

## Product Summary

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

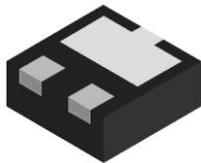
## Description and Applications

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.

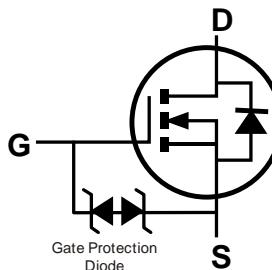
- Power Management Functions
- Backlighting
- Load Switch



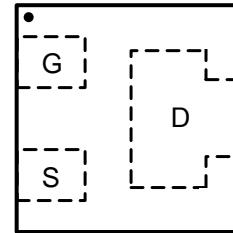
X2-DFN1010-3



Bottom View



Equivalent Circuit



Pin-out Top View

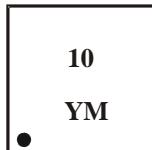
## Ordering Information (Note 4)

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

**Maximum Ratings** (@ $T_A = +25^\circ\text{C}$ , unless otherwise specified)

Characteristic			Symbol	Value	Unit
Drain-Source Voltage			$V_{DSS}$	12	V
Gate-Source Voltage			$V_{GSS}$	$\pm 8$	V
Continuous Drain Current (Note 6) $V_{GS} = 4.5\text{V}$	Steady State	$T_A = +25^\circ\text{C}$ $T_A = +70^\circ\text{C}$	$I_D$	3.2 2.5	A
Pulsed Drain Current (10 $\mu\text{s}$ 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 @ $T_A = +25^\circ\text{C}$ (Note 5)	$R_{\theta JA}$	251	°C/W
Total Power Dissipation (Note 6)	$P_D$	1.26	W
Thermal Resistance, Junction to Ambient @ $T_A = +25^\circ\text{C}$ (Note 6)	$R_{\theta JA}$	99	°C/W
Operating and Storage Temperature Range	$T_J, T_{STG}$	-55 to +150	°C

**Electrical Characteristics** (@ $T_A = +25^\circ\text{C}$ , unless otherwise specified)

Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
<b>OFF CHARACTERISTICS (Note 7)</b>						
Drain-Source Breakdown Voltage	$BV_{DSS}$	12	—	—	V	$V_{GS} = 0\text{V}, I_D = 250\mu\text{A}$
Zero Gate Voltage Drain Current	$I_{DSS}$	—	—	1	$\mu\text{A}$	$V_{DS} = 12\text{V}, V_{GS} = 0\text{V}$
Gate-Source Leakage	$I_{GSS}$	—	—	$\pm 10$	$\mu\text{A}$	$V_{GS} = \pm 8\text{V}, V_{DS} = 0\text{V}$
<b>ON CHARACTERISTICS (Note 7)</b>						
Gate Threshold Voltage	$V_{GS(\text{th})}$	0.4	—	1.0	V	$V_{DS} = V_{GS}, I_D = 250\mu\text{A}$
Static Drain-Source On-Resistance	$R_{DS(\text{ON})}$	—	25 32 40 50	45 64 85 100	$\text{m}\Omega$	$V_{GS} = 4.5\text{V}, I_D = 3.2\text{A}$ $V_{GS} = 2.5\text{V}, I_D = 3.2\text{A}$ $V_{GS} = 1.8\text{V}, I_D = 1\text{A}$ $V_{GS} = 1.5\text{V}, I_D = 0.1\text{A}$
Diode Forward Voltage	$V_{SD}$	—	—	1.2	V	$V_{GS} = 0\text{V}, I_S = 1.0\text{A}$
<b>DYNAMIC CHARACTERISTICS (Note 8)</b>						
Input Capacitance	$C_{iss}$	—	375	—	pF	$V_{DS} = 10\text{V}, V_{GS} = 0\text{V}, f = 1.0\text{MHz}$
Output Capacitance	$C_{oss}$	—	57	—	pF	
Reverse Transfer Capacitance	$C_{rss}$	—	51	—	pF	
Total Gate Charge	$Q_g$	—	4.8	—	nC	$V_{GS} = 4.5\text{V}, V_{DS} = 10\text{V}$ $I_D = 3.2\text{A}$
Gate-Source Charge	$Q_{gs}$	—	0.6	—	nC	
Gate-Drain Charge	$Q_{gd}$	—	1.2	—	nC	
Turn-On Delay Time	$t_{D(\text{on})}$	—	7	—	ns	$V_{DD} = 10\text{V}, V_{GEN} = 4.5\text{V}$ $R_{\text{GEN}} = 6\Omega, I_D = 3.2\text{A}$
Turn-On Rise Time	$t_r$	—	25	—	ns	
Turn-Off Delay Time	$t_{D(\text{off})}$	—	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.

