AP120P06D

-60V P-Channel Enhancement Mode MOSFET

Description

The AP120P06D uses advanced **APM-SGT**Ⅰ technology to provide excellent $R_{DS(ON)}$, low gate charge and operation with gate voltages as low as 6V. This device is suitable for use as a Battery protection or in other Switching application.

General Features

V_{DS} = -60V I_D =-120A

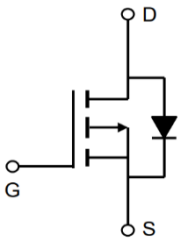
$R_{DS(ON)}$ < 7.2mΩ @ V_{GS}=-10V **(Type：5.3mΩ)**

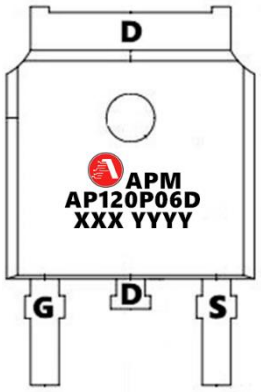
Application

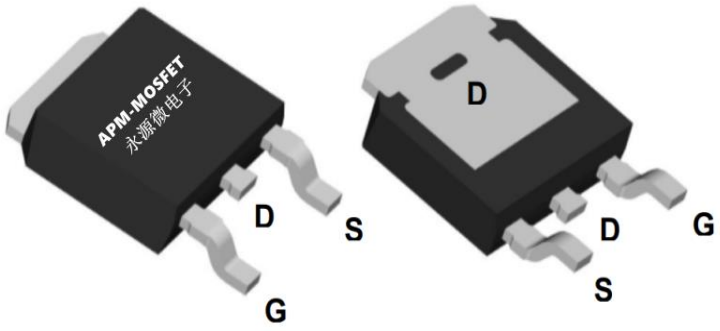
Lithium battery protection

Wireless impact

Mobile phone fast charging







Package Marking and Ordering Information

Product ID	Pack	Marking	Qty(PCS)
AP120P06D	TO-252-3L	AP120P06D XXX YYYY	5000

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]	-120	A
I_D@T_C=100℃	Continuous Drain Current, -V_{GS} @ -10V[1]	-70	A
I_{DM}	Pulsed Drain Current[2]	-360	A
EAS	Single Pulse Avalanche Energy[3]	800	mJ
I_{AS}	Avalanche Current	51	A
P_D@T_C=25℃	Total Power Dissipation[4]	110	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]	62.5	℃/W
$R_{\theta JC}$	Thermal Resistance Junction-Case[1]	0.69	℃/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	-60	-68	---	V
△BVDSS/△TJ	BV_{DSS} Temperature Coefficient	Reference to 25℃ , I_D=-1mA	---	-0.035	---	V/℃
RDS(ON)	Static Drain-Source On-Resistance[2]	V_{GS}=-10V , I_D=-20A	---	5.0	6.5	mΩ
		V_{GS}=-4.5V , I_D=-15A	---	7.2	10	
VGS(th)	Gate Threshold Voltage	V_{GS}=V_{DS} , I_D =-250uA	-1.2	-2.0	-2.5	V
△$V_{GS(th)}$	$V_{GS(th)}$ Temperature Coefficient		---	4.28	---	mV/℃
IDSS	Drain-Source Leakage Current	V_{DS}=-60V , V_{GS}=0V , T_J=25℃	---	---	1	uA
		V_{DS}=-60V , V_{GS}=0V , T_J=55℃	---	---	5	
IGSS	Gate-Source Leakage Current	V_{GS}=±20V , V_{DS}=0V	---	---	±100	nA
R_g	Gate Resistance	V_{DS}=0V , V_{GS}=0V , f=1MHz	---	2.0	---	Ω
Q_g	Total Gate Charge (-4.5V)	V_{DS}=-30V , V_{GS}=-10V I_D=-15A	---	80.2	---	nC
Q_{gs}	Gate-Source Charge		---	15.2	---	
Q_{gd}	Gate-Drain Charge		---	11	---	
Td(on)	Turn-On Delay Time	V_{DD}=-30V , V_{GS}=-10V , R_G=3Ω, I_D=-15A	---	4.5	---	ns
T_r	Rise Time		---	2.5	---	
Td(off)	Turn-Off Delay Time		---	14.5	---	
T_f	Fall Time		---	3.5	---	
C_{iss}	Input Capacitance	V_{DS}=-30V , V_{GS}=0V , f=1MHz	---	5403	---	pF
Coss	Output Capacitance		---	941	---	
Crss	Reverse Transfer Capacitance		---	48	---	
I_S	Continuous Source Current[1,5]	V_G=V_D=0V , Force Current	---	---	-120	A
ISM	Pulsed Source Current[2,5]		---	---	-480	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 EAS data shows Max. rating . The test condition is VDD =-48V,VGS =-10V,L=0.1mH,IAS =-51A

