

Product Summary

$V_{(BR)DSS}$	$R_{DS(ON)}$	I_D $T_C = +25^\circ C$
-30V	9mΩ @ $V_{GS} = -10V$	-45A
	12mΩ @ $V_{GS} = -4.5V$	-35A

Description and Applications

This new generation 30V P-Channel Enhancement Mode MOSFET has been designed to minimize $R_{DS(ON)}$ and yet maintain superior switching performance. This device is ideal for use in Notebook battery power management and loadswitch.

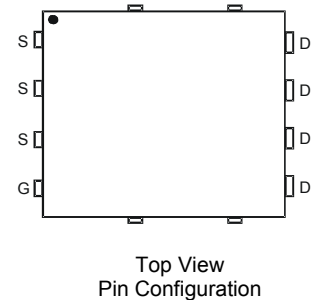
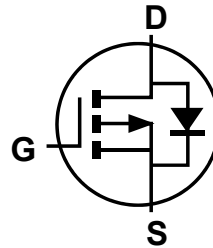
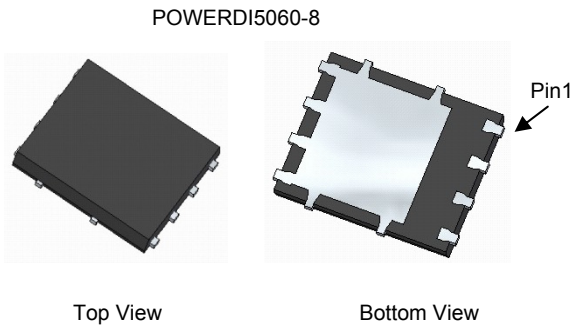
- Notebook Battery Power Management
- DC-DC Converters
- Loadswitch

Features and Benefits

- Thermally Efficient Package-Cooler Running Applications
- High Conversion Efficiency
- Low $R_{DS(ON)}$ – Minimizes On State Losses
- Low Input Capacitance
- Fast Switching Speed
- <1.1mm Package Profile – Ideal for Thin Applications
- ESD HBM Protected up to 1kV
- **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: POWERDI5060-8
- 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: 0.097 grams (approximate)

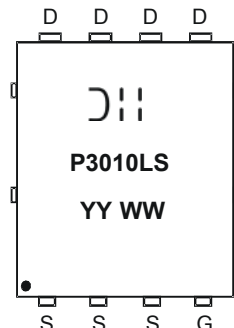


Ordering Information (Note 4)

Part Number	Case	Packaging
DMP3012LPS-13	POWERDI5060-8	2500 / Tape & Reel

- 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/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



= Manufacturer's Marking
 P3012LS = Product Type Marking Code
 YYWW = Date Code Marking
 YY = Year (ex: 13 = 2013)
 WW = Week (01 - 53)

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

Characteristic			Symbol	Value	Unit
Drain-Source Voltage			V _{DSS}	-30	V
Gate-Source Voltage			V _{GSS}	±20	V
Continuous Drain Current (Note 6) V _{GS} = -10V	Steady State	T _A = +25°C	I _D	13.2	A
		T _A = +70°C		10.5	
Continuous Drain Current (Note 6) V _{GS} = -4.5V	Steady State	T _A = +25°C	I _D	11.4	A
		T _A = +70°C		9.1	
Pulsed Drain Current (Notes 6)			I _{DM}	-100	A
Avalanche Current (Notes 7) L = 1mH			I _{AR}	-24	A
Avalanche Energy (Notes 7) L = 1mH			E _{AR}	292	mJ

