AP180N04NF

40V N-Channel Enhancement Mode MOSFET

Description

The AP180N04NF uses advanced **APM-SGT V** 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 =180A

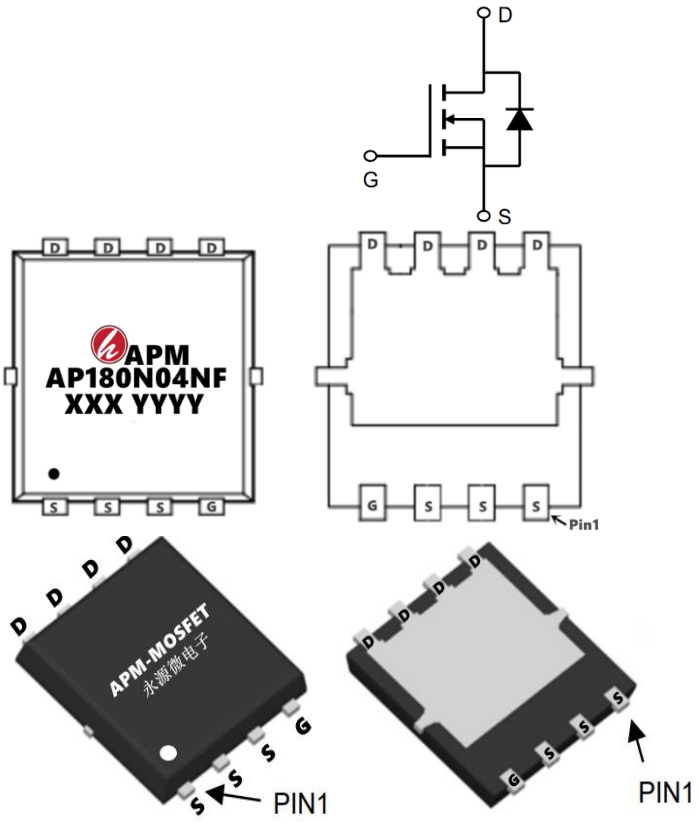
$R_{DS(ON)}$ < 1.5mΩ @ V_{GS}=10V **（Type：1.15mΩ）**

Application

BMS

BLDC

UPS



Package Marking and Ordering Information

Product ID	Pack	Marking	Qty(PCS)
AP180N04NF	PDFN5*6-8L	AP180N04NF XXX YYYY	5000

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

Symbol	Parameter	Max.	Units
VDSS	Drain-Source Voltage	40	V
VGSS	Gate-Source Voltage	±20	V
ID@TC=25℃	Continuous Drain Current, VGS @ 10V1	180	A
ID@TC=100℃	Continuous Drain Current, VGS @ 10V1	125	A
IDM	Pulsed Drain Current	750	A
EAS	Single Pulsed Avalanche Energy	420	mJ
IAS	Avalanche Current	70	A
PD@TC=25℃	Power Dissipation	68	W
RθJA	Thermal Resistance Junction-Ambient [1]	25	°C/W
RθJC	Thermal Resistance, Junction to Case	1.4	℃/W
T_J	Operating Junction Temperature Range	-55 to 150	°C
TSTG	Storage Temperature Range	-55 to 150	°C

