AP120N03BD

30V N-Channel Enhancement Mode MOSFET

Description

The AP120N03BD 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 =120A

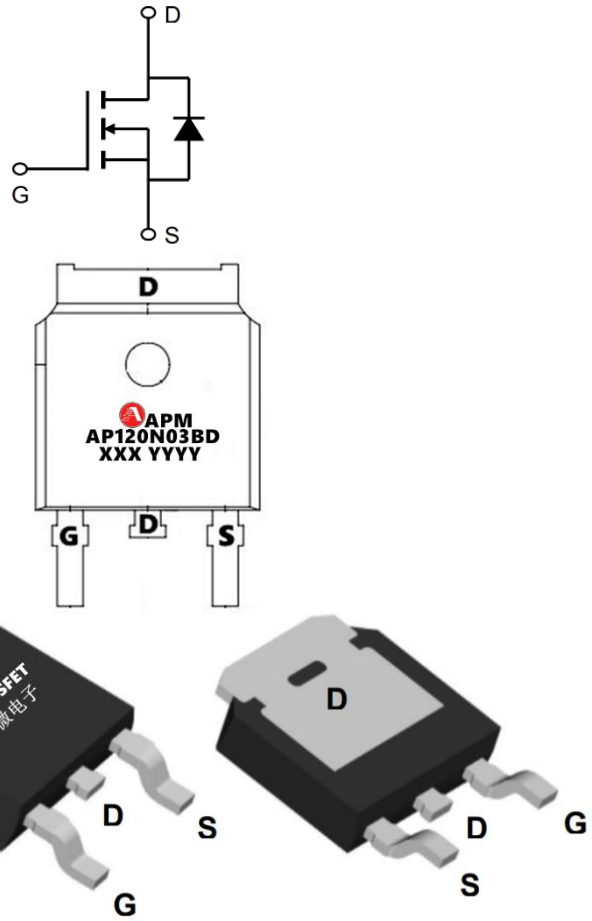
$R_{DS(ON)}$ < 3.8mΩ @ V_{GS}=10V **（Type：2.8mΩ）**

Application

Battery protection

Load switch

Uninterruptible power supply



Package Marking and Ordering Information

Product ID	Pack	Marking	Qty(PCS)
AP120N03BD	TO-252-3L	AP120N03BD XXX YYYY	2500

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

Symbol	Parameter	Rating	Units
VDS	Drain-Source Voltage	30	V
VGS	Gate-Source Voltage	±20	V
I_D@T_C=25℃	Continuous Drain Current, V_{GS} @ 10V[1]	120	A
I_D@T_C=100℃	Continuous Drain Current, V_{GS} @ 10V[1]	84	A
IDM	Pulsed Drain Current[2]	480	A
EAS	Single Pulse Avalanche Energy[3]	355	mJ
IAS	Avalanche Current	36	A
P_D@T_C=25℃	Total Power Dissipation[4]	59	W
TSTG	Storage Temperature Range	-55 to 150	℃
T_J	Operating Junction Temperature Range	-55 to 150	℃
R_{θ}JC	Thermal Resistance Junction-Case[1]	2.1	℃/W
R_{θ}JA	Thermal Resistance Junction-Ambient [1]	62.5	℃/W

