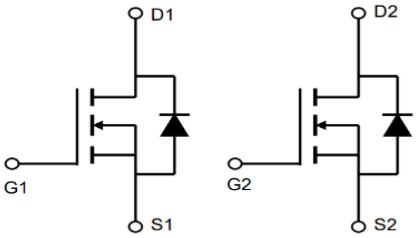
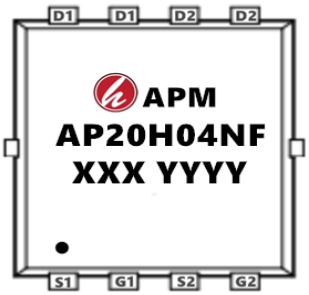
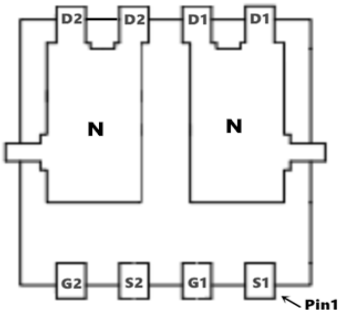
40V N+N-Channel Enhancement Mode MOSFET

Description

The AP20H04NF 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} = 40V I_D =20A

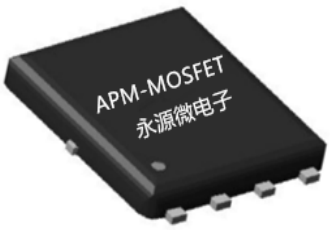
$R_{DS(ON)}$ < 16mΩ @ V_{GS}=10V

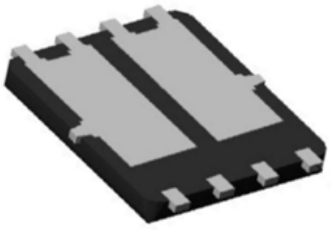
Application

Battery protection

Load switch

Uninterruptible power supply





Package Marking and Ordering Information

Product ID	Pack	Marking	Qty(PCS)
AP20H04NF	PDFN5*6-8L	AP20H04NF	5000

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

Parameter	Symbol	Limit	Unit
Drain-Source Voltage	V_{DS}	40	V
Gate-Source Voltage	V_{GS}	±20	V
Drain Current-Continuous	I_D	20	A
Drain Current-Continuous(T_C=100℃)	I_D (100℃)	8.4	A
Pulsed Drain Current	I_{DM}	100	A
Maximum Power Dissipation	P_D	2	W
Operating Junction and Storage Temperature Range	T_J,T_{STG}	-55 To 150	℃
Thermal Resistance,Junction-to-Ambient (Note 2)	$R_{\theta JA}$	62.5	℃/W

40V N+N-Channel Enhancement Mode MOSFET

N-CH Electrical Characteristics (T_A=25℃unless otherwise noted)

Parameter	Symbol	Condition	Min	Typ	Max	Unit
Drain-Source Breakdown Voltage	BV_{DSS}	V_{GS}=0V I_D=250μA	40	-	-	V
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS}=40V,V_{GS}=0V	-	-	1	μA
Gate-Body Leakage Current	I_{GSS}	V_{GS}=±20V,V_{DS}=0V	-	-	±100	nA
Gate Threshold Voltage	$V_{GS(th)}$	V_{DS}=V_{GS},I_D=250μA	1	1.5	2.0	V
Drain-Source On-State Resistance	$R_{DS(ON)}$	V_{GS}=10V, I_D=8A	-	10.5	16	mΩ
		V_{GS}=4.5V, I_D=4A	-	18.9	24	mΩ
Forward Transconductance	g_{FS}	V_{DS}=5V,I_D=8A	33	-	-	S
Input Capacitance	C_{lss}	V_{DS}=20V,V_{GS}=0V, F=1.0MHz	-	964	-	PF
Output Capacitance	C_{oss}		-	109	-	PF
Reverse Transfer Capacitance	C_{rss}		-	96	-	PF
Turn-on Delay Time	$t_{d(on)}$	V_{DD}=20V, R_L=2.5Ω V_{GS}=10V,R_{GEN}=3Ω	-	5.5	-	nS
Turn-on Rise Time	t_r		-	14	-	nS
Turn-Off Delay Time	$t_{d(off)}$		-	24	-	nS
Turn-Off Fall Time	t_f		-	12	-	nS
Total Gate Charge	Q_g	V_{DS}=20V,I_D=8A, V_{GS}=10V	-	22.9	-	nC
Gate-Source Charge	Q_{gs}		-	3.5	-	nC
Gate-Drain Charge	Q_{gd}		-	5.3	-	nC
Diode Forward Voltage (Note 3)	V_{SD}	V_{GS}=0V,I_S=9A	-	0.8	1.2	V

