



60V +175°C N-CHANNEL ENHANCEMENT MODE MOSFET

Product Summary

BV _{DSS}	R _{DS(ON)} Max	I _D Max T _A = +25°C
001/	18mΩ @ V _{GS} = 10V	9.4A
60V	27.5 m Ω @ V _{GS} = 4.5 V	7.6A

Features

- Rated to +175°C—Ideal for High Ambient Temperature Environments
- 100% Unclamped Inductive Switching (UIS) Test in Production:
 Ensures More Reliable and Robust End Application
- Low R_{DS(ON)}—Ensures On-State Losses Are Minimized
- 0.6mm Profile—Ideal for Low-Profile Applications
- PCB Footprint of 4mm²
- Sidewall Plated for Improved Optical Inspection
- Totally Lead-Free & Fully RoHS Compliant (Notes 1 & 2)
- Halogen- and Antimony-Free. "Green" Device (Note 3)
- The DMTH6016LFDFWQ is suitable for automotive applications requiring specific change control; this part is AEC-Q101 qualified, PPAP capable, and manufactured in IATF 16949 certified facilities.

https://www.diodes.com/quality/product-definitions/

Description

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

- Power Management Functions
- DC-DC Converters
- Backlighting

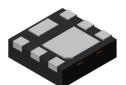
Mechanical Data

- 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
- Frame; Solderable per MIL-STD-202, Method 208
- Weight: 0.007 grams (Approximate)

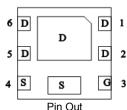
U-DFN2020-6 (SWP) (Type F)



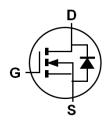




Bottom View



Pin Out Bottom View



Internal Schematic

Ordering Information (Note 4 & 5)

Part Number	Case	Quantity Per Reel
DMTH6016LFDFWQ-7	U-DFN2020-6 (SWP) (Type F)	3,000
DMTH6016LFDFWQ-7R	U-DFN2020-6 (SWP) (Type F)	3,000
DMTH6016LFDFWQ-13	U-DFN2020-6 (SWP) (Type F)	10,000
DMTH6016LFDFWQ-13R	U-DFN2020-6 (SWP) (Type F)	10,000

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. The options -7 and -7R stand for different taping orientations. Please refer to Diodes Incorporated's website at https://www.diodes.com for further details.
- 5. For packaging details, see https://www.diodes.com/design/support/packaging/diodes-packaging/



Marking Information



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

Date Code Key

Year	2	017	2018	20	19	2020	20:	21	2022	202	3	2024
Code		E	F	(G	Н			J	K		L
Month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Code	1	2	3	4	5	6	7	8	9	0	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	I _D	9.4 6.6	А	
Pulsed Drain Current (10µs Pulse, Duty Cycle = 1%)	·	I _{DM}	70	Α
Continuous Source-Drain Diode Current (Note 7)		Is	3.0	Α
Pulsed Source-Drain Diode Current (10µs Pulse, Duty Cycle	I _{SM}	70	Α	
Avalanche Current, L = 0.1mH	I _{AS}	15.3	Α	
Avalanche Energy, L = 0.1mH	E _{AS}	11.7	mJ	

Thermal Characteristics

Characteristic		Symbol	Value	Unit
Total Power Dissipation (Note 6)	T _A = +25°C	P_{D}	1.06	W
Thermal Resistance, Junction to Ambient (Note 6)		R _{0JA}	141	°C/W
Total Power Dissipation (Note 7)	P _D	2.3	W	
Thermal Resistance, Junction to Ambient (Note 7)		R _{0JA}	63	°C/W
Thermal Resistance, Junction to Case (Note 7)	T _C = +25°C	R _{0JC}	9.6	°C/W
Operating and Storage Temperature Range		T _J , T _{STG}	-55 to +175	°C

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 1inch square copper plate. Notes:

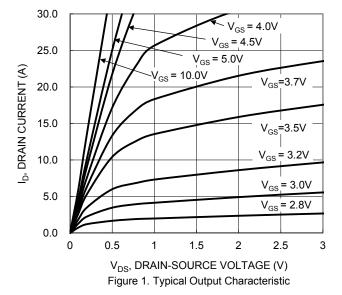


Electrical Characteristics (@ T_A = +25°C, unless otherwise specified.)

