AP7P03MI

-30V P-Channel Enhancement Mode MOSFET

Description

The AP7P03MI 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

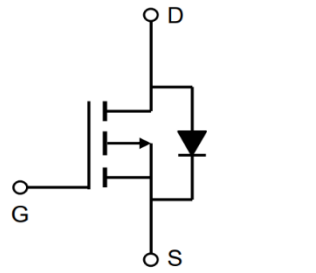
V_{DS} = -30V I_D =7.0A

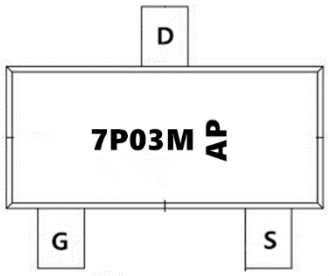
$R_{DS(ON)}$ <32mΩ @ V_{GS}=10V （Type：26mΩ）

Application

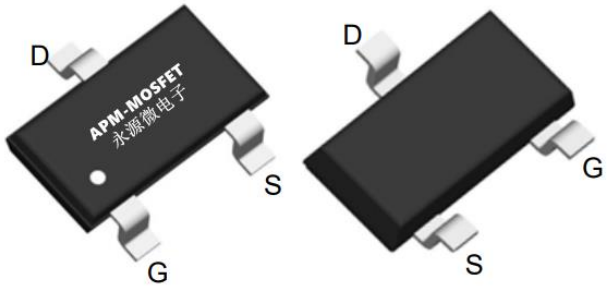
Boost driver

Brushless motor





Top View Bottom View



Package Marking and Ordering Information

Product ID	Pack	Marking	Qty(PCS)
AP7P03MI	SOT23-3L	7P03M AP	3000

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

Symbol	Parameter	Rating	Units
VDS	Drain-Source Voltage	-30	V
VGS	Gate-Source Voltage	±20	V
I_D@T_C=25℃	Continuous Drain Current, V_{GS} @ -4.5V[1]	-7.0	A
I_D@T_C=70℃	Continuous Drain Current, V_{GS} @ -4.5V[1]	-4.5	A
IDM	Pulsed Drain Current[2]	-28	A
P_D@T_C=25℃	Total Power Dissipation[3]	1.8	W
TSTG	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]	110	℃/W

Electrical Characteristics (T_C=25℃unless otherwise noted)

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
BVDSS	Drain-Source Breakdown Voltage	V_{GS}=0V , I_D=-250uA	-30	-33	---	V
RDS(ON)	Static Drain-Source On-Resistance[2]	V_{GS}=-10V , I_D=-7A	---	25	32	mΩ
		V_{GS}=-4.5V , I_D=-5A	---	33	45	
VGS(th)	Gate Threshold Voltage	V_{GS}=V_{DS} , I_D =-250uA	-1.0	-1.5	-2.5	V
IDSS	Drain-Source Leakage Current	V_{DS}=-24V , V_{GS}=0V , T_J=25℃	---	---	1	uA
		V_{DS}=-24V , 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=-7A	---	15	---	S
R_g	Gate Resistance	V_{DS}=0V , V_{GS}=0V , f=1MHz		15	30	Ω
Q_g	Total Gate Charge (-4.5V)	V_{DS}=-20V , V_{GS}=-4.5V , I_D=-7A	---	9.8	---	nC
Qgs	Gate-Source Charge		---	2.2	---	
Qgd	Gate-Drain Charge		---	3.4	---	
Td(on)	Turn-On Delay Time	V_{DD}=-15V V_{GS}=-10V R_G=3.3Ω I_D=-5A	---	16.4	---	ns
T_r	Rise Time		---	20.2	---	
Td(off)	Turn-Off Delay Time		---	55	---	
T_f	Fall Time		---	10	---	
Ciss	Input Capacitance	V_{DS}=-15V , V_{GS}=0V , f=1MHz	---	930	---	pF
Coss	Output Capacitance		---	148	---	
Crss	Reverse Transfer Capacitance		---	115	---	
IS	Continuous Source Current[1,5]	V_G=V_D=0V , Force Current	---	---	-8	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 mo unted 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.

