

Product Summary

BV _{DSS}	R _{DS(ON)} Max	I _D Max T _A = +25°C
20V	0.99Ω @ V _{GS} = 4.5V	0.55A
	1.2Ω @ V _{GS} = 2.5V	0.50A
	1.8Ω @ V _{GS} = 1.8V	0.41A
	2.4Ω @ V _{GS} = 1.5V	0.35A

Description

This MOSFET is 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

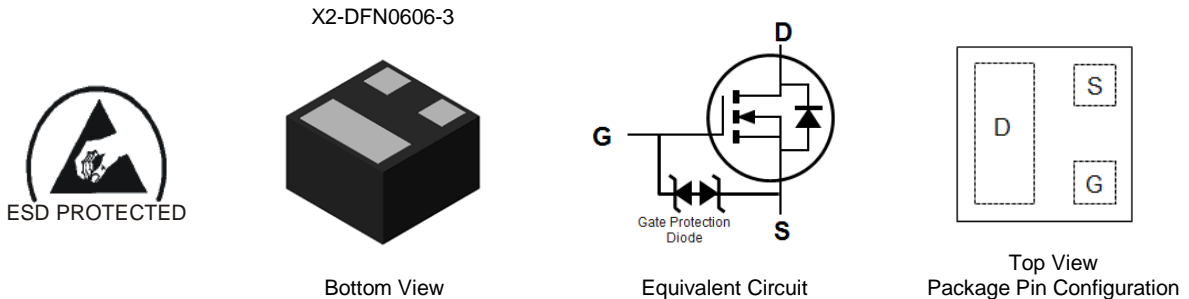
- General-purpose interfacing switches
- Power-management functions
- Analog switches

Features and Benefits

- Low Package Profile, 0.42mm Maximum Package Height
- 0.62mm x 0.62mm Package Footprint
- Low On-Resistance
- Very Low Gate Threshold Voltage, 1.0V Maximum
- ESD Protected Gate
- **Totally Lead-Free & Fully RoHS Compliant (Notes 1 & 2)**
- **Halogen and Antimony Free. "Green" Device (Note 3)**
- **An automotive-compliant part is available under separate datasheet ([DMN2991UFZQ](#))**

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)



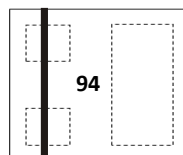
Ordering Information (Note 4)

Part Number	Package	Packing	
		Qty.	Carrier
DMN2991UFZ-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

X2-DFN0606-3



Top View

94 = Product Type Marking Code
Bar Denotes Gate and Source Side

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

Characteristic			Symbol	Value	Unit
Drain-Source Voltage			V _{DSS}	20	V
Gate-Source Voltage			V _{GSS}	±8	V
Continuous Drain Current (Note 5) V _{GS} = 4.5V	Steady State	T _A = +25°C T _A = +75°C	I _D	0.55 0.44	A
Maximum Body Diode Forward Current (Note 6)			I _S	0.7	A
Pulsed Drain Current (380µs Pulse, Duty Cycle = 1%)			I _{DM}	1.5	A

