DUAL P-CHANNEL ENHANCEMENT MODE MOSFET

Product Summary

BV$_{DSS}$	R$_{DS(ON)}$ Max	I$_{D\ MAX}$ T$_A$ = +25°C
-20V	75mΩ @ V$_{GS}$ = -4.5V	-3.2A
	110mΩ @ V$_{GS}$ = -2.5V	-2.9A

Features

- PCB Footprint of 4mm^2
- Low On-Resistance
- Low Input Capacitance
- Low Profile, 0.6mm Maximum Height
- **Totally Lead-Free & Fully RoHS Compliant (Notes 1 & 2)**
- **Halogen and Antimony Free. "Green" Device (Note 3)**
- **An automotive-compliant part is available under separate datasheet (DMP2110UFDBQ)**

Description and Applications

This MOSFET is designed to minimize the on-state resistance (R$_{DS(ON)}$) yet maintain superior switching performance, which makes it ideal for high-efficiency power management applications.

- Load switches
- Power management functions
- Portable power adaptors

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)
- Terminals Connections: See Diagram Below
- Weight: 0.0065 grams (Approximate)
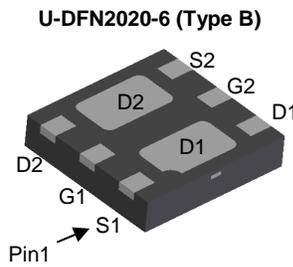
**U-DFN2020-6 (Type B)**

Bottom View
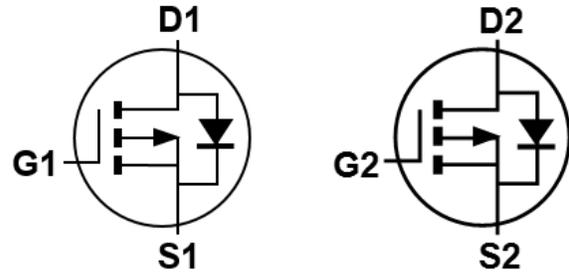
Internal Schematic

Ordering Information (Note 4)

Part Number	Package	Packing Qty.	Carrier
DMP2110UFDB-7	U-DFN2020-6 (Type B)	3,000	Tape & Reel
DMP2110UFDB-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/.

Marking Information

H6
YWX
●
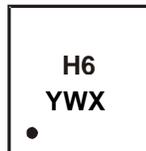
H6 = Product Type Marking Code
YWX = Date Code Marking
Y = Year (ex: 3 = 2023)
W = Week (ex: a = Week 27; z Represents Week 52 and 53)
X = Internal Code (ex: U = Monday)

Date Code Key

Year	2019	-	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032
Code	9	-	3	4	5	6	7	8	9	0	1	2

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$_{DSS}$	-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$_D$	-3.2 -2.6	A
Maximum Continuous Body Diode Forward Current (Note 6)			I$_S$	-1.05	A
Pulsed Drain Current (10µs Pulse, Duty Cycle = 1%)			I$_{DM}$	-15	A

