



#### 40V N-CHANNEL ENHANCEMENT MODE MOSFET

#### **Product Summary**

V <sub>(BR)DSS</sub>	R <sub>DS(ON)</sub>	I <sub>D</sub> T <sub>C</sub> = +25°C
40V	24mΩ @V <sub>GS</sub> = 10V	28A
40 V	32mΩ @V <sub>GS</sub> = 4.5V	24A

#### **Description**

This 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.

#### **Applications**

- Backlighting
- DC-DC Converters
- · Power Management Functions

## **Features**

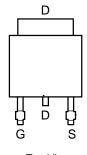
- 100% Unclamped Inductive Switch (UIS) Test in Production
- Low On-resistance
- Fast Switching Speed
- Totally Lead-Free & Fully RoHS compliant (Notes 1 & 2)
- Halogen and Antimony Free. "Green" Device (Note 3)

## **Mechanical Data**

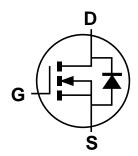
- Case: TO252
- Case Material: Molded Plastic, "Green" Molding Compound. UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminals: Matte Tin Finish Annealed over Copper Leadframe.
   Solderable per MIL-STD-202, Method 208 (3)
- Weight: 0.33 grams (Approximate)







Top View Pin-Out



**Equivalent Circuit** 

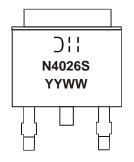
## **Ordering Information** (Note 4)

Product	Case	Packaging
DMN4026SK3-13	TO252	2,500/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**



Oll = Manufacturer's Marking
N4026S = Product Type Marking Code
YYWW = Date Code Marking
YY = Year (ex: 15 = 2015)
WW = Week (01 to 53)



# 

Characteristic			Symbol	Value	Unit
Drain-Source Voltage			$V_{DSS}$	40	V
Gate-Source Voltage			$V_{GSS}$	±20	V
Continuous Drain Current (Note 6) V <sub>GS</sub> = 10V	ΙD	28 18	А		
Maximum Body Diode Continuous Current	Is	2.5	Α		
Pulsed Drain Current (10µs Pulse, Duty Cycle = 1%)			I <sub>DM</sub>	70	Α
Avalanche Current (Note 7) L = 0.1mH			I <sub>AS</sub>	18	Α
Avalanche Energy (Note 7) L = 0.1mH			Eas	17	mJ

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

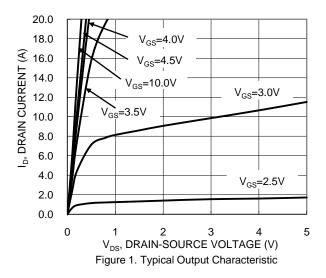
Characteristic	Symbol	Value	Unit	
Total Dawar Dissination (Note 5)	T <sub>A</sub> = +25°C		1.6	W
Total Power Dissipation (Note 5)	$T_A = +70^{\circ}C$	$P_{D}$	1.0	
Thermal Resistance, Junction to Ambient (Note 5)	Steady state	D	75	°C/W
Thermal Resistance, Junction to Ambient (Note 3)	t<10s	$R_{\theta JA}$	32.7	
Total Power Dissipation (Note 6)	$T_A = +25^{\circ}C$	В	3.4	W
Total Power Dissipation (Note 6)	$T_A = +70^{\circ}C$	$P_{D}$	2.1	
Thermal Resistance, Junction to Ambient (Note 6)	Steady state	D	37	°C/W
Thermal Resistance, Junction to Ambient (Note o)	t<10s	$R_{\theta JA}$	18.1	
Thermal Resistance, Junction to Case (Note 6)		R <sub>0</sub> JC	4.5	
Operating and Storage Temperature Range		$T_{J_i} T_{STG}$	-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>	40		_	V	$V_{GS} = 0V, I_D = 250\mu A$
Zero Gate Voltage Drain Current	I <sub>DSS</sub>	_		1	μΑ	$V_{DS} = 40V, V_{GS} = 0V$
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		3	V	$V_{DS} = V_{GS}$ , $I_D = 250\mu A$
Static Drain-Source On-Resistance	D	_	15	24	mΩ	$V_{GS} = 10V, I_D = 6A$
Static Dialii-Source Oil-Resistance	R <sub>DS(ON)</sub>	_	20	32	11177	$V_{GS} = 4.5V, I_D = 5A$
Diode Forward Voltage	$V_{SD}$	_	0.7	1.0	V	$V_{GS} = 0V, I_{S} = 1.0A$
DYNAMIC CHARACTERISTICS (Note 9)						
Input Capacitance	Ciss	_	1181	_		V <sub>DS</sub> = 20V, V <sub>GS</sub> = 0V, f = 1.0MHz
Output Capacitance	Coss	_	85	_	pF	
Reverse Transfer Capacitance	Crss	_	63	_		
Gate Resistance	R <sub>G</sub>	_	1.5	_	Ω	$V_{DS} = 0V, V_{GS} = 0V, f = 1.0MHz$
Total Gate Charge (V <sub>GS</sub> = 4.5V)	$Q_g$	_	9.6	_		
Total Gate Charge (V <sub>GS</sub> = 10V)	Qg	_	21.3	_	nC	V 20V I 0A
Gate-Source Charge	$Q_{gs}$	_	3.7	_	110	$V_{DS} = 20V, I_D = 8A$
Gate-Drain Charge	$Q_{gd}$	_	3.0	_		
Turn-On Delay Time	t <sub>D(ON)</sub>	_	4.3	_		$V_{DD} = 25V, R_L = 2.5\Omega$ $V_{GS} = 10V, R_G = 3\Omega$
Turn-On Rise Time	t <sub>R</sub>	_	4.6	_		
Turn-Off Delay Time	t <sub>D(OFF)</sub>	_	19.5	_	ns	
Turn-Off Fall Time	t <sub>F</sub>	_	3.1	_		
Body Diode Reverse Recovery Time	t <sub>RR</sub>	_	12.0	_	ns	I <sub>F</sub> = 8A, di/dt = 100A/μs
Body Diode Reverse Recovery Charge	Q <sub>RR</sub>	_	3.85	_	nC	I <sub>F</sub> = 8A, di/dt = 100A/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.
- I<sub>AS</sub> and E<sub>AS</sub> ratings are based on low frequency and duty cycles to keep T<sub>J</sub> = +25°C.
   Short duration pulse test used to minimize self-heating effect.
   Guaranteed by design. Not subject to product testing.





