

**70V P-CHANNEL ENHANCEMENT MODE MOSFET**
**Product Summary**

BV <sub>DSS</sub>	R <sub>DS(on)</sub> max	I <sub>D</sub> T <sub>A</sub> = +25°C
-70V	160mΩ @ V <sub>GS</sub> = -10V	-5.7A
	250mΩ @ V <sub>GS</sub> = -4.5V	-5.3A

**Description**

This new generation of trench MOSFETs utilizes a unique structure that combines the benefits of low on-resistance with fast switching speed. The ZXMP7A17KQ is ideal for high efficiency, low voltage power management applications.

**Applications**

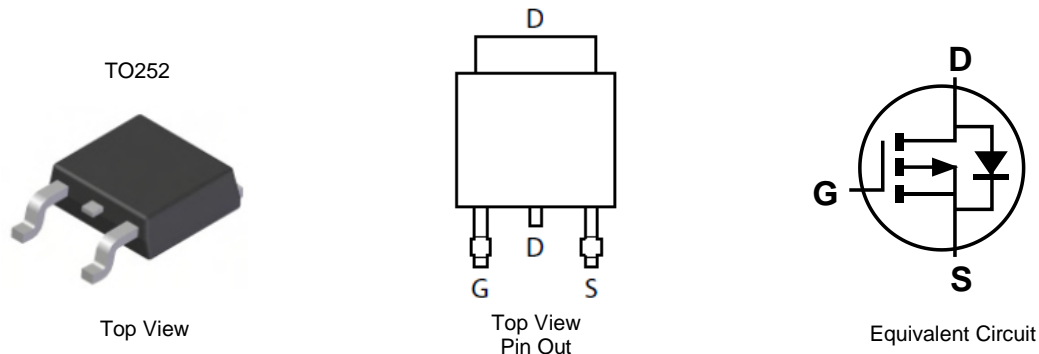
- DC-DC Converters
- Power Management Functions
- Disconnect Switches
- Motor Control
- Class D Audio Output Stages

**Features and Benefits**

- Low On-Resistance
- Fast Switching Speed
- Low Threshold
- Low Gate Drive
- DPAK Package
- **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)**

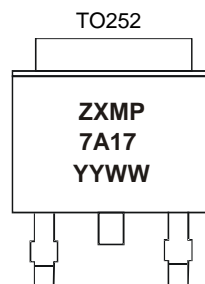
**Mechanical Data**

- Case: TO252 (DPAK)
- 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 Below
- Terminals: Finish - Matte Tin Annealed over Copper Leadframe; Solderable per MIL-STD-202, Method 208③
- Weight: 0.315 grams (Approximate)


**Ordering Information** (Note 5)

Part Number	Case	Packaging
ZXMP7A17KQTC	TO252	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](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**


ZXMP7A17 = Product Type Marking Code  
 YYWW = Date Code Marking  
 YY = Year (ex: 10 = 2010)  
 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>	-70	V	
Gate-Source Voltage			V <sub>GS</sub>	±20	V	
Continuous Drain Current	V <sub>GS</sub> = 10V	(Note 7)	I <sub>D</sub>	-5.7	A	
		T <sub>A</sub> = +70°C (Note 7)		-4.6		
		(Note 6)		-3.8		
Pulsed Drain Current	V <sub>GS</sub> = 10V	(Note 8)	I <sub>DM</sub>	-17.7	A	
Continuous Source Current (Body diode)			(Note 7)	I <sub>S</sub>	-9.2	A
Pulsed Source Current (Body diode)			(Note 8)	I <sub>SM</sub>	-17.7	A

