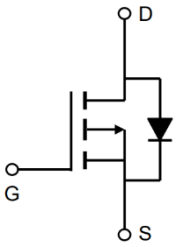
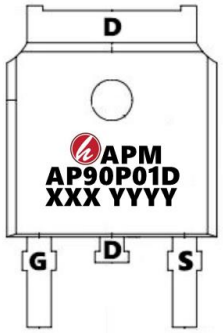
AP90P01D

12V P-Channel Enhancement Mode MOSFET

Description

The AP90P01D uses advanced trench technology to provide excellent $R_{DS(ON)}$, low gate charge and operation with gate voltages as low as 2.5V. This device is suitable for use as a Battery protection or in other Switching application.





General Features

V_{DS}=12V I_D =90A

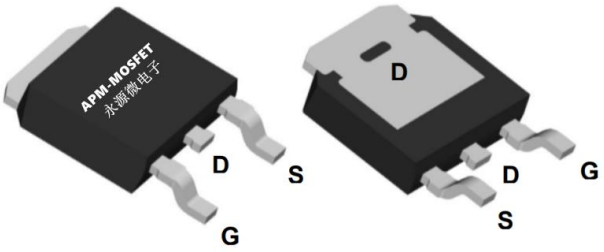
$R_{DS(ON)}$ < 4.5mΩ @ V_{GS}=4.5V **(Type：3.5mΩ)**

Application

Battery protection

Load switch

Uninterruptible power supply



Package Marking and Ordering Information

Product ID	Pack	Marking	Qty(PCS)
AP90P01D	TO-252-3L	AP90P01D XXX YYYY	2500

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

Symbol	Parameter	Rating	Units
VDS	Drain-Source Voltage	-12	V
VGS	Gate-Source Voltage	±12	V
I_D@T_C=25℃	Continuous Drain Current, V_{GS} @ 10V[1]	-90	A
I_D@T_C=100℃	Continuous Drain Current, V_{GS} @ 10V[1]	-54	A
IDM	Drain Current – Pulsed1	-240	A
IAS	Avalanche Current	50	A
EAS	Single Pulsed Avalanche Energy	560	mJ
TJ, TSTG	Operating and Storage Temperature Range	-55 to 150	℃
RθJA	Thermal Resistance Junction to ambient	62.5	℃/W
RθJC	Thermal Resistance Junction to Case	3	℃/W

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

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
BVDSS	Drain-Source Breakdown Voltage	VGS=0V , ID=-250uA	-12	-18	---	V
△BVDSS/△TJ	BVDSS Temperature Coefficient	Reference to 25℃ , ID=-1mA	---	-0.008	---	V/℃
RDS(ON)	Static Drain-Source On-Resistance	VGS=-4.5V , ID=-20A	---	3.5	4.5	mΩ
		VGS=-2.5V , ID=-20A	---	4.8	6.0	
VGS(th)	Gate Threshold Voltage	VGS=VDS , ID =-250uA	-0.4	-0.6	-1.0	V
△VGS	VGS(th) Temperature Coefficient		---	-3.44	---	mV/℃
IDSS	Drain-Source Leakage Current	VDS=-20V , VGS=0V , TJ=25℃	---	---	-1	uA
		VDS=-16V ,VGS=0V ,TJ=125℃	---	---	-30	uA
IGSS	Gate-Source Leakage Current	VGS=±12V , VDS=0V	---	---	±500	nA
gfs	Forward Transconductance	VDS=-10V , IS=-3A	---	30	---	S
Qg	Total Gate Charge	VDS=-16V , VGS=-4.5V , ID=-5A	---	149	225	nC
Qgs	Gate-Source Charge		---	14.4	22	
Qgd	Gate-Drain Charge		---	42.8	65	
Td(on)	Turn-On Delay Time	VDD=-15V , VGS=-4.5V , RG=25□ ID=-1A	---	21.2	42	nS
Tr	Rise Time		---	20.6	40	
Td(off)	Turn-Off Delay Time		---	26	52	
Tf	Fall Time		---	400	600	
Ciss	Input Capacitance	VDS=-15V , VGS=0V , F=1MHz	---	6800		pF
Coss	Output Capacitance		---	769		
Crss	Reverse Transfer Capacitance		---	726		
Rg	Gate resistance	VGS=0V, VDS=0V, F=1MHz	---	2.6	---	Ω
IS	Contineous Source Current	Vg=Vd=0V, Force Current	--	--	-90	A
ISM	Pulsed Source Current		--	--	-180	
VSD	Diode Forward Voltage	Vgs=0V Is=1A Tj=25℃	--	--	-1	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 VDD=8V,VGS=4.5V,L=0.1mH,IAS =50A

