

65V N-Channel Enhancement Mode MOSFET

Description

The AP200N06NF uses advanced **SGT II** 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

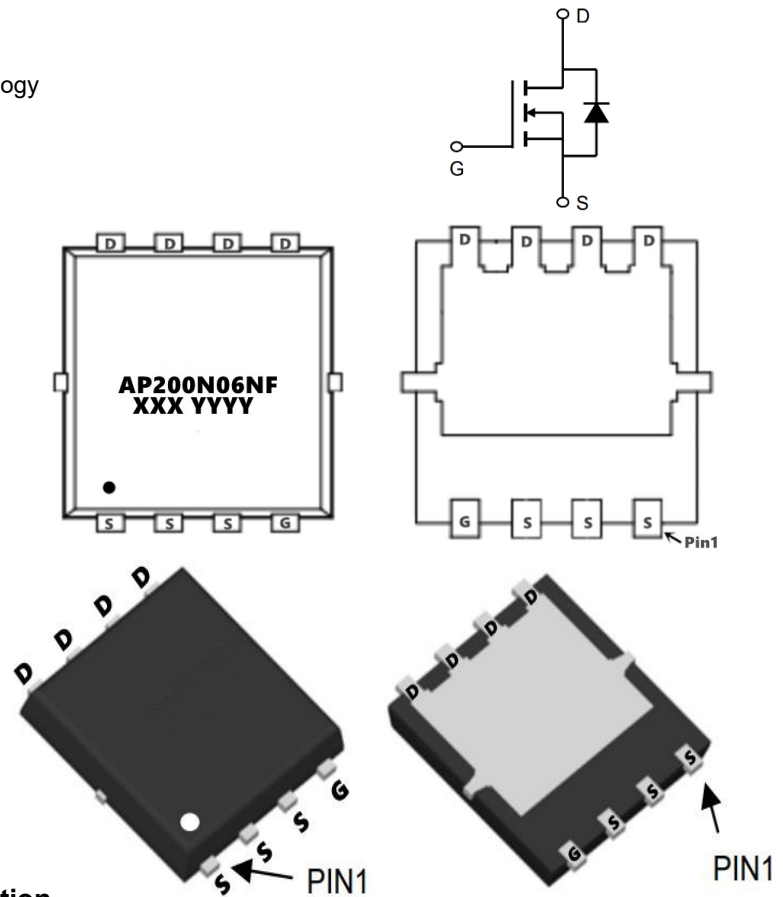
$V_{DS} = 65V$ $I_D = 200A$

$R_{DS(ON)} < 1.3m\Omega$ @ $V_{GS}=10V$ (**Type: 1.0mΩ**)

Application

Battery protection

UPS



Package Marking and Ordering Information

Product ID	Pack	Marking	Qty(PCS)
AP200N06NF	PDFN5X6-8L	AP200N06NF XXX YYYY	5000

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

Symbol	Parameter	Rating	Units
V_{DS}	Drain-Source Voltage	65	V
V_{GS}	Gate-Source Voltage	± 20	V
$I_D@T_C=25^\circ\text{C}$	Continuous Drain Current ^{1,6}	200	A
$I_D@T_C=100^\circ\text{C}$	Continuous Drain Current ^{1,6}	158	A
I_{DM}	Pulsed Drain Current ²	1340	A
E_{AS}	Single Pulse Avalanche Energy ³	580	mJ
I_{AS}	Avalanche Current	47	A
$P_D@T_C=25^\circ\text{C}$	Total Power Dissipation ⁴	231	W
T_{STG}	Storage Temperature Range	-55 to 150	$^\circ\text{C}$
T_J	Operating Junction Temperature Range	-55 to 150	$^\circ\text{C}$
$R_{\theta JA}$	Thermal Resistance Junction-Ambient ¹	55	$^\circ\text{C/W}$
$R_{\theta JC}$	Thermal Resistance Junction-Case ¹	0.65	$^\circ\text{C/W}$

