

**Product Summary**

$V_{(BR)DSS}$	$R_{DS(ON)}$	$I_D$ $T_A = +25^\circ C$
12V	20m $\Omega$ @ $V_{GS} = 4.5V$	6.6A
	23m $\Omega$ @ $V_{GS} = 2.5V$	6.1A

**Features and Benefits**

- Low  $Q_g$  &  $Q_{gd}$
- Small Footprint
- Low Profile 0.62mm Height
- **Lead-Free Finish; RoHS Compliant (Notes 1 & 2)**
- **Halogen and Antimony Free. "Green" Device (Note 3)**
- **Qualified to AEC-Q101 Standards for High Reliability**

**Description and Applications**

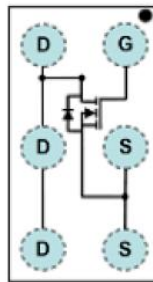
This new generation MOSFET is designed to minimize the on-state resistance ( $R_{DS(ON)}$ ) and yet maintain superior switching performance, making it ideal for high-efficiency power management applications.

- Battery Management
- Load Switch
- Battery Protection

**Mechanical Data**

- Case: U-WLB1510-6
- Terminal Connections: See Diagram Below
- Weight: 0.0018 grams (Approximate)

U-WLB1510-6



Top View

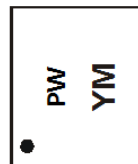
**Ordering Information** (Note 4)

Part Number	Case	Packaging
DMN1016UCB6-7	U-WLB1510-6	3,000/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. For packaging details, go to our website at <http://www.diodes.com/products/packages.html>.

**Marking Information**

U-WLB1510-6



PW = Product Type Marking Code  
 YM = Date Code Marking  
 Y = Year (ex: Y = 2011)  
 M = Month (ex: 9 = September)

## Date Code Key

Year	2011	2012	2013	2014	2015	2016	2017
Code	Y	Z	A	B	C	D	E

Month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Code	1	2	3	4	5	6	7	8	9	O	N	D

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

Characteristic	Symbol	Value	Units
Drain-Source Voltage	V <sub>DSS</sub>	12	V
Gate-Source Voltage	V <sub>GSS</sub>	±8	V
Continuous Drain Current (Note 5) V <sub>GS</sub> = 4.5V	Steady State	T <sub>A</sub> = +25°C	5.5
		T <sub>A</sub> = +70°C	4.2
Continuous Drain Current (Note 6) V <sub>GS</sub> = 4.5V	Steady State	T <sub>A</sub> = +25°C	6.6
		T <sub>A</sub> = +70°C	5.3
Pulsed Drain Current (Note 7)	I <sub>DM</sub>	30	A

