

**DUAL P-CHANNEL ENHANCEMENT MODE MOSFET**

**Product Summary**

$V_{(BR)DSS}$	$R_{DS(ON) max}$	$I_D MAX$ $T_A = +25^{\circ}C$
-12V	59mΩ @ $V_{GS} = -4.5V$	-3.9A
	81mΩ @ $V_{GS} = -2.5V$	-3.3A
	115mΩ @ $V_{GS} = -1.8V$	-2.8A

**Description**

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

**Applications**

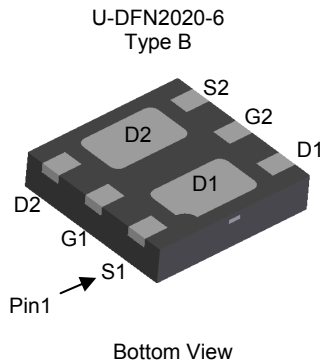
- Load Switch
- Power Management Functions
- Portable Power Adaptors

**Features**

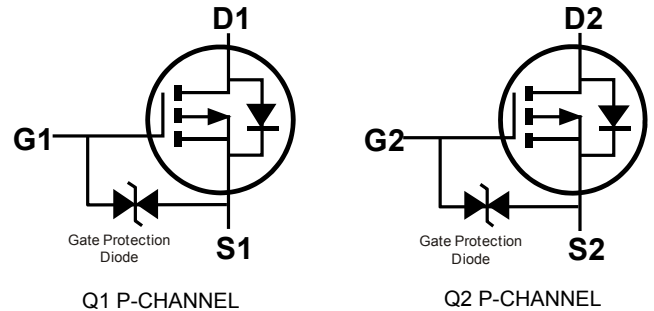
- Low On-Resistance
- Low Input Capacitance
- Low Profile, 0.6mm Max Height
- **ESD protected gate.**
- **Totally Lead-Free & Fully RoHS Compliant (Notes 1 & 2)**
- **Halogen and Antimony Free. "Green" Device (Note 3)**
- **Qualified to AEC-Q101 Standards for High Reliability**

**Mechanical Data**

- Case: U-DFN2020-6 Type B
- 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 <sup>(e4)</sup>
- Terminals Connections: See Diagram Below
- Weight: 0.0065 grams (approximate)



Bottom View



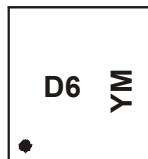
Internal Schematic

**Ordering Information (Note 4)**

Part Number	Case	Packaging
DMP1055UFDB -7	U-DFN2020-6 Type B	3000/Tape & Reel
DMP1055UFDB -13	U-DFN2020-6 Type B	10000/Tape & Reel

- Notes:
1. No purposely added lead. Fully EU Directive 2002/95/EC (RoHS) & 2011/65/EU (RoHS 2) compliant.
  2. See [http://www.diodes.com/quality/lead\\_free.html](http://www.diodes.com/quality/lead_free.html) 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 <http://www.diodes.com/products/packages.html>.

**Marking Information**



D6 = Product Type Marking Code  
 YM = Date Code Marking  
 Y = Year (ex: A = 2013)  
 M = Month (ex: 9 = September)

Date Code Key

Year Code	2012	2013	2014	2015	2016	2017	2018
Code	Z	A	B	C	D	E	F

Month Code	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

**Maximum Ratings** (@ $T_A = +25^\circ\text{C}$ , unless otherwise specified.)

Characteristic	Symbol	Value	Units	
Drain-Source Voltage	$V_{DSS}$	-12	V	
Gate-Source Voltage	$V_{GSS}$	$\pm 8$	V	
Continuous Drain Current (Note 5) $V_{GS} = -4.5\text{V}$	Steady State	$T_A = +25^\circ\text{C}$ $T_A = +70^\circ\text{C}$	$I_D$ -3.9 -3.1	A
	$t < 5\text{s}$	$T_A = +25^\circ\text{C}$ $T_A = +70^\circ\text{C}$	$I_D$ -5.0 -4.0	A
Maximum Continuous Body Diode Forward Current (Note 5)	$I_S$	-1.7	A	
Pulsed Drain Current (10 $\mu\text{s}$ pulse, duty cycle = 1%)	$I_{DM}$	-25	A	

