

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.

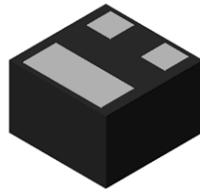
Applications

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



ESD PROTECTED

X2-DFN0606-3



Bottom View

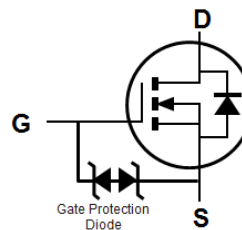
Features and Benefits

- Low Package Profile, 0.42mm Maximum Package Height
- 0.62mm × 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)**
- **The DMN2991UFZQ is suitable for automotive applications requiring specific change control; this part is AEC-Q101 qualified, PPAP capable, and manufactured in IATF 16949 certified facilities.**

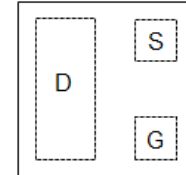
<https://www.diodes.com/quality/product-definitions/>

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 (M4)
- Weight: 0.001 grams (Approximate)



Equivalent Circuit



Top View
Package Pin Configuration

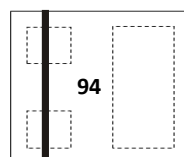
Ordering Information (Note 4)

Part Number	Package	Packing	
		Qty.	Carrier
DMN2991UFZQ-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 (@ $T_A = +25^\circ\text{C}$, 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) $V_{GS} = 4.5\text{V}$	Steady State	I_D	$T_A = +25^\circ\text{C}$ $T_A = +75^\circ\text{C}$	A
Maximum Body Diode Forward Current (Note 6)			I_S	0.7
Pulsed Drain Current (380 μs Pulse, Duty Cycle = 1%)		I_{DM}	1.5	A

Thermal Characteristics (@ $T_A = +25^\circ\text{C}$, 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	$R_{\theta JA}$	279	$^\circ\text{C/W}$
Power Dissipation (Note 6)	Steady State	P_D	0.53	W
Thermal Resistance, Junction to Ambient (Note 6)	Steady State	$R_{\theta JA}$	148	$^\circ\text{C/W}$
Operating and Storage Temperature Range		T_J, T_{STG}	-55 to +150	$^\circ\text{C}$

Electrical Characteristics (@ $T_A = +25^\circ\text{C}$, unless otherwise specified.)

Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
OFF CHARACTERISTICS (Note 7)						
Drain-Source Breakdown Voltage	BV_{DSS}	20	—	—	V	$V_{GS} = 0\text{V}, I_D = 250\mu\text{A}$
Zero Gate Voltage Drain Current	I_{DSS}	—	—	1	μA	$V_{DS} = 16\text{V}, V_{GS} = 0\text{V}$
Gate-Source Leakage	I_{GSS}	—	—	1	μA	$V_{GS} = \pm 5\text{V}, V_{DS} = 0\text{V}$
ON CHARACTERISTICS (Note 7)						
Gate Threshold Voltage	$V_{GS(TH)}$	0.4	—	1.0	V	$V_{DS} = V_{GS}, I_D = 250\mu\text{A}$
Static Drain-Source On-Resistance	$R_{DS(ON)}$	—	0.60	0.99	Ω	$V_{GS} = 4.5\text{V}, I_D = 100\text{mA}$
		—	0.75	1.2		$V_{GS} = 2.5\text{V}, I_D = 50\text{mA}$
		—	0.90	1.8		$V_{GS} = 1.8\text{V}, I_D = 20\text{mA}$
		—	1.2	2.4		$V_{GS} = 1.5\text{V}, I_D = 10\text{mA}$
		—	—	—		$V_{GS} = 1.5\text{V}, I_D = 10\text{mA}$
Diode Forward Voltage	V_{SD}	—	0.6	1.0	V	$V_{GS} = 0\text{V}, I_S = 150\text{mA}$
DYNAMIC CHARACTERISTICS (Note 8)						
Input Capacitance	C_{iss}	—	14.6	—	pF	$V_{DS} = 16\text{V}, V_{GS} = 0\text{V}$ $f = 1.0\text{MHz}$
Output Capacitance	C_{oss}	—	4.7	—	pF	
Reverse Transfer Capacitance	C_{rss}	—	3.2	—	pF	
Total Gate Charge	Q_g	—	0.28	—	nC	$V_{GS} = 4.5\text{V}, V_{DS} = 10\text{V}$ $I_D = 250\text{mA}$
Gate-Source Charge	Q_{gs}	—	0.04	—	nC	
Gate-Drain Charge	Q_{gd}	—	0.1	—	nC	
Turn-On Delay Time	$t_{D(ON)}$	—	7.1	—	ns	$V_{DD} = 10\text{V}, V_{GS} = 4.5\text{V}$ $R_L = 47\Omega, R_G = 10\Omega$ $I_D = 200\text{mA}$
Turn-On Rise Time	t_r	—	18	—	ns	
Turn-Off Delay Time	$t_{D(OFF)}$	—	125	—	ns	
Turn-Off Fall Time	t_f	—	56.9	—	ns	
		—	—	—	ns	

