

## Product Summary

BV <sub>DSS</sub>	R <sub>DS(ON)</sub> MAX	I <sub>D</sub> MAX T <sub>A</sub> = +25°C
-30V	25mΩ @ V <sub>GS</sub> = -10V	-6.8A
	38mΩ @ V <sub>GS</sub> = -4.5V	-5.0A

## Description

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

## Applications

- DC-DC Converters
- Power Management Functions
- Load Switch

## Features

- Low Input Capacitance
- Low On-Resistance
- 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 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/>

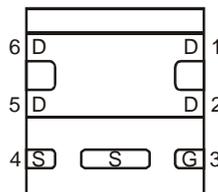
## Mechanical Data

- 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
- Terminal Connections: See Diagram
- Terminals: Finish – Matte Tin Annealed over Copper Leadframe. Solderable per MIL-STD-202, Method 208 (E3)
- Weight: 0.0065 grams (Approximate)

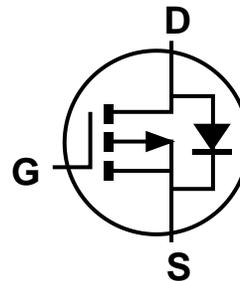
U-DFN2020-6 (Type E)



Bottom View



Pin Out  
Bottom View



Equivalent Circuit

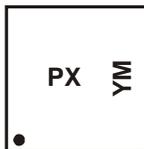
## Ordering Information (Note 4)

Part Number	Case	Packaging
DMP3028LFDE-7	U-DFN2020-6 (Type E)	3,000/Tape & Reel
DMP3028LFDE-13	U-DFN2020-6 (Type E)	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**

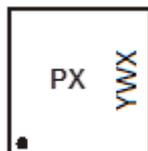


PX = Product Type Marking Code  
 YM = Date Code Marking  
 Y = Year (ex: H = 2020)  
 M = Month (ex: 9 = September)

Date Code Key

<b>Year</b>	2012	...	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029
<b>Code</b>	Z	...	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**



PX= 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>	2012	...	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029
<b>Code</b>	2	...	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>	-30	V
Gate-Source Voltage			V <sub>GSS</sub>	±20	V
Continuous Drain Current (Note 6) V <sub>GS</sub> = -10V	Steady State	T <sub>A</sub> = +25°C T <sub>A</sub> = +70°C	I <sub>D</sub>	-6.8 -5.3	A
	t < 10s	T <sub>A</sub> = +25°C T <sub>A</sub> = +70°C	I <sub>D</sub>	-8.2 -6.6	A
Maximum Body Diode Forward Current (Note 6)			I <sub>S</sub>	-2.5	A
Pulsed Drain Current (10µs Pulse, Duty Cycle = 1%)			I <sub>DM</sub>	-40	A

