



60V +175°C N-CHANNEL ENHANCEMENT MODE MOSFET

Product Summary

BV _{DSS}	R _{DS(ON)} max	I _D max T _C = +25°C
60V	$12m\Omega @ V_{GS} = 10V$	60A
	$18m\Omega @ V_{GS} = 4.5V$	50A

Description and Applications

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

- Body Control Electronics
- DC/DC Converters

Features

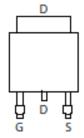
- Rated to +175°C Ideal for High Ambient Temperature Environments
- 100% Unclamped Inductive Switching Ensures More Reliable and Robust End Application
- Low On-Resistance
- Low Input Capacitance
- Lead-Free Finish; RoHS Compliant (Notes 1 & 2)
- Halogen and Antimony Free. "Green" Device (Note 3)
- Qualified to AEC-Q101 Standards for High Reliability

Mechanical Data

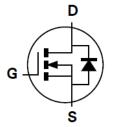
- Case: TO252
- Case Material: Molded Plastic, "Green" Molding Compound.
- UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminal Finish Matte Tin Annealed over Copper Leadframe.
 Solderable per MIL-STD-202, Method 208 @3
- Weight: 0.33 grams (Approximate)



Top View



Pin Out Top View



Equivalent Circuit

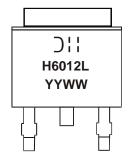
Ordering Information (Note 4)

Part Number	Case	Packaging
DMNH6012LK3-13	TO252	2500/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. For packaging details, go to our website at http://www.diodes.com/products/packages.html.

Marking Information



Dil =Manufacturer's Marking
H6012L = 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}	60	V	
Gate-Source Voltage	V_{GSS}	±20	V	
Continuous Drain Current (Note 6) $V_{GS} = 10V$ $T_C = +25^{\circ}C$ $T_C = +100^{\circ}C$		I _D	60 40	А
Pulsed Drain Current (380μs Pulse, Duty Cycle = 1%)	I _{DM}	120	Α	
Maximum Continuous Body Diode Forward Current (Note 6)	I _S	2.6	Α	
Avalanche Current, L = 0.1mH (Note 7)	I _{AS}	45	Α	
Avalanche Energy, L = 0.1mH (Note 7)	Eas	100	mJ	

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

Characteristic	Symbol	Value	Unit	
Total Power Dissipation (Note 5)		P_{D}	2.0	W
Thermal Resistance, Junction to Ambient (Note 5) Steady state		$R_{\theta JA}$	74	°C/W
Total Power Dissipation (Note 6)	P _D	3.8	W	
Thermal Resistance, Junction to Ambient (Note 6) Steady state		$R_{\theta JA}$	40	°C/W
Thermal Resistance, Junction to Case		$R_{\theta JC}$	1.2	C/VV
Operating and Storage Temperature Range		T _{J,} T _{STG}	-55 to +175	°C

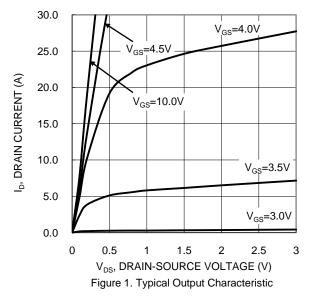
Electrical Characteristics (@T_A = +25°C, unless otherwise specified.)

