



#### **60V DUAL N-CHANNEL 175°C MOSFET**

## **Product Summary**

BV <sub>DSS</sub>	R <sub>DS(ON)</sub> Max	I <sub>D</sub> T <sub>C</sub> = +25°C
60V	$27m\Omega$ @ $V_{GS} = 10V$	22.6A
	$30m\Omega$ @ $V_{GS} = 6V$	21.5A

#### **Description**

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

## **Applications**

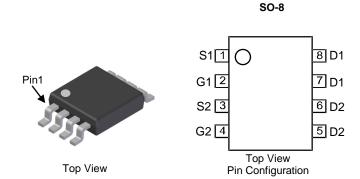
- Engine Management Systems
- Body Control Electronics
- DC-DC Converters

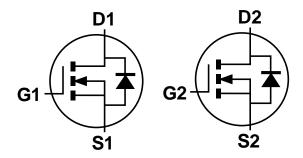
#### **Features**

- Rated to +175°C Ideal for High Ambient Temperature Environments
- 100% Unclamped Inductive Switching Ensures More Reliable and Robust End Application
- Low R<sub>DS(ON)</sub> Minimizes Power Losses
- Low Q<sub>g</sub> Minimiszs Switching Losses
- Totally Lead-Free & Fully RoHS Compliant (Notes 1 & 2)
- Halogen and Antimony Free. "Green" Device (Note 3)
- Qualified to AEC-Q101 Standards for High Reliability

#### **Mechanical Data**

- Case: SO-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
- Terminals: Finish Matte Tin Annealed over Copper Leadframe;
   Solderable per MIL-STD-202, Method 208 (3)
- Weight: 0.074 grams (Approximate)





**Equivalent Circuit** 

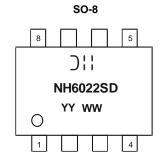
#### Ordering Information (Note 4)

Part Number	Case	Packaging
DMNH6022SSD-13	SO-8	2,500 / Tape & Reel

Notes:

- 1. No purposely added lead. Fully EU Directive 2002/95/EC (RoHS) & 2011/65/EU (RoHS 2) compliant.
- 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**



⊃¦¦ = Manufacturer's Marking NH6022SD = Product Type Marking Code YYWW = Date Code Marking YY = Year (ex: 16 = 2016) WW = Week (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 Prais Correct V 40V (Note C)	$T_{C} = +25^{\circ}C$ $T_{C} = +100^{\circ}C$	I <sub>D</sub>	22.6 16.0	А
Continuous Drain Current V <sub>GS</sub> = 10V (Note 6)	$T_A = +25$ °C $T_A = +70$ °C	I <sub>D</sub>	7.1 5.9	А
Pulsed Drain Current (10µs Pulse, Duty Cycle = 1%)		I <sub>DM</sub>	45	Α
Maximum Continuous Body Diode Forward Current (Note 6)		I <sub>S</sub>	2	Α
Avalanche Current L=0.1mL (Note 7)		I <sub>AS</sub>	22	Α
Avalanche Energy L=0.1mL (Note 7)		E <sub>AS</sub>	24	mJ