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

Symbol	Parameter	Test Conditions	Min	Type	Max	Unit
V(BR)DSS	Drain-Source Breakdown Voltage	V _{GS} = 0V, I _D = 250μA	65	72	-	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	Zero Gate Voltage Drain Current		-	-	100	
VGS(th)	Gate-Threshold Voltage	V _{DS} = V _{GS} , I _D = 250μA	2.0	2.9	4.0	V
RDS(on)	Drain-Source On-Resistance ⁴	V _{GS} = 10V, I _D = 20A	-	1.0	1.3	mΩ
gfs	Forward Transconductance ⁴	V _{DS} = 5V, I _D = 20A	-	97	-	S
Ciss	Input Capacitance	V _{DS} = 30V, V _{GS} = 0V, f = 1MHz	-	7312	-	pF
Coss	Output Capacitance		-	2239	-	
Crss	Reverse Transfer Capacitance		-	53	-	
RG	Gate Resistance	f = 1MHz	-	3.0	-	Ω
Q _g	Total Gate Charge	V _{GS} = 10V, V _{DS} = 30V, I _D = 20A	-	102	-	nC
Q _{gs}	Gate-Source Charge		-	25	-	
Q _{gd}	Gate-Drain Charge		-	15.8	-	
td(on)	Turn-on Delay Time	V _{GS} = 10V, V _{DD} = 30V, R _G = 3Ω, I _D = 20A	-	24	-	ns
t _r	Rise Time		-	71	-	
td(off)	Turn-off Delay Time		-	129	-	
t _f	Fall Time		-	92	-	
trr	Body Diode Reverse Recovery Time	I _F = 20A, dI/dt = 100A/μs	-	86	-	ns
Qrr	Body Diode Reverse Recovery Charge		-	61	-	nC
VSD	Diode Forward Voltage ⁴	I _S = 20A, V _{GS} = 0V	-	-	1.2	V
IS	Continuous Source Current T _C =25°C		-	-	300	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 .The EAS data shows Max. rating .
- 3、The power dissipation is limited by 175°C junction temperature
- 4、EAS condition: T_J=25°C, V_{DD}=48V, V_G=10V, R_G=25Ω, L=0.1mH, I_{AS}= 55A
- 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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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	72	-	V
IGSS	Gate-body Leakage current	V _{DS} = 0V, V _{GS} = ±20V	-	-	±100	nA
IDSS	Zero Gate Voltage Drain Current T _J =25°C	V _{DS} = 60V, V _{GS} = 0V	-	-	1	μA
	Zero Gate Voltage Drain Current T _J =100°C		-	-	100	
VGS(th)	Gate-Threshold Voltage	V _{DS} = V _{GS} , I _D = 250μA	2	2.9	4	V
RDS(on)	Drain-Source on-Resistance ⁴	V _{GS} = 10V, I _D = 20A	-	1.0	1.3	mΩ
gfs	Forward Transconductance ⁴	V _{DS} =10V, I _D =20A	-	62	-	S
Ciss	Input Capacitance	V _{DS} = 30V, V _{GS} = 0V, f = 1MHz	-	5990	-	pF
Coss	Output Capacitance		-	2257	-	
Crss	Reverse Transfer Capacitance		-	86	-	
R _g	Gate Resistance	f = 1MHz	-	2.6	-	Ω
Q _g	Total Gate Charge	V _{GS} = 10V, V _{DS} = 30V, I _D =20A	-	102	-	nC
Q _{gs}	Gate-Source Charge		-	24.6	-	
Q _{gd}	Gate-Drain Charge		-	28.2	-	
td(on)	Turn-on Delay Time	V _{GS} = 10V, V _{DD} = 30V, R _G = 3Ω, I _D = 20A	-	15.6	-	ns
t _r	Rise Time		-	29	-	
td(off)	Turn-off Delay Time		-	63	-	
t _f	Fall Time		-	51	-	
trr	Body Diode Reverse Recovery Time	I _F = 20A, dI/dt=100A/μs	-	80	-	ns
Q _{rr}	Body Diode Reverse Recovery Charge		-	114	-	nC
VSD	Diode Forward Voltage ⁴	I _S = 20A, V _{GS} = 0V	-	-	1.2	V
IS	Continuous Source Current	T _C =25°C	-	-	378	A

