

-30V P-Channel Enhancement Mode MOSFET

Description

The AP150P03NF uses advanced trench 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

$V_{DS} = -30V$ $I_D = -150A$

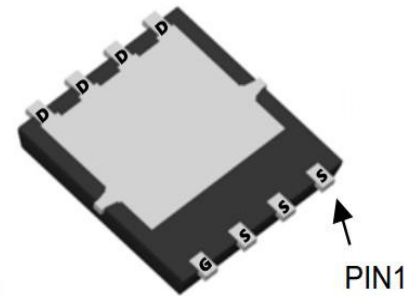
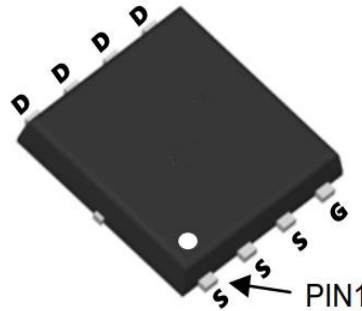
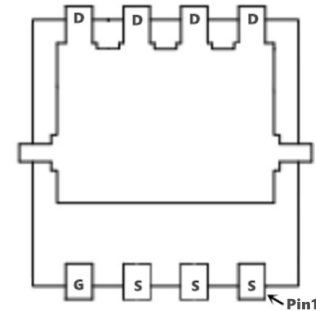
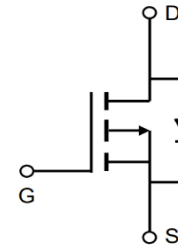
$R_{DS(ON)} < 3.2m\Omega$ @ $V_{GS} = -10V$ (Type: 2.5m Ω)

Application

Lithium battery protection

Wireless impact

Mobile phone fast charging



Package Marking and Ordering Information

Product ID	Pack	Marking	Qty(PCS)
AP150P03NF	PDFN5*6-8L	AP150P03NF XXX YYYY	5000

Absolute Maximum Ratings (TC=25°C unless otherwise noted)

Symbol	Parameter	Rating	Units
V_{DS}	Drain-Source Voltage	-30	V
V_{GS}	Gate-Source Voltage	± 20	V
$I_{D@TC=25^\circ C}$	Continuous Drain Current, $V_{GS} @ -10V$	-150	A
$I_{D@TC=100^\circ C}$	Continuous Drain Current, $V_{GS} @ -10V$	-75	A
I_{DM}	Pulsed Drain Current ²	-450	A
E_{AS}	Single Pulse Avalanche Energy ³	576	mJ
I_{AS}	Avalanche Current	-70	A
$P_{D@TC=25^\circ C}$	Total Power Dissipation ⁴	150	W
T_{STG}	Storage Temperature Range	-55 to 150	$^\circ C$
T_J	Operating Junction Temperature Range	-55 to 150	$^\circ C$
$R_{\theta JA}$	Thermal Resistance Junction-Ambient 1	25	$^\circ C/W$
$R_{\theta JC}$	Thermal Resistance Junction-Case1	1.06	$^\circ C/W$

-30V P-Channel Enhancement Mode MOSFET

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

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
BVDSS	Drain-Source Breakdown Voltage	V _{GS} =0V I _D =-250μA	-30	-35		V
IDSS	Zero Gate Voltage Drain Current	V _{DS} =-30V, V _{GS} =0V			-1	μA
IGSS	Gate-Body Leakage Current	V _{GS} =±20V, V _{DS} =0V			±100	nA
VGS(th)	Gate Threshold Voltage	V _{DS} =V _{GS} , I _D =-250μA	-1	-1.7	-2.5	V
RDS(ON)	Drain-Source On-State Resistance	V _{GS} =-10V, I _D =-20A		2.5	3.2	mΩ
		V _{GS} =-4.5V, I _D =-20A		4.0	5.2	mΩ
gFS	Forward Transconductance	V _{DS} =-5V, I _D =-20A		65		S
Ciss	Input Capacitance	V _{DS} =-15V, V _{GS} =0V, f=1.0MHz		7000		pF
Coss	Output Capacitance			820		pF
Crss	Reverse Transfer Capacitance			540		pF
Rg	Gate resistance	V _{GS} =0V, V _{DS} =0V, f=1.0MHz		2.2		Ω
td(on)	Turn-on Delay Time	V _{GS} =-10V, V _{DS} =-15V, R _L =0.75Ω, R _{GEN} =3Ω		14		nS
t _r	Turn-on Rise Time			13		nS
td(off)	Turn-Off Delay Time			65		nS
t _f	Turn-Off Fall Time			37		nS
Q _g	Total Gate Charge	V _{GS} =-10V, V _{DS} =-15V, I _D =-20A		130		nC
Q _{gs}	Gate-Source Charge			12		nC
Q _{gd}	Gate-Drain Charge			31		nC
ISD	Source-Drain Current (Body Diode)				-150	A
VSD	Forward on Voltage ^(Note 3)	V _{GS} =0V, I _S =-20A			-1.3	V
trr	Reverse Recovery Time	I _F =-20A, di/dt=100A/μs		30		ns
Q _{rr}	Reverse Recovery Charge	I _F =-20A, di/dt=100A/μs		40		nC

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 T_J =25°C, V_{DD}=-15V, V_G=-10V, R_G=25Ω, L=0.5mH, I_{AS}=-30A
- 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.