# **Thermal Characteristics**

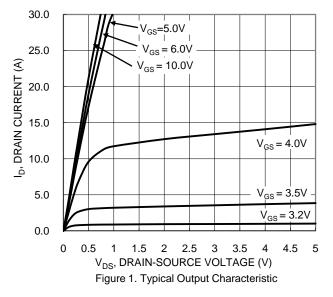
Characteristic	Symbol	Value	Unit	
Total Power Dissipation (Note 5)	T <sub>A</sub> = +25°C	P <sub>D</sub>	1.5	W
Thermal Resistance, Junction to Ambient (Note 5)	Steady State	D	104	°C/W
Thermal Resistance, Junction to Ambient (Note 3)	t<10s	$R_{\theta JA}$	60	
Total Power Dissipation (Note 6)	T <sub>A</sub> = +25°C	P <sub>D</sub>	2.1	W
Thermal Resistance, Junction to Ambient (Note 6)	Steady State	D	74	°C/W
Thermal Resistance, Junction to Ambient (Note o)	t<10s	$R_{\theta JA}$	42	
Thermal Resistance, Junction to Case (Note 6)		$R_{ heta JC}$	7.25	
Operating and Storage Temperature Range		T <sub>J,</sub> T <sub>STG</sub>	-55 to +175	°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>	60	_	_	V	$V_{GS} = 0V, I_D = 250\mu A$
Zero Gate Voltage Drain Current T <sub>J</sub> = +25°C	I <sub>DSS</sub>	_	_	1	μΑ	$V_{DS} = 60V, V_{GS} = 0V$
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>	1.0	_	3.0	V	$V_{DS} = V_{GS}, I_{D} = 250 \mu A$
Static Drain-Source On-Resistance	D		21	27	mΩ	$V_{GS} = 10V, I_D = 5A$
Static Diain-Source On-Resistance	R <sub>DS(ON)</sub>	_	24	30	11122	$V_{GS} = 6V, I_D = 5A$
Diode Forward Voltage	$V_{SD}$	_	0.8	1.2	V	$V_{GS} = 0V, I_{S} = 1.7A$
DYNAMIC CHARACTERISTICS (Note 9)						
Input Capacitance	C <sub>iss</sub>	_	2127	_	рF	)/ 25\/ \/ 0\/
Output Capacitance	Coss	_	86	_	рF	$V_{DS} = 25V, V_{GS} = 0V,$ -f = 1.0MHz
Reverse Transfer Capacitance	$C_{rss}$	_	54	_	pF	1 = 1.0WHZ
Gate Resistance	Rg	_	2.0	_	Ω	$V_{DS} = 0V$ , $V_{GS} = 0V$ , $f = 1MHz$
Total Gate Charge at (V <sub>GS</sub> = 10V)	$Q_g$	_	32	_	nC	
Total Gate Charge at (V <sub>GS</sub> = 4.5V)	$Q_{g}$	_	14	_	nC	\/ 20\/ I- 6A
Gate-Source Charge	Q <sub>gs</sub>	_	7	_	nC	$V_{DS} = 30V, I_{D} = 6A$
Gate-Drain Charge	$Q_{gd}$	_	4	_	nC	
Turn-On Delay Time	t <sub>D(ON)</sub>	_	5.4	_	ns	
Turn-On Rise Time	t <sub>R</sub>	_	4.4	_	ns	$V_{GS} = 10V, V_{DS} = 30V,$
Turn-Off Delay Time	t <sub>D(OFF)</sub>	_	30.4	_	ns	$R_g = 6\Omega$ , $I_D = 1A$
Turn-Off Fall Time	t <sub>F</sub>	_	8.4	_	ns	] -
Body Diode Reverse Recovery Time	t <sub>RR</sub>	_	18.1	_	ns	$I_F = 1.7A$ , di/dt = 100A/ $\mu$ s
Body Diode Reverse Recovery Charge	Q <sub>RR</sub>	_	12.5	_	nC	$I_F = 1.7A$ , di/dt = 100A/ $\mu$ s

- 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 1-inch square copper plate.
- Severe invariant of substance of sound, 202 copper, with 1-intersquare copper.
   Is and Eas rating 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.





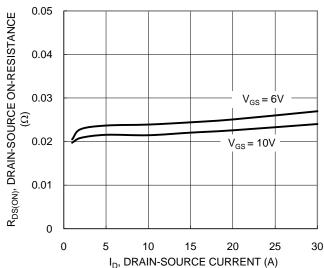


Figure 3. Typical On-Resistance vs. Drain Current and Gate Voltage

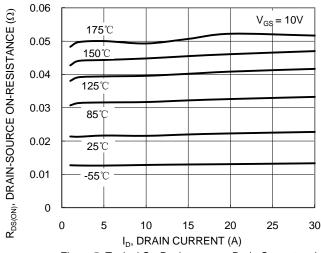
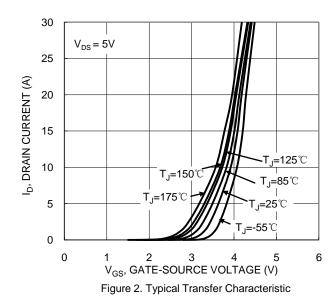


