Product Summary

BV_{DSS}	$R_{DS(ON)}$ Max	I_D Max T_A = +25°C
60V	5.0Ω @ V_{GS} = 10V	0.26A
	5.3Ω @ V_{GS} = 4.5V	0.25A

Features and Benefits

- Low On-Resistance
- Low Input Capacitance
- Fast Switching Speed
- Low Input/Output Leakage
- **ESD Protected up to 2kV**
- **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-Q100/101/200, PPAP capable, and manufactured in IATF 16949 certified facilities), please contact us or your local Diodes representative. https://www.diodes.com/quality/product-definitions/**

Description and Applications

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.

- Load switch

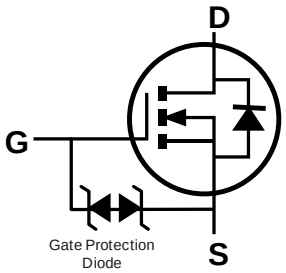
Mechanical Data

- Package: X2-DFN1010-4
- Package Material: Molded Plastic, "Green" Molding Compound. UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminal Connections: See Diagram
- Terminals: Finish NiPdAu Annealed over Copper Leadframe. Solderable per MIL-STD-202, Method 208 e4
- Weight: 0.0015 grams (Approximate)

ESD PROTECTED

X2-DFN1010-4 (Type B)





Equivalent Circuit



Pin-Out Top View

Ordering Information (Note 4)

Part Number	Package	Packing	
		Qty.	Carrier
DMN65D7LFR4-7	X2-DFN1010-4 (Type B)	5000	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



57 = Product Type Marking Code
YWX = Date Code Marking
Y = Year (ex: 1 = 2021)
W = Week (ex: a = Week 27; z Represents Week 52 and 53)
X = Internal Code (ex: U = Monday)

Date Code Key

Year	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031
Code	0	1	2	3	4	5	6	7	8	9	0	1

Week	1-26	27-52	53
Code	A-Z	a-z	z

Internal Code	Sun	Mon	Tue	Wed	Thu	Fri	Sat
Code	T	U	V	W	X	Y	Z

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

Characteristic			Symbol	Value	Unit
Drain-Source Voltage			V_{DSS}	60	V
Gate-Source Voltage			V_{GSS}	±20	V
Continuous Drain Current (Note 6) V_{GS} = 10V	Steady State	T_A = +25°C T_A = +70°C	I_D	0.26 0.21	A
Maximum Continuous Body Diode Forward Current (Note 6)			I_S	0.26	A
Pulsed Drain Current (10µs Pulse, Duty Cycle = 1%)			I_{DM}	1	A
Pulsed Source Current (10µs Pulse, Duty Cycle = 1%)			I_{SM}	1	A

