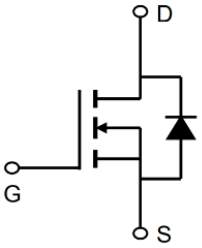
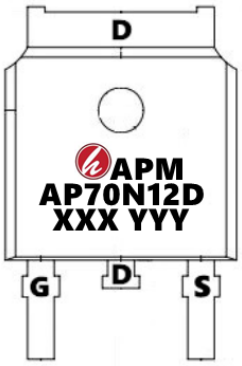
AP70N12D

120V N-Channel Enhancement Mode MOSFET

Description

The AP70N12D uses advanced **SGT II** 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} = 120V I_D =70A

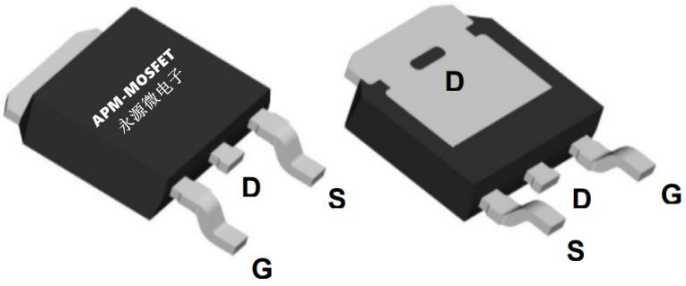
$R_{DS(ON)}$ < 13mΩ @ V_{GS}=10V **（Type：10mΩ）**

Application

Mobile phone fast charging

Brushless motor

Home appliance control board



Package Marking and Ordering Information

Product ID	Pack	Marking	Qty(PCS)
AP70N12D	TO-252-3L	AP70N12D XXX YYYY	2500

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

Symbol	Parameter	Value	Unit
VDS	Drain source voltage	120	V
VGS	Gate source voltage	±20	V
I_D@T_A=25℃	Continuous drain current[1], T_C=25 ℃	70	A
I_D@T_A=70℃	Continuous drain current[1], T_C=75 ℃	35	A
ID, pulse	Pulsed drain current[2], T_C=25 ℃	150	A
P_D	Power dissipation[3], T_C=25 ℃	140	W
EAS	Single pulsed avalanche energy[4]	53.8	mJ
Tstg，Tj	Operation and storage temperature	-55 to 150	℃
RθJC	Thermal resistance, junction-case	0.89	℃/W
RθJA	Thermal resistance, junction-ambient[5]	62.5	℃/W

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

Symbol	Parameter	Test condition	Min	Typ	Max	Unit
BVDSS	Drain-source breakdown voltage	V_{GS}=0 V, I_D=250 μA	120	125		V
VGS(th)	Gate threshold voltage	V_{DS}=V_{GS}, I_D=250 μA	1.2	1.8	2.5	V
RDS(ON)	Drain-source on-state resistance	V_{GS}=10 V, I_D=30 A		10	13	mΩ
RDS(ON)	Drain-source on-state resistance	V_{GS}=4.5 V, I_D=20 A		15	18	mΩ
IGSS	Gate-source leakage current	V_{GS}=±20 V			±100	nA
IDSS	Drain-source leakage current	V_{DS}=120 V, V_{GS}=0 V			1	uA
Ciss	Input capacitance	V_{GS}=0 V, V_{DS}=50 V, f=100 kHz		2640		pF
Coss	Output capacitance			330		pF
Crss	Reverse transfer capacitance			11		pF
td(on)	Turn-on delay time	V_{GS}=10 V, V_{DS}=50 V, R_G=2 Ω, I_D=25 A		22		ns
t_r	Rise time			10		ns
td(off)	Turn-off delay time			85		ns
t_f	Fall time			112		ns
Q_g	Total gate charge	I_D=25 A, V_{DS}=50 V, V_{GS}=10 V		33		nC
Q_{gs}	Gate-source charge			5.6		nC
Qgd	Gate-drain charge			7.2		nC
Vplateau	Gate plateau voltage			3.1		V
I_S	Diode forward current	VGS<Vth			50	A
ISP	Pulsed source current	VGS<Vth			150	A
VSD	Diode forward voltage	I_S=12 A, V_{GS}=0 V			1.3	V
trr	Reverse recovery time	I_S=25 A, di/dt=100 A/μs		62.3		ns
Q_{rr}	Reverse recovery charge			135.3		nC
Irrm	Peak reverse recovery current			3.5		A

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 .The EAS data shows Max. rating .