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

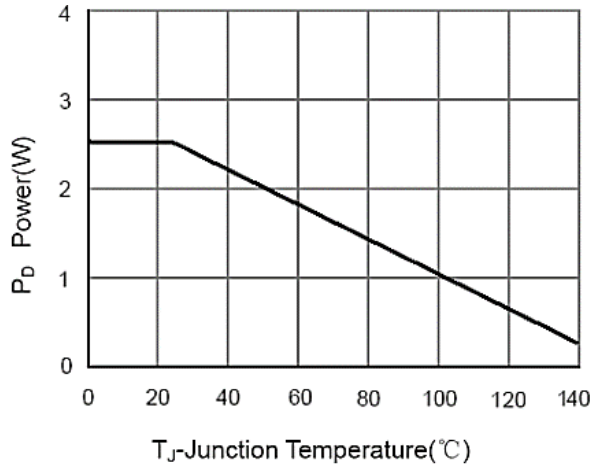


Figure 1：Power Dissipation

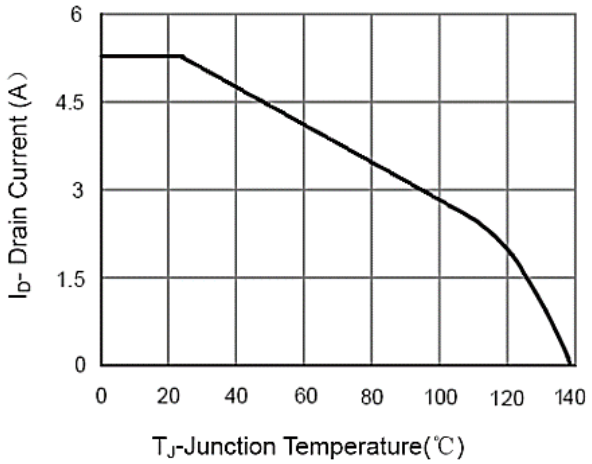


Figure 2：Drain Current

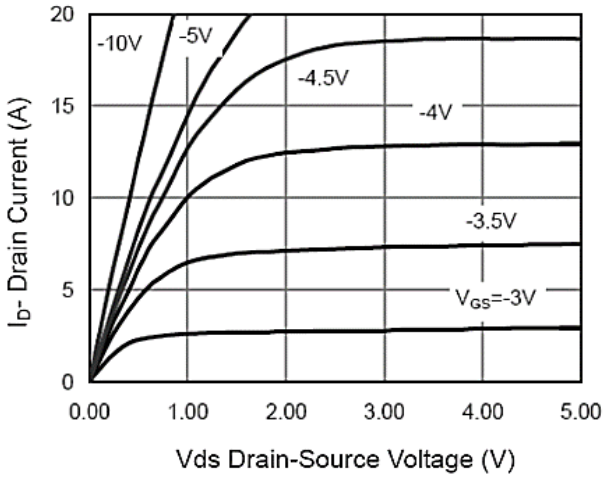


Figure 3：Output Characteristics

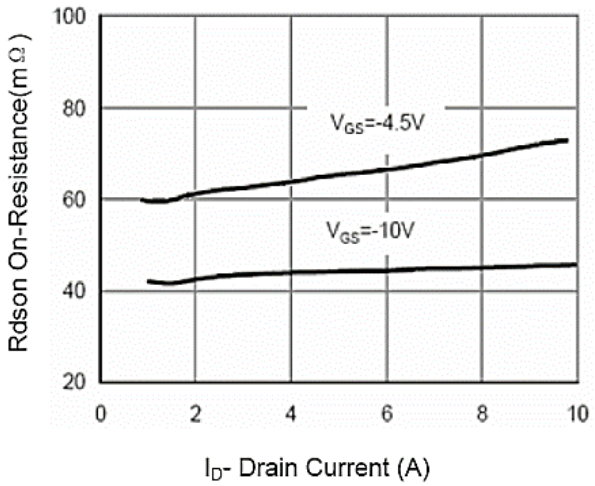