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

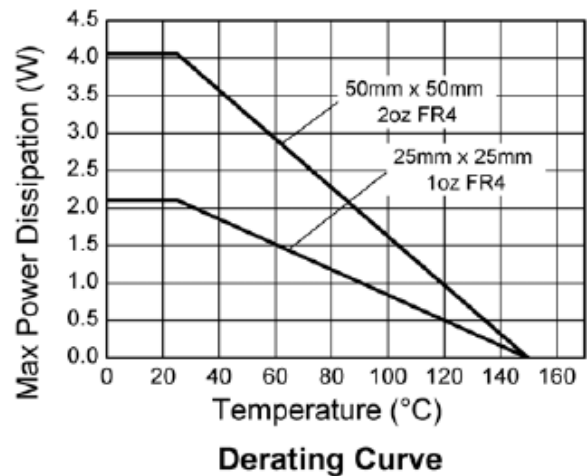
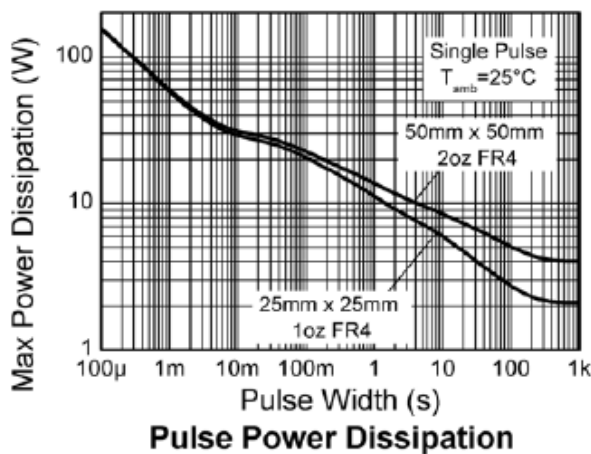
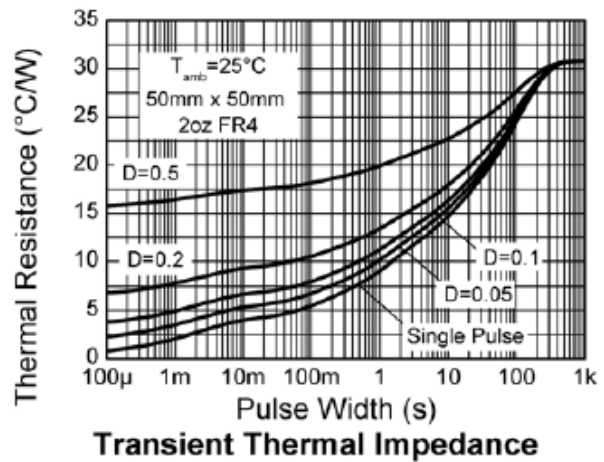
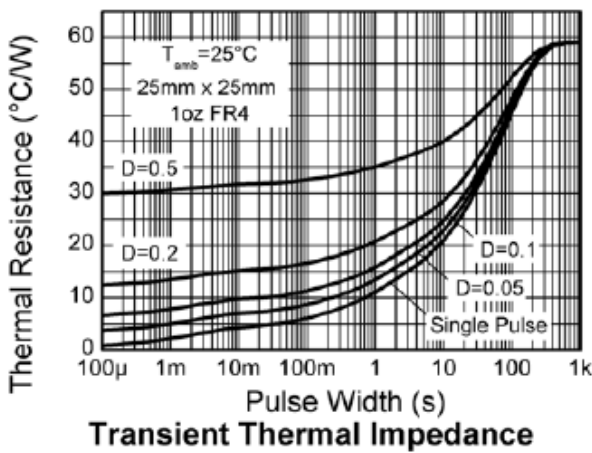
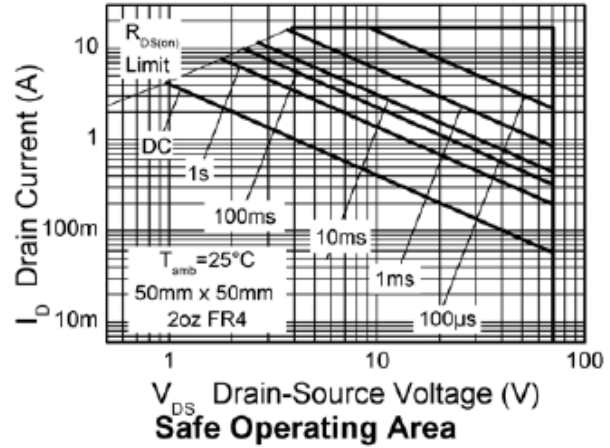
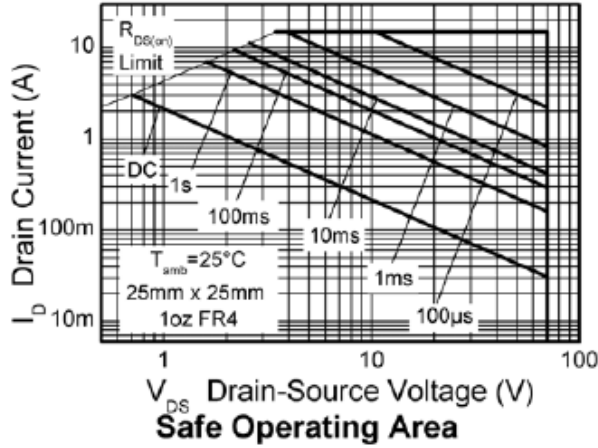
Characteristic		Symbol	Value	Unit
Power Dissipation Linear Derating Factor	(Note 6)	P <sub>D</sub>	4.17	W mW/°C
			33.3	
	(Note 7)		9.25	
			74	
	(Note 9)		2.11	
			16.8	
Thermal Resistance, Junction to Ambient	(Note 6)	R <sub>θJA</sub>	30	°C/W
	(Note 7)		13.5	
	(Note 8)		59.1	
Operating and Storage 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.)

