

Product Summary

BV_{DSS}	$R_{DS(ON)}$ Max	I_D Max $T_A = +25^\circ\text{C}$
20V	$0.99\Omega @ V_{GS} = 4.5V$	0.45A
	$1.2\Omega @ V_{GS} = 2.5V$	0.40A
	$1.8\Omega @ V_{GS} = 1.8V$	0.34A
	$2.4\Omega @ V_{GS} = 1.5V$	0.30A

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.

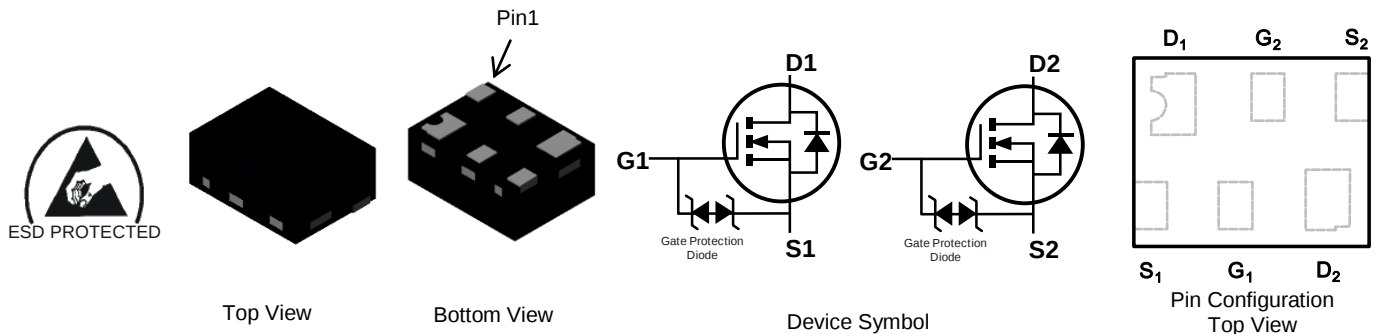
- General Purpose Interfacing Switch
- Power Management Functions
- Analog Switch

Features and Benefits

- Low On-Resistance
- Very Low Gate Threshold Voltage, 1.0V Maximum
- 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 (Note 1 & 2)**
- **Halogen and Antimony Free. "Green" Device (Note 3)**

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 — NiPdAu over Copper Leadframe; Solderable per MIL-STD-202, Method 208 (e4)
- Weight: 0.001 grams (Approximate)

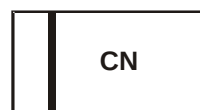


Ordering Information (Note 4)

Part Number	Case	Packaging
DMN2991UDA-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) & 2015/863/EU (RoHS 3) compliant.
 2. See <https://www.diodes.com/quality/lead-free/> 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



Top View

CN = Product Type Marking Code

Maximum Ratings (@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	I _D	0.45	A
		T _A = +70°C		0.36	
Pulsed Drain Current (Note 6)			I _{DM}	1.2	A

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

Characteristic		Symbol	Value	Unit
Total Power Dissipation (Note 5)		P _D	0.31	W
Thermal Resistance, Junction to Ambient (Note 5)	Steady State	R _{θJA}	404	°C/W
Operating and Storage Temperature Range		T _J , T _{STG}	-55 to +150	°C

