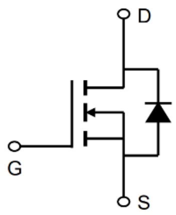
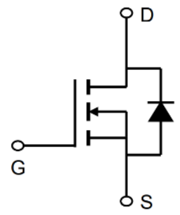
AP20H03NF

30V N+N-Channel Enhancement Mode MOSFET

Description

The AP20H03NF 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.

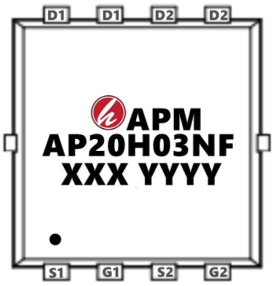


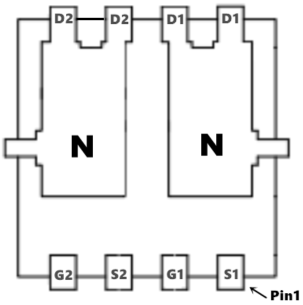


General Features

V_{DS} = 30V I_D =24.7A

$R_{DS(ON)}$ < 12mΩ @ V_{GS}=10V （Type：8.5mΩ）



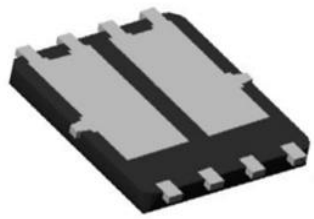


Application

Lithium battery protection

Wireless impact

Mobile phone fast charging



Package Marking and Ordering Information

Product ID	Pack	Marking	Qty(PCS)
AP20H03NF	PDFN5*6-8L	AP20H03NF XXX YYYY	5000

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

Symbol	Parameter	Rating	Units
VDS	Drain-Source Voltage	30	V
VGS	Gate-Source Voltage	±20	V
I_D@T_C=25℃	Continuous Drain Current, V_{GS} @ 10V[1]	24.7	A
I_D@T_C=100℃	Continuous Drain Current, V_{GS} @ 10V[1]	10.6	A
IDM	Pulsed Drain Current[2]	92	A
EAS	Single Pulse Avalanche Energy[3]	57.8	mJ
IAS	Avalanche Current	13	A
P_D@T_C=25℃	Total Power Dissipation[4]	19.2	W
P_D@T_A=25℃	Total Power Dissipation[4]	1.42	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]	6.5	℃/W

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

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
BVDSS	Drain-Source Breakdown Voltage	V_{GS}=0V , I_D=250uA	30	33	---	V
△BVDSS/△TJ	BVDSS Temperature Coefficient	Reference to 25℃ , I_D=1mA	---	0.023	---	V/℃
RDS(ON)	Static Drain-Source On-Resistance[2]	V_{GS}=10V , I_D=15A	---	8.5	12	mΩ
		V_{GS}=4.5V , I_D=10A	---	11.5	16.5	
VGS(th)	Gate Threshold Voltage	V_{GS}=V_{DS} , I_D =250uA	1.0	---	2.5	V
△$V_{GS(th)}$	$V_{GS(th)}$ Temperature Coefficient		---	-5.08	---	mV/℃
IDSS	Drain-Source Leakage Current	V_{DS}=24V , V_{GS}=0V , T_J=25℃	---	---	1	uA
		V_{DS}=24V , V_{GS}=0V , T_J=55℃	---	---	5	
IGSS	Gate-Source Leakage Current	V_{GS}=±20V , V_{DS}=0V	---	---	±100	nA
gfs	Forward Transconductance	V_{DS}=5V , I_D=15A	---	24.4	---	S
R_g	Gate Resistance	V_{DS}=0V , V_{GS}=0V , f=1MHz	---	1.8	---	Ω
Q_g	Total Gate Charge (4.5V)	V_{DS}=15V , V_{GS}=4.5V , I_D=12A	---	9.82	---	nC
Qgs	Gate-Source Charge		---	2.24	---	
Qgd	Gate-Drain Charge		---	5.54	---	
Td(on)	Turn-On Delay Time	V_{DD}=15V , V_{GS}=10V , R_G=1.5Ω I_D=20A	---	6.4	---	ns
T_r	Rise Time		---	39	---	
Td(off)	Turn-Off Delay Time		---	21	---	
T_f	Fall Time		---	4.7	---	
Ciss	Input Capacitance	V_{DS}=15V , V_{GS}=0V , f=1MHz	---	896	---	pF
Coss	Output Capacitance		---	126	---	
Crss	Reverse Transfer Capacitance		---	108	---	
IS	Continuous Source Current[1,5]	V_G=V_D=0V , Force Current	---	---	37	A
ISM	Pulsed Source Current[2,5]		---	---	75	A
VSD	Diode Forward Voltage[2]	V_{GS}=0V , I_S=1A , T_J=25℃	---	---	1	V