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

Characteristic	Symbol	Value	Units
Total Power Dissipation (Note 5)	P <sub>D</sub>	0.92	W
Total Power Dissipation (Note 6)	P <sub>D</sub>	1.47	W
Thermal Resistance, Junction to Ambient (Note 5)	R <sub>θJA</sub>	136	°C/W
Thermal Resistance, Junction to Ambient (Note 6)	R <sub>θJA</sub>	94	°C/W
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 (Note 8)</b>						
Drain-Source Breakdown Voltage	BV <sub>DSS</sub>	12	—	—	V	V <sub>GS</sub> = 0V, I <sub>D</sub> = 250μA
Zero Gate Voltage Drain Current (@T <sub>C</sub> = +25°C)	I <sub>DSS</sub>	—	—	1.0	μA	V <sub>DS</sub> = 9.6V, V <sub>GS</sub> = 0V
Gate-Source Leakage	I <sub>GSS</sub>	—	—	±100	nA	V <sub>GS</sub> = ±8V, V <sub>DS</sub> = 0V
<b>ON CHARACTERISTICS (Note 8)</b>						
Gate Threshold Voltage	V <sub>GS(th)</sub>	0.4	0.6	1.0	V	V <sub>DS</sub> = V <sub>GS</sub> , I <sub>D</sub> = 250μA
Static Drain-Source On-Resistance	R <sub>DS(on)</sub>	—	16	20	mΩ	V <sub>GS</sub> = 4.5V, I <sub>D</sub> = 1.5A
		—	20	23		V <sub>GS</sub> = 2.5V, I <sub>D</sub> = 1.5A
Forward Transfer Admittance	Y <sub>fs</sub>	—	14	—	S	V <sub>DS</sub> = 6V, I <sub>D</sub> = 1.5A
Diode Forward Voltage (Note 6)	V <sub>SD</sub>	—	0.7	1.0	V	V <sub>GS</sub> = 0V, I <sub>S</sub> = 1.5A
Reverse Recovery Charge	Q <sub>rr</sub>	—	8	—	nC	V <sub>dd</sub> = 6V, I <sub>F</sub> = 1.5A, di/dt = 200A/μs
Reverse Recovery Time	t <sub>rr</sub>	—	43.6	—	ns	
<b>DYNAMIC CHARACTERISTICS (Note 9)</b>						
Input Capacitance	C <sub>iss</sub>	—	423	—	pF	V <sub>DS</sub> = 6V, V <sub>GS</sub> = 0V, f = 1.0MHz
Output Capacitance	C <sub>oss</sub>	—	238	—	pF	
Reverse Transfer Capacitance	C <sub>rss</sub>	—	41	—	pF	
Series Gate Resistance	R <sub>G</sub>	—	3	—	Ω	V <sub>DS</sub> = 0V, V <sub>GS</sub> = 0V, f = 1MHz
Total Gate Charge (4.5V)	Q <sub>g</sub>	—	4.2	—	nC	V <sub>GS</sub> = 4.5V, V <sub>DS</sub> = 6V, I <sub>D</sub> = 1.5A
Gate-Source Charge	Q <sub>gs</sub>	—	0.6	—	nC	
Gate-Drain Charge	Q <sub>gd</sub>	—	0.4	—	nC	
Turn-On Delay Time	t <sub>D(on)</sub>	—	5	—	ns	V <sub>DS</sub> = 6V, V <sub>GS</sub> = 4.5V, R <sub>G</sub> = 4Ω, I <sub>D</sub> = 1.5A
Turn-On Rise Time	t <sub>r</sub>	—	10	—	ns	
Turn-Off Delay Time	t <sub>D(off)</sub>	—	25	—	ns	
Turn-Off Fall Time	t <sub>f</sub>	—	10	—	ns	

- Notes:
- Device mounted on FR-4 PCB with minimum recommended pad layout.
  - Device mounted on FR4 material with 1-inch<sup>2</sup> (6.45-cm<sup>2</sup>), 2-oz (0.071-mm thick) Cu.
  - 300ms pulse, pulse duty cycle ≤ 2%.
  - Short duration pulse test used to minimize self-heating effect.
  - Guaranteed by design. Not subject to production testing.

