

## Product Summary

BV <sub>DSS</sub>	R <sub>DS(ON)</sub> Max	I <sub>D</sub> Max T <sub>A</sub> = +25°C
-60V	110mΩ @ V <sub>GS</sub> = -10V	-4.2A
	130mΩ @ V <sub>GS</sub> = -4.5V	-3.9A

## Features and Benefits

- Low On-Resistance
- Low Gate Threshold Voltage
- 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 (Notes 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 refer to the related automotive grade (Q-suffix) part. A listing can be found at <https://www.diodes.com/products/automotive/automotive-products/>.**
- **This part is qualified to JEDEC standards (as references in AEC-Q) for High Reliability. <https://www.diodes.com/quality/product-definitions/>**
- **An Automotive-Compliant Part is Available Under Separate Datasheet ([DMP6110SFDFQ](#))**

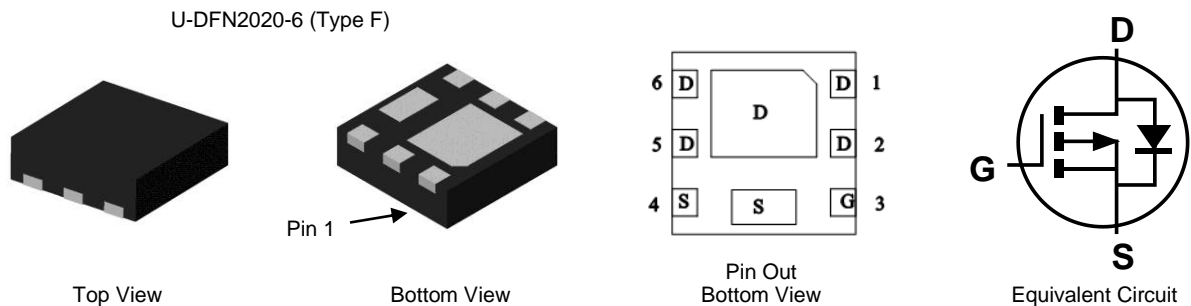
## Description and Applications

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

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

## 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 208③
- Weight: 0.007 grams (Approximate)



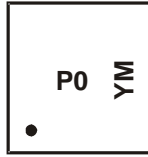
## Ordering Information (Note 4)

Part Number	Case	Packaging
DMP6110SFDF-7	U-DFN2020-6 (Type F)	3,000/Tape & Reel
DMP6110SFDF-13	U-DFN2020-6 (Type F)	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:

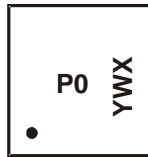


P0 = Product Type Marking Code  
 YM = Date Code Marking  
 Y = Year (ex: H = 2020)  
 M = Month (ex: 9 = September)

Date Code Key

<b>Year</b>	2015	...	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029
<b>Code</b>	C	...	H	I	J	K	L	M	N	O	P	R
<b>Month</b>	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
<b>Code</b>	1	2	3	4	5	6	7	8	9	O	N	D

Site 2:



P0 = 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

<b>Year</b>	2015	...	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029
<b>Code</b>	5	...	0	1	2	3	4	5	6	7	8	9
<b>Week</b>	1-26				27-52				53			
<b>Code</b>	A-Z				a-z				z			
<b>Internal Code</b>	Sun	Mon	Tue	Wed	Thu	Fri	Sat					
<b>Code</b>	T	U	V	W	X	Y	Z					

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

Characteristic		Symbol	Value	Unit
Drain-Source Voltage		V <sub>DSS</sub>	-60	V
Gate-Source Voltage		V <sub>GSS</sub>	±20	V
Continuous Drain Current (Note 6) V <sub>GS</sub> = -10V	Steady State	I <sub>D</sub>	-3.5 -2.8	A
	t < 10s	I <sub>D</sub>	-4.2 -3.4	A
Pulsed Drain Current (10µs Pulse, Duty Cycle = 1%)		I <sub>DM</sub>	-20	A
Continuous Source-Drain Diode Current (Note 6)		I <sub>S</sub>	-2.1	A
Avalanche Current (Note 7) L = 0.1mH		I <sub>AS</sub>	-19	A
Avalanche Energy (Note 7) L = 0.1mH		E <sub>AS</sub>	18	mJ

