AP30P20NF

-200V P-Channel Enhancement Mode MOSFET

Description

The AP30P20NF uses advanced trench technology to provide excellent $R_{DS(ON)}$, low gate charge and operation with gate voltages as low as 10V. This device is suitable for use as a Battery protection or in other Switching application.

General Features

V_{DS} = -200V I_D =-30A

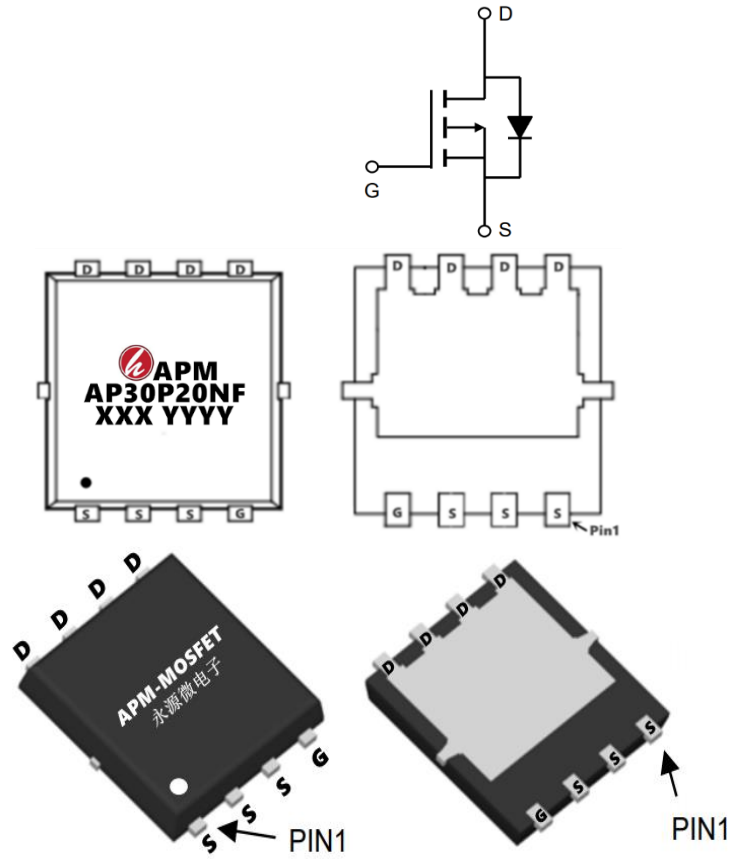
$R_{DS(ON)}$ < 380mΩ @ V_{GS}=10V **(Type：270mΩ)**

Application

Brushless motor

Load switch

Uninterruptible power supply



Package Marking and Ordering Information

Product ID	Pack	Marking	Qty(PCS)
AP30P20NF	PDFN5*6-8L	AP20P20NF XXX YYYY	5000

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

Symbol	Parameter	Rating	Units
VDS	Drain-Source Voltage	-200	V
VGS	Gate-Source Voltage	±20	V
I_D@T_A=25℃	Continuous Drain Current, -V_{GS} @ -10V[1]	-30	A
I_D@T_A=70℃	Continuous Drain Current, -V_{GS} @ -10V[1]	-15.8	A
IDM	Pulsed Drain Current[2]	-37	A
EAS	Single Pulse Avalanche Energy[3]	45	mJ
IAS	Avalanche Current	7.7	A
P_D@T_A=25℃	Total Power Dissipation[4]	68	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]	62	℃/W
$R_{\theta JC}$	Thermal Resistance Junction-Case[1]	2.2	℃/W

