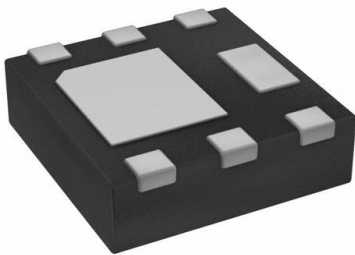


DMN3021LFDF-7 Datasheet

www.digi-electronics.com



<https://www.DiGi-Electronics.com>

DiGi Electronics Part Number	DMN3021LFDF-7-DG
Manufacturer	Diodes Incorporated
Manufacturer Product Number	DMN3021LFDF-7
Description	MOSFET N-CH 30V 11.8A 6UDFN
Detailed Description	N-Channel 30 V 11.8A (Ta) 2.03W (Ta) Surface Mount U-DFN2020-6 (Type F)



Tel: +00 852-30501935

RFQ Email: Info@DiGi-Electronics.com

DiGi is a global authorized distributor of electronic components.

Purchase and inquiry

Manufacturer Product Number:

DMN3021LFDF-7

Series:

-

FET Type:

N-Channel

Drain to Source Voltage (Vdss):

30 V

Drive Voltage (Max Rds On, Min Rds On):

4.5V, 10V

Vgs(th) (Max) @ Id:

2.2V @ 250µA

Vgs (Max):

±20V

FET Feature:

-

Operating Temperature:

-55°C ~ 150°C (Tj)

Supplier Device Package:

U-DFN2020-6 (Type F)

Base Product Number:

DMN3021

Manufacturer:

Diodes Incorporated

Product Status:

Active

Technology:

MOSFET (Metal Oxide)

Current - Continuous Drain (Id) @ 25°C:

11.8A (Ta)

Rds On (Max) @ Id, Vgs:

15mOhm @ 7A, 10V

Gate Charge (Qg) (Max) @ Vgs:

14 nC @ 10 V

Input Capacitance (Ciss) (Max) @ Vds:

706 pF @ 15 V

Power Dissipation (Max):

2.03W (Ta)

Mounting Type:

Surface Mount

Package / Case:

6-UDFN Exposed Pad

Environmental & Export classification

RoHS Status:

ROHS3 Compliant

REACH Status:

REACH Unaffected

HTSUS:

8541.29.0095

Moisture Sensitivity Level (MSL):

1 (Unlimited)

ECCN:

EAR99

Product Summary

BV _{DSS}	R _{DS(ON)} Max	I _D Max T _A = +25°C
30V	15mΩ @ V _{GS} = 10V	9.3A
	20mΩ @ V _{GS} = 4.5V	8.1A

Description


This 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.

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

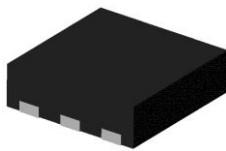
Features

- 0.6mm Profile – Ideal for Low Profile Applications
- PCB Footprint of 4mm²
- Low Gate Threshold Voltage
- Fast Switching Speed
- **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@diodes.com) or your local Diodes representative. <https://www.diodes.com/quality/product-definitions/>**

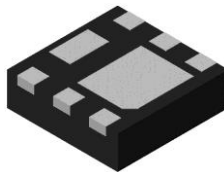
Mechanical Data

- 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)

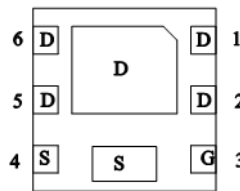
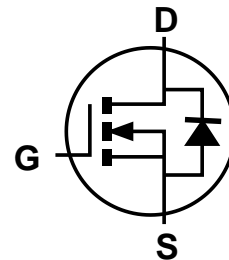
U-DFN2020-6 (Type F)



Top View



Bottom View

Pin Out
Bottom View

Internal Schematic

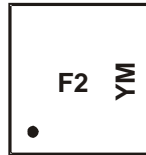
Ordering Information (Note 4)

Part Number	Case	Packaging
DMN3021LFDF-7	U-DFN2020-6 (Type F)	3,000/Tape & Reel
DMN3021LFDF-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



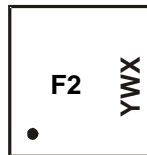
F2 = Product Type Marking Code
 YM = Date Code Marking
 Y = Year (ex: H = 2020)
 M = Month (ex: 9 = September)

Date Code Key

Year	2015	...	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029
Code	C	...	H	I	J	K	L	M	N	O	P	R

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



F2 = 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	2015	...	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029
Code	5	...	0	1	2	3	4	5	6	7	8	9

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



DMN3021LDF

Maximum Ratings (@T_A = +25°C, unless otherwise specified.)

