APG120N04NF

40V N-Channel Enhancement Mode MOSFET

MAOYUANWEI semiconductor

General Description

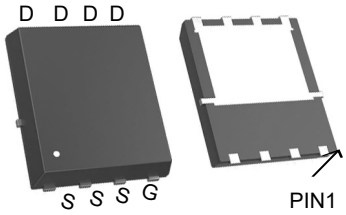
The APG120N04NF uses advanced trench technology to provide excellent Ros(ON), low gate charge and operation with gate voltages as low as 4.5V. This device is suitable for use as a
Battery protection or in other Switching application.

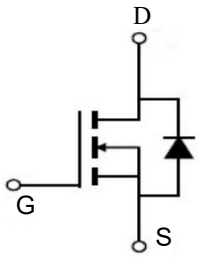
Features

V_{DSS}	40	V
I_D	120	A
$R_{DS(ON)}$(atV_{GS}=10V)	2.1	mΩ
$R_{DS(ON)}$(atV_{GS}=4.5V)	2.9	mΩ

Application

- logic level
- Superior thermal resistance
- 100 valanche tested
- P-free plating





Package Marking and Ordering Information

Product ID	Pack	Marking	Qty(PCS)
APG120N04NF	PDFN5*6-8L	120N04	5000

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

Symbol	Parameter	Rating	Units
V_{DS}	Drain-Source Voltage	40	V
V_{GS}	Gate-Source Voltage	±20	V
I_D@T_C=25℃	Continuous Drain Current, V_{GS} @ 10V[1,6]	120	A
I_D@T_C=100℃	Continuous Drain Current, V_{GS} @ 10V[1,6]	200	A
I_{DM}	Pulsed Drain Current[2]	450	A
EAS	Single Pulse Avalanche Energy[3]	151	mJ
I_{AS}	Avalanche Current	55	A
P_D@T_C=25℃	Total Power Dissipation[4]	156	W
T_{STG}	Storage Temperature Range	-55 to 150	℃
T_J	Operating Junction Temperature Range	-55 to 150	℃
$R_{\theta JA}$	Thermal Resistance Junction-Ambient [1]	50	℃/W
$R_{\theta JC}$	Thermal Resistance Junction-Case[1]	0.8	℃/W

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

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
BV_{DSS}	Drain-Source Breakdown Voltage	V_{GS}=0V , I_D=250uA	40	---	---	V
$R_{DS(ON)}$	Static Drain-Source On-Resistance[2]	V_{GS}=10V , I_D=20A	---	2.1	2.5	mΩ
		V_{GS}=4.5V , I_D=20A	---	2.9	4.5	
$V_{GS(th)}$	Gate Threshold Voltage	V_{GS}=V_{DS} , I_D =250uA	1.2	1.6	2.2	V
I_{DSS}	Drain-Source Leakage Current	V_{DS}=24V , V_{GS}=0V , T_J=25 ℃	---	---	1	uA
		V_{DS}=24V , V_{GS}=0V , T_J=55℃	---	---	5	
I_{GSS}	Gate-Source Leakage Current	V_{GS}=±20V , V_{DS}=0V	---	---	±100	nA
gfs	Forward Transconductance	V_{DS}=5V , I_D=20A	---	91	---	S
R_g	Gate Resistance	V_{DS}=0V , V_{GS}=0V , f=1MHz	---	1.7	---	Ω
Q_g	Total Gate Charge (4.5V)	V_{DS}=15V , V_{GS}=10V , I_D=20A	---	21	---	nC
Q_{gs}	Gate-Source Charge		---	12.5	---	
Q_{gd}	Gate-Drain Charge		---	14.5	---	
$T_{d(on)}$	Turn-On Delay Time	V_{DD}=15V , V_{GS}=10V , R_G=3.3Ω I_D=20A	---	12	---	ns
T_r	Rise Time		---	6	---	
$T_{d(off)}$	Turn-Off Delay Time		---	38.5	---	
T_f	Fall Time		---	11.5	---	
C_{iss}	Input Capacitance	V_{DS}=15V , V_{GS}=0V , f=1MHz	---	3032	---	pF
C_{oss}	Output Capacitance		---	1588	---	
C_{rss}	Reverse Transfer Capacitance		---	207	---	
I_S	Continuous Source Current[1,6]	V_G=V_D=0V , Force Current	---	---	85	A
V_{SD}	Diode Forward Voltage[2]	V_{GS}=0V , I_S=1A , T_J=25℃	---	---	1.2	V

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 V_{DD}=25V,V_{GS}=10V,L=0.1mH,I_{AS}=55A
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.
6.Package limitation current is 85A.

