

Product Summary

BV _{DSS}	R _{DS(ON)} Max	Package	I _D Max T _A = +25°C
12V	10mΩ @ V _{GS} = 4.5V	U-DFN2020-6 (Type E)	11A
	12mΩ @ V _{GS} = 2.5V		10
	14mΩ @ V _{GS} = 1.8V		9A
	18mΩ @ V _{GS} = 1.5V		8A
	41mΩ @ V _{GS} = 1.2V		5A

Description

This new generation MOSFET has been 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

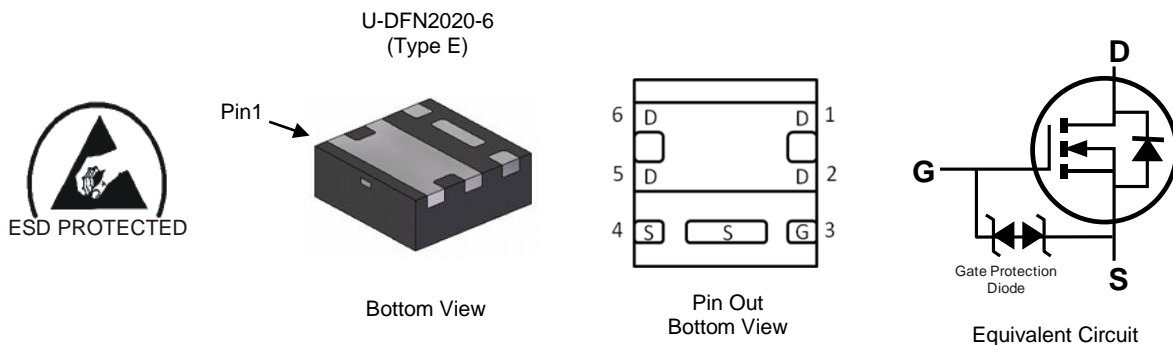
- Load Switching
- Battery Management Application
- Power Management Functions

Features

- 0.6mm Profile – Ideal for Low Profile Applications
- PCB Footprint of 4mm²
- Low Gate Threshold Voltage
- Fast Switching Speed
- ESD Protected Gate
- **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 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/>**

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 **(e4)**
- Weight: 0.008 grams (Approximate)



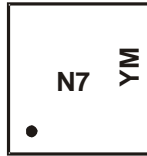
Ordering Information (Note 4)

Part Number	Marking	Reel Size (inches)	Quantity Per Reel
DMN1019UFDE-7	N7	7	3,000

- 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



N7 = Product Type Marking Code
 YM = Date Code Marking
 Y = Year (ex: H = 2020)
 M = Month (ex: 9 = September)

Date Code Key

Year	2011	...	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029
Code	Y	...	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



N7 = 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	2011	...	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029
Code	1	...	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					

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

Characteristic			Symbol	Value	Unit
Drain-Source Voltage			V _{DSS}	12	V
Gate-Source Voltage			V _{GSS}	±8	V
Continuous Drain Current (Note 5) V _{GS} = 4.5V	Steady State	T _A = +25°C T _A = +70°C	I _D	11 9	A
	t < 5s	T _A = +25°C T _A = +70°C	I _D	14 11	A
Maximum Continuous Body Diode Current			I _S	3.0	A
Pulsed Drain Current (10µs Pulse, Duty Cycle = 1%)			I _{DM}	100	A

Thermal Characteristics

Characteristic			Symbol	Value	Unit
Total Power Dissipation (Note 5)	T _A = +25°C		P _D	0.69	W
	T _A = +70°C			0.44	
Thermal Resistance, Junction to Ambient (Note 5)	Steady State		R _{θJA}	182	°C/W
	t < 5s			118	
Total Power Dissipation (Note 6)	T _A = +25°C		P _D	2.17	W
	T _A = +70°C			1.38	
Thermal Resistance, Junction to Ambient (Note 6)	Steady State		R _{θJA}	58	°C/W
	t < 5s			38	
Thermal Resistance, Junction to Case (Note 6)			R _{θJC}	10	
Operating and Storage Temperature Range			T _J , T _{STG}	-55 to +150	°C

- Notes: 5. Device mounted on FR-4 PC board, with minimum recommended pad layout, single sided.
6. Device mounted on FR-4 substrate PC board, 2oz copper, with thermal bias to bottom layer 1inch square copper plate.