Electrical Characteristics (@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	0.78	1.0	V	V _{DS} = V _{GS} , I _D = 250μA
Static Drain-Source On-Resistance	R _{DS(ON)}	—	0.47	0.99	Ω	V _{GS} = 4.5V, I _D = 100mA
		—	0.63	1.2		V _{GS} = 2.5V, I _D = 50mA
		—	0.84	1.8		V _{GS} = 1.8V, I _D = 20mA
		—	1.1	2.4		V _{GS} = 1.5V, I _D = 10mA
Diode Forward Voltage	V _{SD}	—	0.6	1.0	V	V _{GS} = 0V, I _S = 10mA
DYNAMIC CHARACTERISTICS (Note 8)						
Input Capacitance	C _{iss}	—	21.5	—	pF	V _{DS} = 16V, V _{GS} = 0V, f = 1.0MHz
Output Capacitance	C _{oss}	—	4.9	—	pF	
Reverse Transfer Capacitance	C _{rss}	—	3.7	—	pF	
Gate Resistance	R _g	—	0.94	—	Ω	V _{DS} = 0V, V _{GS} = 0V, f = 1.0MHz
Total Gate Charge	Q _g	—	0.35	—	nC	V _{GS} = 4.5V, V _{DS} = 10V, I _D = 250mA
Gate-Source Charge	Q _{gs}	—	0.07	—	nC	
Gate-Drain Charge	Q _{gd}	—	0.08	—	nC	
Turn-On Delay Time	t _{D(ON)}	—	5.6	—	ns	V _{DD} = 10V, V _{GS} = 4.5V, R _L = 47Ω, R _g = 10Ω, I _D = 200mA
Turn-On Rise Time	t _R	—	4.9	—	ns	
Turn-Off Delay Time	t _{D(OFF)}	—	60.6	—	ns	
Turn-Off Fall Time	t _F	—	27.6	—	ns	
Reverse Recovery Time	t _{RR}	—	12.3	—	ns	I _F = 1.0A, di/dt = 100A/μs
Reverse Recovery Charge	Q _{RR}	—	1.1	—	nC	I _F = 1.0A, di/dt = 100A/μs

