

**DUAL P-CHANNEL ENHANCEMENT MODE MOSFET**

**Product Summary**

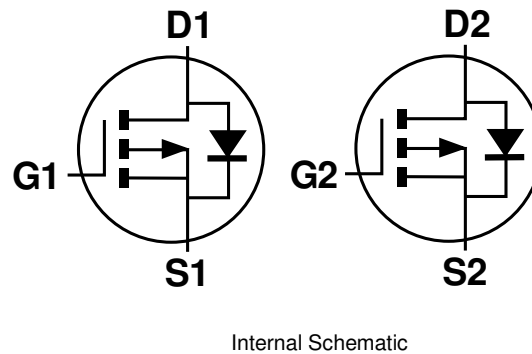
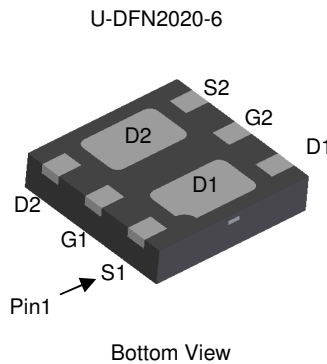
Device	V <sub>(BR)DSS</sub>	R <sub>DS(ON)</sub> max	I <sub>D</sub> MAX T <sub>A</sub> = +25 °C
P-Channel	-12V	61mΩ @ V <sub>GS</sub> = -4.5V	-3.8A
		81mΩ @ V <sub>GS</sub> = -2.5V	-3.3A
		115mΩ @ V <sub>GS</sub> = -1.8V	-2.8A

**Description**

This MOSFET is designed to minimize the on-state resistance (R<sub>DS(on)</sub>) 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
- **Totally Lead-Free & Fully RoHS Compliant (Notes 1 & 2)**
- **Halogen and Antimony Free. "Green" Device (Note 3)**

**Mechanical Data**

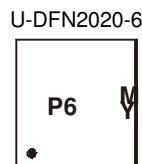
- Case: U-DFN2020-6
- Case Material: Molded Plastic, "Green" Molding Compound. UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminals: Finish NiPdAu over Copper Leadframe. Solderable per MIL-STD-202, Method 208 @4
- Terminals Connections: See Diagram Below
- Weight: 0.0065 grams (Approximate)

**Ordering Information** (Note 4)

Part Number	Case	Packaging
DMP1046UFDB -7	U-DFN2020-6	3,000/Tape & Reel
DMP1046UFDB -13	U-DFN2020-6	10,000/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> 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>.

**Marking Information**



P6 = Product Type Marking Code  
 YM = Date Code Marking  
 Y = Year (ex: C = 2015)  
 M = Month (ex: 9 = September)

Date Code Key

Year	2015	2016	2017	2018	2019	2020	2021
Code	C	D	E	F	G	H	I

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

**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	$T_A = +25^\circ\text{C}$ $T_A = +70^\circ\text{C}$	$I_D$	-3.8 -3.0	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	A
Pulsed Drain Current (10 $\mu\text{s}$ pulse, duty cycle = 1%)			$I_{DM}$	-15	A
Avalanche Current ( $L = 0.1\text{mH}$ )			$I_{AS}$	-12	A
Avalanche Energy ( $L = 0.1\text{mH}$ )			$E_{AS}$	8	mJ

**Thermal Characteristics**

Characteristic		Symbol	Value	Units
Total Power Dissipation (Note 5)	Steady State	$P_D$	1.4	W
	$t < 5\text{s}$		2.2	
Thermal Resistance, Junction to Ambient (Note 5)	Steady State	$R_{\theta JA}$	92	$^\circ\text{C/W}$
	$t < 5\text{s}$		55	
Thermal Resistance, Junction to Case (Note 5)		$R_{\theta JC}$	20	
Operating and Storage Temperature Range		$T_J, T_{STG}$	-55 to 150	$^\circ\text{C}$

Notes: 5. Device mounted on 1" x 1" FR-4 PCB with high coverage 2oz. Copper, single sided.

