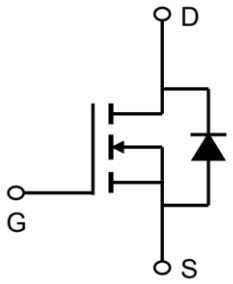
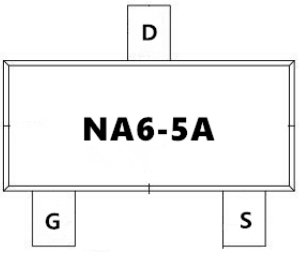
AP5N06MI

60V N-Channel Enhancement Mode MOSFET

Description

The AP5N06MI 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 =5A

$R_{DS(ON)}$ < 38mΩ @ V_{GS}=10V

Application

Battery protection

Load switch

Automative lighting

Package Marking and Ordering Information

Product ID	Pack	Marking	Qty(PCS)
AP5N06MI	SOT-23-3L	NA6-5A	3000

Absolute Maximum Ratings (T_C=25℃unless otherwise note

Symbol	Parameter	Rating	Units
V_{DS}	Drain-Source Voltage	60	V
V_{GS}	Gate-Source Voltage	±20	V
I_D@T_A=25℃	Continuous Drain Current, V_{GS} @ 10V[1]	5.8	A
I_D@T_A=70℃	Continuous Drain Current, V_{GS} @ 10V[1]	3.5	A
I_{DM}	Pulsed Drain Current[2]	18	A
EAS	Single Pulse Avalanche Energy[3]	22	mJ
I_{AS}	Avalanche Current	21	A
P_D@T_A=25℃	Total Power Dissipation[4]	1.5	W
T_{STG}	Storage Temperature Range	-55 to 150	℃
T_J	Operating Junction Temperature Range	-55 to 150	℃
$R_{\theta JA}$	Thermal Resistance Junction-ambient [1]	85	℃/W
$R_{\theta JC}$	Thermal Resistance Junction-Case[1]	25	℃/W

Electrical Characteristics (T_J=25 ℃, unless otherwise noted)

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
BVDSS	Drain-Source Breakdown Voltage	V_{GS}=0V , I_D=250uA	60	---	---	V
△BVDSS/△TJ	BVDSS Temperature Coefficient	Reference to 25℃ , I_D=1mA	---	0.044	---	V/℃
RDS(ON)	Static Drain-Source On-Resistance[2]	V_{GS}=10V , I_D=4A	---	28	38	mΩ
		V_{GS}=4.5V , I_D=2A	---	35	50	
VGS(th)	Gate Threshold Voltage	V_{GS}=V_{DS} , I_D =250uA	1.0	1.76	2.5	V
△$V_{GS(th)}$	$V_{GS(th)}$ Temperature Coefficient		---	-4.8	---	mV/℃
IDSS	Drain-Source Leakage Current	V_{DS}=48V , V_{GS}=0V , T_J=25℃	---	---	1	uA
		V_{DS}=48V , V_{GS}=0V , T_J=55℃	---	---	5	
IGSS	Gate-Source Leakage Current	V_{GS}=±20V , V_{DS}=0V	---	---	±100	nA
gfs	Forward Transconductance	V_{DS}=5V , I_D=4A	---	28.3	---	S
R_g	Gate Resistance	V_{DS}=0V , V_{GS}=0V , f=1MHz	---	2.5	---	Ω
Q_g	Total Gate Charge (10V)	V_{DS}=48V , V_{GS}=10V , I_D=4A	---	19	---	nC
Qgs	Gate-Source Charge		---	2.6	---	
Qgd	Gate-Drain Charge		---	4.1	---	
Td(on)	Turn-On Delay Time	V_{DD}=30V , V_{GS}=10V , R_G=3.3Ω I_D=4A	---	3	---	ns
T_r	Rise Time		---	34	---	
Td(off)	Turn-Off Delay Time		---	23	---	
T_f	Fall Time		---	6	---	
Ciss	Input Capacitance	V_{DS}=15V , V_{GS}=0V , f=1MHz	---	1027	---	pF
Coss	Output Capacitance		---	65	---	
Crss	Reverse Transfer Capacitance		---	46	---	
IS	Continuous Source Current[1,5]	V_G=V_D=0V , Force Current	---	---	4.5	A
ISM	Pulsed Source Current[2,5]		---	---	18	A
VSD	Diode Forward Voltage[2]	V_{GS}=0V , I_S=1A , T_J=25℃	---	---	1.2	V
trr	Reverse Recovery Time	I_F=4A , dI/dt=100A/μs , T_J=25℃	---	12.1	---	nS
Q_{rr}	Reverse Recovery Charge		---	6.7	---	nC