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

Symbol	Parameter	Test Conditions	Min	Typ	Max	Unit
VDS	Drain-source breakdown voltage	V_{GS}=0, I_D=-250 μA	-200	-220	-	V
VGS(th)	Gate-source threshold voltage	V_{DS}=V_{GS}, I_D=-250 μA	-2.5	-3.0	-3.5	
IGSS	Gate-source leakage	V_{DS}=0V, V_{GS}=± 20 V	-	-	± 100	nA
IDSS	Zero gate voltage drain current	V_{GS}=0V V_{DS}=-200V	-	-	-1	μA
RDS(on)	Drain-source on-state resistance [a]	V_{GS}=-10V I_D=-15A	-	270	380	mΩ
RDS(on)	Drain-source on-state resistance [a]	V_{GS}=-6.0V I_D=-10A	-	310	450	mΩ
gfs	Forward transconductance [b]	V_{DS}=-15 V, I_D=-3.8A	-	15	-	S
Ciss	Input capacitance	V_{GS}=0V V_{DS}=-25V, f=1MHz	-	2734	3700	pF
Coss	Output capaci tance		-	155	210	
Crss	Reverse transfer capacitance		-	103	140	
Q_g	Total gate charge [c]	V_{GS}=-10V V_{DS}=-100V, I_D=-5.2A	-	55	85	nC
Qgs	Gate-source charge [c]		-	11	-	
Qgd	Gate-drain charge [c]		-	17	-	
R_g	Gate resistance	f= 1MHz	0.6	1.25	1.9	Ω
td(on)	Turn-on delay time [c]	V_{DD}=-100V, R_L=20.8Ω I_D≅-4.8A, V_{GEN}=-10V, R_g=1Ω	-	16	25	ns
t_r	Rise time [c]		-	5	10	
td(off)	Turn-off delay time [c]		-	35	55	
t_f	Fall time [c]		-	5	10	
trr	Body diode reverse recovery time	I_F=-4 A, di/dt=100A/μs	-	101	205	ns
Q_{rr}	Body diode reverse recovery charge		-	52	105	nC
ta	Reverse recovery fall time		-	87	-	ns
tb	Reverse recovery rise time		-	14	-	
ISM	Pulsed current		-	-	-37	A
VSD	Forward voltage	I_F = -5 A, V_{GS} = 0	-	-0.8	-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 =-50V,VGS =-10V,L=0.1mH,IAS =-7.7A
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