Characteristic		Symbol	Value	Unit	
Drain-Source Voltage		V _{DSS}	30	V	
Gate-Source Voltage		V _{GSS}	±20	V	
Continuous Drain Current (Note 6) V _{GS} = 10V	Steady State	I _D	T _A = +25°C T _A = +70°C	9.3 7.5	A
	t < 5s		T _A = +25°C T _A = +70°C	11.8 9.4	A
Pulsed Drain Current (380µs Pulse, Duty Cycle = 1%)		I _{DM}	50	A	
Maximum Continuous Drain-Source Diode Forward Current (Note 6)		I _S	1.8	A	
Avalanche Current (Note 7) L = 0.1mH		I _{AS}	18	A	
Avalanche Energy (Note 7) L = 0.1mH		E _{AS}	16	mJ	

Thermal Characteristics

Characteristic		Symbol	Value	Unit
Total Power Dissipation (Note 5)	T _A = +25°C	P _D	0.73	W
	T _A = +70°C		0.47	
Thermal Resistance, Junction to Ambient (Note 5)	Steady State	R _{θJA}	174	°C/W
	t < 5s		112	
Total Power Dissipation (Note 6)	T _A = +25°C	P _D	2.03	W
	T _A = +70°C		1.30	
Thermal Resistance, Junction to Ambient (Note 6)	Steady State	R _{θJA}	64	°C/W
	t < 5s		40	
Thermal Resistance, Junction to Case (Note 6)	Steady State	R _{θJC}	13	
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}	30	—	—	V	V _{GS} = 0V, I _D = 250µA
Zero Gate Voltage Drain Current T _J = +25°C	I _{DSS}	—	—	1	µA	V _{DS} = 30V, 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	—	2.2	V	V _{DS} = V _{GS} , I _D = 250µA
Static Drain-Source On-Resistance	R _{DS(ON)}	—	—	15	mΩ	V _{GS} = 10V, I _D = 7A
			—	20		V _{GS} = 4.5V, I _D = 7A
Diode Forward Voltage	V _{SD}	—	0.8	1.2	V	V _{GS} = 0V, I _S = 2.2A
DYNAMIC CHARACTERISTICS (Note 9)						
Input Capacitance	C _{ISS}	—	706	—	pF	V _{DS} = 15V, V _{GS} = 0V, f = 1.0MHz
Output Capacitance	C _{OSS}	—	112	—		
Reverse Transfer Capacitance	C _{RSS}	—	81	—		
Gate Resistance	R _G	—	2.6	—	Ω	V _{DS} = 0V, V _{GS} = 0V, f = 1MHz
Total Gate Charge (V _{GS} = 10V)	Q _G	—	14	—	nC	V _{DS} = 15V, I _D = 5A
Total Gate Charge (V _{GS} = 4.5V)	Q _G	—	6.7	—		
Gate-Source Charge	Q _{GS}	—	1.9	—		
Gate-Drain Charge	Q _{GD}	—	2.5	—		
Turn-On Delay Time	t _{D(ON)}	—	5.4	—	ns	V _{DS} = 15V, V _{GS} = 4.5V, R _G = 1.7Ω, I _D = 5A
Turn-On Rise Time	t _R	—	6.8	—		
Turn-Off Delay Time	t _{D(OFF)}	—	9.7	—		
Turn-Off Fall Time	t _F	—	4.7	—		

- 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_{AS} and E_{AS} ratings 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.



