

## Product Summary

BV <sub>DSS</sub>	R <sub>DS(ON)</sub> max	I <sub>D</sub> T <sub>A</sub> = +25°C
-20V	90mΩ @ V <sub>GS</sub> = -4.5V	-3.1A
	120mΩ @ V <sub>GS</sub> = -2.5V	-2.6A

## Features

- PCB Footprint of 4mm<sup>2</sup>
- Low On-Resistance
- Low Input Capacitance
- Low Profile, 0.6mm Maximum Height
- ESD Protected Gate
- **Totally Lead-Free & Fully RoHS Compliant (Notes 1 & 2)**
- **Halogen- and Antimony-Free. "Green" Device (Note 3)**
- **For automotive applications requiring specific change control (i.e. parts qualified to AEC-Q100/101/200, PPAP capable, and manufactured in IATF 16949 certified facilities), please [contact us](mailto:contact_us) or your local Diodes representative. <https://www.diodes.com/quality/product-definitions/>**

## Description and Applications

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

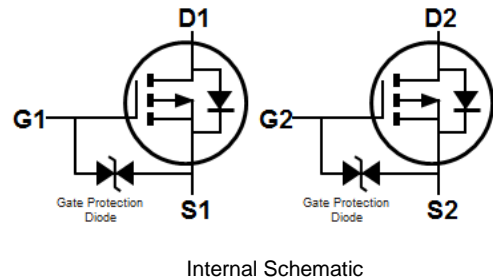
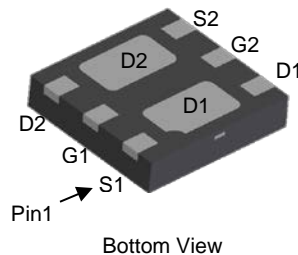
- Load Switch
- Power Management Functions
- Portable Power Adaptors

## 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 Lead-Frame. Solderable per MIL-STD-202, Method 208@4
- Terminals Connections: See Diagram Below
- Weight: 0.0065 grams (Approximate)



U-DFN2020-6 (Type B)



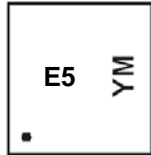
## Ordering Information (Note 4)

Part Number	Case	Packaging
DMP2045UFDB-7	U-DFN2020-6 (Type B)	3000/Tape & Reel
DMP2045UFDB-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

Site 1:



E5 = 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:



E5 = 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					

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

Characteristic	Symbol	Value	Unit	
Drain-Source Voltage	$V_{DSS}$	-20	V	
Gate-Source Voltage	$V_{GSS}$	$\pm 8$	V	
Continuous Drain Current (Note 6) $V_{GS} = -4.5\text{V}$	$I_D$	$T_A = +25^\circ\text{C}$	-3.1	A
		$T_A = +70^\circ\text{C}$	-2.4	A
Maximum Continuous Body Diode Forward Current (Note 6)	$I_S$	-1.8	A	
Pulsed Drain Current (10 $\mu\text{s}$ Pulse, Duty Cycle = 1%)	$I_{DM}$	-24	A	
Avalanche Current (Note 7) $L = 0.1\text{mH}$	$I_{AS}$	-11	A	
Avalanche Energy (Note 7) $L = 0.1\text{mH}$	$E_{AS}$	7	mJ	

