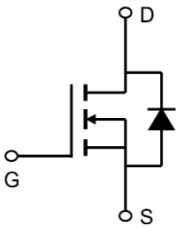
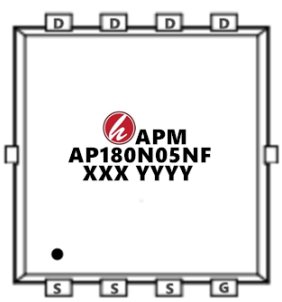
AP180N05NF

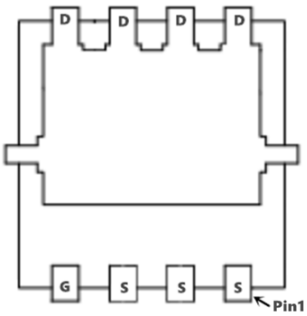
45V N-Channel Enhancement Mode MOSFET

Description

The AP180N05NF 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} = 45V I_D =180A

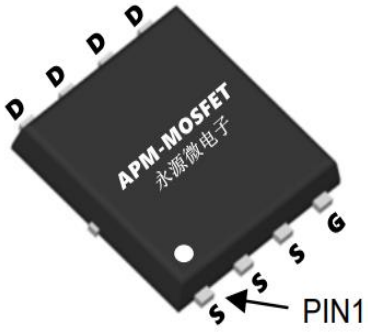
$R_{DS(ON)}$ < 1.3mΩ @ V_{GS}=10V **（Type：1.1mΩ）**

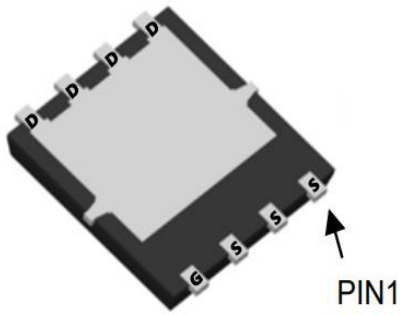
Application

BMS

BLDC

UPS





Package Marking and Ordering Information

Product ID	Pack	Marking	Qty(PCS)
AP180N05NF	PDFN5X6-8L	AP180N05NF XXX YYYY	5000

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

Symbol	Parameter	Max.	Units
VDSS	Drain-Source Voltage	45	V
VGSS	Gate-Source Voltage	±20	V
ID@TC=25℃	Continuous Drain Current, VGS @ 10V1	300	A
ID@TC=100℃	Continuous Drain Current, VGS @ 10V1	239	A
IDM	Pulsed Drain Current	1512	A
EAS	Single Pulsed Avalanche Energy	1512	mJ
IAS	Avalanche Current	70	A
PD@TC=25℃	Power Dissipation	333.3	W
RθJA	Thermal Resistance Junction-Ambient [1]	25	°C/W
RθJC	Thermal Resistance, Junction to Case	0.45	℃/W
T_J	Operating Junction Temperature Range	-55 to 175	°C
TSTG	Storage Temperature Range	-55 to 175	°C