**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	$I_{GSS}$	-	-	$\pm 100$	nA	$V_{GS} = \pm 8\text{V}, V_{DS} = 0\text{V}$
<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	61	m $\Omega$	$V_{GS} = -4.5\text{V}, I_D = -3.6\text{A}$
		-	47	81		$V_{GS} = -2.5\text{V}, I_D = -3.2\text{A}$
		-	63	115		$V_{GS} = -1.8\text{V}, I_D = -1.0\text{A}$
Diode Forward Voltage	$V_{SD}$	-	-0.65	-1.2	V	$V_{GS} = 0\text{V}, I_S = -4.5\text{A}$
<b>DYNAMIC CHARACTERISTICS (Note 7)</b>						
Input Capacitance	$C_{iss}$	-	915	-	pF	$V_{DS} = -6\text{V}, V_{GS} = 0\text{V}, f = 1.0\text{MHz}$
Output Capacitance	$C_{oss}$	-	225	-	pF	
Reverse Transfer Capacitance	$C_{rss}$	-	183	-	pF	
Gate Resistance	$R_g$	-	56.9	-	$\Omega$	$V_{DS} = 0\text{V}, V_{GS} = 0\text{V}, f = 1\text{MHz}$
Total Gate Charge ( $V_{GS} = -4.5\text{V}$ )	$Q_g$	-	10.7	-	nC	$V_{DS} = -6\text{V}, I_D = -4.3\text{A}$
Total Gate Charge ( $V_{GS} = -8\text{V}$ )		-	17.9	-	nC	
Gate-Source Charge	$Q_{gs}$	-	1.7	-	nC	
Gate-Drain Charge	$Q_{gd}$	-	3.0	-	nC	
Turn-On Delay Time	$t_{D(on)}$	-	5.7	-	ns	
Turn-On Rise Time	$t_r$	-	11.5	-	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	$t_{D(off)}$	-	27.8	-	ns	
Turn-Off Fall Time	$t_f$	-	26.4	-	ns	

Notes: 6. Short duration pulse test used to minimize self-heating effect.  
7. Guaranteed by design. Not subject to product testing.

