

# DMN2450UFB4-7B Datasheet



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DiGi Electronics Part Number	DMN2450UFB4-7B-DG
Manufacturer	<a href="#">Diodes Incorporated</a>
Manufacturer Product Number	DMN2450UFB4-7B
Description	MOSFET N-CH 20V 1A X2-DFN1006-3
Detailed Description	N-Channel 20 V 1A (Ta) 500mW (Ta) Surface Mount X2-DFN1006-3



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## Purchase and inquiry

Manufacturer Product Number:

DMN2450UFB4-7B

Series:

-

FET Type:

N-Channel

Drain to Source Voltage (Vdss):

20 V

Drive Voltage (Max Rds On, Min Rds On):

1.8V, 4.5V

Vgs(th) (Max) @ Id:

900mV @ 250µA

Vgs (Max):

±12V

FET Feature:

-

Operating Temperature:

-55°C ~ 150°C (Tj)

Supplier Device Package:

X2-DFN1006-3

Base Product Number:

DMN2450

Manufacturer:

Diodes Incorporated

Product Status:

Active

Technology:

MOSFET (Metal Oxide)

Current - Continuous Drain (Id) @ 25°C:

1A (Ta)

Rds On (Max) @ Id, Vgs:

400mOhm @ 600mA, 4.5V

Gate Charge (Qg) (Max) @ Vgs:

1.3 nC @ 10 V

Input Capacitance (Ciss) (Max) @ Vds:

56 pF @ 16 V

Power Dissipation (Max):

500mW (Ta)

Mounting Type:

Surface Mount

Package / Case:

3-XFDFN

## Environmental & Export classification

RoHS Status:

ROHS3 Compliant

REACH Status:

REACH Unaffected

HTSUS:

8541.21.0095

Moisture Sensitivity Level (MSL):

1 (Unlimited)

ECCN:

EAR99



DMN2450UFB4

## N-CHANNEL ENHANCEMENT MODE MOSFET

## Product Summary

BV <sub>DSS</sub>	R <sub>DS(ON)</sub> Max	I <sub>D</sub> Max T <sub>A</sub> = +25°C
20V	0.4Ω @ V <sub>GS</sub> = 4.5V	1.0A
	0.5Ω @ V <sub>GS</sub> = 2.5V	0.9A
	0.7Ω @ V <sub>GS</sub> = 1.8V	0.8A

## Description and Applications

This MOSFET is designed to minimize the on-state resistance (R<sub>DS(ON)</sub>) and yet maintain superior switching performance, making it ideal for high efficiency power management applications.

- Load Switch

## Features and Benefits

- Footprint of just 0.6mm<sup>2</sup> – Thirteen Times Smaller than SOT23
- 0.4mm Profile – Ideal for Low Profile Applications
- Low Gate Threshold Voltage
- Fast Switching Speed
- **ESD Protected Gate**
- **Totally Lead-Free & Fully RoHS Compliant (Notes 1 & 2)**
- **Halogen and Antimony Free. “Green” Device (Note 3)**

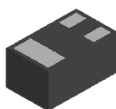
## Mechanical Data

- Case: X2-DFN1006-3
- 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)

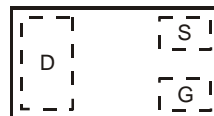
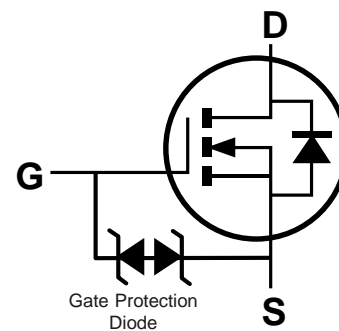


ESD Protected Gate

X2-DFN1006-3



Bottom View

Top View  
Internal Schematic


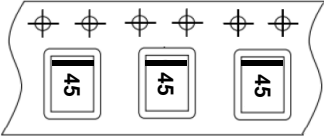

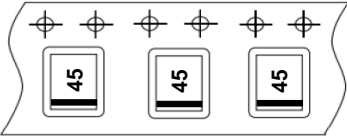
Equivalent Circuit

## Ordering Information (Note 4)

Part Number	Marking	Reel Size (inches)	Tape Width (mm)	Tape Pitch (mm)	Quantity per Reel
DMN2450UFB4-7B	45	7	8	2	10,000
DMN2450UFB4-7R	45	7	8	4	3,000