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

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
V(BR)DSS	Drain-Source Breakdown Voltage	VGS=0V, ID=250μA	45	49	-	V
IGSS	Gate-Body Leakage Current	VDS=0V, VGS=±20V	-	-	±100	nA
IDSS	Zero Gate Voltage Drain Current TJ=25°C	VDS=40V, VGS=0V	-	-	1	μA
	Zero Gate Voltage Drain Current TJ=100°C		-	-	100	
VGS(th)	Gate-Threshold Voltage	VDS=VGS, ID=250μA	1.2	1.6	2.5	V
RDS(on)	Drain-Source on-Resistance4	VGS=10V, ID=20A	-	1.1	1.3	mΩ
		VGS=4.5V, ID=10A	-	1.6	1.9	
gfs	Forward Transconductance4	VDS=10V, ID=20A	-	105	-	S
Ciss	Input Capacitance	VDS=20V, VGS=0V, f =1MHz	-	6650	-	pF
Coss	Output Capacitance		-	1495	-	
Crss	Reverse Transfer Capacitance		-	103	-	
RG	Gate Resistance	f =1MHz	-	2.2	-	Ω
Qg	Total Gate Charge	VGS = 10V, VDS = 20V, ID= 20A	-	118	-	nC
Qgs	Gate-Source Charge		-	19	-	
Qgd	Gate-Drain Charge		-	22.2	-	
td(on)	Turn-on Delay Time	VGS =10V, VDD= 20V, RG = 3Ω, ID= 20A	-	13.8	-	ns
tr	Rise Time		-	14	-	
td(off)	Turn-off Delay Time		-	91	-	
tf	Fall Time		-	43	-	
trr	Body Diode Reverse Recovery Time	IF = 20A, dI/dt = 100A/μs	-	66	-	ns
Qrr	Body Diode Reverse Recovery Charge		-	39.6	-	nC
VSD	Diode Forward Voltage4	IS = 20A, VGS = 0V	-	-	1.2	V
IS	Continuous Source Current	TC=25°C	-	-	- 378	A

