

65V N-Channel Enhancement Mode MOSFET

Description

The AP180N06NF uses advanced **APM-SGT_{1.1}** technology to provide excellent $R_{DS(ON)}$, low gate charge and operation with gate voltages as low as 10V. This device is suitable for use as a Battery protection or in other Switching application.

General Features

$V_{DS} = 65V$ $I_D = 180A$

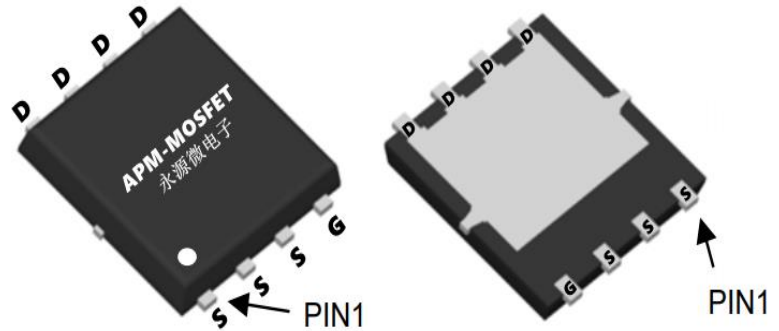
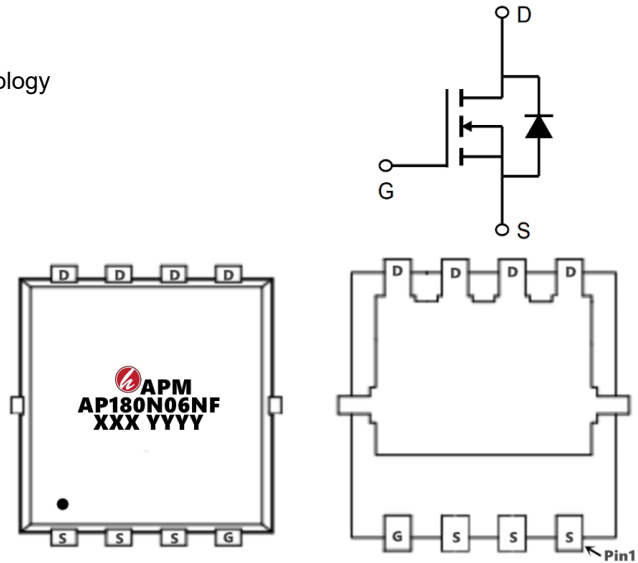
$R_{DS(ON)} < 2.2m\Omega$ @ $V_{GS}=10V$ (Type: **1.7mΩ**)

Application

Battery protection

Load switch

Uninterruptible power supply



Package Marking and Ordering Information

Product ID	Pack	Marking	Qty(PCS)
AP65N06NF	DFN5*6-8L	AP65N06NF XXX YYYY	5000

Absolute Maximum Ratings ($T_C=25^\circ\text{C}$ unless otherwise noted)

Symbol	Parameter	Value	Unit
V_{DS}	Drain source voltage	65	V
V_{GS}	Gate source voltage	± 20	V
$I_D@T_A=25^\circ\text{C}$	Continuous drain current	180	A
$I_D@T_A=70^\circ\text{C}$	Continuous drain current	110	A
I_{DM}	Pulsed drain current	700	A
$P_D@T_A=25^\circ\text{C}$	Power dissipation	114	W
EAS	Single pulsed avalanche energy	353	mJ
TSTG	Storage Temperature Range	-55 to 150	$^\circ\text{C}$
T_j	Operation and storage temperature	-55 to 150	$^\circ\text{C}$
$R_{\theta JC}$	Thermal resistance, junction-case	1.1	$^\circ\text{C/W}$
$R_{\theta JA}$	Thermal resistance, junction-ambient5)	25	$^\circ\text{C/W}$

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Electrical Characteristics (T_J=25°C, unless otherwise noted)

