



Description

The AP9T16AGH-HF use advanced trench technology to provide excellent $R_{DS(ON)}$ and low gate charge . The complementary MOSFETs may be used to form a level shifted high side switch, and for a host of other applications

General Features

$V_{DS} = 20V, I_D = 20A$
 $R_{DS(ON)} < 25m\Omega @ V_{GS}=4.5V$

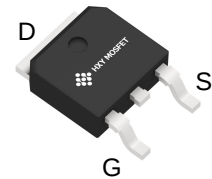
High power and current handing capability

Lead free product is acquired

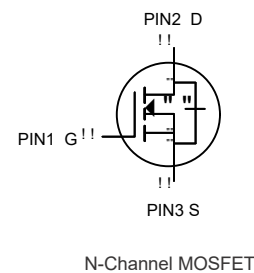
Surface mount package

Application

- Power switching application
- Hard Switched and High Frequency Circuits
- Uninterruptible Power Supply



TO-252-2L
(DPAK)



Package Marking and Ordering Information

Product ID	Pack	Brand	Qty(PCS)
AP9T16AGH-HF	TO-252-2L (DPAK)	HXY MOSFET	2500

Absolute Maximum Ratings@ $T_J=25^{\circ}C$ (unless otherwise specified)

Symbol	Parameter	Rating	Units
V_{DS}	Drain-Source Voltage	20	V
V_{GS}	Gate-Source Voltage	± 12	V
$I_D @ T_C=25^{\circ}C$	Drain Current, $V_{GS} @ 4.5V$	20	A
$I_D @ T_C=100^{\circ}C$	Drain Current, $V_{GS} @ 4.5V$	12	A
I_{DM}	Pulsed Drain Current ¹	40	A
$P_D @ T_C=25^{\circ}C$	Total Power Dissipation	5	W
$P_D @ T_A=25^{\circ}C$	Total Power Dissipation ³	2	W
E_{AS}	Single Pulse Avalanche Energy ⁴	150	mJ
T_{STG}	Storage Temperature Range	-55 to 150	$^{\circ}C$
T_J	Operating Junction Temperature Range	-55 to 150	$^{\circ}C$
R_{thj-c}	Maximum Thermal Resistance, Junction-case	5	$^{\circ}C/W$
R_{thj-a}	Maximum Thermal Resistance, Junction-ambient ³	62	$^{\circ}C/W$



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

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
BV_{DSS}	Drain-Source Breakdown Voltage	$V_{GS}=0V$, $I_D=250\mu A$	20	---	---	V
$\Delta BV_{DSS}/\Delta$	BVDSS Temperature Coefficient	Reference to 25°C , $I_D=1mA$	---	0.023	---	$V/^\circ\text{C}$
$R_{DS(ON)}$	Static Drain-Source On-Resistance ²	$V_{GS}=4.5V$, $I_D=8.0A$	---	16	25	$m\Omega$
		$V_{GS}=2.5V$, $I_D=5.0A$	---	22	30	
$V_{GS(th)}$	Gate Threshold Voltage	$V_{GS}=V_{DS}$, $I_D=250\mu A$	0.4	0.8	1.2	V
$\Delta V_{GS(th)}$	$V_{GS(th)}$ Temperature Coefficient		---	-5.2	---	$mV/^\circ\text{C}$
I_{DSS}	Drain-Source Leakage Current	$V_{DS}=24V$, $V_{GS}=0V$, $T_J=25^\circ\text{C}$	---	---	1	μA
		$V_{DS}=24V$, $V_{GS}=0V$, $T_J=55^\circ\text{C}$	---	---	5	
I_{GSS}	Gate-Source Leakage Current	$V_{GS}=\pm 20V$, $V_{DS}=0V$	---	---	± 100	nA
g_{fs}	Forward Transconductance	$V_{DS}=5V$, $I_D=15A$	---	21.6	---	S
R_g	Gate Resistance	$V_{DS}=0V$, $V_{GS}=0V$, $f=1MHz$	---	2.5	5	Ω
Q_g	Total Gate Charge (4.5V)	$V_{DS}=15V$, $V_{GS}=4.5V$, $I_D=15A$	---	6.2	8.7	nC
Q_{gs}	Gate-Source Charge		---	2.4	3.4	
Q_{gd}	Gate-Drain Charge		---	2.5	3.5	
$T_{d(on)}$	Turn-On Delay Time	$V_{DD}=15V$, $V_{GS}=10V$, $R_G=3.3\Omega$, $I_D=15A$	---	4	6.0	ns
T_r	Rise Time		---	7.6	14	
$T_{d(off)}$	Turn-Off Delay Time		---	21	42	
T_f	Fall Time		---	4	8	
C_{iss}	Input Capacitance	$V_{DS}=15V$, $V_{GS}=0V$, $f=1MHz$	---	472	801	pF
C_{oss}	Output Capacitance		---	71	113	
C_{rss}	Reverse Transfer Capacitance		---	55	91	

