Product Summary

Device	BV_{DSS}	$R_{DS(ON)}$ max	I_D max T_A = +25°C
NMOS	20V	0.99Ω @ V_{GS} = 4.5V	455mA
		1.2Ω @ V_{GS} = 2.5V	414mA
		1.8Ω @ V_{GS} = 1.8V	338mA
		2.4Ω @ V_{GS} = 1.5V	292mA

Features and Benefits

- Low On-Resistance
- Very Low Gate Threshold Voltage, 1.0V max
- Low Input Capacitance
- Fast Switching Speed
- Ultra-Small Surface Mount Package 0.8mm x 0.6mm
- **ESD Protected Gate**
- **Totally Lead-Free & Fully RoHS Compliant (Notes 1 & 2)**
- **Halogen and Antimony Free. "Green" Device (Note 3)**

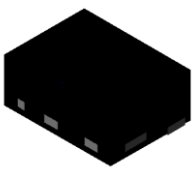
Description and Applications

This 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.

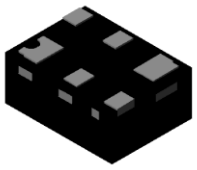
- General Purpose Interfacing Switch
- Power Management Functions
- Analog Switch

Mechanical Data

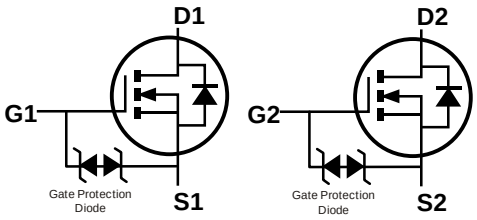
- Case: X2-DFN0806-6
- Case Material: Molded Plastic, "Green" Molding Compound. UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminals: Finish – Matte Tin Annealed over Copper Leadframe. Solderable per MIL-STD-202, Method 208 e3
- Weight: 0.001 grams (Approximate)



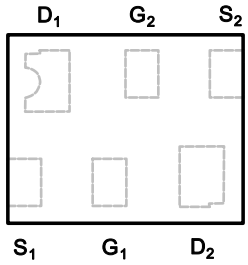
Top View



Bottom View



Device Symbol



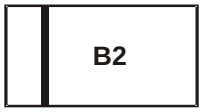
Pin Configuration
Top View

Ordering Information (Note 4)

Part Number	Case	Packaging
DMN21D1UDA-7B	X2-DFN0806-6	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/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



Top View

B2 = Product Type Marking Code

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Maximum Ratings N-CHANNEL (@T_A = +25°C, unless otherwise specified.)

Characteristic			Symbol	Value	Unit
Drain-Source Voltage			V_{DSS}	20	V
Gate-Source Voltage			V_{GSS}	±8	V
Continuous Drain Current (Note 5)	Steady State	T_A = +25°C T_A = +70°C	I_D	455 365	mA
Pulsed Drain Current (Note 6)			I_{DM}	1500	mA

Thermal Characteristics (@T_A = +25°C, unless otherwise specified.)

Characteristic		Symbol	Value	Unit
Total Power Dissipation (Note 5)		P_D	310	mW
Thermal Resistance, Junction to Ambient (Note 5)	Steady State	$R_{\theta JA}$	405	°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 minimum recommended pad layout test board, 10µs pulse duty cycle = 1%.

Electrical Characteristics N-CHANNEL (@T_A = +25°C, unless otherwise specified.)

Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
OFF CHARACTERISTICS (Note 7)						
Drain-Source Breakdown Voltage	BV_{DSS}	20	—	—	V	V_{GS} = 0V, I_D = 250µA
Zero Gate Voltage Drain Current @T_C = +25°C	I_{DSS}	—	—	1	µA	V_{DS} = 16V, V_{GS} = 0V
Gate-Source Leakage	I_{GSS}	—	—	±10	µA	V_{GS} = ±5V, V_{DS} = 0V
ON CHARACTERISTICS (Note 7)						
Gate Threshold Voltage	$V_{GS(TH)}$	0.4	0.75	1.0	V	V_{DS} = V_{GS}, I_D = 250µA
Static Drain-Source On-Resistance	$R_{DS(ON)}$	—	0.5	0.99	Ω	V_{GS} = 4.5V, I_D = 100mA
		—	0.6	1.2		V_{GS} = 2.5V, I_D = 50mA
		—	0.8	1.8		V_{GS} = 1.8V, I_D = 20mA
		—	1.0	2.4		V_{GS} = 1.5V, I_D = 10mA
		—	2.0	—		V_{GS} = 1.2V, I_D = 1mA
Diode Forward Voltage	V_{SD}	—	0.6	1.0	V	V_{GS} = 0V, I_S = 10mA
DYNAMIC CHARACTERISTICS (Note 8)						
Input Capacitance	C_{iss}	—	31	—	pF	V_{DS} = 15V, V_{GS} = 0V, f = 1.0MHz
Output Capacitance	C_{oss}	—	3.6	—	pF	
Reverse Transfer Capacitance	C_{rss}	—	2.6	—	pF	
Gate Resistance	R_G	—	113	—	Ω	V_{DS} = 0V, V_{GS} = 0V, f = 1.0MHz
Total Gate Charge	Q_g	—	0.41	—	nC	V_{GS} = 4.5V, V_{DS} = 10V, I_D = 250mA
Gate-Source Charge	Q_{gs}	—	0.06	—	nC	
Gate-Drain Charge	Q_{gd}	—	0.05	—	nC	
Turn-On Delay Time	$t_{D(ON)}$	—	4.5	—	ns	V_{DD} = 15V, V_{GS} = 4.5V, R_G = 2Ω, I_D = 200mA
Turn-On Rise Time	t_R	—	3.4	—	ns	
Turn-Off Delay Time	$t_{D(OFF)}$	—	24	—	ns	
Turn-Off Fall Time	t_F	—	12	—	ns	

Notes: 7. Short duration pulse test used to minimize self-heating effect.
8. Guaranteed by design. Not subject to product testing.

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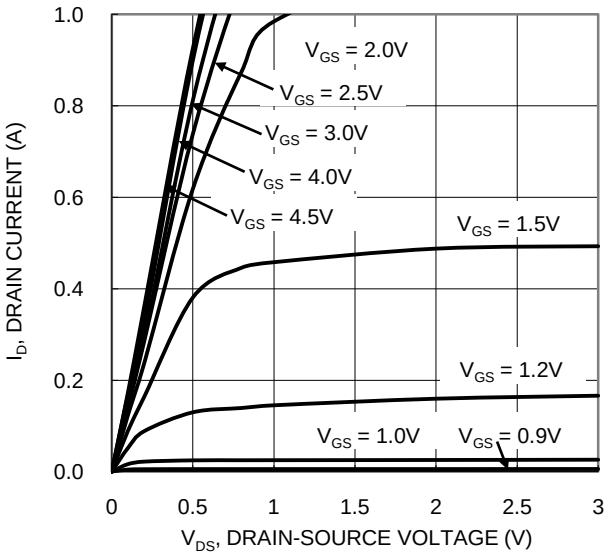

