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Lead-free Green

DMT3020LFDBQ

DUAL N-CHANNEL ENHANCEMENT MODE MOSFET

Product Summary

BV_{DSS}	$R_{DS(ON)}$ Max	I_D Max T_A = +25°C
30V	20mΩ @ V_{GS} = 10V	7.7A
	32mΩ @ V_{GS} = 4.5V	6.1A

Features and Benefits

- 0.6mm Profile – Ideal for Low Profile Applications
- 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 DMT3020LFDBQ 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

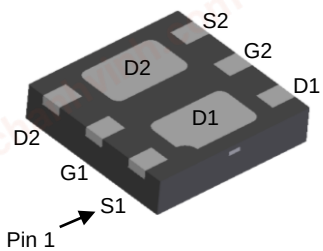
This MOSFET is designed to meet the stringent requirements of automotive applications. It is qualified to AEC-Q101, supported by a PPAP, and is ideal for use in:

- General Purpose Interfacing Switch
- Power Management Functions

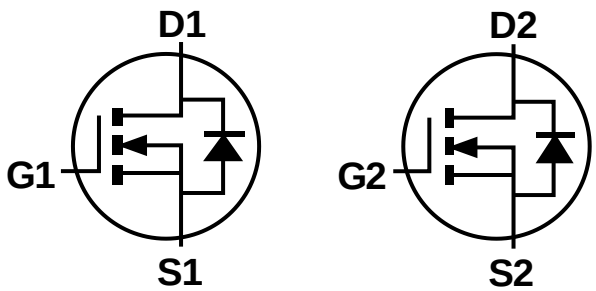
Mechanical Data

- 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 Annealed over Copper Leadframe. Solderable per MIL-STD-202, Method 208 e4
- Terminals Connections: See Diagram Below
- Weight: 0.0065 grams (Approximate)

U-DFN2020-6 (Type B)



Bottom View



Internal Schematic

Ordering Information (Note 4)

Part Number	Case	Packaging
DMT3020LFDBQ-7	U-DFN2020-6 (Type B)	3,000/Tape & Reel
DMT3020LFDBQ-13	U-DFN2020-6 (Type B)	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/.

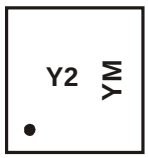
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Marking Information

Site 1:

U-DFN2020-6 (Type B)



Y2 = Product Type Marking Code
YM = Date Code Marking
Y = Year (ex: H = 2020)
M = Month (ex: 9 = September)

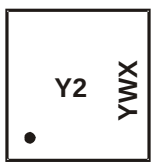
Date Code Key

Year	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031
Code	H	I	J	K	L	M	N	O	P	R	S	T

Month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Code	1	2	3	4	5	6	7	8	9	O	N	D

Site 2:

U-DFN2020-6 (Type B)



Y2 = 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

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Maximum Ratings (@T_A = +25°C, unless otherwise specified.)

Characteristic				Symbol	Value	Unit
Drain-Source Voltage				V_{DSS}	30	V
Gate-Source Voltage				V_{GSS}	±20	V
Continuous Drain Current (Note 6)	V_{GS} = 10V	Steady State	T_A = +25°C T_A = +75°C	I_D	7.7 6.2	A
Maximum Continuous Body Diode Forward Current (Note 6)				I_S	2	A
Pulsed Drain Current (380µs Pulse, Duty Cycle = 1%)				I_{DM}	50	A

