40V P-CHANNEL ENHANCEMENT MODE MOSFET

Product Summary

BV_{DSS}	$R_{DS(on)\ max}$	I_D T_A = +25°C
-40V	60mΩ @ V_{GS} = -10V	-6.4A
	100mΩ @ V_{GS} = -4.5V	-5.0A

Description

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

Applications

- DC-DC Converters
- Power Management Functions
- Backlighting

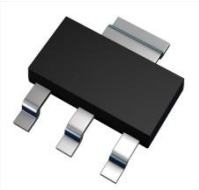
Features and Benefits

- Low Input Capacitance
- Low On-Resistance
- Fast Switching Speed
- **Lead-Free Finish; RoHS Compliant (Notes 1 & 2)**
- **Halogen and Antimony Free. "Green" Device (Note 3)**
- **Qualified to AEC-Q101 Standards for High Reliability**

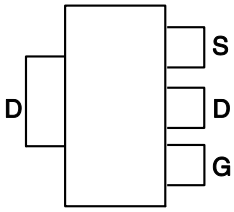
Mechanical Data

- Case: SOT223
- Case Material: Molded Plastic, "Green" Molding Compound. UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminals: Matte Tin Finish e3
- Weight: 0.112 grams (Approximate)

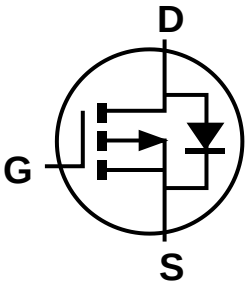
SOT223



Top View



Pin Out - Top



Equivalent Circuit

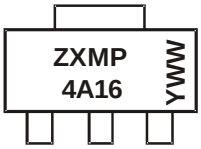
Ordering Information (Note 4)

Part Number	Marking	Reel size (inches)	Tape width (mm)	Quantity per reel
ZXMP4A16GTA	ZXMP4A16	7	12	1,000
ZXMP4A16GTC	ZXMP4A16	13	12	4,000

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 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 http://www.diodes.com/products/packages.html.

Marking Information

SOT223



ZXMP4A16 = Product Type Marking Code
YWW = Date Code Marking
Y or $\overline{Y}$ = Last Digit of Year (ex: 5= 2015)
WW or $\overline{W}$W = Week Code (01~53)

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

Characteristic			Symbol	Value	Units
Drain-Source Voltage			V_{DSS}	-40	V
Gate-Source Voltage			V_{GSS}	±20	V
Continuous Drain Current, V_{GS} = -10V	Steady State	T_A = +25°C (Note 6) T_A = +70°C (Note 6) T_A = +25°C (Note 5)	I_D	-6.4 -5.1 -4.6	A
Maximum Body Diode Forward Current (Note 6)			I_S	-5.2	A
Pulsed Drain Current (Note 7)			I_{DM}	-21	A
Pulsed Source Current (Note 7)			I_{SM}	-21	A

Thermal Characteristics (@T_A = +25°C, unless otherwise specified.)

