

60V N-CHANNEL ENHANCEMENT MODE MOSFET

Product Summary

BV _{DSS}	R _{DS(ON)} Max	I _D Max T _A = +25°C
60V	16mΩ @ V _{GS} = 10V	8.9A
	27mΩ @ V _{GS} = 4.5V	6.8A

Description

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

Applications

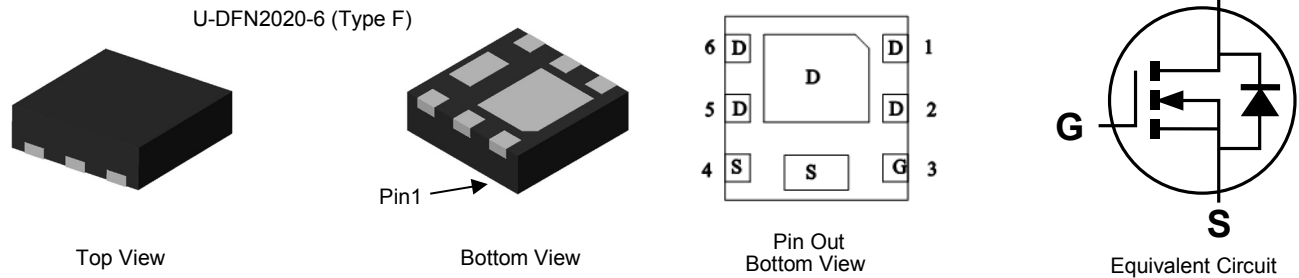
- Load Switch
- Adaptor Switch
- Notebook PC

Features and Benefits

- 100% Unclamped Inductive Switch (UIS) Test in Production
- 0.6mm Profile – Ideal for Low Profile Applications
- PCB Footprint of 4mm²
- Low On-Resistance
- **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](#) or your local Diodes representative. <https://www.diodes.com/quality/product-definitions/>**

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 ⁽⁴⁾
- Weight: 0.007 grams (Approximate)



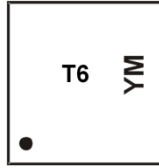
Ordering Information (Note 4)

Part Number	Marking	Reel Size (inches)	Quantity per Reel
DMT6016LDFD-7	T6	7	3000
DMT6016LDFD-13	T6	13	10,000

- 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 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

Site 1:



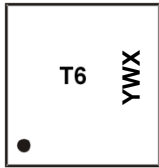
T6 = Product Type Marking Code
 YM = Date Code Marking
 Y = Year (ex: H = 2020)
 M = Month (ex: 9 = September)

Date Code Key

Year	2013	...	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028
Code	A	...	G	H	I	J	K	L	M	N	O	P

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:



T6 = Product Type Marking Code
 YWX = Date Code Marking
 Y = Year (ex: H = 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
Code	0	1	2	3	4	5	6	7	8

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°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 6) V _{GS} = 10V	Steady State	T _A = +25°C T _A = +70°C	I _D	8.9 7.1	A
	t < 10s	T _A = +25°C T _A = +70°C	I _D	11.1 8.9	A
Pulsed Drain Current (10µs Pulse, Duty Cycle = 1%)			I _{DM}	60	A
Maximum Body Diode Continuous Current			I _S	2.2	A
Avalanche Current (Note 7) L = 0.1mH			I _{AS}	15.3	A
Avalanche Energy (Note 7) L = 0.1mH			E _{AS}	11.7	mJ