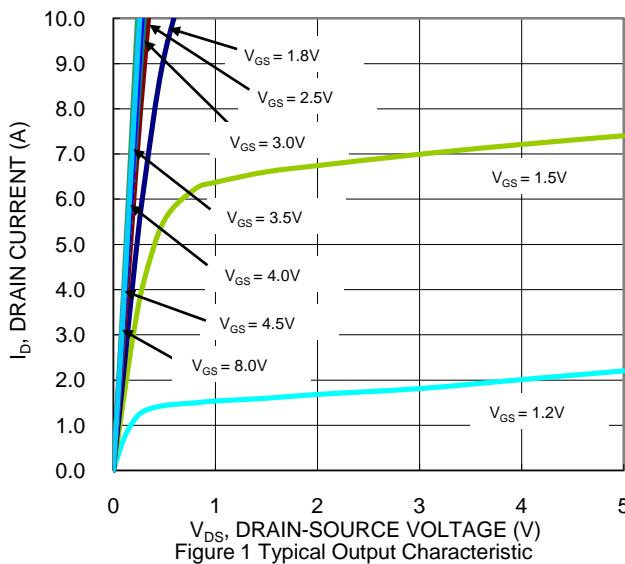


Figure 1 Typical Output Characteristic

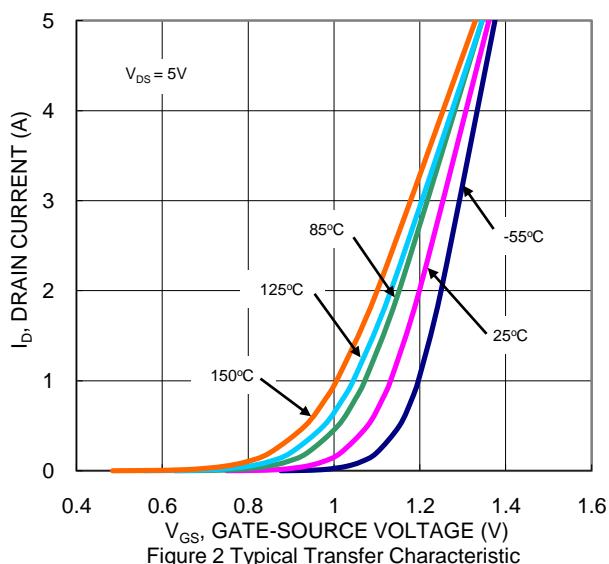


Figure 2 Typical Transfer Characteristic

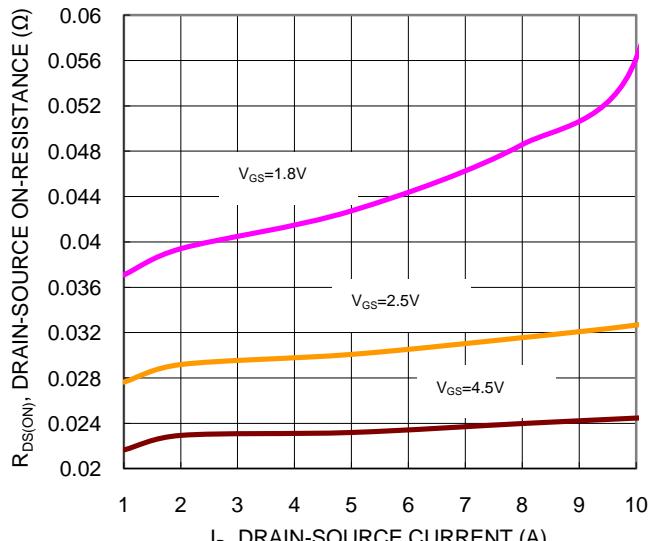


Figure 3 Typical On-Resistance vs Drain Current and Gate Voltage

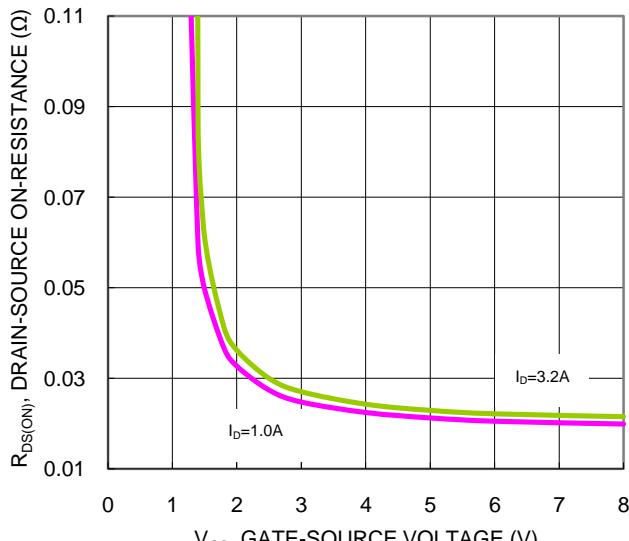


Figure 4 Typical Transfer Characteristic

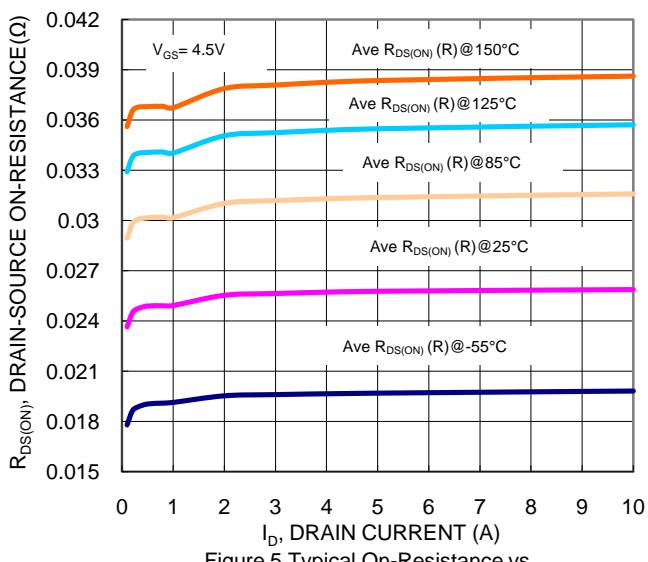


Figure 5 Typical On-Resistance vs Drain Current and Temperature