**Thermal Characteristics**

Characteristic	Symbol	Value	Unit
Total Power Dissipation (Note 5)	$P_D$	0.74	W
Thermal Resistance, Junction to Ambient (Note 5)	$R_{\theta JA}$	170	$^\circ\text{C/W}$
Total Power Dissipation (Note 6)	$P_D$	1.29	W
Thermal Resistance, Junction to Ambient (Note 6)	$R_{\theta JA}$	97	$^\circ\text{C/W}$
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 7)</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 $T_J = +25^\circ\text{C}$	$I_{DSS}$	—	—	-1.0	$\mu\text{A}$	$V_{DS} = -20\text{V}, V_{GS} = 0\text{V}$
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 7)</b>						
Gate Threshold Voltage	$V_{GS(TH)}$	-0.3	—	-1.0	V	$V_{DS} = V_{GS}, I_D = -250\mu\text{A}$
Static Drain-Source On-Resistance	$R_{DS(ON)}$	—	35	90	m $\Omega$	$V_{GS} = -4.5\text{V}, I_D = -4\text{A}$
		—	47	120		$V_{GS} = -2.5\text{V}, I_D = -3.5\text{A}$
Diode Forward Voltage	$V_{SD}$	—	-0.75	-1.2	V	$V_{GS} = 0\text{V}, I_S = -1.0\text{A}$
<b>DYNAMIC CHARACTERISTICS (Note 8)</b>						
Input Capacitance	$C_{iss}$	—	634	—	pF	$V_{DS} = -10\text{V}, V_{GS} = 0\text{V}, f = 1.0\text{MHz}$
Output Capacitance	$C_{oss}$	—	81	—	pF	
Reverse Transfer Capacitance	$C_{rss}$	—	66	—	pF	
Gate Resistance	$R_g$	—	20	—	$\Omega$	$V_{DS} = 0\text{V}, V_{GS} = 0\text{V}, f = 1\text{MHz}$
Total Gate Charge ( $V_{GS} = -4.5\text{V}$ )	$Q_g$	—	6.8	—	nC	$V_{DS} = -4.5\text{V}, I_D = -4\text{A}, V_{DS} = -10\text{V}$
Gate-Source Charge	$Q_{gs}$	—	0.7	—	nC	
Gate-Drain Charge	$Q_{gd}$	—	1.6	—	nC	
Turn-On Delay Time	$t_{D(ON)}$	—	4.2	—	ns	$V_{DS} = -10\text{V}, V_{GS} = -4.5\text{V}, R_L = 3.3\Omega, R_g = 1\Omega$
Turn-On Rise Time	$t_R$	—	3.4	—	ns	
Turn-Off Delay Time	$t_{D(OFF)}$	—	23	—	ns	
Turn-Off Fall Time	$t_F$	—	9.6	—	ns	
Body Diode Reverse Recovery Time	$t_{RR}$	—	1.8	—	ns	$I_S = -1.0\text{A}, dI/dt = 100\text{A}/\mu\text{s}$
Body Diode Reverse Recovery Charge	$Q_{RR}$	—	9.4	—	nC	$I_S = -1.0\text{A}, dI/dt = 100\text{A}/\mu\text{s}$