Thermal Characteristics

Characteristic		Symbol	Value	Unit
Total Power Dissipation (Note 5)	T _A = +25°C	P _D	0.82	W
	T _A = +70°C		0.52	
Thermal Resistance, Junction to Ambient (Note 5)	Steady State	R _{θJA}	153	°C/W
	t < 10s		97	
Total Power Dissipation (Note 6)	T _A = +25°C	P _D	1.9	W
	T _A = +70°C		1.2	
Thermal Resistance, Junction to Ambient (Note 6)	Steady State	R _{θJA}	66	°C/W
	t < 10s		42	
Thermal Resistance, Junction to Case (Note 6)		R _{θJC}	14.7	
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 8)						
Drain-Source Breakdown Voltage	BV _{DSS}	60	—	—	V	V _{GS} = 0V, I _D = 250µA
Zero Gate Voltage Drain Current	I _{DSS}	—	—	1	µA	V _{DS} = 48V, V _{GS} = 0V
Gate-Source Leakage	I _{GSS}	—	—	±100	nA	V _{GS} = ±20V, V _{DS} = 0V
ON CHARACTERISTICS (Note 8)						
Gate Threshold Voltage	V _{GS(TH)}	1.0	—	3.0	V	V _{DS} = V _{GS} , I _D = 250µA
Static Drain-Source On-Resistance	R _{DS(ON)}	—	12.2	16	mΩ	V _{GS} = 10V, I _D = 10A
		—	17.2	27		
Diode Forward Voltage	V _{SD}	—	0.7	1.2	V	V _{GS} = 0V, I _S = 1A
DYNAMIC CHARACTERISTICS (Note 9)						
Input Capacitance	C _{iss}	—	864	—	pF	V _{DS} = 30V, V _{GS} = 0V f = 1.0MHz
Output Capacitance	C _{oss}	—	282	—		
Reverse Transfer Capacitance	C _{rss}	—	27.1	—		
Gate Resistance	R _g	—	1.35	—	Ω	V _{DS} = 0V, V _{GS} = 0V, f = 1.0MHz
Total Gate Charge (V _{GS} = 10V)	Q _g	—	17	—	nC	V _{DS} = 30V, I _D = 10A
Total Gate Charge (V _{GS} = 4.5V)	Q _g	—	8.4	—		
Gate-Source Charge	Q _{gs}	—	3.1	—		
Gate-Drain Charge	Q _{gd}	—	4.3	—		
Turn-On Delay Time	t _{D(ON)}	—	3.4	—	nS	V _{GS} = 10V, V _{DD} = 30V, R _g = 6Ω, I _D = 10A
Turn-On Rise Time	t _r	—	5.2	—		
Turn-Off Delay Time	t _{D(OFF)}	—	12.9	—		
Turn-Off Fall Time	t _f	—	6.8	—		
Body Diode Reverse Recovery Time	t _{RR}	—	22	—	nS	I _S = 10A, dI/dt = 100A/µs
Body Diode Reverse Recovery Charge	Q _{RR}	—	11.1	—	nC	I _S = 10A, 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_{AS} and E_{AS} rating are based on low frequency and duty cycles to keep T_J = +25°C.
 - Short duration pulse test used to minimize self-heating effect.
 - Guaranteed by design. Not subject to product testing.