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
V(BR)DSS	Drain-Source Breakdown Voltage	V _{GS} = 0V, I _D = 250μA	65	71	-	V
IGSS	Gate-body Leakage Current	V _{DS} = 0V, V _{GS} = ±20V	-	-	±100	nA
IDSS T _J =25°C	Zero Gate Voltage Drain Current	V _{DS} = 60V, V _{GS} = 0V	-	-	1	μA
IDSS T _J =100°C			-	-	100	
VGS(th)	Gate-Threshold Voltage	V _{DS} = V _{GS} , I _D = 250μA	2.0	2.8	4.0	V
RDS(on)	Drain-Source On-Resistance ⁴	V _{GS} = 10V, I _D = 20A	-	1.7	2.2	mΩ
gfs	Forward Transconductance ⁴	V _{DS} = 10V, I _D = 20A	-	89	-	S
Ciss	Input Capacitance	V _{DS} = 30V, V _{GS} = 0V, f = 1MHz	-	4150	-	pF
Coss	Output Capacitance		-	1075	-	
Crss	Reverse Transfer Capacitance		-	33	-	
RG	Gate Resistance	f = 1MHz	-	2.2	-	Ω
Qg	Total Gate Charge	V _{GS} = 10V, V _{DS} = 30V, I _D = 20A	-	69	-	nC
Qgs	Gate-Source Charge		-	17.2	-	
Qgd	Gate-Drain Charge		-	21	-	
td(on)	Turn-on Delay Time	V _{GS} = 10V, V _{DD} = 30V, = 3Ω, I _D = 20A	-	17.5	-	ns
t _r	Rise Time		-	18.1	-	
td(off)	Turn-off Delay Time		-	42	-	
t _f	Fall Time		-	22	-	
trr	Body Diode Reverse Recovery Time	I _F = 20A, dI/dt = 100A/μs	-	57	-	ns
Qrr	Body Diode Reverse Recovery Charge		-	67.9	-	nC
VSD	Diode Forward Voltage ⁴	I _S = 20A, V _{GS} = 0V	-	-	1.2	V
IS	Continuous Source Current T _C =25°C		-	-	180	A

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=38A
- 4、The power dissipation is limited by 150°C junction temperature
- 5、The data is theoretically the same as ID and IDM , in real applications , should be limited by total power dissipation