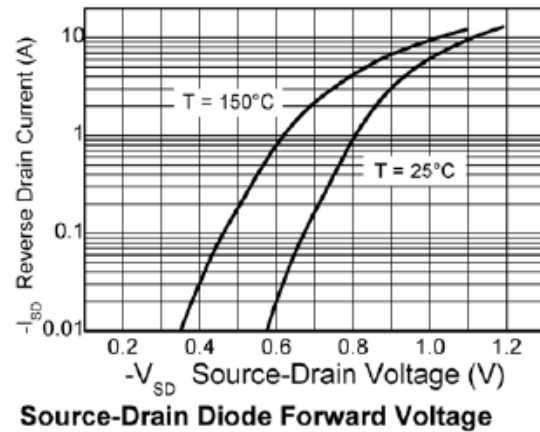
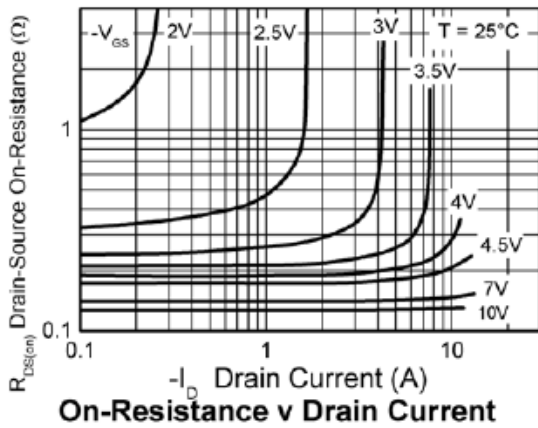
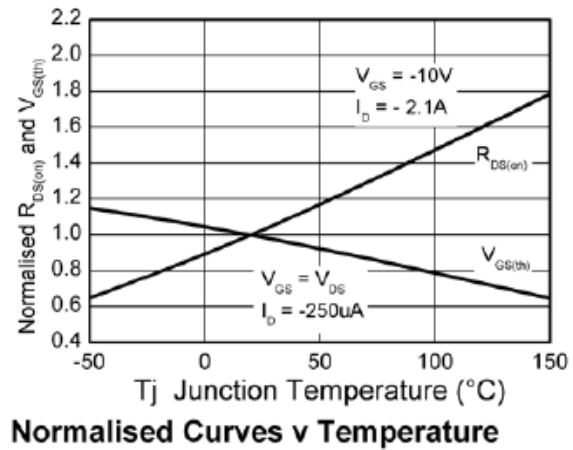
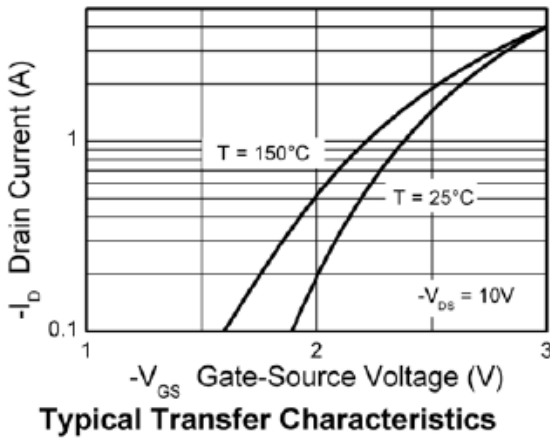
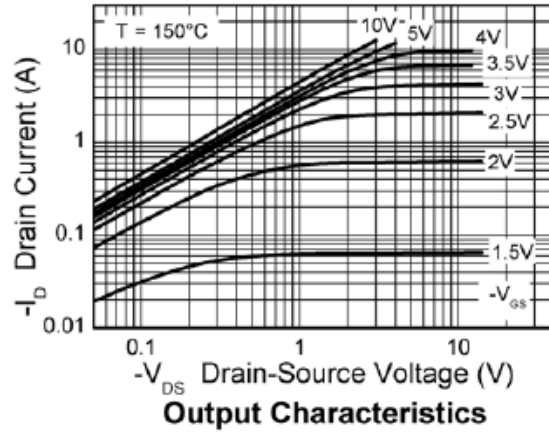
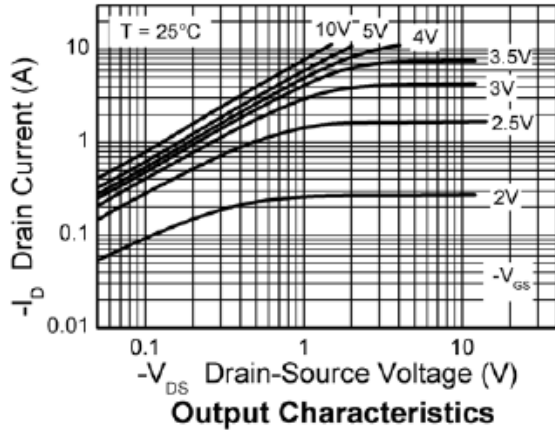
Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
<b>OFF CHARACTERISTICS</b>						
Drain-Source Breakdown Voltage	BV <sub>DSS</sub>	-70	—	—	V	I <sub>D</sub> = -250μA, V <sub>GS</sub> = 0V
Zero Gate Voltage Drain Current	I <sub>DSS</sub>	—	—	-1	μA	V <sub>DS</sub> = -70V, V <sub>GS</sub> = 0V
Gate-Source 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 10)	R <sub>DS(on)</sub>	—	—	0.16	Ω	V <sub>GS</sub> = -10V, I <sub>D</sub> = -2.1A
				0.25		V <sub>GS</sub> = -4.5V, I <sub>D</sub> = -1.7A
Forward Transconductance (Notes 10 & 11)	g <sub>fs</sub>	—	4.4	—	S	V <sub>DS</sub> = -15V, I <sub>D</sub> = -2.1A
Diode Forward Voltage (Note 10)	V <sub>SD</sub>	—	-0.85	-0.95	V	I <sub>S</sub> = -2.0A, V <sub>GS</sub> = 0V, T <sub>J</sub> = +25°C
