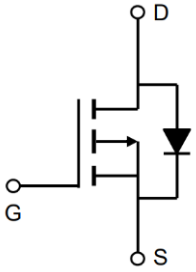
AP70P03NF

-30V P-Channel Enhancement Mode MOSFET

Description

The AP70P03NF 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 =−70 A

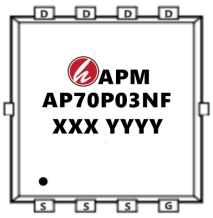
$R_{DS(ON)}$ < −7.5 mΩ @ V_{GS}=−10V

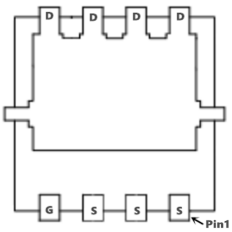
Application

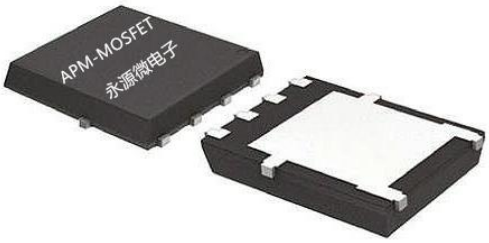
Battery protection

Load switch

Uninterruptible power supply







Package Marking and Ordering Information

Product ID	Pack	Marking	Qty(PCS)
AP70N03NF	PDFN5*6-8L	AP70P03NF xXx yyyy	5000

Absolute Maximum Ratings (TC=25℃ unless otherwise specified)

Symbol	Parameter	Rating	Units
V_{DS}	Drain-Source Voltage	-30	V
V_{GS}	Gate-Source Voltage	±20	V
I_D@T_C=25℃	Continuous Drain Current, V_{GS} @ -10V[1,6]	-70	A
I_D@T_C=100℃	Continuous Drain Current, V_{GS} @ -10V[1,6]	-50	A
I_{DM}	Pulsed Drain Current[2]	-200	A
EAS	Single Pulse Avalanche Energy[3]	80	mJ
I_{AS}	Avalanche Current	-40	A
P_D@T_C=25℃	Total Power Dissipation[4]	90	W
T_{STG}	Storage Temperature Range	-55 to 175	℃
T_J	Operating Junction Temperature Range	-55 to 175	℃
$R_{\theta JA}$	Thermal Resistance Junction-ambient [1](t≦10S)	20	℃/W
	Thermal Resistance Junction-ambient [1](Steady State)	50	℃/W

-30V P-Channel Enhancement Mode MOSFET

$R_{\theta JC}$	Thermal Resistance Junction-case [1]	1.6	˚C/W

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
BV_{DSS}	Drain-Source Breakdown Voltage	V_{GS}=0V , I_D=-250uA	-30	---	---	V
$R_{DS(ON)}$	Static Drain-Source On-Resistance[2]	V_{GS}=-10V , I_D=-20A	---	5.6	7.2	mΩ
		V_{GS}=-4.5V , I_D=-15A	---	9.5	12	mΩ
$V_{GS(th)}$	Gate Threshold Voltage	V_{GS}=V_{DS} , I_D =-250uA	-1.2	---	-2.5	V
I_{DSS}	Drain-Source Leakage Current	V_{DS}=-24V , V_{GS}=0V , T_J=25˚C	---	---	-1	uA
		V_{DS}=-24V , V_{GS}=0V , T_J=55˚C	---	---	-5	
I_{GSS}	Gate-Source Leakage Current	V_{GS}=±20V , V_{DS}=0V	---	---	±100	nA
Rg	Gate Resistance	V_{DS}=0V , V_{GS}=0V , f=1MHz	---	1.2	–––	Ω
Q_g	Total Gate Charge (-10V)	V_{DS}=-15V , V_{GS}=-10V , I_D=-18A	---	60	---	nC
Q_{gs}	Gate-Source Charge		---	9	---	
Q_{gd}	Gate-Drain Charge		---	15	---	
$T_{d(on)}$	Turn-On Delay Time	V_{DD}=-15V , V_{GS}=-10V , R_G=3.3 , I_D=-20A	---	17	---	ns
T_r	Rise Time		---	40	---	
$T_{d(off)}$	Turn-Off Delay Time		---	55	---	
T_f	Fall Time		---	13	---	
C_{iss}	Input Capacitance	V_{DS}=-25V , V_{GS}=0V , f=1MHz	---	3450	---	pF
C_{oss}	Output Capacitance		---	255	---	
C_{rss}	Reverse Transfer Capacitance		---	140	---	
I_S	Continuous Source Current[1,5]	V_G=V_D=0V , Force Current	---	---	-70	A
V_{SD}	Diode Forward Voltage[2]	V_{GS}=0V , I_S=-1A , T_J=25˚C	---	---	-1.2	V
t_{rr}	Reverse Recovery Time	I_F=-20A , di/dt=100A/μs , T_J=25˚C	---	22	---	nS
Q_{rr}	Reverse Recovery Charge		---	72	---	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 V_{DD}=-50V,V_{GS}=-10V,L=0.1mH,I_{AS}=-40A
4.The power dissipation is limited by 150˚C 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
6.The maximum current rating is package limited.