Note :

1、The data tested by surface mounted on a 1 inch2 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=25V,VGS=10V,L=0.1mH,IAS=13A
4、The power dissipation is limited by 150℃ junction temperature
5、The data is theoretically the same as ID and IDM , in real applications , should be limited by total power dissipation.

Typical Characteristics

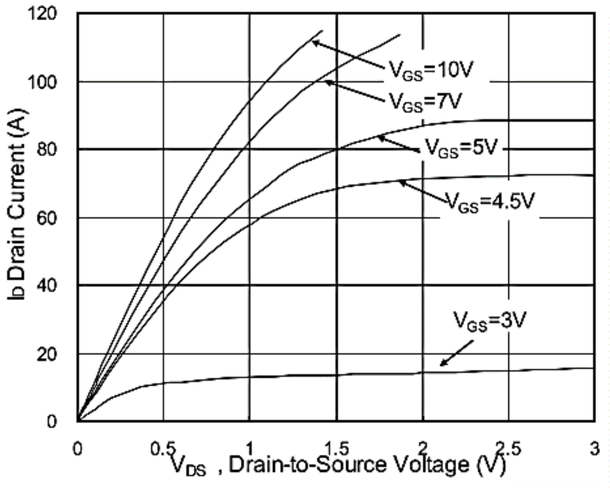


Figure1:Typical Output Characteristics

