

Product Summary

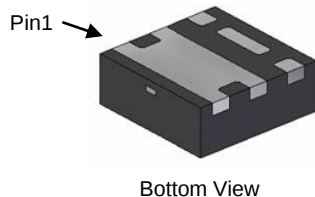
BV _{DSS}	R _{DS(ON)} Max	I _D Max T _A = +25°C
-40V	34mΩ @ V _{GS} = -10V	-6.5A
	50mΩ @ V _{GS} = -4.5V	-5.3A

Description and Applications

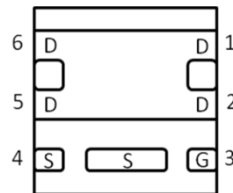
This MOSFET is designed to meet the stringent requirements of automotive applications. It is qualified to AEC-Q101, supported by a PPAP and is ideal for use in:

- General Purpose Interfacing Switch
- Load Switching
- Battery Management Application
- Power Management Functions

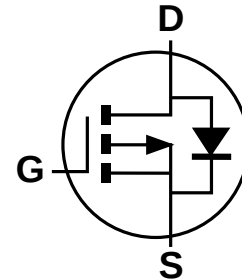
U-DFN2020-6 (Type E)



Bottom View



Pin Out
Bottom View



Equivalent Circuit

Features and Benefits

- 100% Unclamped Inductive Switch (UIS) Test in Production
- 0.6mm Profile – Ideal for Low Profile Applications
- PCB Footprint of 4mm²
- Low Gate Threshold Voltage
- Low On-Resistance
- **Totally Lead-Free & Fully RoHS Compliant (Notes 1 & 2)**
- **Halogen and Antimony Free. "Green" Device (Note 3)**
- **The DMP4047LFDEQ 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

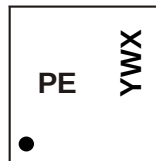
- Case: U-DFN2020-6
- Case Material: Molded Plastic, "Green" Molding Compound. UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminals: Finish – NiPdAu over Copper Leadframe. Solderable per MIL-STD-202, Method 208 **(e4)**
- Weight: 0.0065 grams (Approximate)

Ordering Information (Note 4)

Part Number	Case	Packaging
DMP4047LFDEQ-7	U-DFN2020-6 (Type E)	3000/Tape & Reel
DMP4047LFDEQ-13	U-DFN2020-6 (Type E)	10000/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



PE = Product Type Marking Code
YWX = Date Code Marking
Y = Year (ex: 0 = 2020)
W = Week (ex: a = Week 27; z Represents Week 52 And 53)
X = Internal Code (ex: U = Monday)

Date Code Key

Year	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031		
Code	0	1	2	3	4	5	6	7	8	9	0	1		
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}	-40	V
Gate-Source Voltage			V _{GSS}	±20	V
Continuous Drain Current (Note 6) V _{GS} = -10V	Steady State	T _A = +25°C T _A = +70°C	I _D	-6.5 -5.2	A
Pulsed Drain Current (10μs Pulse, Duty Cycle = 1%)			I _{DM}	-36	A
Maximum Body Diode Continuous Current			I _S	-6.5	A
Pulsed Body Diode Forward Current (10μs Pulse, Duty Cycle = 1%)			I _{SM}	-36	A
Avalanche Current (Note 7) L = 0.1mH			I _{AS}	-23	A
Avalanche Energy (Note 7) L = 0.1mH			E _{AS}	26	mJ

