



DUAL N-CHANNEL ENHANCEMENT MODE MOSFET

Product Summary

V _{(BR)DSS}	R _{DS(ON)} max	I _D max T _A = +25°C
20V	$9.5 \text{m}\Omega @ V_{GS} = 4.5 \text{V}$	12.2 A
	$13m\Omega @ V_{GS} = 2.5V$	10.4 A

Features and Benefits

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

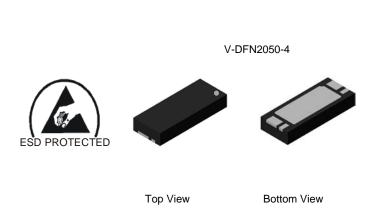
Description and Applications

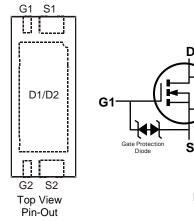
This new generation MOSFET is designed to minimize the on-state resistance ($R_{DS(ON)}$) and yet maintain superior switching performance, making it ideal for high efficiency power management applications.

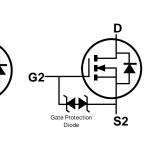
- General Purpose Interfacing Switch
- Power Management Functions

Mechanical Data

- Case: V-DFN2050-4
- 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@4
- Weight: 0.01 grams (approximate)







Equivalent Circuit

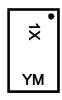
Ordering Information (Note 4)

Part Number	Case	Packaging
DMN2011UFX-7	V-DFN2050-4	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.htmlfor 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



1X = Product Type Marking Code YM = Date Code Marking Y = Year (ex: B = 2014) M = Month (ex: 9 = September)

Date Code Key

Year	201	4	2015		2016	20	17	2018		2019	2	2020
Code	В		С		D	ı	=	F		G		Н
Month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Code	1	2	3	4	5	6	7	8	9	0	N	D



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

Characteri	Symbol	Value	Unit		
Drain-Source Voltage	V _{DSS}	20	V		
Gate-Source Voltage	V _{GSS}	±12	V		
Continuous Drain Current (Note 6) V _{GS} = 4.5V	Steady State	$T_A = +25$ °C $T_A = +70$ °C	I _D	12.2 9.8	А
Continuous Drain Current (Note 6) V _{GS} = 2.5V	Steady State	$T_A = +25$ °C $T_A = +70$ °C	I _D	10.4 8.3	А
Pulsed Drain Current (10µs pulse, duty cycle = 19	I _{DM}	80	А		
Maximum Body Diode Continuous Current	Is	2.5	Α		
Avalanche Current (Note 7) L = 0.1mH	I _{AS}	18	А		
Repetitive Avalanche Energy (Note 7) L = 0.1mH	E _{AS}	17	mJ		

