

**40V P-CHANNEL ENHANCEMENT MODE MOSFET**

**Product Summary**

$V_{(BR)DSS}$	$R_{DS(on) max}$	$I_D$ $T_A = +25^\circ C$
-40V	60mΩ @ $V_{GS} = -10V$	-6.4A
	100mΩ @ $V_{GS} = -4.5V$	-5.6A

**Features and Benefits**

- Low On-Resistance
- Fast Switching Speed
- Low Threshold
- Low Gate Drive
- **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 Capable (Note 4)**

**Description and Applications**

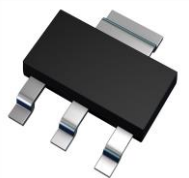
This new generation of Trench MOSFETs utilizes a unique structure that combines the benefits of low on-resistance with fast switching speed. This makes them ideal for high efficiency, low voltage, and power management applications.

- DC-DC Converters
- Disconnect Switches
- Audio Output Stages
- Motor Control

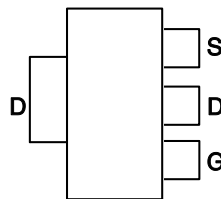
**Mechanical Data**

- Case: SOT223
- Case Material: Molded Plastic, UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminals: Finish - Matte Tin Annealed over Copper Leadframe. Solderable per MIL-STD-202, Method 208
- Weight: 0.112 grams (Approximate)

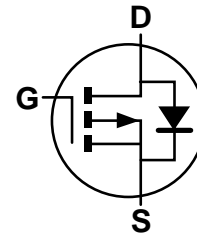
SOT223



Top View



Pin Out - Top View



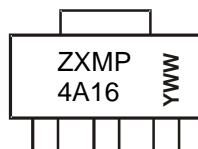
Equivalent Circuit

**Ordering Information** (Note 5)

Product	Case	Packaging
ZXMP4A16GQTA	SOT223	1,000/Tape & Reel
ZXMP4A16GQTC	SOT223	4,000/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**



ZXMP4A16 = Product Type Marking Code  
 YWW = Date Code Marking  
 Y = Year (ex: 4 = 2014)  
 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>	-40	V
Gate-Source Voltage		V <sub>GS</sub>	±20	V
Continuous Drain Current	V <sub>GS</sub> = 10V	(Note 7)	-6.4	A
		T <sub>A</sub> = +70°C (Note 7)	-4.6	
		(Note 6)	-1.7	
Pulsed Drain Current	V <sub>GS</sub> = 10V	I <sub>DM</sub>	-21	A
Continuous Source Current (Body diode)		I <sub>S</sub>	-5.2	A
Pulsed Source Current (Body diode)		I <sub>SM</sub>	-21	A

