

## Product Summary

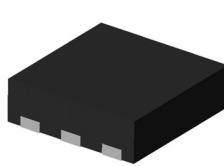
$V_{(BR)DSS}$	$R_{DS(ON)}$ max	$I_D$ max $T_A = +25^\circ\text{C}$
-20V	27m $\Omega$ @ $V_{GS} = -4.5\text{V}$	-7.6A
	32m $\Omega$ @ $V_{GS} = -2.5\text{V}$	-6.7A
	50m $\Omega$ @ $V_{GS} = -1.8\text{V}$	-5.2A
	90m $\Omega$ @ $V_{GS} = -1.5\text{V}$	-3.9A

## Description

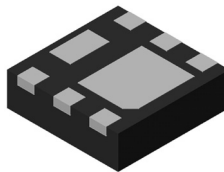
This MOSFET is designed to minimize the on-state resistance ( $R_{DS(ON)}$ ) and yet maintain superior switching performance, making it ideal for high-efficiency power management applications.

- Battery Management Application
- Power Management Functions
- DC-DC Converters

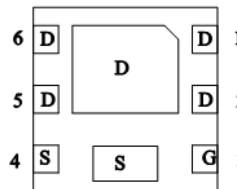
U-DFN2020-6



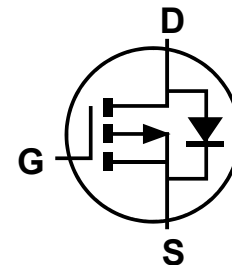
Top View



Bottom View



Pin Out  
Bottom View



Internal Schematic

## Features

- 0.6mm Profile – Ideal for Low Profile Applications
- PCB Footprint of 4mm<sup>2</sup>
- Low Gate Threshold Voltage
- Fast Switching Speed
- Totally Lead-Free & Fully RoHS Compliant (Notes 1 & 2)**
- Halogen and Antimony Free. "Green" Device (Note 3)**

## Mechanical Data

- Case: U-DFN2020-6 (Type F)
- 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 **(e4)**
- Weight: 0.007 Grams (Approximate)

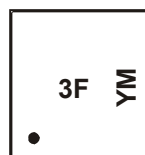
## Ordering Information (Note 4)

Part Number	Marking	Reel size (inches)	Quantity per reel
DMP2023UFDF-7	3F	7	3,000
DMP2023UFDF-13	3F	13	10,000

- Notes:
- No purposely added lead. Fully EU Directive 2002/95/EC (RoHS) & 2011/65/EU (RoHS 2) compliant.
  - See <http://www.diodes.com> for more information about Diodes Incorporated's definitions of Halogen- and Antimony-free, "Green" and Lead-free.
  - Halogen- and Antimony-free "Green" products are defined as those which contain <900ppm bromine, <900ppm chlorine (<1500ppm total Br + Cl) and <1000ppm antimony compounds.
  - For packaging details, go to our website at <http://www.diodes.com/products/packages.html>.

## Marking Information

U-DFN2020-6



3F = Product Type Marking Code  
YM = Date Code Marking  
Y = Year (ex: B = 2014)  
M = Month (ex: 9 = September)

### Date Code Key

Date Code Key

Year	2014	2015	2016	2017	2018	2019	2020	2021
Code	B	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<sub>A</sub> = +25°C, unless otherwise specified.)

Characteristic			Symbol	Value	Units
Drain-Source Voltage			V <sub>DSS</sub>	-20	V
Gate-Source Voltage			V <sub>GSS</sub>	±8	V
Continuous Drain Current (Note 6) V <sub>GS</sub> = -4.5V	Steady State	T <sub>A</sub> = +25°C T <sub>A</sub> = +70°C	I <sub>D</sub>	-7.6 -6.1	A
	t < 5s	T <sub>A</sub> = +25°C T <sub>A</sub> = +70°C	I <sub>D</sub>	-9.5 -7.6	A
Pulsed Drain Current (10μs pulse, duty cycle = 1%)			I <sub>DM</sub>	-40	A
Continuous Source-Drain Diode Current			I <sub>S</sub>	-2	A
Avalanche Current (Note 7) L = 0.1mH			I <sub>AS</sub>	-23	A
Repetitive Avalanche Energy (Note 7) L = 0.1mH			E <sub>AS</sub>	27	mJ

