AP10P10D
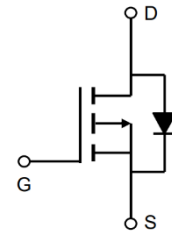
-100V P-Channel Enhancement Mode MOSFET

Description

The AP10P10D uses advanced trench technology to provide excellent $R_{DS(ON)}$, low gate charge and operation with gate voltages as low as 5V. This device is suitable for use as a Battery protection or in other Switching application.

General Features

V_{DS} = -100V I_D =-10A

$R_{DS(ON)}$ < 400mΩ @ V_{GS}=-10V

Application

Auto Alarm Controller

POS

Brushless Motor

Package Marking and Ordering Information

Product ID	Pack	Marking	Qty(PCS)
AP10P10D	TO-252-3L	AP10P10D XXX YYYY	2500

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

Symbol	Parameter	Rating	Units
V_{DS}	Drain-Source Voltage	-100	V
V_{GS}	Gate-Source Voltage	±20	V
I_D@T_A=25℃	Continuous Drain Current, V_{GS} @ -10V[1]	-10	A
I_D@T_A=70℃	Continuous Drain Current, V_{GS} @ -10V[1]	-6.7	A
I_{DM}	Pulsed Drain Current[2]	-50	A
P_D@T_A=25℃	Total Power Dissipation[3]	4.5	W
T_{STG}	Storage Temperature Range	-55 to 150	℃
T_J	Operating Junction Temperature Range	-55 to 150	℃
$R_{θJA}$	Thermal Resistance Junction-ambient [1]	60	℃/W
$R_{θJC}$	Thermal Resistance Junction-Case[1]	645	℃/W

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-100V P-Channel Enhancement Mode MOSFET

Electrical Characteristics (T$_J$=25°C, unless otherwise noted)

| Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
BVDSS	Drain-Source Breakdown Voltage	V$_{GS}$=0V , I$_D$=-250uA	-100	-116	---	V
△BVDSS/△TJ	BVDSS Temperature Coefficient	Reference to 25°C , I$_D$=-1mA	---	-0.0624	---	V/$^\circ$C
RDS(ON)	Static Drain-Source On-Resistance[2]	V$_{GS}$=-10V , I$_D$=-3A	---	325	400	mΩ
		V$_{GS}$=-4.5V , I$_D$=-2A	---	320	420	
VGS(th)	Gate Threshold Voltage	V$_{GS}$=V$_{DS}$, I$_D$ =-250uA	-1.2	-1.8	-2.5	V
△V$_{GS(th)}$	V$_{GS(th)}$ Temperature Coefficient		---	4.5	---	mV/$^\circ$C
IDSS	Drain-Source Leakage Current	V$_{DS}$=-100V , V$_{GS}$=0V , T$_J$=25°C	---	---	1	uA
		V$_{DS}$=-100V , V$_{GS}$=0V , T$_J$=100°C	---		100	
IGSS	Gate-Source Leakage Current	V$_{GS}$=±20V , V$_{DS}$=0V	---	---	±100	nA
gfs	Forward Transconductance	V$_{DS}$=-5V , I$_D$=-0.8A	---	3	---	S
R$_g$	Gate Resistance	V$_{DS}$=0V , V$_{GS}$=0V , f=1MHz	---	16	32	Ω
Q$_g$	Total Gate Charge (-4.5V)	V$_{DS}$=-15V , V$_{GS}$=-4.5V , I$_D$=-0.5A	---	4.5	---	nC
Qgs	Gate-Source Charge		---	1.14	---	
Qgd	Gate-Drain Charge		---	1.5	---	
Td(on)	Turn-On Delay Time	V$_{DD}$=-50V , V$_{GS}$=-10V , R$_G$=3.3Ω I$_D$=-0.5A	---	17.6	---	ns
T$_r$	Rise Time		---	2.7	---	
Td(off)	Turn-Off Delay Time		---	4.5	---	
T$_f$	Fall Time		---	3	---	
Ciss	Input Capacitance	V$_{DS}$=-15V , V$_{GS}$=0V , f=1MHz	---	550	---	pF
Coss	Output Capacitance		---	56	---	
Crss	Reverse Transfer Capacitance		---	35	---	
IS	Continuous Source Current[1,4]	V$_G$=V$_D$=0V , Force Current	---	---	-3	A
ISM	Pulsed Source Current[2,4]		---	---	-9	A
VSD	Diode Forward Voltage[2]	V$_{GS}$=0V , I$_S$=-1A , T$_J$=25°C	---	---	-1.3	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 power dissipation is limited by 150°C junction temperature