Characteristic	Symbol	Min	Тур	Max	Unit	Test Condition	
OFF CHARACTERISTICS (Note 8)							
Drain-Source Breakdown Voltage	BV _{DSS}	60	_	_	V	$V_{GS} = 0V, I_D = 250\mu A$	
Zero Gate Voltage Drain Current	I _{DSS}	_	_	1	μΑ	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	_	3	V	$V_{DS} = V_{GS}$, $I_D = 250\mu A$	
Static Drain-Source On-Resistance	Б		13.8	18	mΩ	V _{GS} = 10V, I _D = 10A	
Static Drain-Source On-Resistance	R _{DS(ON)}	_	20.3	27.5	11122	V _{GS} = 4.5V, I _D = 6A	
Diode Forward Voltage	V _{SD}	_	_	1.0	V	V _{GS} = 0V, I _S = 10A	
DYNAMIC CHARACTERISTICS (Note 9)	DYNAMIC CHARACTERISTICS (Note 9)						
Input Capacitance	C _{iss}	_	925	_			
Output Capacitance	Coss		242	_	pF	$V_{DS} = 30V, V_{GS} = 0V,$ f = 1MHz	
Reverse Transfer Capacitance	C _{rss}	_	25.4	_		1 - 11/11/2	
Gate Resistance	R _g	_	1.3	_	Ω	$V_{DS} = 0V$, $V_{GS} = 0V$, $f = 1MHz$	
Total Gate Charge (V _{GS} = 4.5V)	Qg	_	7.5	_		V _{DS} = 30V, I _D = 10A	
Total Gate Charge (V _{GS} = 10V)	Qg	_	15.3	_	nC		
Gate-Source Charge	Q _{gs}	_	2.6	_	IIC		
Gate-Drain Charge	Q _{gd}	_	3.5	_			
Turn-On Delay Time	t _{D(ON)}	_	3.2	_			
Turn-On Rise Time	t _R	_	4.2	_	20	$V_{GS} = 10V, V_{DS} = 30V,$	
Turn-Off Delay Time	t _{D(OFF)}	_	14.5	_	ns	$R_g = 6\Omega$, $I_D = 10A$	
Turn-Off Fall Time	t _F	_	7.2	_			
Reverse Recovery Time	t _{RR}	_	20.8	_	ns	1 404 11/14 4004/	
Reverse Recovery Charge	Q _{RR}	_	11.4	_	nC	I _F = 10A, di/dt = 100A/μs	

8. Short duration pulse test used to minimize self-heating effect. 9. Guaranteed by design. Not subject to product testing. Notes:





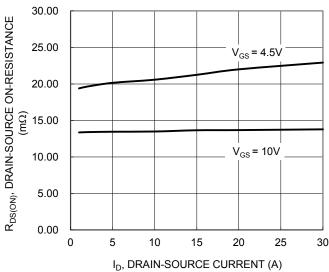


Figure 3. Typical On-Resistance vs. Drain Current and Gate Voltage

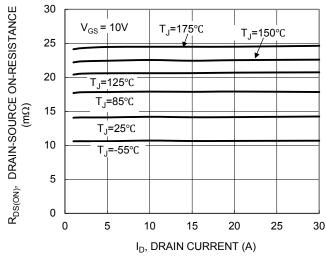
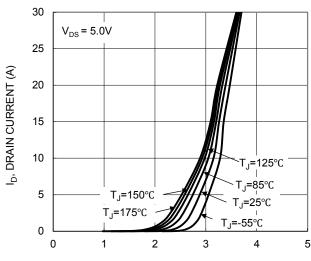


Figure 5. Typical On-Resistance vs. Drain Current and Temperature



V_{GS}, GATE-SOURCE VOLTAGE (V) Figure 2. Typical Transfer Characteristic

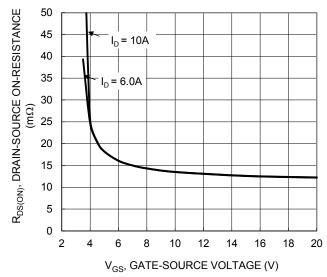


Figure 4. Typical Transfer Characteristic

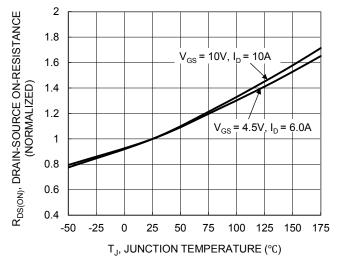


Figure 6. On-Resistance Variation with Temperature



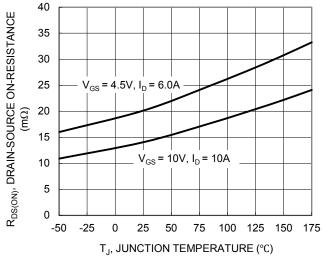
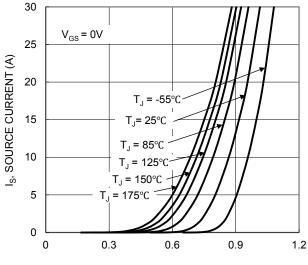