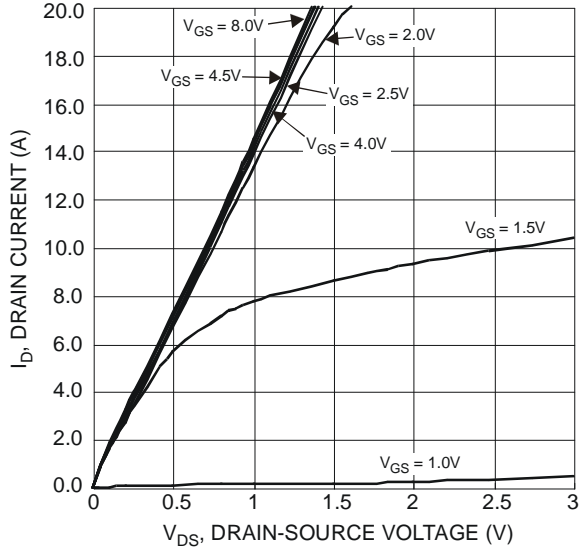


Figure 1 Typical Output Characteristics

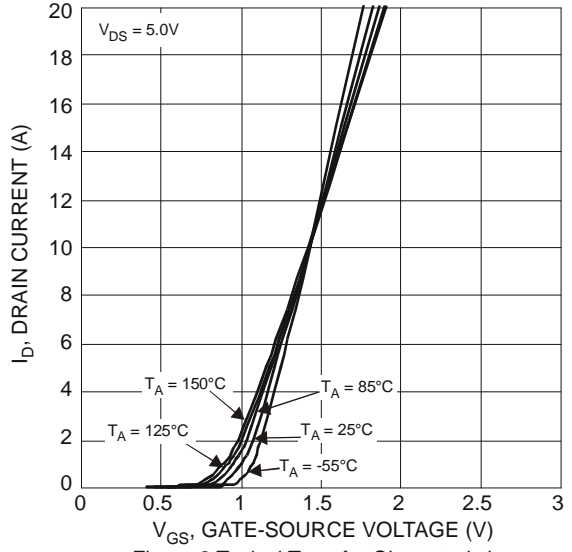


Figure 2 Typical Transfer Characteristics

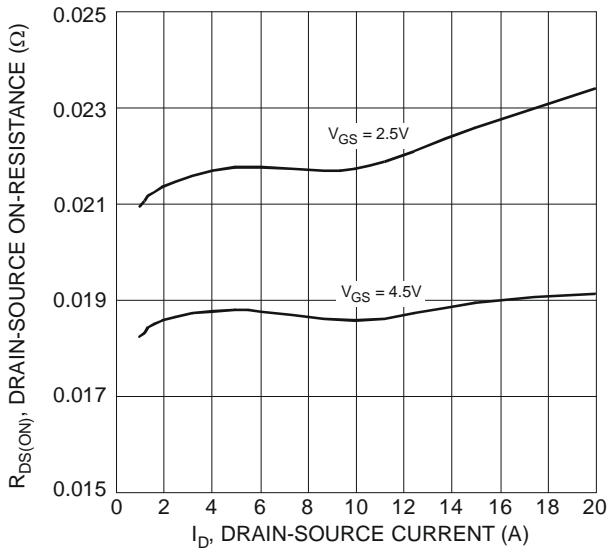


Figure 3 Typical On-Resistance vs. Drain Current and Gate Voltage

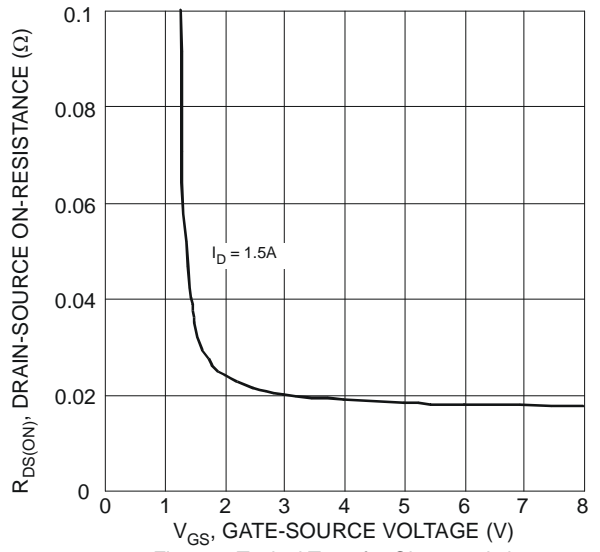


Figure 4 Typical Transfer Characteristics

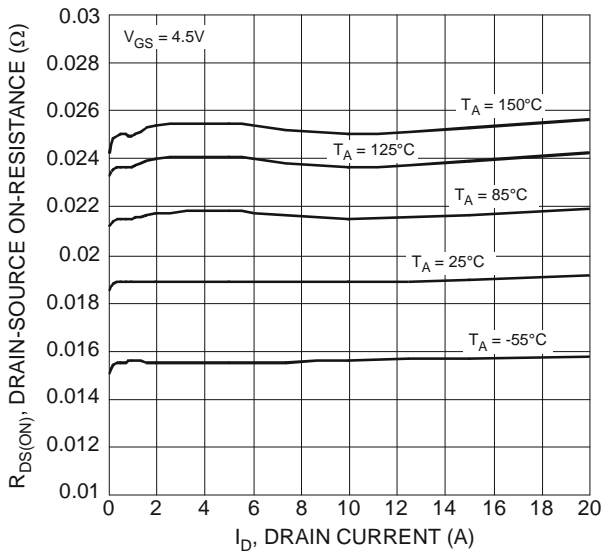


