

Product Summary

BV _{bss}	R _{DS(ON)} Max	I _D Max T _A = +25°C
30V	1.5Ω @ V _{GS} = 4.5V	0.41A
	2.0Ω @ V _{GS} = 2.5V	0.36A
	3.0Ω @ V _{GS} = 1.8V	0.29A
	4.5Ω @ V _{GS} = 1.5V	0.24A

Description

This MOSFET has been designed to minimize the on-state resistance (R_{DS(ON)}) yet maintain superior switching performance, making it ideal for high efficiency power management applications.

Applications

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

Features and Benefits

- Low Package Profile, 0.4mm Maximum Package Height
- 0.62mm x 0.62mm Package Footprint
- Low On-Resistance
- Very Low Gate Threshold Voltage, 1.0V Max
- ESD Protected Gate
- **Totally Lead-Free & Fully RoHS Compliant (Notes 1 & 2)**
- **Halogen and Antimony Free. "Green" Device (Note 3)**
- **The DMN31D5UFZQ is suitable for automotive applications requiring specific change control; this part is AEC-Q101 qualified, PPAP capable, and manufactured in IATF 16949 certified facilities.**

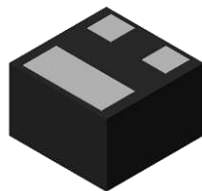
<https://www.diodes.com/quality/product-definitions/>

Mechanical Data

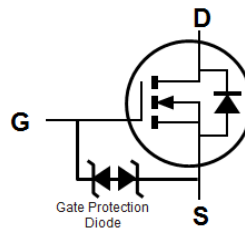
- Case: X2-DFN0606-3
- Case Material: Molded Plastic, "Green" Molding Compound
UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminals: Finish – NiPdAu over Copper Leadframe
Solderable per MIL-STD-202, Method 208 (e4)
- Weight: 0.001 grams (Approximate)



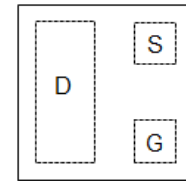
ESD PROTECTED



Bottom View



Equivalent Circuit



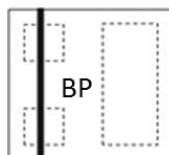
Top View
Package Pin Configuration

Ordering Information (Note 4)

Part Number	Case	Packaging
DMN31D5UFZQ-7B	X2-DFN0606-3	10K/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
Bar Denotes Gate
and Source Side

BP = Product Type Marking Code

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

Characteristic			Symbol	Value	Unit
Drain-Source Voltage			V _{DSS}	30	V
Gate-Source Voltage			V _{GSS}	±12	V
Continuous Drain Current (Note 5) V _{GS} = 4.5V	Steady State	T _A = +25°C T _A = +85°C	I _D	0.41 0.33	A
Pulsed Drain Current (Note 6)			I _{DM}	0.7	A

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

Characteristic		Symbol	Value	Unit
Total Power Dissipation (Note 5)	Steady State	P _D	0.4	W
Thermal Resistance, Junction to Ambient (Note 5)		R _{θJA}	315	°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}	30	—	—	V	V _{GS} = 0V, I _D = 250μA
Zero Gate Voltage Drain Current	T _C = +25°C	I _{DSS}	—	—	100	nA	V _{DS} = 24V, V _{GS} = 0V
Gate-Source Leakage		I _{GSS}	—	—	±10	μA	V _{GS} = ±10V, V _{DS} = 0V
ON CHARACTERISTICS (Note 7)							
Gate Threshold Voltage		V _{GS(TH)}	0.4	—	1.0	V	V _{DS} = V _{GS} , I _D = 250μA
Static Drain-Source On-Resistance		R _{DS(ON)}	—	1.3	1.5	Ω	V _{GS} = 4.5V, I _D = 100mA
			—	1.6	2.0		V _{GS} = 2.5V, I _D = 50mA
			—	1.8	3.0		V _{GS} = 1.8V, I _D = 20mA
			—	2.0	4.5		V _{GS} = 1.5V, I _D = 10mA
			Diode Forward Voltage		V _{SD}		—
DYNAMIC CHARACTERISTICS (Note 8)							
Input Capacitance		C _{iss}	—	22.6	—	pF	V _{DS} = 15V, V _{GS} = 0V, f = 1.0MHz
Output Capacitance		C _{oss}	—	2.68	—	pF	
Reverse Transfer Capacitance		C _{rss}	—	1.8	—	pF	
Total Gate Charge		Q _g	—	0.38	—	nC	V _{GS} = 4.5V, V _{DS} = 15V, I _D = 200mA
Gate-Source Charge		Q _{gs}	—	0.05	—	nC	
Gate-Drain Charge		Q _{gd}	—	0.07	—	nC	
Turn-On Delay Time		t _{D(ON)}	—	3.2	—	ns	V _{DD} = 15V, V _{GS} = 4.5V, R _G = 2Ω, I _D = 200mA
Turn-On Rise Time		t _R	—	2.2	—	ns	
Turn-Off Delay Time		t _{D(OFF)}	—	21	—	ns	
Turn-Off Fall Time		t _F	—	7.5	—	ns	

