



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

Product Summary

BV _{DSS}	R _{DS(ON)} max	I _D max T _C = +25°C
001/	$50m\Omega$ @ $V_{GS} = -10V$	-23.6A
-60V	$70m\Omega @ V_{GS} = -4.5V$	-19A

Features

- Rated to +175°C Ideal for High Ambient Temperature Environments
- 100% Unclamped Inductive Switching Ensures More Reliable and Robust End Application
- Low Qg Minimizes Switching Loss
- Low R_{DS(ON)} Minimizes On State Loss
- 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)

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:

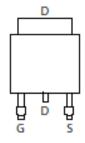
- Engine Management Systems
- Body Control Electronics
- DC-DC Converters

Mechanical Data

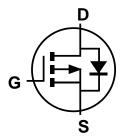
- Case: TO252 (DPAK)
- Case Material: Molded Plastic, "Green" Molding Compound;
 UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminal Finish Matte Tin annealed over Copper Leadframe.
 Solderable per MIL-STD-202, Method 208 (23)
- Weight: 0.315 grams (Approximate)







Pin Out Top View



Equivalent Circuit

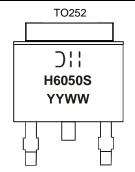
Ordering Information (Note 5)

Part Number	Case	Packaging
DMPH6050SK3Q-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. Automotive products are AEC-Q101 qualified and are PPAP capable. Automotive, AEC-Q101 and standard products are electrically and thermally the same, except where specified. For more information, please refer to http://www.diodes.com/quality/product_grade_definitions/.
- 5. For packaging details, go to our website at http://www.diodes.com/products/packages.html.

Marking Information



Dil =Manufacturer's Marking
H6050S = Product Type Marking Code
YYWW = Date Code Marking
YY = Last Digit of Year (ex: 15 = 2015)
WW = Week Code (01 to 53)

April 2016



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

Characteristic	Symbol	Value	Units		
Drain-Source Voltage	V _{DSS}	-60	V		
Gate-Source Voltage			V _{GSS}	±20	V
Operitary on Decision Company (Natura 7) V	Steady State	T _C = +25°C T _C = +70°C	I _D	-23.6 -19	А
Continuous Drain Current (Note 7) V _{GS} = -10V	Steady State	T _A = +25°C T _A = +70°C	I _D	-7.2 6	А
Pulsed Drain Current (10µs pulse, duty cycle = 1%)	I _{DM}	-40	Α		
Maximum Continuous Body Diode Forward Current	Is	-3.8	Α		
Avalanche Current (Note 8) L = 0.1mH			I _{AS}	-25	Α
Avalanche Energy (Note 8) L = 0.1mH			E _{AS}	31	mJ

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

Characteristic	Symbol	Value	Units	
Total Power Dissipation (Note 6)		P_D	1.9	W
Thermal Resistance, Junction to Ambient (Note 6)	Steady State	$R_{ hetaJA}$	80	°C/W
Total Power Dissipation (Note 7)		P_{D}	3.8	W
Thermal Resistance, Junction to Ambient (Note 7) Steady State		$R_{ hetaJA}$	39	°C/W
Thermal Resistance, Junction to Case (Note 7)		$R_{ heta JC}$	3	C/VV
Operating and Storage Temperature Range		T _{J,} T _{STG}	-55 to +175	°C

