

Product Summary

BV _{DSS}	R _{DS(ON)} MAX	I _D MAX T _A = +25°C
20V	0.6Ω @ V _{GS} = 4.5V	1.2A
	0.8Ω @ V _{GS} = 2.5V	1.1A
	1.0Ω @ V _{GS} = 1.8V	0.9A

Features

- 0.6mm Profile – Ideal for Low Profile Applications
- PCB Footprint of 4mm²
- Low Gate Threshold Voltage
- Low On-Resistance
- ESD Protected Gate
- Wettable Flank for Improved Optical Inspection
- **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-Q100/101/104/200, PPAP capable, and manufactured in IATF 16949 certified facilities), please [contact us](mailto:contact@diodes.com) or your local Diodes representative.**
<https://www.diodes.com/quality/product-definitions/>

Description and Applications

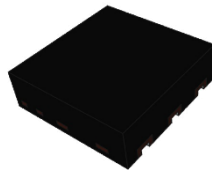
This new generation MOSFET is designed to minimize the on-state resistance (R_{DS(ON)}) yet maintain superior switching performance, making it ideal for high-efficiency power-management applications.

- Power-management functions
- General-purpose interfacing switches

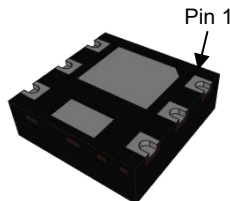
Mechanical Data

- Package: U-DFN2020-6
- 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 **(@4)**
- Weight: 0.0065 grams (Approximate)

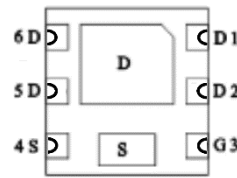
U-DFN2020-6/SWP (Type UXG)



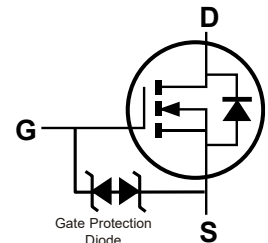
Top View



Bottom View



Pinout
Bottom View



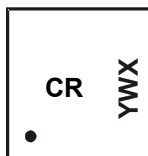
Equivalent Circuit

Ordering Information (Note 4)

Orderable Part Number	Package	Packing	
		Qty.	Carrier
DMN2451UFDFW-7	U-DFN2020-6/SWP (Type UXG)	3,000	Tape & Reel
DMN2451UFDFW-13	U-DFN2020-6/SWP (Type UXG)	10,000	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



CR = Product Type Marking Code
 YWX = Date Code Marking
 Y = Year (ex: 5 = 2025)
 W = Week (ex: a = Week 27; z Represents Weeks 52 and 53)
 X = Internal Code (ex: U = Monday)

Date Code Key

Year	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036
Code	5	6	7	8	9	0	1	2	3	4	5	6

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

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}	±12	V
Continuous Drain Current (Note 6) V _{GS} = 4.5V	Steady State	T _A = +25°C T _A = +70°C	I _D	1.2 0.7	A
Continuous Drain Current (Note 6) V _{GS} = 2.5V	Steady State	T _A = +25°C T _A = +70°C	I _D	1.1 0.6	A
Pulsed Drain Current (10μs Pulse, Duty Cycle = 1%)			I _{DM}	3	A
Maximum Body Diode Continuous Current (Note 6)			I _S	1	A

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

Characteristic			Symbol	Value	Unit
Total Power Dissipation (Note 5)			P _D	0.87	W
Thermal Resistance, Junction to Ambient (Note 5)	Steady State		R _{θJA}	144	°C/W
Total Power Dissipation (Note 6)			P _D	1.39	W
Thermal Resistance, Junction to Ambient (Note 6)	Steady State		R _{θJA}	90	°C/W
Thermal Resistance, Junction to Case (Note 6)			R _{θJC}	31	°C/W
Operating and Storage Temperature Range			T _J , T _{STG}	-55 to +150	°C

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.