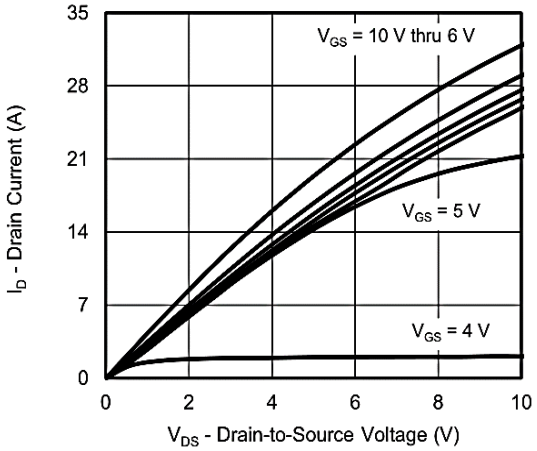


Fig1：Output Characteristics

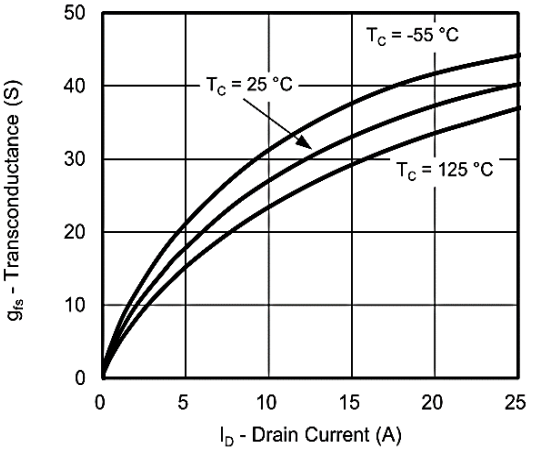


Fig2：Transfer Characteristics

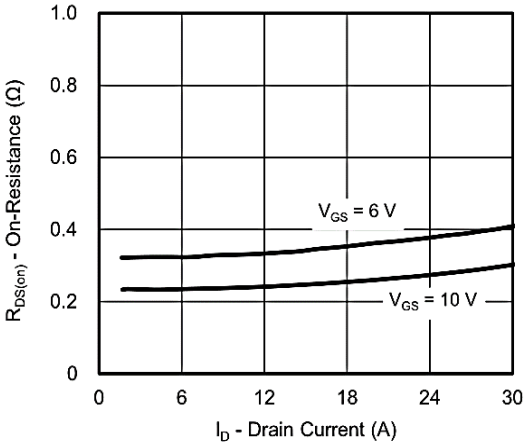


Fig3：On-Resistance vs. Drain Current

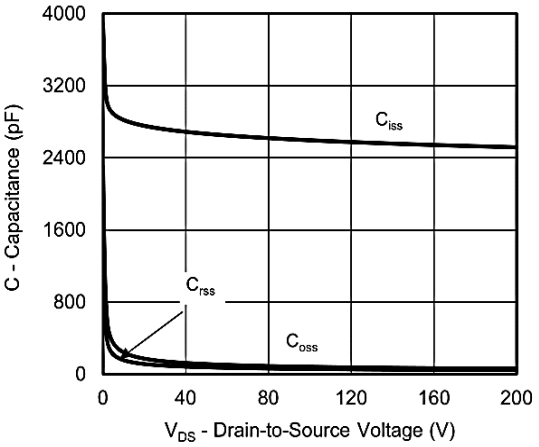


Fig4： Capacitance

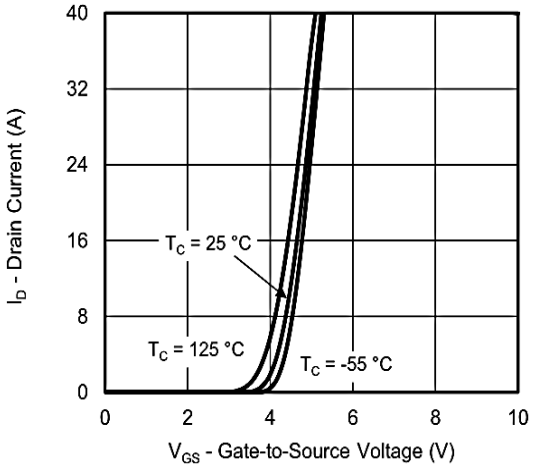


Fig5：Gate Charge

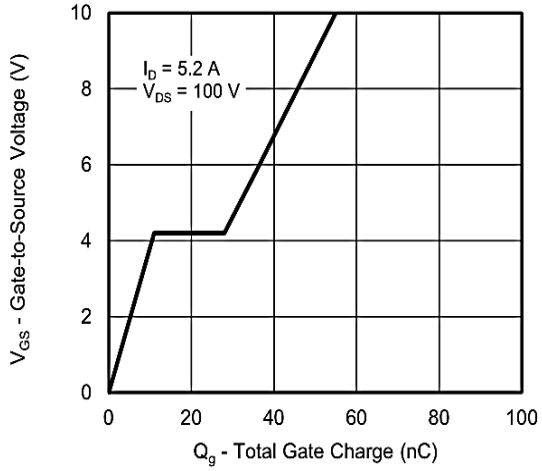


Fig6：On-Resistance vs. Junction Temperature