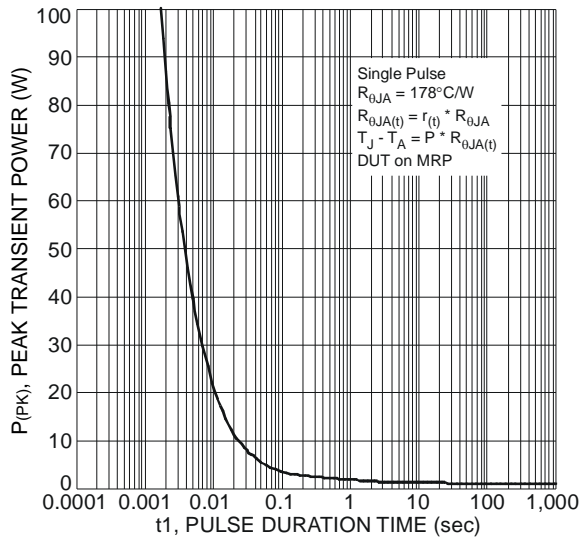


Fig. 1 Single Pulse Maximum Power Dissipation

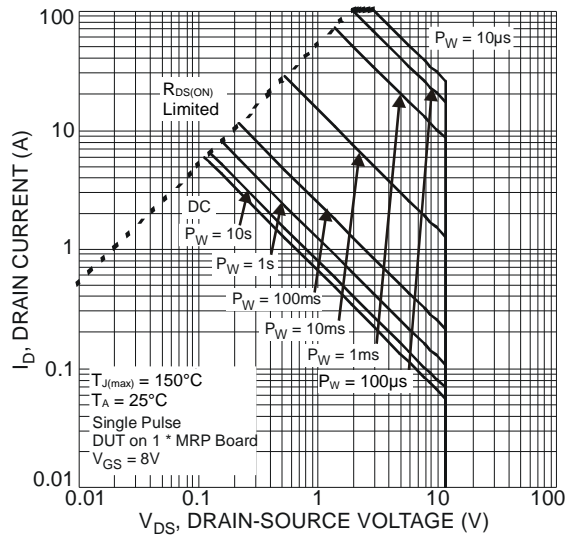


Fig. 2 SOA, Safe Operation Area

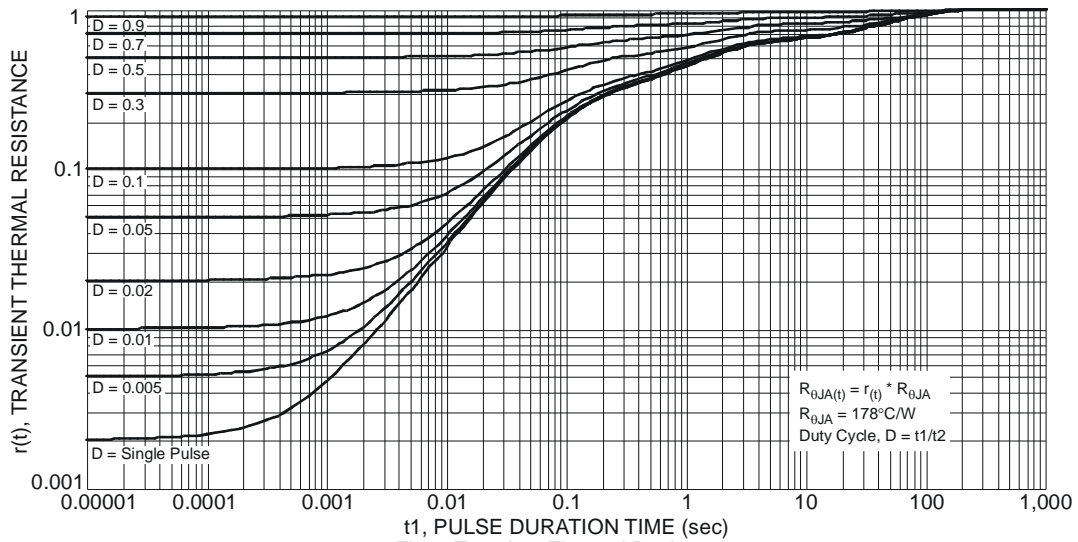


Fig. 3 Transient Thermal Resistance

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

Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
OFF CHARACTERISTICS (Note 7)						
Drain-Source Breakdown Voltage	BV _{DSS}	12	—	—	V	V _{GS} = 0V, I _D = 250μA
Zero Gate Voltage Drain Current T _J = +25°C	I _{DSS}	—	—	1	μA	V _{DS} = 12V, V _{GS} = 0V
Gate-Source Leakage	I _{GSS}	—	—	±2	μA	V _{GS} = ±8V, V _{DS} = 0V
ON CHARACTERISTICS (Note 7)						
Gate Threshold Voltage	V _{GS(TH)}	0.35	—	0.8	V	V _{DS} = V _{GS} , I _D = 250μA
Static Drain-Source On-Resistance	R _{DS(ON)}	—	7	10	mΩ	V _{GS} = 4.5V, I _D = 9.7A
			8	12		V _{GS} = 2.5V, I _D = 9A
			10	14		V _{GS} = 1.8V, I _D = 8.1A
			14	18		V _{GS} = 1.5V, I _D = 4.5A
			28	41		V _{GS} = 1.2V, I _D = 2.4A
