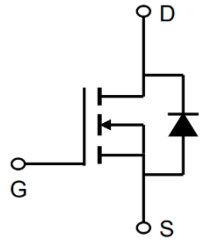
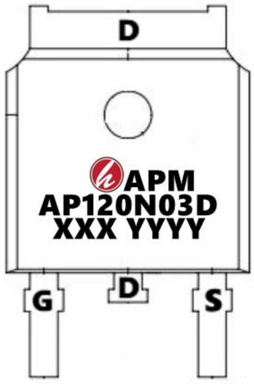
AP120N03D

30V N-Channel Enhancement Mode MOSFET

Description

The AP120N03D 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

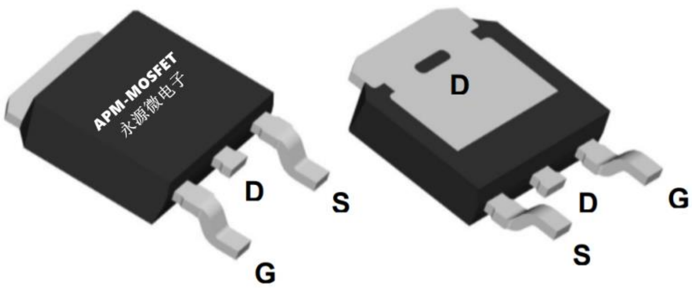
$R_{DS(ON)}$ < 4mΩ V_{GS}=10V **（Type：2.8mΩ）**

Application

Battery protection

Load switch

Uninterruptible power supply



Package Marking and Ordering Information

Product ID	Pack	Marking	Qty(PCS)
AP120N03D	TO-252-3L	AP120N03D XXX YYYY	2500

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

Symbol	Parameter	Rating	Units
V_{DS}	Drain-Source Voltage	30	V
V_{GS}	Gate-Source Voltage	±20	V
I_D@T_C=25˚C	Continuous Drain Current, V_{GS} @ 10V[1]	120	A
I_D@T_C=100˚C	Continuous Drain Current, V_{GS} @ 10V[1]	65	A
I_{DM}	Pulsed Drain Current[2]	360	A
EAS	Single Pulse Avalanche Energy[3]	144.7	mJ
I_{AS}	Avalanche Current	53.8	A
P_D@T_C=25˚C	Total Power Dissipation[4]	43.4	W
P_D@T_A=25˚C	Total Power Dissipation[4]	1.67	W
T_{STG}	Storage Temperature Range	-55 to 150	˚C
T_J	Operating Junction Temperature Range	-55 to 150	˚C
$R_{\theta JA}$	Thermal Resistance Junction-Ambient [1]	75	˚C/W
$R_{\theta JC}$	Thermal Resistance Junction-Case[1]	2.88	˚C/W

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

Symbol	Parameter	Test Condition	Min.	Typ.	Max.	Units
V(BR)DSS	Drain-Source Breakdown Voltage	V_{GS}=0V, I_D=250μA	30	33	-	V
IDSS	Zero Gate Voltage Drain Current	V_{DS} =30V, V_{GS} = 0V,	-	-	1.0	μA
IGSS	Gate to Body Leakage Current	V_{DS} =0V, V_{GS} = ±20V	-	-	±100	nA
VGS(th)	Gate Threshold Voltage	V_{DS}= V_{GS}, I_D=250μA	1.0	1.5	2.5	V
RDS(on)	Static Drain-Source on-Resistance note3	V_{GS} =10V, I_D =30A	-	2.8	4	mΩ
		V_{GS} =4.5V, I_D =20A	-	4.8	6.5	
C_{iss}	Input Capacitance	V_{DS} =15V, V_{GS} =0V, f = 1.0MHz	-	2680	-	pF
Coss	Output Capacitance		-	393	-	pF
Crss	Reverse Transfer Capacitance		-	330	-	pF
Q_g	Total Gate Charge	V_{DS} =15V, I_D =30A, V_{GS} =10V	-	30	-	nC
Q_{gs}	Gate-Source Charge		-	7.2	-	nC
Q_{gd}	Gate-Drain(“Miller”) Charge		-	10.4	-	nC
td(on)	Turn-on Delay Time	V_{DS}=15V, I_D=30A, R_{GEN}=3Ω, V_{GS} =10V	-	23	-	ns
t_r	Turn-on Rise Time		-	28	-	ns
td(off)	Turn-off Delay Time		-	74	-	ns
t_f	Turn-off Fall Time		-	36	-	ns
IS	Maximum Continuous Drain to Source Diode Forward Current		-	-	120	A
ISM	Maximum Pulsed Drain to Source Diode Forward Current		-	-	400	A
VSD	Drain to Source Diode Forward Voltage	V_{GS} = 0V, I_S=30A	-	-	1.2	V
trr	Body Diode Reverse Recovery Time	I_F=20A,dI/dt=100A/μs	-	28	-	ns
Qrr	Body Diode Reverse Recovery Charge		-	21	-	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 . The test condition is V_{DD}=25V,V_{GS}=10V,L=0.1mH,I_{AS}=53.8A