**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>	0.66	W
	T <sub>A</sub> = +70°C		0.42	
Thermal Resistance, Junction to Ambient (Note 5)	Steady State	R <sub>θJA</sub>	189	°C/W
	t < 10s		125	
Total Power Dissipation (Note 6)	T <sub>A</sub> = +25°C	P <sub>D</sub>	2.03	W
	T <sub>A</sub> = +70°C		1.3	
Thermal Resistance, Junction to Ambient (Note 6)	Steady State	R <sub>θJA</sub>	61	°C/W
	t < 10s		41	
Thermal Resistance, Junction to Case (Note 6)		R <sub>θJC</sub>	9.3	
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 (Note 7)</b>						
Drain-Source Breakdown Voltage	BV <sub>DSS</sub>	-30	—	—	V	V <sub>GS</sub> = 0V, I <sub>D</sub> = -250µA
Zero Gate Voltage Drain Current	I <sub>DSS</sub>	—	—	-1	µA	V <sub>DS</sub> = -30V, V <sub>GS</sub> = 0V
Gate-Source Leakage	I <sub>GSS</sub>	—	—	±100	nA	V <sub>GS</sub> = ±20V, V <sub>DS</sub> = 0V
<b>ON CHARACTERISTICS (Note 7)</b>						
Gate Threshold Voltage	V <sub>GS(TH)</sub>	-1.2	—	-2.4	V	V <sub>DS</sub> = V <sub>GS</sub> , I <sub>D</sub> = -250µA
Static Drain-Source On-Resistance	R <sub>DS(ON)</sub>	—	20	25	mΩ	V <sub>GS</sub> = -10V, I <sub>D</sub> = -7A
		—	29	38		V <sub>GS</sub> = -4.5V, I <sub>D</sub> = -6.2A
Forward Transfer Admittance	Y <sub>fs</sub>	—	4.5	—	s	V <sub>DS</sub> = -5V, I <sub>D</sub> = -7A
Diode Forward Voltage	V <sub>SD</sub>	—	-0.7	-1.2	V	V <sub>GS</sub> = 0V, I <sub>S</sub> = -2.1A
On State Drain Current (Note 8)	I <sub>D(ON)</sub>	-20	—	—	A	V <sub>DS</sub> ≤ -5V, V <sub>GS</sub> = -4.5V
<b>DYNAMIC CHARACTERISTICS (Note 8)</b>						
Input Capacitance	C <sub>iss</sub>	—	1241	1860	pF	V <sub>DS</sub> = -15V, V <sub>GS</sub> = 0V f = 1.0MHz
Output Capacitance	C <sub>oss</sub>	—	147	220		
Reverse Transfer Capacitance	C <sub>rss</sub>	—	110	165		
Gate Resistance	R <sub>G</sub>	—	15	30	Ω	V <sub>DS</sub> = 0V, V <sub>GS</sub> = 0V, f = 1.0MHz
Total Gate Charge (V <sub>GS</sub> = -10V)	Q <sub>g</sub>	—	22	33	nC	V <sub>DS</sub> = -15V, I <sub>D</sub> = -7A
Total Gate Charge (V <sub>GS</sub> = -4.5V)	Q <sub>g</sub>	—	10.9	17		
Gate-Source Charge	Q <sub>gs</sub>	—	3.5	6		
Gate-Drain Charge	Q <sub>gd</sub>	—	4.7	8		
Turn-On Delay Time	t <sub>D(ON)</sub>	—	9.7	15	ns	V <sub>GS</sub> = -10V, V <sub>DD</sub> = -15V, R <sub>GEN</sub> = 6Ω, I <sub>D</sub> = -7A
Turn-On Rise Time	t <sub>R</sub>	—	17.1	26		
Turn-Off Delay Time	t <sub>D(OFF)</sub>	—	60.5	91		
Turn-Off Fall Time	t <sub>F</sub>	—	40.4	61		

- 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.
  - Short duration pulse test used to minimize self-heating effect.
  - Guaranteed by design. Not subject to product testing.