Figure 1. Typical Output Characteristic

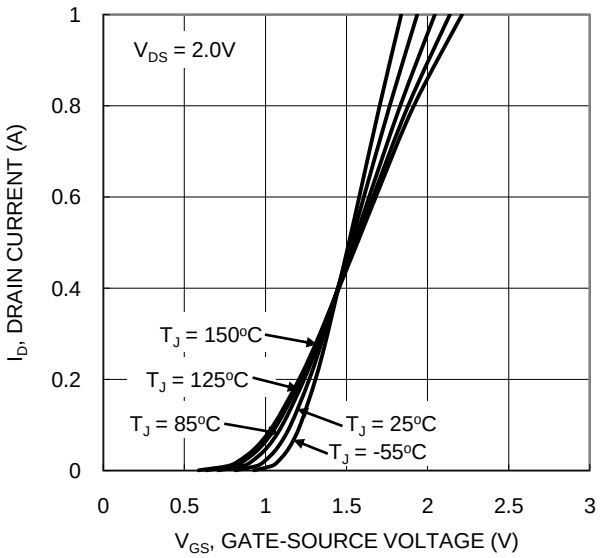

Figure 2. Typical Transfer Characteristic

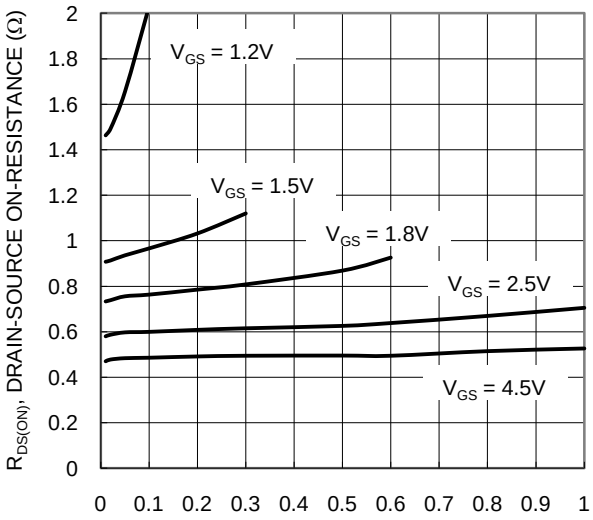

Figure 3. Typical On-Resistance vs. Drain Current and Gate Voltage

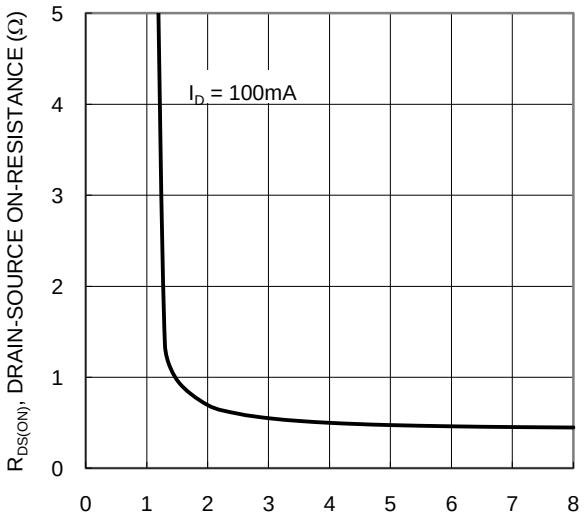

Figure 4. Typical Transfer Characteristic

