



60V DUAL N-CHANNEL 175°C MOSFET

Product Summary

BV _{DSS}	R _{DS(ON)} Max	I _D Max T _C = +25°C
001/	$50m\Omega$ @ $V_{GS} = 10V$	16.7A
60V	65mΩ @ V _{GS} = 4.5V	14.6A

Description and Applications

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

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

Features and Benefits

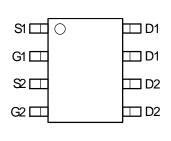
- Rated to +175°C Ideal for High Ambient Temperature Environments
- 100% Unclamped Inductive Switching Ensures More Reliable and Robust End Application
- Low R_{DS(ON)} Minimizes Power Losses
- $\begin{tabular}{ll} Low Q_g Minimizes Switching Losses \\ \hline \textbf{Totally Lead-Free \& Fully RoHS Compliant (Notes 1 \& 2)} \\ \end{tabular}$
- Halogen and Antimony Free. "Green" Device (Note 3)
- Qualified to AEC-Q101 Standards for High Reliability
- An Automotive-Compliant Part is Available Under Separate Datasheet (DMNH6042SSDQ)

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 Indicator: See Diagram
- Terminals: Finish Matte Tin Annealed over Copper Leadframe. Solderable per MIL-STD-202, Method 208 @3
- Weight: 0.076 grams (Approximate)

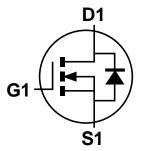


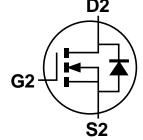




SO-8

Top View Pin Configuration





Equivalent Circuit

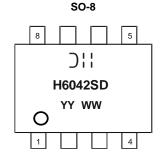
Ordering Information (Note 4)

Part Number	Case	Packaging
DMNH6042SSD-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"
- 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 H6042SD = 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	Units		
Drain-Source Voltage	V_{DSS}	60	V		
Gate-Source Voltage			V_{GSS}	±20	V
Continuous Drain Courset (Note C) V	Steady State	$T_A = +25^{\circ}C$ $T_A = +70^{\circ}C$	I _D	5.3 4.4	А
Continuous Drain Current (Note 6) V _{GS} = 10V	Steady State	$T_{C} = +25^{\circ}C$ $T_{C} = +100^{\circ}C$	ID	16.7 14	А
Pulsed Drain Current (10µs pulse, duty cycle = 1%)	I _{DM}	35	Α		
Maximum Continuous Body Diode Forward Current (Is	2.3	Α		
Avalanche Current (Note 7) L = 10mH			I _{AS}	3.5	Α
Avalanche Energy (Note 7) L = 10mH			E _{AS}	65	mJ

Thermal Characteristics

Characteristic		Symbol	Value	Units	
Total Power Dissipation (Note 5)		P_{D}	1.5	W	
Thermal Peciatones Junction to Ambient (Note 5)	Steady State	R _{θJA}	100	°C/W	
Thermal Resistance, Junction to Ambient (Note 5)	t<10s		61	C/VV	
Total Power Dissipation (Note 6)		P_{D}	2.1	W	
Thermal Resistance, Junction to Ambient (Note 6)	Steady State		72	°C/W	
Thermal Resistance, Junction to Ambient (Note 6)	t<10s	$R_{\theta JA}$	44		
Thermal Resistance, Junction to Case (Note 6)		$R_{\theta JC}$	7.25		
Operating and Storage Temperature Range		$T_{J_i} T_{STG}$	-55 to +175	°C	

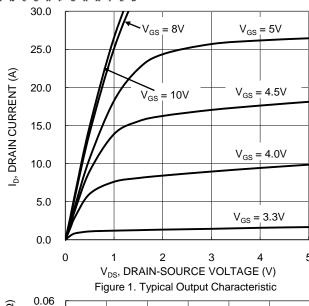
Electrical Characteristics (@T_A= +25°C, unless otherwise specified.)