Thermal Characteristics

Characteristic	Symbol	Max	Unit
Power Dissipation (Note 6)	P_{D}	2.1	W
Thermal Resistance, Junction to Ambient @T _A = +25°C (Note 6)	$R_{\theta JA}$	59.1	°C/W
Thermal Resistance, Junction to Case (Note 6)	$R_{\theta JC}$	7.1	°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	Тур	Max	Unit	Test Condition
OFF CHARACTERISTICS (Note 8)						
Drain-Source Breakdown Voltage	BV _{DSS}	20	_	—	V	$V_{GS} = 0V, I_D = 250\mu A$
Zero Gate Voltage Drain Current T _J = +25°C	I _{DSS}	_	_	1	μΑ	$V_{DS} = 16V$, $V_{GS} = 0V$
Gate-Source Leakage	I _{GSS}	_		±10	μΑ	$V_{GS} = \pm 10V$, $V_{DS} = 0V$
ON CHARACTERISTICS (Note 8)						
Gate Threshold Voltage	$V_{GS(th)}$	0.3	_	1.0	V	$V_{DS} = V_{GS}, I_{D} = 250 \mu A$
			_	9.5		$V_{GS} = 4.5V, I_D = 10A$
			_	10		$V_{GS} = 4.0V, I_D = 10A$
Static Drain-Source On-Resistance	R _{DS(ON)}	_		10.5	mΩ	$V_{GS} = 3.5V, I_D = 9A$
				11.5		$V_{GS} = 3.1V, I_D = 9A$
				13		$V_{GS} = 2.5V, I_D = 8A$
Diode Forward Voltage	V_{SD}			1.2	V	$V_{GS} = 0V$, $I_S = 1A$
DYNAMIC CHARACTERISTICS (Note 9)						
Input Capacitance	C _{iss}	_	2248	_	pF	101/1/ 01/
Output Capacitance	Coss	_	295	_	pF	$V_{DS} = 10V, V_{GS} = 0V,$ -f = 1.0MHz
Reverse Transfer Capacitance	C _{rss}		265	_	рF	1 = 1.01/11/12
Gate Resistance	R_g	_	1.5	_	Ω	$V_{DS} = 0V$, $V_{GS} = 0V$, $f = 1MHz$
Total Gate Charge (V _{GS} = 4.5V)	Q_{g}		24	_	nC	
Total Gate Charge (V _{GS} = 10V)	Q_g	_	56	_	nC	\/ 10\/ I- 9.5A
Gate-Source Charge	Q_{gs}		3.5	_	nC	$V_{DS} = 10V, I_{D} = 8.5A$
Gate-Drain Charge	Q_{gd}		5.1	_	nC	
Turn-On Delay Time	t _{D(on)}	_	3.6	_	ns	
Turn-On Rise Time	t _r	_	2.6	_	ns	$V_{DS} = 10V, I_D = 8.5A$
Turn-Off Delay Time	t _{D(off)}	_	21.6	_	ns	$V_{GS} = 4.5V, R_G = 1.8\Omega$
Turn-Off Fall Time	t _f	_	13.5	_	ns	
Body Diode Reverse Recovery Time	t _{rr}	_	12.8	_	nS	I _F = 8.5A, dl/dt = 210A/μs
Body Diode Reverse Recovery Charge	Q _{rr}	_	6.9		nC	I _F = 8.5A, dl/dt = 210A/μs

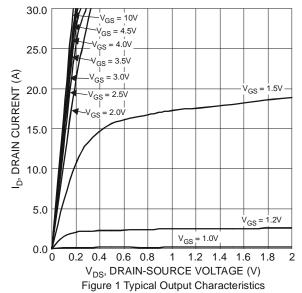
 Device mounted on FR-4 substrate PC board, 2oz copper, with minimum recommended pad layout.
 Device mounted on FR-4 substrate PC board, 2oz copper, with 1inch square copper plate. Notes:

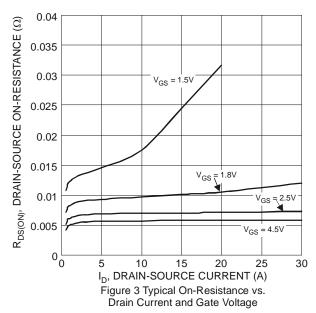
^{7.} IAS and EAS rating are based on low frequency and duty cycles to keep $T_J = +25$ °C.

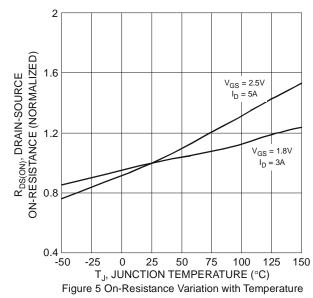
^{8.} Short duration pulse test used to minimize self-heating effect.

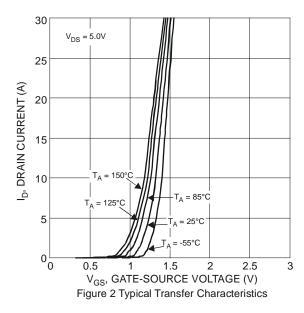
^{9.} Guaranteed by design. Not subject to product testing.

