

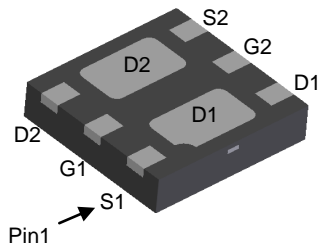
## Product Summary

$V_{(BR)DSS}$	$R_{DS(ON)}$ max	$I_D$ max $T_A = +25^\circ\text{C}$
-20V	50m $\Omega$ @ $V_{GS} = -4.5\text{V}$	-4.5A
	100m $\Omega$ @ $V_{GS} = -2.5\text{V}$	-3.2A

## Description and Applications

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.

- Battery Charging
- Power Management Functions
- DC-DC Converters
- Portable Power Adaptors



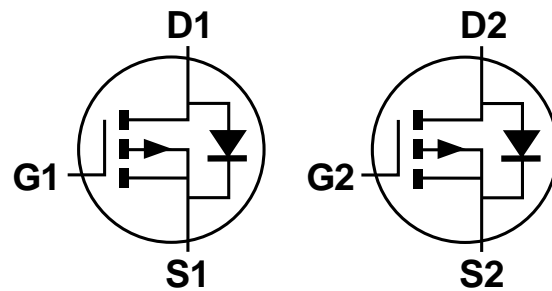
Bottom View

## Features and Benefits

- Low On-Resistance
- Low Input Capacitance
- Fast Switching Speed
- Low Input/Output Leakage
- **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 Annealed over Copper Leadframe. Solderable per MIL-STD-202, Method 208@4
- Terminals Connections: See Diagram Below
- Weight: 0.0065 grams (Approximate)



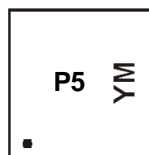
Internal Schematic

## Ordering Information (Note 4)

Part Number	Case	Packaging
DMP2065UFDB-7	U-DFN2020-6 (Type B)	3,000/Tape & Reel
DMP2065UFDB-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) 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



P5 = Product Type Marking Code  
 YM = Date Code Marking  
 Y = Year (ex: D = 2016)  
 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	$V_{DSS}$	-20	V
Gate-Source Voltage	$V_{GSS}$	$\pm 12$	V
Continuous Drain Current (Note 6) $V_{GS} = -4.5\text{V}$	$I_D$	Steady State $T_A = +25^\circ\text{C}$	-4.5
		$T_A = +85^\circ\text{C}$	-3.6
Pulsed Drain Current (10 $\mu\text{s}$ pulse, duty cycle = 1%)	$I_{DM}$	-25	A
Maximum Continuous Body Diode Forward Current (Note 6)	$I_S$	-1.4	A
Avalanche Current (Note 7) $L = 0.1\text{mH}$	$I_{AS}$	-13	A
Avalanche Energy (Note 7) $L = 0.1\text{mH}$	$E_{AS}$	9	mJ

