

## Product Summary

BV <sub>DSS</sub>	R <sub>DS(ON)</sub>	I <sub>D</sub> T <sub>A</sub> = +25°C
30V	460mΩ @ V <sub>GS</sub> = 4.5V	1.2A
	560mΩ @ V <sub>GS</sub> = 2.5V	1.0A

## Description

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.

## Applications

- Load Switch
- Portable Applications
- Power Management Functions

## Features and Benefits

- 0.4mm Ultra Low Profile Package for Thin Application
- 0.6mm<sup>2</sup> Package Footprint, 10 times Smaller than SOT23
- Low V<sub>GS(TH)</sub>, Can Be Driven Directly From A Battery
- Low R<sub>DS(ON)</sub>
- **ESD Protected Gate**
- **Totally Lead-Free & Fully RoHS Compliant (Notes 1 & 2)**
- **Halogen and Antimony Free. "Green" Device (Note 3)**

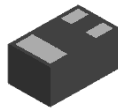
## Mechanical Data

- 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
- Weight: 0.001 grams (Approximate)

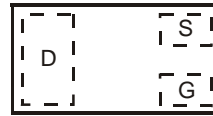


ESD PROTECTED

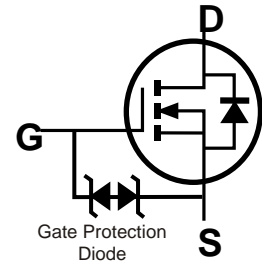
X2-DFN1006-3



Bottom View



Top View



Gate Protection Diode

Equivalent Circuit

## Ordering Information (Note 4)

Part Number	Marking	Reel Size (inches)	Tape Width (mm)	Tape Pitch (mm)	Quantity Per Reel
DMN3731UFB4-7B	BR	7	8	2	10,000

- 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

<b>DMN3731UFB4-7B</b>	<p>Top View Bar Denotes Gate and Source Side</p>	<b>BR = Part Marking Code</b>

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

Characteristic	Symbol	Value	Unit	
Drain-Source Voltage	V <sub>DSS</sub>	30	V	
Gate-Source Voltage	V <sub>GSS</sub>	±8		
Continuous Drain Current (Note 6) V <sub>GS</sub> = 4.5V	I <sub>D</sub>	T <sub>A</sub> = +25°C T <sub>A</sub> = +70°C	1.2 0.9	A
Maximum Continuous Body Diode Forward Current (Note 6)		I <sub>S</sub>	1.2	A
Pulsed Drain Current (10µs Pulse, Duty Cycle = 1%)	I <sub>DM</sub>	3	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>	0.52	W
Thermal Resistance, Junction to Ambient (Note 5)	R <sub>θJA</sub>	240	°C/W
Total Power Dissipation (Note 6)	P <sub>D</sub>	0.97	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>	30	—	—	V	V <sub>GS</sub> = 0V, I <sub>D</sub> = 10µA
Zero Gate Voltage Drain Current	I <sub>DSS</sub>	—	—	1	µA	V <sub>DS</sub> = 30V, V <sub>GS</sub> = 0V
Gate-Source Leakage	I <sub>GSS</sub>	—	—	3	µA	V <sub>GS</sub> = ±8V, V <sub>DS</sub> = 0V
<b>ON CHARACTERISTICS (Note 7)</b>						
Gate Threshold Voltage	V <sub>GS(TH)</sub>	0.45	—	0.95	V	V <sub>DS</sub> = V <sub>GS</sub> , I <sub>D</sub> = 250µA
Static Drain-Source On-Resistance	R <sub>DS(ON)</sub>	—	297	460	mΩ	V <sub>GS</sub> = 4.5V, I <sub>D</sub> = 200mA
		—	311	560		V <sub>GS</sub> = 2.5V, I <sub>D</sub> = 100mA
		—	335	730		V <sub>GS</sub> = 1.8V, I <sub>D</sub> = 75mA
Diode Forward Voltage	V <sub>SD</sub>	—	1.0	1.2	V	V <sub>GS</sub> = 0V, I <sub>S</sub> = 300mA
<b>DYNAMIC CHARACTERISTICS (Note 8)</b>						
Input Capacitance	C <sub>iss</sub>	—	73	—	pF	V <sub>DS</sub> = 25V, V <sub>GS</sub> = 0V, f = 1.0MHz
Output Capacitance	C <sub>oss</sub>	—	7.2	—	pF	
Reverse Transfer Capacitance	C <sub>rss</sub>	—	5	—	pF	
Gate Resistance	R <sub>g</sub>	—	902	—	Ω	V <sub>DS</sub> = 0V, V <sub>GS</sub> = 0V, f = 1MHz
Total Gate Charge	Q <sub>g</sub>	—	5.5	—	nC	V <sub>GS</sub> = 4.5V, V <sub>DS</sub> = 15V, I <sub>D</sub> = 1A
Gate-Source Charge	Q <sub>gs</sub>	—	0.8	—	nC	
Gate-Drain Charge	Q <sub>gd</sub>	—	1.4	—	nC	
Turn-On Delay Time	t <sub>D(ON)</sub>	—	2.5	—	ns	V <sub>DS</sub> = 10V, I <sub>D</sub> = 1A V <sub>GS</sub> = 10V, R <sub>G</sub> = 6Ω
Turn-On Rise Time	t <sub>R</sub>	—	3.1	—	ns	
Turn-Off Delay Time	t <sub>D(OFF)</sub>	—	477	—	ns	
Turn-Off Fall Time	t <sub>F</sub>	—	123	—	ns	
Reverse Recovery Time	t <sub>RR</sub>	—	59	—	ns	I <sub>F</sub> = 1A, di/dt = 100A/µs
Reverse Recovery Charge	Q <sub>RR</sub>	—	25	—	nC	I <sub>F</sub> = 1A, di/dt = 100A/µs