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

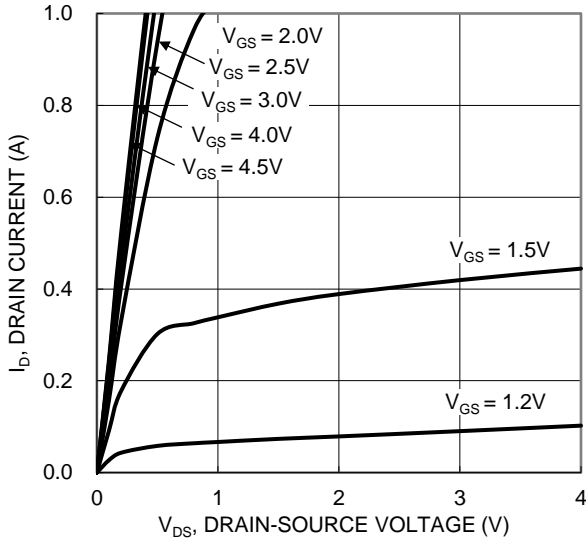


Figure 1. Typical Output Characteristic

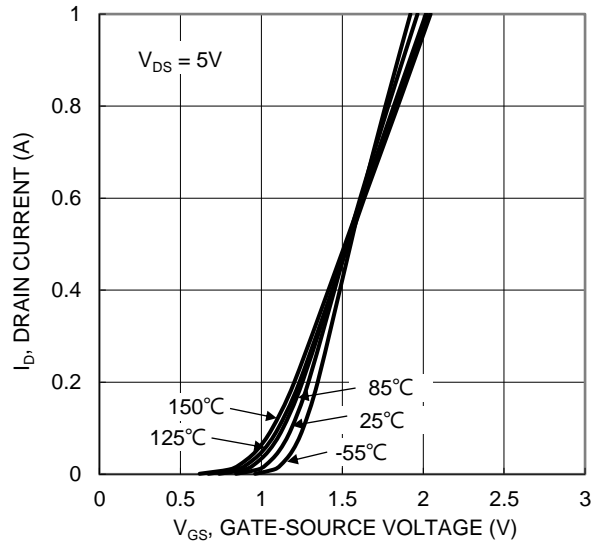


Figure 2. Typical Transfer Characteristic

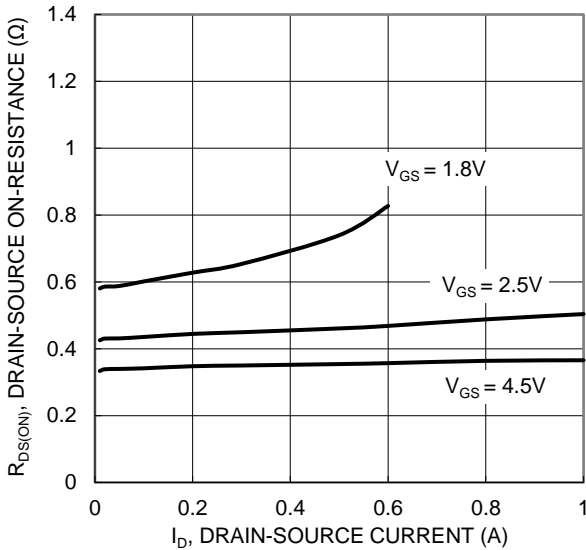


Figure 3. Typical On-Resistance vs. Drain Current and Gate Voltage

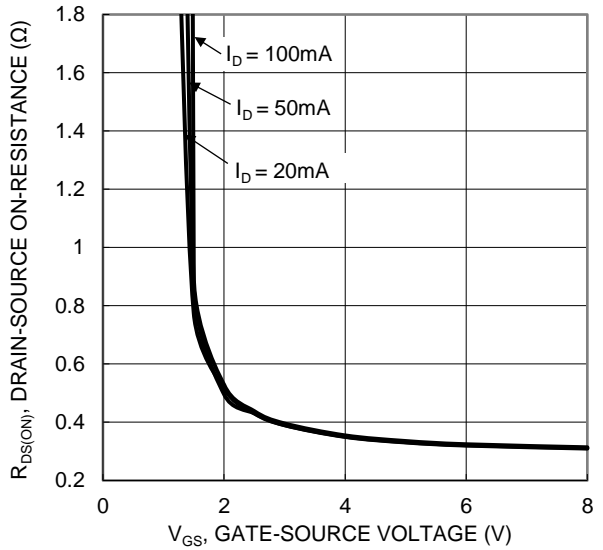


