

Product Summary

BV _{DSS}	R _{DS(ON)} Max	I _D Max T _A = +25°C
-60V	110mΩ @ V _{GS} = -10V	-4.2A
	130mΩ @ V _{GS} = -4.5V	-3.9A

Description and Applications

This MOSFET is designed to meet the stringent requirements of automotive applications. It is qualified to AEC-Q101, supported by a PPAP and is ideal for use in:

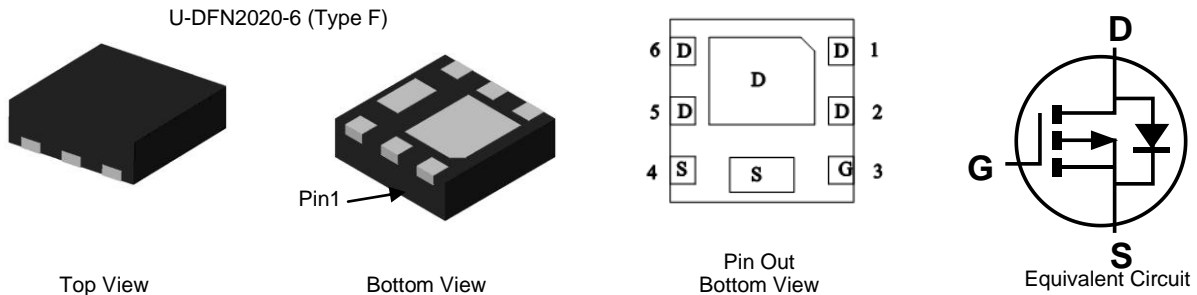
- Battery Management Application
- Power Management Functions
- DC-DC Converters

Features and Benefits

- 100% Unclamped Inductive Switching Test in Production – Ensures More Reliable and Robust End Application
- 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)**
- **Qualified to AEC-Q101 Standards for High Reliability**
- **PPAP Capable (Note 4)**

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
- Weight: 0.007 grams (Approximate)

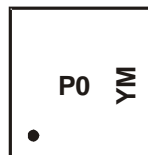


Ordering Information (Note 5)

Part Number	Case	Packaging
DMP6110SFDFQ-7	U-DFN2020-6 (Type F)	3,000/Tape & Reel
DMP6110SFDFQ-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. Automotive products are AEC-Q101 qualified and are PPAP capable. Refer to <https://www.diodes.com/quality/>.
 5. For packaging details, go to our website at <https://www.diodes.com/design/support/packaging/diodes-packaging/>.

Marking Information



- P0 = Product Type Marking Code
- YM = Date Code Marking
- Y = Year (ex: G = 2019)
- M = Month (ex: 9 = September)

Date Code Key

Year	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027
Code	F	G	H	I	J	K	L	M	N	O

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°C, unless otherwise specified.)

Characteristic			Symbol	Value	Unit
Drain-Source Voltage			V _{DSS}	-60	V
Gate-Source Voltage			V _{GSS}	±20	V
Continuous Drain Current (Note 7) V _{GS} = -10V	Steady State	T _A = +25°C T _A = +70°C	I _D	-3.5 -2.8	A
	t < 10s	T _A = +25°C T _A = +70°C	I _D	-4.2 -3.4	A
Pulsed Drain Current (10µs Pulse, Duty Cycle = 1%)			I _{DM}	-20	A
Continuous Source-Drain Diode Current (Note 7)		T _A = +25°C	I _S	-2.1	A
Pulsed Source Current (10µs Pulse, Duty Cycle = 1%)			I _{SM}	-20	A
Avalanche Current (Note 8) L = 0.1mH			I _{AS}	-19	A
Avalanche Energy (Note 8) L = 0.1mH			E _{AS}	18	mJ