**Thermal Characteristics**

Characteristic	Symbol	Value	Units
Total Power Dissipation (Note 5)	$T_A = +25^\circ\text{C}$ $P_D$	0.74	W
Thermal Resistance, Junction to Ambient (Note 5)	Steady state	171	$^\circ\text{C/W}$
	$t < 10\text{s}$	131	
Total Power Dissipation (Note 6)	$T_A = +25^\circ\text{C}$ $P_D$	1.54	W
Thermal Resistance, Junction to Ambient (Note 6)	Steady state	82	$^\circ\text{C/W}$
	$t < 10\text{s}$	60	
Thermal Resistance, Junction to Case (Note 6)	$R_{\theta JC}$	13	
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 8)</b>						
Drain-Source Breakdown Voltage	$BV_{DSS}$	-20	—	—	V	$V_{GS} = 0\text{V}, I_D = -250\mu\text{A}$
Zero Gate Voltage Drain Current	$I_{DSS}$	—	—	-1.0	$\mu\text{A}$	$V_{DS} = -20\text{V}, V_{GS} = 0\text{V}$
Gate-Source Leakage	$I_{GSS}$	—	—	$\pm 100$	nA	$V_{GS} = \pm 8\text{V}, V_{DS} = 0\text{V}$
<b>ON CHARACTERISTICS (Note 8)</b>						
Gate Threshold Voltage	$V_{GS(TH)}$	-0.4	—	-1.0	V	$V_{DS} = V_{GS}, I_D = -250\mu\text{A}$
Static Drain-Source On-Resistance	$R_{DS(ON)}$	—	40	50	m $\Omega$	$V_{GS} = -4.5\text{V}, I_D = -2.0\text{A}$
			55	100		$V_{GS} = -2.5\text{V}, I_D = -2.0\text{A}$
			75	150		$V_{GS} = -1.8\text{V}, I_D = -1.6\text{A}$
			95	200		$V_{GS} = -1.5\text{V}, I_D = -1.0\text{A}$
Diode Forward Voltage	$V_{SD}$	—	-0.75	-1.1	V	$V_{GS} = 0\text{V}, I_S = -1\text{A}$
<b>DYNAMIC CHARACTERISTICS (Note 9)</b>						
Input Capacitance	$C_{iss}$	—	752	—	pF	$V_{DS} = -15\text{V}, V_{GS} = 0\text{V}$ $f = 1.0\text{MHz}$
Output Capacitance	$C_{oss}$	—	87	—	pF	
Reverse Transfer Capacitance	$C_{rss}$	—	78	—	pF	
Gate Resistance	$R_G$	—	15.2	—	$\Omega$	$V_{GS} = 0\text{V}, V_{DS} = 0\text{V}, f = 1.0\text{MHz}$
Total Gate Charge	$Q_g$	—	9.1	—	nC	$V_{GS} = -4.5\text{V}, V_{DS} = -4\text{V},$ $I_D = -3.5\text{A}$
Gate-Source Charge	$Q_{gs}$	—	1.2	—	nC	
Gate-Drain Charge	$Q_{gd}$	—	1.9	—	nC	
Turn-On Delay Time	$t_{D(ON)}$	—	5.4	—	ns	$V_{DS} = -4\text{V}, V_{GS} = -4.5\text{V},$ $R_G = 6\Omega, I_D = -1\text{A}$
Turn-On Rise Time	$t_R$	—	8.3	—	ns	
Turn-Off Delay Time	$t_{D(OFF)}$	—	47	—	ns	
Turn-Off Fall Time	$t_F$	—	20	—	ns	

- Notes:
- Device mounted on FR-4 substrate PC board, 2oz copper, with minimum recommended pad layout.
  - Device mounted on FR-4 substrate PC board, 2oz copper, with 1inch square copper plate.
  - $I_{AS}$  and  $E_{AS}$  rating are based on low frequency and duty cycles to keep  $T_J = +25^\circ\text{C}$ .
  - Short duration pulse test used to minimize self-heating effect.
  - Guaranteed by design. Not subject to product testing.