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} = 0, I _D = 250μA
Zero Gate Voltage Drain Current T _J = +25°C	I _{DSS}	—	—	1	μA	V _{DS} = 20V, V _{GS} = 0
Gate-Source Leakage	I _{GSS}	—	—	±1.0	μA	V _{GS} = ±4.5V, V _{DS} = 0
ON CHARACTERISTICS (Note 7)						
Gate Threshold Voltage	V _{GS(TH)}	0.45	—	1.0	V	V _{DS} = V _{GS} , I _D = 250μA
Static Drain-Source On-Resistance	R _{DS(ON)}	—	0.27	0.6	Ω	V _{GS} = 4.5V, I _D = 200mA
			0.35	0.8		V _{GS} = 2.5V, I _D = 200mA
			0.52	1.0		V _{GS} = 1.8V, I _D = 100mA
			0.77	1.6		V _{GS} = 1.5V, I _D = 50mA
Diode Forward Voltage	V _{SD}	—	0.7	1.2	V	V _{GS} = 0, I _S = 500mA
DYNAMIC CHARACTERISTICS (Note 8)						
Input Capacitance	C _{iss}	—	52	—	pF	V _{DS} = 16V, V _{GS} = 0, f = 1.0MHz
Output Capacitance	C _{oss}	—	4.8	—	pF	
Reverse Transfer Capacitance	C _{rss}	—	3.1	—	pF	
Gate Resistance	R _g	—	95	—	Ω	V _{DS} = 0, V _{GS} = 0 f = 1.0MHz
Total Gate Charge	Q _g	—	0.7	—	nC	V _{GS} = 4.5V, V _{DS} = 10V, I _D = 250mA
Gate-Source Charge	Q _{gs}	—	0.2	—	nC	
Gate-Drain Charge	Q _{gd}	—	0.1	—	nC	
Turn-On Delay Time	t _{D(ON)}	—	3.7	—	ns	V _{DD} = 10V, V _{GS} = 4.5V, R _L = 47Ω, R _G = 10Ω, I _D = 200mA
Turn-On Rise Time	t _r	—	2.4	—	ns	
Turn-Off Delay Time	t _{D(OFF)}	—	20.9	—	ns	
Turn-Off Fall Time	t _f	—	5.6	—	ns	

Notes: 7. Short duration pulse test used to minimize self-heating effect.
8. Guaranteed by design. Not subject to product testing.