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

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
BVDSS	Drain-Source Breakdown Voltage	V_{GS}=0V, I_D=250uA	30	34	-	V
RDS(ON)	Static Drain-Source On-Resistance	V_{GS}=10V, I_D=30A	-	2.8	3.8	mΩ
		V_{GS}=4.5V, I_D=15A	-	4.7	5.8	
VGS(th)	Gate Threshold Voltage	V_{GS}=V_{DS} , I_D =250uA	1.2	1.5	2.5	V
IDSS	Drain-Source Leakage Current	V_{DS}=30V, V_{GS}=0V, T_J=25℃	-	-	1	uA
		V_{DS}=30V, V_{GS}=0V, T_J=55℃	-	-	5	
IGSS	Gate-Source Leakage Current	V_{GS}=±20V, V_{DS}=0V	-	-	±100	nA
gfs	Forward Transconductance	V_{DS}=5V, I_D=30A	-	22	-	S
R_g	Gate Resistance	V_{DS}=15V, V_{GS}=0V, f=1MHz	-	1.7	-	Ω
C_{iss}	Input Capacitance		-	2320	-	pF
Coss	Output Capacitance		-	293	-	
Crss	Reverse Transfer Capacitance		-	307	-	
Q_g	Total Gate Charge (4.5V)	V_{DS}=15V, V_{GS}=4.5V, I_D=15A	-	20	-	nC
Q_{gs}	Gate-Source Charge		-	7.6	-	
Q_{gd}	Gate-Drain Charge		-	7.2	-	
Td(on)	Turn-On Delay Time	V_{DD}=15V,V_{GS}=10V, R_G=3.3Ω,I_D=15A	-	7.8	-	ns
T_r	Rise Time		-	15	-	
Td(off)	Turn-Off Delay Time		-	37.3	-	
T_f	Fall Time		-	10.6	-	
I_S	Continuous Source Current[1,5]	V_G=V_D=0V , Force Current	-	-	100	A
ISM	Pulsed Source Current[2,5]		-	-	480	A
VSD	Diode Forward Voltage[2]	V_{GS}=0V , I_S=1A , T_J=25℃	-	-	1	V
t_{rr}	Reverse Recovery Time	IF=30A , dI/dt=100A/μs, T_J=25℃	-	14	-	nS
Q_{rr}	Reverse Recovery Charge		-	5	-	nC

Note :

1、The data tested by surface mounted on a 1 inch2 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 VDD=24V,VGS=10V,L=0.1mH,IAS=36A

4、The power dissipation is limited by 175℃ junction temperature

5、The data is theoretically the same as ID and IDM , in real applications , should be limited by total power dissipation.

