



40V 175°C N-CHANNEL ENHANCEMENT MODE MOSFET

Product Summary

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

Description and Applications

This MOSFET is designed to meet the stringent requirements of Automotive applications. It is qualified to AEC-Q101, supported by a PPAP and is ideal for use in:

- DC-DC Converters
- Power Management Functions

Features and Benefits

- Rated to +175°C Ideal for High Ambient Temperature

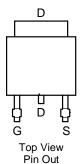
 Environments
- 100% Unclamped Inductive Switching ensures more reliable and robust end application
- Low On-Resistance
- Low Input Capacitance
- Lead-Free Finish; RoHS Compliant (Notes 1 & 2)
- Halogen and Antimony Free. "Green" Device (Note 3)
- Qualified to AEC-Q101 Standards for High Reliability
- PPAP Capable (Note 4)

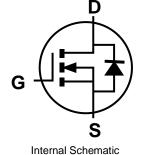
Mechanical Data

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



Top View





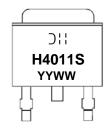
Ordering Information (Note 5)

Part Number	Case	Packaging
DMNH4011SK3Q-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.
- 2. 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. Automotive products are AEC-Q101 qualified and are PPAP capable. Please refer to http://www.diodes.com/product_compliance_definitions.html.
- 5. 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 Two Digits of Year
(ex: 15 = 2015)
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 7)	Steady State	$T_{C} = +25^{\circ}C$ $T_{C} = +100^{\circ}C$	I _D	50 27	А
Maximum Body Diode Forward Current (Note 7)	I _S	40	Α		
Pulsed Drain Current (380µs Pulse, Duty Cycle = 1%)			I _{DM}	120	Α
Avalanche Current, L=0.1mH			I _{AS}	45	Α
Avalanche Energy, L=0.1mH	E _{AS}	100	mJ		

Thermal Characteristics

Characteristic	Symbol	Value	Unit
Total Power Dissipation (Note 6)	P _D	2.6	W
Thermal Resistance, Junction to Ambient (Note 6)	$R_{\theta JA}$	47	°C/W
Total Power Dissipation (Note 7)	P _D	50	W
Thermal Resistance, Junction to Case (Note 7)	$R_{\theta JC}$	3	°C/W
Operating and Storage Temperature Range	T _J , T _{STG}	-55 to +175	°C

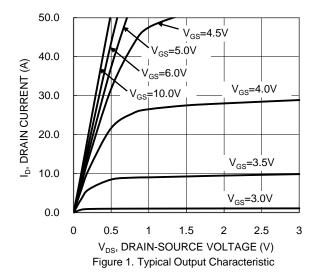
Electrical Characteristics (@T_A = +25°C, unless otherwise specified.)

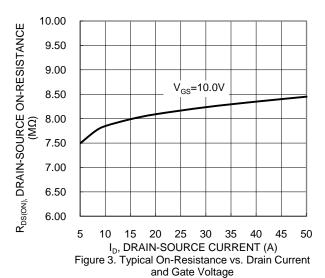
Characteristic	Symbol	Min	Тур	Max	Unit	Test Condition	
OFF CHARACTERISTICS (Note 8)							
Drain-Source Breakdown Voltage	BV _{DSS}	40		_	V	$V_{GS} = 0V, I_D = 250\mu A$	
Zero Gate Voltage Drain Current	I _{DSS}	1		1	μA	$V_{DS} = 40V, V_{GS} = 0V$	
Gate-Source Leakage	I _{GSS}			±100	nA	$V_{GS} = \pm 20V, V_{DS} = 0V$	
ON CHARACTERISTICS (Note 8)							
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)}		8.5	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 9)							
Input Capacitance	Ciss		1,405	_		V _{DS} = 20V, V _{GS} = 0V, f = 1MHz	
Output Capacitance	Coss	_	247	_	pF		
Reverse Transfer Capacitance	C_{rss}		108	_			
Gate Resistance	R_g	_	2.2	_	Ω	$V_{DS} = 0V$, $V_{GS} = 0V$, $f = 1MHz$	
Total Gate Charge	Q_g	_	25.5	_		V _{DS} = 20V, V _{GS} = 10V , I _D = 50A	
Gate-Source Charge	Q_{gs}	_	4.6	_	nC		
Gate-Drain Charge	Q _{gd}	_	6.9	_			
Turn-On Delay Time	t _{D(ON)}	_	4.6	_		V _{DD} = 20V, V _{GS} = 10V,	
Turn-On Rise Time	t _R	_	3.7	_	ns		
Turn-Off Delay Time	t _{D(OFF)}	_	16	_	ns	$I_D = 50A, R_g = 3.5\Omega$	
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		

Notes:

- 6. Device mounted on FR-4 substrate PC board, 2oz copper, with thermal bias to bottom layer 1-inch square copper plate.
- 7. Thermal resistance from junction to soldering point (on the exposed drain pad).
- 8. Short duration pulse test used to minimize self-heating effect.
- 9. Guaranteed by design. Not subject to product testing.







