

Product Summary

BV _{DSS}	R _{DS(ON)} Max	I _D Max T _C = +25°C
-20V	32mΩ @ V _{GS} = -4.5V	-15A
	53mΩ @ V _{GS} = -2.5V	-12A

Features

- 0.6mm Profile – Ideal for Low-Profile Applications
- PCB Footprint of 4mm²
- Low Gate Threshold Voltage
- Low On-Resistance
- 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](https://www.diodes.com/quality/product-definitions/) or your local Diodes representative.**
<https://www.diodes.com/quality/product-definitions/>

Description and Applications

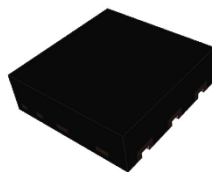
This new generation MOSFET is designed to minimize the on-state resistance (R_{DS(ON)}) yet maintain superior switching performance, making it ideal for high-efficiency power-management applications.

- Power-management functions
- General-purpose interfacing switches

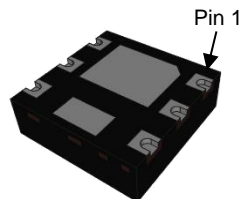
Mechanical Data

- 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 **(e4)**
- Weight: 0.0065 grams (Approximate)

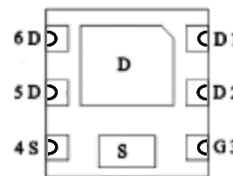
U-DFN2020-6/SWP (Type UXG)



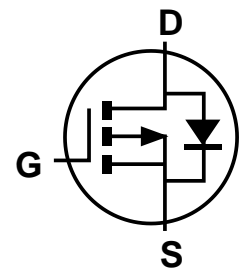
Top View



Bottom View



Pinout
Bottom View



Equivalent Circuit

Ordering Information (Note 4)

Orderable Part Number	Package	Packing	
		Qty.	Carrier
DMP2040UFDFW-7	U-DFN2020-6/SWP (Type UXG)	3,000	Tape & Reel
DMP2040UFDFW-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

DMP2040UFDFW-7 DMP2040UFDFW-13	<div style="display: flex; align-items: center;"> <div style="border: 1px solid black; padding: 10px; margin-right: 20px;"> <div style="text-align: center;"> U4 <div style="display: flex; justify-content: space-between; width: 100px;"> • YWX </div> </div> </div> <div> U4 = Product Type Marking Code YWX = Date Code Marking Y = Year (ex: 5 = 2025) W = Week (ex: a = Week 27; z Represents Week 52 and 53) X = Internal Code (ex: U = Monday) </div> </div>
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Date Code Key

Year	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035
Code	4	5	6	7	8	9	0	1	2	3	4	5

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 5) V _{GS} = -4.5V	Steady State	T _A = +25°C T _A = +70°C	I _D	-6.1 -4.9	A
Continuous Drain Current (Note 6) V _{GS} = -4.5V	Steady State	T _C = +25°C T _C = +70°C	I _D	-15 -12	A
Pulsed Drain Current (10µs Pulse, Duty Cycle = 1%)			I _{DM}	-39	A
Maximum Body Diode Continuous Current (Note 5)			I _S	-2.0	A
Avalanche Current (Note 7) L = 0.1mH			I _{AS}	-20	A
Avalanche Energy (Note 7) L = 0.1mH			E _{AS}	21	mJ

Thermal Characteristics

Characteristic		Symbol	Value	Unit
Total Power Dissipation (Note 8)	T _A = +25°C	P _D	1.1	W
Thermal Resistance, Junction to Ambient (Note 8)	Steady State	R _{θJA}	108	°C/W
Total Power Dissipation (Note 5)	T _A = +25°C	P _D	1.8	W
Thermal Resistance, Junction to Ambient (Note 5)	Steady State	R _{θJA}	68	°C/W
Thermal Resistance, Junction to Case (Note 6)	Steady State	R _{θJC}	11	°C/W
Operating and Storage Temperature Range		T _J , T _{STG}	-55 to +150	°C

- Notes:
- Device mounted on FR-4 substrate PC board, 2oz copper, with 1inch square copper plate.
 - Thermal resistance from junction to soldering point (on the exposed drain pad).
 - I_{AS} and E_{AS} ratings are based on low frequency and duty cycles to keep T_J = +25°C.
 - Device mounted on FR-4 substrate PC board, 2oz copper, with minimum recommended pad layout.

