AP120P08P/T

-80V P-Channel Enhancement Mode MOSFET

Description

The AP120P08P/T 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} = -80V I_D =-120A

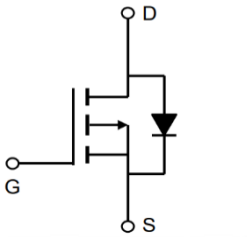
$R_{DS(ON)}$ <15mΩ @ V_{GS}=10V **(Type：11mΩ)**

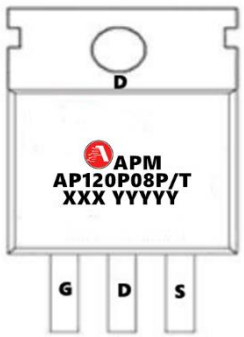
Application

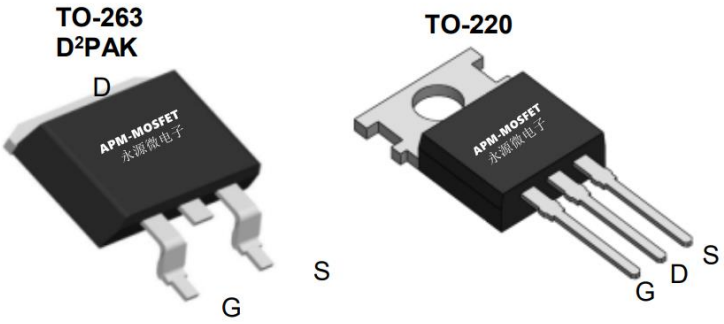
Brushless motor

Load switch

Uninterruptible power supply







Package Marking and Ordering Information

Product ID	Pack	Marking	Qty(PCS)
AP120P08P	TO-220-3L	AP120P08P XXX YYYY	1000
AP120P08P	TO-263-3L	AP120P08P XXX YYYY	800

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

Symbol	Parameter	Rating	Units
VDS	Drain-Source Voltage	-80	V
VGS	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]	-71	A
IDM	Pulsed Drain Current[2]	-120	A
EAS	Single Pulse Avalanche Energy[3]	881	mJ
IAS	Avalanche Current	-29	A
P_D@T_C=25℃	Total Power Dissipation[4]	375	W
TSTG	Storage Temperature Range	-55 to 150	℃
T_J	Operating Junction Temperature Range	-55 to 150	℃
R_{θ}JA	Thermal Resistance Junction-Ambient [1]	62.5	℃/W
R_{θ}JC	Thermal Resistance Junction-Case[1]	0.33	℃/W

-80V P-Channel Enhancement Mode MOSFET

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	-80	-88	---	V
RDS(ON)	Static Drain-Source On-Resistance[2]	V_{GS}=-10V , I_D=-30A	---	11	15	mΩ
		V_{GS}=-4.5V , I_D=-20A	---	12	18	
VGS(th)	Gate Threshold Voltage	V_{GS}=V_{DS} , I_D =-250uA	-1.2	-1.65	-2.5	V
IDSS	Drain-Source Leakage Current	V_{DS}=-100V , V_{GS}=0V , T_J=25℃	---	---	-1	uA
IGSS	Gate-Source Leakage Current	V_{GS}=±20V , V_{DS}=0V	---	---	±100	nA
gfs	Forward Transconductance	V_{DS}=-10V , I_D=-10A	---	32	---	S
Q_g	Total Gate Charge	V_{DS}=-40V V_{GS}=-10V I_D=-110A	---	180	---	nC
Qgs	Gate-Source Charge		---	35	---	
Qgd	Gate-Drain Charge		---	42	---	
Td(on)	Turn-On Delay Time	V_{DD}=-40V ,V_{GS}=-10V ,R_G=3.3Ω,I_D=-110A	---	20.5	---	ns
T_r	Rise Time		---	330	---	
Td(off)	Turn-Off Delay Time		---	135	---	
T_f	Fall Time		---	550	---	
Ciss	Input Capacitance	V_{DS}=-40V, V_{GS}=0V, f=1MHz	---	10850	---	pF
Coss	Output Capacitance		---	800	---	
Crss	Reverse Transfer Capacitance		---	700	---	
IS	Continuous Source Current[1,5]	V_G=V_D=0V , Force Current	---	---	-120	A
VSD	Diode Forward Voltage[2]	V_{GS}=0V , I_S=-1A , T_J=25℃	---	---	-1.2	V
trr	Reverse Recovery Time	IF=-20A , di/dt=-100A/μs , T_J=25℃	---	65	---	nS
Q_{rr}	Reverse Recovery Charge		---	135	---	nC

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=-64V,V GS =-10V,L=0.1mH,IAS =-71A
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.