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

4、EAS condition: T_J=25℃, V_{DD}= 50V, V_G= 10V, R_G=25Ω, L=0.5mH, I_{AS}= 30A

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

Typical Characteristics

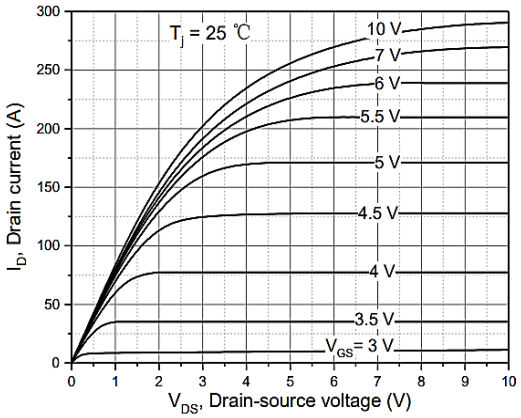


Figure 1. Typ. output characteristics

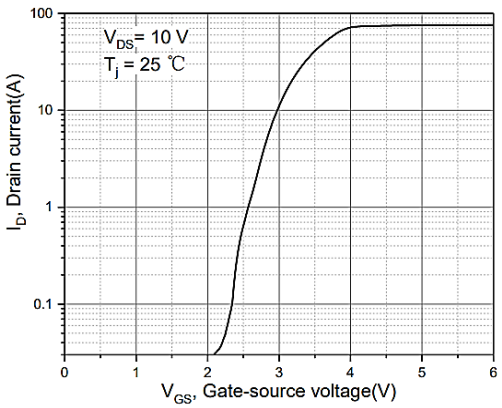


Figure 2. Typ. transfer characteristics

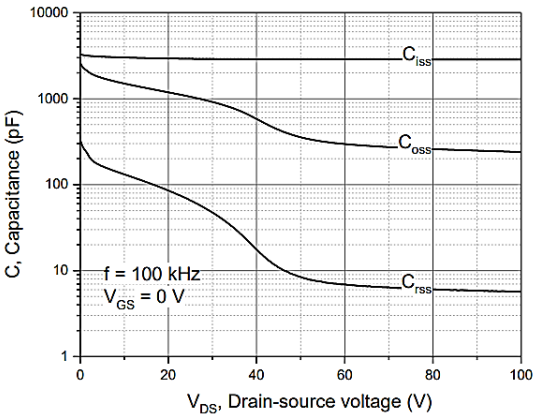


Figure 3. Typ. capacitances

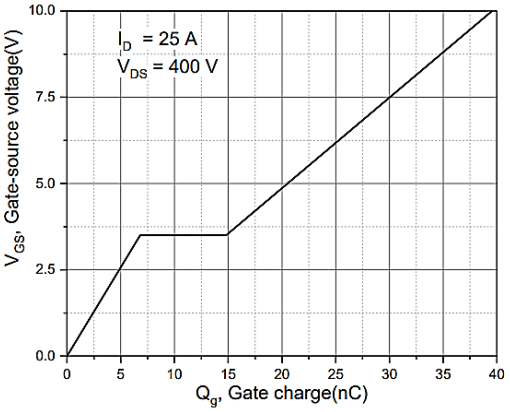


Figure 4. Typ. gate charge

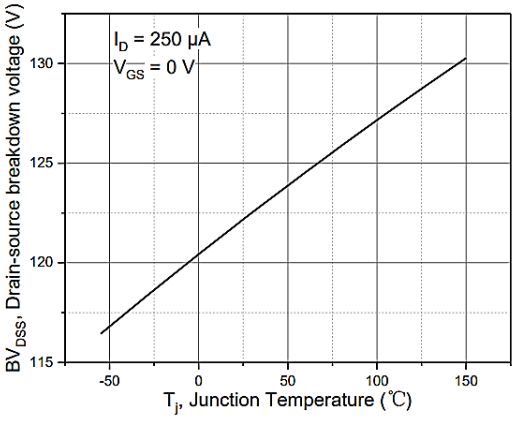


Figure 5. Drain-source breakdown voltage

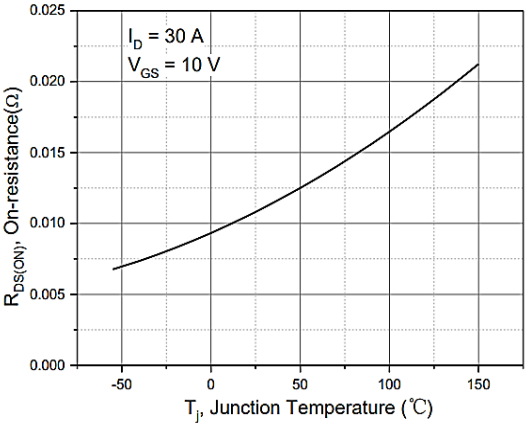


Figure 6. Drain-source on-state resistance

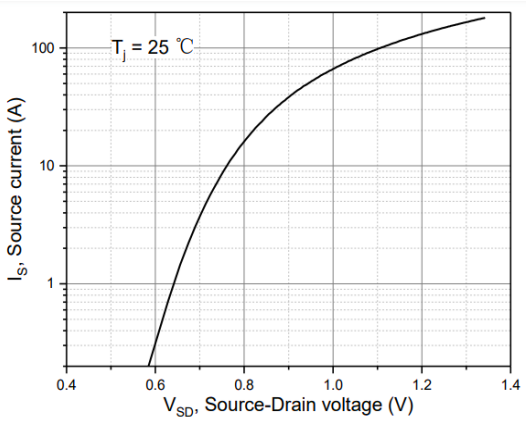


Figure 7. Forward characteristic of body diode

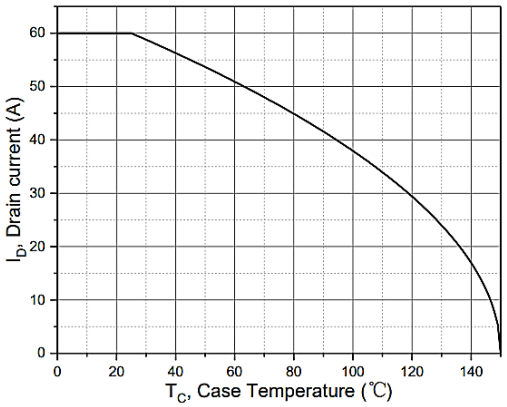