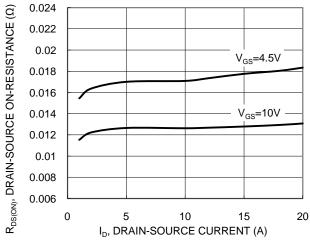


Figure 3. Typical On-Resistance vs. Drain Current and Gate Voltage

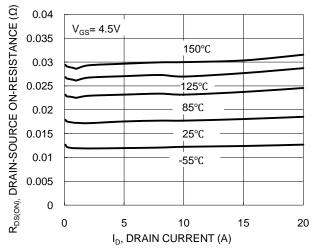
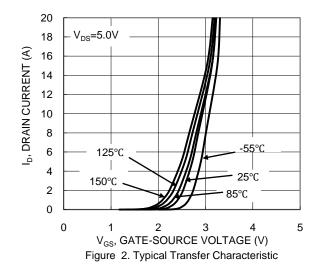
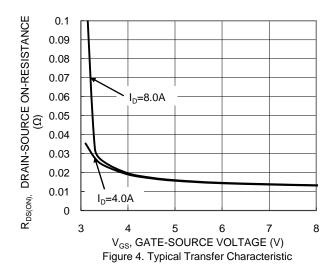


Figure 5. Typical On-Resistance vs. Drain Current and Temperature





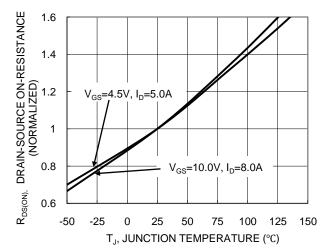


Figure 6. On-Resistance Variation with Temperature



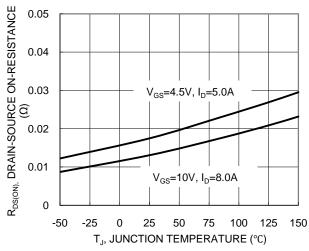
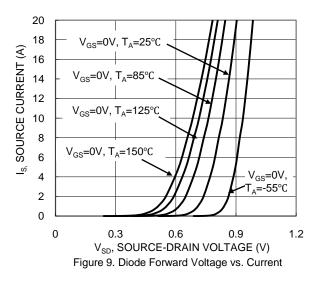
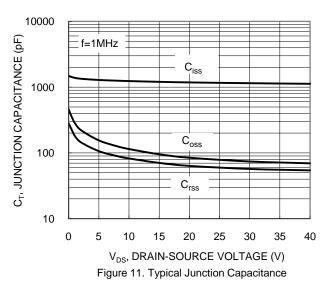


