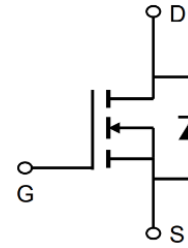


120V N-Channel Enhancement Mode MOSFET

Description

The AP70N12NF uses advanced **SGT II** 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.



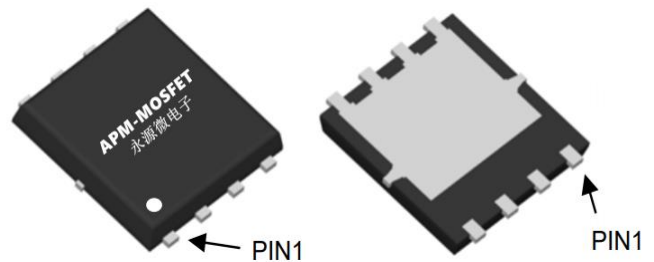
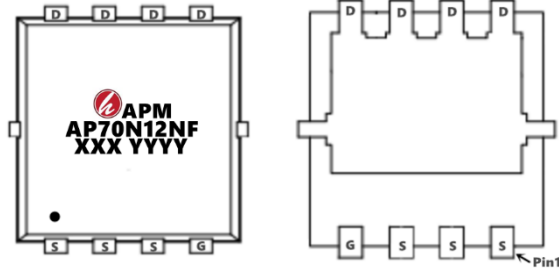
General Features

$V_{DS} = 120V$ $I_D = 70A$

$R_{DS(ON)} < 13m\Omega$ @ $V_{GS}=10V$ (Type: **10mΩ**)

Application

- Mobile phone fast charging
- Brushless motor
- Home appliance control board



Package Marking and Ordering Information

Product ID	Pack	Marking	Qty(PCS)
AP70N12NF	PDFN5*6-8L	AP70N12NF XXXX YYYY	5000

Absolute Maximum Ratings ($T_C=25^\circ\text{C}$ unless otherwise noted)

Symbol	Parameter	Value	Unit
V_{DS}	Drain source voltage	120	V
V_{GS}	Gate source voltage	± 20	V
$I_D@T_A=25^\circ\text{C}$	Continuous drain current ¹⁾ , $T_C=25^\circ\text{C}$	70	A
$I_D@T_A=70^\circ\text{C}$	Continuous drain current ¹⁾ , $T_C=75^\circ\text{C}$	35	A
I_D , pulse	Pulsed drain current ²⁾ , $T_C=25^\circ\text{C}$	150	A
P_D	Power dissipation ³⁾ , $T_C=25^\circ\text{C}$	140	W
EAS	Single pulsed avalanche energy ⁴⁾	53.8	mJ
Tstg, T_j	Operation and storage temperature	-55 to 150	$^\circ\text{C}$
$R_{\theta JC}$	Thermal resistance, junction-case	0.89	$^\circ\text{C/W}$
$R_{\theta JA}$	Thermal resistance, junction-ambient ⁵⁾	25	$^\circ\text{C/W}$

120V N-Channel Enhancement Mode MOSFET

Electrical Characteristics ($T_J=25^{\circ}\text{C}$, unless otherwise noted)

Symbol	Parameter	Test condition	Min	Typ	Max	Unit
BVDSS	Drain-source breakdown voltage	$V_{GS}=0\text{ V}, I_D=250\ \mu\text{A}$	120	125		V
VGS(th)	Gate threshold voltage	$V_{DS}=V_{GS}, I_D=250\ \mu\text{A}$	1.2	1.8	2.5	V
RDS(ON)	Drain-source on-state resistance	$V_{GS}=10\text{ V}, I_D=30\text{ A}$		10	13	m Ω
RDS(ON)	Drain-source on-state resistance	$V_{GS}=4.5\text{ V}, I_D=20\text{ A}$		15	18	m Ω
IGSS	Gate-source leakage current	$V_{GS}=\pm 20\text{ V}$			± 100	nA
IDSS	Drain-source leakage current	$V_{DS}=120\text{ V}, V_{GS}=0\text{ V}$			1	μA
Ciss	Input capacitance	$V_{GS}=0\text{ V}, V_{DS}=50\text{ V}, f=100\text{ kHz}$		2640		pF
Coss	Output capacitance			330		pF
Crss	Reverse transfer capacitance			11		pF
td(on)	Turn-on delay time	$V_{GS}=10\text{ V}, V_{DS}=50\text{ V}, R_G=2\ \Omega, I_D=25\text{ A}$		22		ns
t _r	Rise time			10		ns
td(off)	Turn-off delay time			85		ns
t _f	Fall time			112		ns
Q _g	Total gate charge	$I_D=25\text{ A}, V_{DS}=50\text{ V}, V_{GS}=10\text{ V}$		33		nC
Q _{gs}	Gate-source charge			5.6		nC
Q _{gd}	Gate-drain charge			7.2		nC
V _{plateau}	Gate plateau voltage			3.1		V
I _s	Diode forward current	$V_{GS}<V_{th}$			50	A
ISP	Pulsed source current	$V_{GS}<V_{th}$			150	A
VSD	Diode forward voltage	$I_S=12\text{ A}, V_{GS}=0\text{ V}$			1.3	V
trr	Reverse recovery time	$I_S=25\text{ A}, di/dt=100\text{ A}/\mu\text{s}$		62.3		ns
Q _{rr}	Reverse recovery charge			135.3		nC
I _{rrm}	Peak reverse recovery current			3.5		A