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

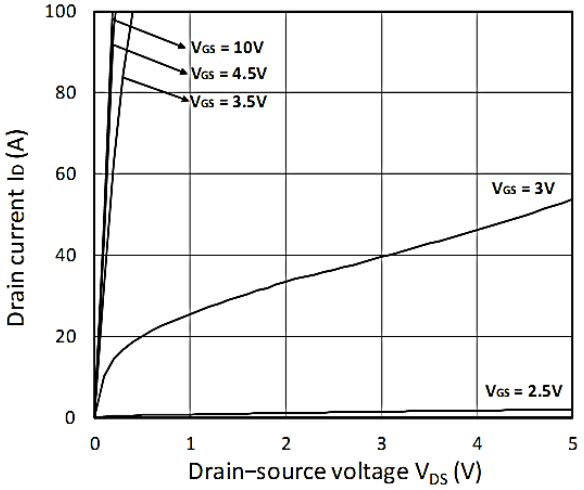


Figure 1. Output Characteristics

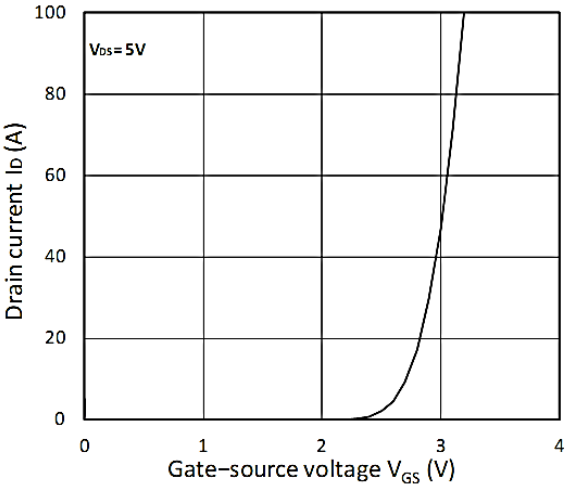


Figure 2. Transfer Characteristics

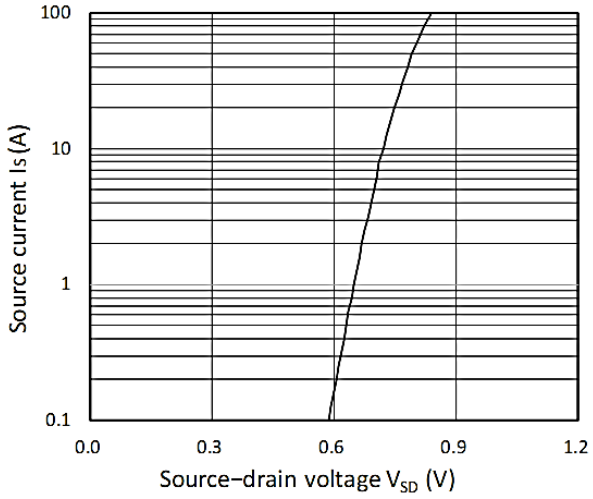


Figure 3. Forward Characteristics of Reverse

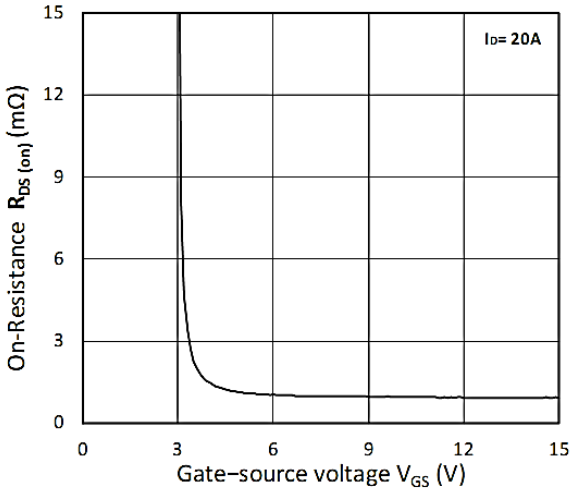