Thermal Characteristics

Characteristic		Symbol	Value	Unit
Total Power Dissipation (Note 5)	T _A = +25°C	P _D	0.8	W
Thermal Resistance, Junction to Ambient (Note 5)		R _{θJA}	150	°C/W
Total Power Dissipation (Note 6)	T _A = +25°C	P _D	2.1	W
Thermal Resistance, Junction to Ambient (Note 6)		R _{θJA}	58	°C/W
Thermal Resistance, Junction to Case (Note 6)		R _{θJC}	5.6	
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 8)						
Drain-Source Breakdown Voltage	BV _{DSS}	-40	—	—	V	V _{GS} = 0V, I _D = -250μA
Zero Gate Voltage Drain Current	I _{DSS}	—	—	-1	μA	V _{DS} = -40V, V _{GS} = 0V
Gate-Source Leakage	I _{GSS}	—	—	±100	nA	V _{GS} = ±20V, V _{DS} = 0V
ON CHARACTERISTICS (Note 8)						
Gate Threshold Voltage	V _{GS(TH)}	-1.0	—	-2.2	V	V _{DS} = V _{GS} , I _D = -250μA
Static Drain-Source On-Resistance	R _{DS(ON)}	—	26	34	mΩ	V _{GS} = -10V, I _D = -4.4A
			36	50		V _{GS} = -4.5V, I _D = -3.7A
Diode Forward Voltage	V _{SD}	—	-0.75	-1.2	V	V _{GS} = 0V, I _S = -3.9A
DYNAMIC CHARACTERISTICS (Note 9)						
Input Capacitance	C _{iss}	—	1265	—	pF	V _{DS} = -20V, V _{GS} = 0V, f = 1.0MHz
Output Capacitance	C _{oss}	—	103	—	pF	
Reverse Transfer Capacitance	C _{rss}	—	76	—	pF	
Gate Resistance	R _g	—	7.7	—	Ω	V _{DS} = 0V, V _{GS} = 0V, f = 1MHz
Total Gate Charge (V _{GS} = -4.5V)	Q _g	—	12.2	—	nC	V _{DS} = -20V, I _D = -4.9A
Total Gate Charge (V _{GS} = -10V)	Q _g	—	24.9	—	nC	
Gate-Source Charge	Q _{gs}	—	3.7	—	nC	
Gate-Drain Charge	Q _{gd}	—	3.8	—	nC	
Turn-On Delay Time	t _{D(ON)}	—	18.4	—	ns	V _{DS} = -20V, I _D = -3.9A V _{GS} = -4.5V, R _G = 1Ω
Turn-On Rise Time	t _r	—	28.2	—	ns	
Turn-Off Delay Time	t _{D(OFF)}	—	38.8	—	ns	
Turn-Off Fall Time	t _f	—	28.6	—	ns	
Reverse Recovery Time	t _{RR}	—	15.4	—	ns	I _F = -3.9A, di/dt = 100A/μs
Reverse Recovery Charge	Q _{RR}	—	5.4	—	nC	

- Notes:
- Device mounted on FR-4 PC board, with minimum recommended pad layout, single sided.
 - Device mounted on FR-4 substrate PC board, 2oz copper, with thermal vias to bottom layer 1inch square copper plate.
 - Single pulse avalanche rating limited by junction temperature T_{J(max)} = +150°C.
 - Short duration pulse test used to minimize self-heating effect.
 - Guaranteed by design. Not subject to production testing.