Thermal Characteristics

Characteristic		Symbol	Value	Unit
Total Power Dissipation (Note 5)	T$_A$ = +25°C	P$_D$	0.82	W
Thermal Resistance, Junction to Ambient (Note 5)	Steady State	R$_{\theta JA}$	153	°C/W
Total Power Dissipation (Note 6)	T$_A$ = +25°C	P$_D$	1.14	W
Thermal Resistance, Junction to Ambient (Note 6)	Steady State	R$_{\theta JA}$	110	°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$_{DSS}$	-20	—	—	V	V$_{GS}$ = 0V, I$_D$ = -250µA
Zero Gate Voltage Drain Current T$_J$ = +25°C	I$_{DSS}$	—	—	-1.0	µA	V$_{DS}$ = -16V, V$_{GS}$ = 0V
Gate-Source Leakage	I$_{GSS}$	—	—	±100	nA	V$_{GS}$ = ±8V, V$_{DS}$ = 0V
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$_{DS(ON)}$	—	—	75	mΩ	V$_{GS}$ = -4.5V, I$_D$ = -2.8A
		—	—	110		V$_{GS}$ = -2.5V, I$_D$ = -2.0A
		—	—	168		V$_{GS}$ = -1.8V, I$_D$ = -1.0A
Diode Forward Voltage	V$_{SD}$	—	—	-1.0	V	V$_{GS}$ = 0V, I$_S$ = -1.0A
DYNAMIC CHARACTERISTICS (Note 8)						
Input Capacitance	C$_{iss}$	—	443	—	pF	V$_{DS}$ = -10V, V$_{GS}$ = 0V, f = 1.0MHz
Output Capacitance	C$_{oss}$	—	59	—	pF	
Reverse Transfer Capacitance	C$_{rss}$	—	47	—	pF	
Gate Resistance	R$_g$	—	8.5	—	Ω	V$_{DS}$ = 0V, V$_{GS}$ = 0V, f = 1MHz
Total Gate Charge (V$_{GS}$ = -4.5V)	Q$_g$	—	6.0	—	nC	V$_{DS}$ = -4.5V, I$_D$ = -3.0A
Total Gate Charge (V$_{GS}$ = -8V)		—	12.7	—	nC	
Gate-Source Charge	Q$_{gs}$	—	0.6	—	nC	
Gate-Drain Charge	Q$_{gd}$	—	1.8	—	nC	
Turn-On Delay Time	t$_{D(ON)}$	—	4.0	—	ns	V$_{DS}$ = -10V, V$_{GS}$ = -4.5V, R$_L$ = 10Ω, R$_g$ = 6Ω
Turn-On Rise Time	t$_R$	—	3.7	—	ns	
Turn-Off Delay Time	t$_{D(OFF)}$	—	24.5	—	ns	
Turn-Off Fall Time	t$_F$	—	9.5	—	ns	
Body Diode Reverse Recovery Time	t$_{RR}$	—	8.3	—	ns	I$_S$ = -1.0A, dI/dt = 100A/µs
Body Diode Reverse Recovery Charge	Q$_{RR}$	—	2.0	—	nC	I$_S$ = -1.0A, dI/dt = 100A/µs

Notes: 5. Device mounted on FR-4 substrate PCB, 2oz copper, with minimum recommended pad layout.
6. Device mounted on FR-4 substrate PCB, 2oz copper, with 1inch square copper plate.
7. Short duration pulse test used to minimize self-heating effect.
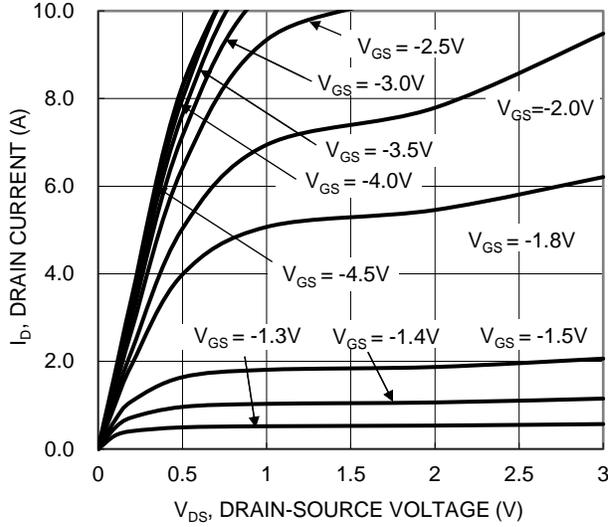8. Guaranteed by design. Not subject to product testing.

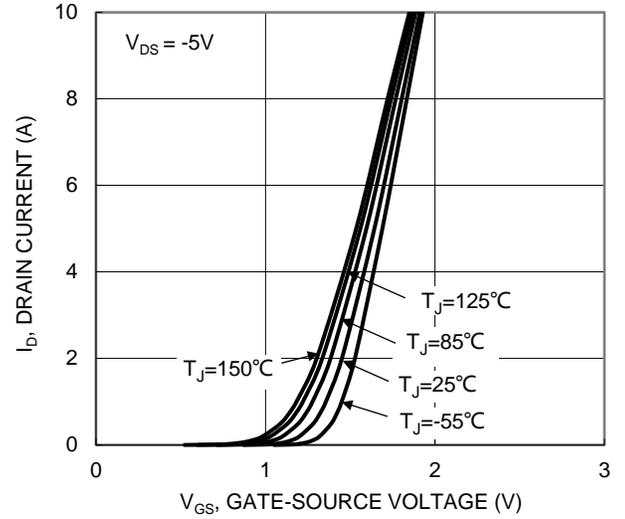Figure 1. Typical Output Characteristic
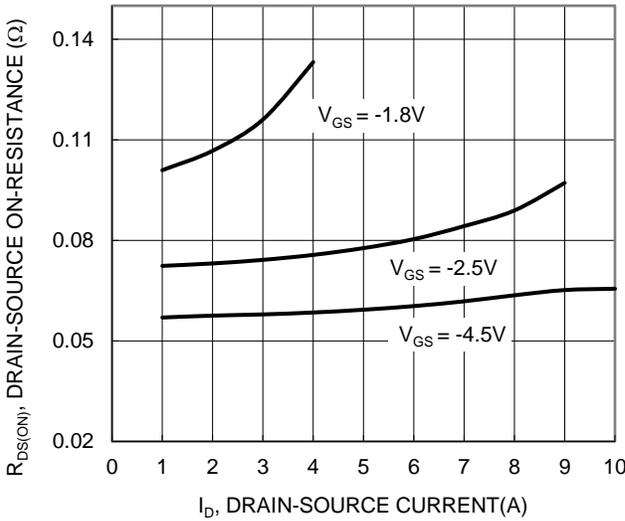
Figure 2. Typical Transfer Characteristic

