

## Product Summary

$V_{(BR)DSS}$	$R_{DS(ON) \max}$	$I_D \max$ $T_A = +25^\circ C$
100V	160m $\Omega$ @ $V_{GS} = 10V$	2.9A
	200m $\Omega$ @ $V_{GS} = 4.5V$	2.6A

## Description

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.

## Applications

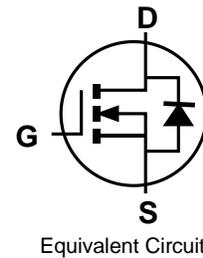
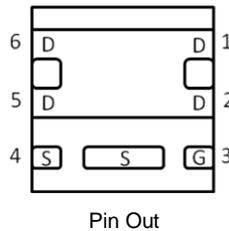
- Power Management Functions
- Battery Operated Systems and Solid-State Relays
- Drivers: Relays, Solenoids, Lamps, Hammers, Displays, Memories, Transistors, etc.

## Features and Benefits

- 0.6mm Profile – Ideal for Low Profile Applications
- PCB Footprint of 4mm<sup>2</sup>
- Low On-Resistance
- **Totally Lead-Free & Fully RoHS Compliant (Notes 1 & 2)**
- **Halogen and Antimony Free. “Green” Device (Note 3)**

## Mechanical Data

- Case: U-DFN2020-6
- 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 <sup>e4</sup>
- Weight: 0.0065 grams (Approximate)



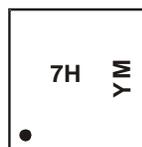
## Ordering Information (Note 4)

Part Number	Compliance	Case	Quantity per reel
DMN10H170SFDE-7	Standard	U-DFN2020-6	3,000
DMN10H170SFDE-13	Standard	U-DFN2020-6	10,000

- 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

U-DFN2020-6



7H = Product Type Marking Code  
 YM = Date Code Marking  
 Y = Year (ex: B = 2014)  
 M = Month (ex: 9 = September)

Date Code Key

Year	2014	2015	2016	2017	2018	2019	2020	2020				
Code	B	C	D	E	F	G	H	I				
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>	100	V	
Gate-Source Voltage		V <sub>GSS</sub>	±20	V	
Continuous Drain Current (Note 6) V <sub>GS</sub> = 10V	Steady State	I <sub>D</sub>	T <sub>A</sub> = +25°C T <sub>A</sub> = +70°C	2.9 2.3	A
	t < 10s		T <sub>A</sub> = +25°C T <sub>A</sub> = +70°C	3.4 2.7	A
Pulsed Drain Current (10µs pulse, duty cycle = 1%)		I <sub>DM</sub>	10	A	
Maximum Body Diode Continuous Current		I <sub>S</sub>	2.5	A	
Avalanche Current (Note 7)		I <sub>AS</sub>	4.7	A	
Avalanche Energy (Note 7)		E <sub>AS</sub>	16	mJ	

