



#### 30V DUAL N-CHANNEL ENHANCEMENT MODE MOSFET

#### **Product Summary**

Device	V <sub>(BR)DSS</sub>	R <sub>DS(ON) max</sub>	I <sub>D MAX</sub> T <sub>A</sub> = +25°C
N-Channel	30V	$20m\Omega @ V_{GS} = 10V$	7.3A
N-Charine	30 V	$24m\Omega$ @ $V_{GS} = 4.5V$	6.7A

## **Description**

This MOSFET is designed to minimize the on-state resistance (R<sub>DS(ON)</sub>) and yet maintain superior switching performance, making it ideal for high efficiency power management applications.

#### **Applications**

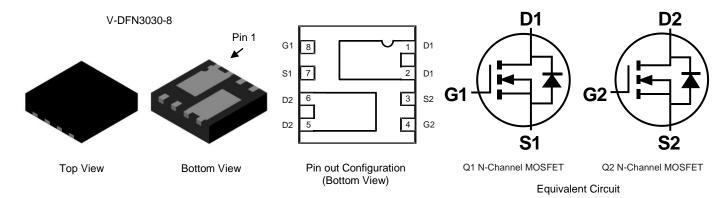
- DC Motor Control
- DC-AC Inverters

## **Features**

- Low On-Resistance
- Low Input Capacitance
- Fast Switching Speed
- Totally Lead-Free & Fully RoHS Compliant (Notes 1 & 2)
- Halogen and Antimony Free. "Green" Device (Note 3)

#### **Mechanical Data**

- Case: V-DFN3030-8
- 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
- Weight: 0.02 grams (Approximate)



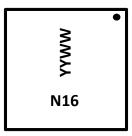
#### Ordering Information (Note 4)

Part Number	Case	Packaging
DMN3016LDN-7	V-DFN3030-8	3000/Tape & Reel
DMN3016LDN-13	V-DFN3030-8	10000/Tape & Reel

Notes:

- 1. No purposely added lead. Fully EU Directive 2002/95/EC (RoHS) & 2011/65/EU (RoHS 2) compliant.
- 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. For packaging details, go to our website at http"//www.diodes.com/products/packages.html.

# **Marking Information**



N16 = Product Type Marking Code YYWW = Date Code Marking YY = Last Digit of Year (ex: 13 for 2013) WW = Week Code (01 ~ 53)



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

Characteristic			Symbol	Value	Units
Drain-Source Voltage			$V_{DSS}$	30	V
Gate-Source Voltage			V <sub>GSS</sub>	±20	V
		T <sub>A</sub> = +25°C T <sub>A</sub> = +70°C	I <sub>D</sub>	7.3 5.8	А
Continuous Drain Current (Note 6) V <sub>GS</sub> = 10V	t<10s	$T_A = +25^{\circ}C$ $T_A = +70^{\circ}C$	I <sub>D</sub>	9.2 7.3	А
Maximum Continuous Body Diode Forward Current (Note 6)			Is	2.5	Α
Pulsed Drain Current (10µs Pulse, Duty Cycle = 1%)			I <sub>DM</sub>	45	Α
Avalanche Current (Note 7) L = 0.1mH			I <sub>AS</sub>	22	Α
Avalanche Energy (Note 7) L = 0.1mH			Eas	24	mJ

# **Thermal Characteristics**

Characteristic	Symbol	Value	Units		
Total Power Dissipation (Note 5)	T <sub>A</sub> = +25°C	P <sub>D</sub>	1.1	W	
Thermal Decistores, Junction to Ambient (Note E)	Steady State	D	119	°C/W	
Thermal Resistance, Junction to Ambient (Note 5)	t<10s	$R_{\theta JA}$	75		
Total Power Dissipation (Note 6)	$T_A = +25^{\circ}C$	P <sub>D</sub>	1.6	W	
Thermal Resistance, Junction to Ambient (Note 6)	Steady State	D	78		
Thermal Resistance, Junction to Ambient (Note 6)	t<10s	$R_{\theta JA}$	49	°C/W	
Thermal Resistance, Junction to Case (Note 6)		R <sub>0JC</sub>	13.5		
Operating and Storage Temperature Range	T <sub>J</sub> , T <sub>STG</sub>	-55 to +150	°C		