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

Characteristic		Symbol	Value	Unit
Total Power Dissipation (Note 5)		P_D	0.6	W
Thermal Resistance, Junction to Ambient (Note 5)	Steady State	$R_{\theta JA}$	213	°C/W
Total Power Dissipation (Note 6)		P_D	0.7	W
Thermal Resistance, Junction to Ambient (Note 6)	Steady State	$R_{\theta JA}$	174	°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}	60	—	—	V	V_{GS} = 0V, I_D = 10µA
Zero Gate Voltage Drain Current	I_{DSS}	—	—	1.0	µA	V_{DS} = 60V, V_{GS} = 0V
Gate-Source Leakage	I_{GSS}	—	—	±10	µA	V_{GS} = ±20V, V_{DS} = 0V
ON CHARACTERISTICS (Note 7)						
Gate Threshold Voltage	$V_{GS(TH)}$	1.0	—	2.5	V	V_{DS} = V_{GS}, I_D = 250µA
Static Drain-Source On-Resistance	$R_{DS(ON)}$	—	1.2 1.4	5.0 5.3	Ω	V_{GS} = 10V, I_D = 40mA V_{GS} = 4.5V, I_D = 35mA
Diode Forward Voltage	V_{SD}	—	0.85	1.1	V	V_{GS} = 0V, I_S = 300mA
DYNAMIC CHARACTERISTICS (Note 8)						
Input Capacitance	C_{iss}	—	41	—	pF	V_{DS} = 30V, V_{GS} = 0V f = 1.0MHz
Output Capacitance	C_{oss}	—	4.5	—	pF	
Reverse Transfer Capacitance	C_{rss}	—	2.7	—	pF	
Gate Resistance	R_g	—	224	—	Ω	f = 1MHz, V_{GS} = 0V, V_{DS} = 0V
Total Gate Charge (V_{GS} = 4.5V)	Q_g	—	0.51	—	nC	V_{DS} = 15V, I_D = 200mA
Total Gate Charge (V_{GS} = 10V)	Q_g	—	1.04	—	nC	
Gate-Source Charge	Q_{gs}	—	0.16	—	nC	
Gate-Drain Charge	Q_{gd}	—	0.18	—	nC	
Turn-On Delay Time	$t_{D(ON)}$	—	6.9	—	ns	V_{DD} = 30V, V_{GS} = 10V, R_G = 150Ω, I_D = 200mA
Turn-On Rise Time	t_R	—	5.8	—	ns	
Turn-Off Delay Time	$t_{D(OFF)}$	—	37.8	—	ns	
Turn-Off Fall Time	t_F	—	14.3	—	ns	
Reverse Recovery Time	t_{RR}	—	19	—	ns	I_F =1A, di/dt = 100A/µs
Reverse Recovery Charge	Q_{RR}	—	9	—	nC	I_F =1A, di/dt = 100A/µs

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 1inch square copper plate.
7. Short duration pulse test used to minimize self-heating effect.
8. Guaranteed by design. Not subject to product testing.

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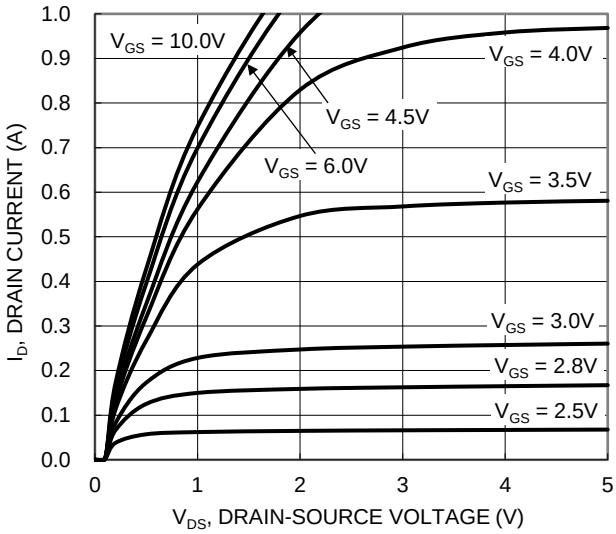