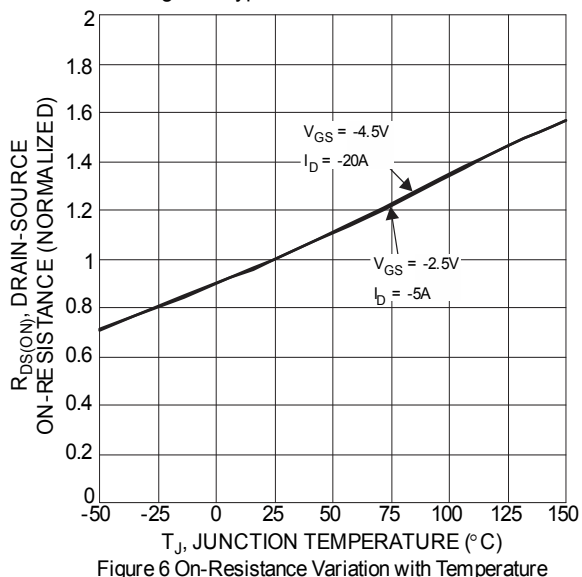
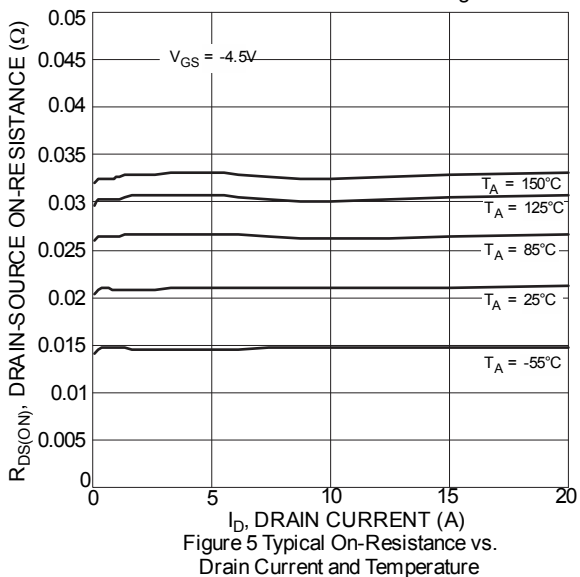
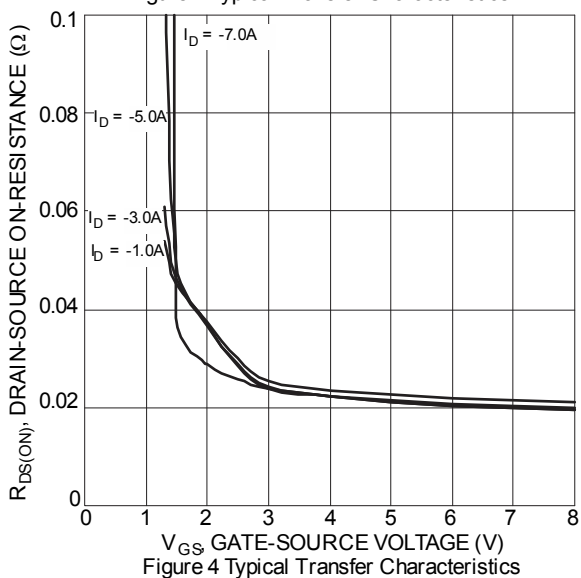
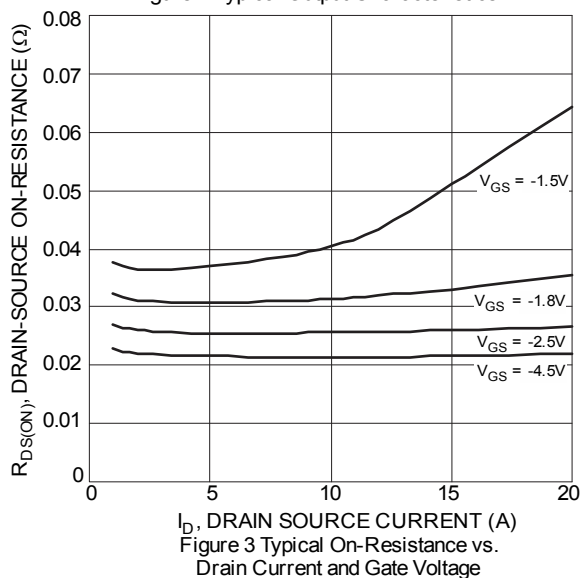
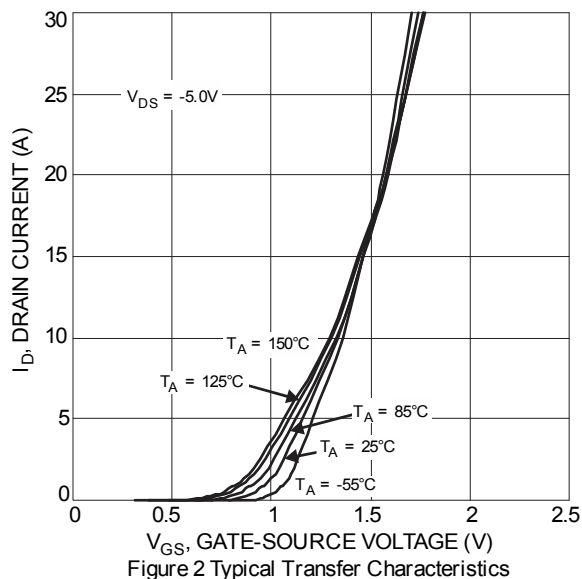
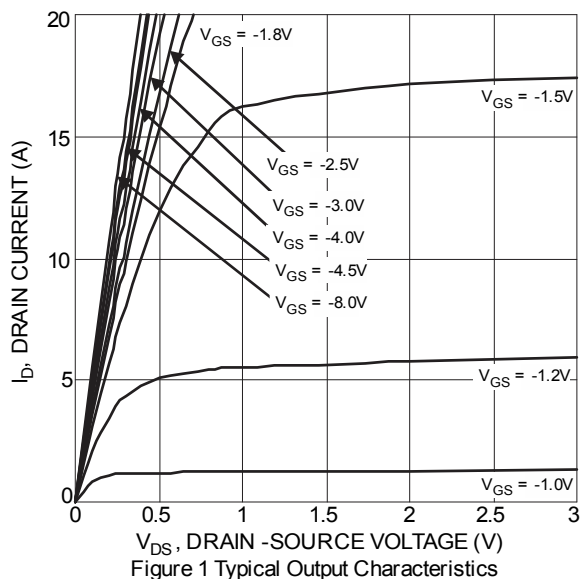
**Thermal Characteristics**