Diode Characteristics

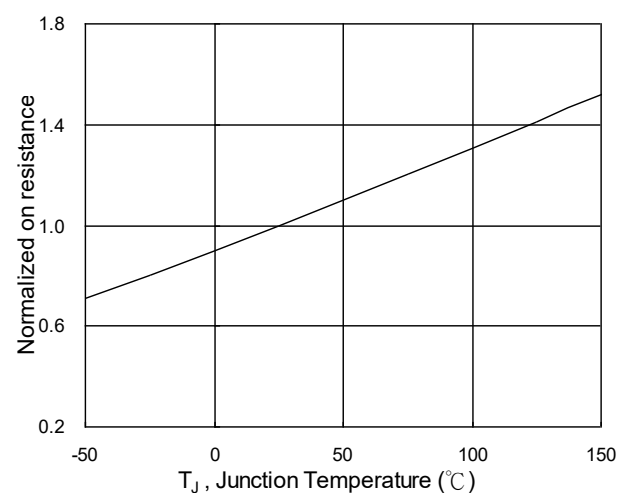
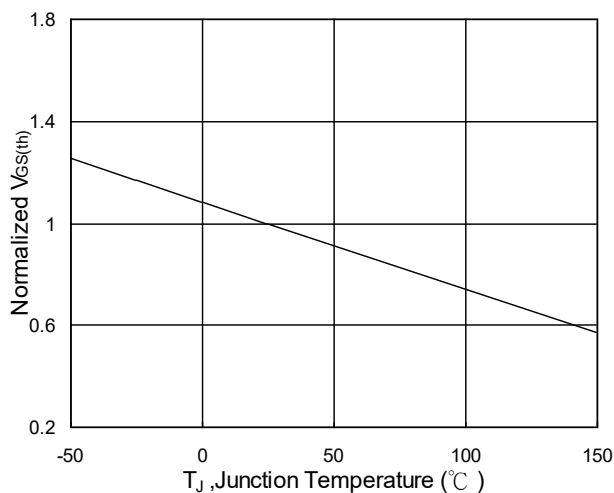
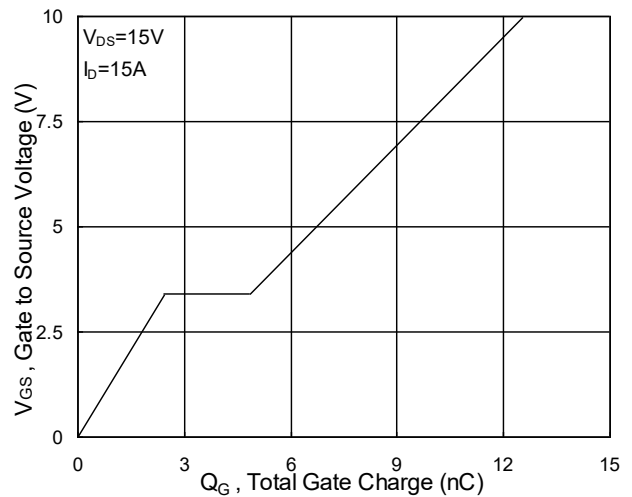
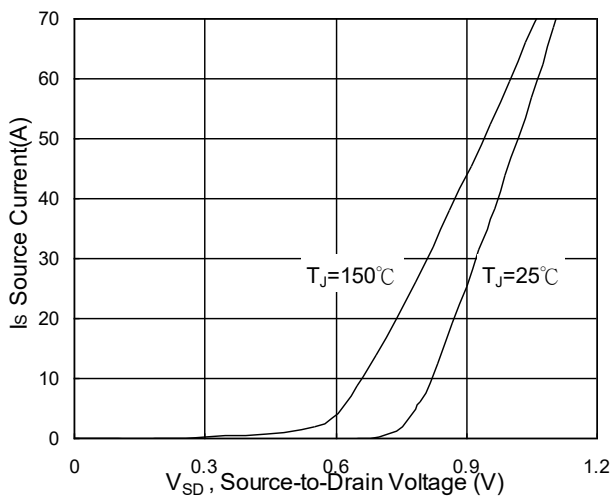
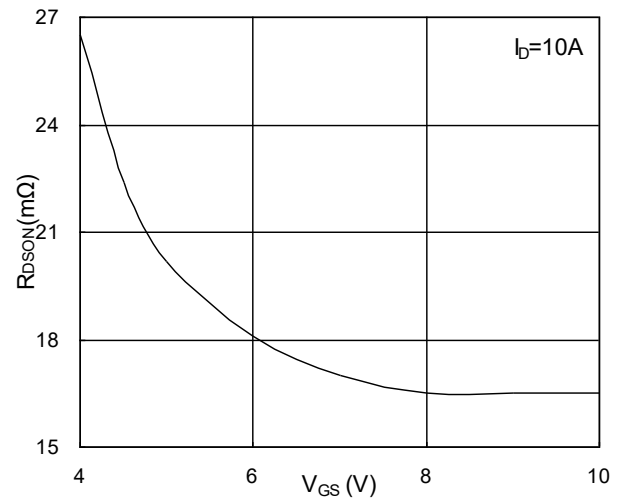
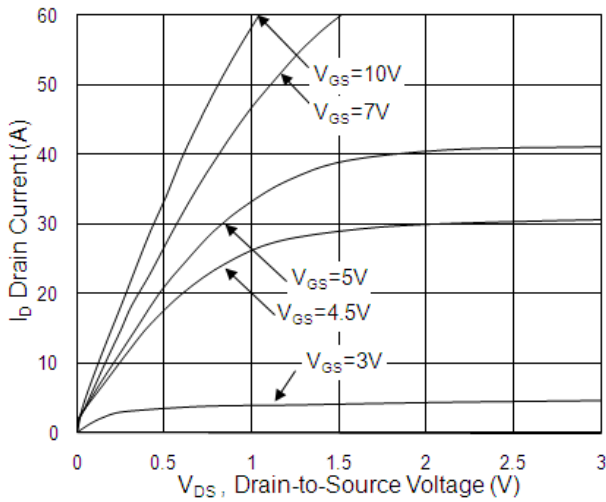
Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
I_S	Continuous Source Current ^{1,5}	$V_G=V_D=0V$, Force Current	---	---	20	A
I_{SM}	Pulsed Source Current ^{2,5}		---	---	40	A
V_{SD}	Diode Forward Voltage ²	$V_{GS}=0V$, $I_S=1A$, $T_J=25^\circ\text{C}$	---	---	1.2	V
t_{rr}	Reverse Recovery Time	$I_F=15A$, $dI/dt=100A/\mu s$, $T_J=25^\circ\text{C}$	---	17	---	nS
Q_{rr}	Reverse Recovery Charge		---	3	---	nC

