

**N-CHANNEL ENHANCEMENT MODE MOSFET WITH SCHOTTKY DIODE**

**Features**

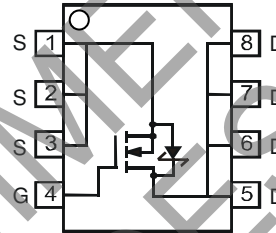
- DIOFET Utilizes a Unique Patented Process to Monolithically Integrate a MOSFET and a Schottky in a Single Die to Deliver:
  - Low  $R_{DS(ON)}$  - Minimizes Conduction Losses
  - Low  $V_{SD}$  - Reducing the Losses Due to Body Diode Conduction
  - Low  $Q_{rr}$  - Lower  $Q_{rr}$  of the Integrated Schottky Reduces Body Diode Switching Losses
  - Low Gate Capacitance ( $Q_g/Q_{gs}$ ) Ratio – Reduces Risk of Shoot-Through or Cross Conduction Currents at High Frequencies
  - Avalanche Rugged –  $I_{AR}$  and  $E_{AR}$  Rated
- **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: See Diagram Below
- Weight: 0.072 grams (Approximate)



Top View



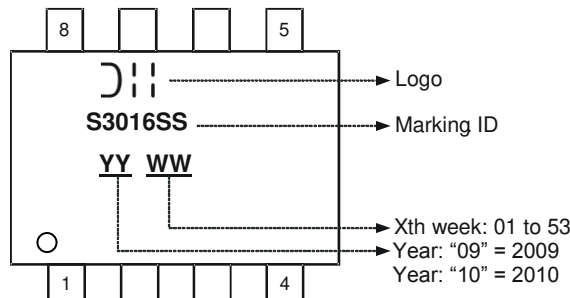
Top View Internal Schematic

**Ordering Information** (Note 4)

Part Number	Case	Packaging
DMS3016SSS-13	SO-8	2500 / 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**



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

Characteristic	Symbol	Value	Unit
Drain-Source Voltage	V <sub>DSS</sub>	30	V
Gate-Source Voltage	V <sub>GSS</sub>	±12	V
Continuous Drain Current (Note 5) V <sub>GS</sub> = 4.5V	I <sub>D</sub>	9.8	A
Steady State		6.3	
Pulsed Drain Current (Note 6)	I <sub>DM</sub>	90	A
Avalanche Current (Note 6) (Note 7)	I <sub>AR</sub>	13	A
Repetitive Avalanche Energy (Note 6) (Note 7) L = 0.3mH	E <sub>AR</sub>	25.4	mJ