Typical Characteristics

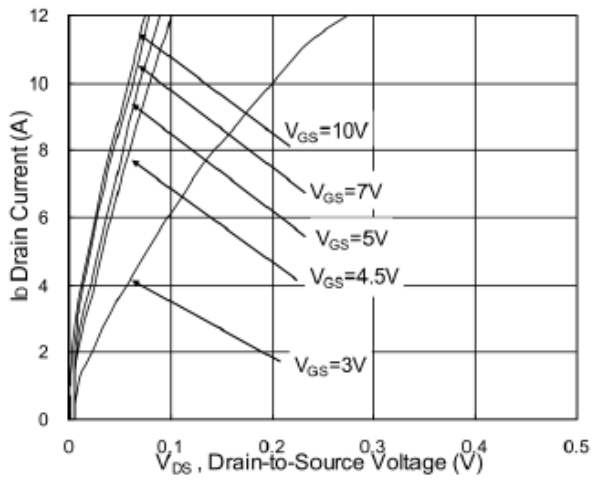


Fig.1 Typical Output Characteristics

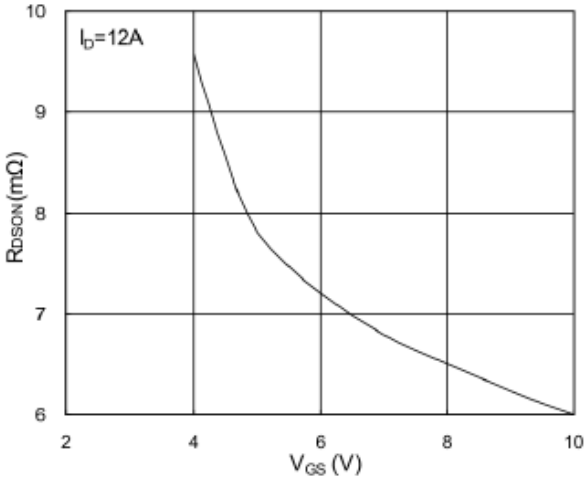


Fig.2 On-Resistance vs. G-S Voltage

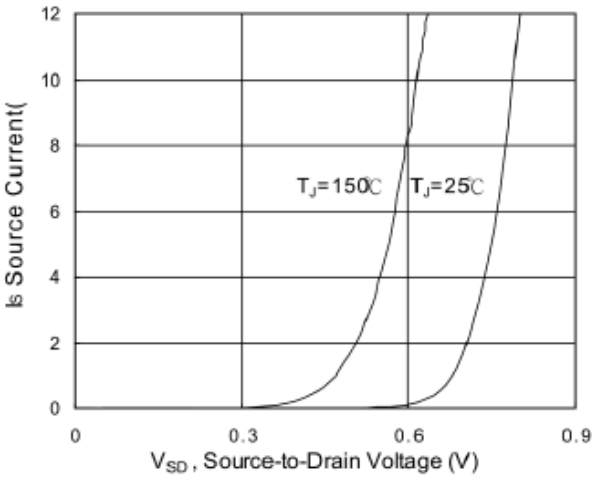


Fig.3 Forward Characteristics of Reverse

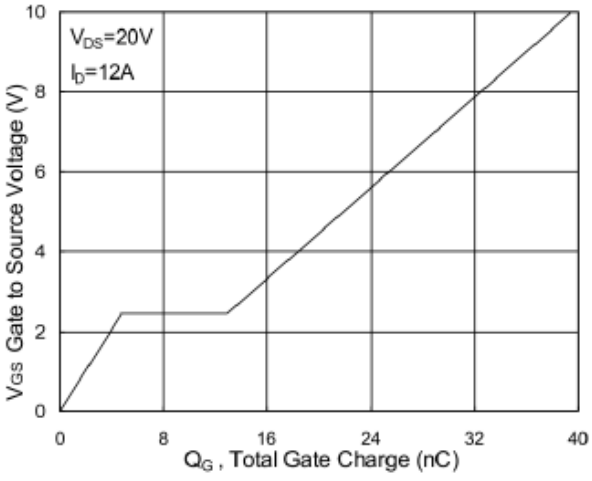