Characteristic	Symbol	Min	Тур	Max	Unit	Test Condition
OFF CHARACTERISTICS (Note 8)						•
Drain-Source Breakdown Voltage	BV _{DSS}	60	_	_	V	$V_{GS} = 0V, I_D = 250\mu A$
Zero Gate Voltage Drain Current T _J = +25°C	I _{DSS}	_	_	1	μΑ	$V_{DS} = 60V, V_{GS} = 0V$
Gate-Source Leakage	I _{GSS}	_	_	±100	nA	$V_{GS} = \pm 20V, V_{DS} = 0V$
ON CHARACTERISTICS (Note 8)						
Gate Threshold Voltage	$V_{GS(TH)}$	1.0	_	3.0	V	$V_{DS} = V_{GS}, I_{D} = 250 \mu A$
Static Drain-Source On-Resistance		_	34	50	mΩ	$V_{GS} = 10V, I_D = 5.1A$
Static Dialii-Source Off-Resistance	R _{DS(ON)}	_	45	65	mt2	$V_{GS} = 4.5V, I_D = 4.4A$
Diode Forward Voltage	V_{SD}	_	0.8	1.2	V	$V_{GS} = 0V, I_S = 2.6A$
DYNAMIC CHARACTERISTICS (Note 9)						
Input Capacitance	C _{iss}	_	584	_	pF), OF),), O),
Output Capacitance	Coss	_	83		рF	$V_{DS} = 25V, V_{GS} = 0V,$ -f = 1.0MHz
Reverse Transfer Capacitance	C _{rss}	_	24	_	рF	1 - 1.01/11/12
Gate Resistance	R_{g}	_	3.8	_	Ω	$V_{DS} = 0V$, $V_{GS} = 0V$, $f = 1MHz$
Total Gate Charge (V _{GS} = 4.5V)	Qg	_	4.2	_	nC	
Total Gate Charge (V _{GS} = 10V)	Q_g	_	8.8	_	nC	V 44V I 5.2A
Gate-Source Charge	Q_{gs}	_	1.8	_	nC	$V_{DS} = 44V, I_{D} = 5.2A$
Gate-Drain Charge	Q _{gd}	_	1.8	_	nC	
Turn-On Delay Time	t _{D(ON)}	_	3.4	_	ns	
Turn-On Rise Time	t _R	_	1.9	_	ns	$V_{GS} = 10V, V_{DS} = 30V,$
Turn-Off Delay Time	t _{D(OFF)}	_	10.1	_	ns	$R_G = 6\Omega$, $I_D = 1A$
Turn-Off Fall Time	t _F	_	4.5	_	ns	
Body Diode Reverse Recovery Time	t _{RR}	_	12.9	_	ns	L 2 6
Body Diode Reverse Recovery Charge	Q _{RR}	_	5.4	_	nC	I _F = 2.6A, di/dt = 100A/μs

Notes:

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





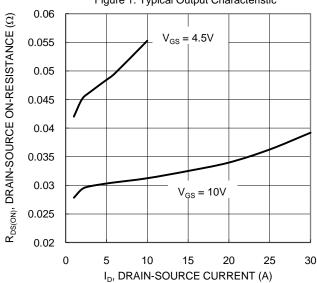


Figure 3. Typical On-Resistance vs Drain Current and Gate Voltage

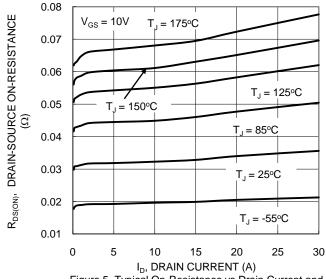
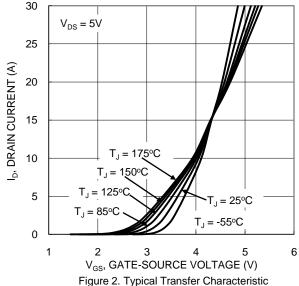