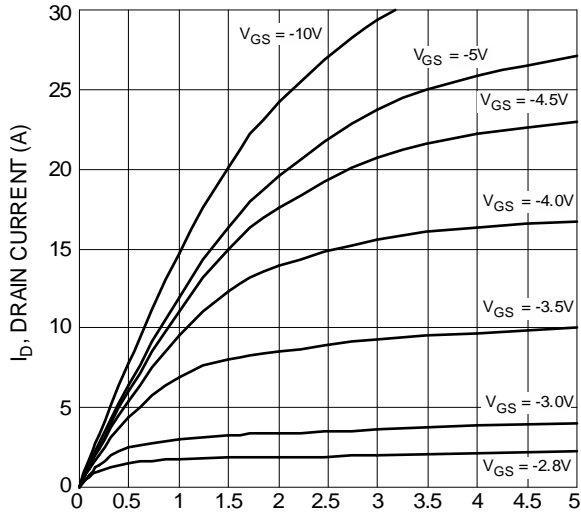
**Thermal Characteristics** (@T<sub>A</sub> = +25°C, unless otherwise specified.)

Characteristic		Symbol	Value	Unit
Total Power Dissipation (Note 5)	T <sub>A</sub> = +25°C	P <sub>D</sub>	0.76	W
	T <sub>A</sub> = +70°C		0.47	
Thermal Resistance, Junction to Ambient (Note 5)	Steady State	R <sub>θJA</sub>	167	°C/W
	t < 10s		121	
Total Power Dissipation (Note 6)	T <sub>A</sub> = +25°C	P <sub>D</sub>	1.97	W
	T <sub>A</sub> = +70°C		1.30	
Thermal Resistance, Junction to Ambient (Note 6)	Steady State	R <sub>θJA</sub>	64	°C/W
	t < 10s		42	
Thermal Resistance, Junction to Case (Note 6)	Steady State	R <sub>θJC</sub>	8	
Operating and Storage Temperature Range		T <sub>J</sub> , T <sub>STG</sub>	-55 to +150	°C

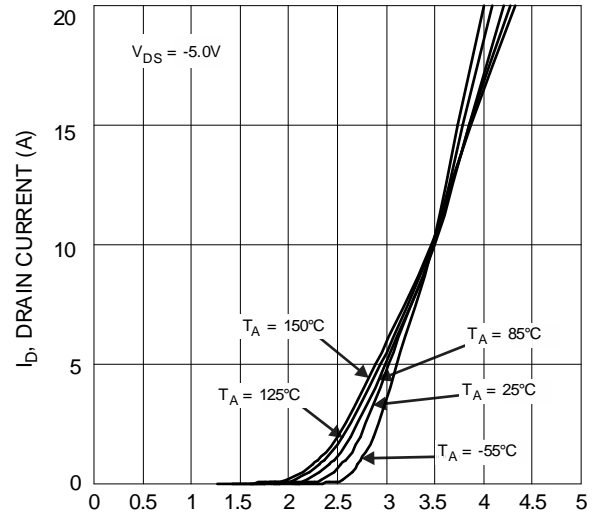
**Electrical Characteristics** (@T<sub>A</sub> = +25°C, unless otherwise specified.)

Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
<b>OFF CHARACTERISTICS</b> (Note 8)						
Drain-Source Breakdown Voltage	BV <sub>DSS</sub>	-60	—	—	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> = -48V, V <sub>GS</sub> = 0V
Gate-Source Leakage	I <sub>GSS</sub>	—	—	±100	nA	V <sub>GS</sub> = ±16V, V <sub>DS</sub> = 0V
<b>ON CHARACTERISTICS</b> (Note 8)						
Gate Threshold Voltage	V <sub>GS(TH)</sub>	-1	—	-3	V	V <sub>DS</sub> = V <sub>GS</sub> , I <sub>D</sub> = -250µA
Static Drain-Source On-Resistance	R <sub>DS(ON)</sub>	—	—	110	mΩ	V <sub>GS</sub> = -10V, I <sub>D</sub> = -4.5A
			—	130		V <sub>GS</sub> = -4.5V, I <sub>D</sub> = -3.5A
Diode Forward Voltage	V <sub>SD</sub>	—	-0.7	-1.2	V	V <sub>GS</sub> = 0V, I <sub>S</sub> = -1A
<b>DYNAMIC CHARACTERISTICS</b> (Note 9)						
Input Capacitance	C <sub>ISS</sub>	—	969	—	pF	V <sub>DS</sub> = -30V, V <sub>GS</sub> = 0V, f = 1.0MHz
Output Capacitance	C <sub>OSS</sub>	—	58	—		
Reverse Transfer Capacitance	C <sub>RSS</sub>	—	44	—		
Gate Resistance	R <sub>G</sub>	—	14	—	Ω	V <sub>DS</sub> = 0V, V <sub>GS</sub> = 0V, f = 1.0MHz
Total Gate Charge (V <sub>GS</sub> = -4.5V)	Q <sub>G</sub>	—	8.2	—	nC	V <sub>DS</sub> = -30V, I <sub>D</sub> = -12A
Total Gate Charge (V <sub>GS</sub> = -10V)	Q <sub>G</sub>	—	17.2	—		
Gate-Source Charge	Q <sub>GS</sub>	—	3.0	—		
Gate-Drain Charge	Q <sub>GD</sub>	—	3.1	—		
Turn-On Delay Time	t <sub>D(ON)</sub>	—	4.4	—	ns	V <sub>GS</sub> = -10V, V <sub>DS</sub> = -30V, R <sub>GEN</sub> = 6Ω, I <sub>D</sub> = -12A
Turn-On Rise Time	t <sub>R</sub>	—	23	—		
Turn-Off Delay Time	t <sub>D(OFF)</sub>	—	34	—		
Turn-Off Fall Time	t <sub>F</sub>	—	42	—		
Reverse Recovery Time	t <sub>RR</sub>	—	13.2	—	ns	I <sub>S</sub> = -12A, di/dt = -100A/µs
Reverse Recovery Charge	Q <sub>RR</sub>	—	6.2	—	nC	I <sub>S</sub> = -12A, di/dt = -100A/µs

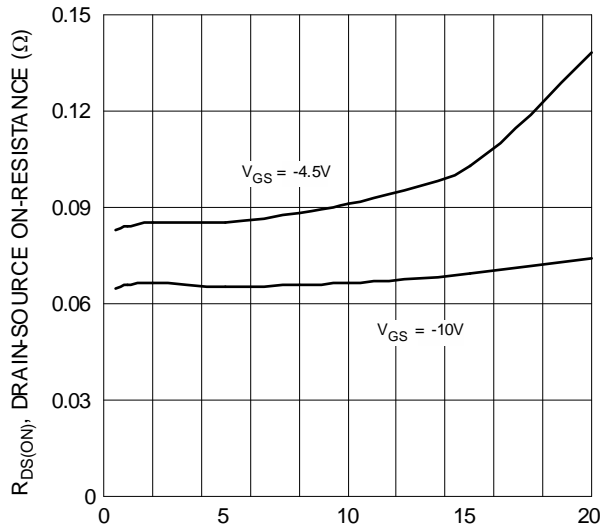
- Notes:
- Device mounted on FR-4 substrate PC board, 2oz copper, with minimum recommended pad layout.
  - Device mounted on FR-4 substrate PC board, 2oz copper, with 1-inch square copper plate.
  - I<sub>AS</sub> and E<sub>AS</sub> ratings are based on low frequency and duty cycles to keep T<sub>J</sub>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