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

Characteristic		Symbol	Value	Units
Total Power Dissipation (Note 5)	T <sub>A</sub> = +25°C	P <sub>D</sub>	0.66	W
	T <sub>A</sub> = +70°C		0.42	
Thermal Resistance, Junction to Ambient (Note 5)	Steady state	R <sub>θJA</sub>	189	°C/W
	t < 10s		132	
Total Power Dissipation (Note 6)	T <sub>A</sub> = +25°C	P <sub>D</sub>	2.03	W
	T <sub>A</sub> = +70°C		1.31	
Thermal Resistance, Junction to Ambient (Note 6)	Steady state	R <sub>θJA</sub>	61	°C/W
	t < 10s		43	
Thermal Resistance, Junction to Case (Note 6)		R <sub>θJC</sub>	9.3	
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>	100	-	-	V	V <sub>GS</sub> = 0V, I <sub>D</sub> = 250µA
Zero Gate Voltage Drain Current T <sub>J</sub> = +25°C	I <sub>DSS</sub>	-	-	1	µA	V <sub>DS</sub> = 100V, V <sub>GS</sub> = 0V
Gate-Source Leakage	I <sub>GSS</sub>	-	-	±100	nA	V <sub>GS</sub> = ±20V, V <sub>DS</sub> = 0V
<b>ON CHARACTERISTICS (Note 8)</b>						
Gate Threshold Voltage	V <sub>GS(th)</sub>	1.0	2.0	3.0	V	V <sub>DS</sub> = V <sub>GS</sub> , I <sub>D</sub> = 250µA
Static Drain-Source On-Resistance	R <sub>DS(on)</sub>	-	116	160	mΩ	V <sub>GS</sub> = 10V, I <sub>D</sub> = 5.0A
			126	200		V <sub>GS</sub> = 4.5V, I <sub>D</sub> = 5.0A
Diode Forward Voltage	V <sub>SD</sub>	-	0.9	1.0	V	V <sub>GS</sub> = 0V, I <sub>S</sub> = 10A
<b>DYNAMIC CHARACTERISTICS (Note 9)</b>						
Input Capacitance	C <sub>ISS</sub>	-	1167	-	pF	V <sub>DS</sub> = 25V, V <sub>GS</sub> = 0V, f = 1.0MHz
Output Capacitance	C <sub>OSS</sub>	-	36	-	pF	
Reverse Transfer Capacitance	C <sub>RSS</sub>	-	25	-	pF	
Gate Resistance	R <sub>g</sub>	-	1.3	-	Ω	V <sub>DS</sub> = 0V, V <sub>GS</sub> = 0V, f = 1MHz
Total Gate Charge (V <sub>GS</sub> = 4.5V)	Q <sub>g</sub>	-	4.9	-	nC	V <sub>DS</sub> = 80V, I <sub>D</sub> = 12.8A
Total Gate Charge (V <sub>GS</sub> = 10V)	Q <sub>g</sub>	-	9.7	-	nC	
Gate-Source Charge	Q <sub>gs</sub>	-	2.0	-	nC	
Gate-Drain Charge	Q <sub>gd</sub>	-	2.0	-	nC	
Turn-On Delay Time	t <sub>D(on)</sub>	-	10.5	-	ns	V <sub>DS</sub> = 50V, I <sub>D</sub> = 12.8A V <sub>GS</sub> = 10V, R <sub>G</sub> = 25Ω
Turn-On Rise Time	t <sub>r</sub>	-	11.1	-	ns	
Turn-Off Delay Time	t <sub>D(off)</sub>	-	42.6	-	ns	
Turn-Off Fall Time	t <sub>f</sub>	-	12.8	-	ns	
Reverse Recovery Time	T <sub>rr</sub>	-	30.3	-	ns	I <sub>F</sub> = 12.8A, di/dt = 100A/µs
Reverse Recovery Charge	Q <sub>rr</sub>	-	35.2	-	nC	

- 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.
  - .UIS in production with L = 1.43mH, T<sub>J</sub> = +25°C.
  - Short duration pulse test used to minimize self-heating effect.
  - Guaranteed by design. Not subject to product testing.