DMN3021LFDF

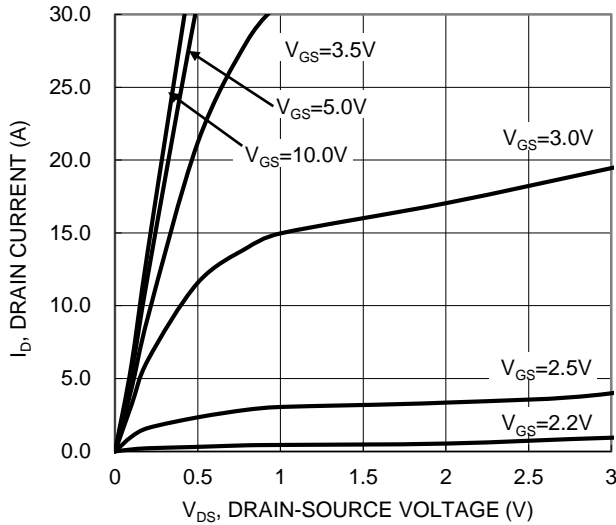


Figure 1. Typical Output Characteristic

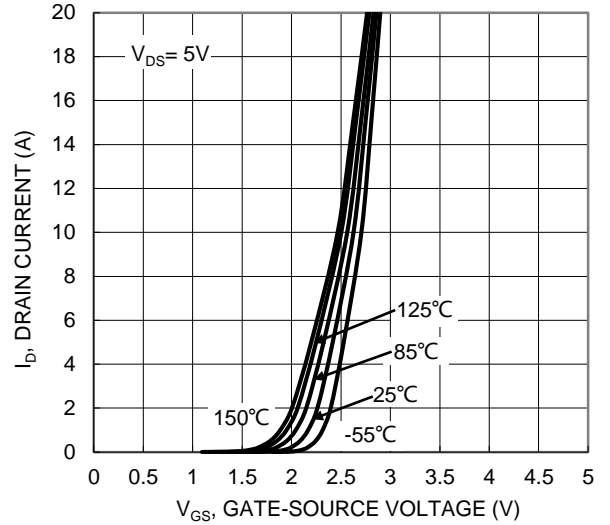


Figure 2. Typical Transfer Characteristic

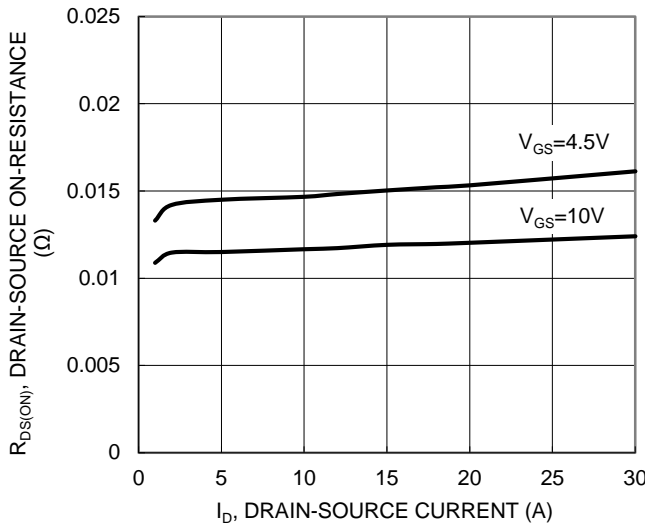


Figure 3. Typical On-Resistance vs. Drain Current and Gate Voltage

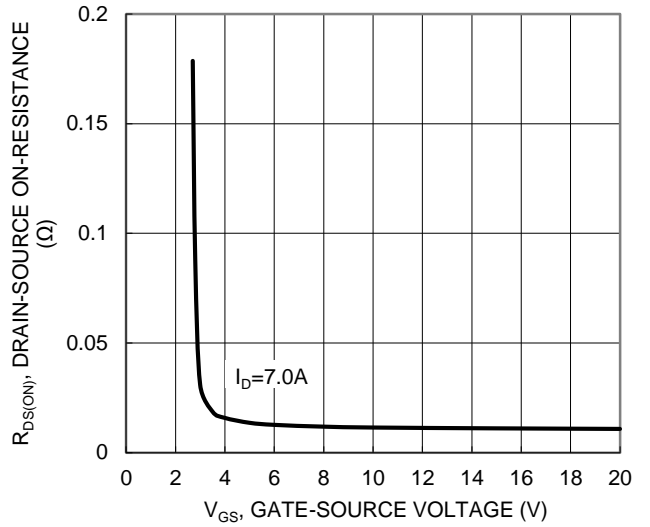


Figure 4. Typical Transfer Characteristic

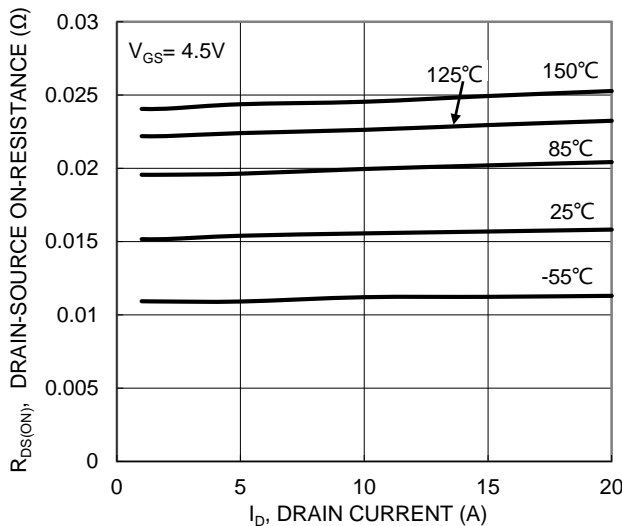


