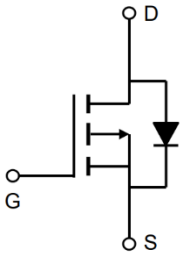
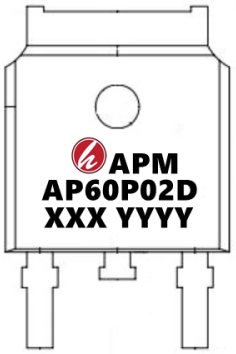
AP60P02D

-20V P-Channel Enhancement Mode MOSFET

Description

The AP60P02D 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} = -20V I_D =-60A

$R_{DS(ON)}$ < 12mΩ @ V_{GS}=-4.5V (Type： 8mΩ)

Application

Battery protection

Load switch

Uninterruptible power supply

Package Marking and Ordering Information

Product ID	Pack	Marking	Qty(PCS)
AP60P02D	TO-252-3L	AP60P02D XXX YYYY	2500

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

Symbol	Parameter	Rating	Units
VDS	Drain-Source Voltage	-20	V
VGS	Gate-Source Voltage	±12	V
I_D@T_C=25℃	Continuous Drain Current, V_{GS} @ -4.5V[1]	-60	A
I_D@T_C=70℃	Continuous Drain Current, V_{GS} @ -4.5V[1]	-48	A
IDM	Pulsed Drain Current[2]	-200	A
P_D@T_C=25℃	Total Power Dissipation[3]	60	W
P_D@T_C=70℃	Total Power Dissipation[3]	48	W
TSTG	Storage Temperature Range	-55 to 150	℃
T_J	Operating Junction Temperature Range	-55 to 150	℃
$R_{\theta}JA$	Thermal Resistance Junction-Ambient [1]	75	℃/W
$R_{\theta}JA$	Thermal Resistance Junction-Ambient [1] (t ≤10s)	40	℃/W
$R_{\theta}JC$	Thermal Resistance Junction-Case[1]	3.6	℃/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	-20	-22	---	V
△BVDSS/△TJ	BV_{DSS} Temperature Coefficient	Reference to 25℃ , I_D=-1mA	---	-0.012	---	V/℃
RDS(ON)	Static Drain-Source On-Resistance[2]	V_{GS}=-4.5V , I_D=-10A	---	8	12	mΩ
RDS(ON)	Static Drain-Source On-Resistance[2]	V_{GS}=-2.5V , I_D=-5.0A	---	11	116	
VGS(th)	Gate Threshold Voltage	V_{GS}=V_{DS} , I_D =-250uA	-0.4	0.65	-1.0	V
△$V_{GS(th)}$	$V_{GS(th)}$ Temperature Coefficient		---	2.94	---	mV/℃
IDSS	Drain-Source Leakage Current	V_{DS}=-20V , V_{GS}=0V , T_J=25℃	---	---	1	uA
IGSS	Gate-Source Leakage Current	V_{GS}=±12V , V_{DS}=0V	---	---	±100	nA
gfs	Forward Transconductance	V_{DS}=-10V , I_D=-10A	12	---	---	S
Q_g	Total Gate Charge (-4.5V)	V_{DS}=-10V , V_{GS}=-4.5V , I_D=-10A	---	63	---	nC
Qgs	Gate-Source Charge		---	9.1	---	
Qgd	Gate-Drain Charge		---	13	---	
Td(on)	Turn-On Delay Time	V_{DD}=-10V , V_{GS}=-4.5V , R_G=6.0Ω, I_D=-1A	---	10	---	ns
T_r	Rise Time		---	15	---	
Td(off)	Turn-Off Delay Time		---	110	---	
T_f	Fall Time		---	70	---	
Ciss	Input Capacitance	V_{DS}=-15V , V_{GS}=0V , f=1MHz	---	1600	---	pF
Coss	Output Capacitance		---	350	---	
Crss	Reverse Transfer Capacitance		---	300	---	
IS	Continuous Source Current[1,4]	V_G=V_D=0V , Force Current	---	---	-50	A
VSD	Diode Forward Voltage[2]	V_{GS}=0V , I_S=-15A , T_J=25℃	---	---	-1.2	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=-16V,VGS=-10V,L=0.1mH,IAS=12A