Typical Characteristics

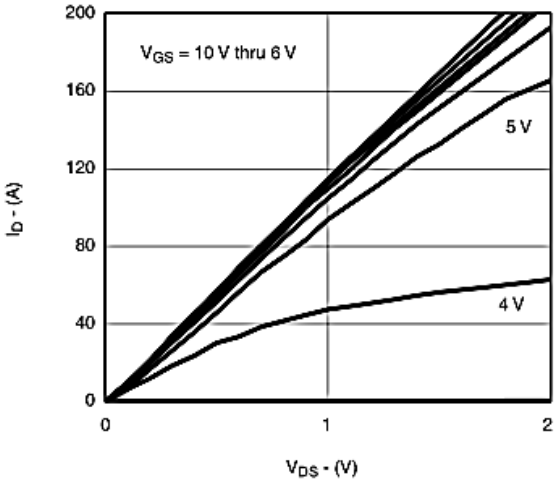


Figure 1:Output Characteristics

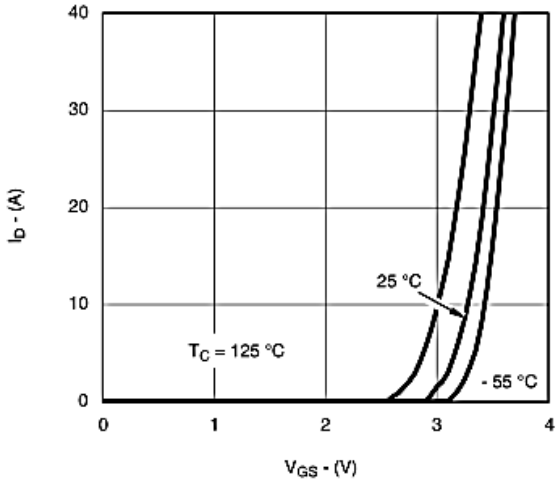


Figure 2:Transfer Characteristics

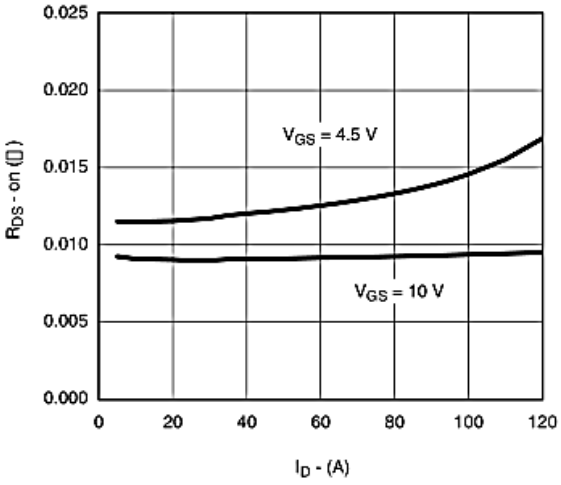


Figure 3:On-Resistance vs. Drain Current

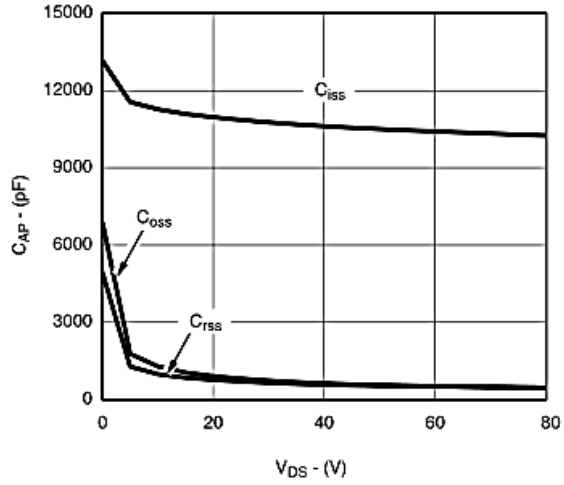