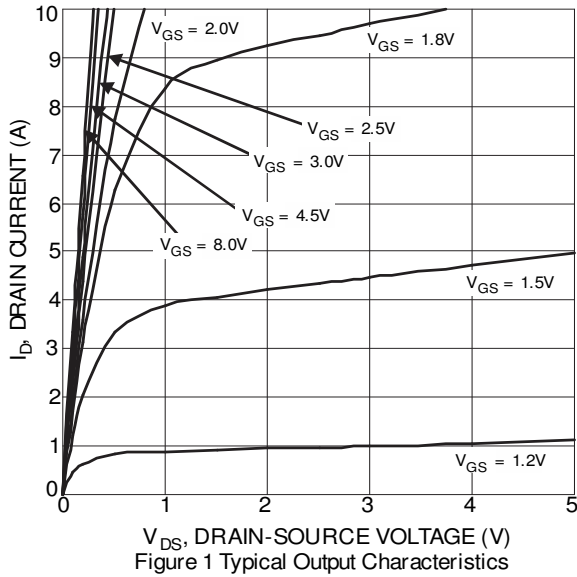


Figure 1 Typical Output Characteristics

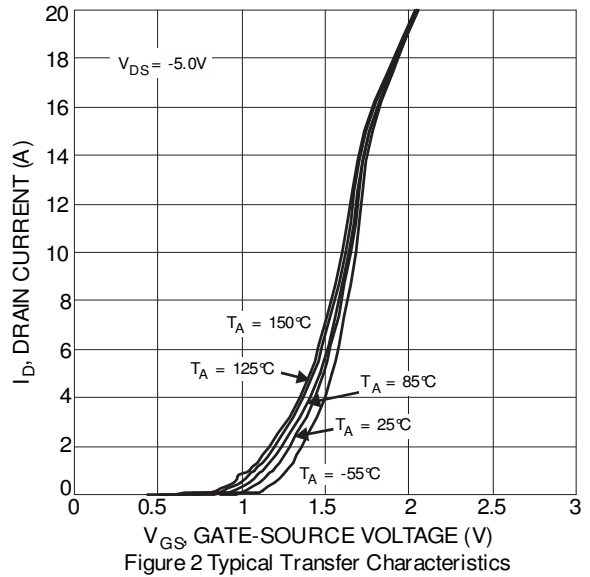


Figure 2 Typical Transfer Characteristics

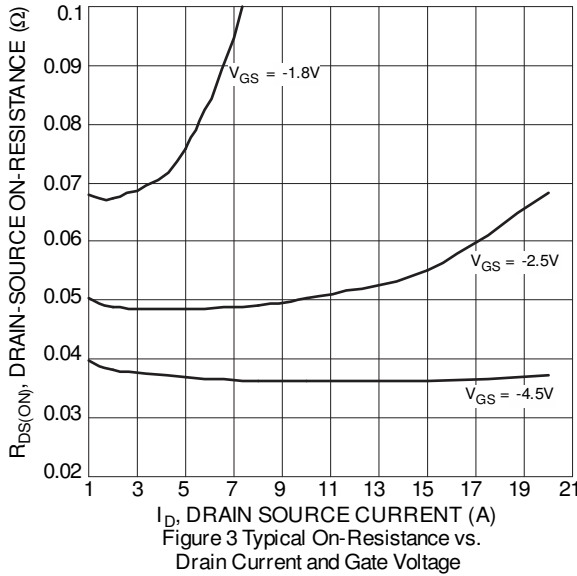


Figure 3 Typical On-Resistance vs. Drain Current and Gate Voltage

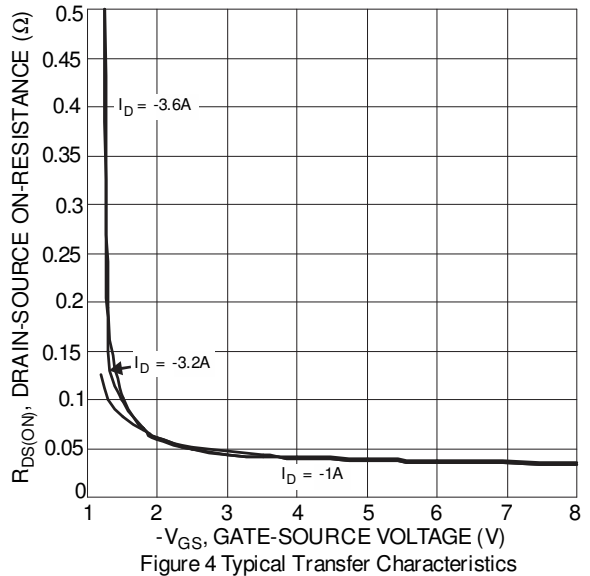


Figure 4 Typical Transfer Characteristics