- Notes:
- Device mounted on FR-4 PCB, with minimum recommended pad layout.
 - Device mounted on minimum recommended pad layout test board, 10μs pulse duty cycle = 1%.
 - Short duration pulse test used to minimize self-heating effect.
 - Guaranteed by design. Not subject to product testing.

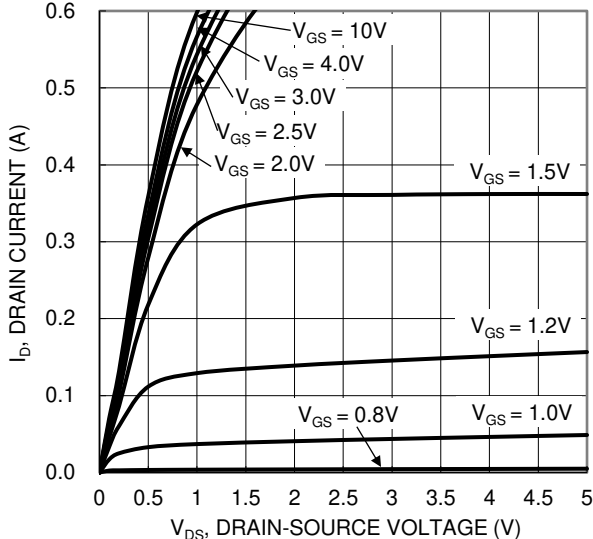


Figure 1. Typical Output Characteristic

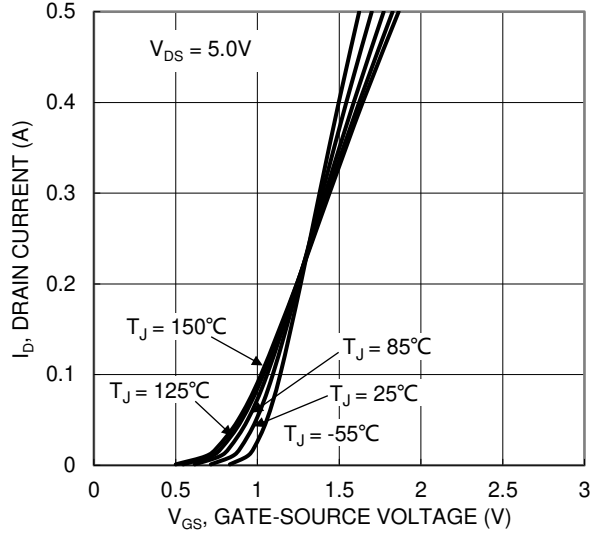