Figure 7. On-Resistance Variation with Temperature





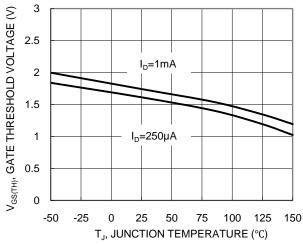


Figure 8. Gate Threshold Variation vs. Junction Temperature

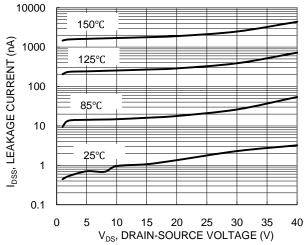
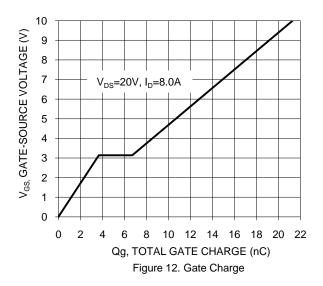
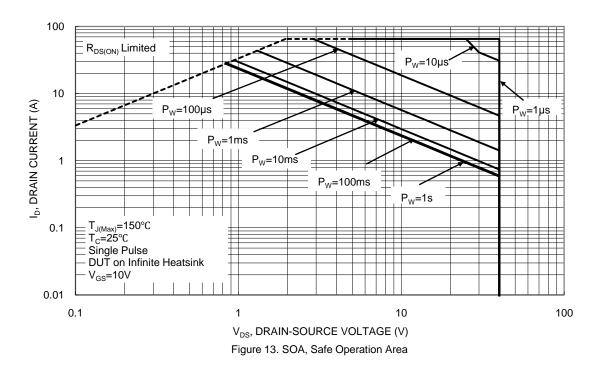
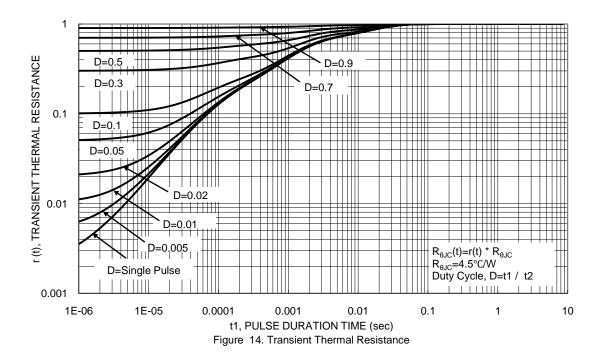


Figure 10. Typical Drain-Source Leakage Current vs. Voltage





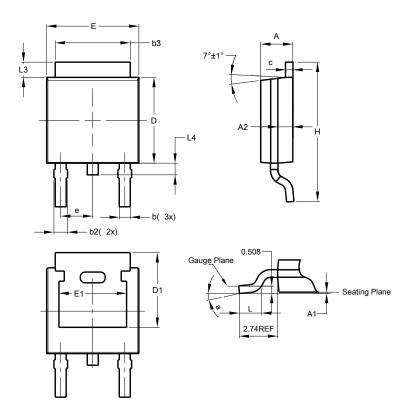






## **Package Outline Dimensions**

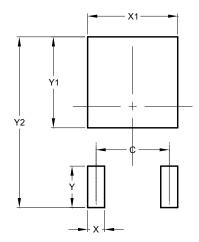
Please see AP02002 at http://www.diodes.com/datasheets/ap02002.pdf for the latest version.



TO252 (DPAK)					
Dim	Min	Max	Тур		
Α	2.19	2.39	2.29		
A1	0.00	0.13	0.08		
A2	0.97	1.17	1.07		
b	0.64	0.88	0.783		
b2	0.76	1.14	0.95		
b3	5.21	5.46	5.33		
С	0.45	0.58	0.531		
D	6.00	6.20	6.10		
D1	5.21	-	-		
е	-	-	2.286		
Е	6.45	6.70	6.58		
E1	4.32	-	-		
Н	9.40	10.41	9.91		
L	1.40	1.78	1.59		
L3	0.88	1.27	1.08		
L4	0.64	1.02	0.83		
а	0°	10°	-		
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	4.572		
Х	1.060		
X1	5.632		
Υ	2.600		
Y1	5.700		
Y2	10.700		



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