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.

Typical Characteristics

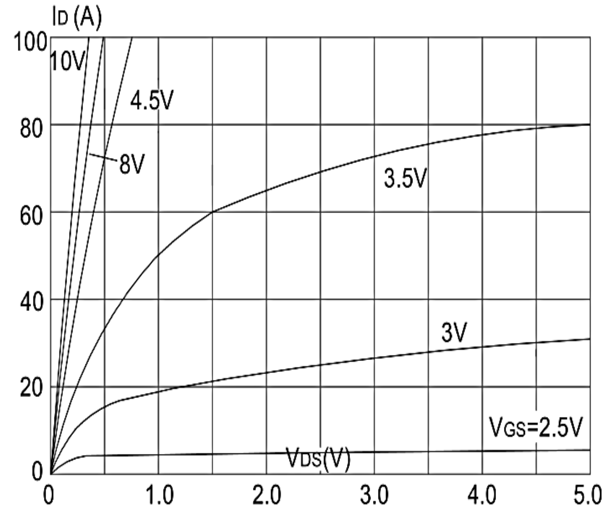


Figure1: Output Characteristics

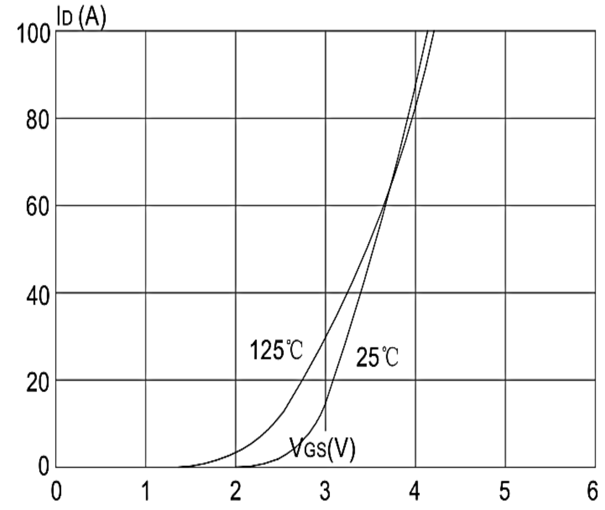


Figure 2: Typical Transfer Characteristics

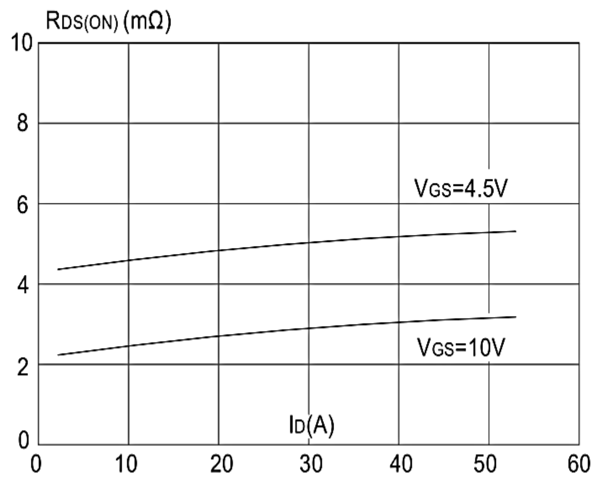


Figure 3:On-resistance vs. Drain Current

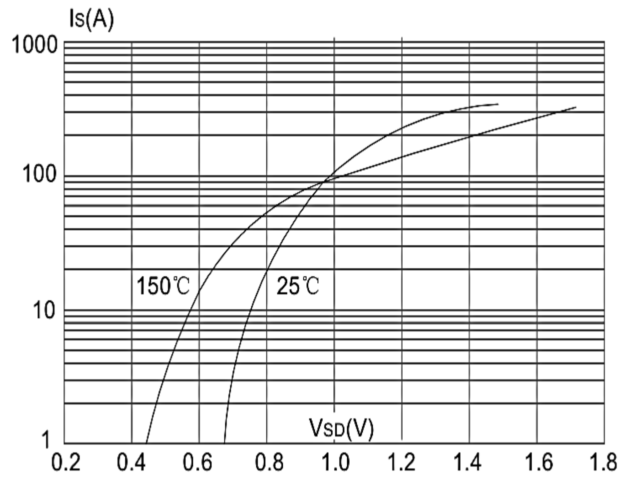