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

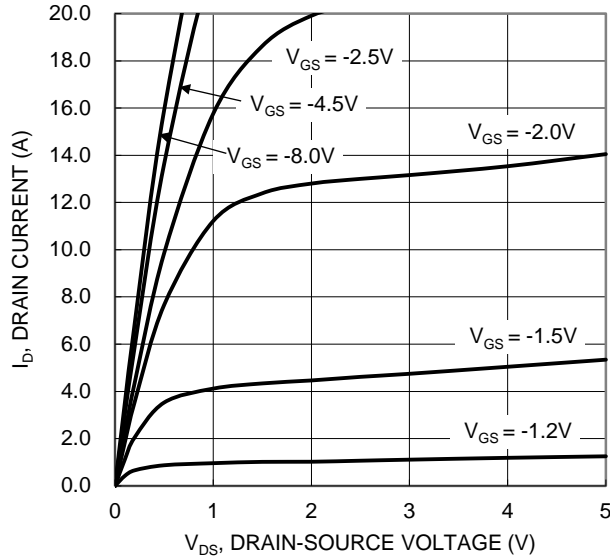


Figure 1. Typical Output Characteristic

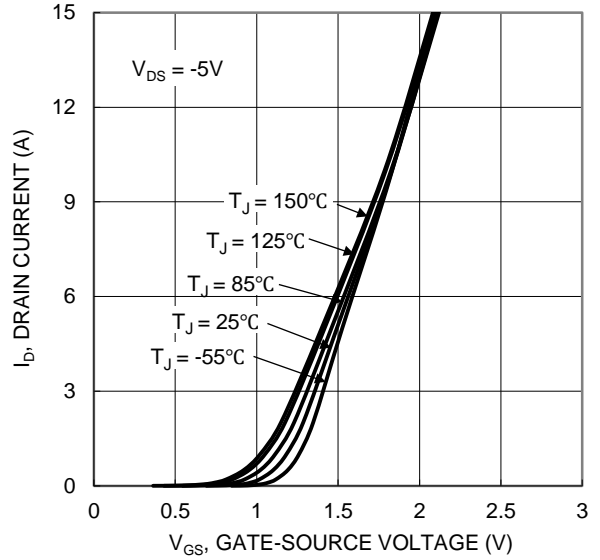


Figure 2. Typical Transfer Characteristic

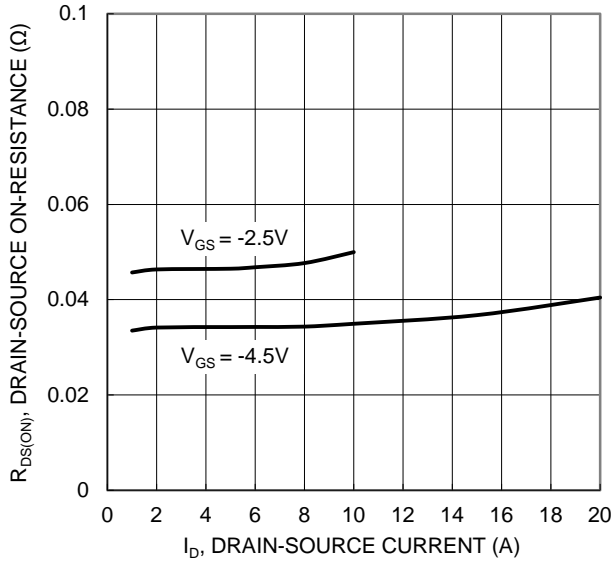


Figure 3. Typical On-Resistance vs. Drain Current and Gate Voltage

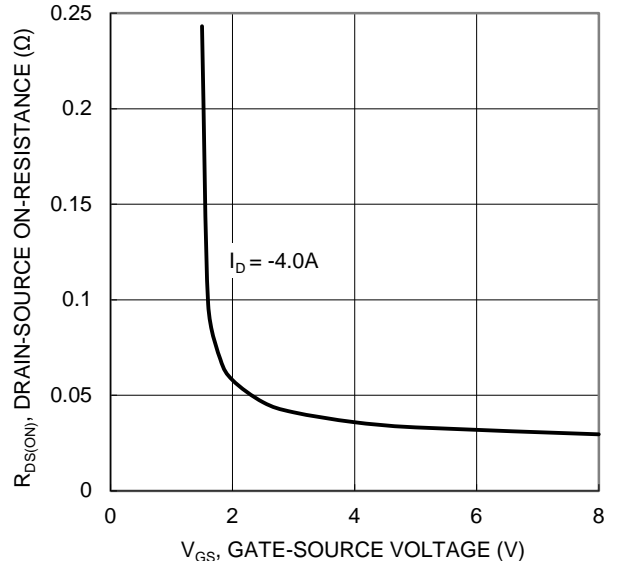


Figure 4. Typical Transfer Characteristic