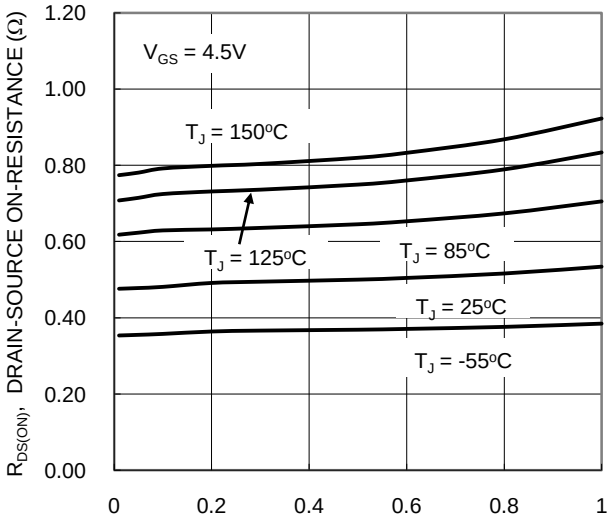

Figure 5. Typical On-Resistance vs. Drain Current and Temperature

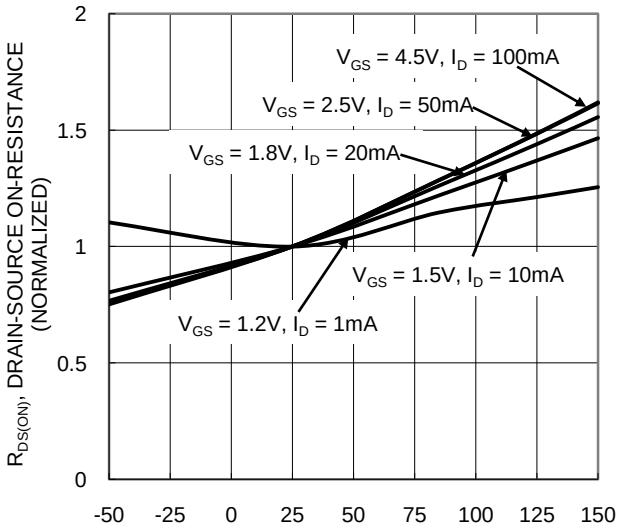

Figure 6. On-Resistance Variation with Temperature

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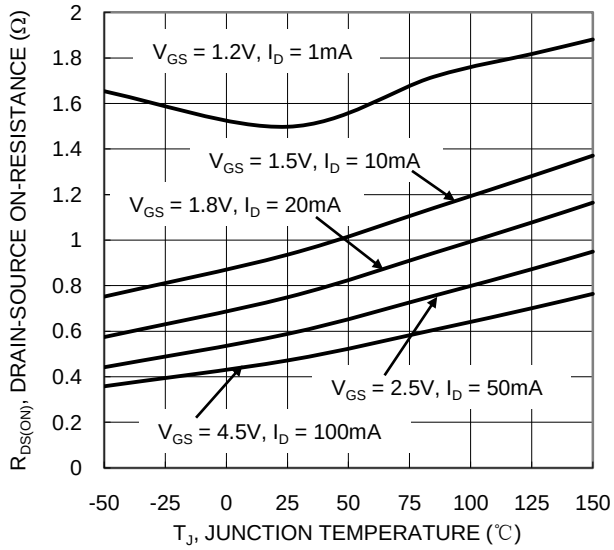