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

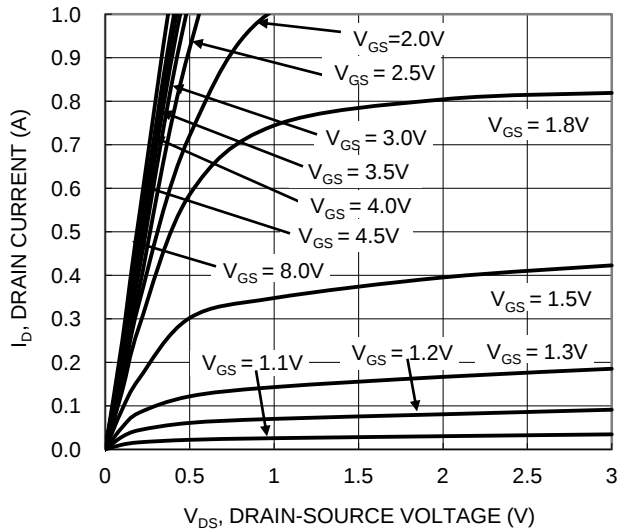


Figure 1. Typical Output Characteristic

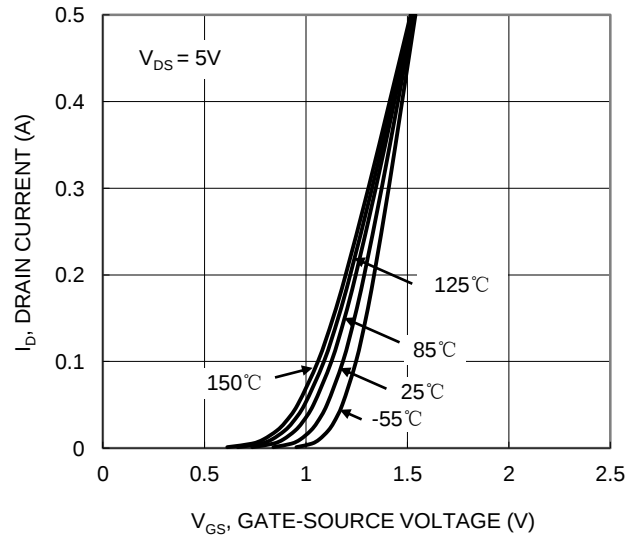


Figure 2. Typical Transfer Characteristic

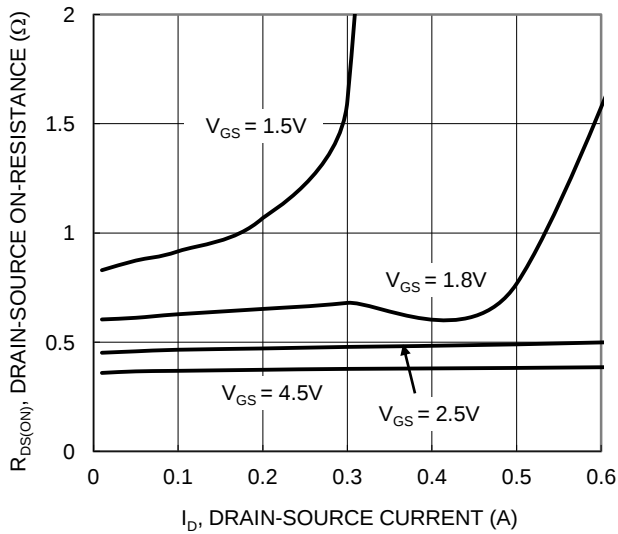