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

Characteristic		Symbol	Value	Unit
Power Dissipation (Note 5)	Steady State	P _D	0.45	W
Thermal Resistance, Junction to Ambient (Note 5)	Steady State	R _{θJA}	279	°C/W
Power Dissipation (Note 6)	Steady State	P _D	0.53	W
Thermal Resistance, Junction to Ambient (Note 6)	Steady State	R _{θJA}	148	°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}	20	—	—	V	V _{GS} = 0V, I _D = 250µA
Zero Gate Voltage Drain Current	I _{DSS}	—	—	1	µA	V _{DS} = 16V, V _{GS} = 0V
Gate-Source Leakage	I _{GSS}	—	—	1	µA	V _{GS} = ±5V, V _{DS} = 0V
ON CHARACTERISTICS (Note 7)						
Gate Threshold Voltage	V _{GS(TH)}	0.4	0.8	1.0	V	V _{DS} = V _{GS} , I _D = 250µA
Static Drain-Source On-Resistance	R _{DS(ON)}	—	0.60	0.99	Ω	V _{GS} = 4.5V, I _D = 100mA
		—	0.75	1.2		V _{GS} = 2.5V, I _D = 50mA
		—	0.90	1.8		V _{GS} = 1.8V, I _D = 20mA
		—	1.2	2.4		V _{GS} = 1.5V, I _D = 10mA
		—	2.0	—		V _{GS} = 1.2V, I _D = 1mA
Diode Forward Voltage	V _{SD}	—	0.6	1.0	V	V _{GS} = 0V, I _S = 150mA
DYNAMIC CHARACTERISTICS (Note 8)						
Input Capacitance	C _{iss}	—	21.5	—	pF	V _{DS} = 16V, V _{GS} = 0V, f = 1.0MHz
Output Capacitance	C _{oss}	—	4.9	—	pF	
Reverse Transfer Capacitance	C _{rss}	—	3.7	—	pF	
Total Gate Charge	Q _g	—	0.35	—	nC	V _{GS} = 4.5V, V _{DS} = 10V, I _D = 250mA
Gate-Source Charge	Q _{gs}	—	0.07	—	nC	
Gate-Drain Charge	Q _{gd}	—	0.08	—	nC	
Turn-On Delay Time	t _{D(ON)}	—	5.6	—	ns	V _{DD} = 10V, V _{GS} = 4.5V, R _L = 47Ω, R _g = 10Ω, I _D = 200mA
Turn-On Rise Time	t _R	—	4.9	—	ns	
Turn-Off Delay Time	t _{D(OFF)}	—	60.6	—	ns	
Turn-Off Fall Time	t _F	—	27.6	—	ns	
Reverse Recovery Time	t _{RR}	—	12.3	—	ns	I _F = 1.0A, di/dt = 100A/µs
Reverse Recovery Charge	Q _{RR}	—	1.1	—	nC	I _F = 1.0A, di/dt = 100A/µs

- Notes:
5. Device mounted on FR-4 PCB, with minimum recommended pad layout.
 6. Device mounted on FR-4 substrate PC board, 2oz copper, with thermal vias to bottom layer 1inch square copper plate.
 7. Short duration pulse test used to minimize self-heating effect.
 8. Guaranteed by design. Not subject to product testing.

