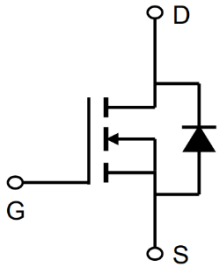
AP70N04NF

40V N-Channel Enhancement Mode MOSFET

Description

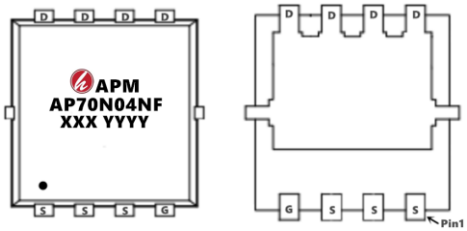
The AP70N04NF uses advanced trench technology to provide excellent $R_{DS(ON)}$, low gate charge and operation with gate voltages as low as 4.5V. This device is suitable for use as a Battery protection or in other Switching application.



General Features

V_{DS} = 40V I_D =70 A

$R_{DS(ON)}$ < 7mΩ @ V_{GS}=10V

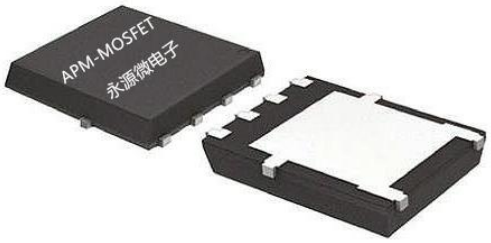


Application

Battery protection

Load switch

Uninterruptible power supply



Package Marking and Ordering Information

Product ID	Pack	Marking	Qty(PCS)
AP70N04NF	PDFN5*6-8L	AP70N04NF XXX YYYY	5000

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

Symbol	Parameter	Rating	Units
V_{DS}	Drain-Source Voltage	40	V
V_{GS}	Gate-Source Voltage	±20	V
I_D@T_C=25℃	Continuous Drain Current, V_{GS} @ 10V[1]	70	A
I_D@T_C=100℃	Continuous Drain Current, V_{GS} @ 10V[1]	39	A
I_D@T_A=25℃	Continuous Drain Current, V_{GS} @ 10V[1]	13	A
I_D@T_A=70℃	Continuous Drain Current, V_{GS} @ 10V[1]	810	A
I_{DM}	Pulsed Drain Current[2]	240	A
EAS	Single Pulse Avalanche Energy[3]	81	mJ
I_{AS}	Avalanche Current	20	A
P_D@T_C=25℃	Total Power Dissipation[4]	46	W
T_{STG}	Storage Temperature Range	-55 to 150	℃
T_J	Operating Junction Temperature Range	-55 to 150	℃
$R_{\theta JA}$	Thermal Resistance Junction-ambient (Steady State)[1]	62	℃/W
$R_{\theta JC}$	Thermal Resistance Junction-Case[1]	2.7	℃/W

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

Symbol	Parameter	Test Condition	Min.	Typ	Max	Units
V(BR)DSS	Drain-Source Breakdown Voltage	V_{GS}=0V,I_D=250μA	40	-	-	V
VGS(th)	Gate Threshold Voltage	V_{DS}= V_{GS}, I_D=250μA	1.0	1.7	2.5	V
△BVDSS/△TJ	BVDSS Temperature Coefficient	Reference to 25℃ , I_D=1mA	---	0.034	---	V/℃
RDS(on)	Static Drain-Source on-Resistance note3	V_{GS} =10V, I_D =30A	-	5.5	7	mΩ
		V_{GS} =4.5V, I_D =20A	-	9	12	
IDSS	Zero Gate Voltage Drain Current	V_{DS} =40V, V_{GS} = 0V,	-	-	1.0	μA
IGSS	Gate to Body Leakage Current	V_{DS} =0V,V_{GS} = ±20V	-	-	±100	nA
C_{iss}	Input Capacitance	V_{DS} = 20V, V_{GS} =0V, f = 1.0MHz	-	2400	-	pF
Coss	Output Capacitance		-	192	-	pF
Crss	Reverse Transfer Capacitance		-	165	-	pF
Q_g	Total Gate Charge	V_{DS} =20V, I_D =30A, V_{GS} =10V	-	37	-	nC
Q_{gs}	Gate-Source Charge		-	6	-	nC
Q_{gd}	Gate-Drain(“Miller”) Charge		-	7	-	nC
td(on)	Turn-on Delay Time	V_{DD}=20V, I_D =30A, R_L=1Ω, R_{GEN}=3Ω, V_{GS} =10V	-	12	-	ns
t_r	Turn-on Rise Time		-	12	-	ns
td(off)	Turn-off Delay Time		-	38	-	ns
t_f	Turn-off Fall Time		-	9	-	ns
IS	Maximum Continuous Drain to Source Diode ForwardCurrent		-	-	60	A
ISM	Maximum Pulsed Drain to Source Diode Forward Current		-	-	240	A
VSD	Drain to Source Diode Forward Voltage	V_{GS} =0V, I_S=30A	-	-	1.2	V
t_{rr}	Body Diode Reverse Recovery Time	T_J=25℃,I_F=20A,dI/dt=100A /μs	-	22	-	ns
Q_{rr}	Body Diode Reverse Recovery Charge		-	11	-	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}=25V,V_{GS}=10V,L=0.1mH,I_{AS}=20A