Characteristic Symbol Min Typ Max Unit Test Condition							
Characteristic		Min	Тур	Max	Unit	Test Condition	
OFF CHARACTERISTICS (Note 8)							
Drain-Source Breakdown Voltage		60	_	_	V	$V_{GS} = 0V, I_D = 250\mu A$	
Zero Gate Voltage Drain Current, T _J = +25°C	I _{DSS}		_	1	μA	$V_{DS} = 60V, V_{GS} = 0V$	
Gate-Source Leakage	I _{GSS}	_	_	±100	nA	$V_{GS} = \pm 20V, V_{DS} = 0V$	
ON CHARACTERISTICS (Note 8)							
Gate Threshold Voltage	V _{GS(TH)}	1	_	3	V	$V_{DS} = V_{GS}, I_{D} = 250 \mu A$	
Static Drain-Source On-Resistance			8	12	mΩ	$V_{GS} = 10V, I_D = 25A$	
Static Dialif-Source Off-Resistance	R _{DS(ON)}		10	18	11122	$V_{GS} = 4.5V, I_D = 25A$	
Diode Forward Voltage	V _{SD}		0.7	1.2	V	$V_{GS} = 0V, I_{S} = 1.7A$	
DYNAMIC CHARACTERISTICS (Note 9)							
Input Capacitance	C _{iss}		1926	_	pF		
Output Capacitance	Coss		330	_	pF	$V_{DS} = 30V, V_{GS} = 0V,$ - f = 1MHz	
Reverse Transfer Capacitance	C _{rss}	_	112	_	pF		
Gate Resistance	Rg	_	2.0	_	Ω	$V_{DS} = 0V$, $V_{GS} = 0V$, $f = 1MHz$	
Total Gate Charge (V _{GS} = 4.5V)	Qg		16.3	_	nC		
Total Gate Charge (V _{GS} = 10V)	Qg		35.2	_	nC	201/ 1 254	
Gate-Source Charge	Q _{gs}		7.6	_	nC	$V_{DS} = 30V, I_{D} = 25A$	
Gate-Drain Charge	Q _{gd}		6.9	_	nC		
Turn-On Delay Time	t _{D(ON)}	_	6.4	_	ns	$V_{GS} = 10V, V_{DS} = 30V,$ $R_G = 3\Omega, I_D = 25A$	
Turn-On Rise Time	t _R		11.9	_	ns		
Turn-Off Delay Time	t _{D(OFF)}		16.5	_	ns		
Turn-Off Fall Time	t _F		5	_	ns		
Body Diode Reverse Recovery Time	t _{RR}	_	28	_	ns	I _F = 25A, di/dt = 100A/μs	
Body Diode Reverse Recovery Charge	Q _{RR}	_	23	_	nC	= 25A, α/αι = 100A/μs	

Notes:

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





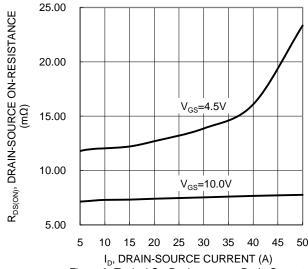


Figure 3. Typical On-Resistance vs. Drain Current and Gate Voltage

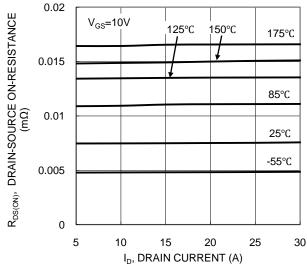
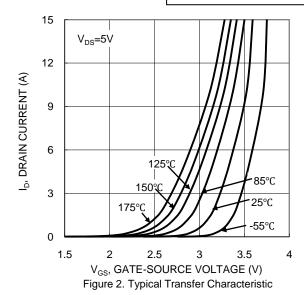
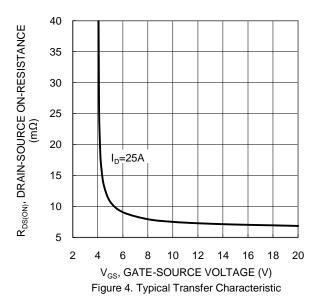


