NEW PRODUCT

Product Summary

$V_{(BR)DSS}$	$R_{DS(ON)}$	I_D T_A = +25°C
12V	45mΩ @ V_{GS} = 4.5V	3.2A
	64mΩ @ V_{GS} = 2.5V	
	85mΩ @ V_{GS} = 1.8V	
	100mΩ @ V_{GS} = 1.5V	

Features and Benefits

- Low On-Resistance
- Low Input/Output Leakage
- Fast Switching Speed
- **ESD Protected Gate**
- **Totally Lead-Free & Fully RoHS Compliant (Notes 1 & 2)**
- **Halogen and Antimony Free. "Green" Device (Note 3)**

Description and Applications

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.

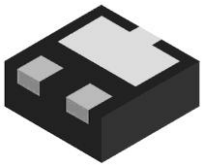
- Power Management Functions
- Backlighting
- Load Switch

Mechanical Data

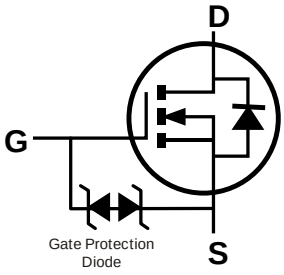
- Case: X2-DFN1010-3
- Case Material: Molded Plastic, "Green" Molding Compound. UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminal Connections: See Diagram
- Terminals: Finish NiPdAu Annealed over Copper Leadframe. Solderable per MIL-STD-202, Method 208
- Weight: 0.0015 Grams (Approximate)



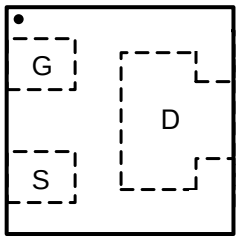
X2-DFN1010-3



Bottom View



Equivalent Circuit



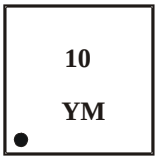
Pin-out Top View

Ordering Information (Note 4)

Part Number	Case	Packaging
DMN1045UFR4-7	X2-DFN1010-3	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 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



10 = Product Type Marking Code
YM = Date Code Marking
Y = Year (ex: B = 2014)
M = Month (ex: 9 = September)

Date Code Key

Year	2014	2015	2016	2017	2018	2019	2020
Code	B	C	D	E	F	G	H

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

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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 (Note 6) V_{GS} = 4.5V	Steady State	T_A = +25°C T_A = +70°C	I_D	3.2 2.5	A
Pulsed Drain Current (10μs pulse, Duty cycle = 1%)			I_{DM}	15	A

Thermal Characteristics

Characteristic	Symbol	Value	Unit
Total Power Dissipation (Note 5)	P_D	0.5	W
Thermal Resistance, Junction to Ambient @T_A = +25°C (Note 5)	$R_{\theta JA}$	251	°C/W
Total Power Dissipation (Note 6)	P_D	1.26	W
Thermal Resistance, Junction to Ambient @T_A = +25°C (Note 6)	$R_{\theta JA}$	99	°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}	12	—	—	V	V_{GS} = 0V, I_D = 250μA
Zero Gate Voltage Drain Current	I_{DSS}	—	—	1	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	$V_{GS(th)}$	0.4	—	1.0	V	V_{DS} = V_{GS}, I_D = 250μA
Static Drain-Source On-Resistance	$R_{DS(ON)}$	—	25 32 40 50	45 64 85 100	mΩ	V_{GS} = 4.5V, I_D = 3.2A V_{GS} = 2.5V, I_D = 3.2A V_{GS} = 1.8V, I_D = 1A V_{GS} = 1.5V, I_D = 0.1A
Diode Forward Voltage	V_{SD}	—	—	1.2	V	V_{GS} = 0V, I_S = 1.0A
DYNAMIC CHARACTERISTICS (Note 8)						
Input Capacitance	C_{iss}	—	375	—	pF	V_{DS} = 10V, V_{GS} = 0V, f = 1.0MHz
Output Capacitance	C_{oss}	—	57	—	pF	
Reverse Transfer Capacitance	C_{rss}	—	51	—	pF	
Total Gate Charge	Q_g	—	4.8	—	nC	V_{GS} = 4.5V, V_{DS} = 10V I_D = 3.2A
Gate-Source Charge	Q_{gs}	—	0.6	—	nC	
Gate-Drain Charge	Q_{gd}	—	1.2	—	nC	
Turn-On Delay Time	$t_{D(on)}$	—	7	—	ns	V_{DD} = 10V, V_{GEN} = 4.5V, R_{GEN} = 6Ω, I_D = 3.2A
Turn-On Rise Time	t_r	—	25	—	ns	
Turn-Off Delay Time	$t_{D(off)}$	—	93	—	ns	
Turn-Off Fall Time	t_f	—	48	—	ns	