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

Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
OFF CHARACTERISTICS (Note 9)						
Drain-Source Breakdown Voltage	BV _{DSS}	-20	—	—	V	V _{GS} = 0V, I _D = -250μA
Zero Gate Voltage Drain Current T _J = +25°C	I _{DSS}	—	—	-1	μA	V _{DS} = -16V, V _{GS} = 0V
Gate-Source Leakage	I _{GSS}	—	—	±100	nA	V _{GS} = ±12V, V _{DS} = 0V
ON CHARACTERISTICS (Note 9)						
Gate Threshold Voltage	V _{GS(TH)}	-0.6	—	-1.5	V	V _{DS} = V _{GS} , I _D = -250μA
Static Drain-Source On-Resistance	R _{DS(ON)}	—	27	32	mΩ	V _{GS} = -4.5V, I _D = -8.9A
			38	53		V _{GS} = -2.5V, I _D = -6.9A
Diode Forward Voltage	V _{SD}	—	-0.7	-1.2	V	V _{GS} = 0V, I _S = -2.9A
DYNAMIC CHARACTERISTICS (Note 10)						
Input Capacitance	C _{iss}	—	834	—	pF	V _{DS} = -10V, V _{GS} = 0V f = 1.0MHz
Output Capacitance	C _{oss}	—	133	—	pF	
Reverse Transfer Capacitance	C _{rss}	—	105	—	pF	
Gate Resistance	R _g	—	4.9	—	Ω	V _{DS} = 0V, V _{GS} = 0V, f = 1.0MHz
Total Gate Charge (V _{GS} = -4.5V)	Q _g	—	8.6	—	nC	V _{DS} = -6V, I _D = -8.9A
Total Gate Charge (V _{GS} = -8V)	Q _g	—	19	—	nC	
Gate-Source Charge	Q _{gs}	—	1.5	—	nC	
Gate-Drain Charge	Q _{gd}	—	2.5	—	nC	
Turn-On Delay Time	t _{D(ON)}	—	5.8	—	ns	V _{DD} = -6V, R _L = 6Ω V _{GS} = -4.5V, R _g = 6Ω, I _D = -1A
Turn-On Rise Time	t _R	—	7.7	—	ns	
Turn-Off Delay Time	t _{D(OFF)}	—	28.1	—	ns	
Turn-Off Fall Time	t _F	—	14.6	—	ns	
Reverse-Recovery Time	t _{RR}	—	9.8	—	ns	I _F = -8.9A, di/dt = -100A/μs
Reverse-Recovery Charge	Q _{RR}	—	2.7	—	nC	

Notes: 9. Short duration pulse test used to minimize self-heating effect.
10. Guaranteed by design. Not subject to product testing.