Thermal Characteristics

Characteristic		Symbol	Value	Unit
Total Power Dissipation (Note 5)		P_D	0.7	W
Thermal Resistance, Junction to Ambient (Note 5)	Steady State	$R_{\theta JA}$	170	°C/W
Total Power Dissipation (Note 6)		P_D	1.8	W
Thermal Resistance, Junction to Ambient (Note 6)	Steady State	$R_{\theta JA}$	70	°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 7)						
Drain-Source Breakdown Voltage	BV_{DSS}	30	—	—	V	V_{GS} = 0V, I_D = 250µA
Zero Gate Voltage Drain Current T_J = +25°C	I_{DSS}	—	—	1	µA	V_{DS} = 24V, V_{GS} = 0V
Gate-Source Leakage	I_{GSS}	—	—	±100	nA	V_{GS} = ±20V, V_{DS} = 0V
ON CHARACTERISTICS (Note 7)						
Gate Threshold Voltage	$V_{GS(TH)}$	1.0	—	2.5	V	V_{DS} = V_{GS}, I_D = 250µA
Static Drain-Source On-Resistance	$R_{DS(ON)}$	—	—	20	mΩ	V_{GS} = 10V, I_D = 9.0A
				32		V_{GS} = 4.5V, I_D = 7.0A
Diode Forward Voltage	V_{SD}	—	—	1.0	V	V_{GS} = 0V, I_S = 2A
DYNAMIC CHARACTERISTICS (Note 8)						
Input Capacitance	C_{iss}	—	393	—	pF	V_{DS} = 15V, V_{GS} = 0V, f = 1.0MHz
Output Capacitance	C_{oss}	—	173	—	pF	
Reverse Transfer Capacitance	C_{rss}	—	27	—	pF	
Gate Resistance	R_g	—	1.1	—	Ω	V_{DS} = 0V, V_{GS} = 0V, f = 1MHz
Total Gate Charge (V_{GS} = 10V)	Q_g	—	7.0	—	nC	V_{DD} = 15V, I_D = 9A
Total Gate Charge (V_{GS} = 4.5V)	Q_g	—	3.6	—	nC	
Gate-Source Charge	Q_{gs}	—	0.9	—	nC	
Gate-Drain Charge	Q_{gd}	—	1.5	—	nC	
Turn-On Delay Time	$t_{D(ON)}$	—	1.8	—	ns	V_{DD} = 15V, V_{GS} = 10V, R_G = 6Ω, I_D = 9A
Turn-On Rise Time	t_R	—	1.9	—	ns	
Turn-Off Delay Time	$t_{D(OFF)}$	—	7.5	—	ns	
Turn-Off Fall Time	t_F	—	2.4	—	ns	
Reverse Recovery Time	t_{RR}	—	10	—	ns	I_F = 9A, di/dt = 100A/µs
Reverse Recovery Charge	Q_{RR}	—	2.6	—	nC	

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 1-inch square copper plate.
7. Short duration pulse test used to minimize self-heating effect.
8. Guaranteed by design. Not subject to product testing.

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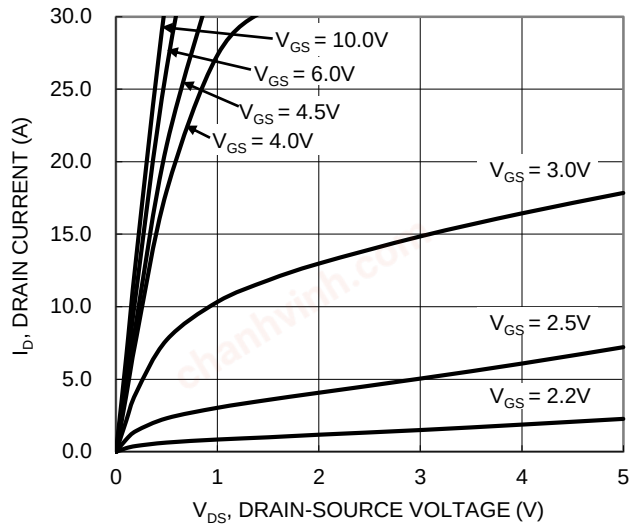


