

## Product Summary

$V_{(BR)DSS}$	$R_{DS(on)max}$	$I_D$ $T_A = +25^\circ C$
20V	15.5m $\Omega$ @ $V_{GS} = 4.5V$	7.5A
	16.5m $\Omega$ @ $V_{GS} = 4.0V$	7.3A
	19m $\Omega$ @ $V_{GS} = 3.1V$	6.9A
	20m $\Omega$ @ $V_{GS} = 2.5V$	6.7A
	30m $\Omega$ @ $V_{GS} = 1.8V$	5.4A

## Description

This new generation MOSFET has been 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

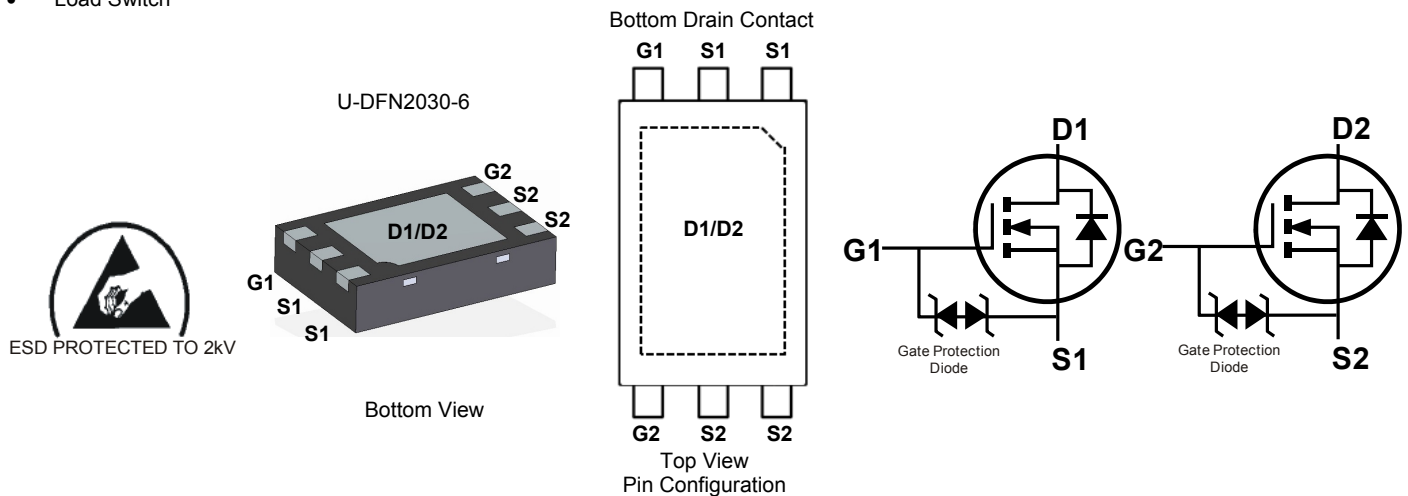
- Power Management Functions
- Battery Pack
- Load Switch

## Features

- Low On-Resistance
- Low Gate Threshold Voltage
- Low Input Capacitance
- Fast Switching Speed
- **ESD Protected Gate**
- **Totally Lead-Free & Fully RoHS Compliant (Notes 1 & 2)**
- **Halogen and Antimony Free. "Green" Device (Note 3)**

## Mechanical Data

- Case: U-DFN2030-6
- Case Material: Molded Plastic, "Green" Molding Compound. UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminals: Finish – NiPdAu over Copper leadframe. Solderable per MIL-STD-202, Method 208 @4
- Weight: 0.012 grams (approximate)

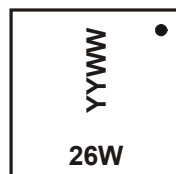
**NEW PRODUCT**


## Ordering Information (Note 4)

Part Number	Case	Packaging
DMN2016LHAB-7	U-DFN2030-6	3,000 / 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](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



26W = Product Type Marking Code  
 YYWW = Date Code Marking  
 YY = Last digit of year (ex: 12 for 2012)  
 WW = Week code (01 to 53)

