

Product Summary

BV _{DSS}	R _{DS(ON)}	I _D T _A = +25°C
12V	20mΩ @V _{GS} = 4.5V	6.6A
	23mΩ @V _{GS} = 2.5V	6.1A

Description

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

Applications

- Battery management
- Load switches
- Battery protections

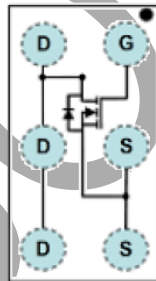
Features and Benefits

- Low Q_G & Q_{GD}
- Small Footprint
- Low Profile 0.62mm Height
- **Totally Lead-Free & Full RoHS Compliant (Notes 1 & 2)**
- **Halogen and Antimony Free. "Green" Device (Note 3)**
- **For automotive applications requiring specific change control (i.e.: parts qualified to AEC-Q100/101/104/200, PPAP capable, and manufactured in IATF 16949 certified facilities), please refer to the related automotive grade (Q-suffix) part. A listing can be found at <https://www.diodes.com/products/automotive/automotive-products/>.**
- **This part is qualified to JEDEC standards (as references in AEC-Q) for High Reliability. <https://www.diodes.com/quality/product-definitions/>**

Mechanical Data

- Package: U-WLB1510-6
- Terminal Connections: See Diagram Below
- Terminals: Finished – SnAgCu Ball (e1)
- Weight: 0.0018 grams (Approximate)

U-WLB1510-6



Top View

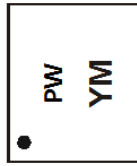
Ordering Information (Note 4)

Part Number	Package	Packing	
		Qty.	Carrier
DMN1016UCB6-7	U-WLB1510-6	3,000	Tape & Reel

- Notes:
1. No purposely added lead. Fully EU Directive 2002/95/EC (RoHS), 2011/65/EU (RoHS 2) & 2015/863/EU (RoHS 3) compliant.
 2. See <https://www.diodes.com/quality/lead-free/> 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 <https://www.diodes.com/design/support/packaging/diodes-packaging/>.

Marking Information

U-WLB1510-6



PW = Product Type Marking Code
 YM = Date Code Marking
 Y = Year (ex: J = 2022)
 M = Month (ex: 9 = September)

Date Code Key

Year	2014	...	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031
Code	B	...	J	K	L	M	N	O	P	R	S	T

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_A = +25°C, unless otherwise specified.)

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

Thermal Characteristics

Characteristic	Symbol	Value	Units
Total Power Dissipation (Note 5)	P _D	0.92	W
Total Power Dissipation (Note 6)	P _D	1.47	W
Thermal Resistance, Junction to Ambient (Note 5)	R _{θJA}	136	°C/W
Thermal Resistance, Junction to Ambient (Note 6)	R _{θJA}	94	°C/W
Operating and Storage Temperature Range	T _J , T _{STG}	-55 to +150	°C

Notes: 5. Device mounted on FR-4 PCB with minimum recommended pad layout.
 6. Device mounted on FR4 material with 1inch² (6.45cm²), 2oz (0.071mm thick) Cu.
 7. 300ms pulse, pulse duty cycle<=2%.