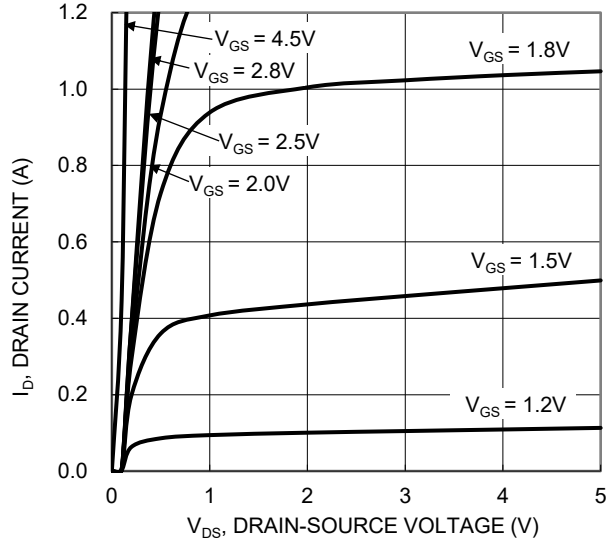


Figure 1. Typical Output Characteristic

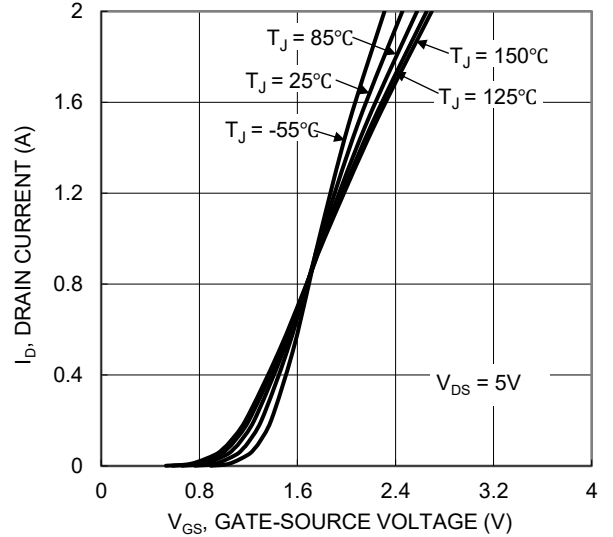


Figure 2. Typical Transfer Characteristic

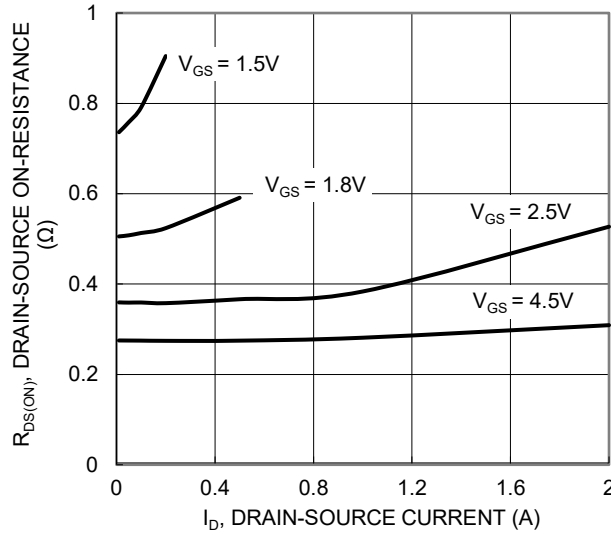


Figure 3. Typical On-Resistance vs. Drain Current and Gate Voltage

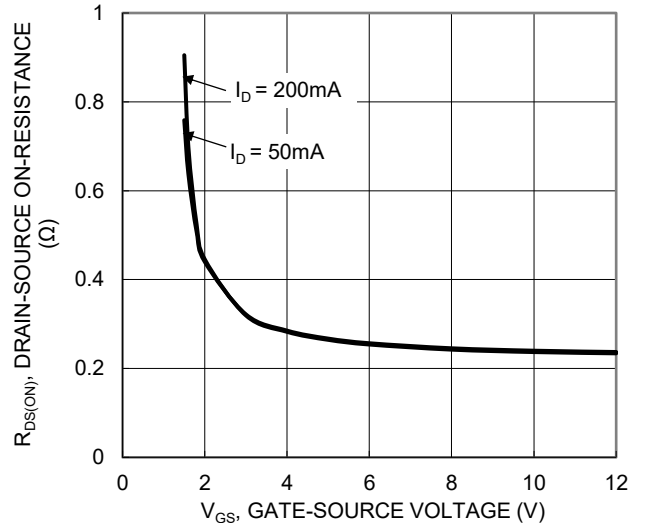


Figure 4. Typical Transfer Characteristic

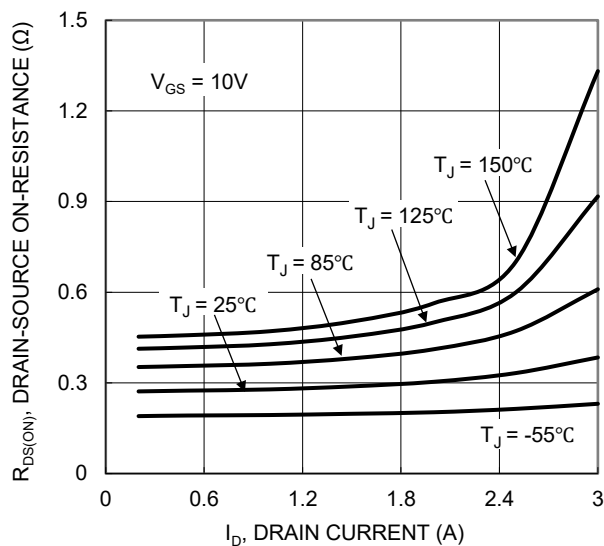


Figure 5. Typical On-Resistance vs. Drain Current and Junction Temperature

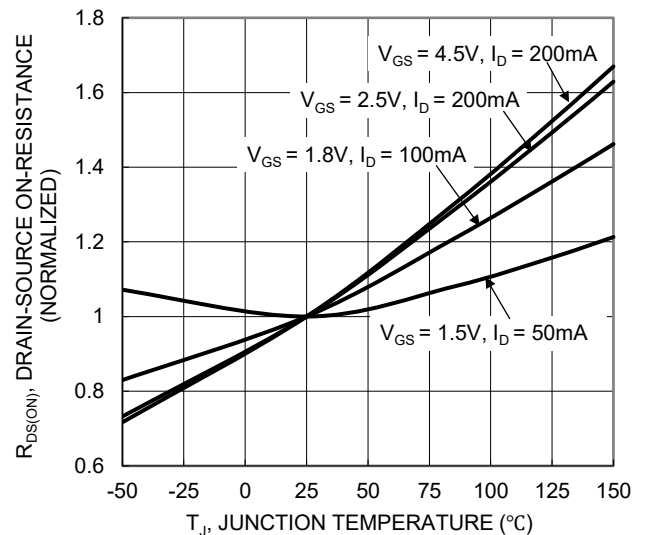