- 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

DMN2450UFB4-7R	 <p>Top View Bar Denotes Gate and Source Side</p> <p>45 = Part Marking Code</p> 
DMN2450UFB4-7B	 <p>Top View Bar Denotes Gate and Source Side</p> <p>45 = Part Marking Code</p> 



DMN2450UFB4

**Maximum Ratings** (@T<sub>A</sub> = +25°C, unless otherwise specified.)

Characteristic	Symbol	Value	Unit
Drain-Source Voltage	V <sub>DSS</sub>	20	V
Gate-Source Voltage	V <sub>GSS</sub>	±12	V
Continuous Drain Current (Note 6) V <sub>GS</sub> = 4.5V	I <sub>D</sub>	1.0	A
Steady State T <sub>A</sub> = +25°C T <sub>A</sub> = +70°C		0.8	
Pulsed Drain Current (10μs Pulse, Duty Cycle = 1%)	I <sub>DM</sub>	3.0	A

**Thermal Characteristics** (@T<sub>A</sub> = +25°C, unless otherwise specified.)

Characteristic	Symbol	Value	Unit
Total Power Dissipation (Note 5)	P <sub>D</sub>	0.5	W
Thermal Resistance, Junction to Ambient (Note 5)	R <sub>θJA</sub>	225	°C/W
Total Power Dissipation (Note 6)	P <sub>D</sub>	0.9	W
Thermal Resistance, Junction to Ambient (Note 6)	R <sub>θJA</sub>	129	°C/W
Operating and Storage Temperature Range	T <sub>J</sub> , T <sub>STG</sub>	-55 to +150	°C

**Electrical Characteristics** (@T<sub>A</sub> = +25°C, unless otherwise specified.)

Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
<b>OFF CHARACTERISTICS (Note 7)</b>						
Drain-Source Breakdown Voltage	BV <sub>DSS</sub>	20	-	-	V	V <sub>GS</sub> = 0V, I <sub>D</sub> = 250μA
Zero Gate Voltage Drain Current T <sub>J</sub> = +25°C	I <sub>DSS</sub>	-	-	100	nA	V <sub>DS</sub> = 20V, V <sub>GS</sub> = 0V
Gate-Source Leakage	I <sub>GSS</sub>	-	-	±1.0	μA	V <sub>GS</sub> = ±4.5V, V <sub>DS</sub> = 0V
<b>ON CHARACTERISTICS (Note 7)</b>						
Gate Threshold Voltage	V <sub>GS(TH)</sub>	0.5	-	0.9	V	V <sub>DS</sub> = V <sub>GS</sub> , I <sub>D</sub> = 250μA
Static Drain-Source On-Resistance	R <sub>DS(ON)</sub>	-	0.3	0.4	Ω	V <sub>GS</sub> = 4.5V, I <sub>D</sub> = 600mA
		-	0.4	0.5		V <sub>GS</sub> = 2.5V, I <sub>D</sub> = 500mA
		-	0.5	0.7		V <sub>GS</sub> = 1.8V, I <sub>D</sub> = 350mA
Diode Forward Voltage	V <sub>SD</sub>	-	0.7	1.2	V	V <sub>GS</sub> = 0V, I <sub>S</sub> = 150mA,
<b>DYNAMIC CHARACTERISTICS (Note 8)</b>						
Input Capacitance	C <sub>iss</sub>	-	56	-	pF	V <sub>DS</sub> = 16V, V <sub>GS</sub> = 0V, f = 1.0MHz
Output Capacitance	C <sub>oss</sub>	-	19	-	pF	
Reverse Transfer Capacitance	C <sub>rss</sub>	-	7.3	-	pF	
Gate Resistance	R <sub>g</sub>	-	86	-	Ω	V <sub>DS</sub> = 0V, V <sub>GS</sub> = 0V,
Total Gate Charge (V <sub>GS</sub> = 4.5V)	Q <sub>g</sub>	-	0.6	-	nC	V <sub>DS</sub> = 10V, I <sub>D</sub> = 250mA
Total Gate Charge (V <sub>GS</sub> = 10V)	Q <sub>g</sub>	-	1.3	-	nC	
Gate-Source Charge	Q <sub>gs</sub>	-	0.1	-	nC	
Gate-Drain Charge	Q <sub>gd</sub>	-	0.16	-	nC	
Turn-On Delay Time	t <sub>D(ON)</sub>	-	5.3	-	ns	V <sub>DD</sub> = 10V, V <sub>GS</sub> = 4.5V, R <sub>L</sub> = 47Ω, R <sub>G</sub> = 10Ω, I <sub>D</sub> = 200mA
Turn-On Rise Time	t <sub>R</sub>	-	2.6	-	ns	
Turn-Off Delay Time	t <sub>D(OFF)</sub>	-	18.1	-	ns	
Turn-Off Fall Time	t <sub>F</sub>	-	6.6	-	ns	