Figure 3. Typical On-Resistance vs. Drain Current and Gate Voltage
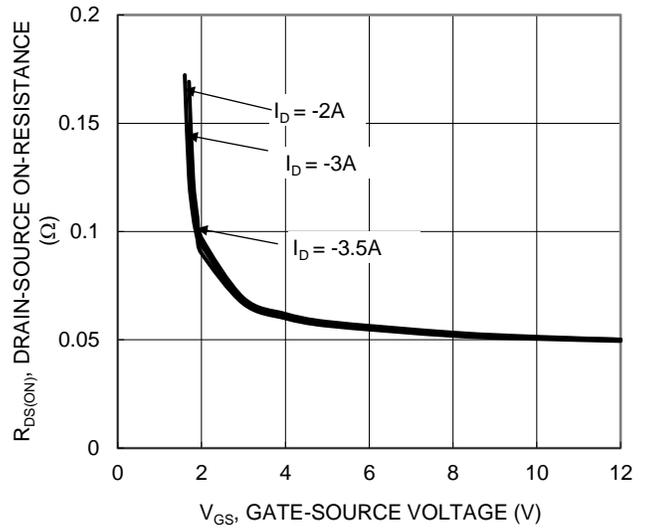
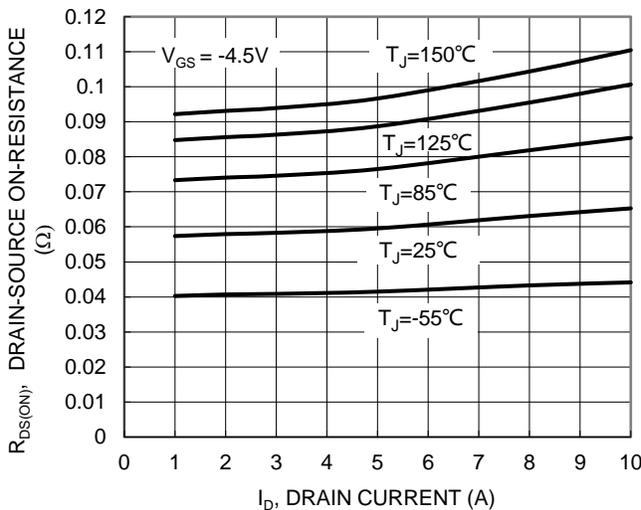Figure 4. Typical Transfer Characteristic

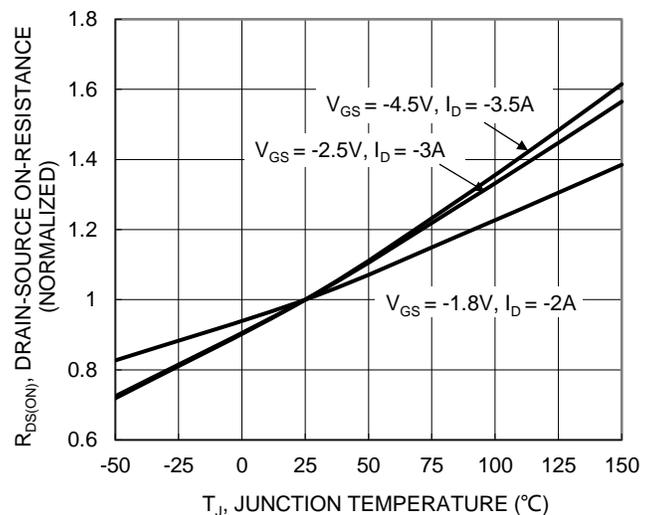Figure 5. Typical On-Resistance vs. Drain Current and Junction Temperature