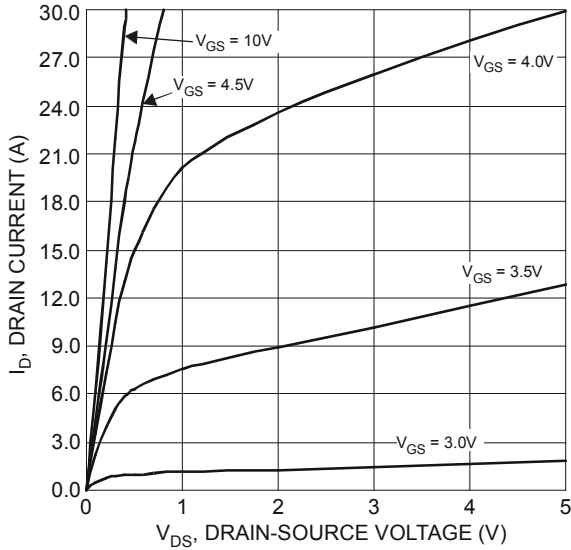


Figure 1 Typical Output Characteristics

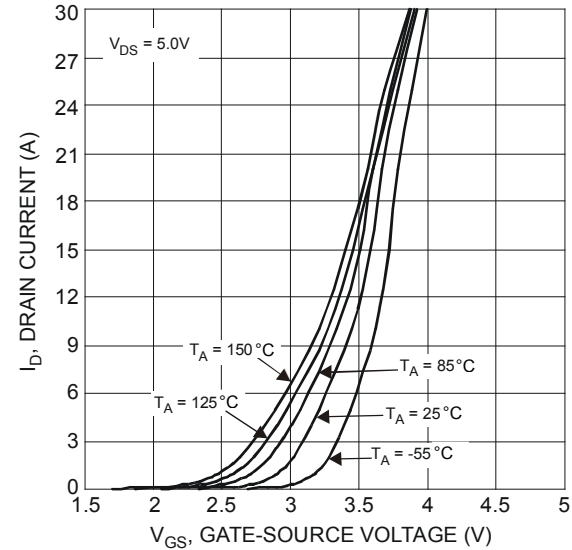


Figure 2 Typical Transfer Characteristics

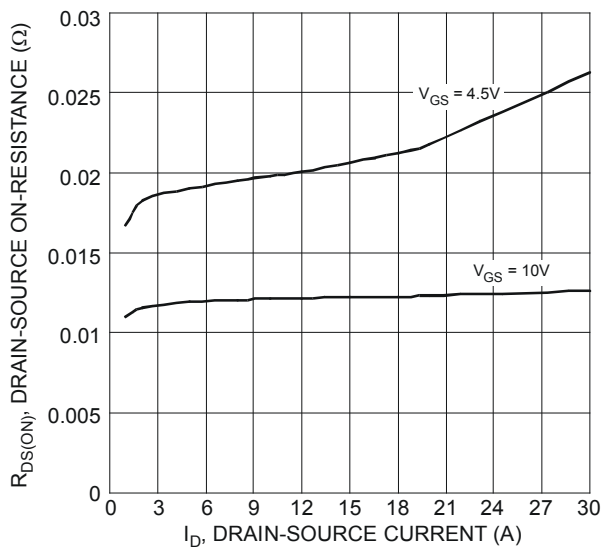


Figure 3 Typical On-Resistance vs. Drain Current and Gate Voltage

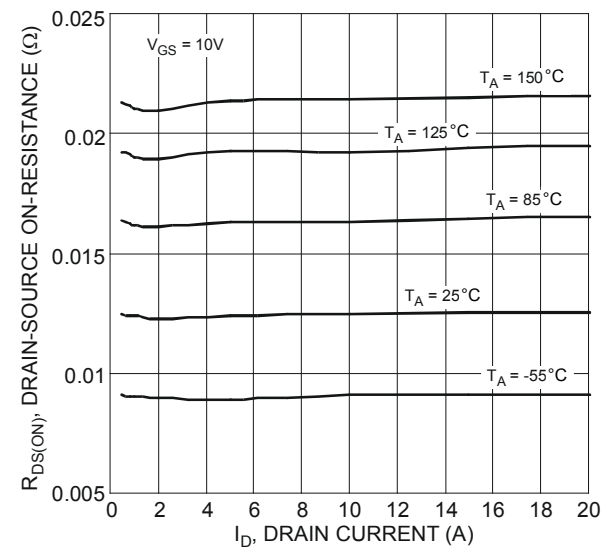


Figure 4 Typical On-Resistance vs. Drain Current and Temperature

