

## Product Summary

$V_{(BR)DSS}$	$R_{DS(on)}$ max	$I_D$ $T_A = 25^\circ C$
-12V	32m $\Omega$ @ $V_{GS} = -4.5V$	-5.5A
	45m $\Omega$ @ $V_{GS} = -2.5V$	-4.5A
	75m $\Omega$ @ $V_{GS} = -1.8V$	-3.2A

## 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

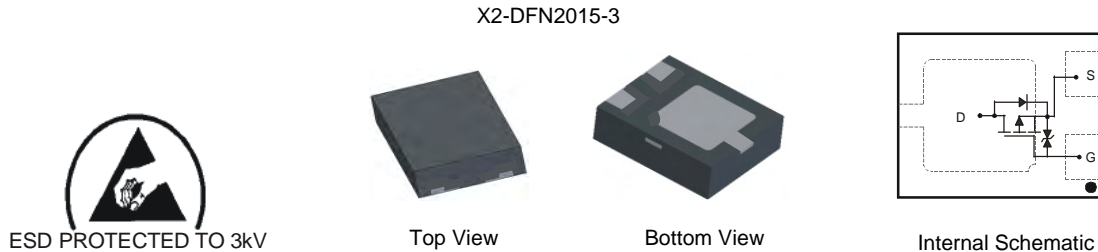
- DC-DC Converters
- Power management functions
- Analog Switch

## Features

- Low On-Resistance
- Low Input Capacitance
- Fast Switching Speed
- Low Input/Output Leakage
- **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: X2-DFN2015-3
- Case Material: Molded Plastic, "Green" Molding Compound. UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminal Connections: See Diagram
- Terminals: Finish – NiPdAu over Copper leadframe. Solderable per MIL-STD-202, Method 208 <sup>(e4)</sup>
- Weight: 0.008 grams (approximate)

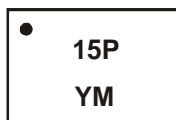


## Ordering Information (Note 4)

Part Number	Case	Packaging
DMP1045UFY4-7	X2-DFN2015-3	3,000/Tape & Reel
DMP1045UFY4-13	X2-DFN2015-3	10,000/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> 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>.

## Marking Information



15P = Marking Code  
 YM = Date Code Marking  
 Y = Year (ex: W = 2009)  
 M = Month (ex: 9 = September)

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

Characteristic		Symbol	Value	Unit	
Drain-Source Voltage		V <sub>DSS</sub>	-12	V	
Gate-Source Voltage		V <sub>GSS</sub>	±8	V	
Continuous Drain Current V <sub>GS</sub> = -4.5V (Note 6)	Steady State	I <sub>D</sub>	T <sub>A</sub> = +25°C T <sub>A</sub> = +70°C	-5.5 -4.3	A
	t < 5s		T <sub>A</sub> = +25°C T <sub>A</sub> = +70°C	-6.5 -5.1	A
Maximum Continuous Body Diode Forward Current (Note 6)		I <sub>S</sub>	-2.2	A	
Pulsed Drain Current (10µs pulse, duty cycle = 1%)		I <sub>DM</sub>	-25	A	