Figure 6. On-Resistance Variation with Junction Temperature

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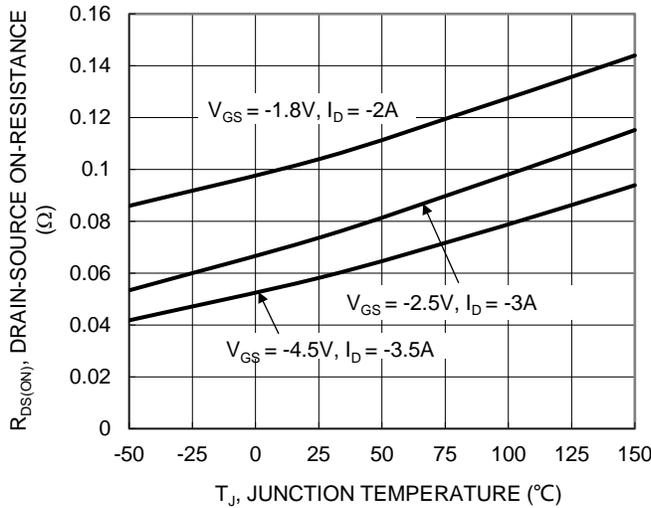© 2023 Copyright Diodes Incorporated. All Rights Reserved.

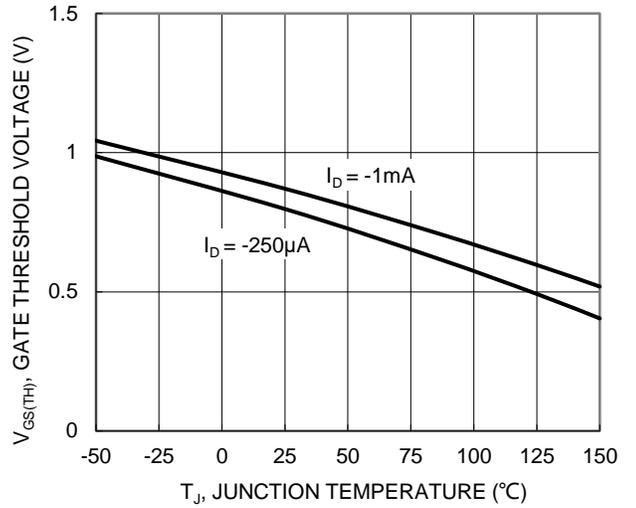Figure 7. On-Resistance Variation with Junction Temperature

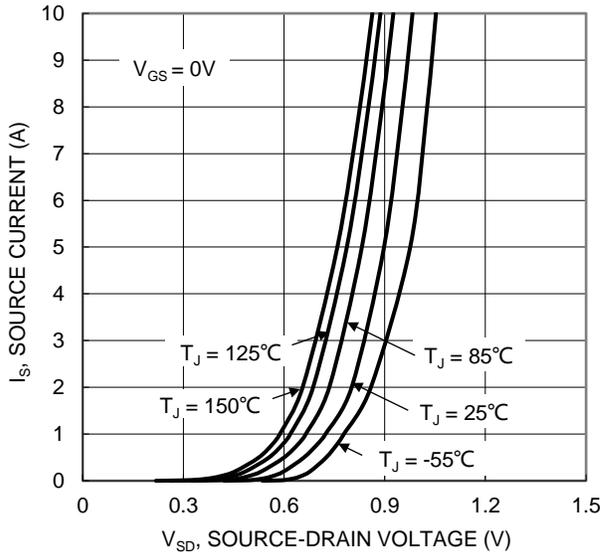Figure 8. Gate Threshold Variation vs. Junction Temperature