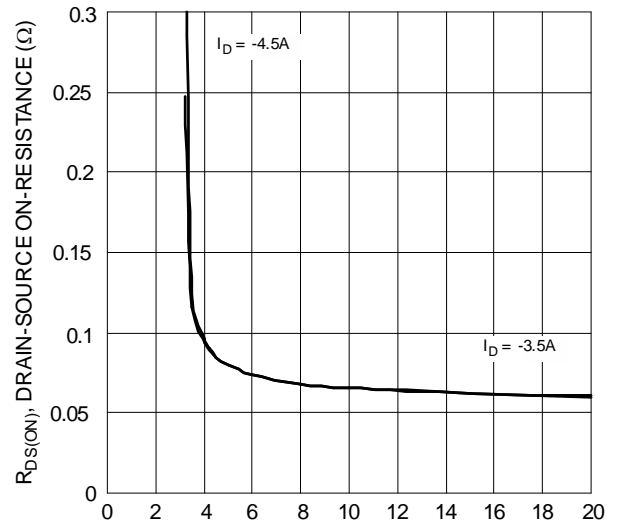
$V_{DS}$ , DRAIN-SOURCE VOLTAGE (V)  
Figure 1 Typical Output Characteristic



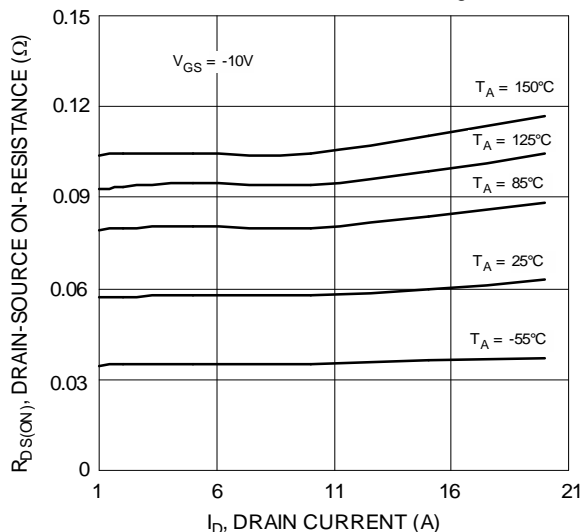
$V_{GS}$ , GATE-SOURCE VOLTAGE (V)  
Figure 2 Typical Transfer Characteristics



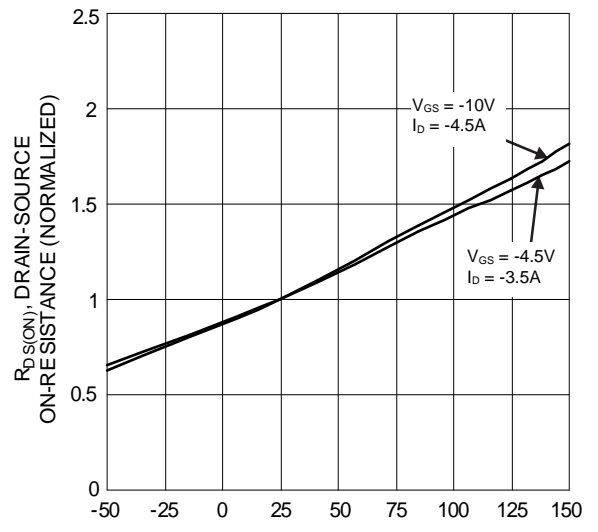
$I_D$ , DRAIN-SOURCE CURRENT (A)  
Figure 3 Typical On-Resistance vs. Drain Current and Gate Voltage



$V_{GS}$ , GATE-SOURCE VOLTAGE (V)  
Figure 4 Typical Transfer Characteristic



$I_D$ , DRAIN CURRENT (A)  
Figure 5 Typical On-Resistance vs. Drain Current and Temperature



$T_J$ , JUNCTION TEMPERATURE ( $^{\circ}C$ )  
Figure 6 On-Resistance Variation with Temperature