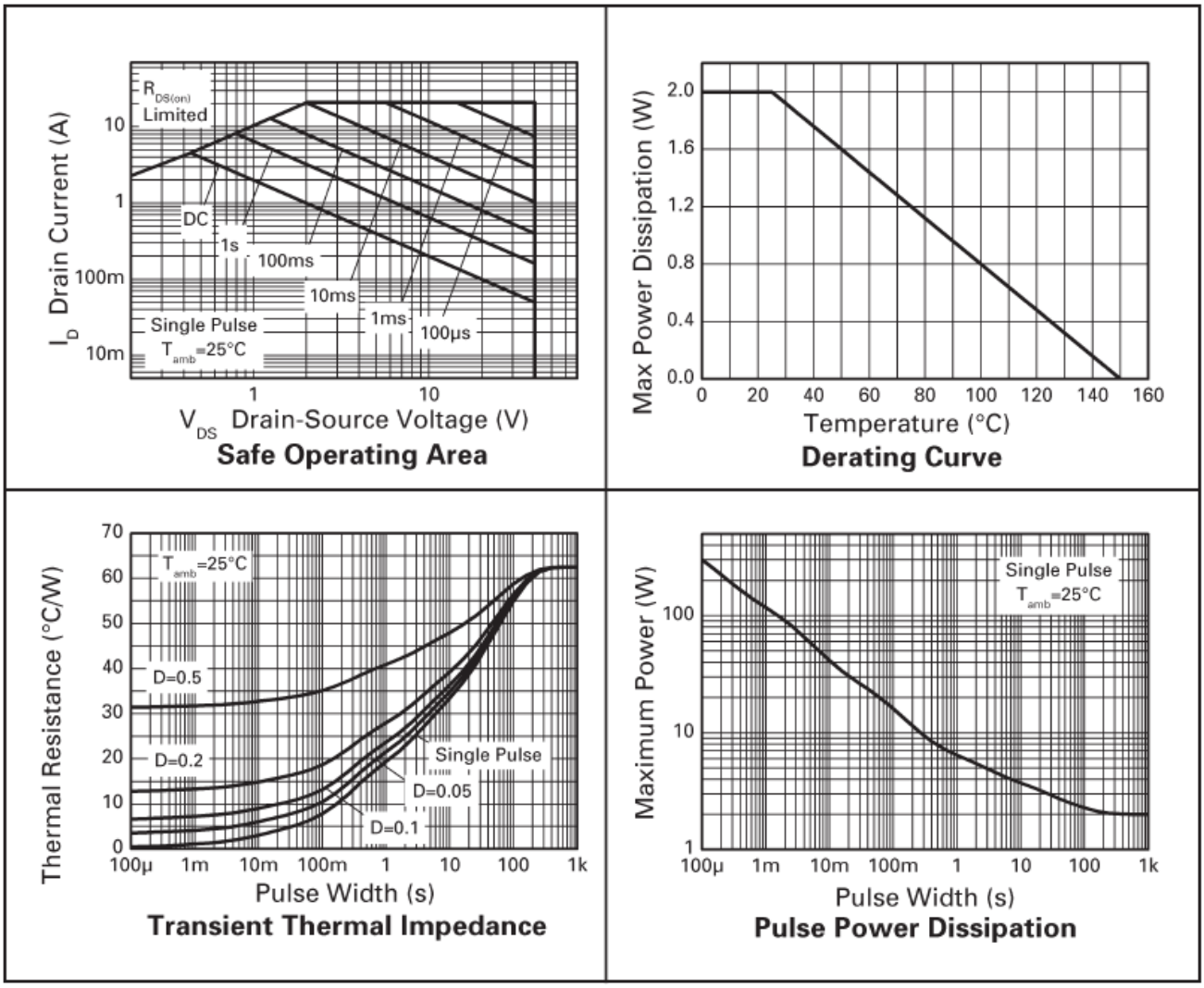
Characteristic		Symbol	Value	Units
Total Power Dissipation Linear Derating Factor	T_A = +25°C (Note 5)	P_D	2.0 16	W mW/°C
Total Power Dissipation Linear Derating Factor	T_A = +25°C (Note 6)	P_D	3.9 31	W mW/°C
Thermal Resistance, Junction to Ambient	Steady state (Note 5)	$R_{\theta JA}$	62.5	°C/W
	Steady state (Note 6)		32	°C/W
Operating and Storage Temperature Range		T_J, T_{STG}	-55 to +150	°C

Electrical Characteristics (@T_A = +25°C, unless otherwise specified.)

