

60V N+N-Channel Enhancement Mode MOSFET

Description

The AP8H06S uses advanced trench technology to provide excellent $R_{DS(ON)}$, low gate charge and operation with gate voltages as low as 4.5V. This device is suitable for use as a Battery protection or in other Switching application.

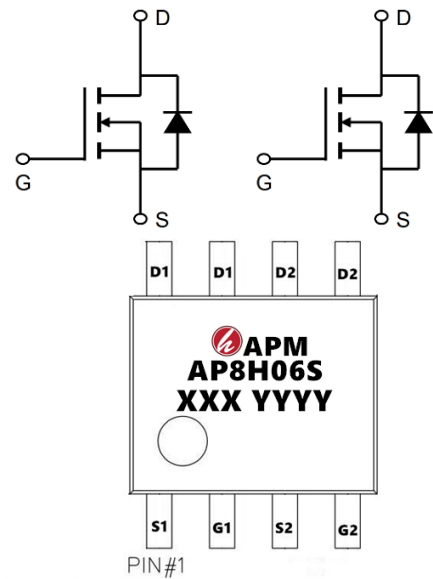
General Features

$V_{DS} = 60V$ $I_D = 8A$

$R_{DS(ON)} < 32m\Omega$ @ $V_{GS}=10V$

Application

- Battery protection
- Load switch
- Uninterruptible power supply



Package Marking and Ordering Information

Product ID	Pack	Marking	Qty(PCS)
AP8H06S	SOP-8	AP8H06S XXX YYYYY	3000

Absolute Maximum Ratings ($T_C=25^\circ C$ unless otherwise noted)

Symbol	Parameter	Rating	Units
V _{DS}	Drain-Source Voltage	60	V
V _{GS}	Gate-Source Voltage	±20	V
$I_D@T_A=25^\circ C$	Continuous Drain Current, $V_{GS} @ 10V^1$	8.2	A
$I_D@T_A=70^\circ C$	Continuous Drain Current, $V_{GS} @ 10V^1$	5.8	A
IDM	Pulsed Drain Current ²	16.6	A
EAS	Single Pulse Avalanche Energy ³	28.5	mJ
IAS	Avalanche Current	22.6	A
$P_D@T_A=25^\circ C$	Total Power Dissipation ⁴	1.5	W
TSTG	Storage Temperature Range	-55 to 150	°C
T _J	Operating Junction Temperature Range	-55 to 150	°C
R _{θJA}	Thermal Resistance Junction-Ambient ¹	85	°C/W
R _{θJC}	Thermal Resistance Junction-Case ¹	36	°C/W

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Electrical Characteristics ($T_J=25^{\circ}\text{C}$, unless otherwise noted)

Symbol	Parameter	Conditions	Min	Typ.	Max	Unit
BVDSS	Drain-Source Breakdown Voltage	$V_{GS}=0V, I_D=250\mu A$	60	66	---	V
$\Delta BVDSS/\Delta T_J$	BV_{DSS} Temperature Coefficient	Reference to 25°C , $I_D=1\text{mA}$	---	0.063	---	$V/^{\circ}\text{C}$
RDS(ON)	Static Drain-Source On-Resistance ²	$V_{GS}=10V, I_D=8A$	---	23	32	m Ω
		$V_{GS}=4.5V, I_D=6A$	---	28	38	
VGS(th)	Gate Threshold Voltage	$V_{GS}=V_{DS}, I_D=250\mu A$	1.2	1.6	2.5	V
$\Delta V_{GS(th)}$	$V_{GS(th)}$ Temperature Coefficient		---	-5.24	---	mV/ $^{\circ}\text{C}$
IDSS	Drain-Source Leakage Current	$V_{DS}=48V, V_{GS}=0V, T_J=25^{\circ}\text{C}$	---	---	1	uA
		$V_{DS}=48V, V_{GS}=0V, T_J=55^{\circ}\text{C}$	---	---	5	
IGSS	Gate-Source Leakage Current	$V_{GS}=\pm 20V, V_{DS}=0V$	---	---	± 100	nA
gfs	Forward Transconductance	$V_{DS}=5V, I_D=4A$	---	21	---	S
Rg	Gate Resistance	$V_{DS}=0V, V_{GS}=0V, f=1\text{MHz}$	---	3.2	6.4	Ω
Qg	Total Gate Charge (4.5V)	$V_{DS}=48V, V_{GS}=4.5V, I_D=4A$	---	12.6	---	nC
Qgs	Gate-Source Charge		---	3.2	---	
Qgd	Gate-Drain Charge		---	6.3	---	
Td(on)	Turn-On Delay Time	$V_{DD}=30V, V_{GS}=10V, R_G=3.3\Omega, I_D=4A$	---	8	---	ns
Tr	Rise Time		---	14.2	---	
Td(off)	Turn-Off Delay Time		---	24.4	---	
Tf	Fall Time		---	4.6	---	
Ciss	Input Capacitance	$V_{DS}=15V, V_{GS}=0V, f=1\text{MHz}$	---	1378	---	pF
Coss	Output Capacitance		---	86	---	
Crss	Reverse Transfer Capacitance		---	64	---	
IS	Continuous Source Current ^{1,5}	$V_G=V_D=0V, \text{Force Current}$	---	---	4.8	A
ISM	Pulsed Source Current ^{2,5}		---	---	9.6	A
VSD	Diode Forward Voltage ²	$V_{GS}=0V, I_S=1A, T_J=25^{\circ}\text{C}$	---	0.746	1.2	V