**Thermal Characteristics**

Characteristic	Symbol	Value	Units	
Total Power Dissipation (Note 5)	$P_D$	Steady State	1.36	W
		$t < 5\text{s}$	1.89	
Thermal Resistance, Junction to Ambient (Note 5)	$R_{\theta JA}$	Steady State	92	$^\circ\text{C/W}$
		$t < 5\text{s}$	66	
Thermal Resistance, Junction to Case (Note 5)	$R_{\theta JC}$	18		
Operating and Storage Temperature Range	$T_J, T_{STG}$	-55 to +150	$^\circ\text{C}$	

**Electrical Characteristics** (@ $T_A = +25^\circ\text{C}$ , unless otherwise specified.)

Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
<b>OFF CHARACTERISTICS (Note 6)</b>						
Drain-Source Breakdown Voltage	$BV_{DSS}$	-12	—	—	V	$V_{GS} = 0\text{V}, I_D = -250\mu\text{A}$
Zero Gate Voltage Drain Current $T_J = +25^\circ\text{C}$	$I_{DSS}$	—	—	-1.0	$\mu\text{A}$	$V_{DS} = -12\text{V}, V_{GS} = 0\text{V}$
Gate-Source Leakage	$I_{GSS}$	—	—	$\pm 10$	$\mu\text{A}$	$V_{GS} = \pm 8\text{V}, V_{DS} = 0\text{V}$
<b>ON CHARACTERISTICS (Note 6)</b>						
Gate Threshold Voltage	$V_{GS(th)}$	-0.4	—	-1	V	$V_{DS} = V_{GS}, I_D = -250\mu\text{A}$
Static Drain-Source On-Resistance	$R_{DS(on)}$	—	37	59	m $\Omega$	$V_{GS} = -4.5\text{V}, I_D = -3.6\text{A}$
		—	48	81		$V_{GS} = -2.5\text{V}, I_D = -3.1\text{A}$
		—	69	115		$V_{GS} = -1.8\text{V}, I_D = -2.6\text{A}$
		—	88	215		$V_{GS} = -1.5\text{V}, I_D = -0.5\text{A}$
		—	—	—		—
Diode Forward Voltage	$V_{SD}$	—	-0.7	-1.2	V	$V_{GS} = 0\text{V}, I_S = -3.7\text{A}$
<b>DYNAMIC CHARACTERISTICS (Note 7)</b>						
Input Capacitance	$C_{iss}$	—	1028	—	pF	$V_{DS} = -6\text{V}, V_{GS} = 0\text{V}, f = 1.0\text{MHz}$
Output Capacitance	$C_{oss}$	—	285	—	pF	
Reverse Transfer Capacitance	$C_{rss}$	—	254	—	pF	
Gate Resistance	$R_g$	—	19.6	—	$\Omega$	$V_{DS} = 0\text{V}, V_{GS} = 0\text{V}, f = 1\text{MHz}$
Total Gate Charge ( $V_{GS} = -4.5\text{V}$ )	$Q_g$	—	13	—	nC	$V_{DS} = -10\text{V}, I_D = -4.7\text{A}$
Total Gate Charge ( $V_{GS} = -8\text{V}$ )		—	20.8	—	nC	
Gate-Source Charge	$Q_{gs}$	—	1.8	—	nC	
Gate-Drain Charge	$Q_{gd}$	—	4.5	—	nC	
Turn-On Delay Time	$t_{D(on)}$	—	5.6	—	ns	
Turn-On Rise Time	$t_r$	—	12.8	—	ns	$V_{DD} = -6\text{V}, V_{GS} = -4.5\text{V}, R_L = 1.6\Omega, R_G = 1\Omega$
Turn-Off Delay Time	$t_{D(off)}$	—	30.7	—	ns	
Turn-Off Fall Time	$t_f$	—	25.4	—	ns	
Body Diode Reverse Recovery Time	$t_{rr}$	—	31.6	—	nS	$I_S = -3.6\text{A}, dI/dt = 100\text{A}/\mu\text{s}$
Body Diode Reverse Recovery Charge	$Q_{rr}$	—	7.8	—	nC	$I_S = -3.6\text{A}, dI/dt = 100\text{A}/\mu\text{s}$