- Notes:
- Device mounted on FR-4 substrate PC board, 2oz copper, with minimum recommended pad layout.
  - Device mounted on FR-4 substrate PC board, 2oz copper, with 25mm X 25mm square copper plate.
  - Short duration pulse test used to minimize self-heating effect.
  - Guaranteed by design. Not subject to product testing.



**DMN2450UFB4**

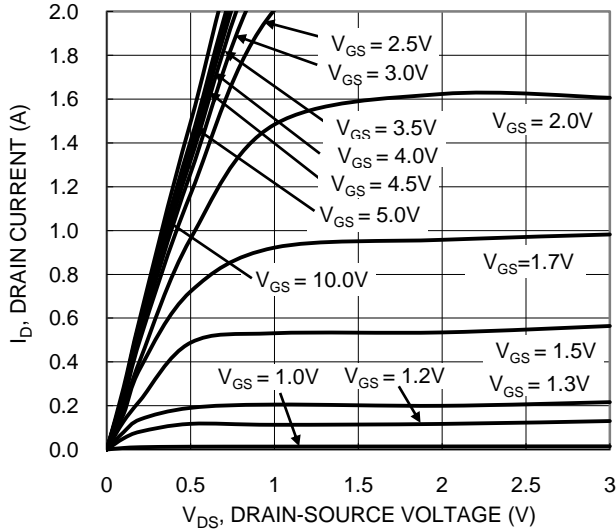


Figure 1. Typical Output Characteristic