Figure 7. On-Resistance Variation with Temperature

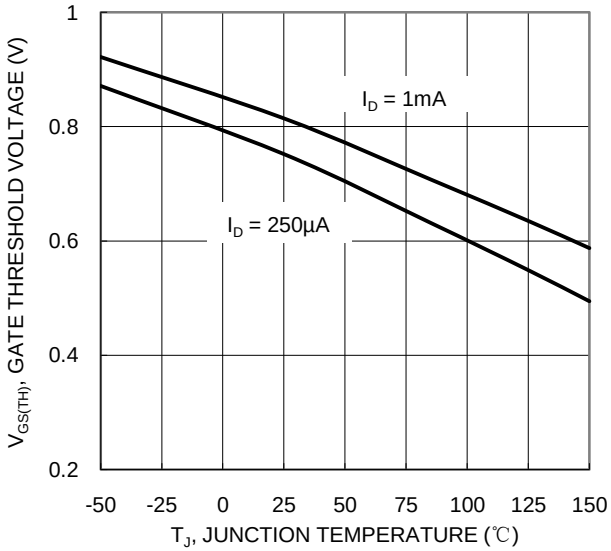

Figure 8. Gate Threshold Variation vs. Junction Temperature

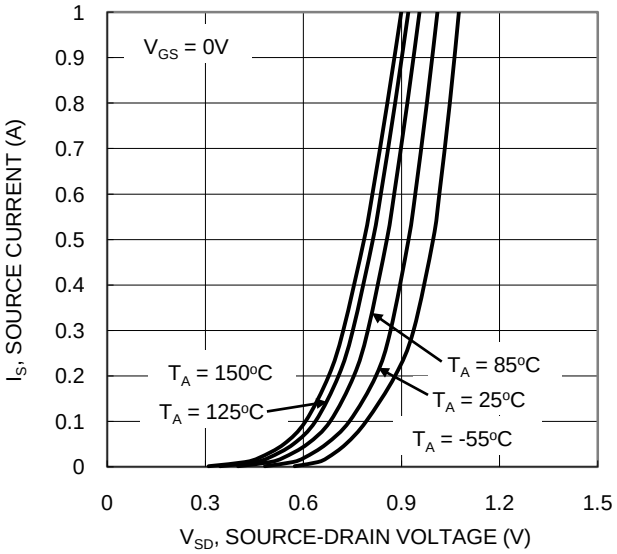

Figure 9. Diode Forward Voltage vs. Current

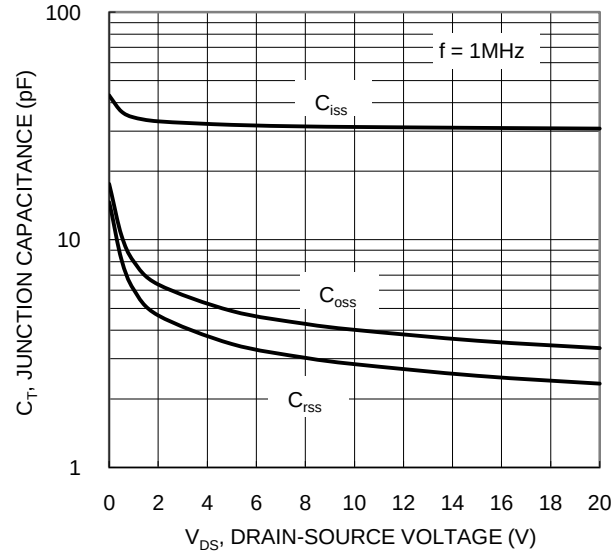

Figure 10. Typical Junction Capacitance

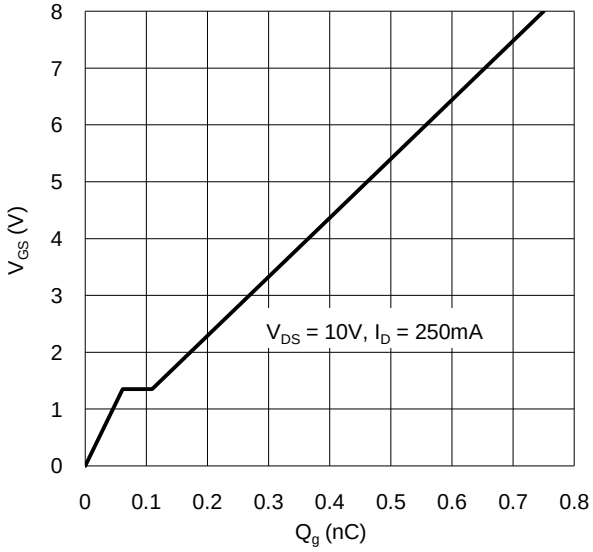

Figure 11. Gate Charge

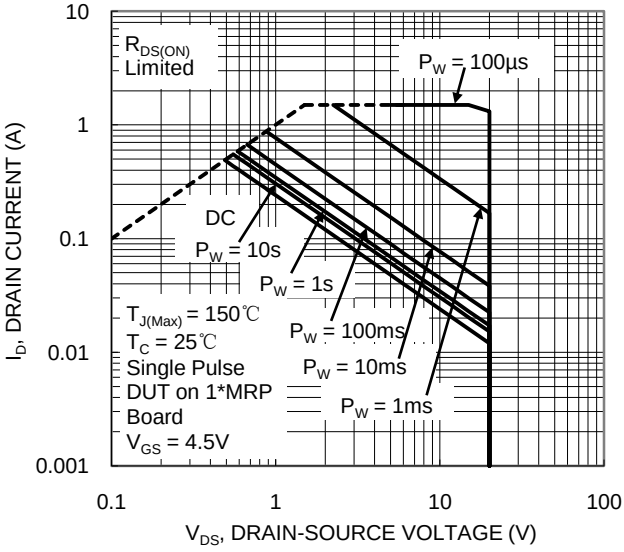

Figure 12. SOA, Safe Operation Area

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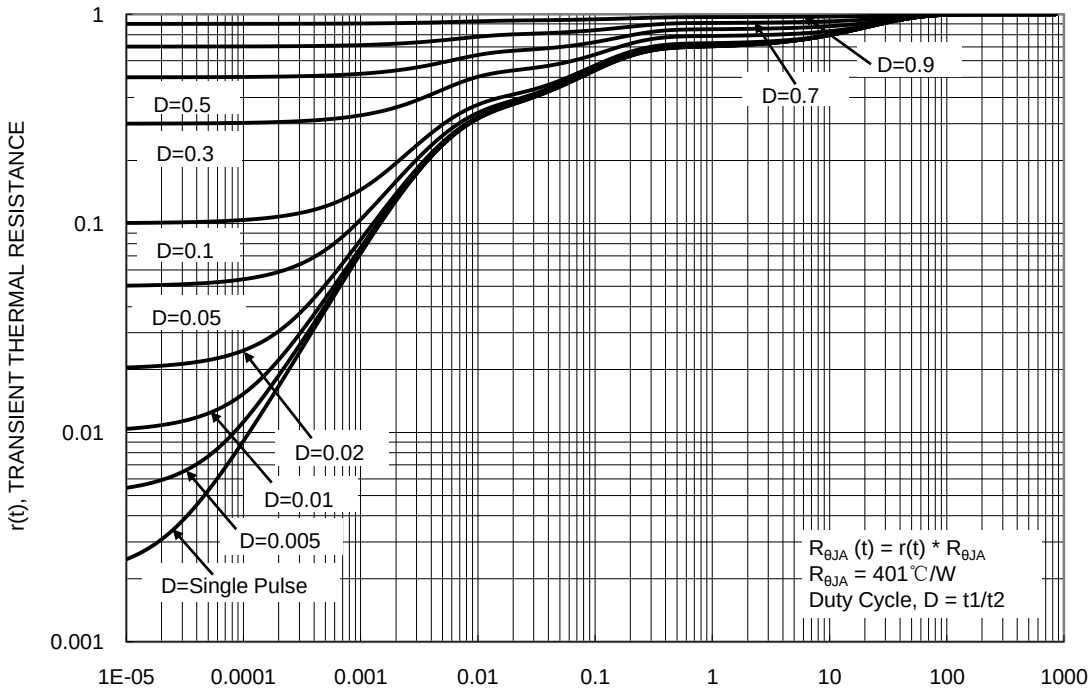

Figure 13. Transient Thermal Resistance

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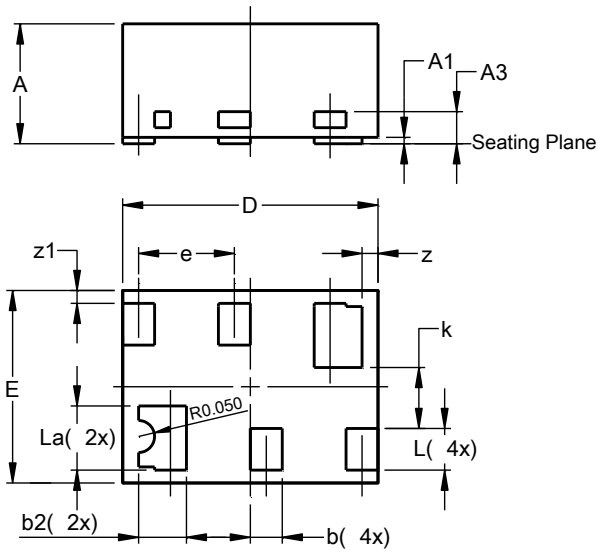