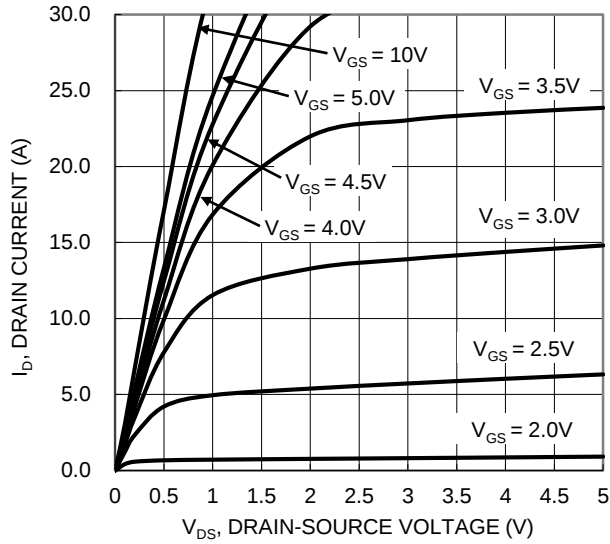


Figure 1. Typical Output Characteristic

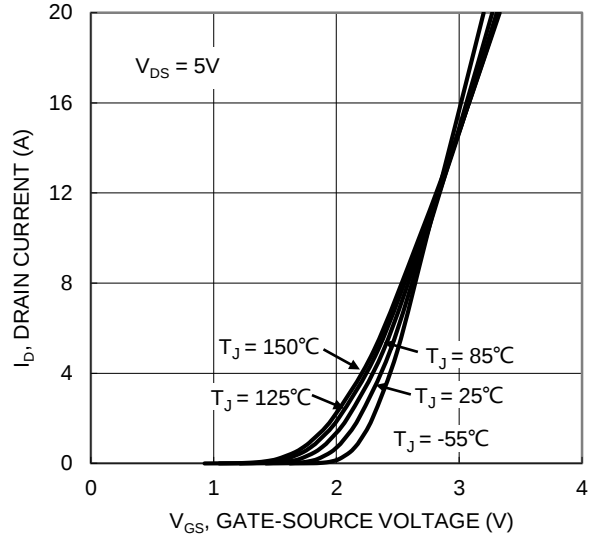


Figure 2. Typical Transfer Characteristic

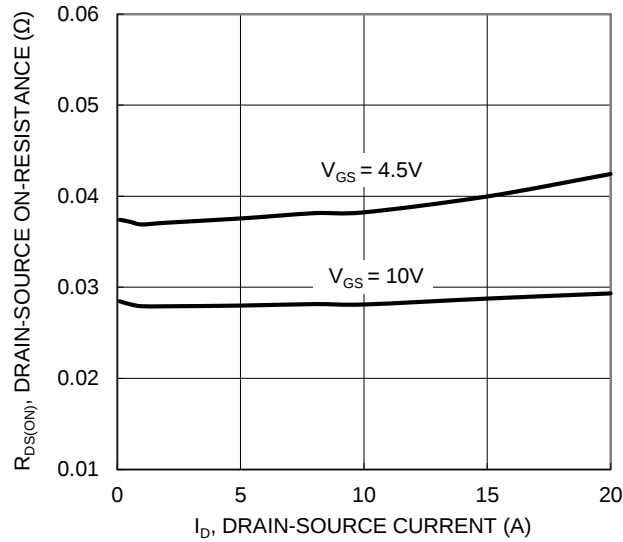


Figure 3. Typical On-Resistance vs. Drain Current and Gate Voltage

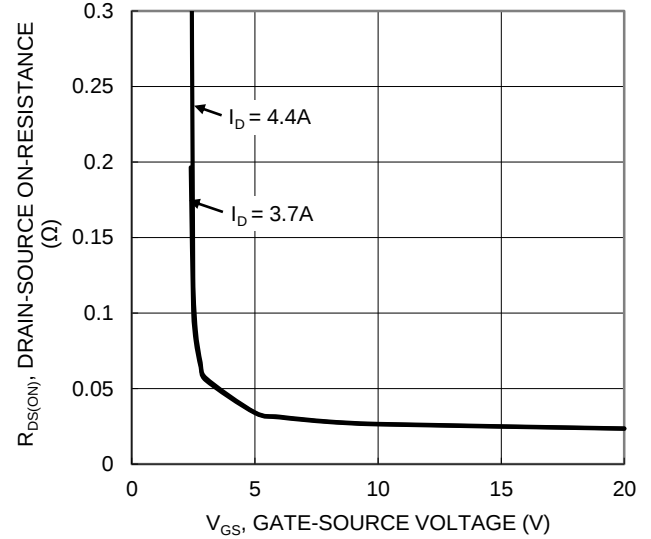


Figure 4. Typical Transfer Characteristic

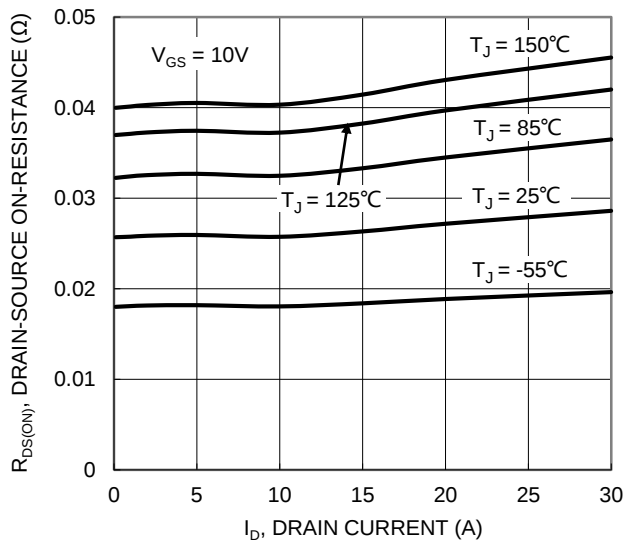


Figure 5. Typical On-Resistance vs. Drain Current and Temperature