**Thermal Characteristics** @T<sub>A</sub> = 25°C unless otherwise specified

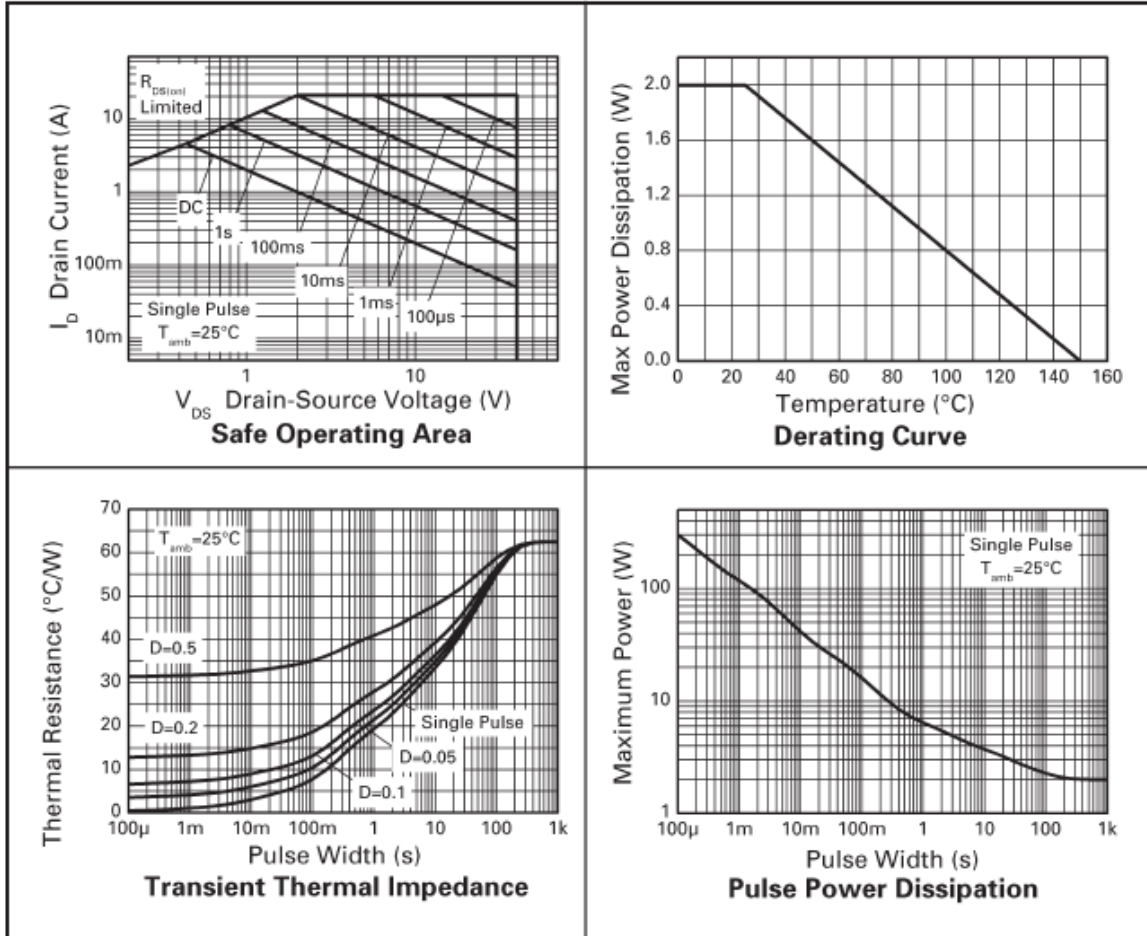
Characteristic		Symbol	Value	Unit
Power Dissipation	(Note 6)	P <sub>D</sub>	2.0	W
			16	
Linear Derating Factor	(Note 7)		3.9	mW/°C
			31	
Thermal Resistance, Junction to Ambient	(Note 6)	R <sub>θJA</sub>	62.5	°C/W
	(Note 7)		32.2	
Operating and Storage Temperature Range		T <sub>J</sub> , T <sub>STG</sub>	-55 to 150	°C