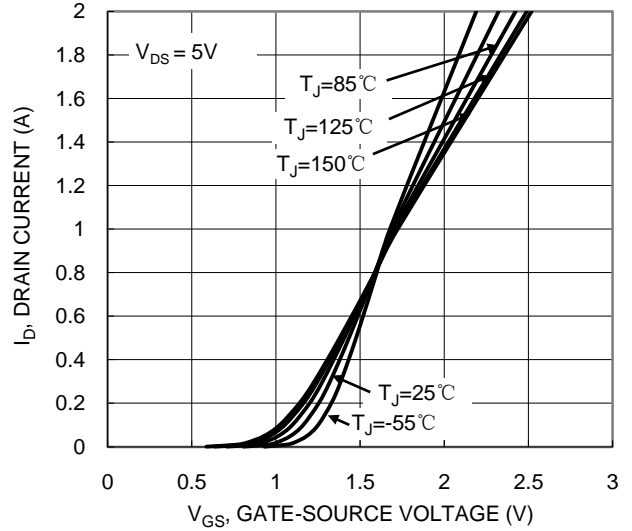


Figure 2. Typical Transfer Characteristic

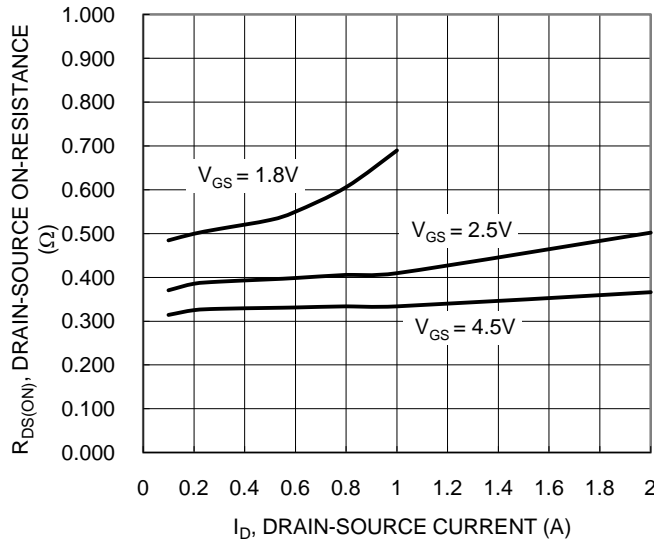


Figure 3. Typical On-Resistance vs. Drain Current and Gate Voltage

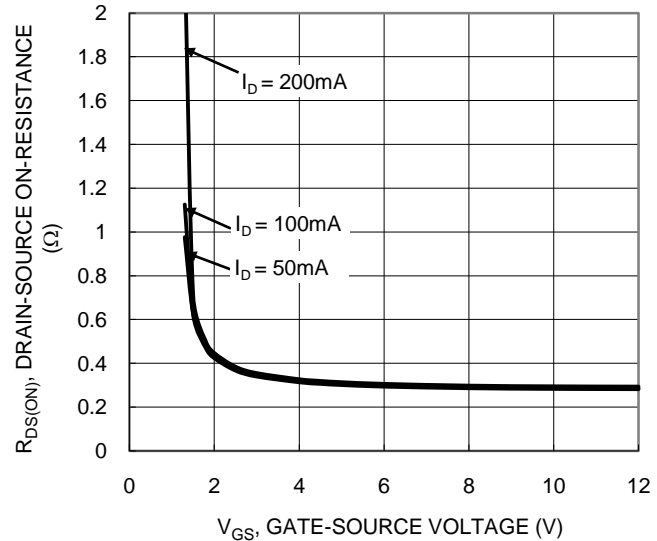


Figure 4. Typical Transfer Characteristic

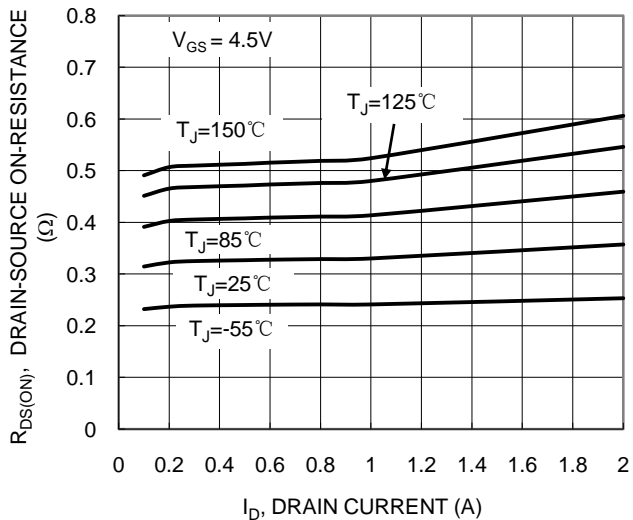


Figure 5. Typical On-Resistance vs. Drain Current and Temperature

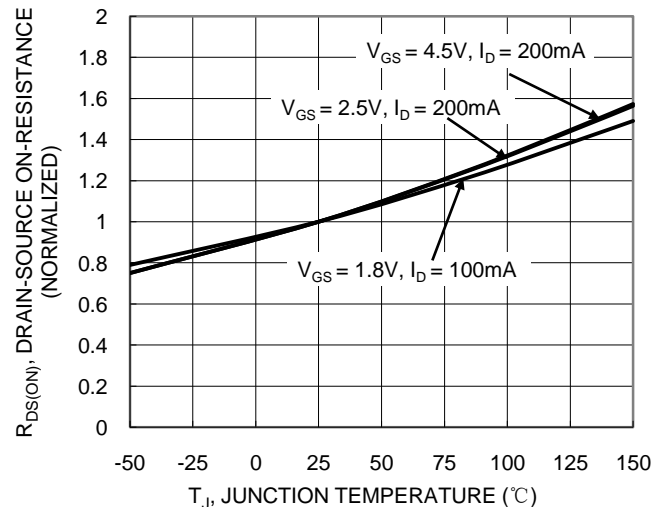