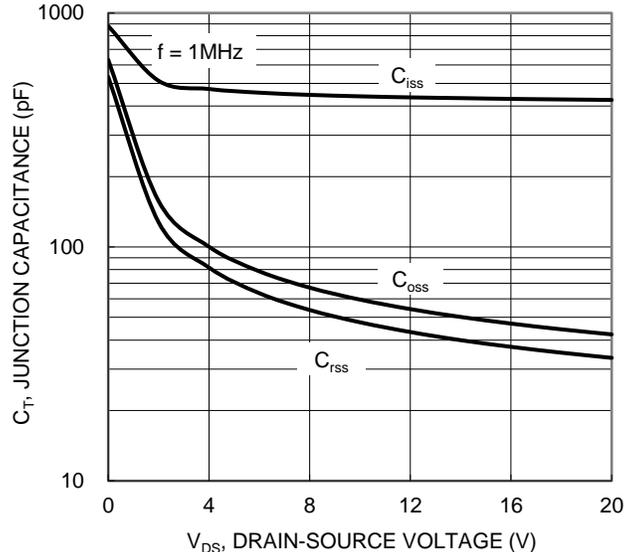Figure 9. Diode Forward Voltage vs. Current

Figure 10. Typical Junction Capacitance
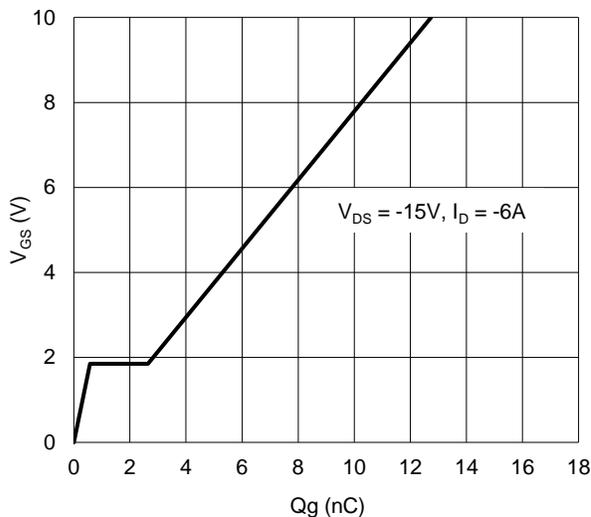
Figure 11. Gate Charge
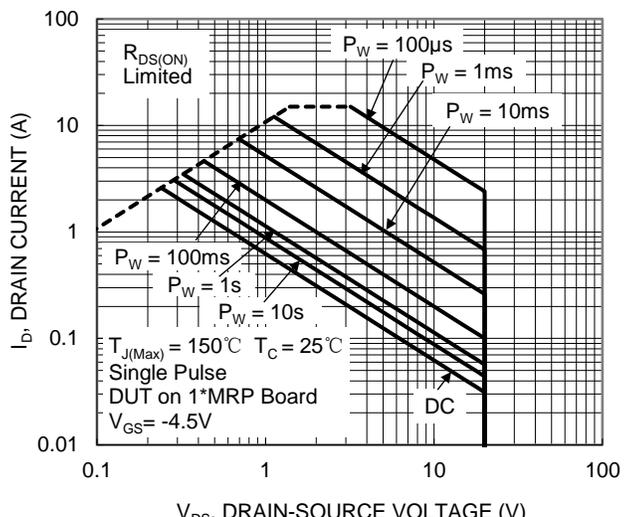
Figure 12. SOA, Safe Operation Area

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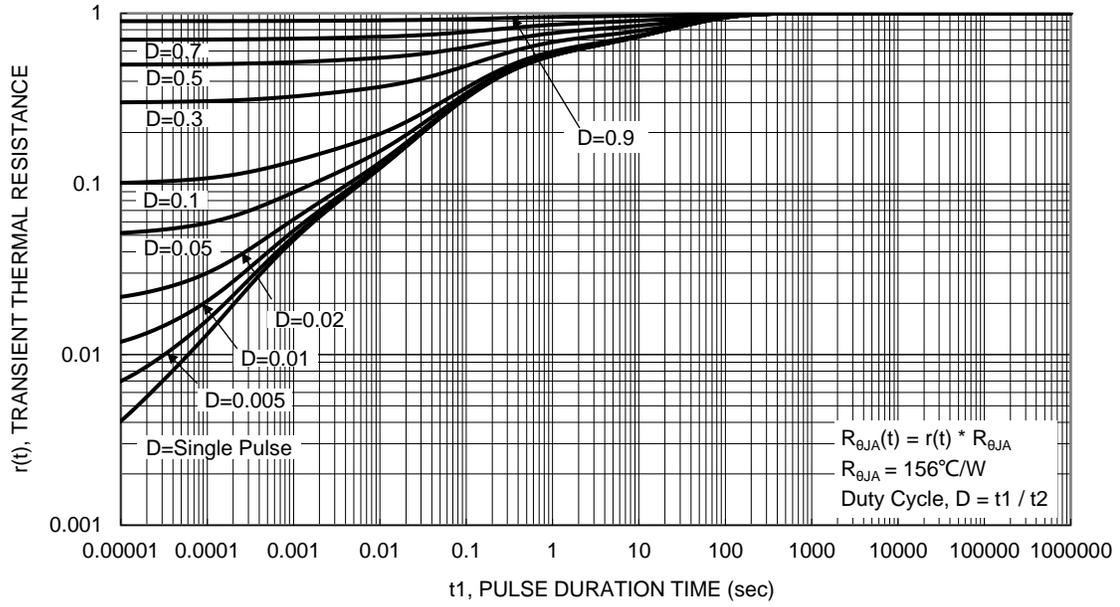
Figure 13. Transient Thermal Resistance