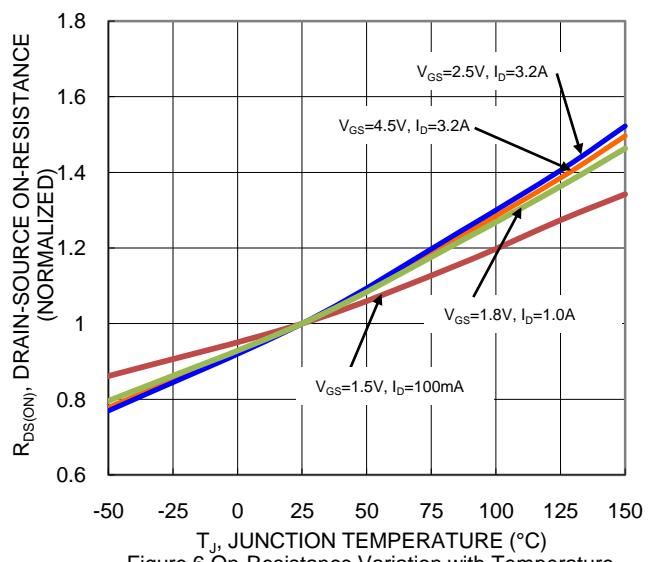


Figure 6 On-Resistance Variation with Temperature

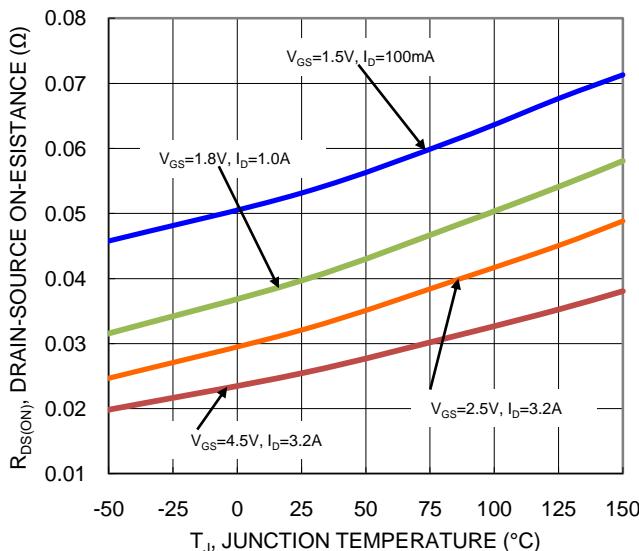


Figure 7 On-Resistance Variation with Temperature

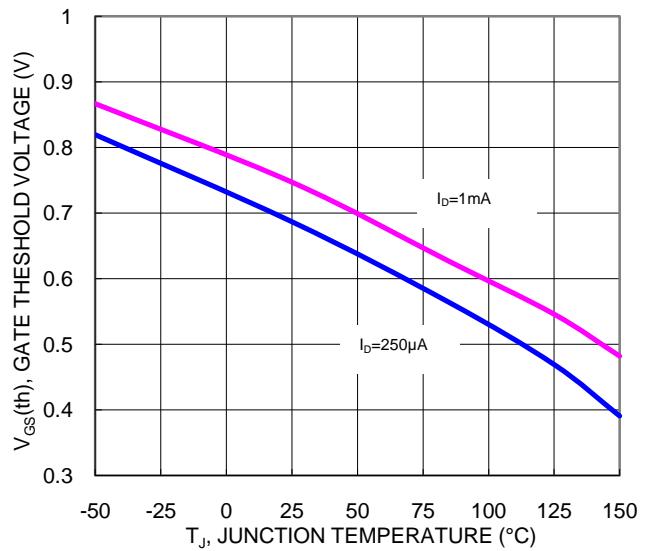


Figure 8 Gate Threshold Variation vs Ambient Temperature

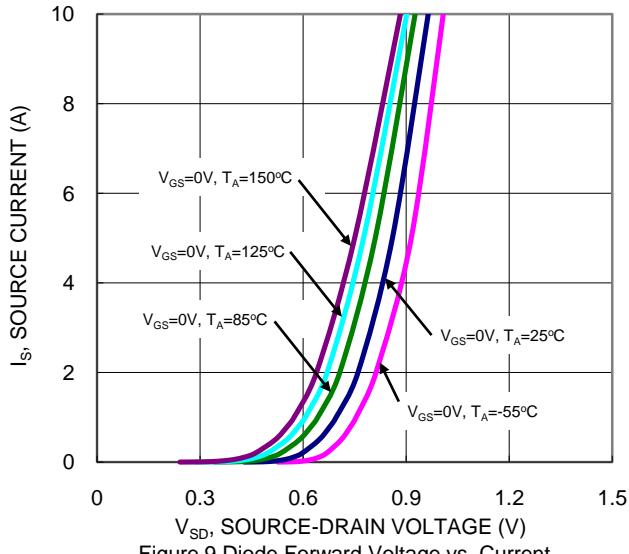


Figure 9 Diode Forward Voltage vs. Current

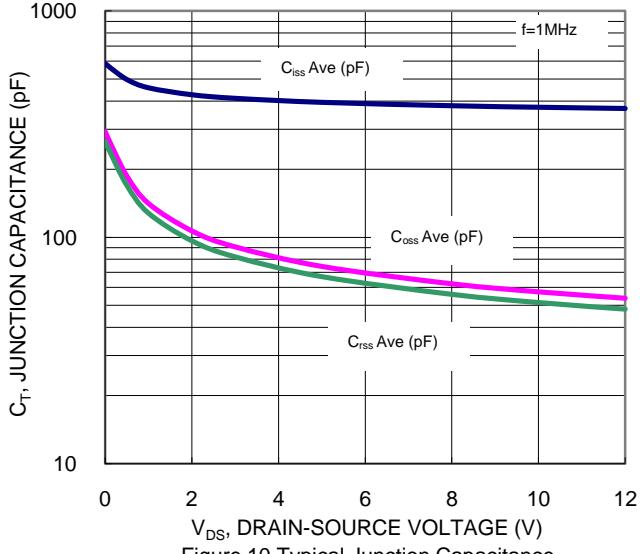