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

Characteristic		Symbol	Value	Unit
Power Dissipation (Note 5)	T <sub>A</sub> = +25°C	P <sub>D</sub>	0.7	W
	T <sub>A</sub> = +70°C		0.4	
Thermal Resistance, Junction to Ambient (Note 5)	Steady state	R <sub>θJA</sub>	193	°C/W
	t < 5s		135	
Power Dissipation (Note 6)	T <sub>A</sub> = +25°C	P <sub>D</sub>	1.7	W
	T <sub>A</sub> = +70°C		1.1	
Thermal Resistance, Junction to Ambient (Note 6)	Steady state	R <sub>θJA</sub>	73	°C/W
	t < 5s		52	
Thermal Resistance, Junction to Case (Notes 6)	Steady state	R <sub>θJC</sub>	17	
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 7)</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>J</sub> = 25°C	I <sub>DSS</sub>	-	-	-1.0	µA	V <sub>DS</sub> = -12V, V <sub>GS</sub> = 0V
Gate-Source Leakage	I <sub>GSS</sub>	-	-	±10	µA	V <sub>GS</sub> = ±8V, V <sub>DS</sub> = 0V
<b>ON CHARACTERISTICS (Note 7)</b>						
Gate Threshold Voltage	V <sub>GS(th)</sub>	-0.3	-0.55	-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>	-	26	32	mΩ	V <sub>GS</sub> = -4.5V, I <sub>D</sub> = -4.0A
			31	45		V <sub>GS</sub> = -2.5V, I <sub>D</sub> = -3.5A
			51	75		V <sub>GS</sub> = -1.8V, I <sub>D</sub> = -2.7A
Forward Transfer Admittance	Y <sub>fs</sub>	-	12	-	S	V <sub>DS</sub> = -5V, I <sub>D</sub> = -4A
Diode Forward Voltage	V <sub>SD</sub>	-	-0.6	-	V	V <sub>GS</sub> = 0V, I <sub>S</sub> = -1A
<b>DYNAMIC CHARACTERISTICS (Note 8)</b>						
Input Capacitance	C <sub>ISS</sub>	-	1291	-	pF	V <sub>DS</sub> = -10V, V <sub>GS</sub> = 0V f = 1.0MHz
Output Capacitance	C <sub>OSS</sub>	-	266	-	pF	
Reverse Transfer Capacitance	C <sub>RSS</sub>	-	242	-	pF	
Gate Resistance	R <sub>g</sub>	-	13	-	Ω	V <sub>DS</sub> = 0V, V <sub>GS</sub> = 0V, f = 1.0MHz
<b>SWITCHING CHARACTERISTICS (Note 8)</b>						
Total Gate Charge (V <sub>GS</sub> = -8V)	Q <sub>g</sub>	-	23.7	-	nC	V <sub>DS</sub> = -10V, I <sub>D</sub> = -4A
Total Gate Charge (V <sub>GS</sub> = -4.5V)	Q <sub>g</sub>	-	14.7	-	nC	
Gate-Source Charge	Q <sub>gs</sub>	-	1.8	-	nC	
Gate-Drain Charge	Q <sub>gd</sub>	-	4.6	-	nC	
Turn-On Delay Time	t <sub>D(on)</sub>	-	14	-	ns	V <sub>DS</sub> = -10V, V <sub>GS</sub> = -4.5V, R <sub>L</sub> = 2.5Ω, R <sub>G</sub> = 3.0Ω
Turn-On Rise Time	t <sub>r</sub>	-	22	-	ns	
Turn-Off Delay Time	t <sub>D(off)</sub>	-	74	-	ns	
Turn-Off Fall Time	t <sub>f</sub>	-	75	-	ns	

- Notes:
- Device mounted on FR-4 PCB with minimum recommended pad layout, single sided.
  - Device mounted on 1" x 1" FR-4 PCB with high coverage 2oz. Copper, single sided.
  - Short duration pulse test used to minimize self-heating effect.
  - Guaranteed by design. Not subject to production testing.