N-Channel 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	48	-	V
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
VGS(th)	Gate Threshold Voltage	V_{DS}=V_{GS}, I_D=250μA	1.0	1.8	2.5	V
RDS(on)	Static Drain-Source on-Resistance	V_{GS}=10V, I_D=30A	-	1.15	1.5	mΩ
		V_{GS}=4.5V, I_D=20A	-	1.7	2.5	mΩ
Ciss	Input Capacitance	V_{DS}=20V, V_{GS}=0V, f=1.0MHz	-	8300	-	pF
Coss	Output Capacitance		-	1510	-	pF
Crss	Reverse Transfer Capacitance		-	130	-	pF
Q_g	Total Gate Charge	V_{DS}=20V, I_D=85A, V_{GS}=10V	-	127	-	nC
Qgs	Gate-Source Charge		-	35	-	nC
Qgd	Gate-Drain(“Miller”) Charge		-	26	-	nC
td(on)	Turn-on Delay Time	V_{DD}=20V, I_D=85A, R_G=1.6Ω, V_{GS}=10V	-	22.5	-	ns
tr	Turn-on Rise Time		-	6.7	-	ns
td(off)	Turn-off Delay Time		-	80.3	-	ns
t_f	Turn-off Fall Time		-	26.9	-	ns
IS	Maximum Continuous Drain to Source Diode Forward Current		-	-	185	A
ISM	Maximum Pulsed Drain to Source Diode Forward Current		-	-	750	A
VSD	Drain to Source Diode Forward Voltage	V_{GS}=0V, I_S=30A	-	-	1.2	V
trr	Body Diode Reverse Recovery Time	T_J=25℃, I_F=I_S,dI/dt=100A/μs	-	100	-	ns
Q_{rr}	Body Diode Reverse Recovery Charge		-	163	-	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 VDD =32V,VGS =10V,L=0.1mH,IAS =70A

