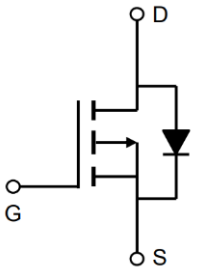
AP6P06MI

-60V P-Channel Enhancement Mode MOSFET

Description

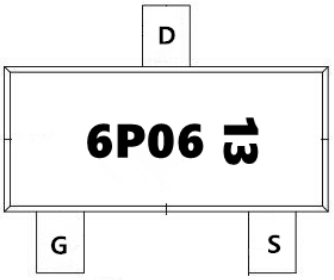
The AP6P06MI uses advanced trench technology to provide excellent $R_{DS(ON)}$, low gate charge and operation with gate voltages as low as 4.5V. This device is suitable for use as a Battery protection or in other Switching application.



General Features

V_{DS} = -60V I_D =-6A

$R_{DS(ON)}$ < 90mΩ @ V_{GS}=10V **(Type：80mΩ)**



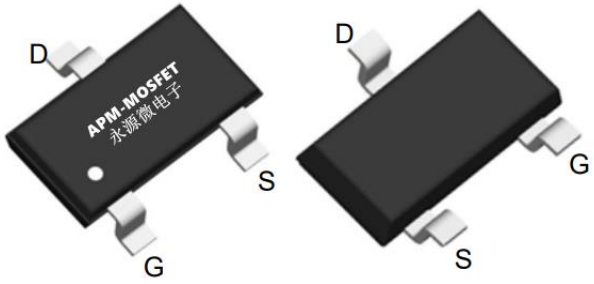
Application

Brushless motor

Load switch

Uninterruptible power supply

Top View **Bottom View**



Package Marking and Ordering Information

Product ID	Pack	Marking	Qty(PCS)
AP6P06MI	SOT23-3L	6P06-13	3000

Absolute Maximum Ratings (T_C=25℃unless otherwise noted)

Symbol	Parameter	Rating	Units
V_{DS}	Drain-Source Voltage	-60	V
V_{GS}	Gate-Source Voltage	±20	V
I_D@T_C=25℃	Continuous Drain Current, V_{GS} @ -10V[1]	-6	A
I_D@T_C=100℃	Continuous Drain Current, V_{GS} @ -10V[1]	-4.3	A
I_{DM}	Pulsed Drain Current[2]	-26	A
EAS	Single Pulse Avalanche Energy[3]	29.8	mJ
I_{AS}	Avalanche Current	-24.4	A
P_D@T_C=25℃	Total Power Dissipation[4]	31.3	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]	125	℃/W
$R_{\theta JC}$	Thermal Resistance Junction-Case[1]	40	℃/W

P-Channel Electrical Characteristics (TJ =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	BV_{DSS} Temperature Coefficient	Reference to 25℃ , I_D=-1mA	---	-0.03	---	V/℃
RDS(ON)	Static Drain-Source On-Resistance[2]	V_{GS}=-10V , I_D=-3A	---	80	90	mΩ
		V_{GS}=-4.5V , I_D=-2A	---	100	115	
VGS(th)	Gate Threshold Voltage	V_{GS}=V_{DS} , I_D =-250uA	-1.2	-1.75	-2.5	V
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=-3A	---	8.5	---	S
Q_g	Total Gate Charge (-4.5V)	V_{DS}=-48V , V_{GS}=-4.5V , I_D=-3A	---	12.1	---	nC
Qgs	Gate-Source Charge		---	2.2	---	
Qgd	Gate-Drain Charge		---	6.3	---	
Td(on)	Turn-On Delay Time	V_{DD}=-15V , V_{GS}=-10V , R_G=3.3□, I_D=-1A	---	9.2	---	ns
T_r	Rise Time		---	20.1	---	
Td(off)	Turn-Off Delay Time		---	46.7	---	
T_f	Fall Time		---	9.4	---	
Ciss	Input Capacitance	V_{DS}=-15V , V_{GS}=0V , f=1MHz	---	1137	---	pF
Coss	Output Capacitance		---	76	---	
Crss	Reverse Transfer Capacitance		---	50	---	
IS	Continuous Source Current[1,5]	V_G=V_D=0V , Force Current	---	---	-13	A
VSD	Diode Forward Voltage[2]	V_{GS}=0V , I_S=-1A , T_J=25℃	---	---	-1.2	V