Notes: 5. Device mounted on FR-4 substrate PC board, 2oz copper, with minimum recommended pad layout.
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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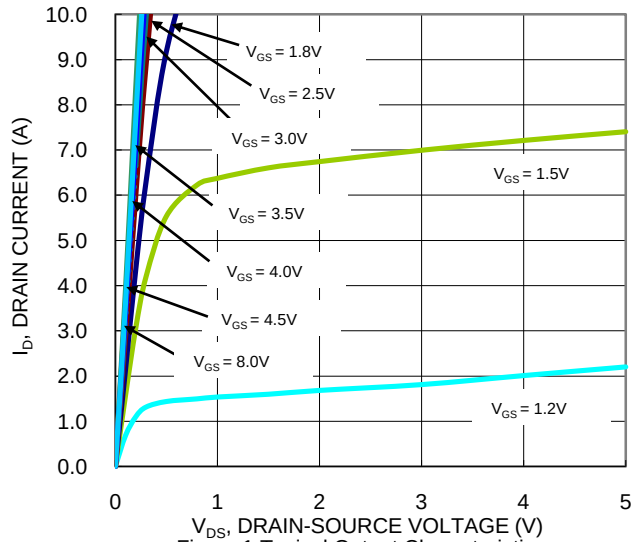


Figure 1 Typical Output Characteristic

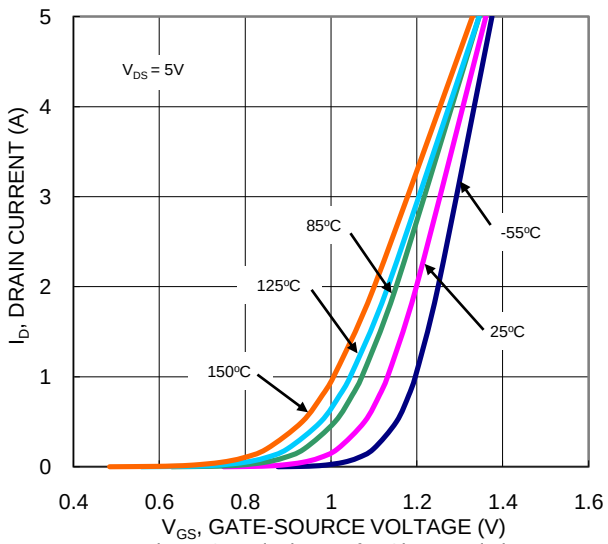


Figure 2 Typical Transfer Characteristic

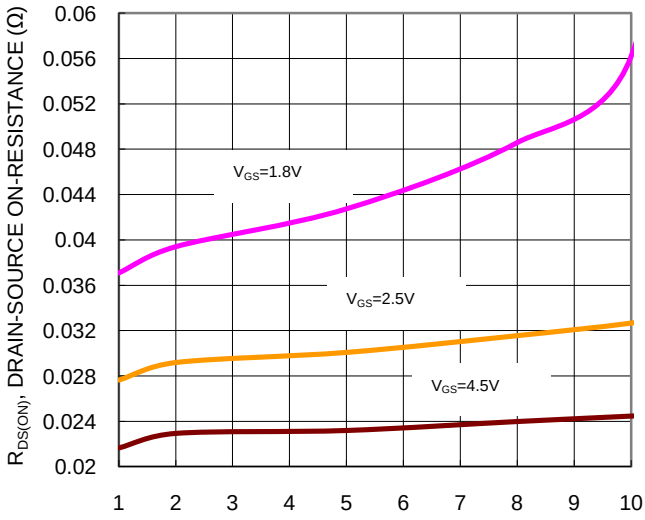