#### **Electrical Characteristics** (@T<sub>A</sub> = +25°C, unless otherwise specified.)

Characteristic	Symbol	Min	Тур	Max	Unit	Test Condition	
OFF CHARACTERISTICS (Note 8)							
Drain-Source Breakdown Voltage	BV <sub>DSS</sub>	30	-	-	V	$V_{GS} = 0V, I_D = 250\mu A$	
Zero Gate Voltage Drain Current	I <sub>DSS</sub>	-	-	1	μΑ	V <sub>DS</sub> = 30V, V <sub>GS</sub> = 0V	
Gate-Source Leakage	I <sub>GSS</sub>	-	-	±100	nA	$V_{GS} = \pm 20V, V_{DS} = 0V$	
ON CHARACTERISTICS (Note 8)							
Gate Threshold Voltage	V <sub>GS(TH)</sub>	1.4	-	2.0	V	$V_{DS} = V_{GS}$ , $I_D = 250\mu A$	
Static Drain-Source On-Resistance	В	-	-	20	m0	$V_{GS} = 10V, I_D = 11A$	
Static Drain-Source On-Resistance	R <sub>DS(ON)</sub>	-	-	24	mΩ	$V_{GS} = 4.5V, I_D = 9A$	
Diode Forward Voltage	V <sub>SD</sub>	-	0.70	1.0	V	$V_{GS} = 0V, I_{S} = 1A$	
DYNAMIC CHARACTERISTICS (Note 9)							
Input Capacitance	C <sub>iss</sub>	-	1415	-		V <sub>DS</sub> = 15V, V <sub>GS</sub> = 0V, f = 1.0MHz	
Output Capacitance	C <sub>oss</sub>	-	119	-	pF		
Reverse Transfer Capacitance	C <sub>rss</sub>	-	82	-			
Gate Resistance	$R_{g}$	-	2.6	-	Ω	$V_{DS} = 0V, V_{GS} = 0V, f = 1.0MHz$	
Total Gate Charge (V <sub>GS</sub> = 4.5V)	Qg	-	11.3	-		V <sub>DS</sub> = 15V, I <sub>D</sub> = 12A	
Total Gate Charge (V <sub>GS</sub> = 10V)	Qg	-	25.1	-	nC		
Gate-Source Charge	Q <sub>gs</sub>	-	3.5	-	nc		
Gate-Drain Charge	$Q_{gd}$	-	3.6	-			
Turn-On Delay Time	t <sub>D(ON)</sub>	-	4.8	-		$V_{DD} = 15V, V_{GS} = 10V,$ $R_L = 1.25\Omega, R_G = 3\Omega$	
Turn-On Rise Time	t <sub>R</sub>	-	16.5	-			
Turn-Off Delay Time	t <sub>D(OFF)</sub>	-	26.1	-	ns		
Turn-Off Fall Time	t <sub>F</sub>	_	5.6	-			
Reverse Recovery Time	t <sub>RR</sub>	-	12.3	-	ns	1 404 41/41 5004/55	
Reverse Recovery Charge	Q <sub>rr</sub>	-	10.4	-	nC	$I_F = 12A$ , di/dt = 500A/ $\mu$ s	

- 5. Device mounted on FR-4 PC board, with minimum recommended pad layout, single sided.
  6. Device mounted on FR-4 substrate PC board, 2oz copper, with thermal bias to bottom layer 1in. square copper plate.
  7.  $I_{AS}$  and  $E_{AS}$  rating are based on low frequency and duty cycles to keep  $T_J = +25^{\circ}$ C.
- Short duration pulse test used to minimize self-heating effect.
   Guaranteed by design. Not subject to product testing.