Typical Characteristics

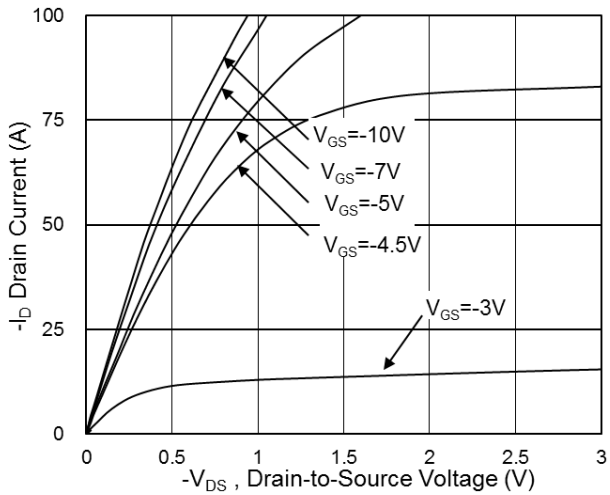


Fig.1 Typical Output Characteristics

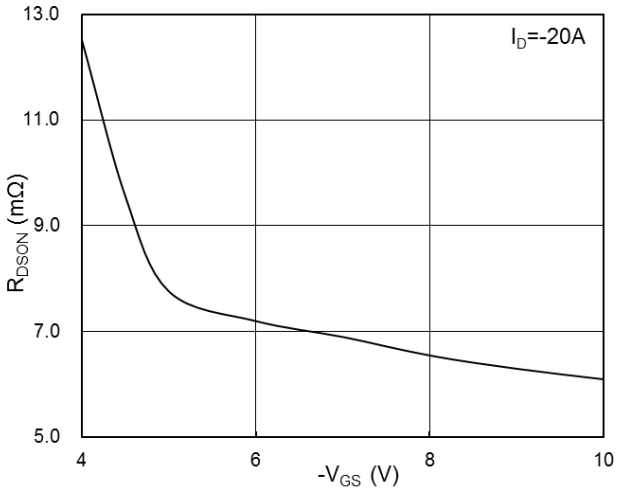


Fig.2 On-Resistance vs. Gate-Source Voltage

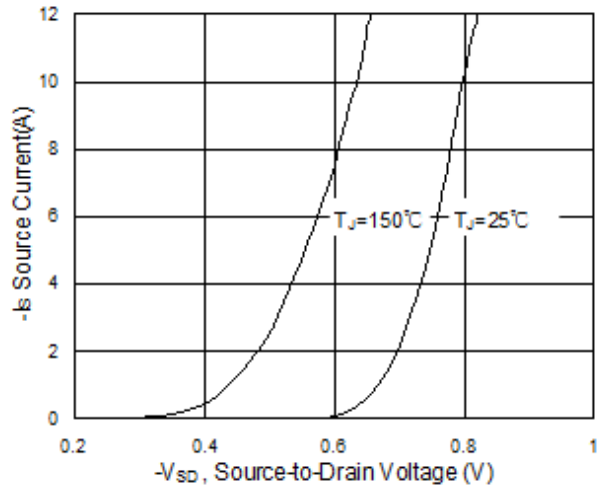


Fig.3 Forward Characteristics of Reverse