Figure 1. Typical Output Characteristic

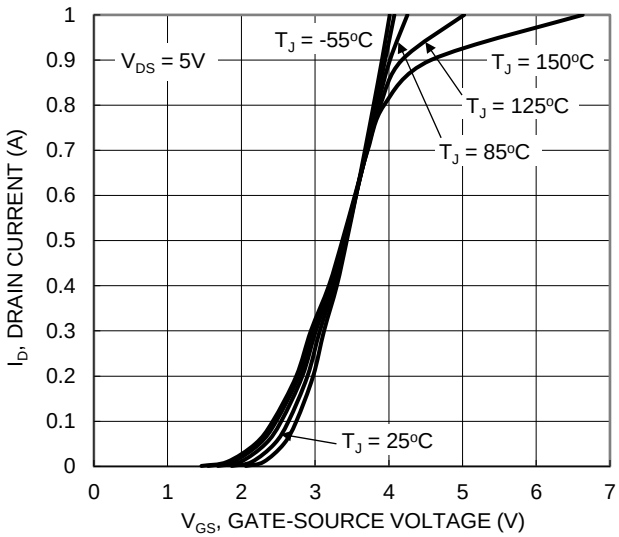


Figure 2. Typical Transfer Characteristic

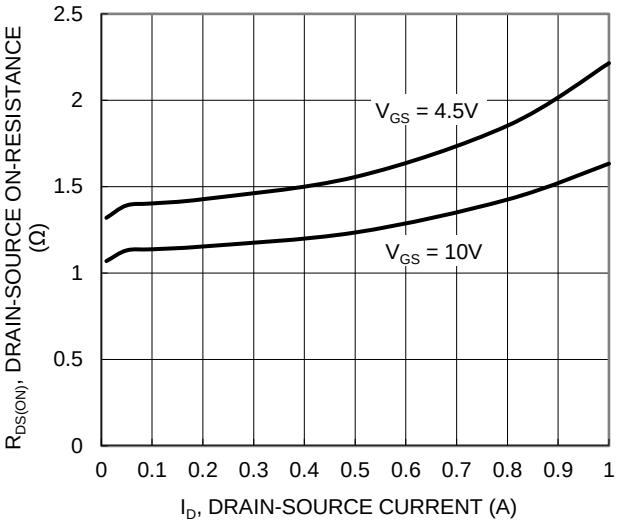


Figure 3. Typical On-Resistance vs. Drain Current and Gate Voltage

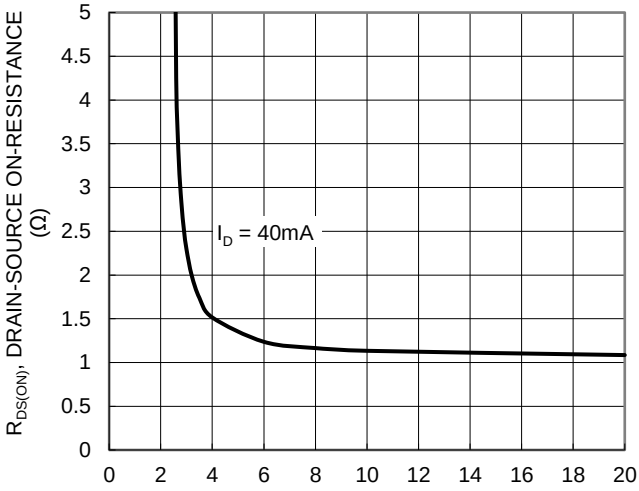


Figure 4. Typical Transfer Characteristic