Figure 3 Typical On-Resistance vs Drain Current and Gate Voltage

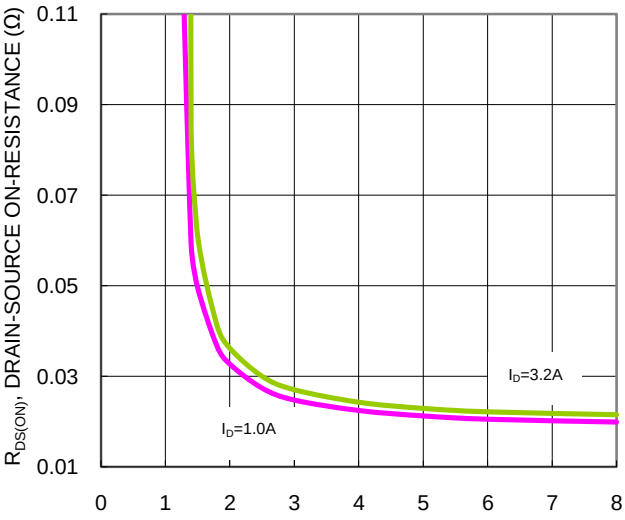


Figure 4 Typical Transfer Characteristic

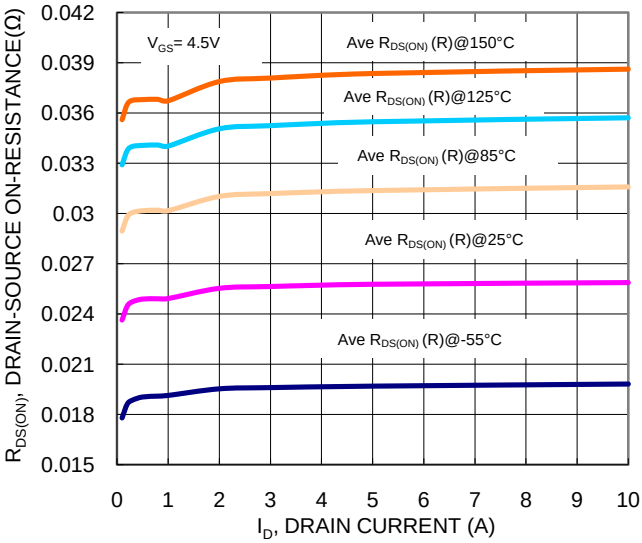


Figure 5 Typical On-Resistance vs Drain Current and Temperature

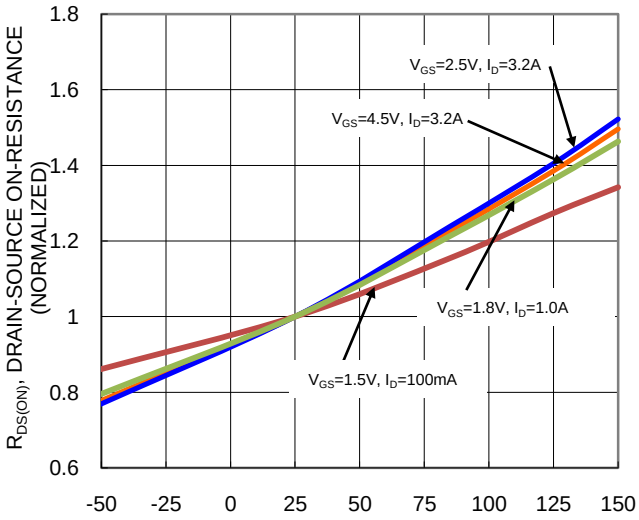


Figure 6 On-Resistance Variation with Temperature

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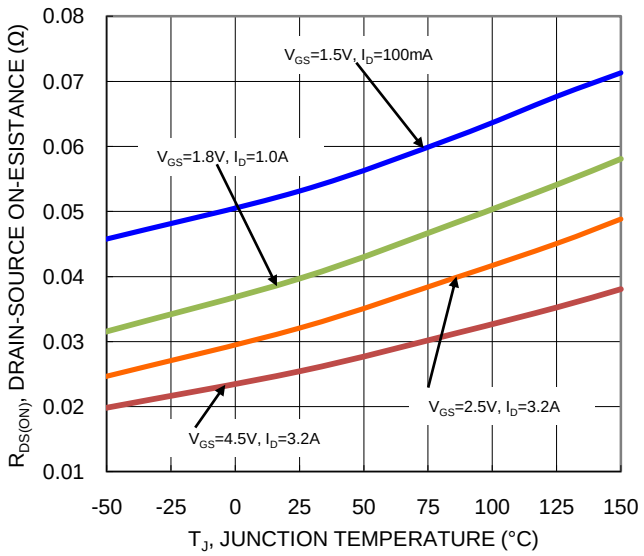