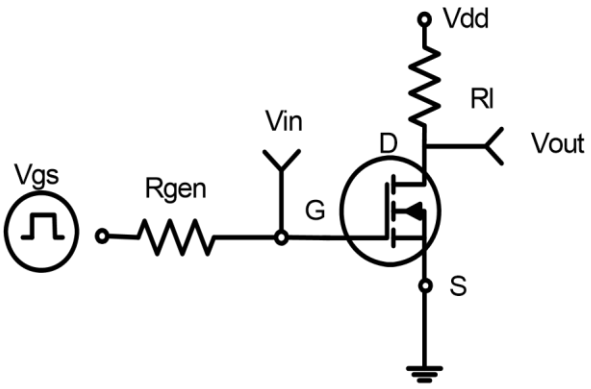


Figure 1:Switching Test Circuit

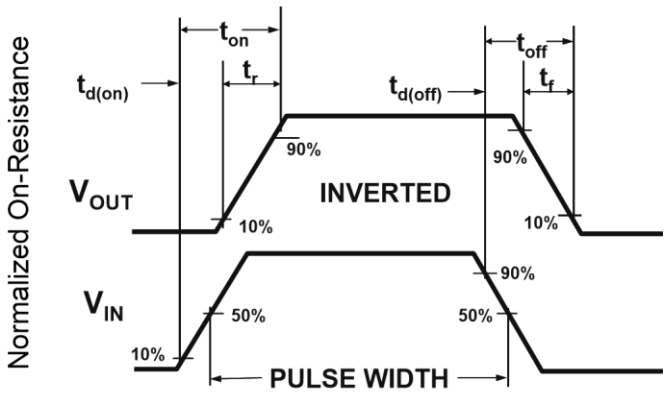


Figure 2:Switching Waveforms

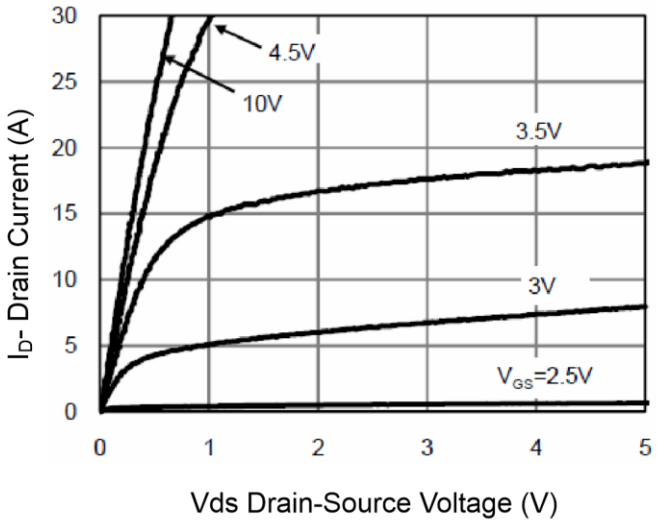


Figure 3 Output Characteristics

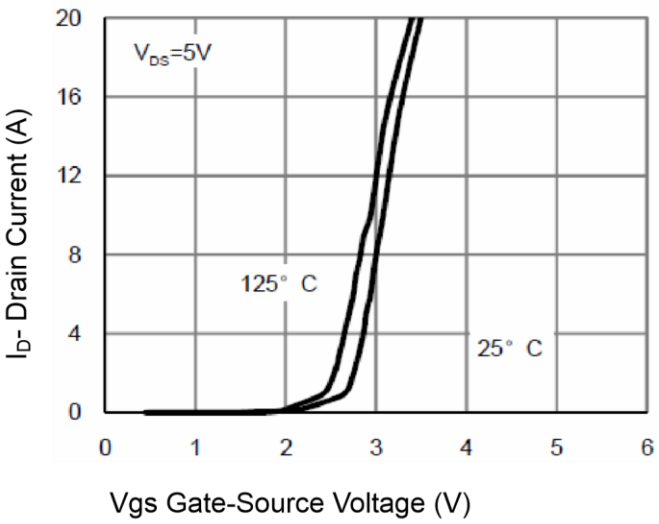