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

Characteristic			Symbol	Value	Unit
Drain-Source Voltage			$V_{DSS}$	20	V
Gate-Source Voltage			$V_{GSS}$	$\pm 12$	V
Continuous Drain Current (Note 6) $V_{GS} = 4.5\text{V}$	Steady State	$T_A = +25^\circ\text{C}$ $T_A = +70^\circ\text{C}$	$I_D$	7.5 5.8	A
	$t < 10\text{s}$	$T_A = +25^\circ\text{C}$ $T_A = +70^\circ\text{C}$	$I_D$	7.7 6.0	A
Pulsed Drain Current (10 $\mu\text{s}$ pulse, duty cycle = 1%)			$I_{DM}$	45	A

**Thermal Characteristics**

Characteristic		Symbol	Value	Units
Total Power Dissipation (Note 5)	$T_A = +25^\circ\text{C}$	$P_D$	1.2	W
	$T_A = +70^\circ\text{C}$		0.75	
Thermal Resistance, Junction to Ambient (Note 5)	Steady State	$R_{\theta JA}$	106	$^\circ\text{C/W}$
	$t < 10\text{s}$		100	
Total Power Dissipation (Note 6)	$T_A = +25^\circ\text{C}$	$P_D$	1.65	W
	$T_A = +70^\circ\text{C}$		1	
Thermal Resistance, Junction to Ambient (Note 6)	Steady State	$R_{\theta JA}$	78	$^\circ\text{C/W}$
	$t < 10\text{s}$		72	
Thermal Resistance, Junction to Case		$R_{\theta JC}$	11.4	
Operating and Storage Temperature Range		$T_J, T_{STG}$	-55 to 150	$^\circ\text{C}$

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

Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
<b>OFF CHARACTERISTICS (Note 7)</b>						
Drain-Source Breakdown Voltage	$BV_{DSS}$	20	—	—	V	$V_{GS} = 0\text{V}, I_D = 250\mu\text{A}$
Zero Gate Voltage Drain Current $T_J = +25^\circ\text{C}$	$I_{DSS}$	—	—	1.0	$\mu\text{A}$	$V_{DS} = 20\text{V}, V_{GS} = 0\text{V}$
Gate-Source Leakage	$I_{GSS}$	—	—	$\pm 10$	$\mu\text{A}$	$V_{GS} = \pm 8\text{V}, V_{DS} = 0\text{V}$
<b>ON CHARACTERISTICS (Note 7)</b>						
Gate Threshold Voltage	$V_{GS(th)}$	0.5	0.71	1.1	V	$V_{DS} = V_{GS}, I_D = 250\mu\text{A}$
Static Drain-Source On-Resistance	$R_{DS(on)}$	—	13	15.5	m $\Omega$	$V_{GS} = 4.5\text{V}, I_D = 4.0\text{A}$
			13.5	16.5		$V_{GS} = 4.0\text{V}, I_D = 4.0\text{A}$
			14	19		$V_{GS} = 3.1\text{V}, I_D = 4.0\text{A}$
			15	20		$V_{GS} = 2.5\text{V}, I_D = 4.0\text{A}$
			21	30		$V_{GS} = 1.8\text{V}, I_D = 3.5\text{A}$
Forward Transfer Admittance	$ Y_{fs} $	—	25	—	S	$V_{DS} = 5\text{V}, I_D = 6\text{A}$
Diode Forward Voltage	$V_{SD}$	—	0.75	1.0	V	$V_{GS} = 0\text{V}, I_S = 1\text{A}$
<b>DYNAMIC CHARACTERISTICS (Note 8)</b>						
Input Capacitance	$C_{iss}$	—	1550	—	pF	$V_{DS} = 10\text{V}, V_{GS} = 0\text{V}, f = 1.0\text{MHz}$
Output Capacitance	$C_{oss}$	—	166	—	pF	
Reverse Transfer Capacitance	$C_{rss}$	—	145	—	pF	
Gate Resistance	$R_g$	—	1.37	—	$\Omega$	$V_{DS} = 0\text{V}, V_{GS} = 0\text{V}, f = 1\text{MHz}$
Total Gate Charge ( $V_{GS} = 2.5\text{V}$ )	$Q_g$	—	8.4	—	nC	$V_{DS} = 10\text{V}, I_D = 6\text{A}$
Total Gate Charge ( $V_{GS} = 4.5\text{V}$ )	$Q_g$	—	16	—	nC	
Gate-Source Charge	$Q_{gs}$	—	2.3	—	nC	
Gate-Drain Charge	$Q_{gd}$	—	2.5	—	nC	
Turn-On Delay Time	$t_{D(on)}$	—	6.9	—	ns	
Turn-On Rise Time	$t_r$	—	15.5	—	ns	$V_{DD} = 10\text{V}, R_L = 1.7\Omega, V_{GS} = 5.0\text{V}, R_G = 3\Omega$
Turn-Off Delay Time	$t_{D(off)}$	—	40.9	—	ns	
Turn-Off Fall Time	$t_f$	—	12	—	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 pad
  - Repetitive rating, pulse width limited by junction temperature
  - Guaranteed by design. Not subject to product testing