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

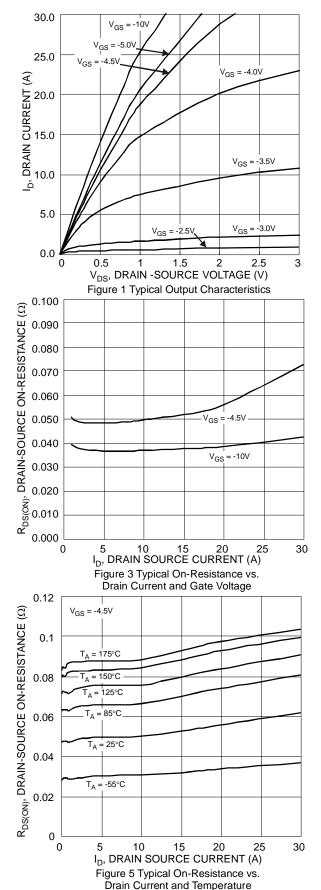
Characteristic	Symbol	Min	Тур	Max	Unit	Test Condition	
OFF CHARACTERISTICS (Note 9)							
Drain-Source Breakdown Voltage	BV _{DSS}	-60	_	_	V	$V_{GS} = 0V, I_D = -250\mu A$	
Zero Gate Voltage Drain Current T _J = +25°C	I _{DSS}	_		-1	μA	V _{DS} = -60V, V _{GS} = 0V	
Gate-Source Leakage	I _{GSS}	_	_	±100	nA	$V_{GS} = \pm 20V, V_{DS} = 0V$	
ON CHARACTERISTICS (Note 9)							
Gate Threshold Voltage	V _{GS(th)}	-1	l	-3	V	$V_{DS} = V_{GS}, I_{D} = -250 \mu A$	
Static Drain-Source On-Resistance			l	50	mΩ	$V_{GS} = -10V, I_D = -7A$	
Static Dialif-Source Off-Resistance	R _{DS} (ON)			70	11122	$V_{GS} = -4.5V, I_{D} = -7A$	
Diode Forward Voltage	V _{SD}	_	-0.7	-1.2	V	$V_{GS} = 0V, I_{S} = -1A$	
DYNAMIC CHARACTERISTICS (Note 10)							
Input Capacitance	C _{iss}	_	1,377	_	pF	201/1/	
Output Capacitance	Coss	_	87	_	pF	V _{DS} = -30V, V _{GS} = 0V, -f = 1MHz	
Reverse Transfer Capacitance	C _{rss}		68	_	pF	1 - 1101112	
Gate Resistance	Rg	l	12	_	Ω	$V_{DS} = 0V$, $V_{GS} = 0V$, $f = 1MHz$	
Total Gate Charge (V _{GS} = -4.5V)	Qg	l	12	_	nC		
Total Gate Charge (V _{GS} = -10V)	Qg	l	25	_	nC	\/ 20\/ I- FA	
Gate-Source Charge	Qgs	_	3.8	_	nC	$V_{DS} = -30V, I_{D} = -5A$	
Gate-Drain Charge	Q_{gd}	_	4.9	_	nC		
Turn-On Delay Time	t _{D(on)}	_	5.3	_	ns		
Turn-On Rise Time	t _r	_	8.6	_	ns	V _{DS} = -30V, V _{GS} = -10V,	
Turn-Off Delay Time	t _{D(off)}	_	49.4	_	ns	$R_G = 3\Omega$, $I_D = -5A$	
Turn-Off Fall Time	t _f	_	29.7	_	ns		
Body Diode Reverse Recovery Time	t _{rr}	_	14.2	_	nS	I FA di/dt 400A/v.c	
Body Diode Reverse Recovery Charge	Qrr	_	7.9	_	nC	-I _F = -5A, di/dt = 100A/μs	

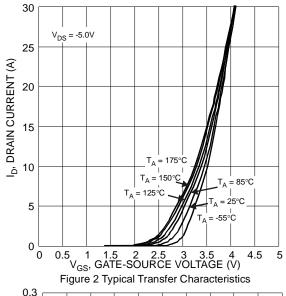
Device mounted on FR-4 substrate PC board, 2oz copper, with minimum recommended pad layout.
 Device mounted on FR-4 substrate PC board, 2oz copper, with 1-inch square copper heat sink area.

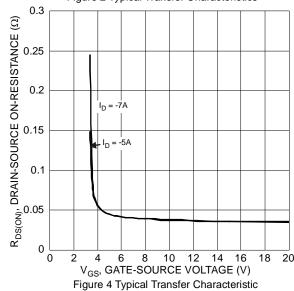
^{8.} I_{AS} and E_{AS} rating are based on low frequency and duty cycles to keep TJ = +25°C.
9. Short duration pulse test used to minimize self-heating effect.
10. Guaranteed by design. Not subject to product testing.