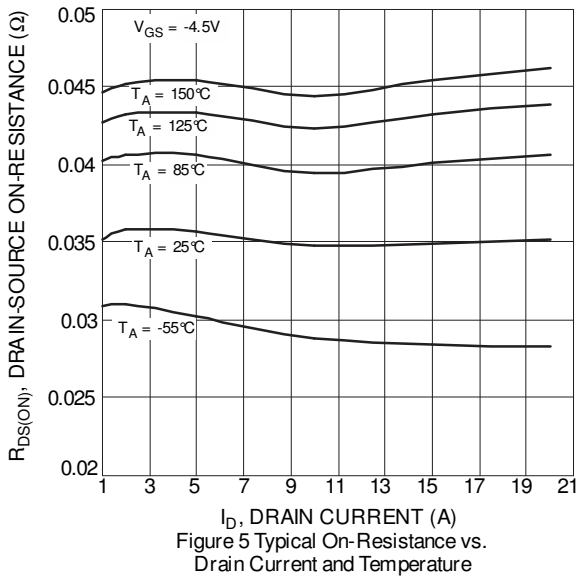


Figure 5 Typical On-Resistance vs. Drain Current and Temperature

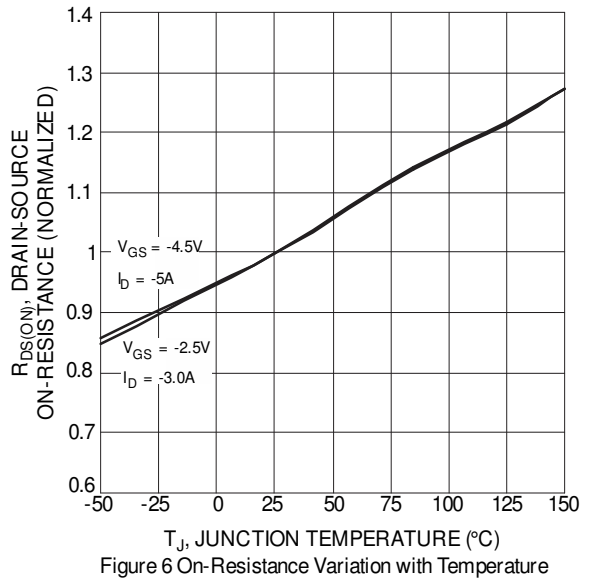


Figure 6 On-Resistance Variation with Temperature

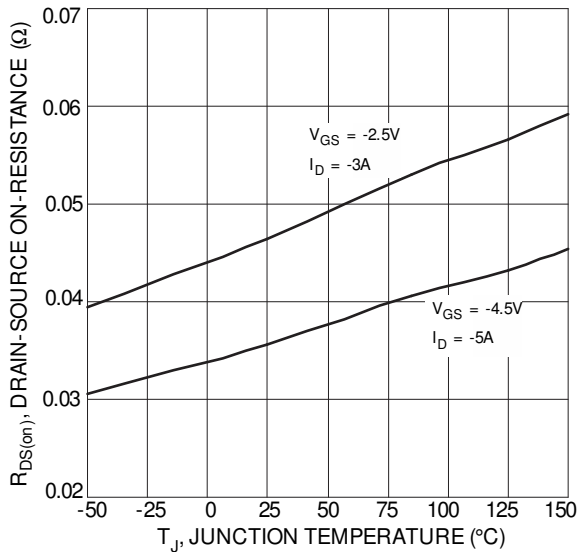


Figure 7 On-Resistance Variation with Temperature

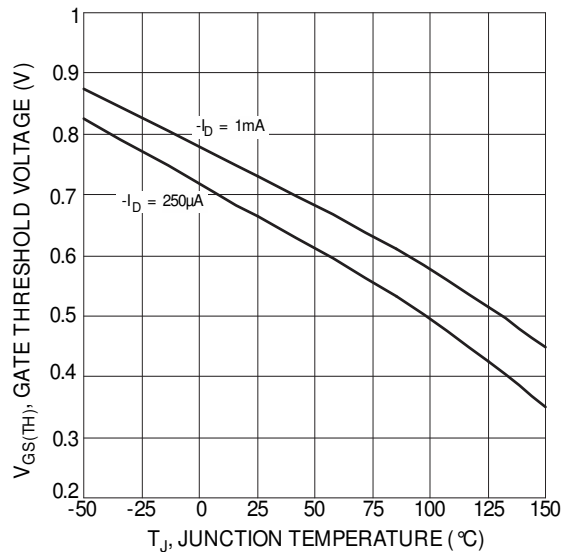


Figure 8 Gate Threshold Variation vs. Ambient Temperature