Figure 4:Capacitance

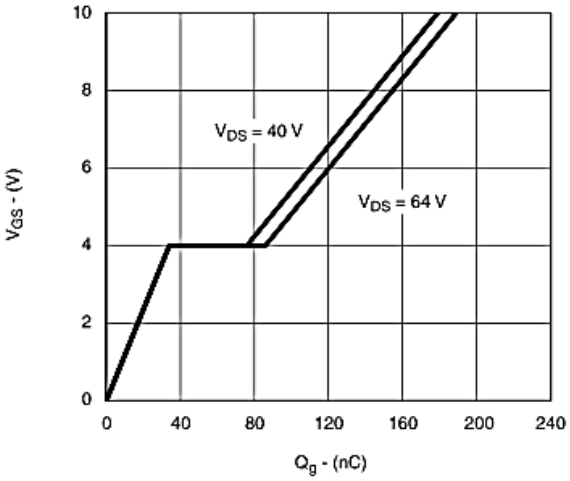


Figure 5:Gate Charge

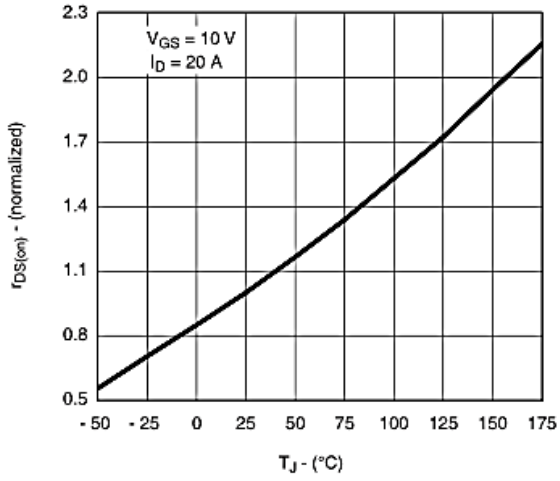


Figure 6:On-Resistance vs. Junction Temperature

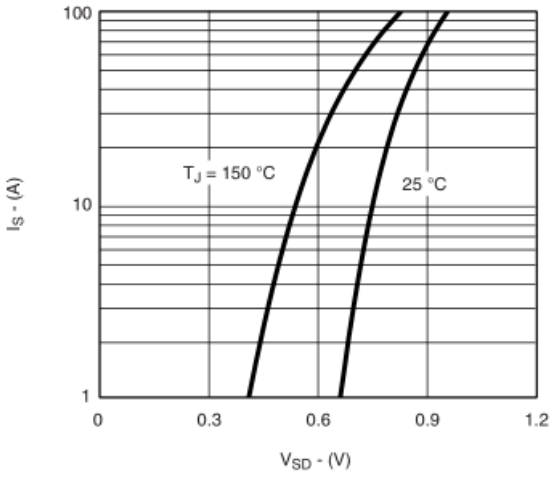


Figure 6:Source-Drain Diode Forward Voltage

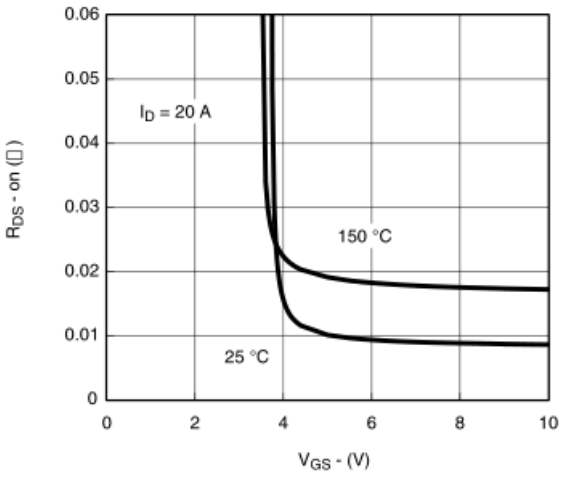