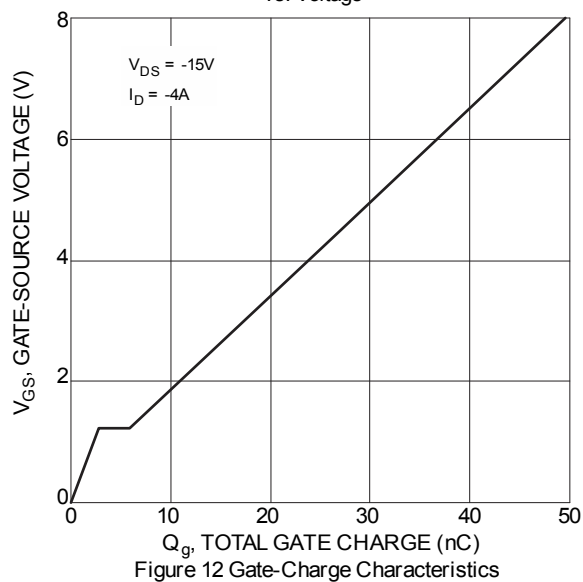
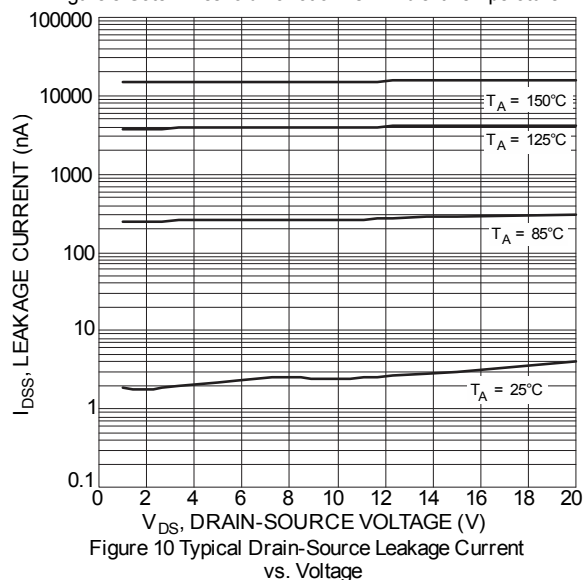
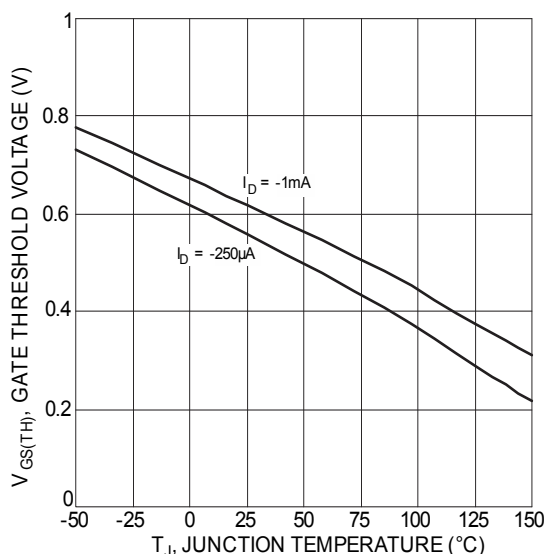
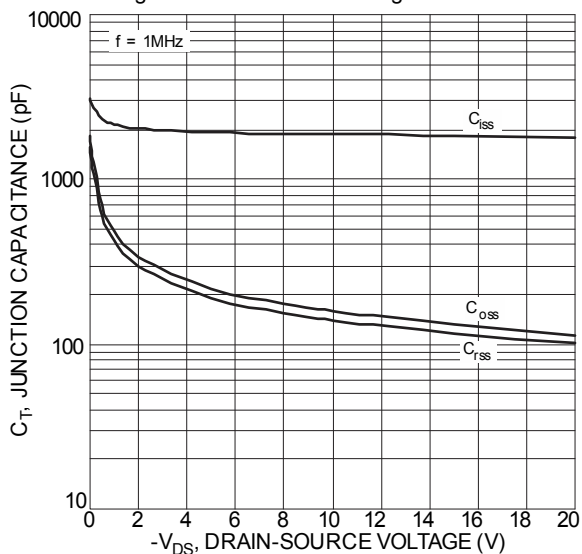
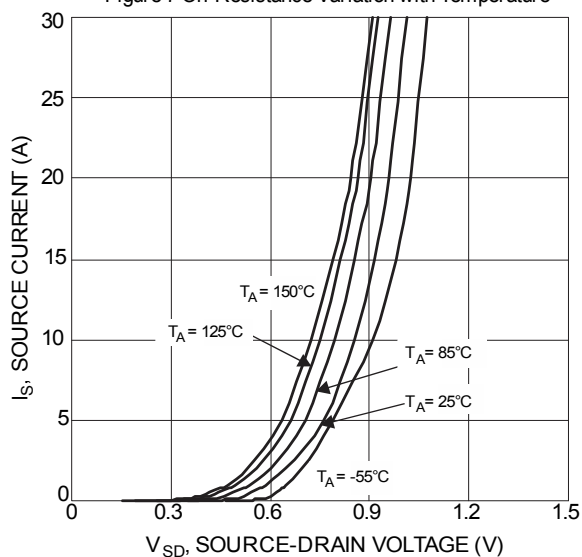
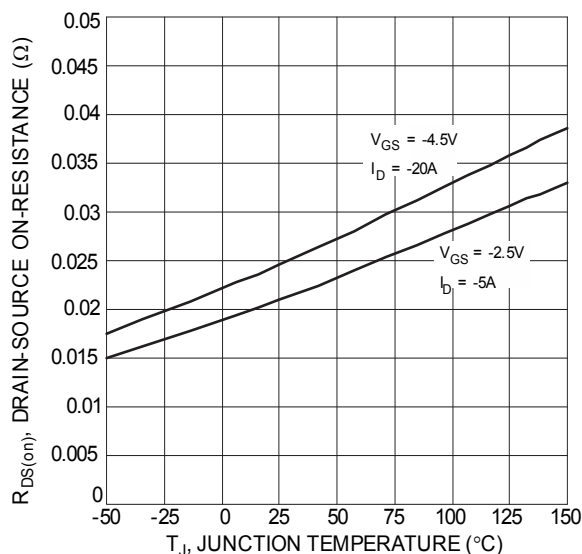
Characteristic		Symbol	Value	Units
Total Power Dissipation (Note 5)	T <sub>A</sub> = +25°C	P <sub>D</sub>	0.73	W
	T <sub>A</sub> = +70°C		0.47	
Thermal Resistance, Junction to Ambient (Note 5)	Steady State	R <sub>θJA</sub>	171	°C/W
	t < 5s		112	
Total Power Dissipation (Note 6)	T <sub>A</sub> = +25°C	P <sub>D</sub>	2.03	W
	T <sub>A</sub> = +70°C		1.30	
Thermal Resistance, Junction to Ambient (Note 6)	Steady State	R <sub>θJA</sub>	62	°C/W
	t < 5s		40	
Thermal Resistance, Junction to Case (Note 6)	Steady State	R <sub>θJC</sub>	9.3	°C/W
Operating and Storage Temperature Range		T <sub>J</sub> , T <sub>STG</sub>	-55 to +150	°C