Typical Characteristics

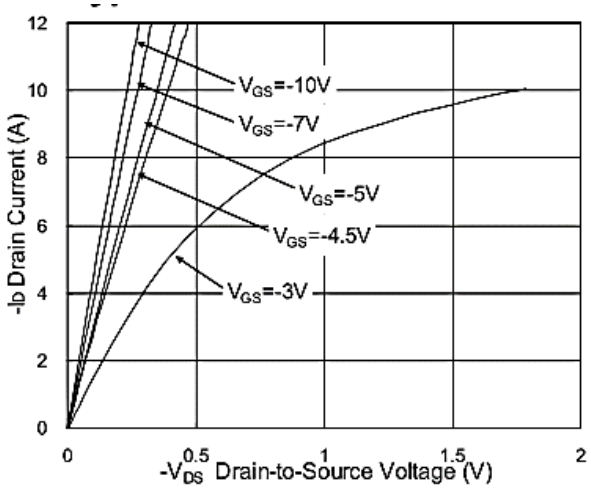


Fig.1 Typical Output Characteristics

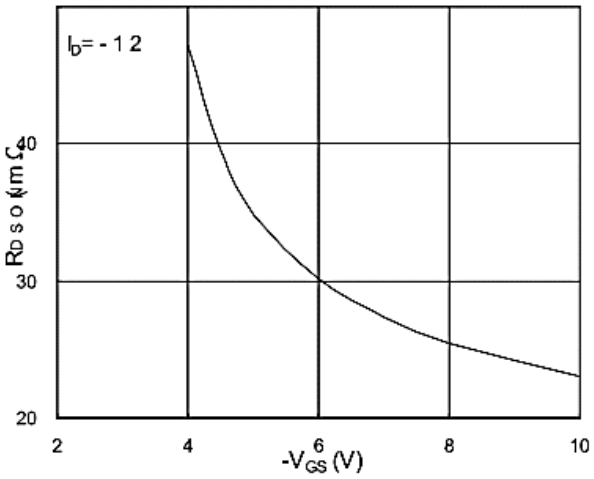


Fig.2 On-Resistance v.s Gate-Source

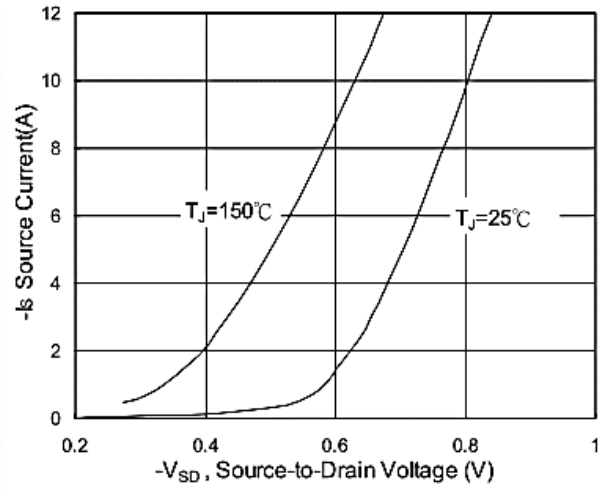


Fig.3 Forward Characteristics Of Reverse

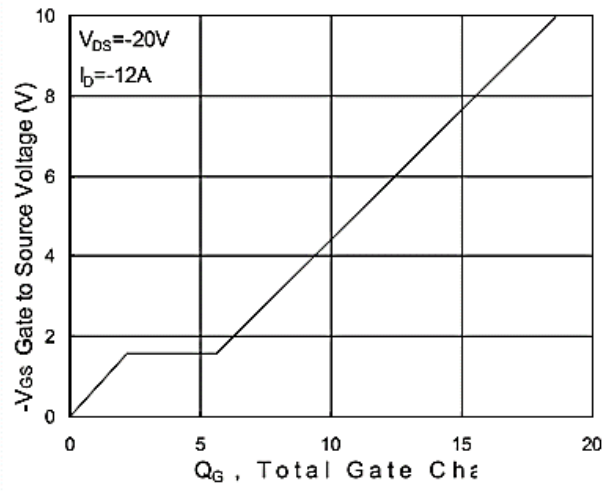