Figure 5. Typical On-Resistance vs Drain Current and Temperature



0.1

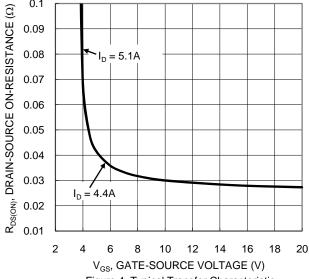


Figure 4. Typical Transfer Characteristic

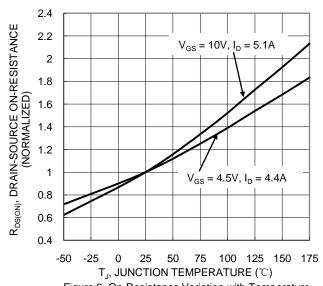
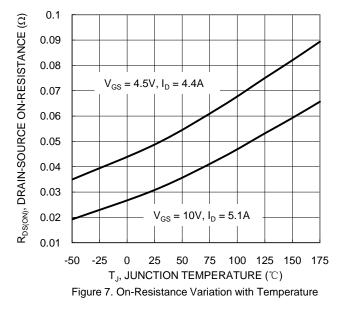
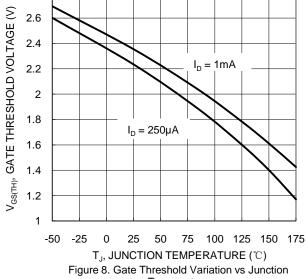


Figure 6. On-Resistance Variation with Temperature



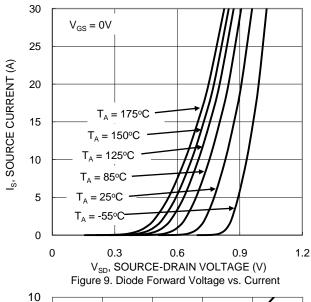






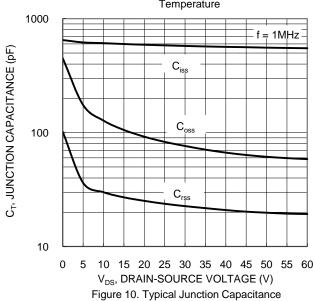
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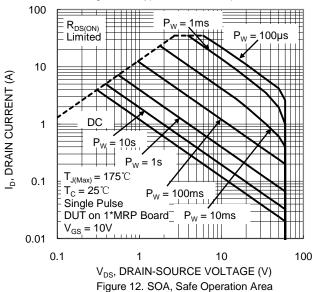
Figure 8. Gate Threshold Variation vs Junction Temperature



8 6 $V_{GS}(V)$ 4 $V_{DS} = 44V, I_{D} = 5.2A$ 2 0 0 2 6 8 10 Q_q (nC)

Figure 11. Gate Charge







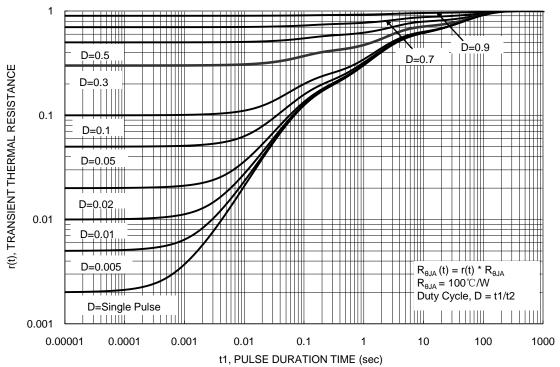


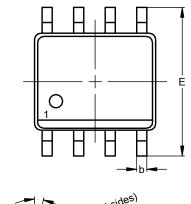
Figure 13. Transient Thermal Resistance

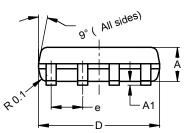


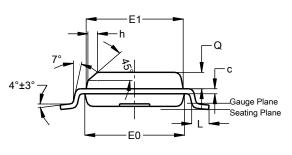
Package Outline Dimensions

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

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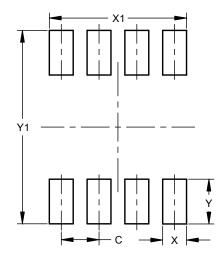


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Dim	Min	Max	Тур			
Α	1.40	1.50	1.45			
A1	0.10	0.20	0.15			
b	0.30	0.50	0.40			
С	0.15	0.25	0.20			
D	4.85	4.95	4.90			
Е	5.90	6.10	6.00			
E1	3.80	3.90	3.85			
E0	3.85	3.95	3.90			
е			1.27			
h	-		0.35			
L	0.62	0.82	0.72			
Q	0.60	0.70	0.65			
All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

Suggested Pad Layout

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

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



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