Figure 10 Typical Junction Capacitance

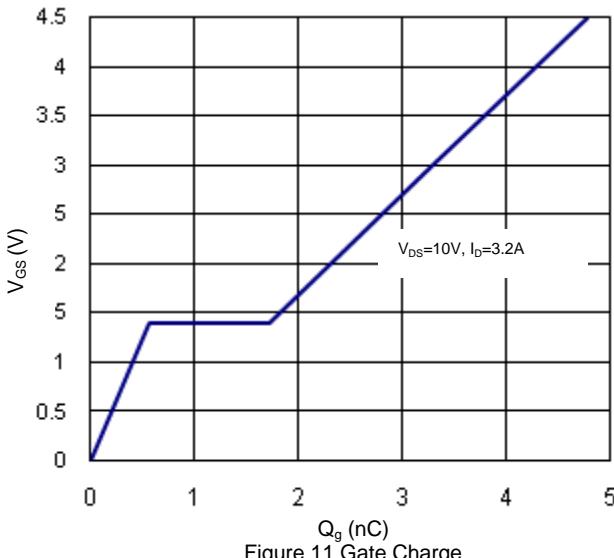


Figure 11 Gate Charge

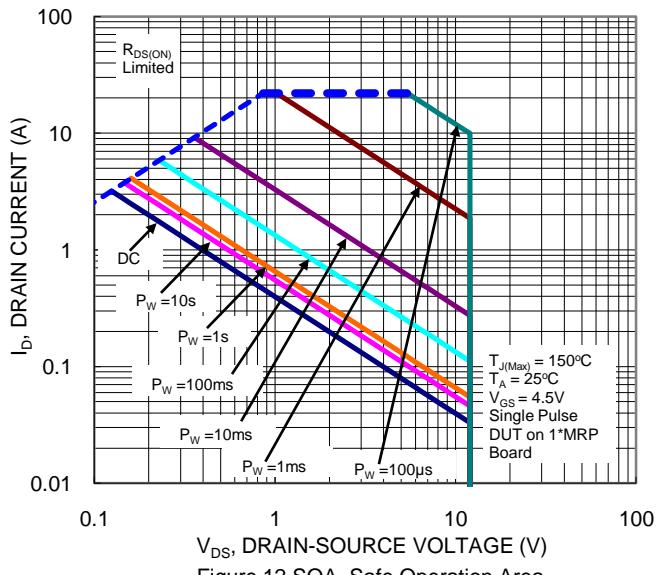
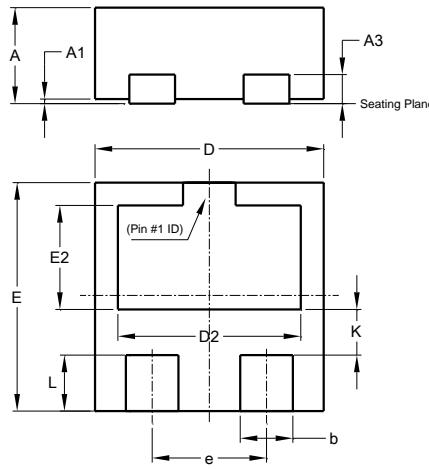


Figure 12 SOA, Safe Operation Area

## Package Outline Dimensions

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

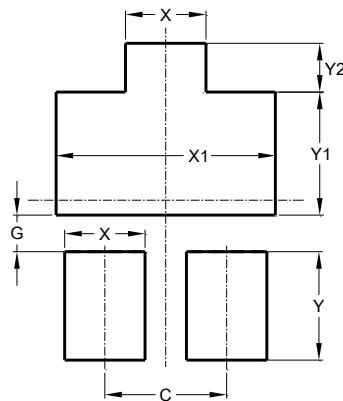


X2-DFN1010-3			
Dim	Min	Max	Typ
<b>A</b>	-	0.40	0.39
<b>A1</b>	0.00	0.05	0.02
<b>A3</b>	-	-	0.13
<b>b</b>	0.18	0.28	0.23
<b>D</b>	0.95	1.05	1.00
<b>D2</b>	0.70	0.90	0.80
<b>E</b>	0.95	1.05	1.00
<b>E2</b>	0.36	0.56	0.46
<b>e</b>	-	-	0.50
<b>K</b>	-	-	0.20
<b>L</b>	0.195	0.295	0.245

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
<b>C</b>	0.500
<b>G</b>	0.150
<b>X</b>	0.330
<b>X1</b>	0.900
<b>Y</b>	0.445
<b>Y1</b>	0.505
<b>Y2</b>	0.200

All Dimensions in mm

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