Figure 3. Typical On-Resistance vs. Drain Current and Gate Voltage

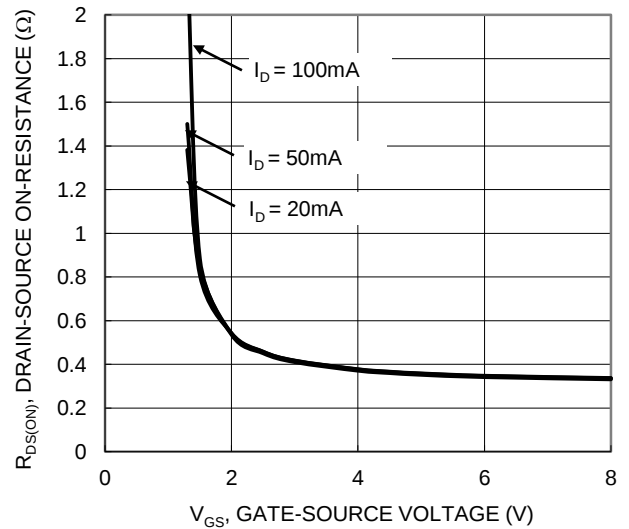


Figure 4. Typical Transfer Characteristic

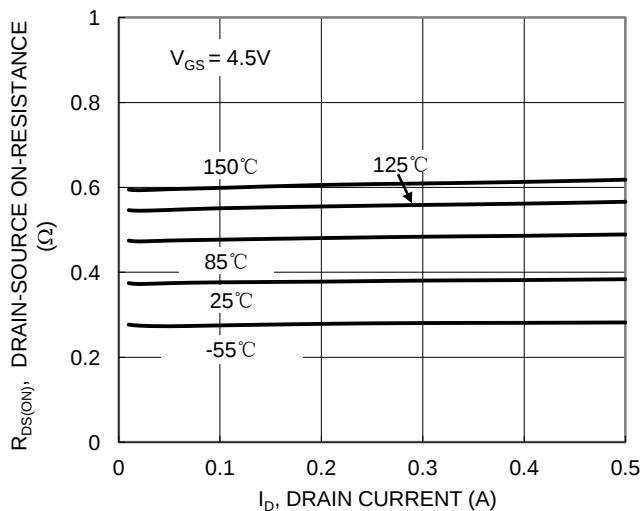


Figure 5. Typical On-Resistance vs. Drain Current and Temperature