Figure 7:On-Resistance vs. Gate-to-Source Voltage

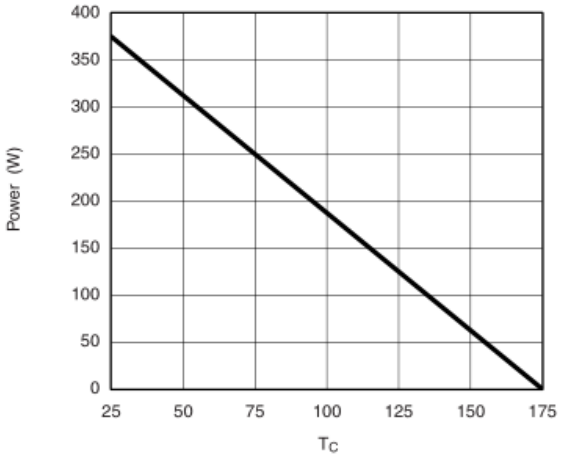


Figure 9：Power Derating, Junction-to-Case

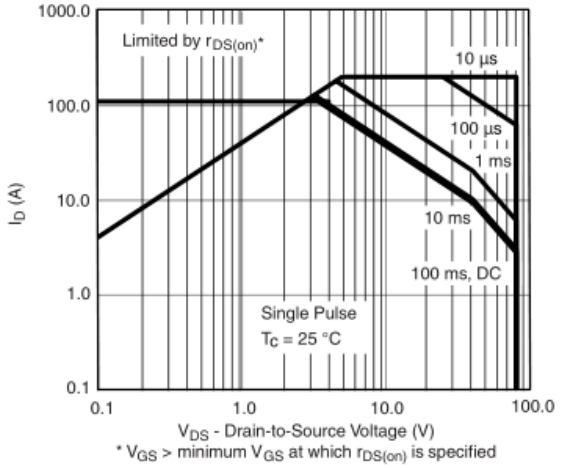


Figure 10：Safe Operating Area

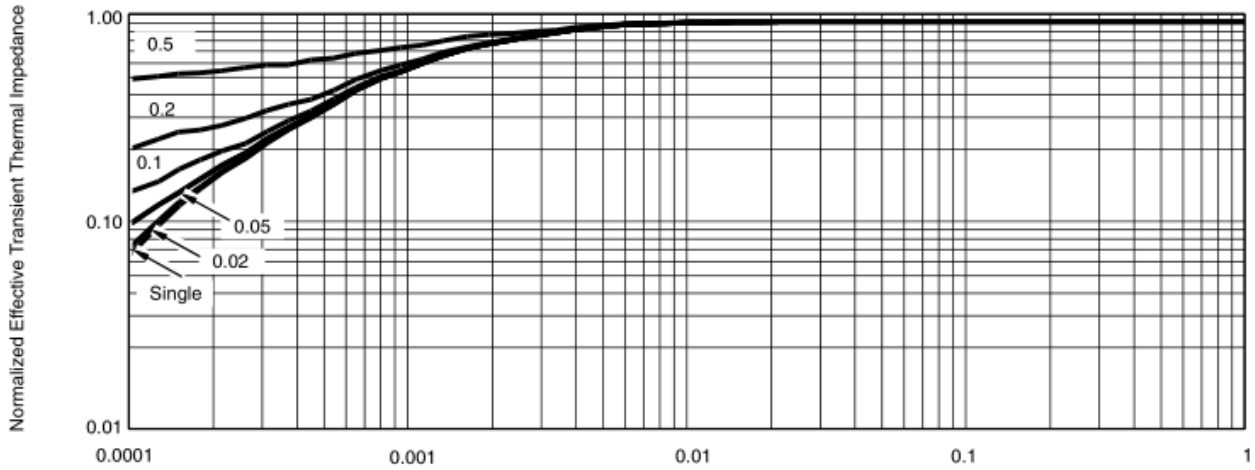
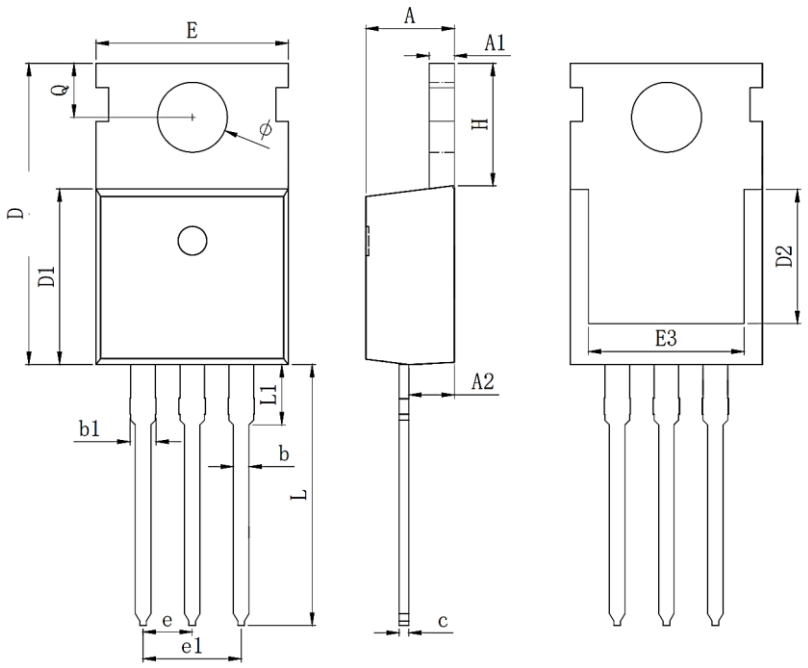


