Product Summary

BV_{DSS}	$R_{DS(ON)}$ Max	I_D Max T_A = +25°C
30V	1.5Ω @ V_{GS} = 4.5V	0.31A
	2.0Ω @ V_{GS} = 2.5V	0.32A
	3.0Ω @ V_{GS} = 1.8V	0.26A
	4.5Ω @ V_{GS} = 1.5V	0.21A

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 switches
- Power management functions
- Analog switches

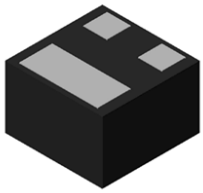
Features and Benefits

- 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)**
- **For automotive applications requiring specific change control (i.e. parts qualified to AEC-Q100/101/104/200, PPAP capable, and manufactured in IATF 16949 certified facilities), please contact us or your local Diodes representative. https://www.diodes.com/quality/product-definitions/**

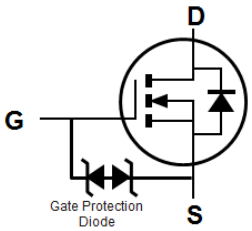
Mechanical Data

- Package: X2-DFN0606-3
- Package 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)

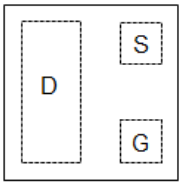




Bottom View



Equivalent Circuit



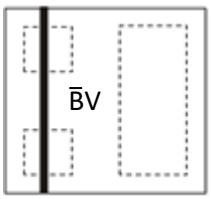
Top View
Package Pin Configuration

Ordering Information (Note 4)

Part Number	Package	Packing	
		Qty.	Carrier
DMN31D4UFZ-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

$\overline{B}$V = Product Type Marking Code
Bar Denotes Gate and Source Side

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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	0.31 0.2	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	0.3	W
Thermal Resistance, Junction to Ambient (Note 5)	Steady State	$R_{\theta JA}$	403	°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}	—	0.54	1.0	V	V_{GS} = 0V, I_S = 10mA
DYNAMIC CHARACTERISTICS (Note 8)							
Input Capacitance		C_{iss}	—	15.4	—	pF	V_{DS} = 15V, V_{GS} = 0V, f = 1.0MHz
Output Capacitance		C_{oss}	—	8	—	pF	
Reverse Transfer Capacitance		C_{rss}	—	5	—	pF	
Total Gate Charge		Q_g	—	0.3	—	nC	V_{GS} = 4.5V, V_{DS} = 15V, I_D = 200mA
Gate-Source Charge		Q_{gs}	—	0.05	—	nC	
Gate-Drain Charge		Q_{gd}	—	0.1	—	nC	
Turn-On Delay Time		$t_{D(ON)}$	—	5.7	—	ns	V_{DD} = 10V, V_{GS} = 4.5V, R_G = 2Ω, I_D = 200mA
Turn-On Rise Time		t_R	—	9.1	—	ns	
Turn-Off Delay Time		$t_{D(OFF)}$	—	146	—	ns	
Turn-Off Fall Time		t_F	—	48	—	ns	

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.

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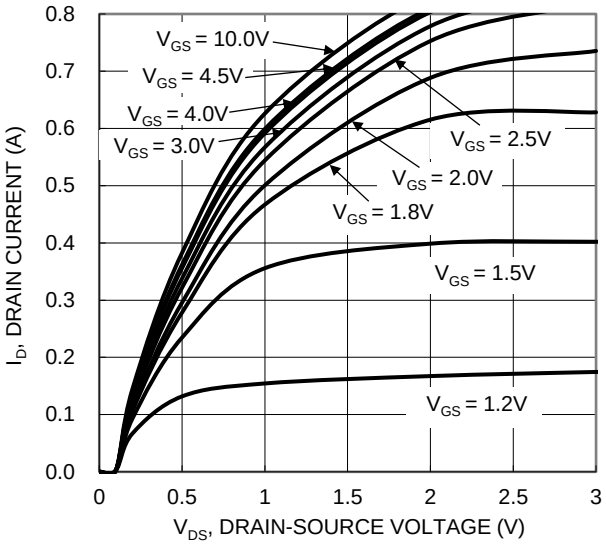

