DUAL N-CHANNEL ENHANCEMENT MODE MOSFET

Product Summary

$V_{(BR)DSS}$	$R_{DS(ON)}$	I_D T_A = +25°C
24V	15mΩ @ V_{GS} = 4.5V	6.5A
	20mΩ @ V_{GS} = 2.5V	5.6A

Description

This new generation MOSFET has been designed to minimize the on-state resistance ($R_{DS(on)}$) and yet maintain superior switching performance, making it ideal for high efficiency power management applications.

Applications

- DC-DC Converters
- Power management functions

Features

- Low On-Resistance
- Low Input Capacitance
- Fast Switching Speed
- Low Input/Output Leakage
- **ESD Protected up to 3kV**
- **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

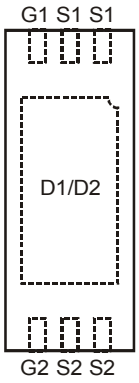
- Case: W-DFN5020-6
- Case Material: Molded Plastic, "Green" Molding Compound. UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminal Connections: See Diagram Below
- Weight: 0.03 grams (approximate)


ESD PROTECTED TO 3kV

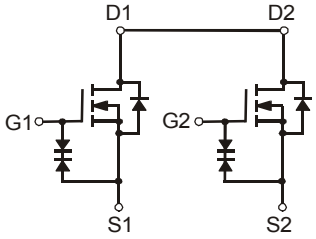
W-DFN5020-6


Top View


Bottom View



Top View
Pin-Out



Equivalent Circuit

Ordering Information (Note 4)

Part Number	Case	Packaging
DMG5802LFX-7	W-DFN5020-6	3000 / 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

ME = Product Type Marking Code
YM = Date Code Marking
Y = Year (ex: X = 2010)
M = Month (ex: 9 = September)

Date Code Key

Year	2010	2011	2012	2013	2014	2015	2016	2017	2018
Code	X	Y	Z	A	B	C	D	E	F

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

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

Characteristic			Symbol	Value	Unit
Drain-Source Voltage			V_{DSS}	24	V
Gate-Source Voltage			V_{GSS}	±12	V
Continuous Drain Current (Note 5) V_{GS} = 4.5V	Steady State	T_A = +25°C T_A = +70°C	I_D	6.5 5.2	A
Continuous Drain Current (Note 5) V_{GS} = 2.5V	Steady State	T_A = +25°C T_A = +70°C	I_D	5.6 4.5	A
Pulsed Drain Current (Note 6)			I_{DM}	70	A

Thermal Characteristics

Characteristic	Symbol	Max	Unit
Power Dissipation (Note 5)	P_D	0.98	W
Thermal Resistance, Junction to Ambient @T_A = +25°C (Note 5)	$R_{\theta JA}$	126.5	°C/W
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 7)						
Drain-Source Breakdown Voltage	BV_{DSS}	24	—	—	V	V_{GS} = 0V, I_D = 250µA
Zero Gate Voltage Drain Current T_J = +25°C	I_{DSS}	—	—	1.0	µA	V_{DS} = 24V, V_{GS} = 0V
Gate-Source Leakage	I_{GSS}	—	—	±10	µA	V_{GS} = ±12V, V_{DS} = 0V
ON CHARACTERISTICS (Note 7)						
Gate Threshold Voltage	$V_{GS(th)}$	0.6	0.9	1.5	V	V_{DS} = V_{GS}, I_D = 250µA
Static Drain-Source On-Resistance	$R_{DS\ (ON)}$	—	11	15	mΩ	V_{GS} = 4.5V, I_D = 6.5A
		—	12	17		V_{GS} = 4V, I_D = 5.6A
		—	13	18		V_{GS} = 3.1V, I_D = 5.6A
		—	14	20		V_{GS} = 2.5V, I_D = 5.6A
Forward Transfer Admittance	$\|Y_{fs}\|$	—	17	—	S	V_{DS} = 5V, I_D = 6.5A
Diode Forward Voltage	V_{SD}	—	0.6	0.9	V	V_{GS} = 0V, I_S = 1A
DYNAMIC CHARACTERISTICS (Note 8)						
Input Capacitance	C_{iss}	—	1066.4	—	pF	V_{DS} = 15V, V_{GS} = 0V, f = 1.0MHz
Output Capacitance	C_{oss}	—	132.0	—		
Reverse Transfer Capacitance	C_{rss}	—	127.1	—		
Gate Resistance	R_g	—	1.47	—	Ω	V_{DS} = 0V, V_{GS} = 0V, f = 1MHz
Total Gate Charge V_{GS} = 4.5V	Q_g	—	14.5	—	nC	V_{GS} = 4.5V, V_{DS} = 15V, I_D = 5.8A
Total Gate Charge V_{GS} = 10V	Q_g	—	31.3	—		V_{GS} = 10V, V_{DS} = 15V, I_D = 5.8A
Gate-Source Charge	Q_{gs}	—	2.0	—		
Gate-Drain Charge	Q_{gd}	—	3.1	—		
Turn-On Delay Time	$t_{D(on)}$	—	3.69	—	ns	V_{GS} = 10V, V_{DS} = 15V, R_L = 2.1Ω, R_G = 3Ω
Turn-On Rise Time	t_r	—	13.43	—	ns	
Turn-Off Delay Time	$t_{D(off)}$	—	32.18	—	ns	
Turn-Off Fall Time	t_f	—	22.45	—	ns	