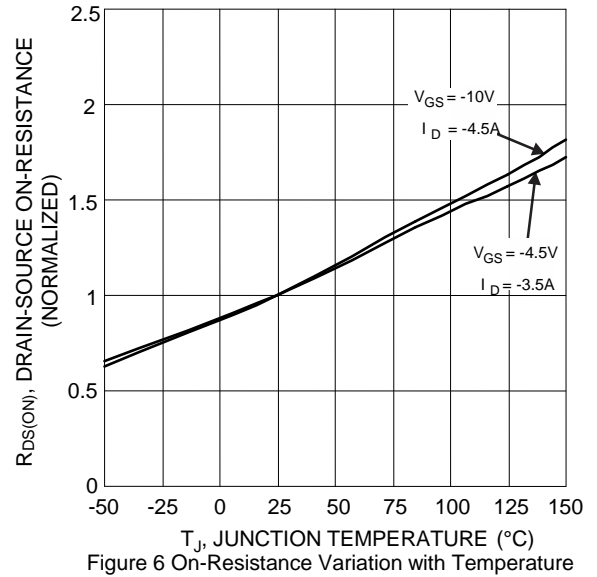
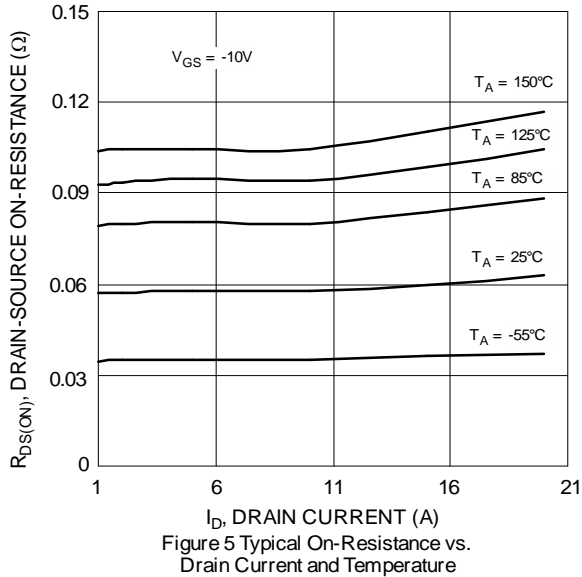
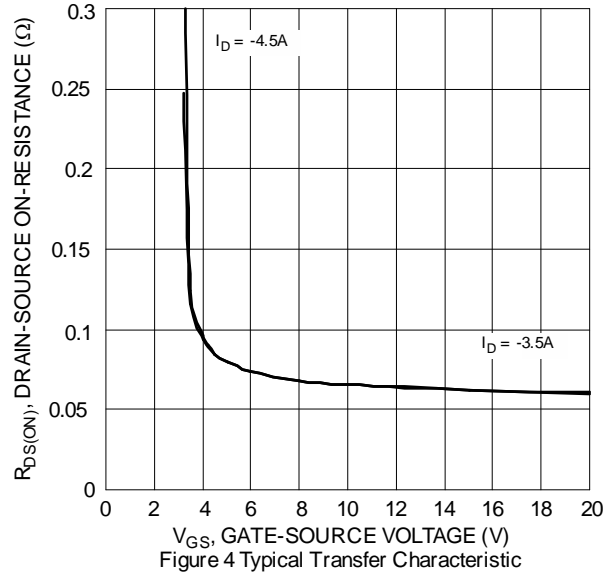
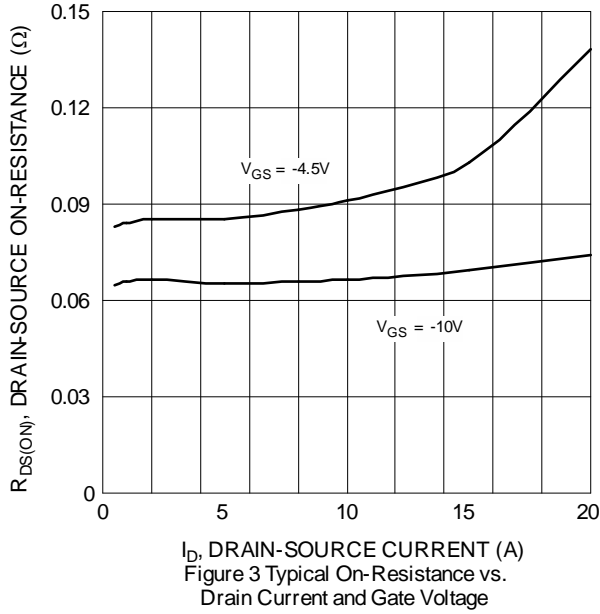
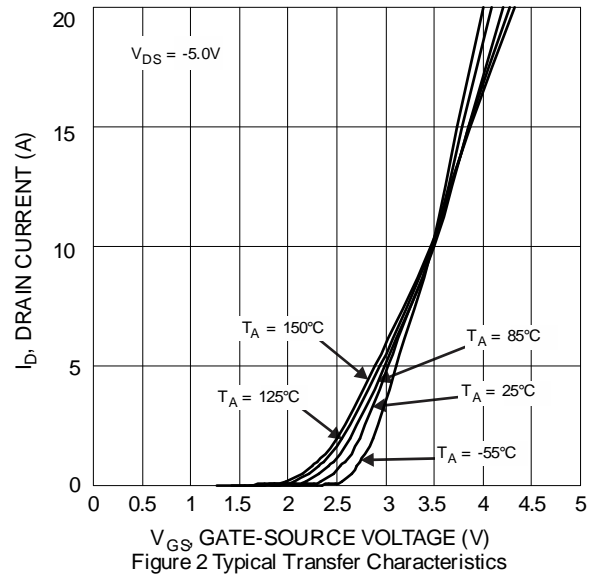
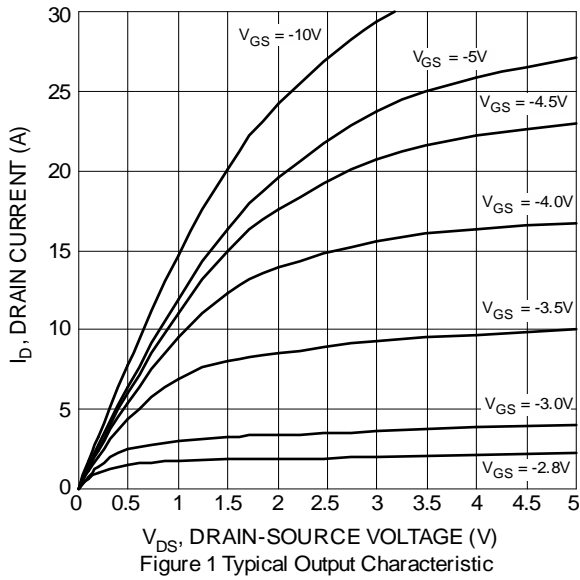
Thermal Characteristics (@T_A = +25°C, unless otherwise specified.)