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

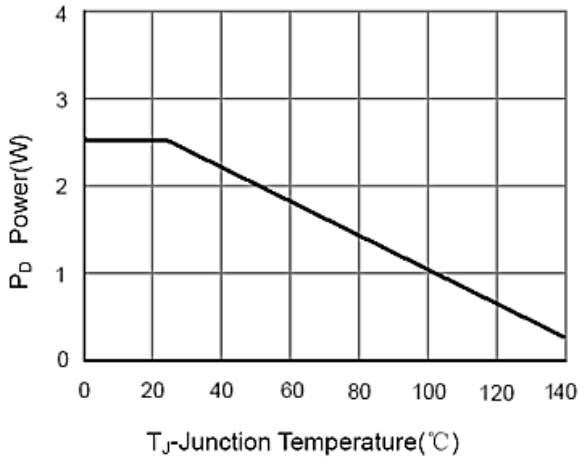


Figure 1：Power Dissipation

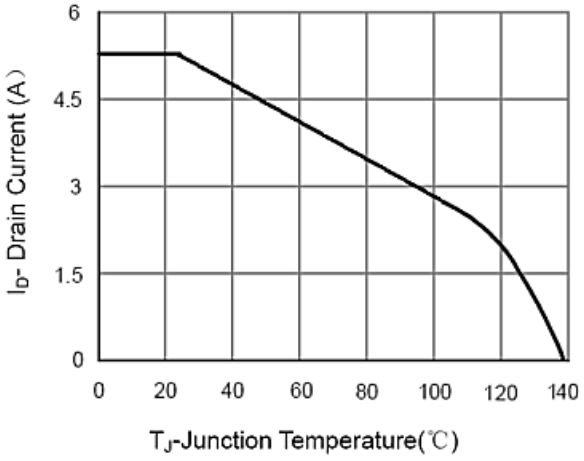


Figure 2：Drain Current

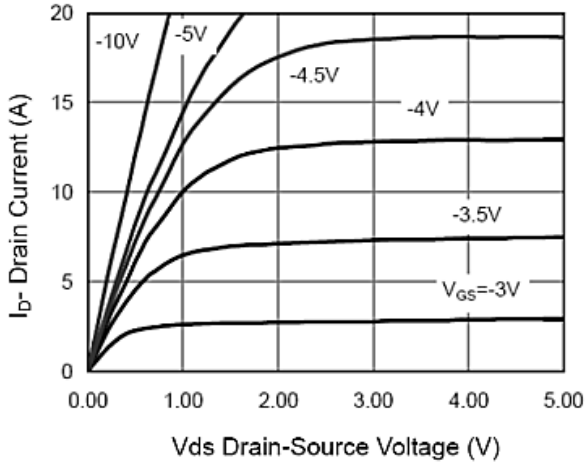


Figure 3：Output Characteristics

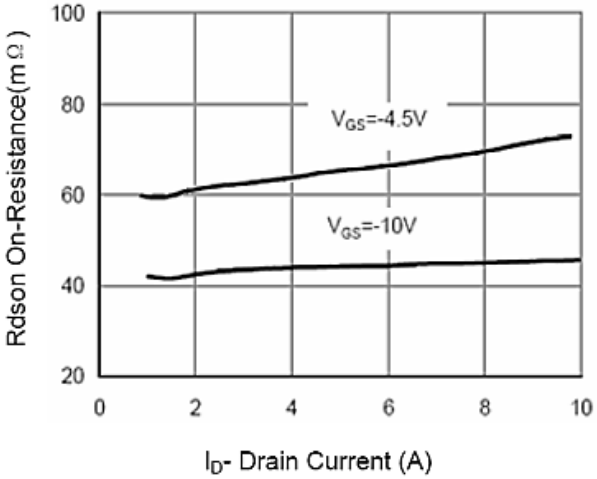


Figure 4：Drain-Source On-Resistance

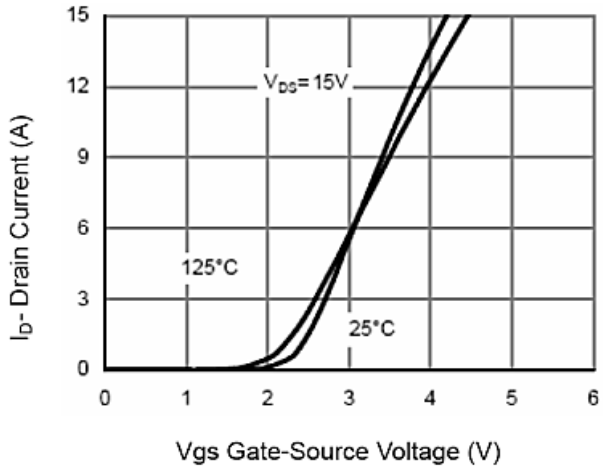


Figure 5：Transfer Characteristics