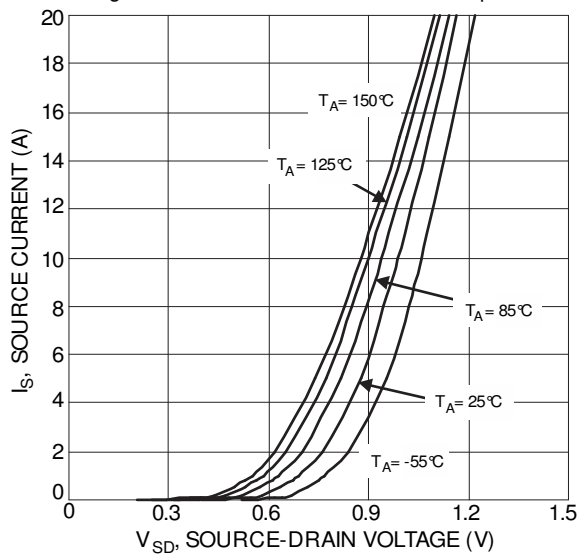


Figure 9 Diode Forward Voltage vs. Current

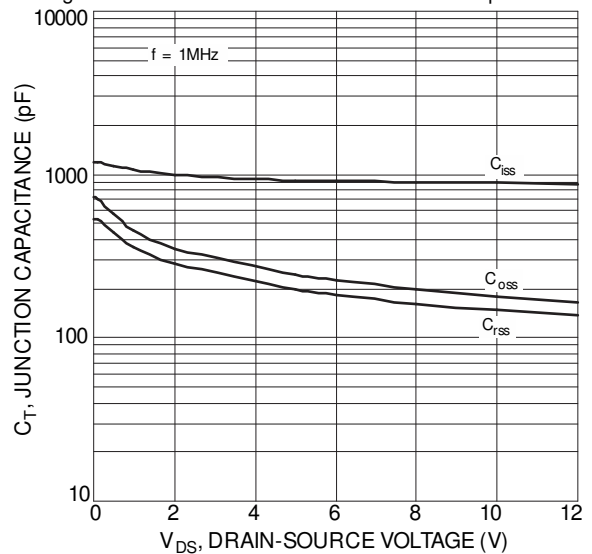


Figure 10 Typical Junction Capacitance

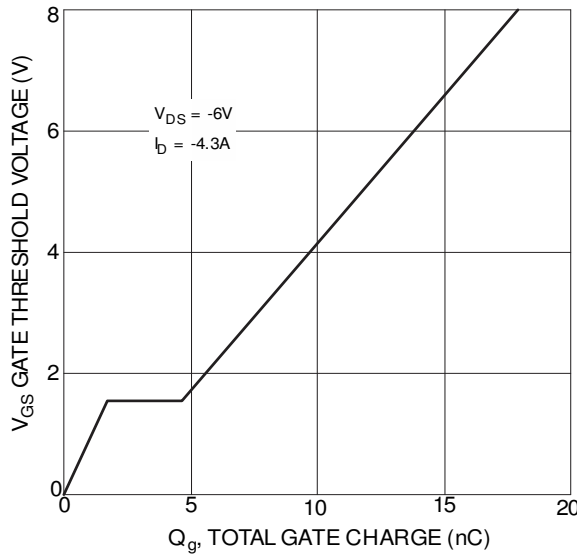


Figure 11 Gate Charge

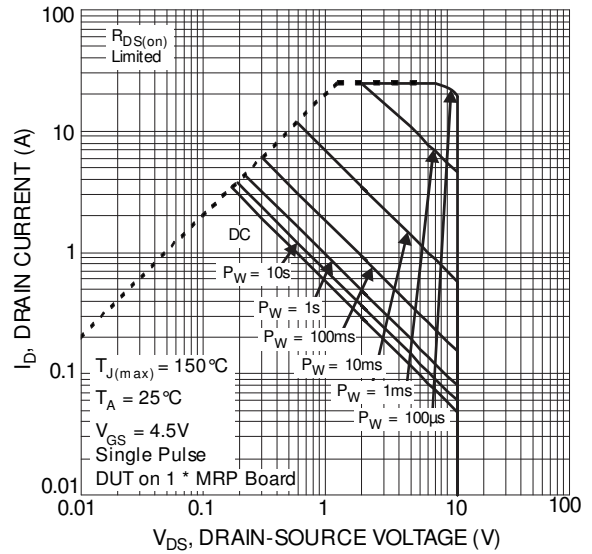


Figure 12 SOA, Safe Operation Area

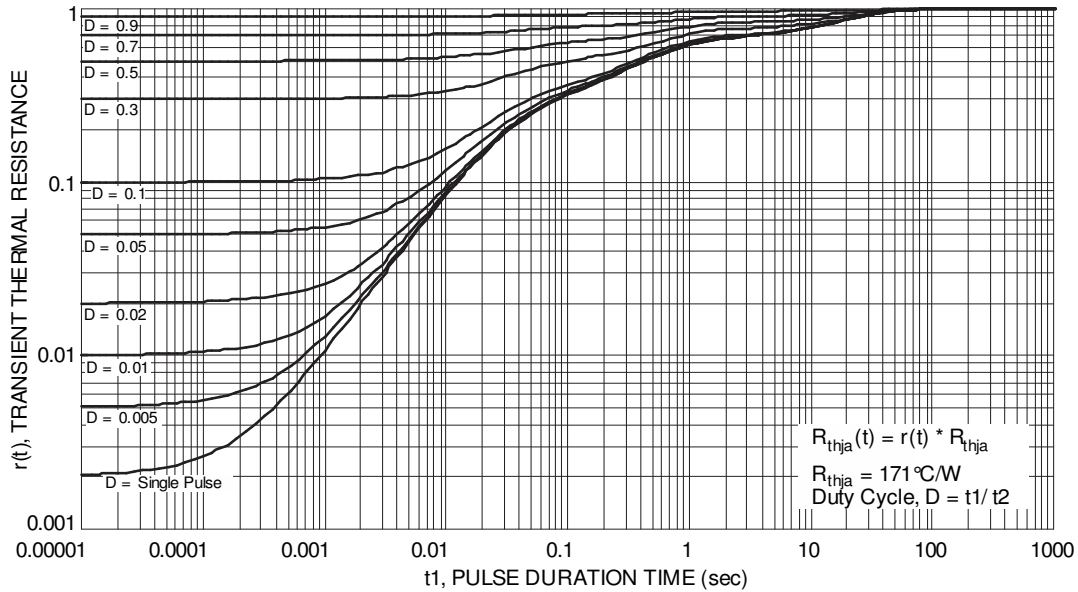