Note :
1、The data tested by surface mounted on a 1 inch 2 FR-4 board with 2OZ copper.
2、The data tested by pulsed , pulse width ≦ 300us , duty cycle ≦ 2%
3、The power dissipation is limited by 150℃ junction temperature
4、The data is theoretically the same as I D and I DM , in real applications , should be limited by total power dissipation.

P-Channel Typical Characteristics

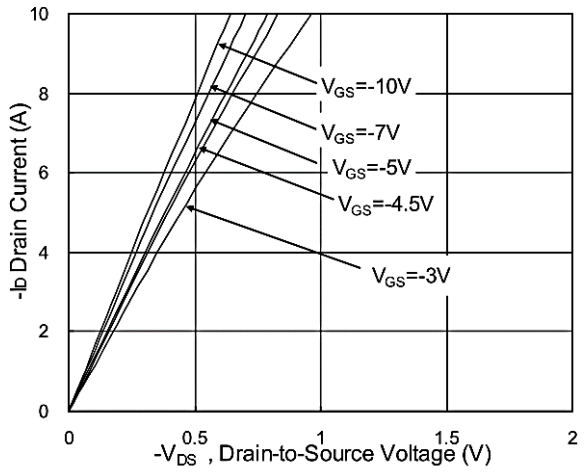