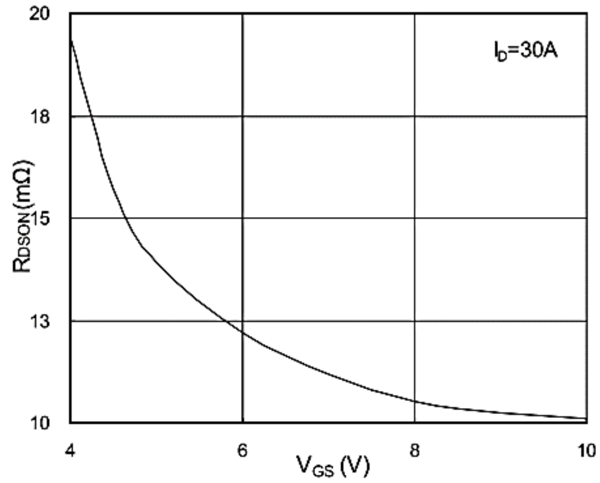


Figure2:On-Resistance vs. G-S Voltage

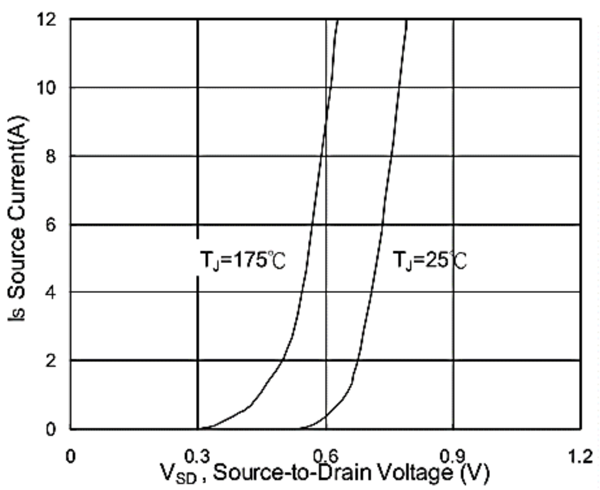


Figure3:Forward Characteristics of Reverse diode

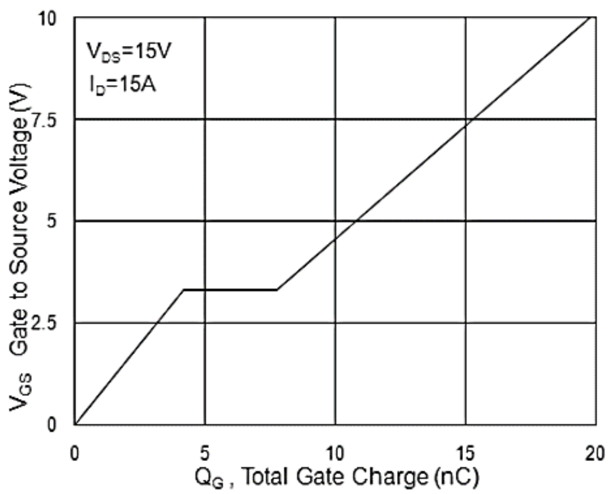


Figure 4:Gate-Charge Characteristics

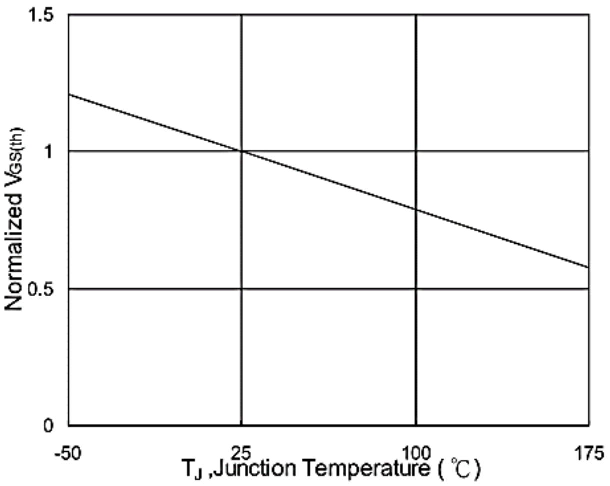


Figure5: Normalized V GS(th) vs. T J

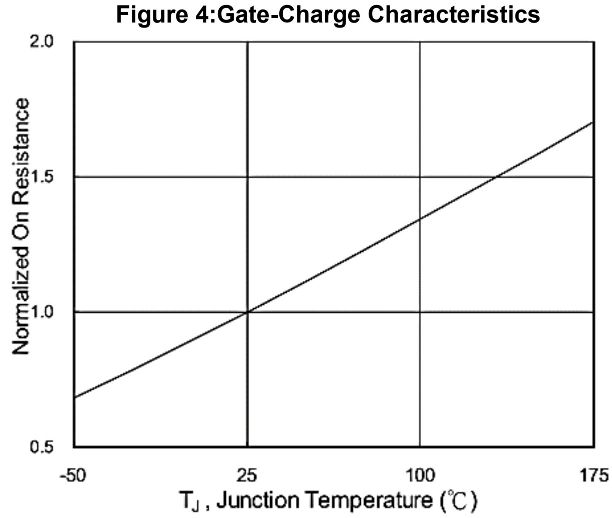


Figure6: Normalized R DSON vs. T J

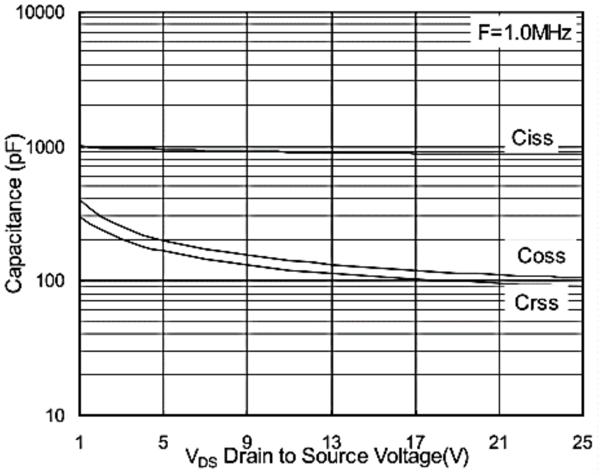