#### **DMN3016LDN** 30.0 30 GS = 3.5V V<sub>DS</sub>= 5.0V 25.0 25 = 4.0V $V_{GS} = 3.0V$ ID, DRAIN CURRENT (A) ID, DRAIN CURRENT (A) 20.0 20 15.0 15 $T_A = 150^{\circ}C$ $V_{GS} = 10.0V$ 10.0 10 = 125°C = 25°C 5.0 5 $V_{GS} = 2.5V$ $= 85^{\circ}C$ = -55°C $V_{GS} = 2.2V$ 0.0 0 0 0.5 0 0.5 1 1.5 2 2.5 3 3.5 V<sub>DS</sub>, DRAIN-SOURCE VOLTAGE (V) V<sub>GS</sub>, GATE-SOURCE VOLTAGE (V) Figure 2 Typical Transfer Characteristic Figure 1 Typical Output Characteristic 0.03 0.03 $V_{GS} = 4.5V$ 0.025 R<sub>DS(ON)</sub>, DRAIN-SOURCE ON-RESISTANCE (Ω) T<sub>A</sub> = 150°C R<sub>DS(ON)</sub>, DRAIN-SOURCE ON-RESISTANCE (Ω) $T_A = 125^{\circ}C$ 0.02 0.02 0.015 $V_{GS} = 4.5V$ $T_{\Delta} = 85^{\circ}C$ 0.01 0.01 $T_A = 25^{\circ}C$ $V_{GS} = 10V$ $T_A = -55$ °C 0.005 0 0 5 15 10 20 10 20 25 30 0 5 15 25 30 0 I<sub>D</sub>, DRAIN-SOURCE CURRENT (A) I<sub>D</sub>, DRAIN CURRENT (A) Figure 3 Typical On-Resistance vs Drain Current Figure 4 Typical On-Resistance vs Drain Current and Gate Voltage and Temperature 0.024 1.8 0.02 R<sub>DS(ON)</sub>, DRAIN-SOURCE ON-ESISTANCE (NORMALIZED) 0.016 $V_{GS} = 4.5V, I_{D} = 5A$ $V_{GS} = 4.5V,$ I<sub>D</sub> =5A 0.012 $V_{GS} = 10V$ , $I_D = 10A$ 0.008 $V_{GS} = 10V, I_{D} = 10A$ 0.004

-50

0

25

50

T<sub>J</sub>, JUNCTION TEMPERATURE (°C)

Figure 5 On-Resistance Variation with Temperature

75

100 125

150

0.6

0

0

25

50

T<sub>J</sub>, JUNCTION TEMPERATURE (°C)

Figure 6 On-Resistance Variation with Temperature

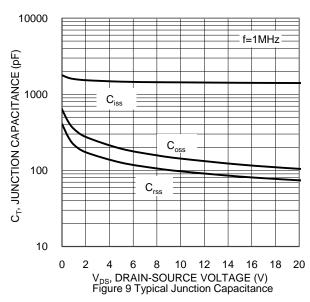
75

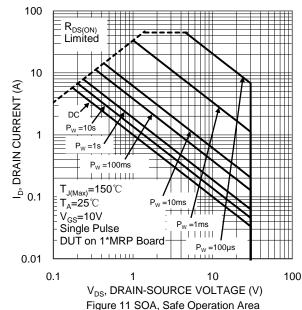
100 125



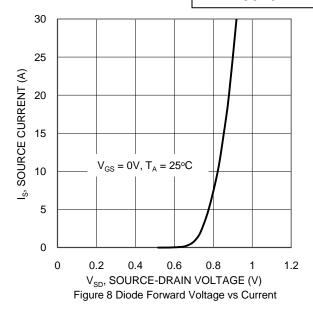
#### 3 $V_{\text{GS(TH)}}$ , GATE THESHOLD VOLTAGE (V) 2.5 2 $I_D = 1mA$ 1.5 1 $I_{D} = 250 \mu A$ 0.5 0 -25 0 25 75 100 125 -50 50