**Thermal Characteristics**

Characteristic	Symbol	Value	Unit
Power Dissipation (Note 5)	P <sub>D</sub>	1.54	W
Thermal Resistance, Junction to Ambient @T <sub>A</sub> = +25°C (Note 5)	R <sub>θJA</sub>	81	°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>	-	-	0.1	mA	V <sub>DS</sub> = 30V, 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>	1.0	-	2.3	V	V <sub>DS</sub> = V <sub>GS</sub> , I <sub>D</sub> = 250μA
Static Drain-Source On-Resistance	R <sub>DS(ON)</sub>	-	9	13	mΩ	V <sub>GS</sub> = 10V, I <sub>D</sub> = 9.8A
		-	11	16		V <sub>GS</sub> = 4.5V, I <sub>D</sub> = 9.8A
Forward Transfer Admittance	Y <sub>fs</sub>	-	5	-	S	V <sub>DS</sub> = 5V, I <sub>D</sub> = 9.8A
Diode Forward Voltage	V <sub>SD</sub>	-	0.4	1	V	V <sub>GS</sub> = 0V, I <sub>S</sub> = 1A
Maximum Body-Diode + Schottky Continuous Current	I <sub>S</sub>	-	-	5	A	-
<b>DYNAMIC CHARACTERISTICS (Note 9)</b>						
Input Capacitance	C <sub>iSS</sub>	-	1849	-	pF	V <sub>DS</sub> = 15V, V <sub>GS</sub> = 0V, f = 1.0MHz
Output Capacitance	C <sub>oSS</sub>	-	158	-	pF	
Reverse Transfer Capacitance	C <sub>rSS</sub>	-	23	-	pF	
Gate Resistance	R <sub>g</sub>	0.53	2.68	4.82	Ω	V <sub>DS</sub> = 0V, V <sub>GS</sub> = 0V, f = 1MHz
Total Gate Charge V <sub>GS</sub> = 4.5V	Q <sub>g</sub>	-	18.5	-	nC	V <sub>DS</sub> = 15V, V <sub>GS</sub> = 10V, I <sub>D</sub> = 9.8A
Total Gate Charge V <sub>GS</sub> = 10V	Q <sub>g</sub>	-	43	-	nC	
Gate-Source Charge	Q <sub>gs</sub>	-	4.7	-	nC	
Gate-Drain Charge	Q <sub>gd</sub>	-	4.0	-	nC	
Turn-On Delay Time	t <sub>D(ON)</sub>	-	6.62	-	ns	V <sub>GS</sub> = 10V, V <sub>DS</sub> = 10V, R <sub>g</sub> = 3Ω, R <sub>L</sub> = 1.2Ω
Turn-On Rise Time	t <sub>r</sub>	-	8.73	-	ns	
Turn-Off Delay Time	t <sub>D(OFF)</sub>	-	36.41	-	ns	
Turn-Off Fall Time	t <sub>f</sub>	-	4.69	-	ns	

- Notes:
5. Device mounted on minimum recommended layout. The value in any given application depends on the user's specific board design.
  6. Repetitive rating, pulse width limited by junction temperature.
  7. I<sub>AR</sub> and E<sub>AR</sub> ratings are based on low frequency and duty cycles to keep T<sub>J</sub> = +25°C.
  8. Short duration pulse test used to minimize self-heating effect.
  9. Guaranteed by design. Not subject to production testing.

