product Type Marking Code
YYWW = Date Code Marking
YY or YY = Year (ex: 22 = 2022)
WW = Week (01 to 53)

Maximum Ratings (@T_A = +25°C, unless otherwise specified.)

Characteristic			Symbol	Value	Unit
Drain-Source Voltage			V_{DSS}	-40	V
Gate-Source Voltage			V_{GSS}	±25	V
Continuous Drain Current (Note 5) V_{GS} = -10V	Steady State	T_A = +25°C T_A = +70°C	I_D	-9.1 -7.2	A
Continuous Drain Current (Note 5) V_{GS} = -4.5V	Steady State	T_A = +25°C T_A = +70°C	I_D	-7.8 -6.2	A
Continuous Drain Current (Note 6) V_{GS} = -10V	Steady State	T_A = +25°C T_A = +70°C	I_D	-10.1 -8	A
Continuous Drain Current (Note 6) V_{GS} = -4.5V	Steady State	T_A = +25°C T_A = +70°C	I_D	-8.8 -7	A
Pulsed Drain Current (10µs Pulse, Duty Cycle = 1%)			I_{DM}	-100	A
Avalanche Current (Note 7)			I_{AS}	-22	A
Avalanche Energy (Note 7)			E_{AS}	242	mJ

Thermal Characteristics

Characteristic	Symbol	Value	Unit
Total Power Dissipation (Note 5)	P_D	1.45	W
Thermal Resistance, Junction to Ambient (Note 5)	$R_{\theta JA}$	88	°C/W
Total Power Dissipation (Note 6)	P_D	1.82	W
Thermal Resistance, Junction to Ambient (Note 6)	$R_{\theta JA}$	70	°C/W
Thermal Resistance, Junction to Case (Note 6)	$R_{\theta Jc}$	7.6	°C/W
Operating and Storage Temperature Range	T_J, T_{STG}	-55 to +150	°C

Notes: 5. Device mounted on FR-4 PC board, with minimum recommended pad layout, single sided.
6. Device mounted on FR-4 substrate PC board, 2oz copper, with thermal vias to bottom layer 1inch square copper plate.
7. UIS in production with L = 1mH, T_J = +25°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}	-40	—	—	V	V_{GS} = 0V, I_D = -250µA
Zero Gate Voltage Drain Current	I_{DSS}	—	—	-1	µA	V_{DS} = -40V, V_{GS} = 0V
Gate-Source Leakage	I_{GSS}	—	—	±100	nA	V_{GS} = ±25V, V_{DS} = 0V
ON CHARACTERISTICS (Note 8)						
Gate Threshold Voltage	$V_{GS(TH)}$	-1.5	-2	-2.5	V	V_{DS} = V_{GS}, I_D = -250µA
Static Drain-Source On-Resistance	$R_{DS(ON)}$	—	7	11	mΩ	V_{GS} = -10V, I_D = -9.8A
		—	9	15		V_{GS} = -4.5V, I_D = -9.8A
Forward Transfer Admittance	$\|Y_{fs}\|$	—	26	—	S	V_{DS} = -20V, I_D = -9.8A
Diode Forward Voltage (Note 5)	V_{SD}	—	-0.7	-1	V	V_{GS} = 0V, I_S = -1A
DYNAMIC CHARACTERISTICS (Note 9)						
Input Capacitance	C_{iss}	—	4234	—	pF	V_{DS} = -20V, V_{GS} = 0V f = 1MHz
Output Capacitance	C_{oss}	—	1036	—		
Reverse Transfer Capacitance	C_{rss}	—	526	—		
Gate Resistance	R_g	—	7.77	—	Ω	V_{DS} = 0V, V_{GS} = 0V, f = 1MHz
Total Gate Charge	Q_g	—	47.5	—	nC	V_{DS} = -20V, V_{GS} = -5V I_D = -9.8A
Gate-Source Charge	Q_{gs}	—	14.2	—		
Gate-Drain Charge	Q_{gd}	—	13.5	—		
Turn-On Delay Time	$t_{D(ON)}$	—	13.2	—	ns	V_{GS} = -10V, V_{DD} = -20V, R_g = 6Ω I_D = -1A, R_L = 20Ω
Turn-On Rise Time	t_R	—	10	—		
Turn-Off Delay Time	$t_{D(OFF)}$	—	302.7	—		
Turn-Off Fall Time	t_F	—	137.9	—		

Notes: 8. Short duration pulse test used to minimize self-heating effect.
9. Guaranteed by design. Not subject to production testing.