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

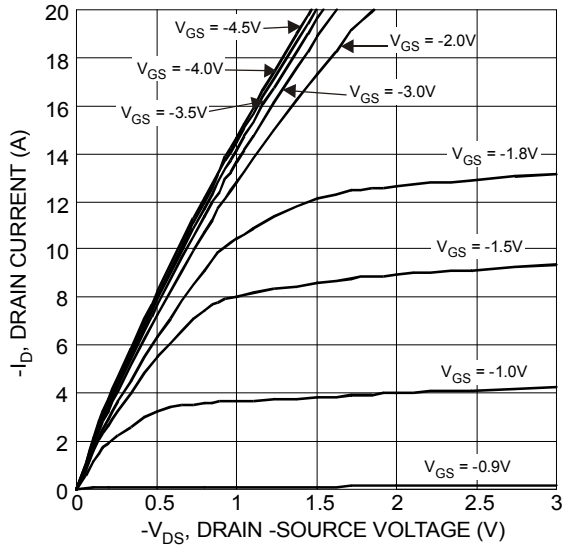


Figure 1 Typical Output Characteristics

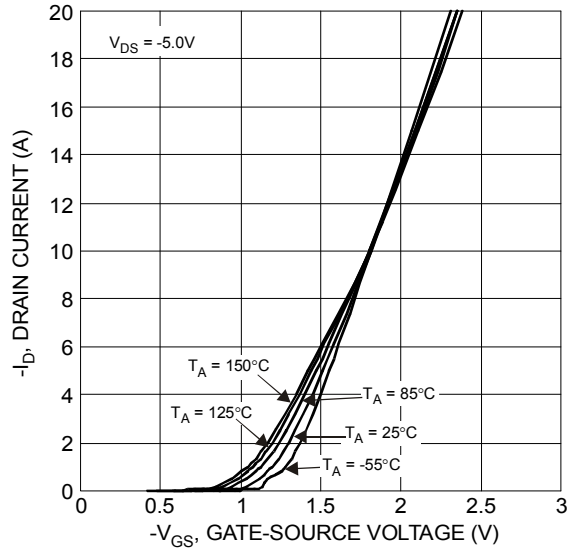


Figure 2 Typical Transfer Characteristics

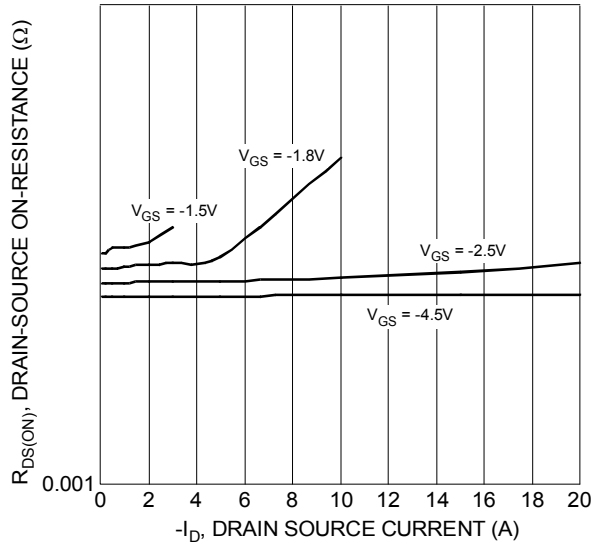


Figure 3 Typical On-Resistance vs. Drain Current and Gate Voltage

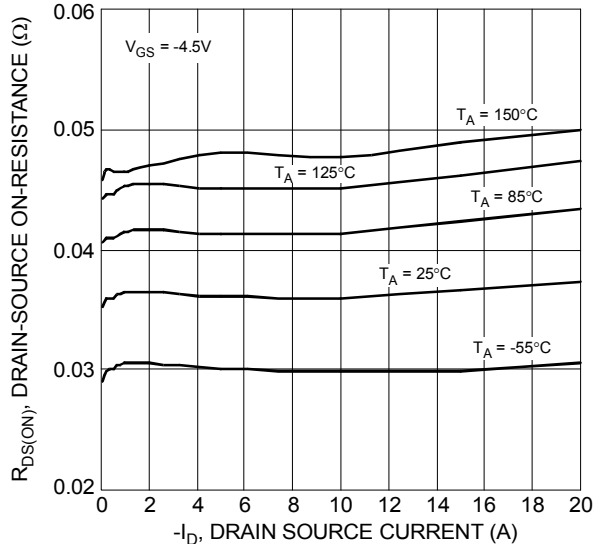


Figure 4 Typical On-Resistance vs. Drain Current and Temperature