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

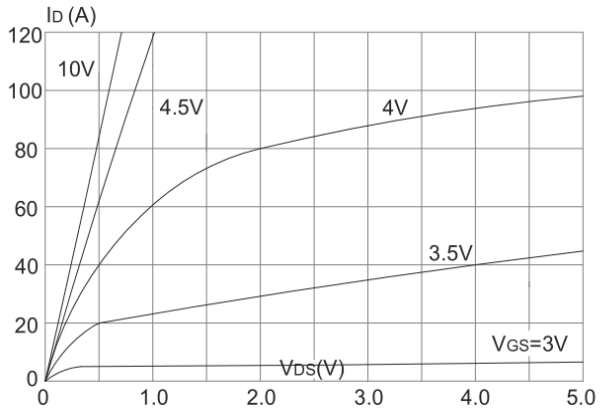


Figure1: Output Characteristics

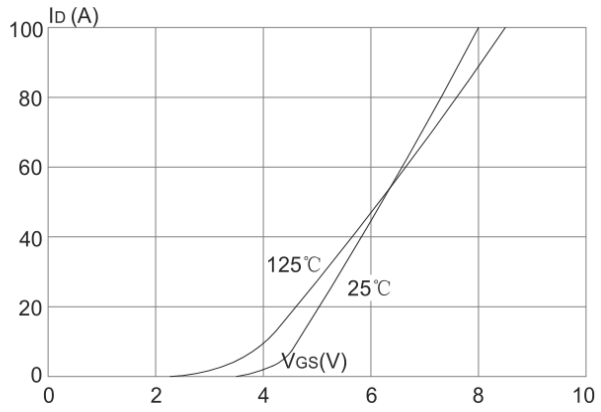


Figure 2: Typical Transfer Characteristics

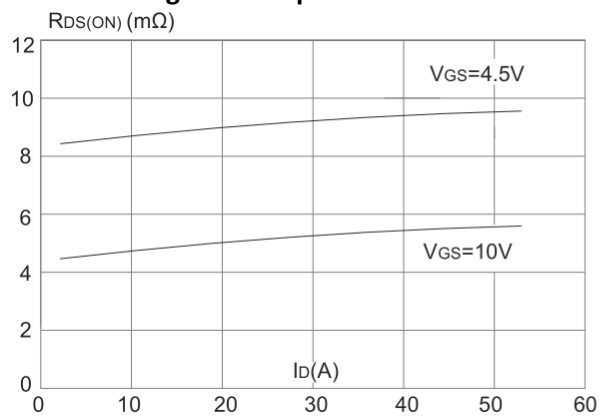


Figure 3:On-resistance vs. Drain Current

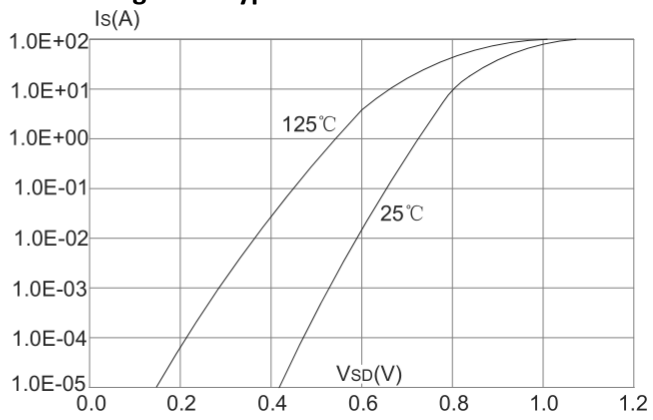


Figure 4: Body Diode Characteristics

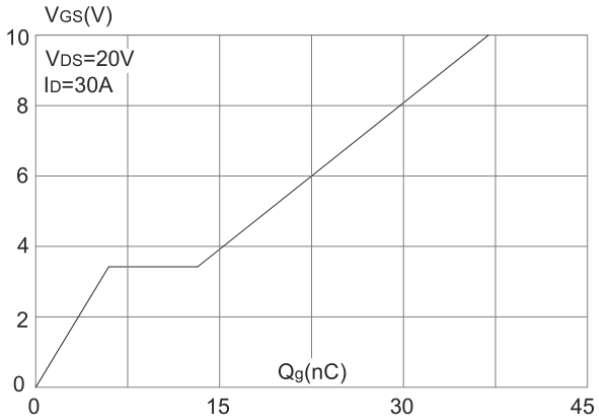


