

40V N-Channel Enhancement Mode MOSFET

Description

The AP110N04NF uses advanced trench 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

$V_{DS} = 40V$ $I_D = 110A$

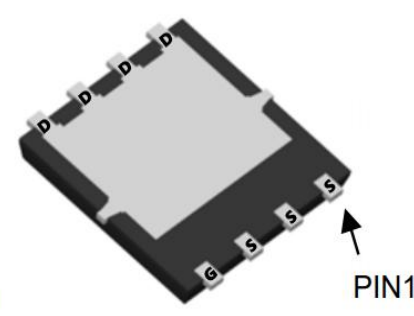
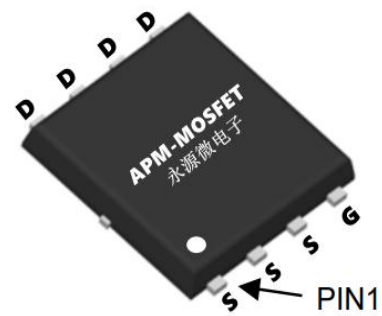
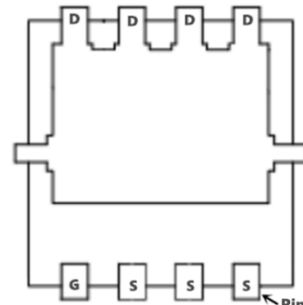
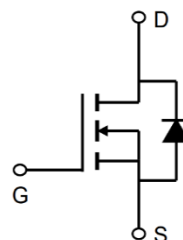
$R_{DS(ON)} < 4.3m\Omega$ @ $V_{GS}=10V$ (Type: 3.5m Ω)

Application

Battery protection

Load switch

Uninterruptible power supply



Package Marking and Ordering Information

Product ID	Pack	Marking	Qty(PCS)
AP110N04NF	PDFN5*6-8L	AP110N04NF XXX YYYY	5000

Absolute Maximum Ratings@T_J=25°C(unless otherwise specified)

Symbol	Parameter	Value	Unit
V _{DS}	Drain-Source Voltage	40	V
V _{GS}	Gate-Source Voltage	±20	V
I _D @T _C =25°C	Continuous Drain Current, V _{GS} @ 10V ¹	110	A
I _D @T _C =100°C	Continuous Drain Current, V _{GS} @ 10V ¹	78	A
IDM	Pulsed Drain Current ²	440	A
EAS	Single Pulse Avalanche Energy ³	195	mJ
IAS	Avalanche Current	42	A
P _D @T _C =25°C	Total Power Dissipation ⁴	108	W
TSTG	Storage Temperature Range	-55 to 150	°C
T _J	Operating Junction Temperature Range	-55 to 150	°C
R _{θJA}	Thermal Resistance Junction-Ambient ¹	62	°C/W
R _{θJC}	Thermal Resistance Junction-Case ¹	1.4	°C/W