Figure7:Capacitance

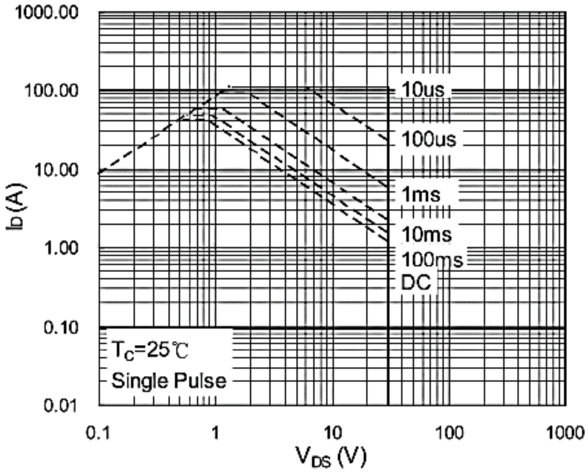


Figure8:Safe Operating Area

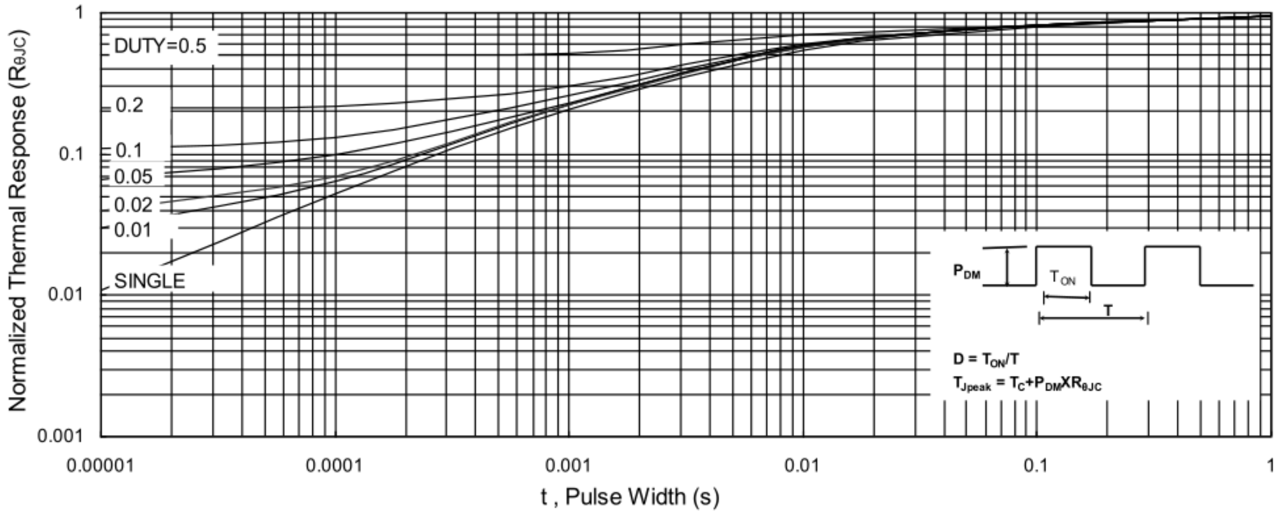


Figure9: Normalized Maximum Transient Thermal Impedance

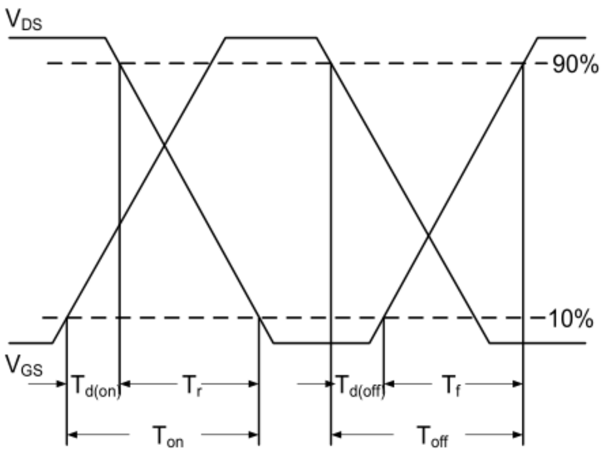


Figure10: Switching Time Waveform

$$EAS= \frac{1}{2} L \times I_{AS}^2 \times \frac{BV_{DSS}}{BV_{DSS}-V_{DD}}$$

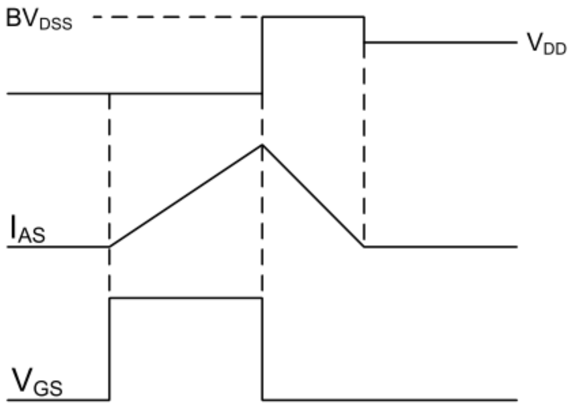
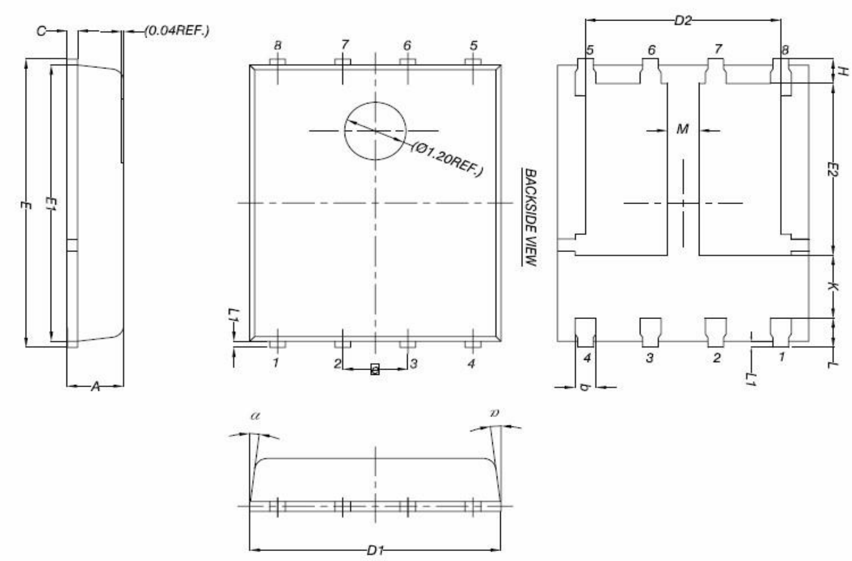


Fig.11 Unclamped Inductive Switching Waveform

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



Symbol	Common		
	mm		
	Mim	Nom	Max
A	0.90	1.00	1.10
b	0.33	0.41	0.51
C	0.20	0.25	0.30
D1	4.80	4.90	5.00
D2	3.61	3.81	3.96
E	5.90	6.00	6.10
E1	5.70	3.30	3.45
E2	3.38	3.05	3.20
e	1.27BSC		
H	0.41	0.51	0.61
K	1.10	--	--
L	0.51	0.61	0.71
L1	0.06	0.13	0.20
M	0.50	--	--
a	0°	--	12°

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