Figure 5. Typical On-Resistance vs. Drain Current and Temperature

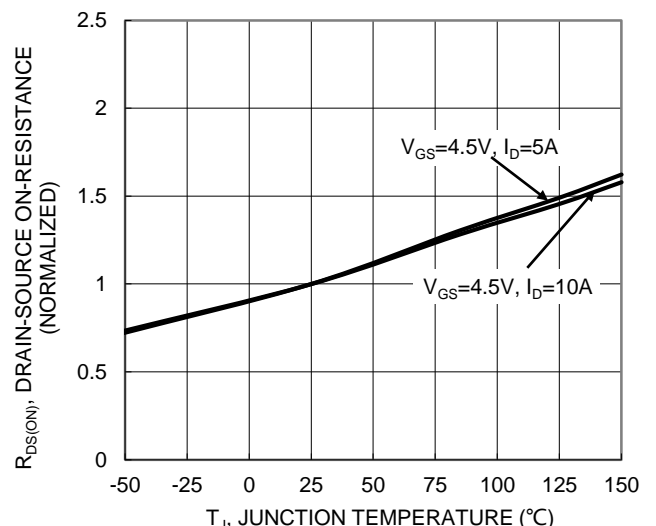


Figure 6. On-Resistance Variation with Temperature



DMN3021LDF

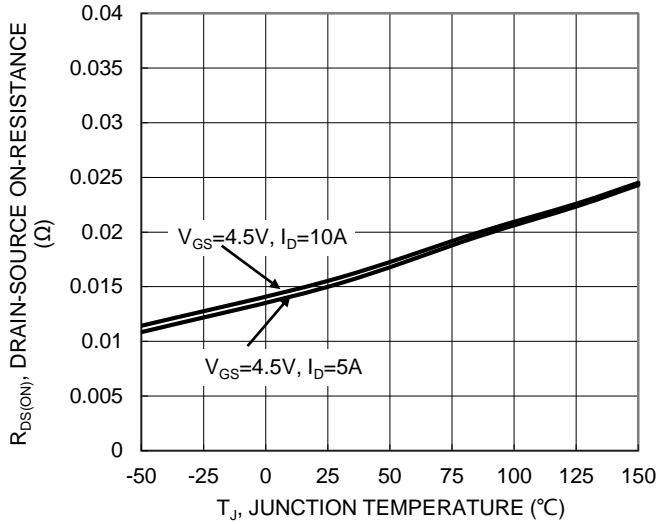


Figure 7. On-Resistance Variation with Temperature

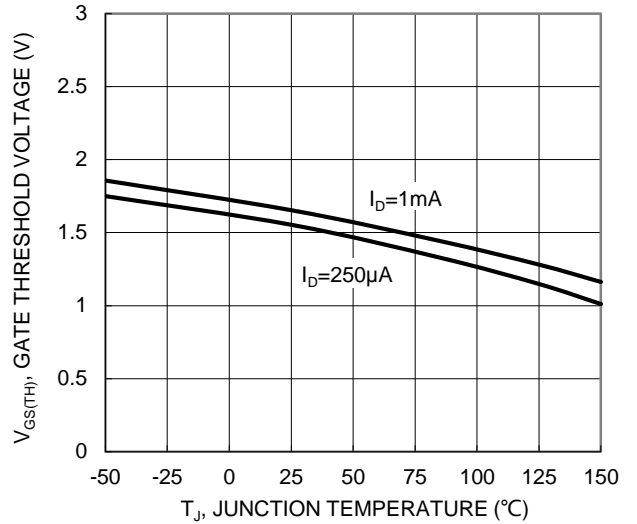


Figure 8. Gate Threshold Variation vs. Junction Temperature

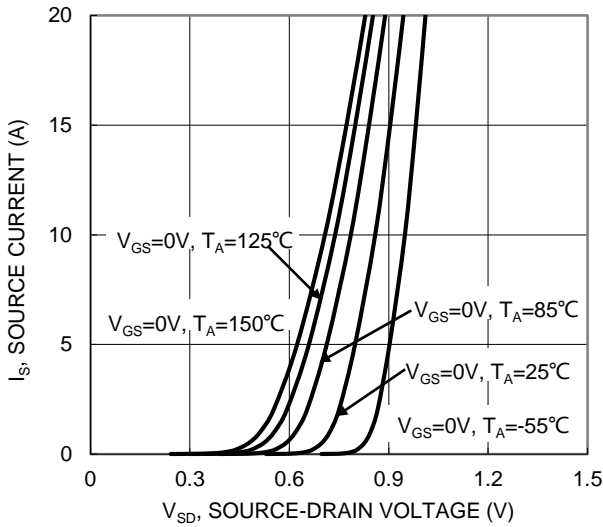


Figure 9. Diode Forward Voltage vs. Current