Forward Transfer Admittance	Y _{fs}	—	28	—	S	V _{DS} = 4V, I _D = 9.7A
Diode Forward Voltage	V _{SD}	—	0.8	1.2	V	V _{GS} = 0V, I _S = 10A
DYNAMIC CHARACTERISTICS (Note 8)						
Input Capacitance	C _{iss}	—	2425	—	pF	V _{DS} = 10V, V _{GS} = 0V, f = 1.0MHz
Output Capacitance	C _{oss}	—	396	—		
Reverse Transfer Capacitance	C _{rss}	—	375	—		
Gate Resistance	R _g	—	1.1	—	Ω	V _{DS} = 0V, V _{GS} = 0V, f = 1MHz
Total Gate Charge (V _{GS} = 8V)	Q _g	—	50.6	—	nC	V _{DS} = 4V, I _D = 10A
Total Gate Charge (V _{GS} = 4.5V)	Q _g	—	27.3	—		
Gate-Source Charge	Q _{gs}	—	3.4	—		
Gate-Drain Charge	Q _{gd}	—	5.2	—		
Turn-On Delay Time	t _{D(ON)}	—	7.6	—	ns	V _{DD} = 4V, V _{GS} = 5V, I _D = 10A R _G = 1Ω, R _L = 0.4Ω
Turn-On Rise Time	t _R	—	22.2	—		
Turn-Off Delay Time	t _{D(OFF)}	—	57.6	—		
Turn-Off Fall Time	t _F	—	16.8	—		

Notes: 7. Short duration pulse test used to minimize self-heating effect.
8. Guaranteed by design. Not subject to production testing.