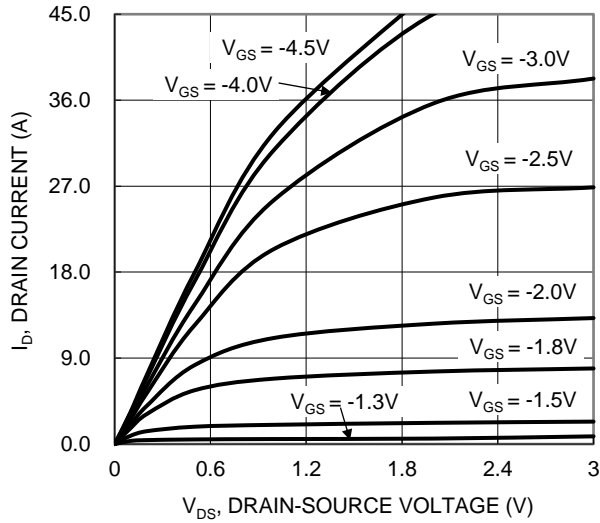


Figure 1. Typical Output Characteristic

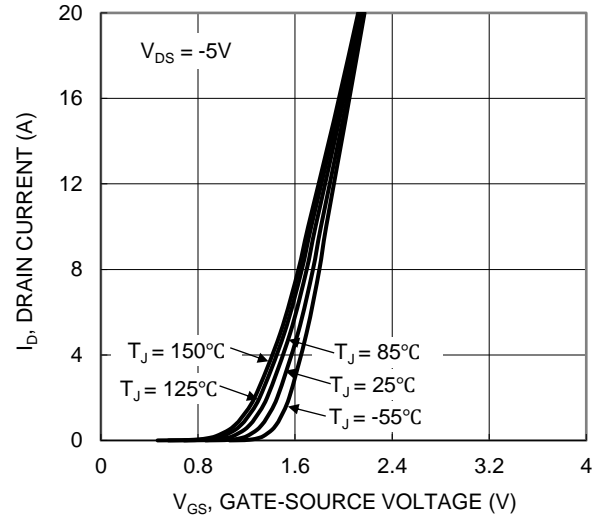


Figure 2. Typical Transfer Characteristic

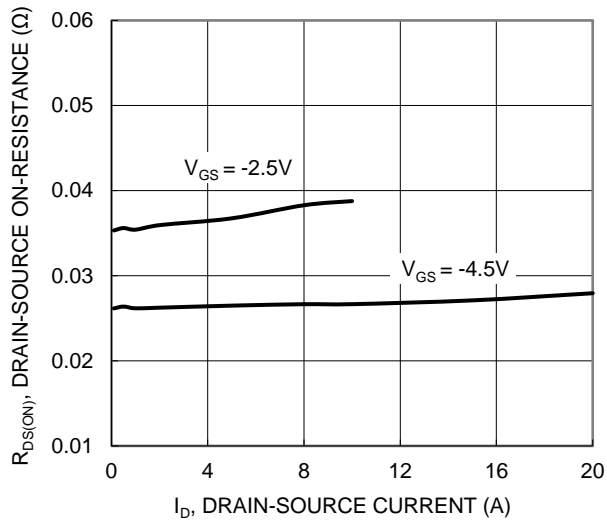


Figure 3. Typical On-Resistance vs. Drain Current and Gate Voltage

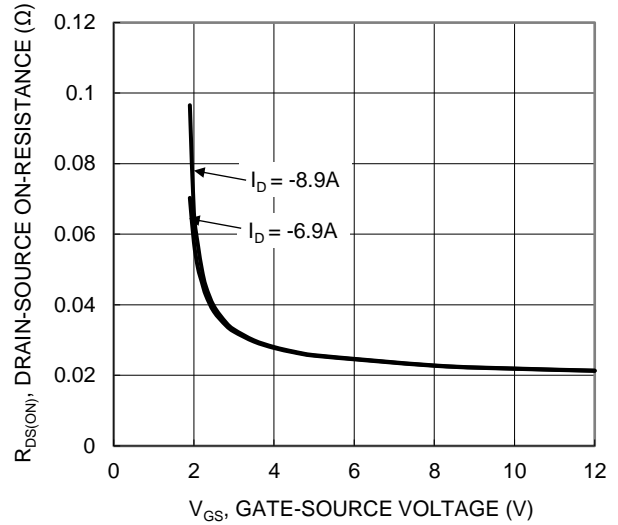


Figure 4. Typical Transfer Characteristic

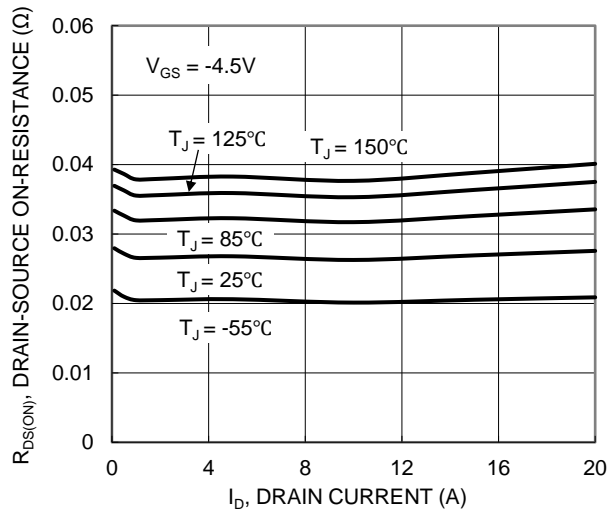