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Typical Characteristics

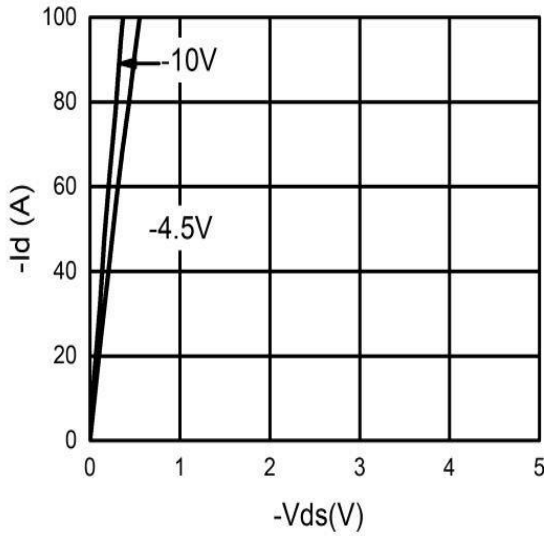


Figure 1. Output Characteristics

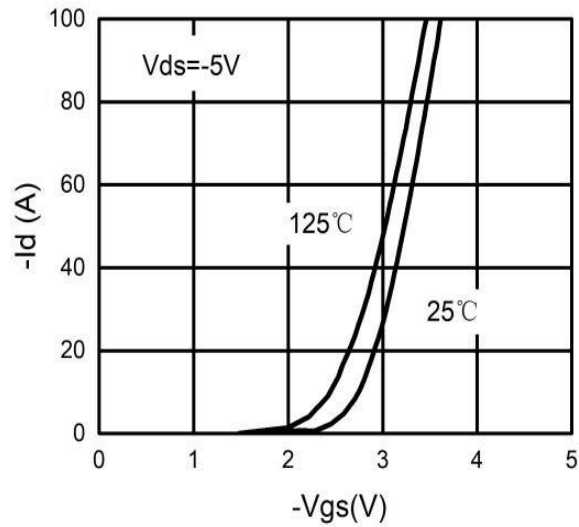


Figure 2. Transfer Characteristics

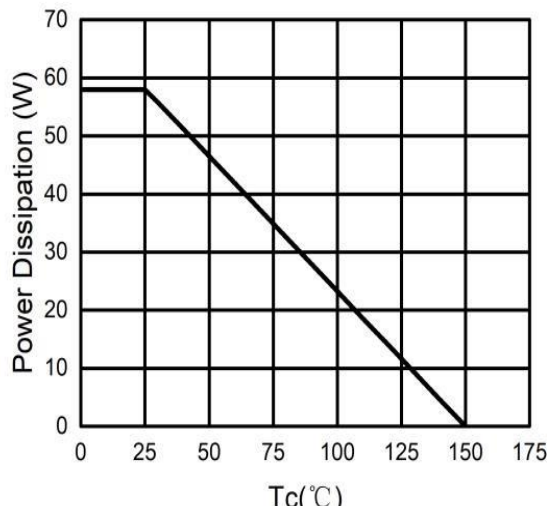


Figure 3. Power Dissipation

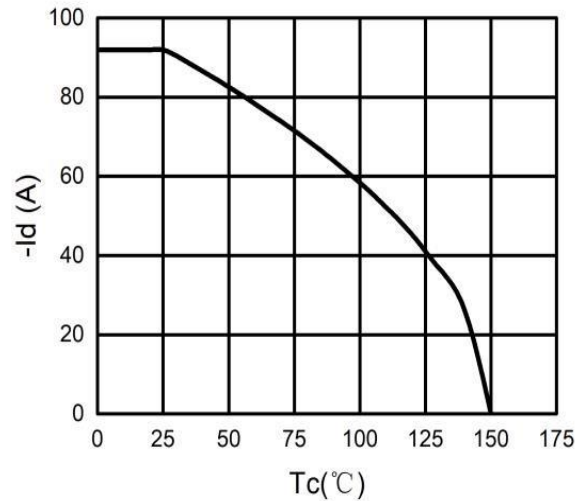


Figure 4. Drain Current

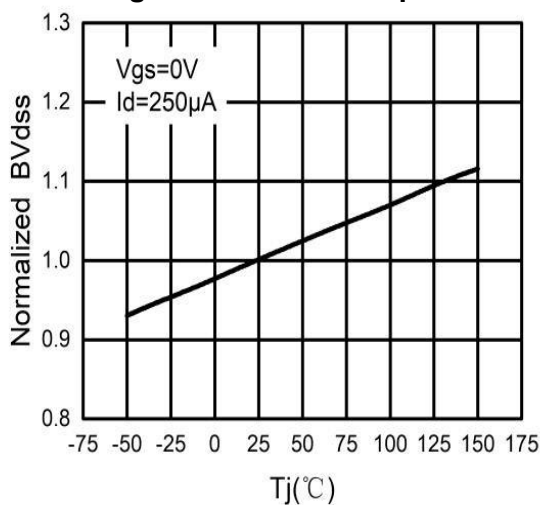