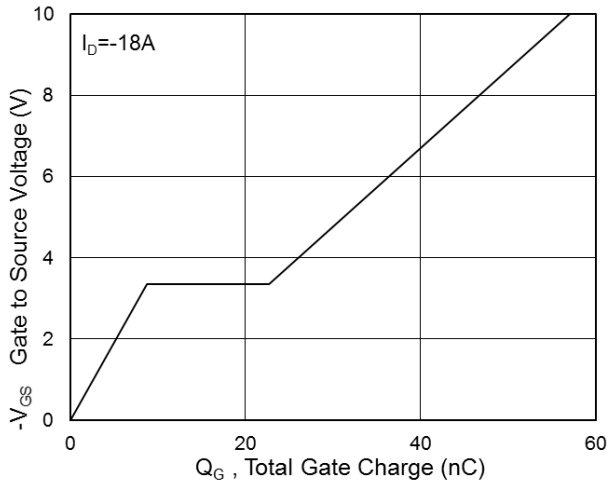


Fig.4 Gate-Charge Characteristics

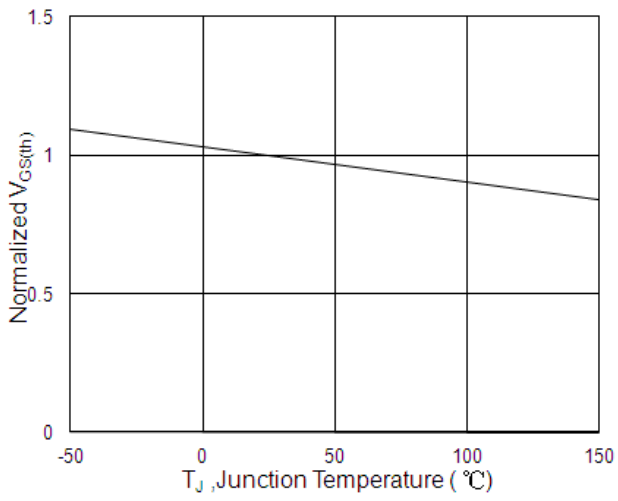


Fig.5 Normalized $-V_{GS(th)}$ vs. T_J

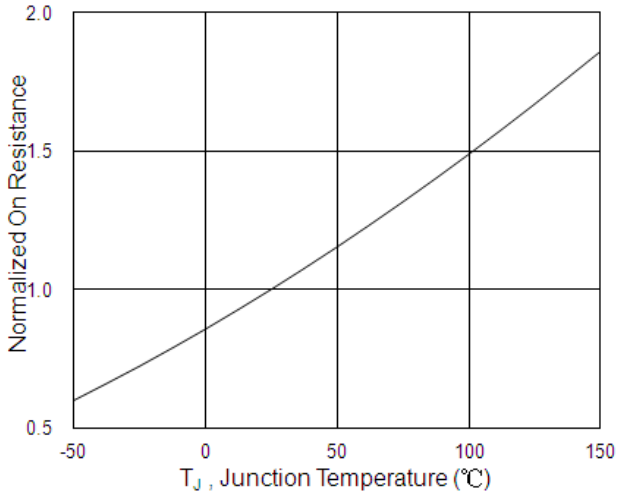


Fig.6 Normalized R_{DSON} vs. T_J