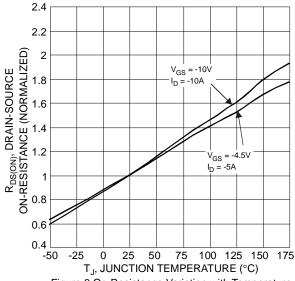
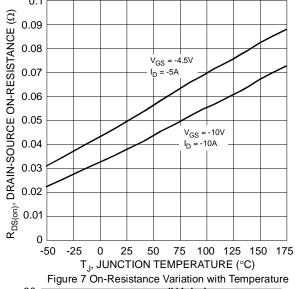
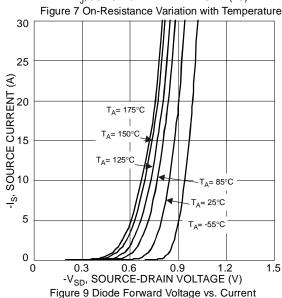
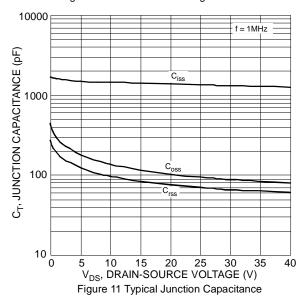


Figure 6 On-Resistance Variation with Temperature









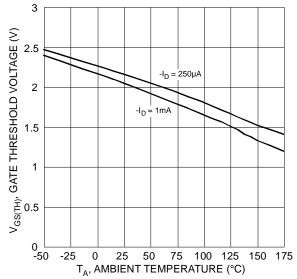


Figure 8 Gate Threshold Variation vs. Ambient Temperature

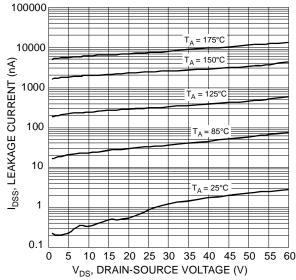
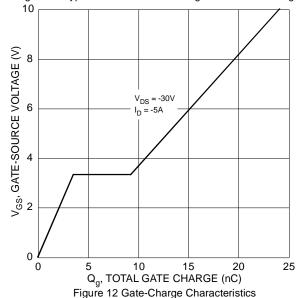
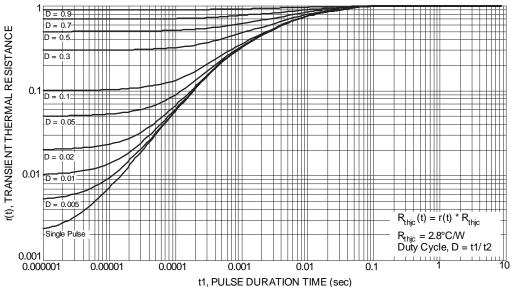
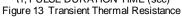


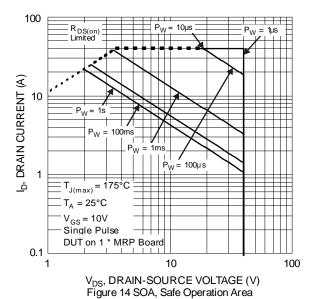
Figure 10 Typical Drain-Source Leakage Current vs. Voltage







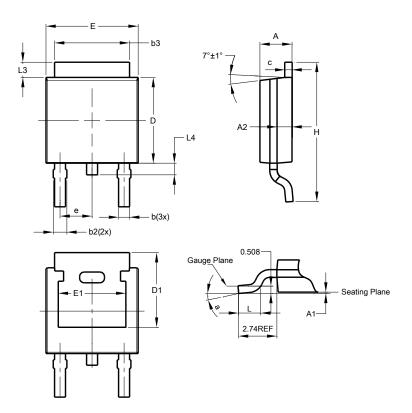






Package Outline Dimensions

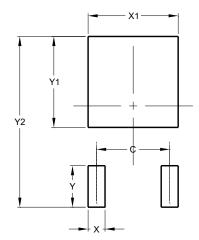
Please see AP02002 at http://www.diodes.com/datasheets/ap02002.pdf for the latest version.



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		
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)			
C	4.572			
Х	1.060			
X1	5.632			
Υ	2.600			
Y1	5.700			
Y2	10.700			



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