Figure 4 Transfer Characteristics

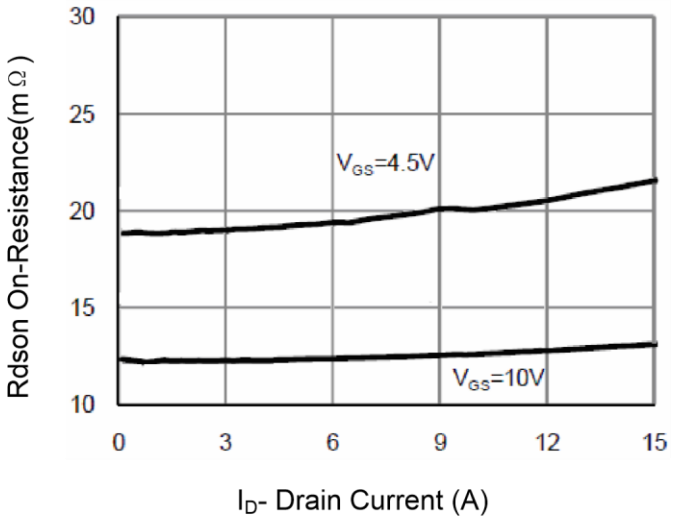


Figure 5 Drain-Source On-Resistance

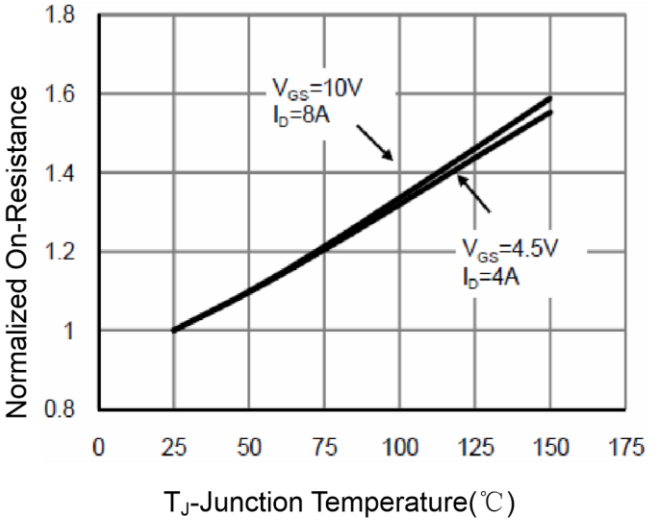
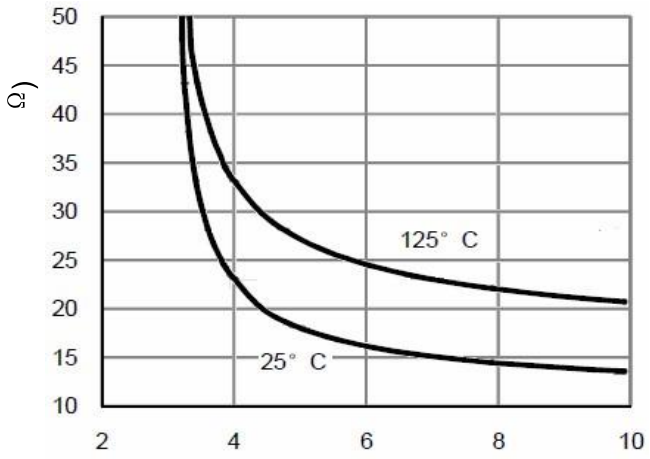
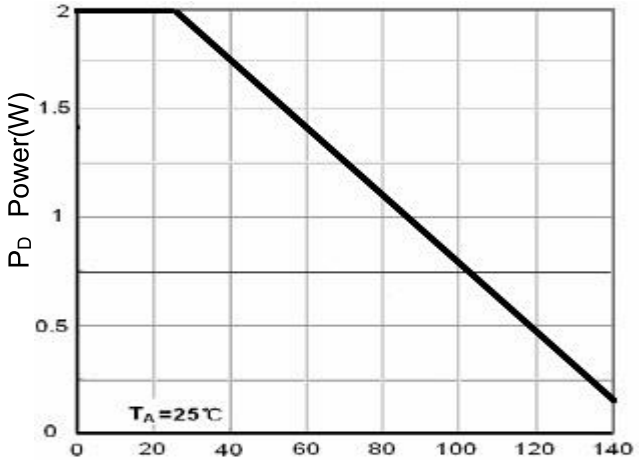