Note :

- 1.The data tested by surface mounted on a 1 inch² FR-4 board with 2OZ copper.
- 2.The data tested by pulsed , pulse width $\leq 300\mu s$, duty cycle $\leq 2\%$
- 3.The EAS data shows Max. rating . The test condition is $V_{DD}=25V, V_{GS}=10V, L=0.1\text{mH}, I_{AS}=22.6A$
- 4.The power dissipation is limited by 150°C junction temperature
- 5.The data is theoretically the same as I_D and I_{DM} , in real applications , should be limited by total power dissipation.

Typical Characteristics

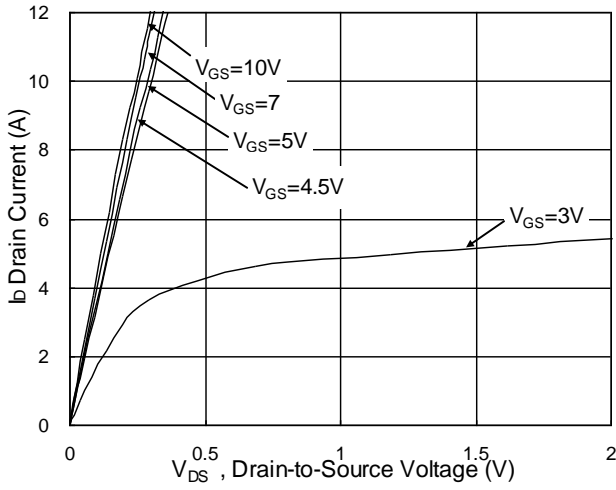