Figure 1. Typical Output Characteristic

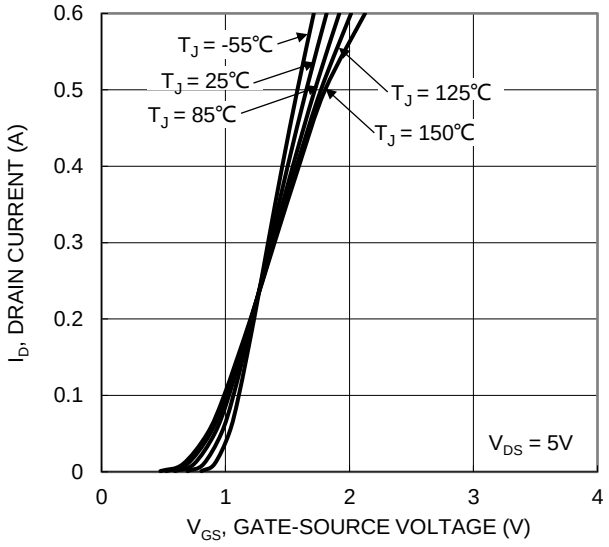

Figure 2. Typical Transfer Characteristic

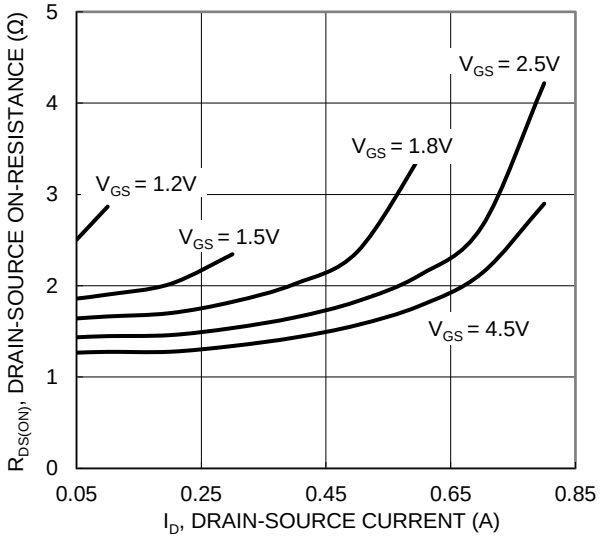

Figure 3. Typical On-Resistance vs. Drain Current and Gate Voltage

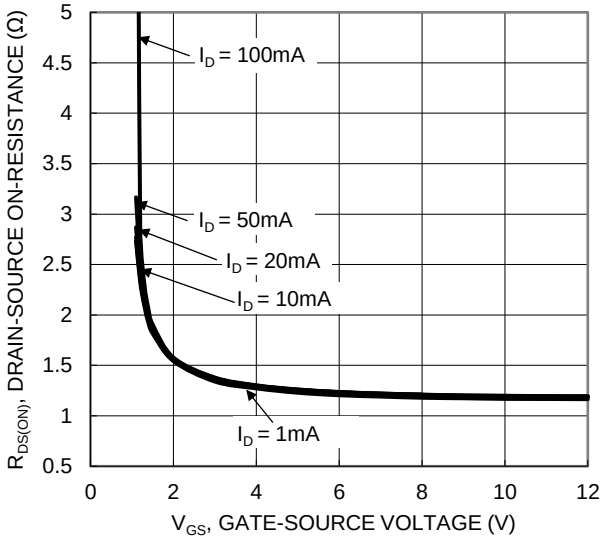

Figure 4. Typical Transfer Characteristic