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 ≦ 300us , duty cycle ≦ 2%

3、The EAS data shows Max. rating . The test condition is VDD=25V,VGS=10V,L=0.1mH,IAS=21A

4、The power dissipation is limited by 150℃ junction temperature

5 、The data is theoretically the same as ID and IDM , in real applications , should be limited by total power dissipation.

Typical Characteristics

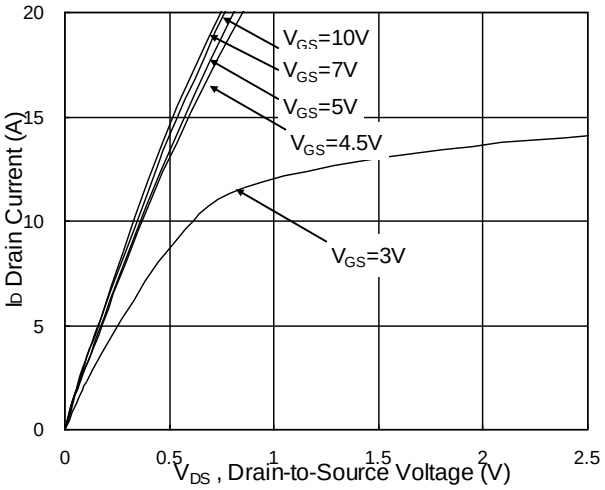