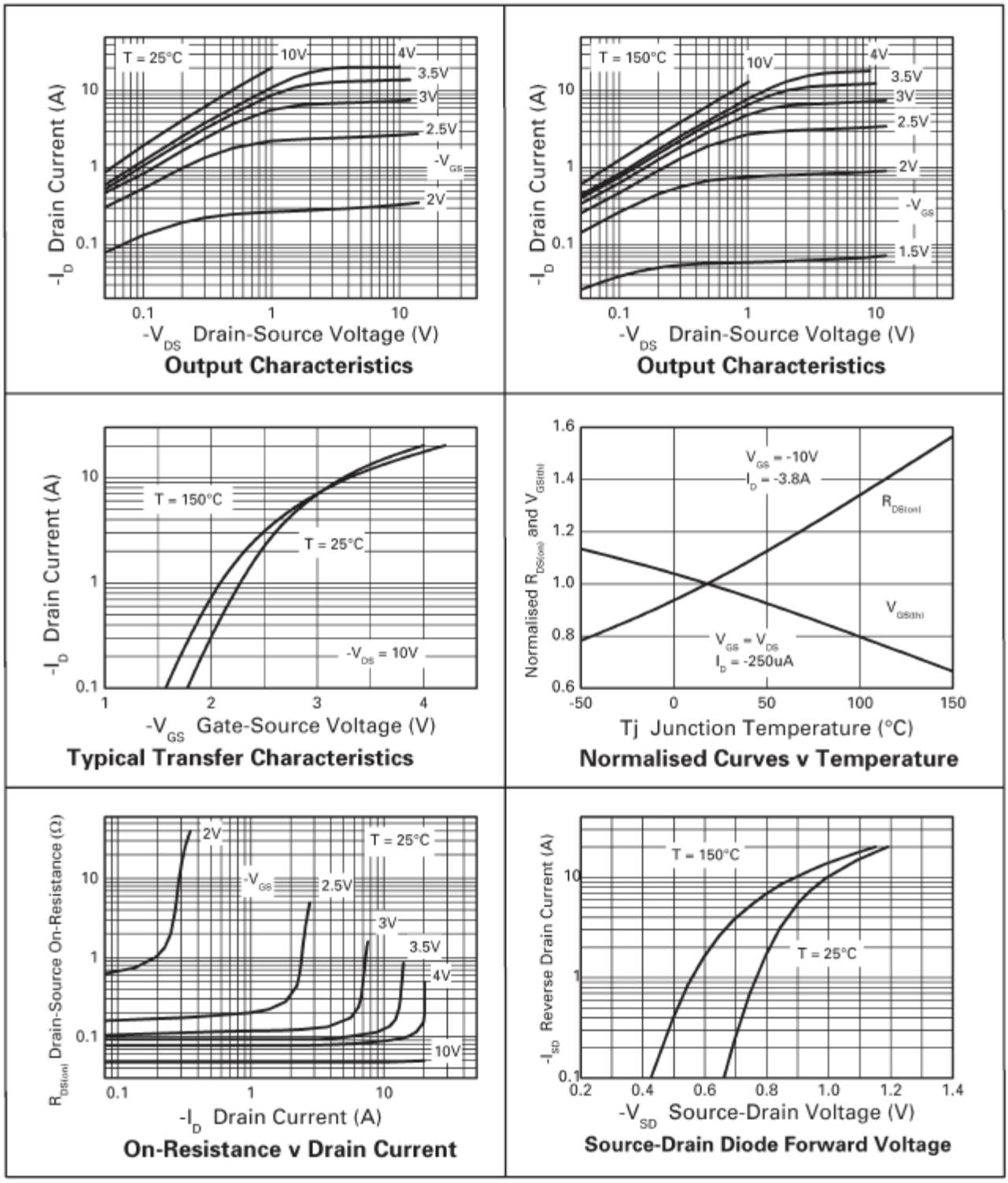
Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
OFF CHARACTERISTICS (Note 9)						
Drain-Source Breakdown Voltage	BV_{DSS}	-40	—	—	V	V_{GS} = 0V, I_D = -250µA
Zero Gate Voltage Drain Current	I_{DSS}	—	—	-1.0	µA	V_{DS} = -40V, V_{GS} = 0V
Gate-Source Leakage	I_{GSS}	—	—	±100	nA	V_{GS} = ±20V, V_{DS} = 0V
ON CHARACTERISTICS (Note 9)						
Gate Threshold Voltage	$V_{GS(th)}$	-1.0	—	—	V	V_{DS} = V_{GS}, I_D = -250µA
Static Drain-Source On-Resistance (Note 8)	$R_{DS(ON)}$	—	—	60	mΩ	V_{GS} = -10V, I_D = -3.8A
		—	—	100		V_{GS} = -4.5V, I_D = -2.9A
Diode Forward Voltage (Note 8)	V_{SD}	—	-0.85	-1.2	V	V_{GS} = 0V, I_S = -3.4A
Forward Transconductance (Notes 8 & 10)	g_{fs}	—	8.85	—	S	V_{DS} = -15V, I_D = -3.8A
DYNAMIC CHARACTERISTICS (Note 10)						
Input Capacitance	C_{iss}	—	1,007	—	pF	V_{DS} = -20V, V_{GS} = 0V f = 1.0MHz
Output Capacitance	C_{oss}	—	130	—		
Reverse Transfer Capacitance	C_{rss}	—	85	—		
Total Gate Charge (V_{GS} = -5.0V)	Q_g	—	13.6	—	nC	V_{DS} = -20V, I_D = -3.8A,
Total Gate Charge (V_{GS} = -10V)	Q_g	—	26.1	—		
Gate-Source Charge	Q_{gs}	—	2.8	—		
Gate-Drain Charge	Q_{gd}	—	4.8	—		
Turn-On Delay Time	$t_{D(on)}$	—	2.33	—	nS	V_{GS} = -10V, V_{DD} = -20V, R_G = 6.0Ω, I_D= -1.0A
Turn-On Rise Time	t_r	—	8.84	—		
Turn-Off Delay Time	$t_{D(off)}$	—	29.18	—		
Turn-Off Fall Time	t_f	—	12.54	—		
Body Diode Reverse Recovery Time	t_{rr}	—	27.2	—	nS	I_F = -3A, dI/dt = 100A/µs
Body Diode Reverse Recovery Charge	Q_{rr}	—	25.4	—	nC	