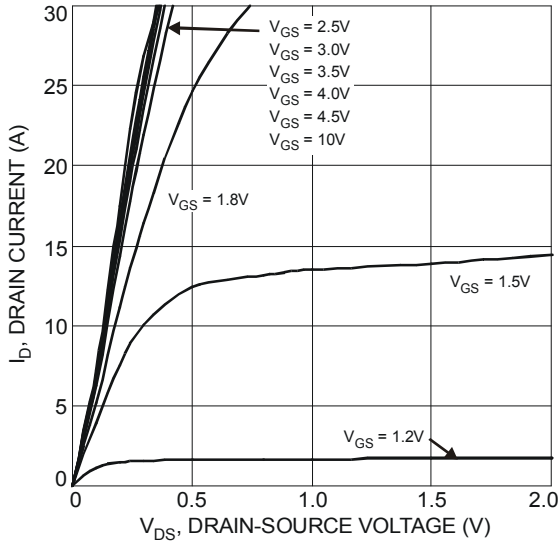


Figure 1 Typical Output Characteristic

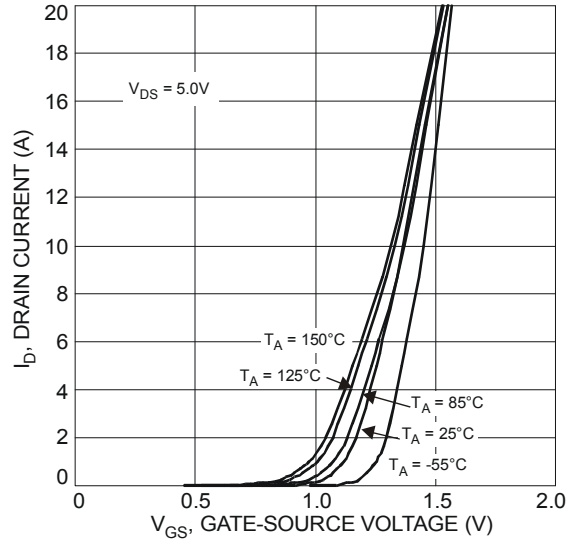


Figure 2 Typical Transfer Characteristics

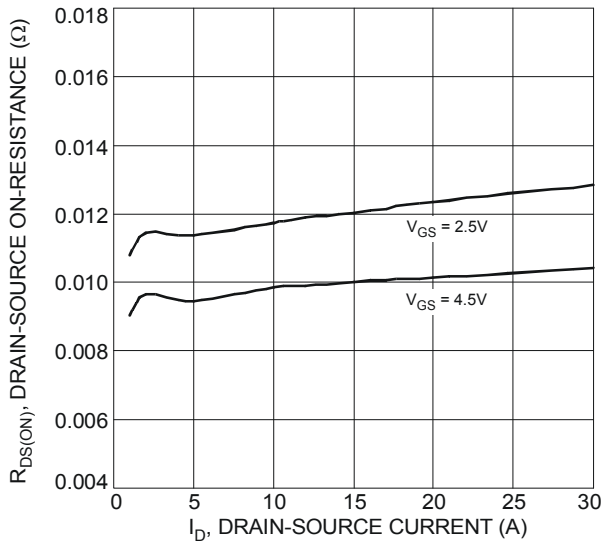


Figure 3 Typical On-Resistance vs. Drain Current and Gate Voltage

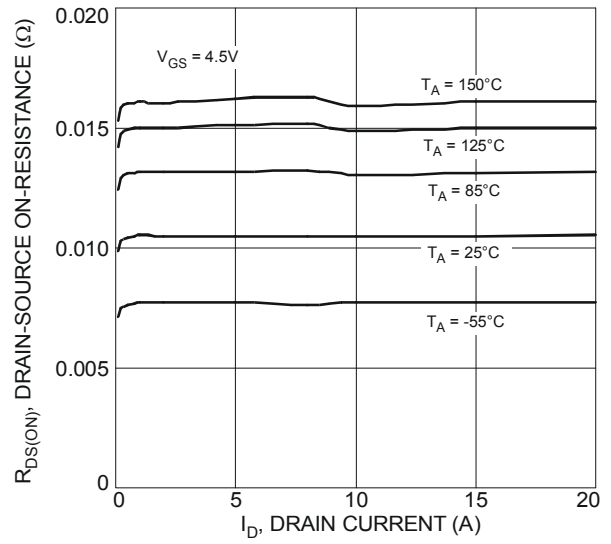


Figure 4 Typical On-Resistance vs. Drain Current and Temperature