Note :

- 1、The data tested by surface mounted on a 1 inch 2 FR-4 board with 20Z copper.
- 2、The data tested by pulsed , pulse width .The EAS data shows Max. rating .
- 3、The power dissipation is limited by 175°C junction temperature
- 4、EAS condition: T_J=25°C, V_{DD}=48V, V_G=10V, R_G=25Ω, L=0.1mH, I_{AS}= 55A
- 5、The data is theoretically the same as ID and IDM , in real applications , should be limited by total power dissipation.

Typical Characteristics

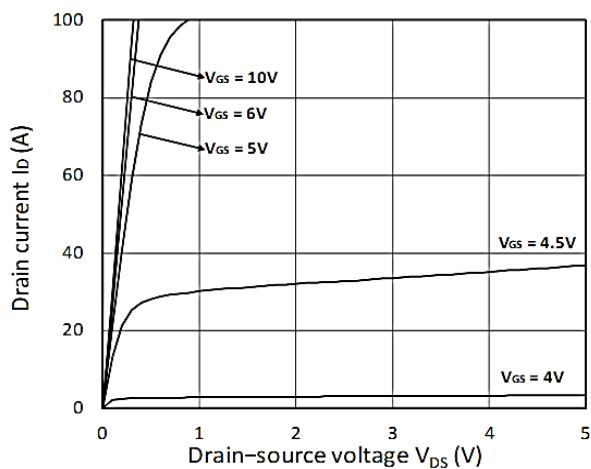


Figure 1. Output Characteristics

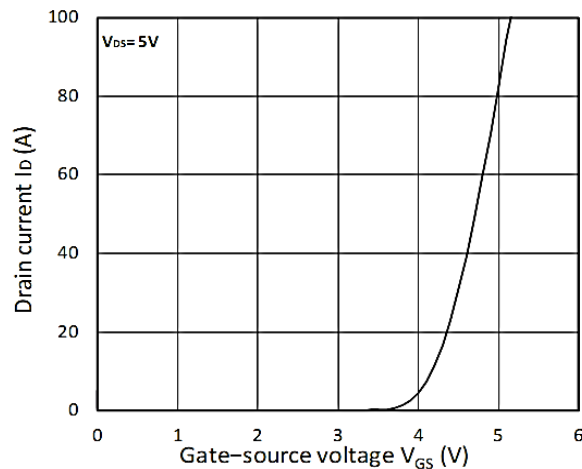


Figure 2. Transfer Characteristics

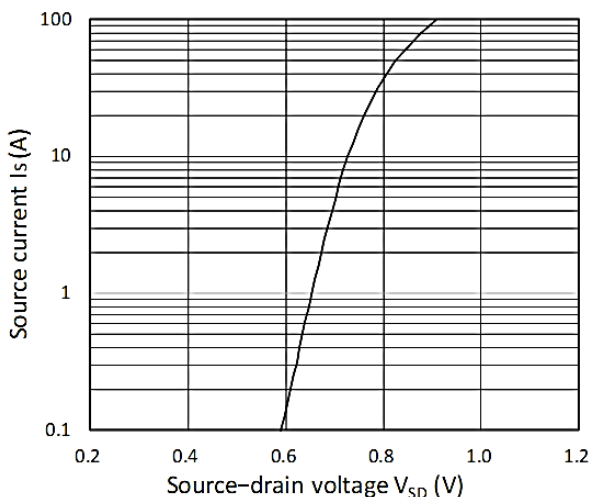


Figure 3. Forward Characteristics of Reverse