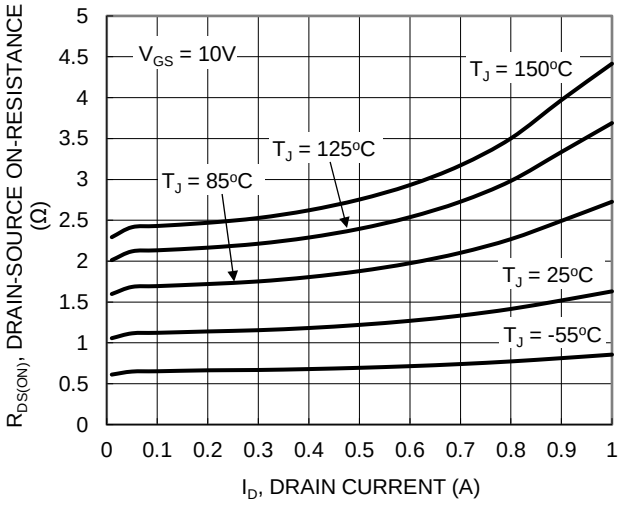


Figure 5. Typical On-Resistance vs. Drain Current and Junction Temperature

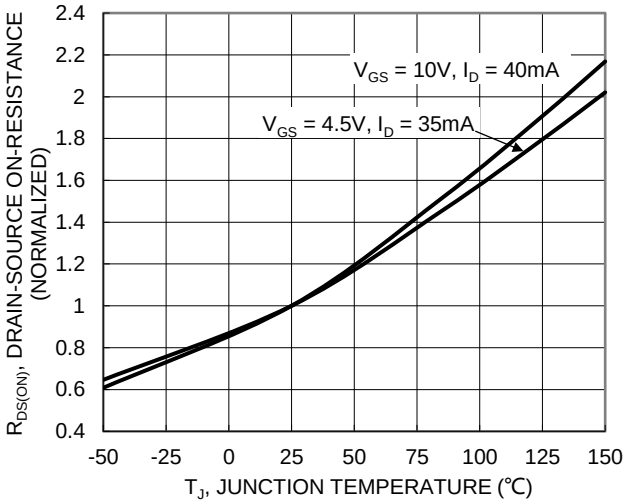


Figure 6. On-Resistance Variation with Junction Temperature

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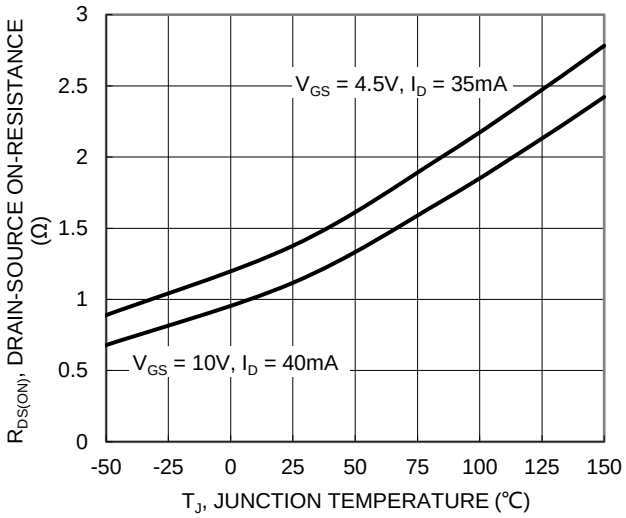


