

Product Summary

BV _{DSS}	R _{DS(ON)} Max	I _D Max T _A = +25°C
60V	14mΩ @ V _{GS} = 10V	9.5A
	21mΩ @ V _{GS} = 4.5V	7.7A

Features and Benefits

- 100% Unclamped Inductive Switching (UIS) Test in Production — Ensures More Reliable and Robust End Application
- 0.6mm Profile — Ideal for Low Profile Applications
- PCB Footprint of 4mm²
- Low On-Resistance
- **Totally Lead-Free & Fully RoHS Compliant (Notes 1 & 2)**
- **Halogen and Antimony Free. “Green” Device (Note 3)**
- **The DMT6012LFDFQ 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/>

Description and Applications

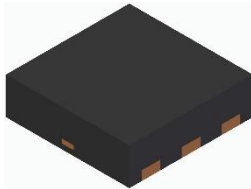
This MOSFET is designed to meet the stringent requirements of automotive applications. It is qualified to AEC-Q101, supported by a PPAP and is ideal for use in:

- DC-DC converters
- Adaptor switches
- Wireless charging

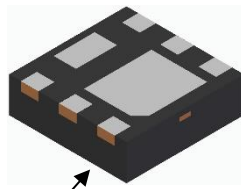
Mechanical Data

- 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
- Weight: 0.007 grams (Approximate)

U-DFN2020-6 (Type F)

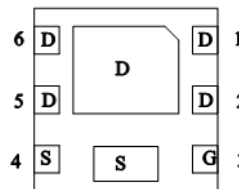


Top View

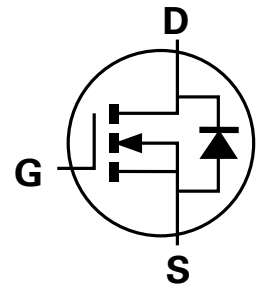


Pin 1

Bottom View



Pinout
Bottom View



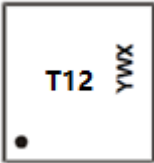
Equivalent Circuit

Ordering Information (Note 4)

Orderable Part Number	Package	Packing	
		Qty.	Carrier
DMT6012LFDFQ-7	U-DFN2020-6 (Type F)	3,000	Reel
DMT6012LFDFQ-13	U-DFN2020-6 (Type F)	10,000	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



T12 = 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)

Date Code Key

Year	2020	-	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034
Code	0	-	5	6	7	8	9	0	1	2	3	4
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}	60	V
Gate-Source Voltage	V _{GSS}	±20	V
Continuous Drain Current (Note 5) V _{GS} = 10V	I _D	T _A = +25°C	9.5
Steady State		T _A = +70°C	7.6
Pulsed Drain Current (10µs Pulse, Duty Cycle = 1%)	I _{DM}	60	A
Maximum Body Diode Continuous Current	I _S	2.1	A
Pulsed Body Diode Forward Current (10µs Pulse, Duty Cycle = 1%)	I _{SM}	60	A
Avalanche Current (Note 6) L = 0.1mH	I _{AS}	12.6	A
Avalanche Energy (Note 6) L = 0.1mH	E _{AS}	7.9	mJ