Figure 5 Typical On-Resistance vs. Drain Current and Temperature

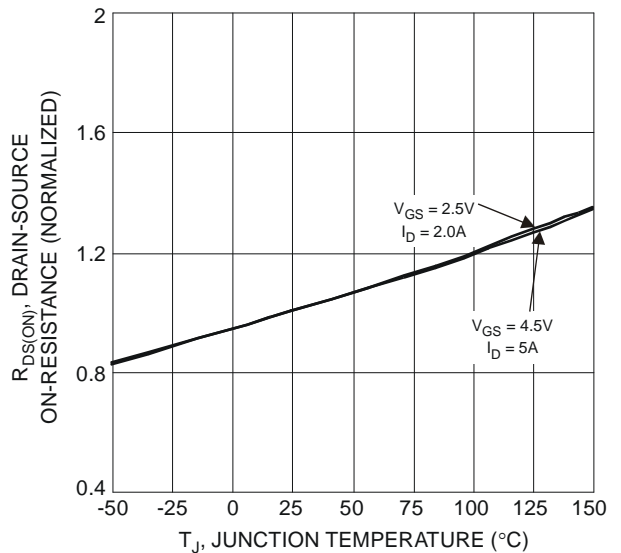


Figure 6 On-Resistance Variation with Temperature

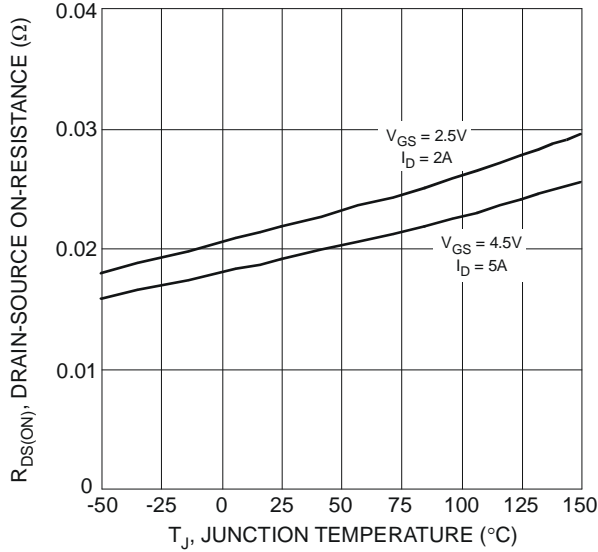


Figure 7 On-Resistance Variation with Temperature

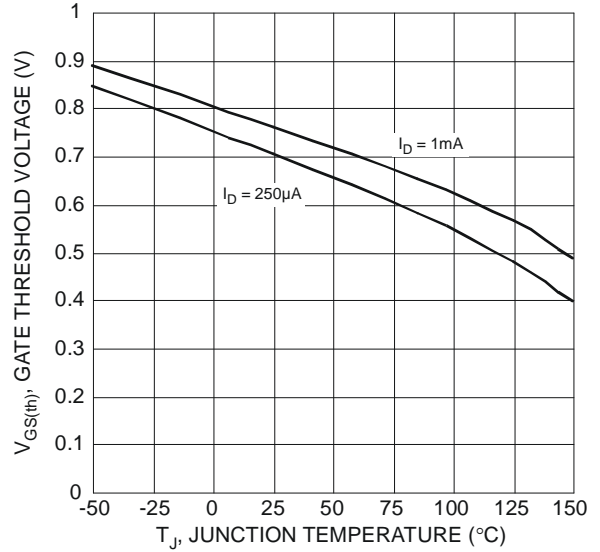


Figure 8 Gate Threshold Variation vs. Ambient Temperature

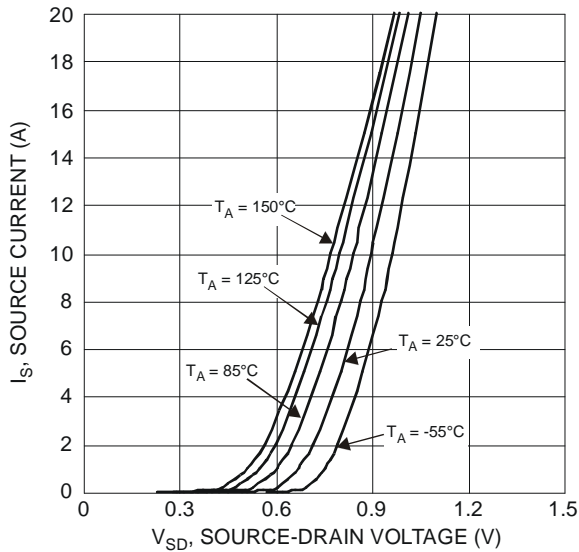