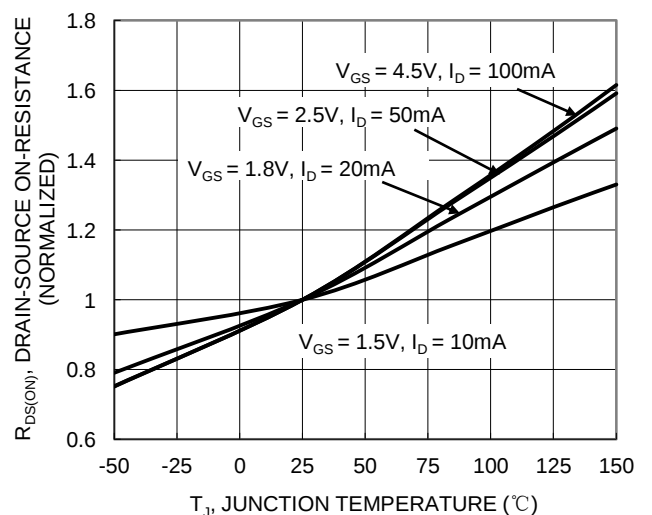
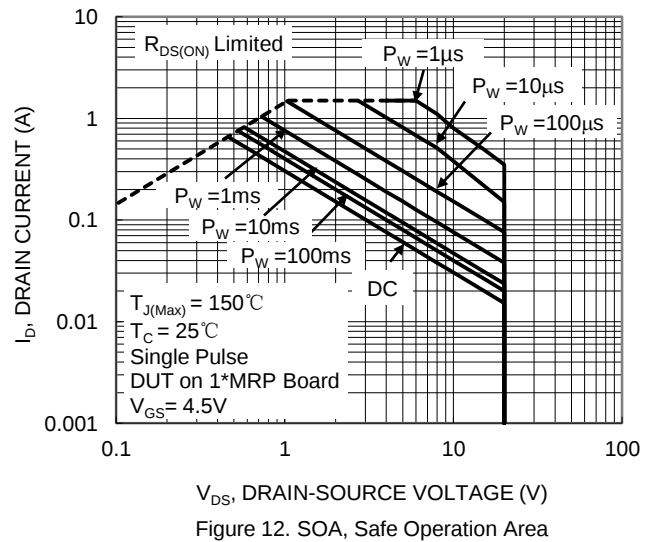
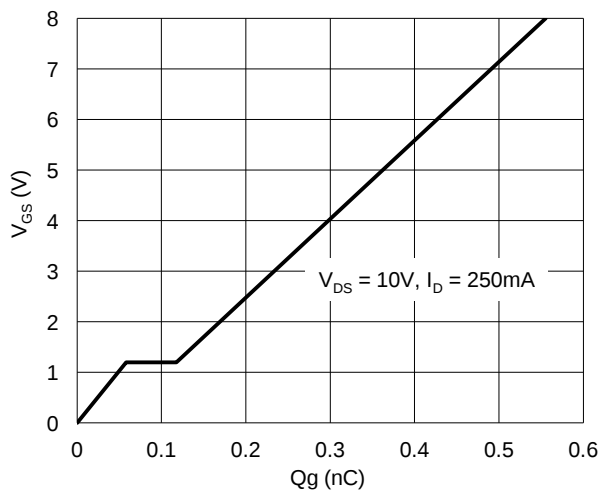
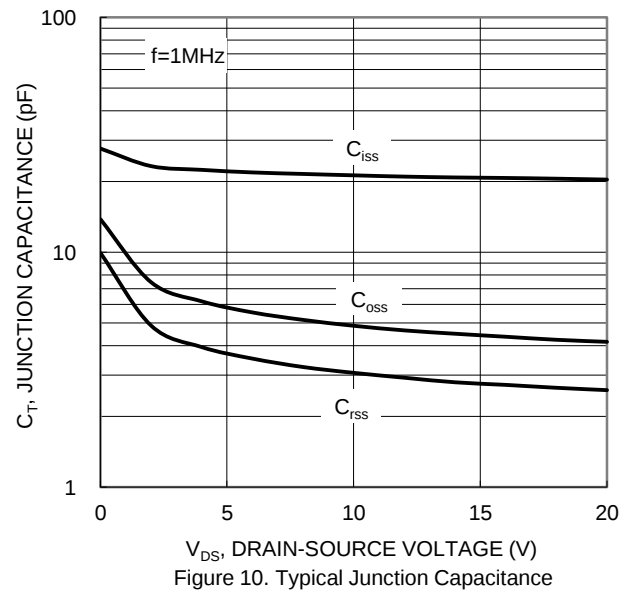
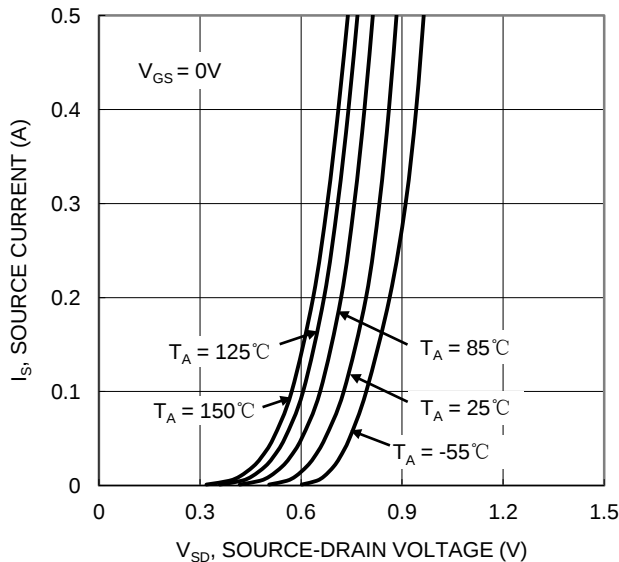
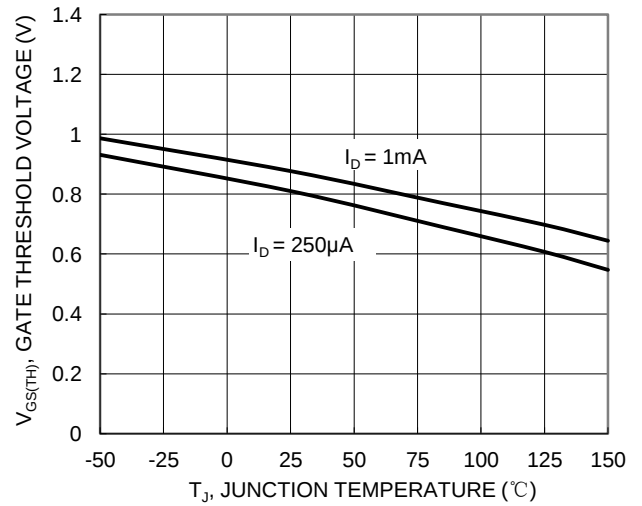
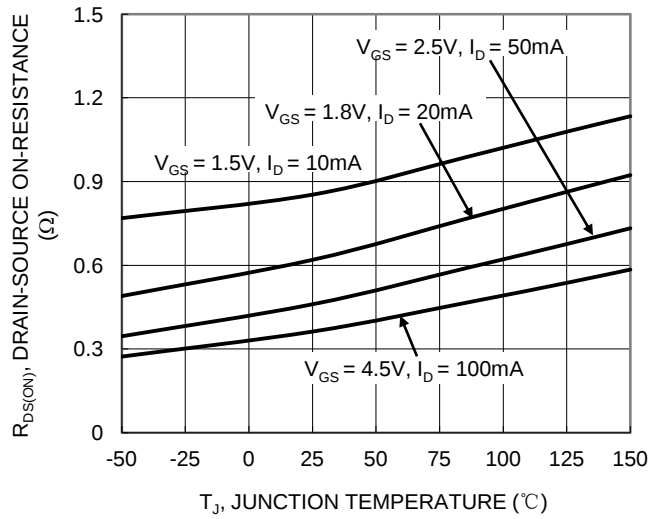


