

Product Summary

$V_{(BR)DSS}$	$R_{DS(ON)}$	I_D $T_A = +25^\circ C$
-20V	47m Ω @ $V_{GS} = -4.5V$	-4.1A
	60m Ω @ $V_{GS} = -2.5V$	-3.6A

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

- Battery Management
- Load Switch
- Battery Protection

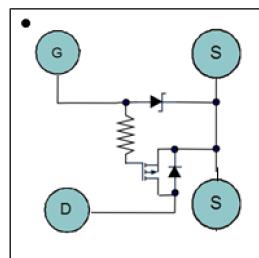
Features

- Low Q_g & Q_{gd}
- Small Footprint
- Low Profile 0.62mm height
- ESD Protected Up To -3KV
- **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: U-WLB1010-4
- Terminal Connections: See Diagram Below
- Weight: 0.0018 grams (approximate)

U-WLB1010-4



Top View
Equivalent Circuit

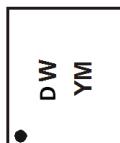
Ordering Information (Note 4)

Part Number	Case	Packaging
DMP2047UCB4-7	U-WLB1010-4	3000/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



DW = Product Type Marking Code
 YM = Date Code Marking
 Y = Year (ex: Z = 2012)
 M = Month (ex: 9 = September)

Date Code Key

Year	2012	2013	2014	2015	2016	2017	2018					
Code	Z	A	B	C	D	E	F					
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 (@ $T_A = +25^\circ\text{C}$, unless otherwise specified.)

Characteristic			Symbol	Value	Unit
Drain-Source Voltage			V_{DSS}	-20	V
Gate-Source Voltage			V_{GSS}	-6	V
Continuous Drain Current (Note 5) $V_{GS} = -4.5\text{V}$	Steady State	$T_A = +25^\circ\text{C}$ $T_A = +70^\circ\text{C}$	I_D	-4.1 -3.2	A
Continuous Drain Current (Note 5) $V_{GS} = -2.5\text{V}$	Steady State	$T_A = +25^\circ\text{C}$ $T_A = +70^\circ\text{C}$	I_D	-3.6 -2.8	A
Pulsed Drain Current (Note 6)			I_{DM}	16	A

Thermal Characteristics

Characteristic	Symbol	Value	Unit
Power Dissipation (Note 7)	P_D	1.0	W
Thermal Resistance, Junction to Ambient @ $T_A = +25^\circ\text{C}$ (Note 7)	$R_{\theta JA}$	127	°C/W
Thermal Resistance, Junction to Case @ $T_C = +25^\circ\text{C}$ (Note 7)	$R_{\theta JC}$	25.8	°C/W
Power Dissipation (Note 5)	P_D	1.66	W
Thermal Resistance, Junction to Ambient @ $T_A = +25^\circ\text{C}$ (Note 5)	$R_{\theta JA}$	77	°C/W
Operating and Storage Temperature Range	T_J, T_{STG}	-55 to +150	°C