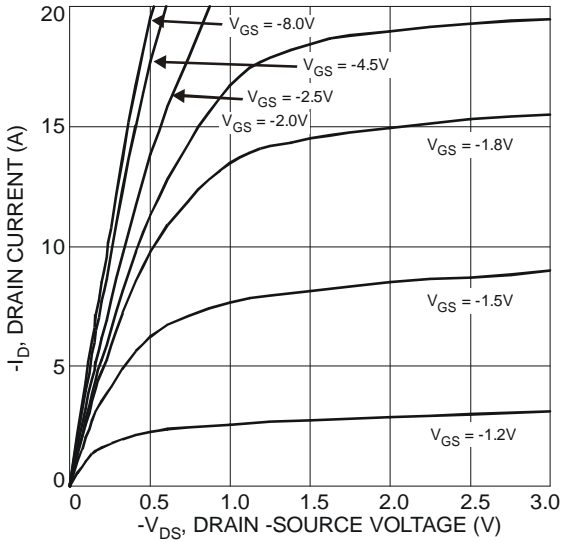


Fig. 1 Typical Output Characteristics

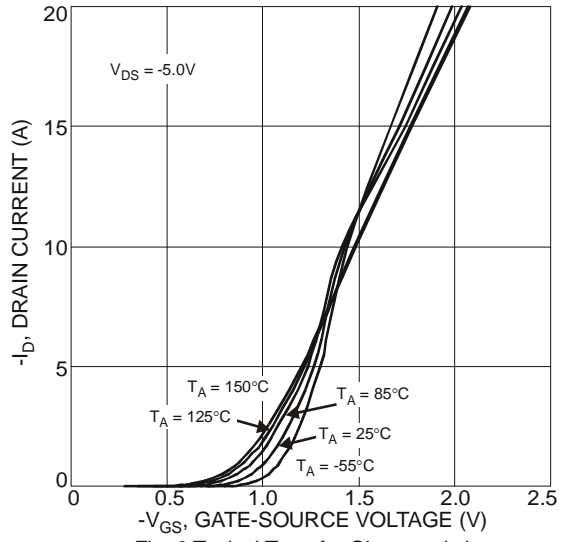


Fig. 2 Typical Transfer Characteristics

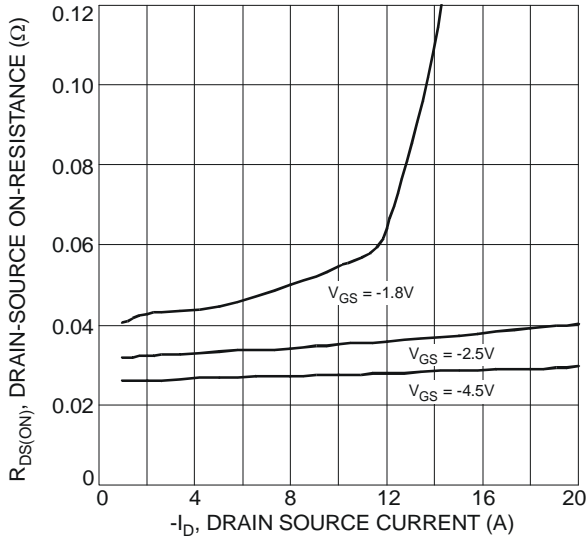


Fig. 3 Typical On-Resistance vs. Drain Current and Gate Voltage

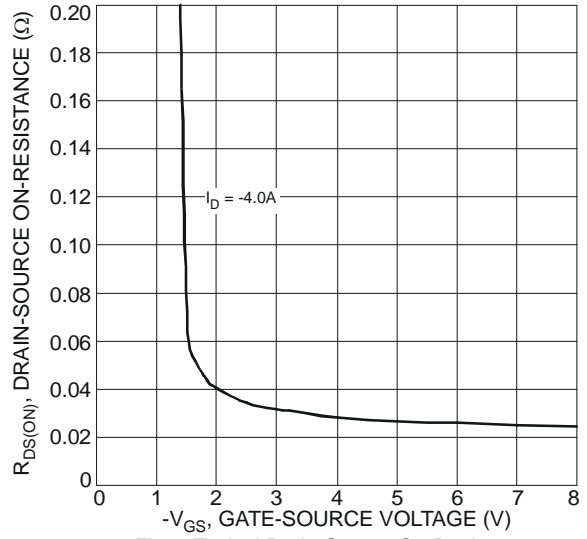


Fig. 4 Typical Drain-Source On-Resistance vs. Gate-Source Voltage

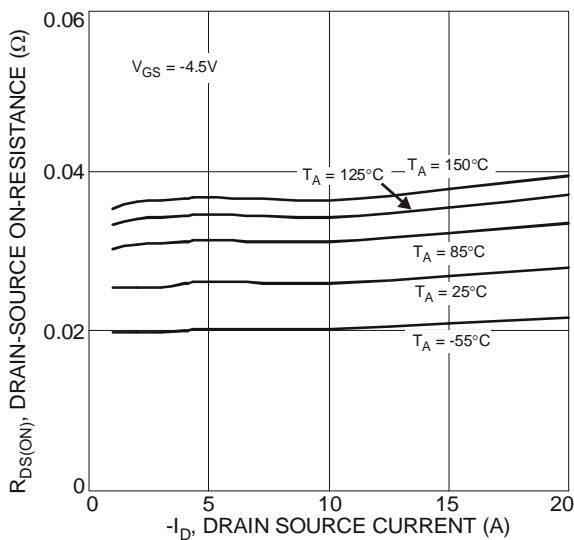