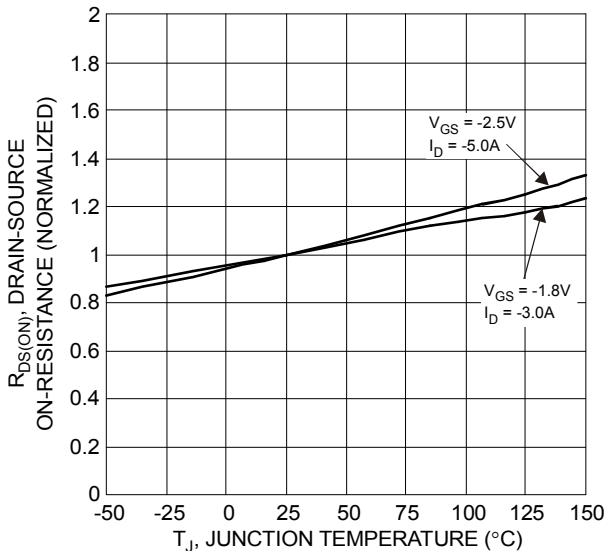


Figure 5 On-Resistance Variation with Temperature

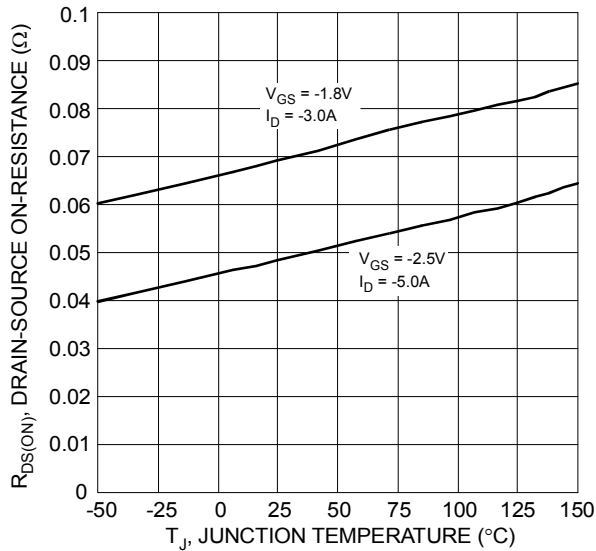


Figure 6 On-Resistance Variation with Temperature

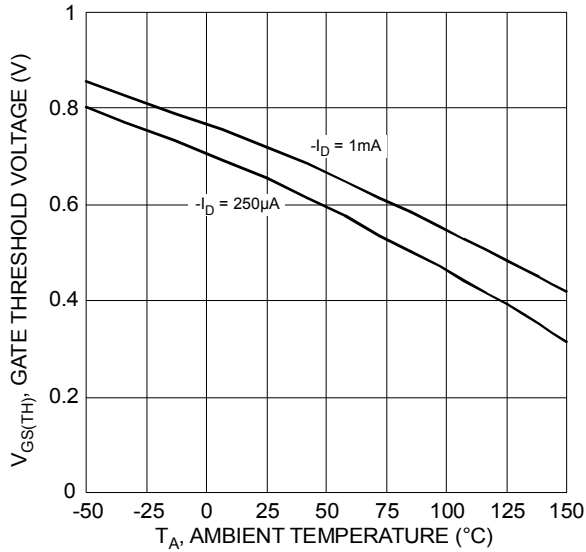


Figure 7 Gate Threshold Variation vs. Ambient Temperature

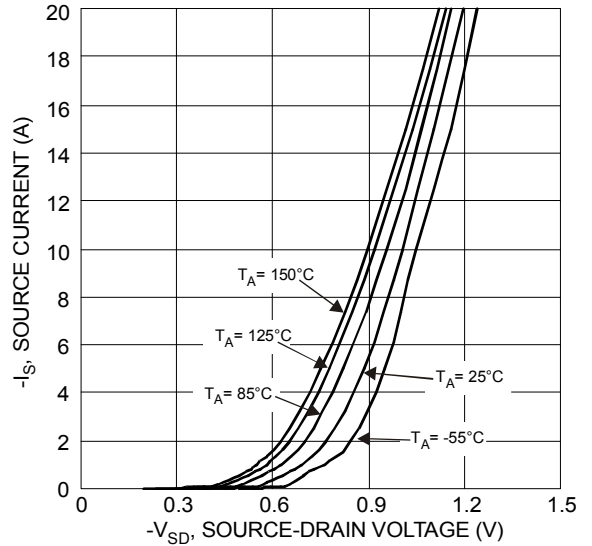


Figure 8 Diode Forward Voltage vs. Current

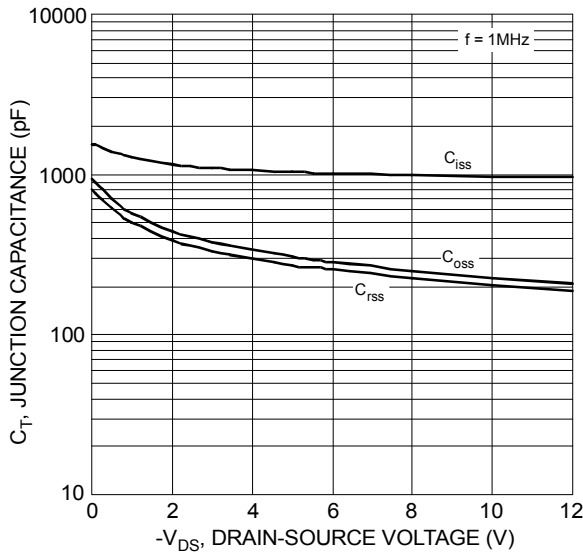


Figure 9 Typical Junction Capacitance