Figure 7. On-Resistance Variation with Junction Temperature

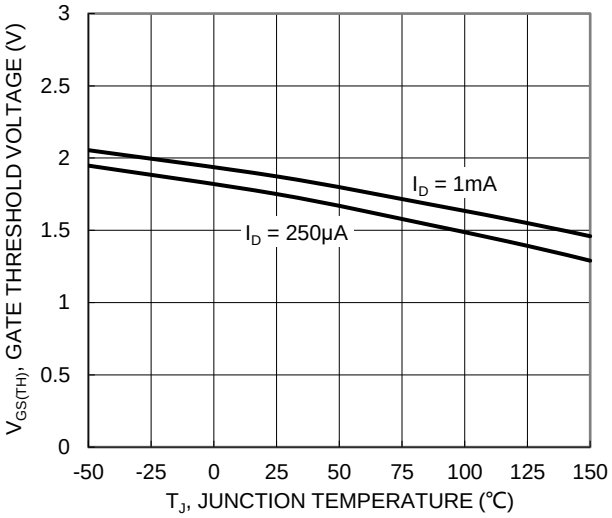


Figure 8. Gate Threshold Variation vs Junction Temperature

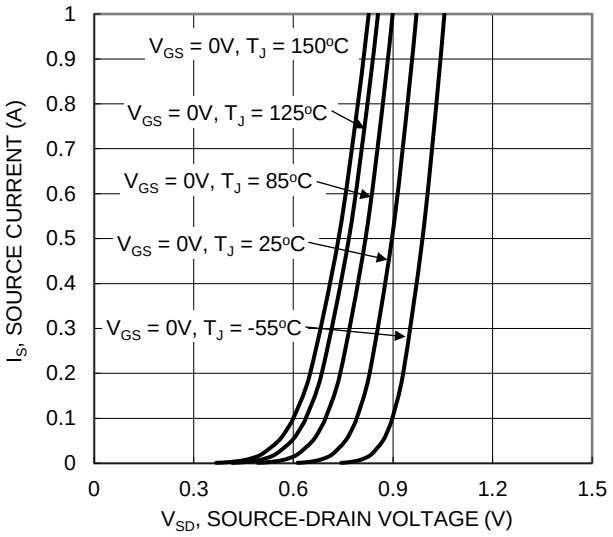


Figure 9. Diode Forward Voltage vs. Current

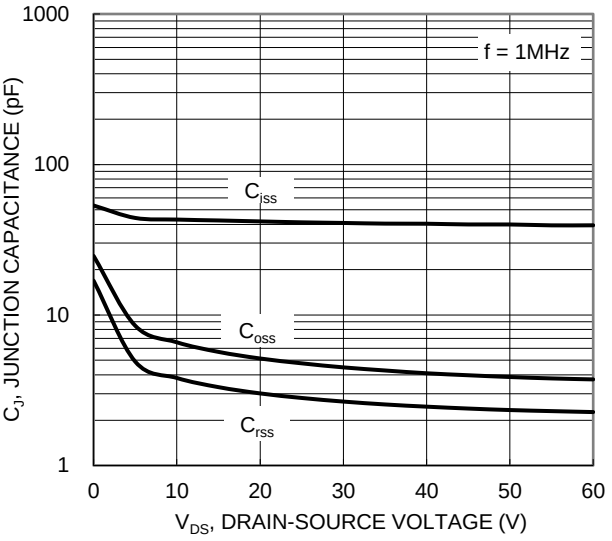


Figure 10. Typical Junction Capacitance

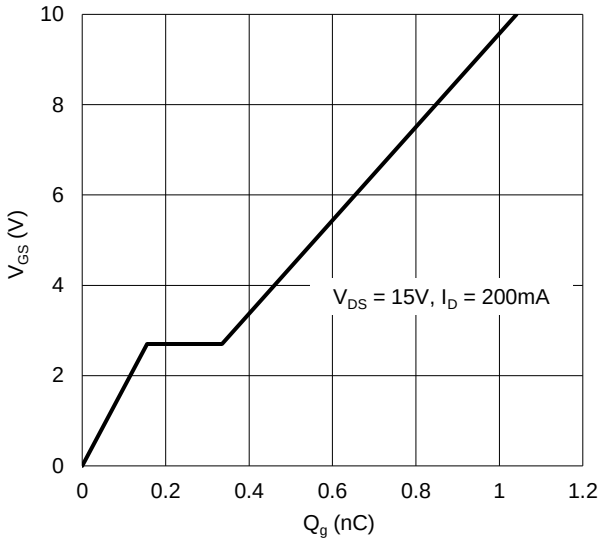


Figure 11. Gate Charge

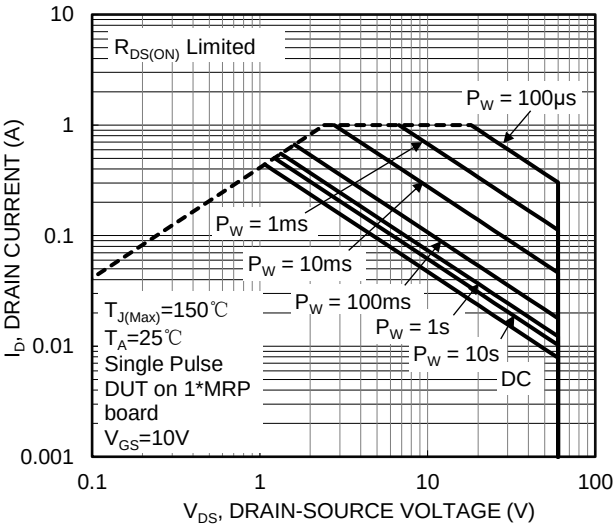


Figure 12. SOA, Safe Operation Area

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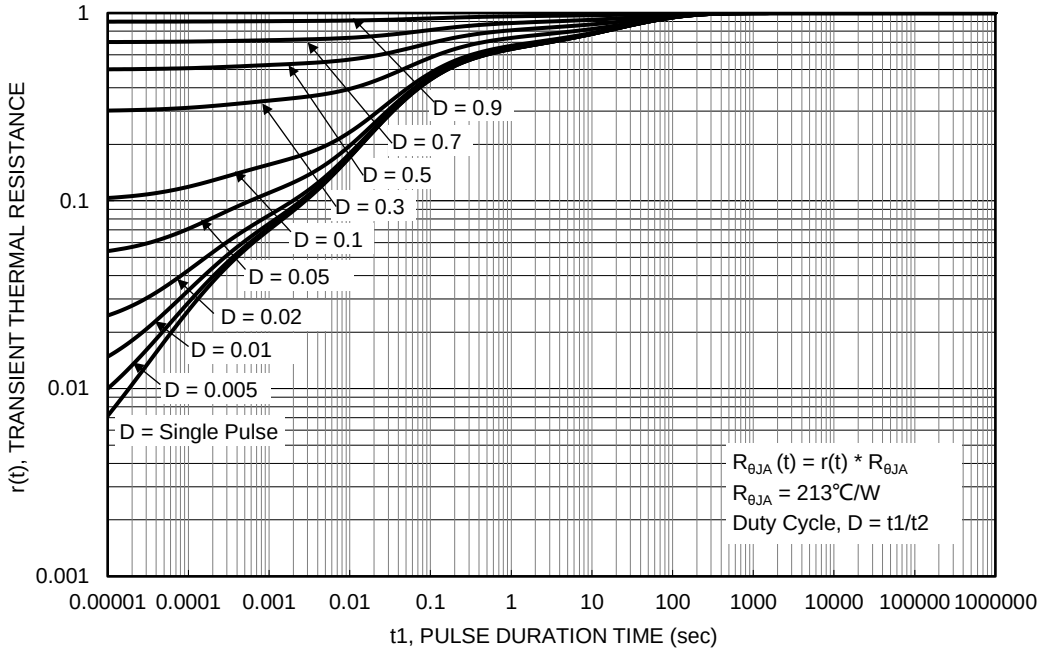


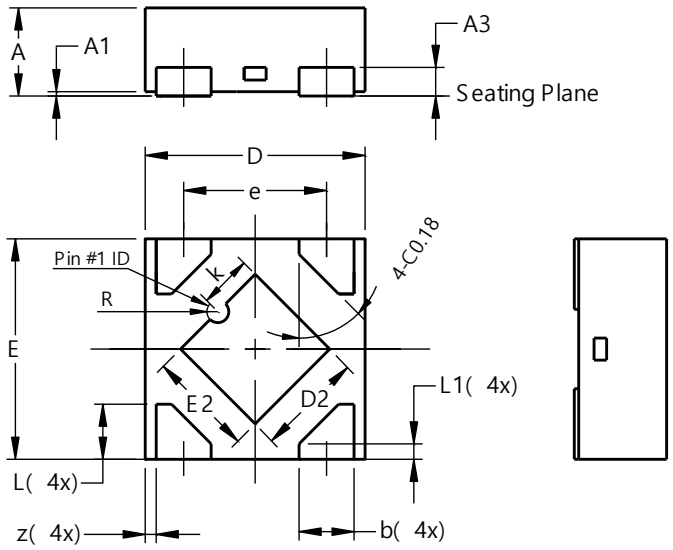
Figure 13. Transient Thermal Resistance

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Package Outline Dimensions