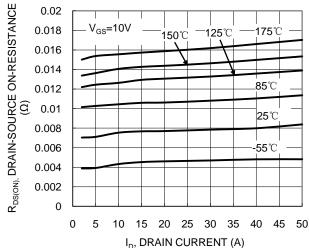
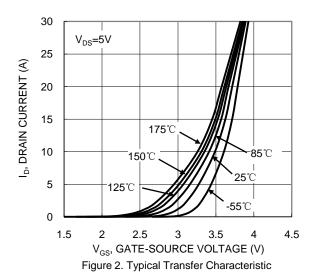
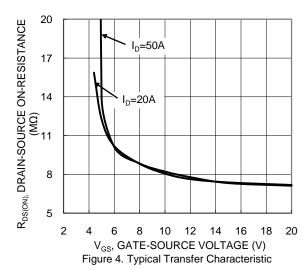


Figure 5. Typical On-Resistance vs. Drain Current and Temperature





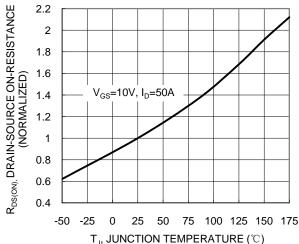
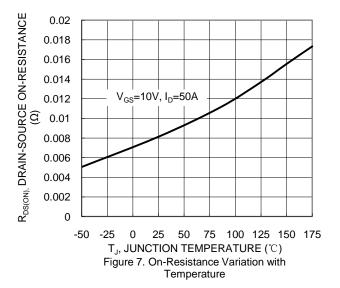


Figure 6. On-Resistance Variation with Temperature







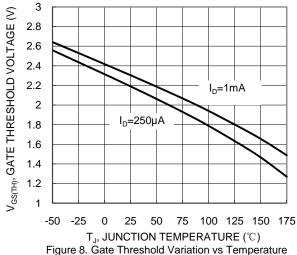
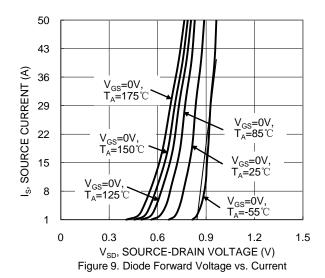
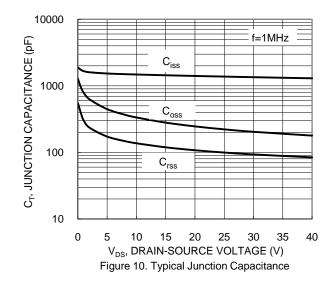
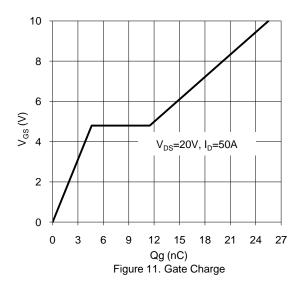
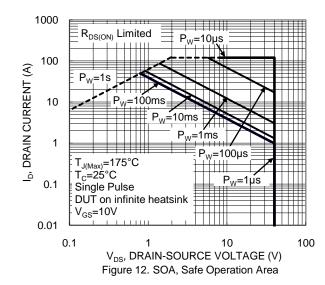


Figure 8. Gate Threshold Variation vs Temperature











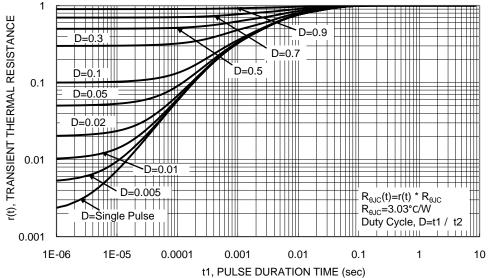


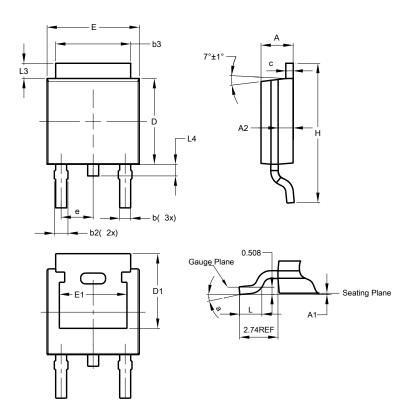
Figure 13. Transient Thermal Resistance



Package Outline Dimensions

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

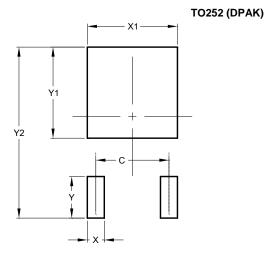
TO252 (DPAK)



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			
q	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	-	-			
Ф	-	-	2.286			
Е	6.45	6.70	6.58			
E1	4.32	-	-			
H	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			
X	1.060			
X1	5.632			
Υ	2.600			
Y1	5.700			
Y2	10.700			



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