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

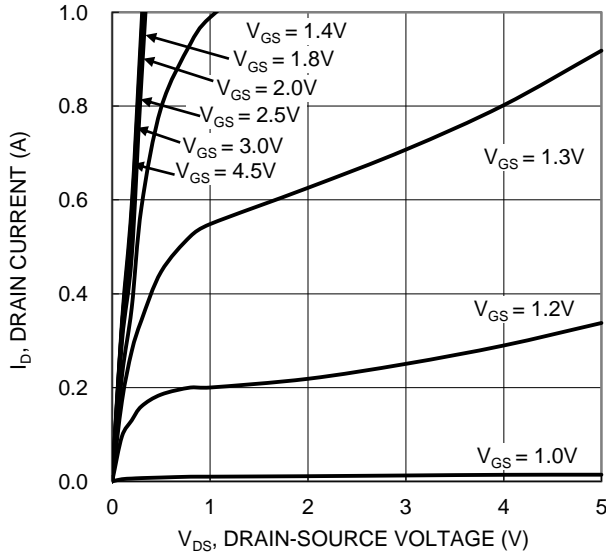


Figure 1. Typical Output Characteristic

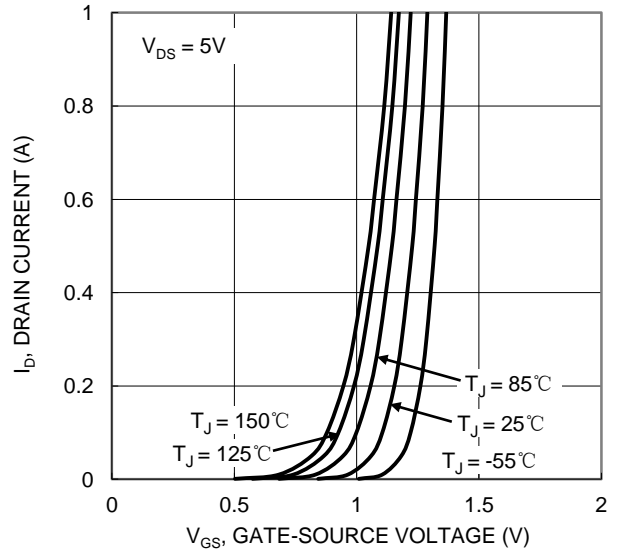


Figure 2. Typical Transfer Characteristic

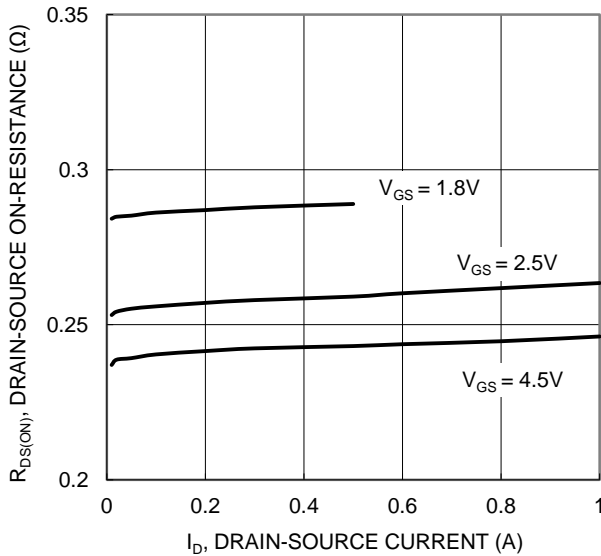


Figure 3. Typical On-Resistance vs. Drain Current and Gate Voltage

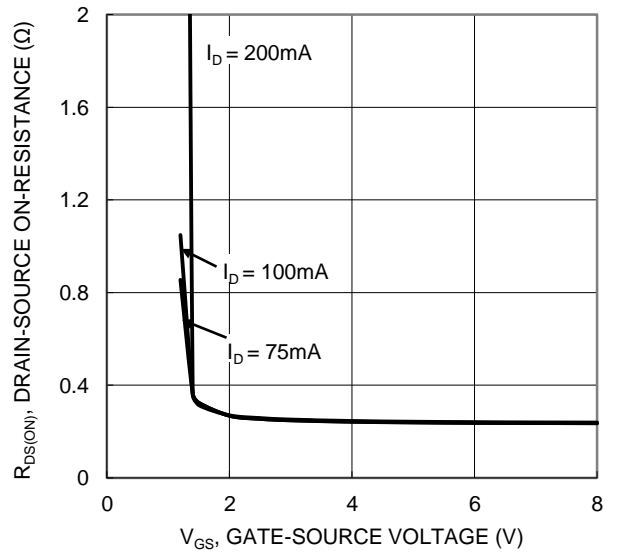


