

Product Summary

BV_{DSS}	$R_{DS(ON)}$	Package	I_D $T_A = +25^\circ C$
-50V	8Ω @ $V_{GS} = -5V$	X1-DFN1006-3	-310mA

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

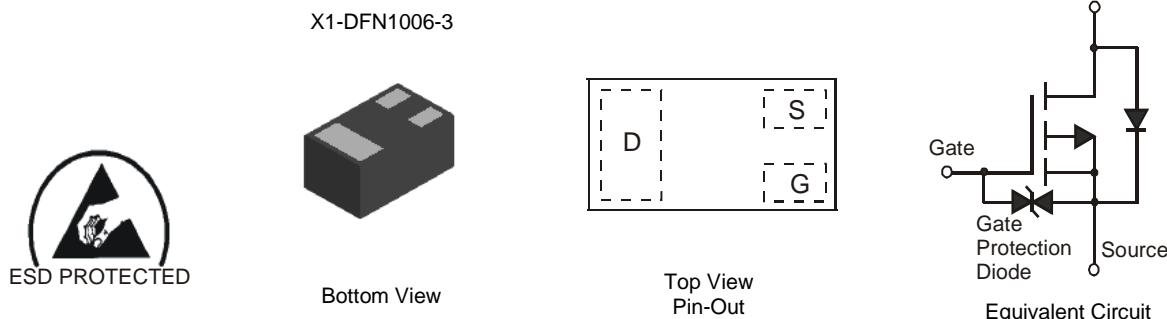
- DC-DC Converters
- Power Management Functions
- Battery Operated Systems and Solid-State Relays
- Drivers: Relays, Solenoids, Lamps, Hammers, Displays, Memories, Transistors, etc.

Features

- Low On-Resistance
- Low Input Capacitance
- Fast Switching Speed
- Low Input/Output Leakage
- **ESD Protected 1kV**
- **Lead-Free Finish; RoHS Compliant (Notes 1 & 2)**
- **Halogen and Antimony Free. "Green" Device (Note 3)**
- **Qualified to AEC-Q101 Standards for High Reliability**

Mechanical Data

- Case: X1-DFN1006-3
- Case Material: Molded Plastic, "Green" Molding Compound; UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminals: Finish - NiPdAu. Solderable per MIL-STD-202, Method 208 (E4)
- Weight: 0.001 grams (Approximate)



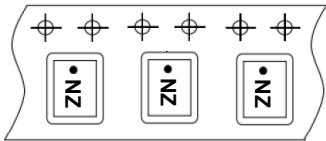
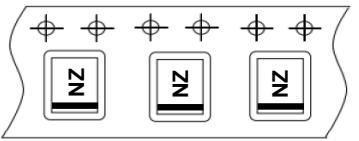
Ordering Information (Note 4)

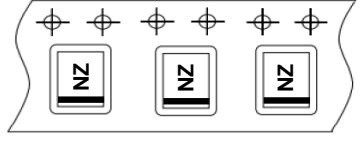
Part Number	Case	Packaging
DMP58D0LFB-7	X1-DFN1006-3	3,000 / Tape & Reel
DMP58D0LFB-7B	X1-DFN1006-3	10,000 / Tape & Reel

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 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

DMP58D0LFB-7	 Top View Dot Denotes Drain Side	From date code 1527 (YYWW), this changes to:	 Top View Bar Denotes Gate and Source Side
			

DMP58D0LFB-7B	 Top View Bar Denotes Gate and Source Side	NZ = Part Marking Code
		

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

Characteristic			Symbol	Value	Unit
Drain-Source Voltage			V_{DSS}	-50	V
Gate-Source Voltage			V_{GSS}	± 20	V
Continuous Drain Current (Note 5) $V_{GS} = -5\text{V}$	Steady State	$T_A = +25^\circ\text{C}$ $T_A = +70^\circ\text{C}$	I_D	-180 -150	mA
Continuous Drain Current (Note 6) $V_{GS} = -5\text{V}$	Steady State	$T_A = +25^\circ\text{C}$ $T_A = +70^\circ\text{C}$	I_D	-310 -250	mA
Pulsed Drain Current (Note 7)			I_{DM}	-500	mA