Figure 4. Typical Transfer Characteristic

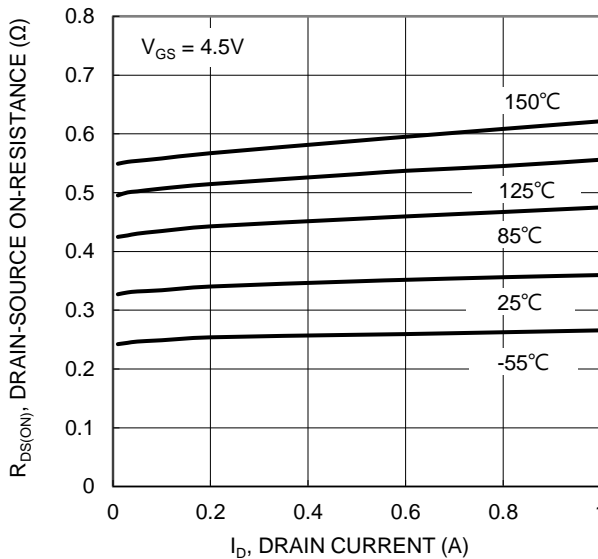


Figure 5. Typical On-Resistance vs. Drain Current and Junction Temperature

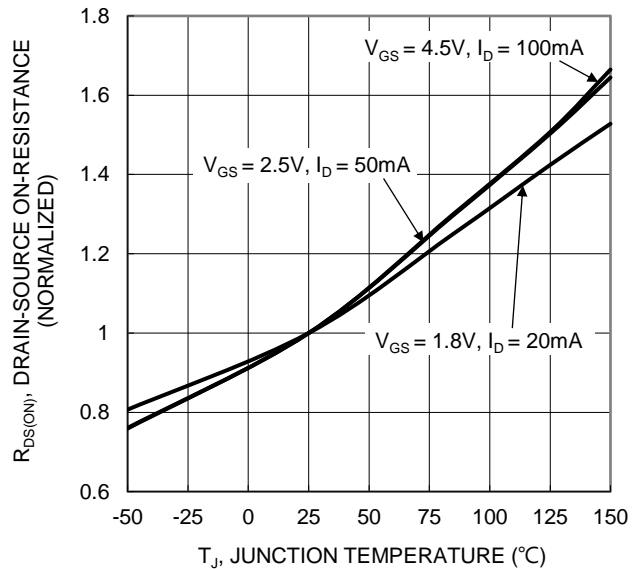


Figure 6. On-Resistance Variation with Junction Temperature

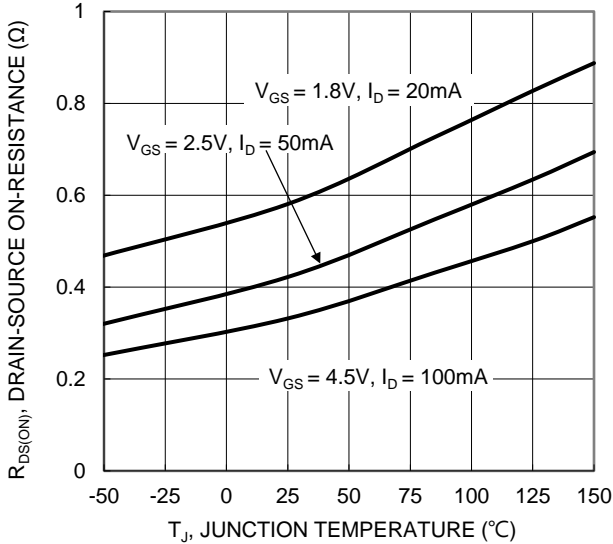


Figure 7. On-Resistance Variation with Junction Temperature