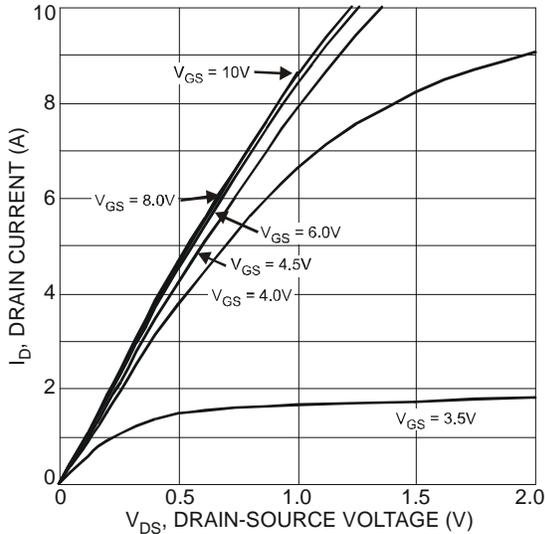


Fig. 1 Typical Output Characteristic

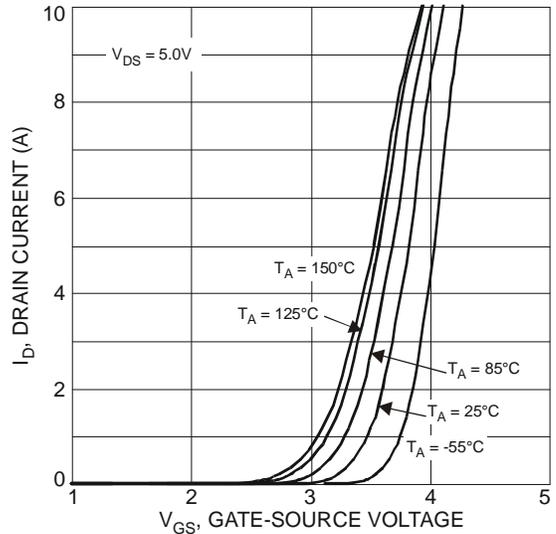


Fig. 2 Typical Transfer Characteristics

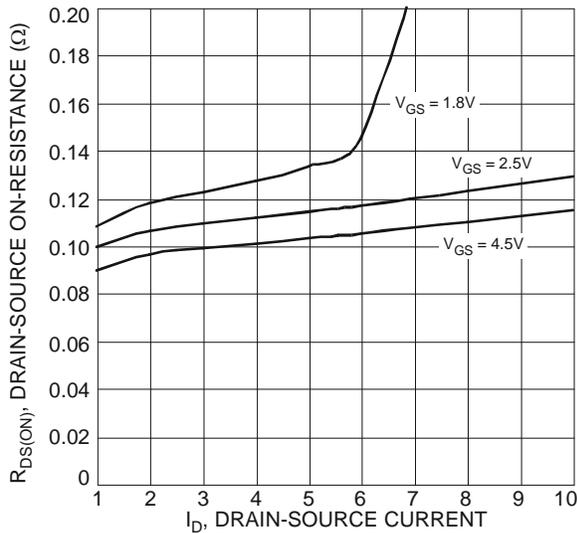


Fig. 3 Typical On-Resistance vs. Drain Current and Gate Voltage

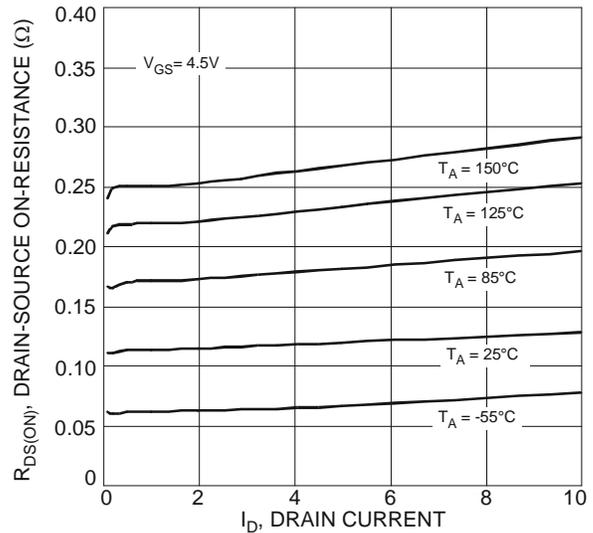


Fig. 4 Typical On-Resistance vs. Drain Current and Temperature

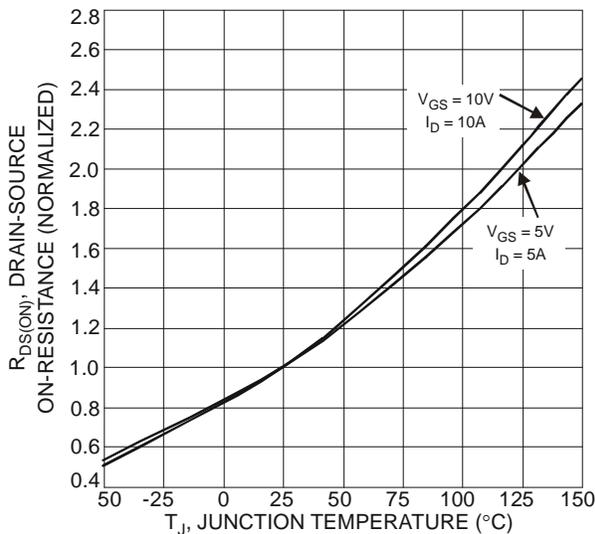