Figure 1. Typical Output Characteristic

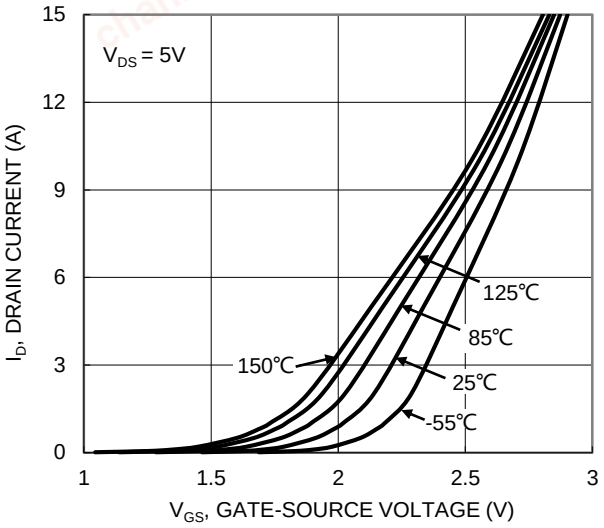


Figure 2. Typical Transfer Characteristic

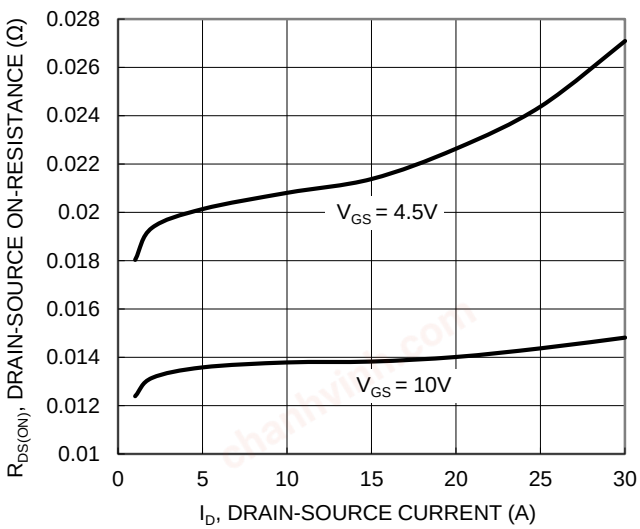


Figure 3. Typical On-Resistance vs. Drain Current and Gate Voltage

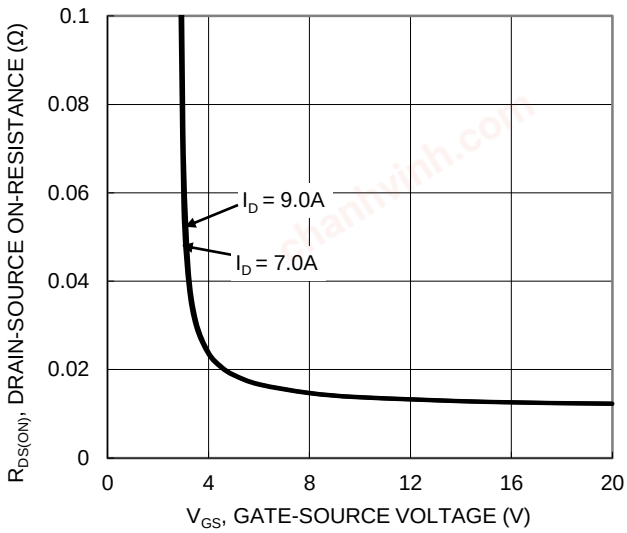


Figure 4. Typical Transfer Characteristic

