Product Summary

$V_{(BR)DSS}$	$R_{DS(ON)}$ max	I_D max T_A = +25°C
-20V	54mΩ @ V_{GS} = -4.5V	-2.5A
	90mΩ @ V_{GS} = -1.8V	-1.8A

Features and Benefits

- 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**
- **PPAP Capable (Note 4)**

Description and Applications

This 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.

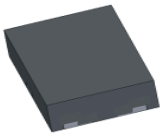
- Backlighting
- Power Management Functions
- DC-DC Converters

Mechanical Data

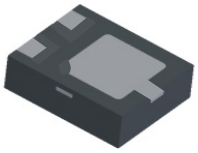
- Case: X2-DFN2015-3
- Case Material: Molded Plastic, "Green" Molding Compound. UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminals: Finish — NiPdAu over Copper leadframe. Solderable per MIL-STD-202, Method 208 e4
- Terminals Connections: See Diagram Below
- Weight: 0.008 grams (approximate)

X2-DFN2015-3

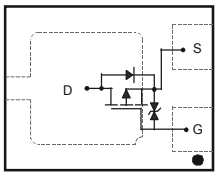
ESD PROTECTED TO 3kV



Top View



Bottom View



Internal Schematic

Ordering Information (Note 4 & 5)

Part Number	Compliance	Case	Packaging
DMP2069UFY4Q-7	Automotive	X2-DFN2015-3	3,000/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. Automotive products are AEC-Q101 qualified and are PPAP capable. Automotive, AEC-Q101 and standard products are electrically and thermally the same, except where specified. For more information, please refer to http://www.diodes.com/quality/product_grade_definitions/.
5. For packaging details, go to our website at http://www.diodes.com/products/packages.html.

Marking Information

29P = Marking Code
YM = Date Code Marking
Y = Year (ex: W = 2009)
M = Month (ex: 9 = September)

Date Code Key

Year	2009	2010	2011	2012	2013	2014	2015
Code	W	X	Y	Z	A	B	C

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	Units
Drain-Source Voltage			V_{DSS}	-20	V
Gate-Source Voltage			V_{GSS}	±8	V
Continuous Drain Current (Note 6)	Steady State	T_A = +25°C T_A = +70°C	I_D	-2.5 -2.2	A
Pulsed Drain Current (Note 7)			I_{DM}	-12	A

Thermal Characteristics

Characteristic	Symbol	Value	Unit
Power Dissipation (Note 6)	P_D	0.53	W
Thermal Resistance, Junction to Ambient @T_A = +25°C	$R_{\theta JA}$	231	°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 8)							
Drain-Source Breakdown Voltage		BV_{DSS}	-20	—	—	V	V_{GS} = 0V, I_D = -250µA
Zero Gate Voltage Drain Current	T_J = +25°C	I_{DSS}	—	—	-1.0	µA	V_{DS} = -20V, V_{GS} = 0V
Gate-Source Leakage		I_{GSS}	—	—	±10	µA	V_{GS} = ±8V, V_{DS} = 0V
ON CHARACTERISTICS (Note 8)							
Gate Threshold Voltage		$V_{GS(th)}$	-0.3	-0.55	-1.0	V	V_{DS} = V_{GS}, I_D = -250µA
Static Drain-Source On-Resistance		$R_{DS(ON)}$	—	36	54	mΩ	V_{GS} = -4.5V, I_D = -2.5A
				46	69		V_{GS} = -2.5V, I_D = -2.2A
				60	90		V_{GS} = -1.8V, I_D = -2.0A
Forward Transfer Admittance		$\|Y_{fs}\|$	—	8	—	S	V_{DS} = -5V, I_D = -2.5A
DYNAMIC CHARACTERISTICS (Note 9)							
Input Capacitance		C_{iss}	—	214	—	pF	V_{DS} = -10V, V_{GS} = 0V f = 1.0MHz
Output Capacitance		C_{oss}	—	104	—	pF	
Reverse Transfer Capacitance		C_{rss}	—	25	—	pF	
Gate Resistnace		R_g	—	250	—	Ω	V_{DS} = 0V, V_{GS} = 0V, f = 1.0MHz
SWITCHING CHARACTERISTICS (Note 9)							
Total Gate Charge		Q_g	—	9.1	—	nC	V_{GS} = -4.5V, V_{DS} = -10V, I_D = -4A
Gate-Source Charge		Q_{gs}	—	1.5	—	nC	
Gate-Drain Charge		Q_{gd}	—	1.7	—	nC	
Turn-On Delay Time		$t_{D(on)}$	—	80.4	160	ns	V_{DS} = -10V, V_{GS} = -4.5V, R_D = 2.5Ω, R_G = 3.0Ω
Turn-On Rise Time		t_r	—	155.1	210	ns	
Turn-Off Delay Time		$t_{D(off)}$	—	688.1	1376	ns	
Turn-Off Fall Time		t_f	—	423.8	848	ns	