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}	12	—	—	V	V _{GS} = 0V, I _D = 250μA
Zero Gate Voltage Drain Current (@T _C = +25°C)	I _{DSS}	—	—	1.0	μA	V _{DS} = 9.6V, V _{GS} = 0V
Gate-Source Leakage	I _{GSS}	—	—	±100	nA	V _{GS} = ±8V, V _{DS} = 0V
ON CHARACTERISTICS (Note 8)						
Gate Threshold Voltage	V _{GS(TH)}	0.4	0.6	1.0	V	V _{DS} = V _{GS} , I _D = 250μA
Static Drain-Source On-Resistance	R _{DS(ON)}	—	16	20	mΩ	V _{GS} = 4.5V, I _D = 1.5A
		—	20	23		V _{GS} = 2.5V, I _D = 1.5A
Forward Transfer Admittance	Y _{FS}	—	14	—	S	V _{DS} = 6V, I _D = 1.5A
Diode Forward Voltage (Note 6)	V _{SD}	—	0.7	1.0	V	V _{GS} = 0V, I _S = 1.5A
Reverse Recovery Charge	Q _{RR}	—	8	—	nC	V _{DD} = 6V, I _F = 1.5A, di/dt = 200A/μs
Reverse Recovery Time	t _{RR}	—	43.6	—	ns	
DYNAMIC CHARACTERISTICS (Note 9)						
Input Capacitance	C _{iss}	—	423	550	pF	V _{DS} = 6V, V _{GS} = 0V, f = 1.0MHz
Output Capacitance	C _{oss}	—	238	310	pF	
Reverse Transfer Capacitance	C _{rss}	—	41	55	pF	
Series Gate Resistance	R _G	—	3	—	Ω	V _{DS} = 0V, V _{GS} = 0V, f = 1MHz
Total Gate Charge (4.5V)	Q _G	—	4.2	5.5	nC	V _{GS} = 4.5V, V _{DS} = 6V, I _D = 1.5A
Gate-Source Charge	Q _{GS}	—	0.6	—	nC	
Gate-Drain Charge	Q _{GD}	—	0.4	—	nC	
Turn-On Delay Time	t _{D(ON)}	—	5	8	ns	V _{DS} = 6V, V _{GS} = 4.5V, R _G = 4Ω, I _D = 1.5A
Turn-On Rise Time	t _r	—	10	—	ns	
Turn-Off Delay Time	t _{D(OFF)}	—	25	40	ns	
Turn-Off Fall Time	t _f	—	10	—	ns	

- Notes:
6. Device mounted on FR4 material with 1inch² (6.45cm²), 2oz (0.071mm thick) Cu.
 8. Short duration pulse test used to minimize self-heating effect.
 9. Guaranteed by design. Not subject to production testing.