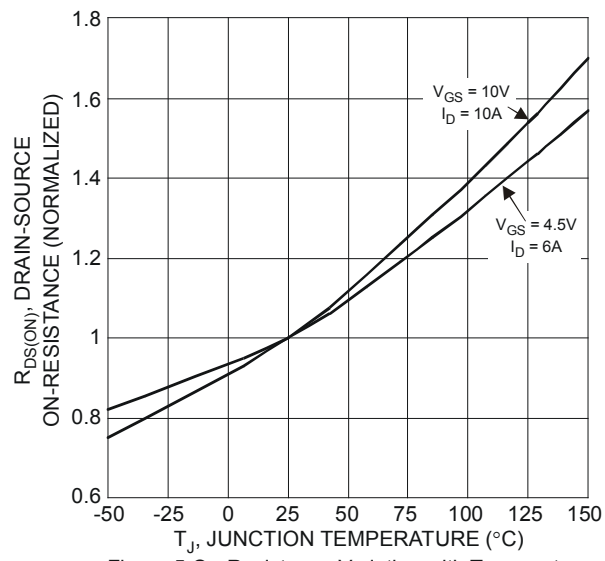


Figure 5 On-Resistance Variation with Temperature

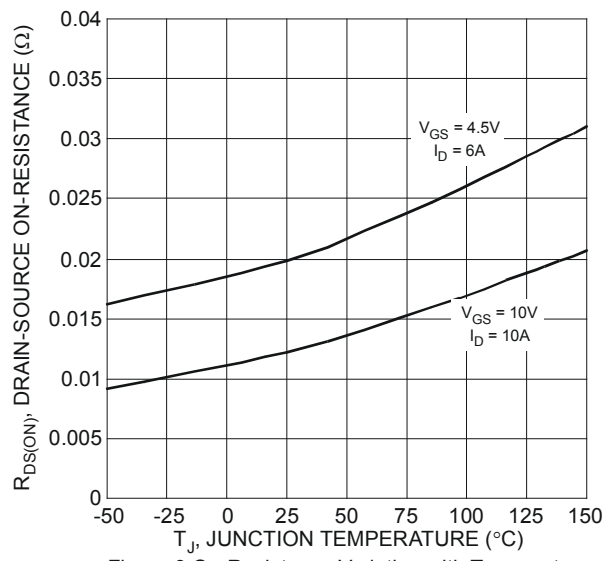


Figure 6 On-Resistance Variation with Temperature

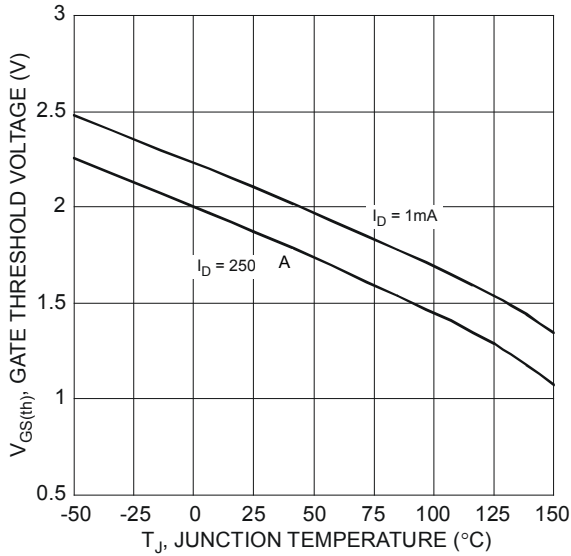


Figure 7 Gate Threshold Variation vs. Ambient Temperature

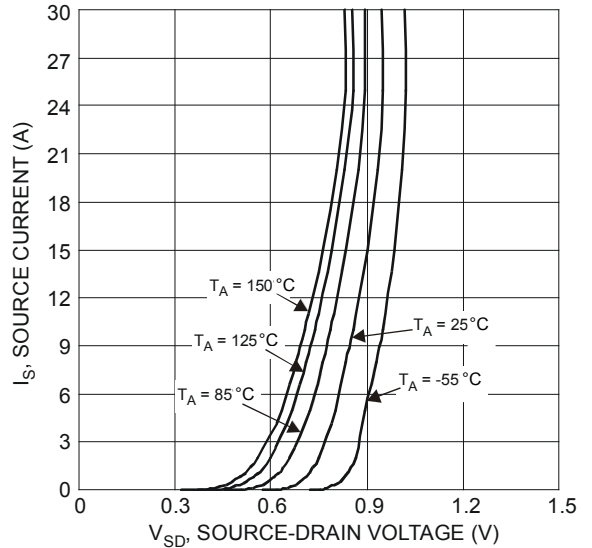