Fig. 5 On-Resistance Variation with Temperature

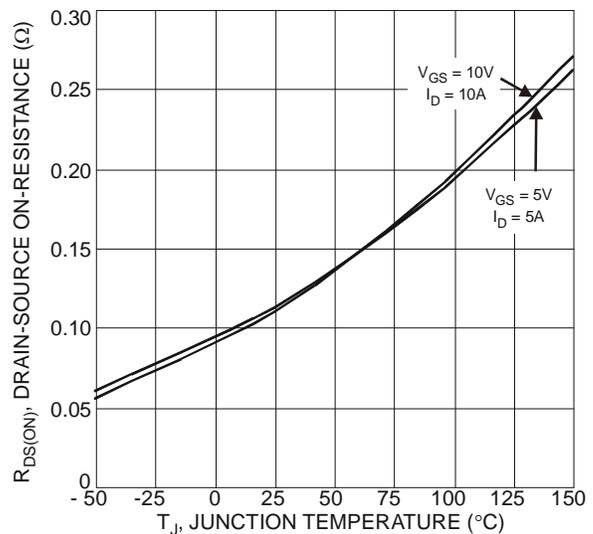


Fig. 6 On-Resistance Variation with Temperature

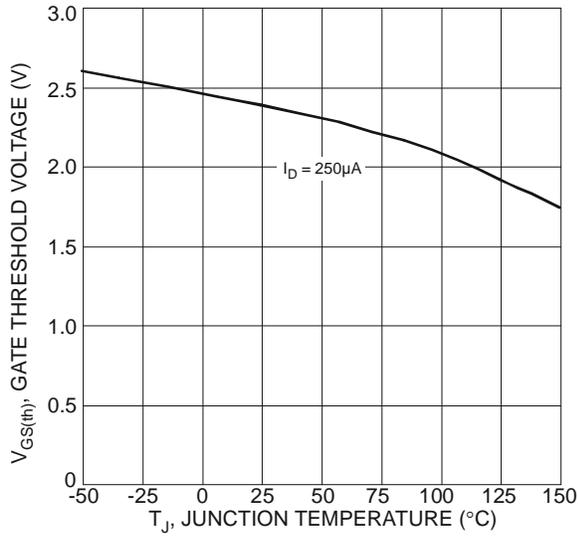


Fig. 7 Gate Threshold Variation vs. Ambient Temperature

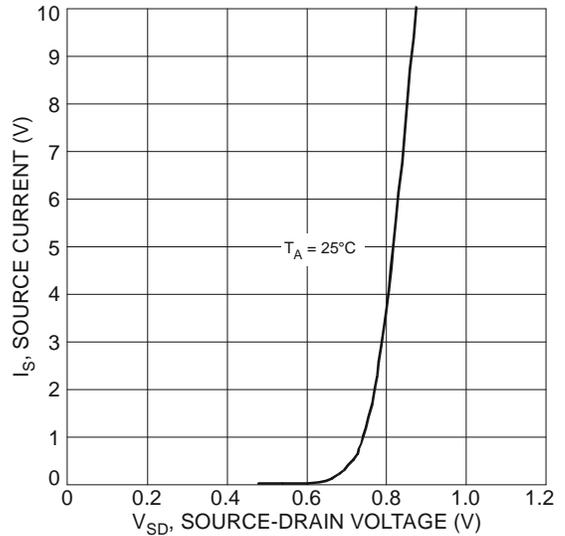


Fig. 8 Diode Forward Voltage vs. Current

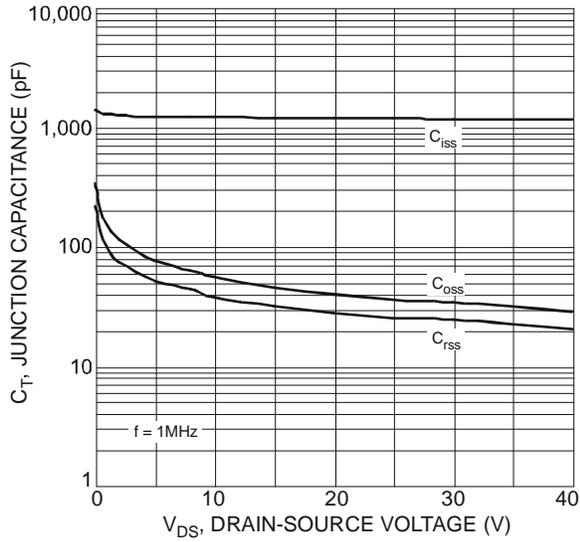


Fig. 9 Typical Junction Capacitance