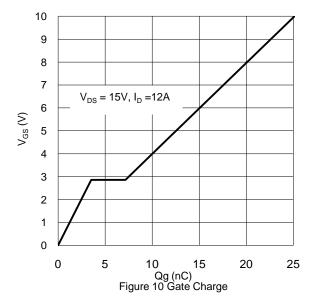
T<sub>J</sub>, JUNCTION TEMPERATURE (°C) Figure 7 Gate Theshold Variation vs Junction Temperature



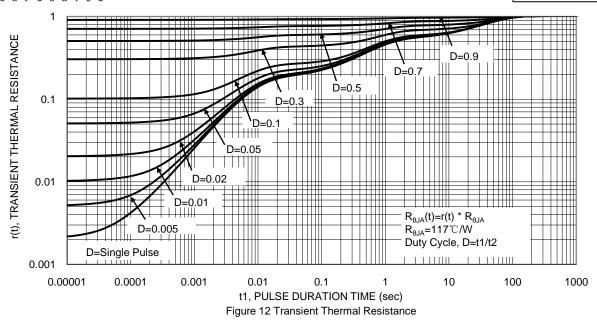


## DMN3016LDN





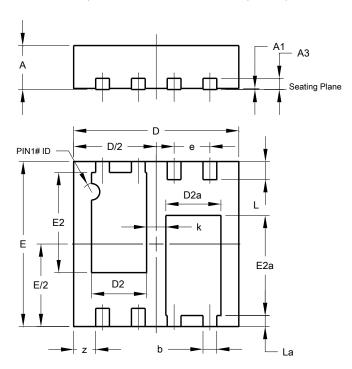






# **Package Outline Dimensions**

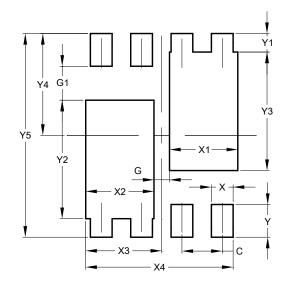
Please see AP02002 at http://www.diodes.com/datasheets/ap02002.pdf for the latest version.



	V-DFN3030-8 (Type J)					
Dim	Min	Max	Тур			
Α	0.77	0.83	0.80			
A1	0.00	0.05	0.02			
A3	0.	203 BS	С			
b	0.20	0.30	0.25			
D	2.95	3.050	3.00			
D2	0.90	1.10	1.00			
D2a	0.90	1.10	1.00			
Е	2.95	3.050	3.00			
E2	1.72	1.92	1.82			
E2a	1.72	1.92	1.82			
е	0.65BSC					
L	0.27	0.38	0.33			
La	0.15	0.25	0.20			
k	0.35 TYP					
Z	0.40 BSC					
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)		
С	0.650		
G	0.250		
G1	0.550		
Х	0.350		
X1	1.100		
X2	1.100		
Х3	1.225		
X4	2.375		
Υ	0.530		
Y1	0.300		
Y2	1.920		
Y3	1.920		
Y4	1.650		
Y5	3.300		



#### IMPORTANT NOTICE

DIODES INCORPORATED MAKES NO WARRANTY OF ANY KIND, EXPRESS OR IMPLIED, WITH REGARDS TO THIS DOCUMENT, INCLUDING, BUT NOT LIMITED TO, THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE (AND THEIR EQUIVALENTS UNDER THE LAWS OF ANY JURISDICTION).

Diodes Incorporated and its subsidiaries reserve the right to make modifications, enhancements, improvements, corrections or other changes without further notice to this document and any product described herein. Diodes Incorporated does not assume any liability arising out of the application or use of this document or any product described herein; neither does Diodes Incorporated convey any license under its patent or trademark rights, nor the rights of others. Any Customer or user of this document or products described herein in such applications shall assume all risks of such use and will agree to hold Diodes Incorporated and all the companies whose products are represented on Diodes Incorporated website, harmless against all damages.