Figure 5: Gate Charge Characteristics

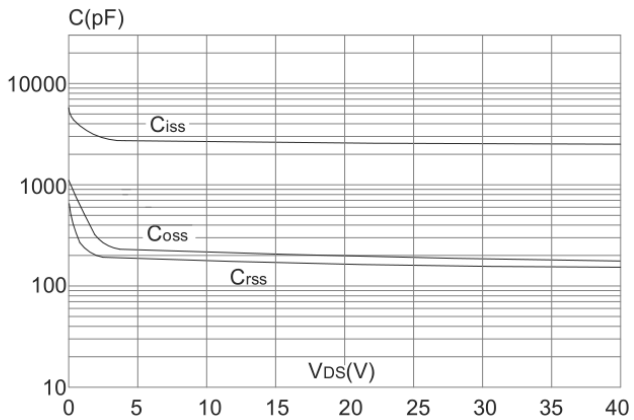


Figure 6: Capacitance Characteristics

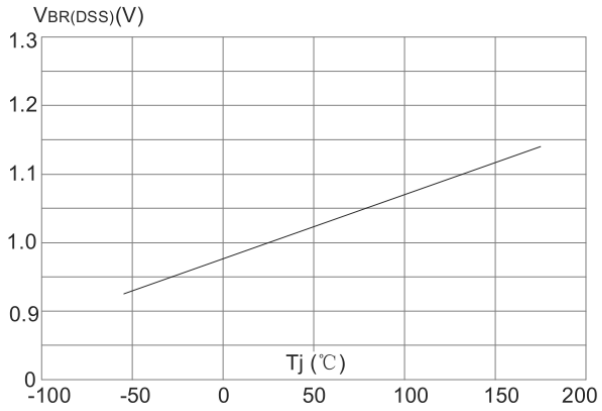


Figure 7: Normalized Breakdown Voltage vs. Junction Temperature

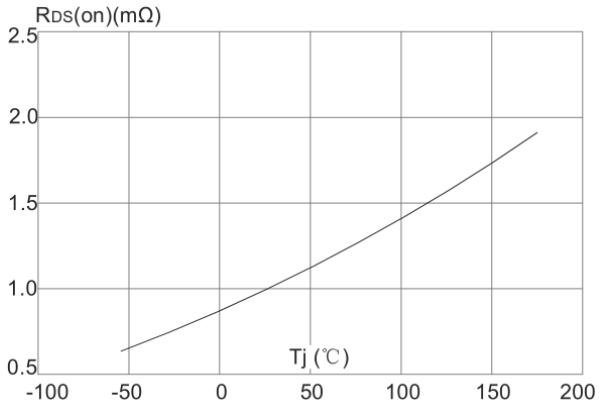


Figure 8: Normalized on Resistance vs Junction Temperature

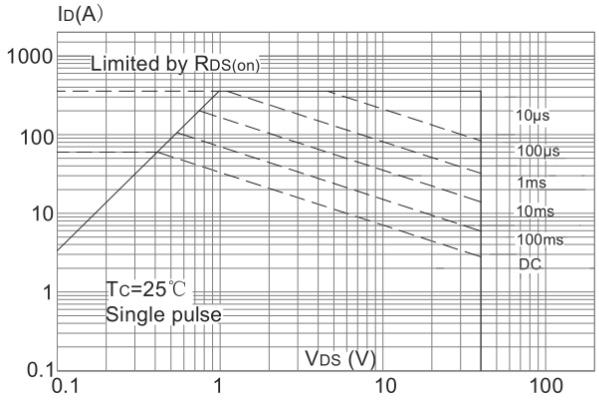


Figure 9: Maximum Safe Operating Area