Thermal Characteristics

Characteristic	Symbol	Value	Unit
Power Dissipation (Note 5)	P _D	1.29	W
Thermal Resistance, Junction to Ambient @ T _A = +25°C (Note 5)	R _{θJA}	97	°C/W
Power Dissipation (Note 6)	P _D	2.36	W
Thermal Resistance, Junction to Ambient @ T _A = +25°C (Note 6)	R _{θJA}	53	°C/W
Thermal Resistance, Junction to Case @ T _C = +25°C (Notes 6)	R _{θJC}	4.0	°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 8)						
Drain-Source Breakdown Voltage	BV _{DSS}	-30	—	—	V	V _{GS} = 0V, I _D = -250μA
Zero Gate Voltage Drain Current	I _{DSS}	—	—	-1.0	μA	V _{DS} = -30V, V _{GS} = 0V
Gate-Source Leakage	I _{GSS}	—	—	±100	nA	V _{GS} = ±20V, V _{DS} = 0V
ON CHARACTERISTICS (Note 8)						
Gate Threshold Voltage	V _{GS(th)}	-1.1	-1.6	-2.1	V	V _{DS} = V _{GS} , I _D = -250μA
Static Drain-Source On-Resistance	R _{DS(on)}	—	7.5	9.0	mΩ	V _{GS} = -10V, I _D = -10A
		—	8.5	12.0		V _{GS} = -4.5V, I _D = -10A
Forward Transfer Admittance	Y _{fs}	—	30	—	S	V _{DS} = -15V, I _D = -10A
Diode Forward Voltage	V _{SD}	—	-0.65	-1.0	V	V _{GS} = 0V, I _S = -1A
DYNAMIC CHARACTERISTICS (Note 9)						
Input Capacitance	C _{iSS}	—	6807	—	pF	V _{DS} = 15V, V _{GS} = 0V, f = 1.0MHz
Output Capacitance	C _{oSS}	—	988	—	pF	
Reverse Transfer Capacitance	C _{rSS}	—	647	—	pF	
Gate Resistance	R _g	—	6.2	—	Ω	V _{DS} = 0V, V _{GS} = 0V, f = 1MHz
Total Gate Charge (V _{GS} = -10V)	Q _g	—	139	—	nC	V _{DS} = -15V, I _D = -10A
Total Gate Charge (V _{GS} = -4.5V)	Q _g	—	66	—	nC	
Gate-Source Charge	Q _{gs}	—	19	—	nC	
Gate-Drain Charge	Q _{gd}	—	21	—	nC	
Turn-On Delay Time	t _{D(on)}	—	8.9	—	ns	V _{DS} = -15V, V _{GEN} = -10V, R _G = 6Ω, I _D = -1A
Turn-On Rise Time	t _r	—	10.5	—	ns	
Turn-Off Delay Time	t _{D(off)}	—	254	—	ns	
Turn-Off Fall Time	t _f	—	95	—	ns	

- Notes:
- Device mounted on FR-4 substrate PC board, 2oz copper, with minimum recommended pad layout.
 - Device mounted on FR-4 substrate PC board, 2oz copper, with 1inch square copper plate.
 - I_{AS} and E_{AS} rating are based on low frequency and duty cycles to keep T_J = 25°C
 - Short duration pulse test used to minimize self-heating effect.
 - Guaranteed by design. Not subject to product testing.