OBSOLETE

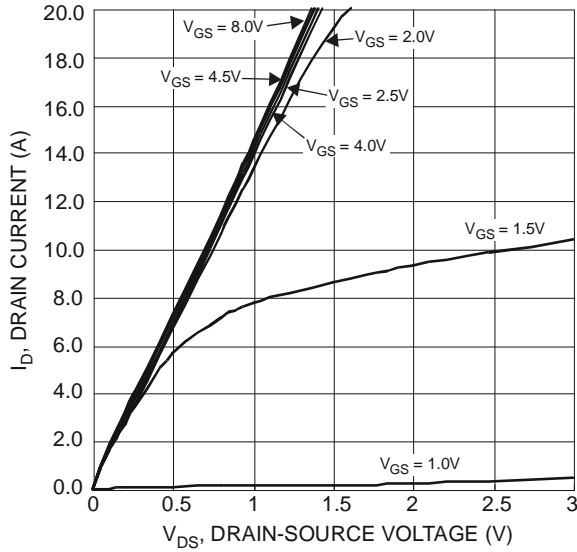


Figure 1 Typical Output Characteristics

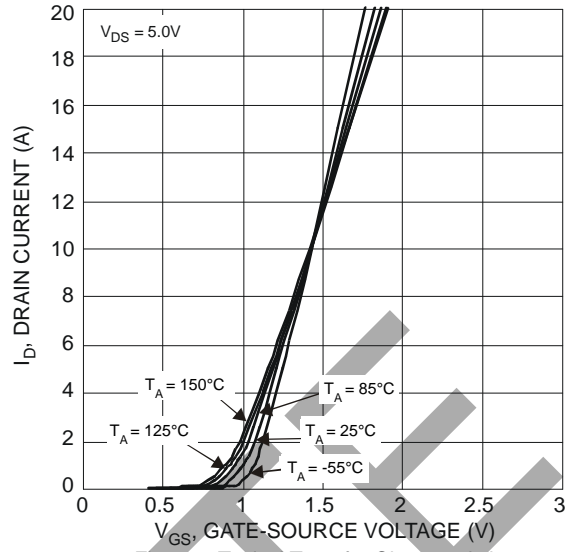


Figure 2 Typical Transfer Characteristics

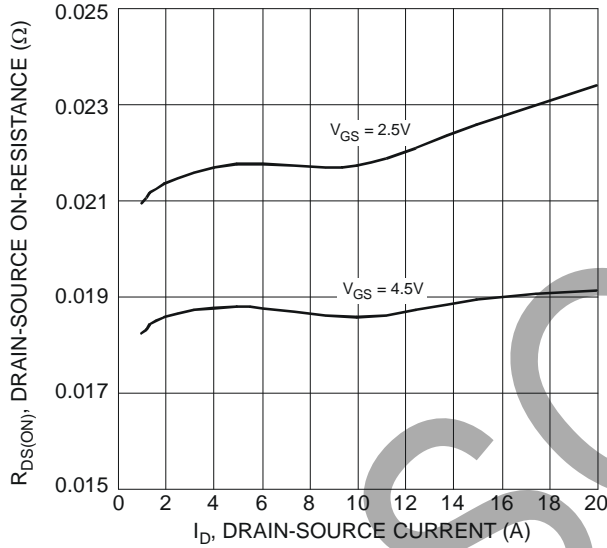


Figure 3 Typical On-Resistance vs. Drain Current and Gate Voltage

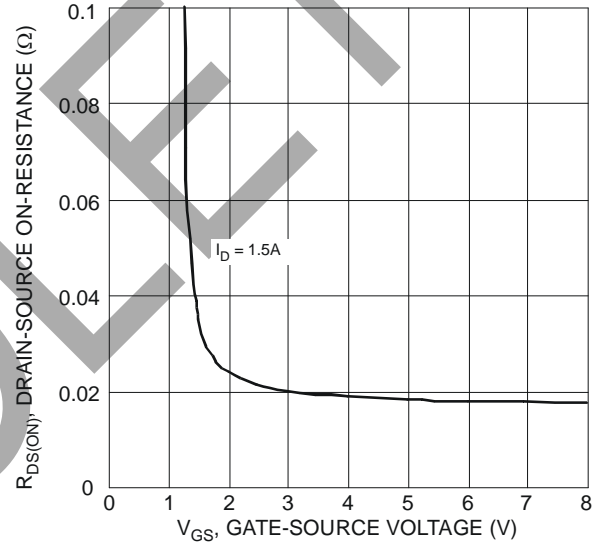


Figure 4 Typical Transfer Characteristics

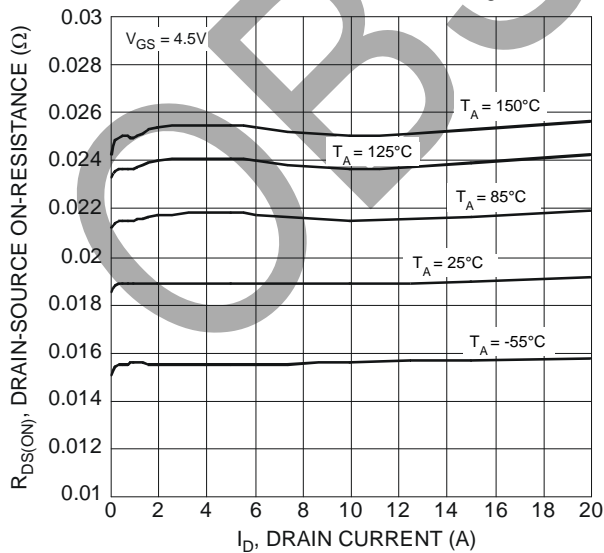