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

Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
OFF CHARACTERISTICS (Note 8)						
Drain-Source Breakdown Voltage	BV_{DSS}	-20	—	—	V	$V_{GS} = 0\text{V}, I_D = -250\mu\text{A}$
Gate-Source Breakdown Voltage	BV_{GSS}	-6.0	—	—	V	$V_{DS} = 0\text{V}, I_G = -250\mu\text{A}$
Zero Gate Voltage Drain Current $T_J = +25^\circ\text{C}$	I_{DSS}	—	—	-1	μA	$V_{DS} = -16\text{V}, V_{GS} = 0\text{V}$
Gate-Source Leakage	I_{GS}	—	—	-100	nA	$V_{GS} = -6\text{V}, V_{DS} = 0\text{V}$
ON CHARACTERISTICS (Note 8)						
Gate Threshold Voltage	$V_{GS(th)}$	-0.4	-0.8	-1.2	V	$V_{DS} = V_{GS}, I_D = -250\mu\text{A}$
Static Drain-Source On-Resistance	$R_{DS(ON)}$	—	—	47	mΩ	$V_{GS} = -4.5\text{V}, I_D = -1\text{A}$
		—	—	60		$V_{GS} = -2.5\text{V}, I_D = -1\text{A}$
Forward Transfer Admittance	$ Y_{fs} $	—	3.7	—	S	$V_{DS} = -10\text{V}, I_D = -1\text{A}$
Diode Forward Voltage	V_{SD}	—	-0.7	-1.0	V	$V_{GS} = 0\text{V}, I_S = -1\text{A}$
Reverse Recovery Charge	Q_{rr}	—	3.07	—	nC	$V_{DD} = -10\text{V}, I_F = -1\text{A},$ $dI/dt = 100\text{A}/\mu\text{s}$
Reverse Recovery Time	t_{rr}	—	13.14	—	ns	
DYNAMIC CHARACTERISTICS (Note 9)						
Input Capacitance	C_{iss}	—	218	—	pF	$V_{DS} = -10\text{V}, V_{GS} = 0\text{V},$ $f = 1.0\text{MHz}$
Output Capacitance	C_{oss}	—	116	—		
Reverse Transfer Capacitance	C_{rss}	—	11	—		
Total Gate Charge	Q_g	—	2.3	—	nC	$V_{GS} = -4.5\text{V}, V_{DS} = -10\text{V},$ $I_D = -1\text{A}$
Gate-Source Charge	Q_{gs}	—	0.2	—		
Gate-Drain Charge	Q_{gd}	—	0.4	—		
Gate Charge at V_{th}	$Q_{g(th)}$	—	0.2	—		
Turn-On Delay Time	$t_{D(on)}$	—	7.9	—	ns	$V_{DS} = -10\text{V}, V_{GS} = -2.5\text{V},$ $R_G = 20\Omega, I_D = -1\text{A}$
Turn-On Rise Time	t_r	—	10.7	—		
Turn-Off Delay Time	$t_{D(off)}$	—	48	—		
Turn-Off Fall Time	t_f	—	38	—		

Notes:

5. Device mounted on FR4 material with 1-inch² (6.45-cm²), 2-oz. (0.071-mm thick) Cu.
6. Repetitive rating, pulse width limited by junction temperature.
7. Device mounted on FR-4 PCB with minimum recommended pad layout, single sided.
8. Short duration pulse test used to minimize self-heating effect.
9. Guaranteed by design. Not subject to production testing.