Notes:
5. Device mounted on FR-4 PCB with minimum recommended pad layout, single sided.
6. Repetitive rating, pulse width limited by junction temperature.
7. Short duration pulse test used to minimize self-heating effect.
8. Guaranteed by design. Not subject to production testing.

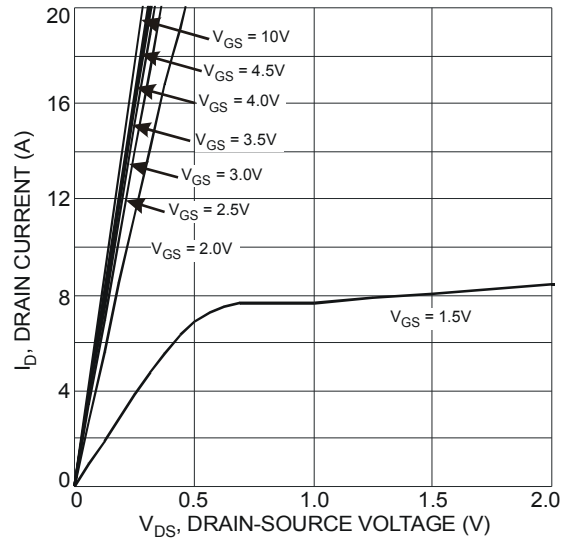


Fig. 1 Typical Output Characteristic

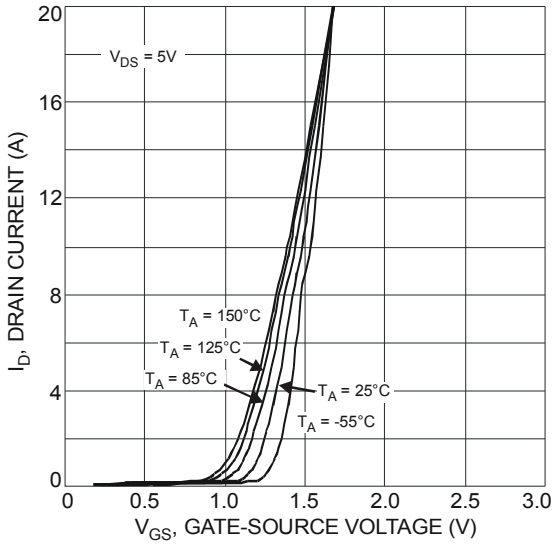


Fig. 2 Typical Transfer Characteristic

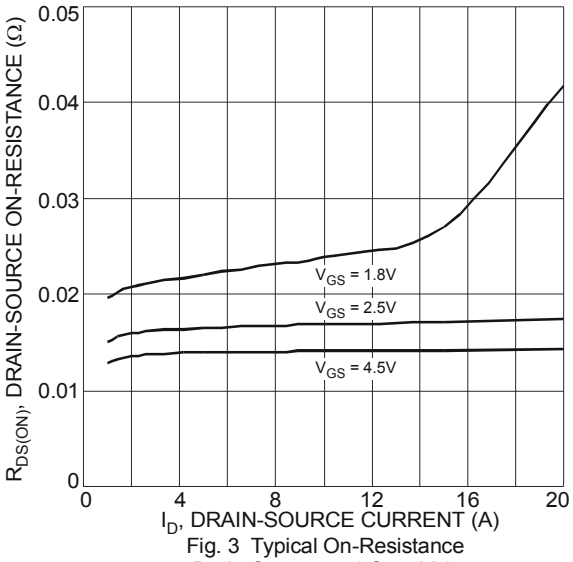


Fig. 3 Typical On-Resistance