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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 =250uA	40	44	---	V
ΔBVDSS/ΔT _J	BV _{DSS} Temperature Coefficient	Reference to 25°C, I _D =1mA	---	0.052	---	V/°C
RDS(ON)	Static Drain-Source On-Resistance ²	V _{GS} =10V, I _D =30A	---	3.5	4.3	mΩ
RDS(ON)	Static Drain-Source On-Resistance ²	V _{GS} =4.5V, I _D =20A	---	5.4	7.5	mΩ
VGS(th)	Gate Threshold Voltage	V _{GS} =V _{DS} , I _D =250uA	1.2	1.6	2.5	V
ΔVGS(th)	V _{GS(th)} Temperature Coefficient		---	-5.76	---	mV/°C
IDSS	Drain-Source Leakage Current	V _{DS} =40V, V _{GS} =0V, T _J =25°C	---	---	1	uA
		V _{DS} =40V, 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 =30A	---	42	---	S
Q _g	Total Gate Charge (4.5V)	V _{DS} =48V, V _{GS} =10V, I _D =30A	---	65	---	nC
Q _{gs}	Gate-Source Charge		---	12.5	---	
Q _{gd}	Gate-Drain Charge		---	15	---	
Td(on)	Turn-On Delay Time	V _{DD} =30V, V _{GS} =10V, R _G =4.7Ω, I _D =15A	---	12	---	ns
T _r	Rise Time		---	16	---	
Td(off)	Turn-Off Delay Time		---	39	---	
T _f	Fall Time		---	15	---	
Ciss	Input Capacitance	V _{DS} =30V, V _{GS} =0V, f=1MHz	---	5595	---	pF
Coss	Output Capacitance		---	411	---	
Crss	Reverse Transfer Capacitance		---	340	---	
IS	Continuous Source Current ^{1,5}	V _G =V _D =0V, Force Current	---	---	110	A
ISM	Pulsed Source Current ^{2,5}		---	---	440	A
VSD	Diode Forward Voltage ²	V _{GS} =0V, I _S =30A, T _J =25°C	---	---	1.2	V
trr	Reverse Recovery Time	IF=30A, dI/dt=100A/μs, T _J =25°C	---	22	---	nS
Q _{rr}	Reverse Recovery Charge		---	11	---	nC

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 . T_J=25°C, V_{DD}=32V, V_G=10V, R_G=25Ω, L=0.1mH, I_{AS}=42A
- 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

