

**DUAL P-CHANNEL 60V ENHANCEMENT MODE MOSFET**

**Product Summary**

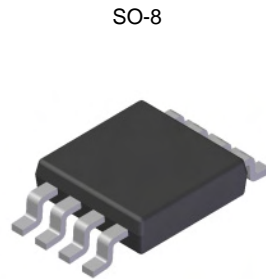
$V_{(BR)DSS}$	$R_{DS(on)}$ Max	$I_D$ $T_A = 25^\circ C$ (Notes 7 & 9)
-60V	125m $\Omega$ @ $V_{GS} = -10V$	-3.4A
	190m $\Omega$ @ $V_{GS} = -4.5V$	-2.8A

**Description**

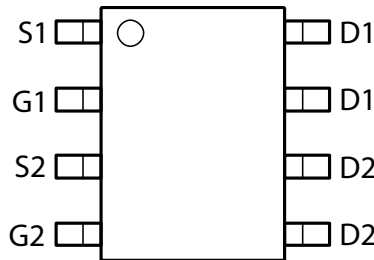
This MOSFET has been designed to minimize the on-state resistance and yet maintain superior switching performance, making it ideal for high efficiency power management applications.

**Applications**

- DC-DC Converters
- Power Management functions
- Disconnect Switches
- Motor control



Top View



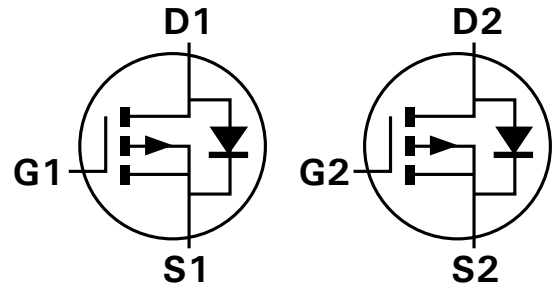
Top View

**Features**

- Low on-resistance
- Fast switching speed
- Low threshold
- Low gate drive
- Low profile SOIC package
- **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 (Note 1)
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminals: Matte Tin Finish; Solderable per MIL-STD-202, Method 208
- Weight: 0.074 grams (approximate)



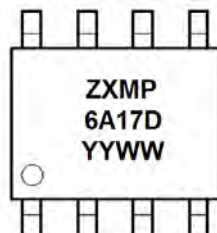
Equivalent Circuit

**Ordering Information** (Notes 4 & 5)

Product	Grade	Marking	Reel size (inches)	Tape width (mm)	Quantity per reel
ZXMP6A17DN8TA	AEC-Q101	ZXMP6A17D	7	12	500
ZXMP6A17DN8QTA	Automotive	ZXMP6A17D	7	12	500

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

**Marking Information**



ZXMP6A17D = Product Type Marking Code  
YYWW = Date Code Marking  
YY = Year (ex: 11 = 2011)  
WW = Week (01 - 53)