Figure 5. Typical On-Resistance vs. Drain Current and Temperature





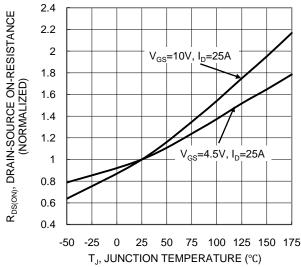


Figure 6. On-Resistance Variation with Temperature



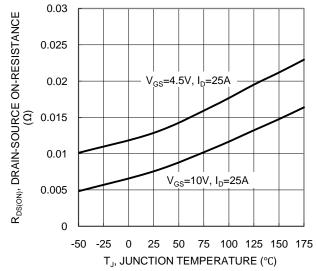


Figure 7. On-Resistance Variation with Temperature

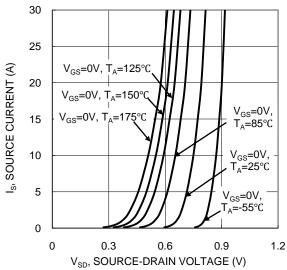
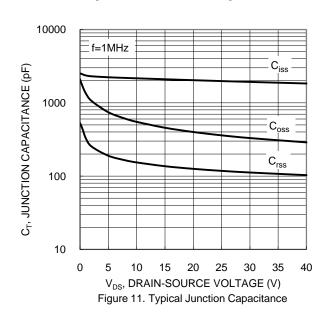


Figure 9. Diode Forward Voltage vs. Current



3 $V_{GS(TH)},$ GATE THRESHOLD VOLTAGE (V) 2.8 2.6 2.4 $I_D=1mA$ 2.2 2 I_D=250μΑ 1.8 1.6 1.4 1.2 8.0 -50 -25 0 25 50 75 100 125 150 175 T_{.i}, JUNCTION TEMPERATURE (°C)

Figure 8. Gate Threshold Variation vs. Junction Temperature

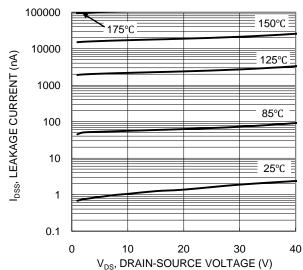


Figure 10. Typical Drain-Source Leakage Current vs. Voltage

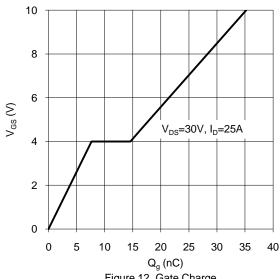
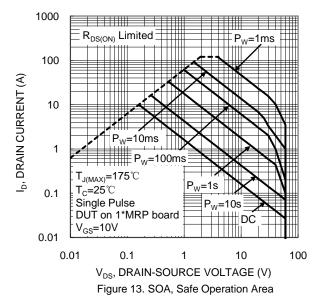
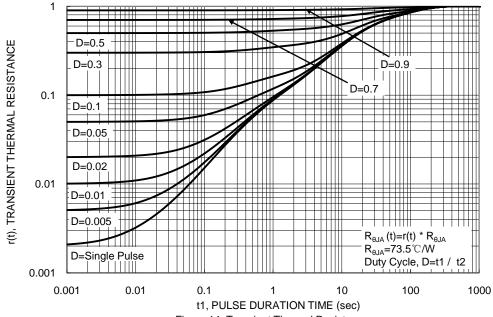


Figure 12. Gate Charge



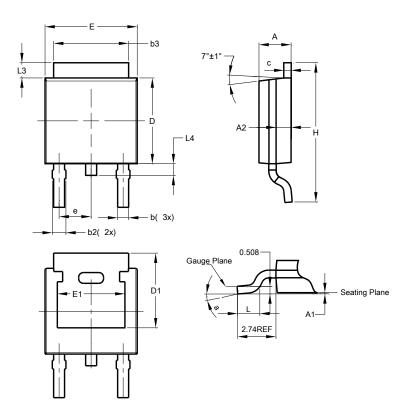






Package Outline Dimensions

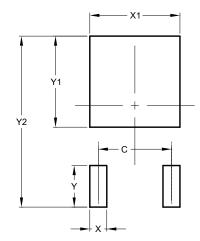
Please see AP02002 at http://www.diodes.com/datasheets/ap02002.pdf for the latest version.



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		
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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