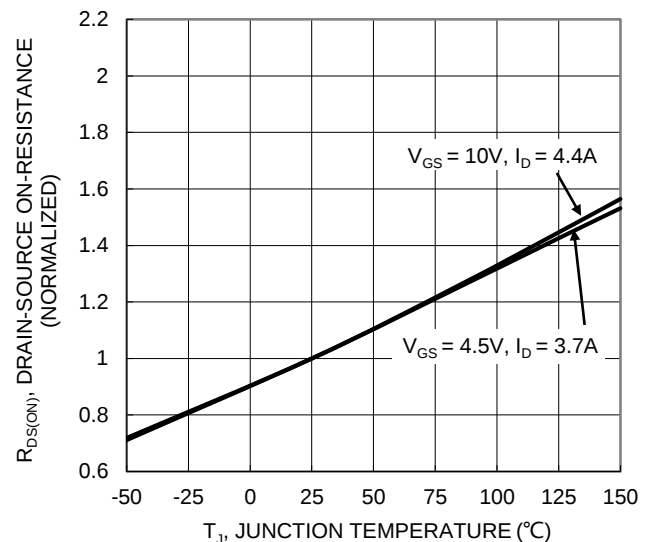


Figure 6. On-Resistance Variation with Temperature

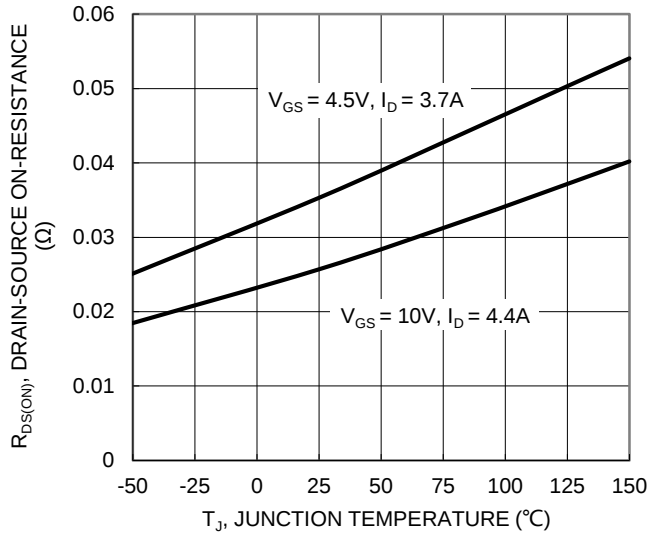


Figure 7. On-Resistance Variation with Temperature

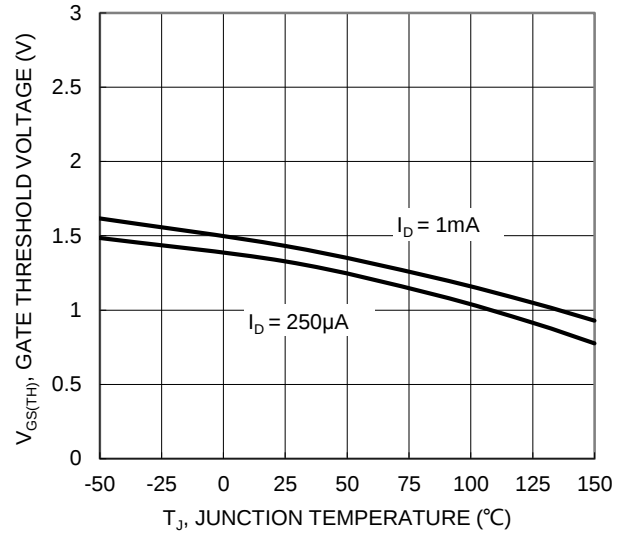


Figure 8. Gate Threshold Variation vs. Junction Temperature

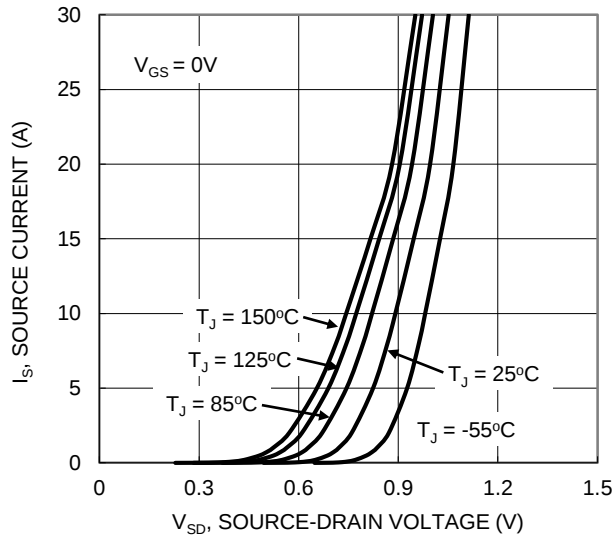


Figure 9. Diode Forward Voltage vs. Current

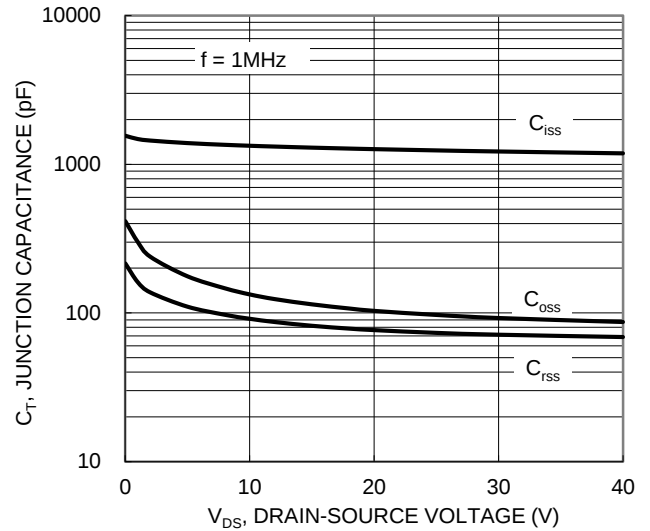


Figure 10. Typical Junction Capacitance