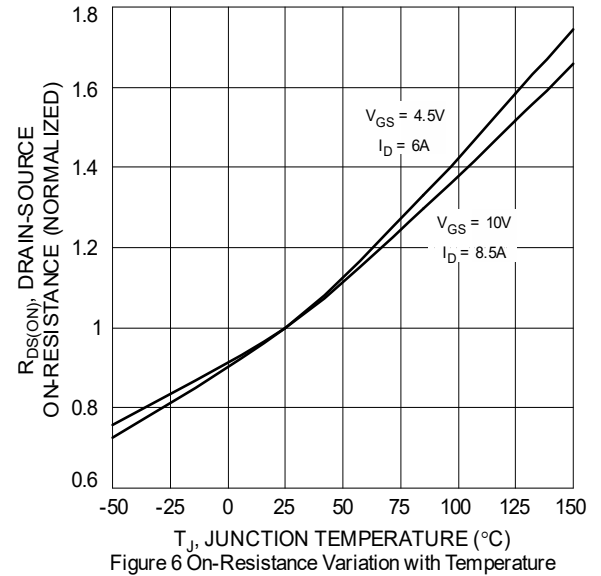
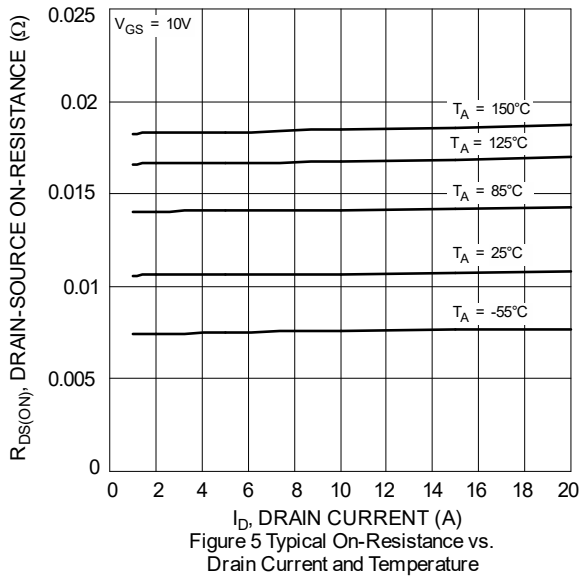
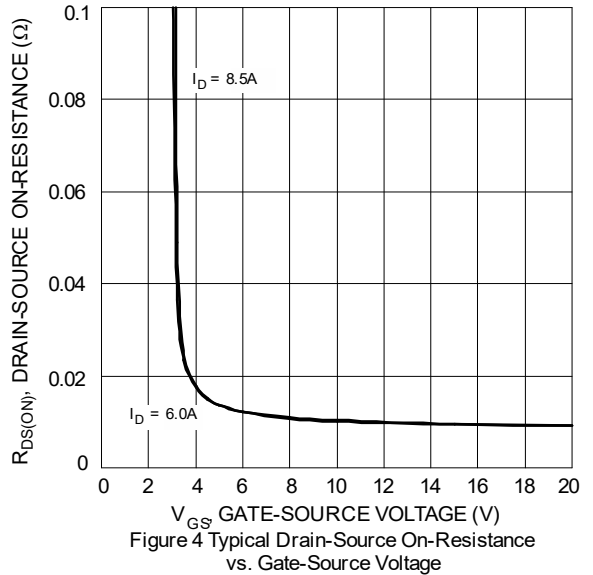
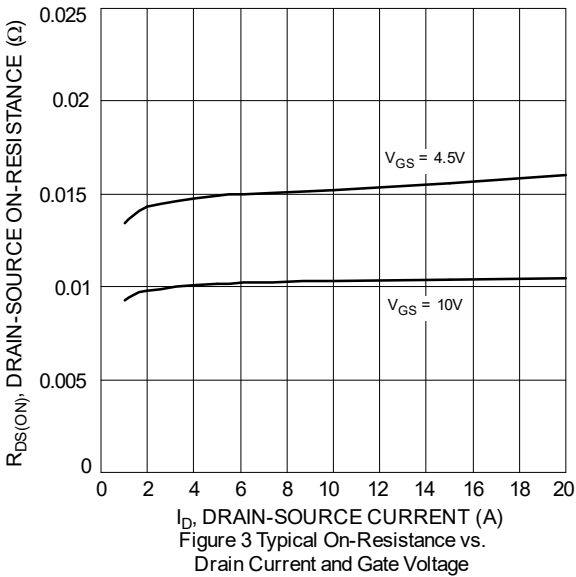
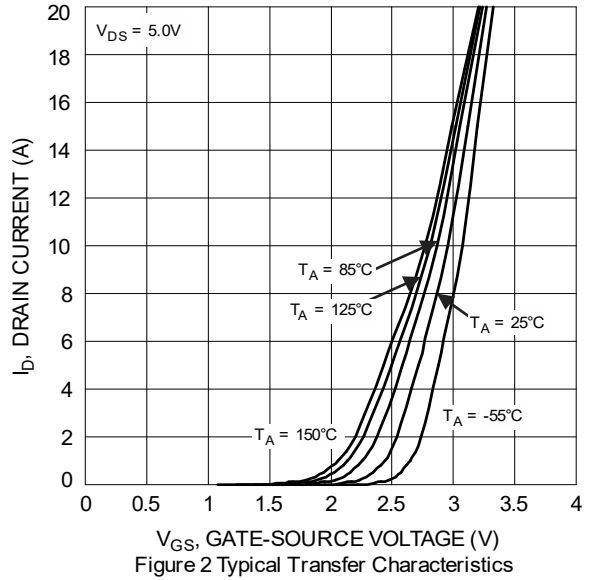
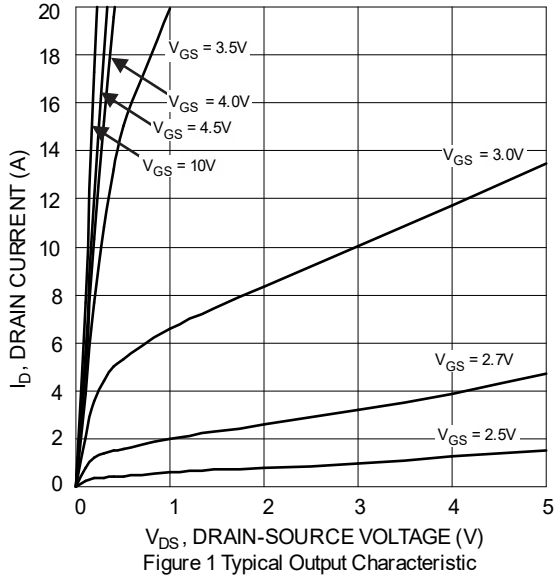
Thermal Characteristics