**Electrical Characteristics** @T<sub>A</sub> = 25°C unless otherwise specified

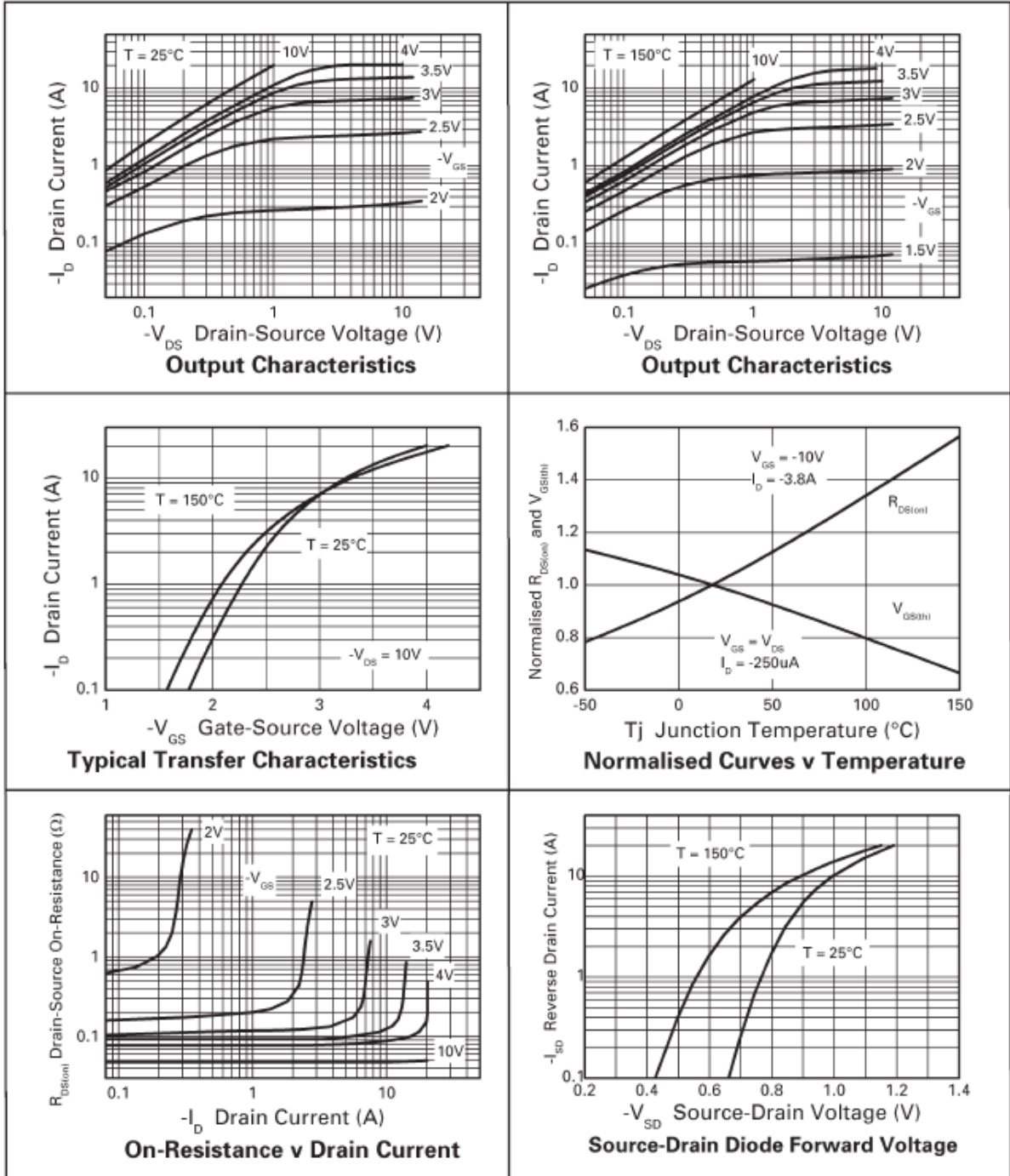
Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
<b>OFF CHARACTERISTICS</b>						
Drain-Source Breakdown Voltage	BV <sub>DSS</sub>	-40	—	—	V	I <sub>D</sub> = -250μA, V <sub>GS</sub> = 0V
Zero Gate Voltage Drain Current	I <sub>DSS</sub>	—	—	-1	μA	V <sub>DS</sub> = -40V, V <sub>GS</sub> = 0V
Gate-Source Leakage	I <sub>GSS</sub>	—	—	100	nA	V <sub>GS</sub> = ±20V, V <sub>DS</sub> = 0V
<b>ON CHARACTERISTICS</b>						
Gate Threshold Voltage	V <sub>GS(th)</sub>	-1.0	—	—	V	I <sub>D</sub> = -250μA, V <sub>DS</sub> = V <sub>GS</sub>
Static Drain-Source On-Resistance (Note 9)	R <sub>DS(on)</sub>	—	—	0.060	Ω	V <sub>GS</sub> = -10V, I <sub>D</sub> = -3.8A
				0.100		V <sub>GS</sub> = -4.5V, I <sub>D</sub> = -2.9A
Forward Transconductance (Notes 9 & 11)	g <sub>fs</sub>	—	8.85	—	S	V <sub>DS</sub> = -15V, I <sub>D</sub> = -3.8A
Diode Forward Voltage (Note 9)	V <sub>SD</sub>	—	-0.85	-1.2	V	T <sub>J</sub> = 25°C, I <sub>S</sub> = -3.4A, V <sub>GS</sub> = 0V
Reverse Recovery Time (Note 11)	t <sub>rr</sub>	—	27.2	—	ns	T <sub>J</sub> = +25°C, I <sub>F</sub> = -3A, di/dt = 100A/μs
Reverse Recovery Charge (Note 11)	Q <sub>rr</sub>	—	25.4	—	nC	
<b>DYNAMIC CHARACTERISTICS (Note 11)</b>						
Input Capacitance	C <sub>iss</sub>	—	1007	—	pF	V <sub>DS</sub> = -20V, V <sub>GS</sub> = 0V f = 1MHz
Output Capacitance	C <sub>oss</sub>	—	130	—	pF	
Reverse Transfer Capacitance	C <sub>rss</sub>	—	85	—	pF	
Total Gate Charge (Note 10)	Q <sub>g</sub>	—	13.6	—	nC	V <sub>GS</sub> = -5V
Total Gate Charge (Note 10)	Q <sub>g</sub>	—	26.1	—	nC	V <sub>GS</sub> = -10V
Gate-Source Charge (Note 10)	Q <sub>gs</sub>	—	2.8	—	nC	
Gate-Drain Charge (Note 10)	Q <sub>gd</sub>	—	4.8	—	nC	
Turn-On Delay Time (Note 10)	t <sub>D(on)</sub>	—	3.0	—	ns	V <sub>DD</sub> = -20V, V <sub>GS</sub> = -10V, I <sub>D</sub> = -1A, R <sub>θ</sub> ≅ 6.0Ω
Turn-On Rise Time (Note 10)	t <sub>r</sub>	—	3.5	—	ns	
Turn-Off Delay Time (Note 10)	t <sub>D(off)</sub>	—	13.4	—	ns	
Turn-Off Fall Time (Note 10)	t <sub>f</sub>	—	7.2	—	ns	