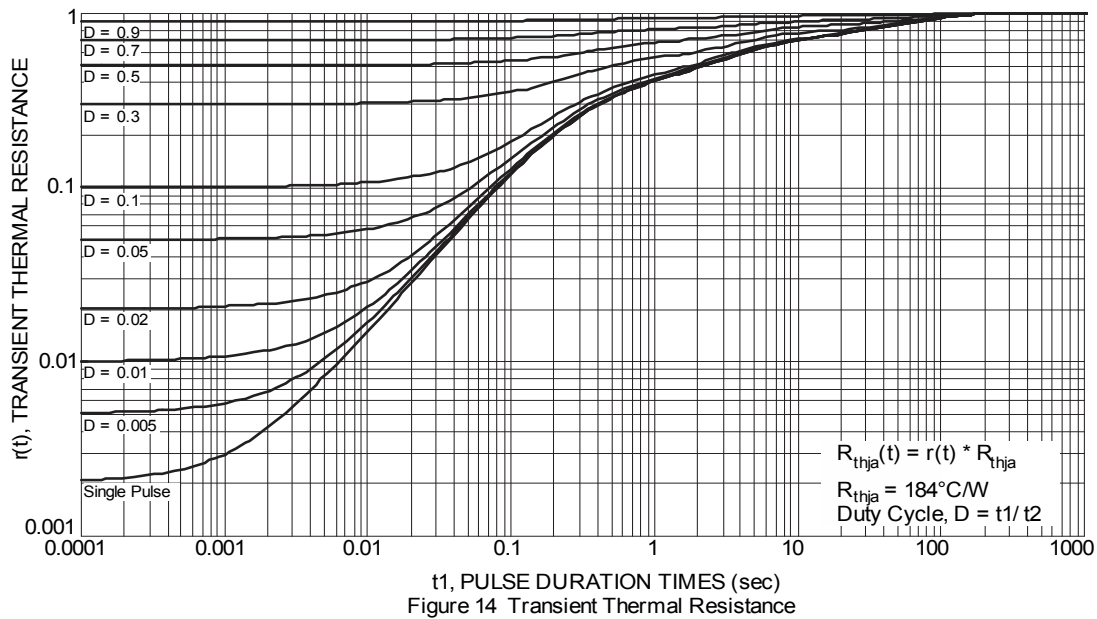
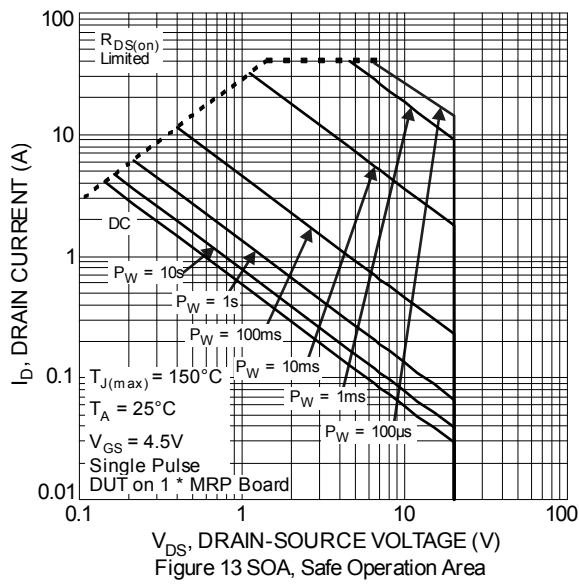
**Electrical Characteristics** (@T<sub>A</sub> = +25°C, unless otherwise specified.)

Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
<b>OFF CHARACTERISTICS (Note 8)</b>						
Drain-Source Breakdown Voltage	BV <sub>DSS</sub>	-20	—	—	V	V <sub>GS</sub> = 0V, I <sub>D</sub> = -250μA
Zero Gate Voltage Drain Current T <sub>J</sub> = +25°C	I <sub>DSS</sub>	—	—	-1	μA	V <sub>DS</sub> = -20V, V <sub>GS</sub> = 0V
Gate-Source Leakage	I <sub>GSS</sub>	—	—	±100	nA	V <sub>GS</sub> = ±5V, V <sub>DS</sub> = 0V
<b>ON CHARACTERISTICS (Note 8)</b>						
Gate Threshold Voltage	V <sub>GS(th)</sub>	-0.4	—	-1.0	V	V <sub>DS</sub> = V <sub>GS</sub> , I <sub>D</sub> = -250μA
Static Drain-Source On-Resistance	R <sub>DS(on)</sub>	—	—	27	mΩ	V <sub>GS</sub> = -4.5V, I <sub>D</sub> = -7.0A
			—	32		V <sub>GS</sub> = -2.5V, I <sub>D</sub> = -5.0A
			—	50		V <sub>GS</sub> = -1.8V, I <sub>D</sub> = -3.0A
			—	90		V <sub>GS</sub> = -1.5V, I <sub>D</sub> = -1.0A
			—	—		V <sub>GS</sub> = 0V, I <sub>S</sub> = -1.0A
Diode Forward Voltage	V <sub>SD</sub>	—	-0.8	-1.2	V	V <sub>GS</sub> = 0V, I <sub>S</sub> = -1.0A
<b>DYNAMIC CHARACTERISTICS (Note 9)</b>						
Input Capacitance	C <sub>iss</sub>	—	1837	—	pF	V <sub>DS</sub> = -15V, V <sub>GS</sub> = 0V, f = 1.0MHz
Output Capacitance	C <sub>oss</sub>	—	131	—		
Reverse Transfer Capacitance	C <sub>rss</sub>	—	115	—		
Gate Resistance	R <sub>g</sub>	—	14.8	—	Ω	V <sub>DS</sub> = 0V, V <sub>GS</sub> = 0V, f = 1MHz
Total Gate Charge (V <sub>GS</sub> = -4.5V)	Q <sub>g</sub>	—	27	—	nC	V <sub>DS</sub> = -15V, V <sub>GS</sub> = -4.5V, I <sub>D</sub> = -4.0A
Gate-Source Charge	Q <sub>gs</sub>	—	2.8	—		
Gate-Drain Charge	Q <sub>gd</sub>	—	3.1	—		
Turn-On Delay Time	t <sub>D(on)</sub>	—	5.8	—	ns	V <sub>DS</sub> = -15V, V <sub>GS</sub> = -4.5V, R <sub>G</sub> = 1Ω, I <sub>D</sub> = -4.0A
Turn-On Rise Time	t <sub>r</sub>	—	19.3	—		
Turn-Off Delay Time	t <sub>D(off)</sub>	—	168.5	—		
Turn-Off Fall Time	t <sub>f</sub>	—	77.3	—		
Reverse Recovery Time	t <sub>rr</sub>	—	46.5	—	ns	I <sub>F</sub> = -1.0A, di/dt = 100A/μs
Reverse Recovery Charge	Q <sub>rr</sub>	—	33.8	—	nC	I <sub>F</sub> = -1.0A, di/dt = 100A/μs