Figure 4. RDS(ON) vs. VGS

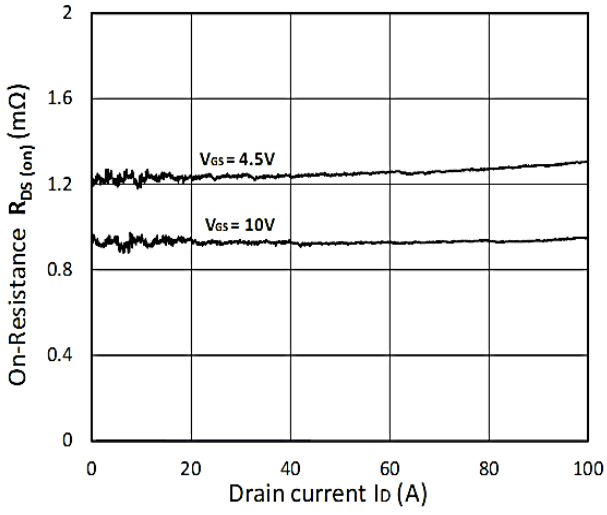


Figure 5. RDS(ON) vs. ID

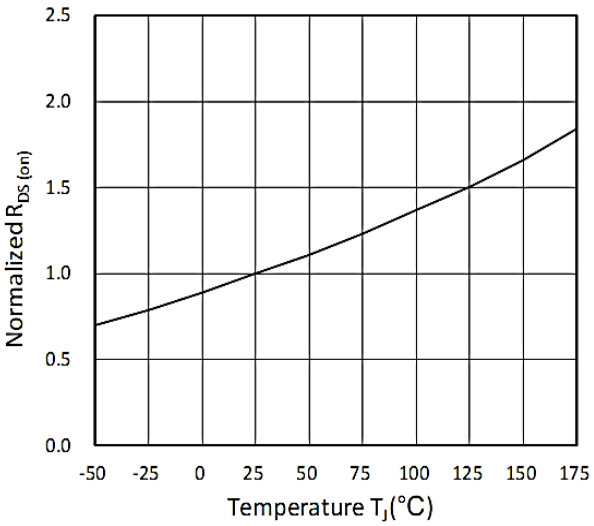


Figure 6. Normalized RDS(on) vs. Temperature

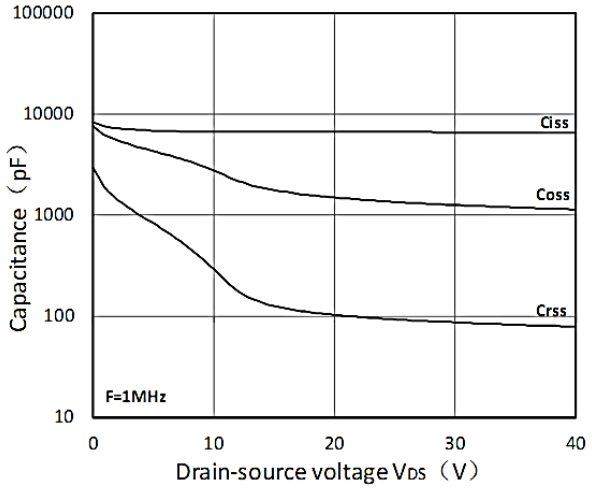


Figure 7. Capacitance Characteristics

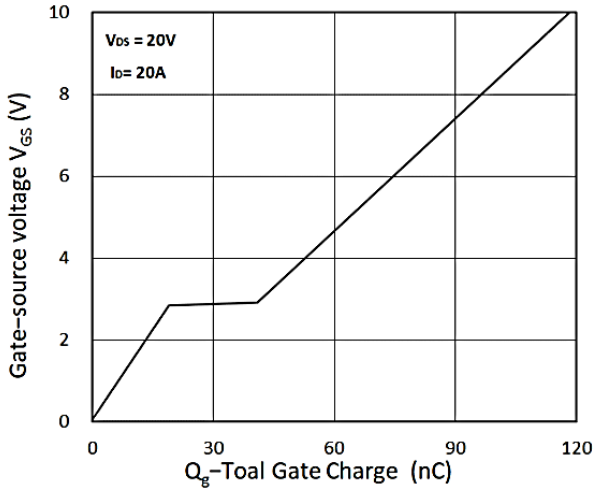


Figure 8. Gate Charge Characteristics