Fig.4 Gate-Charge Characteristics

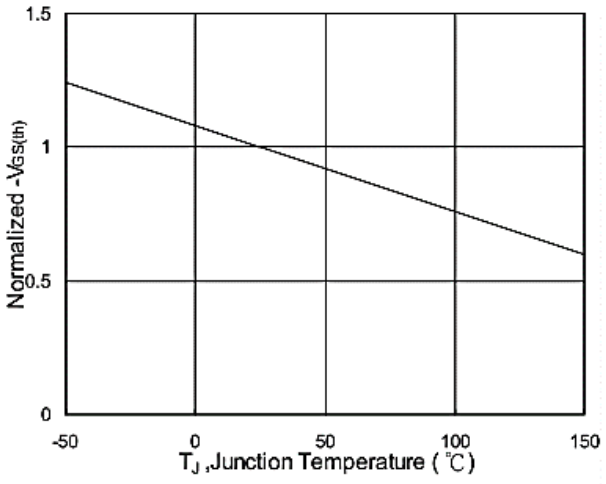


Fig.5 Normalized $V_{GS(th)}$ v.s T_J

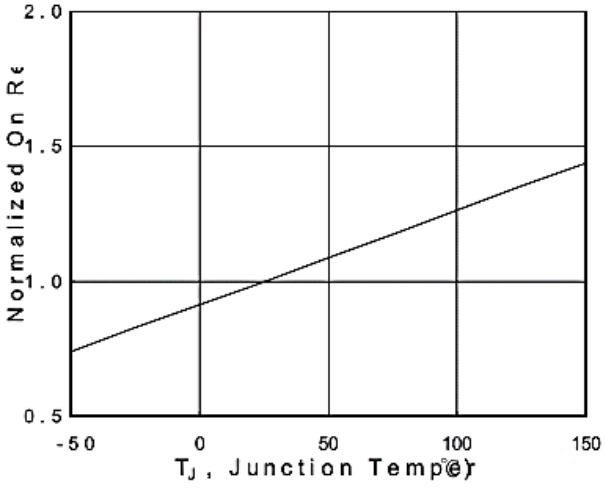


Fig.6 Normalized R_{DSON} v.s T_J

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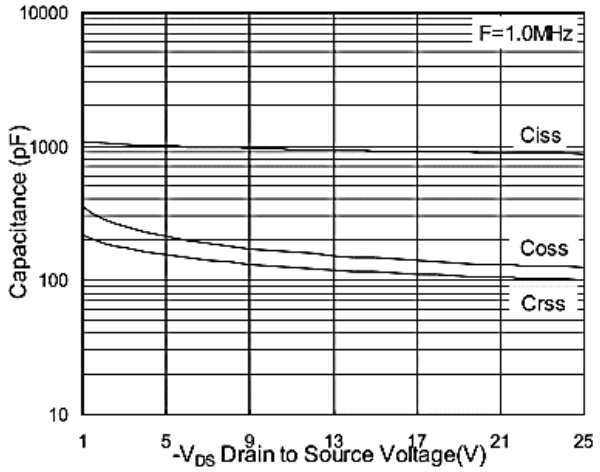