Fig.1 Typical Output Characteristics

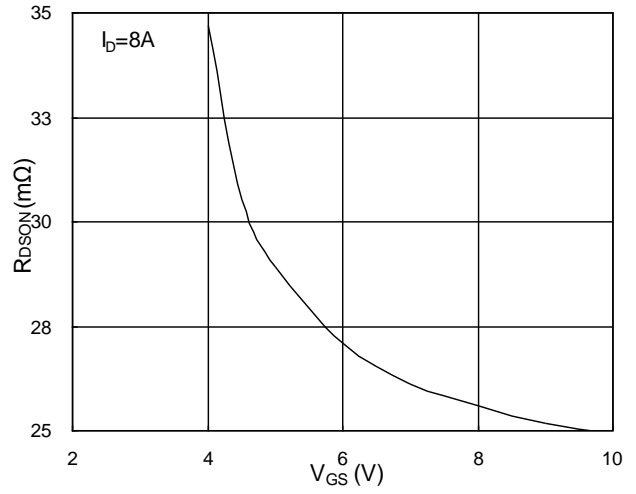


Fig.2 On-Resistance v.s Gate-Source

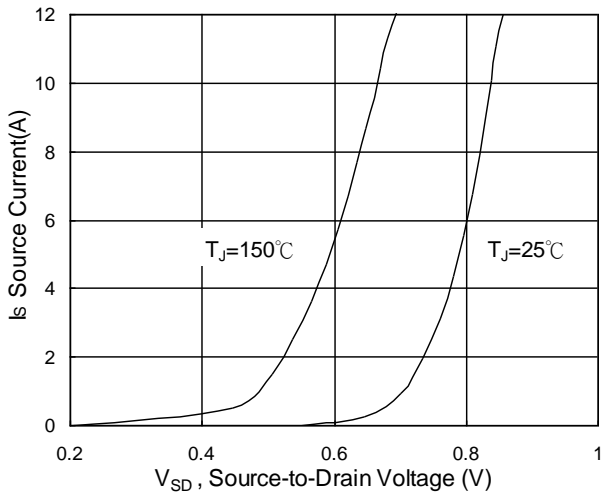


Fig.3 Forward Characteristics of Reverse

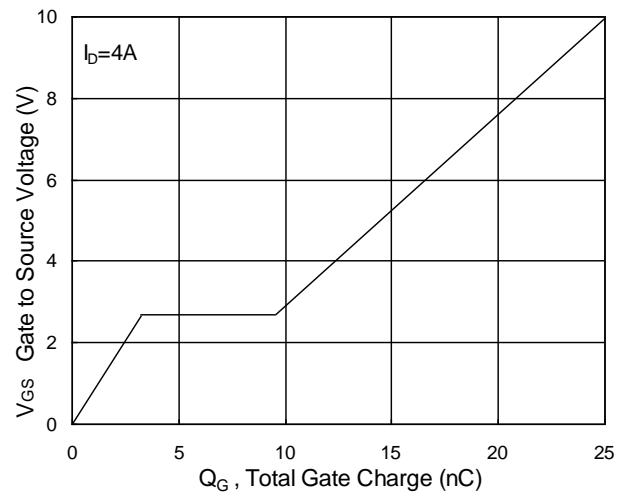


Fig.4 Gate-Charge Characteristics

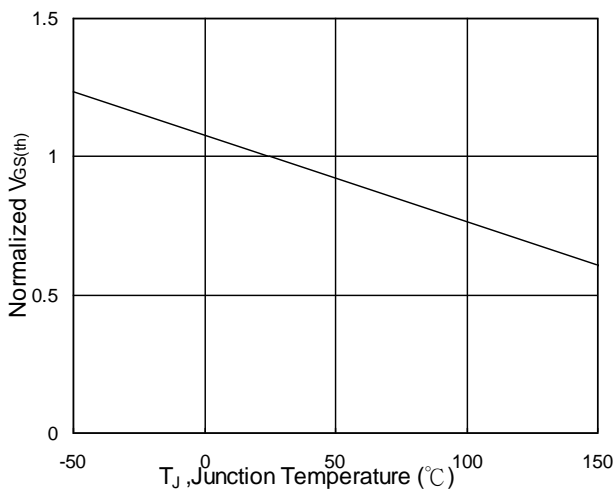


Fig.5 Normalized $V_{GS(th)}$ v.s T_J

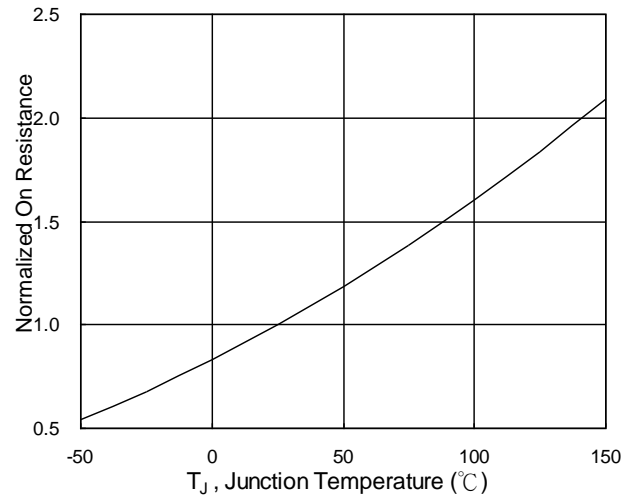


Fig.6 Normalized $R_{DS(on)}$ v.s T_J



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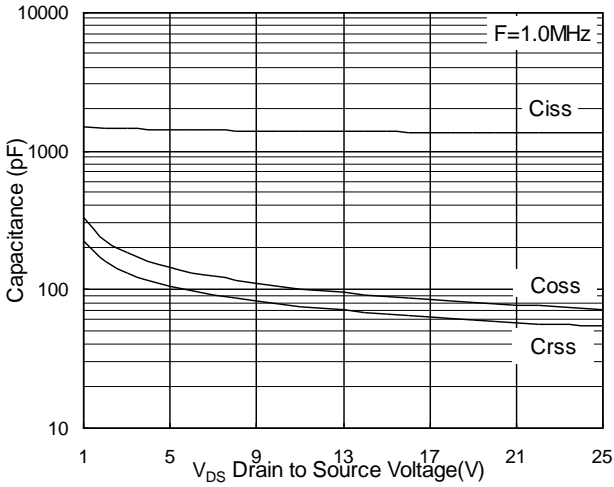


