

-60V P-Channel Enhancement Mode MOSFET

Description

The AP80P06NF uses advanced trench technology to provide excellent $R_{DS(ON)}$, low gate charge and operation with gate voltages as low as 6V. This device is suitable for use as a Battery protection or in other Switching application.

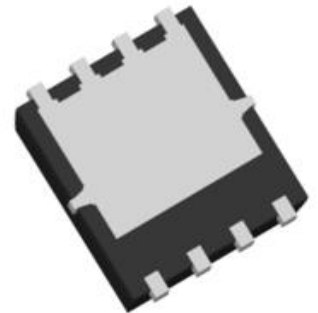
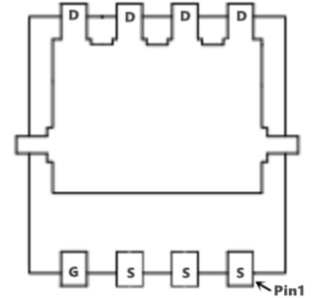
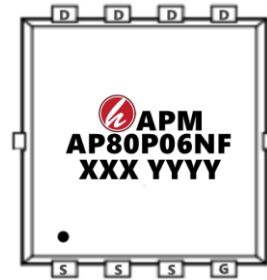
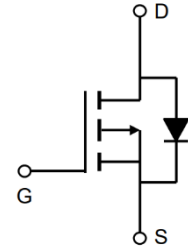
General Features

$V_{DS} = -60V$ $I_D = -80A$

$R_{DS(ON)} < 11m\Omega$ @ $V_{GS} = -10V$ (Type: 9m Ω)

Application

- Lithium battery protection
- Wireless impact
- Mobile phone fast charging



Package Marking and Ordering Information

Product ID	Pack	Marking	Qty(PCS)
AP80P06NF	PDFN5*6-8L	AP80P06NF XXX YYYY	5000

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

Symbol	Parameter	Rating	Units
V_{DS}	Drain-Source Voltage	-60	V
V_{GS}	Gate-Source Voltage	± 20	V
$I_D @ T_C = 25^\circ\text{C}$	Continuous Drain Current, $-V_{GS} @ -10V^1$	-80	A
$I_D @ T_C = 100^\circ\text{C}$	Continuous Drain Current, $-V_{GS} @ -10V^1$	-38	A
I_{DM}	Pulsed Drain Current ²	-240	A
EAS	Single Pulse Avalanche Energy ³	400	mJ
I_{AS}	Avalanche Current	41	A
$P_D @ T_C = 25^\circ\text{C}$	Total Power Dissipation ⁴	104	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	1.2	$^\circ\text{C/W}$
$R_{\theta JC}$	Thermal Resistance Junction-Case ¹	70	$^\circ\text{C/W}$

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Electrical Characteristics (T_C=25°C unless otherwise noted)

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
BVDSS	Drain-Source Breakdown Voltage	V _{GS} =0V, I _D =-250uA	-60	-68	---	V
ΔBVDSS/ΔT _J	BV _{DSS} Temperature Coefficient	Reference to 25°C, I _D =-1mA	---	-0.035	---	V/°C
RDS(ON)	Static Drain-Source On-Resistance ²	V _{GS} =-10V, I _D =-20A	---	9.0	11	mΩ
		V _{GS} =-4.5V, I _D =-15A	---	12	16	
VGS(th)	Gate Threshold Voltage	V _{GS} =V _{DS} , I _D =-250uA	-1.2	-1.8	-2.5	V
ΔVGS(th)	VGS(th) Temperature Coefficient		---	4.28	---	mV/°C
IDSS	Drain-Source Leakage Current	V _{DS} =-60V, V _{GS} =0V, T _J =25°C	---	---	1	uA
		V _{DS} =-60V, V _{GS} =0V, T _J =55°C	---	---	5	
IGSS	Gate-Source Leakage Current	V _{GS} =±20V, V _{DS} =0V	---	---	±100	nA
gfs	Forward Transconductance	V _{DS} =-5V, I _D =-20A	---	50	---	S
R _g	Gate Resistance	V _{DS} =0V, V _{GS} =0V, f=1MHz	---	2.0	---	Ω
Q _g	Total Gate Charge (-4.5V)	V _{DS} =-30V, V _{GS} =-10V, I _D =-20A	---	56	---	nC
Q _{gs}	Gate-Source Charge		---	11	---	
Q _{gd}	Gate-Drain Charge		---	9	---	
Td(on)	Turn-On Delay Time	V _{DD} =-30V, V _{GS} =-10V, R _G =3Ω, I _D =-20A	---	4.5	---	ns
T _r	Rise Time		---	2.5	---	
Td(off)	Turn-Off Delay Time		---	14.5	---	
T _f	Fall Time		---	3.8	---	
C _{iss}	Input Capacitance	V _{DS} =-15V, V _{GS} =0V, f=1MHz	---	3500	---	pF
C _{oss}	Output Capacitance		---	600	---	
Cr _{ss}	Reverse Transfer Capacitance		---	25	---	
I _s	Continuous Source Current ^{1,5}	V _G =V _D =0V, Force Current	---	---	-80	A
ISM	Pulsed Source Current ^{2,5}		---	---	-240	A
VSD	Diode Forward Voltage ²	V _{GS} =0V, I _S =-1A, T _J =25°C	---	---	-1.2	V