Figure 6. On-Resistance Variation with Temperature

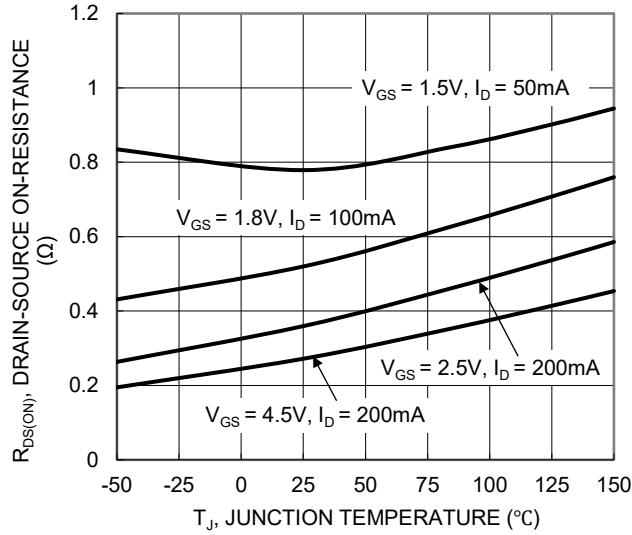


Figure 7. On-Resistance Variation with Temperature

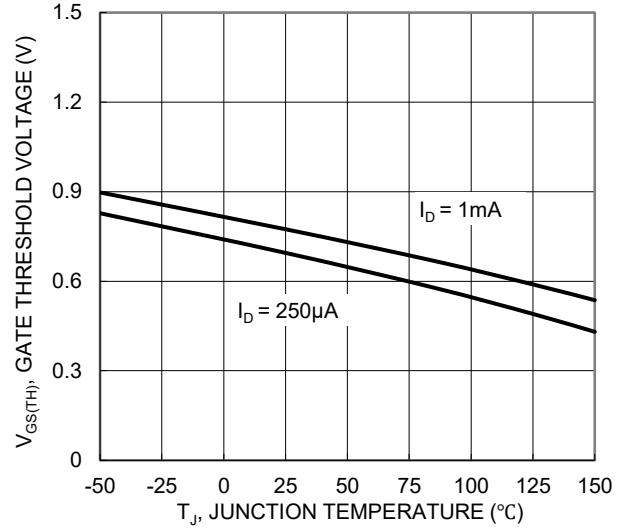


Figure 8. Gate Threshold Variation vs. Junction Temperature

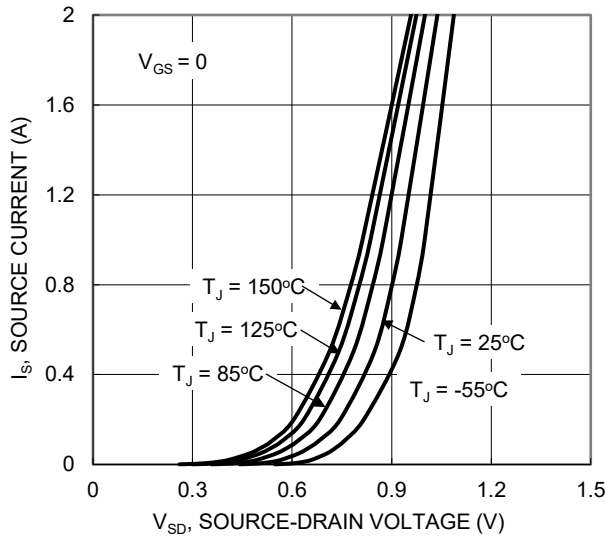


Figure 9. Diode Forward Voltage vs. Current

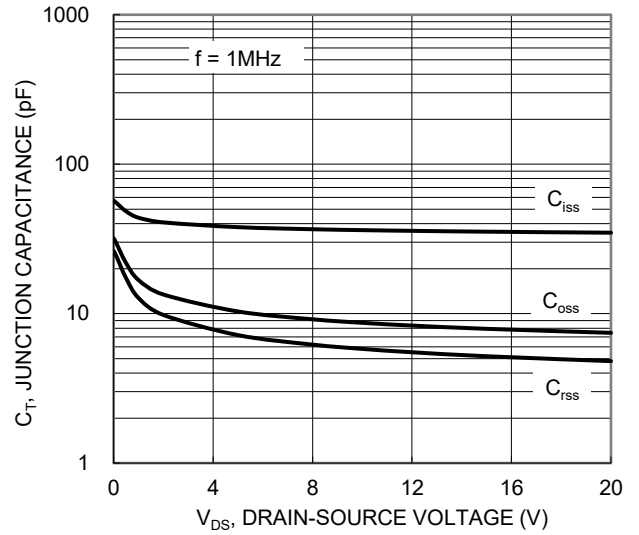


Figure 10. Typical Junction Capacitance

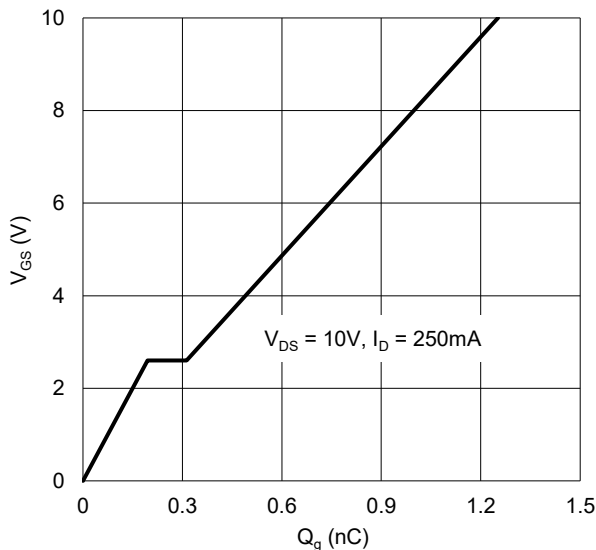


Figure 11. Gate Charge