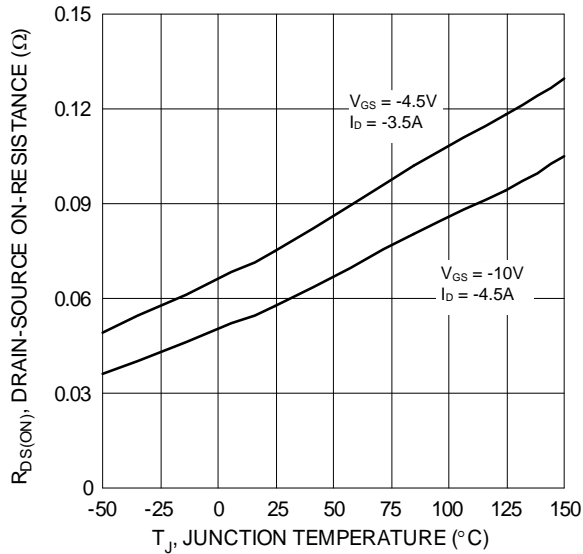


Figure 7 On-Resistance Variation with Temperature

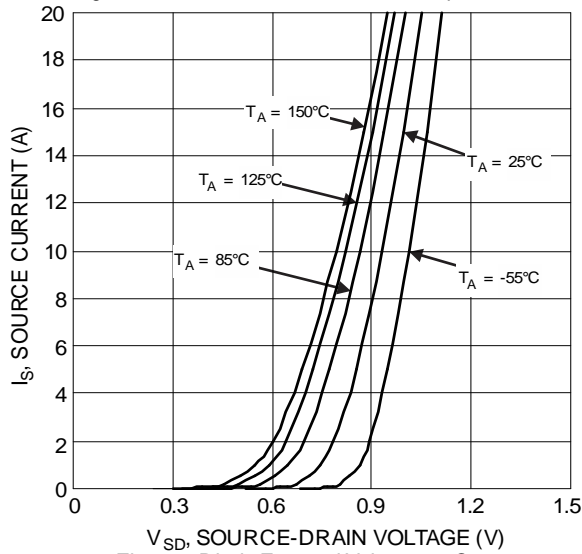


Figure 9 Diode Forward Voltage vs. Current

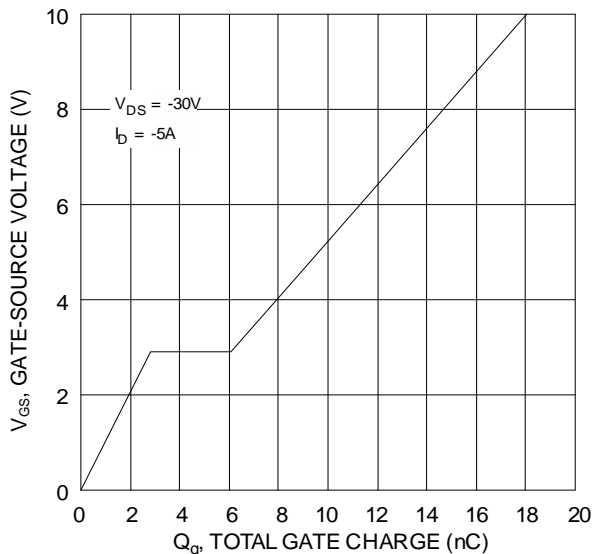


Figure 11 Gate Charge