Characteristic		Symbol	Value	Unit
Total Power Dissipation (Note 6)	T _A = +25°C	P _D	0.76	W
	T _A = +70°C		0.47	
Thermal Resistance, Junction to Ambient (Note 6)	Steady State	R _{θJA}	167	°C/W
	t < 10s		121	
Total Power Dissipation (Note 7)	T _A = +25°C	P _D	1.97	W
	T _A = +70°C		1.30	
Thermal Resistance, Junction to Ambient (Note 7)	Steady State	R _{θJA}	64	°C/W
	t < 10s		42	
Thermal Resistance, Junction to Case (Note 7)	Steady State	R _{θJC}	8	
Operating and Storage Temperature Range		T _J , T _{STG}	-55 to +150	°C

Electrical Characteristics (@T_A = +25°C, unless otherwise specified.)

Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
OFF CHARACTERISTICS (Note 9)						
Drain-Source Breakdown Voltage	BV _{DSS}	-60	—	—	V	V _{GS} = 0V, I _D = -250µA
Zero Gate Voltage Drain Current T _J = +25°C	I _{DSS}	—	—	-1	µA	V _{DS} = -48V, V _{GS} = 0V
Gate-Source Leakage	I _{GSS}	—	—	±100	nA	V _{GS} = ±16V, V _{DS} = 0V
ON CHARACTERISTICS (Note 9)						
Gate Threshold Voltage	V _{GS(TH)}	-1	—	-3	V	V _{DS} = V _{GS} , I _D = -250µA
Static Drain-Source On-Resistance	R _{DS(ON)}	—	56	110	mΩ	V _{GS} = -10V, I _D = -4.5A V _{GS} = -4.5V, I _D = -3.5A
			72	130		
Diode Forward Voltage	V _{SD}	—	-0.7	-1.2	V	V _{GS} = 0V, I _S = -1A
DYNAMIC CHARACTERISTICS (Note 10)						
Input Capacitance	C _{iss}	—	969	—	pF	V _{DS} = -30V, V _{GS} = 0V, f = 1.0MHz
Output Capacitance	C _{oss}	—	58	—		
Reverse Transfer Capacitance	C _{rss}	—	44	—		
Gate Resistance	R _g	—	14	—	Ω	V _{DS} = 0V, V _{GS} = 0V, f = 1.0MHz
Total Gate Charge (V _{GS} = -4.5V)	Q _g	—	8.2	—	nC	V _{DS} = -30V, I _D = -12A
Total Gate Charge (V _{GS} = -10V)	Q _g	—	17.2	—		
Gate-Source Charge	Q _{gs}	—	3.0	—		
Gate-Drain Charge	Q _{gd}	—	3.1	—		
Turn-On Delay Time	t _{D(ON)}	—	4.4	—	ns	V _{GS} = -10V, V _{DS} = -30V, R _{GEN} = 6Ω, I _D = -12A
Turn-On Rise Time	t _r	—	23	—		
Turn-Off Delay Time	t _{D(OFF)}	—	34	—		
Turn-Off Fall Time	t _f	—	42	—		
Reverse Recovery Time	t _{RR}	—	13.2	—	ns	I _S = -12A, di/dt = -100A/µs
Reverse Recovery Charge	Q _{RR}	—	6.2	—	nC	I _S = -12A, di/dt = -100A/µs