Figure 7 On-Resistance Variation with Temperature

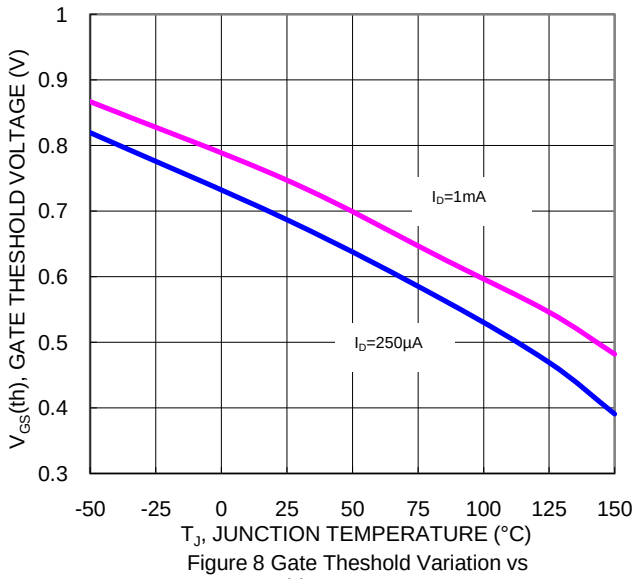


Figure 8 Gate Theshold Variation vs Ambient Temperature

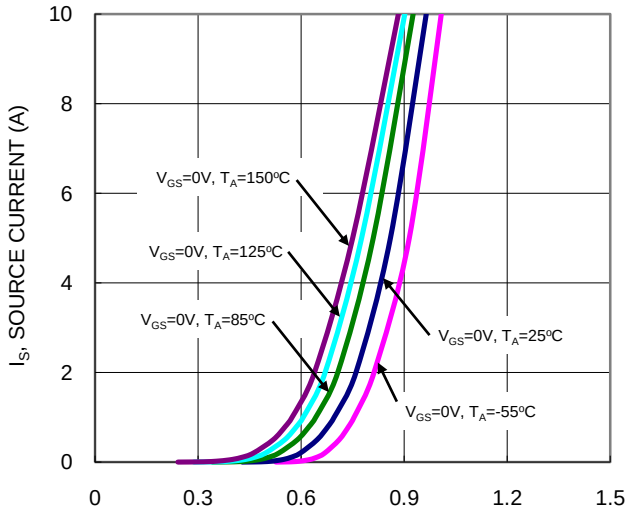


Figure 9 Diode Forward Voltage vs. Current

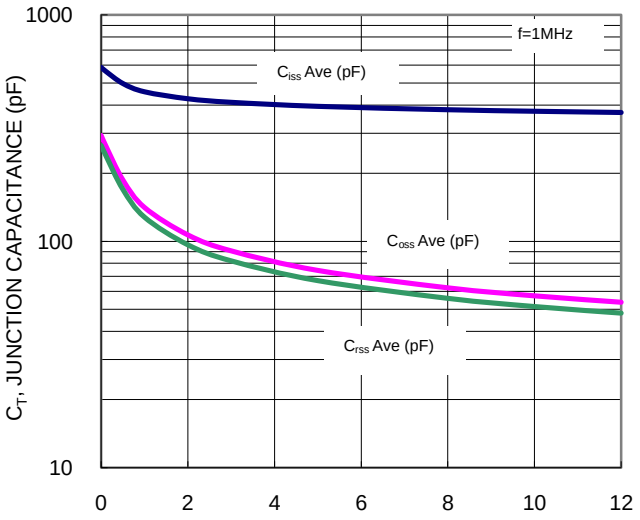


Figure 10 Typical Junction Capacitance

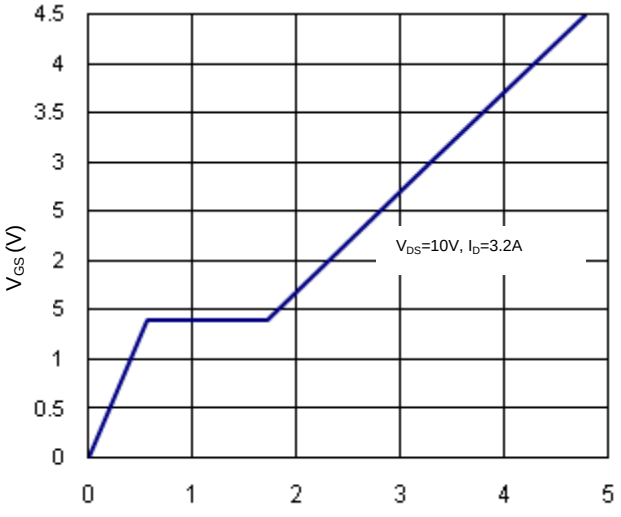


Figure 11 Gate Charge

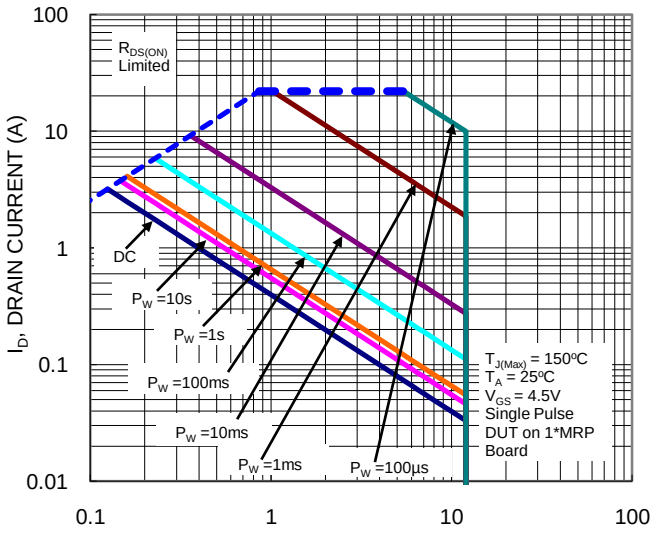


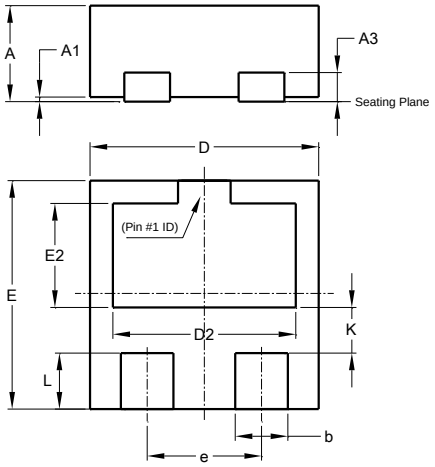
Figure 12 SOA, Safe Operation Area

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Package Outline Dimensions