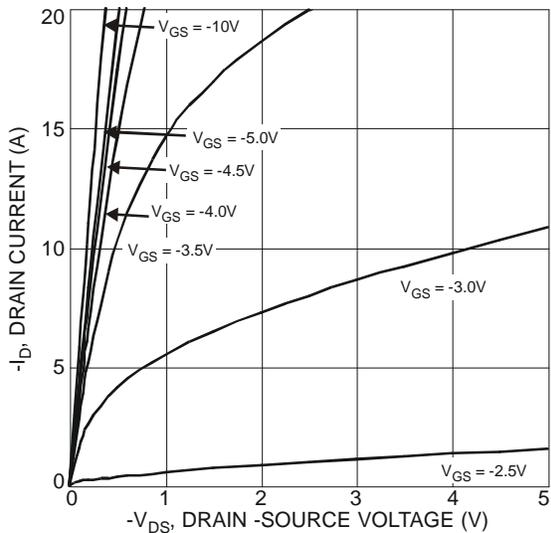


Figure 1 Typical Output Characteristics

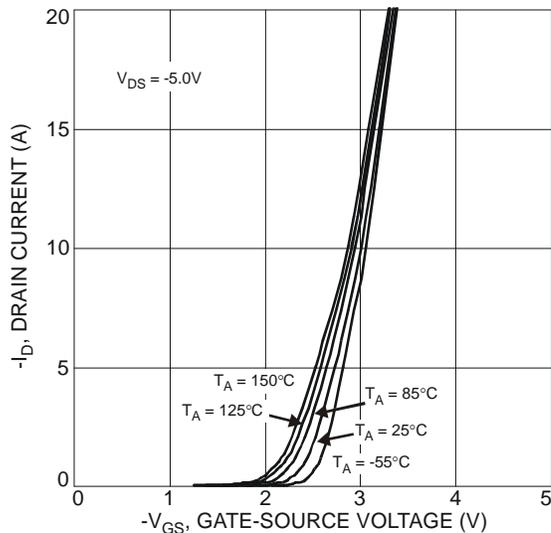


Figure 2 Typical Transfer Characteristics

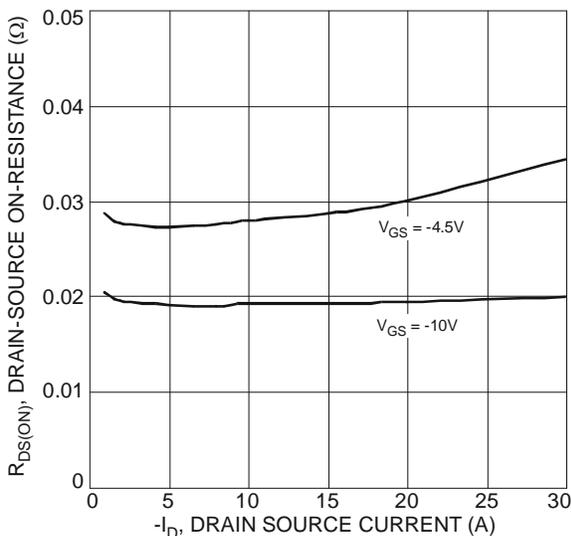


Figure 3 Typical On-Resistance vs. Drain Current and Gate Voltage

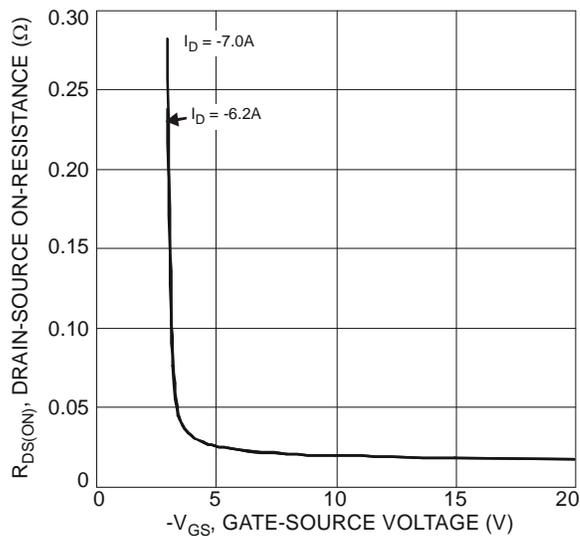


Figure 4 Typical Drain-Source On-Resistance vs. Gate-Source Voltage

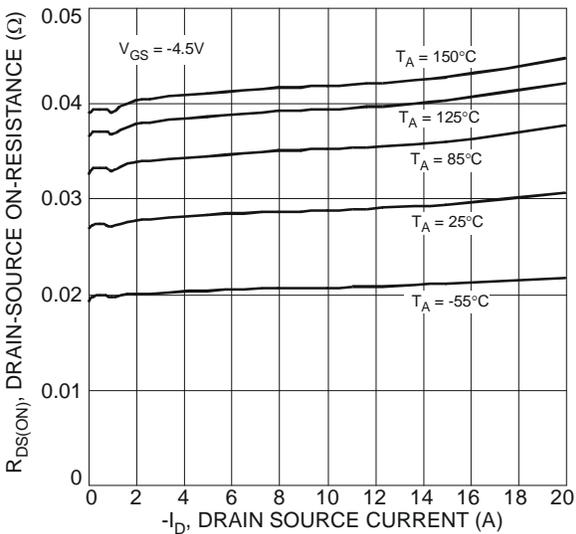


Figure 5 Typical On-Resistance vs. Drain Current and Temperature