Figure 8. Drain current

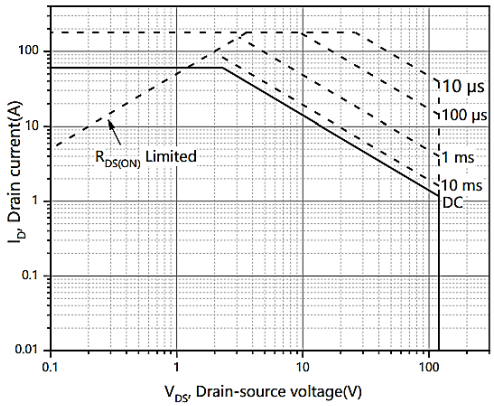
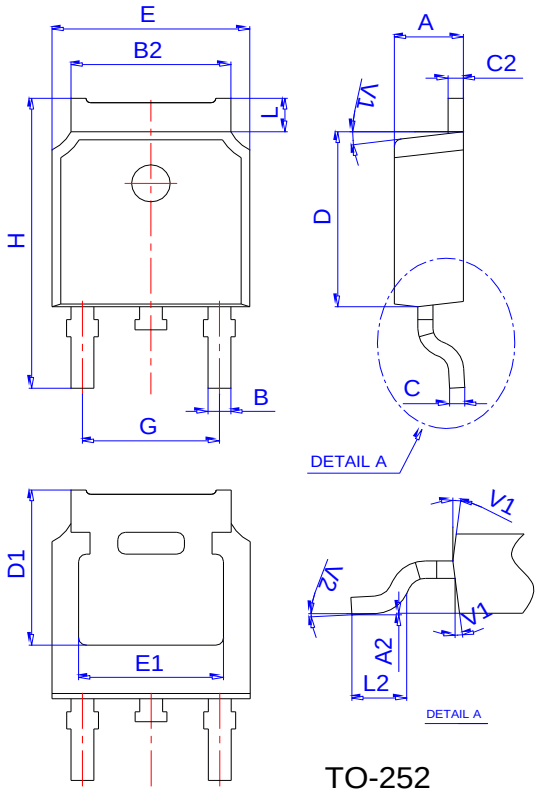


Figure 9. Safe operation area T_C=25 ℃

120V N-Channel Enhancement Mode MOSFET

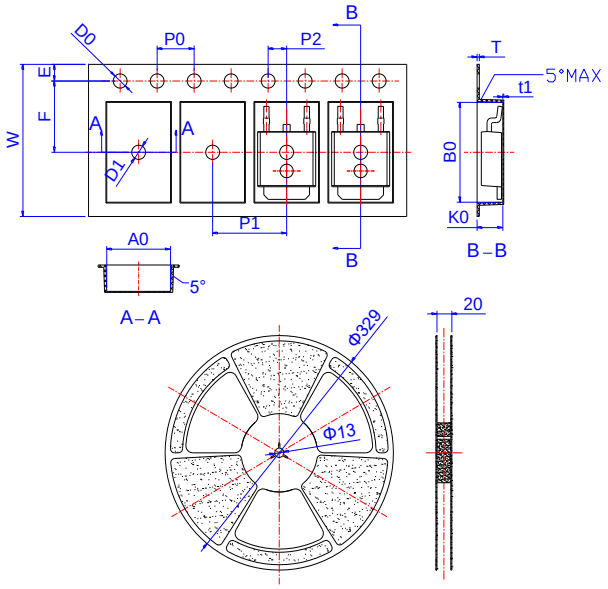
Package Mechanical Data:TO-252-3L



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

Attention

1. Any and all APM Microelectronics products described or contained herein do not have specifications that can handle applications that require extremely high levels of reliability, such as life support systems, aircraft's control systems, or other applications whose failure can be reasonably expected to result in serious physical and/or material damage. Consult with your APM Microelectronics representative nearest

Edition	Date	Change
Rve1.0	2021/8/1	Initial release