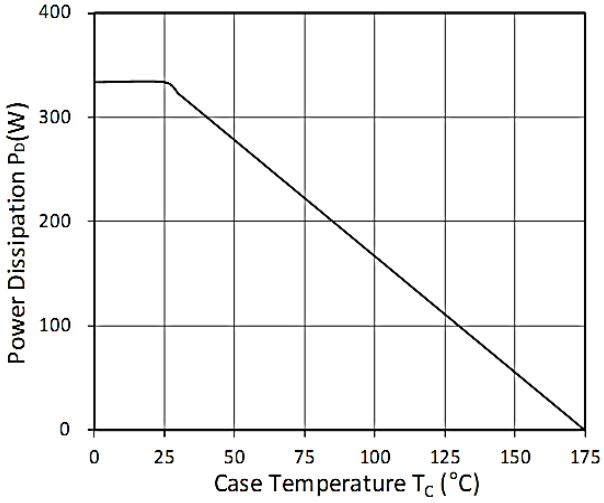


Figure 9. Power Dissipation

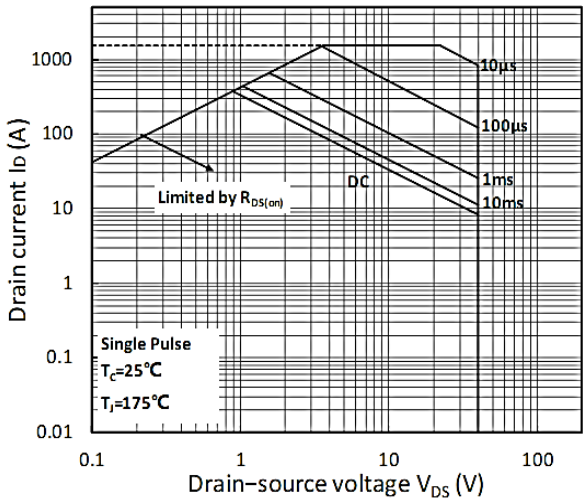


Figure10. Safe Operating Area

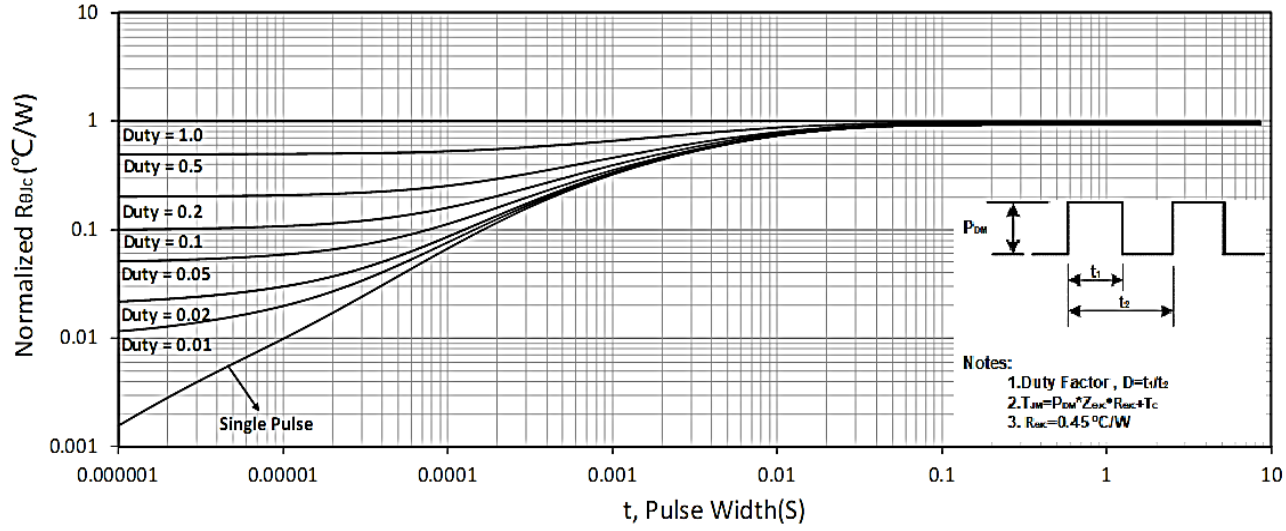
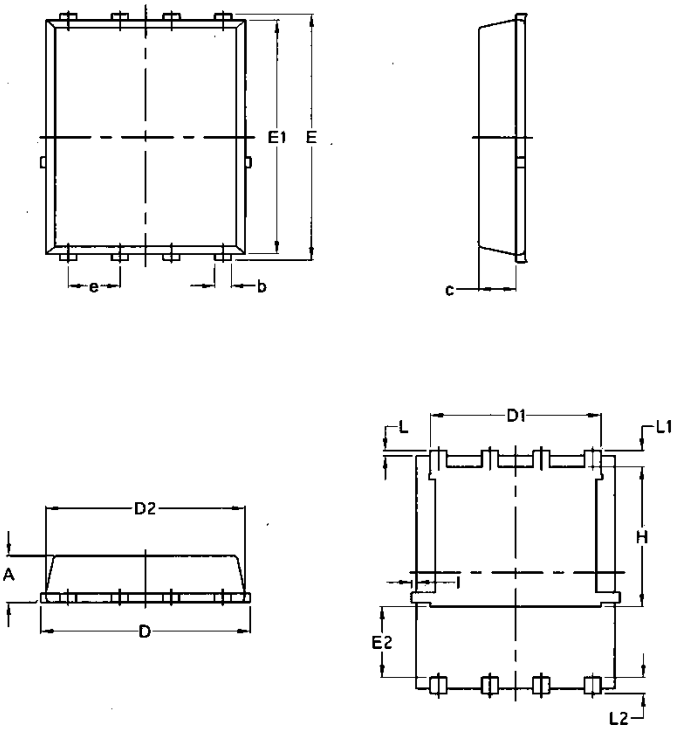


Figure 11 Normalized Maximum Transient Thermal Impedance

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
REV1.0	2023/9/5	Initial release