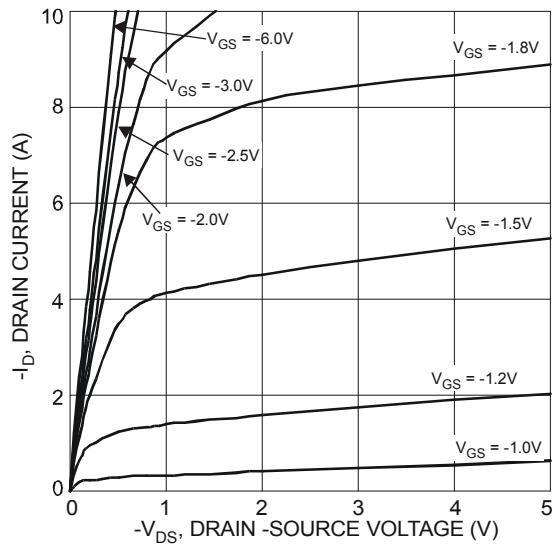


Figure 1 Typical Output Characteristics

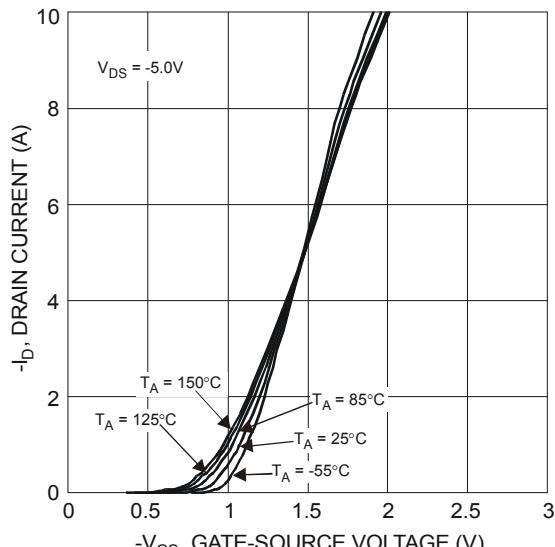


Figure 2 Typical Transfer Characteristics

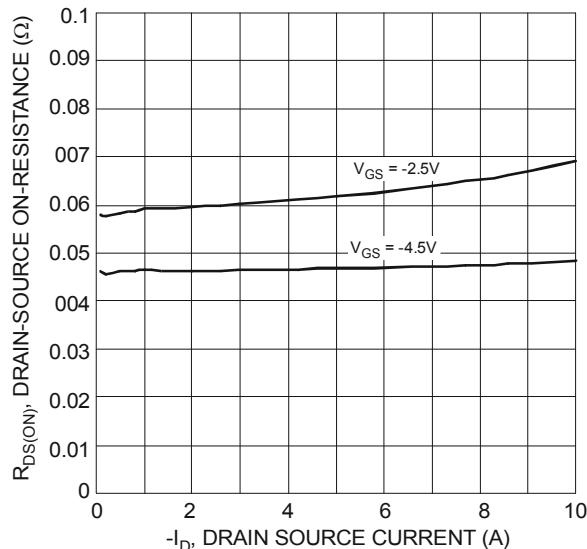


Figure 3 Typical On-Resistance vs.
Drain Current and Gate Voltage

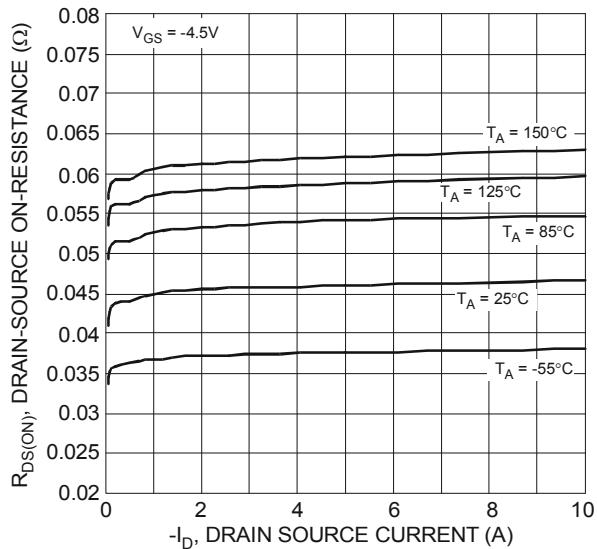


Figure 4 Typical On-Resistance vs.