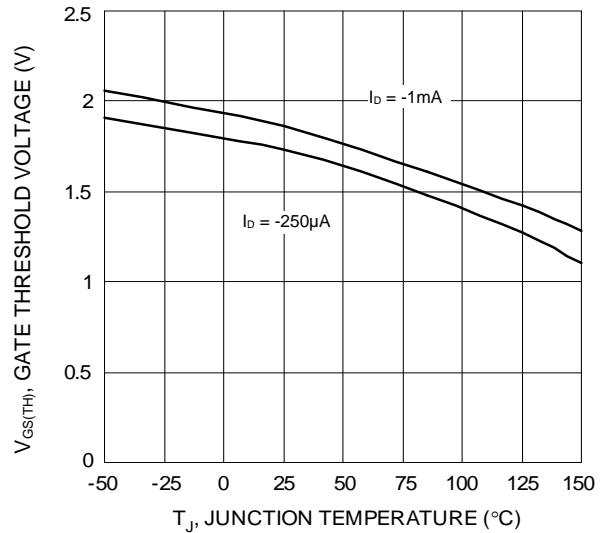


Figure 8 Gate Threshold Variation vs. Junction Temperature

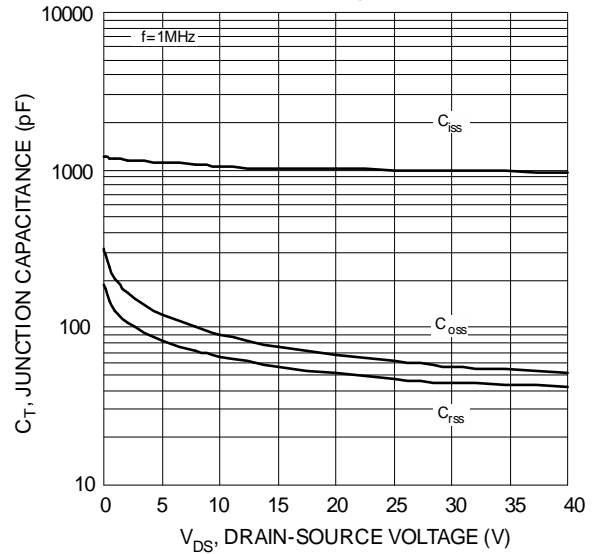


Figure 10 Typical Junction Capacitance

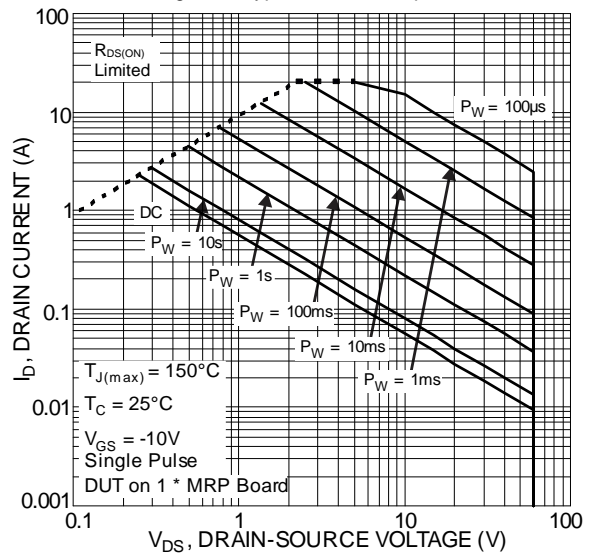
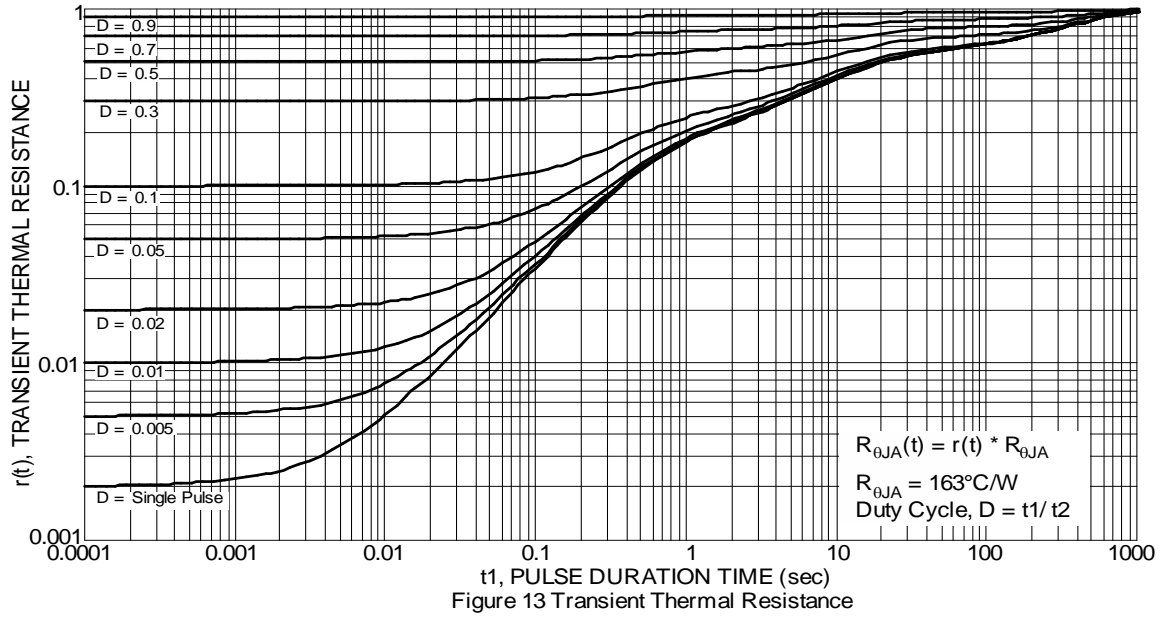


