Product Summary

$V_{(BR)DSS}$	$R_{DS(on)\ max}$	I_D $T_A = 25°C$
-12V	32mΩ@ V_{GS} = -4.5V	-5.5A
	45mΩ@ V_{GS} = -2.5V	-4.5A
	75mΩ@ V_{GS} = -1.8V	-3.2A

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
- Analog Switch

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: X2-DFN2015-3
- 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 – NiPdAu over Copper leadframe. Solderable
- per MIL-STD-202, Method 208 e4
- Weight: 0.008 grams (approximate)

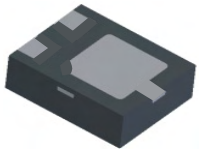
X2-DFN2015-3



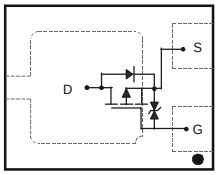
ESD PROTECTED TO 3kV



Top View



Bottom View



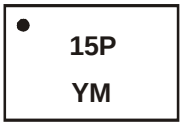
Internal Schematic

Ordering Information (Note 4)

Part Number	Case	Packaging
DMP1045UFY4-7	X2-DFN2015-3	3,000/Tape & Reel
DMP1045UFY4-13	X2-DFN2015-3	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 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.

Marking Information



15P = Marking Code
YM = Date Code Marking
Y = Year (ex: W = 2009)
M = Month (ex: 9 = September)

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

Characteristic			Symbol	Value	Unit
Drain-Source Voltage			V_{DSS}	-12	V
Gate-Source Voltage			V_{GSS}	±8	V
Continuous Drain Current V_{GS} = -4.5V (Note 6)	Steady State	T_A = +25°C T_A = +70°C	I_D	-5.5 -4.3	A
	t<5s	T_A = +25°C T_A = +70°C		-6.5 -5.1	A
Maximum Continuous Body Diode Forward Current (Note 6)			I_S	-2.2	A
Pulsed Drain Current (10µs pulse, duty cycle = 1%)			I_{DM}	-25	A

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

Characteristic		Symbol	Value	Unit
Power Dissipation (Note 5)	T_A = +25°C	P_D	0.7	W
	T_A = +70°C		0.4	
Thermal Resistance, Junction to Ambient (Note 5)	Steady state	$R_{\theta JA}$	193	°C/W
	t<5s		135	
Power Dissipation (Note 6)	T_A = +25°C	P_D	1.7	W
	T_A = +70°C		1.1	
Thermal Resistance, Junction to Ambient (Note 6)	Steady state	$R_{\theta JA}$	73	°C/W
	t<5s		52	
Thermal Resistance, Junction to Case (Notes 6)	Steady state	$R_{\theta JC}$	17	
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}	-12	-	-	V	V_{GS} = 0V, I_D = -250µA
Zero Gate Voltage Drain Current T_J = 25°C	I_{DSS}	-	-	-1.0	µA	V_{DS} = -12V, V_{GS} = 0V
Gate-Source Leakage	I_{GSS}	-	-	±10	µA	V_{GS} = ±8V, V_{DS} = 0V
ON CHARACTERISTICS (Note 7)						
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	$R_{DS\ (ON)}$	-	26	32	mΩ	V_{GS} = -4.5V, I_D = -4.0A
			31	45		V_{GS} = -2.5V, I_D = -3.5A
			51	75		V_{GS} = -1.8V, I_D = -2.7A
Forward Transfer Admittance	$\|Y_{fs}\|$	-	12	-	S	V_{DS} = -5V, I_D = -4A
Diode Forward Voltage	V_{SD}	-	-0.6	-	V	V_{GS} = 0V, I_S = -1A
DYNAMIC CHARACTERISTICS (Note 8)						
Input Capacitance	C_{iss}	-	1291	-	pF	V_{DS} = -10V, V_{GS} = 0V f = 1.0MHz
Output Capacitance	C_{oss}	-	266	-	pF	
Reverse Transfer Capacitance	C_{rss}	-	242	-	pF	
Gate Resistnace	R_g	-	13	-	Ω	V_{DS} = 0V, V_{GS} = 0V, f = 1.0MHz
SWITCHING CHARACTERISTICS (Note 8)						
Total Gate Charge (V_{GS} = -8V)	Q_g	-	23.7	-	nC	V_{DS} = -10V, I_D = -4A
Total Gate Charge (V_{GS} = -4.5V)	Q_g	-	14.7		nC	
Gate-Source Charge	Q_{gs}	-	1.8	-	nC	
Gate-Drain Charge	Q_{gd}	-	4.6	-	nC	
Turn-On Delay Time	$t_{D(on)}$	-	14	-	ns	V_{DS} = -10V, V_{GS} = -4.5V, R_L = 2.5Ω, R_G = 3.0Ω
Turn-On Rise Time	t_r	-	22	-	ns	
Turn-Off Delay Time	$t_{D(off)}$	-	74	-	ns	
Turn-Off Fall Time	t_f	-	75	-	ns	