Typical Characteristics

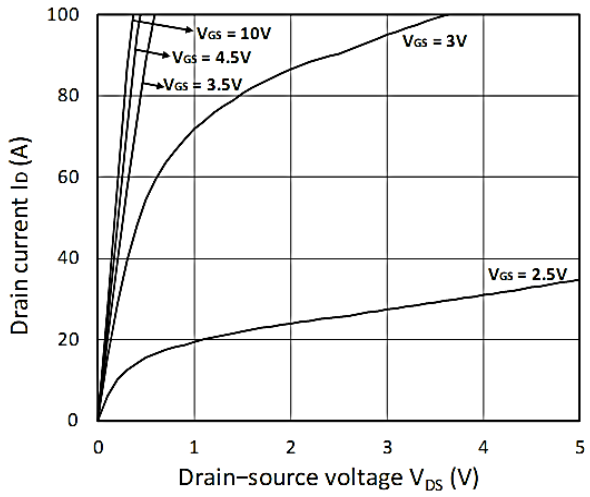


Figure 1. Output Characteristics

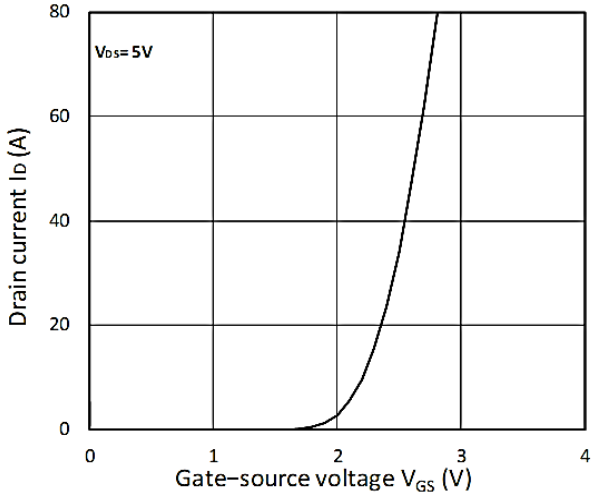


Figure 2. Transfer Characteristics

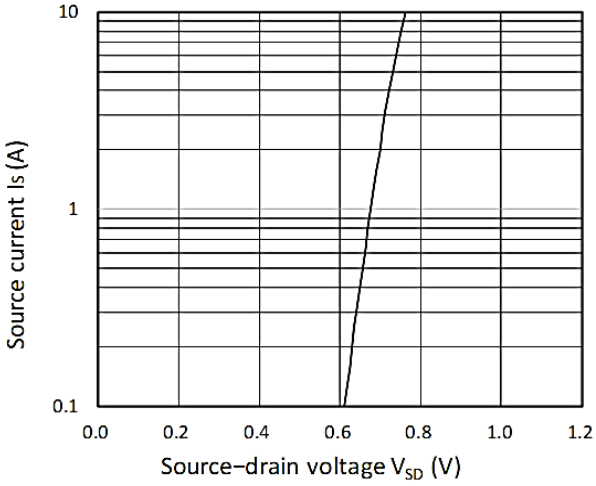


Figure 3. Forward Characteristics of Reverse

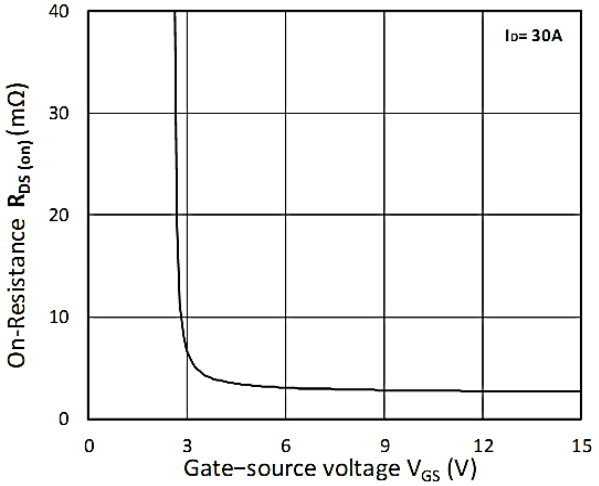


Figure 4. RDS(ON) vs. VGS

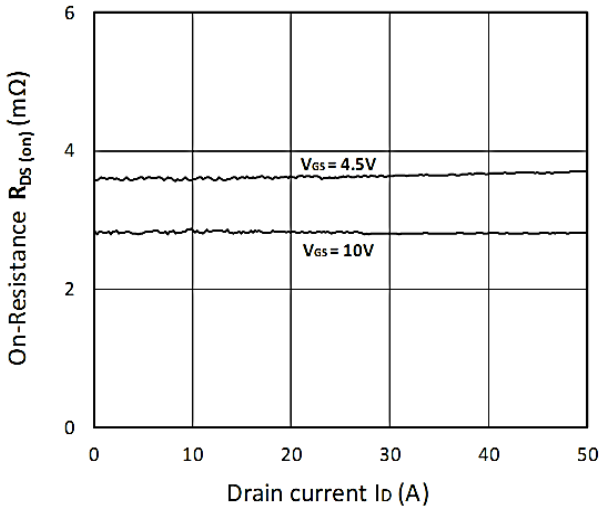


Figure 5. RDS(ON) vs. ID

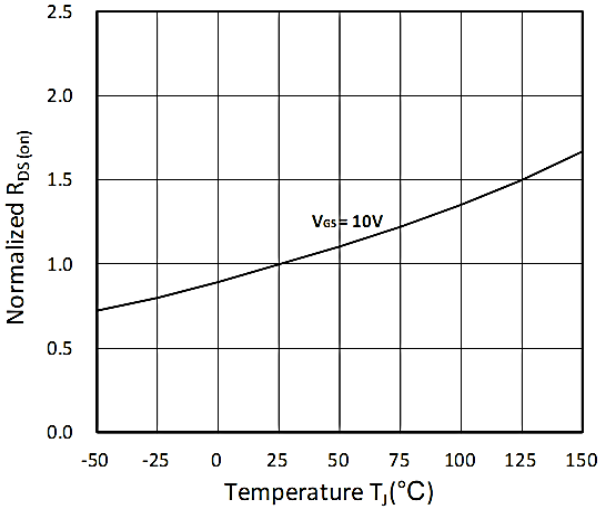