4、The power dissipation is limited by 150℃ 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.

Typ. output characteristics

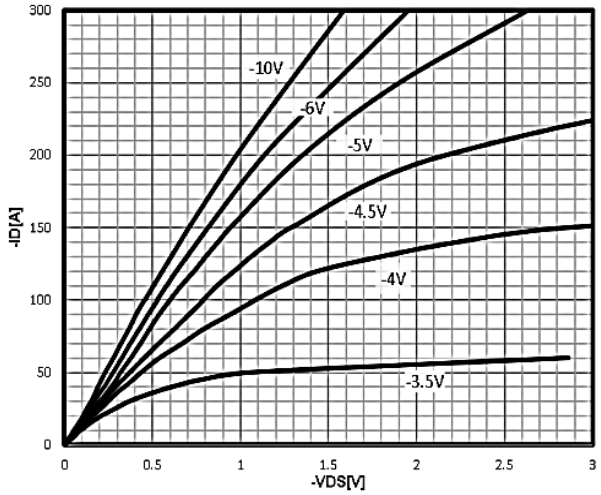


Figure 1.Typ. output characteristics

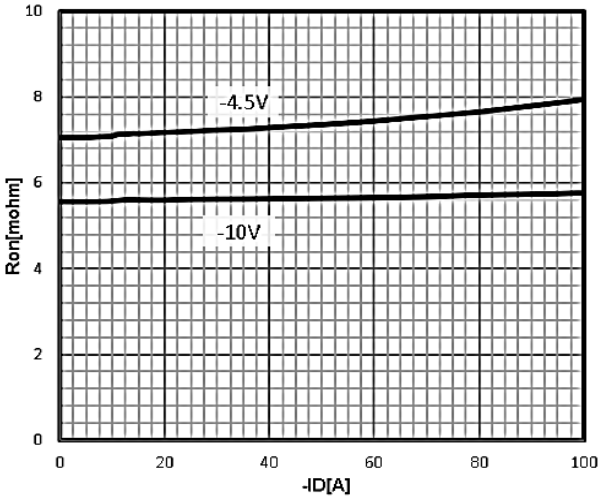


Figure 2.Typ. drain-source on

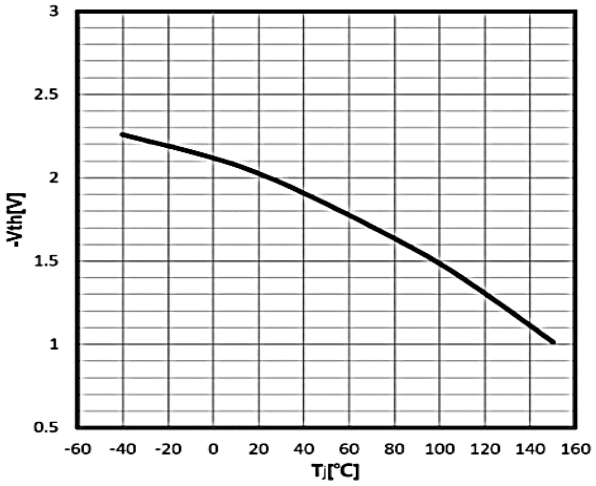


Figure 3.Gate Threshold Voltage