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 ≦ 300us , duty cycle ≦ 2%
- 3、 The EAS data shows Max. rating . The test condition is VDD =-48V,VGS =-10V,L=0.1mH,IAS =-41A
- 4、 The power dissipation is limited by 150°C 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

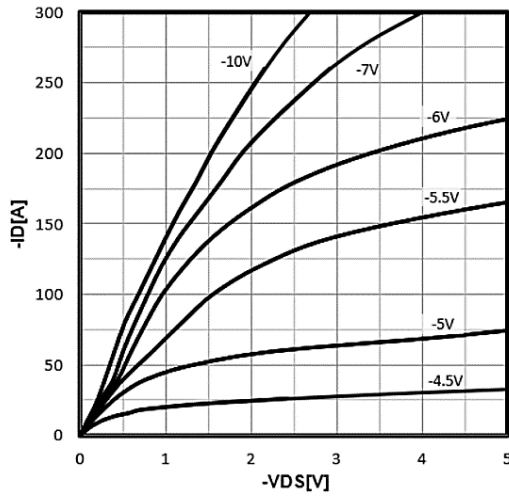


Figure 1. Type. Output Characteristics ($T_j=25^\circ\text{C}$)

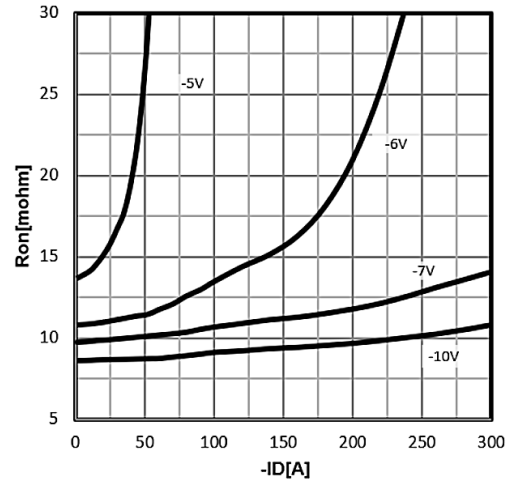


Figure 2. Type. drain-source on resistance

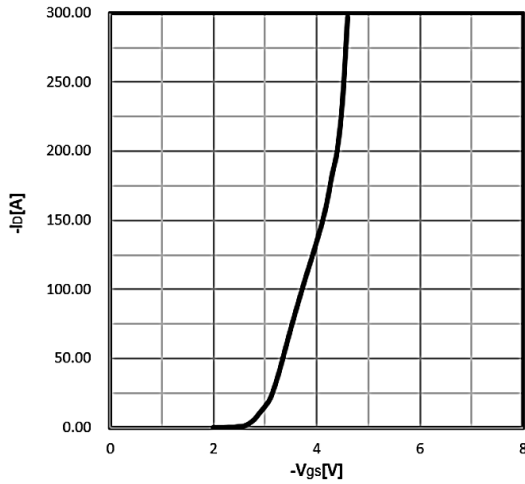


Figure 3. Type. transfer characteristics

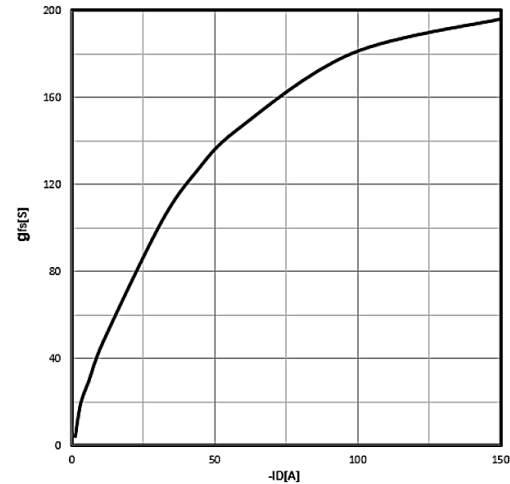


Figure 4. Type. forward transconductance

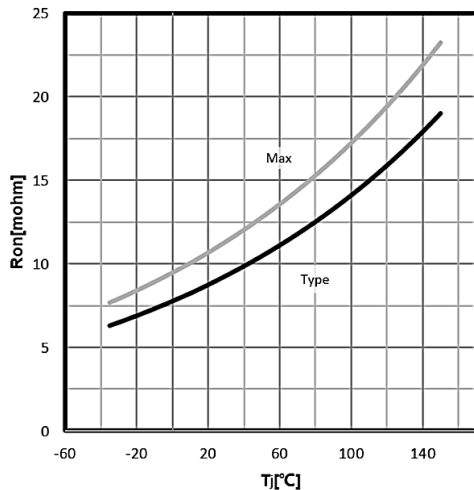


Figure 5. Drain-source on-state resistance $R_{DS(on)} = f(T_j)$; $I_D = 80\text{A}$; $V_{GS} = 10\text{V}$

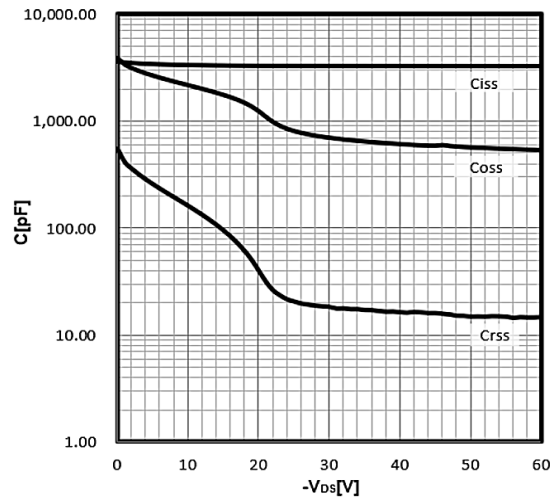


Figure 6. Body-Diode Characteristics $C = f(V_{DS})$; $V_{GS} = 0\text{V}$; $f = 1\text{MHz}$