Figure 2. Typical Transfer Characteristic

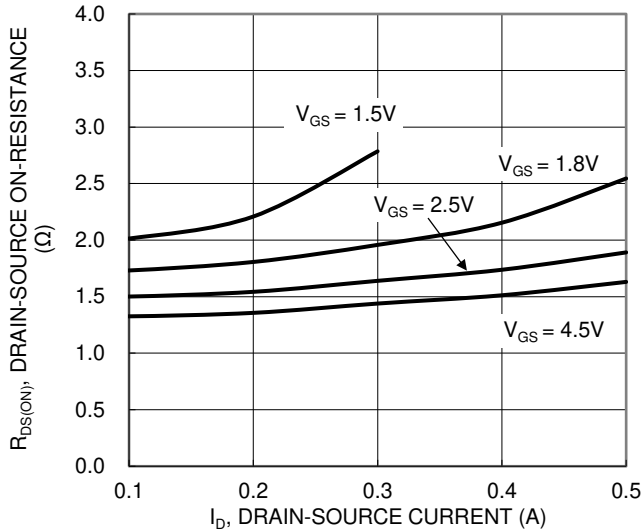


Figure 3. Typical On-Resistance vs. Drain Current and Gate Voltage

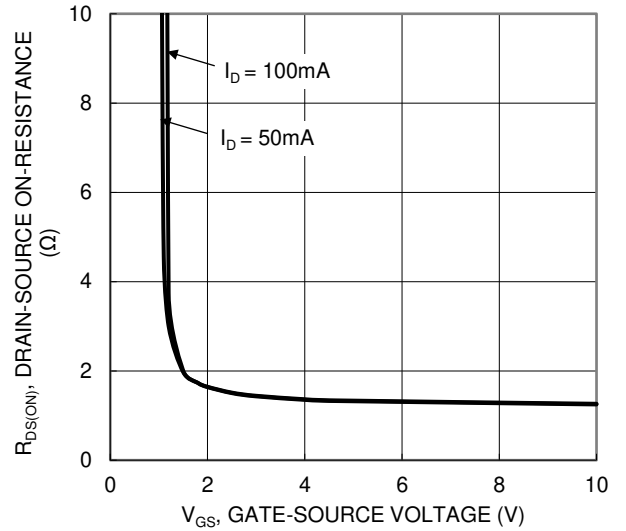


Figure 4. Typical Transfer Characteristic

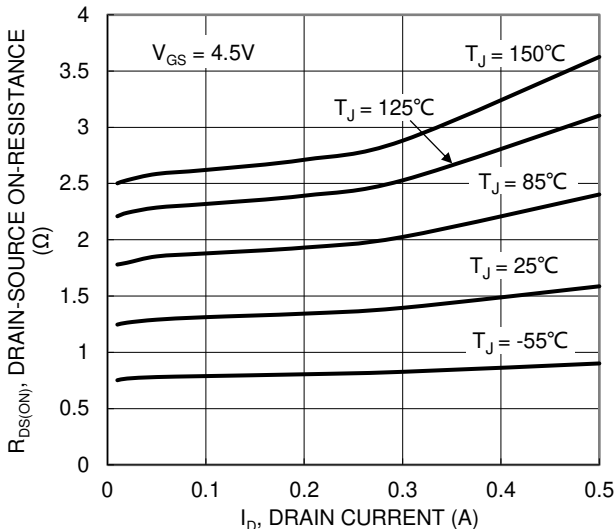


Figure 5. Typical On-Resistance vs. Drain Current and Temperature

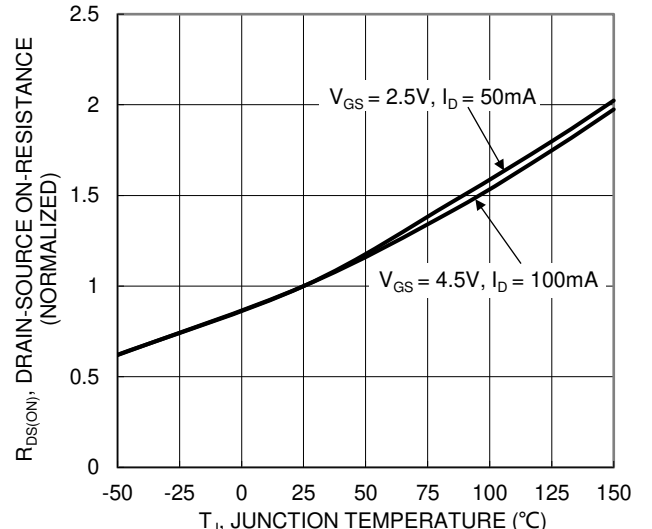


Figure 6. On-Resistance Variation with Temperature