Characteristic	Symbol	Value	Unit
Total Power Dissipation (Note 7)	P _D	T _A = +25°C	0.9
		T _A = +70°C	0.6
Thermal Resistance, Junction to Ambient (Note 7)	R _{θJA}	131	°C/W
Total Power Dissipation (Note 5)	P _D	T _A = +25°C	1.9
		T _A = +70°C	1.2
Thermal Resistance, Junction to Ambient (Note 5)	R _{θJA}	66	°C/W
Total Power Dissipation (Note 5)	P _D	11	W
Thermal Resistance, Junction to Case (Note 5)	R _{θJC}	11.4	°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 8)						
Drain-Source Breakdown Voltage	BV _{DSS}	60	—	—	V	V _{GS} = 0, I _D = 250µA
Zero Gate Voltage Drain Current	I _{DSS}	—	—	1	µA	V _{DS} = 48V, V _{GS} = 0
Gate-Source Leakage	I _{GSS}	—	—	±100	nA	V _{GS} = ±20V, V _{DS} = 0
ON CHARACTERISTICS (Note 8)						
Gate Threshold Voltage	V _{GS(TH)}	1.2	—	2.3	V	V _{DS} = V _{GS} , I _D = 250µA
Static Drain-Source On-Resistance	R _{DS(ON)}	—	10.7	14	mΩ	V _{GS} = 10V, I _D = 8.5A
		—	15.7	21		V _{GS} = 4.5V, I _D = 6A
Diode Forward Voltage	V _{SD}	—	0.7	1.2	V	V _{GS} = 0, I _S = 1A
DYNAMIC CHARACTERISTICS (Note 9)						
Input Capacitance	C _{iss}	—	785	—	pF	V _{DS} = 30V, V _{GS} = 0, f = 1MHz
Output Capacitance	C _{oss}	—	281	—		
Reverse Transfer Capacitance	C _{rss}	—	27	—		
Gate Resistance	R _g	—	1.5	—	Ω	V _{DS} = 0, V _{GS} = 0, f = 1MHz
Total Gate Charge (V _{GS} = 4.5V)	Q _g	—	7.3	—	nC	V _{DS} = 30V, I _D = 10A
Total Gate Charge (V _{GS} = 10V)	Q _g	—	13.6	—		
Gate-Source Charge	Q _{gs}	—	2.2	—		
Gate-Drain Charge	Q _{gd}	—	3.4	—		
Turn-On Delay Time	t _{D(ON)}	—	3.2	—	ns	V _{GS} = 10V, V _{DD} = 30V, R _g = 6Ω, I _D = 10A
Turn-On Rise Time	t _R	—	4.4	—		
Turn-Off Delay Time	t _{D(OFF)}	—	14.7	—		
Turn-Off Fall Time	t _F	—	8.5	—		
Body Diode Reverse-Recovery Time	t _{RR}	—	23.0	—	ns	I _F = 10A, di/dt = 100A/µs
Body Diode Reverse-Recovery Charge	Q _{RR}	—	14.1	—	nC	