Figure 6. On-Resistance Variation with Temperature



**DMN2450UFB4**

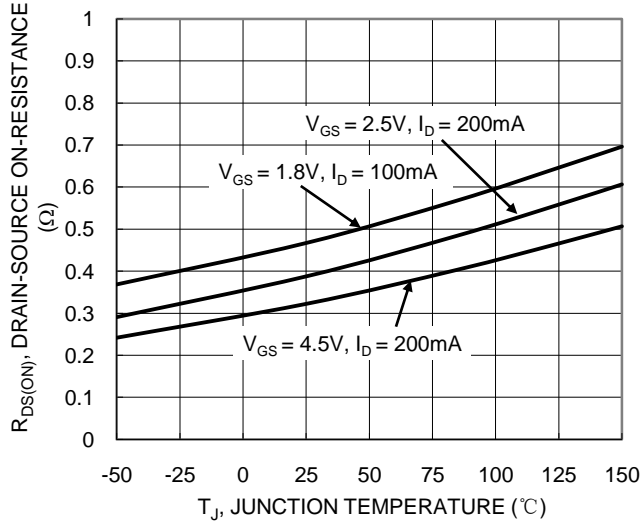


Figure 7. On-Resistance Variation with Temperature

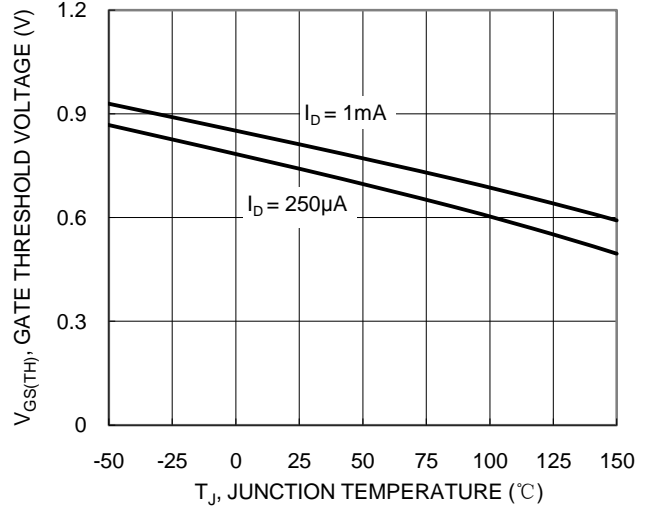


Figure 8. Gate Threshold Variation vs. Junction Temperature

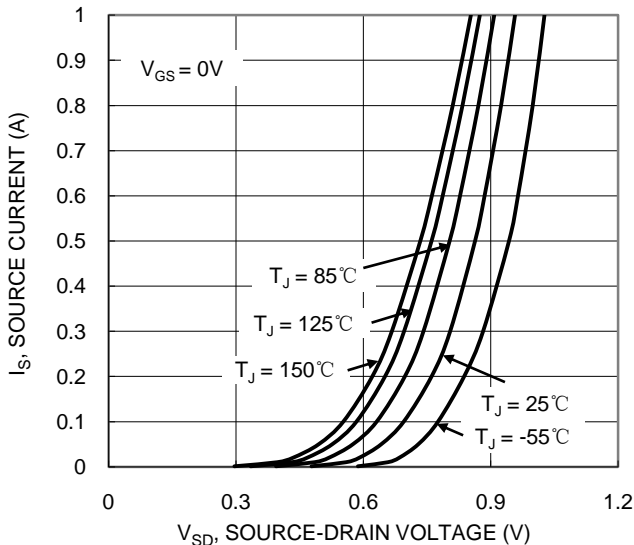


Figure 8. Diode Forward Voltage vs. Current

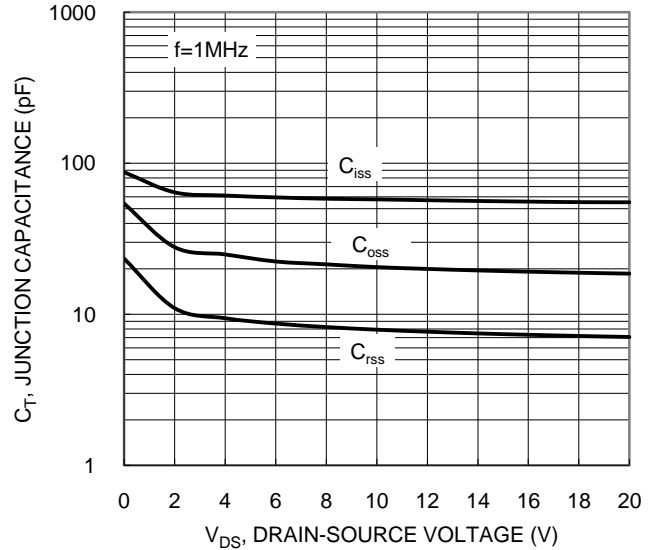


Figure 10. Typical Junction Capacitance

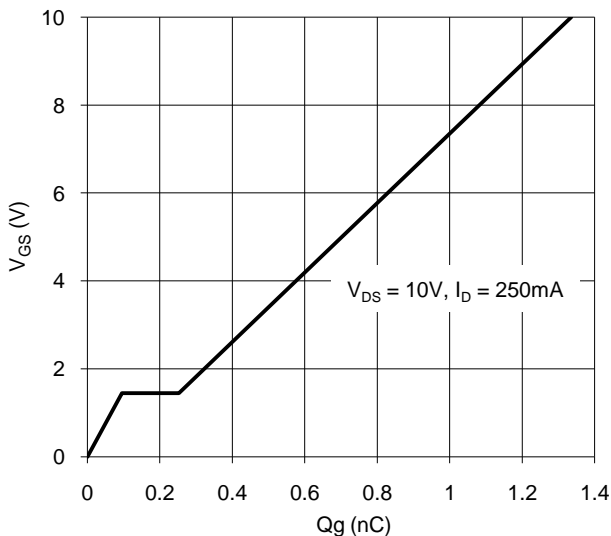


