



COMPLEMENTARY PAIR ENHANCEMENT MODE MOSFET

Product Summary

Device	V _{(BR)DSS}	R _{DS(ON)} Max	I _D Max T _A = +25°C
		$29m\Omega @ V_{GS} = 4.5V$	5.6A
Q1 N-Channel	12V	$34m\Omega$ @ $V_{GS} = 2.5V$	5.1A
		$44m\Omega$ @ $V_{GS} = 1.8V$	4.5A
		$65m\Omega @ V_{GS} = 1.5V$	3.7A
		$61m\Omega @ V_{GS} = -4.5V$	-3.8A
Q2 P-Channel	-12V	$81m\Omega @ V_{GS} = -2.5V$	-3.3A
		115mΩ @ V _{GS} = -1.8V	-2.8A
		170mΩ @ V _{GS} = -1.5V	-2.3A

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.

Applications

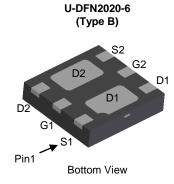
- Loadswitch
- Power Management Functions
- Portable Power Adaptors

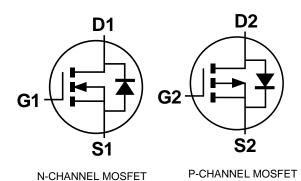
Features

- Low On-Resistance
- Low Input Capacitance
- Low Profile, 0.6mm Max Height
- Totally Lead-Free & Fully RoHS Compliant (Notes 1 & 2)
- Halogen and Antimony Free. "Green" Device (Note 3)
- Qualified to AEC-Q101 Standards for High Reliability

Mechanical Data

- Case: U-DFN2020-6 (Type B)
- 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
- Terminals Connections: See Diagram Below
- Weight: 0.0065 grams (Approximate)





Internal Schematic

Ordering Information (Note 4)

Part Number	Case	Packaging
DMC1229UFDB -7	U-DFN2020-6 Type B	3,000/Tape & Reel
DMC1229UFDB -13	U-DFN2020-6 Type B	10,000/Tape & Reel

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



D2 = Product Type Marking Code YM = Date Code Marking Y = Year (ex: A = 2013) M = Month (ex: 9 = September)

Date Code Key

Year	201	2	2013		2014	20	15	2016		2017	2	2018
Code	Z		Α		В	(2	D		Е		F
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 (@ $T_A = +25^{\circ}C$, unless otherwise specified.)

Characteristic	Symbol	Q1 N-Channel	Q2 P-Channel	Units		
Drain-Source Voltage			V_{DSS}	12	-12	V
Gate-Source Voltage	V_{GSS}	±8	±8	V		
	Steady State	$T_A = +25$ °C $T_A = +70$ °C	I _D	5.6 4.4	-3.8 -3.0	А
Continuous Drain Current (Note 5) V _{GS} = 4.5V	t<5s	$T_A = +25$ °C $T_A = +70$ °C	I _D	7.2 5.8	-5.0 -4.0	А
Maximum Continuous Body Diode Forward Curre	Is	1	-1	Α		
Pulsed Drain Current (10µs Pulse, Duty Cycle =	Pulsed Drain Current (10µs Pulse, Duty Cycle = 1%)				-15	Α

Thermal Characteristics

Characteristic		Symbol	Value	Units	
Total Power Dissipation (Note 5)	Steady State	0	1.4	W	
Total Power Dissipation (Note 5)	t<5s	P_{D}	2.2	VV	
Thermal Resistance, Junction to Ambient (Note 5)	Steady State	D	92		
Thermal Resistance, Junction to Ambient (Note 5)	t<5s	$R_{ heta JA}$	55	°C/W	
Thermal Resistance, Junction to Case (Note 5)	$R_{ heta JC}$	30			
Operating and Storage Temperature Range		$T_{J,}T_{STG}$	-55 to +150	°C	

Note: 5. Device mounted on 1" x 1" FR-4 PCB with high coverage 2oz. copper, single sided.



Electrical Characteristics Q1 N-Channel (@T_A = +25°C, unless otherwise specified.)