Fig.7 Capacitance

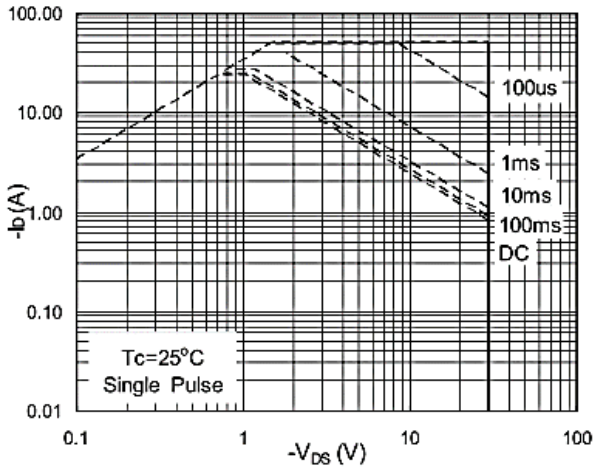


Fig.8 Safe Operating Area

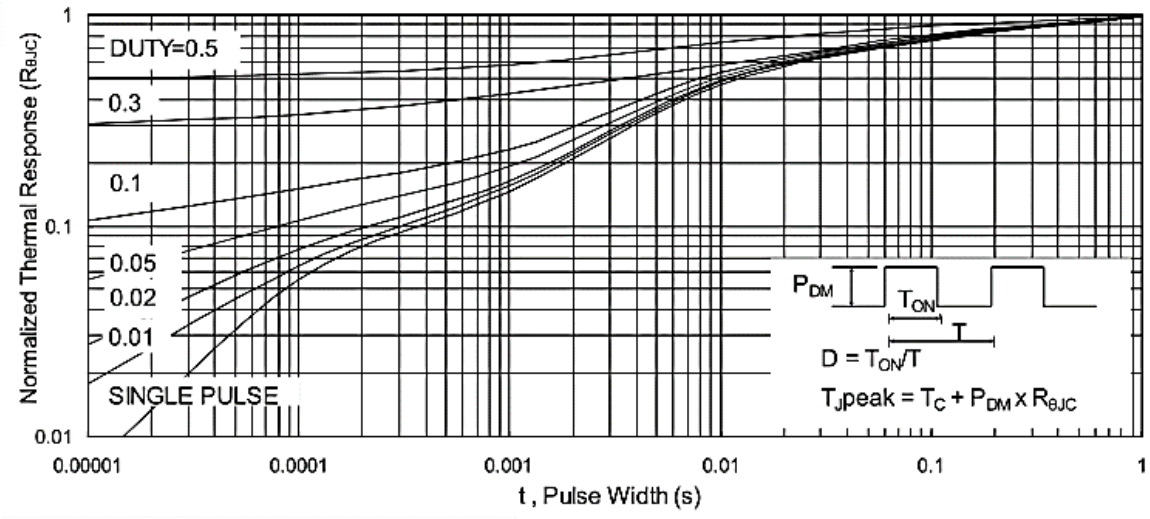


Fig.9 Normalized Maximum Transient Thermal Impedance

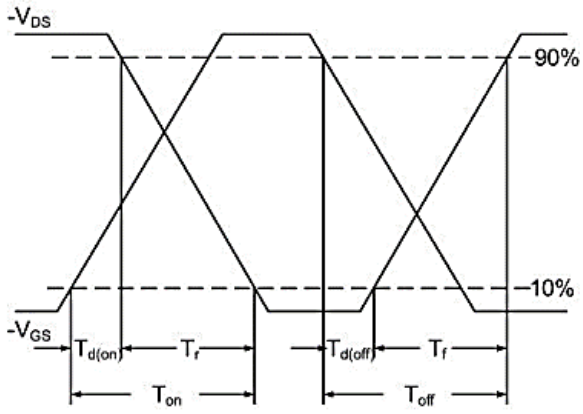


Fig.10 Switching Time Waveform

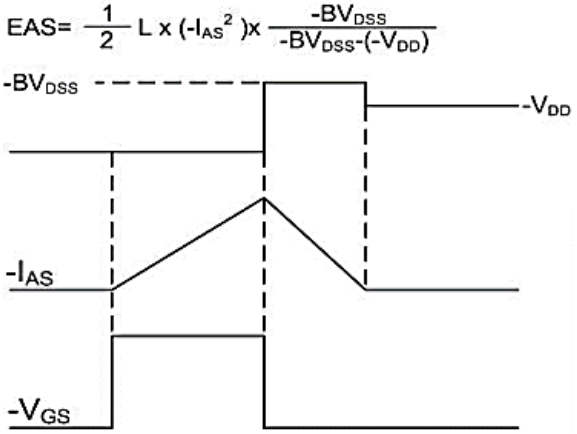
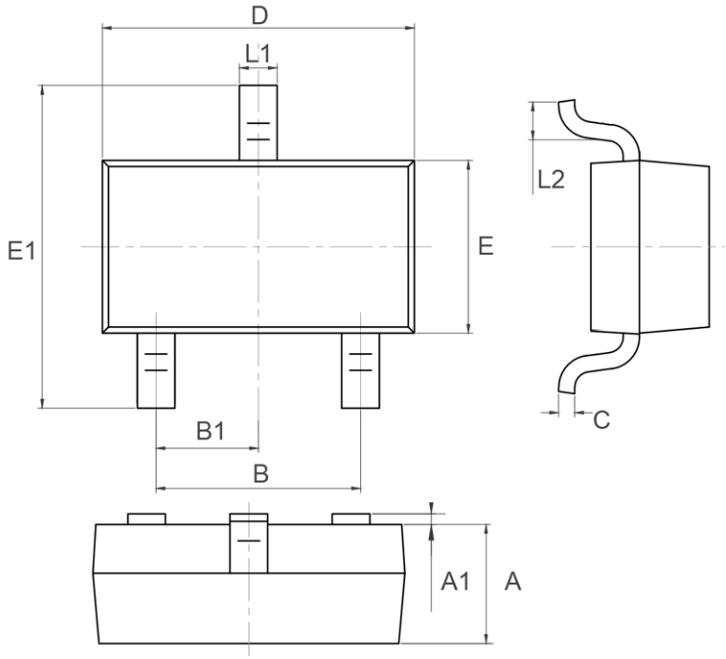


Fig.11 Unclamped Inductive Waveform

Package Mechanical Data-SOT23-3L-Single



Symbol	Dim in mm		
	Min	Typ	Max
A	1	1.1	1.2
A1	0	0.05	0.1
B	1.8	1.9	2
B1	0.95TYP		
C	0.1	0.15	0.2
D	2.82	2.92	3.02
E	1.5	1.6	1.7
E1	2.65	2.8	2.95
L1	0.3	0.4	0.5
L2	0.3	0.45	0.6

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-30V P-Channel Enhancement Mode MOSFET

Edition	Date	Change
REV1.0	2023/12/30	Initial release