Figure 4：Drain-Source On-Resistance

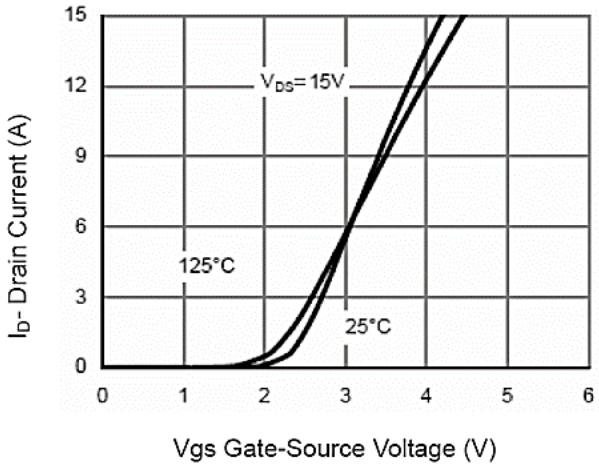


Figure 5：Transfer Characteristics

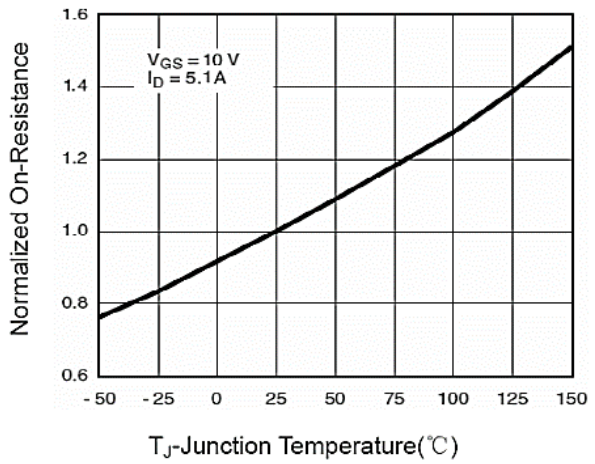


Figure 6：Drain-Source On-Resistance

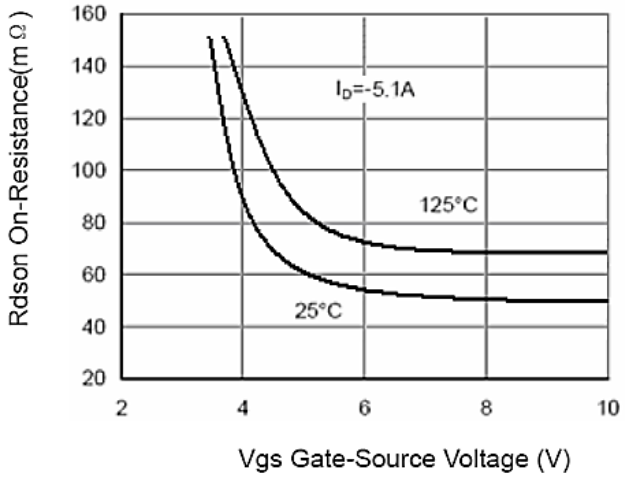


Figure 7：Rdson vs Vgs

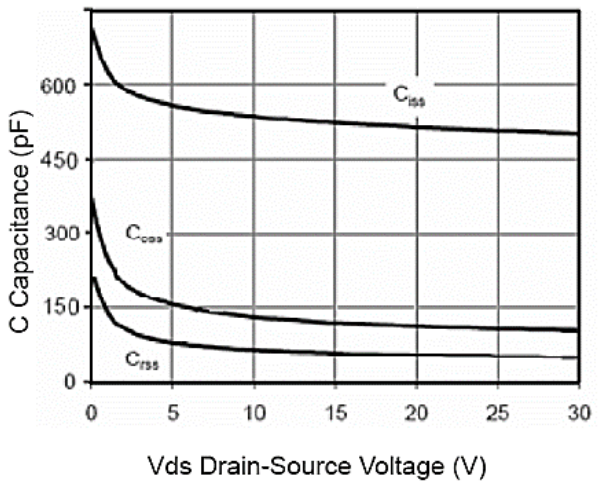