Drain Current and Temperature

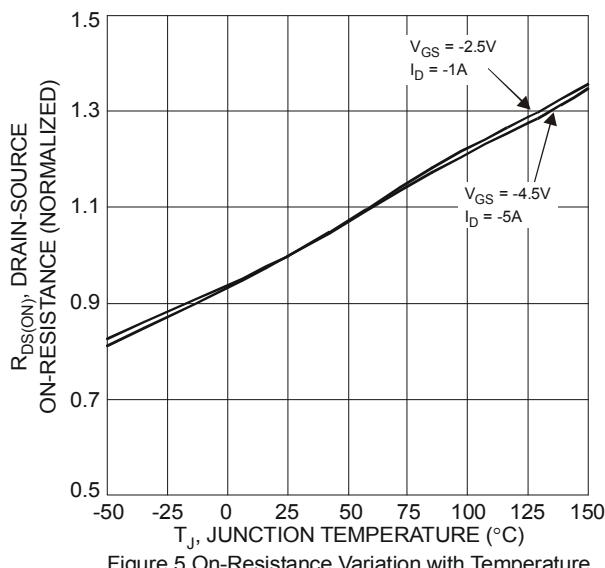


Figure 5 On-Resistance Variation with Temperature

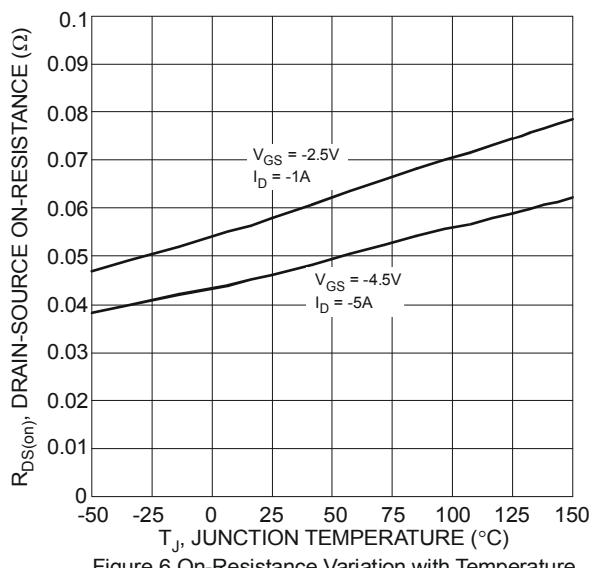


Figure 6 On-Resistance Variation with Temperature

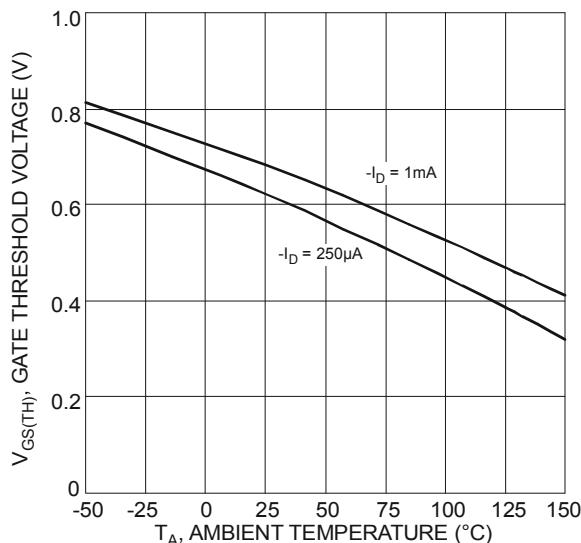


Figure 7 Gate Threshold Variation vs. Ambient Temperature

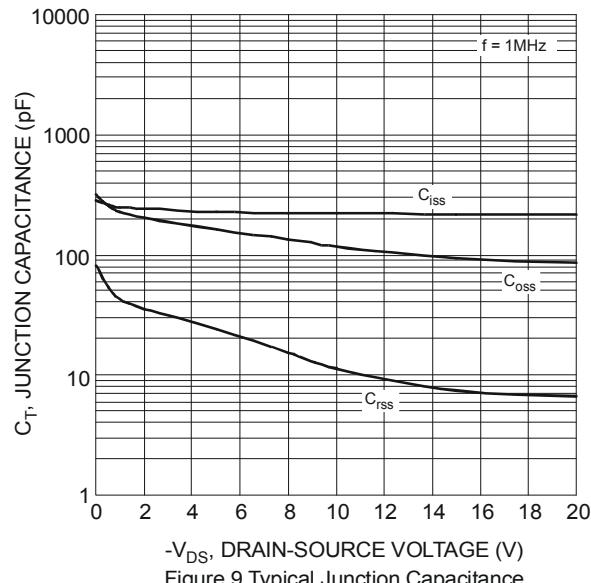


Figure 9 Typical Junction Capacitance

