



40V +175°C N-CHANNEL ENHANCEMENT MODE MOSFET

Product Summary

BV _{DSS}	RDS(ON) Max	I _D T _C = +25°C
40V	$10m\Omega @ V_{GS} = 10V$	50A

Features and Benefits

- Rated to +175°C ideal for high ambient temperature environments
- Low On-Resistance
- Low Input Capacitance
- Lead-Free Finish; RoHS Compliant (Notes 1 & 2)
- Halogen and Antimony Free. "Green" Device (Note 3)
- Qualified to AEC-Q101 Standards for High Reliability

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.

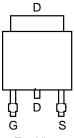
- DC-DC Converters
- Power Management Functions
- Analog Switch

Mechanical Data

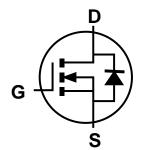
- Case: TO252 (DPAK)
- Case Material: Molded Plastic, "Green" Molding Compound.
 UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminals: Finish Matte Tin Annealed over Copper Leadframe.
 Solderable per MIL-STD-202, Method 208 (§3)
- Weight: 0.33 grams (Approximate)







Top View Pin Out



Internal Schematic

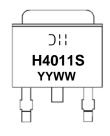
Ordering Information (Note 4)

Part Number	Case	Packaging
DMNH4011SK3-13	TO252	2,500/Tape & Reel

Notes:

- 1. EU Directive 2002/95/EC (RoHS) & 2011/65/EU (RoHS 2) compliant. All applicable RoHS exemptions applied.
- 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



=Manufacturer's Marking
H4011S = Product Type Marking Code
YYWW = Date Code Marking
YY = Last Digit of Year (ex: 14 = 2014)
WW = Week Code (01 to 53)



Maximum Ratings (@T_A = +25°C, unless otherwise specified.)

Characteristic	Symbol	Value	Unit		
Drain-Source Voltage			V_{DSS}	40	V
Gate-Source Voltage			V_{GSS}	±20	V
Continuous Drain Current (Note 6)	Steady State	$T_{C} = +25^{\circ}C$ $T_{C} = +100^{\circ}C$	ID	50 27	А
Maximum Body Diode Forward Current (Note 6)			Is	120	Α
Pulsed Drain Current (380µs Pulse, Duty Cycle = 1%)			I _{DM}	120	Α

Thermal Characteristics

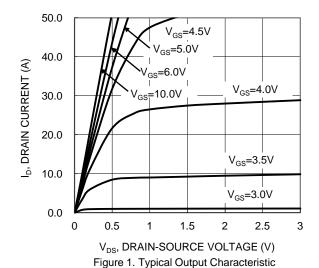
Characteristic	Symbol	Value	Unit
Total Power Dissipation (Note 5)	P_{D}	2.6	W
Thermal Resistance, Junction to Ambient (Note 5)	$R_{\theta JA}$	47	°C/W
Total Power Dissipation (Note 6)	P _D	50	W
Thermal Resistance, Junction to Case (Note 6)	$R_{ heta JC}$	3	°C/W
Operating and Storage Temperature Range	T _{J,} T _{STG}	-55 to +175	°C

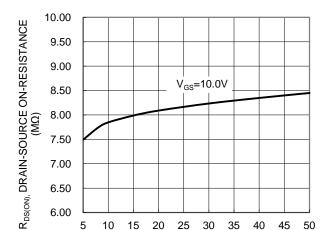
Electrical Characteristics ($@T_A = +25^{\circ}C$, unless otherwise specified.)