Thermal Characteristics

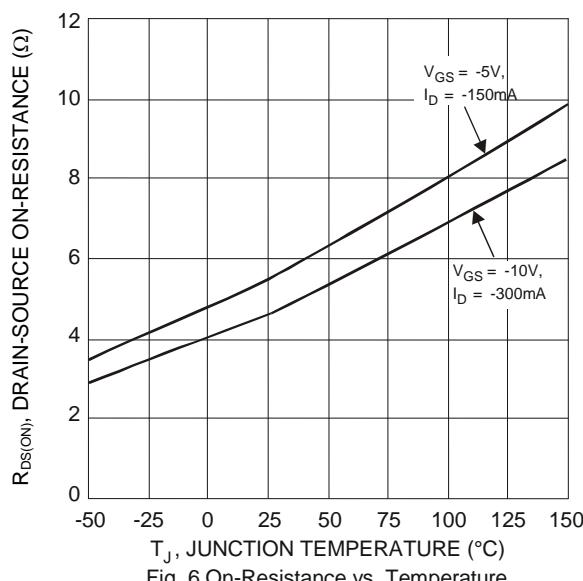
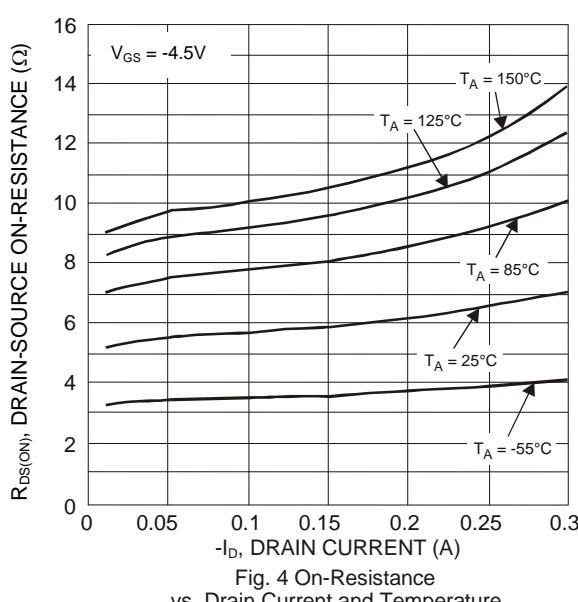
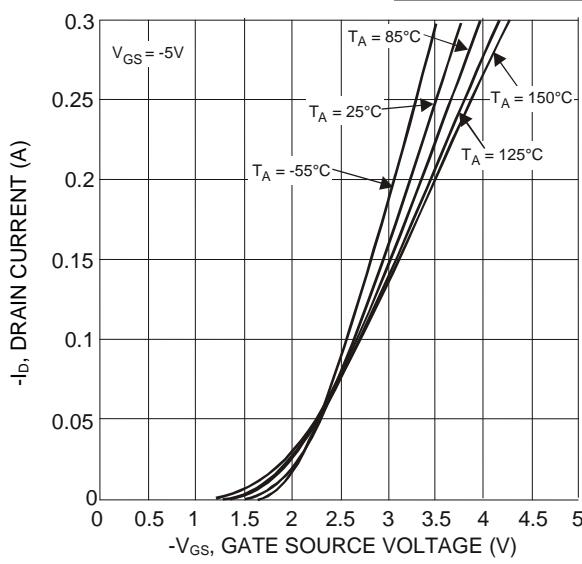
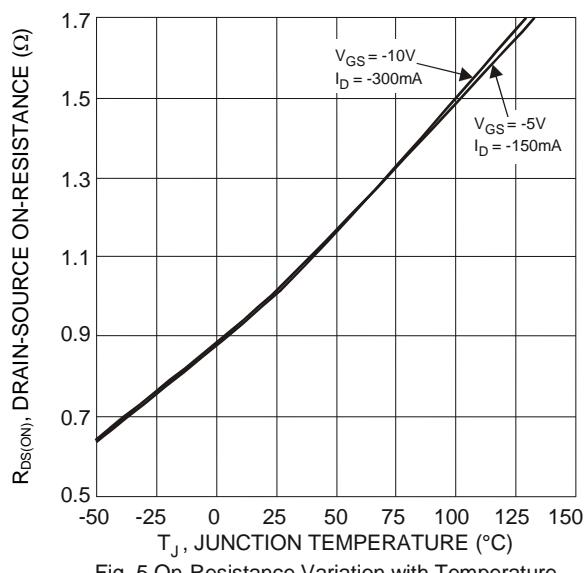
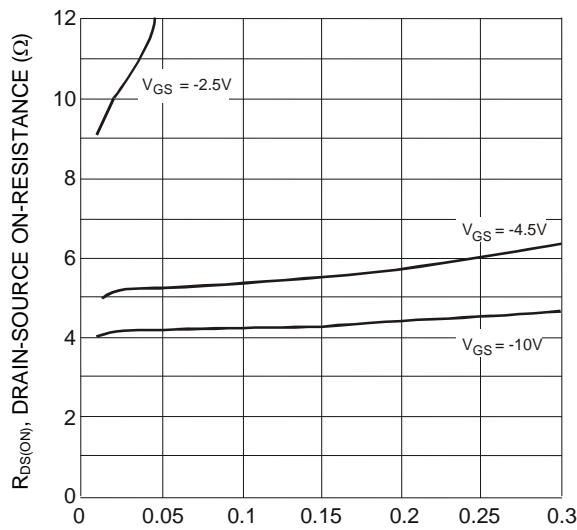
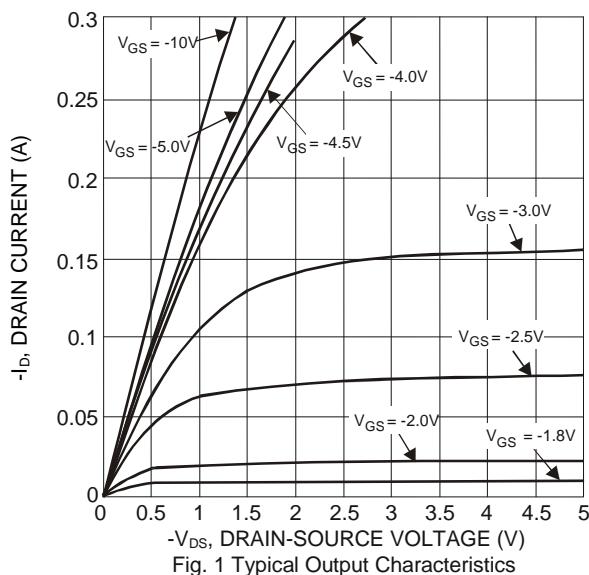
Characteristic		Symbol	Max	Unit
Power Dissipation (Note 5)		P_D	0.47	W
Thermal Resistance, Junction to Ambient @ $T_A = +25^\circ\text{C}$ (Note 5)		$R_{\theta JA}$	258	$^\circ\text{C}/\text{W}$
Power Dissipation (Note 6)		P_D	1.22	W
Thermal Resistance, Junction to Ambient @ $T_A = +25^\circ\text{C}$ (Note 6)		$R_{\theta JA}$	105	$^\circ\text{C}/\text{W}$
Operating and Storage Temperature Range		T_J, T_{STG}	-55 to +150	$^\circ\text{C}$