Figure 4. Typical Transfer Characteristic

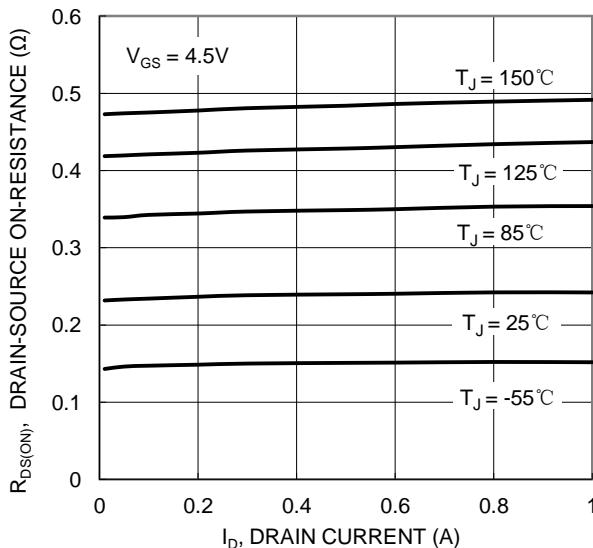


Figure 5. Typical On-Resistance vs. Drain Current and Junction Temperature

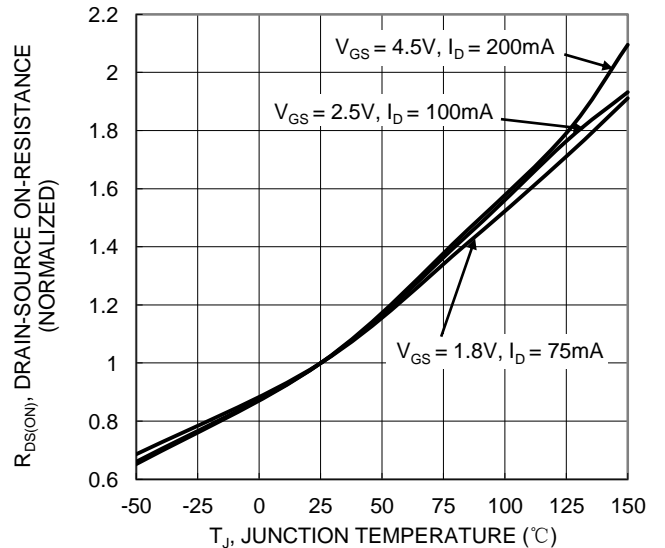


Figure 6. On-Resistance Variation with Junction Temperature

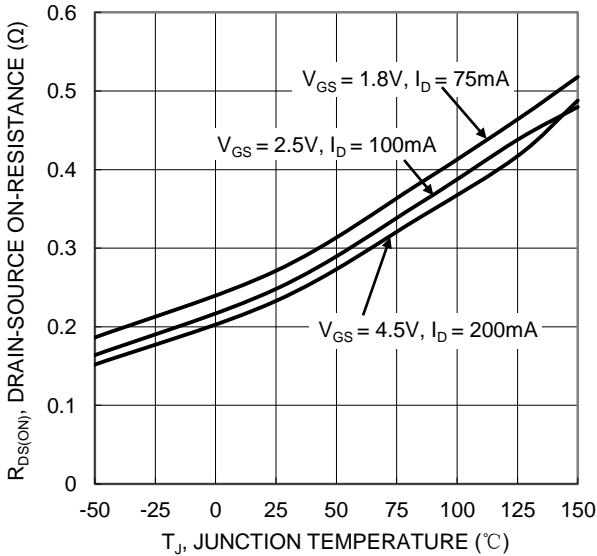