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

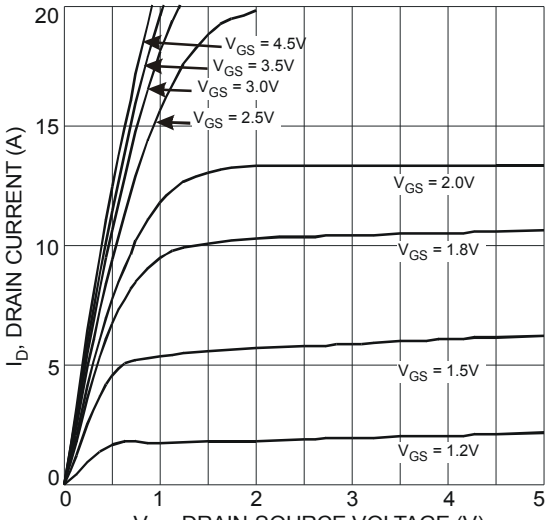


Fig. 1 Typical Output Characteristic

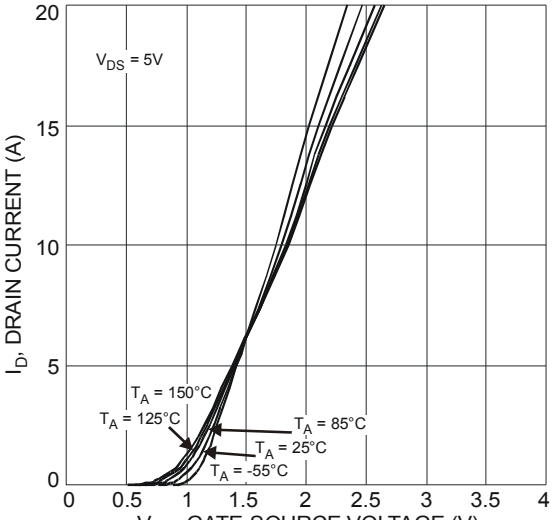


Fig. 2 Typical Transfer Characteristic

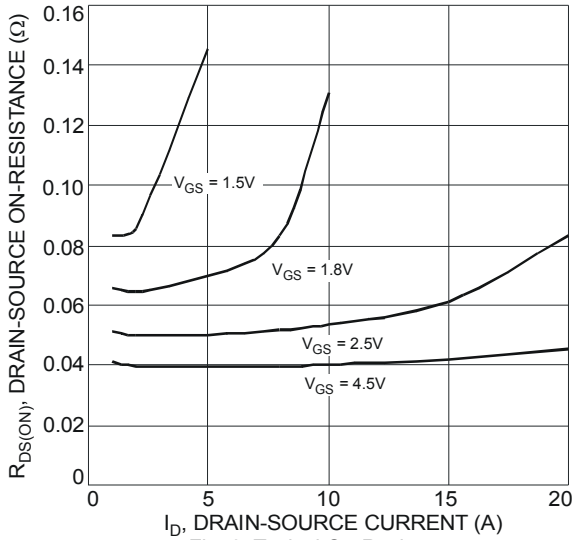


Fig. 3 Typical On-Resistance
vs. Drain Current and Gate Voltage

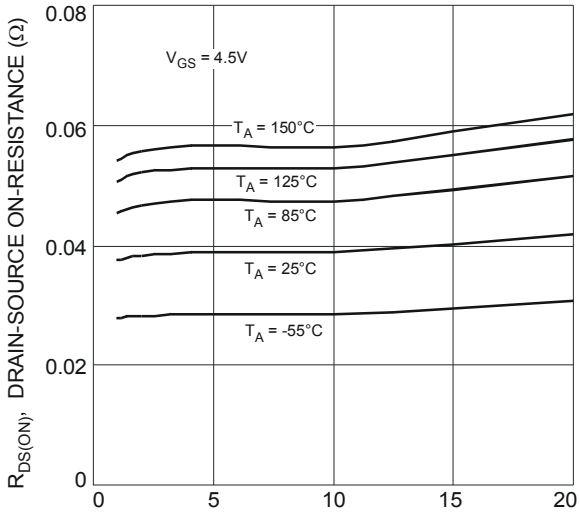


Fig. 4 Typical On-Resistance