vs. Drain Current and Gate Voltage

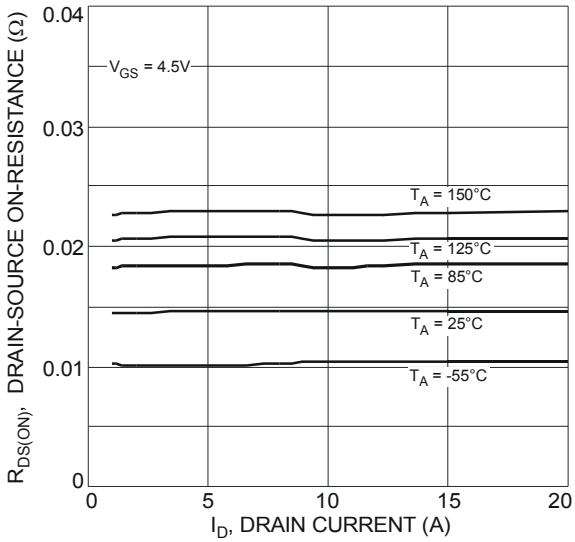


Fig. 4 Typical On-Resistance
vs. Drain Current and Temperature

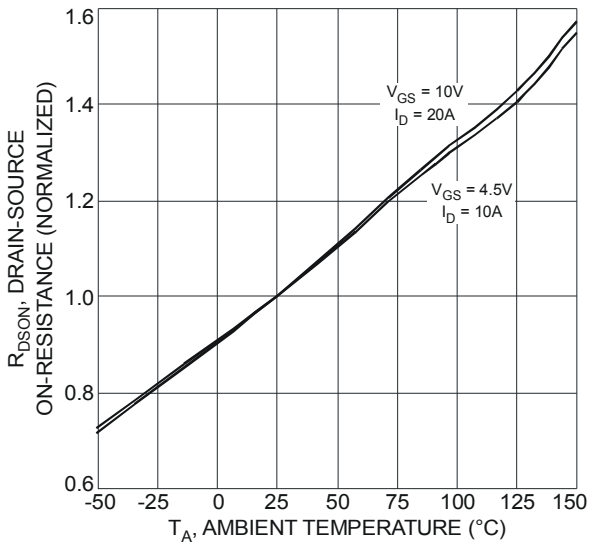


Fig. 5 On-Resistance Variation with Temperature

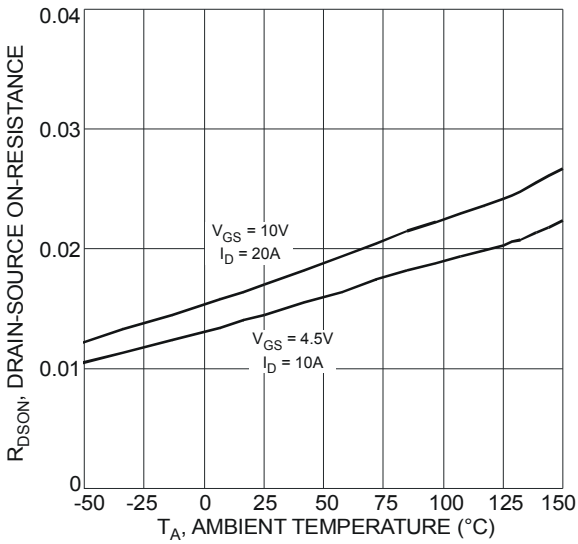


Fig. 6 On-Resistance Variation with Temperature

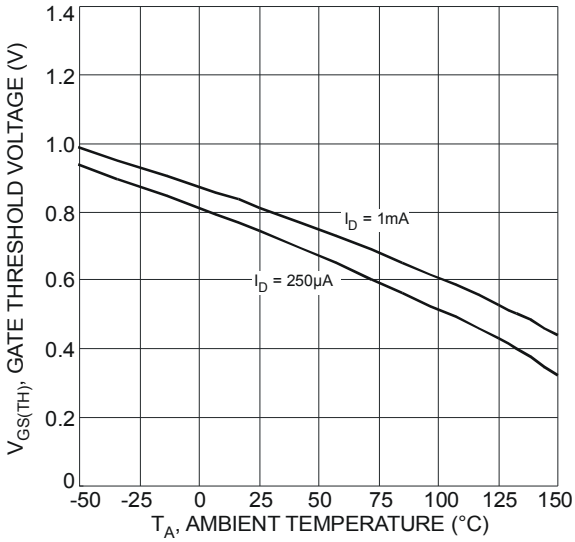


Fig. 7 Gate Threshold Variation vs. Ambient Temperature

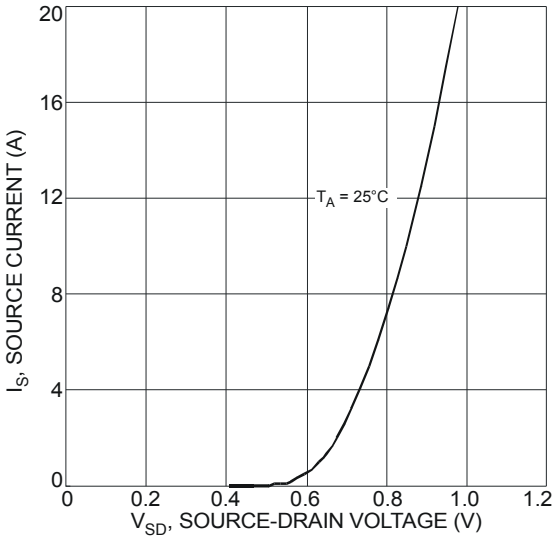


Fig. 8 Diode Forward Voltage vs. Current