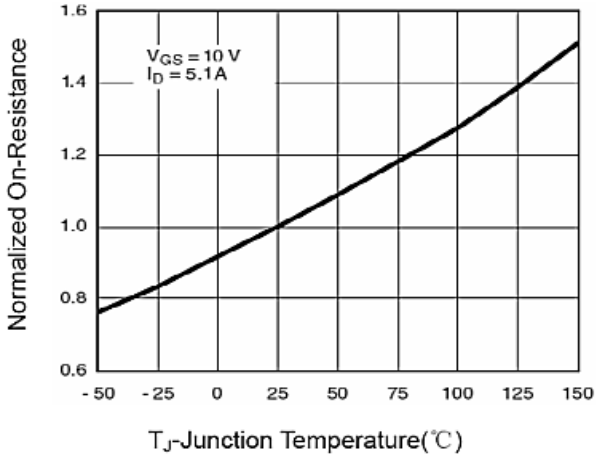


Figure 6：Drain-Source On-Resistance

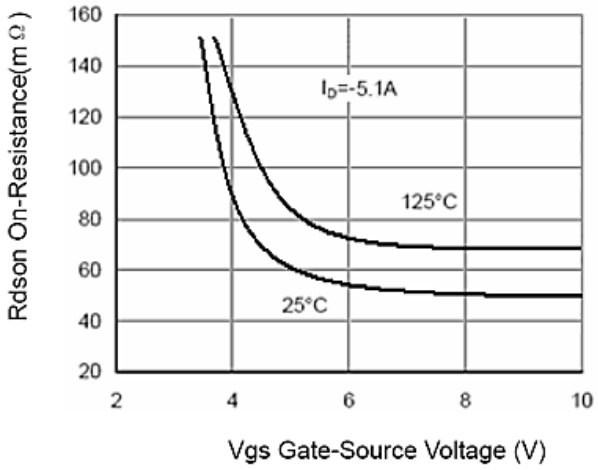


Figure 7：Rdson vs Vgs

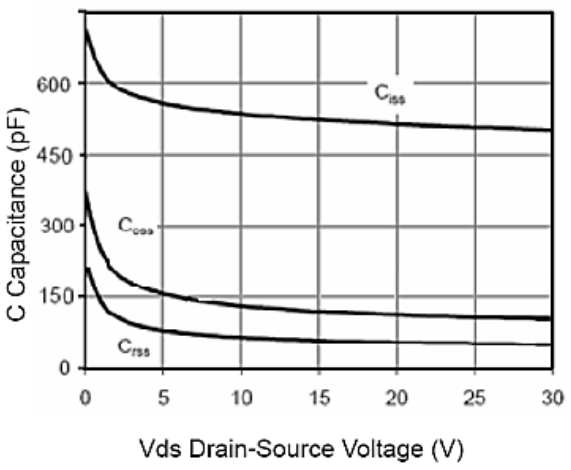


Figure 8：Capacitance vs Vds

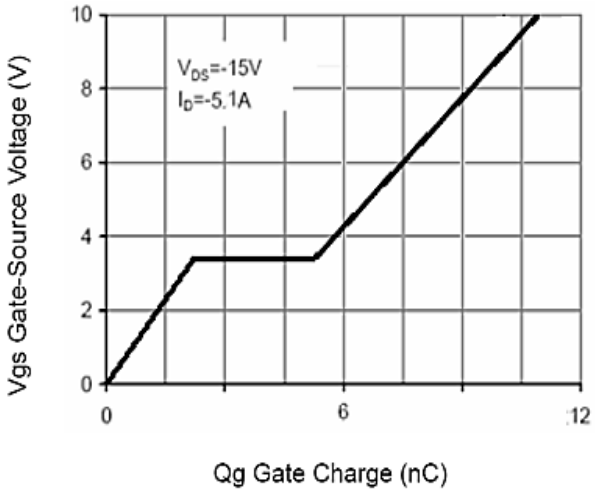


Figure 9：Gate Charge

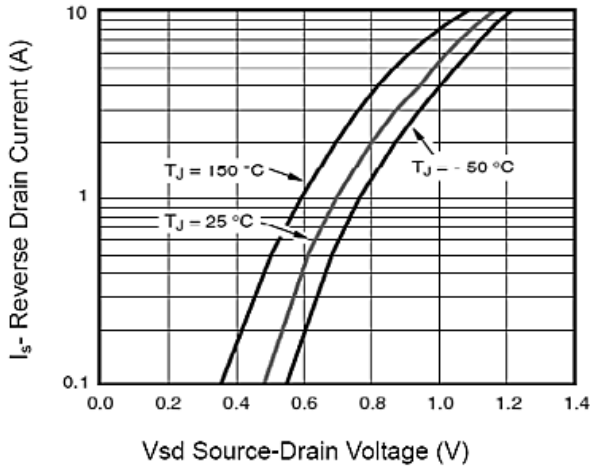


Figure 10：Sourece-Drain Diode Forward

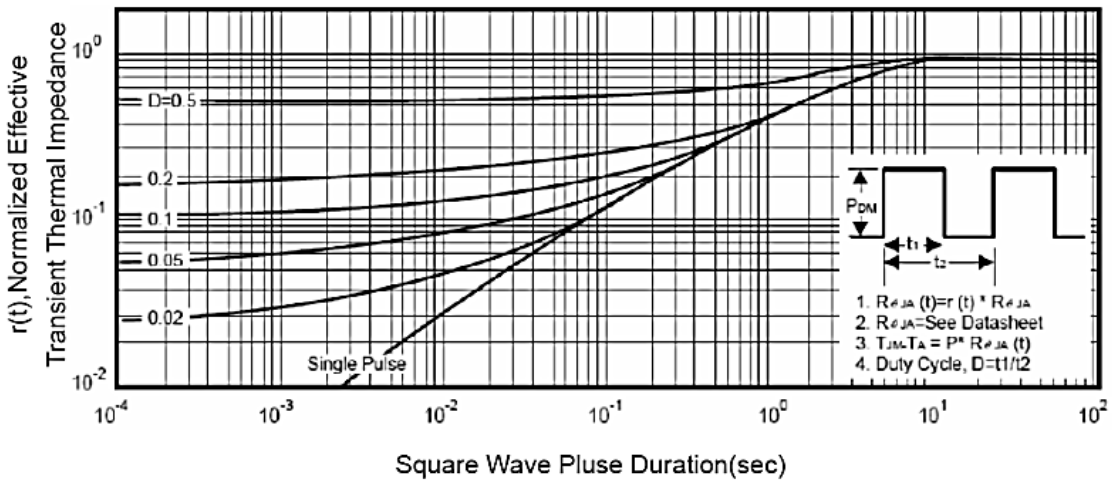
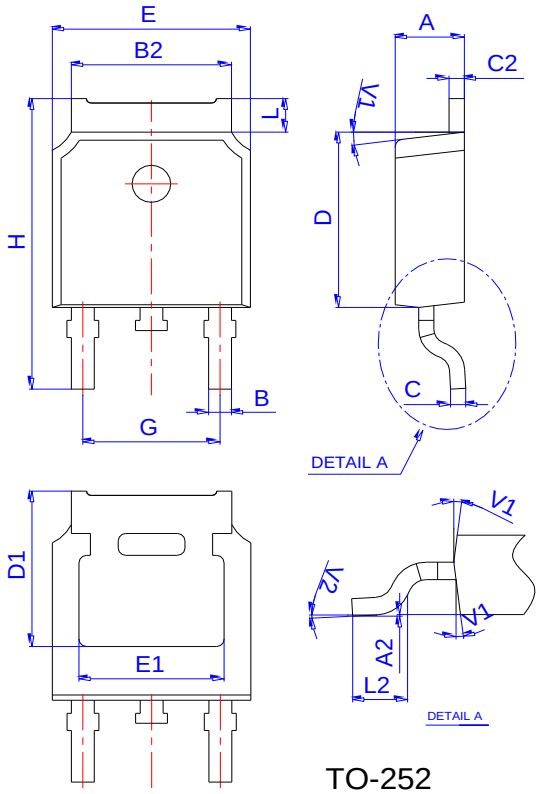