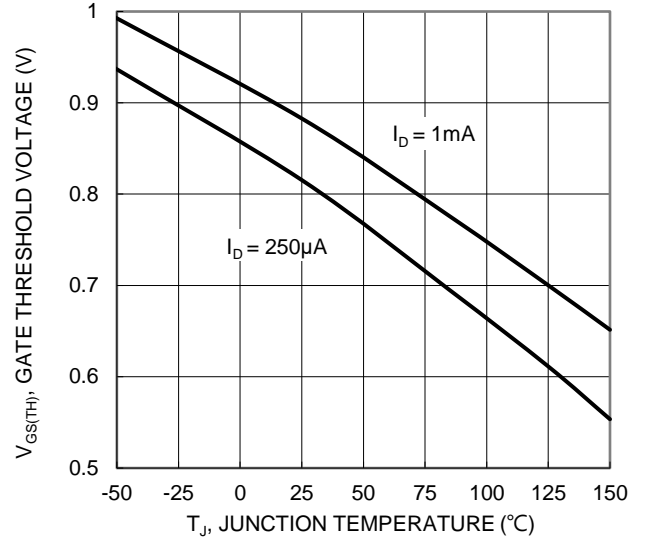


Figure 8. Gate Threshold Variation vs. Junction Temperature

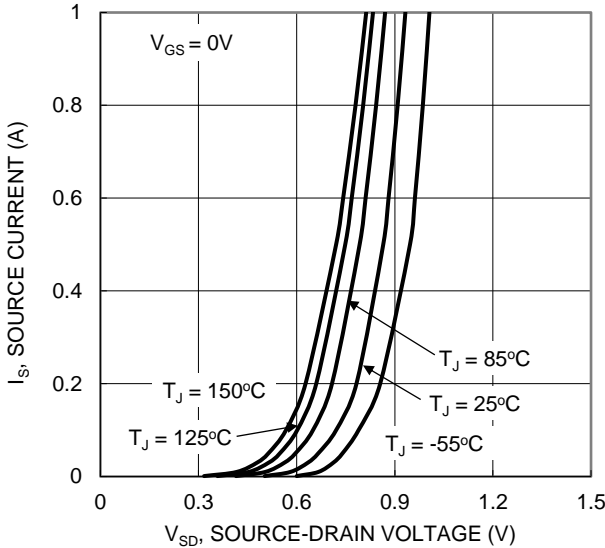


Figure 9. Diode Forward Voltage vs. Current

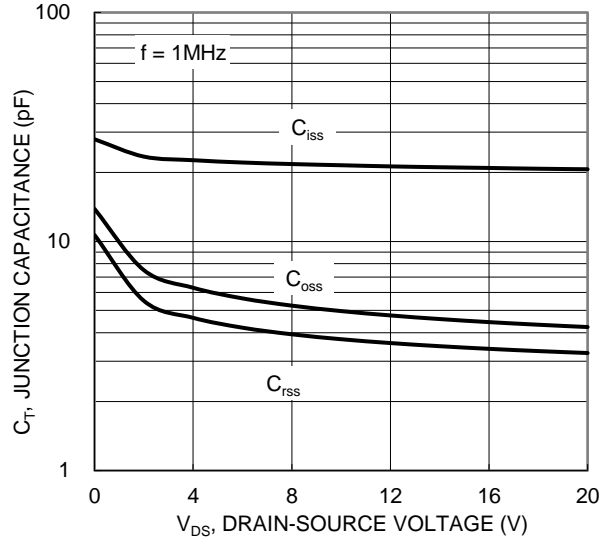


Figure 10. Typical Junction Capacitance

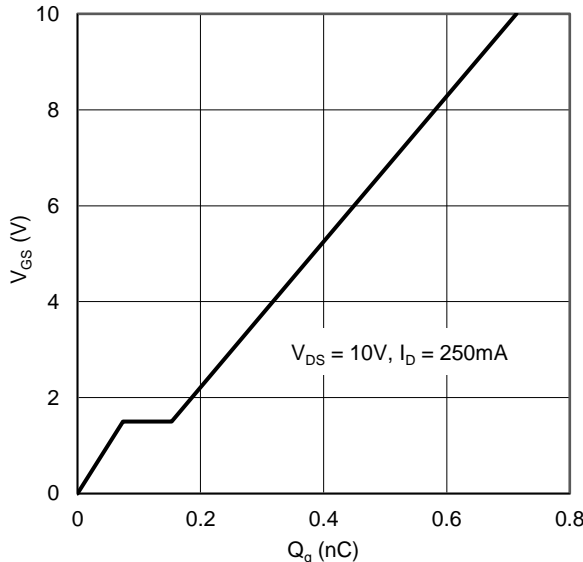


Figure 11. Gate Charge