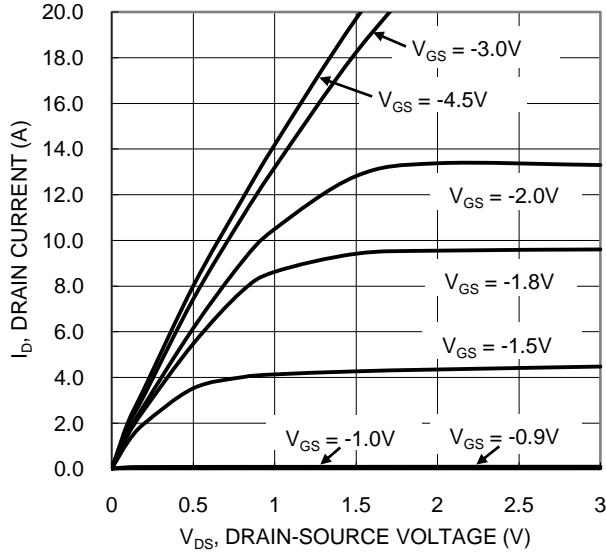


Figure 1. Typical Output Characteristic

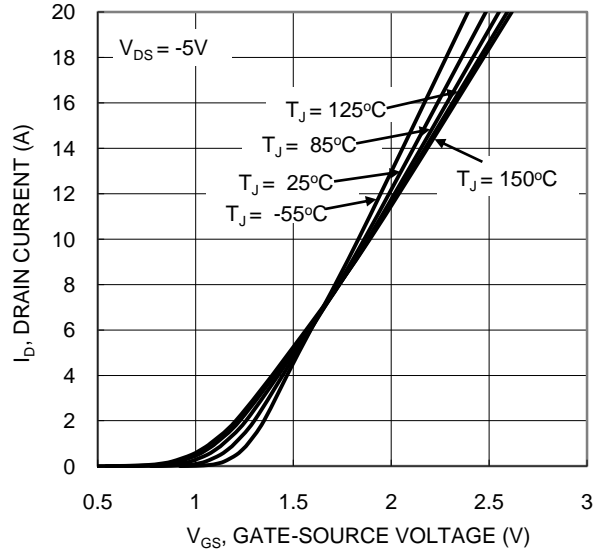


Figure 2. Typical Transfer Characteristic

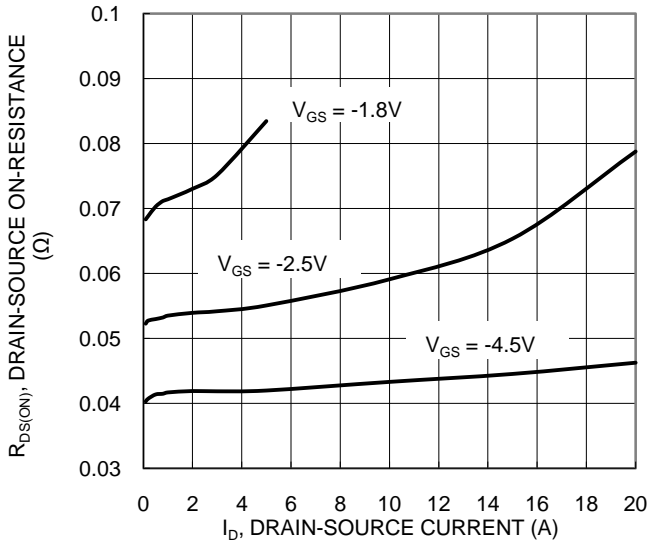


Figure 3. Typical On-Resistance vs Drain Current and Gate Voltage

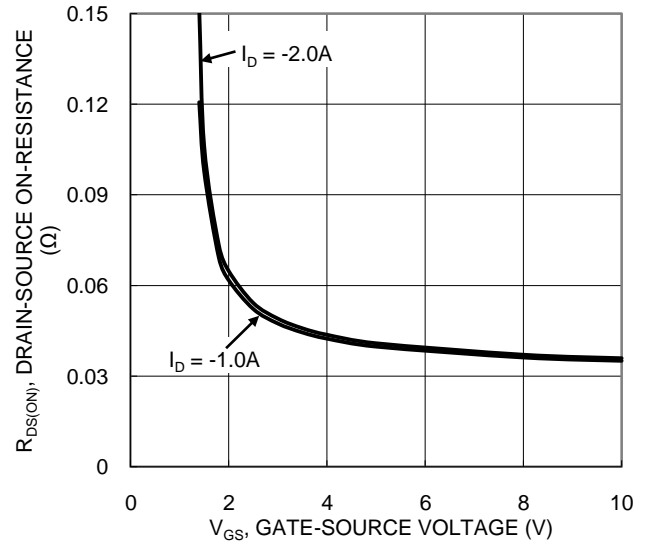


Figure 4. Typical Transfer Characteristic