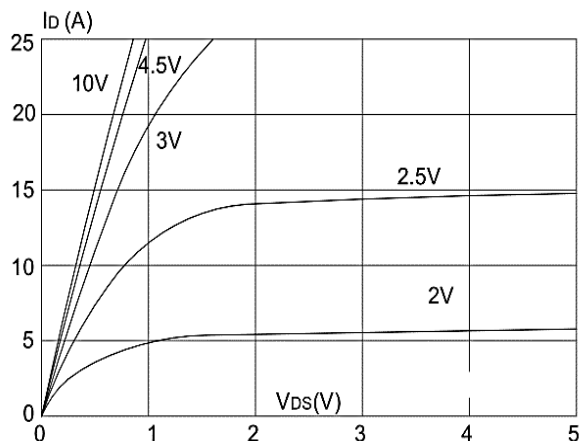


Figure1: Output Characteristics

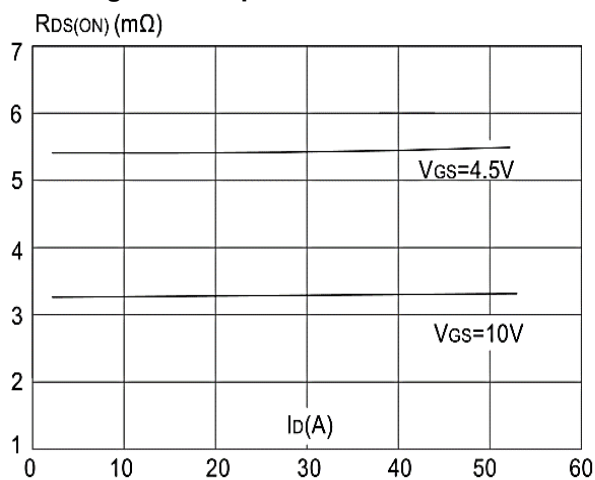


Figure 3: On-resistance vs. Drain Current

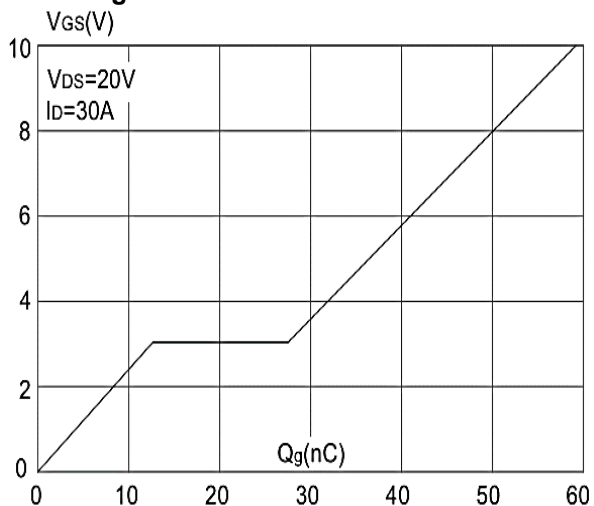


Figure 5: Gate Charge Characteristics

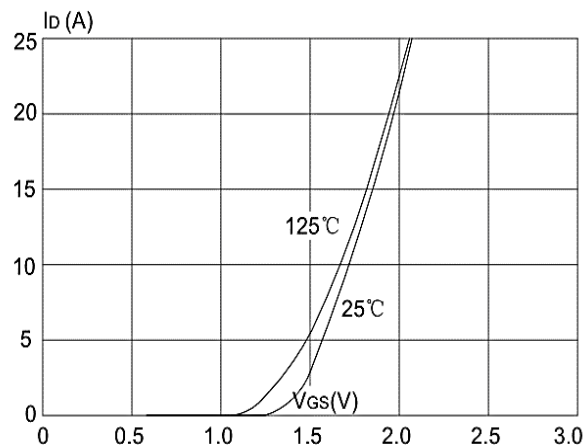