Notes:
5. For a device surface mounted on 25mm x 25mm FR4 PCB with high coverage of single sided 1oz copper, in still air conditions.
6. For a device surface mounted on FR4 PCB measured at t ≤10 secs.
7. Repetitive rating 25mm x 25mm FR4 PCB, D = 0.05, pulse width limited by maximum junction temperature.
8. Measured under pulsed conditions. Width≤300µs. Duty cycle ≤ 2%.
9. Short duration pulse test used to minimize self-heating effect.
10. Guaranteed by design. Not subject to product testing.

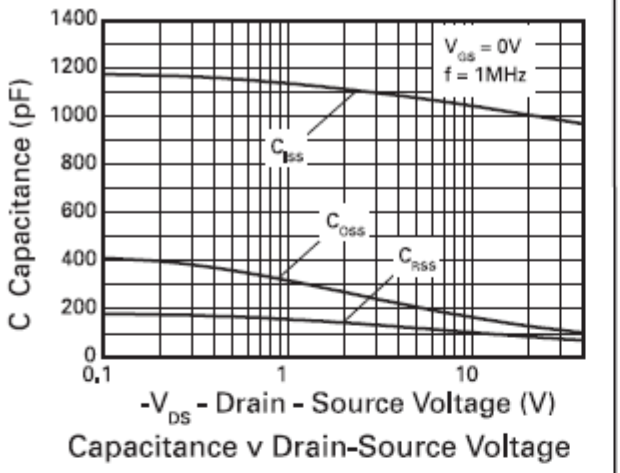
Typical Characteristics



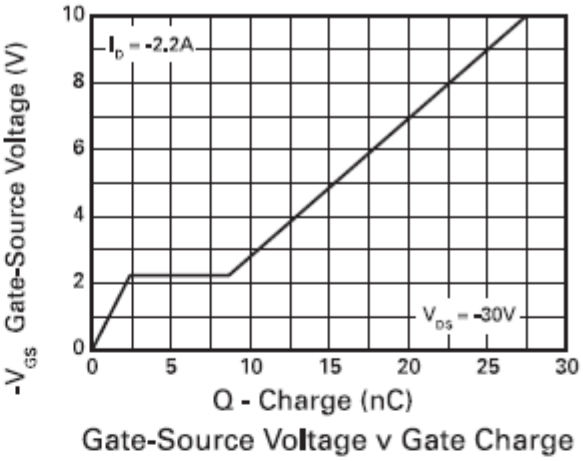
Typical Characteristics (continued)



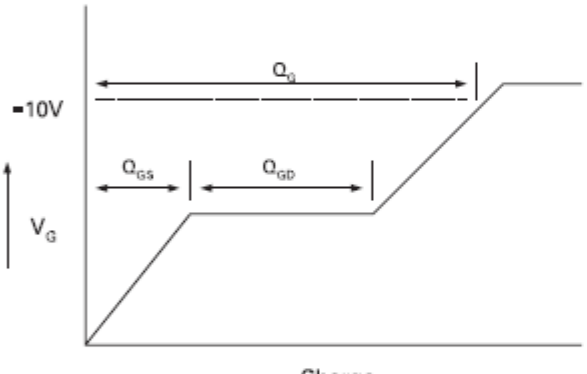
Typical Characteristics (continued)