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

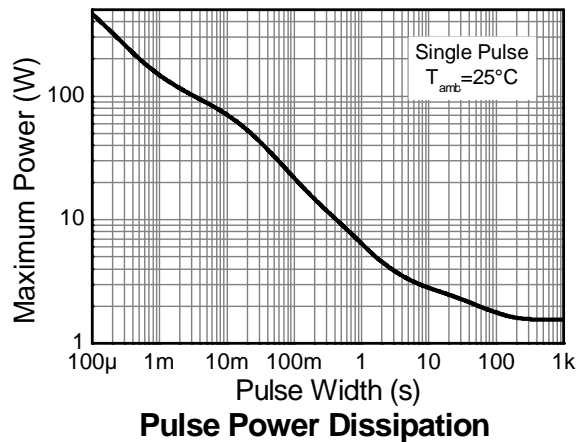
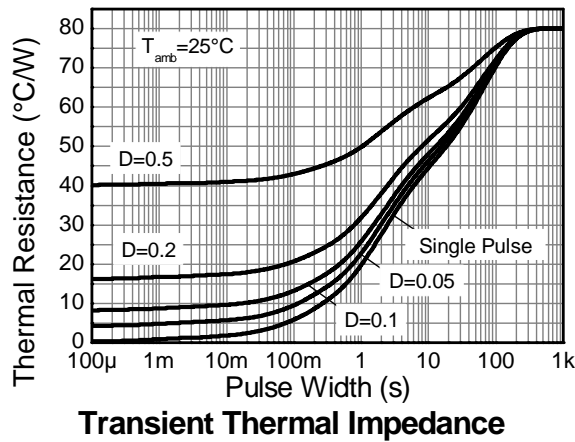
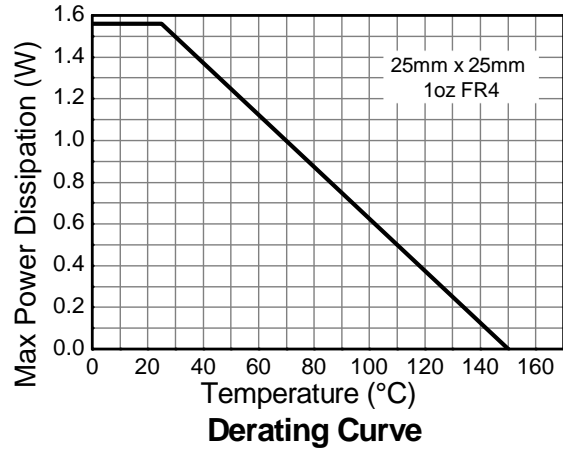
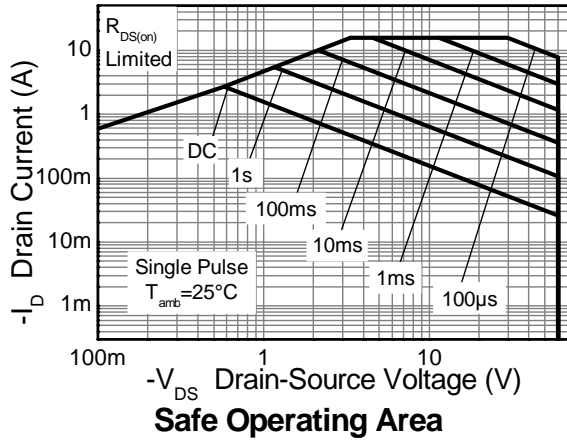
Characteristic		Symbol	Value	Unit	
Drain-Source voltage		V <sub>DSS</sub>	-60	V	
Gate-Source voltage		V <sub>GS</sub>	±20	V	
Continuous Drain current	V <sub>GS</sub> = 10V	I <sub>D</sub>	(Notes 7 & 9)	-3.42	A
			T <sub>A</sub> = 70°C (Notes 7 & 9)	-2.73	
			(Notes 6 & 9)	-2.7	
Pulsed Drain current		I <sub>DM</sub>	-15.6	A	
Continuous Source current (Body diode)		I <sub>S</sub>	-3.4	A	
Pulsed Source current (Body diode)		I <sub>SM</sub>	-15.6	A	

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

Characteristic		Symbol	Value	Unit
Power dissipation Linear derating factor	(Notes 6 & 9)	P <sub>D</sub>	1.25	W mW/°C
	(Notes 6 & 10)		10.0	
	(Notes 7 & 9)		1.81	
	(Notes 7 & 9)		14.5	
Thermal Resistance, Junction to Ambient	(Notes 6 & 9)	R <sub>θJA</sub>	2.15	°C/W
	(Notes 6 & 10)		17	
	(Notes 7 & 9)		100	
Thermal Resistance, Junction to Lead	(Notes 6 & 10)	R <sub>θJL</sub>	70	°C/W
	(Notes 7 & 9)		60	
Operating and storage temperature range		T <sub>J</sub> , T <sub>STG</sub>	-55 to 150	°C

- Notes:
6. 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; the device is measured when operating in a steady-state condition.
  7. Same as note (6), except the device is measured at t ≤ 10 sec.
  8. Same as note (6), except the device is pulsed with D = 0.02 and pulse width 300µs. The pulse current is limited by the maximum junction temperature.
  9. For a dual device with one active die.
  10. For a device with two active die running at equal power.
  11. Thermal resistance from junction to solder-point.