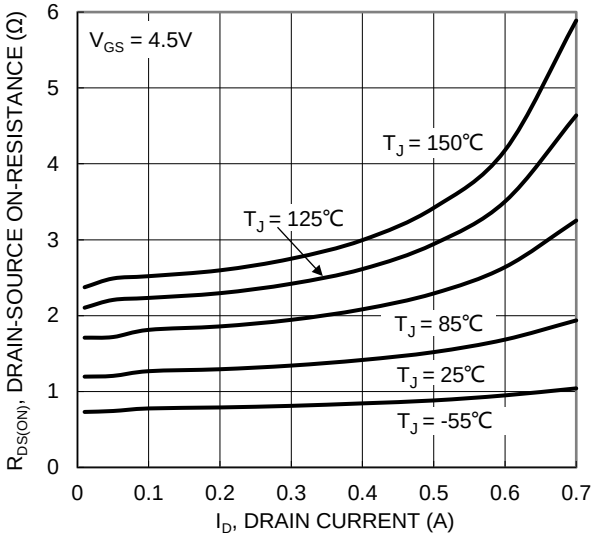

Figure 5. Typical On-Resistance vs. Drain Current and Junction Temperature

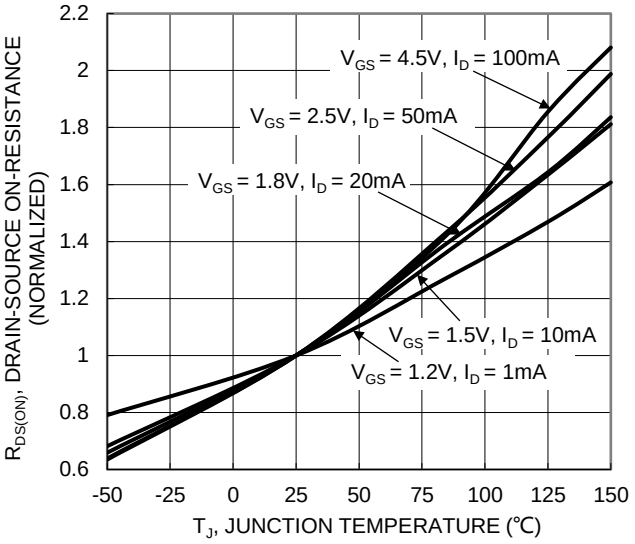

Figure 6. On-Resistance Variation with Junction Temperature

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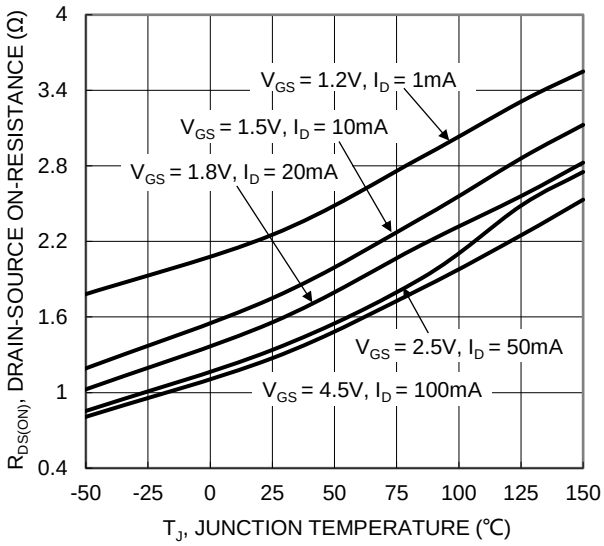