Figure 7. On-Resistance Variation with Junction Temperature

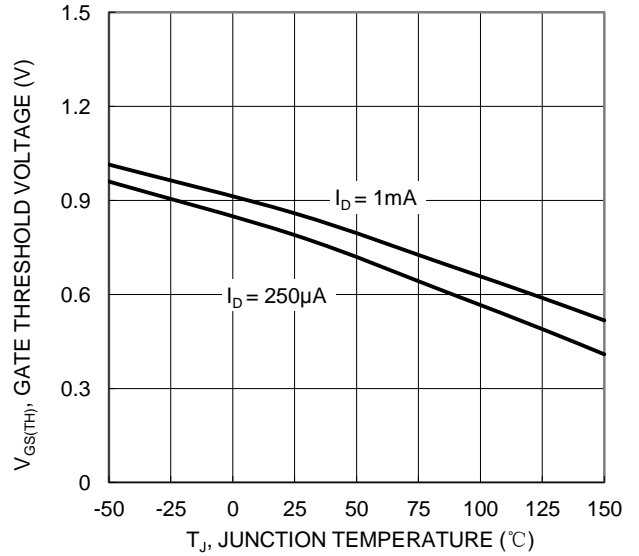


Figure 8. Gate Threshold Variation vs. Junction Temperature

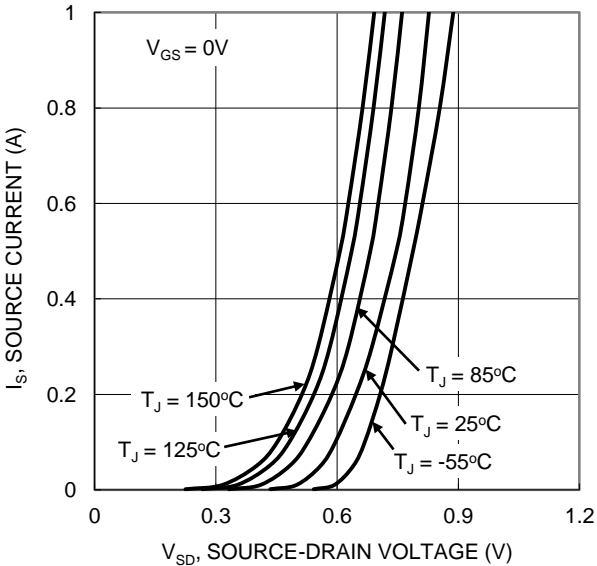


Figure 9. Diode Forward Voltage vs. Current

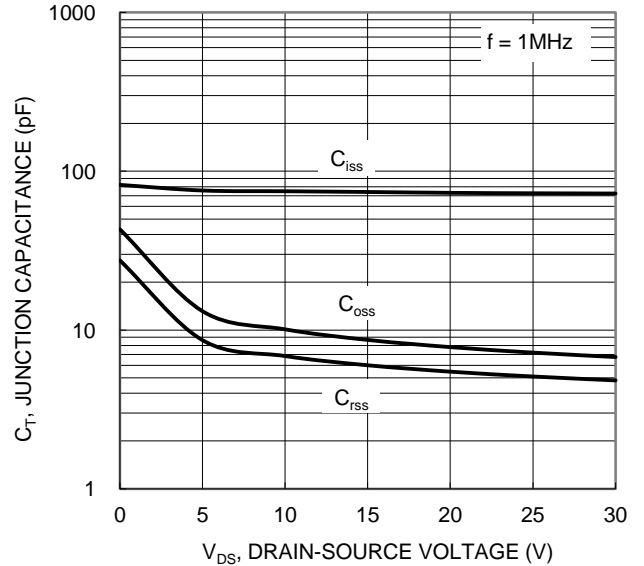


Figure 10. Typical Junction Capacitance

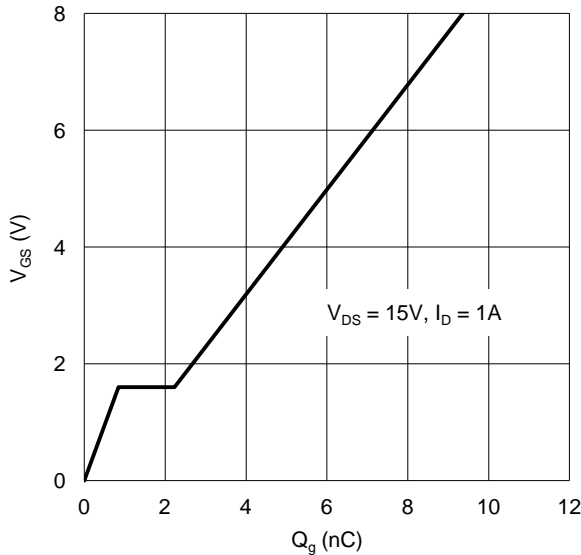