vs. Drain Current and Temperature

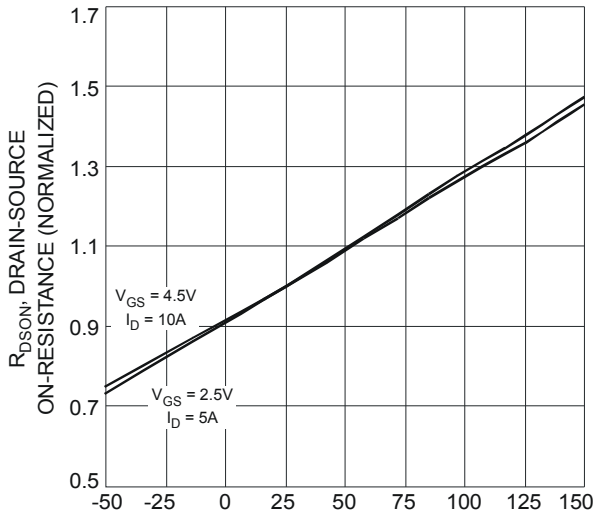


Fig. 5 On-Resistance Variation with Temperature

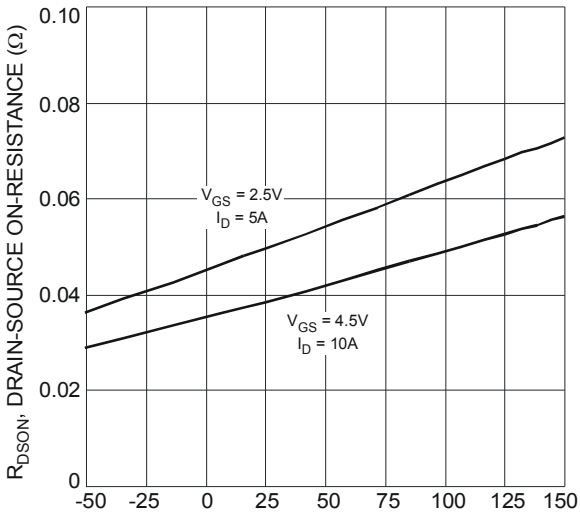


Fig. 6 On-Resistance Variation with Temperature

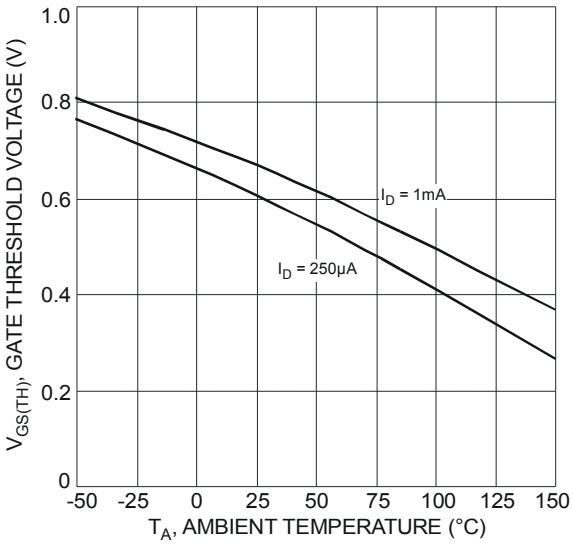


Fig. 7 Gate Threshold Variation vs. Ambient Temperature

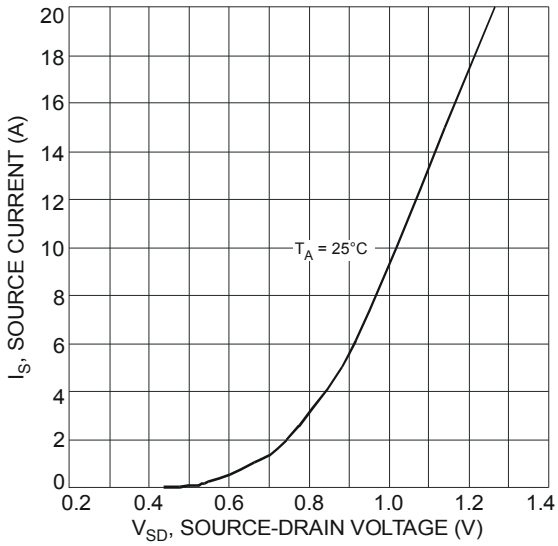


Fig. 8 Diode Forward Voltage vs. Current