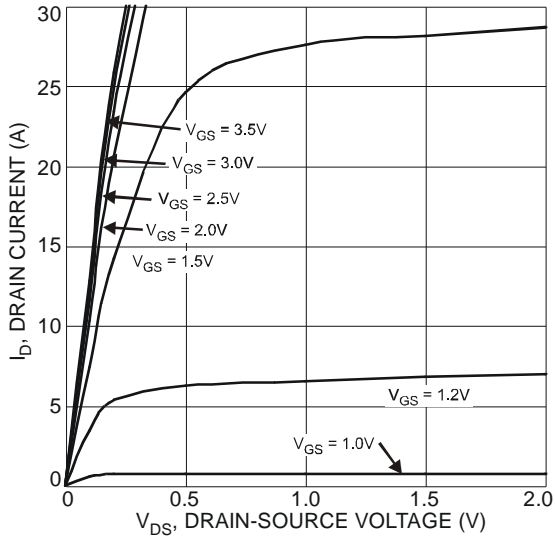


Fig. 4 Typical Output Characteristic

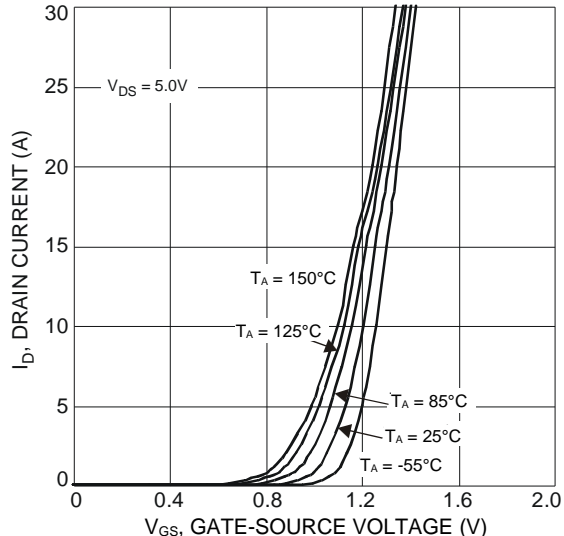


Fig. 5 Typical Transfer Characteristics

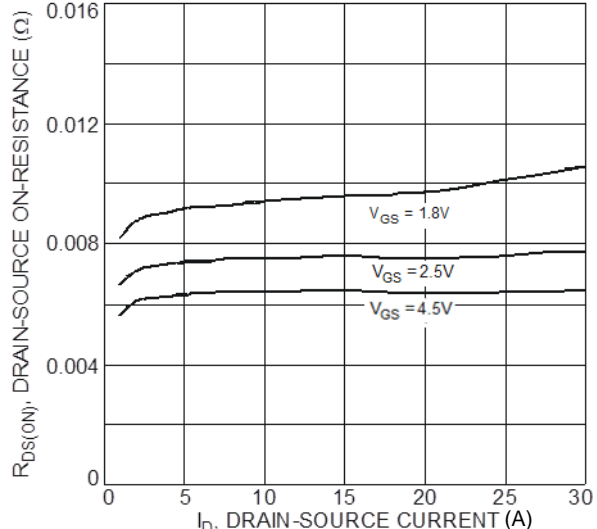


Fig. 6 Typical On-Resistance vs. Drain Current and Gate Voltage

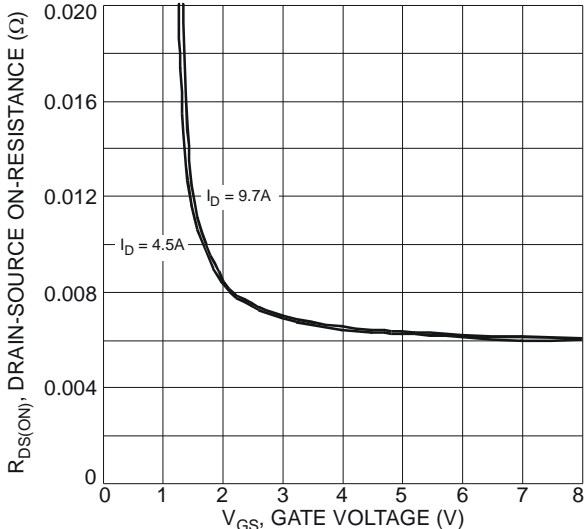


Fig. 7 Typical On-Resistance vs. Gate Voltage

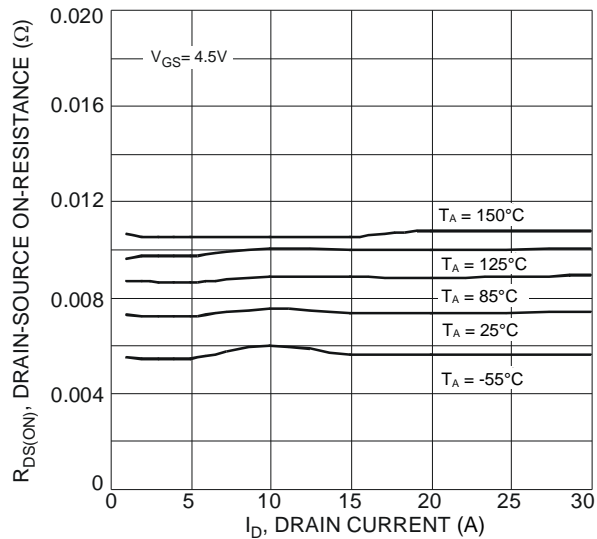


Fig. 8 Typical On-Resistance vs. Drain Current and Temperature

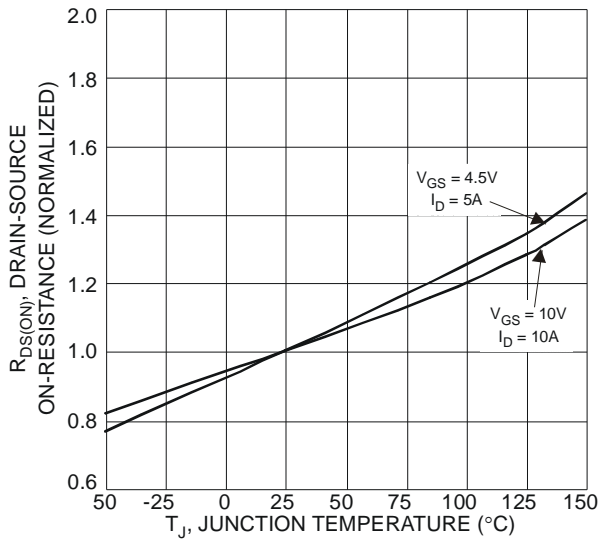


Fig. 9 On-Resistance Variation with Temperature