Figure 6. On-Resistance Variation with Temperature



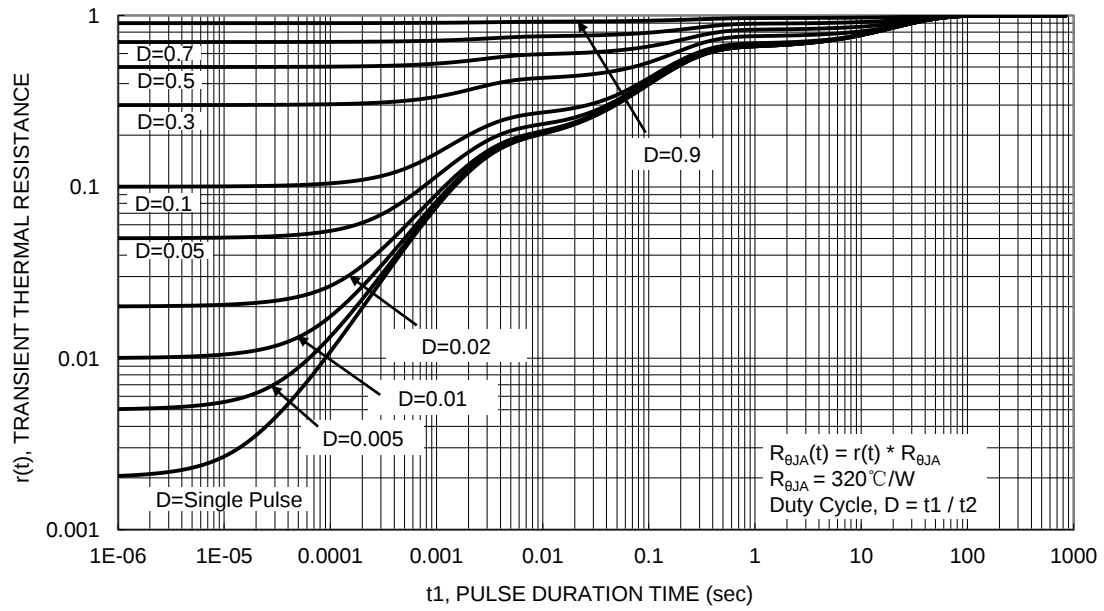
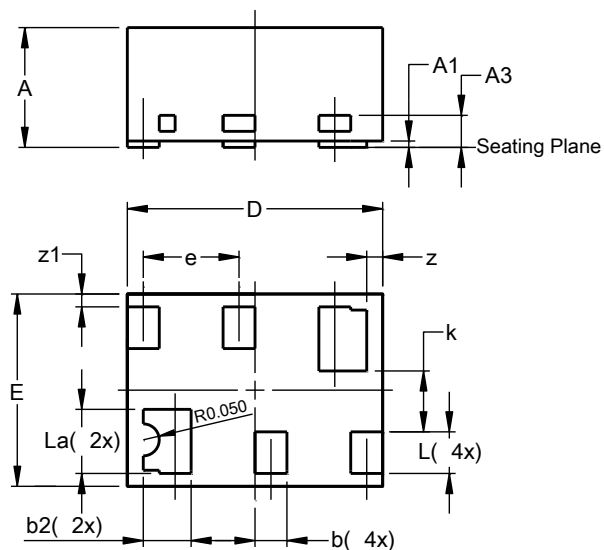


Figure 13. Transient Thermal Resistance

Package Outline Dimensions

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

X2-DFN0806-6

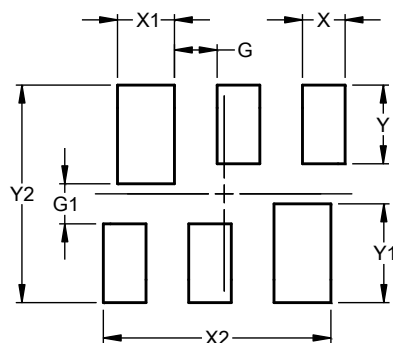


X2-DFN0806-6			
Dim	Min	Max	Typ
A	--	0.40	0.36
A1	0.00	0.03	0.02
A3	--	--	0.10
b	0.07	0.15	0.10
b2	0.10	0.20	0.15
D	0.75	0.85	0.80
E	0.55	0.65	0.60
e	--	--	0.30
k	--	--	0.19
L	0.10	0.18	0.13
La	0.17	0.25	0.20
z	--	--	0.05
z1	--	--	0.04
All Dimensions in mm			

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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