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

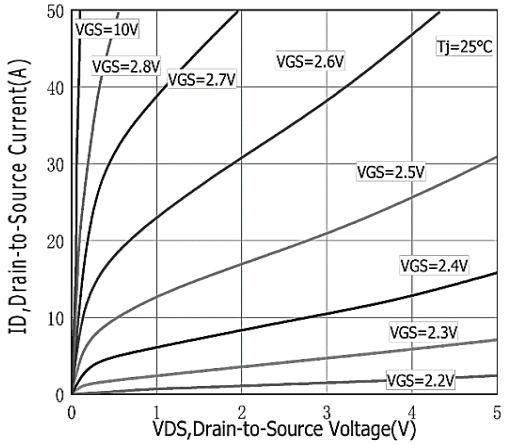


Figure1: Typical Output Characteristics

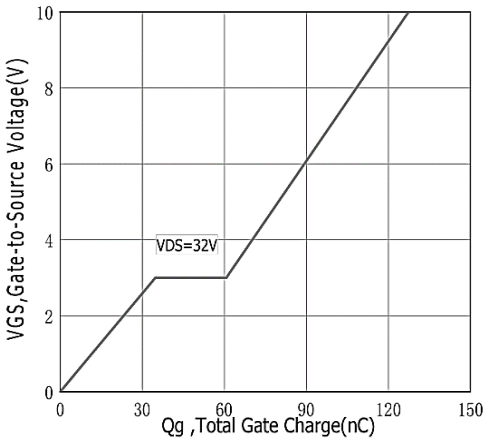


Figure 2: Typical GateCharge vs Gate to Source Voltage

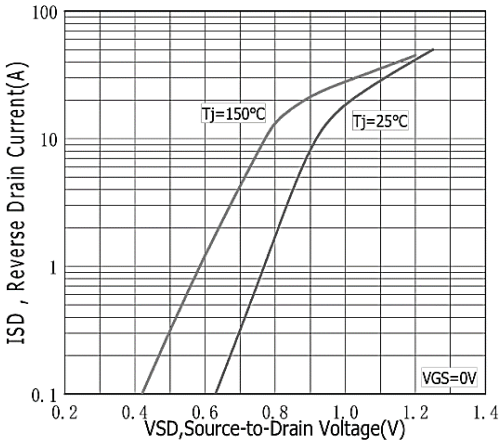


Figure 3: Typical Body Diode Transfer Characteristics

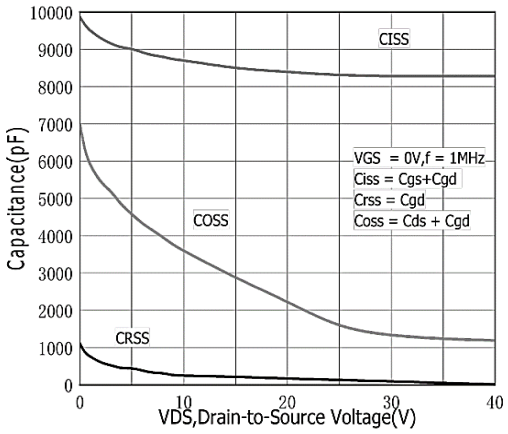


Figure 4: Typical Capacitance vs Drain to Source Voltage

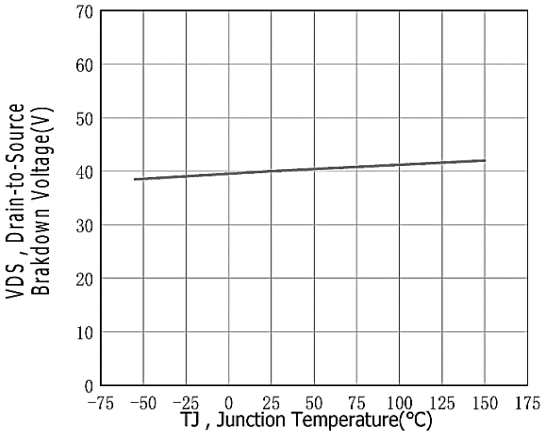


Figure 5: Typical Breakdown Voltage vs Junction Temperature

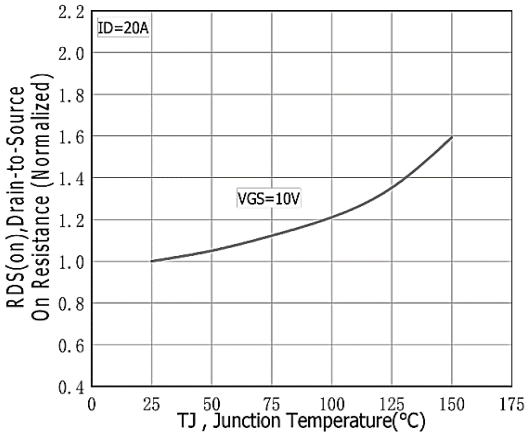


Figure 6: Typical Drain to Source on Resistance vs Junction Temperature

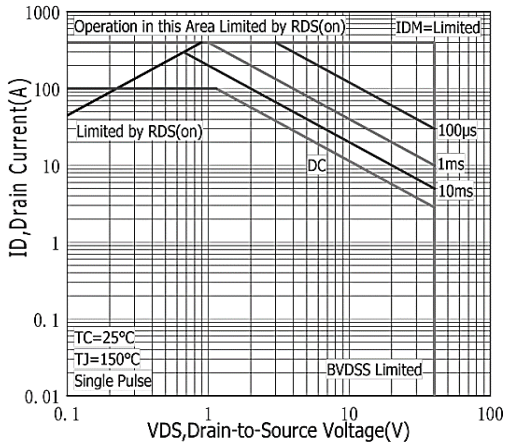


Figure 7: Maximum Forward Bias Safe Operating Area.