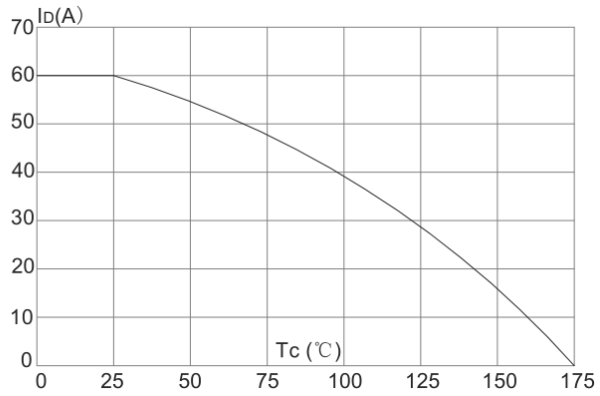


Figure 10: Maximum Continuous Drain Current vs. Case Temperature

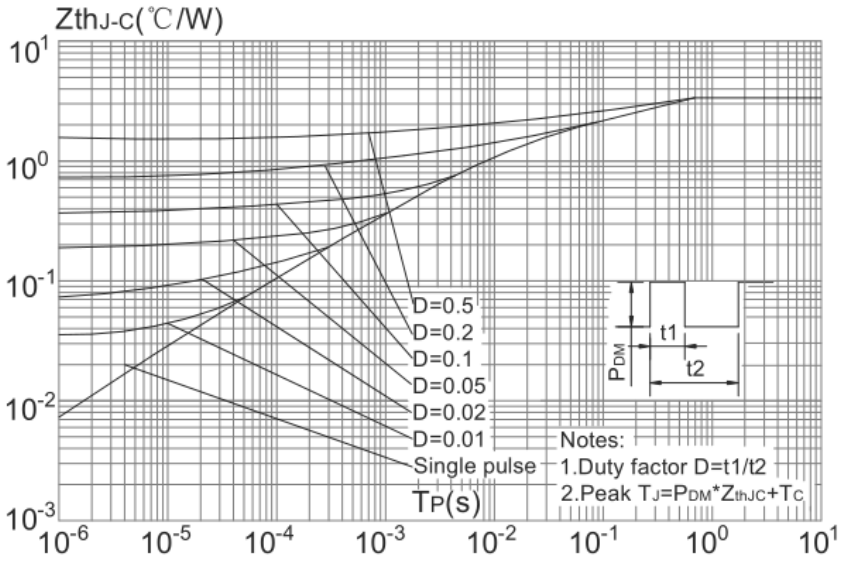
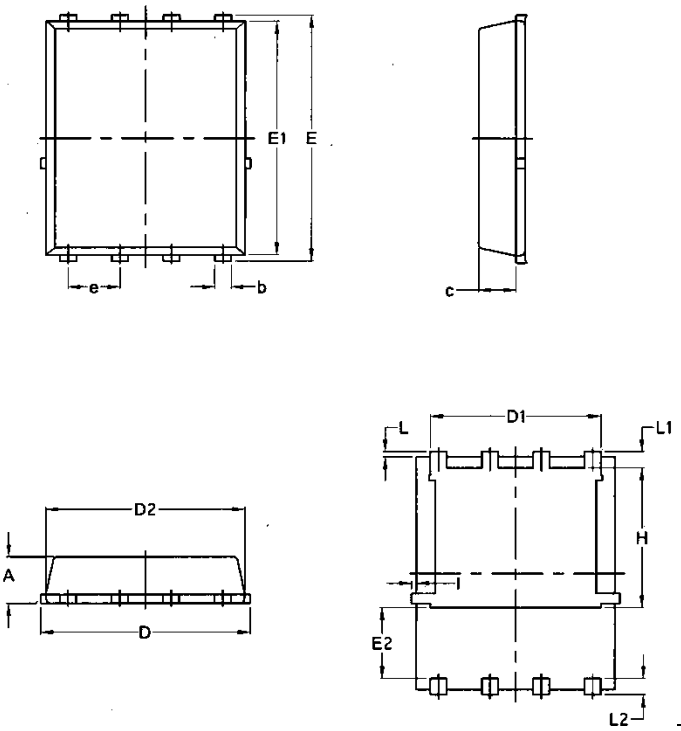


Figure.11: Maximum Effective Transient Thermal Impedance, Junction-to-Case

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

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Edition	Date	Change
Rve1.0	2019/8/1	Initial release