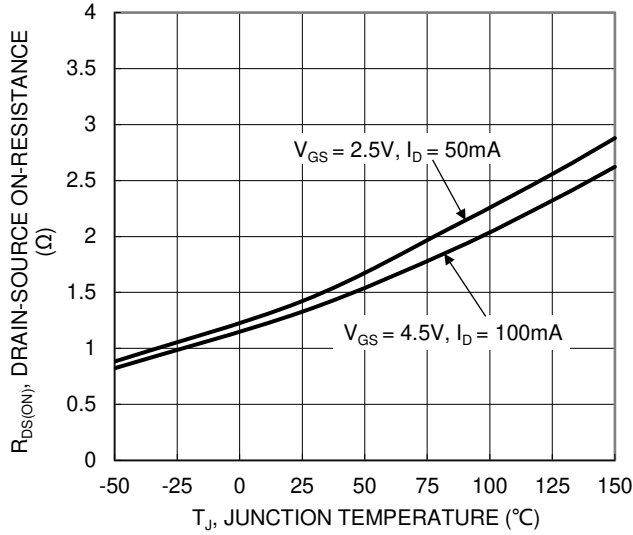


Figure 7. On-Resistance Variation with Temperature

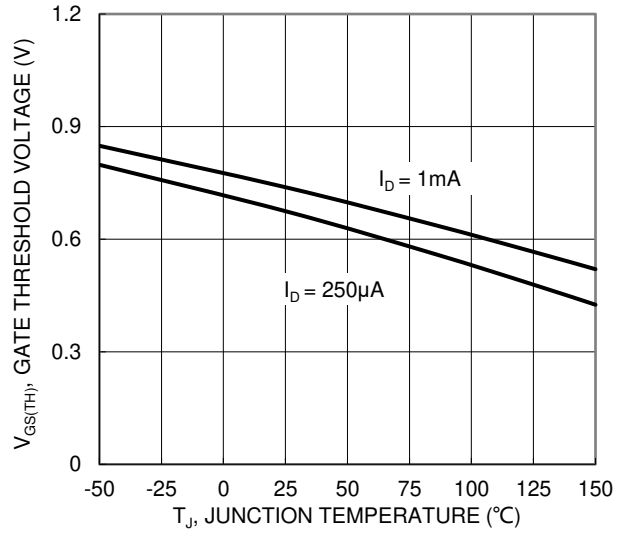


Figure 8. Gate Threshold Variation vs. Junction Temperature

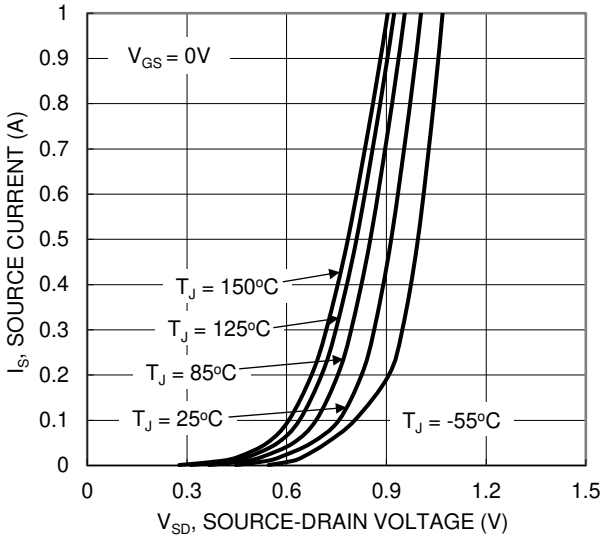


Figure 9. Diode Forward Voltage vs. Current

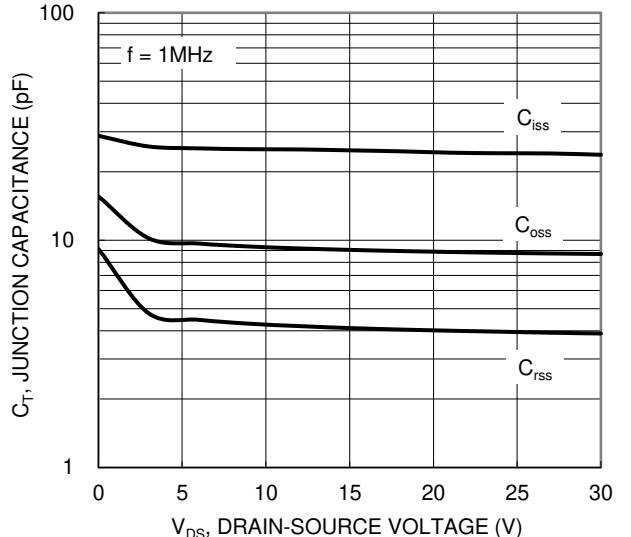


Figure 10. Typical Junction Capacitance

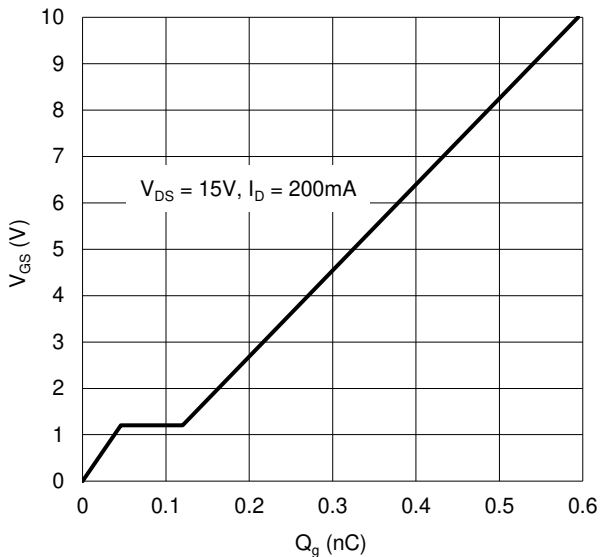


Figure 11. Gate Charge