Figure 4: Body Diode Characteristics

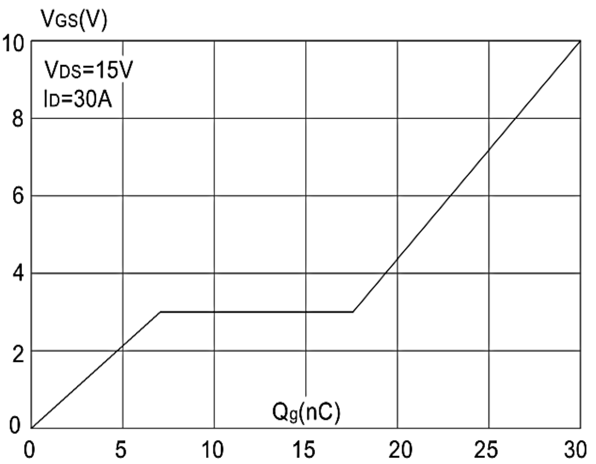


Figure 5: Gate Charge Characteristics

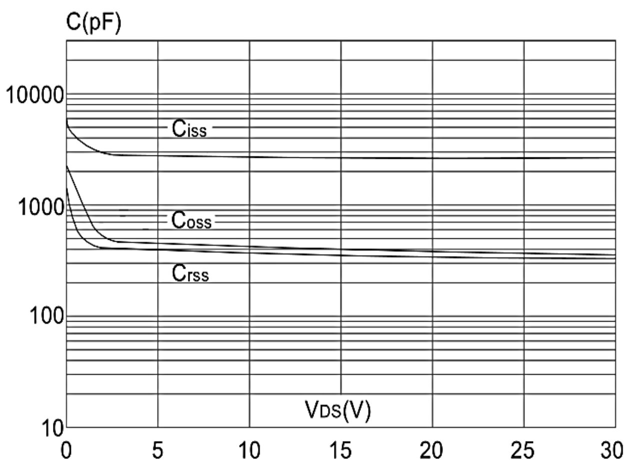


Figure 6: Capacitance Characteristics

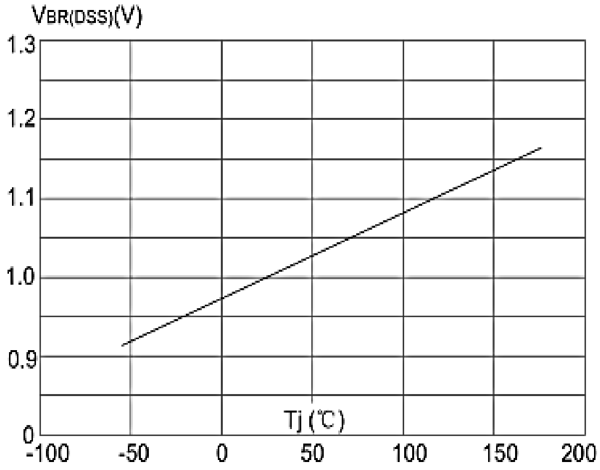


Figure 7: Normalized Breakdown Voltage vs. Junction Temperature

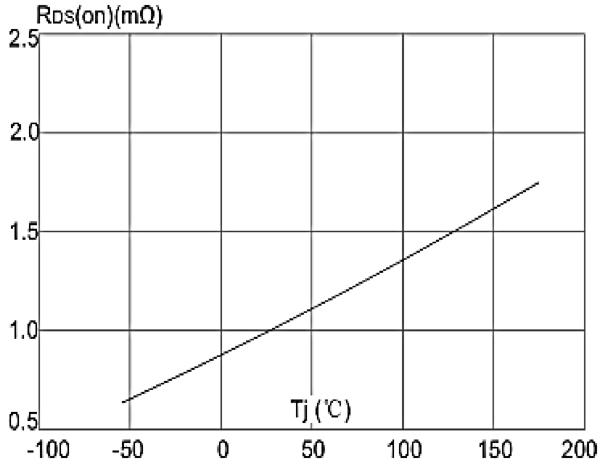