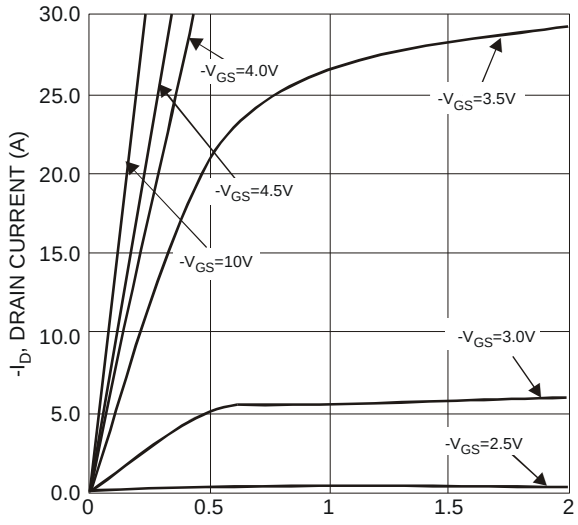


Fig. 1 Typical Output Characteristics

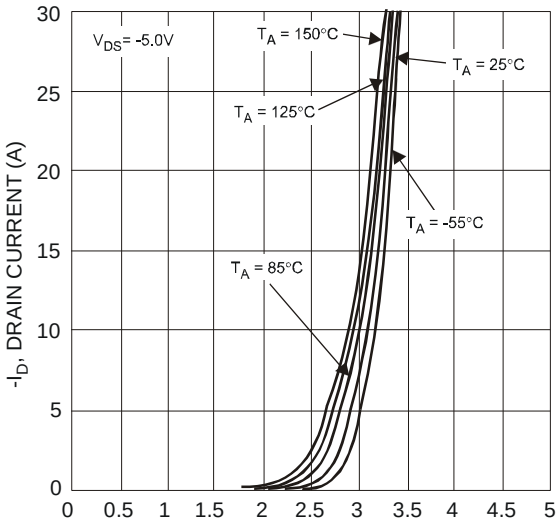


Fig. 2 Typical Transfer Characteristics

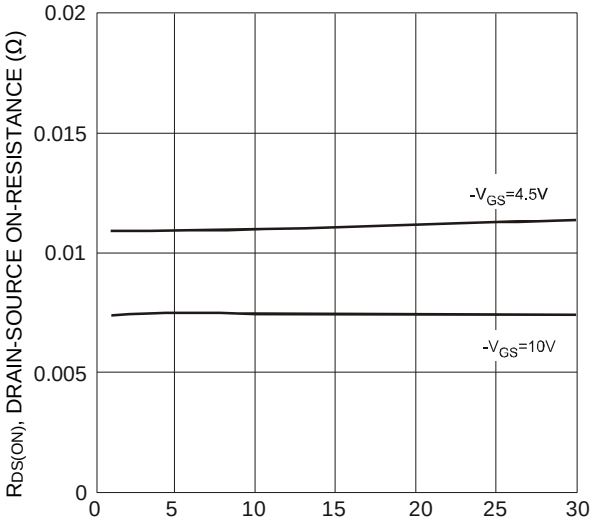


Fig. 3 Typical On-Resistance vs. Drain Current and Gate Voltage

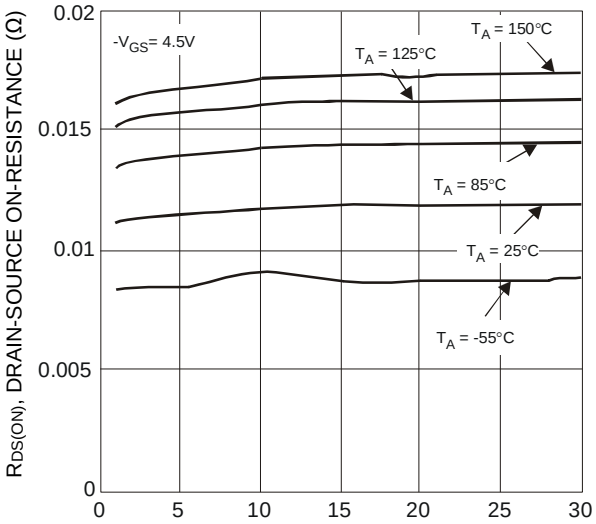


Fig. 4 Typical On-Resistance vs. Drain Current and Temperature

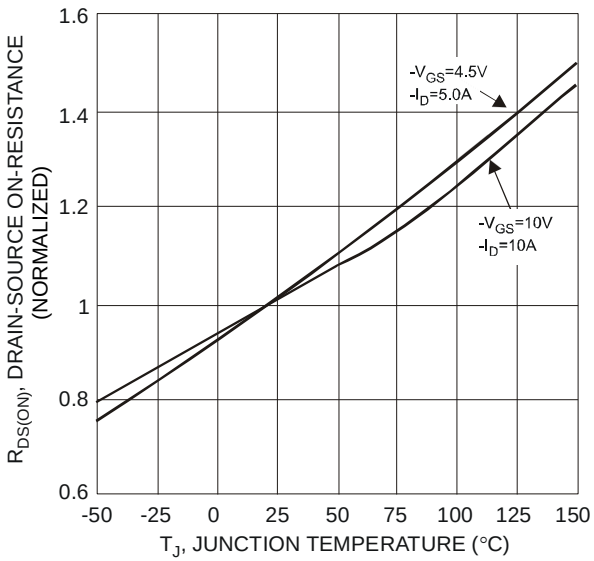