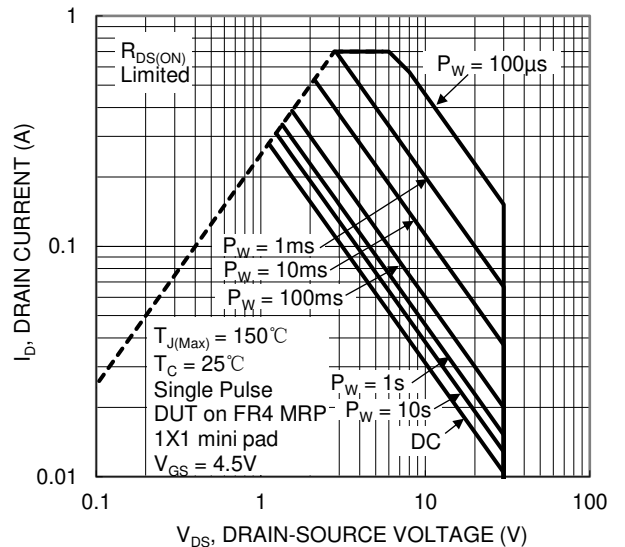


Figure 12. SOA, Safe Operation Area

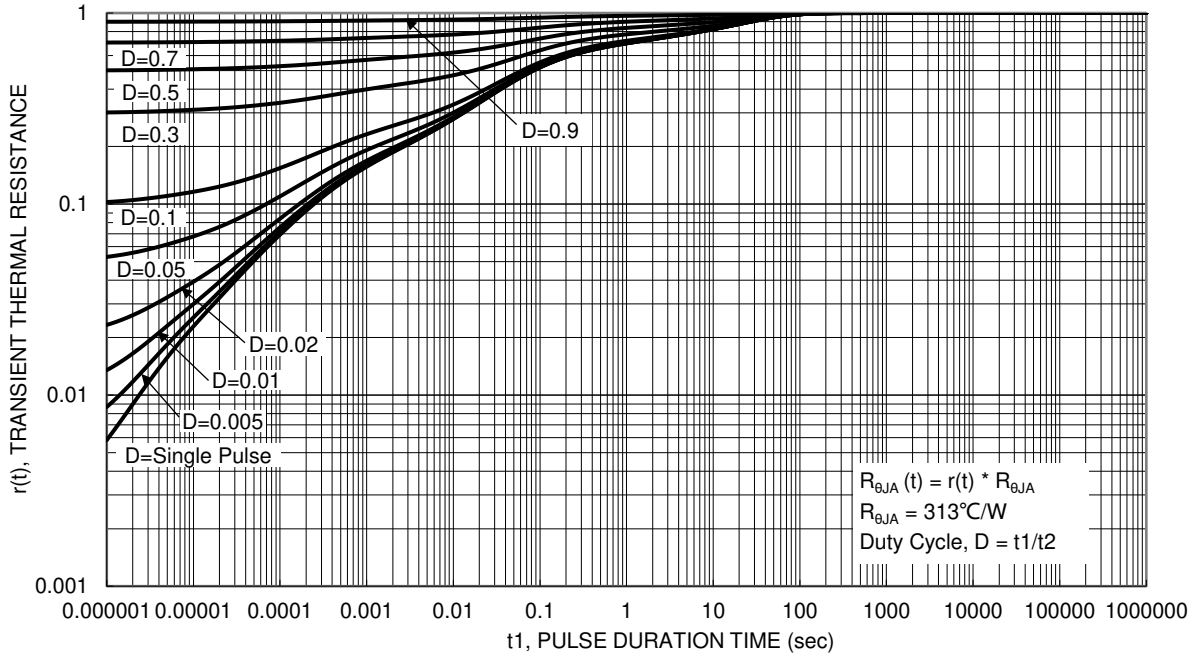
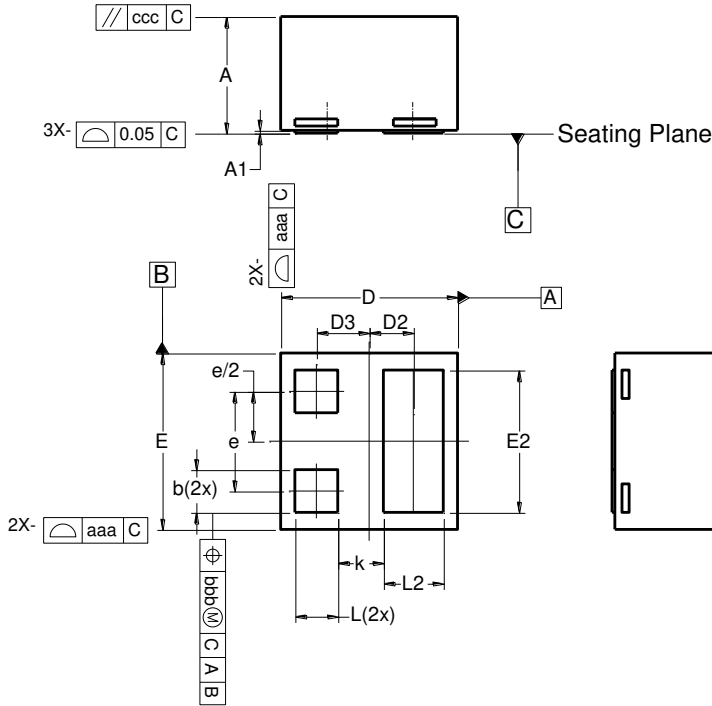


Figure 13. Transient Thermal Resistance

Package Outline Dimensions

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

X2-DFN0606-3

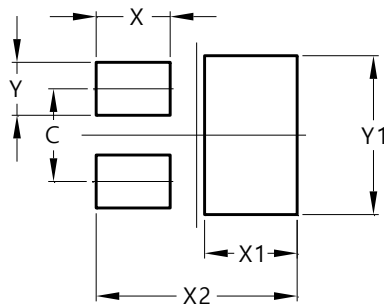


X2-DFN0606-3			
Dim	Min	Max	Typ
A	0.36	0.40	0.39
A1	0.00	0.05	0.02
b	0.10	0.20	0.15
D	0.57	0.67	0.62
D2	0.155 BSC		
D3	0.185 BSC		
E	0.57	0.67	0.62
E2	0.40	0.60	0.50
e	0.35 BSC		
k	0.16 REF		
L	0.10	0.20	0.15
L2	0.11	0.31	0.21
aaa	0.08		
bbb	0.07		
ccc	0.05		
All Dimensions in mm			

Suggested Pad Layout

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

X2-DFN0606-3



Dimensions	Value (in mm)
C	0.350
X	0.280
X1	0.350
X2	0.760
Y	0.200
Y1	0.600

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