Notes: 5. Device mounted on FR-4 PCB with minimum recommended pad layout, single sided.
6. Device mounted on 1" x 1" FR-4 PCB with high coverage 2oz. Copper, single sided.
7. Short duration pulse test used to minimize self-heating effect.
8. Guaranteed by design. Not subject to production testing.

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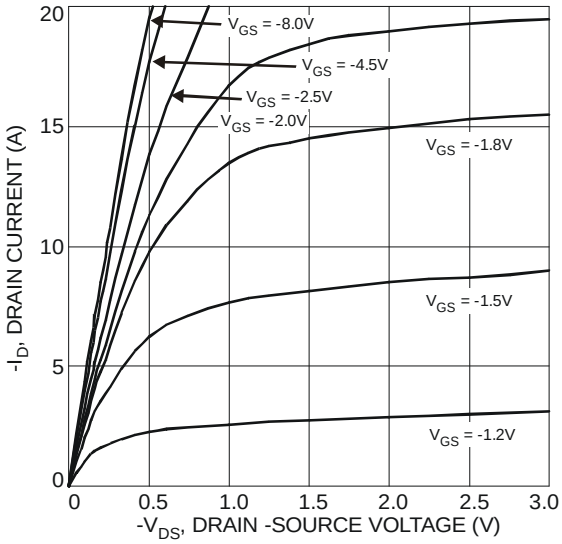