Figure 11. Gate Charge

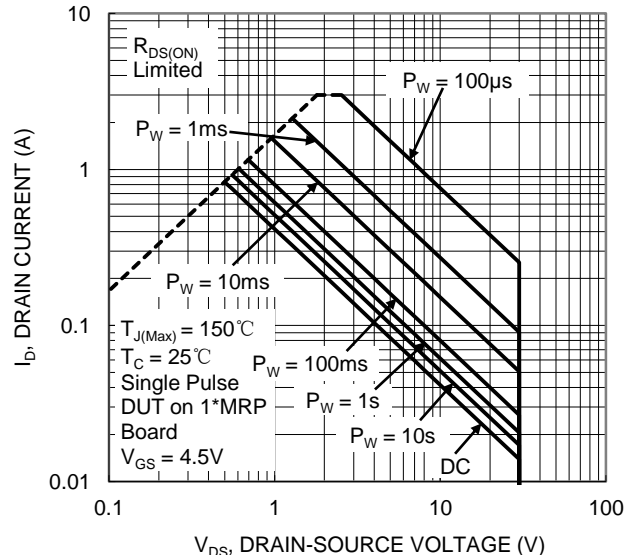


Figure 12. SOA, Safe Operation Area

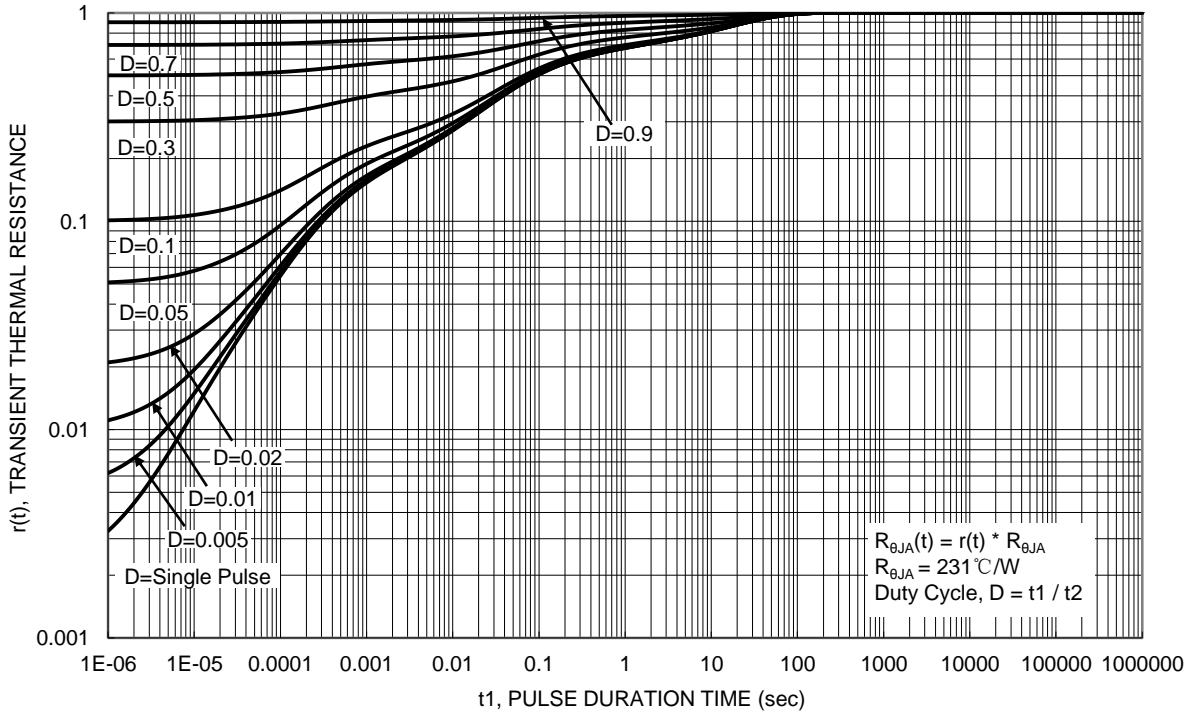
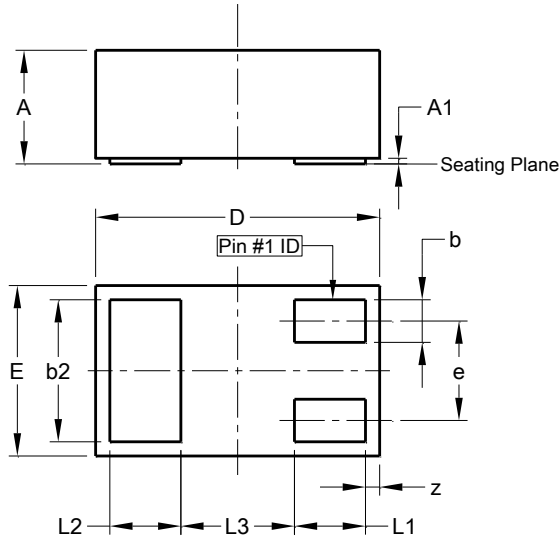


Figure 13. Transient Thermal Resistance

**Package Outline Dimensions**

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

**X2-DFN1006-3**

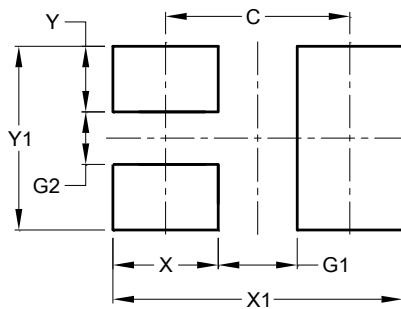


X2-DFN1006-3			
Dim	Min	Max	Typ
A	—	0.40	—
A1	0.00	0.05	0.03
b	0.10	0.20	0.15
b2	0.45	0.55	0.50
D	0.95	1.05	1.00
E	0.55	0.65	0.60
e	-	-	0.35
L1	0.20	0.30	0.25
L2	0.20	0.30	0.25
L3	-	-	0.40
z	0.02	0.08	0.05
<b>All Dimensions in mm</b>			

**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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