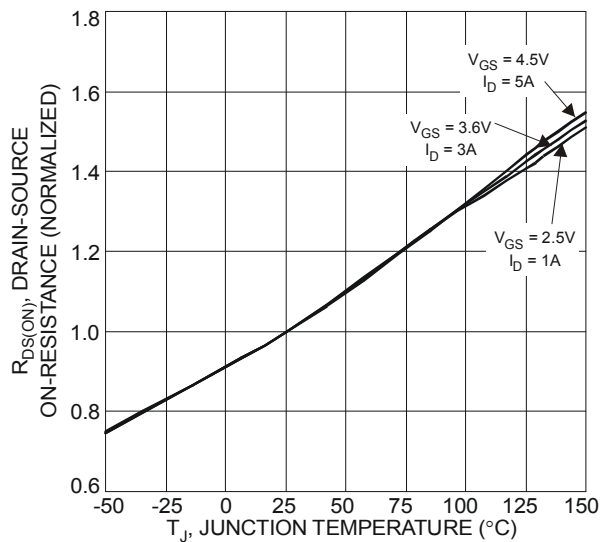


Figure 5 On-Resistance Variation with Temperature

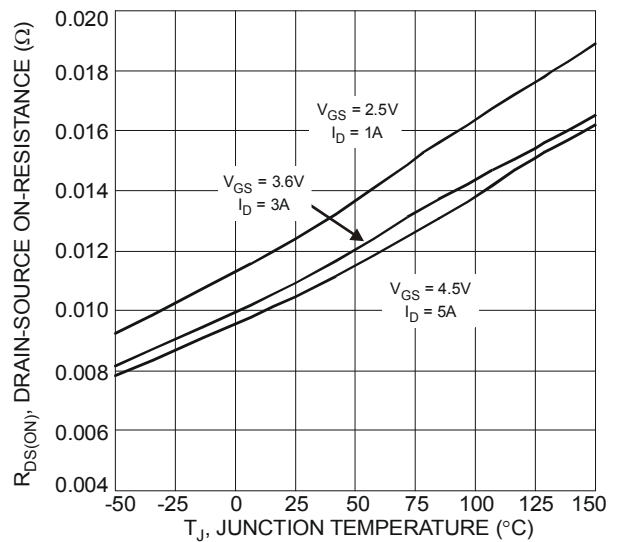


Figure 6 On-Resistance Variation with Temperature

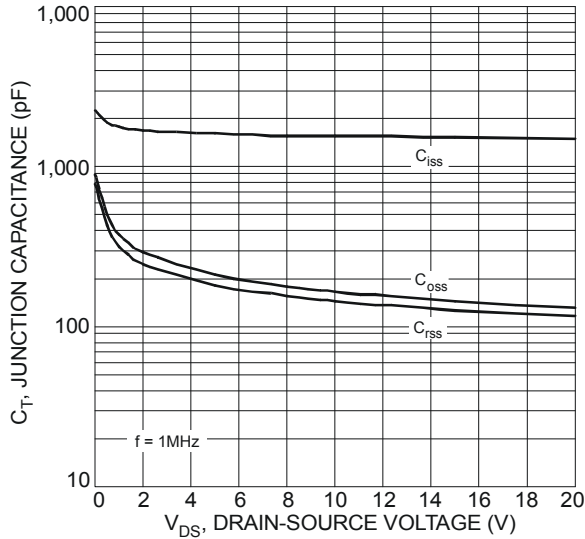


Figure 7 Typical Junction Capacitance

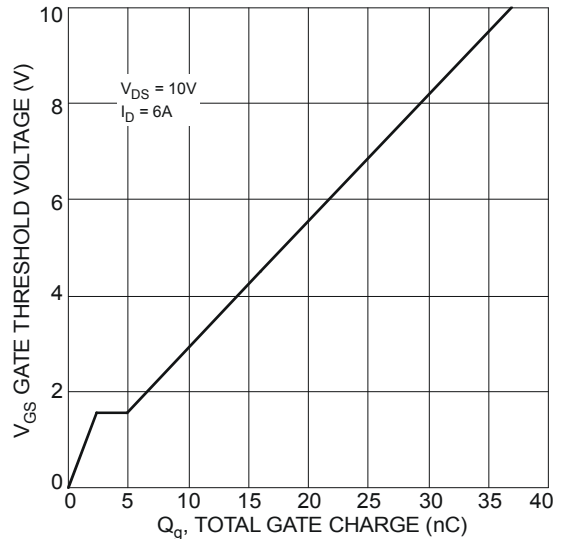


Figure 8 Gate Charge

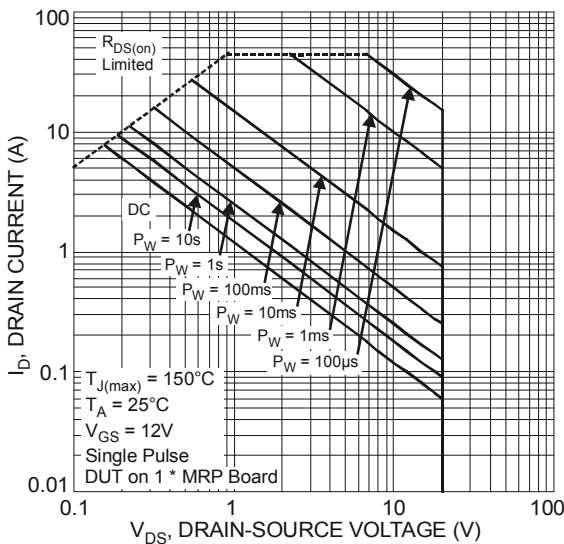