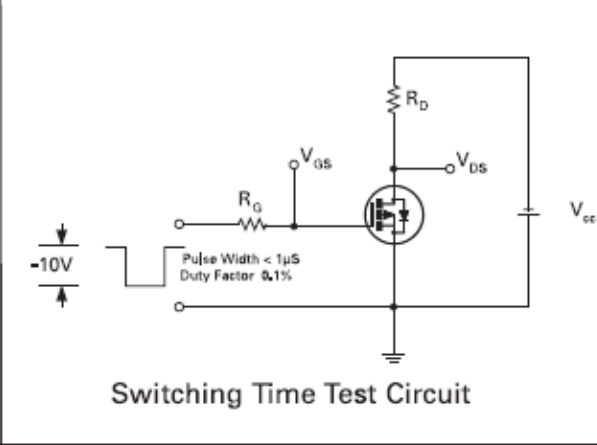
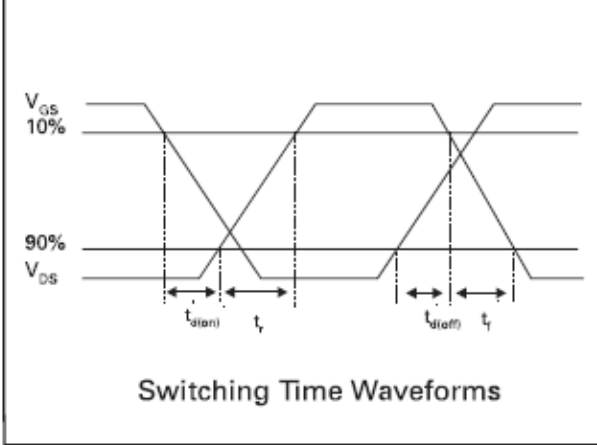
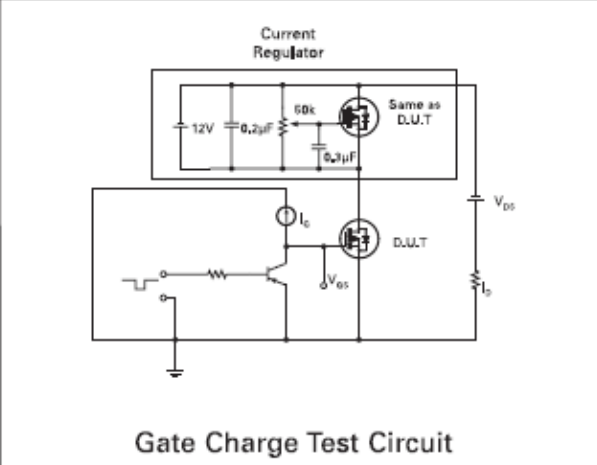
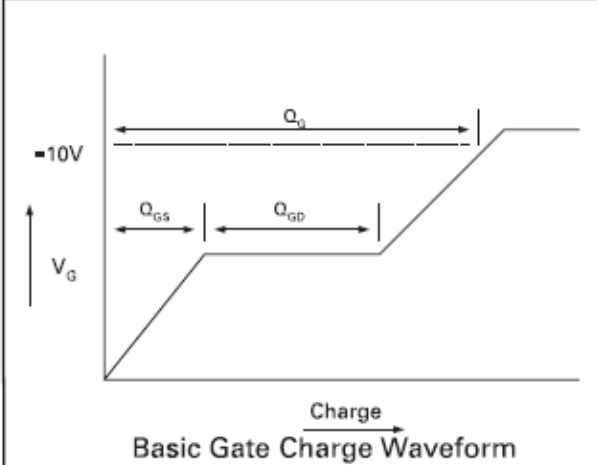
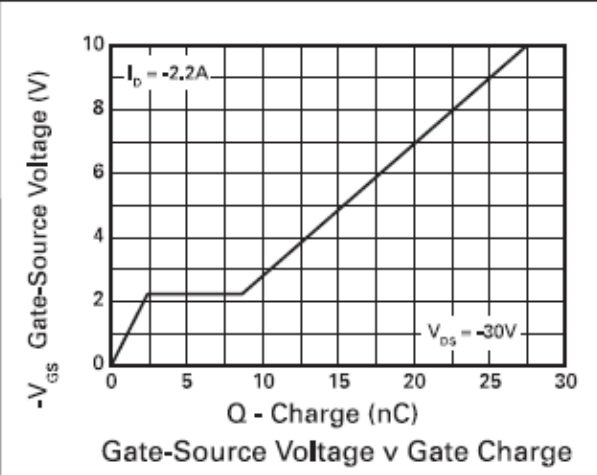
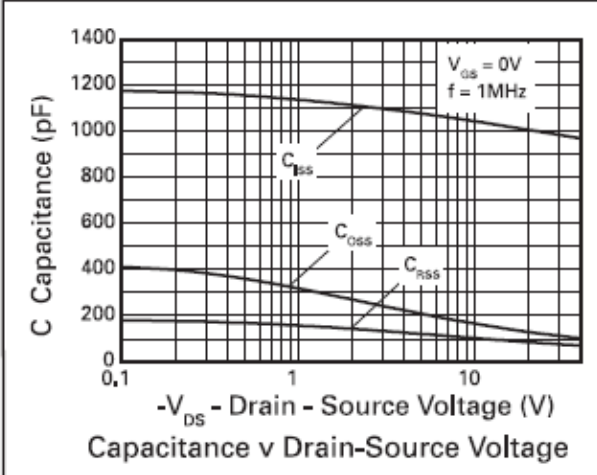
- Notes:
- For a device surface mounted on 25mm x 25mm FR4 PCB with high coverage of single sided 1oz copper, in still air conditions.
  - For a device surface mounted on FR4 PCB measured at t ≤ 10 seconds.
  - For a device surface mounted on 25mm x 25mm FR4 PCB, D = 0.05 pulse width limited by maximum junction temperature.
  - Measured under pulsed conditions. Width ≤ 300μs. Duty cycle ≤ 2%.
  - Switching characteristics are independent of operating junction temperature.
  - For design aid only, not subject to production testing.