Characteristic	Symbol	Min	Тур	Max	Unit	Test Condition	
OFF CHARACTERISTICS (Note 7)							
Drain-Source Breakdown Voltage	BV _{DSS}	40	_	_	V	$V_{GS} = 0V, I_D = 250\mu A$	
Zero Gate Voltage Drain Current	I _{DSS}	_	_	1	μΑ	$V_{DS} = 40V, V_{GS} = 0V$	
Gate-Source Leakage	I _{GSS}	_	_	±100	nA	$V_{GS} = \pm 20V, V_{DS} = 0V$	
ON CHARACTERISTICS (Note 7)							
Gate Threshold Voltage	$V_{GS(TH)}$	2	_	4	V	$V_{DS} = V_{GS}, I_{D} = 250 \mu A$	
Static Drain-Source On-Resistance	R _{DS(ON)}	_	_	10	mΩ	$V_{GS} = 10V, I_D = 50A$	
Diode Forward Voltage	V_{SD}	_	0.9	1.2	V	$V_{GS} = 0V, I_{S} = 20A$	
DYNAMIC CHARACTERISTICS (Note 8)							
Input Capacitance	Ciss	_	1,405	_			
Output Capacitance	Coss	_	247	_	pF	$V_{DS} = 20V, V_{GS} = 0V, f = 1MHz$	
Reverse Transfer Capacitance	Crss	_	108	_			
Gate Resistance	R_{G}	_	2.2	_	Ω	$V_{DS} = 0V$, $V_{GS} = 0V$, $f = 1MHz$	
Total Gate Charge	Q_g	_	25.5	_			
Gate-Source Charge	Q_{gs}	_	4.6	_	nC	$V_{DS} = 20V, V_{GS} = 10V, I_D = 50A$	
Gate-Drain Charge	Q_{gd}	_	6.9	_			
Turn-On Delay Time	t _{D(ON)}	_	4.6	_			
Turn-On Rise Time	t _R	_	3.7	_	ns	$V_{DD} = 20V, V_{GS} = 10V,$ $I_D = 50A, R_G = 3.5\Omega$	
Turn-Off Delay Time	t _{D(OFF)}	_	16	_	115		
Turn-Off Fall Time	t _F	_	5.1	_			
Body Diode Reverse Recovery Time	t _{RR}	_	22.1	_	ns	I _F = 50A, di/dt = 100A/µs	
Body Diode Reverse Recovery Charge	Q _{RR}	_	13.4	_	nC	7 IF = 50A, αί/αι = 100A/μS	

- Device mounted on FR-4 substrate PC board, 2oz copper, with 1inch square copper plate.
 Device mounted on infinite heat sink and measured by thermal couple attached on bottom heat sink of package.
 Short duration pulse test used to minimize self-heating effect.
 Guaranteed by design. Not subject to product testing.





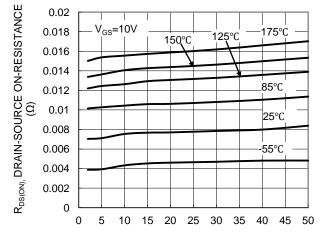


20 25

35 I_D , DRAIN-SOURCE CURRENT (A) Figure 3. Typical On-Resistance vs. Drain Current and Gate Voltage

30

40 45



I_D, DRAIN CURRENT (A) Figure 5. Typical On-Resistance vs. Drain Current and Temperature

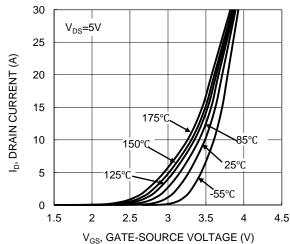
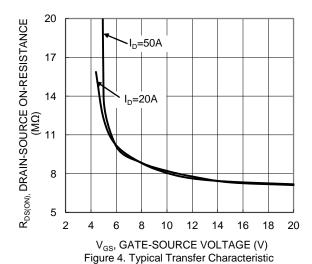


Figure 2. Typical Transfer Characteristic



R_{DS(ON),} DRAIN-SOURCE ON-RESISTANCE (NORMALIZED) 2.2 2 1.8 1.6 V_{GS} =10V, I_{D} =50A 1.4 1.2 1 8.0 0.6 0.4

-50 -25

0 25

T_J, JUNCTION TEMPERATURE (°C) Figure 6. On-Resistance Variation with Temperature