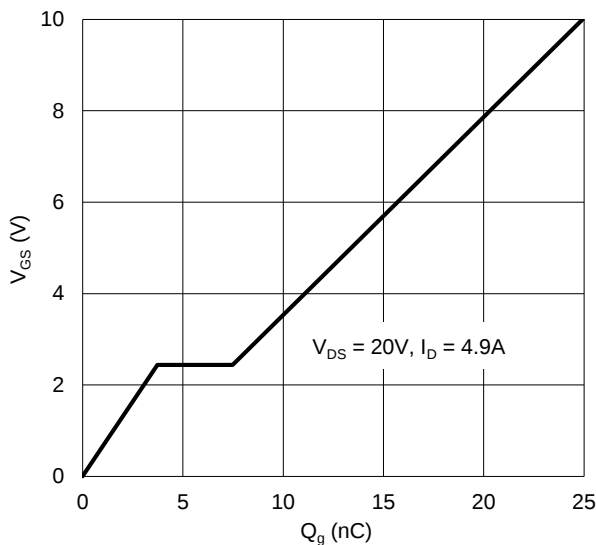


Figure 11. Gate Charge

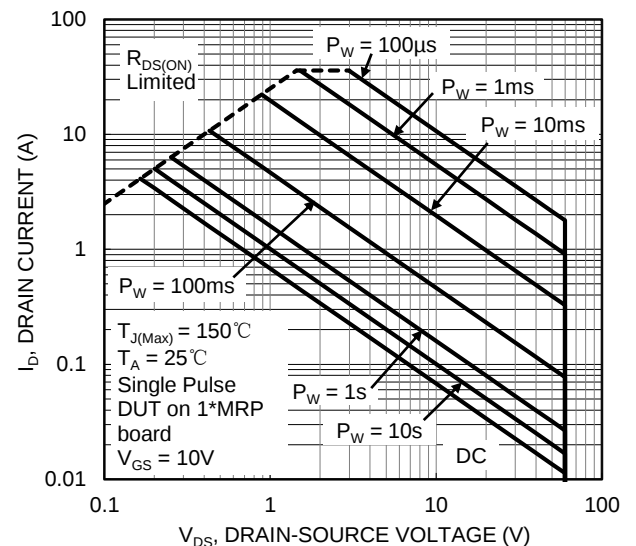


Figure 12. SOA, Safe Operation Area

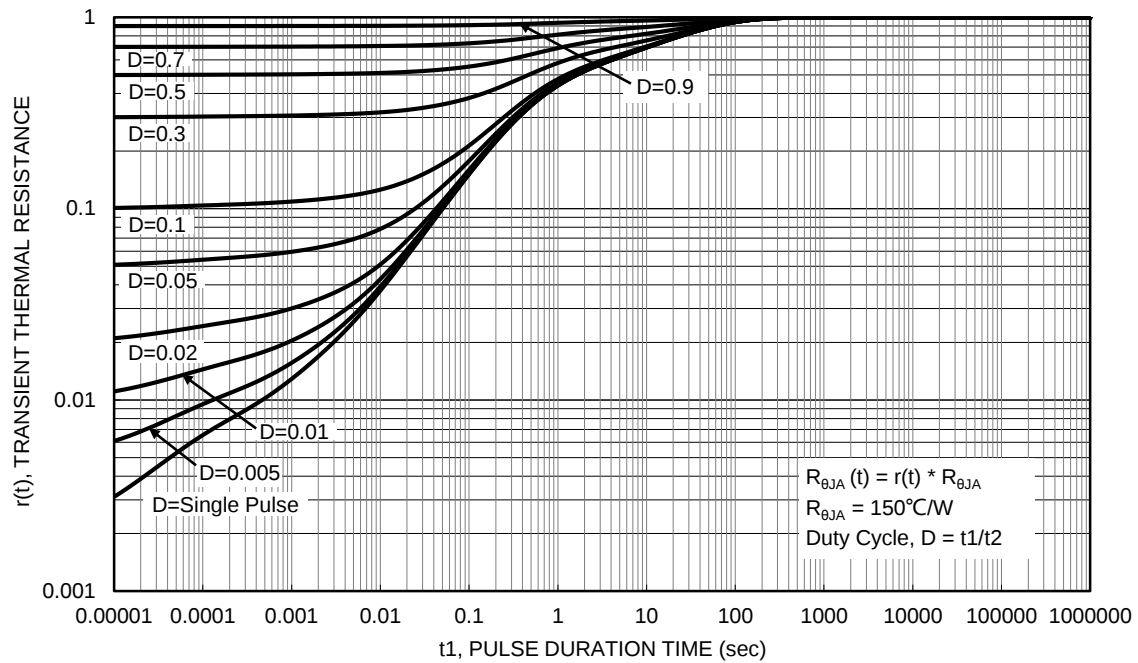
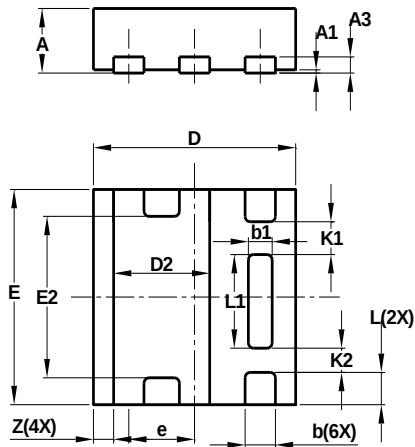


Figure 13. Transient Thermal Resistance

Package Outline Dimensions

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

U-DFN2020-6 (Type E)

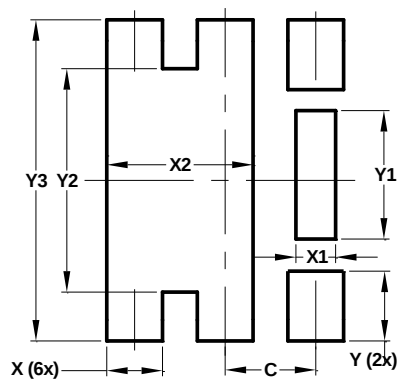


U-DFN2020-6 Type E			
Dim	Min	Max	Typ
A	0.57	0.63	0.60
A1	0	0.05	0.03
A3	—	—	0.15
b	0.25	0.35	0.30
b1	0.185	0.285	0.235
D	1.95	2.05	2.00
D2	0.85	1.05	0.95
E	1.95	2.05	2.00
E2	1.40	1.60	1.50
e	—	—	0.65
L	0.25	0.35	0.30
L1	0.82	0.92	0.87
K1	—	—	0.305
K2	—	—	0.225
Z	—	—	0.20
All Dimensions in mm			

Suggested Pad Layout

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

U-DFN2020-6 (Type E)



Dimensions	Value (in mm)
C	0.650
X	0.400
X1	0.285
X2	1.050
Y	0.500
Y1	0.920
Y2	1.600
Y3	2.300

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