Reverse Recovery Time (Note 11)	t <sub>rr</sub>	—	29.8	—	ns	I <sub>S</sub> = -2.1A, di/dt = 100A/μs
Reverse Recovery Charge (Note 11)	Q <sub>rr</sub>	—	38.5	—	nC	
<b>DYNAMIC CHARACTERISTICS (Note 11)</b>						
Input Capacitance	C <sub>iss</sub>	—	635	—	pF	V <sub>DS</sub> = -40V, V <sub>GS</sub> = 0V f = 1MHz
Output Capacitance	C <sub>oss</sub>	—	52	—	pF	
Reverse Transfer Capacitance	C <sub>rss</sub>	—	42.5	—	pF	
Total Gate Charge (Note 12)	Q <sub>g</sub>	—	9.6	—	nC	V <sub>GS</sub> = -5V
Total Gate Charge (Note 12)	Q <sub>g</sub>	—	18	—	nC	V <sub>GS</sub> = -10V V <sub>DS</sub> = -35V I <sub>D</sub> = -2.1A
Gate-Source Charge (Note 12)	Q <sub>gs</sub>	—	1.77	—	nC	
Gate-Drain Charge (Note 12)	Q <sub>gd</sub>	—	3.66	—	nC	
Turn-On Delay Time (Note 12)	t <sub>D(on)</sub>	—	2.5	—	ns	V <sub>DD</sub> = -35V, V <sub>GS</sub> = -10V I <sub>D</sub> = -1A, R <sub>G</sub> ≅ 6.0Ω
Turn-On Rise Time (Note 12)	t <sub>r</sub>	—	3.4	—	ns	
Turn-Off Delay Time (Note 12)	t <sub>D(off)</sub>	—	27.9	—	ns	
Turn-Off Fall Time (Note 12)	t <sub>f</sub>	—	8	—	ns	