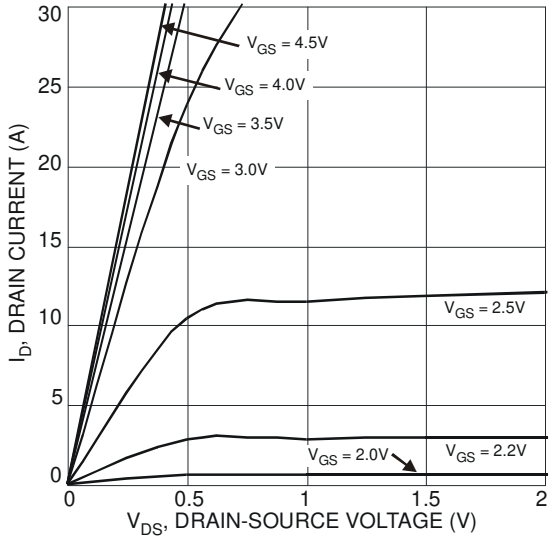


Fig. 1 Typical Output Characteristic

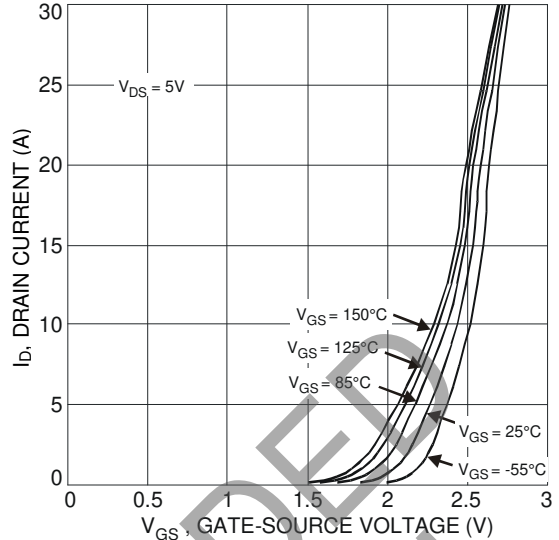


Fig. 2 Typical Transfer Characteristic

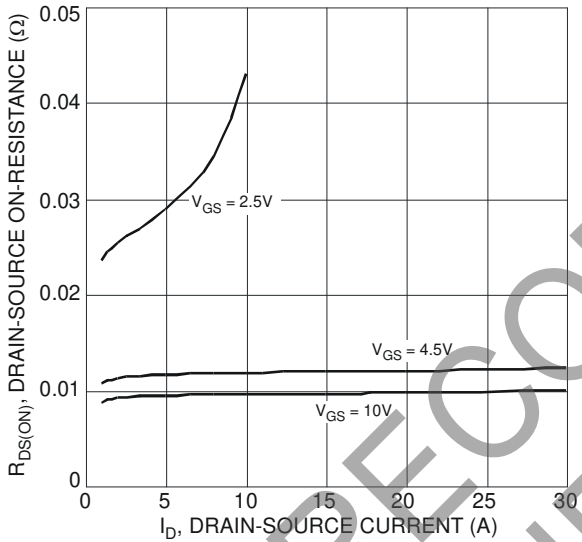


Fig. 3 Typical On-Resistance vs. Drain Current and Gate Voltage

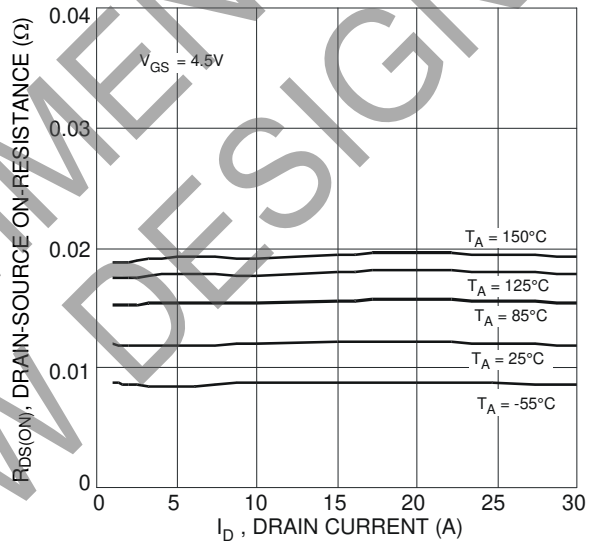