Figure 8：Capacitance vs Vds

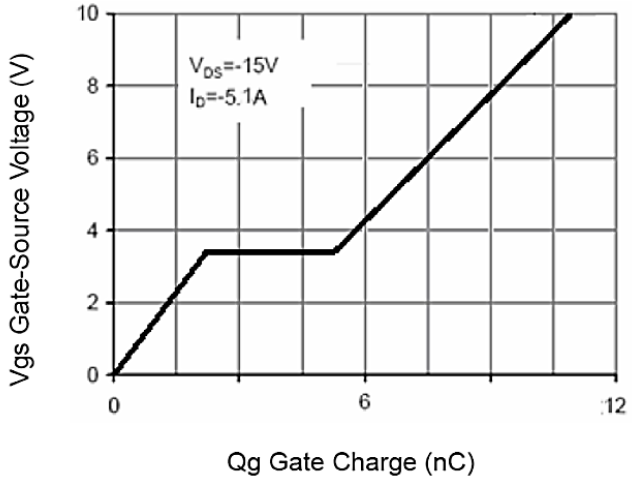


Figure 9：Gate Charge

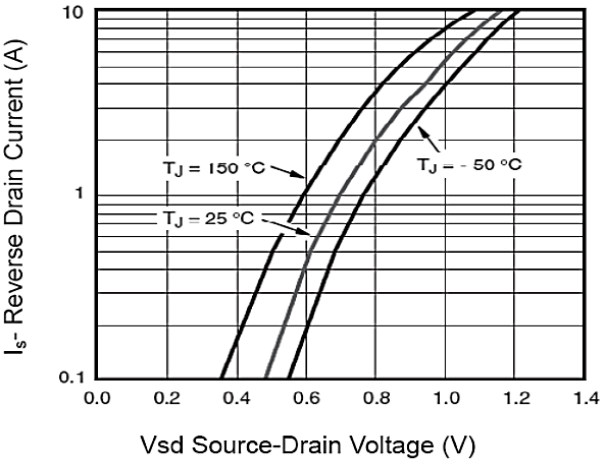


Figure 10：Sourece-Drain Diode Forward

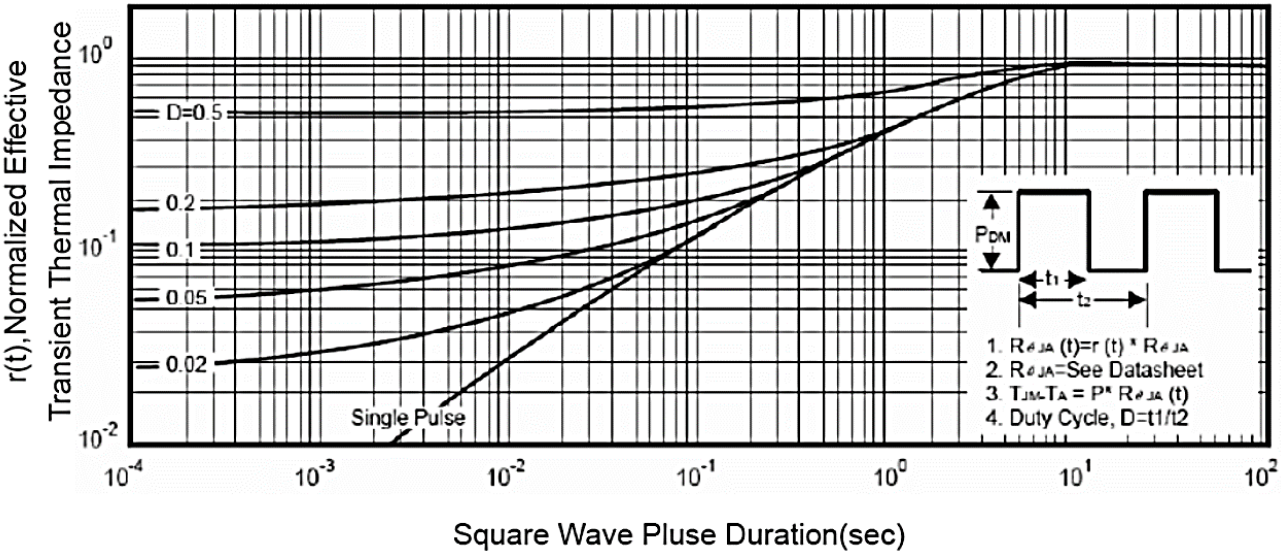
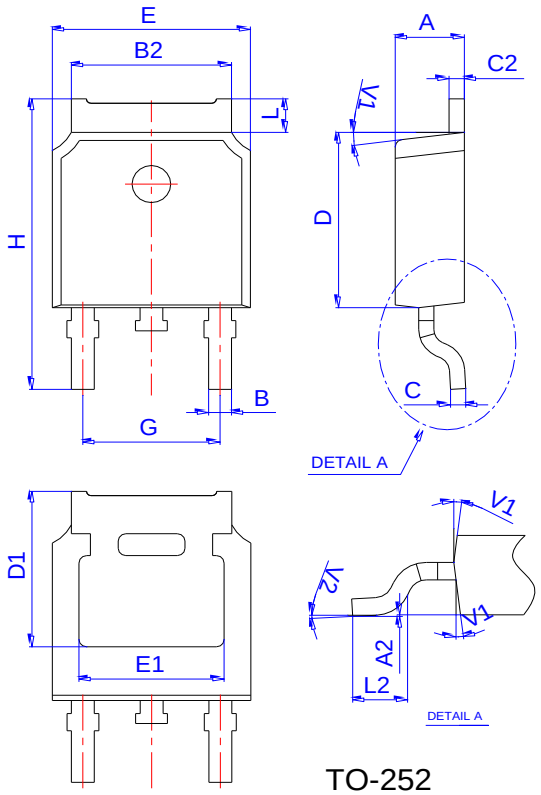


Figure.11: Maximum Effective Transient Thermal Impedance, Junction-to-Case