Fig. 1 Typical Output Characteristics

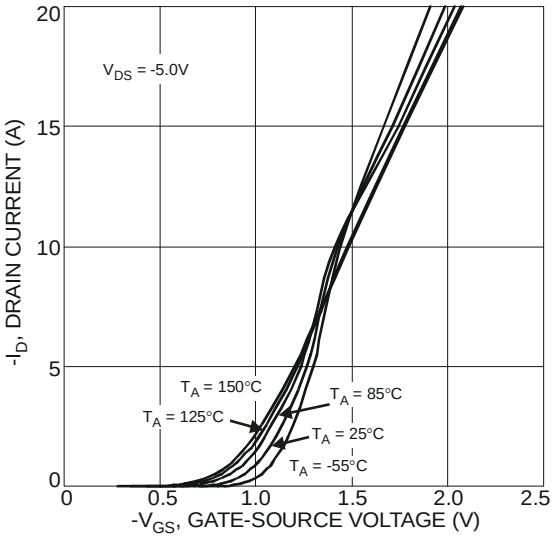

Fig. 2 Typical Transfer Characteristics

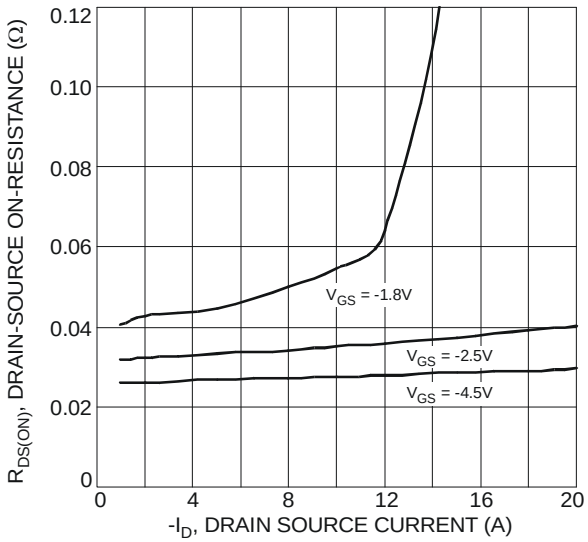

Fig. 3 Typical On-Resistance vs. Drain Current and Gate Voltage

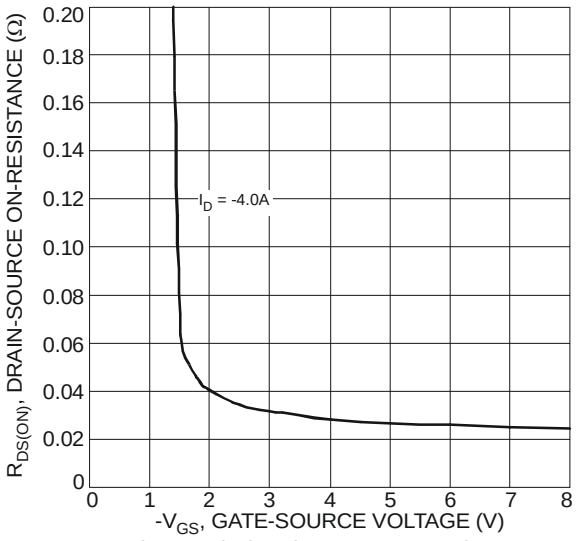

Fig. 4 Typical Drain-Source On-Resistance vs. Gate-Source Voltage

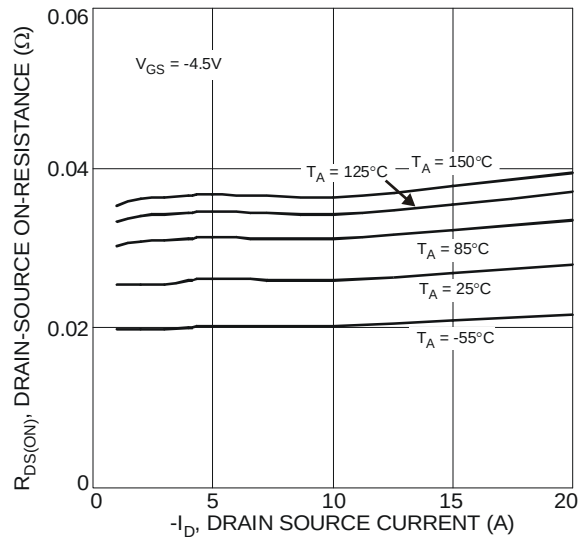

Fig. 5 Typical On-Resistance vs. Drain Current and Temperature

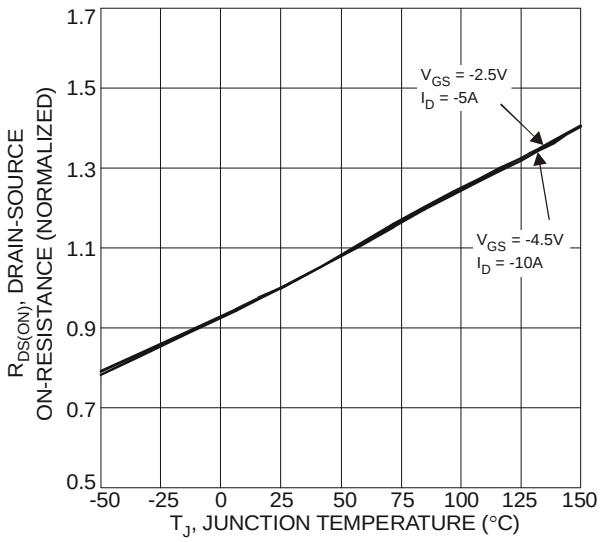

Fig. 6 On-Resistance Variation with Temperature

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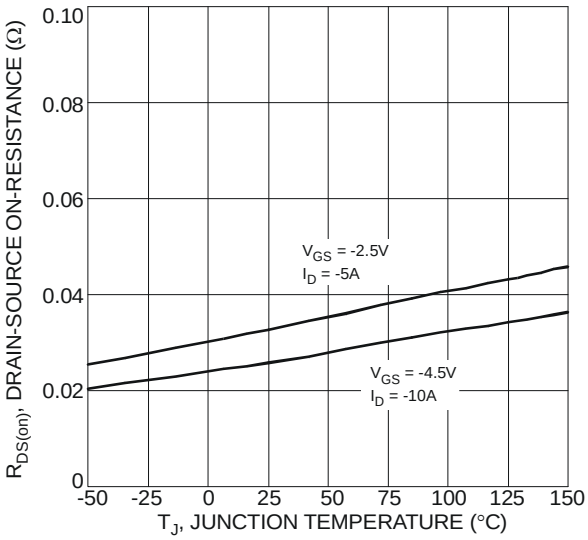