Package Outline Dimensions

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

X2-DFN0806-6

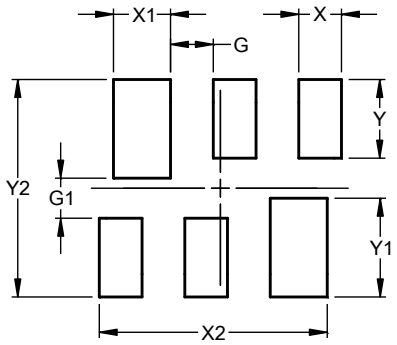


X2-DFN0806-6			
Dim	**Min**	**Max**	**Typ**
A	--	0.40	0.36
A1	0.00	0.03	0.02
A3	--	--	0.10
b	0.07	0.15	0.10
b2	0.10	0.20	0.15
D	0.75	0.85	0.80
E	0.55	0.65	0.60
e	--	--	0.30
k	--	--	0.19
L	0.10	0.18	0.13
La	0.17	0.25	0.20
z	--	--	0.05
z1	--	--	0.04
All Dimensions in mm			

Suggested Pad Layout

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

X2-DFN0806-6



Dimensions	Value (in mm)
G	0.150
G1	0.140
X	0.150
X1	0.200
X2	0.800
Y	0.275
Y1	0.345
Y2	0.760

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