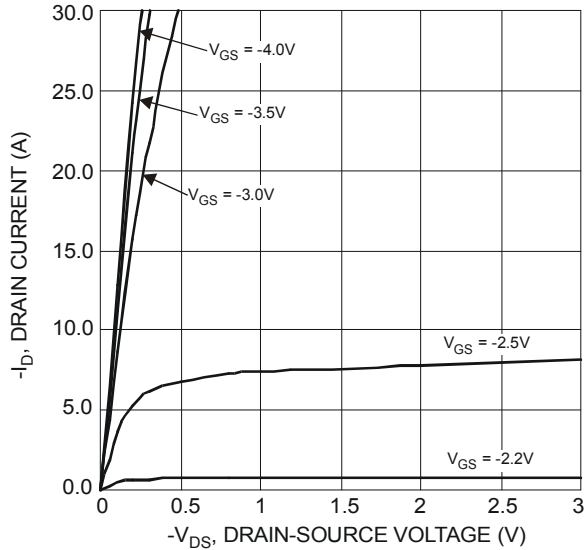


Figure 1 Typical Output Characteristics

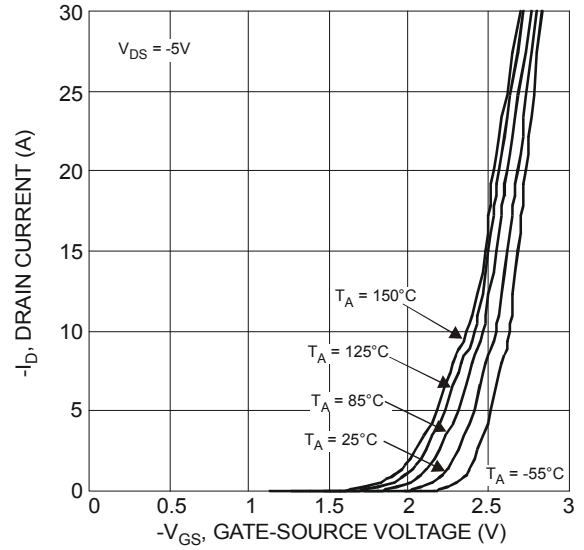


Figure 2 Typical Transfer Characteristics

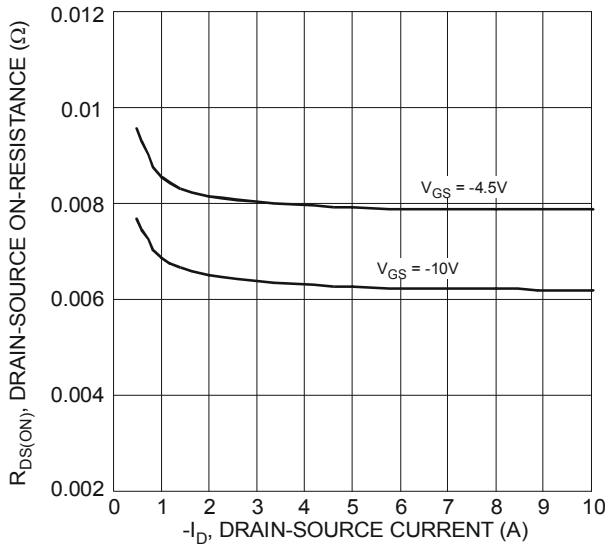


Figure 3 Typical On-Resistance vs. Drain Current and Gate Voltage

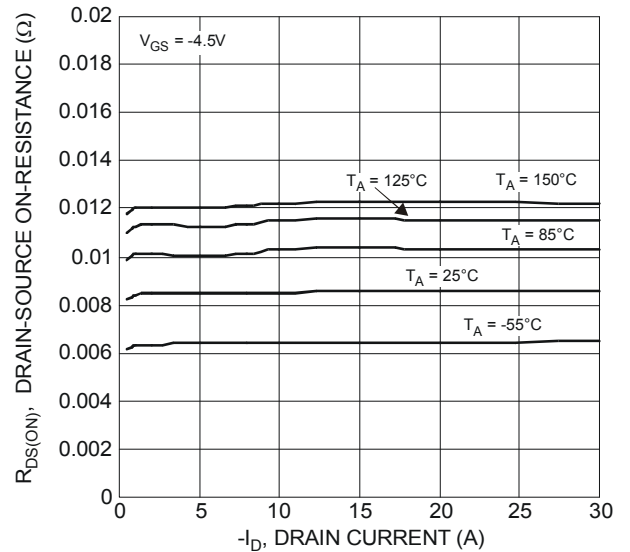