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Typical Characteristics

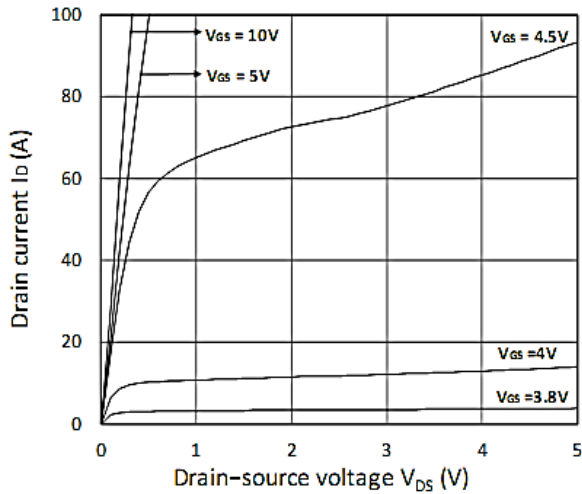


Figure 1. Output Characteristics

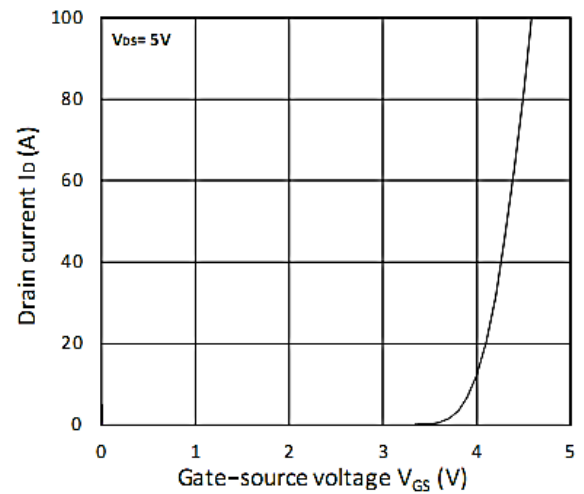


Figure 2. Transfer Characteristics

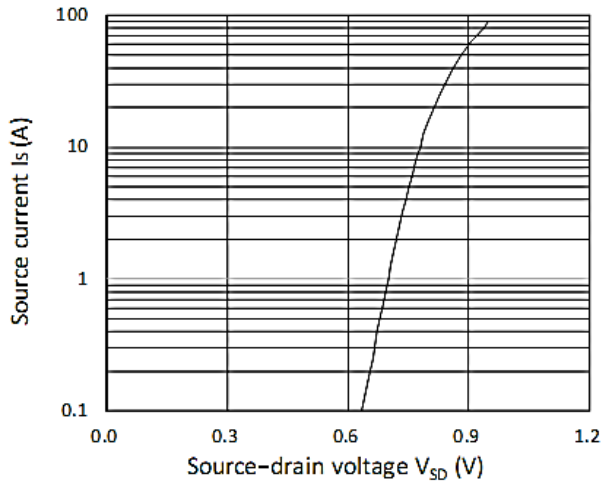


Figure 3. Forward Characteristics of Reverse

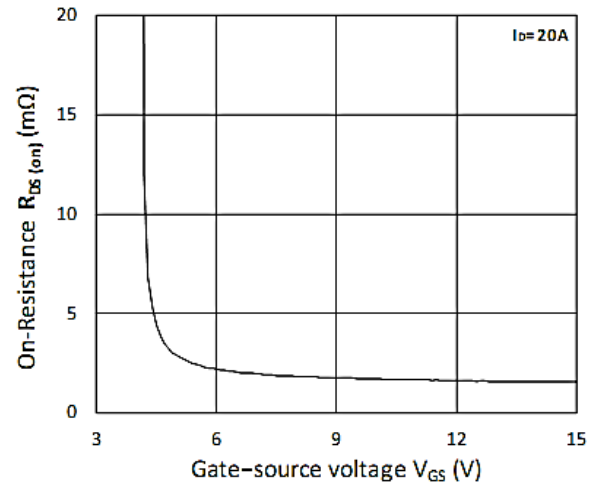


Figure 4. R_DS(ON) vs. V_GS

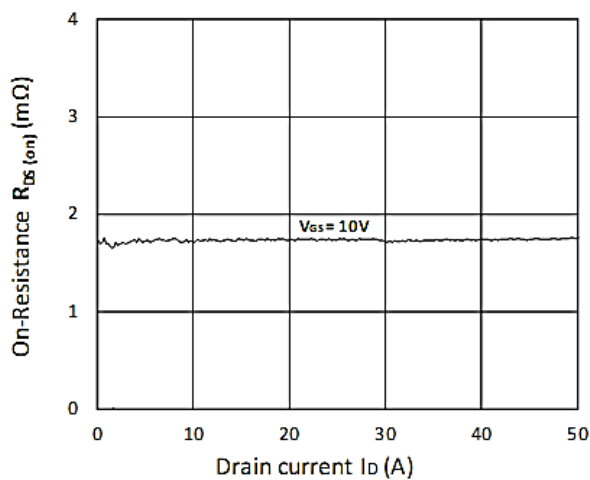


Figure 5. R_DS(ON) vs. I_D

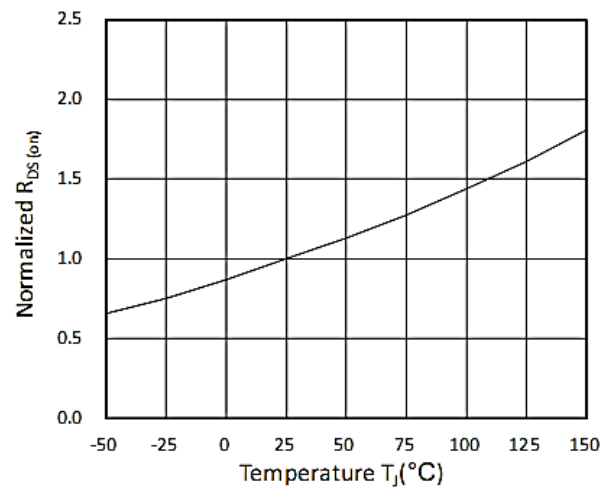