Figure 5. Typical On-Resistance vs. Drain Current and Junction Temperature

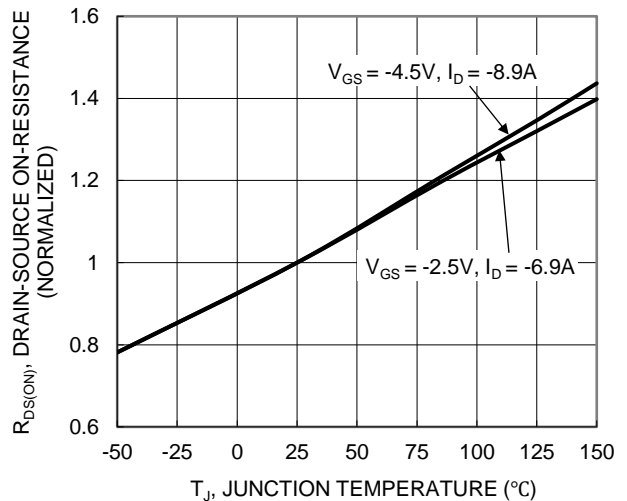


Figure 6. On-Resistance Variation with Junction Temperature

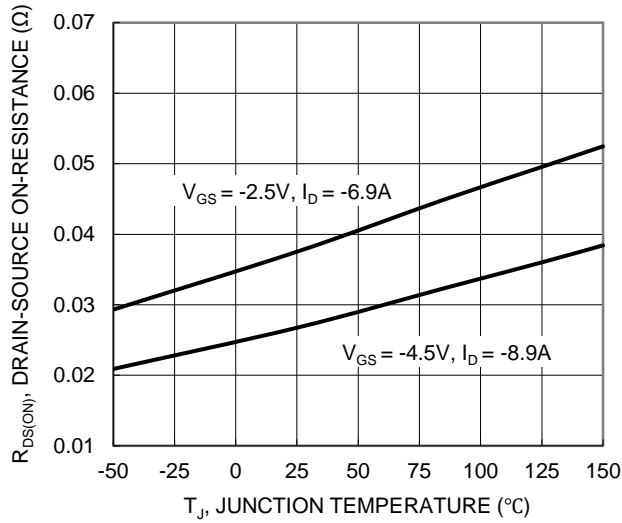


Figure 7. On-Resistance Variation with Junction Temperature

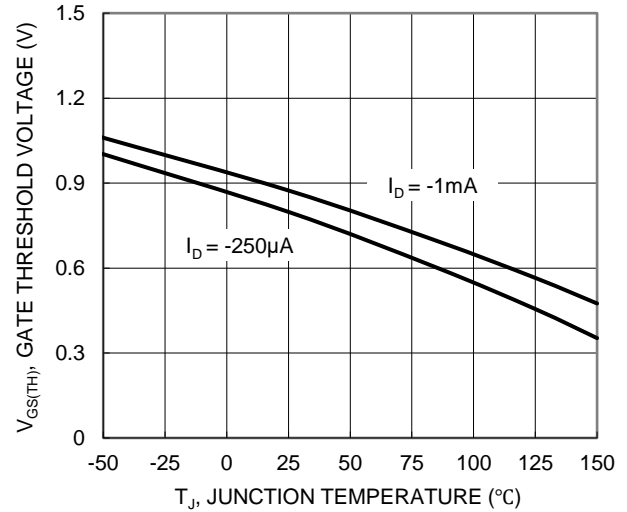


Figure 8. Gate Threshold Variation vs. Junction Temperature

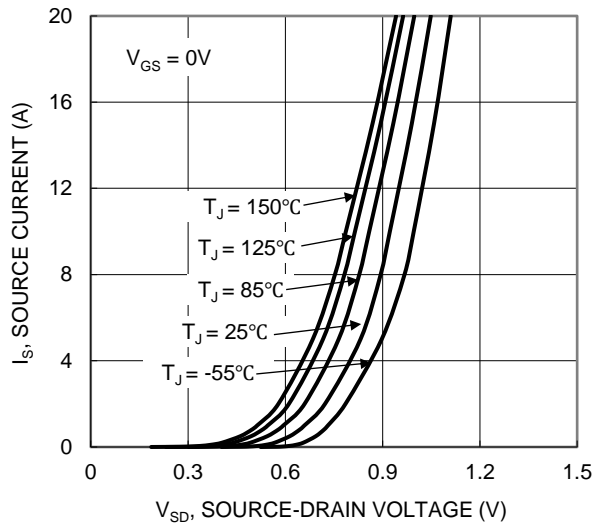


Figure 9. Diode Forward Voltage vs. Current