Figure 11. Gate Charge

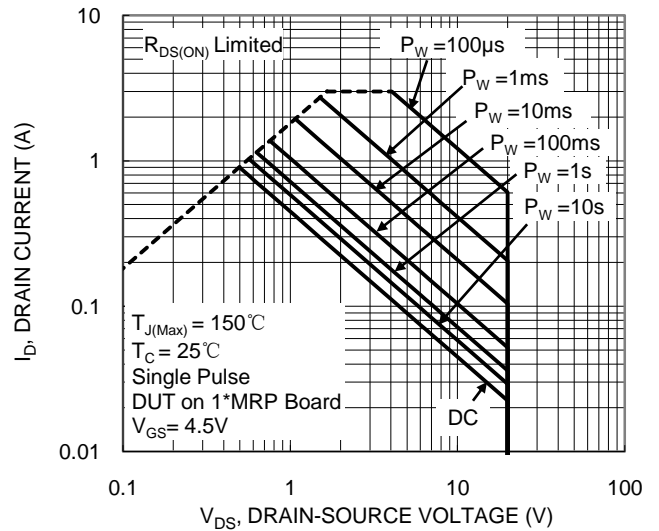


Figure 12. SOA, Safe Operation Area



**DMN2450UFB4**

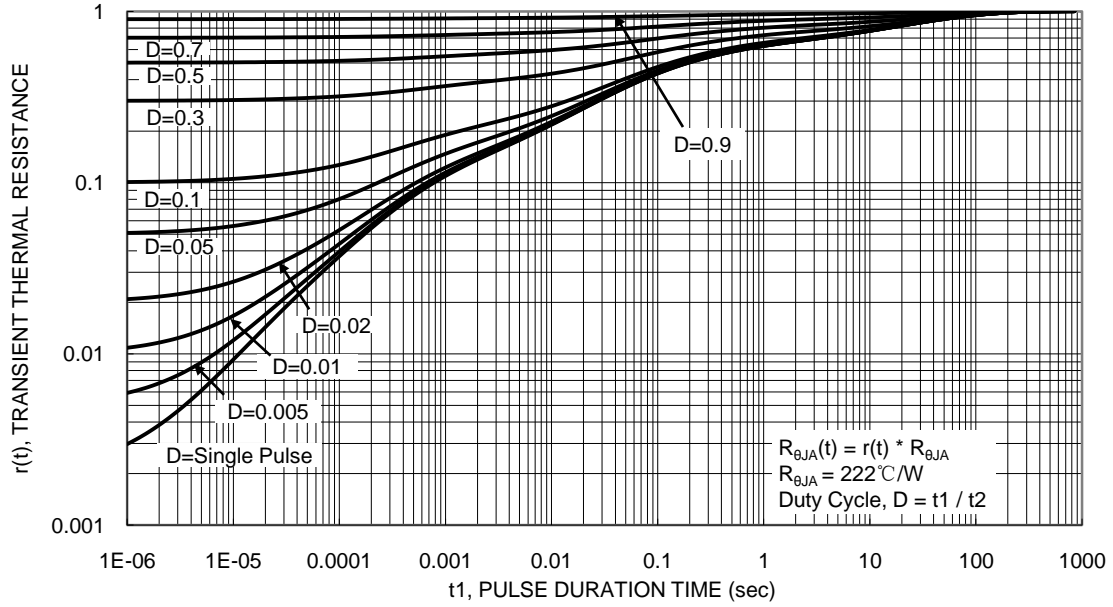
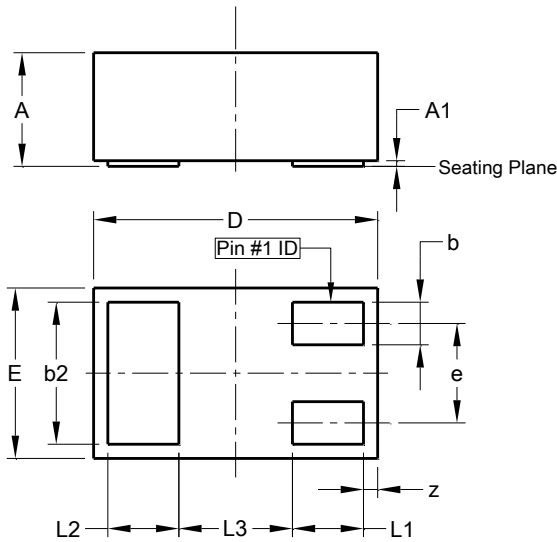


Figure 13. Transient Thermal Resistance

### Package Outline Dimensions

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

#### X2-DFN1006-3



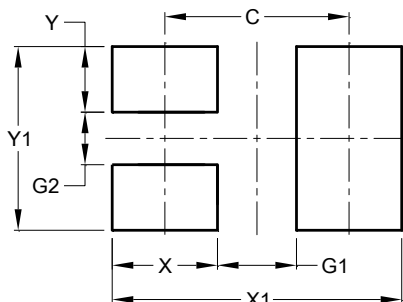
X2-DFN1006-3			
Dim	Min	Max	Typ
A	-	0.40	-
A1	0.00	0.05	0.03
b	0.10	0.20	0.15
b2	0.45	0.55	0.50
D	0.95	1.05	1.00
E	0.55	0.65	0.60
e	-	-	0.35
L1	0.20	0.30	0.25
L2	0.20	0.30	0.25
L3	-	-	0.40
z	0.02	0.08	0.05
<b>All Dimensions in mm</b>			



## Suggested Pad Layout

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

### X2-DFN1006-3



Dimensions	Value (in mm)
C	0.70
G1	0.30
G2	0.20
X	0.40
X1	1.10
Y	0.25
Y1	0.70

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