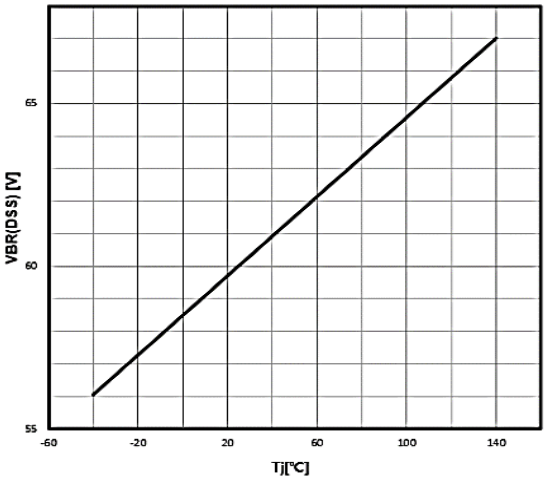


Figure 4.Drain-source breakdown voltage

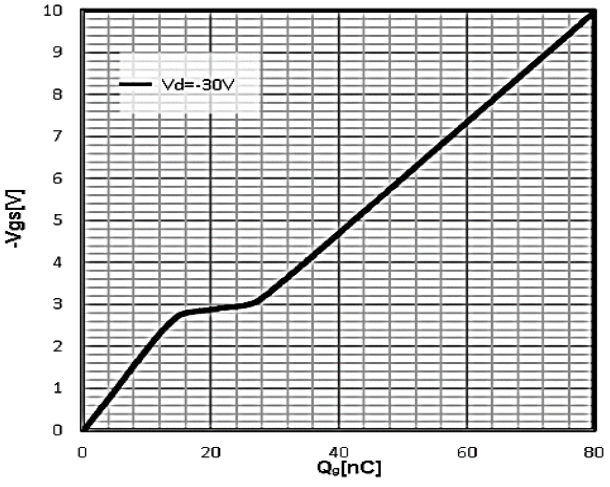


Figure 5.Typ. gate charge

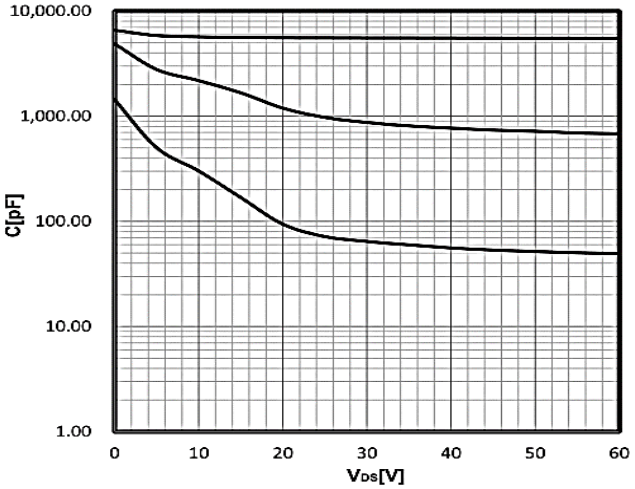


Figure 6.Typ. capacitances

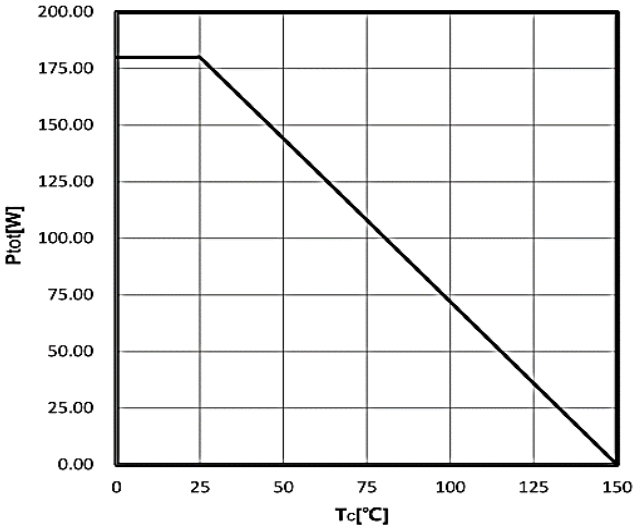


Figure 7.Power Dissipation

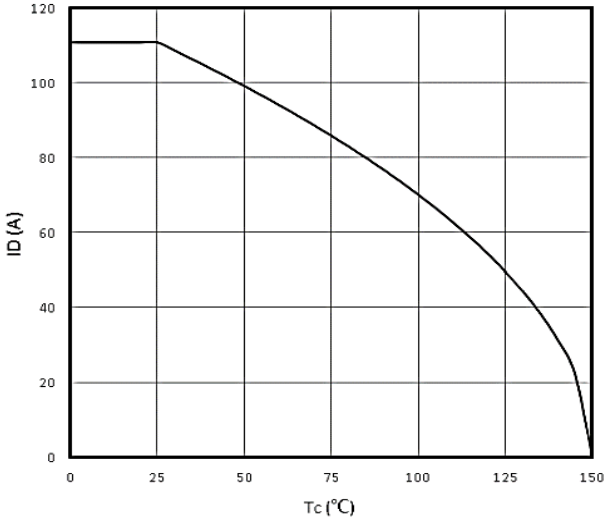


Figure 8. Maximum Drain Current