Figure 7. On-Resistance Variation with Junction Temperature

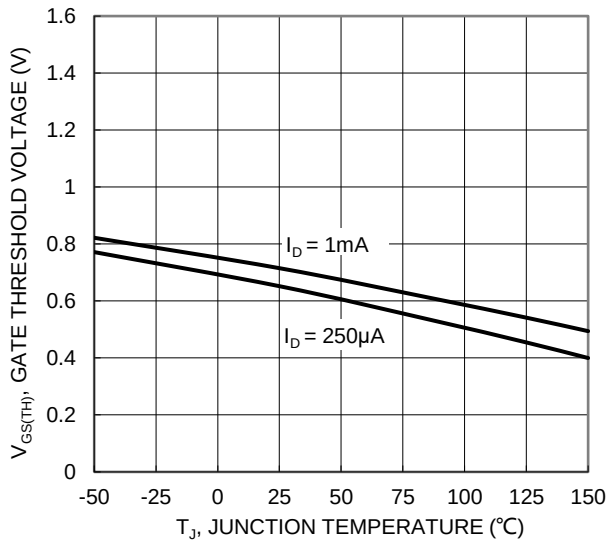

Figure 8. Gate Threshold Variation vs. Junction Temperature

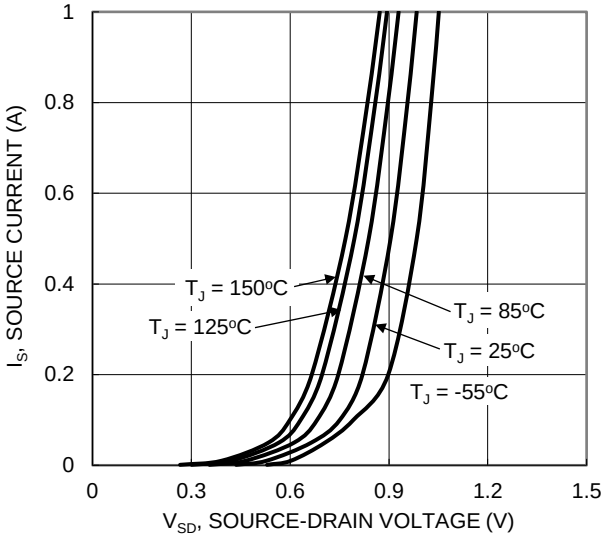

Figure 9. Diode Forward Voltage vs. Current

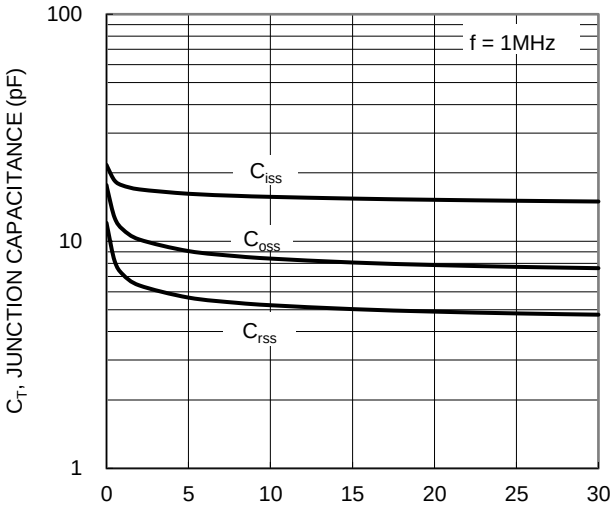

Figure 10. Typical Junction Capacitance

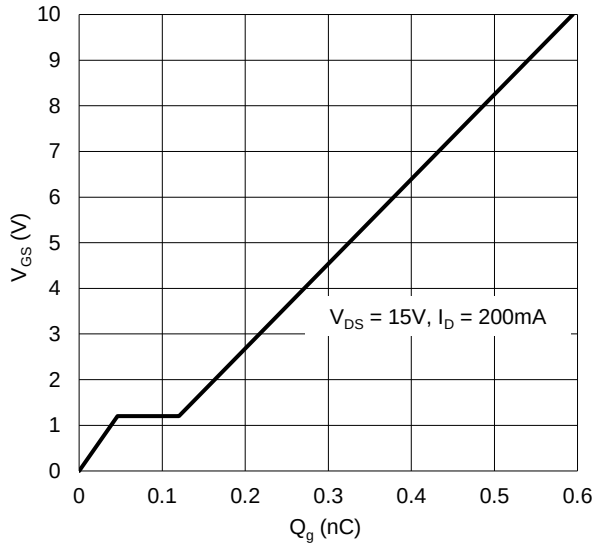

Figure 11. Gate Charge

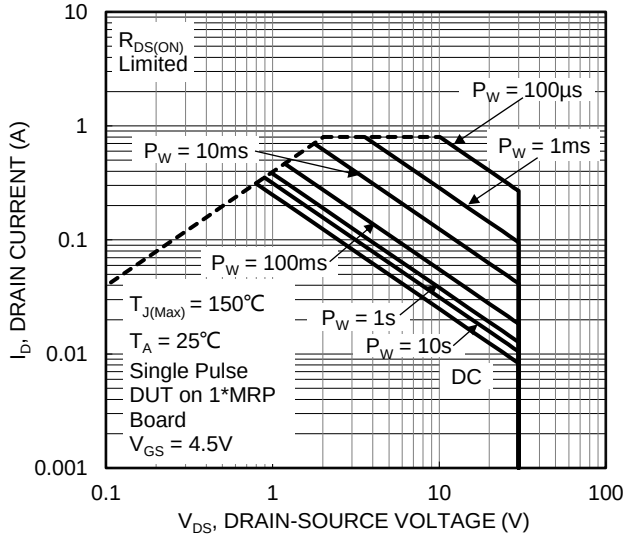

Figure 12. SOA, Safe Operation Area

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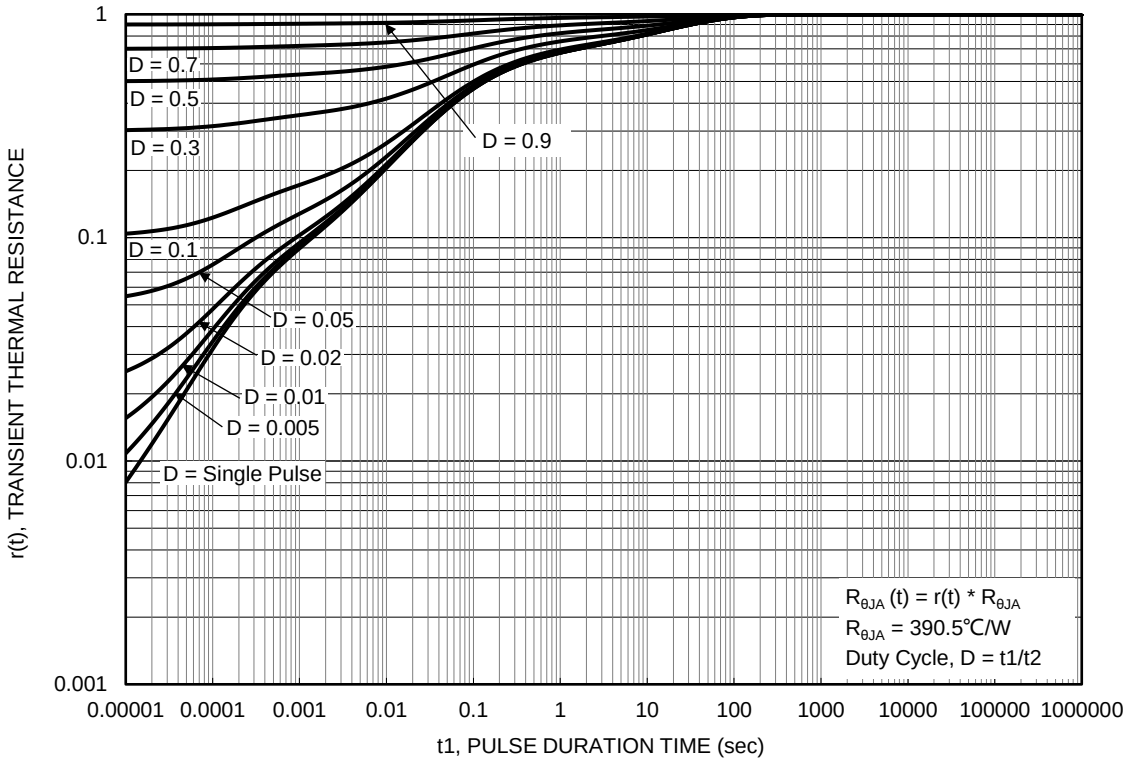

Figure 13. Transient Thermal Resistance