Fig.1 Typical Output Characteristics

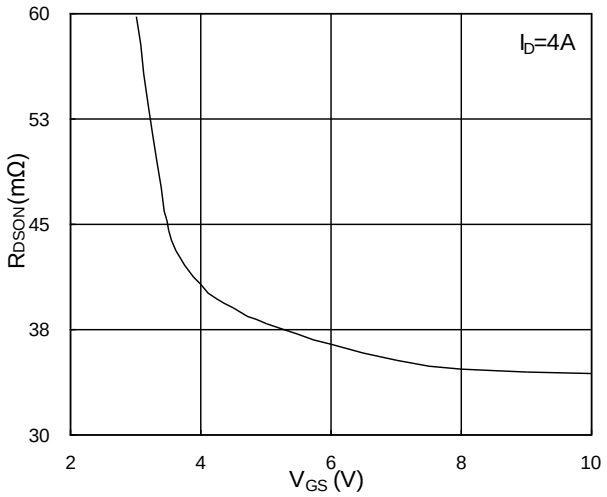


Fig.2 On-Resistance vs. Gate-Source

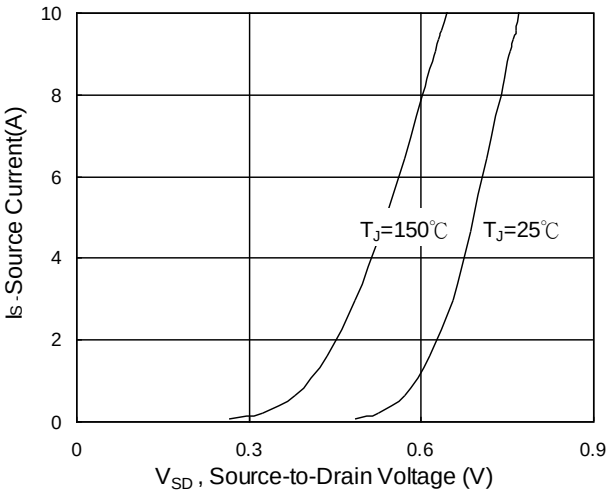


Fig.3 Forward Characteristics Of Reverse

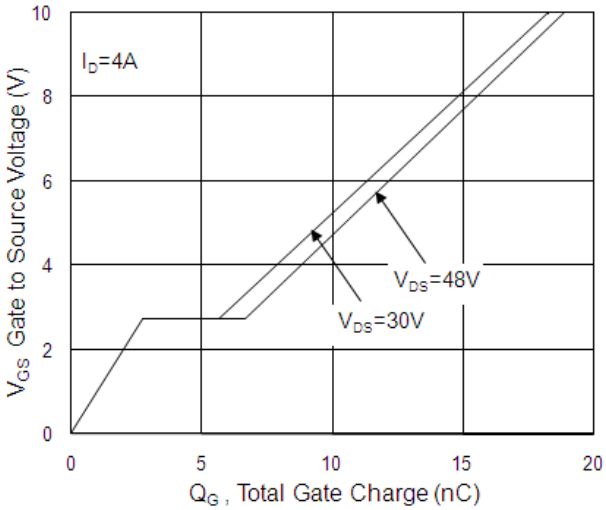


Fig.4 Gate-Charge Characteristics

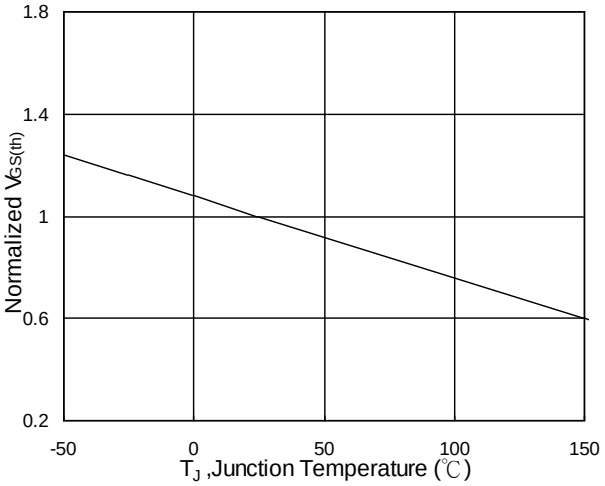


Fig.5 Normalized $V_{GS(th)}$ vs. T_J

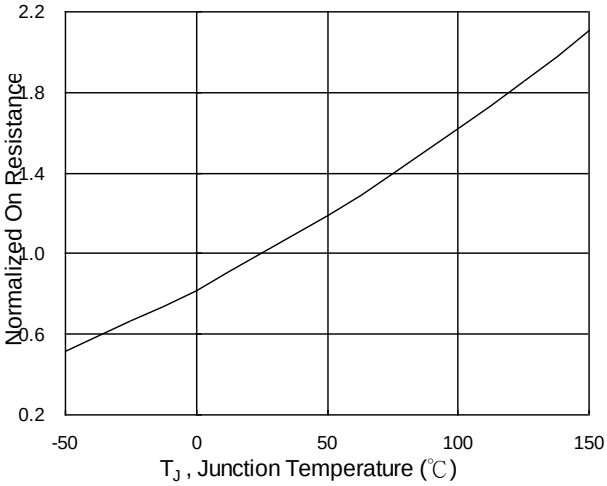


Fig.6 Normalized R_{DSON} vs. T_J