Figure 9 SOA, Safe Operation Area

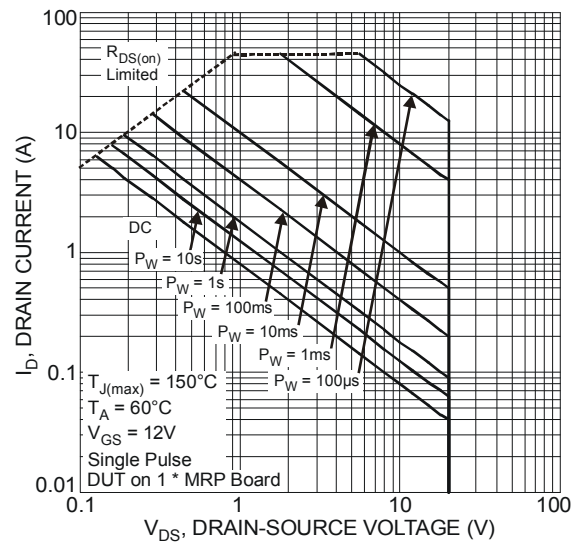


Figure 10 SOA, Safe Operation Area

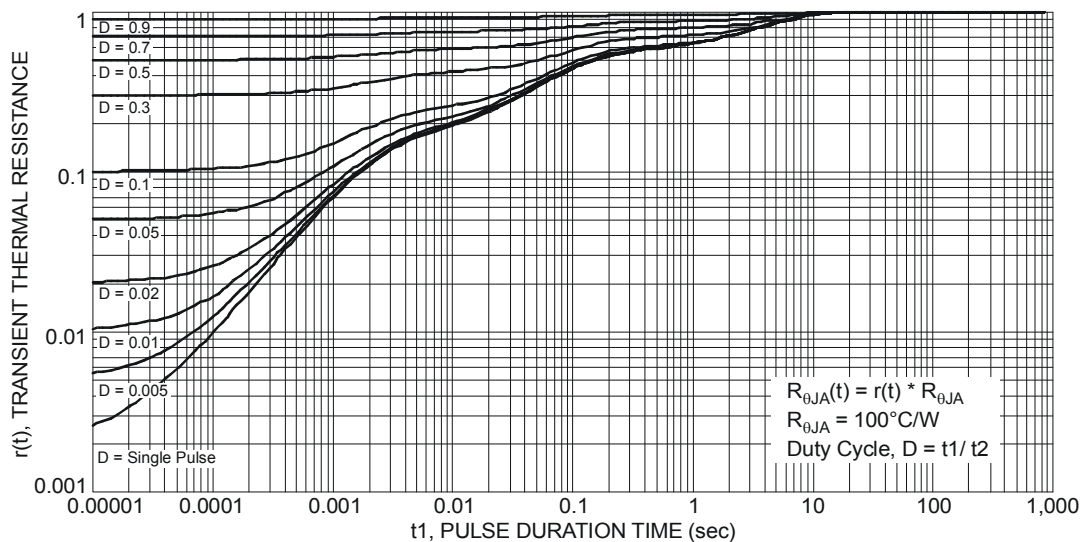
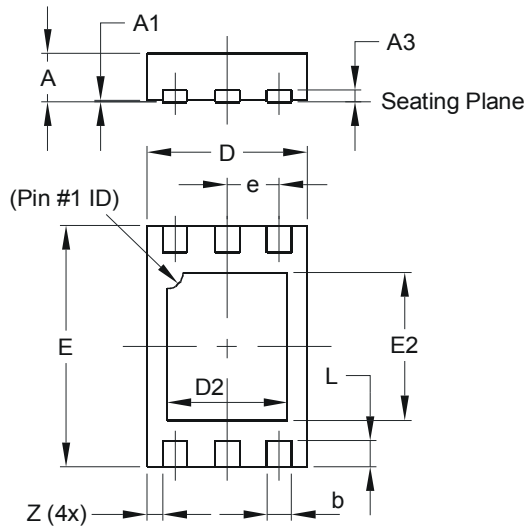


Figure 11 Transient Thermal Resistance

**Package Outline Dimensions**

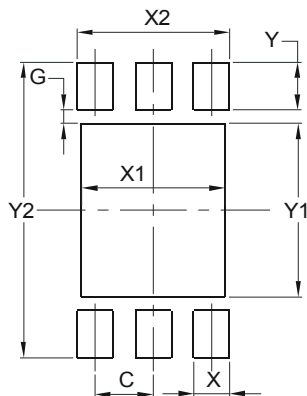
Please see AP02002 at <http://www.diodes.com/datasheets/ap02002.pdf> for latest version.



U-DFN2030-6 Type B			
Dim	Min	Max	Typ
A	0.55	0.65	0.60
A1	0	0.05	0.02
A3	-	-	0.15
b	0.25	0.35	0.30
D	1.95	2.05	2.00
D2	1.40	1.60	1.50
E	2.95	3.05	3.00
E2	1.74	1.94	1.84
e	-	-	0.65
L	0.28	0.38	0.33
Z	-	-	0.20
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	0.650
G	0.150
X	0.400
X1	1.600
X2	1.700
Y	0.530
Y1	1.940
Y2	3.300

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