Figure.11: Maximum Effective Transient Thermal Impedance, Junction-to-Case

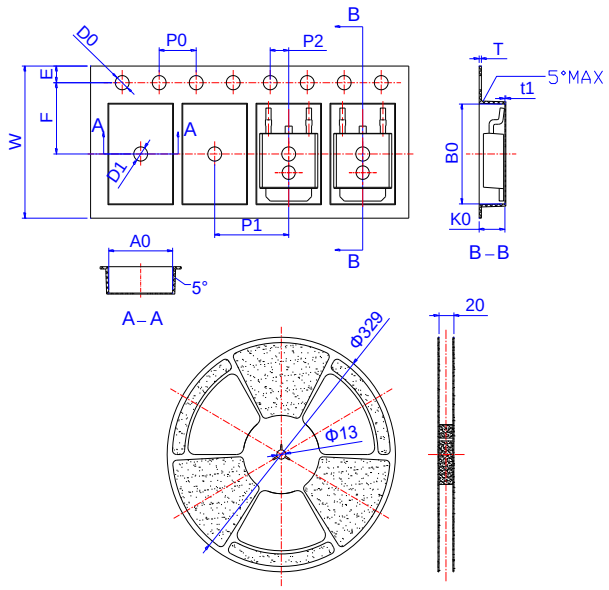
Package Mechanical Data：TO-252-3L



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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-20V P-Channel Enhancement Mode MOSFET

Edition	Date	Change
Rve1.0	2021/1/31	Initial release

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