Figure 5. BV_{DSS} vs Junction Temperature

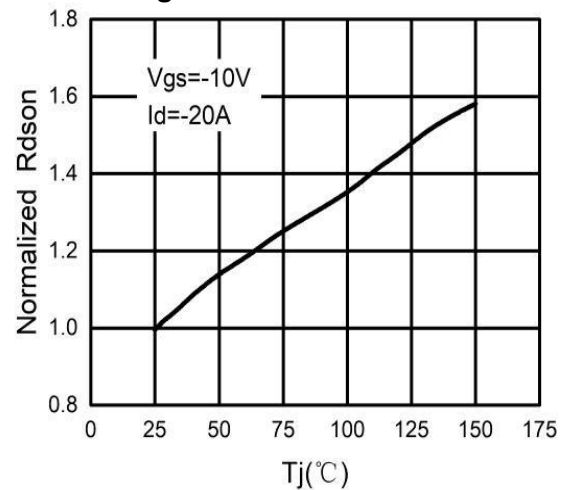


Figure 6. $R_{DS(ON)}$ vs Junction Temperature

-30V P-Channel Enhancement Mode MOSFET

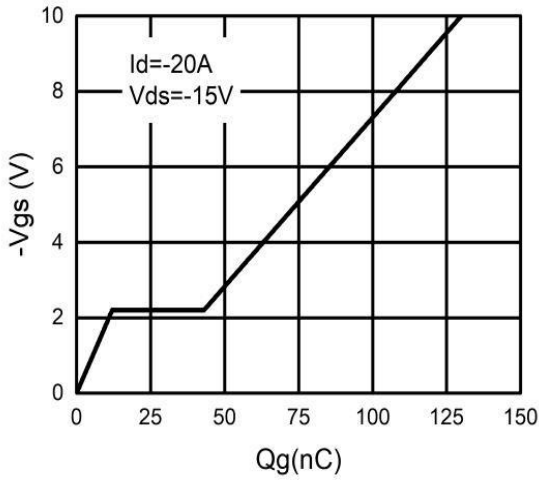


Figure 7. Gate Charge Waveforms

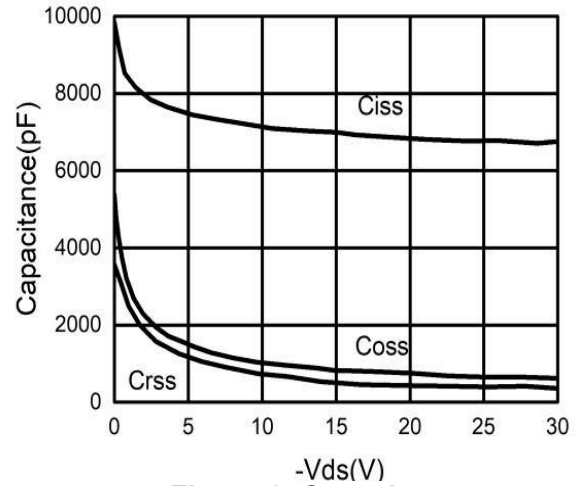


Figure 8. Capacitance

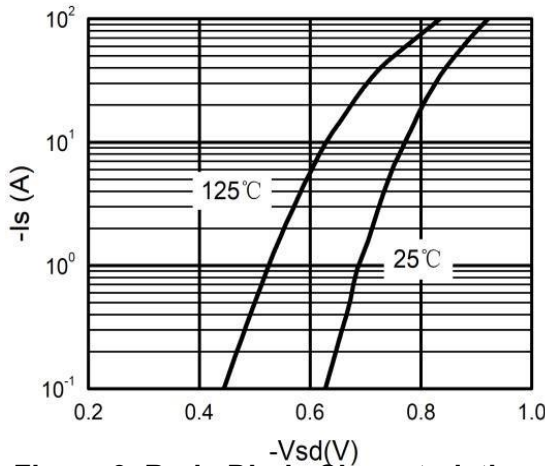


Figure 9. Body-Diode Characteristics