Fig.7 Capacitance

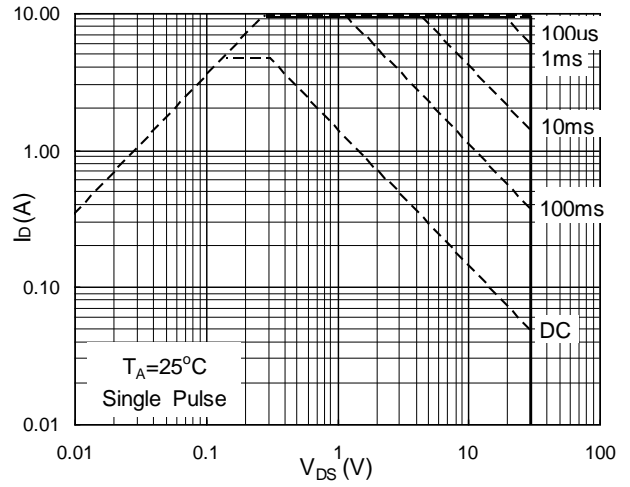


Fig.8 Safe Operating Area

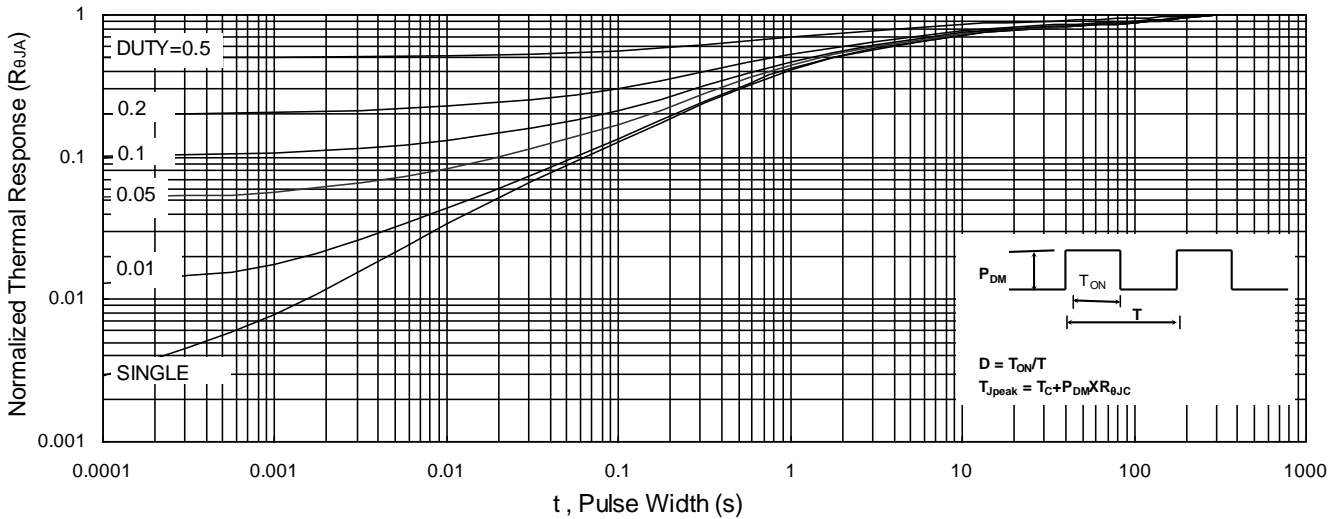


Fig.9 Normalized Maximum Transient Thermal Impedance

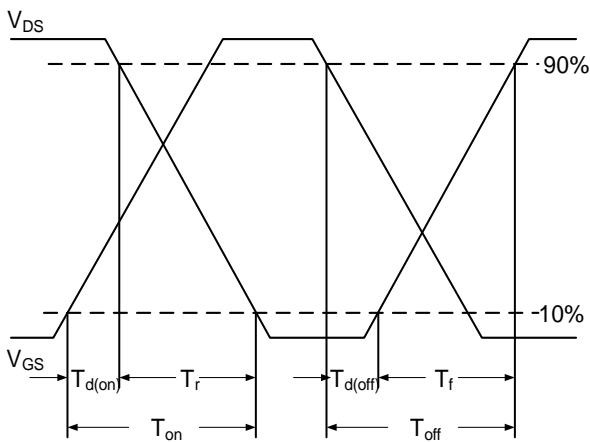


Fig.10 Switching Time Waveform

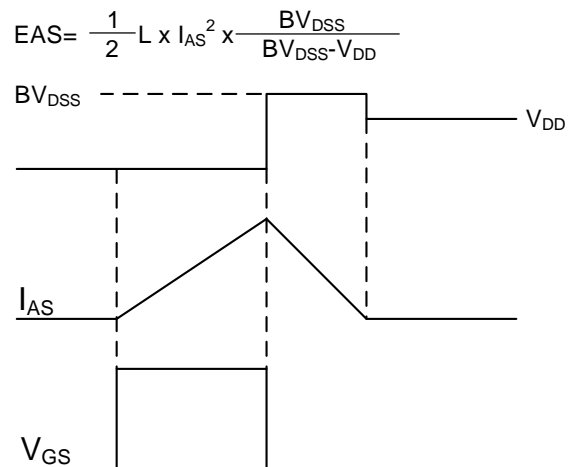
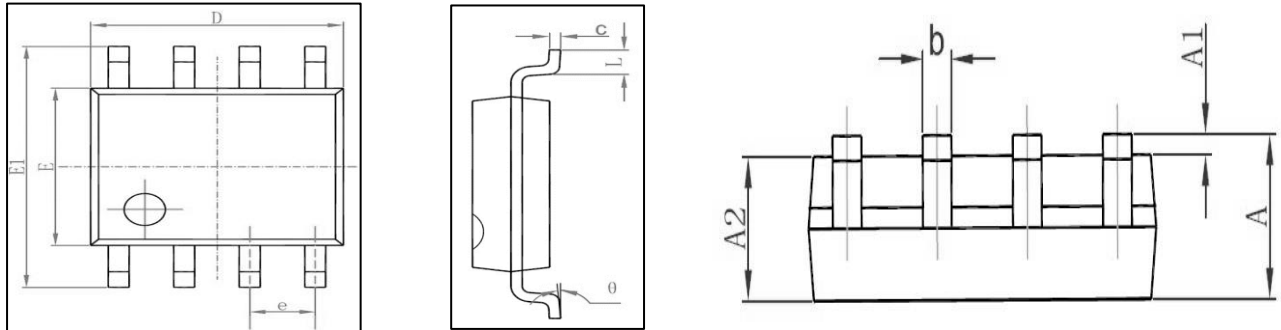
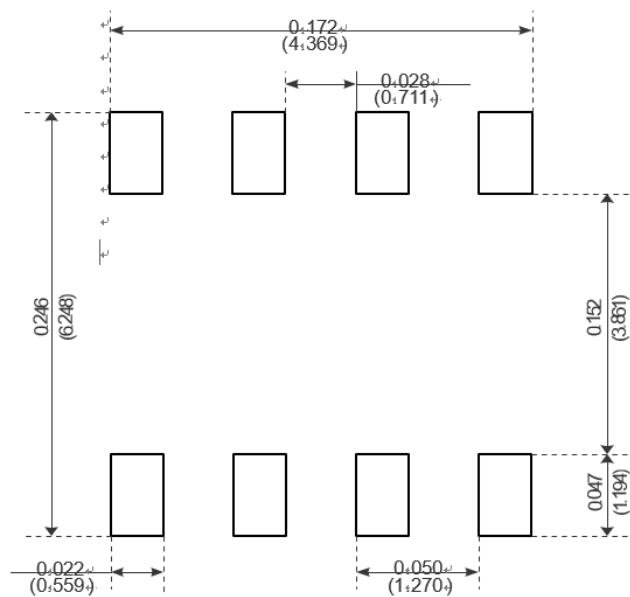


Fig.11 Unclamped Inductive Waveform

Package Mechanical Data-SOP-8



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A	1.350	1.750	0.053	0.069
A1	0.100	0.250	0.004	0.010
A2	1.350	1.550	0.053	0.061
b	0.330	0.510	0.013	0.020
c	0.170	0.250	0.006	0.010
D	4.700	5.100	0.185	0.200
E	3.800	4.000	0.150	0.157
E1	5.800	6.200	0.228	0.244
e	1.270 (BSC)		0.050 (BSC)	
L	0.400	1.270	0.016	0.050
θ	0°	8°	0°	8°



Recommended Minimum Pads

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Edition	Date	Change
Rve1.0	2020/6/11	Initial release

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