**CHARACTERISTICS**



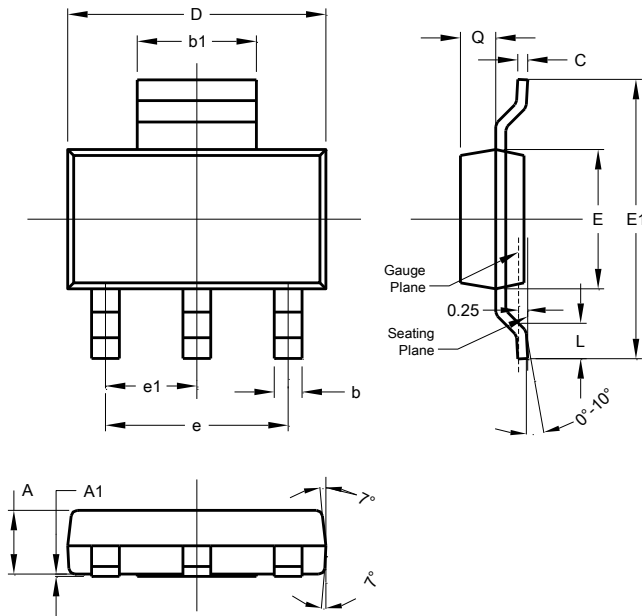
**TYPICAL CHARACTERISTICS**





**Package Outline Dimensions**

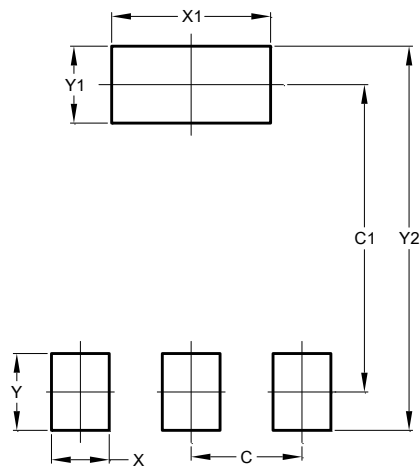
Please see AP02001 at <http://www.diodes.com/datasheets/ap02001.pdf> for the latest version.



SOT223			
Dim	Min	Max	Typ
A	1.55	1.65	1.60
A1	0.010	0.15	0.05
b	0.60	0.80	0.70
b1	2.90	3.10	3.00
C	0.20	0.30	0.25
D	6.45	6.55	6.50
E	3.45	3.55	3.50
E1	6.90	7.10	7.00
e	-	-	4.60
e1	-	-	2.30
L	0.85	1.05	0.95
Q	0.84	0.94	0.89
All Dimensions in mm			

**Suggested Pad Layout**

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



Dimensions	Value (in mm)
C	2.30
C1	6.40
X	1.20
X1	3.30
Y	1.60
Y1	1.60
Y2	8.00

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