Figure 7. On-Resistance Variation with Temperature



V_{SD}, SOURCE-DRAIN VOLTAGE (V) Figure 9. Diode Forward Voltage vs. Current

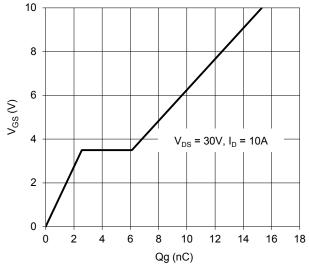


Figure 11. Gate Charge

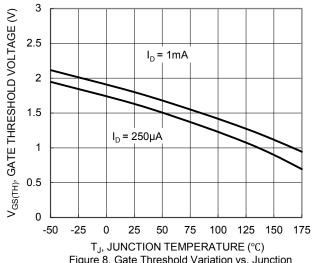


Figure 8. Gate Threshold Variation vs. Junction Temperature

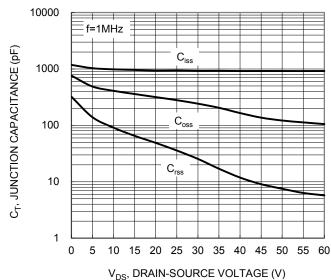


Figure 10. Typical Junction Capacitance

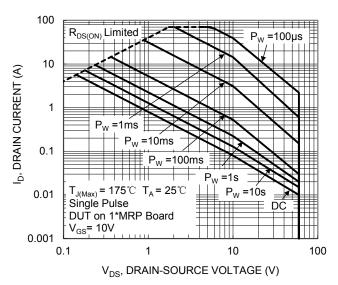


Figure 12. SOA, Safe Operation Area



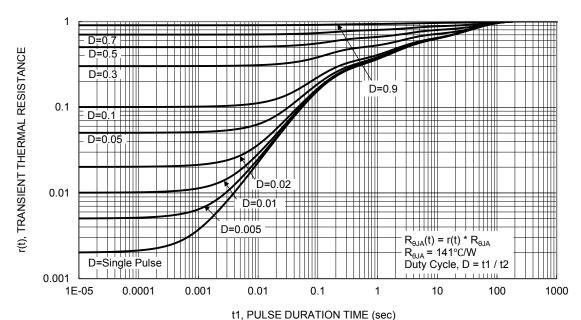


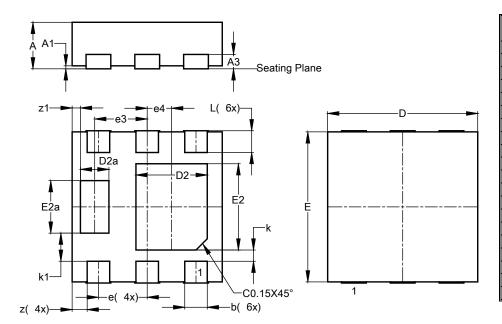
Figure 13. Transient Thermal Resistance



Package Outline Dimensions

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

U-DFN2020-6 (SWP) (Type F)

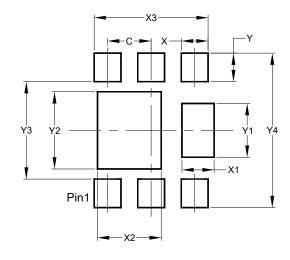


U-DFN2020-6 (SWP)									
(Type F)									
Dim	Min Max Typ								
Α	0.59	0.65	0.62						
A1	0.00	0.05	0.03						
A3	-	-	0.192						
b	0.28	0.38	0.33						
D	1.95	2.05	2.00						
D2	0.87	1.07	0.97						
D2a	0.35	0.45	0.40						
Е	1.95	2.05	2.00						
E2	1.07	1.27	1.17						
E2a	0.67	0.77	0.72						
е		0.65 BSC							
е3		0.70 BSC							
e4	C).325 B	SC						
k			0.15						
k1			0.375						
L	0.225	0.355	0.305						
Z			0.20						
z1	0.11								
All Dimensions in mm									

Suggested Pad Layout

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

U-DFN2020-6 (SWP) (Type F)



Dimensions	Value (in mm)
С	0.650
X	0.400
X1	0.480
X2	0.950
Х3	1.700
Υ	0.425
Y1	0.800
Y2	1.150
Y3	1.450
Y4	2.300



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