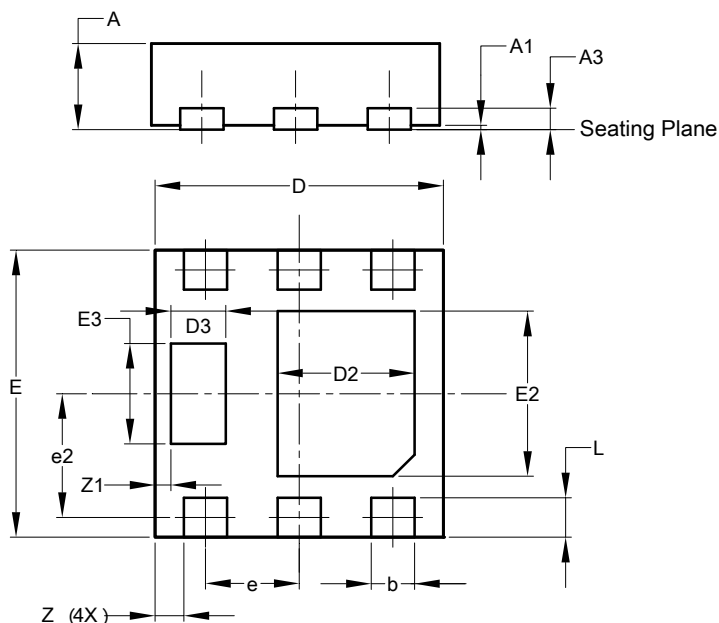
- Notes:
- Device mounted on FR-4 substrate PC board, 2oz copper, with minimum recommended pad layout.
  - Device mounted on FR-4 substrate PC board, 2oz copper, with 1inch square copper plate.
  - I<sub>AS</sub> and E<sub>AS</sub> rating are based on low frequency and duty cycles to keep T<sub>J</sub> = +25°C.
  - Short duration pulse test used to minimize self-heating effect.
  - Guaranteed by design. Not subject to product testing.