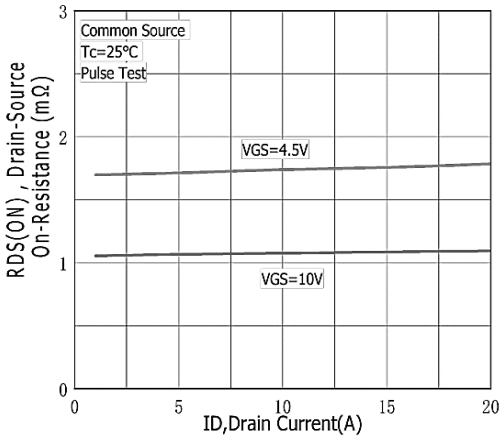


Figure 8: Typical Drain to Source ON Resistance vs Drain Current

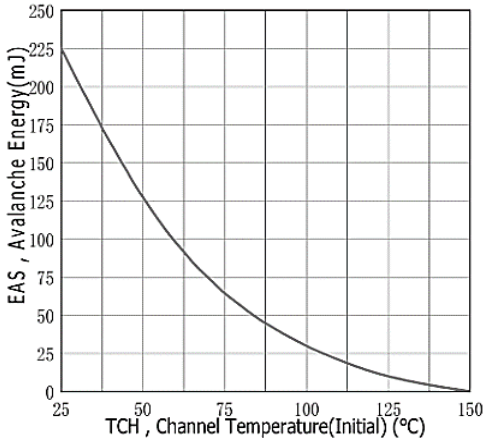


Figure 9: Maximum EAS vs Channel Temperature

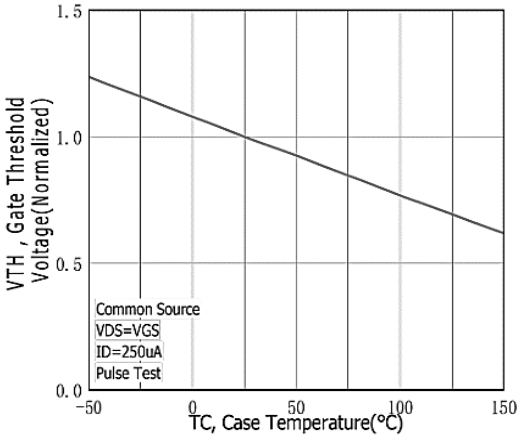


Figure 10: Typical Threshold Voltage vs Case Temperature

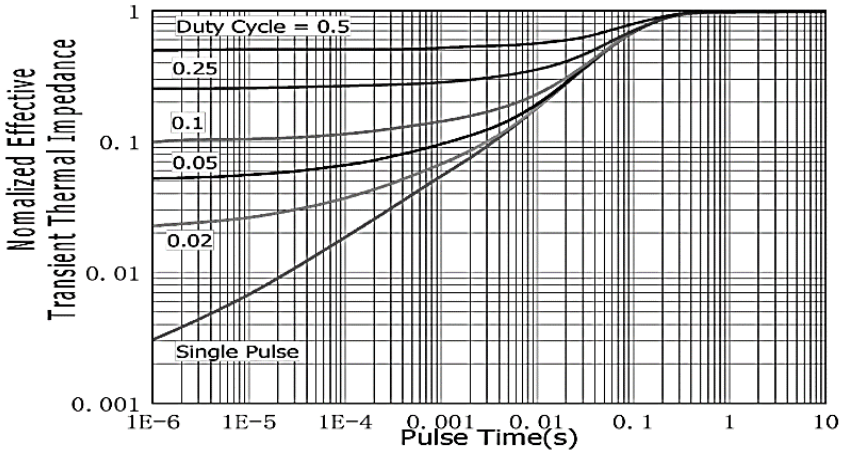
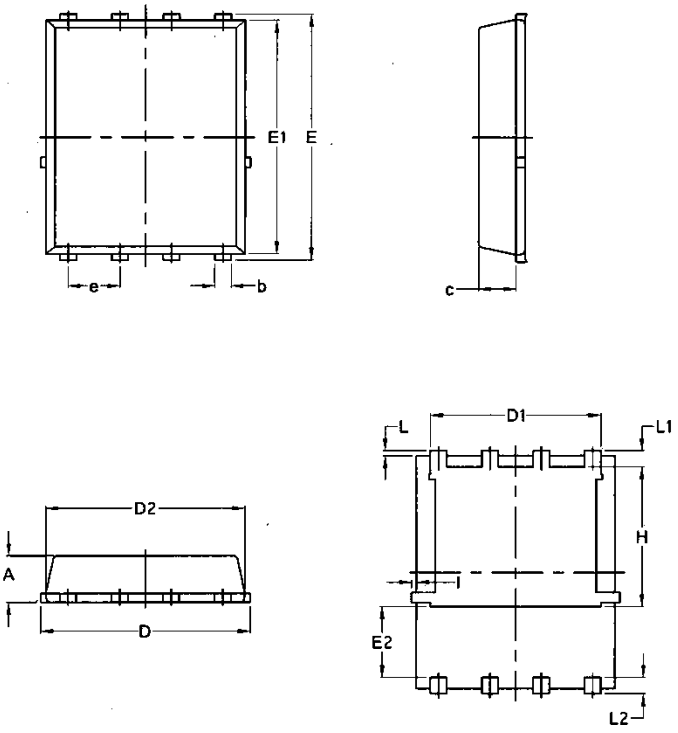


Figure.11: Maximum Effective Transient Thermal Impedance, Junction-to-Cas

Package Mechanical Data-PDFN5*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	2021/12/31	Initial release