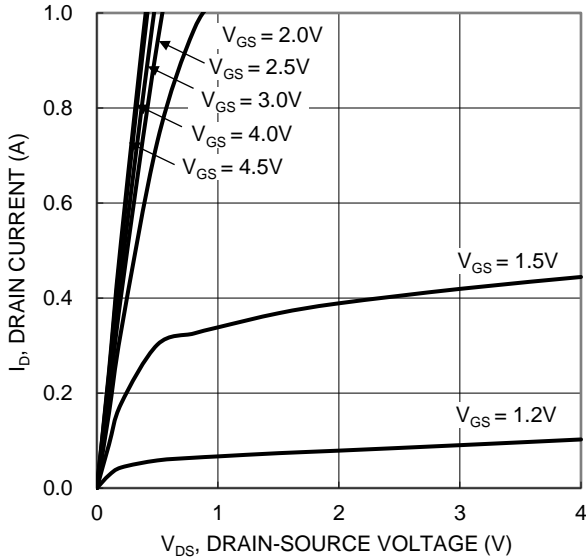


Figure 1. Typical Output Characteristic

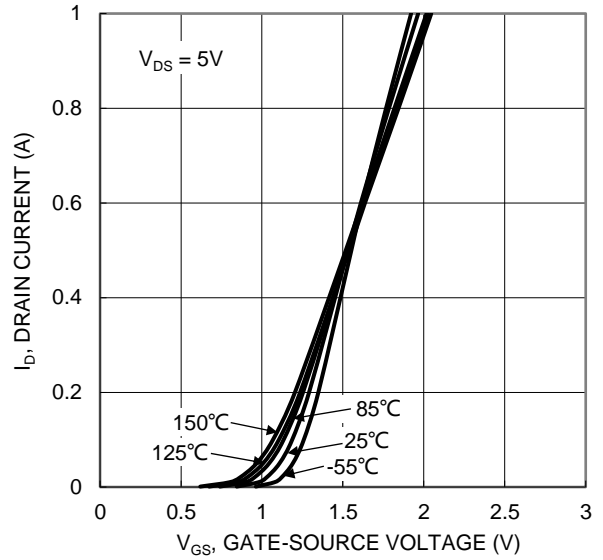


Figure 2. Typical Transfer Characteristic

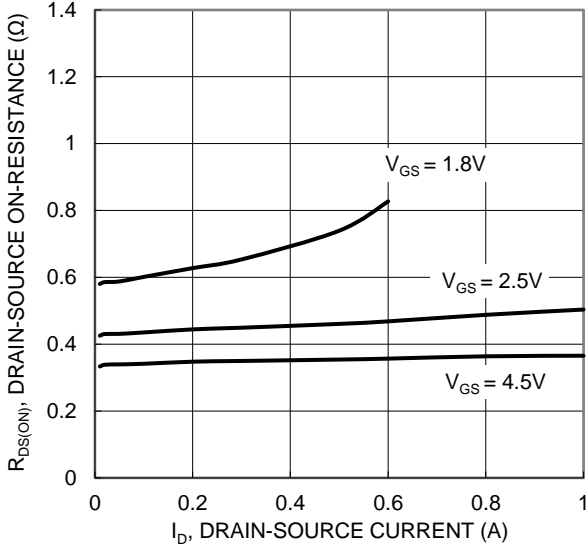


Figure 3. Typical On-Resistance vs. Drain Current and Gate Voltage

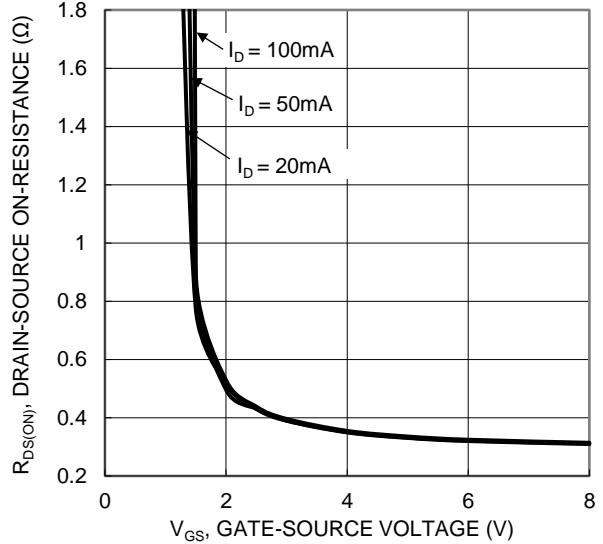


Figure 4. Typical Transfer Characteristic

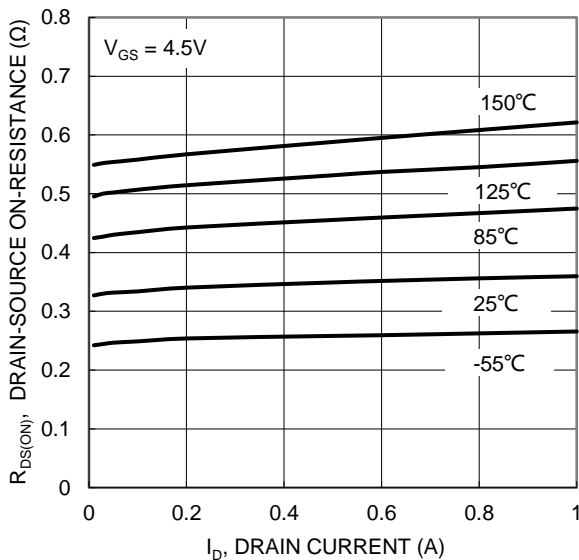