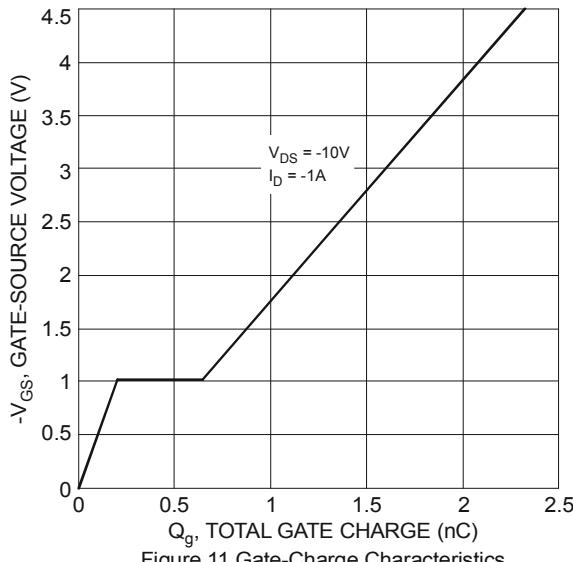


Figure 11 Gate-Charge Characteristics

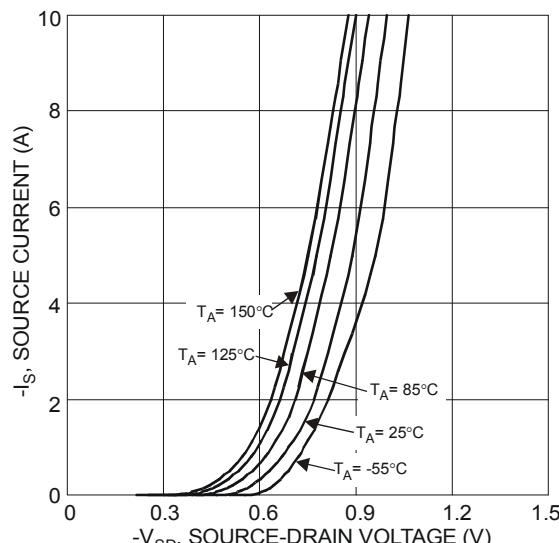


Figure 8 Diode Forward Voltage vs. Current

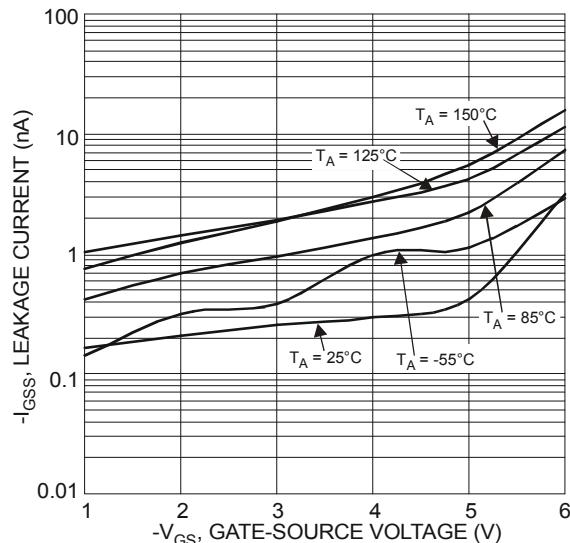


Figure 10 Typical Gate-Source Leakage Current vs. Voltage

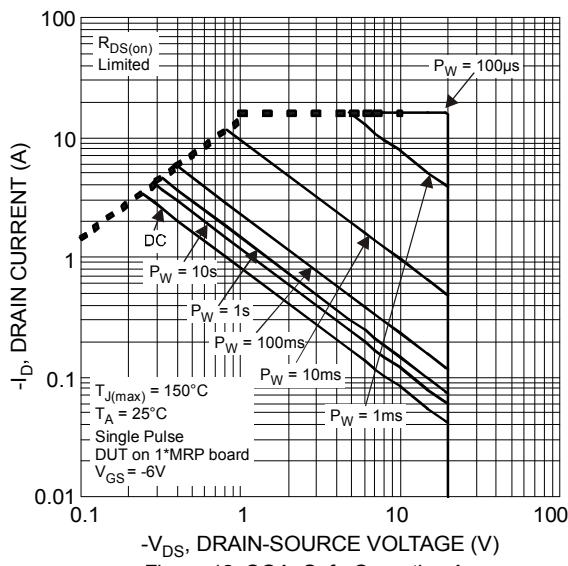
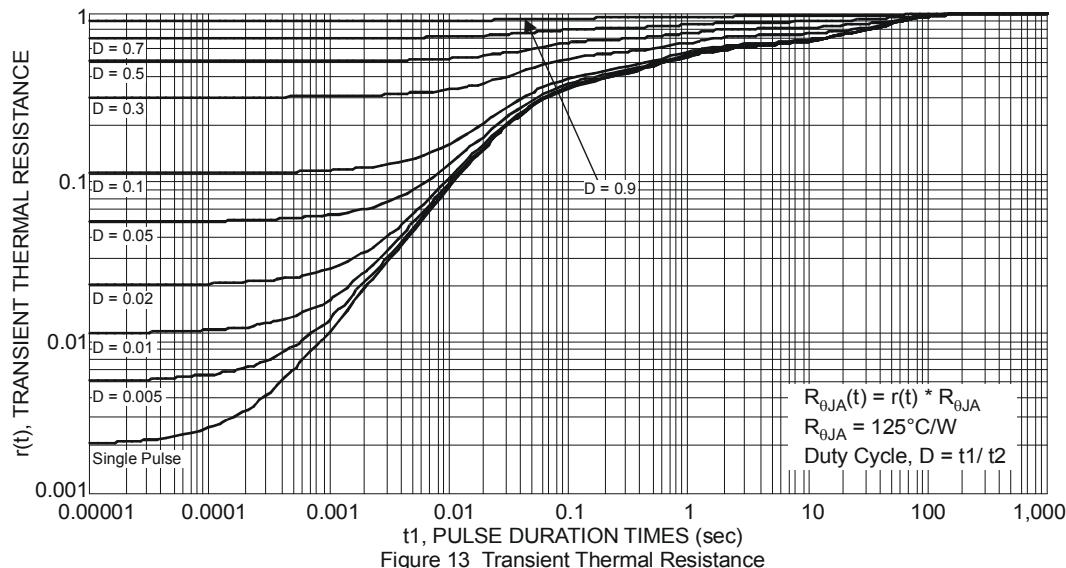