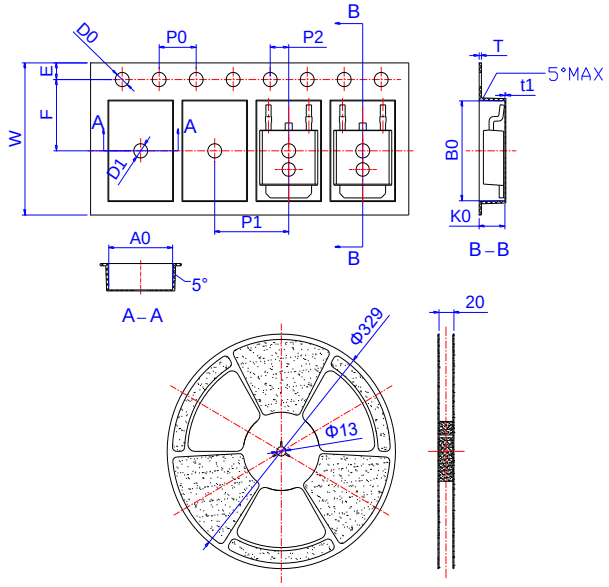
Package Mechanical Data:TO-252-3L



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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12V P-Channel Enhancement Mode MOSFET

Edition	Date	Change
Rve1.0	2020/5/1	Initial release