Figure 5 Typical On-Resistance vs. Drain Current and Temperature

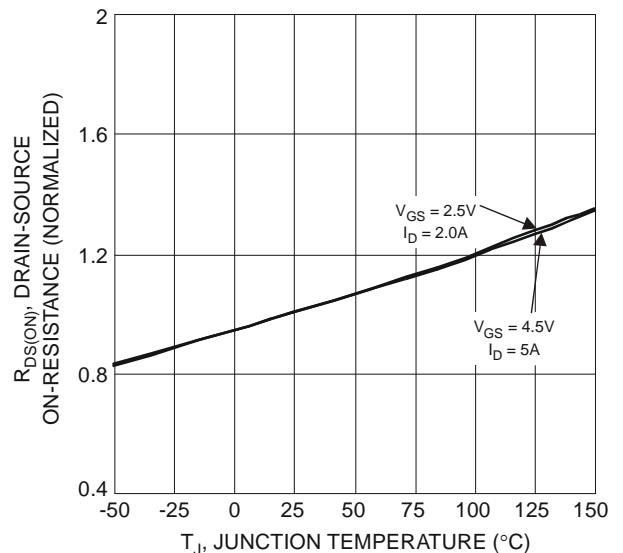


Figure 6 On-Resistance Variation with Temperature

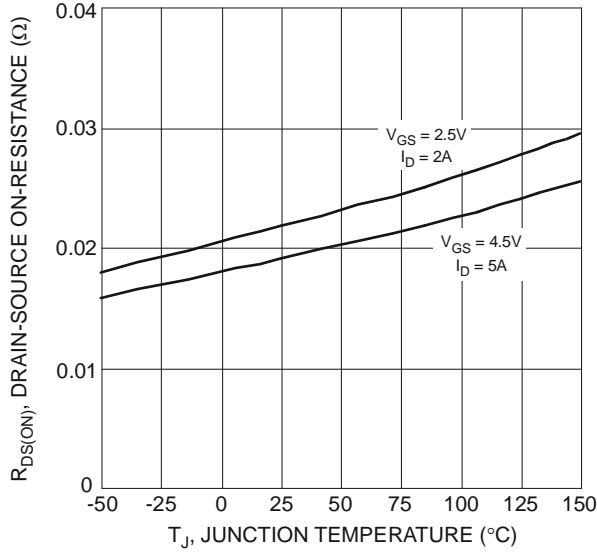


Figure 7 On-Resistance Variation with Temperature

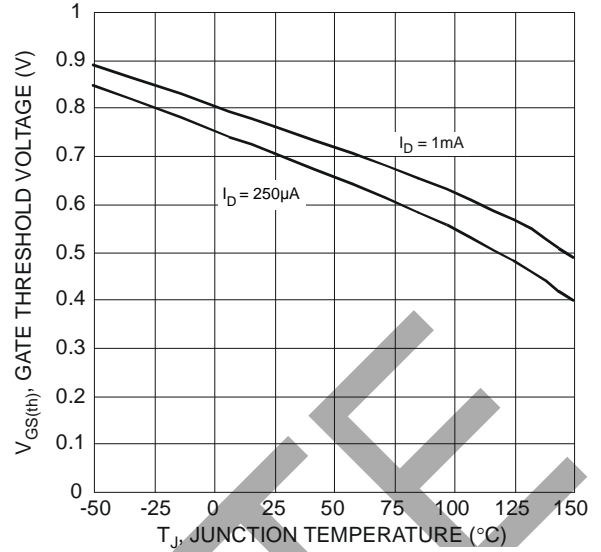


Figure 8 Gate Threshold Variation vs. Junction Temperature

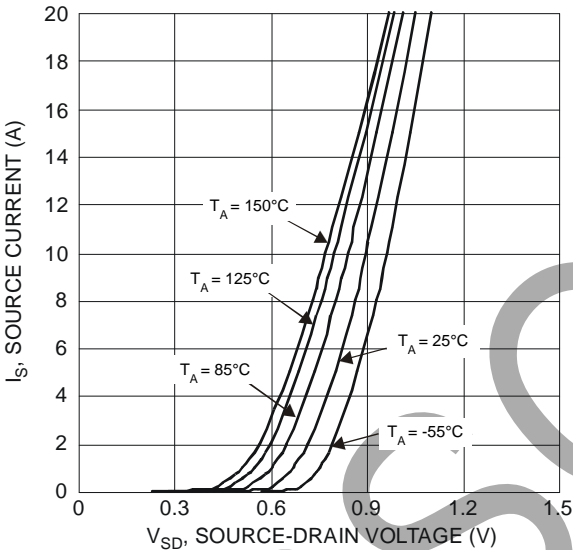


Figure 9 Diode Forward Voltage vs. Current

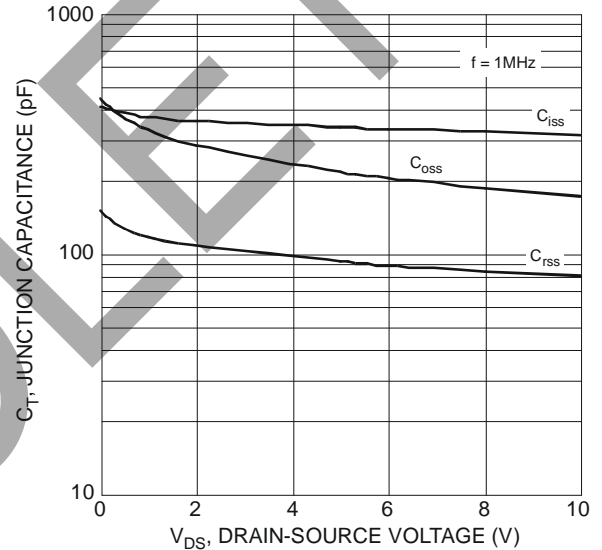