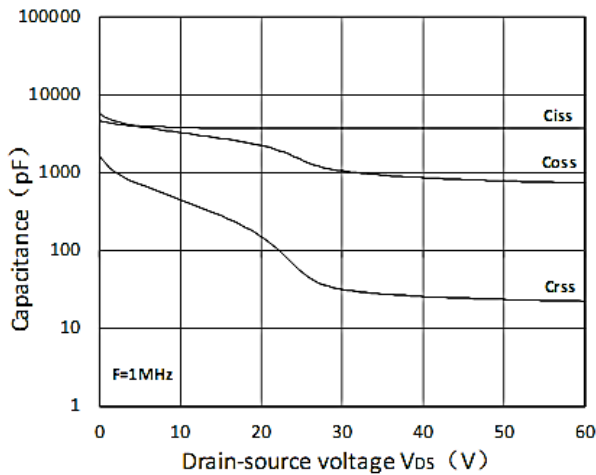
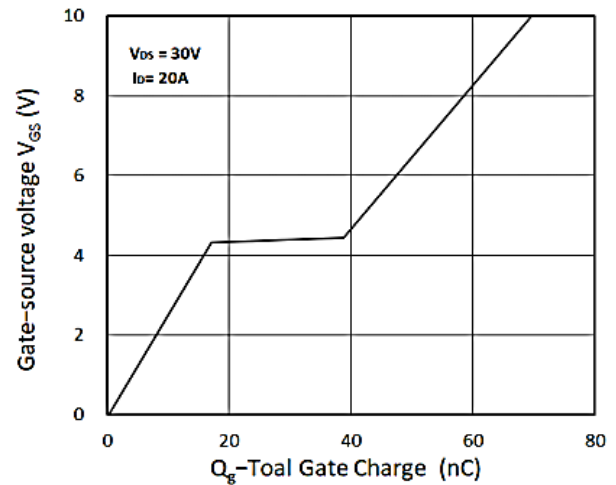
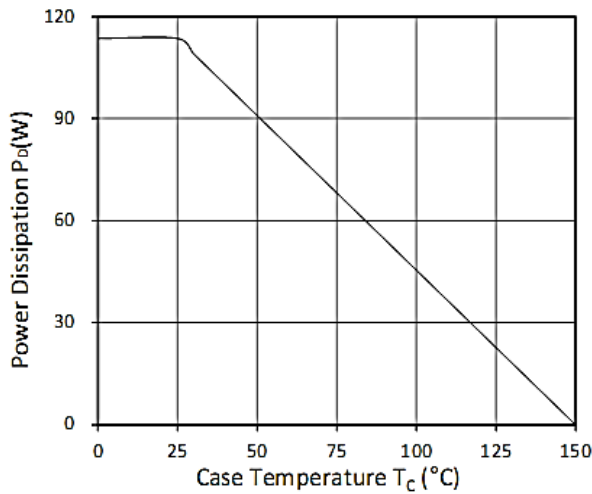
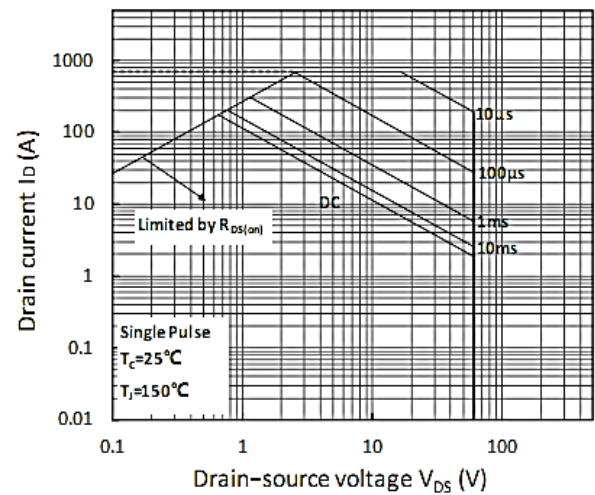
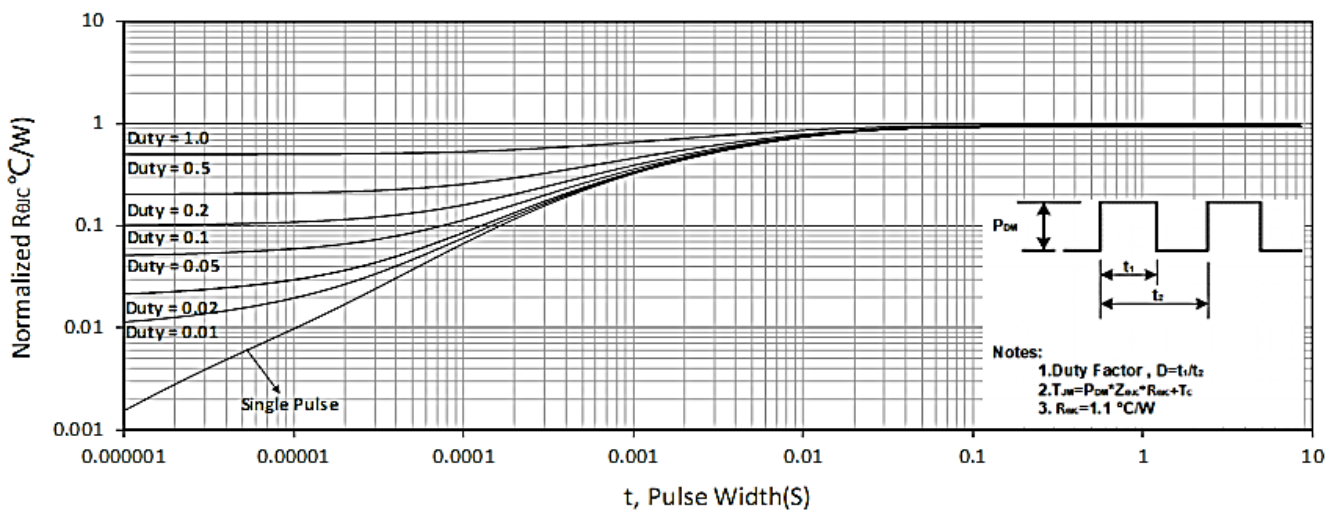
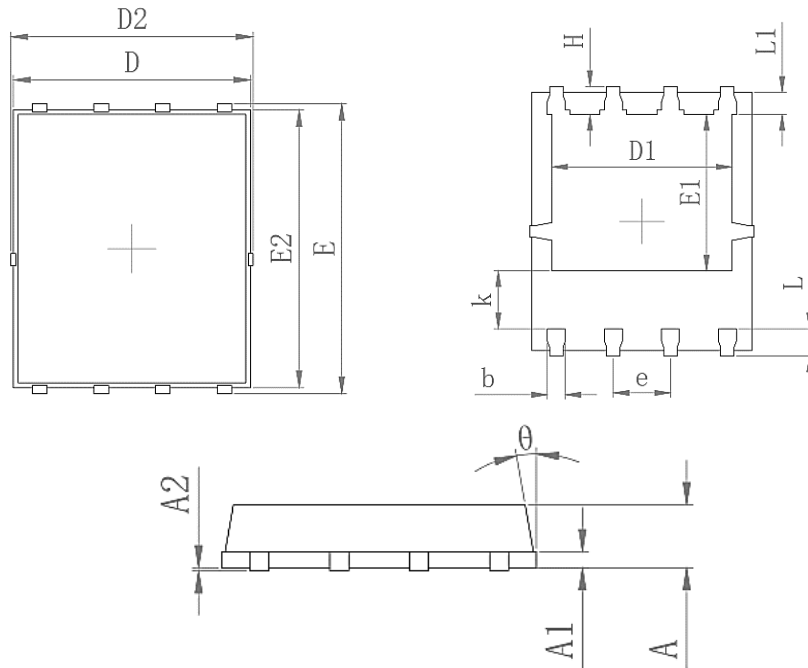


Figure 6. Normalized R_DS(on) vs. Temperature

**65V N-Channel Enhancement Mode MOSFET****Figure 7. Capacitance Characteristics****Figure 8. Gate Charge Characteristics****Figure 9. Power Dissipation****Figure 10. Safe Operating Area****Figure 11. Normalized Maximum Transient Thermal Impedance**

Package Mechanical Data-PDFN5X6-8L-XZT Single



Symbol	Common	
	mm	
	Mim	Max
A	0.90	1.10
A1	0.254 REF	
A2	0-0.05	
D	4.824	4.976
D1	3.910	4.110
D2	4.944	5.076
E	5.924	6.076
E1	3.375	3.575
E2	5.674	5.826
b	0.350	0.450
e	1.270	
L	0.534	0.686
L1	0.424	0.576
K	1.190	1.390
H	0.549	0.701
Φ	8°	12°

65V N-Channel Enhancement Mode MOSFET**Attention**

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Edition	Date	Change
REV1.0	2023/6/1	Initial release

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