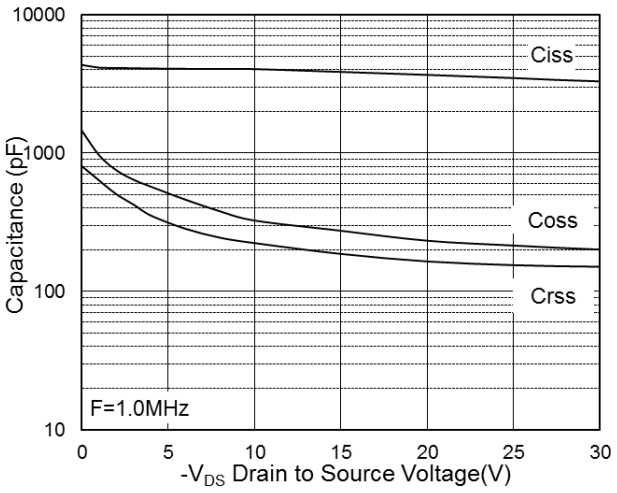


Fig.7 Capacitance

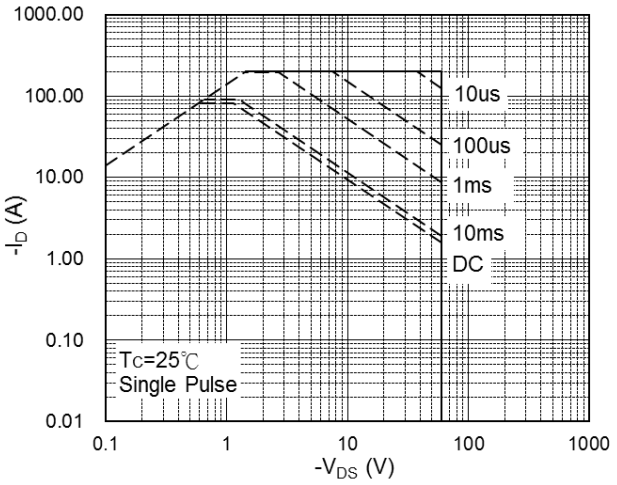


Fig.8 Safe Operating Area

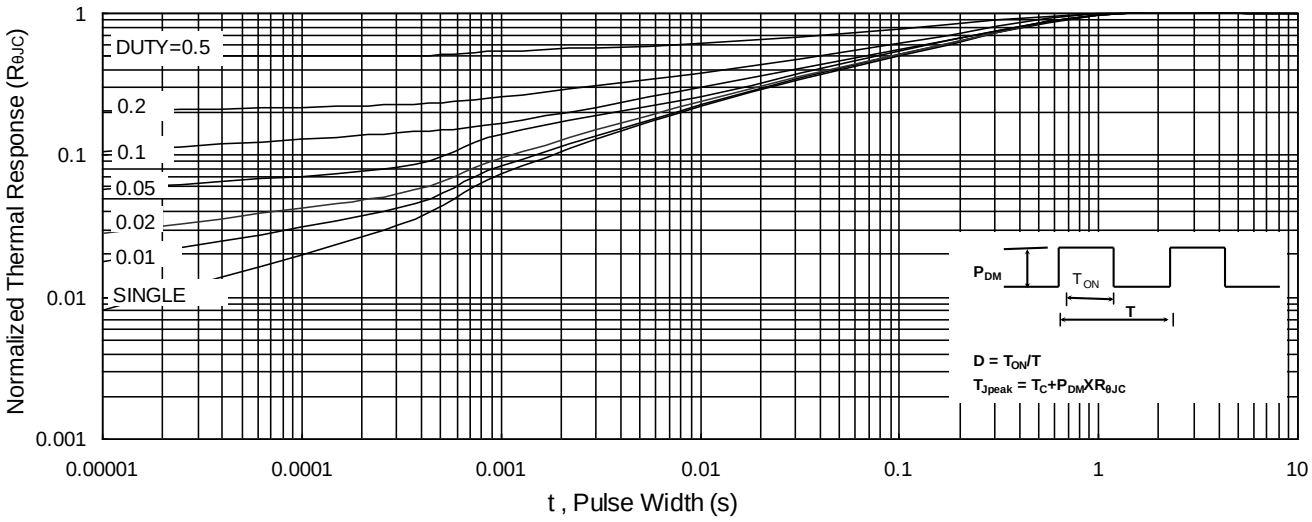


Fig.9 Normalized Maximum Transient Thermal Impedance

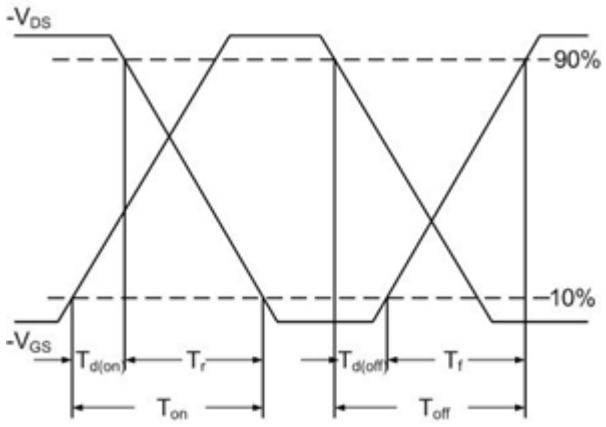


Fig.10 Switching Time Waveform