Figure 9 Diode Forward Voltage vs. Current

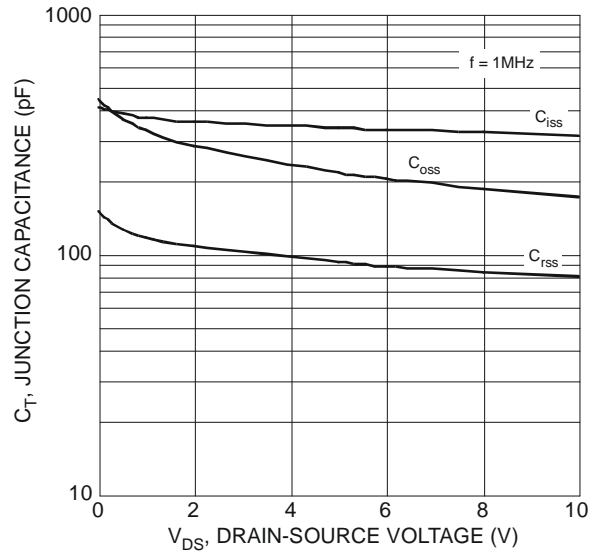


Figure 10 Typical Junction Capacitance

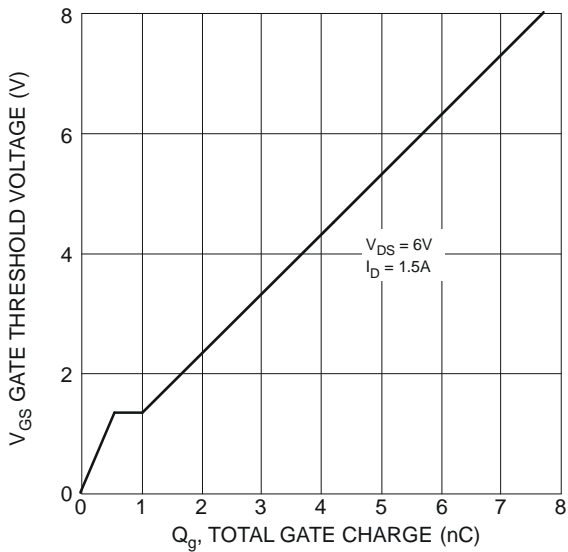


Figure 11 Gate Charge

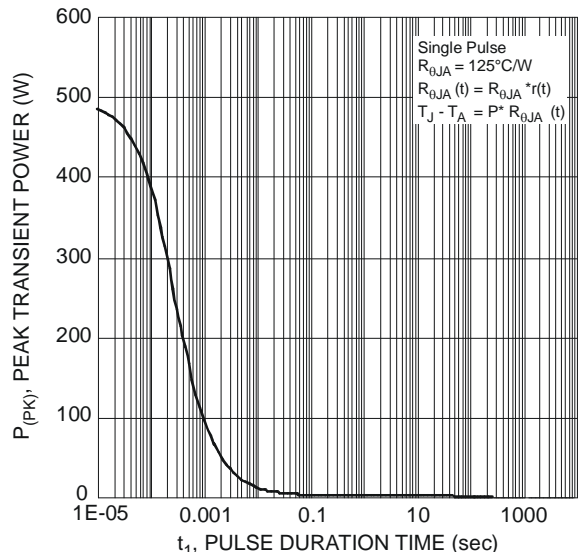
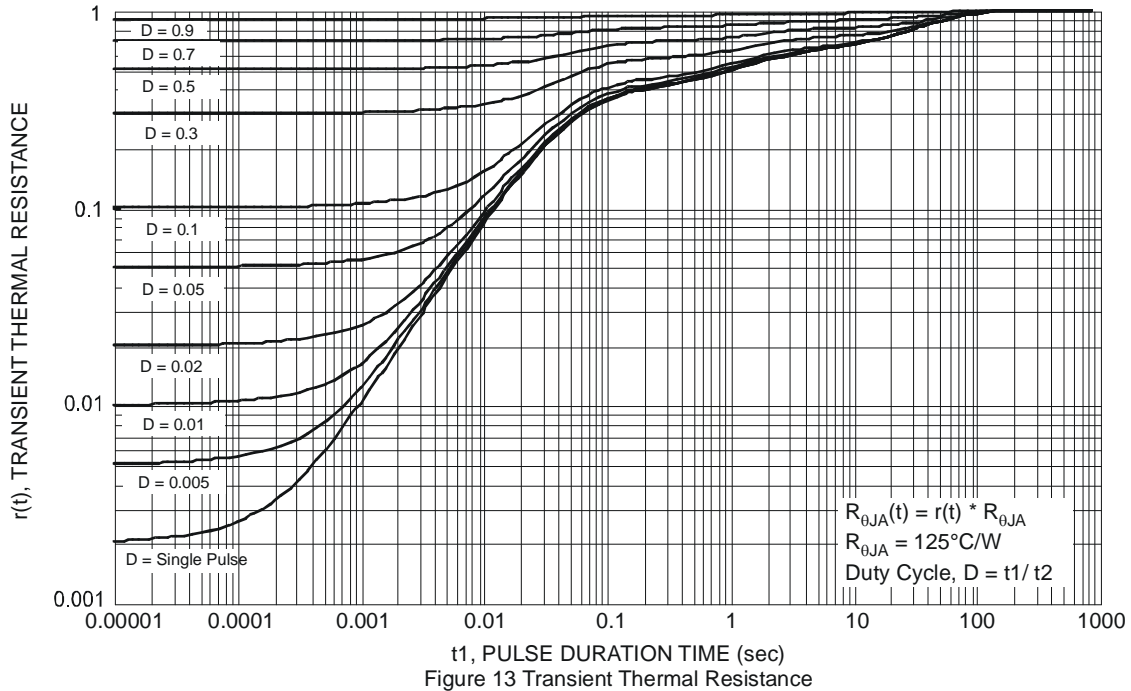
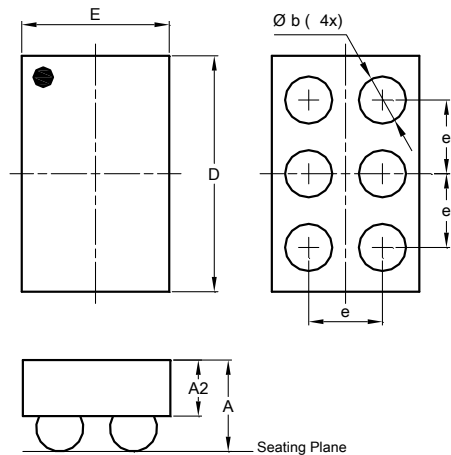


Figure 12 Single Pulse Maximum Power Dissipation



### Package Outline Dimensions

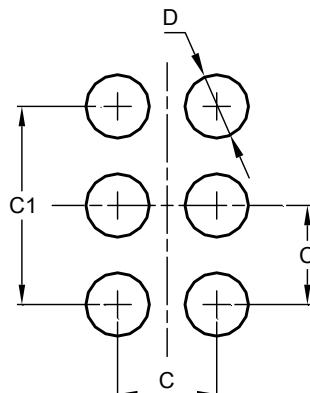
Please see AP02002 at <http://www.diodes.com/datasheets/ap02002.pdf> for the latest version.



U-WLB1510-6			
Dim	Min	Max	Typ
A	--	0.62	--
A2	--	--	0.038
b	0.27	0.37	0.32
D	1.40	1.50	1.50
E	0.90	1.00	1.00
e	--	--	0.50
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	0.50
C1	1.00
D	0.25

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