- Notes:
6. For a device surface mounted on 50mm x 50mm x 1.6mm FR4 PCB with high coverage of single sided 2oz copper, in still air conditions.
  7. For a device surface mounted on FR4 PCB measured at t ≤ 10 sec.
  8. Repetitive rating 50mm x 50mm x 1.6mm FR4 PCB, D=0.02 pulse width=300μs - pulse width limited by maximum junction temperature.
  9. For a device surface mounted on 25mm x 25mm x 1.6mm FR4 PCB with high coverage of single sided 1oz copper, in still air conditions.
  10. Measured under pulsed conditions. Pulse width ≤ 300μs; duty cycle ≤ 2%.
  11. Switching characteristics are independent of operating junction temperature.
  12. For design aid only, not subject to production testing.

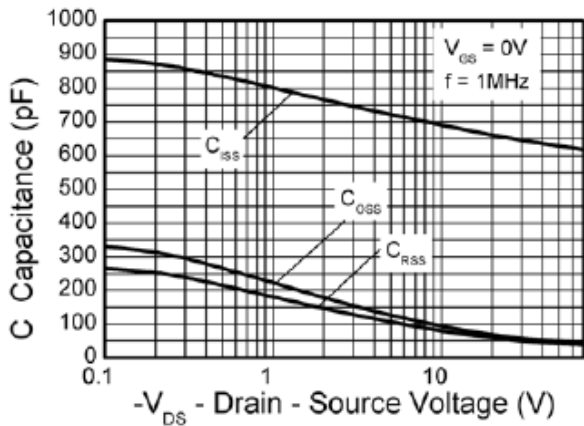
**Thermal Characteristics**



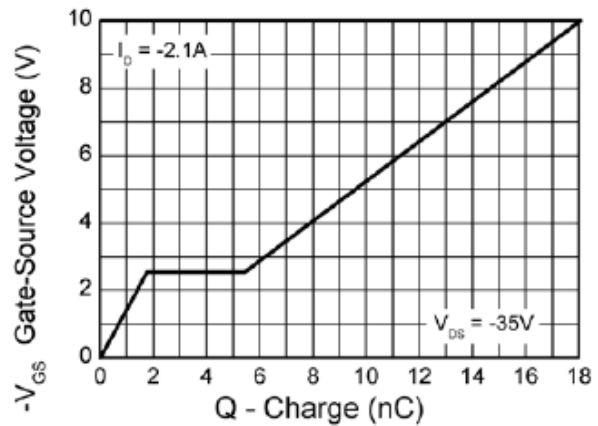
**Typical Characteristics**



Typical Characteristics (cont.)