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Package Outline Dimensions

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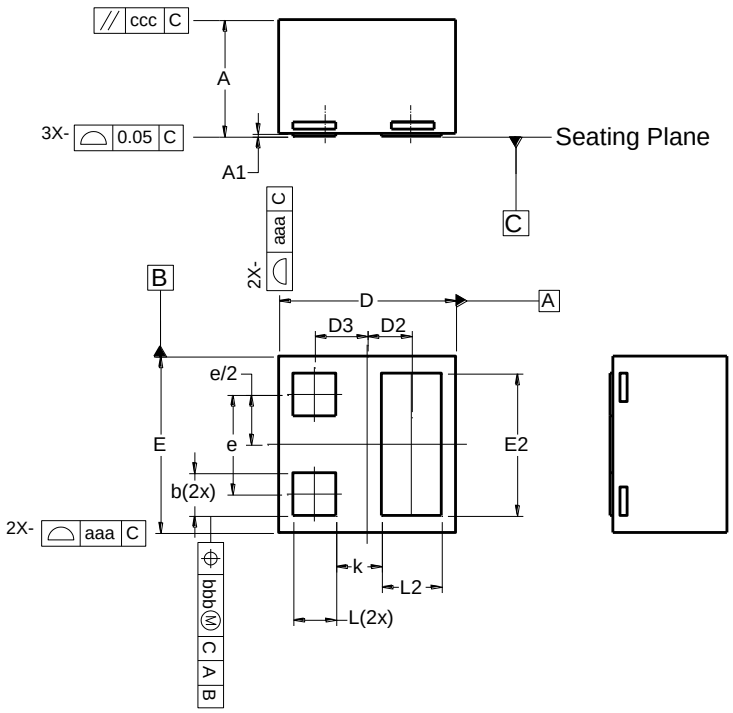
X2-DFN0606-3

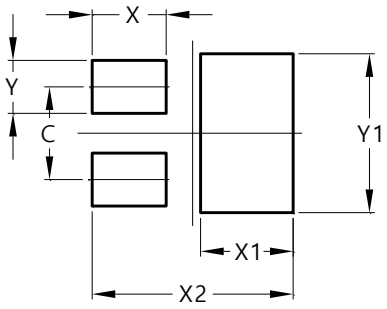


X2-DFN0606-3			
Dim	**Min**	**Max**	**Typ**
A	0.36	0.40	0.39
A1	0.00	0.05	0.02
b	0.10	0.20	0.15
D	0.57	0.67	0.62
D2	0.155 BSC		
D3	0.185 BSC		
E	0.57	0.67	0.62
E2	0.40	0.60	0.50
e	0.35 BSC		
k	0.16 REF		
L	0.10	0.20	0.15
L2	0.11	0.31	0.21
aaa	0.08		
bbb	0.07		
ccc	0.05		
All Dimensions in mm			

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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