Figure 8 Diode Forward Voltage vs. Current

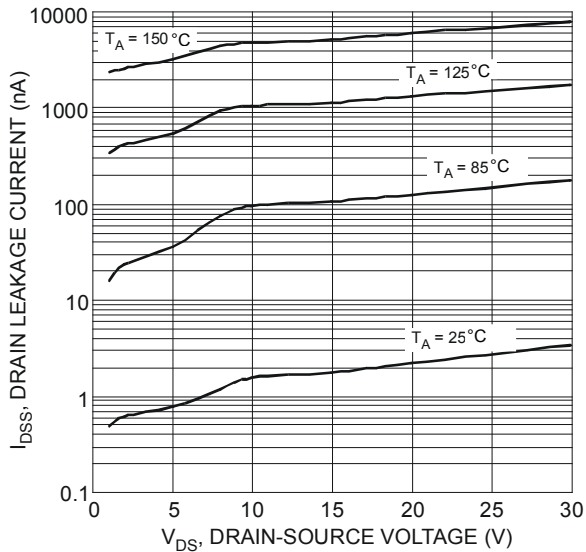


Figure 9 Typical Drain-Source Leakage Current vs. Voltage

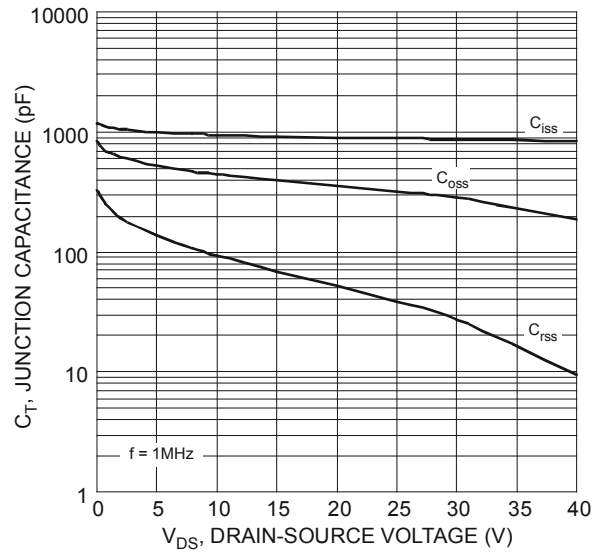


Figure 10 Typical Junction Capacitance

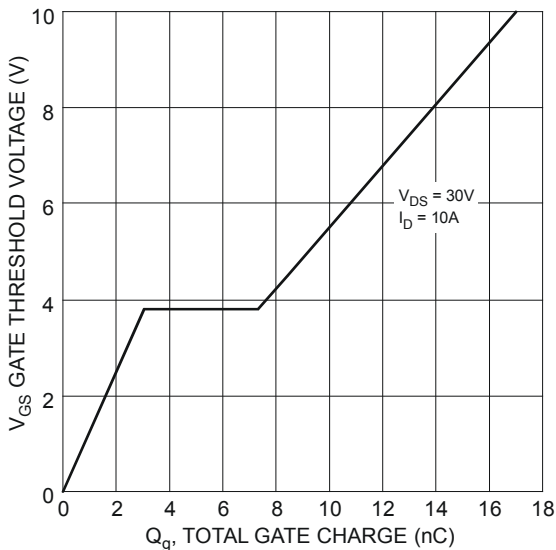


Figure 11 Gate Charge

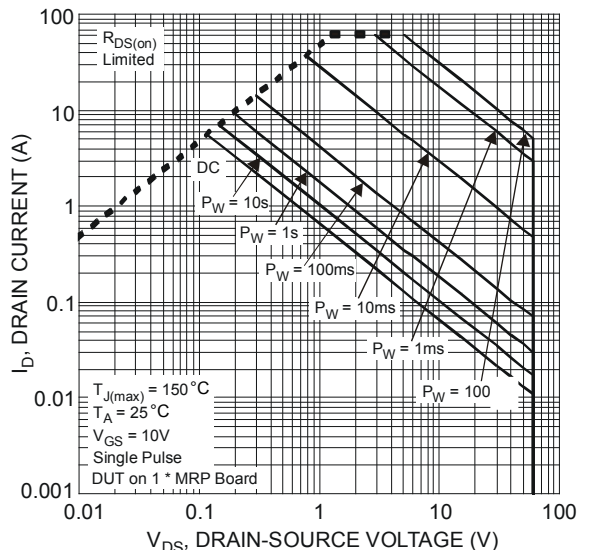
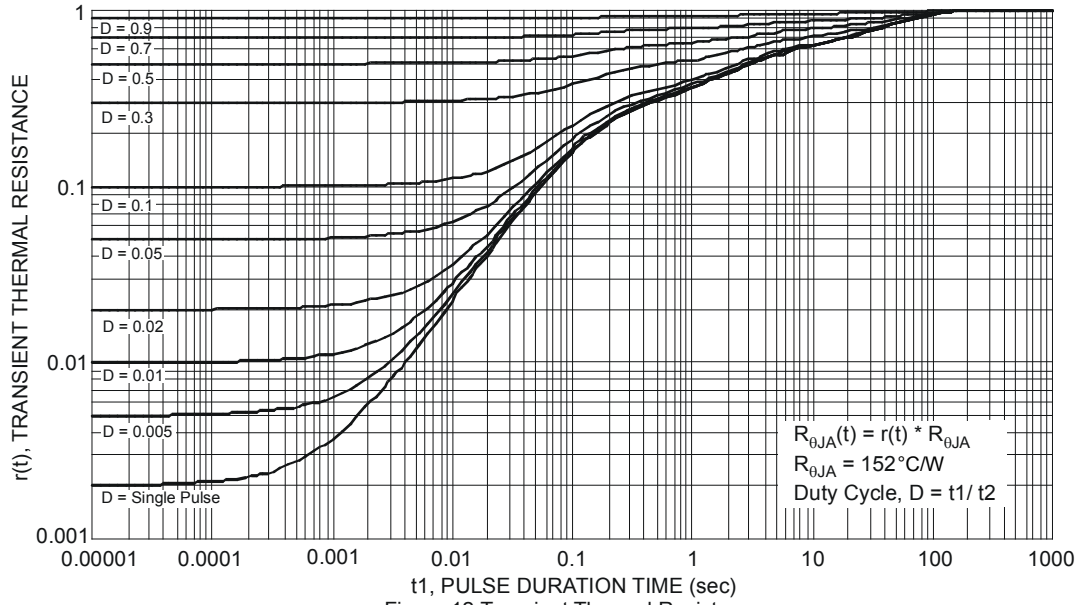