Fig.1 Typical Output Characteristics

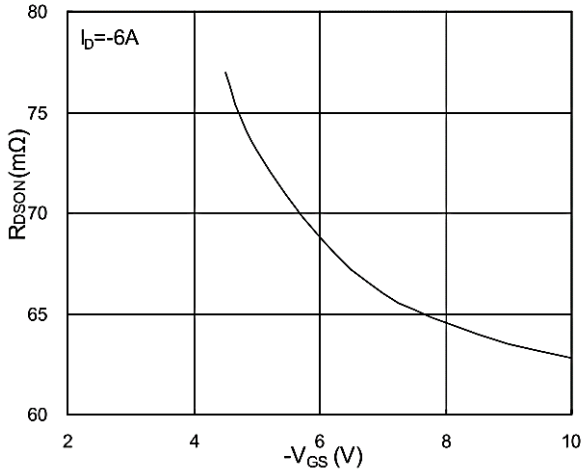


Fig.2 On-Resistance v.s Gate-Source

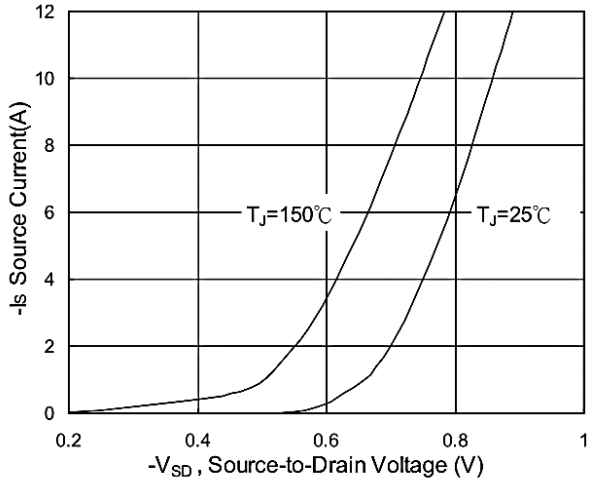


Fig.3 Forward Characteristics of Reverse

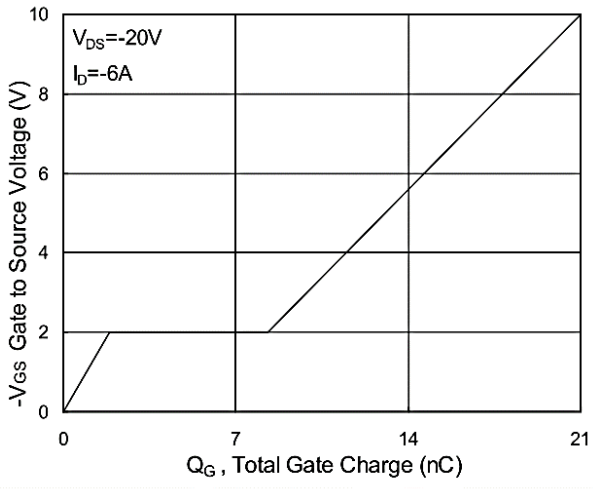


Fig.4 Gate-Charge Characteristics

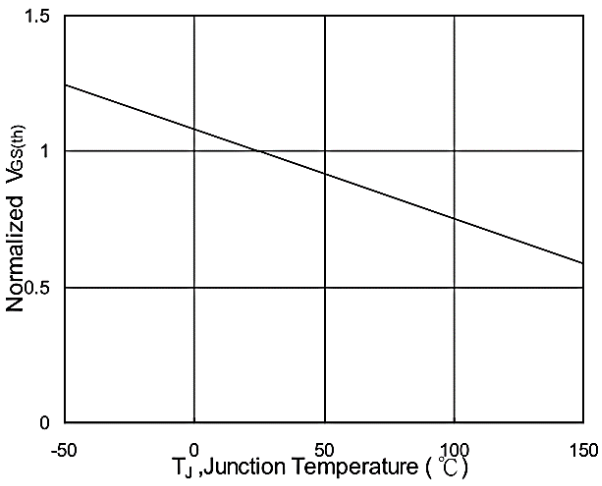


Fig.5 Normalized $V_{GS(th)}$ v.s T_J

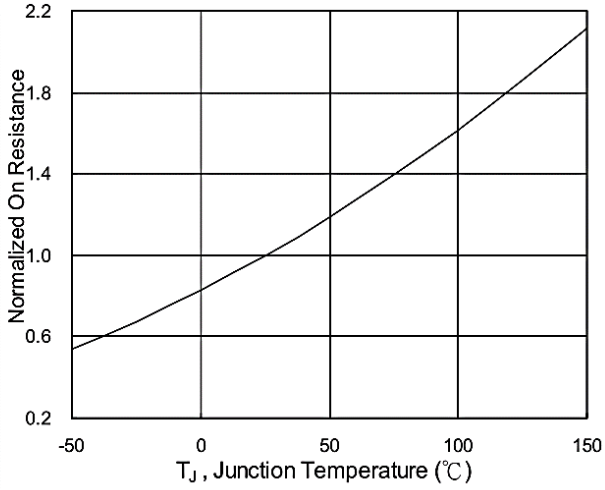