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 .The EAS data shows Max. rating .
- 3、The power dissipation is limited by 175 $^{\circ}\text{C}$ junction temperature
- 4、EAS condition: $T_J=25^{\circ}\text{C}$, $V_{DD}=50\text{V}$, $V_G=10\text{V}$, $R_G=25\ \Omega$, $L=0.5\text{mH}$, $I_{AS}=30\text{A}$
- 5、The data is theoretically the same as ID and IDM , in real applications , should be limited by total power dissipation.

Typical Characteristics

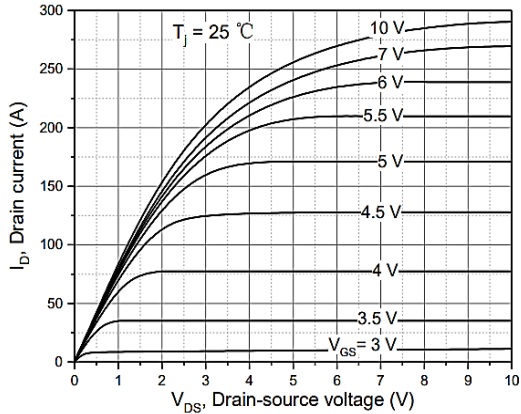


Figure 1. Typ. output characteristics

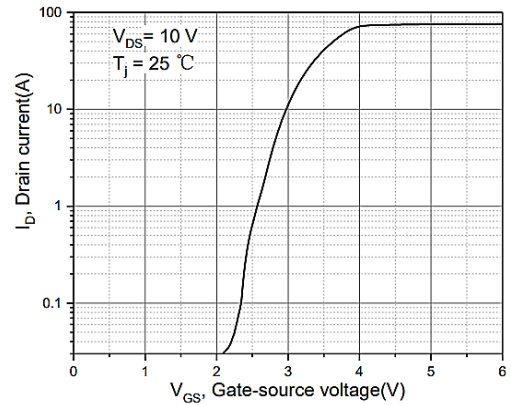


Figure 2. Typ. transfer characteristics

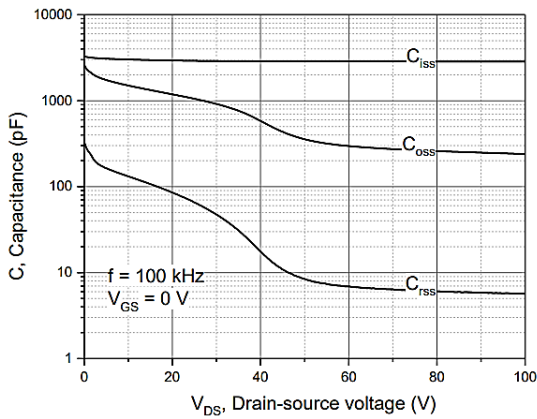


Figure 3. Typ. capacitances

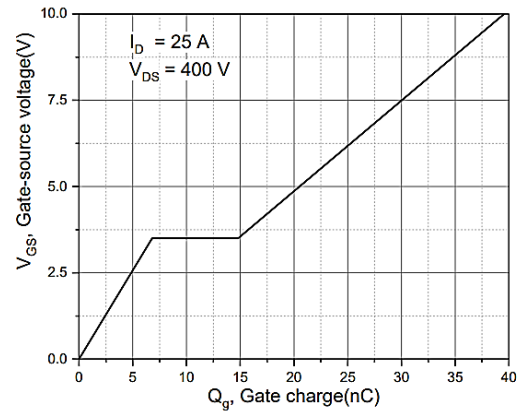


Figure 4. Typ. gate charge

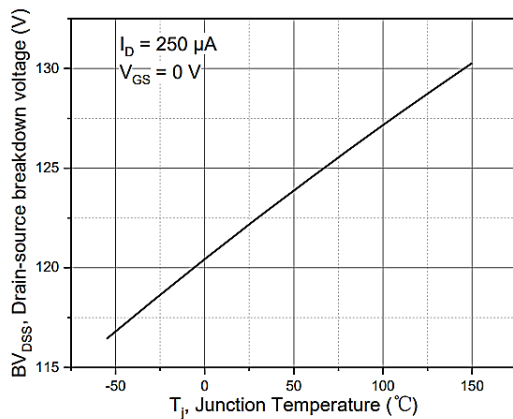