Figure 5. Typical On-Resistance vs. Drain Current and Junction Temperature

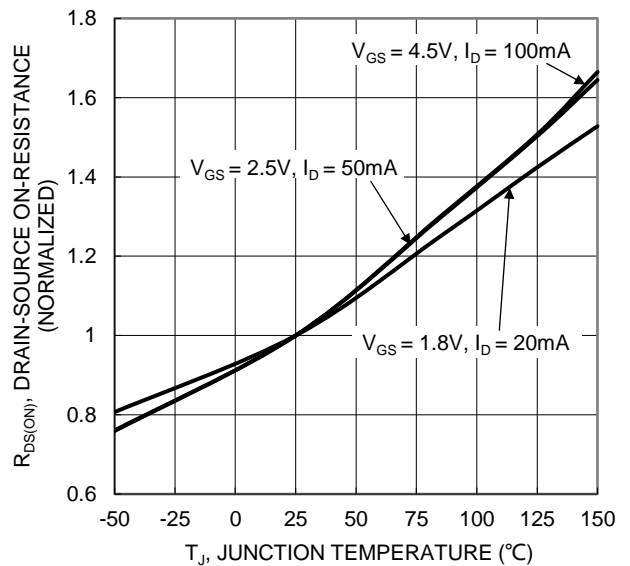


Figure 6. On-Resistance Variation with Junction Temperature

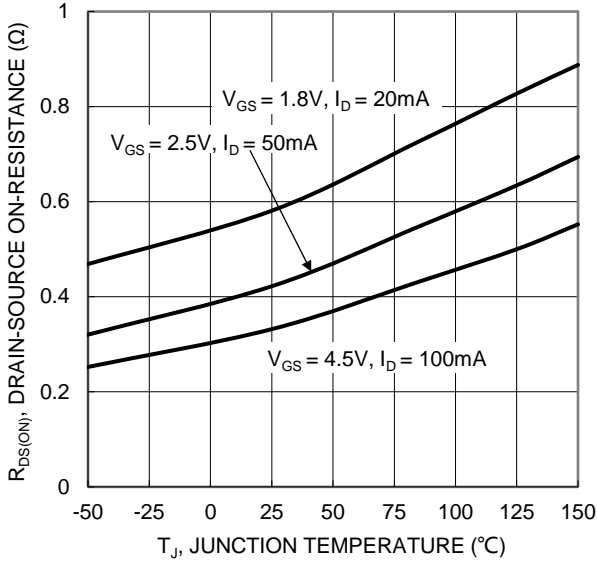


Figure 7. On-Resistance Variation with Junction Temperature

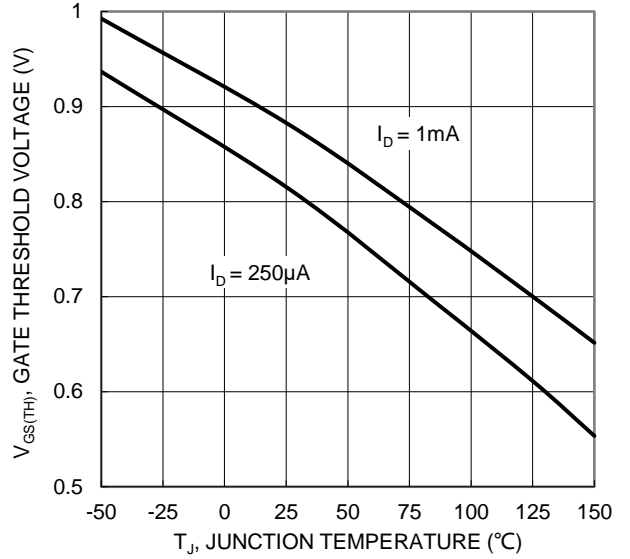


Figure 8. Gate Threshold Variation vs. Junction Temperature

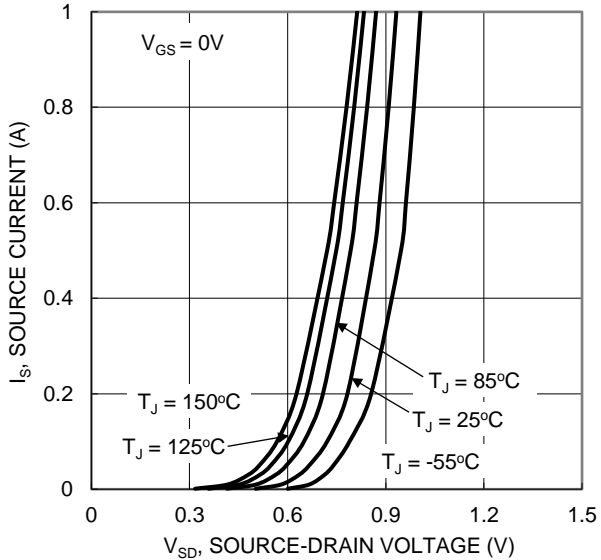


Figure 9. Diode Forward Voltage vs. Current