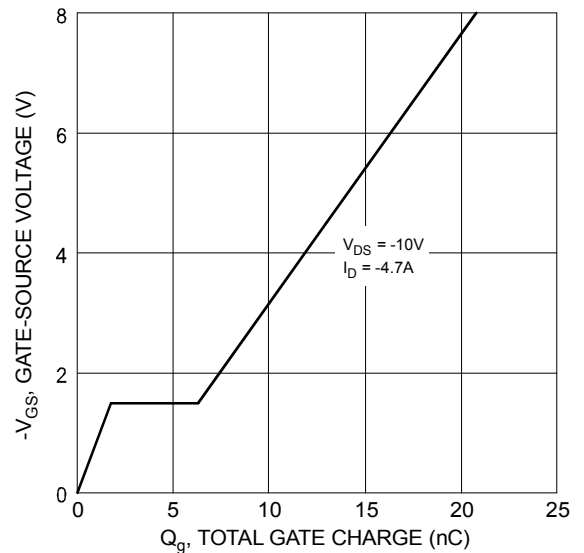


Figure 10 Gate-Charge Characteristics

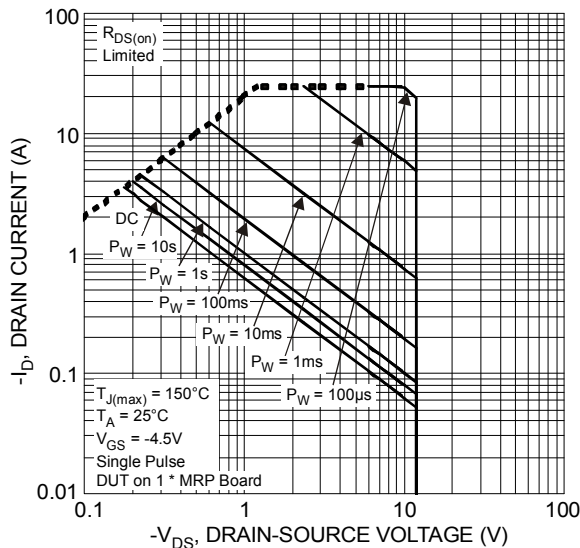
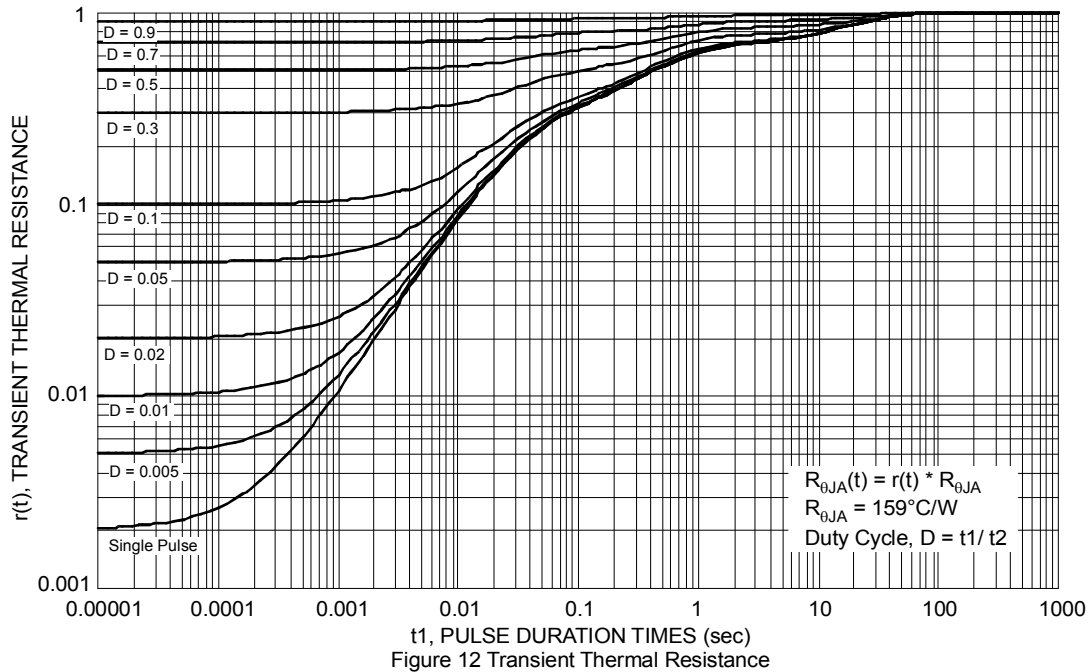
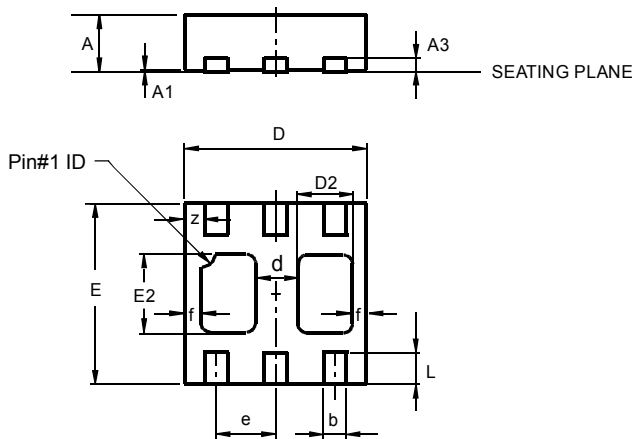


Figure 11 SOA Safe Operation Area



**Package Outline Dimensions**

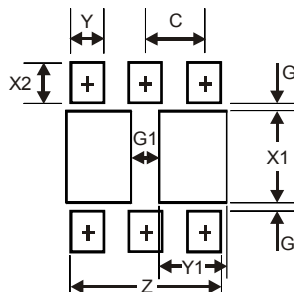
Please see AP02002 at <http://www.diodes.com/datasheets/ap02002.pdf> for latest version.



U-DFN2020-6 Type B			
Dim	Min	Max	Typ
A	0.545	0.605	0.575
A1	0	0.05	0.02
A3	—	—	0.13
b	0.20	0.30	0.25
D	1.95	2.075	2.00
d	—	—	0.45
D2	0.50	0.70	0.60
e	—	—	0.65
E	1.95	2.075	2.00
E2	0.90	1.10	1.00
f	—	—	0.15
L	0.25	0.35	0.30
z	—	—	0.225
All Dimensions in mm			

**Suggested Pad Layout**

Please see AP02001 at <http://www.diodes.com/datasheets/ap02001.pdf> for the latest version.



Dimensions	Value (in mm)
Z	1.67
G	0.20
G1	0.40
X1	1.0
X2	0.45
Y	0.37
Y1	0.70
C	0.65

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