**Thermal Characteristics**

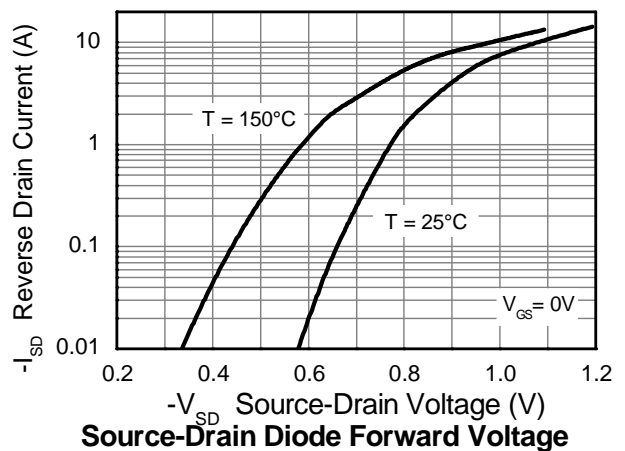
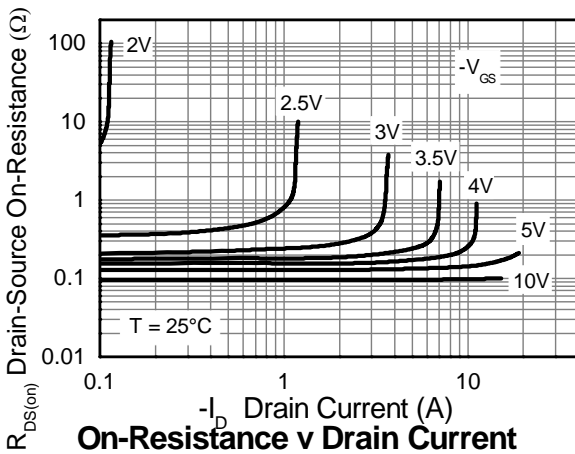
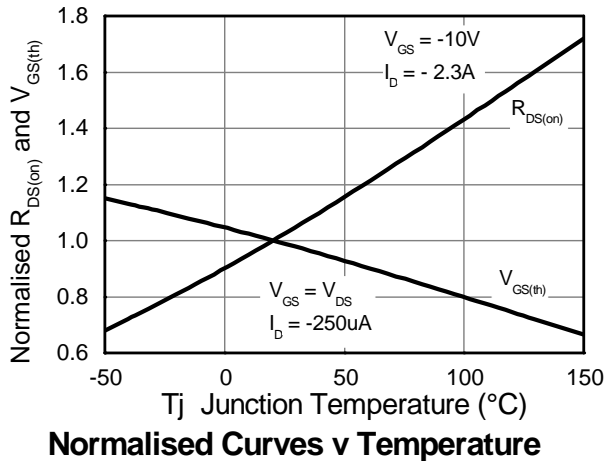
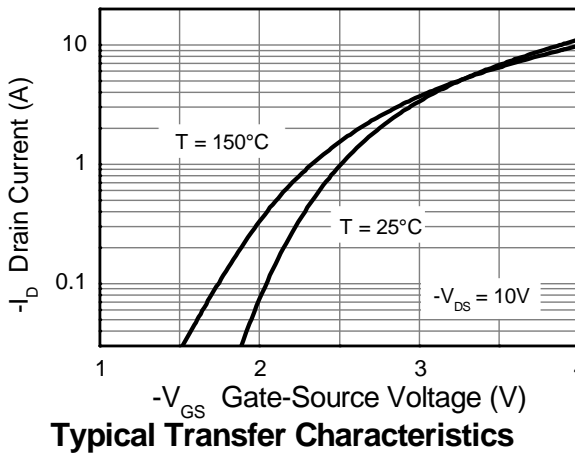
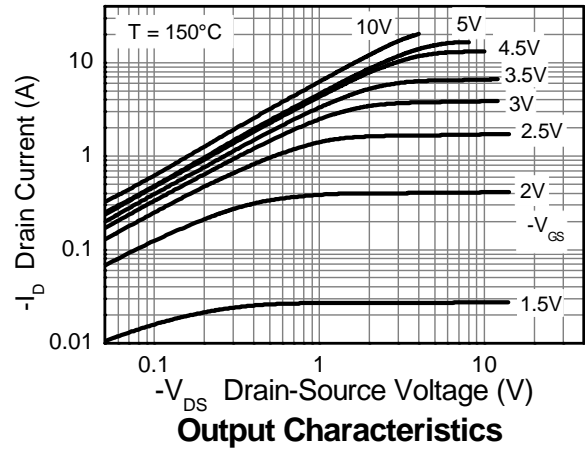
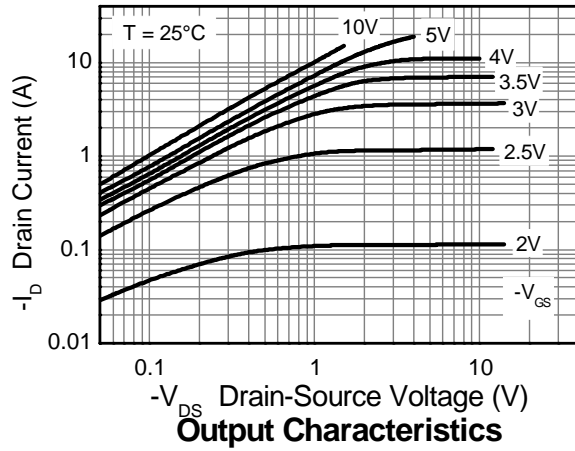