Figure 4 Typical On-Resistance vs. Drain Current and Temperature

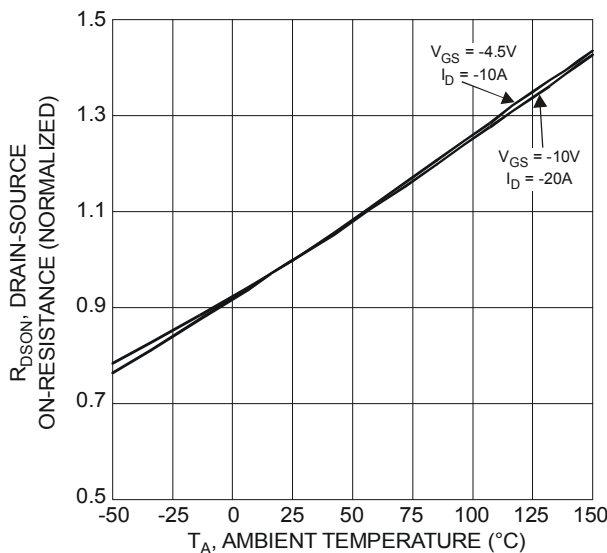


Figure 5 On-Resistance Variation with Temperature

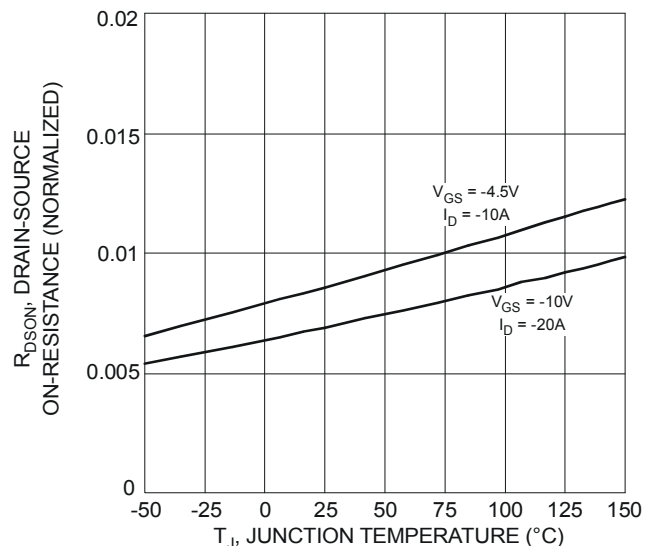


Figure 6 On-Resistance Variation with Temperature

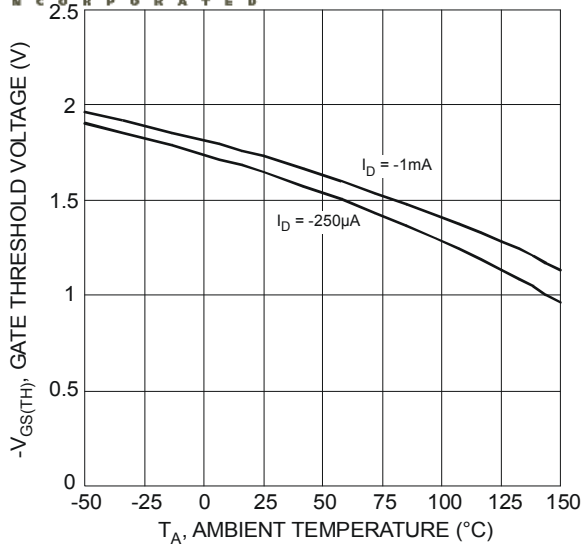


Figure 7 Gate Threshold Variation vs. Ambient Temperature