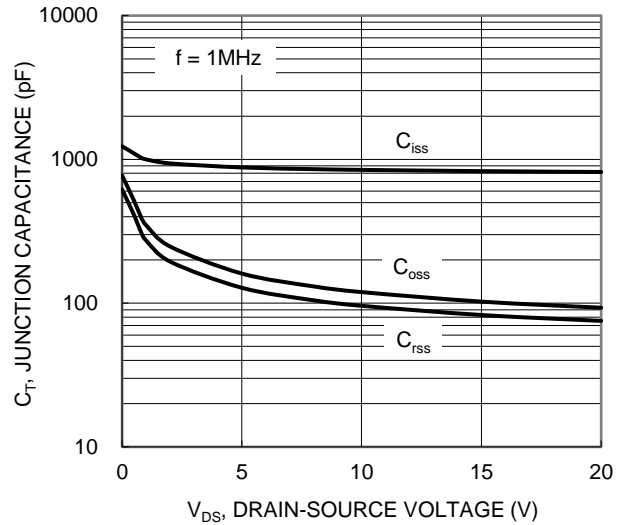


Figure 10. Typical Junction Capacitance

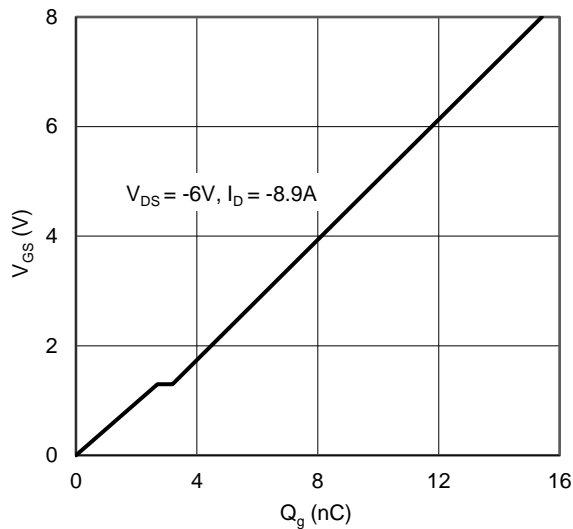


Figure 11. Gate Charge

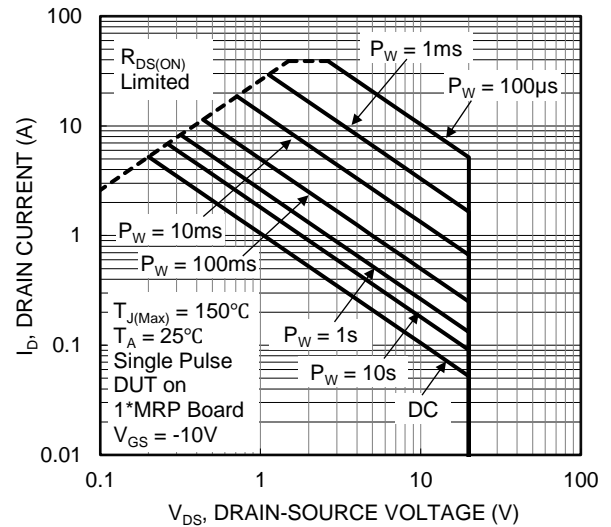


Figure 12. SOA, Safe Operation Area

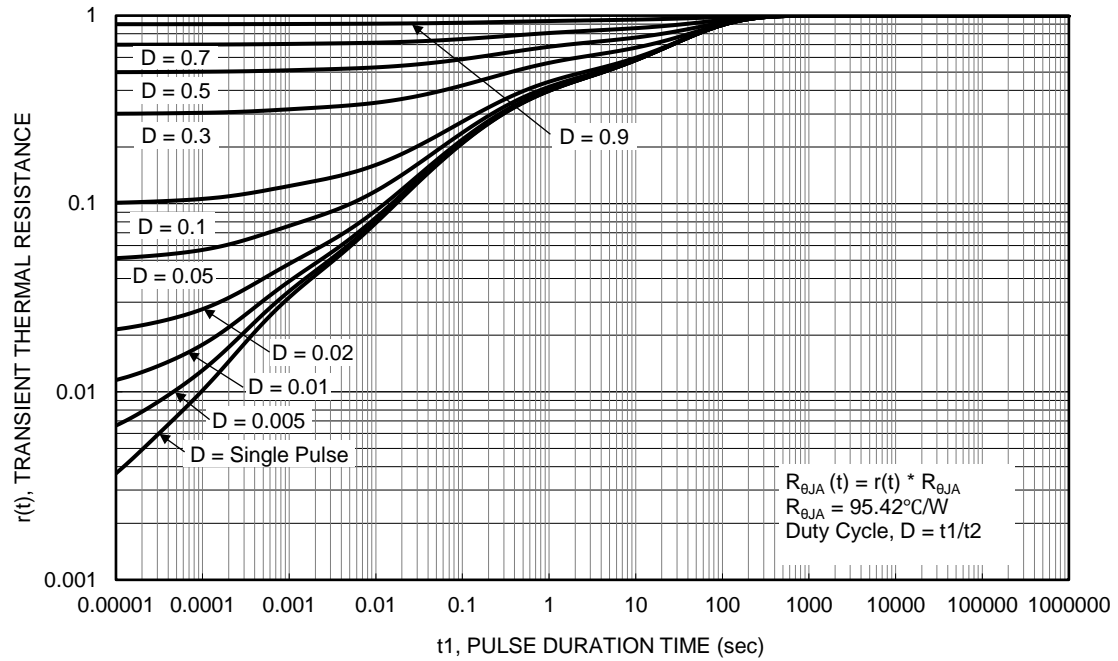
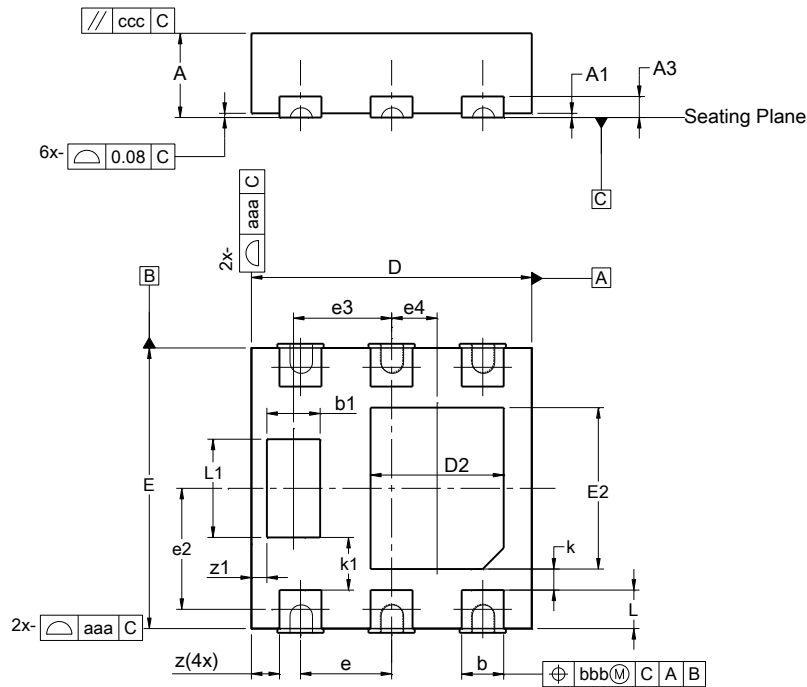


Figure 13. Transient Thermal Resistance

Package Outline Dimensions

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