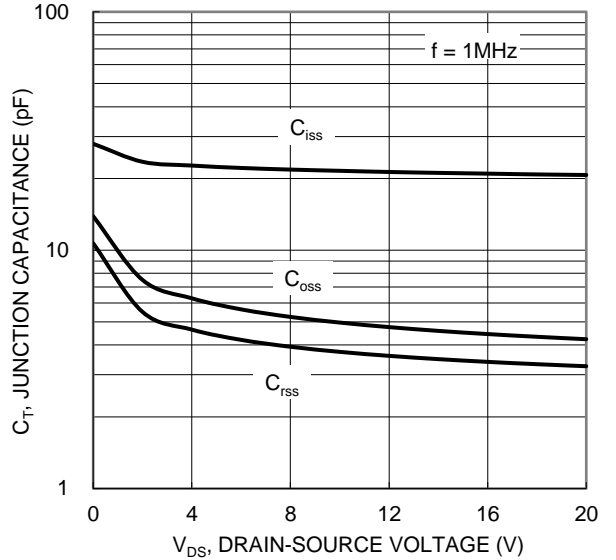


Figure 10. Typical Junction Capacitance

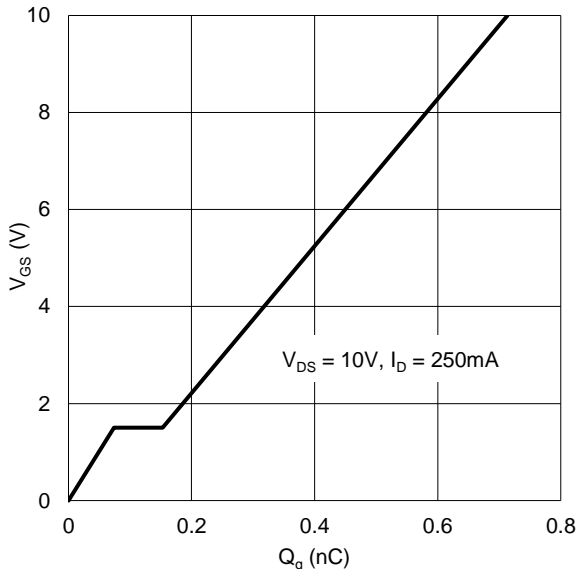


Figure 11. Gate Charge

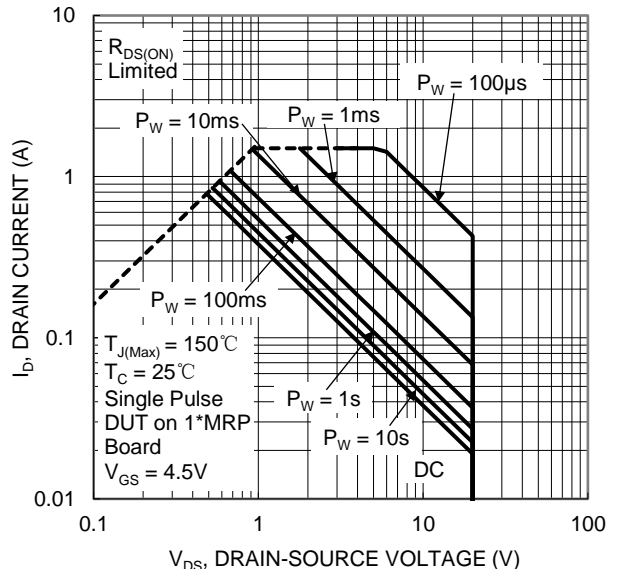


Figure 12. SOA, Safe Operation Area

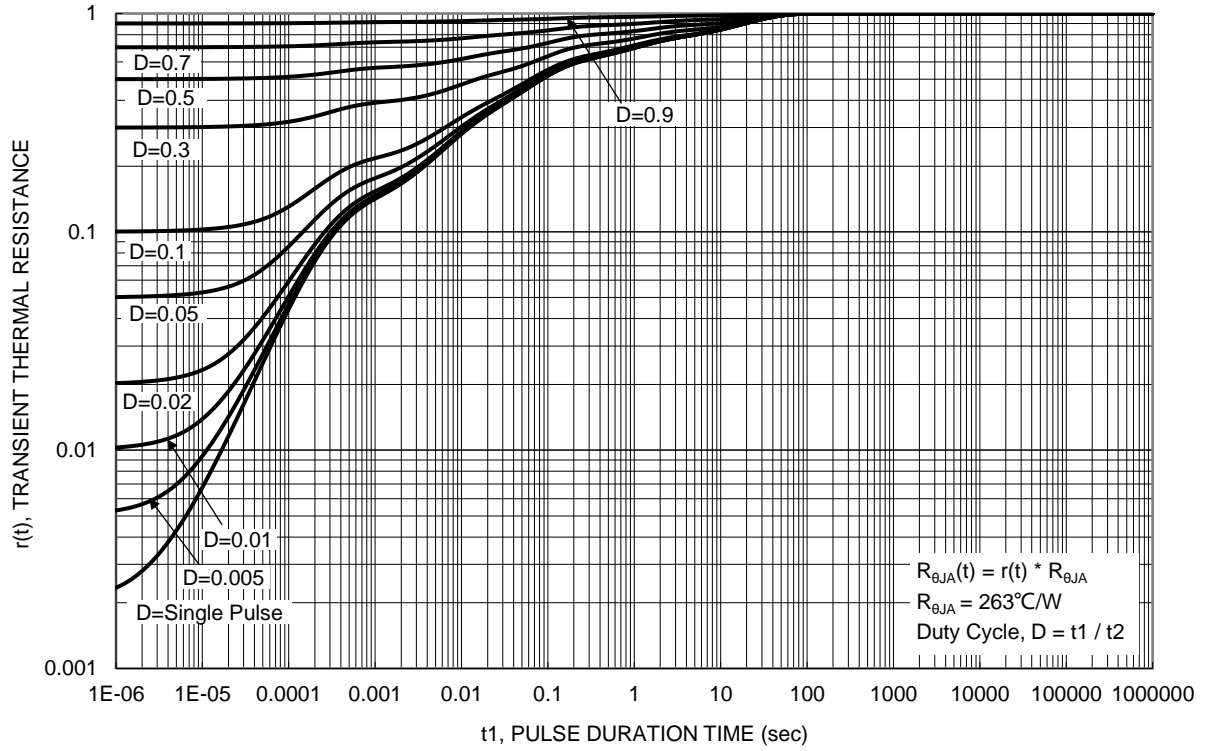
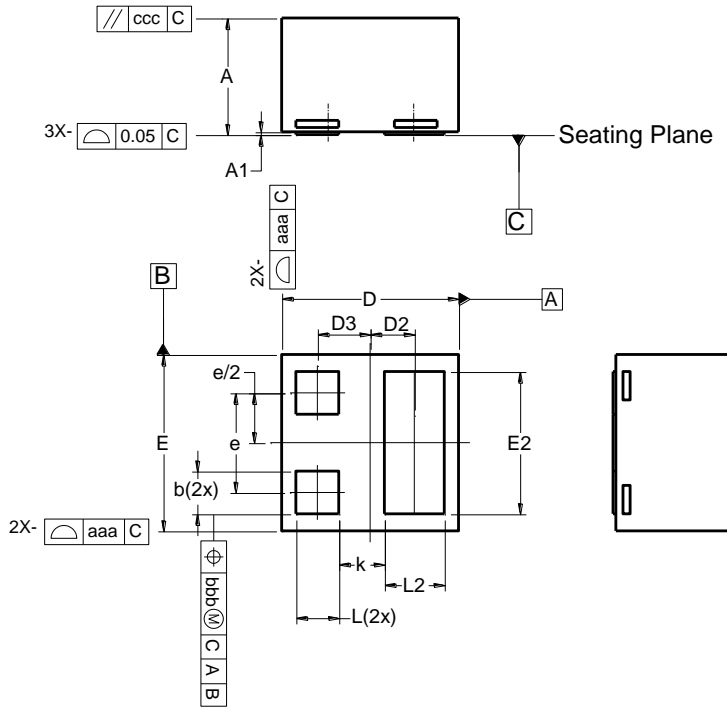


Figure 13. Transient Thermal Resistance

Package Outline Dimensions

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

X2-DFN0606-3

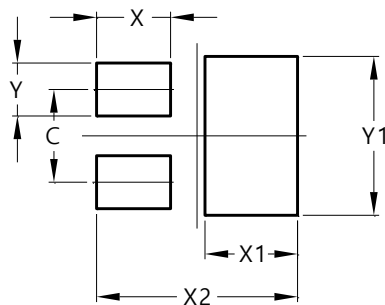


X2-DFN0606-3			
Dim	Min	Max	Typ
A	0.36	0.40	0.39
A1	0.00	0.05	0.02
b	0.10	0.20	0.15
D	0.57	0.67	0.62
D2	0.155 BSC		
D3	0.185 BSC		
E	0.57	0.67	0.62
E2	0.40	0.60	0.50
e	0.35 BSC		
k	0.16 REF		
L	0.10	0.20	0.15
L2	0.11	0.31	0.21
aaa	0.08		
bbb	0.07		
ccc	0.05		
All Dimensions in mm			

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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