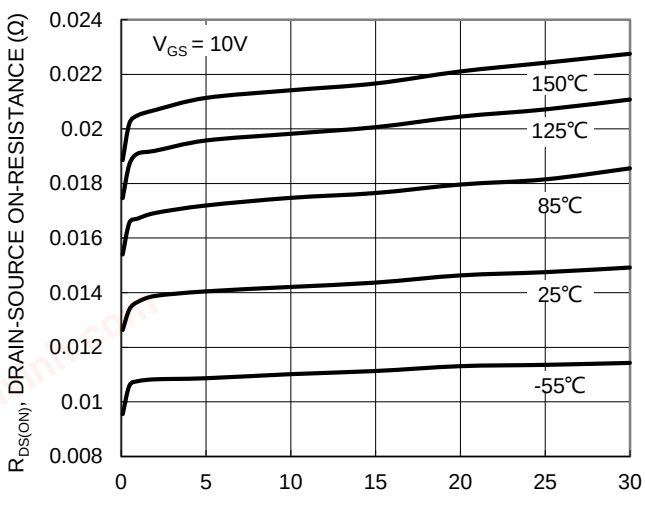


Figure 5. Typical On-Resistance vs. Drain Current and Junction Temperature

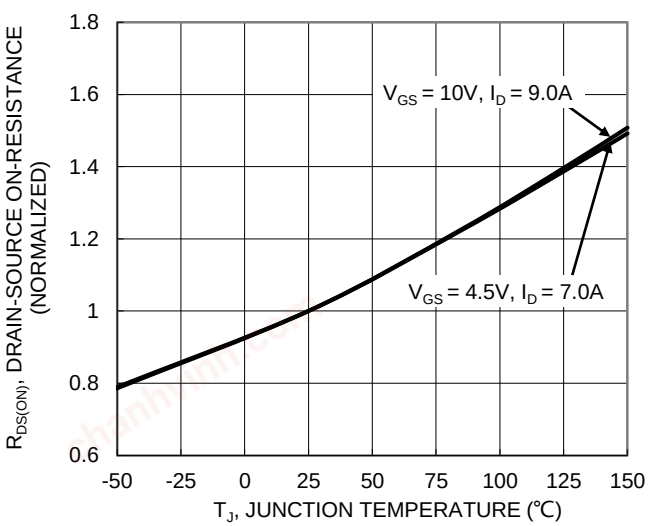


Figure 6. On-Resistance Variation with Junction Temperature

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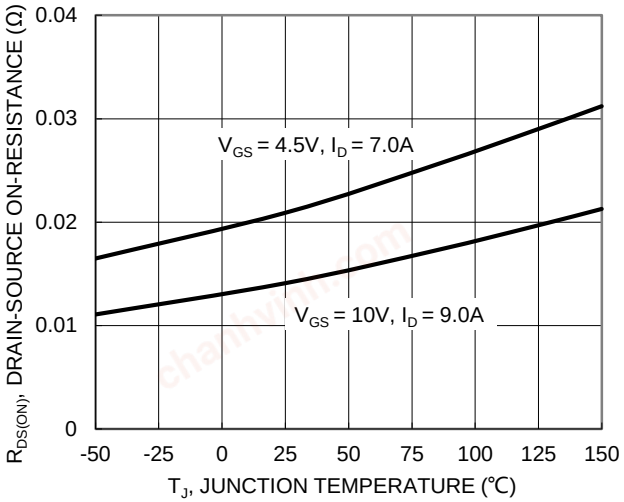