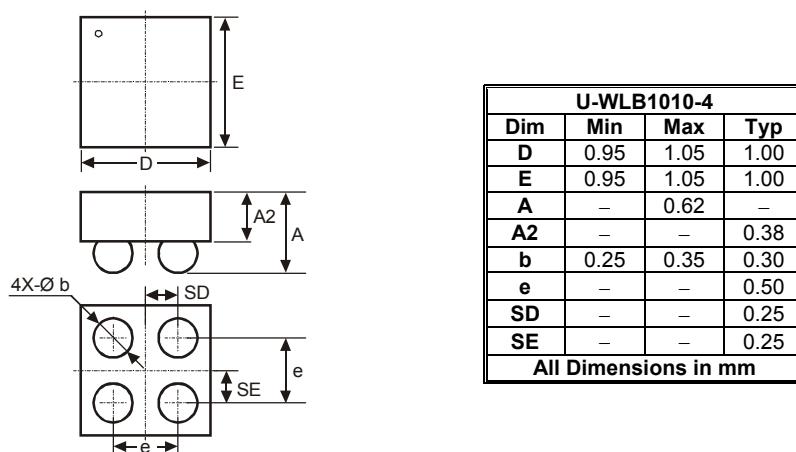


Figure 12 SOA, Safe Operation Area



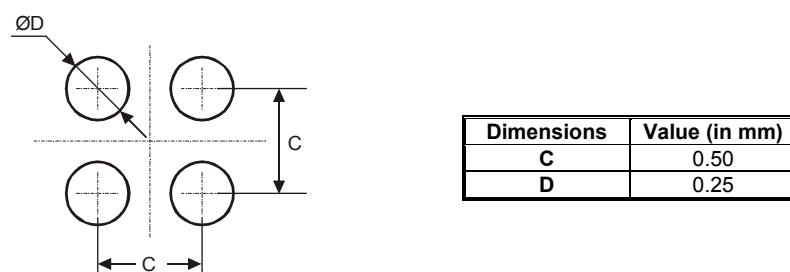
Package Outline Dimensions

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



Suggested Pad Layout

Please see AP02001 at <http://www.diodes.com/datasheets/ap02001.pdf> for the latest version.



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