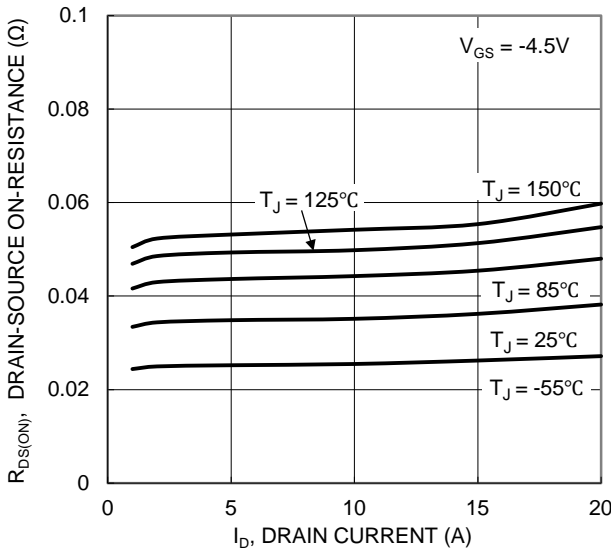


Figure 5. Typical On-Resistance vs. Drain Current and Temperature

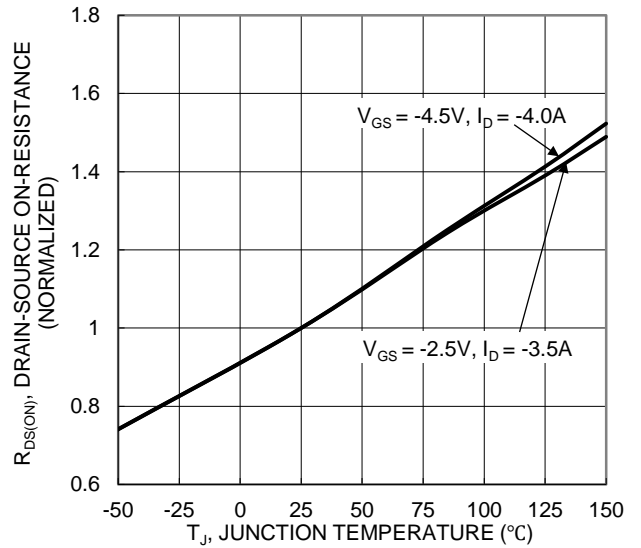


Figure 6. On-Resistance Variation with Temperature

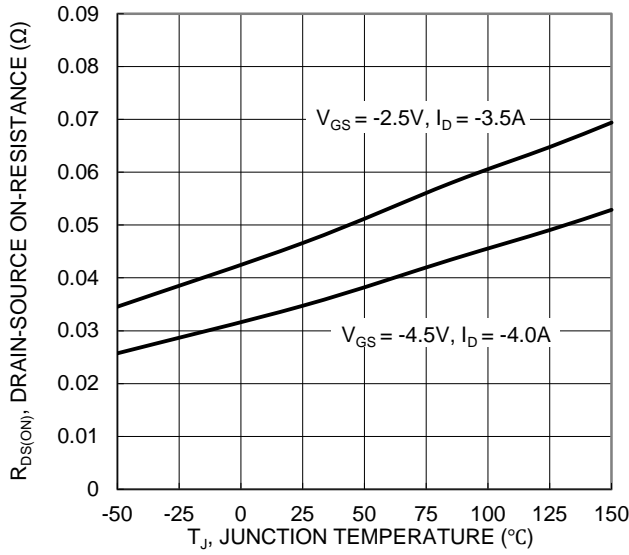


Figure 7. On-Resistance Variation with Temperature

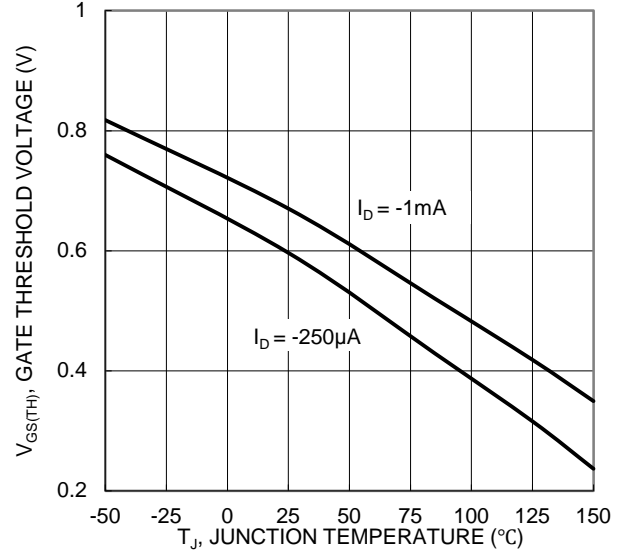


Figure 8. Gate Threshold Variation vs. Junction Temperature