Fig. 5 On-Resistance Variation with Temperature

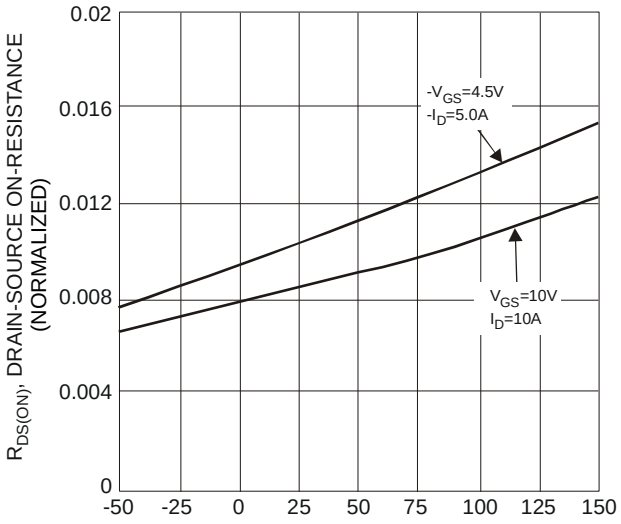


Fig. 6 On-Resistance Variation with Temperature

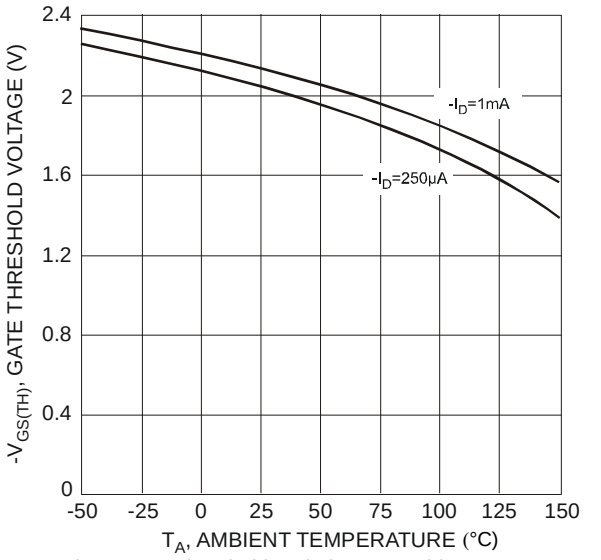


Fig. 7 Gate Threshold Variation vs. Ambient Temperature

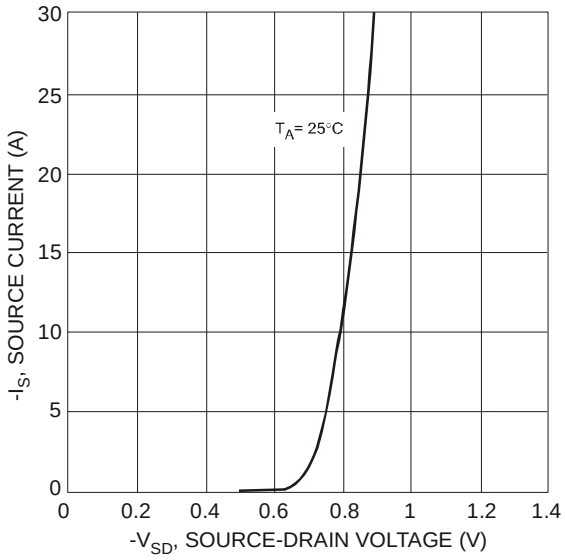


Fig. 8 Diode Forward Voltage vs. Current

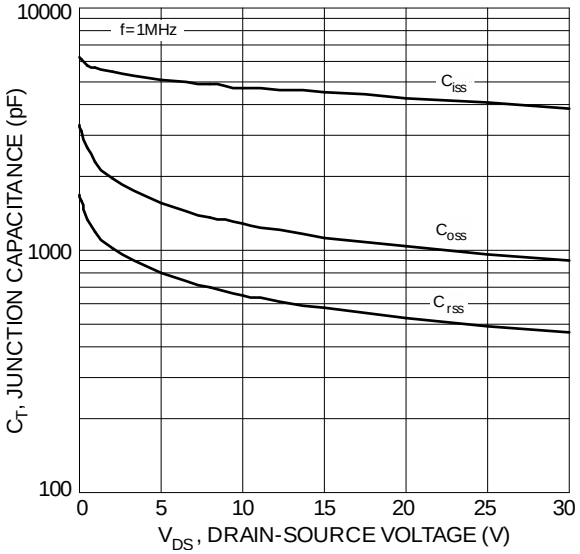


Fig. 9 Typical Junction Capacitance