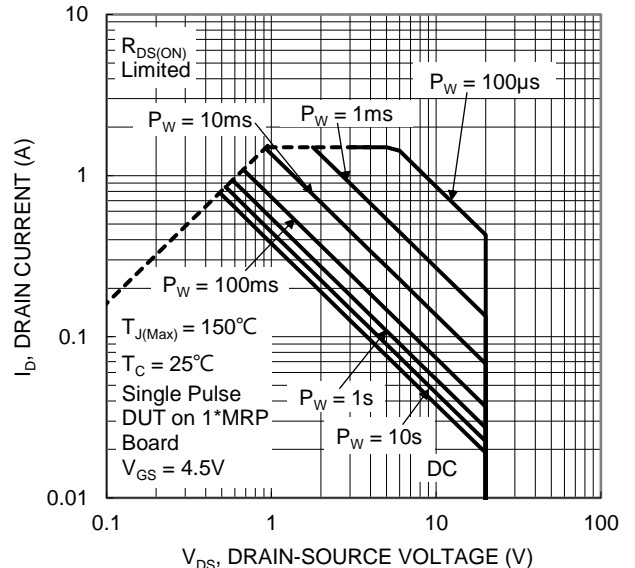


Figure 12. SOA, Safe Operation Area

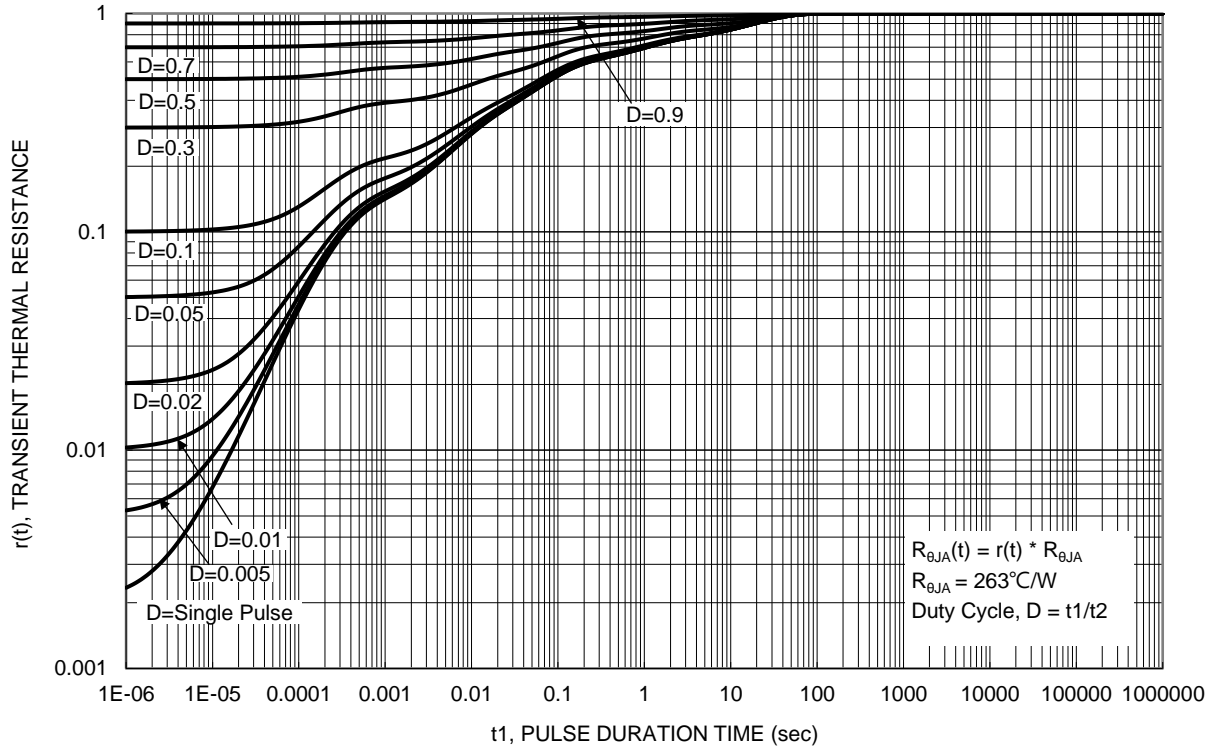
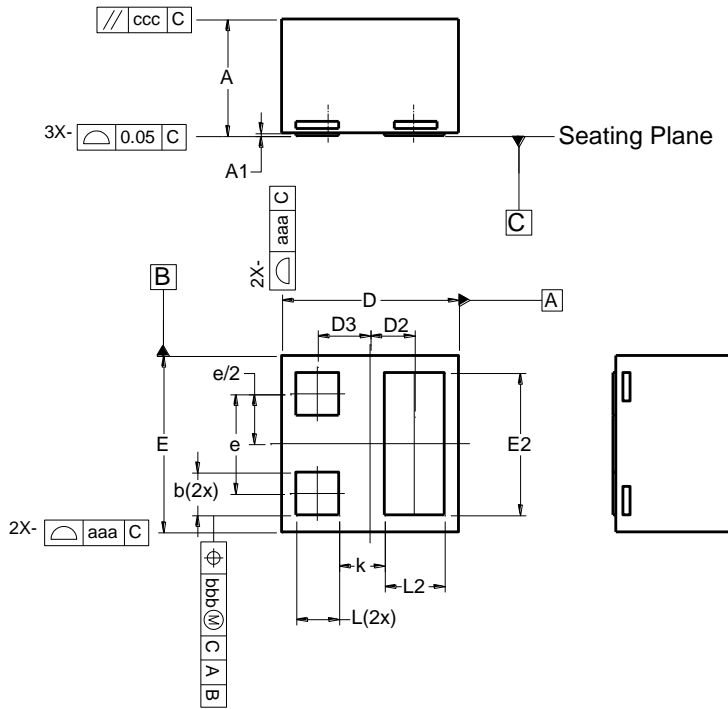


Figure 13. Transient Thermal Resistance

Package Outline Dimensions

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

X2-DFN0606-3

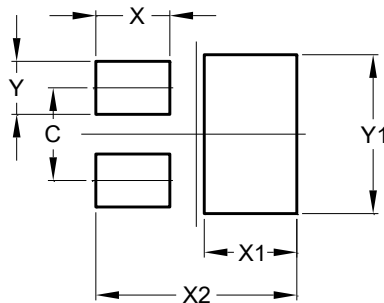


X2-DFN0606-3			
Dim	Min	Max	Typ
A	0.36	0.40	0.39
A1	0.00	0.05	0.02
b	0.10	0.20	0.15
D	0.57	0.67	0.62
D2	0.155 BSC		
D3	0.185 BSC		
E	0.57	0.67	0.62
E2	0.40	0.60	0.50
e	0.35 BSC		
k	0.16 REF		
L	0.10	0.20	0.15
L2	0.11	0.31	0.21
aaa	0.08		
bbb	0.07		
ccc	0.05		
All Dimensions in mm			

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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