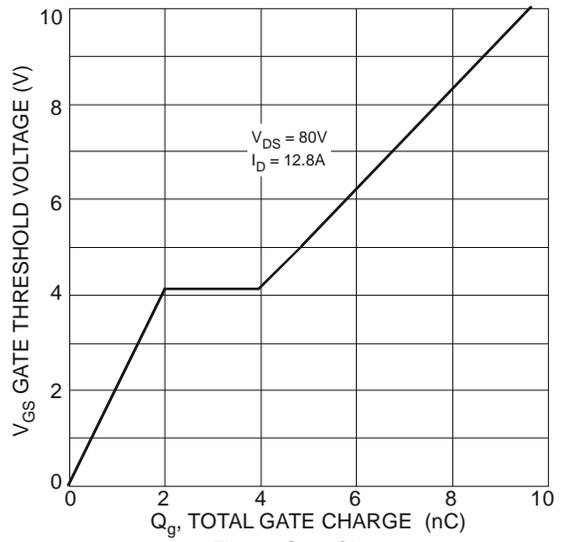


Fig. 10 Gate Charge

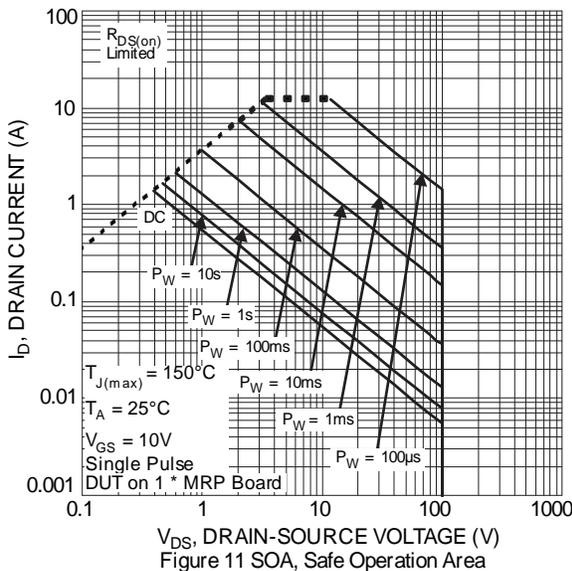
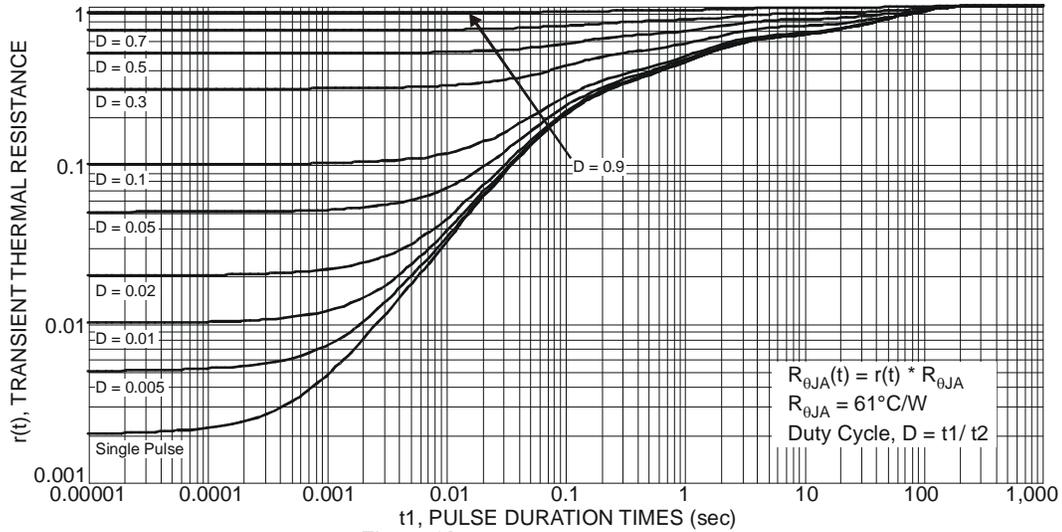
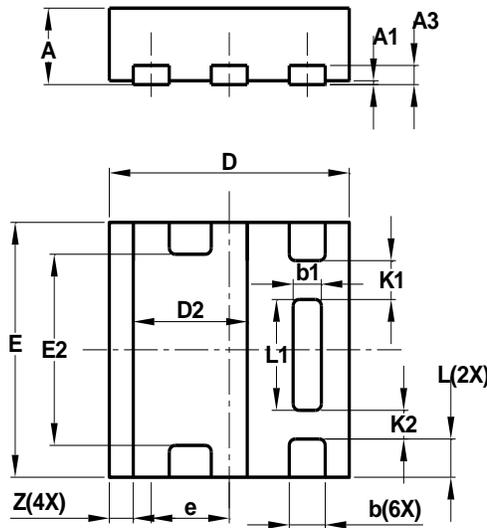


Figure 11 SOA, Safe Operation Area



**Package Outline Dimensions**

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

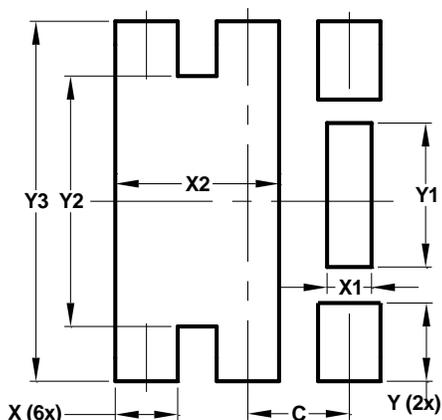


U-DFN2020-6 Type E			
Dim	Min	Max	Typ
A	0.57	0.63	0.60
A1	0	0.05	0.03
A3	—	—	0.15
b	0.25	0.35	0.30
b1	0.185	0.285	0.235
D	1.95	2.05	2.00
D2	0.85	1.05	0.95
E	1.95	2.05	2.00
E2	1.40	1.60	1.50
e	—	—	0.65
L	0.25	0.35	0.30
L1	0.82	0.92	0.87
K1	—	—	0.305
K2	—	—	0.225
Z	—	—	0.20

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)
<b>C</b>	0.650
<b>X</b>	0.400
<b>X1</b>	0.285
<b>X2</b>	1.050
<b>Y</b>	0.500
<b>Y1</b>	0.920
<b>Y2</b>	1.600
<b>Y3</b>	2.300

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