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

X2-DFN1010-4 (Type B)

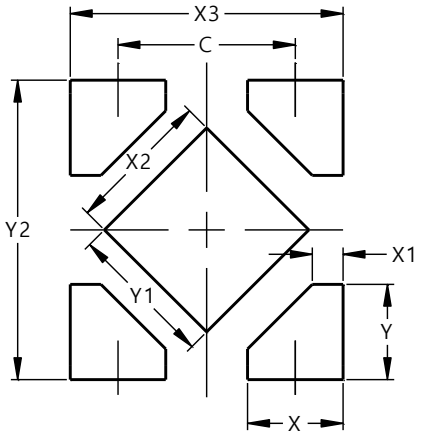


X2-DFN1010-4 (Type B)			
Dim	**Min**	**Max**	**Typ**
A	-	0.40	0.39
A1	0.00	0.05	0.02
A3	-	-	0.13
b	0.20	0.30	0.25
D	0.95	1.05	1.00
D2	0.43	0.53	0.48
E	0.95	1.05	1.00
E2	0.43	0.53	0.48
e	-	-	0.65
k	0.19	0.29	0.24
L	0.20	0.30	0.25
L1	0.02	0.12	0.07
R	0.02	0.08	0.05
z	-	-	0.050
All Dimensions in mm			

Suggested Pad Layout

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

X2-DFN1010-4 (Type B)



Dimensions	Value (in mm)
C	0.650
X	0.350
X1	0.112
X2	0.530
X3	1.00
Y	0.350
Y1	0.530
Y2	1.100

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