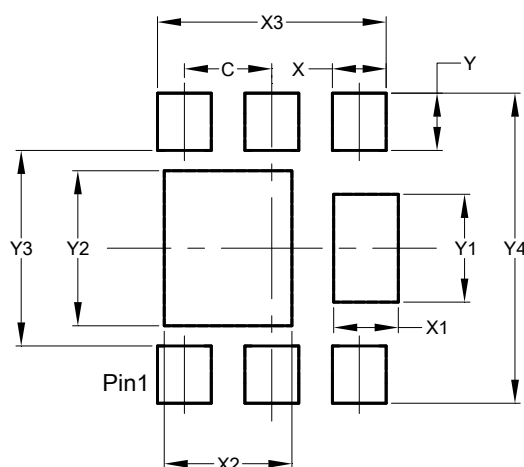


Please see AP02002 at <http://www.diodes.com/datasheets/ap02002.pdf> for the latest version.



U-DFN2020-6 (Type F)			
Dim	Min	Max	Typ
A	0.57	0.63	0.60
A1	0	0.05	0.03
A3	-	-	0.15
b	0.25	0.35	0.30
D	1.95	2.05	2.00
D2	0.85	1.05	0.95
D3	0.33	0.43	0.38
e	0.65 BSC		
e2	0.863 BSC		
E	1.95	2.05	2.00
E2	1.05	1.25	1.15
E3	0.65	0.75	0.70
L	0.225	0.325	0.275
Z	0.20 BSC		
Z1	0.110 BSC		
All Dimensions in mm			

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



Dimensions	Value (in mm)
C	0.650
X	0.400
X1	0.480
X2	0.950
X3	1.700
Y	0.425
Y1	0.800
Y2	1.150
Y3	1.450
Y4	2.300

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