Fig. 5 Typical On-Resistance vs. Drain Current and Temperature

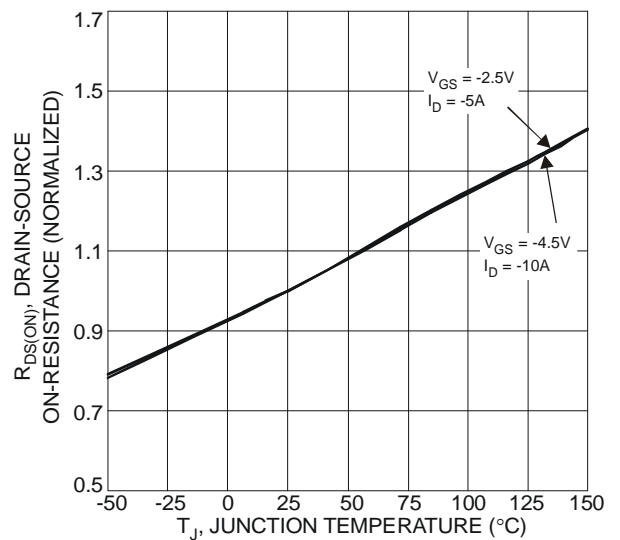


Fig. 6 On-Resistance Variation with Temperature

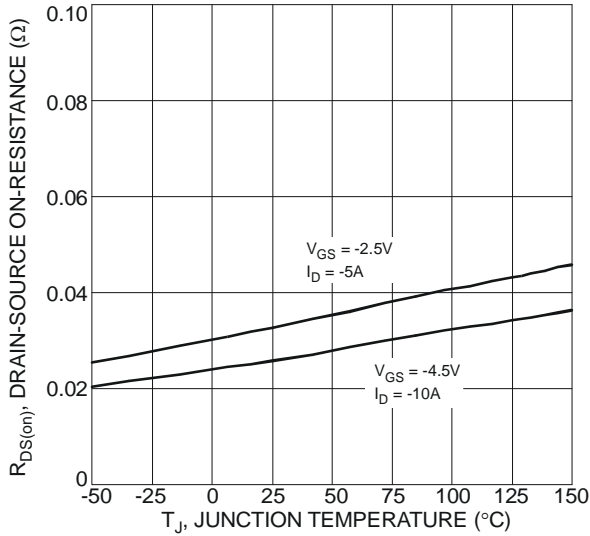


Fig. 7 On-Resistance Variation with Temperature

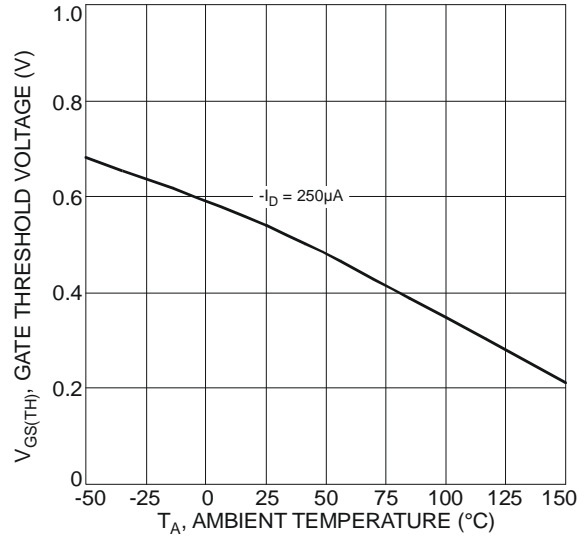


Fig. 8 Gate Threshold Variation vs. Ambient Temperature

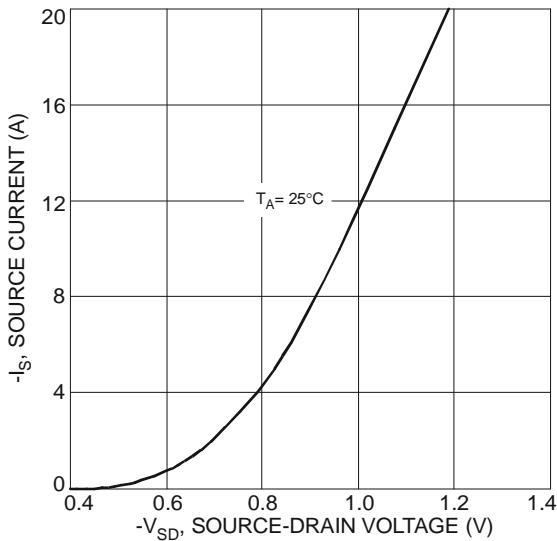


Fig. 9 Diode Forward Voltage vs. Current

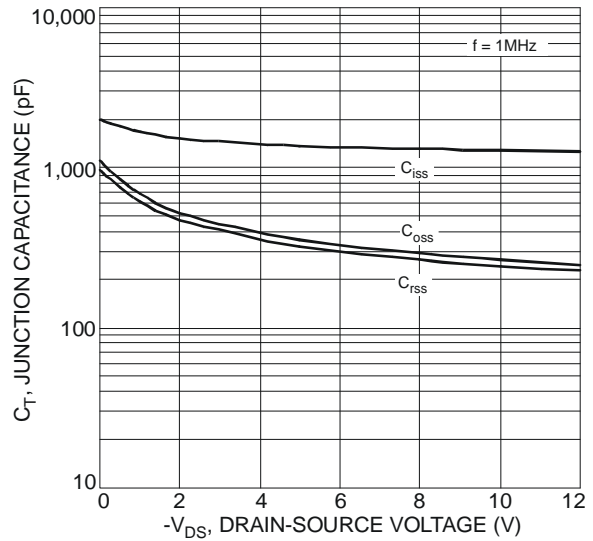