Note :

- 1.The data tested by surface mounted on a 1 inch² FR-4 board with 20Z 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 $V_{DD}=25V$, $V_{GS}=10V$, $L=0.1mH$, $I_{AS}=21A$
- 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



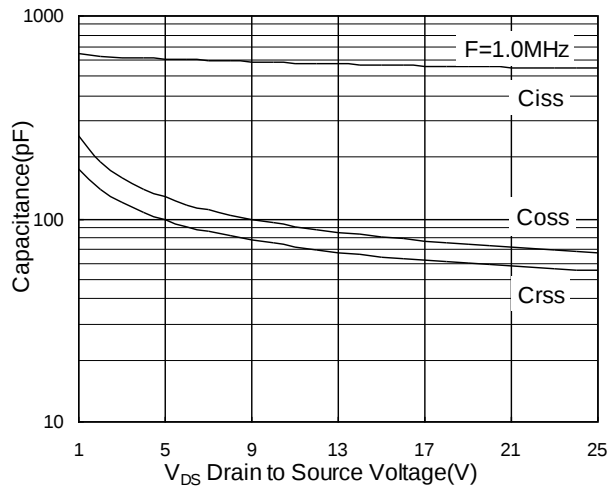


Fig.7 Capacitance

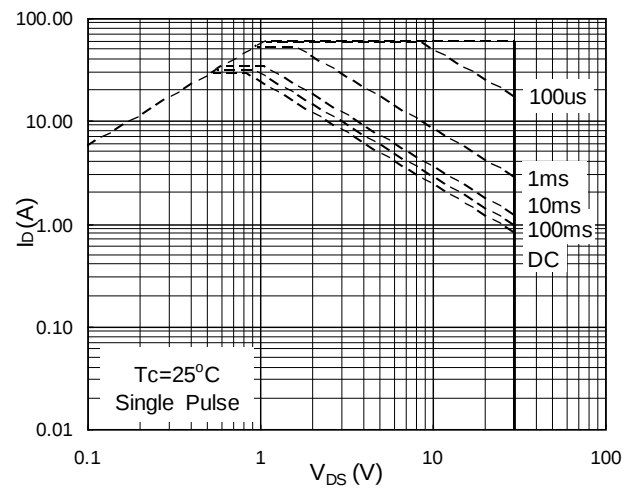


Fig.8 Safe Operating Area

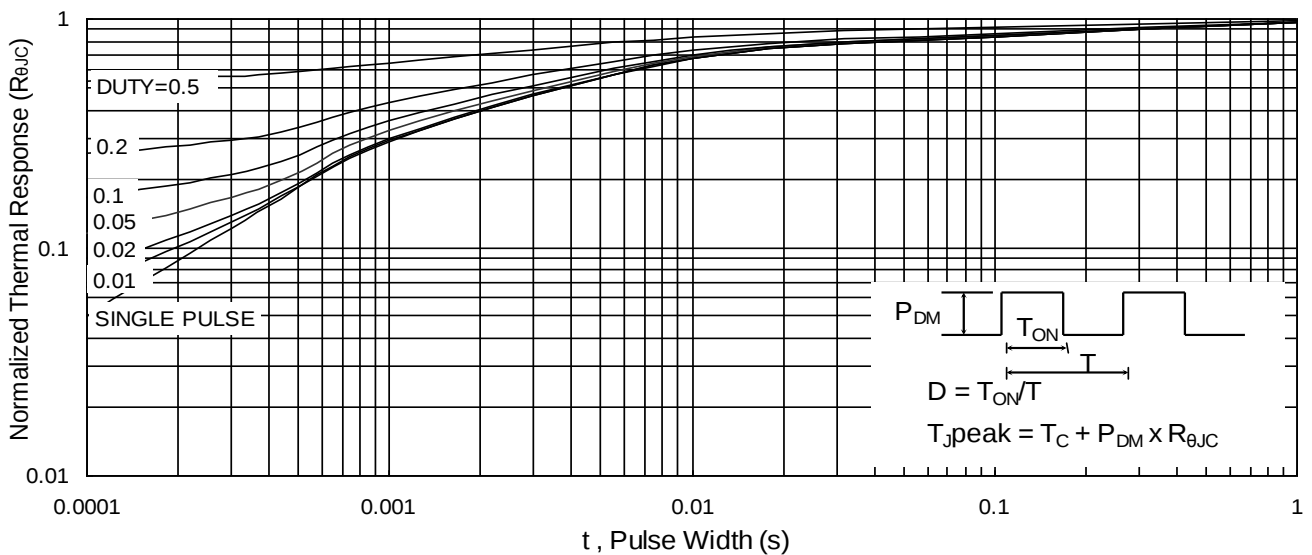


Fig.9 Normalized Maximum Transient Thermal Impedance

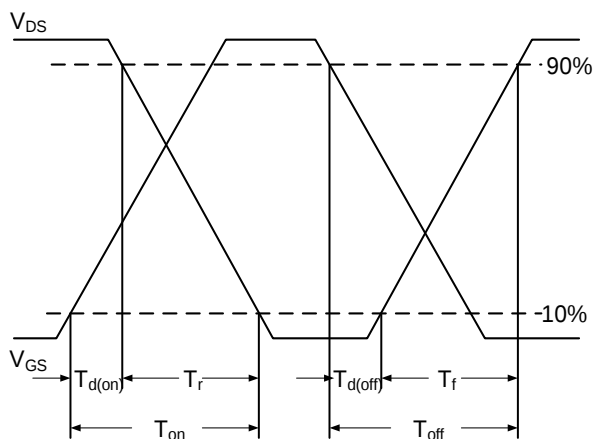


Fig.10 Switching Time Waveform

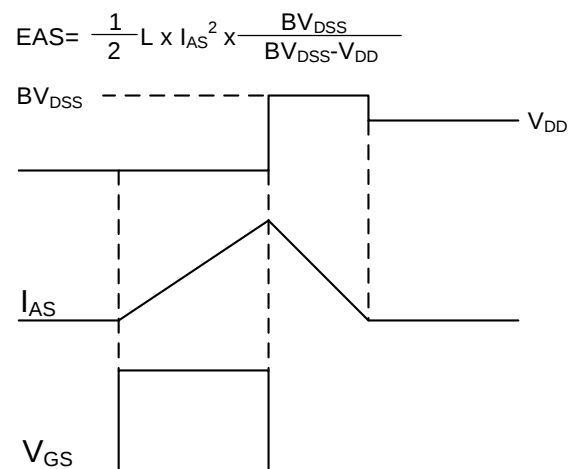
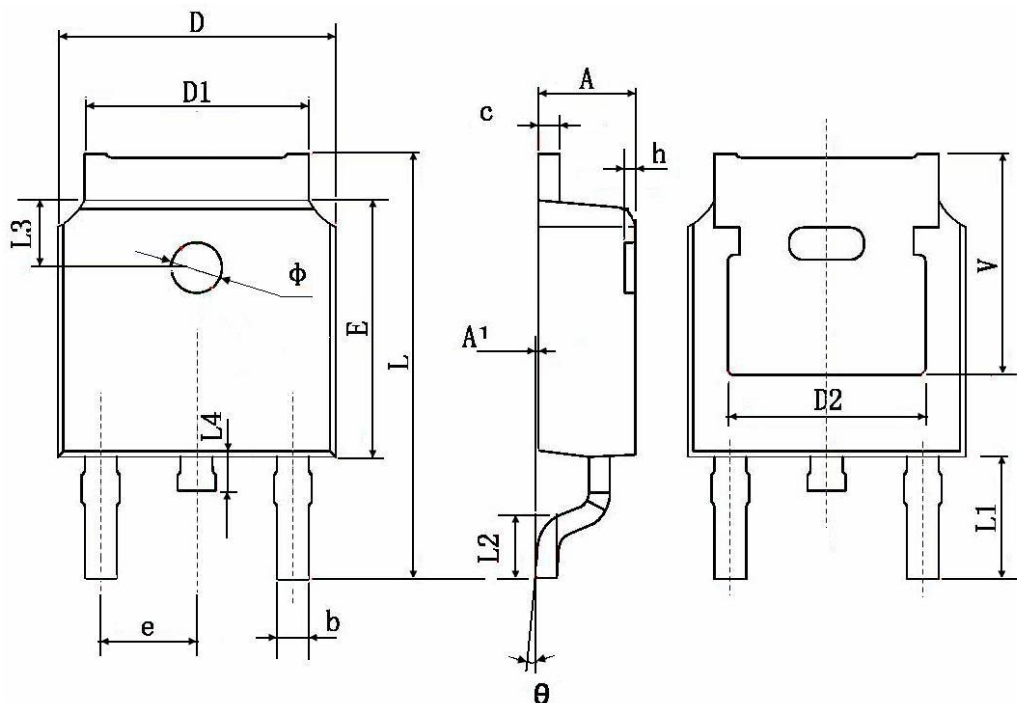


Fig.11 Unclamped Inductive Switching Waveform



TO-252-2L(DPAK) Package Information



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	2.200	2.400	0.087	0.094
A1	0.000	0.127	0.000	0.005
b	0.660	0.860	0.026	0.034
c	0.460	0.580	0.018	0.023
D	6.500	6.700	0.256	0.264
D1	5.100	5.460	0.201	0.215
D2	0.483 TYP.		0.190 TYP.	
E	6.000	6.200	0.236	0.244
e	2.186	2.386	0.086	0.094
L	9.800	10.400	0.386	0.409
L1	2.900 TYP.		0.114 TYP.	
L2	1.400	1.700	0.055	0.067
L3	1.600 TYP.		0.063 TYP.	
L4	0.600	1.000	0.024	0.039
Φ	1.100	1.300	0.043	0.051
θ	0°	8°	0°	8°
h	0.000	0.300	0.000	0.012
V	5.350 TYP.		0.211 TYP.	



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