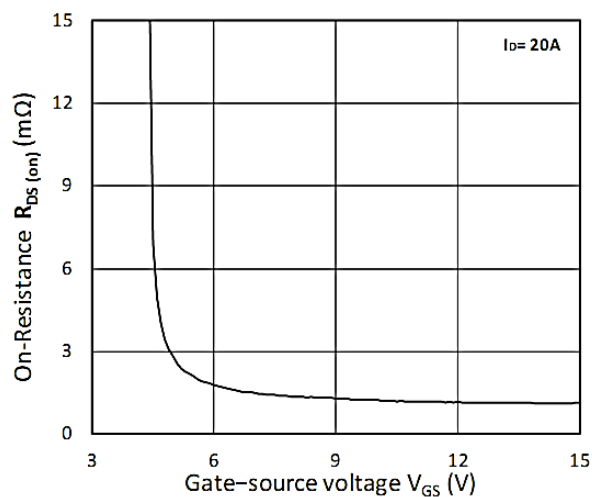


Figure 4. R_DS(ON) vs. V_GS

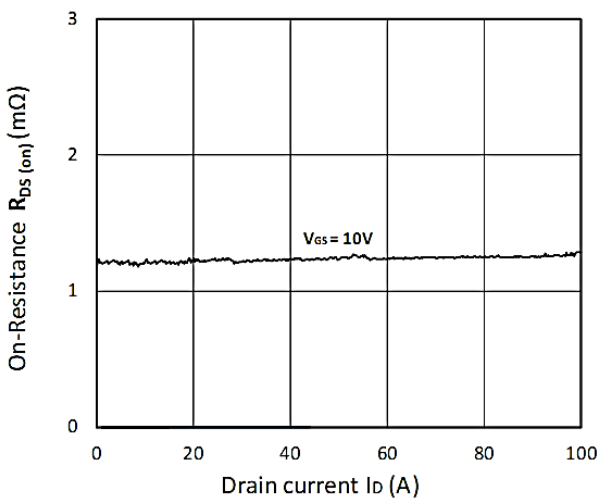


Figure 5. R_DS(ON) vs. I_D

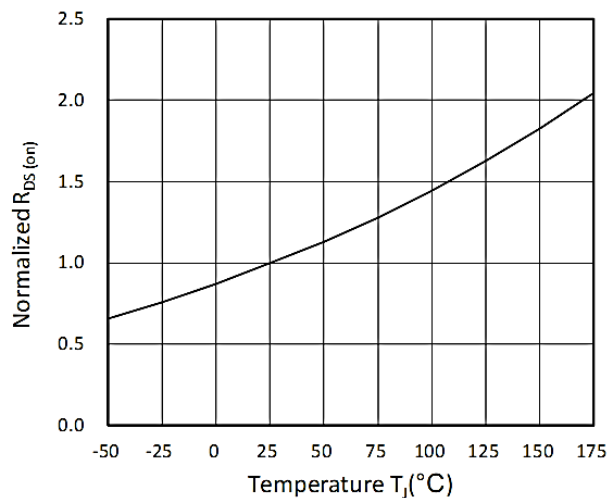


Figure 6. Normalized R_DS(on) vs. Temperature

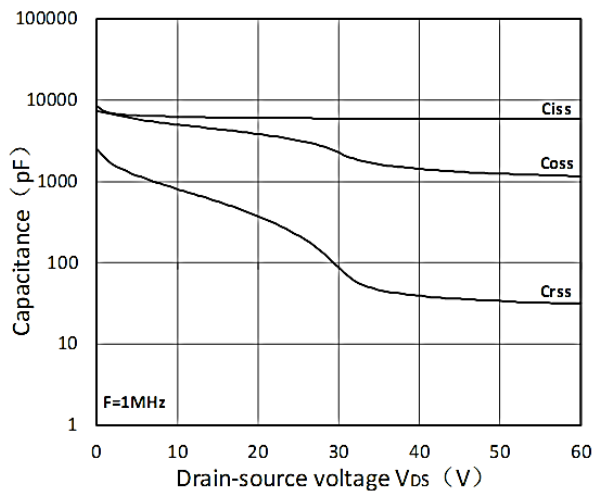


Figure 7. Capacitance Characteristics

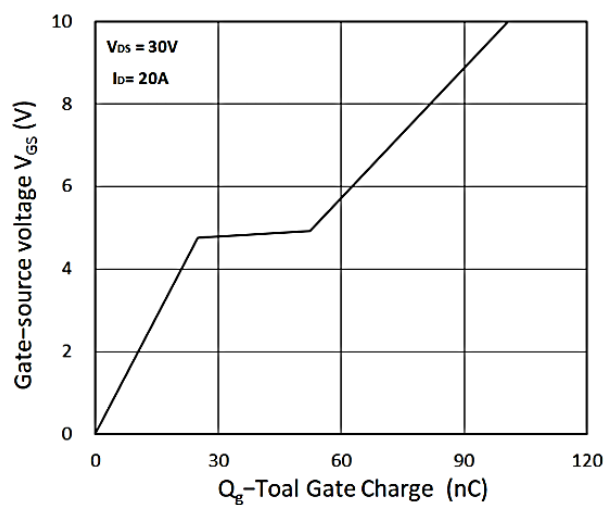


Figure 8. Gate Charge Characteristics