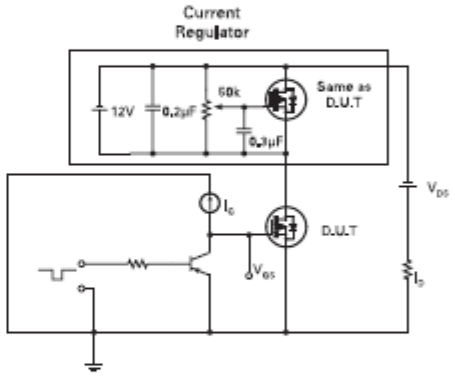
Capacitance v Drain-Source Voltage



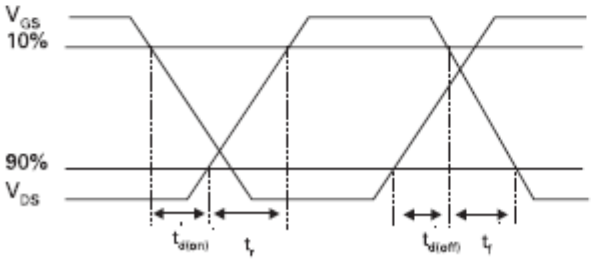
Gate-Source Voltage v Gate Charge



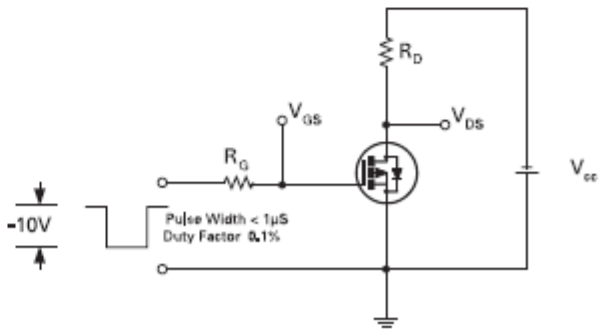
Basic Gate Charge Waveform



Gate Charge Test Circuit



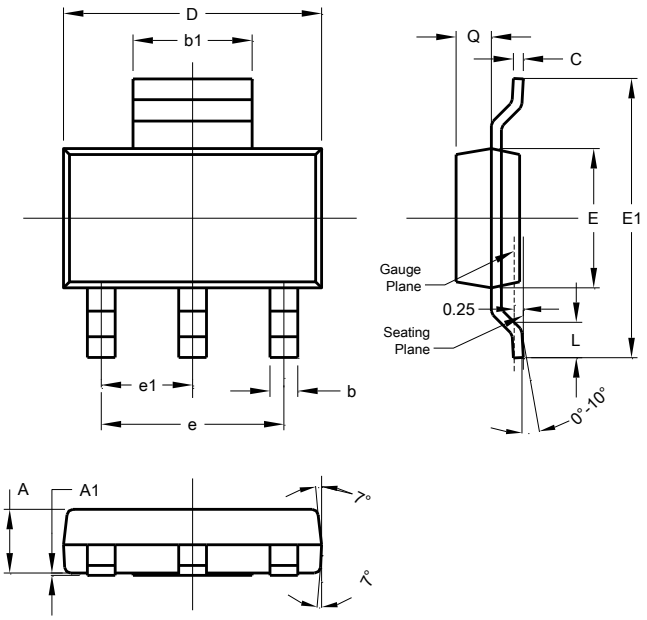
Switching Time Waveforms



Switching Time Test Circuit

Package Outline Dimensions

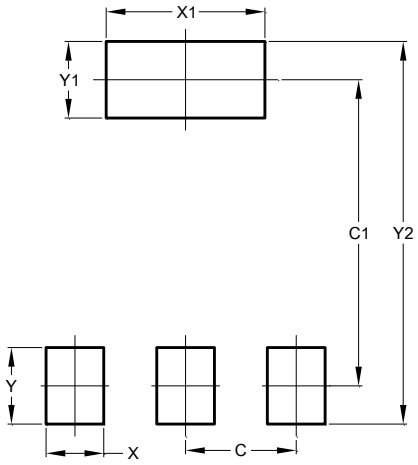
Please see AP02002 at http://www.diodes.com/datasheets/ap02002.pdf for the latest version.



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 AP02001 at http://www.diodes.com/datasheets/ap02001.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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