U-DFN2020-6/SWP (Type UXG)

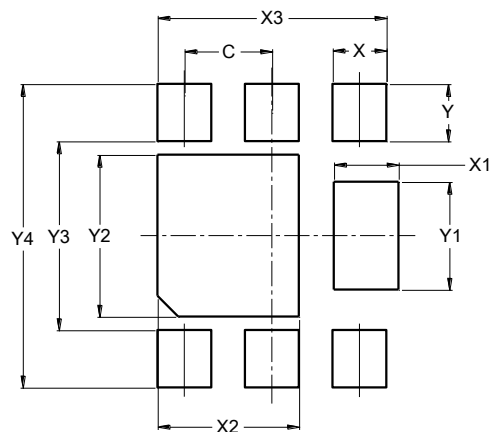


U-DFN2020-6/SWP (Type UXG)			
Dim	Min	Max	Typ
A	0.59	0.65	0.62
A1	0.00	0.05	0.03
A3	—	—	0.152
b	0.28	0.38	0.33
b1	0.35	0.45	0.40
D	1.95	2.05	2.00
D2	0.87	1.07	0.97
E	1.95	2.05	2.00
E2	1.07	1.27	1.17
e	0.65 BSC		
e3	0.70 BSC		
e4	0.325 BSC		
L	0.225	0.325	0.275
L1	0.67	0.77	0.72
k	—	—	0.15
k1	—	—	0.375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