Figure 2: Typical Transfer Characteristics

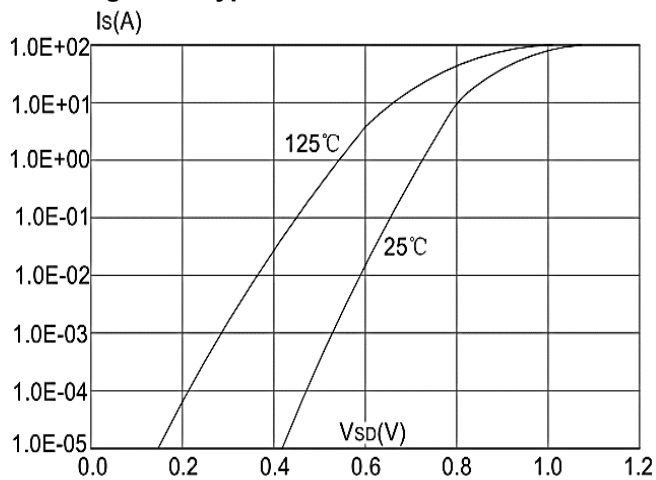


Figure 4: Body Diode Characteristics

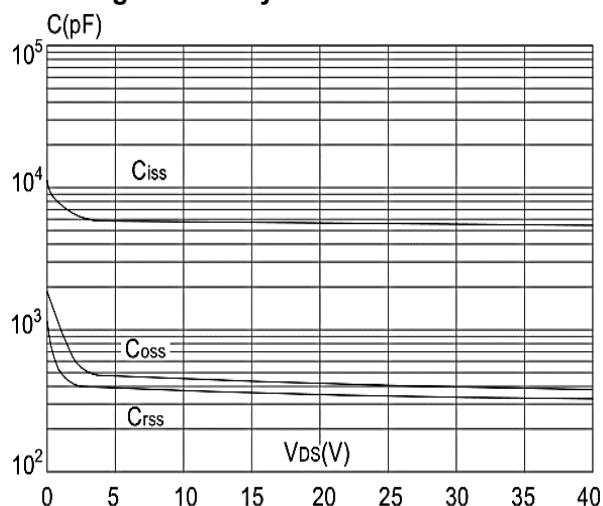


Figure 6: Capacitance Characteristics

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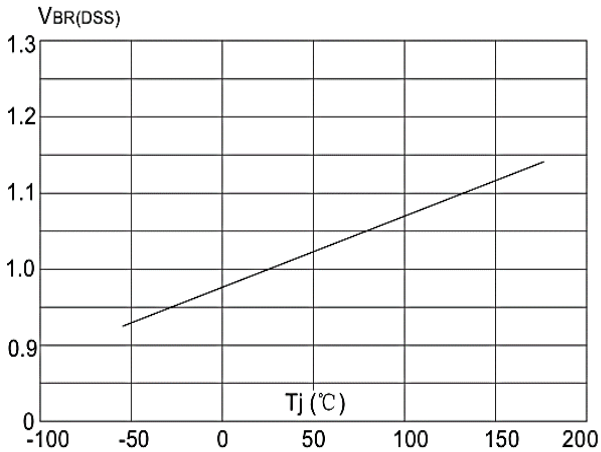