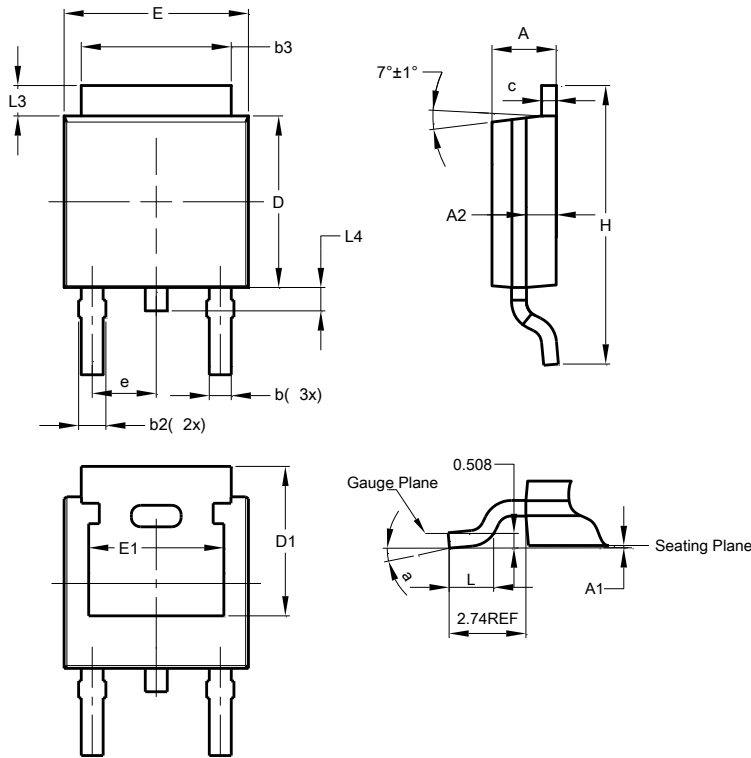
Capacitance v Drain-Source Voltage



Gate-Source Voltage v Gate Charge

## Package Outline Dimensions

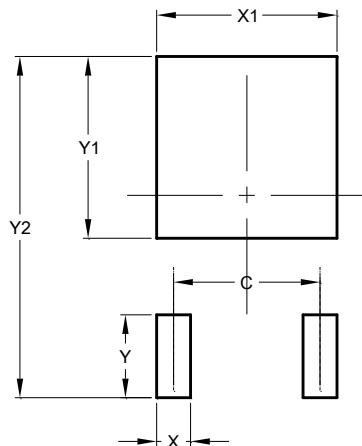
Please see AP02002 at <http://www.diodes.com/datasheets/ap02002.pdf> for the latest version.



TO252 (DPAK)			
Dim	Min	Max	Typ
A	2.19	2.39	2.29
A1	0.00	0.13	0.08
A2	0.97	1.17	1.07
b	0.64	0.88	0.783
b2	0.76	1.14	0.95
b3	5.21	5.46	5.33
c	0.45	0.58	0.531
D	6.00	6.20	6.10
D1	5.21	-	-
e	-	-	2.286
E	6.45	6.70	6.58
E1	4.32	-	-
H	9.40	10.41	9.91
L	1.40	1.78	1.59
L3	0.88	1.27	1.08
L4	0.64	1.02	0.83
a	0°	10°	-
All Dimensions in mm			

## Suggested Pad Layout

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



Dimensions	Value (in mm)
C	4.572
X	1.060
X1	5.632
Y	2.600
Y1	5.700
Y2	10.700

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