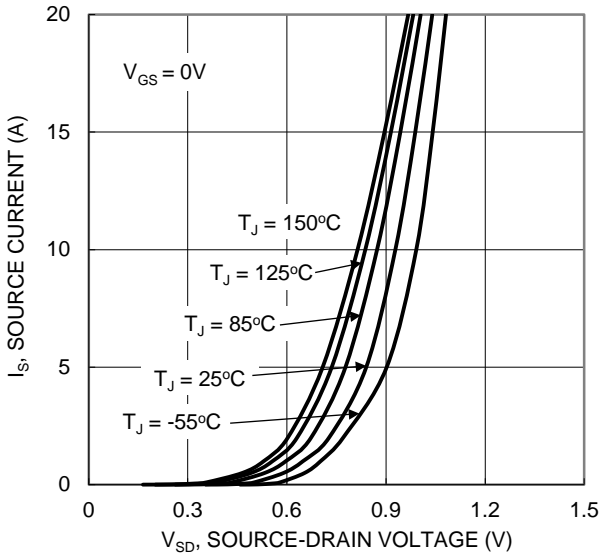


Figure 9. Diode Forward Voltage vs. Current

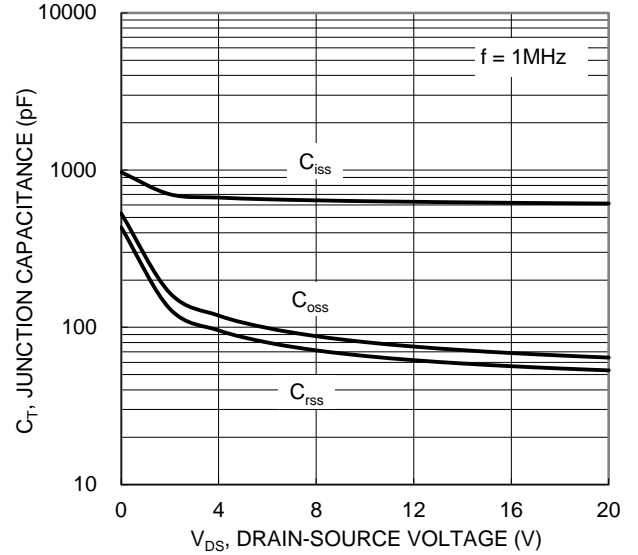


Figure 10. Typical Junction Capacitance

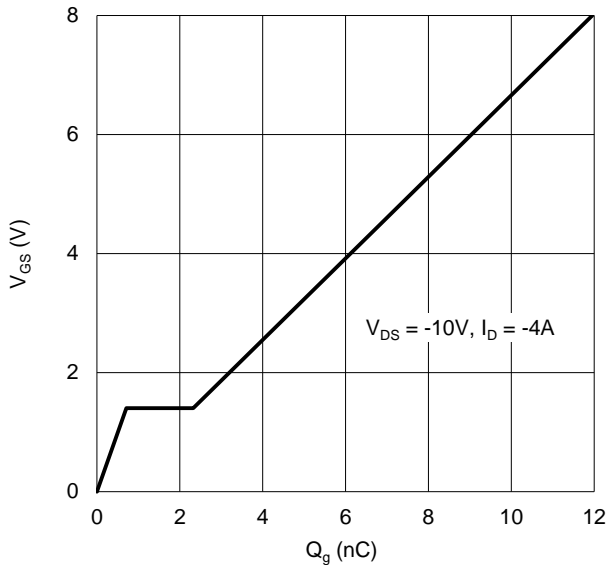


Figure 11. Gate Charge

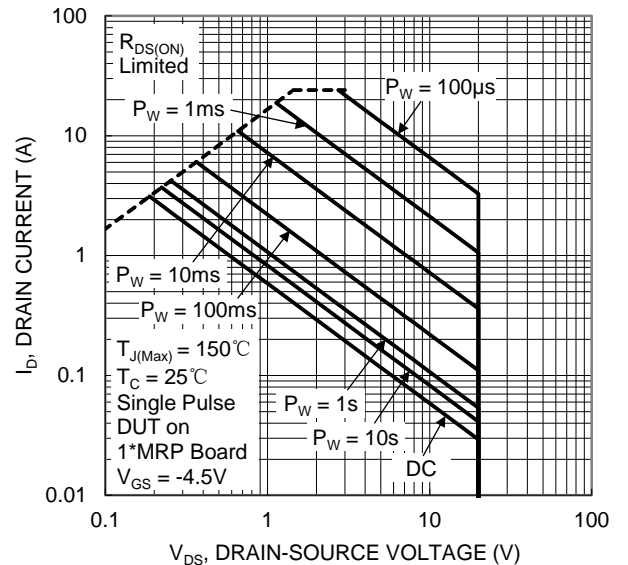


Figure 12. SOA, Safe Operation Area

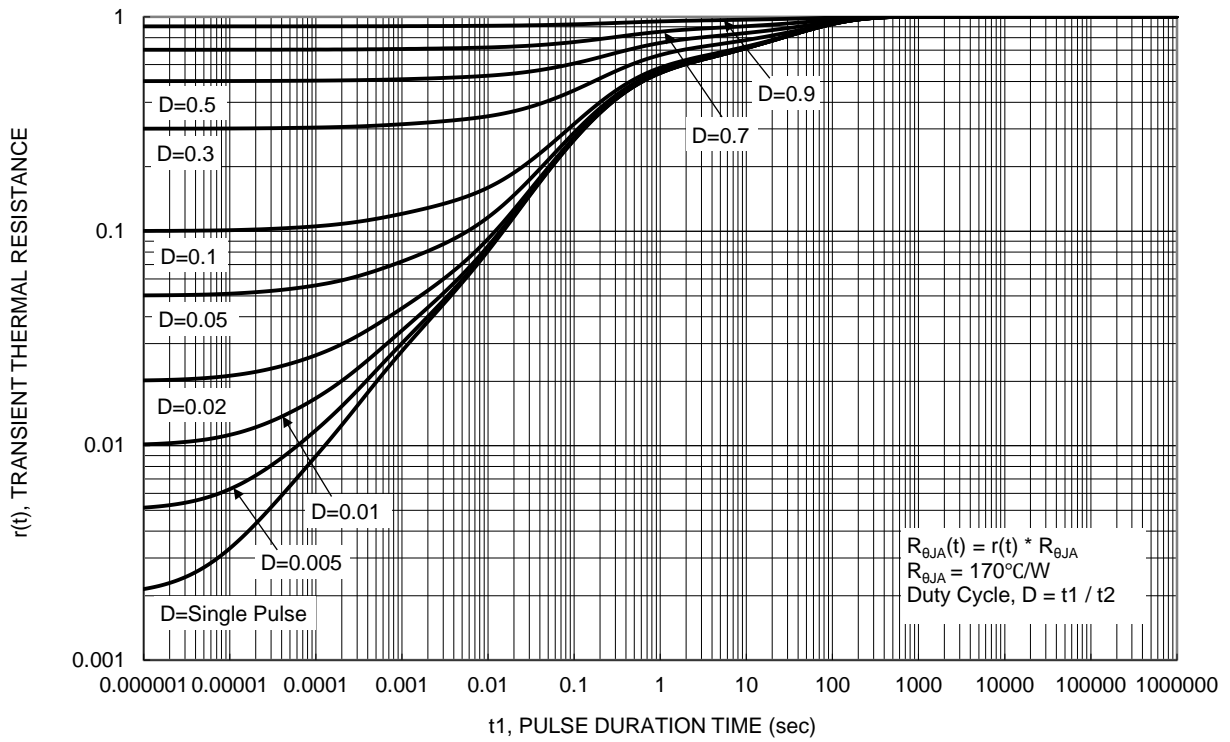
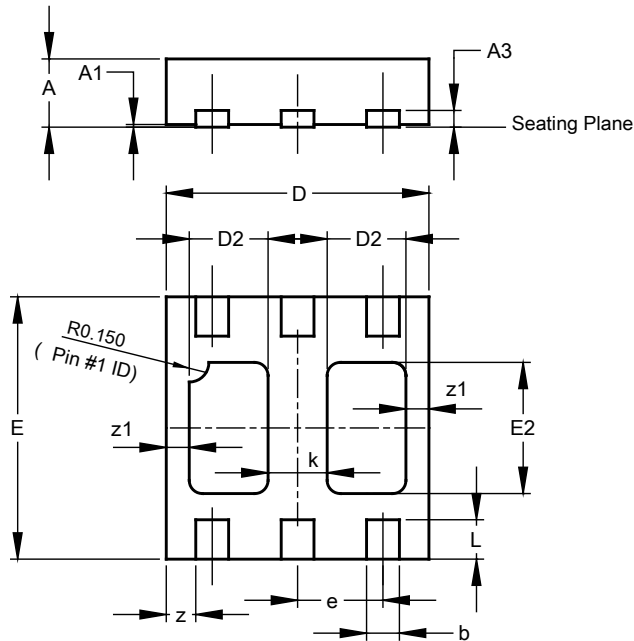


Figure 13. Transient Thermal Resistance

## Package Outline Dimensions

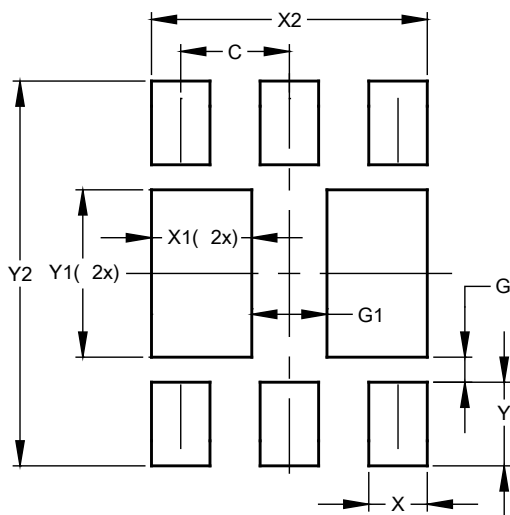
Please see <http://www.diodes.com/package-outlines.html> for the latest version.



U-DFN2020-6 Type B			
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.



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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