Figure 6 Drain-Source On-Resistance



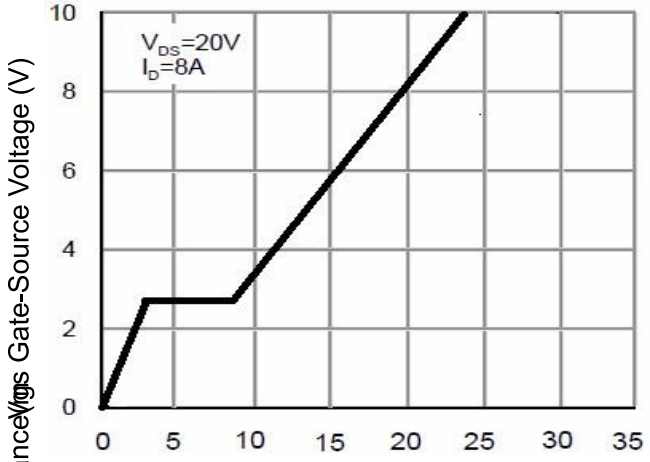
Vgs Gate-Source Voltage (V)

Figure7 Rdson vs Vgs



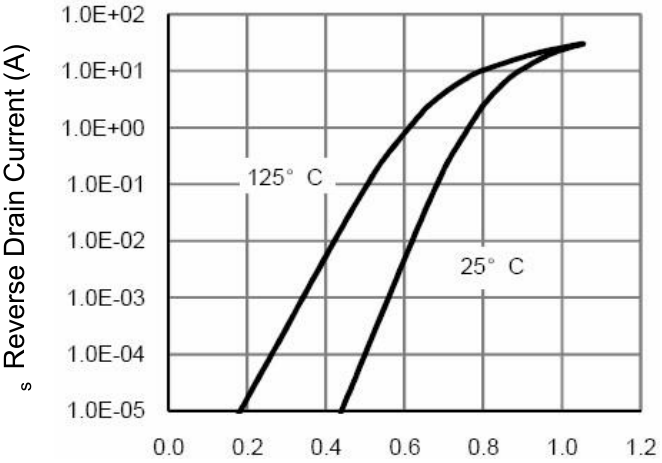
T_J-Junction Temperature(℃)

Figure 8 Power Dissipation



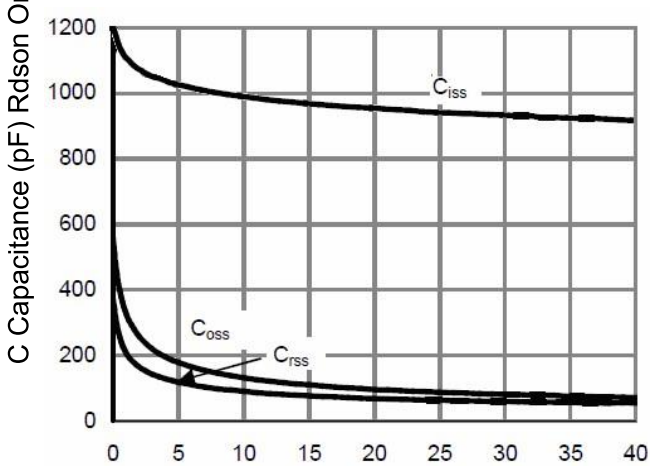
Qg Gate Charge (nC)

Figure 9 Gate Charge



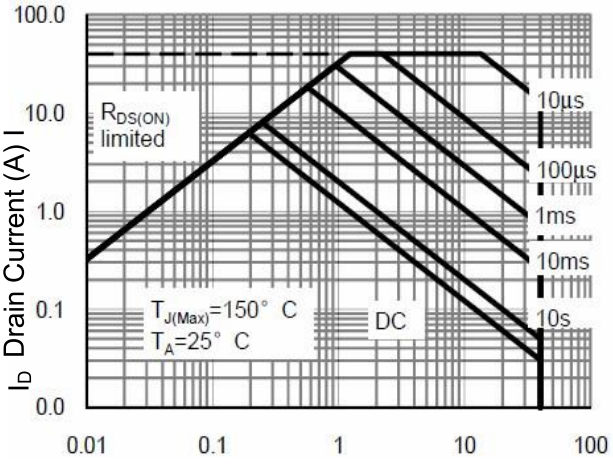
Vds Drain-Source Voltage (V)