Figure 5. Drain-source breakdown voltage

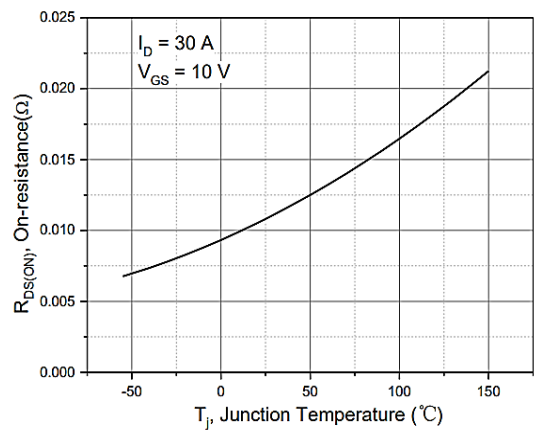


Figure 6. Drain-source on-state resistance

120V N-Channel Enhancement Mode MOSFET

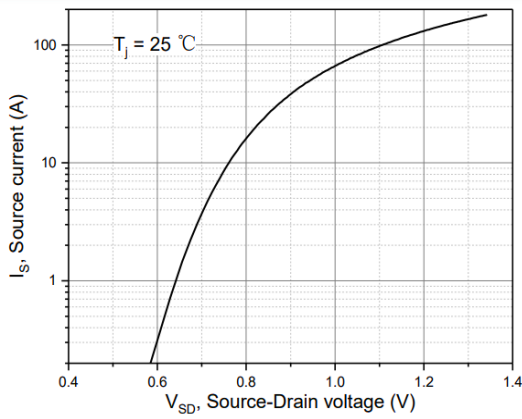


Figure 7. Forward characteristic of body diode

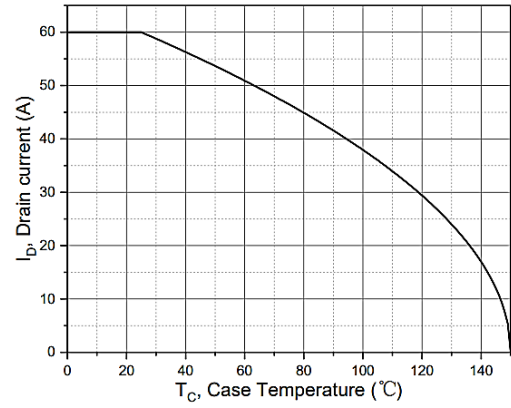


Figure 8. Drain current

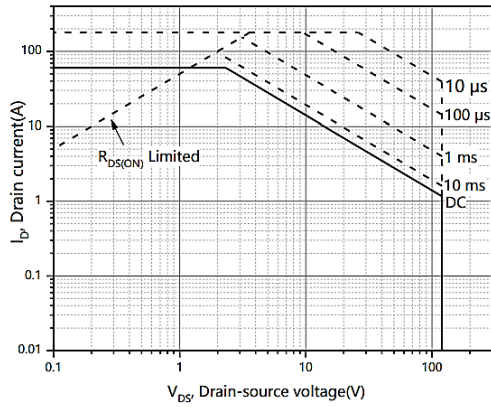
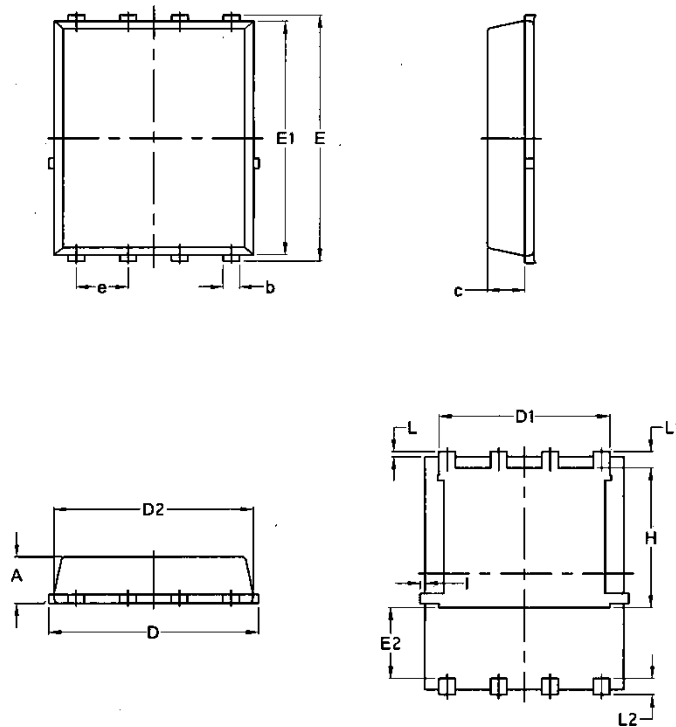


Figure 9. Safe operation area $T_C=25\text{ }^\circ\text{C}$

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



Symbol	Common			
	mm		Inch	
	Min	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

120V N-Channel Enhancement Mode MOSFET

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
Rve1.0	2021/8/1	Initial release

Copyright Attribution“APM-Microelectronice”