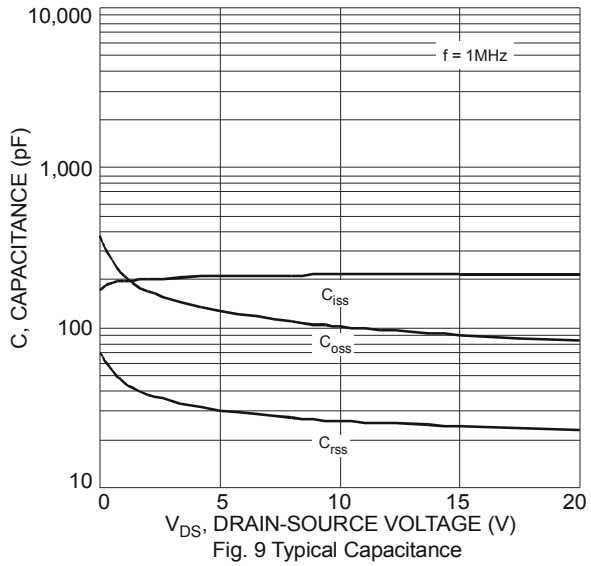


Fig. 9 Typical Capacitance

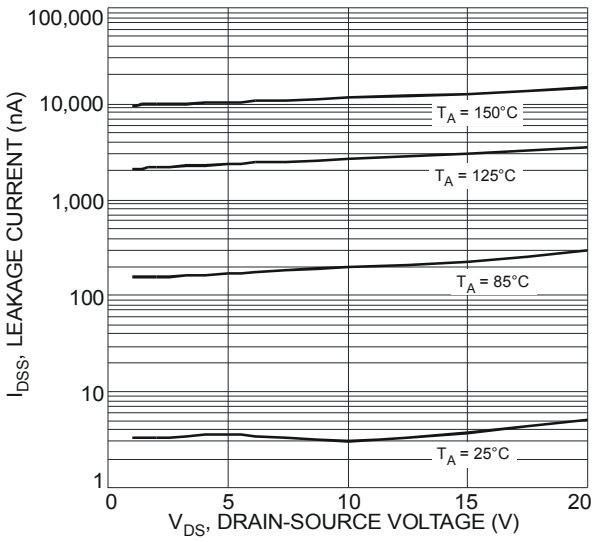


Fig. 10 Typical Leakage Current vs. Drain-Source Voltage

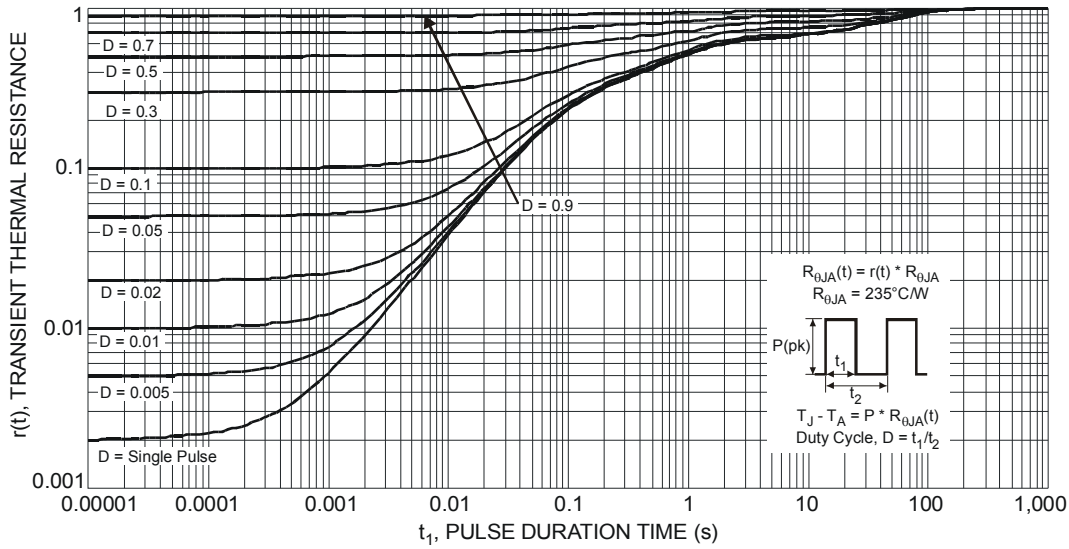
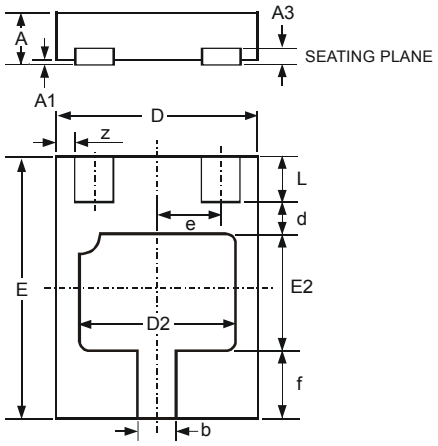


Fig. 11 Transient Thermal Response

Package Outline Dimensions

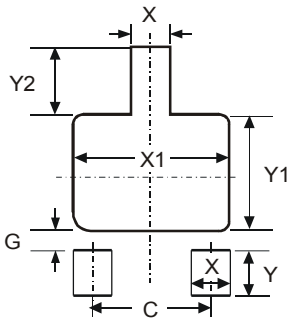
Please see AP02002 at http://www.diodes.com/datasheets/ap02002.pdf for latest version.



X2-DFN2015-3			
Dim	**Min**	**Max**	**Typ**
A	–	0.40	–
A1	0	0.05	0.02
A3	–	–	0.13
b	0.20	0.30	0.25
d	–	–	0.30
D	1.45	1.575	1.50
D2	1.00	1.20	1.10
e	–	–	0.50
E	1.95	2.075	2.00
E2	0.70	0.90	0.80
f	–	–	0.60
L	0.25	0.35	0.30
z	–	–	0.125
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	1.00
G	0.15
X	0.31
X1	1.30
Y	0.50
Y1	1.00
Y2	0.65

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