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}	-50	—	—	V	$\text{V}_{\text{GS}} = 0\text{V}$, $\text{I}_D = -250\mu\text{A}$
Zero Gate Voltage Drain Current $T_J = +25^\circ\text{C}$	I_{DSS}	—	—	-1.0	μA	$\text{V}_{\text{DS}} = -50\text{V}$, $\text{V}_{\text{GS}} = 0\text{V}$
Gate-Source Leakage	I_{GSS}	—	—	± 5	μA	$\text{V}_{\text{GS}} = \pm 20\text{V}$, $\text{V}_{\text{DS}} = 0\text{V}$
ON CHARACTERISTICS (Note 8)						
Gate Threshold Voltage	$\text{V}_{\text{GS(TH)}}$	-0.8	—	-2.1	V	$\text{V}_{\text{DS}} = \text{V}_{\text{GS}}$, $\text{I}_D = -250\mu\text{A}$
Static Drain-Source On-Resistance	$\text{R}_{\text{DS(ON)}}$	—	6	8	Ω	$\text{V}_{\text{GS}} = -5\text{V}$, $\text{I}_D = -100\text{mA}$
		—	12	18	Ω	$\text{V}_{\text{GS}} = -2.5\text{V}$, $\text{I}_D = -10\text{mA}$
Forward Transfer Admittance	$ \text{Y}_{\text{fs}} $	0.05	—	—	S	$\text{V}_{\text{DS}} = -25\text{V}$, $\text{I}_D = -100\text{mA}$
DYNAMIC CHARACTERISTICS (Note 9)						
Input Capacitance	C_{iss}	—	27	—	pF	$\text{V}_{\text{DS}} = -25\text{V}$, $\text{V}_{\text{GS}} = 0\text{V}$, $f = 1.0\text{MHz}$
Output Capacitance	C_{oss}	—	4.0	—		
Reverse Transfer Capacitance	C_{rss}	—	1.4	—		
Turn-On Delay Time	$\text{t}_{\text{D(ON)}}$	—	30.7	—	ns	$\text{V}_{\text{GS}} = -4.5\text{V}$, $\text{V}_{\text{DS}} = -30\text{V}$, $\text{R}_G = 50\Omega$, $\text{I}_D = -10\text{mA}$
Turn-On Rise Time	t_R	—	84.1	—		
Turn-Off Delay Time	$\text{t}_{\text{D(OFF)}}$	—	201.8	—		
Turn-Off Fall Time	t_F	—	32.2	—		