- Notes: 6. Device mounted on FR-4 substrate PC board, 2oz copper, with minimum recommended pad layout.
7. Device mounted on FR-4 substrate PC board, 2oz copper, with 1-inch square copper plate.
8. I_{AS} and E_{AS} ratings are based on low frequency and duty cycles to keep T_J = +25°C.
9. Short duration pulse test used to minimize self-heating effect.
10. Guaranteed by design. Not subject to product testing.



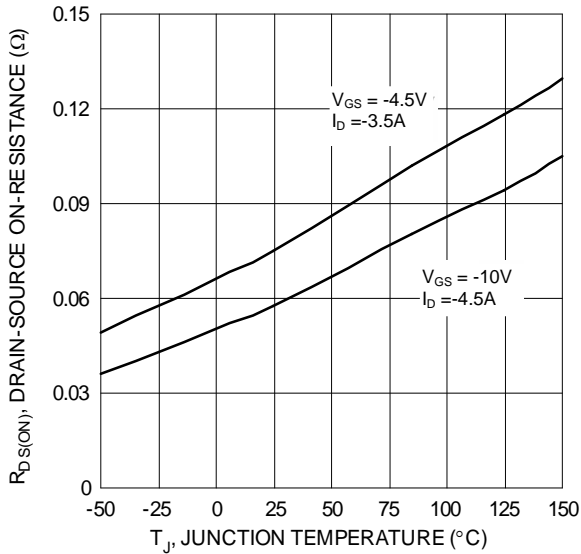