Fig.4 Gate-Charge Characteristics

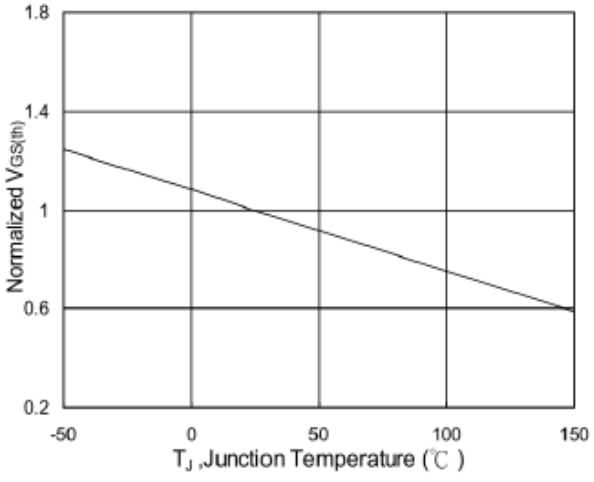


Fig.5 Normalized $V_{GS(th)}$ vs. T_J

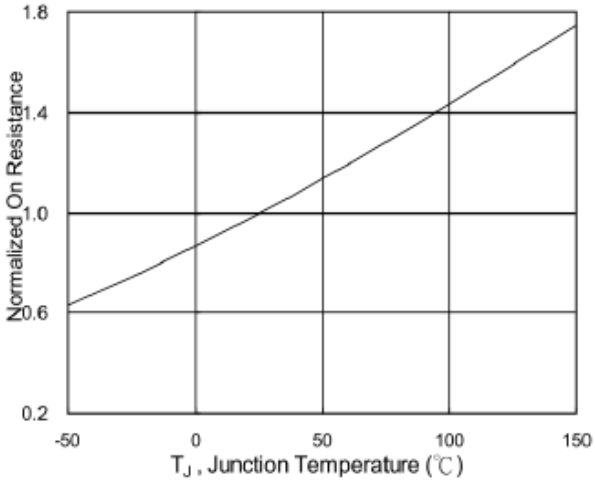


Fig.6 Normalized R_{DSON} vs. T_J

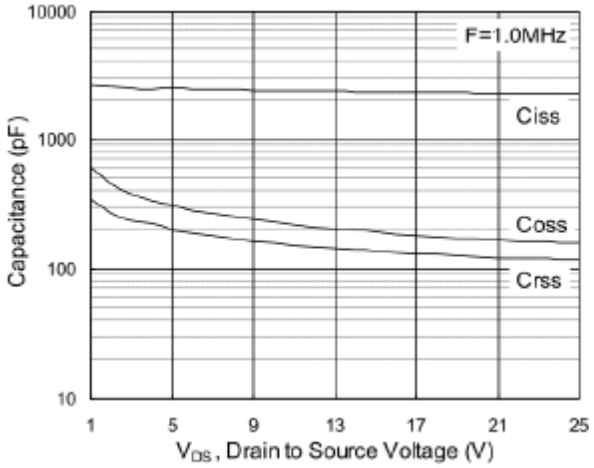


Fig.7 Capacitance

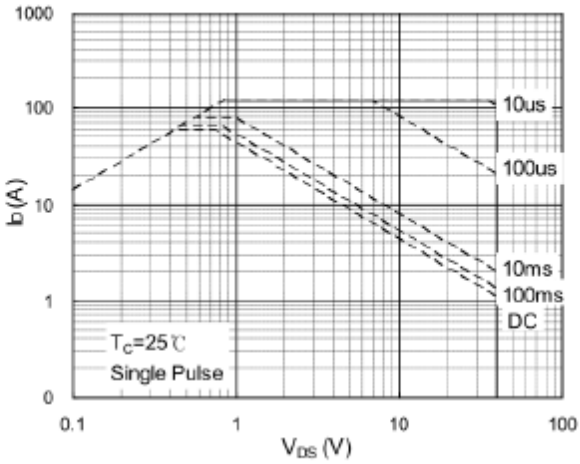


Fig.8 Safe Operating Area