50

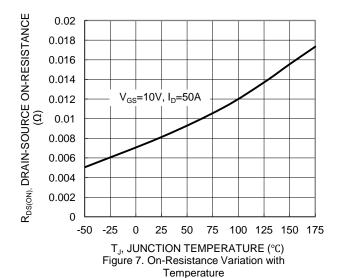
6.50

6.00

5 10 15

75 100 125 150 175





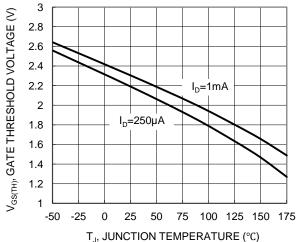


Figure 8. Gate Threshold Variation vs Temperature

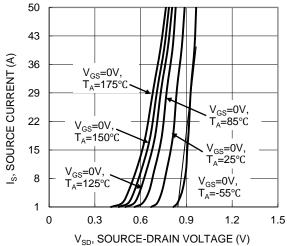
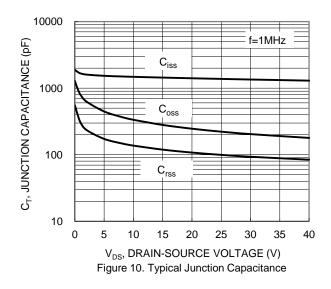


Figure 9. Diode Forward Voltage vs. Current

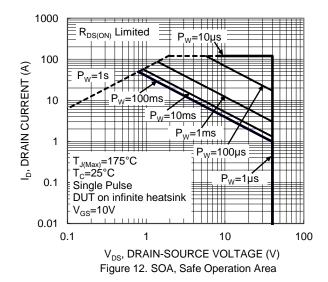
12 15 18

Qg (nC)

Figure 11. Gate Charge



 V_{DS} =20V, I_{D} =50A 21 24 27



10

8

6

4

2

0

0 3 6 9

 $V_{GS}(V)$



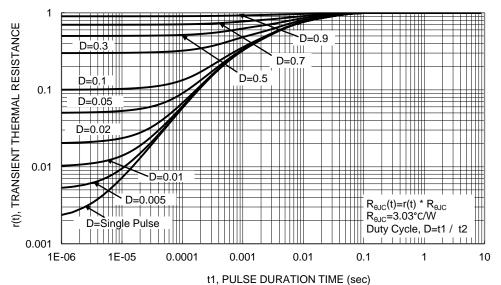
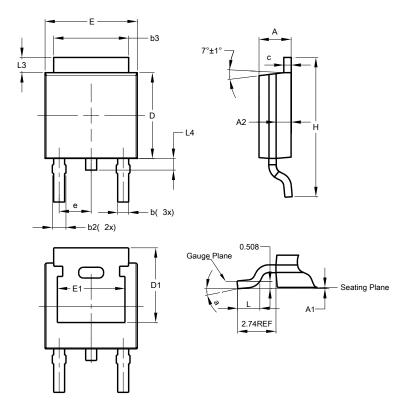


Figure 13. Transient Thermal Resistance

Package Outline Dimensions

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

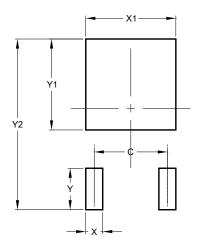


TO252 (DPAK)					
Dim	Min	Max	Тур		
Α	2.19	2.39	2.29		
A 1	0.00	0.13	0.08		
A2	0.97	1.17	1.07		
b	0.64	0.88	0.783		
b2	0.76	1.14	0.95		
b3	5.21	5.46	5.33		
O	0.45	0.58	0.531		
D	6.00	6.20	6.10		
D1	5.21	-	-		
е	-	-	2.286		
Е	6.45	6.70	6.58		
E1	4.32	-	-		
H	9.40	10.41	9.91		
Г	1.40	1.78	1.59		
L3	0.88	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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