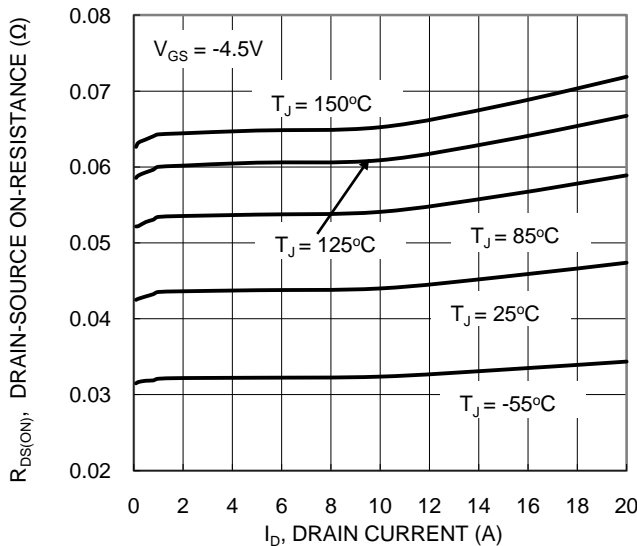


Figure 5. Typical On-Resistance vs Drain Current and Junction Temperature

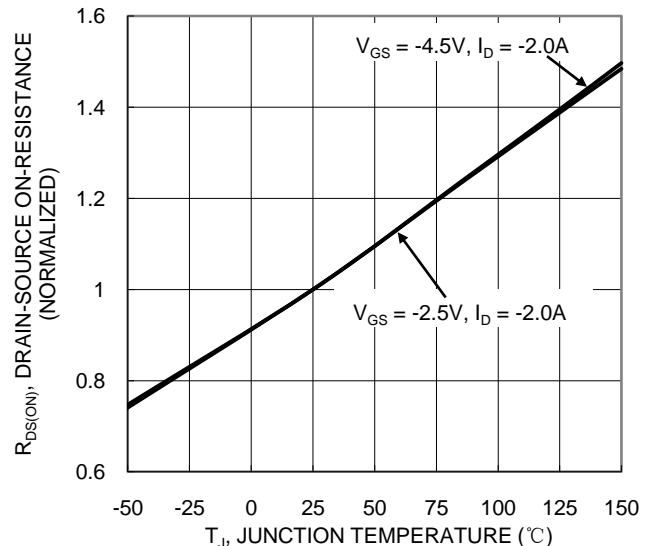


Figure 6. On-Resistance Variation with Junction Temperature

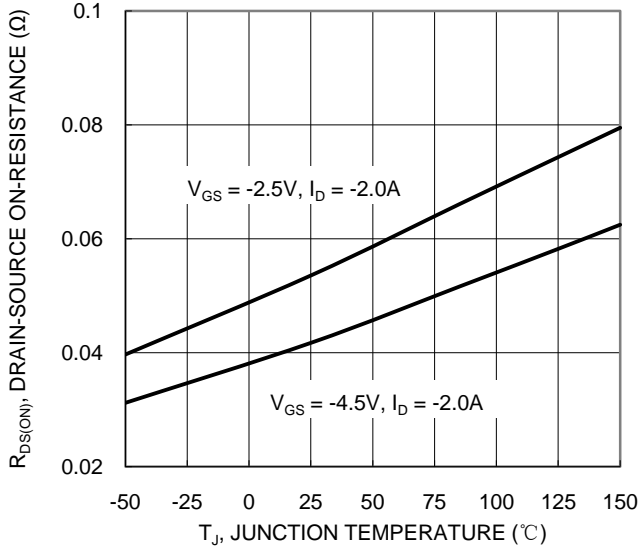


Figure 7. On-Resistance Variation with Junction Temperature