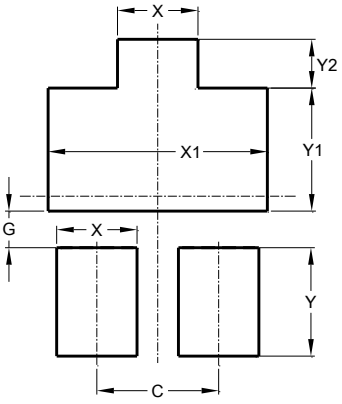
Please see AP02002 at http://www.diodes.com/datasheets/ap02002.pdf for latest version.



X2-DFN1010-3			
Dim	**Min**	**Max**	**Typ**
A	-	0.40	0.39
A1	0.00	0.05	0.02
A3	-	-	0.13
b	0.18	0.28	0.23
D	0.95	1.05	1.00
D2	0.70	0.90	0.80
E	0.95	1.05	1.00
E2	0.36	0.56	0.46
e	-	-	0.50
K	-	-	0.20
L	0.195	0.295	0.245
All Dimensions in mm			

Suggested Pad Layout

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



X2-DFN1010-3	
Dimensions	**Value**
C	0.500
G	0.150
X	0.330
X1	0.900
Y	0.445
Y1	0.505
Y2	0.200
All Dimensions in mm	

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