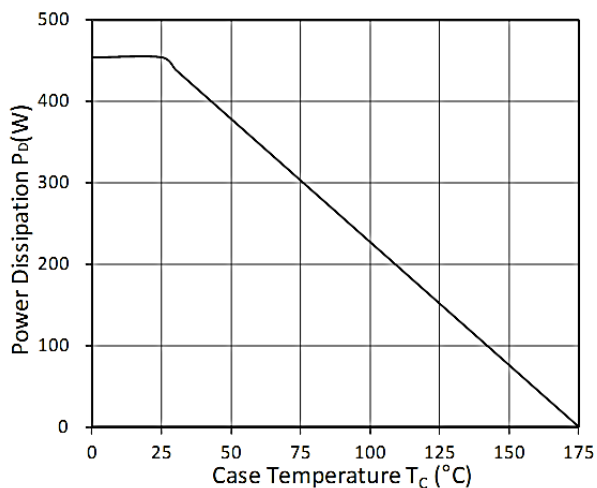


Figure 9. Power Dissipation

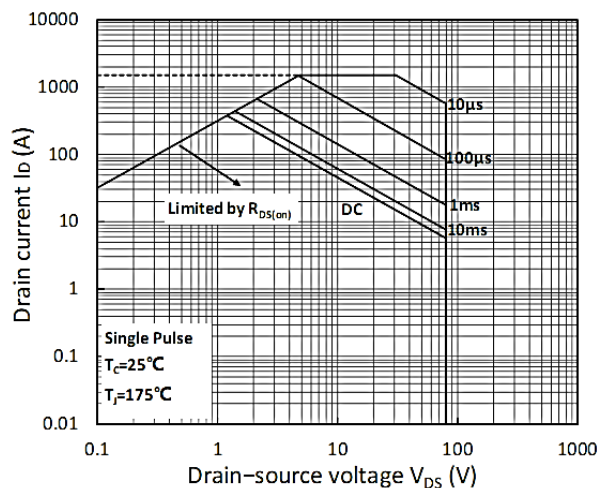


Figure 10. Safe Operating Area

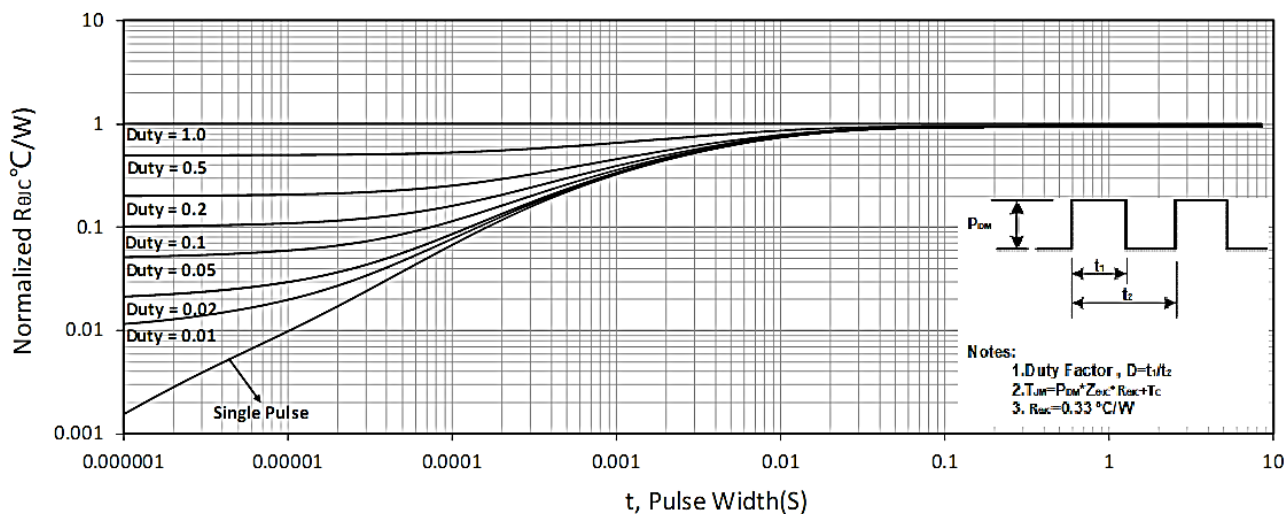
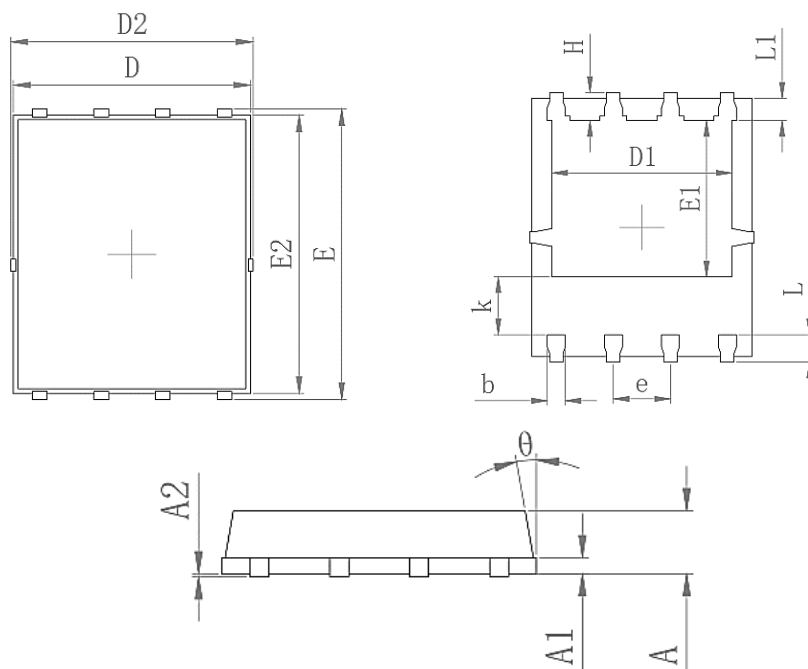


Figure 11. Normalized Maximum Transient Thermal Impedance

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°