Figure 6. Normalized RDS(on) vs. Temperature

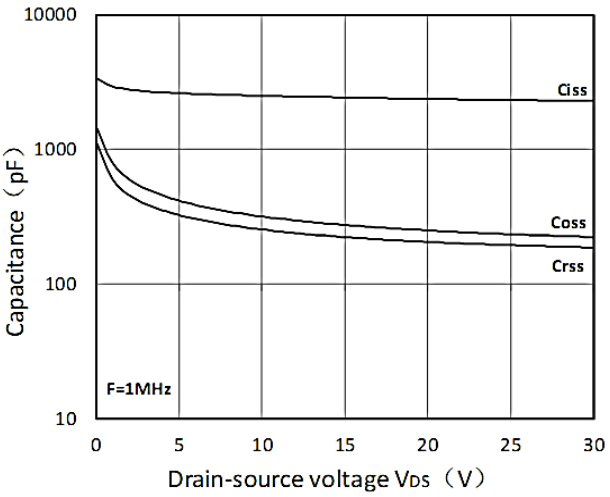


Figure 7. Capacitance Characteristics

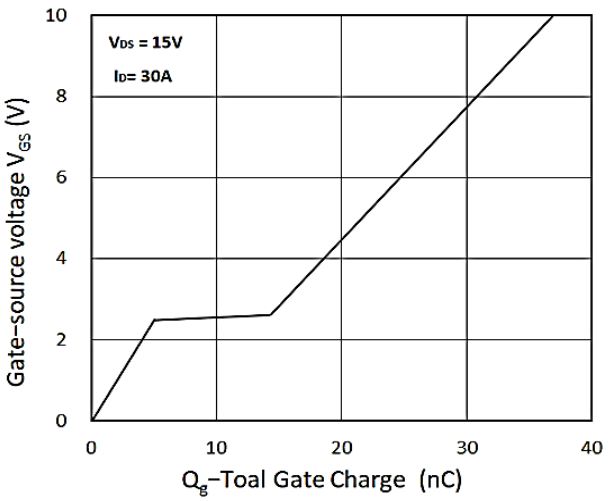


Figure 8. Gate Charge Characteristics

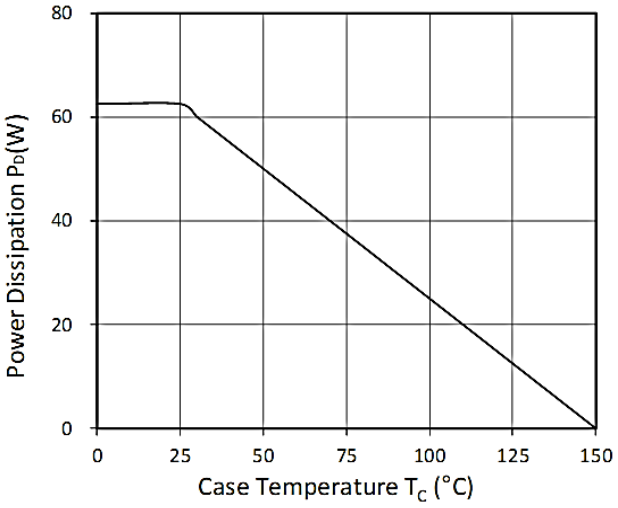


Figure 9. Power Dissipation

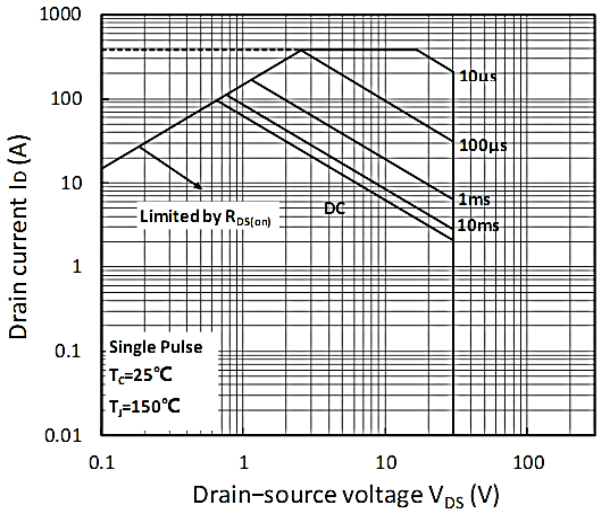


Figure10. Safe Operating Area

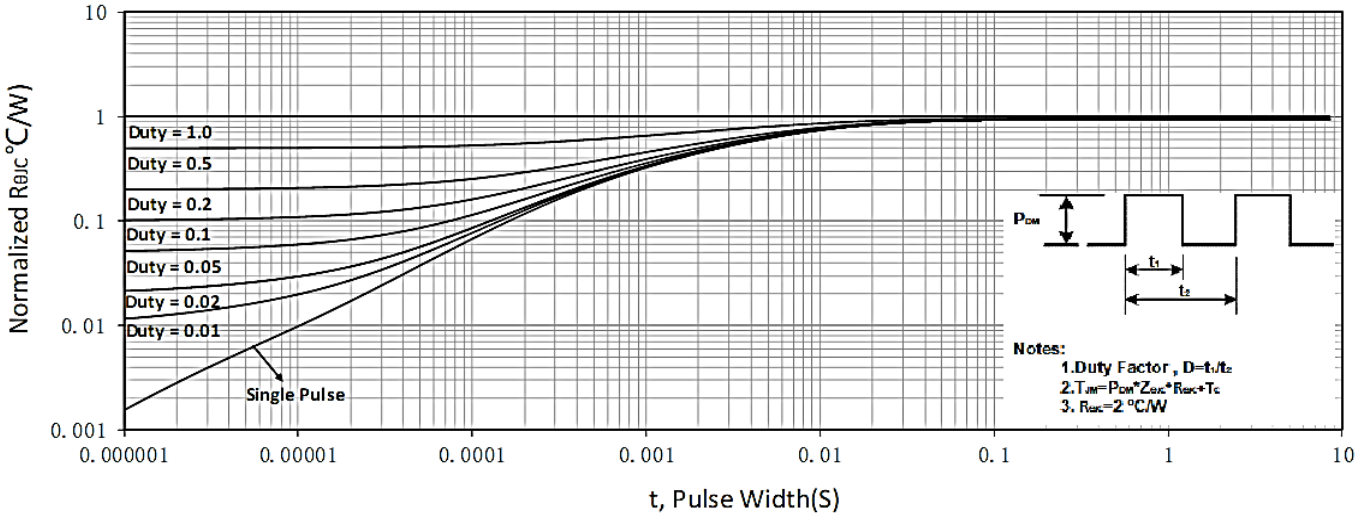
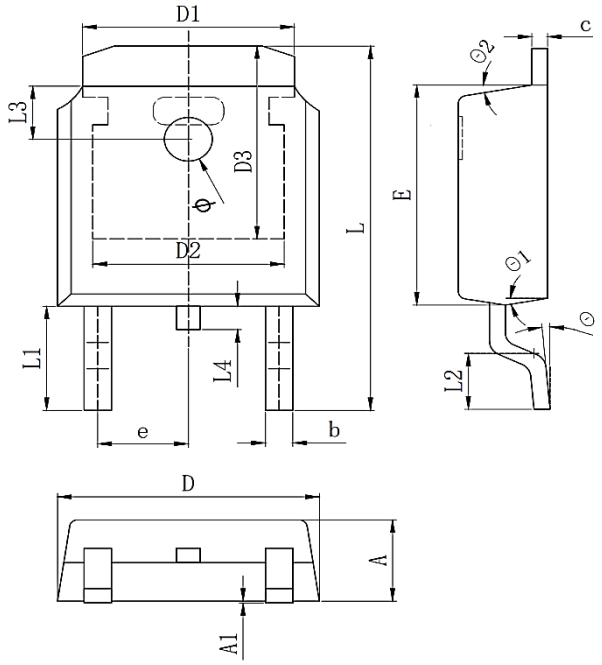


Figure 11.Normalized Maximum Transient Thermal Impedance

Package Mechanical Data-TO-252-3L



Symbol	Dim in mm		
	Min	Typ	Max
A	2.1	2.3	2.5
A1	0	0.064	0.128
b	0.64	0.75	0.86
c	0.45	0.52	0.6
D	6.4	6.6	6.8
D1	5.33REF		
D2	4.83REF		
D3	5.25REF		
E	5.9	6.1	6.3
e	2.286TYP		
L	9.8	10.1	10.4
L1	2.888REF		
L2	1.4	1.5	1.7
L3	1.65REF		
L4	0.6	0.8	1
ϕ	1.1	1.2	1.3
θ	0°		10°
θ1	5°		10°
θ2	5°		10°

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30V N-Channel Enhancement Mode MOSFET

Edition	Date	Change
REV1.0	2024/1/31	Initial release