Figure 10 Typical Junction Capacitance

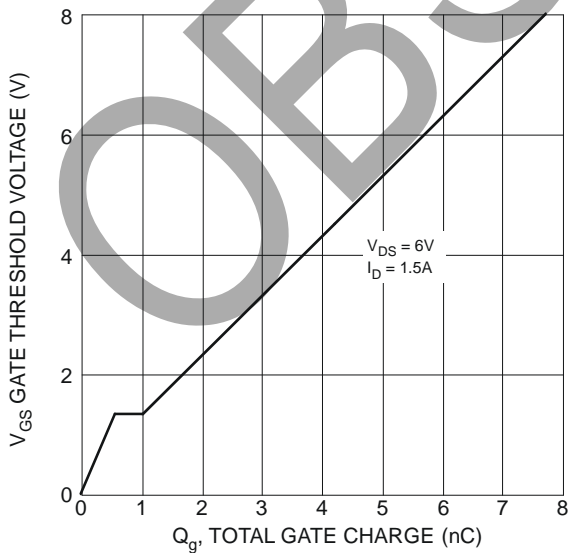


Figure 11 Gate Charge

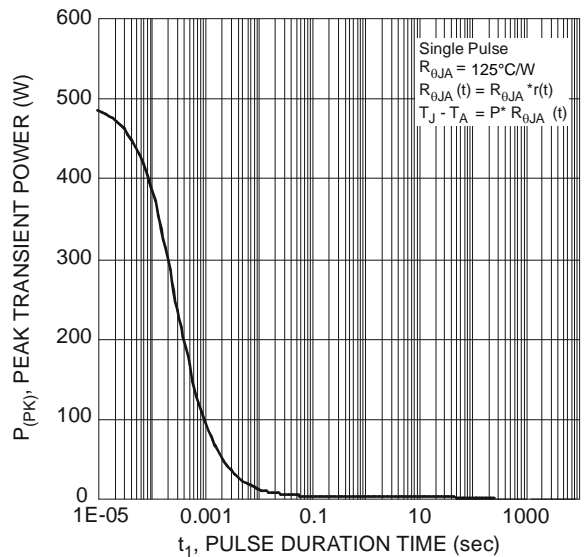
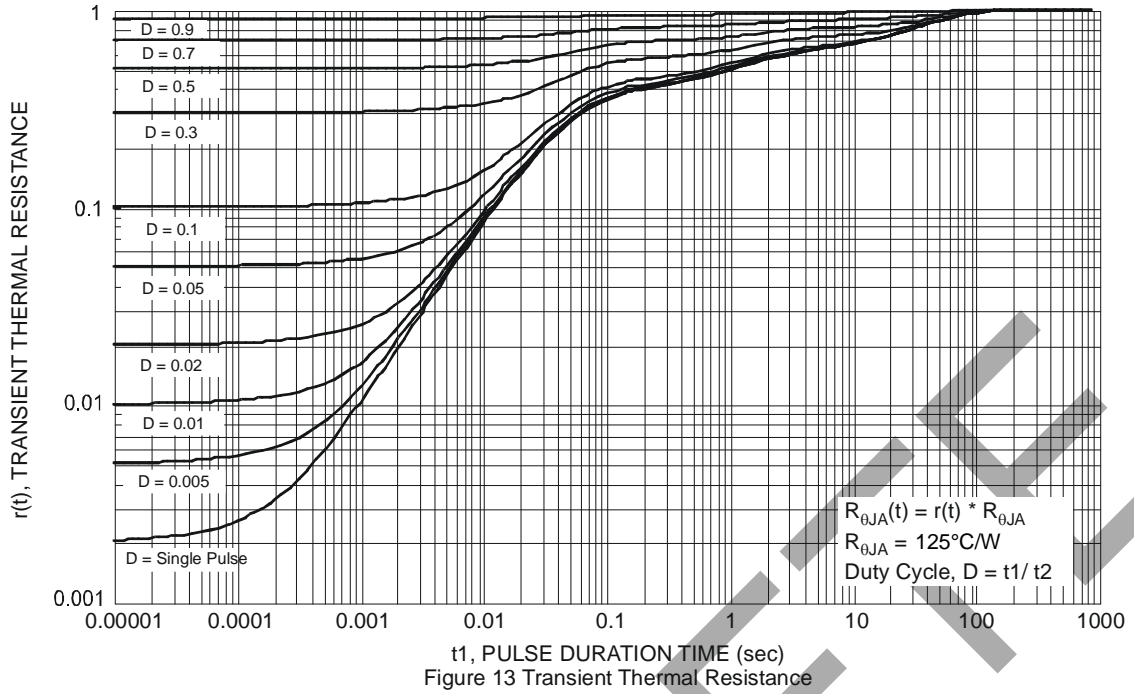


Figure 12 Single Pulse Maximum Power Dissipation

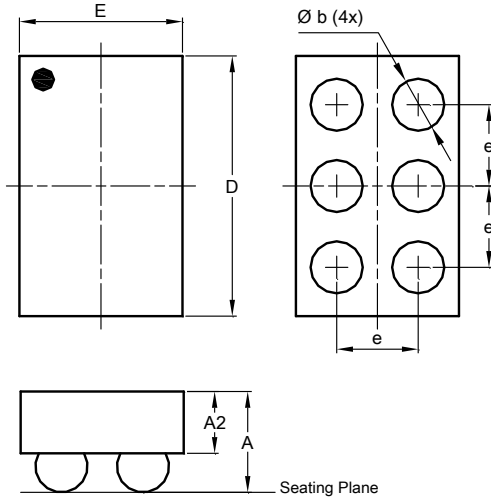


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Package Outline Dimensions

Please see <http://www.diodes.com/package-outlines.html> for the latest version.

U-WLB1510-6

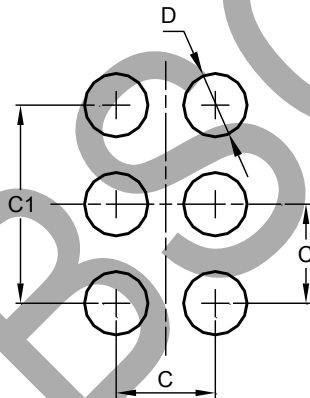


U-WLB1510-6			
Dim	Min	Max	Typ
A	—	0.62	—
A2	—	—	0.038
b	0.27	0.37	0.32
D	1.40	1.50	1.50
E	0.90	1.00	1.00
e	—	—	0.50
All Dimensions in mm			

Suggested Pad Layout

Please see <http://www.diodes.com/package-outlines.html> for the latest version.

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Dimensions	Value (in mm)
C	0.50
C1	1.00
D	0.25

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