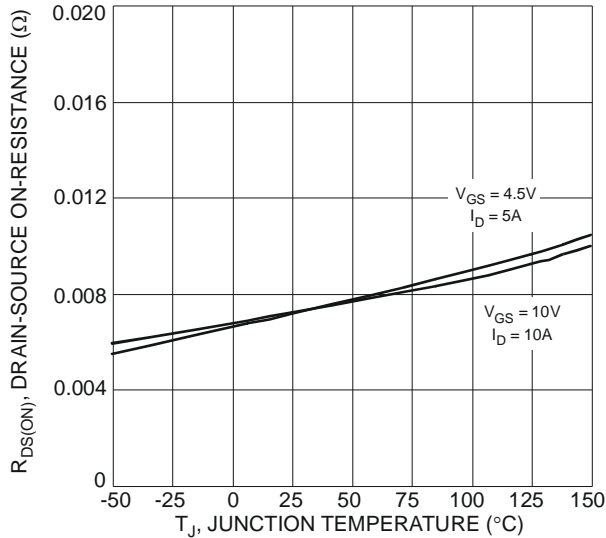


Fig. 10 On-Resistance Variation with Temperature

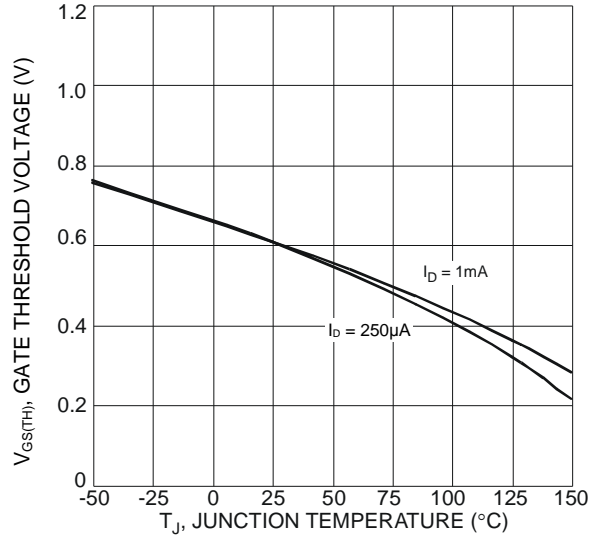


Fig. 11 Gate Threshold Variation vs. Junction Temperature

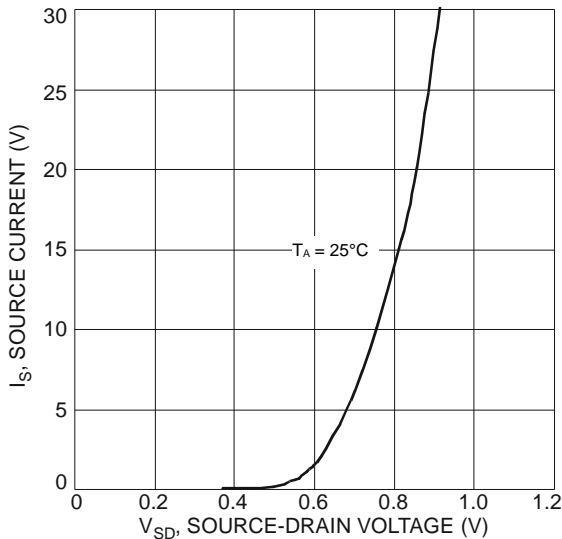


Fig. 12 Diode Forward Voltage vs. Current

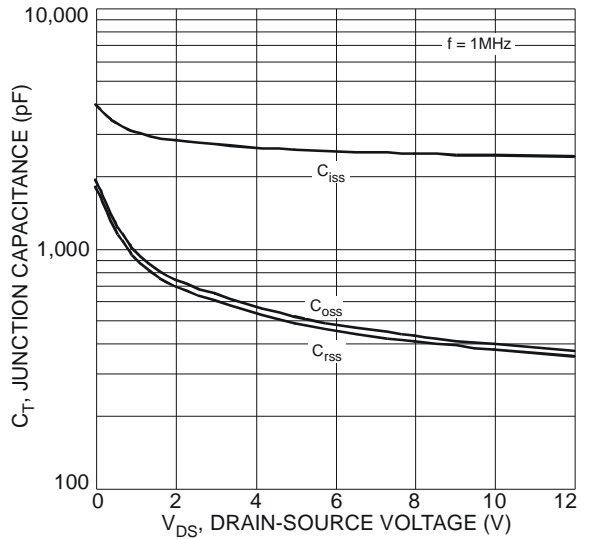


Fig. 13 Typical Junction Capacitance

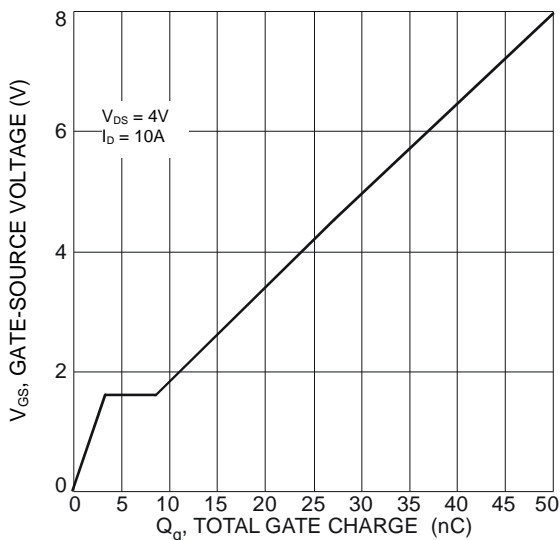
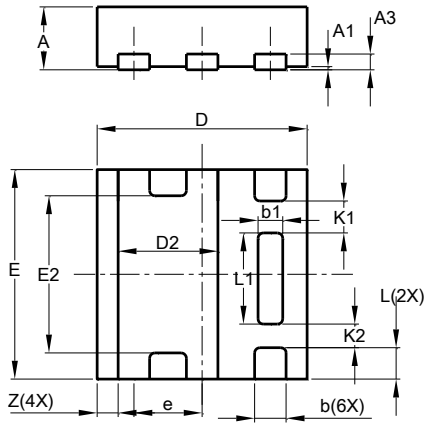


Fig. 14 Gate Charge

Package Outline Dimensions

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

U-DFN2020-6 (Type E)