Fig. 4 Typical On-Resistance vs. Drain Current and Temperature

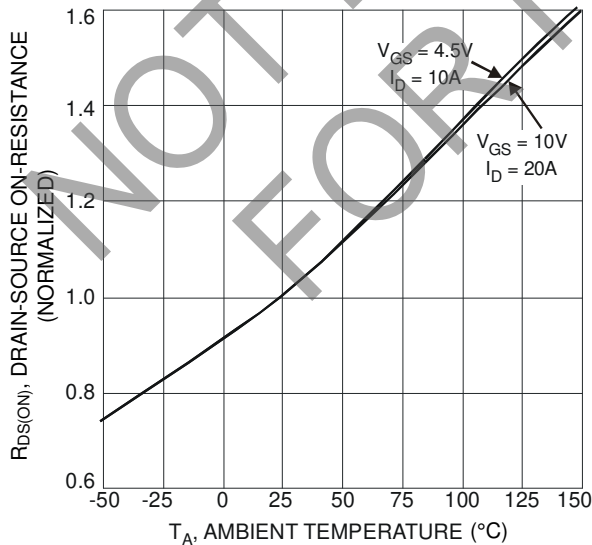


Fig. 5 On-Resistance Variation with Temperature

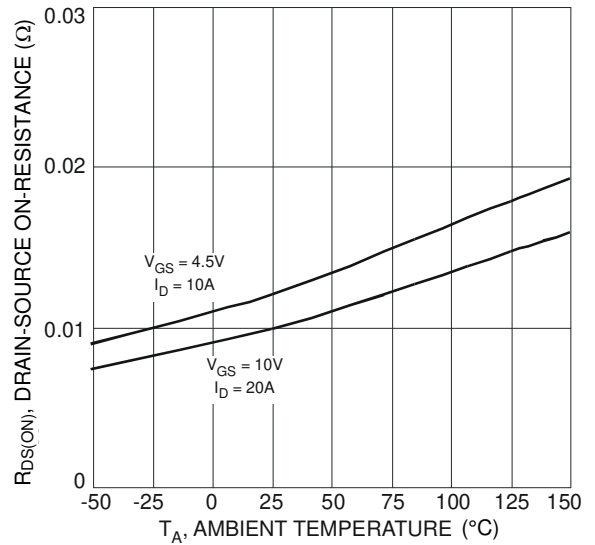


Fig. 6 On-Resistance Variation with Temperature

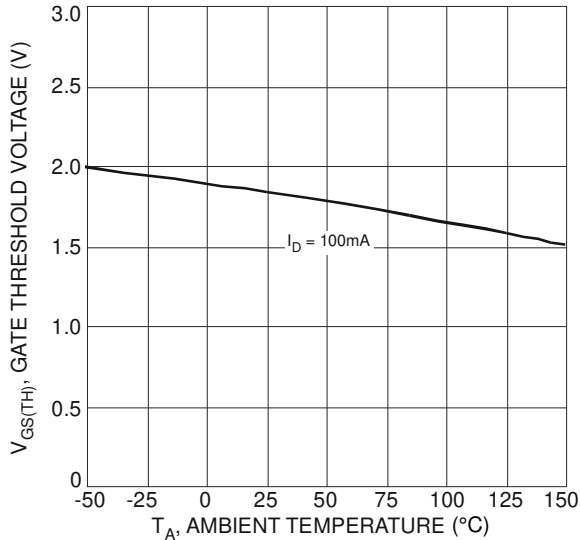


Fig. 7 Gate Threshold Variation vs. Ambient Temperature