Fig. 7 On-Resistance Variation with Temperature

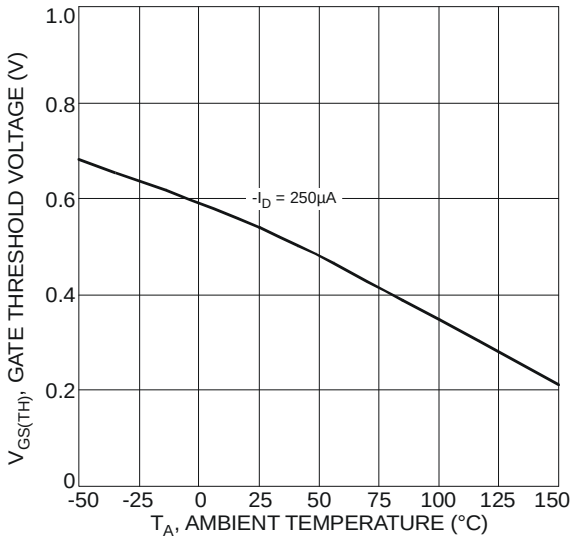

Fig. 8 Gate Threshold Variation vs. Ambient Temperature

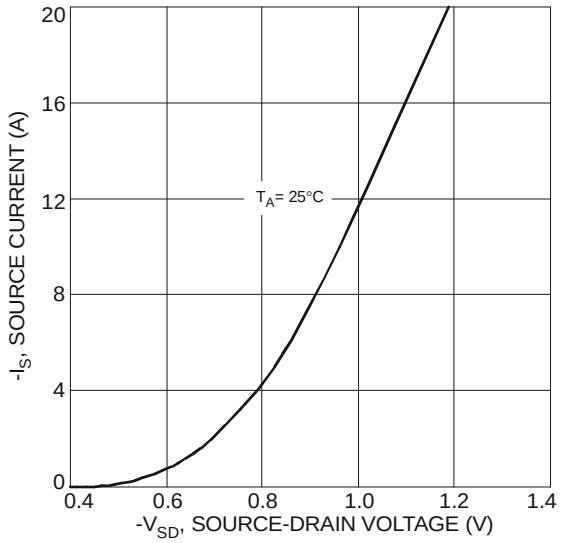

Fig. 9 Diode Forward Voltage vs. Current

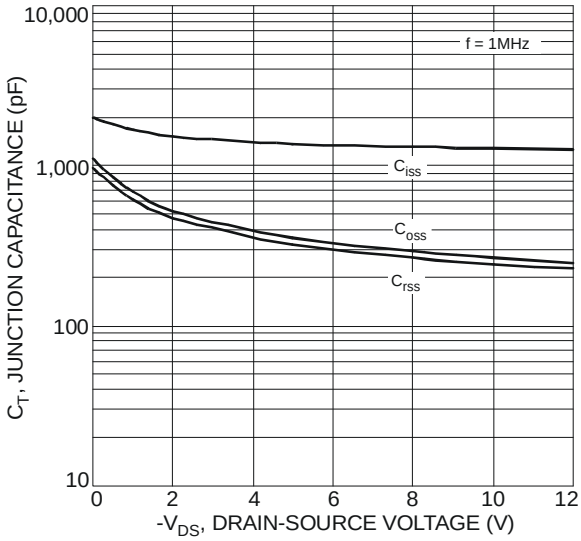

Fig. 10 Typical Junction Capacitance

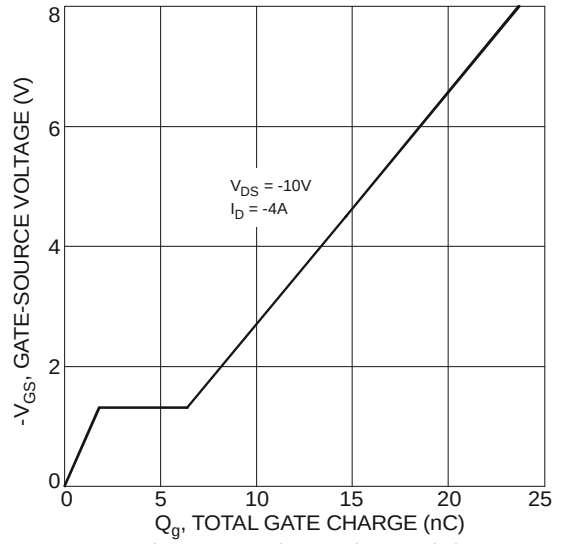

Fig. 11 Gate-Charge Characteristics

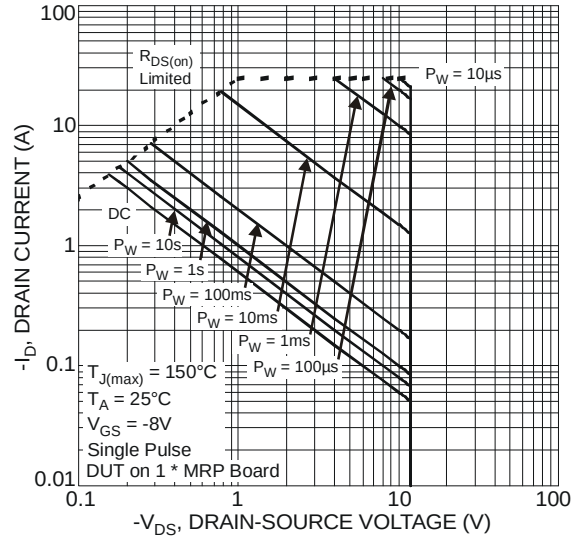

Fig. 12 SOA, Safe Operation Area