**Electrical Characteristics** (@ $T_A = +25^\circ\text{C}$ , unless otherwise specified.)

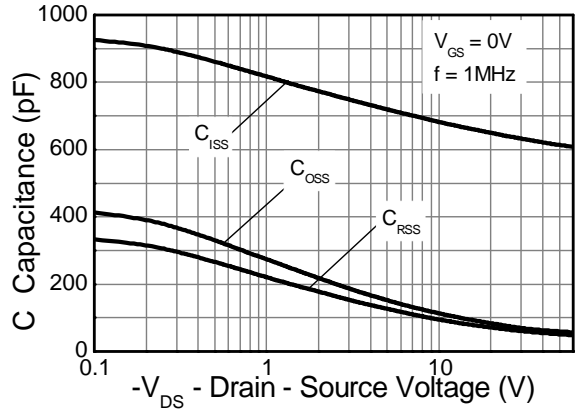
Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
<b>OFF CHARACTERISTICS</b>						
Drain-Source Breakdown Voltage	$BV_{DSS}$	-60	—	—	V	$I_D = -250\mu\text{A}$ , $V_{GS} = 0\text{V}$
Zero Gate Voltage Drain Current	$I_{DSS}$	—	—	-0.5	$\mu\text{A}$	$V_{DS} = -60\text{V}$ , $V_{GS} = 0\text{V}$
Gate-Source Leakage	$I_{GSS}$	—	—	$\pm 100$	nA	$V_{GS} = \pm 20\text{V}$ , $V_{DS} = 0\text{V}$
<b>ON CHARACTERISTICS</b>						
Gate Threshold Voltage	$V_{GS(th)}$	-1.0	—	—	V	$I_D = -250\mu\text{A}$ , $V_{DS} = V_{GS}$
Static Drain-Source On-Resistance (Note 12)	$R_{DS(on)}$	—	—	0.125	$\Omega$	$V_{GS} = -10\text{V}$ , $I_D = -2.3\text{A}$ $V_{GS} = -4.5\text{V}$ , $I_D = -1.9\text{A}$
				0.190		
Forward Transconductance (Notes 12 & 13)	$g_{fs}$	—	4.7	—	S	$V_{DS} = -15\text{V}$ , $I_D = -2.3\text{A}$
Diode Forward Voltage (Note 12)	$V_{SD}$	—	-0.85	-0.95	V	$I_S = -2.0\text{A}$ , $V_{GS} = 0\text{V}$
Reverse recovery time (Note 13)	$t_{rr}$	—	25.1	—	ns	$I_S = -1.7\text{A}$ , $di/dt = 100\text{A}/\mu\text{s}$
Reverse recovery charge (Note 13)	$Q_{rr}$	—	27.2	—	nC	
<b>DYNAMIC CHARACTERISTICS (Note 13)</b>						
Input Capacitance	$C_{iss}$	—	637	—	pF	$V_{DS} = -30\text{V}$ , $V_{GS} = 0\text{V}$ $f = 1\text{MHz}$
Output Capacitance	$C_{oss}$	—	70	—	pF	
Reverse Transfer Capacitance	$C_{rss}$	—	53	—	pF	
Total Gate Charge (Note 14)	$Q_g$	—	9.0	—	nC	$V_{GS} = -4.5\text{V}$
Total Gate Charge (Note 14)	$Q_g$	—	17.7	—	nC	
Gate-Source Charge (Note 14)	$Q_{gs}$	—	1.6	—	nC	$V_{GS} = -10\text{V}$
Gate-Drain Charge (Note 14)	$Q_{gd}$	—	4.4	—	nC	
Turn-On Delay Time (Note 14)	$t_{D(on)}$	—	2.6	—	ns	$V_{DD} = -30\text{V}$ , $V_{GS} = -10\text{V}$ $I_D = -1\text{A}$ , $R_G \cong 6.0\Omega$
Turn-On Rise Time (Note 14)	$t_r$	—	3.4	—	ns	
Turn-Off Delay Time (Note 14)	$t_{D(off)}$	—	26.2	—	ns	
Turn-Off Fall Time (Note 14)	$t_f$	—	11.3	—	ns	