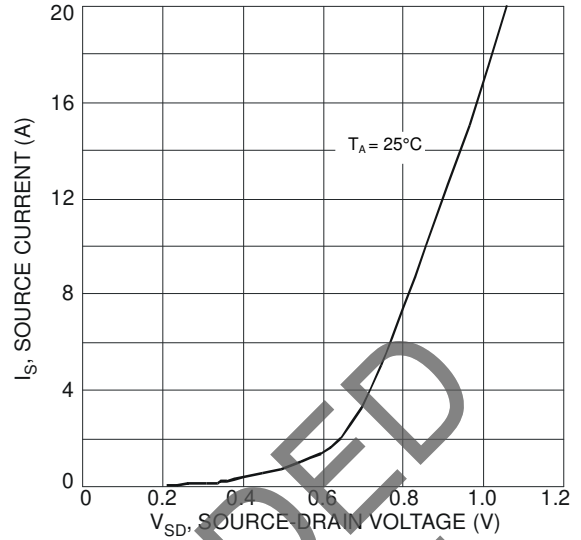


Fig. 8 Diode Forward Voltage vs. Current

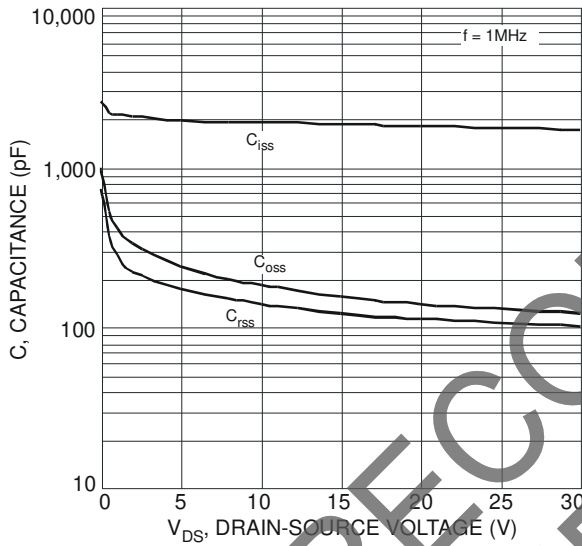


Fig. 9 Typical Total Capacitance

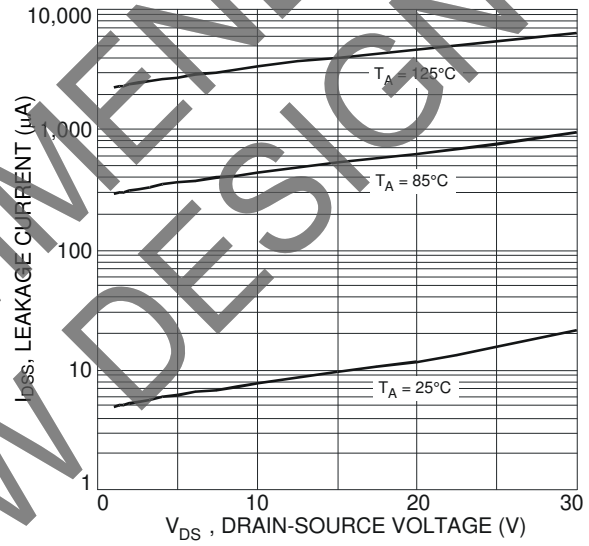


Fig. 10 Typical Leakage Current vs. Drain-Source Voltage

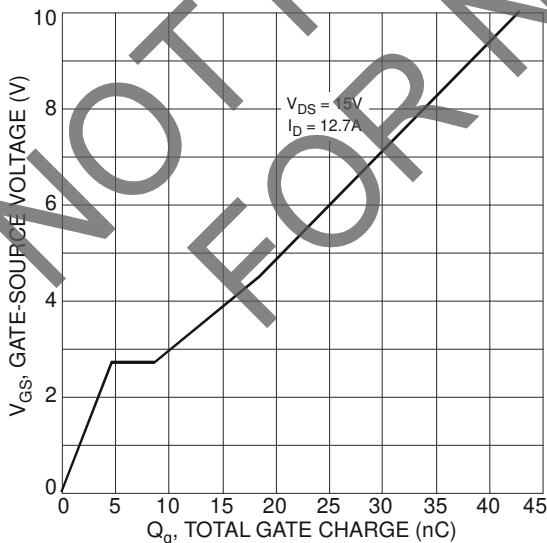
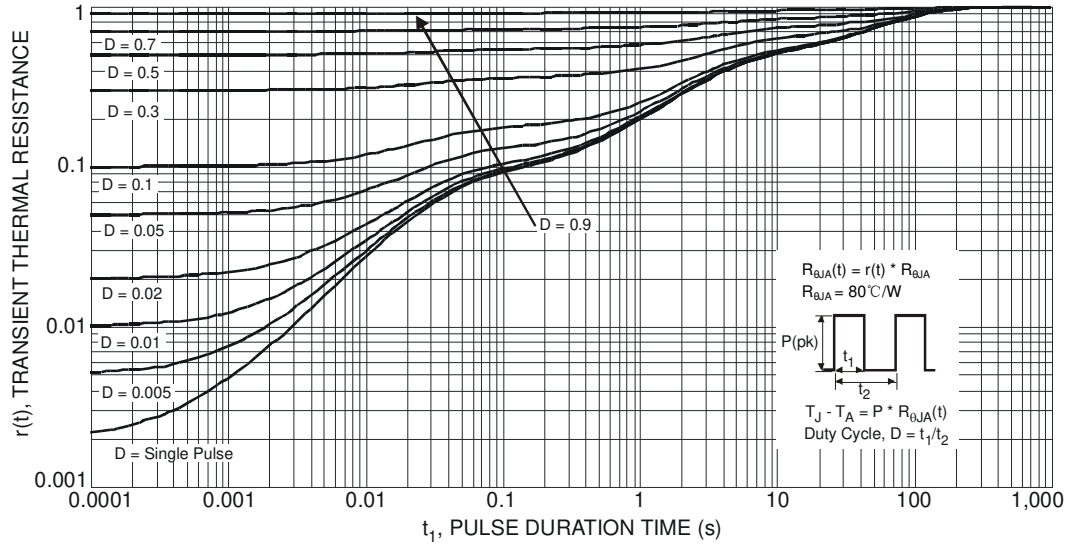