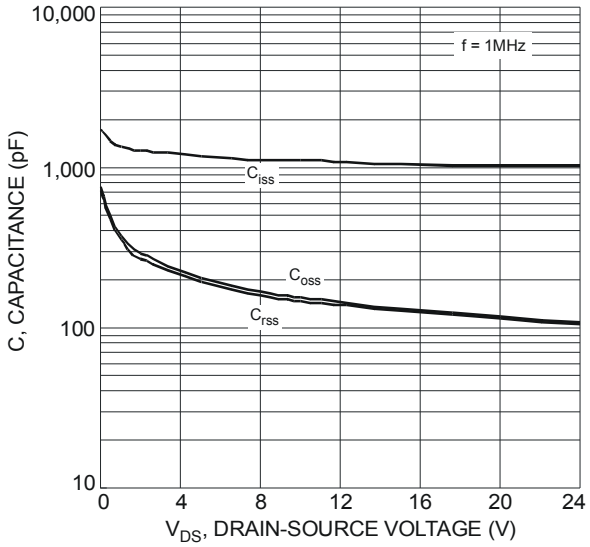


Fig. 9 Typical Total Capacitance

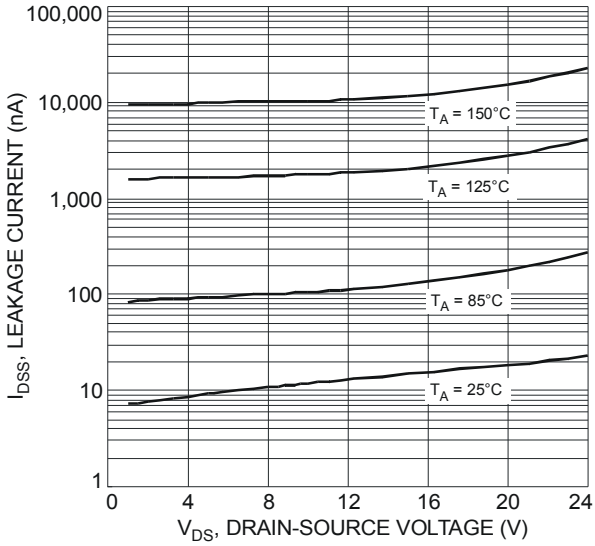


Fig. 10 Typical Leakage Current vs. Drain-Source Voltage

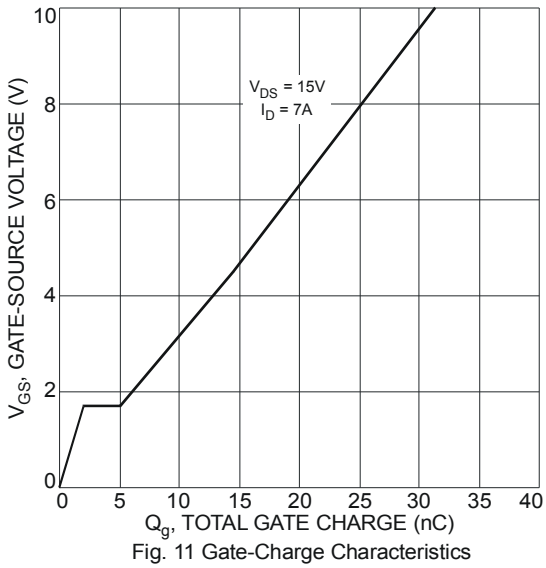


Fig. 11 Gate-Charge Characteristics

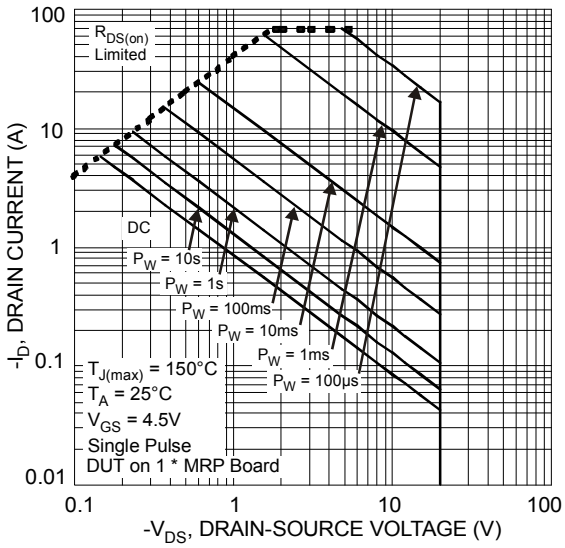


Fig. 12 SOA, Safe Operation Area

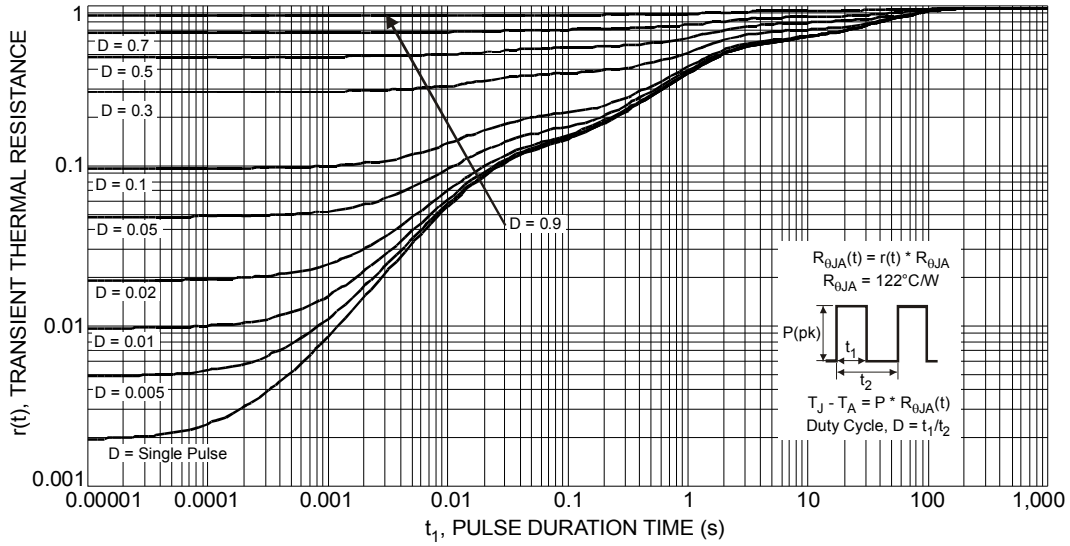
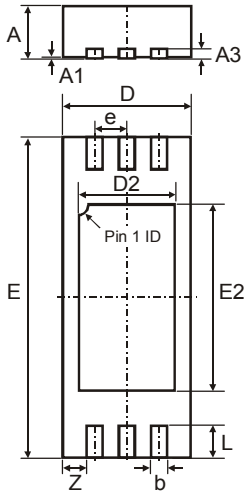


Fig. 13 Transient Thermal Response

Package Outline Dimensions

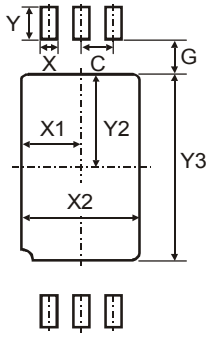
Please see AP02002 at http://www.diodes.com/datasheets/ap02002.pdf for latest version.



W-DFN5020-6			
Dim	**Min**	**Max**	**Typ**
A	0.75	0.85	0.80
A1	0	0.05	0.02
A3	–	–	0.15
b	0.20	0.30	0.25
D	1.90	2.10	2.00
D2	1.40	1.60	1.50
e	–	–	0.50
E	4.90	5.10	5.00
E2	2.80	3.00	2.90
L	0.35	0.65	0.50
Z	–	–	0.375
All Dimensions in mm			

Suggested Pad Layout

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



Dimensions	Value (in mm)
C	0.50
G	0.35
X	0.35
X1	0.90
X2	1.80
Y	0.70
Y2	1.60
Y3	3.20

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