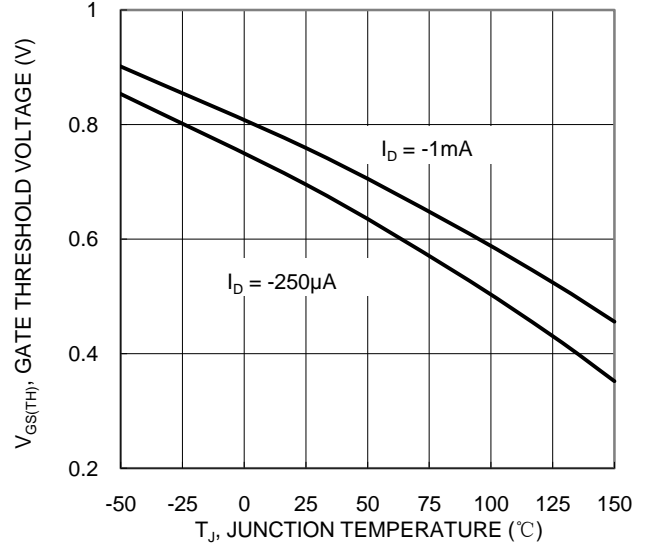


Figure 8. Gate Threshold Variation vs Junction Temperature

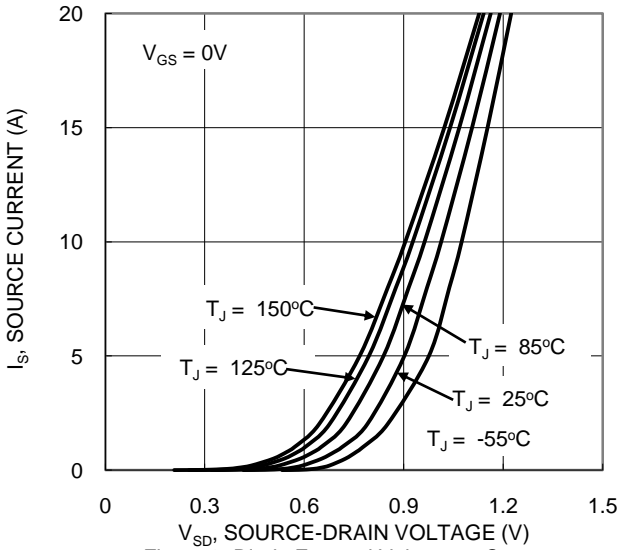


Figure 9. Diode Forward Voltage vs Current

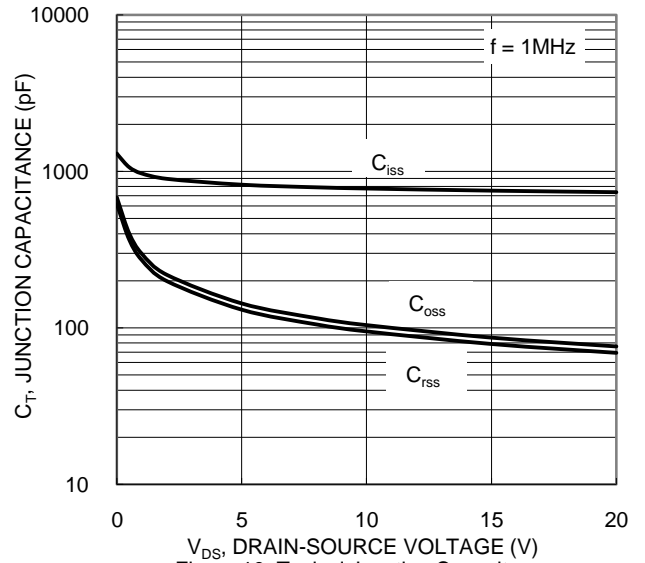


Figure 10. Typical Junction Capacitance

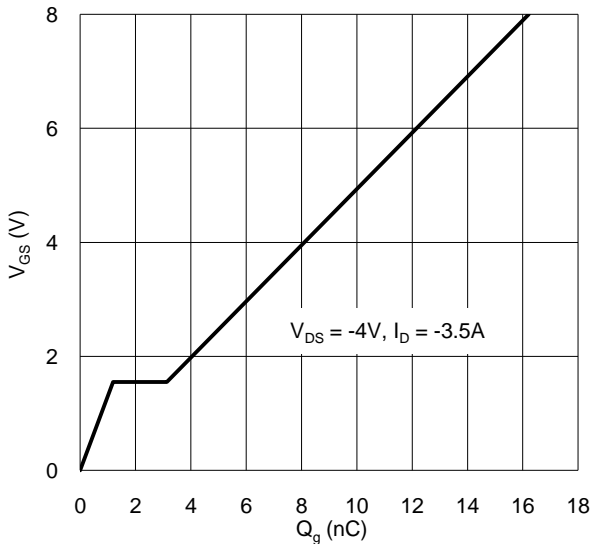


Figure 11. Gate Charge

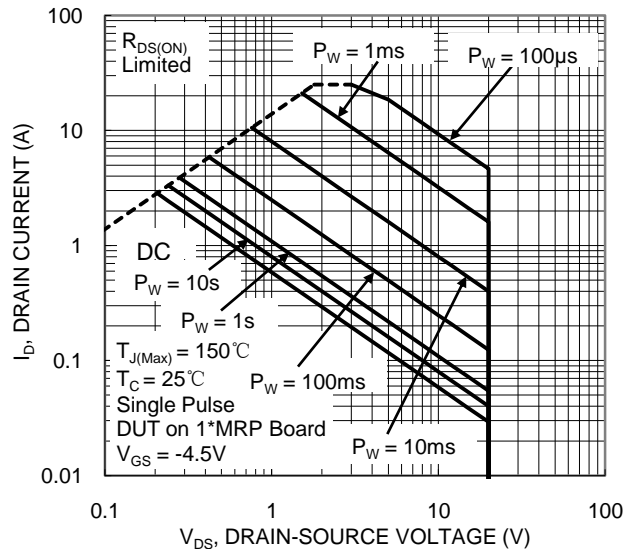