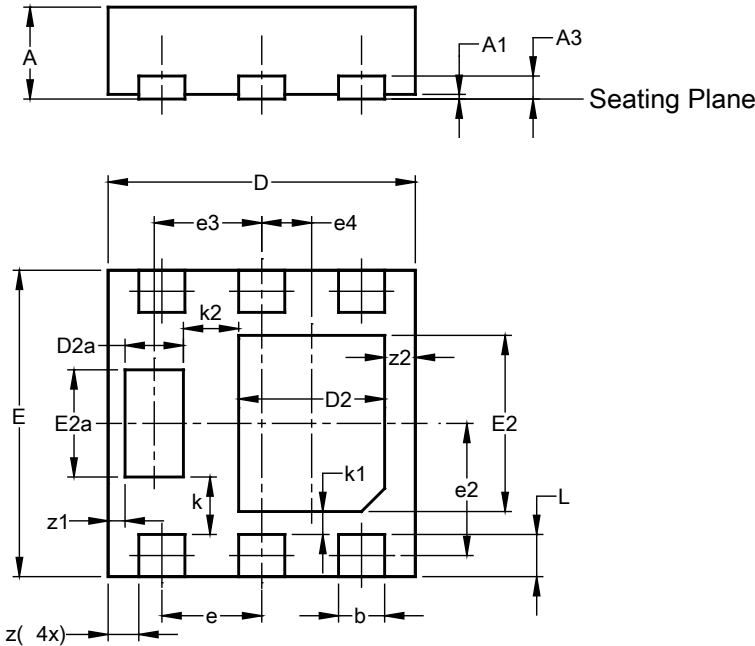
Figure 12 SOA, Safe Operation Area



Package Outline Dimensions

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

U-DFN2020-6 (Type F)

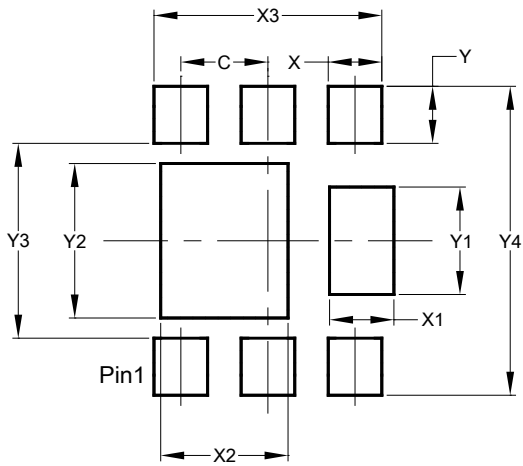


U-DFN2020-6 (Type F)			
Dim	Min	Max	Typ
A	0.57	0.63	0.60
A1	0.00	0.05	0.03
A3	-	-	0.15
b	0.25	0.35	0.30
D	1.95	2.05	2.00
D2	0.85	1.05	0.95
D2a	0.33	0.43	0.38
E	1.95	2.05	2.00
E2	1.05	1.25	1.15
E2a	0.65	0.75	0.70
e	0.65 BSC		
e2	0.863 BSC		
e3	0.70 BSC		
e4	0.325 BSC		
k	0.37 BSC		
k1	0.15 BSC		
k2	0.36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