Figure 7. On-Resistance Variation with Junction Temperature

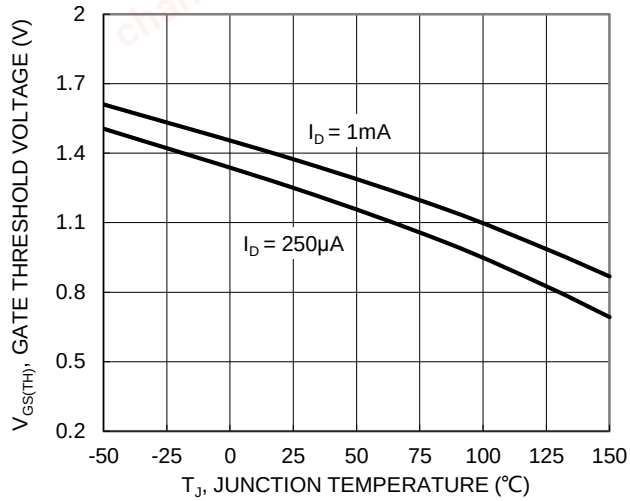


Figure 8. Gate Threshold Variation vs. Junction Temperature

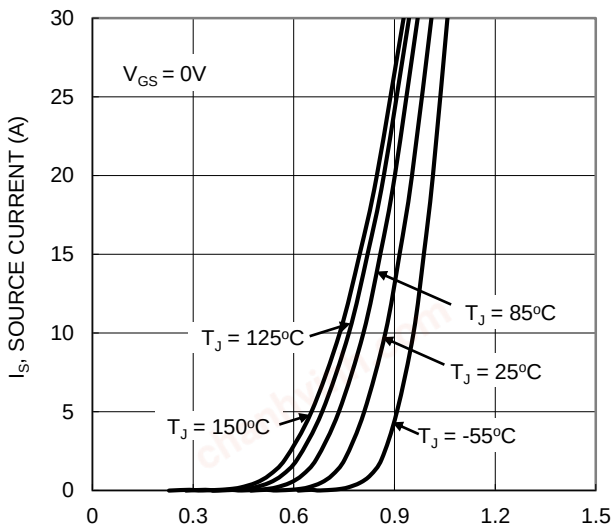


Figure 9. Diode Forward Voltage vs. Current

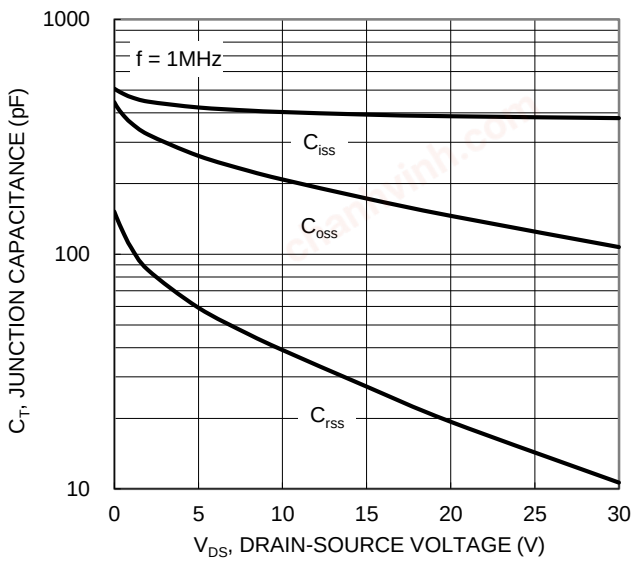


Figure 10. Typical Junction Capacitance

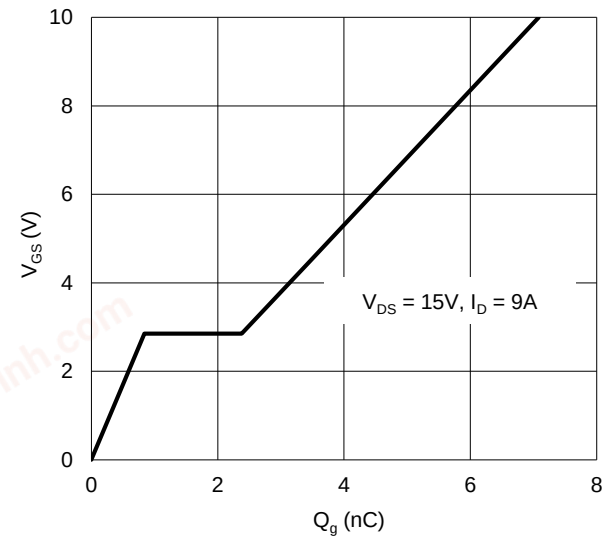


Figure 11. Gate Charge

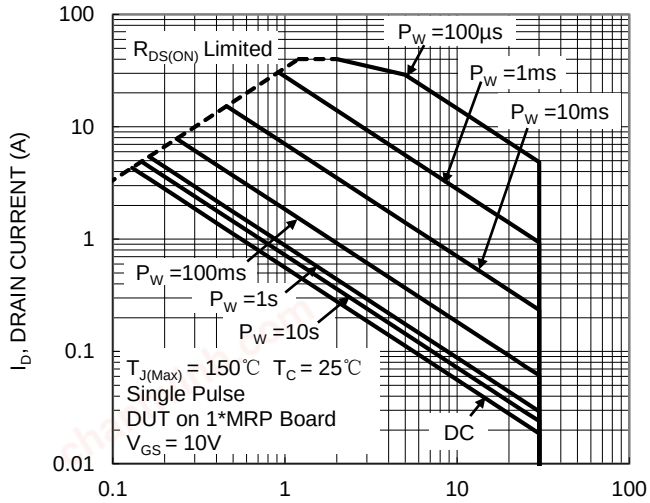


Figure 12. SOA, Safe Operation Area

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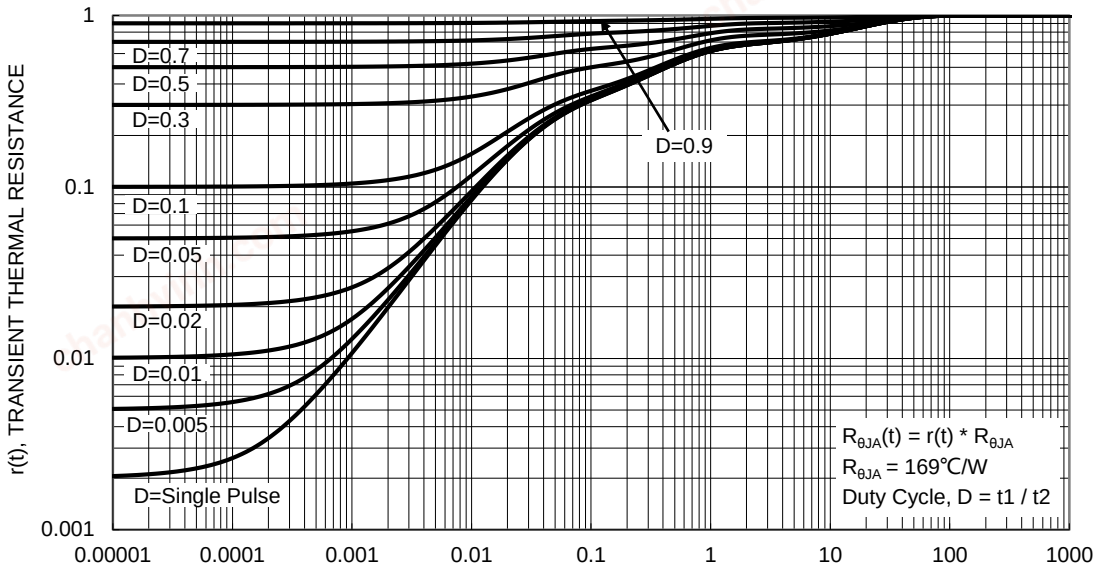


Figure 13. Transient Thermal Resistance

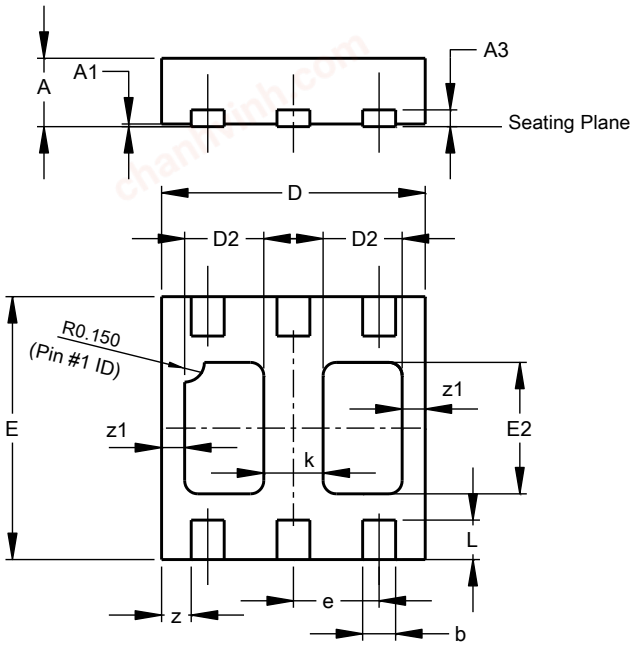