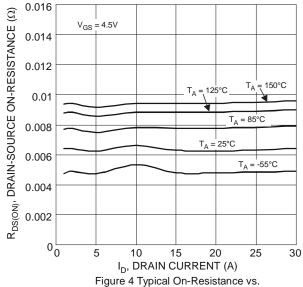




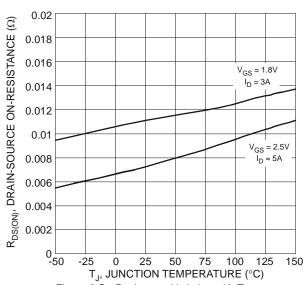








Drain Current and Temperature





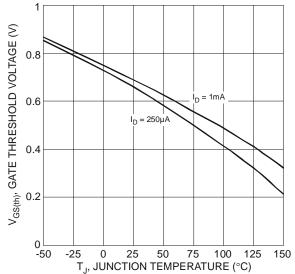


Figure 7 Gate Threshold Variation vs. Ambient Temperature

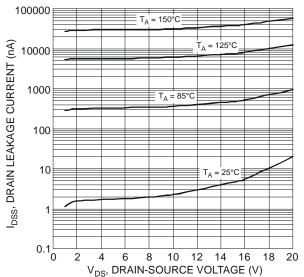
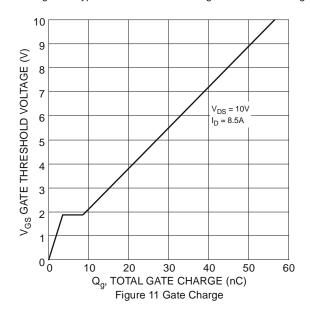
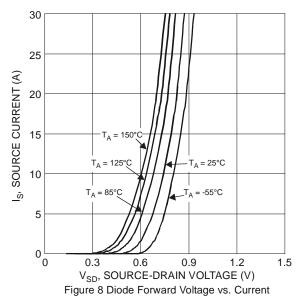
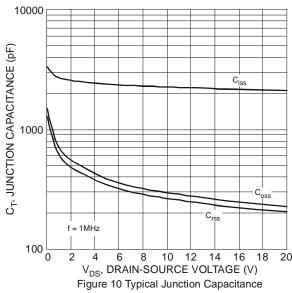
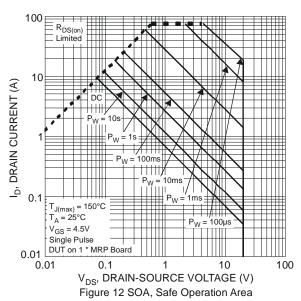


Figure 9 Typical Drain-Source Leakage Current vs. Voltage

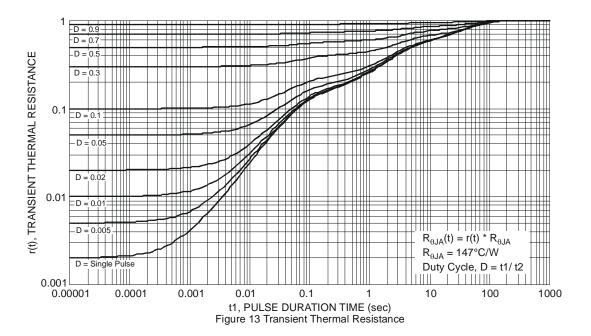








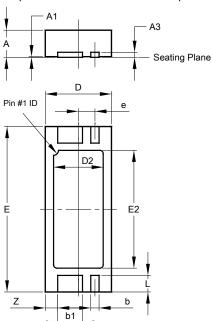






Package Outline Dimensions

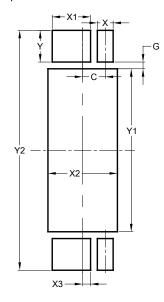
Please see AP02002 at http://www.diodes.com/datasheets/ap02002.pdf for latest version.



Dimensions	Value (in mm)
С	0.500
G	0.150
Х	0.350
X1	0.850
X2	1.540
Х3	0.175
Y	0.700
Y1	3.600
Y2	5.300

Suggested Pad Layout

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



V-DFN2050-4								
Dim	Min	Max	Тур					
Α	0.75	0.85	0.80					
A1	0	0.05	0.02					
A3	-	-	0.15					
b	0.20	0.30	0.25					
b1	0.70	0.80	0.75					
D	1.90	2.10	2.00					
D2	1.40	1.60	1.50					
Е	4.90	5.10	5.00					
E2	3.46	3.66	3.56					
е	e 0.50 BSC							
L	0.35	0.65	0.50					
Z	-	-	0.375					
All Dimensions in mm								



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