Figure 8: Normalized on Resistance vs Junction Temperature

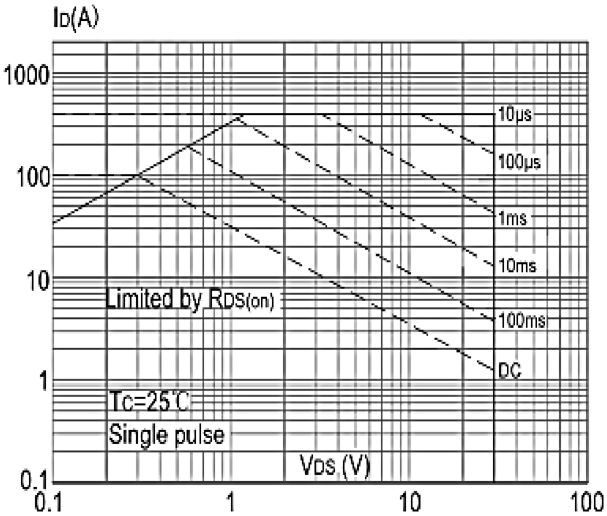


Figure 9: Maximum Safe Operating Area vs. Case Temperature

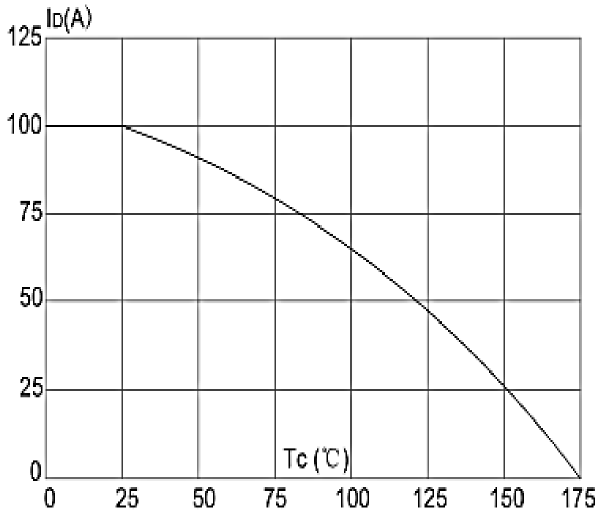


Figure 10: Maximum Continuous Drain Current

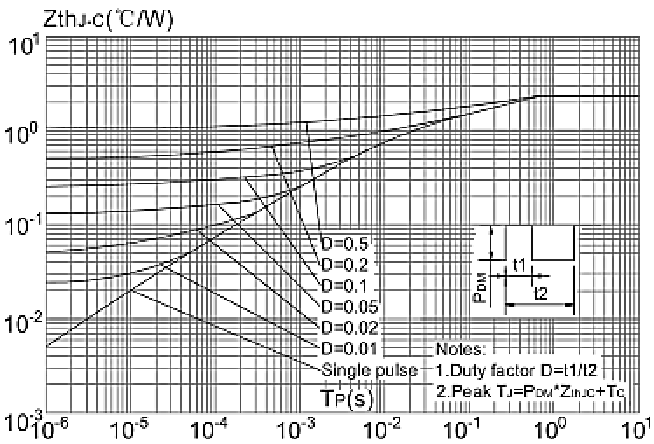
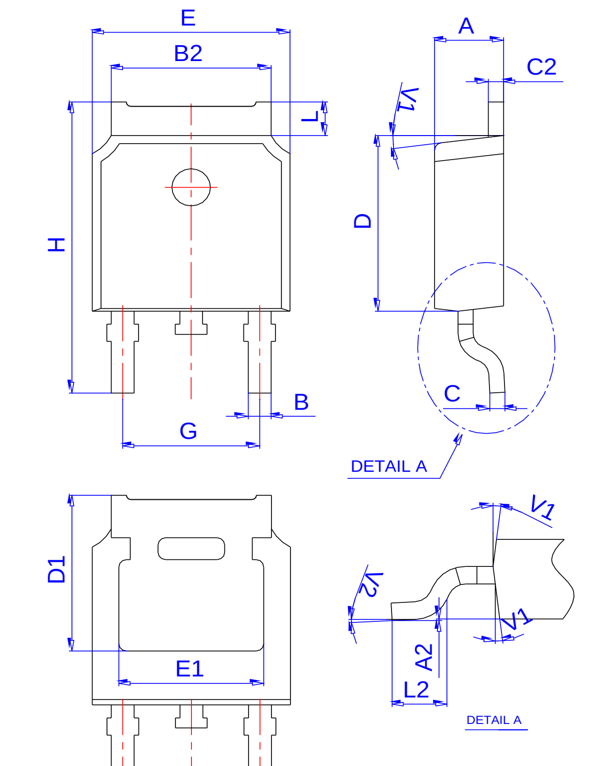