In the chart:

$R_{\theta JA}(t) = r(t) * R_{\theta JA}$

$R_{\theta JA} = 156°C/W$

Duty Cycle, $D = t1 / t2$

Axis labels: r(t), TRANSIENT THERMAL RESISTANCE (vertical); t1, PULSE DURATION TIME (sec) (horizontal)

Curve labels: D=0.7, D=0.5, D=0.3, D=0.1, D=0.05, D=0.02, D=0.01, D=0.005, D=Single Pulse, D=0.9

Package Outline Dimensions

Please see http://www.diodes.com/package-outlines.html for the latest version.
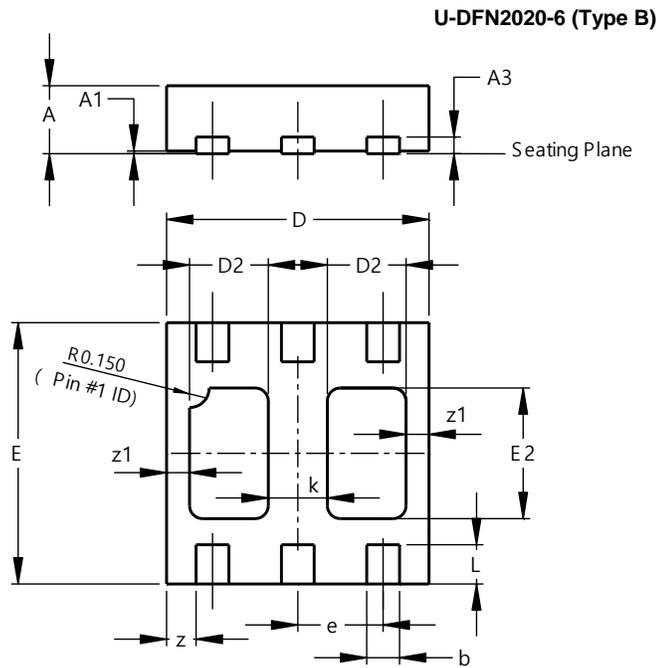
U-DFN2020-6 (Type B)

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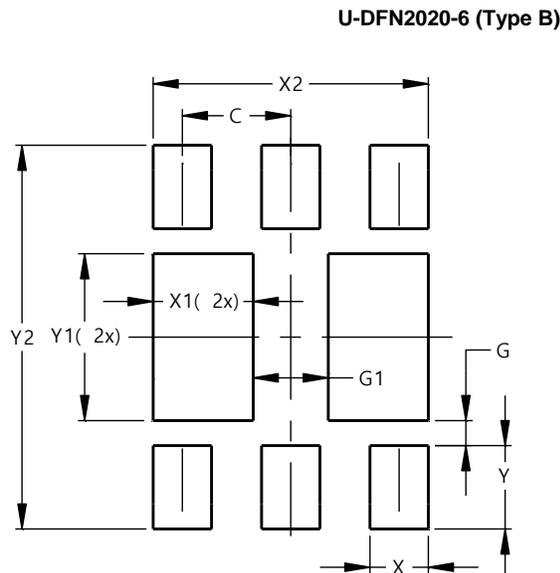
Dimensions	Value (in mm)
C	0.650
G	0.150
G1	0.450
X	0.350
X1	0.600
X2	1.650
Y	0.500
Y1	1.000
Y2	2.300

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