Figure 7: Normalized Breakdown Voltage vs Junction Temperature

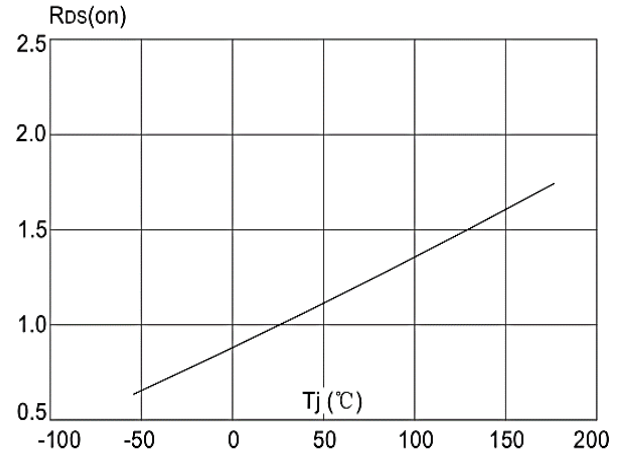


Figure 8: Normalized on Resistance vs. Junction Temperature

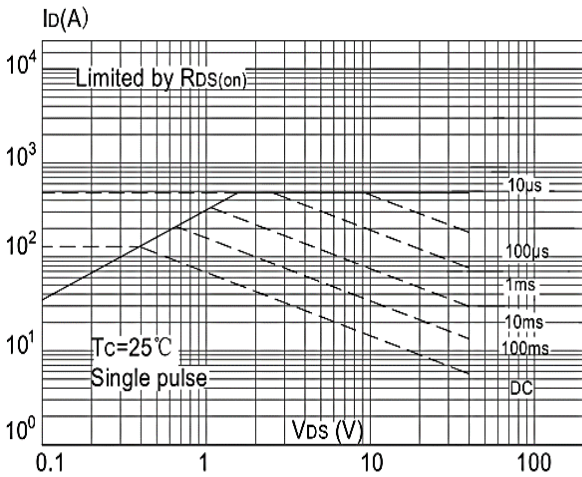


Figure 9: Maximum Safe Operating Area

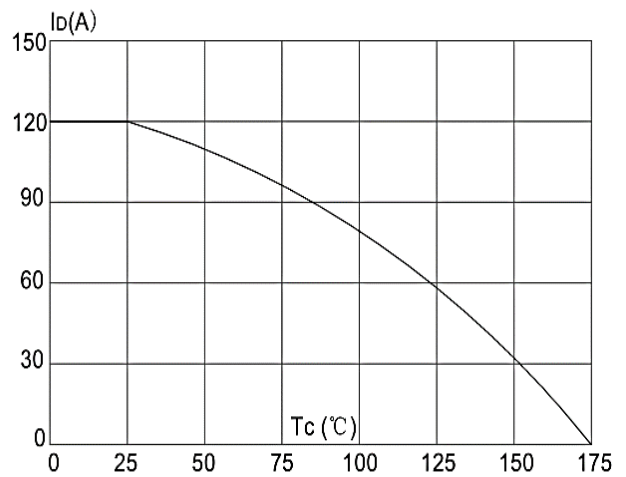


Figure 10: Maximum Continuous Drain Current vs. Ambient Temperature

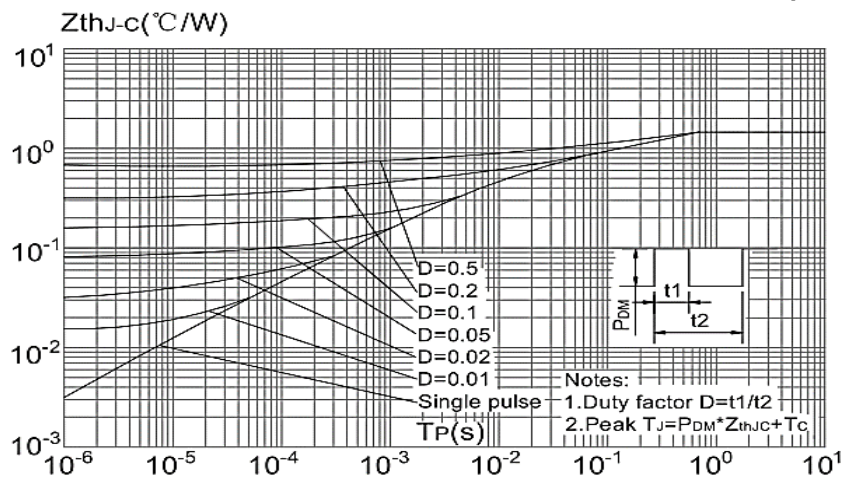
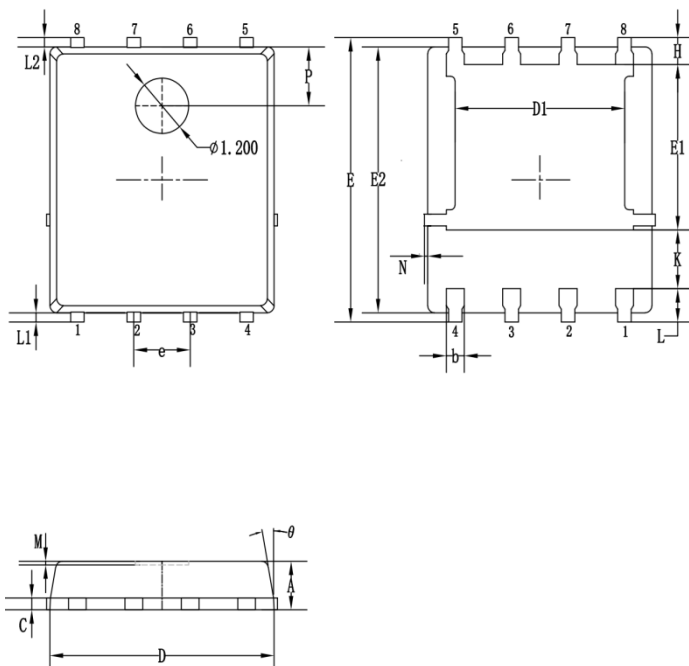


Figure.11: Maximum Effective Transient Thermal Impedance, Junction-to-Ambien

Package Mechanical Data-PDFN5*6-8L



Symbol	Dimensions In Millimeters		
	min.	typ.	max.
A	0.90	1.05	1.20
b	0.30	0.40	0.50
C	0.20	0.25	0.35
D	4.90	5.05	5.20
D1	3.72	3.82	4.12
E	5.90	6.10	6.30
E1	3.30	3.50	3.70
E2	5.60	5.75	5.90
e	1.27BSC		
H	0.48	0.58	0.70
K	1.14	1.27	1.40
L	0.54	0.74	0.84
L1/L2	0.10	0.20	0.30
θ	8°	10°	12°
M	0.08REF		
N	0.00		0.15
P	1.28REF		

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Edition	Date	Change
Rve1.0	2021/1/31	Initial release
Rve1.1	2026/6/18	Update LOGO And Corrected Manual POD

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