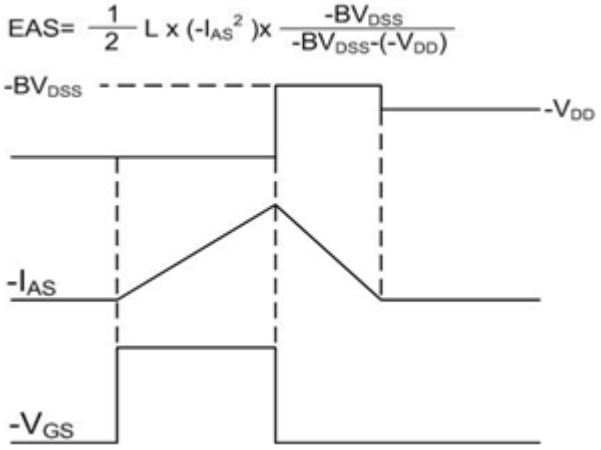
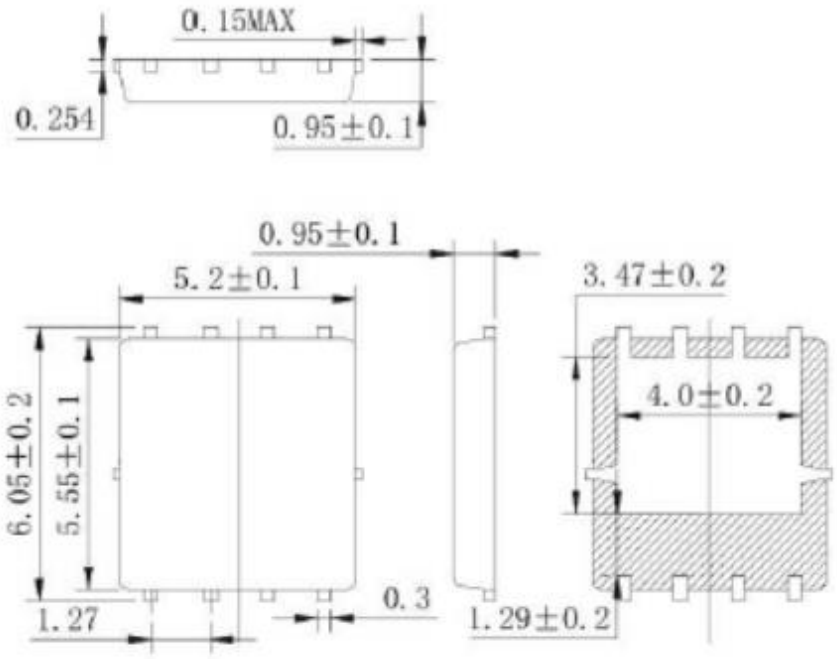


Fig.11 Unclamped Inductive Switching Waveform

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
1.27
0.3
1.29±0.2

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