Notes:

- 5. Device mounted on FR-4 substrate PC board, 2oz copper, with minimum recommended pad layout.
- 6. Device mounted on FR-4 substrate PC board, 2oz copper, with thermal vias to bottom layer 1inch square copper plate.
- 7. Repetitive rating, pulse width limited by junction temperature.
- 8. Short duration pulse test used to minimize self-heating effect.
- 9. Guaranteed by design. Not subject to production testing.



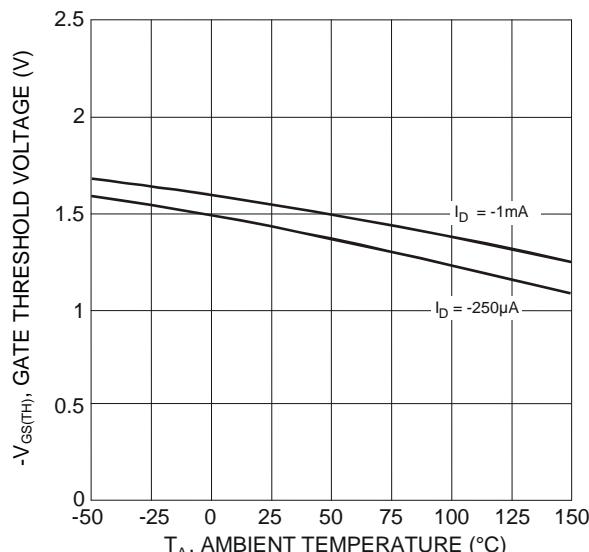


Fig. 7 Gate Threshold Variation vs. Ambient Temperature

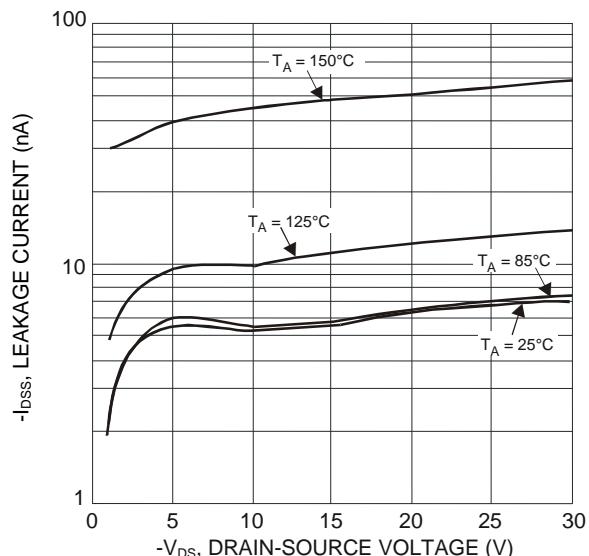


Fig. 9 Typical Drain-Source Leakage Current vs. Voltage

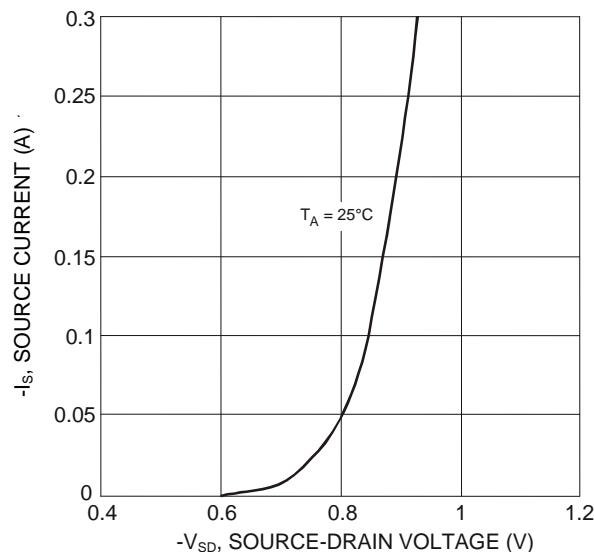


Fig. 8 Diode Forward Voltage vs. Current

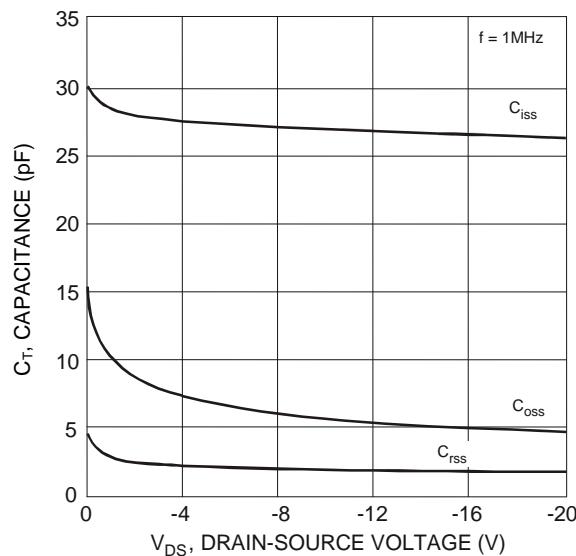


Fig. 10 Typical Junction Capacitance

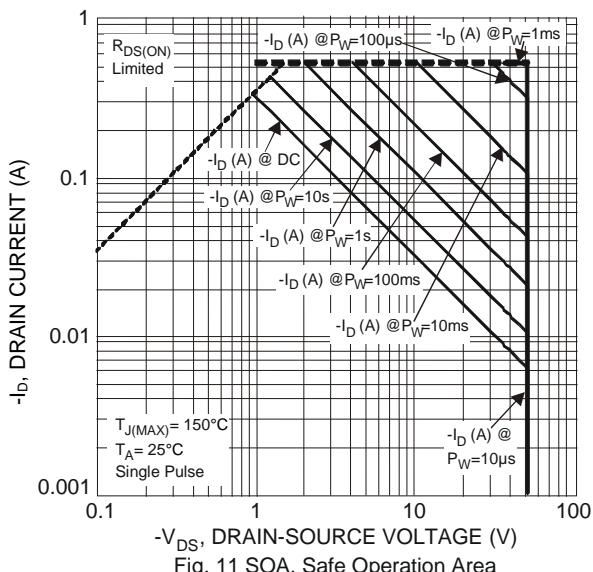
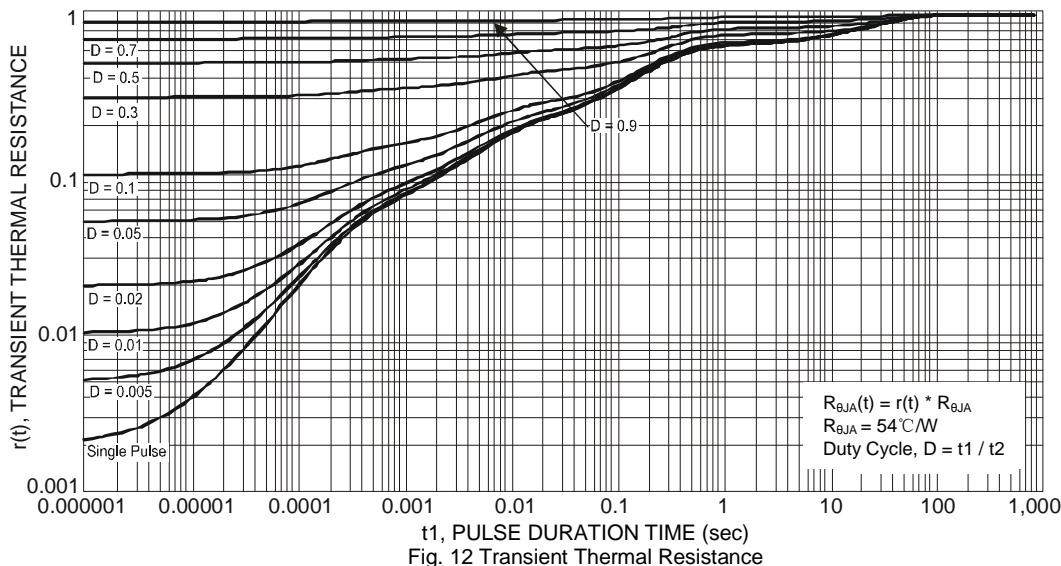