Characteristic	Symbol	Min	Тур	Max	Unit	Test Condition		
OFF CHARACTERISTICS (Note 6)								
Drain-Source Breakdown Voltage	BV _{DSS}	12	_	_	V	$V_{GS} = 0V, I_D = 250\mu A$		
Zero Gate Voltage Drain Current T _J = +25°C	I _{DSS}	l	_	1.0	μΑ	$V_{DS} = 12V$, $V_{GS} = 0V$		
Gate-Source Leakage	I _{GSS}	_	_	±100	nA	$V_{GS} = \pm 8V$, $V_{DS} = 0V$		
ON CHARACTERISTICS (Note 6)								
Gate Threshold Voltage	$V_{GS(th)}$	0.4	_	1	V	$V_{DS} = V_{GS}$, $I_D = 250\mu A$		
		_	17	29		$V_{GS} = 4.5V, I_D = 5A$		
Static Drain-Source On-Resistance	D-s/s/	_	20	34	mΩ	$V_{GS} = 2.5V, I_D = 4.6A$		
Static Dialif-Source Off-Nesistance	R _{DS(ON)}	l	24	44	11122	$V_{GS} = 1.8V, I_D = 4.1A$		
		l	30	65		$V_{GS} = 1.5V, I_D = 2A$		
Forward Transfer Admittance	Y _{fs}	_	6.5	_	S	$V_{DS} = 10V, I_{D} = 5A$		
Diode Forward Voltage	V_{SD}	_	0.6	1.2	V	$V_{GS} = 0V, I_{S} = 1A$		
DYNAMIC CHARACTERISTICS (Note 7)								
Input Capacitance	C _{iss}	1	914	_	pF	\ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \		
Output Capacitance	Coss	l	132		pF	$V_{DS} = 6V, V_{GS} = 0V,$ f = 1.0MHz		
Reverse Transfer Capacitance	C _{rss}	l	119	_	pF	1 – 1.000112		
Gate Resistance	R_g	_	1.26	_	Ω	$V_{DS} = 0V$, $V_{GS} = 0V$, $f = 1MHz$		
Total Gate Charge (V _{GS} = 4.5V)		_	10.5	_	nC			
Total Gate Charge (V _{GS} = 8V)	Qg	_	19.6	_	nC)/ O)/ L O 5A		
Gate-Source Charge	Qgs	_	1.2	_	nC	$V_{DS} = 6V, I_D = 6.5A$		
Gate-Drain Charge	Q _{gd}	_	1.6	_	nC	1		
Turn-On Delay Time	t _{D(on)}	_	5.0	_	nS			
Turn-On Rise Time	t _r	_	10.5	_	nS	$V_{DD} = 6V, V_{GS} = 4.5V,$		
Turn-Off Delay Time	t _{D(off)}	_	16.6	_	nS	$R_L = 1.2\Omega$, $R_G = 1\Omega$		
Turn-Off Fall Time	t _f	_	4.1	_	nS	<u> </u>		

Electrical Characteristics Q2 P-Channel (@T_A = +25°C, unless otherwise specified.)