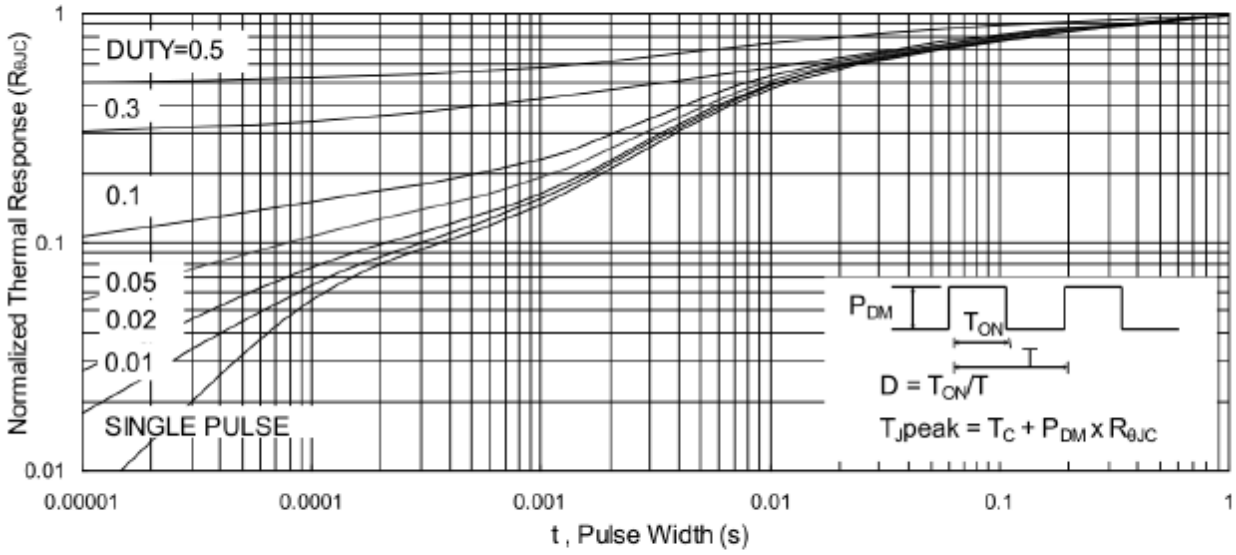


Fig.9 Normalized Maximum Transient Thermal Impedance

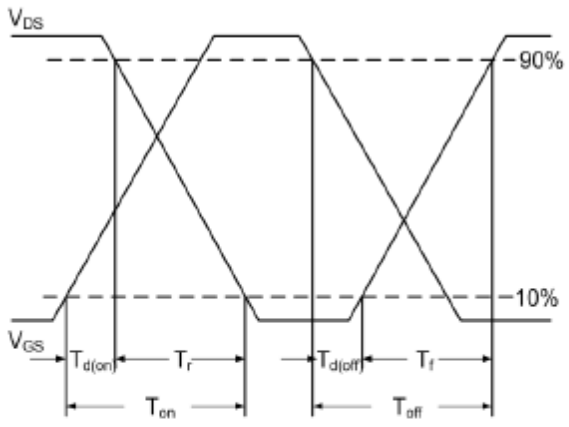


Fig.10 Switching Time Waveform

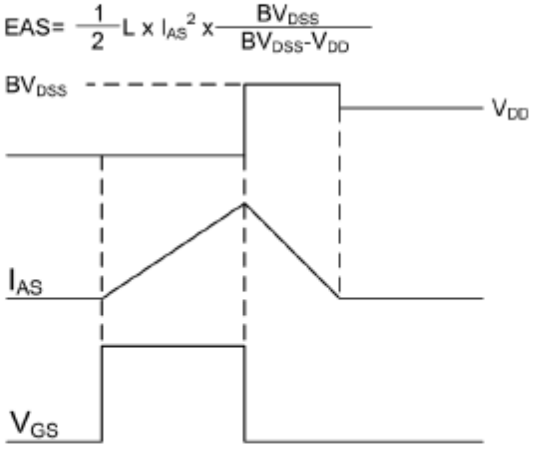
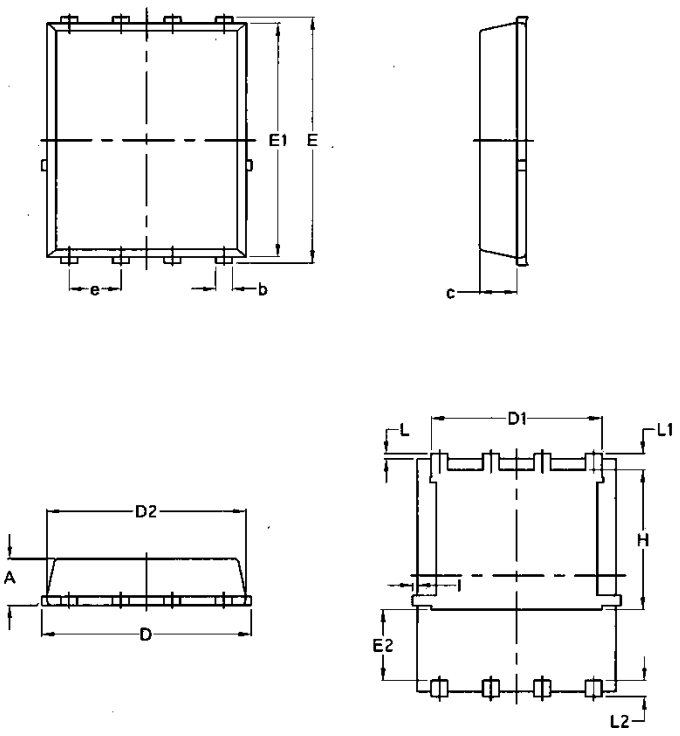


Fig.11 Unclamped Inductive Waveform

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