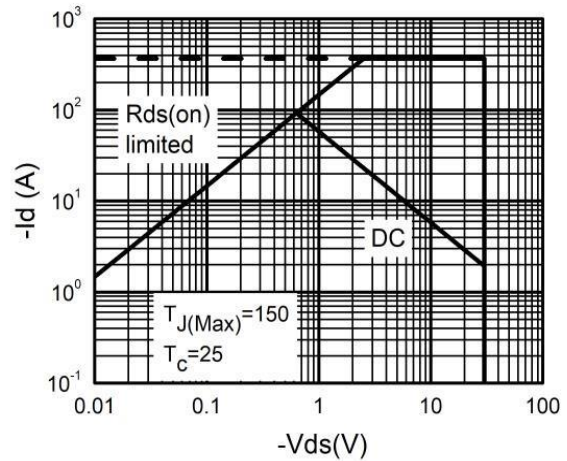


Figure 10. Maximum Safe Operating Area

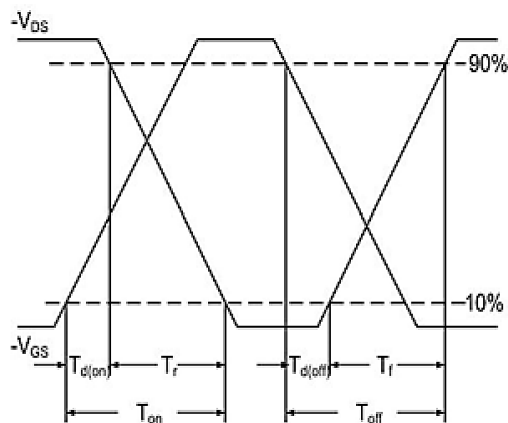


Figure.11 Switching Time Waveform

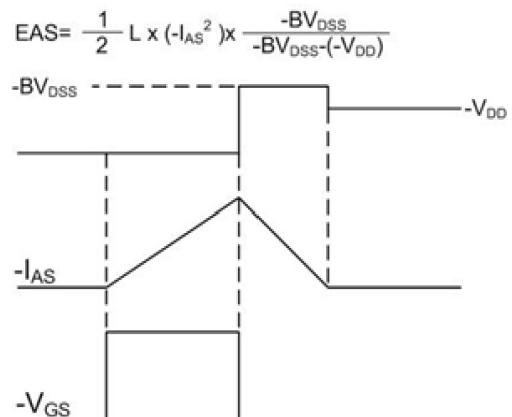
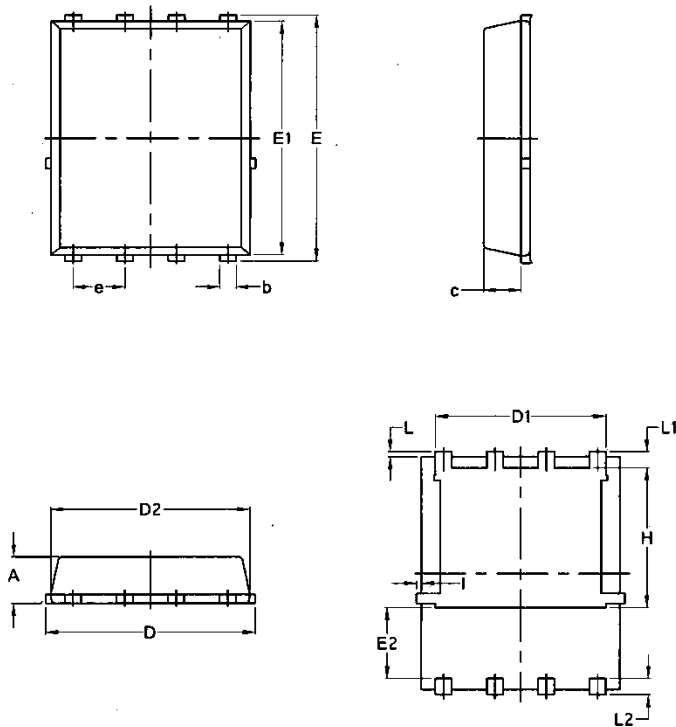


Figure.12 Unclamped Inductive Switching Waveform

-30V P-Channel Enhancement Mode MOSFET

Package Mechanical Data-DFN5*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