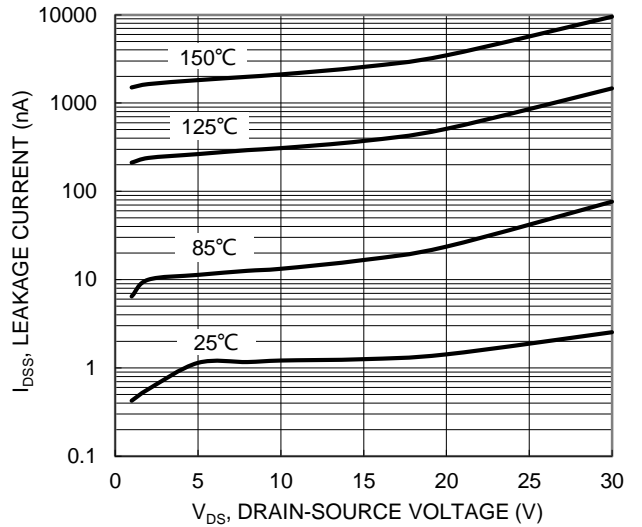


Figure 10. Typical Drain-Source Leakage Current vs. Voltage

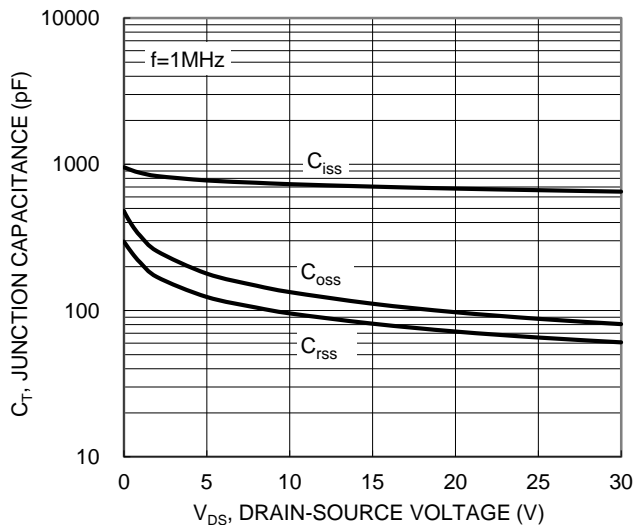


Figure 11. Typical Junction Capacitance

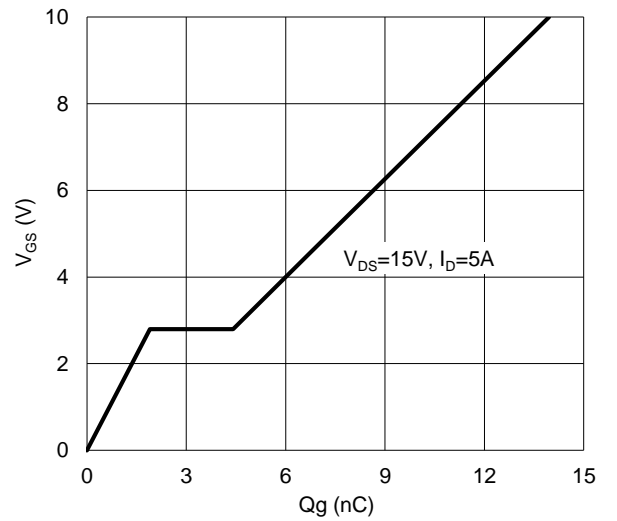


Figure 12. Gate Charge



DMN3021LFDF

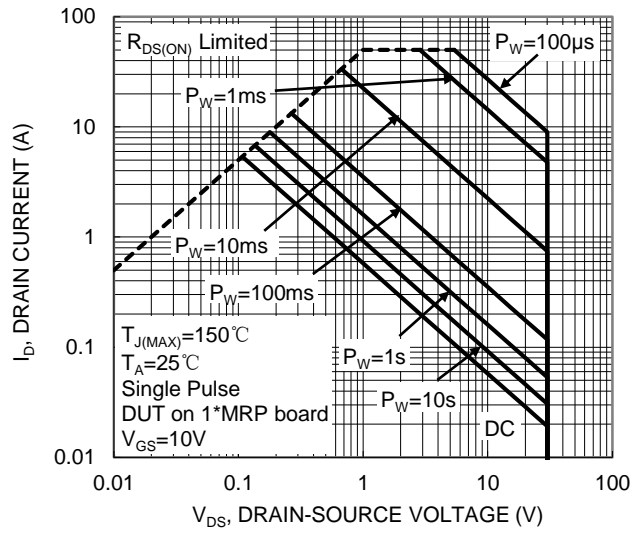


Figure 13. SOA, Safe Operation Area

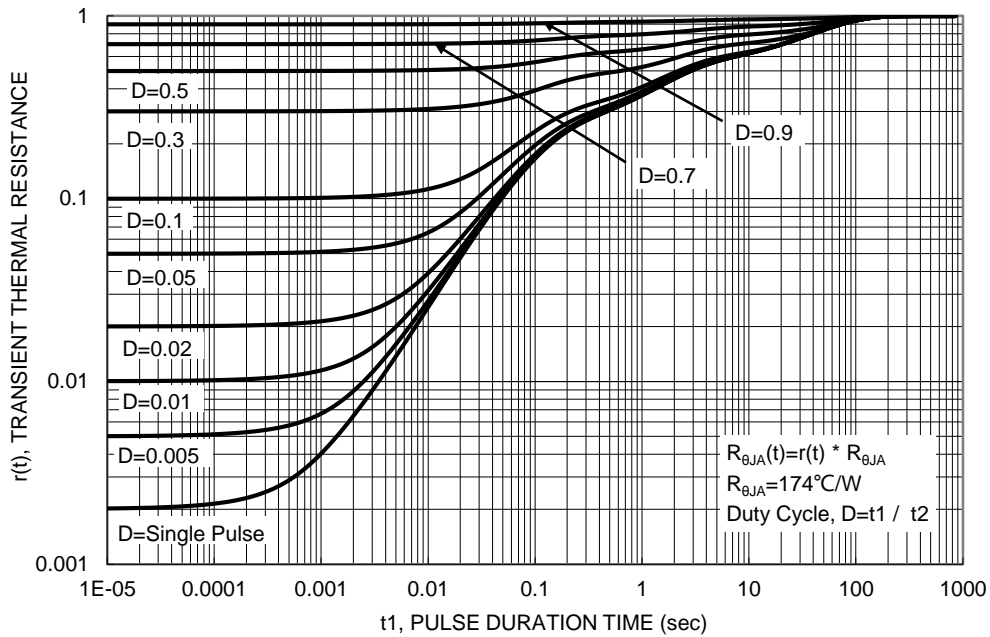
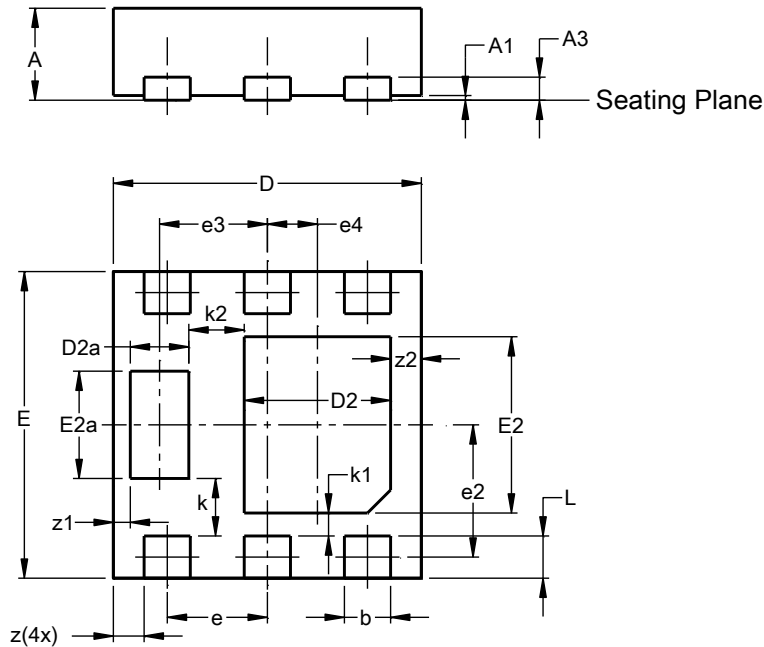