Figure 5. Typical On-Resistance vs. Drain Current and Junction Temperature



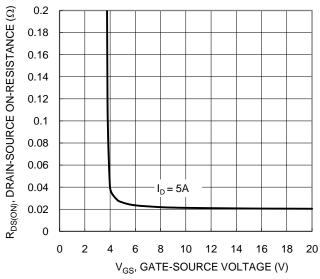


Figure 4. Typical Transfer Characteristic

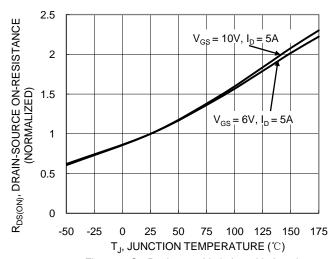


Figure 6. On-Resistance Variation with Junction Temperature



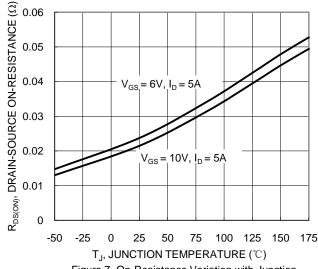
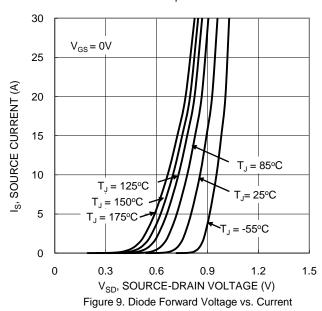
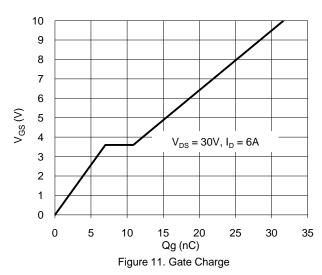


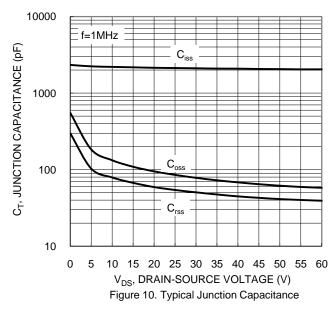
Figure 7. On-Resistance Variation with Junction Temperature

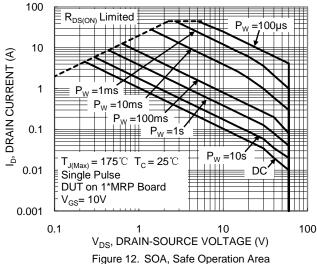




 $V_{\text{GS}(\text{TH})},$  GATE THRESHOLD VOLTAGE (V) 4 3.5 3  $I_D = 1mA$ 2.5  $I_{D} = 250 \mu A$ 2 1.5 1 0.5 0 -50 -25 25 50 75 100 125 150 175 T<sub>J</sub>, JUNCTION TEMPERATURE (°C)

Figure 8. Gate Threshold Variation vs. Junction Temperature







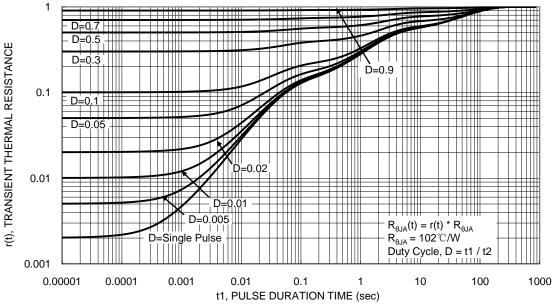


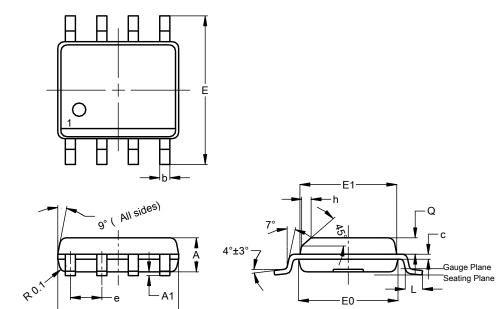
Figure 13. Transient Thermal Resistance



# **Package Outline Dimensions**

Please see http://www.diodes.com/package-outlines.html for the latest version.

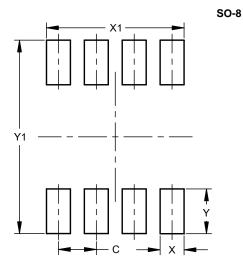
SO-8



SO-8					
Dim	Min	Max	Тур		
Α	1.40	1.50	1.45		
A1	0.10	0.20	0.15		
b	0.30	0.50	0.40		
C	0.15	0.25	0.20		
D	4.85	4.95	4.90		
Е	5.90	6.10	6.00		
E1	3.80	3.90	3.85		
E0	3.85	3.95	3.90		
е			1.27		
h	-		0.35		
L	0.62	0.82	0.72		
Ø	0.60	0.70	0.65		
All Dimensions in mm					

# **Suggested Pad Layout**

Please see http://www.diodes.com/package-outlines.html for the latest version.



Dimensions	Value (in mm)
С	1.27
Х	0.802
X1	4.612
Υ	1.505
Y1	6.50



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многоканальный

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