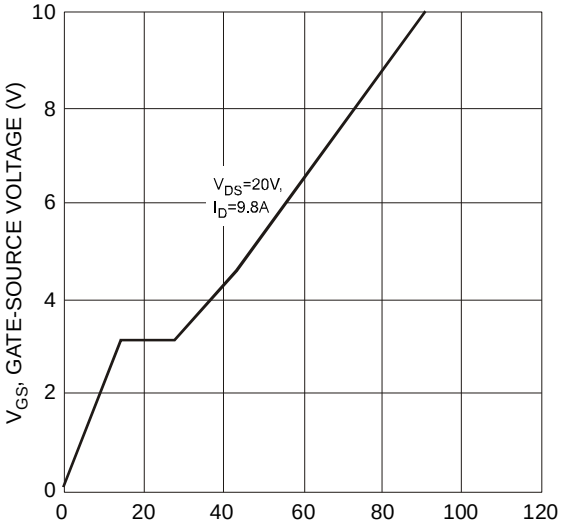


Fig. 10 Gate-Charge Characteristics

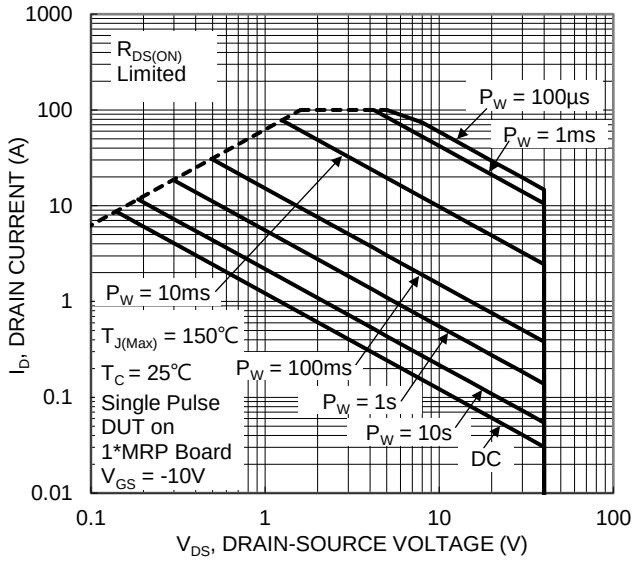


Fig. 11 SOA, Safe Operation Area

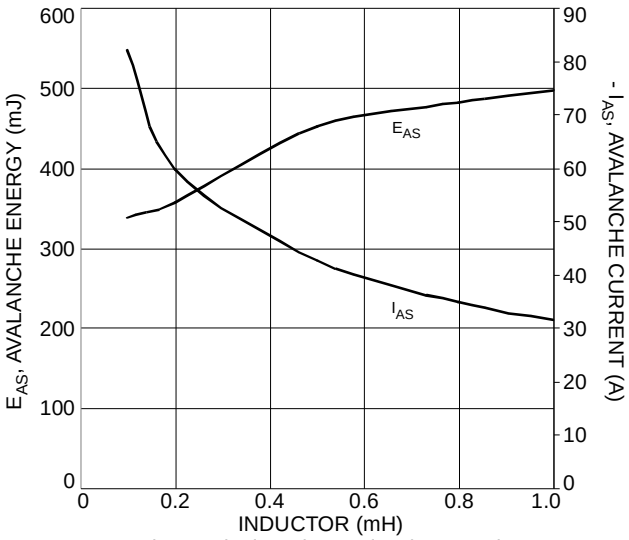


Fig. 12 Single-Pulse Avalanche Tested

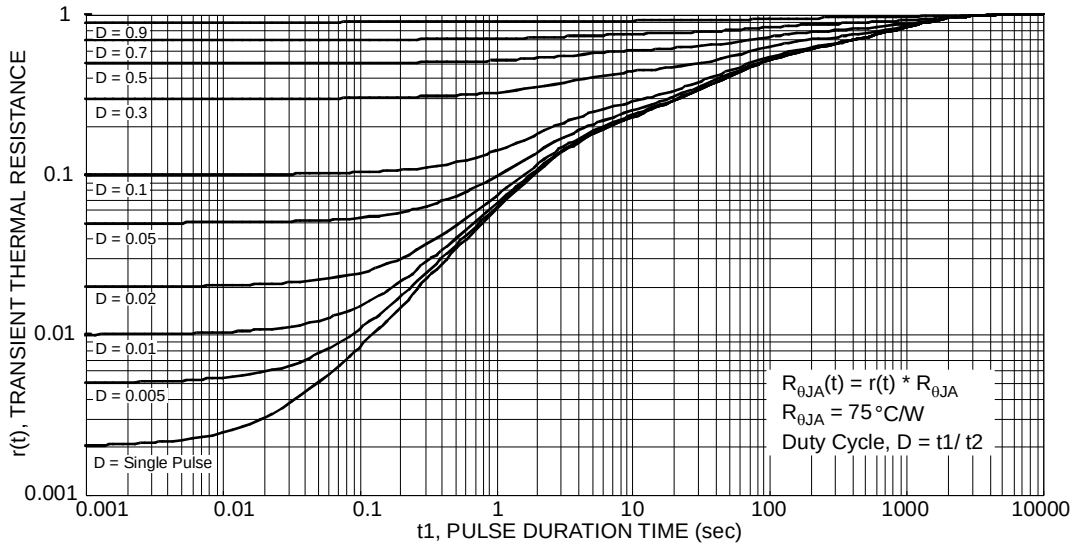
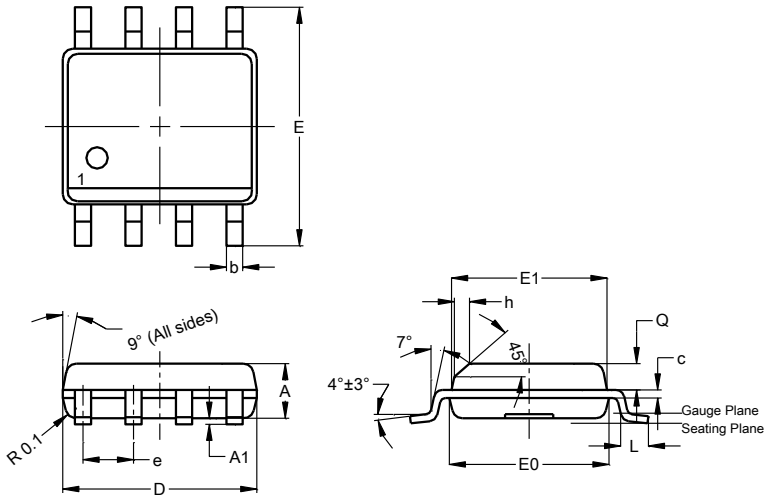


Fig. 13 Transient Thermal Resistance

Package Outline Dimensions

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

SO-8

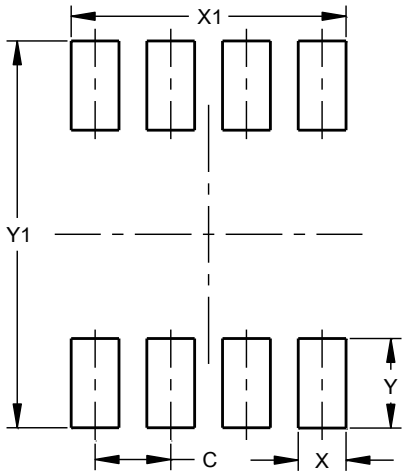


SO-8			
Dim	**Min**	**Max**	**Typ**
A	1.40	1.50	1.45
A1	0.10	0.20	0.15
b	0.30	0.50	0.40
c	0.15	0.25	0.20
D	4.85	4.95	4.90
E	5.90	6.10	6.00
E1	3.80	3.90	3.85
E0	3.85	3.95	3.90
e	--	--	1.27
h	-	--	0.35
L	0.62	0.82	0.72
Q	0.60	0.70	0.65
All Dimensions in mm			

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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