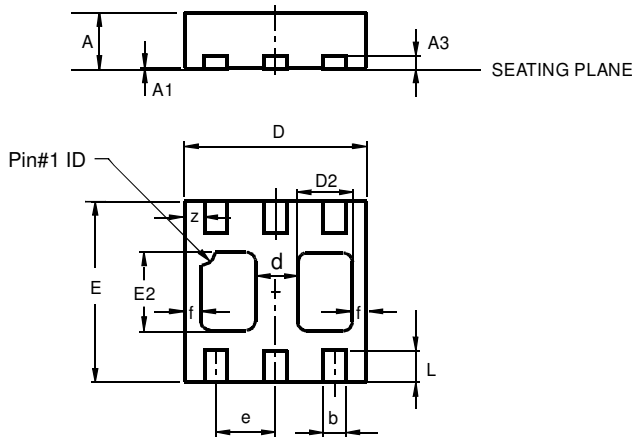


Figure 13 Transient Thermal Resistance

**Package Outline Dimensions**

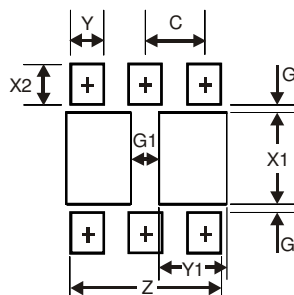
Please see AP02002 at <http://www.diodes.com/datasheets/ap02002.pdf> for the latest version.



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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