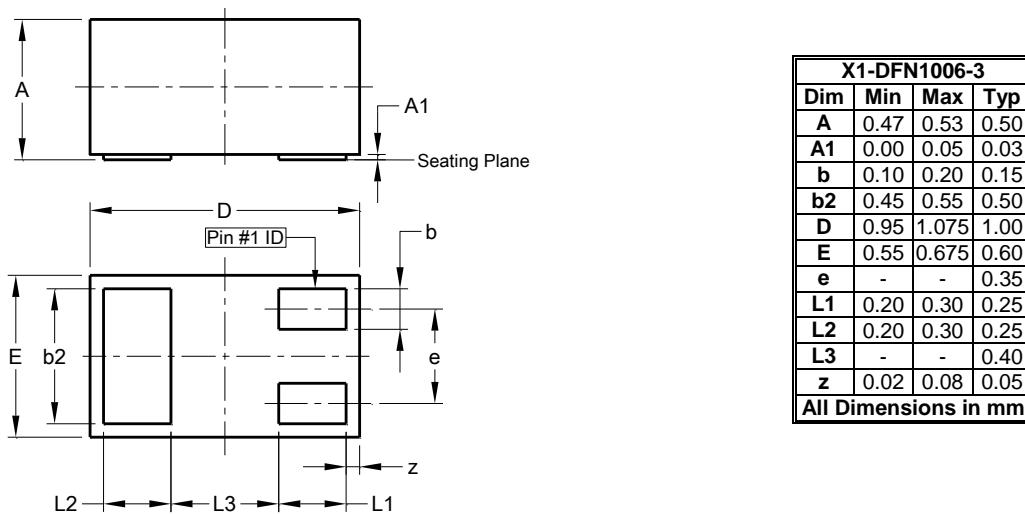
Fig. 11 SOA, Safe Operation Area



Package Outline Dimensions

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

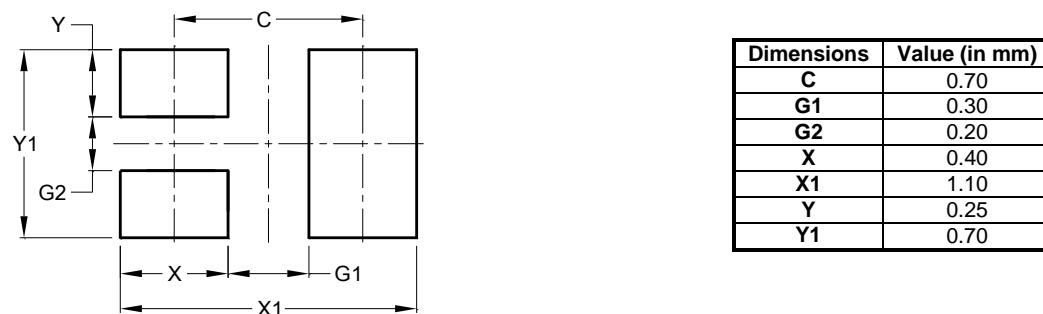
X1-DFN1006-3



Suggested Pad Layout

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

X1-DFN1006-3



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