Fig.6 Normalized R_{DSON} v.s T_J

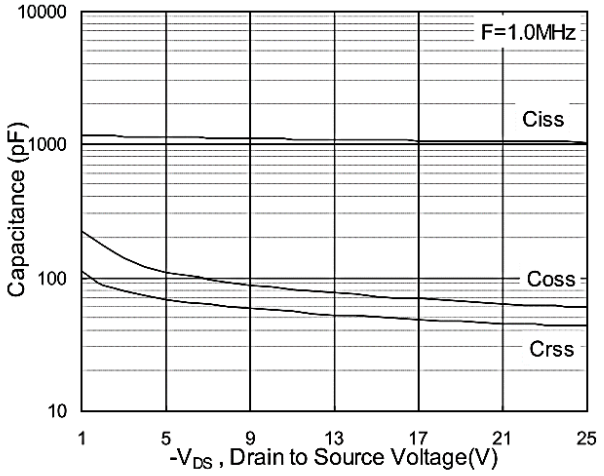


Fig.7 Capacitance

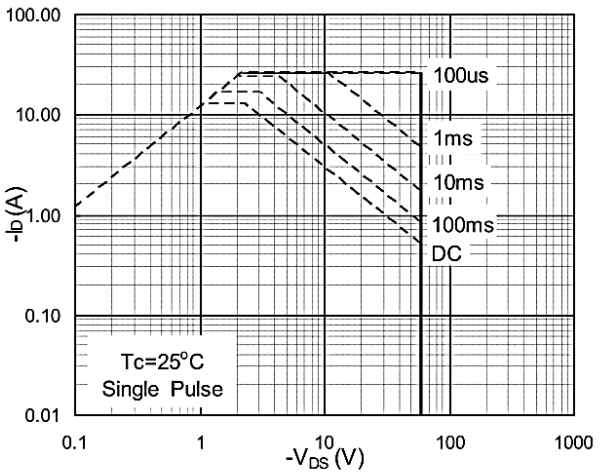


Fig.8 Safe Operating Area

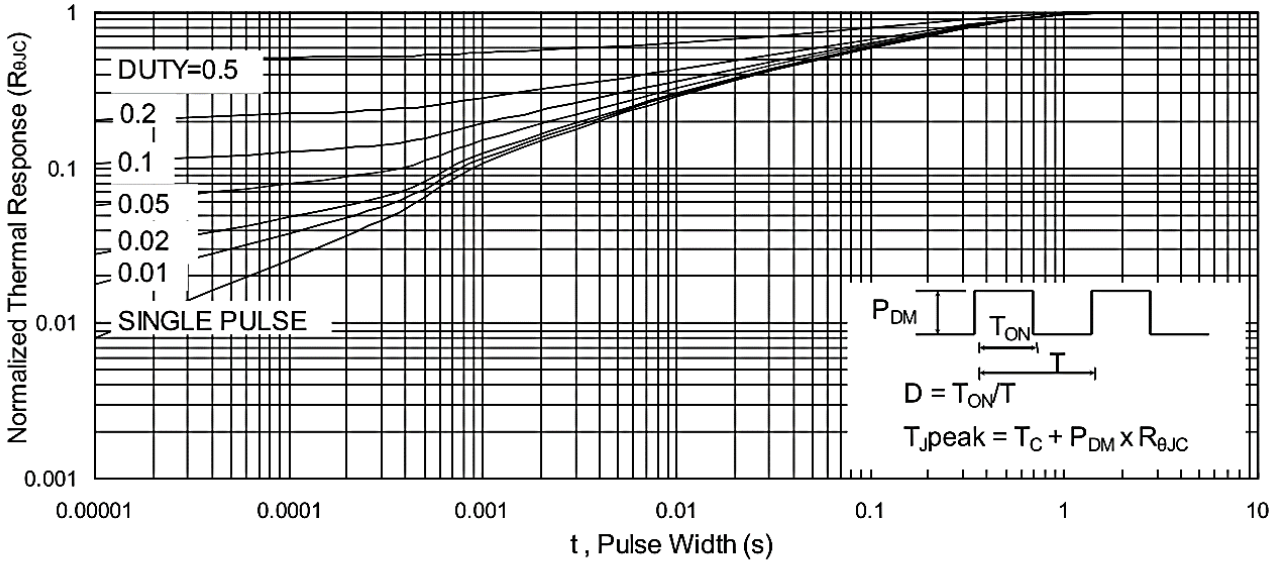


Fig.9 Normalized Maximum Transient Thermal Impedance

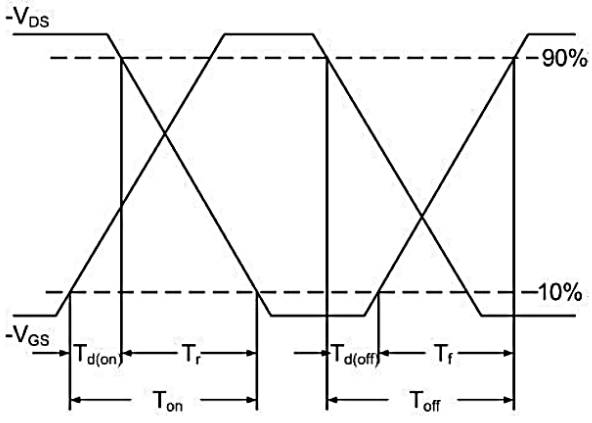


Fig.10 Switching Time Waveform

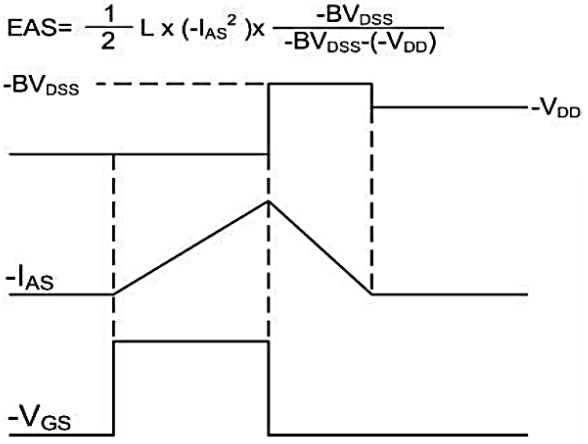
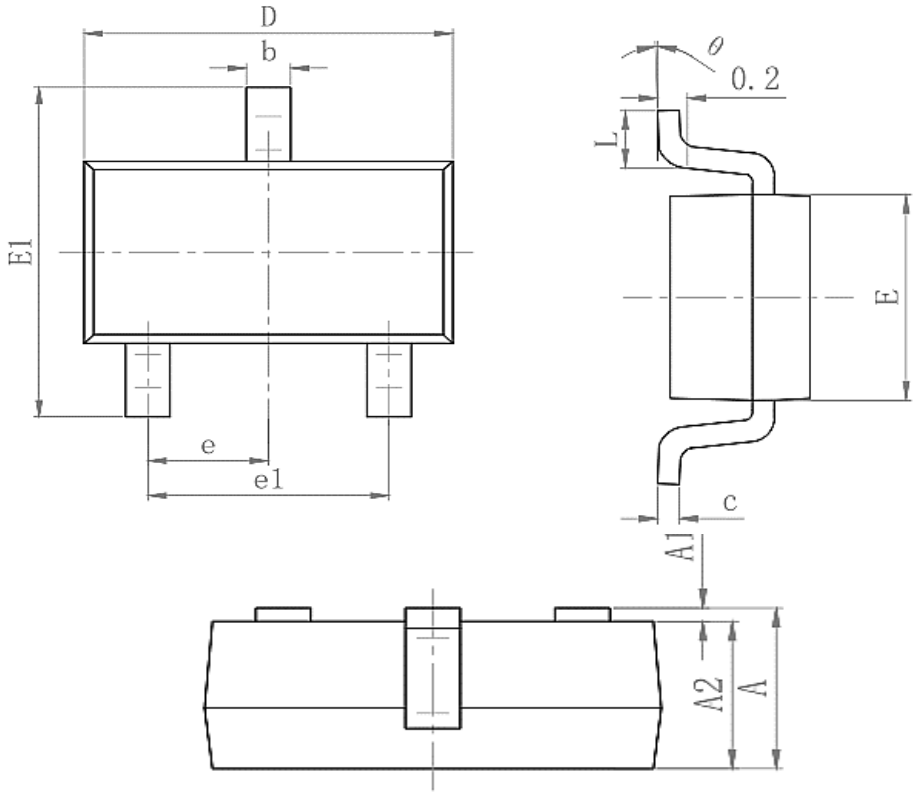


Fig.11 Unclamped Inductive Switching Waveform

Package Mechanical Data-SOT23-3-XC-Single



Symbol	Dimensions In Millimeters	
	Min.	Max.
A	1.050	1.250
A1	0.000	0.100
A2	1.050	1.150
b	0.25	0.45
c	0.100	0.200
D	2.820	3.020
E	1.5	1.7
E1	2.650	2.950
e	0.950(BSC)	
e1	1.800	2.000
L	0.300	0.500
θ	0°	8°

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Edition	Date	Change
Rve1.0	2021/4/13	Initial release