Figure 14. Transient Thermal Resistance

Package Outline Dimensions

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

U-DFN2020-6 (Type F)

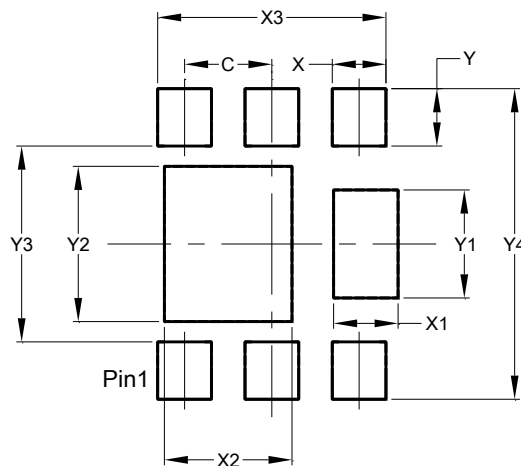


U-DFN2020-6 (Type F)			
Dim	Min	Max	Typ
A	0.57	0.63	0.60
A1	0.00	0.05	0.03
A3	-	-	0.15
b	0.25	0.35	0.30
D	1.95	2.05	2.00
D2	0.85	1.05	0.95
D2a	0.33	0.43	0.38
E	1.95	2.05	2.00
E2	1.05	1.25	1.15
E2a	0.65	0.75	0.70
e	0.65 BSC		
e2	0.863 BSC		
e3	0.70 BSC		
e4	0.325 BSC		
k	0.37 BSC		
k1	0.15 BSC		
k2	0.36 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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2. support or sustain life and whose failure to perform when properly used in accordance with instructions for use provided in the labeling can be reasonably expected to result in significant injury to the user.

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