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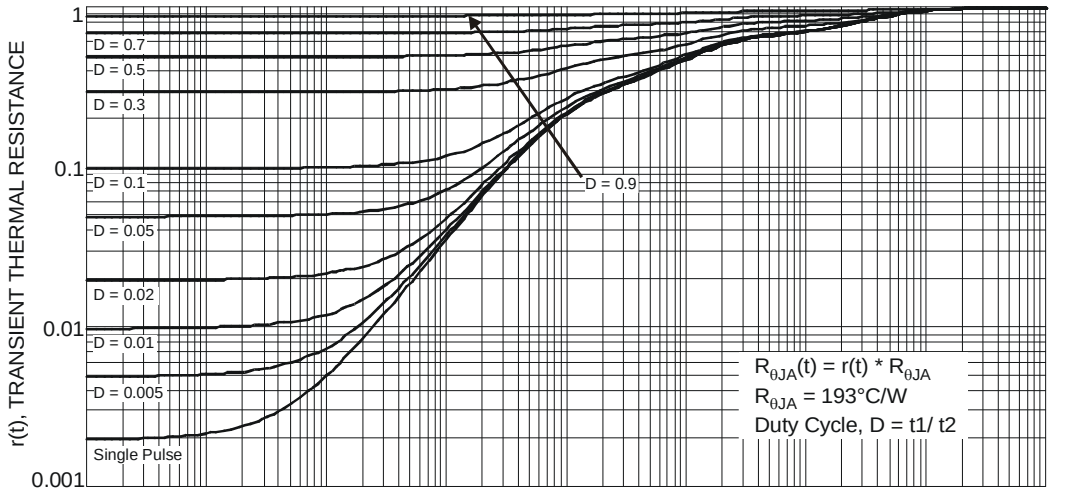
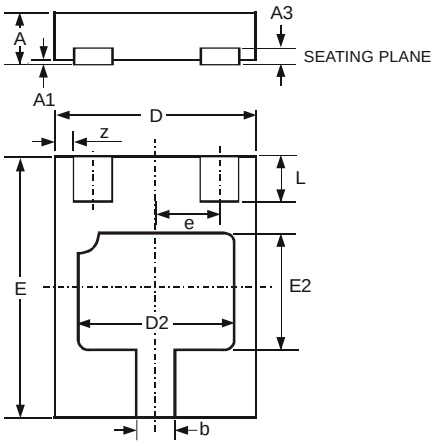


Fig. 13 Transient Thermal Resistance

Package Outline Dimensions

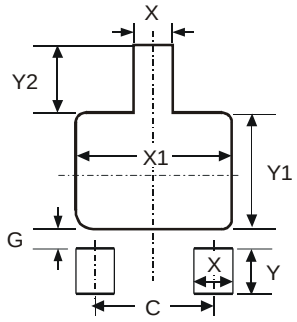
Please see AP02002 at http://www.diodes.com/datasheets/ap02002.pdf for latest version.



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	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
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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