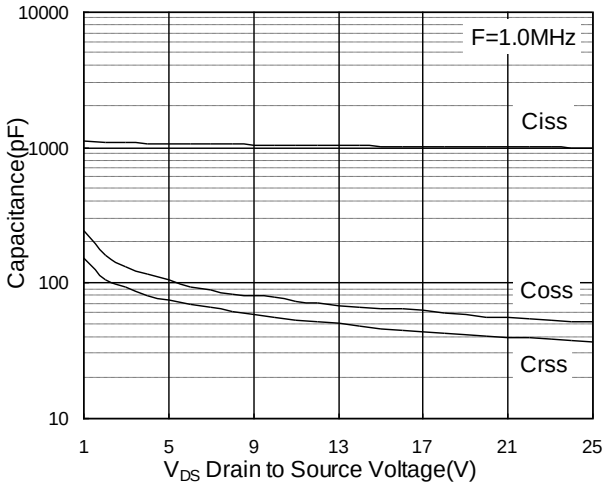


Fig.7 Capacitance

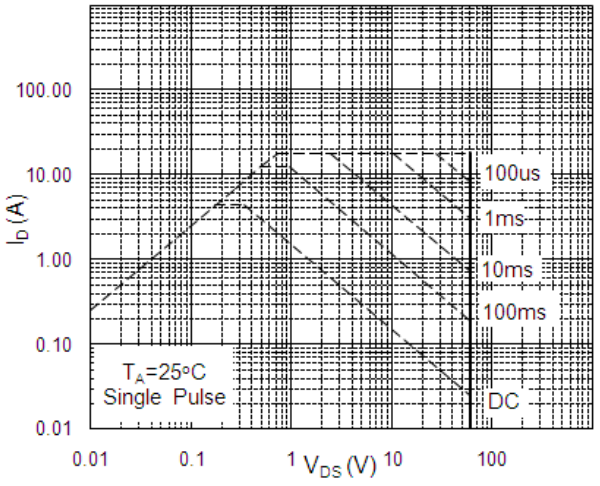


Fig.8 Safe Operating Area

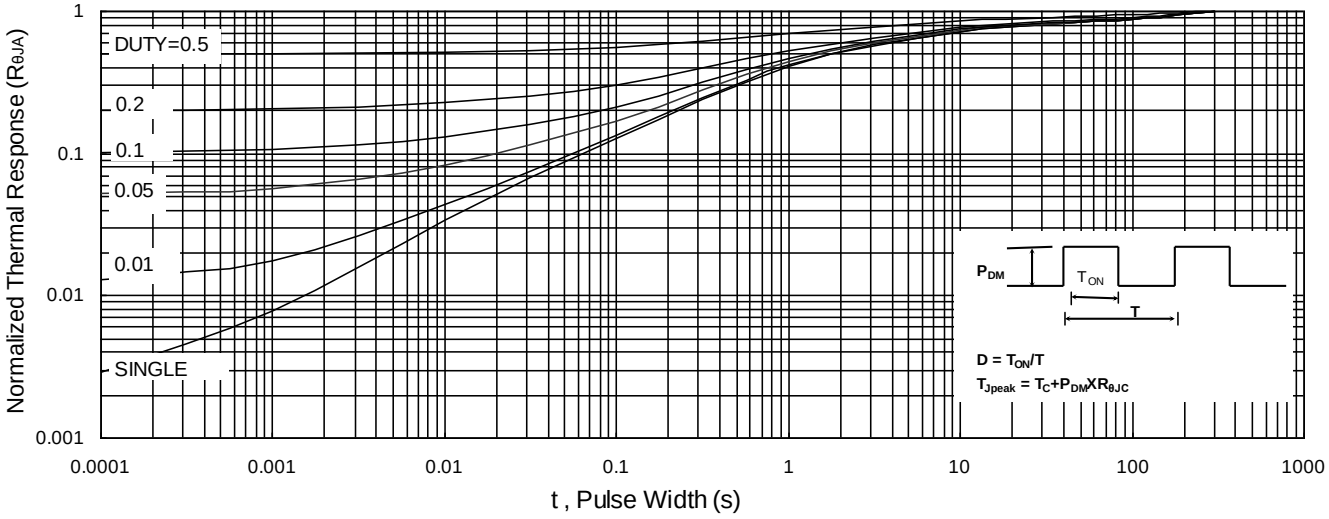


Fig.9 Normalized Maximum Transient Thermal Impedance

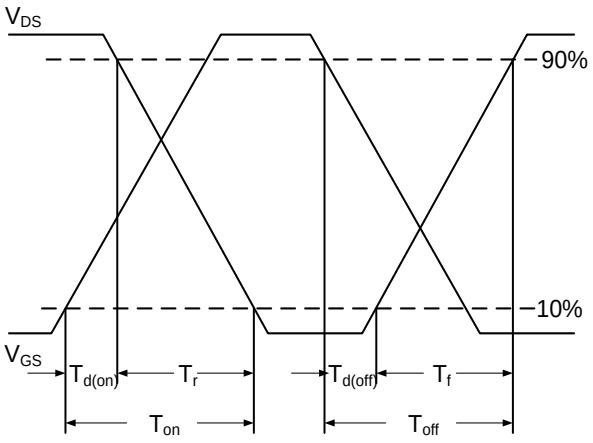


Fig.10 Switching Time Waveform

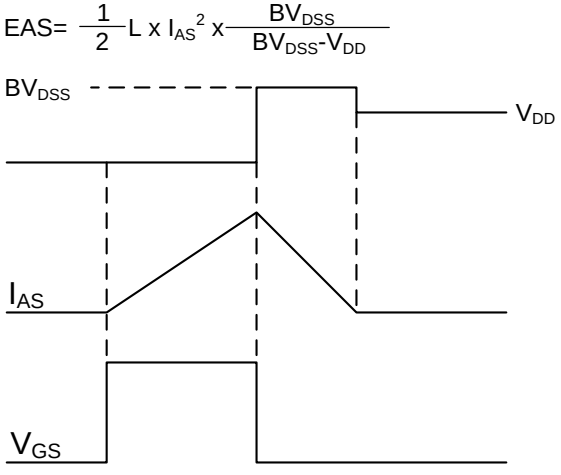
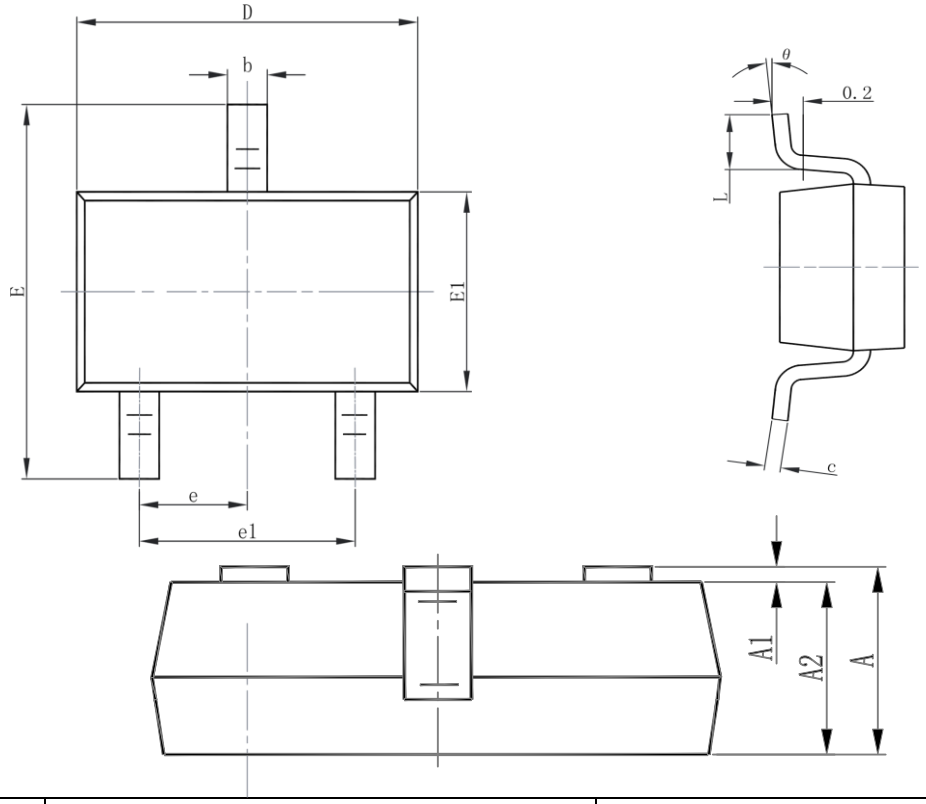


Fig.11 Unclamped Inductive Switching Waveform

Package Mechanical Data-SOT23-3



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	1.050	1.250	0.041	0.049
A1	0.000	0.100	0.000	0.004
A2	1.050	1.150	0.041	0.045
b	0.300	0.500	0.012	0.020
c	0.100	0.200	0.004	0.008
D	2.820	3.020	0.111	0.119
E1	1.500	1.700	0.059	0.067
E	2.650	2.950	0.104	0.116
e	0.950(BSC)		0.037(BSC)	
e1	1.800	2.000	0.071	0.079
L	0.300	0.600	0.012	0.024
θ	0°	8°	0°	8°

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