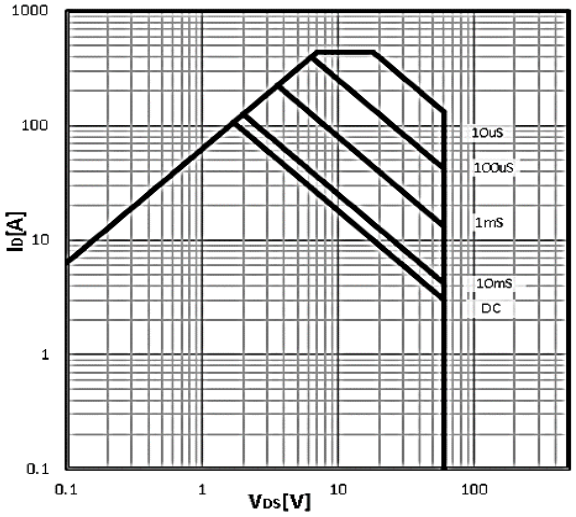


Figure 9.Safe operating area

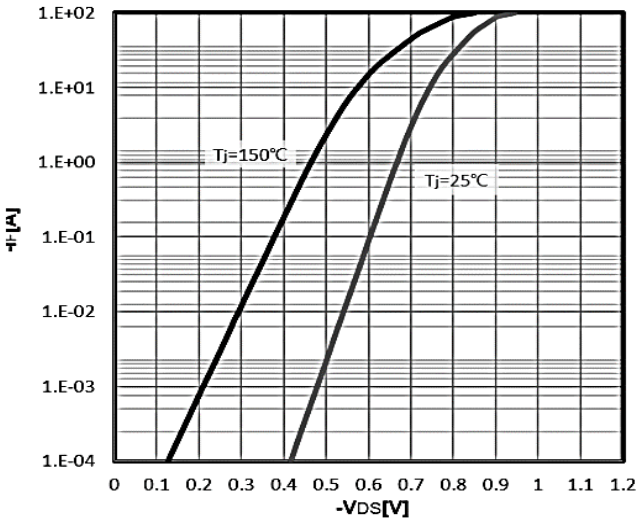


Figure 10. Body Diode Forward Voltage Variation

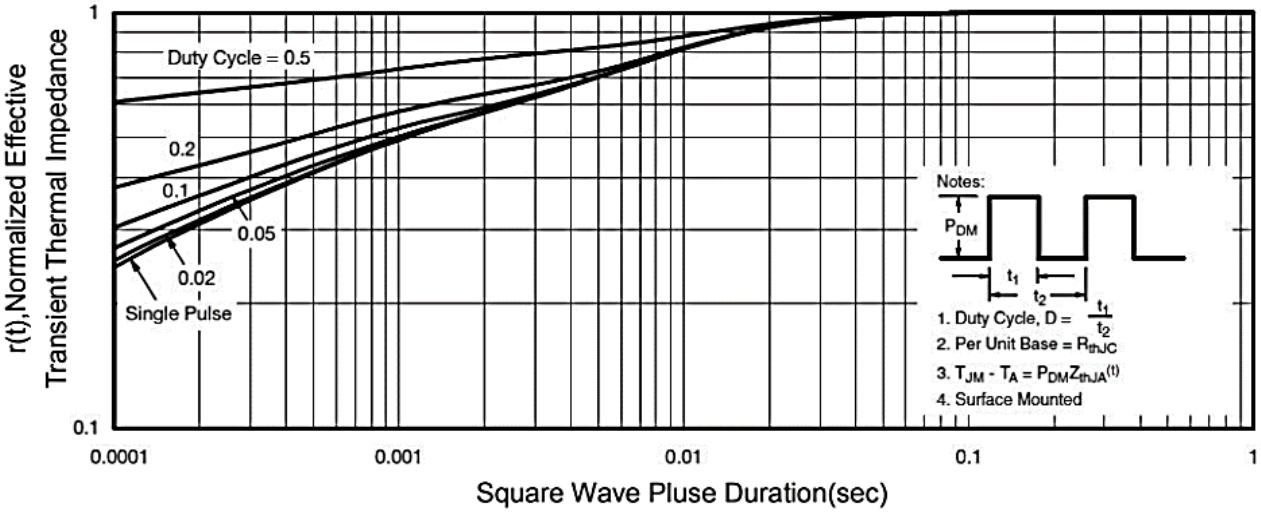
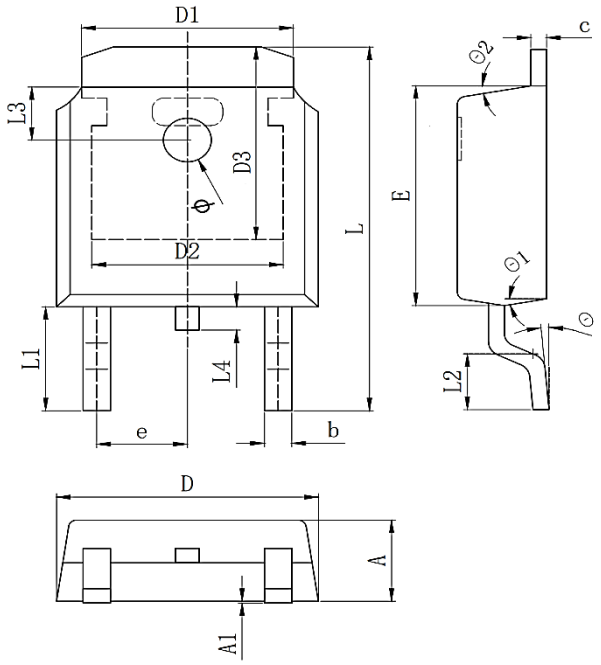


Figure 11.Max. transient thermal impedance

Package Mechanical Data-TO-252-3L



Symbol	Dim in mm		
	Min	Typ	Max
A	2.1	2.3	2.5
A1	0	0.064	0.128
b	0.64	0.75	0.86
c	0.45	0.52	0.6
D	6.4	6.6	6.8
D1	5.33REF		
D2	4.83REF		
D3	5.25REF		
E	5.9	6.1	6.3
e	2.286TYP		
L	9.8	10.1	10.4
L1	2.888REF		
L2	1.4	1.5	1.7
L3	1.65REF		
L4	0.6	0.8	1
ϕ	1.1	1.2	1.3
θ	0°		10°
θ1	5°		10°
θ2	5°		10°

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Edition	Date	Change
REV1.0	2023/2/31	Initial release