Figure 12. SOA, Safe Operation Area

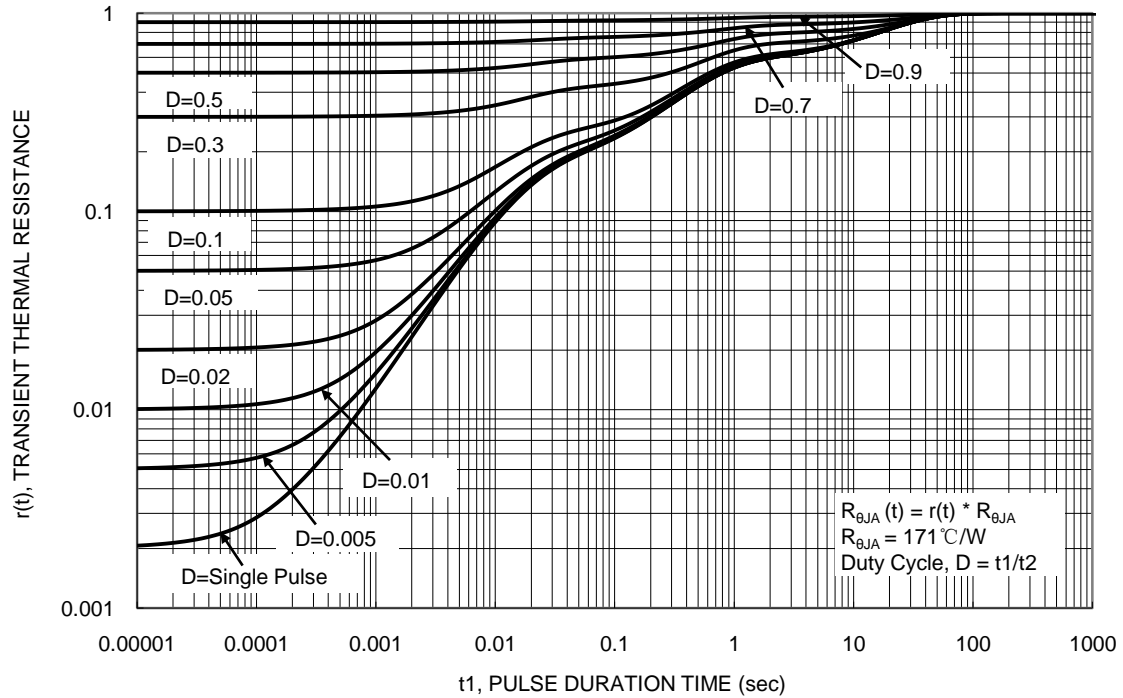
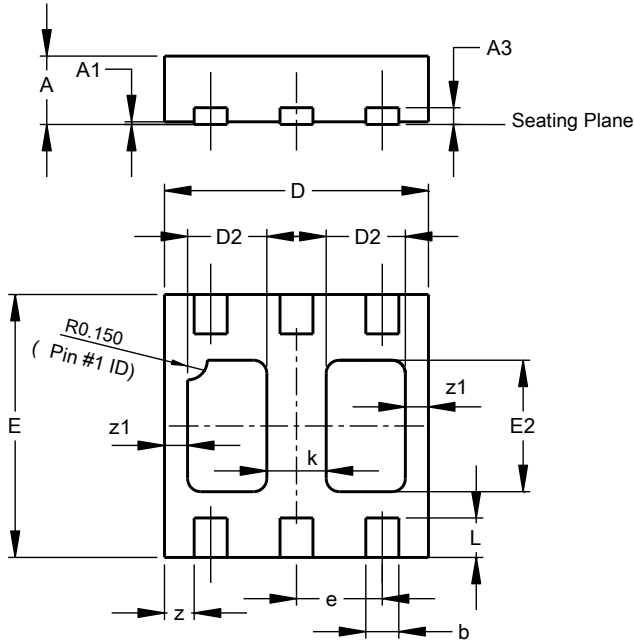


Figure 13. Transient Thermal Resistance

**Package Outline Dimensions**

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

**U-DFN2020-6 (Type B)**

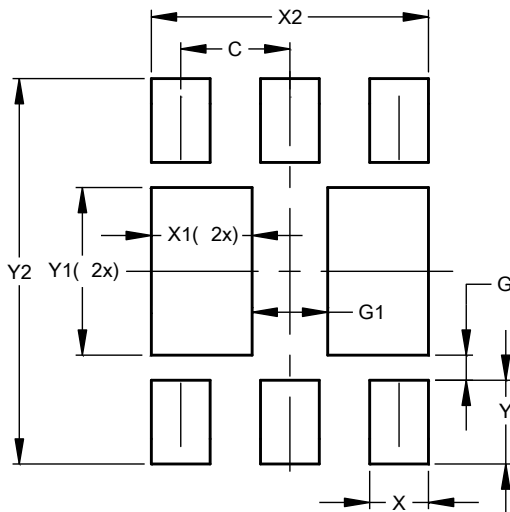


U-DFN2020-6 Type B			
Dim	Min	Max	Typ
A	0.545	0.605	0.575
A1	0.00	0.05	0.02
A3	-	-	0.13
b	0.20	0.30	0.25
D	1.95	2.075	2.00
D2	0.50	0.70	0.60
e	-	-	0.65
E	1.95	2.075	2.00
E2	0.90	1.10	1.00
k	-	-	0.45
L	0.25	0.35	0.30
z	-	-	0.225
z1	-	-	0.175
<b>All Dimensions in mm</b>			

**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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