Fig. 10 Typical Junction Capacitance

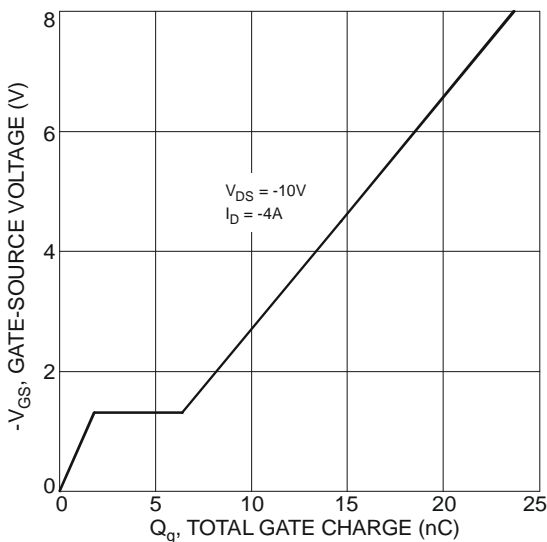


Fig. 11 Gate-Charge Characteristics

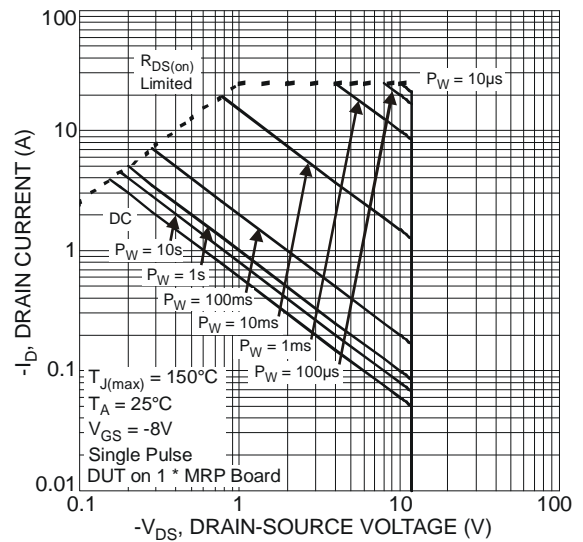


Fig. 12 SOA, Safe Operation Area

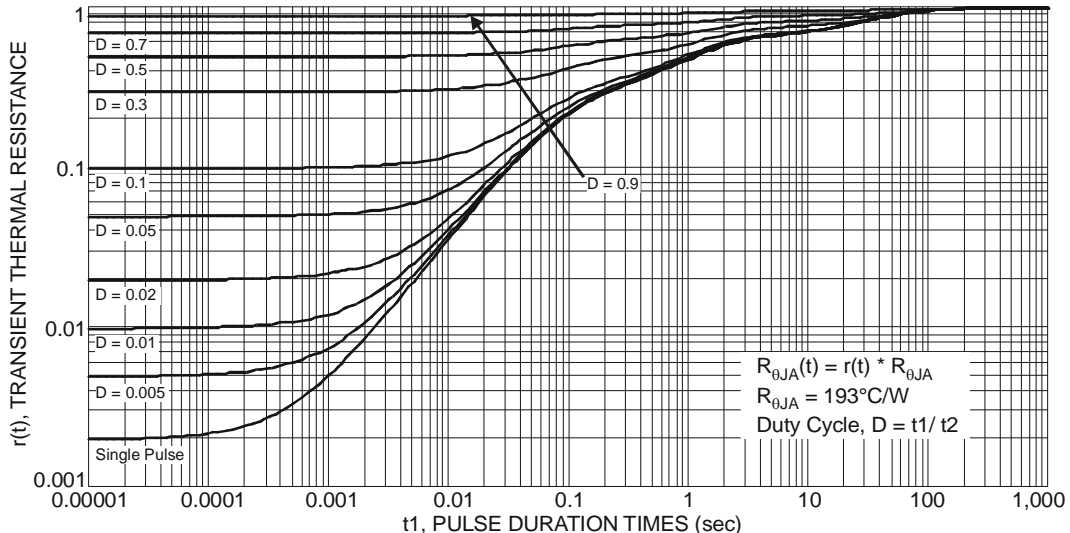
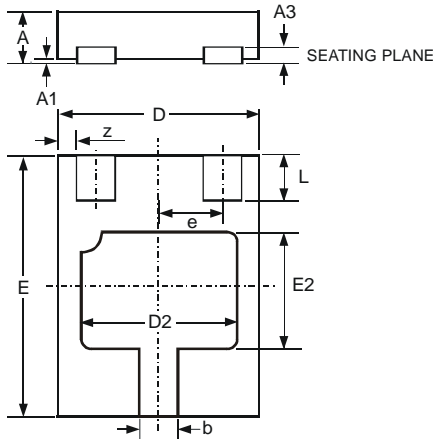


Fig. 13 Transient Thermal Resistance

**Package Outline Dimensions**

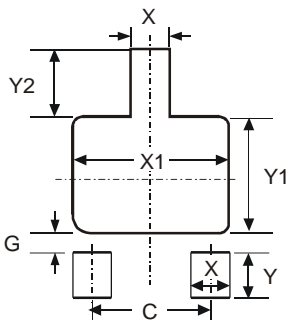
Please see AP02002 at <http://www.diodes.com/datasheets/ap02002.pdf> for latest version.



X2-DFN2015-3			
Dim	Min	Max	Typ
A	-	0.40	-
A1	0	0.05	0.02
A3	-	-	0.13
b	0.20	0.30	0.25
D	1.45	1.575	1.50
D2	1.00	1.20	1.10
e	-	-	0.50
E	1.95	2.075	2.00
E2	0.70	0.90	0.80
L	0.25	0.35	0.30
z	-	-	0.125
<b>All Dimensions in mm</b>			

**Suggested Pad Layout**

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



Dimensions	Value (in mm)
C	1.00
G	0.15
X	0.31
X1	1.30
Y	0.50
Y1	1.00
Y2	0.65

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