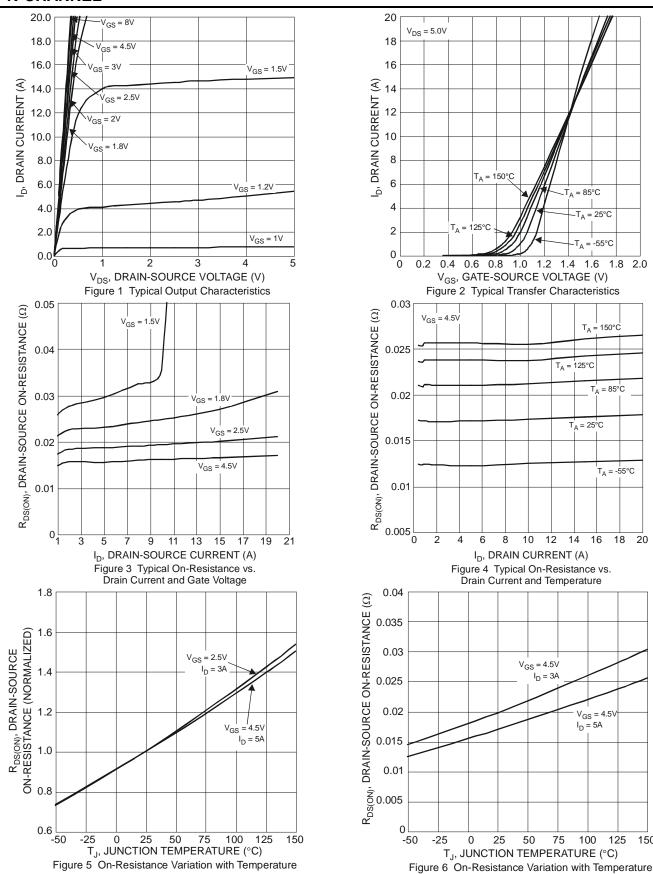
Characteristic	Symbol	Min	Тур	Max	Unit	Test Condition		
OFF CHARACTERISTICS (Note 6)								
Drain-Source Breakdown Voltage	BV _{DSS}	-12	_	_	V	$V_{GS} = 0V, I_D = -250\mu A$		
Zero Gate Voltage Drain Current T _J = +25°C	I _{DSS}	_	_	-1.0	μΑ	$V_{DS} = -12V, V_{GS} = 0V$		
Gate-Source Leakage	IGSS	-	_	±100	nA	$V_{GS} = \pm 8V$, $V_{DS} = 0V$		
ON CHARACTERISTICS (Note 6)								
Gate Threshold Voltage	V _{GS(th)}	-0.4	_	-1	V	$V_{DS} = V_{GS}$, $I_D = -250\mu A$		
		_	37	61		$V_{GS} = -4.5V$, $I_D = -3.6A$		
Static Drain-Source On-Resistance	D	-	47	81	mΩ	$V_{GS} = -2.5V$, $I_D = -3.2A$		
Static Dialif-Source Off-Resistance	R _{DS(ON)}	l	63	115	11122	$V_{GS} = -1.8V, I_{D} = -1A$		
		-	90	170		$V_{GS} = -1.5V, I_D = -1A$		
Forward Transfer Admittance	Y _{fs}	_	5.5	_	S	$V_{DS} = -10V, I_{D} = -3.6A$		
Diode Forward Voltage	V_{SD}	_	-0.65	-1.2	V	$V_{GS} = 0V, I_{S} = -1A$		
DYNAMIC CHARACTERISTICS (Note 7)			•	•				
Input Capacitance	C _{iss}	-	915	_	pF	., ., ., .,		
Output Capacitance	Coss	l	225	_	рF	$V_{DS} = -6V, V_{GS} = 0V,$ -f = 1.0MHz		
Reverse Transfer Capacitance	C _{rss}	_	183	_	pF	1 - 1.000112		
Gate Resistance	Rg	_	56.9	_	Ω	$V_{DS} = 0V$, $V_{GS} = 0V$, $f = 1MHz$		
Total Gate Charge (V _{GS} = -4.5V)		_	10.7	_	nC			
Total Gate Charge (V _{GS} = -8V)	Q_g	_	17.9	_	nC	.,		
Gate-Source Charge	Qgs	_	1.7	_	nC	$V_{DS} = -6V, I_{D} = -4.3A$		
Gate-Drain Charge	Q _{gd}	_	3.0	_	nC			
Turn-On Delay Time	t _{D(on)}	_	5.7	_	nS			
Turn-On Rise Time	t _r	_	11.5	_	nS	$V_{DD} = -6V, V_{GS} = -4.5V,$		
Turn-Off Delay Time	t _{D(off)}	_	27.8	_	nS	$R_L = 1.6\Omega$, $R_G = 1\Omega$		
Turn-Off Fall Time	t _f	_	26.4	_	nS			

Notes: 6. Short duration pulse test used to minimize self-heating effect.

^{7.} Guaranteed by design. Not subject to product testing.



Q1 N-CHANNEL



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Q1 N-CHANNEL (Continued)

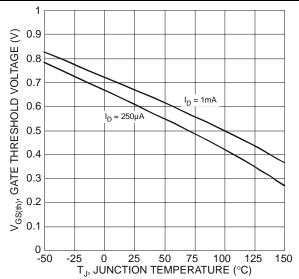
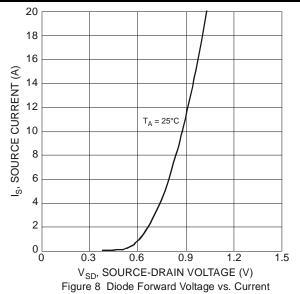
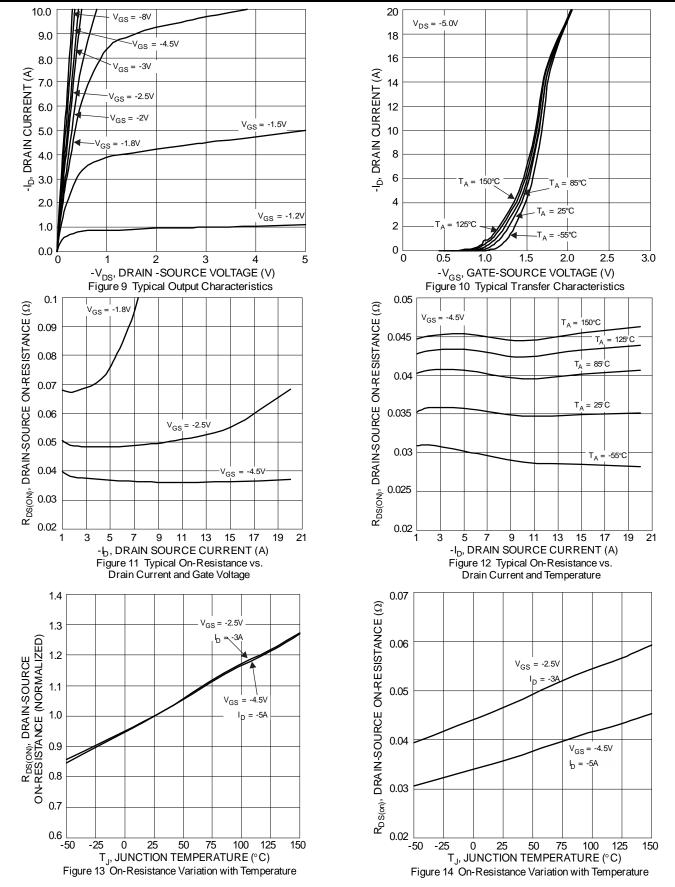