Figure 10 Source- Drain Diode Forward



Vds Drain-Source Voltage (V)

Figure 11 Capacitance vs Vds



Vds Drain-Source Voltage (V)

Figure 12 Safe Operation Area

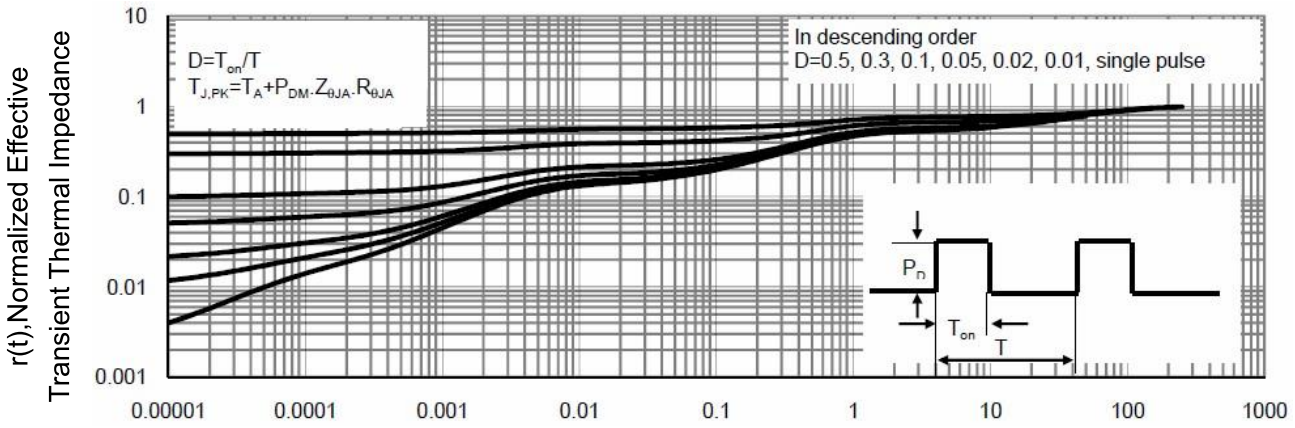
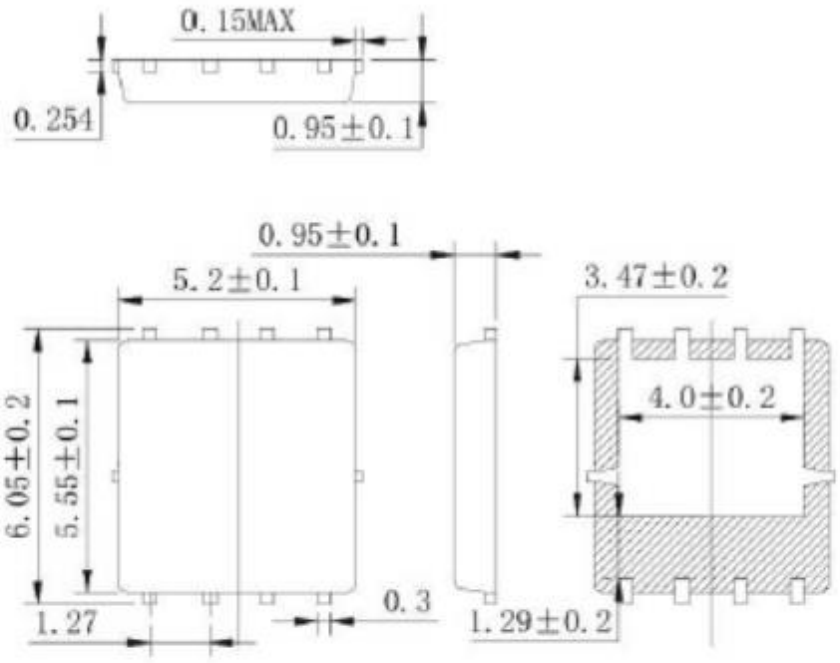


Figure 13 Normalized Maximum Transient Thermal Impedance

DFN5*6-XW-01


0.15MAX
0.254
0.95±0.1
0.95±0.1
5.2±0.1
3.47±0.2
4.0±0.2
6.05±0.2
5.55±0.1
0.3
1.27
1.29±0.2

40V N+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.