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



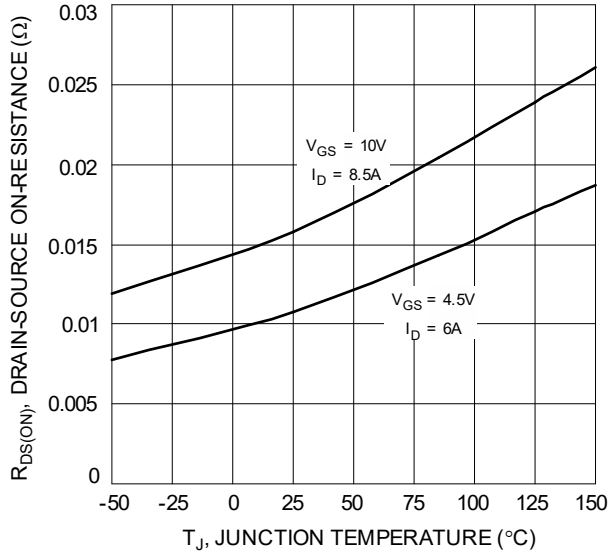


Figure 7 On-Resistance Variation with Temperature

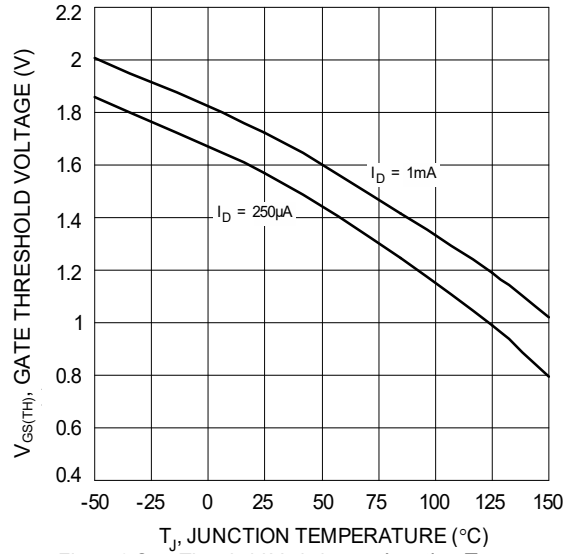


Figure 8 Gate Threshold Variation vs. Junction Temperature (°C)