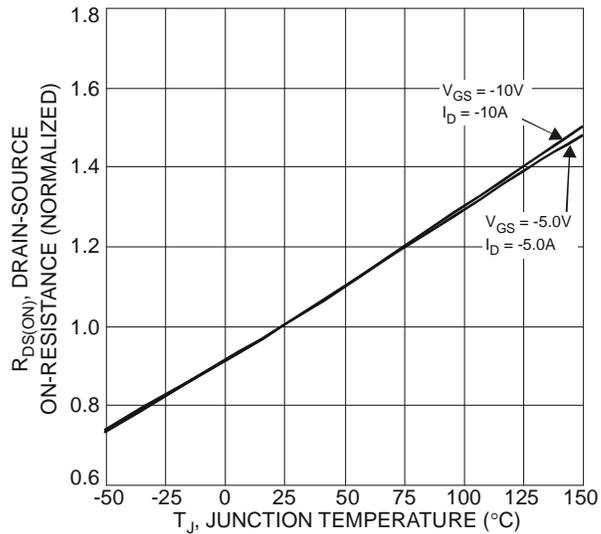


Figure 6 On-Resistance Variation with Temperature

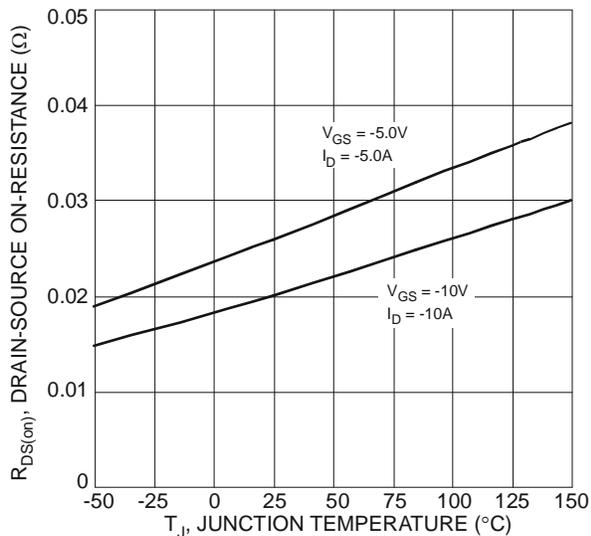


Figure 7 On-Resistance Variation with Temperature

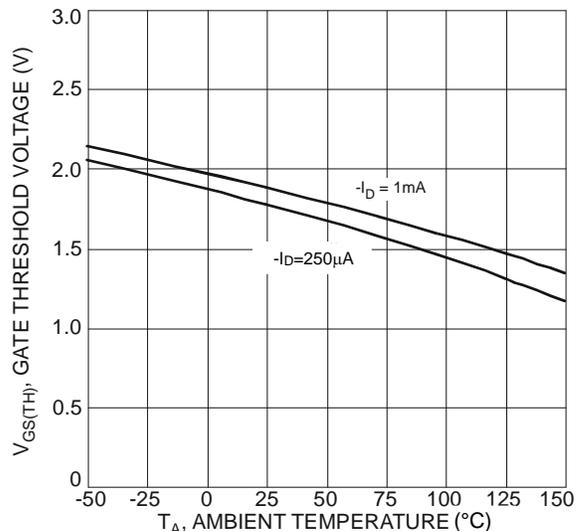


Figure 8 Gate Threshold Variation vs. Ambient Temperature

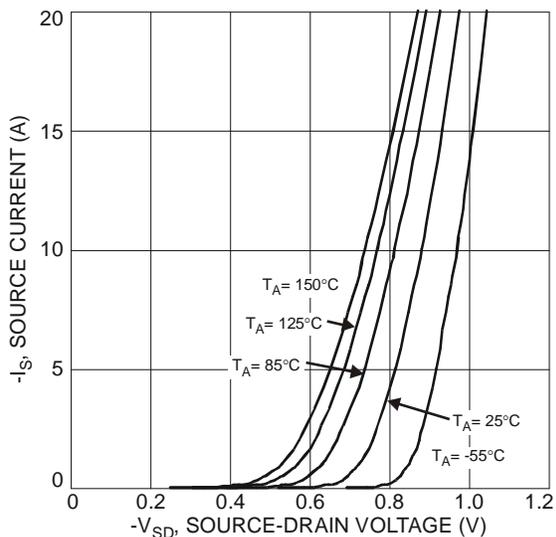


Figure 9 Diode Forward Voltage vs. Current

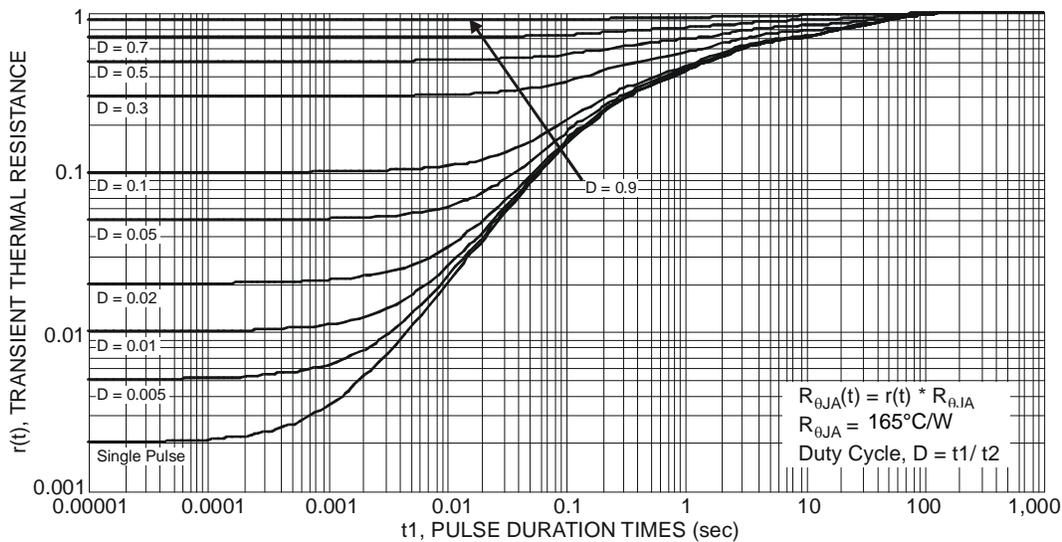
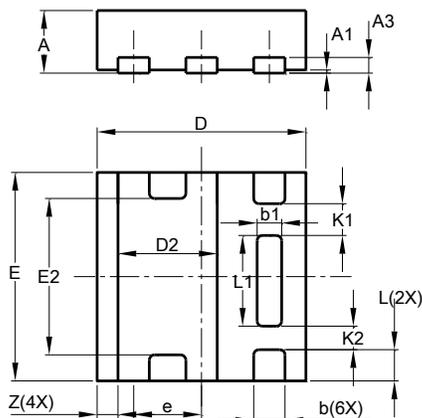


Figure 10 Transient Thermal Resistance

## Package Outline Dimensions

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

### U-DFN2020-6 (Type E)



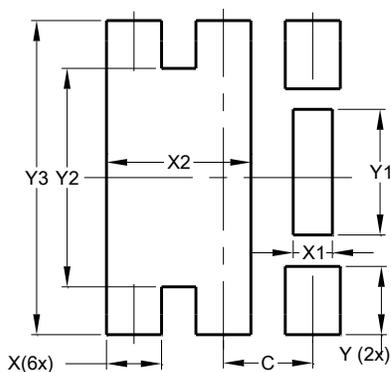
U-DFN2020-6 Type E			
Dim	Min	Max	Typ
A	0.57	0.63	0.60
A1	0	0.05	0.03
A3	-	-	0.15
b	0.25	0.35	0.30
b1	0.185	0.285	0.235
D	1.95	2.05	2.00
D2	0.85	1.05	0.95
E	1.95	2.05	2.00
E2	1.40	1.60	1.50
e	-	-	0.65
L	0.25	0.35	0.30
L1	0.82	0.92	0.87
K1	-	-	0.305
K2	-	-	0.225
Z	-	-	0.20

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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