Figure 7 On-Resistance Variation with Temperature

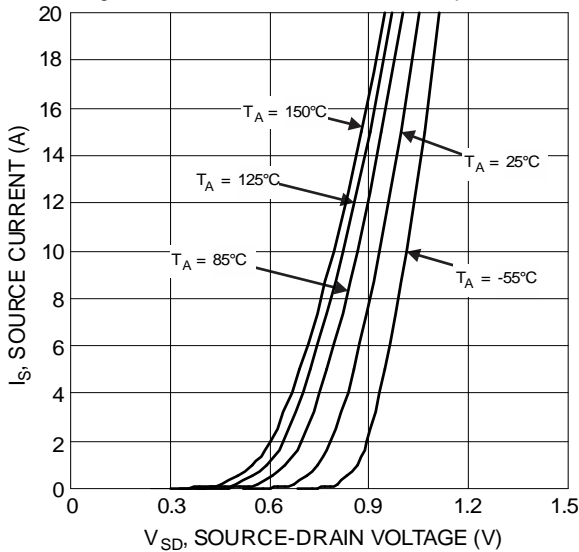


Figure 9 Diode Forward Voltage vs. Current

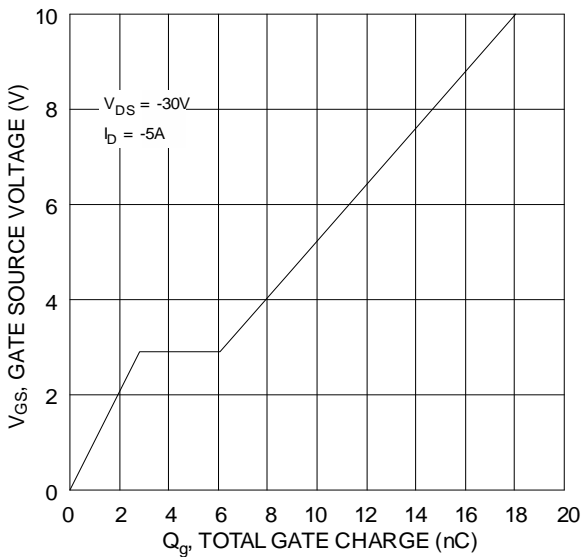


Figure 11 Gate Charge

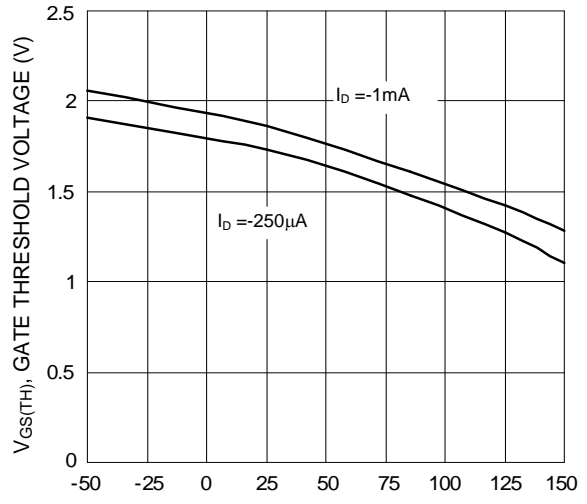


Figure 8 Gate Threshold Variation vs. Junction Temperature

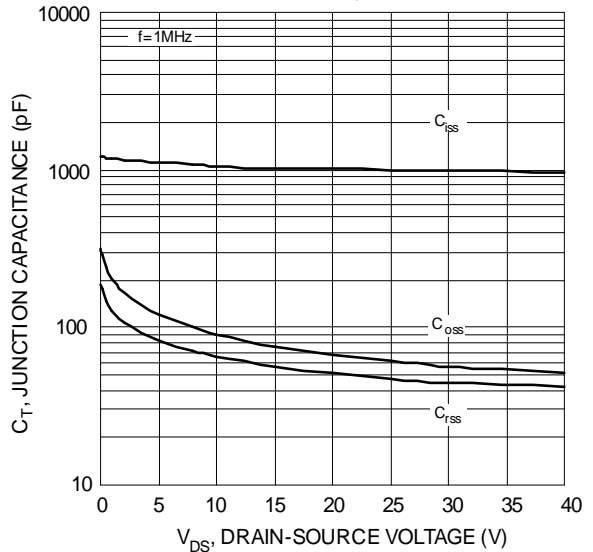


Figure 10 Typical Junction Capacitance

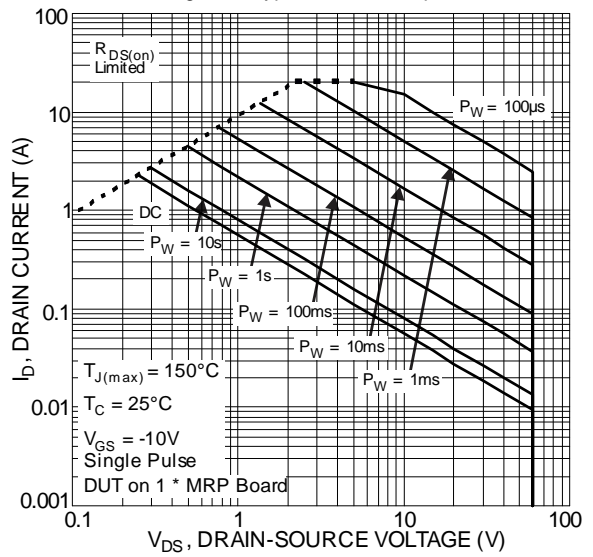
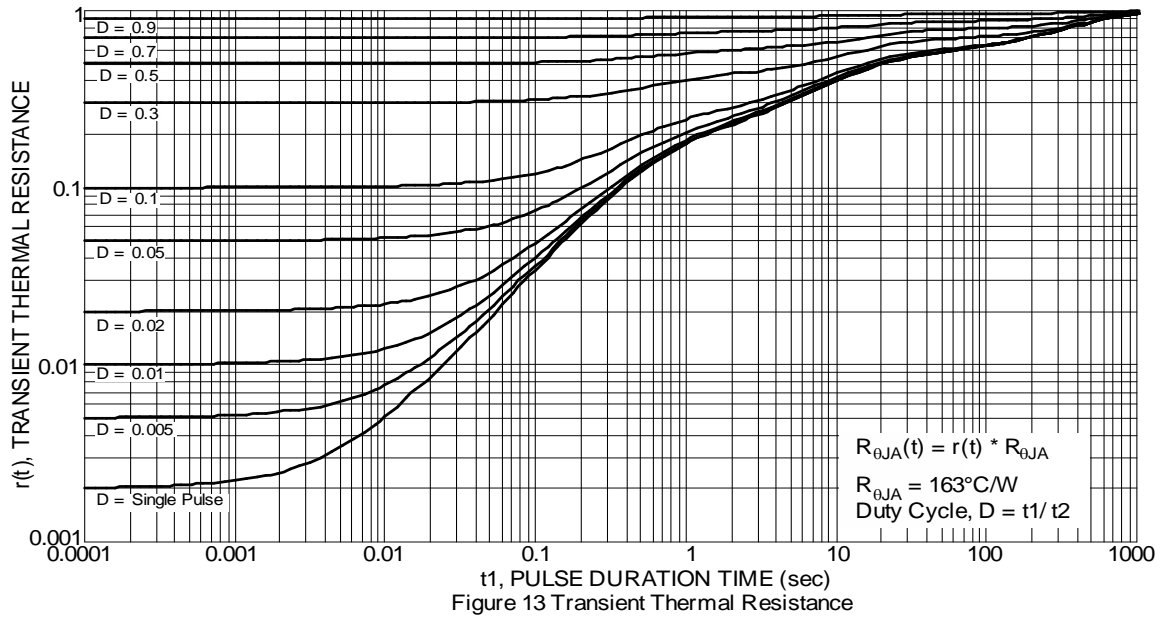