Figure 7 Gate Threshold Variation vs. Ambient Temperature



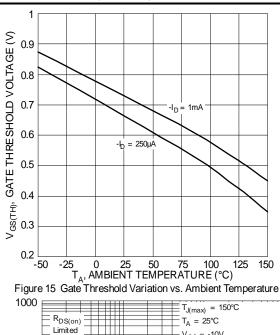


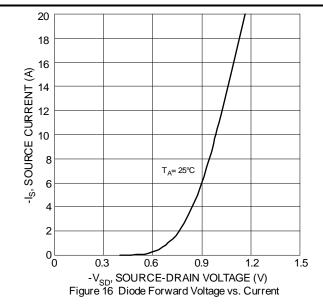
Q2 P-CHANNEL

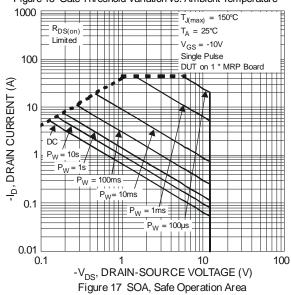


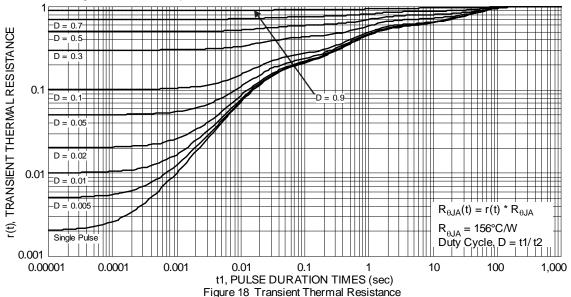


Q2 P-CHANNEL (Continued)







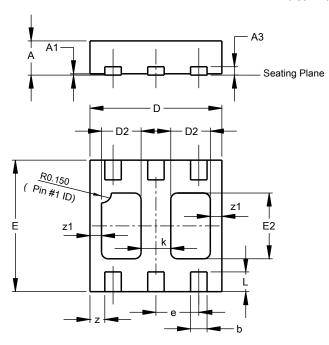




Package Outline Dimensions

Please see AP02002 at http://www.diodes.com/datasheets/ap02002.pdf for the latest version.

U-DFN2020-6 (Type B)

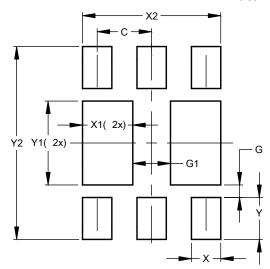


U-DFN2020-6								
(Type B)								
Dim	Min	Min Max Typ						
Α	0.545	0.605	0.575					
A1	0.00	0.05	0.02					
A3	-	-	0.13					
b	0.20	0.30	0.25					
D	1.95	2.075	2.00					
D2	0.50	0.70	0.60					
е	-	-	0.65					
Е	1.95	2.075	2.00					
E2	0.90	1.10	1.00					
k	-	-	0.45					
L	0.25	0.35	0.30					
Z	-	-	0.225					
z1	-	-	0.175					
All	Dimens	ions in	mm					

Suggested Pad Layout

Please see AP02001 at http://www.diodes.com/datasheets/ap02001.pdf for the latest version.

U-DFN2020-6 (Type B)



Dimensions	Value
Dillielisiolis	(in mm)
C	0.650
G	0.150
G1	0.450
X	0.350
X1	0.600
X2	1.650
Y	0.500
Y1	1.000
Y2	2 300



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