- Notes:
12. Measured under pulsed conditions. Pulse width  $\leq 300\mu\text{s}$ ; duty cycle  $\leq 2\%$
  13. For design aid only, not subject to production testing.
  14. Switching characteristics are independent of operating junction temperatures.

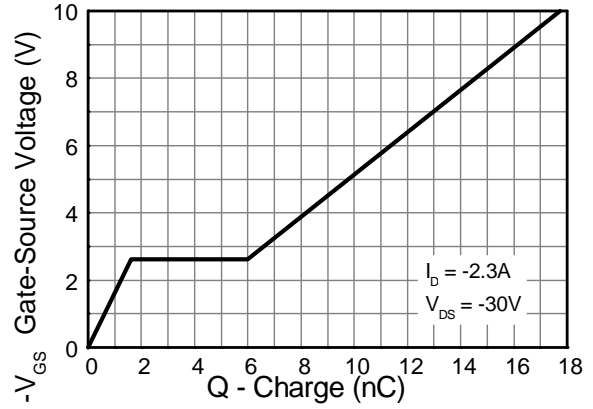
**Typical Characteristics**



**Typical Characteristics - continued**

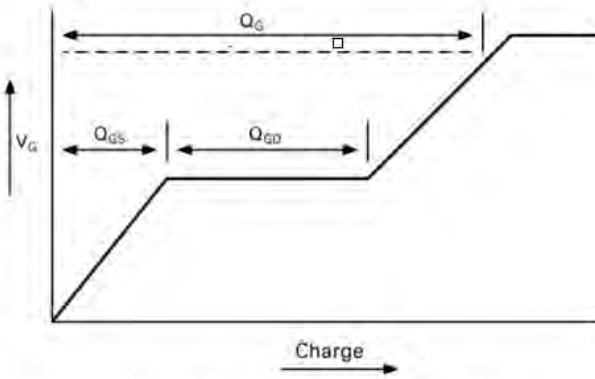


**Capacitance v Drain-Source Voltage**

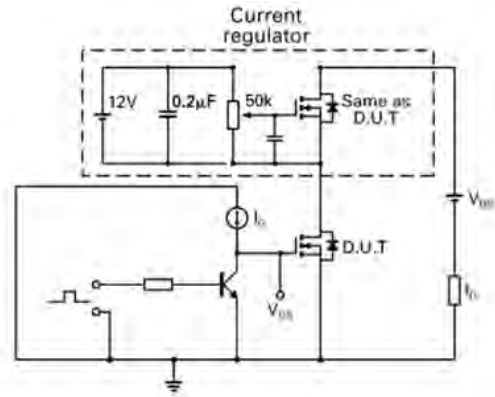


**Gate-Source Voltage v Gate Charge**

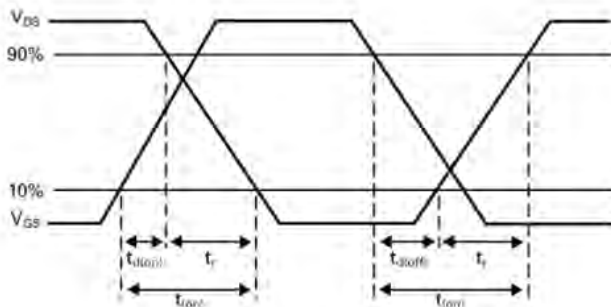