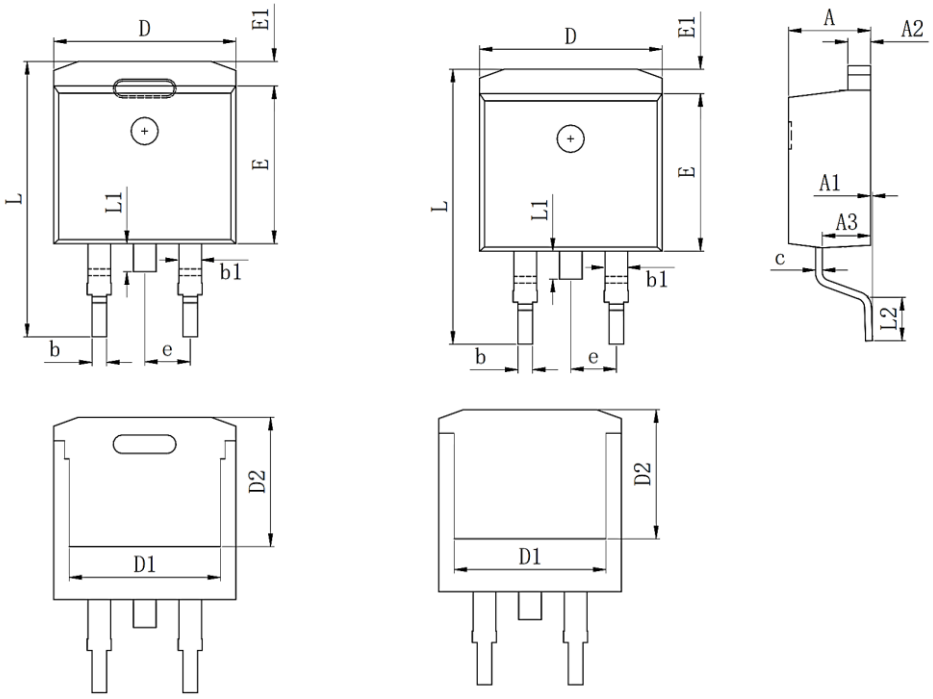
Figure11:Normalized Thermal Transient Impedance, Junction-to-Ambient

Package Mechanical Data:TO-220C-3L



Symbol	Dim in mm		
	Min	Typ	Max
A	4.25	4.5	4.7
A1	1.15	1.3	1.45
A2	2.15	2.35	2.55
b	0.65	0.8	0.95
b1	1.15	1.35	1.55
c	0.35	0.5	0.65
D	14.3	15.3	16.3
D1	8.8	9.1	9.4
D2		6.3REF	
E	9.7	10	10.3
E3	7	8	9
e		2.54BSC	
e1		5.08BSC	
L	12.7	13.5	13.9
L1		3.1	3.4
H	6	6.5	6.85
Q	2.6	2.8	3
ϕ	3.4	3.6	3.8

Package Mechanical Data:TO-263C-3L



Symbol	Dim in mm		
	Min	Typ	Max
A	4.37	4.57	4.77
A1	0		0.25
A2	1.22	1.27	1.42
A3	2.49	2.69	2.89
b	0.7	0.81	0.96
b1	1.17	1.27	1.47
c	0.3	0.38	0.53
D	9.86	10.16	10.36
D1	8.4REF		
D2	7.073REF		
E	8.5	8.7	8.9
E1	1.07	1.27	1.47
e	2.54BSC		
L	17.7	15.1	15.5
L1	1.4	1.55	1.7
L2	2	2.3	2.6
H	6	6.5	6.85
Q	2.6	2.8	3
ϕ	3.4	3.6	3.8

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-80V P-Channel Enhancement Mode MOSFET

Edition	Date	Change
REV1.0	2024/4/13	Initial release