Figure.11: Maximum Effective Transient Thermal Impedance, Junction-to-Case

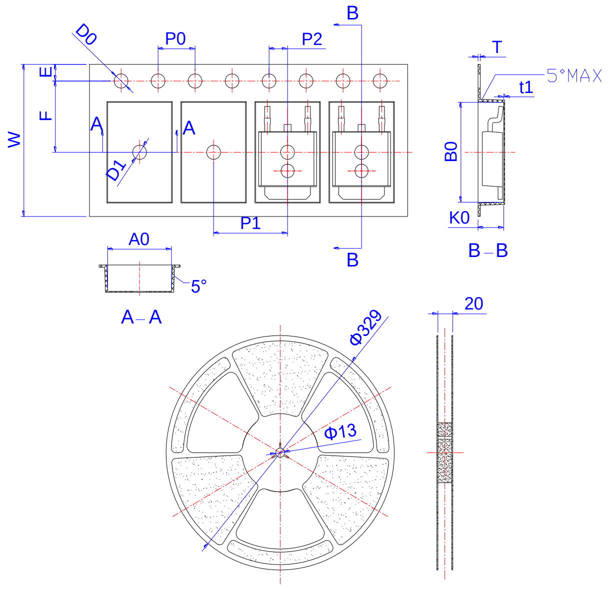
Package Mechanical Data:TO-252-3L



TO-252

Ref.	Dimensions					
	Millimeters			Inches		
	Min.	Typ.	Max.	Min.	Typ.	Max.
A	2.10		2.50	0.083		0.098
A2	0		0.10	0		0.004
B	0.66		0.86	0.026		0.034
B2	5.18		5.48	0.202		0.216
C	0.40		0.60	0.016		0.024
C2	0.44		0.58	0.017		0.023
D	5.90		6.30	0.232		0.248
D1	5.30REF			0.209REF		
E	6.40		6.80	0.252		0.268
E1	4.63			0.182		
G	4.47		4.67	0.176		0.184
H	9.50		10.70	0.374		0.421
L	1.09		1.21	0.043		0.048
L2	1.35		1.65	0.053		0.065
V1		7°			7°	
V2	0°		6°	0°		6°

Reel Specification-TO-252



Ref.	Dimensions					
	Millimeters			Inches		
	Min.	Typ.	Max.	Min.	Typ.	Max.
W	15.90	16.00	16.10	0.626	0.630	0.634
E	1.65	1.75	1.85	0.065	0.069	0.073
F	7.40	7.50	7.60	0.291	0.295	0.299
D0	1.40	1.50	1.60	0.055	0.059	0.063
D1	1.40	1.50	1.60	0.055	0.059	0.063
P0	3.90	4.00	4.10	0.154	0.157	0.161
P1	7.90	8.00	8.10	0.311	0.315	0.319
P2	1.90	2.00	2.10	0.075	0.079	0.083
A0	6.85	6.90	7.00	0.270	0.271	0.276
B0	10.45	10.50	10.60	0.411	0.413	0.417
K0	2.68	2.78	2.88	0.105	0.109	0.113
T	0.24		0.27	0.009		0.011
t1	0.10			0.004		
10P0	39.80	40.00	40.20	1.567	1.575	1.583

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Edition	Date	Change
RVE1.0	2022/1/31	Initial release