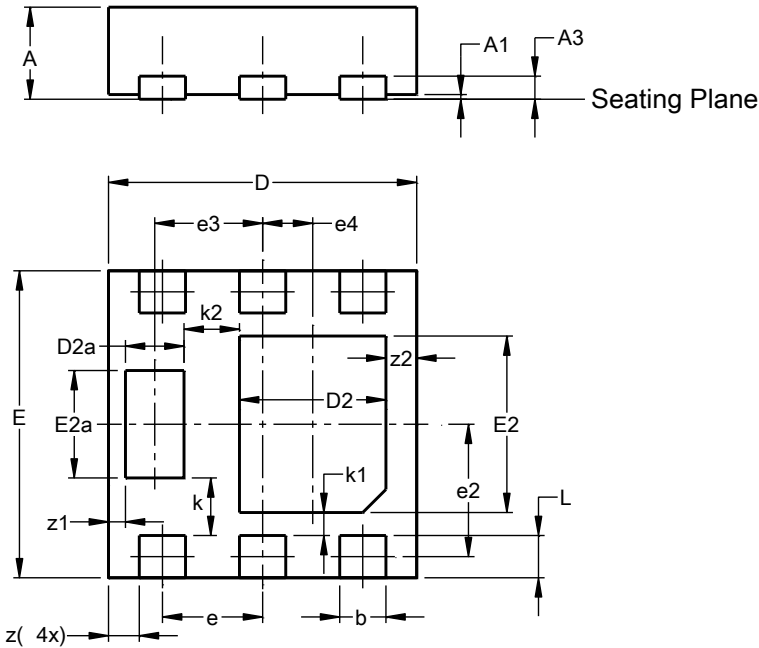
Figure 12 SOA, Safe Operation Area



Package Outline Dimension

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

U-DFN2020-6 (Type F)

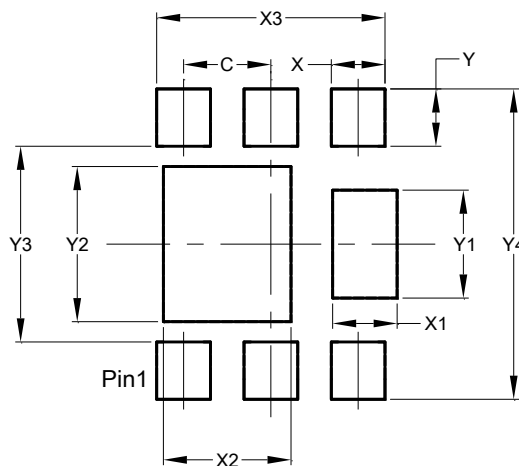


U-DFN2020-6 (Type F)			
Dim	Min	Max	Typ
A	0.57	0.63	0.60
A1	0.00	0.05	0.03
A3	-	-	0.15
b	0.25	0.35	0.30
D	1.95	2.05	2.00
D2	0.85	1.05	0.95
D2a	0.33	0.43	0.38
E	1.95	2.05	2.00
E2	1.05	1.25	1.15
E2a	0.65	0.75	0.70
e	0.65 BSC		
e2	0.863 BSC		
e3	0.70 BSC		
e4	0.325 BSC		
k	0.37 BSC		
k1	0.15 BSC		
k2	0.36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