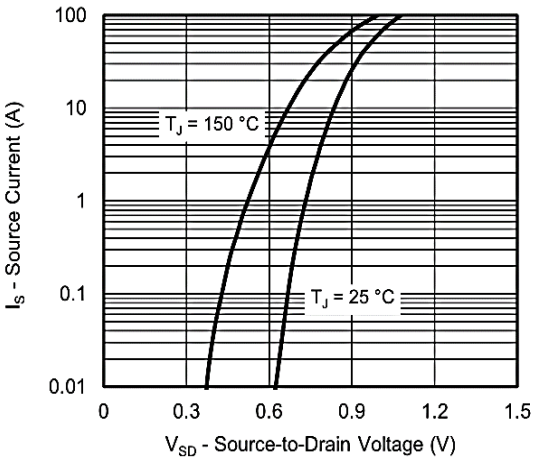


Fig7：Source-Drain Diode Forward Voltage

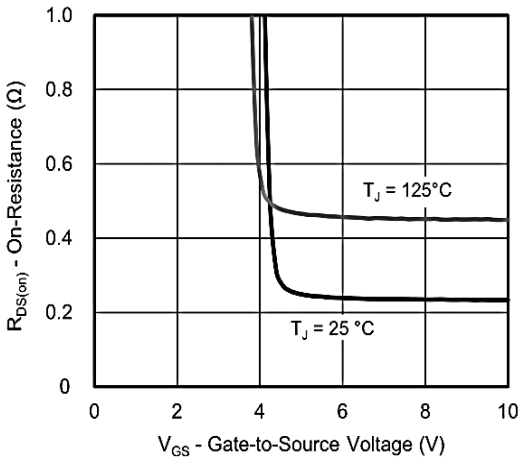


Fig8： On-Resistance vs. Gate-to-Source Voltage

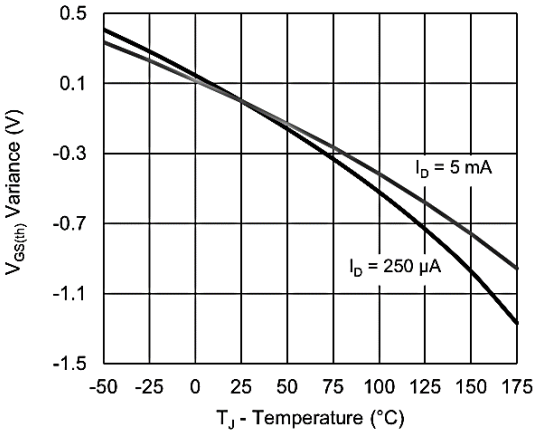


Fig9：Threshold Voltage

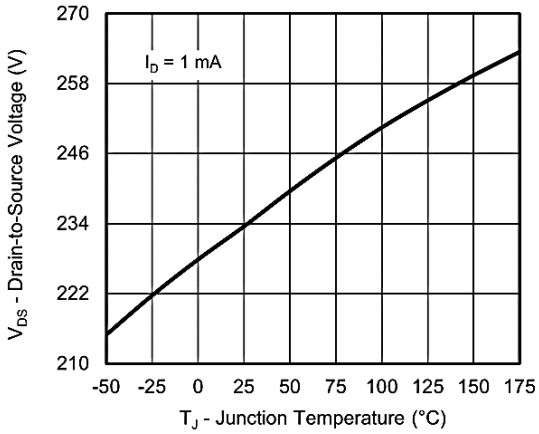


Fig10：Single Pulse Power, Junction-to-Ambient

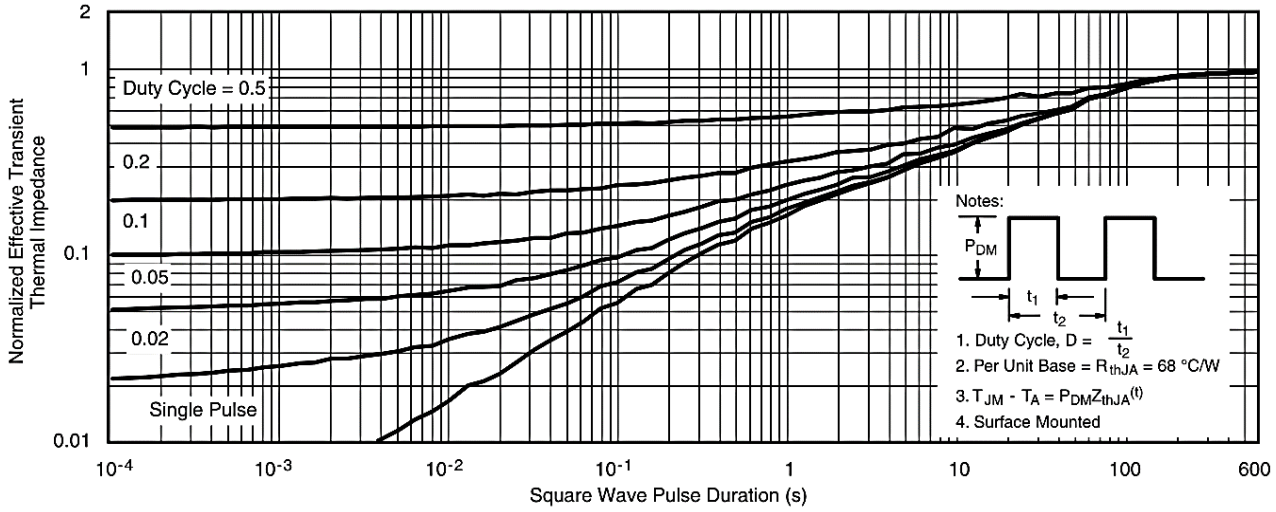
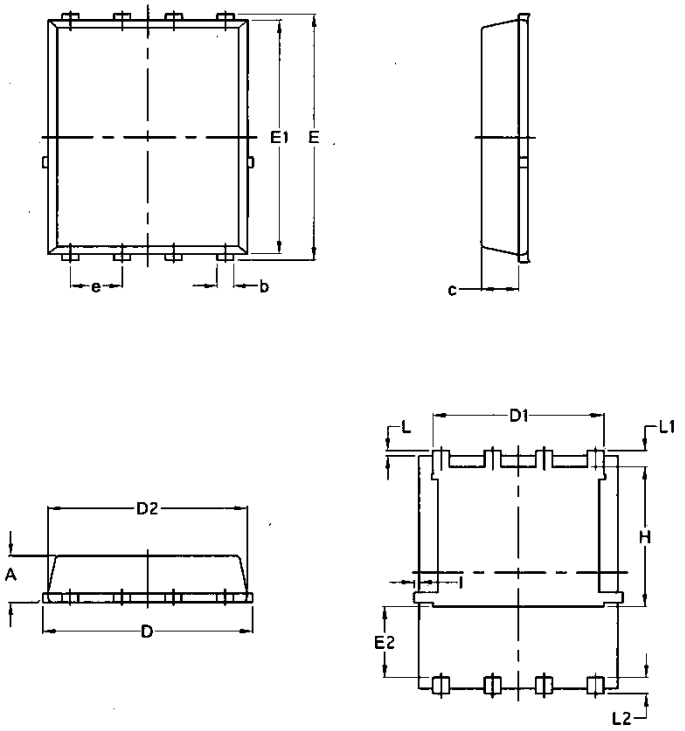