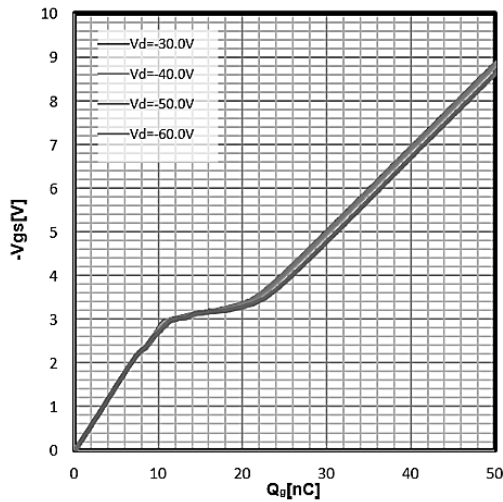


Figure 7. Typ. gate charge
 $V_{GS} = f(Q_{gate})$; $I_D = 20A$

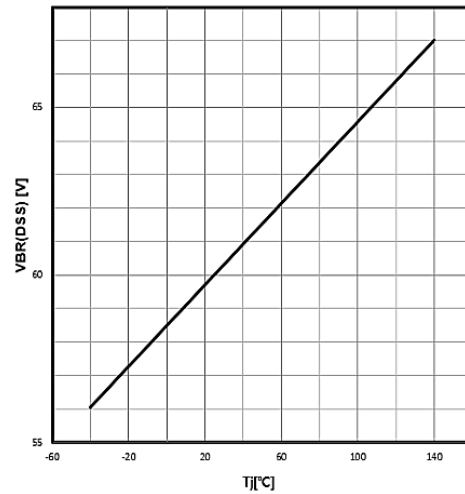


Figure 8. Drain Current Derating
 $V_{BR}(DSS) = f(T_j)$; $I_D = 250\mu A$

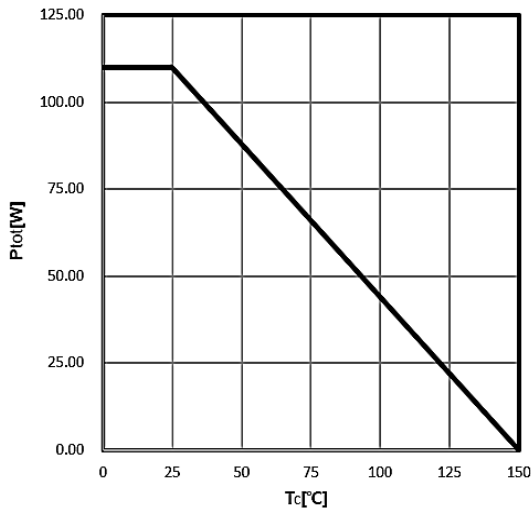


Figure 7. Power Dissipation

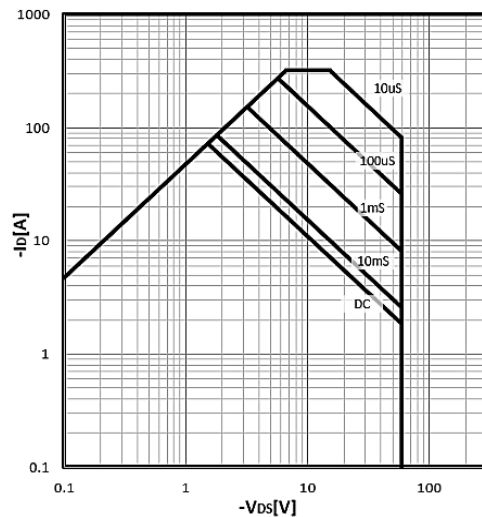


Figure 8. Safe operating area

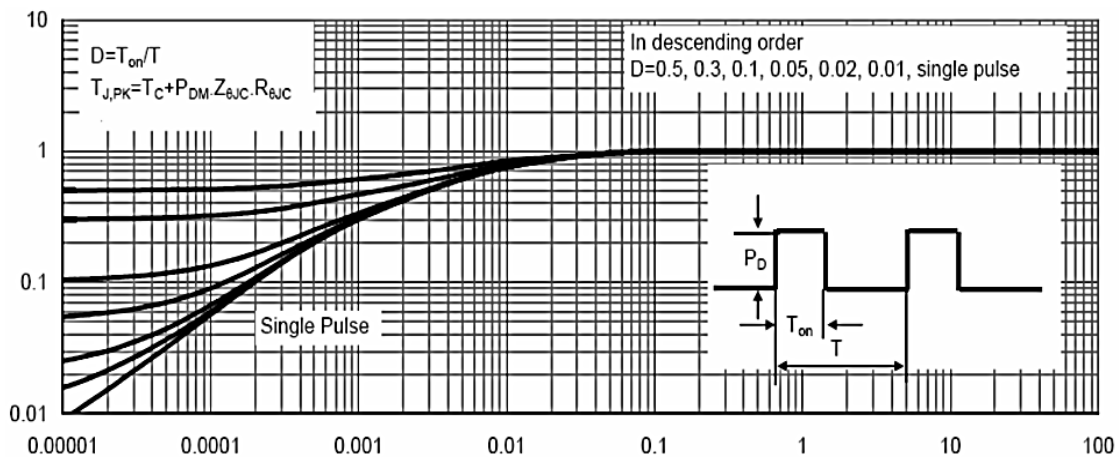