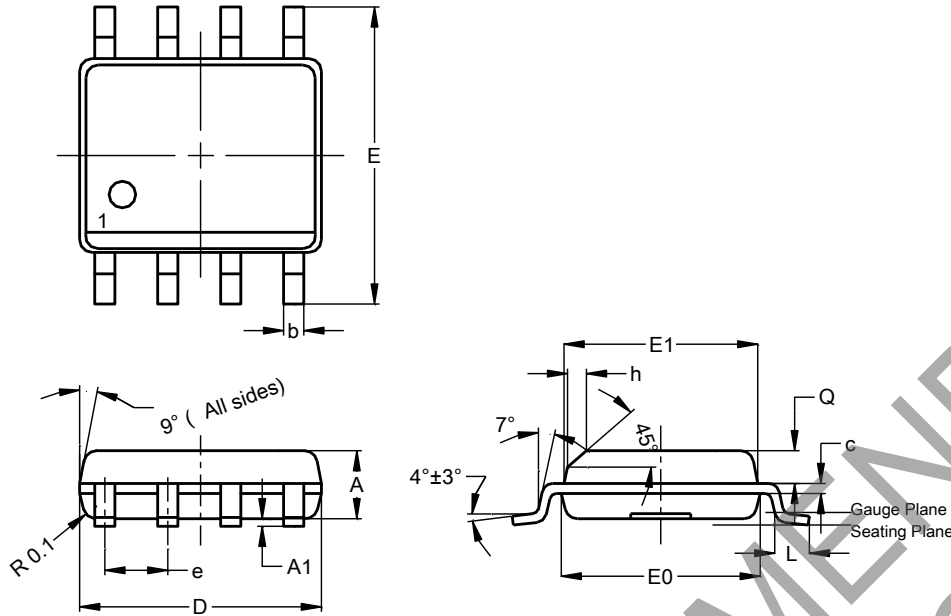
Fig. 11 Gate-Charge Characteristics



**Package Outline Dimensions**

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

**SO-8**

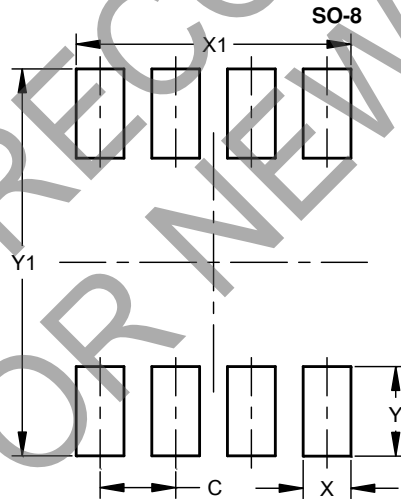


SO-8			
Dim	Min	Max	Typ
<b>A</b>	1.40	1.50	1.45
<b>A1</b>	0.10	0.20	0.15
<b>b</b>	0.30	0.50	0.40
<b>c</b>	0.15	0.25	0.20
<b>D</b>	4.85	4.95	4.90
<b>E</b>	5.90	6.10	6.00
<b>E1</b>	3.80	3.90	3.85
<b>E0</b>	3.85	3.95	3.90
<b>e</b>	--	--	1.27
<b>h</b>	-	--	0.35
<b>L</b>	0.62	0.82	0.72
<b>Q</b>	0.60	0.70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

**All Dimensions in mm**

**Suggested Pad Layout**

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



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

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