Fig11：Normalized Thermal Transient Impedance, Junction-to-Ambient

Package Mechanical Data-DFN5*6-8L-JQ Single



Symbol	Common			
	mm		Inch	
	Mim	Max	Min	Max
A	1.03	1.17	0.0406	0.0461
b	0.34	0.48	0.0134	0.0189
c	0.824	0.0970	0.0324	0.082
D	4.80	5.40	0.1890	0.2126
D1	4.11	4.31	0.1618	0.1697
D2	4.80	5.00	0.1890	0.1969
E	5.95	6.15	0.2343	0.2421
E1	5.65	5.85	0.2224	0.2303
E2	1.60	/	0.0630	/
e	1.27 BSC		0.05 BSC	
L	0.05	0.25	0.0020	0.0098
L1	0.38	0.50	0.0150	0.0197
L2	0.38	0.50	0.0150	0.0197
H	3.30	3.50	0.1299	0.1378
I	/	0.18	/	0.0070

Attention

1,Any and all APM Microelectronics products described or contained herein do not have specifications that can handle applications that require extremely high levels of reliability, such as life support systems, aircraft's control systems, or other applications whose failure can be reasonably expected to result in serious physical and/or material damage. Consult with your APM Microelectronics representative nearest you before using any APM Microelectronics products described or contained herein in such applications.

2,APM Microelectronics assumes no responsibility for equipment failures that result from using products at values that exceed, even momentarily, rated values (such as maximum ratings, operating condition ranges, or other parameters) listed in products specifications of any and all APM Microelectronics products described or contained herein.

3, Specifications of any and all APM Microelectronics products described or contained here instipulate the performance, characteristics, and functions of the described products in the independent state, and are not guarantees of the performance, characteristics, and functions of the described products as mounted in the customer's products or equipment. To verify symptoms and states that cannot be evaluated in an independent device, the customer should always evaluate and test devices mounted in the customer's products or equipment.

4, APM Microelectronics Semiconductor CO., LTD. strives to supply high quality high reliability products. However, any and all semiconductor products fail with some probability. It is possible that these probabilistic failures could give rise to accidents or events that could endanger human lives that could give rise to smoke or fire, or that could cause damage to other property. When designing equipment, adopt safety measures so that these kinds of accidents or events cannot occur. Such measures include but are not limited to protective circuits and error prevention circuits for safe design, redundant design,and structural design.

5,In the event that any or all APM Microelectronics products(including technical data, services) described or contained herein are controlled under any of applicable local export control laws and regulations, such products must not be exported without obtaining the export license from the authorities concerned in accordance with the above law.

6, No part of this publication may be reproduced or transmitted in any form or by any means,electronic or mechanical, including photocopying and recording, or any information storage or retrieval system, or otherwise, without the prior written permission of APM Microelectronics Semiconductor CO., LTD.

7, Information (including circuit diagrams and circuit parameters) herein is for example only; it is not guaranteed for volume production. APM Microelectronics believes information herein is accurate and reliable, but no guarantees are made or implied regarding its use or any infringements of intellectual property rights or other rights of third parties.

8, Any and all information described or contained herein are subject to change without notice due to product/technology improvement,etc. When designing equipment, refer to the "Delivery Specification" for the APM Microelectronics product that you Intend to use.

Edition	Date	Change
REV1.0	2023/8/13	Initial release