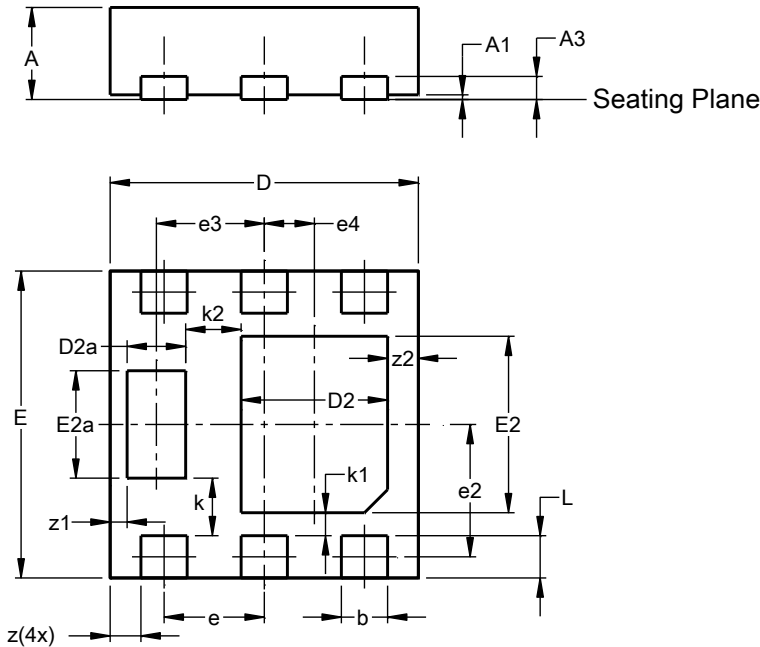
Figure 12 SOA, Safe Operation Area



## Package Outline Dimension

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

U-DFN2020-6 (Type F)

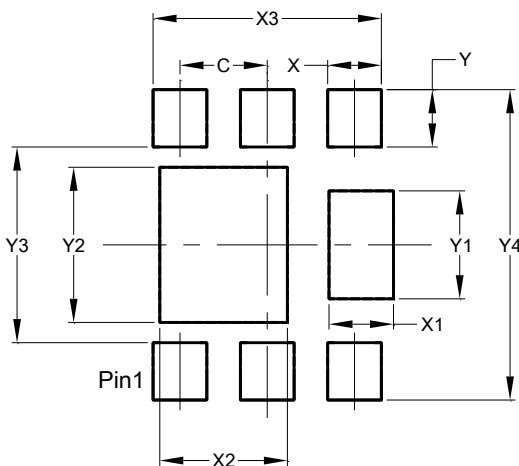


U-DFN2020-6 (Type F)			
Dim	Min	Max	Typ
A	0.57	0.63	0.60
A1	0.00	0.05	0.03
A3	-	-	0.15
b	0.25	0.35	0.30
D	1.95	2.05	2.00
D2	0.85	1.05	0.95
D2a	0.33	0.43	0.38
E	1.95	2.05	2.00
E2	1.05	1.25	1.15
E2a	0.65	0.75	0.70
e	0.65 BSC		
e2	0.863 BSC		
e3	0.70 BSC		
e4	0.325 BSC		
k	0.37 BSC		
k1	0.15 BSC		
k2	0.36 BSC		
L	0.225	0.325	0.275
z	0.20 BSC		
z1	0.110 BSC		
z2	0.20 BSC		
All Dimensions in mm			

## Suggested Pad Layout

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

U-DFN2020-6 (Type F)



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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