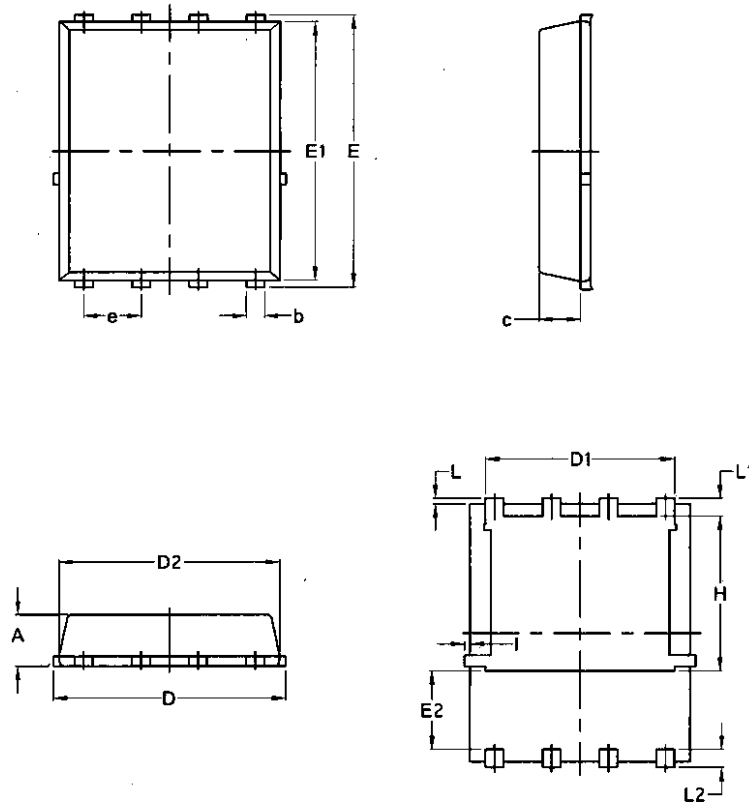


Figure 10. Max. transient thermal impedance

$Z_{thJC} = f(t_p)$

Package Mechanical Data-DFN5*6-8L-JQ Single



Symbol	Common			
	mm		Inch	
	Min	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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Rve1.0	2020/1/16	Initial release

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