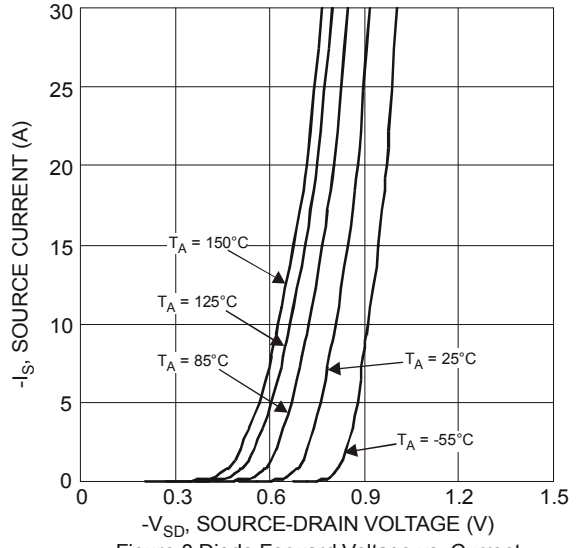


Figure 8 Diode Forward Voltage vs. Current

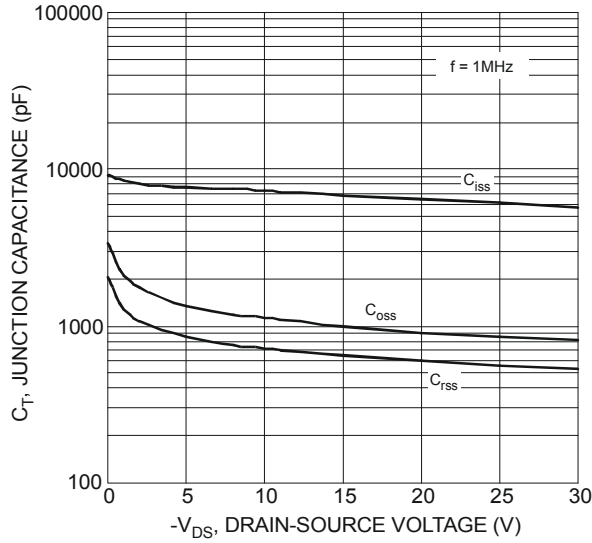


Figure 9 Typical Total Capacitance

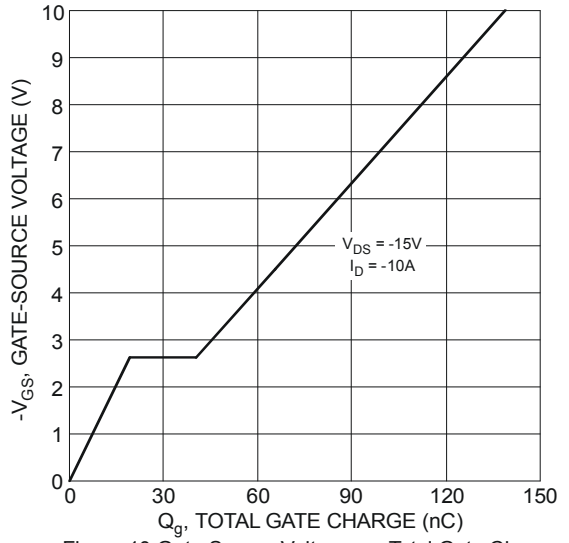


Figure 10 Gate-Source Voltage vs. Total Gate Charge

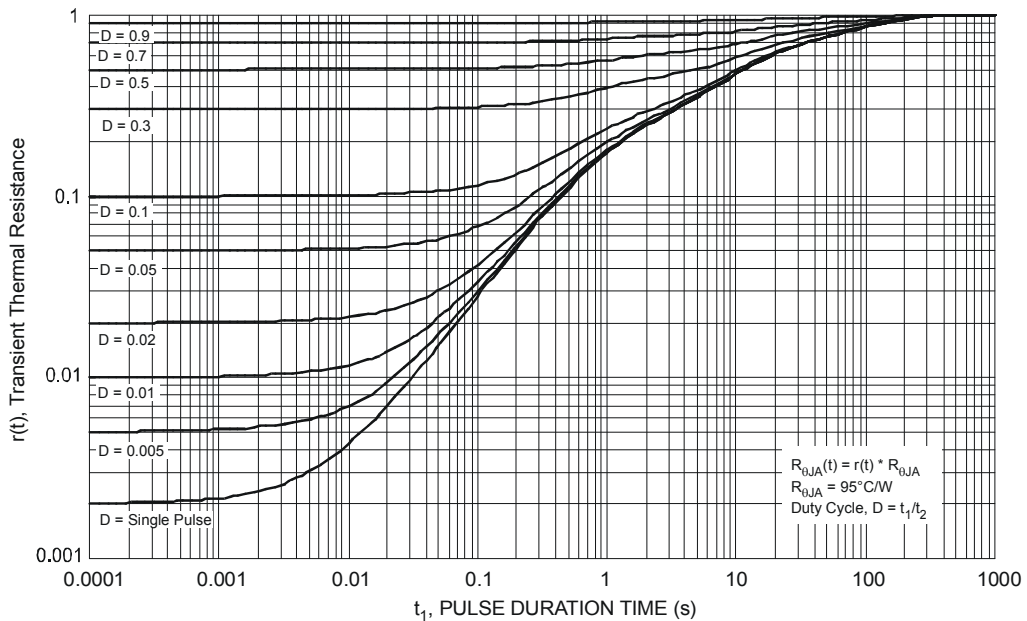
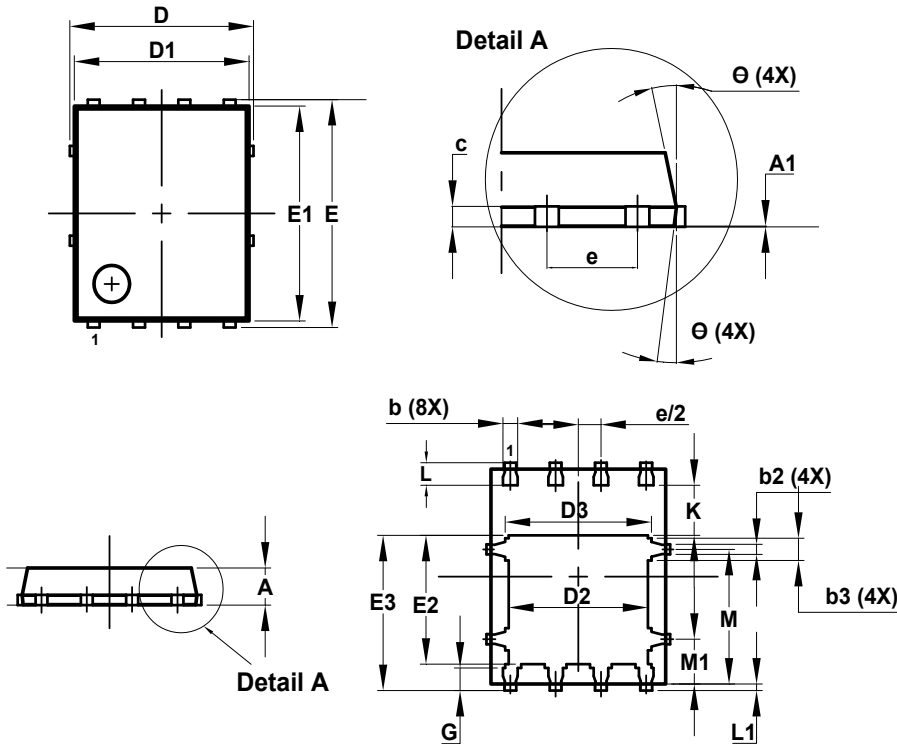