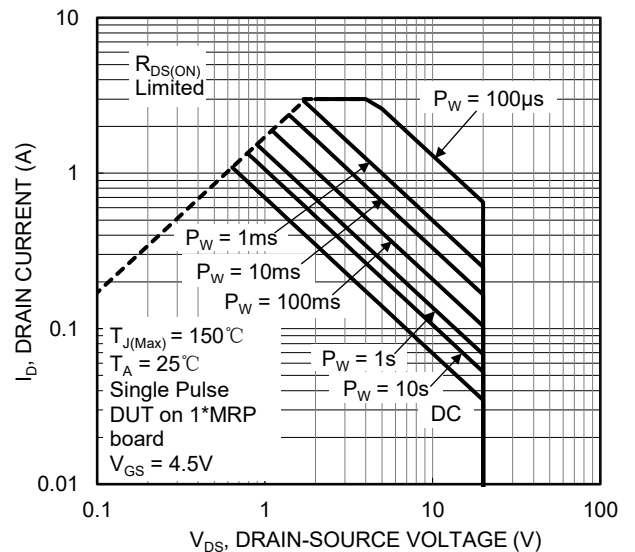


Figure 12. SOA, Safe Operation Area

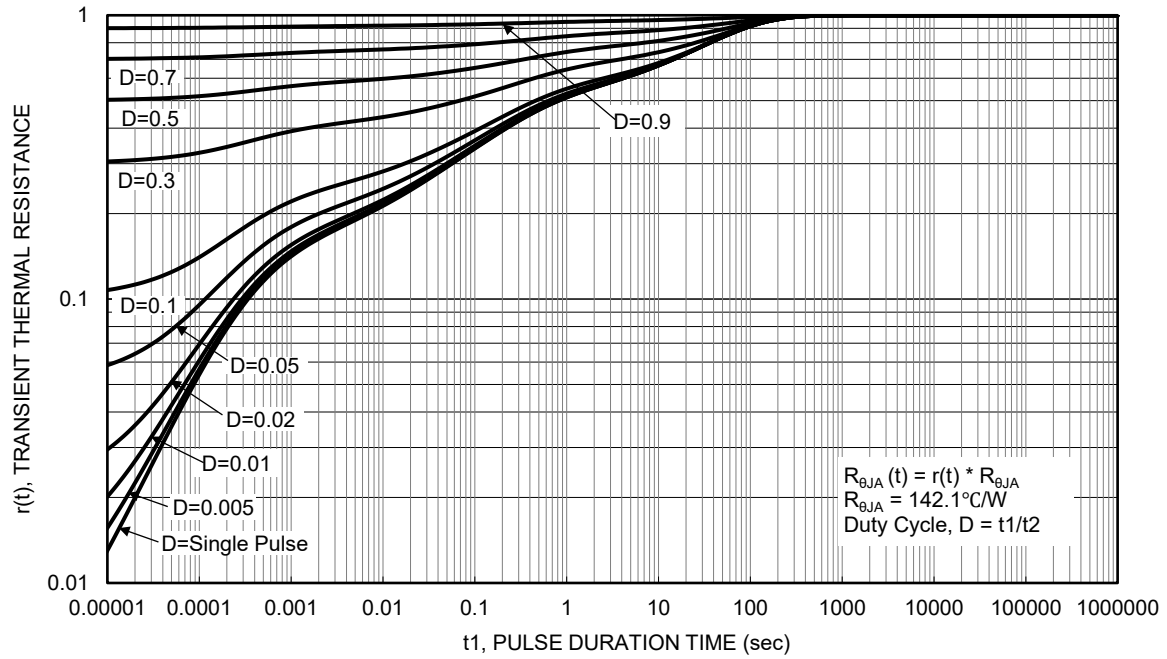
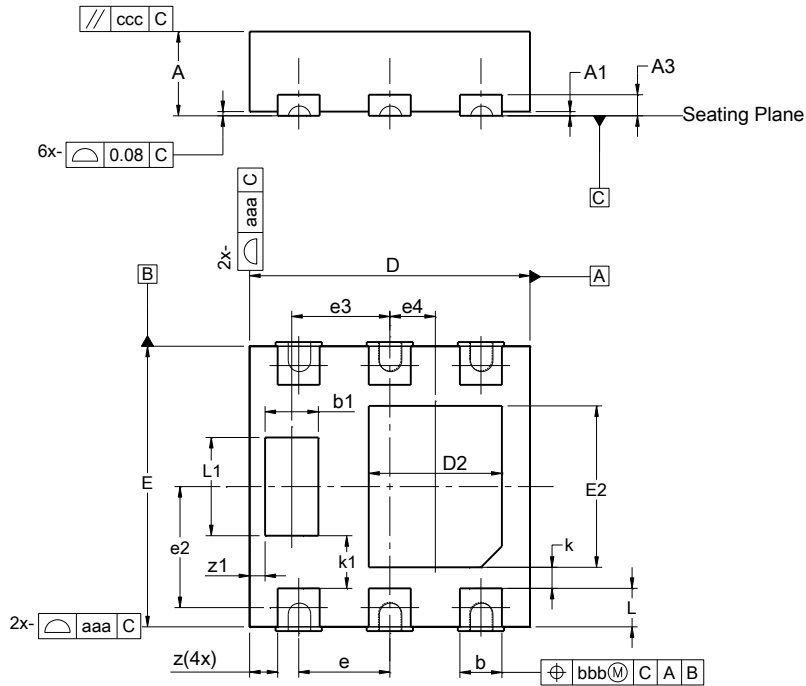


Figure 13. Transient Thermal Resistance

Package Outline Dimensions

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

U-DFN2020-6/SWP (Type UXG)

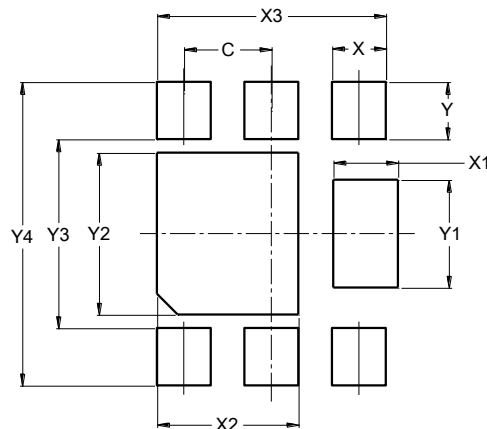


U-DFN2020-6/SWP (Type UXG)			
Dim	Min	Max	Typ
A	0.59	0.65	0.62
A1	0.00	0.05	0.03
A3	—	—	0.152
b	0.28	0.38	0.33
b1	0.35	0.45	0.40
D	1.95	2.05	2.00
D2	0.87	1.07	0.97
E	1.95	2.05	2.00
E2	1.07	1.27	1.17
e	0.65 BSC		
e3	0.70 BSC		
e4	0.325 BSC		
L	0.225	0.325	0.275
L1	0.67	0.77	0.72
k	—	—	0.15
k1	—	—	0.375
z	—	—	0.20
z1	—	—	0.11
aaa	0.25		
bbb	0.10		
ccc	0.10		
All Dimensions in mm			

Suggested Pad Layout

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

U-DFN2020-6/SWP (Type UXG)



Dimensions	Value (in mm)
C	0.650
X	0.350
X1	0.480
X2	1.050
X3	1.700
Y	0.425
Y1	0.800
Y2	1.200
Y3	1.400
Y4	2.250

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