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Package Outline Dimensions

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

U-DFN2020-6 (Type B)

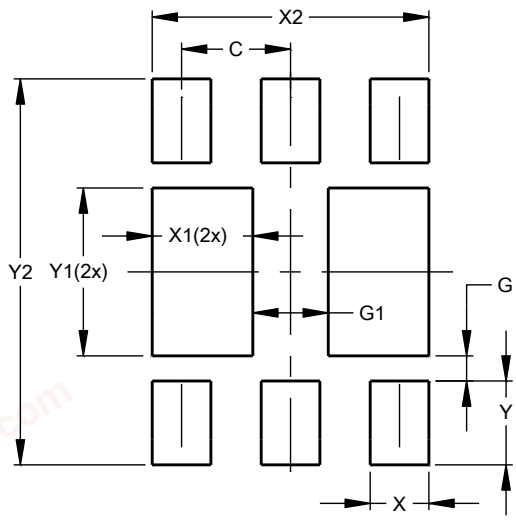


U-DFN2020-6 Type B			
Dim	**Min**	**Max**	**Typ**
A	0.545	0.605	0.575
A1	0.00	0.05	0.02
A3	-	-	0.13
b	0.20	0.30	0.25
D	1.95	2.075	2.00
D2	0.50	0.70	0.60
e	-	-	0.65
E	1.95	2.075	2.00
E2	0.90	1.10	1.00
k	-	-	0.45
L	0.25	0.35	0.30
z	-	-	0.225
z1	-	-	0.175
All Dimensions in mm			

Suggested Pad Layout

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

U-DFN2020-6 (Type B)



Dimensions	Value (in mm)
C	0.650
G	0.150
G1	0.450
X	0.350
X1	0.600
X2	1.650
Y	0.500
Y1	1.000
Y2	2.300

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