Figure 11 Transient Thermal Response

$R_{\theta JA}(t) = r(t) * R_{\theta JA}$
 $R_{\theta JA} = 95^{\circ}\text{C/W}$
 Duty Cycle, $D = t_1/t_2$

Package Outline Dimensions

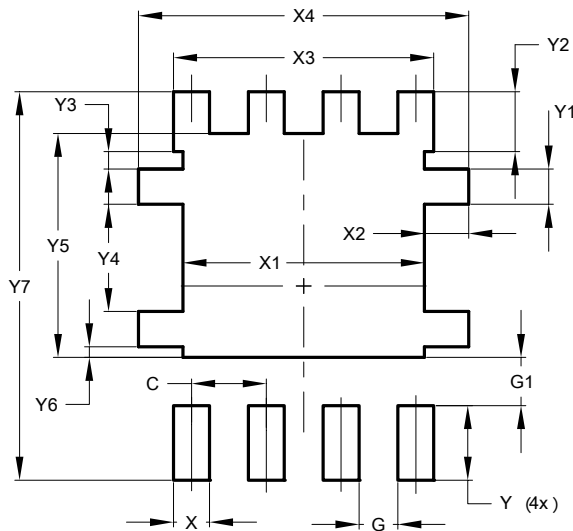
Please see AP02002 at <http://www.diodes.com/datasheets/ap02002.pdf> for latest version.



POWERDI5060-8			
Dim	Min	Max	Typ
A	0.90	1.10	1.00
A1	0.00	0.05	-
b	0.33	0.51	0.41
b2	0.200	0.350	0.273
b3	0.40	0.80	0.60
c	0.230	0.330	0.277
D	5.15 BSC		
D1	4.70	5.10	4.90
D2	3.70	4.10	3.90
D3	3.90	4.30	4.10
E	6.15 BSC		
E1	5.60	6.00	5.80
E2	3.28	3.68	3.48
E3	3.99	4.39	4.19
e	1.27 BSC		
G	0.51	0.71	0.61
K	0.51	-	-
L	0.51	0.71	0.61
L1	0.10	0.20	0.175
M	3.235	4.035	3.635
M1	1.00	1.40	1.21
Θ	10°	12°	11°
Θ1	6°	8°	7°
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	1.270
G	0.660
G1	0.820
X	0.610
X1	4.100
X2	0.755
X3	4.420
X4	5.610
Y	1.270
Y1	0.600
Y2	1.020
Y3	0.295
Y4	1.825
Y5	3.810
Y6	0.180
Y7	6.610

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