**Test Circuits**



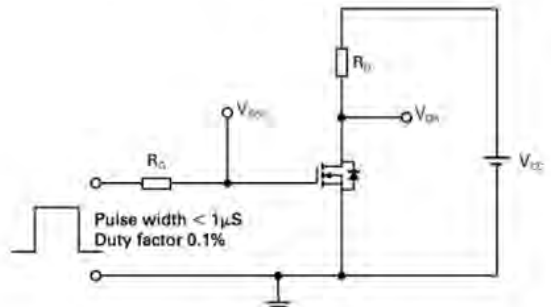
**Basic gate charge waveform**



**Gate charge test circuit**



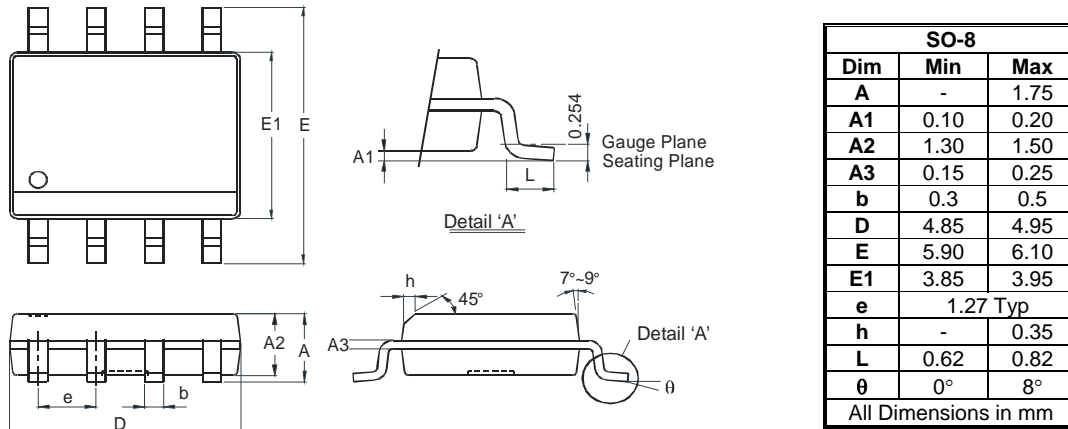
**Switching time waveforms**



**Switching time test circuit**

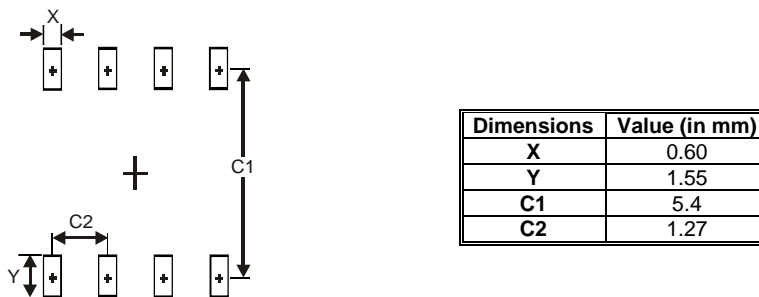
### Package Outline Dimensions

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



### Suggested Pad Layout

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



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