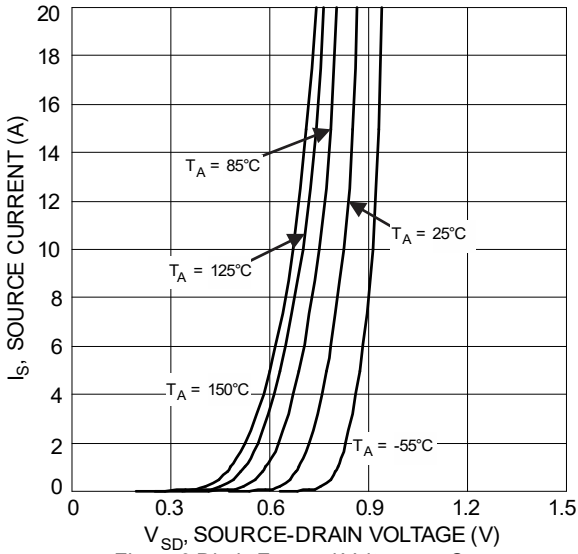


Figure 9 Diode Forward Voltage vs. Current

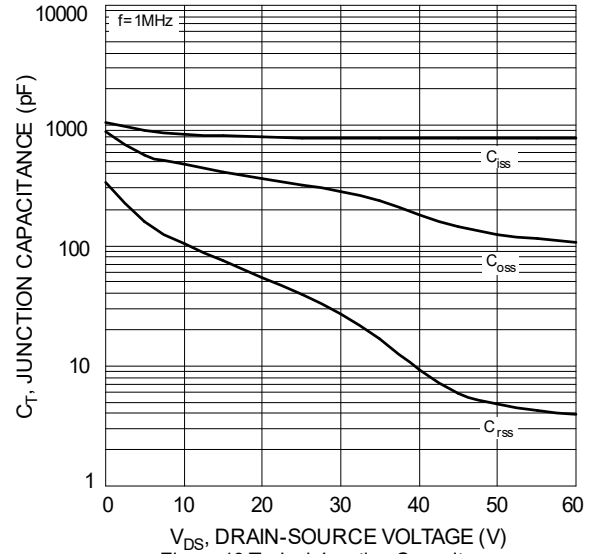


Figure 10 Typical Junction Capacitance

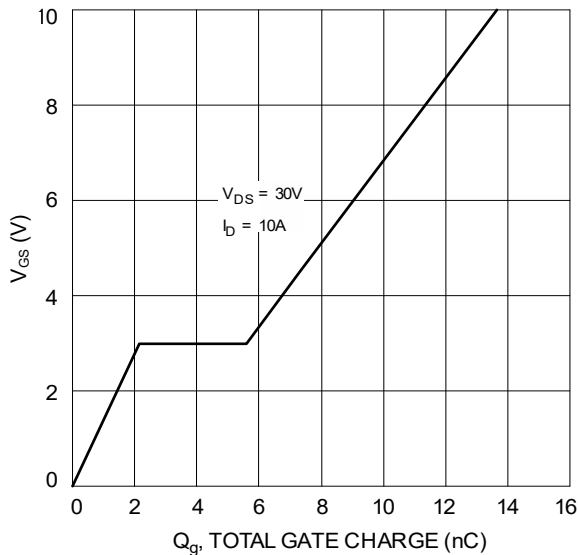


Figure 11 Gate Charge

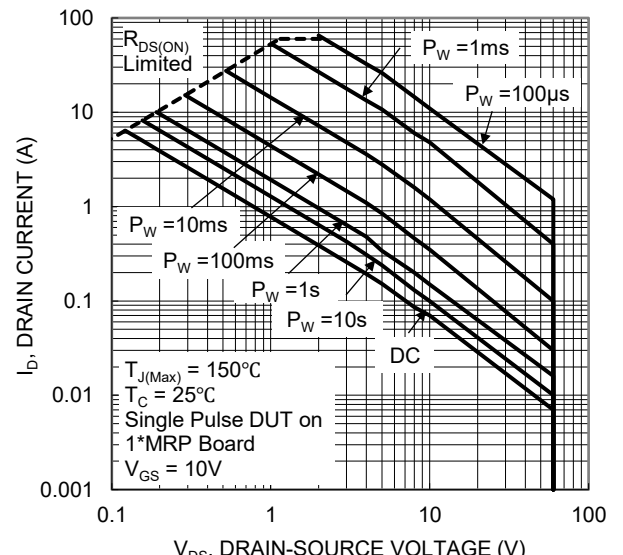


Figure 12 SOA, Safe Operation Area

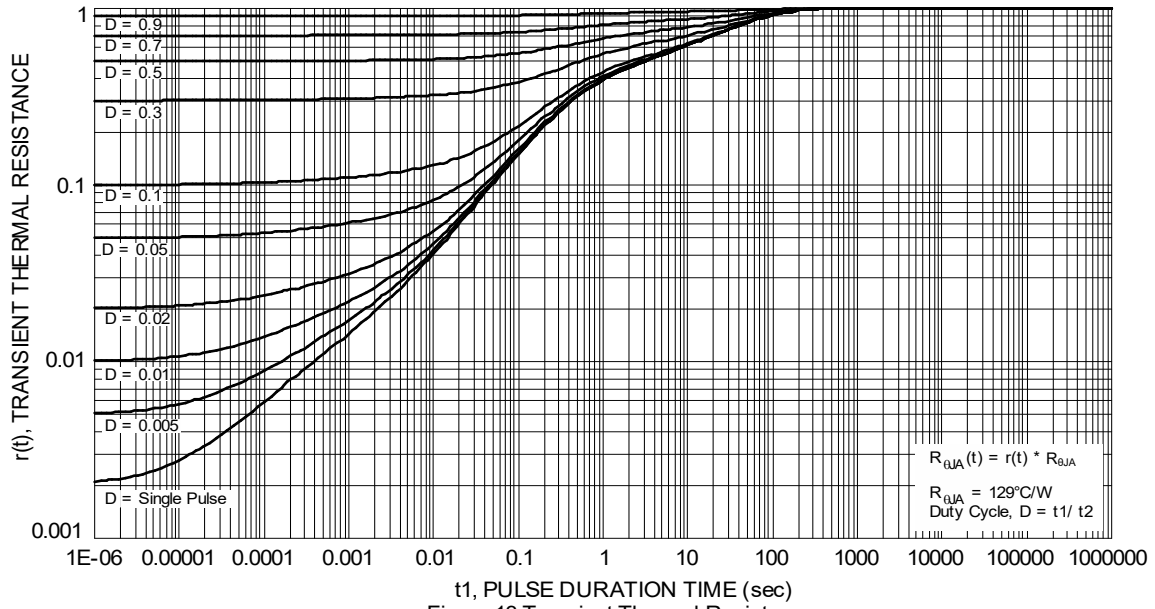
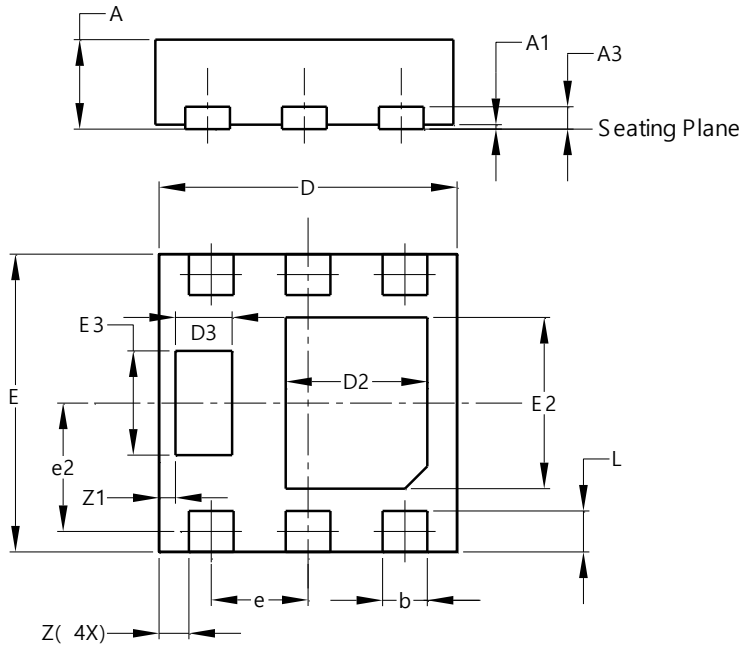


Figure 13 Transient Thermal Resistance

Package Outline Dimensions

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

U-DFN2020-6 (Type F)

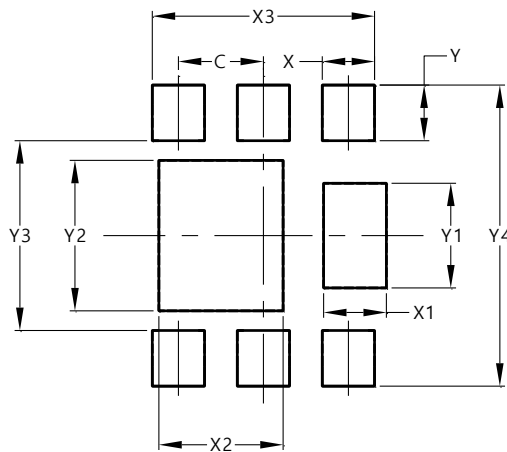


U-DFN2020-6 (Type F)			
Dim	Min	Max	Typ
A	0.57	0.63	0.60
A1	0.00	0.05	0.03
A3	-	-	0.15
b	0.25	0.35	0.30
D	1.95	2.05	2.00
D2	0.85	1.05	0.95
D2a	0.33	0.43	0.38
E	1.95	2.05	2.00
E2	1.05	1.25	1.15
E2a	0.65	0.75	0.70
e	0.65 BSC		
e2	0.863 BSC		
e3	0.70 BSC		
e4	0.325 BSC		
k	0.37 BSC		
k1	0.15 BSC		
k2	0.36 BSC		
L	0.225	0.325	0.275
z	0.20 BSC		
z1	0.110 BSC		
z2	0.20 BSC		
All Dimensions in mm			

Suggested Pad Layout

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

U-DFN2020-6 (Type F)



Dimensions	Value (in mm)
C	0.650
X	0.400
X1	0.480
X2	0.950
X3	1.700
Y	0.425
Y1	0.800
Y2	1.150
Y3	1.450
Y4	2.300

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