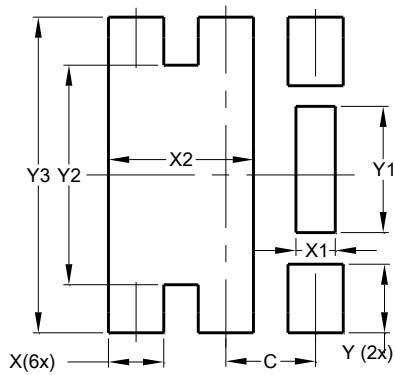


U-DFN2020-6 Type E			
Dim	Min	Max	Typ
A	0.57	0.63	0.60
A1	0	0.05	0.03
A3	-	-	0.15
b	0.25	0.35	0.30
b1	0.185	0.285	0.235
D	1.95	2.05	2.00
D2	0.85	1.05	0.95
E	1.95	2.05	2.00
E2	1.40	1.60	1.50
e	-	-	0.65
L	0.25	0.35	0.30
L1	0.82	0.92	0.87
K1	-	-	0.305
K2	-	-	0.225
Z	-	-	0.20
All Dimensions in mm			

Suggested Pad Layout

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

U-DFN2020-6 (Type E)



Dimensions	Value (in mm)
C	0.650
X	0.400
X1	0.285
X2	1.050
Y	0.500
Y1	0.920
Y2	1.600
Y3	2.300

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