Diodes Incorporated does not warrant or accept any liability whatsoever in respect of any products purchased through unauthorized sales channel. Should Customers purchase or use Diodes Incorporated products for any unintended or unauthorized application, Customers shall indemnify and hold Diodes Incorporated and its representatives harmless against all claims, damages, expenses, and attorney fees arising out of, directly or indirectly, any claim of personal injury or death associated with such unintended or unauthorized application.

Products described herein may be covered by one or more United States, international or foreign patents pending. Product names and markings noted herein may also be covered by one or more United States, international or foreign trademarks.

This document is written in English but may be translated into multiple languages for reference. Only the English version of this document is the final and determinative format released by Diodes Incorporated.

#### LIFE SUPPORT

Diodes Incorporated products are specifically not authorized for use as critical components in life support devices or systems without the express written approval of the Chief Executive Officer of Diodes Incorporated. As used herein:

- A. Life support devices or systems are devices or systems which:
  - 1. are intended to implant into the body, or
  - 2. support or sustain life and whose failure to perform when properly used in accordance with instructions for use provided in the labeling can be reasonably expected to result in significant injury to the user.
- B. A critical component is any component in a life support device or system whose failure to perform can be reasonably expected to cause the failure of the life support device or to affect its safety or effectiveness.

Customers represent that they have all necessary expertise in the safety and regulatory ramifications of their life support devices or systems, and acknowledge and agree that they are solely responsible for all legal, regulatory and safety-related requirements concerning their products and any use of Diodes Incorporated products in such safety-critical, life support devices or systems, notwithstanding any devices- or systems-related information or support that may be provided by Diodes Incorporated. Further, Customers must fully indemnify Diodes Incorporated and its representatives against any damages arising out of the use of Diodes Incorporated products in such safety-critical, life support devices or systems.

Copyright © 2015, Diodes Incorporated

www.diodes.com

# **ПОСТАВКА** ЭЛЕКТРОННЫХ КОМПОНЕНТОВ

многоканальный

Общество с ограниченной ответственностью «МосЧип» ИНН 7719860671 / КПП 771901001 Адрес: 105318, г.Москва, ул.Щербаковская д.3, офис 1107

# Данный компонент на территории Российской Федерации Вы можете приобрести в компании MosChip.

Для оперативного оформления запроса Вам необходимо перейти по данной ссылке:

## http://moschip.ru/get-element

Вы можете разместить у нас заказ для любого Вашего проекта, будь то серийное производство или разработка единичного прибора.

В нашем ассортименте представлены ведущие мировые производители активных и пассивных электронных компонентов.

Нашей специализацией является поставка электронной компонентной базы двойного назначения, продукции таких производителей как XILINX, Intel (ex.ALTERA), Vicor, Microchip, Texas Instruments, Analog Devices, Mini-Circuits, Amphenol, Glenair.

Сотрудничество с глобальными дистрибьюторами электронных компонентов, предоставляет возможность заказывать и получать с международных складов практически любой перечень компонентов в оптимальные для Вас сроки.

На всех этапах разработки и производства наши партнеры могут получить квалифицированную поддержку опытных инженеров.

Система менеджмента качества компании отвечает требованиям в соответствии с ГОСТ Р ИСО 9001, ГОСТ РВ 0015-002 и ЭС РД 009

#### Офис по работе с юридическими лицами:

105318, г. Москва, ул. Щербаковская д. 3, офис 1107, 1118, ДЦ «Щербаковский»

Телефон: +7 495 668-12-70 (многоканальный)

Факс: +7 495 668-12-70 (доб.304)

E-mail: info@moschip.ru

Skype отдела продаж:

moschip.ru moschip.ru\_6 moschip.ru 4 moschip.ru 9