4、The data is theoretically the same as I$_D$ and I$_{DM}$, in real applications , should be limited by total power dissipation.
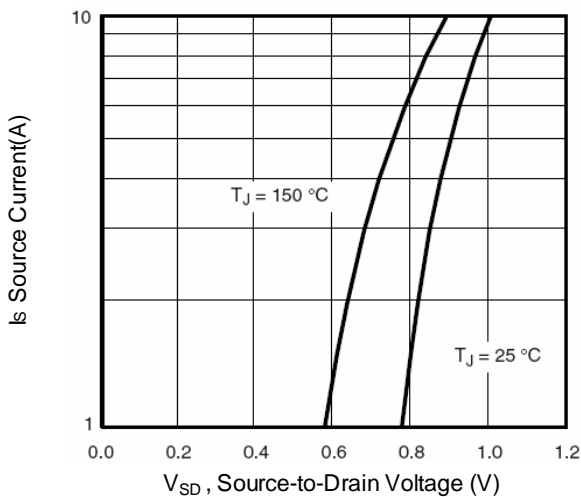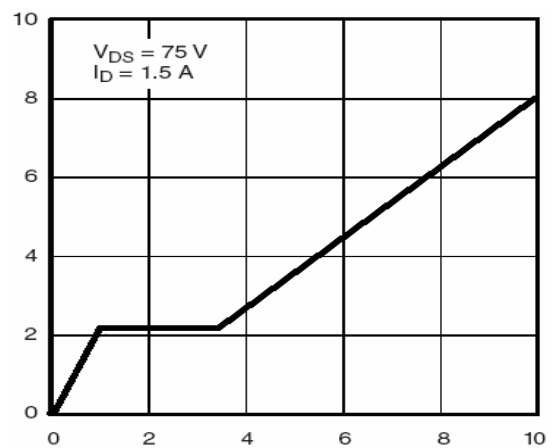
Typical Characteristics
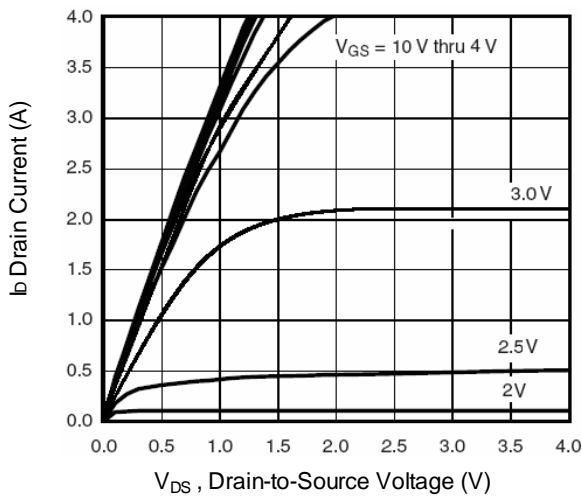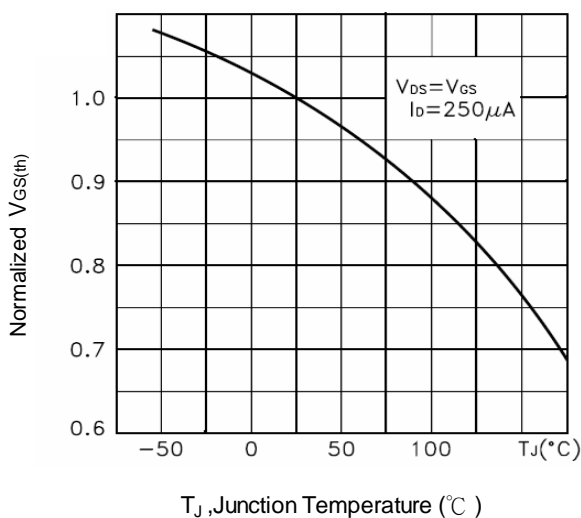
Fig.1 Typical Output Characteristics
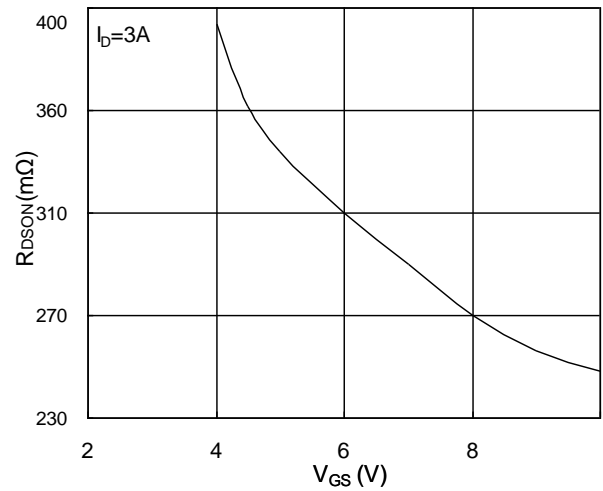
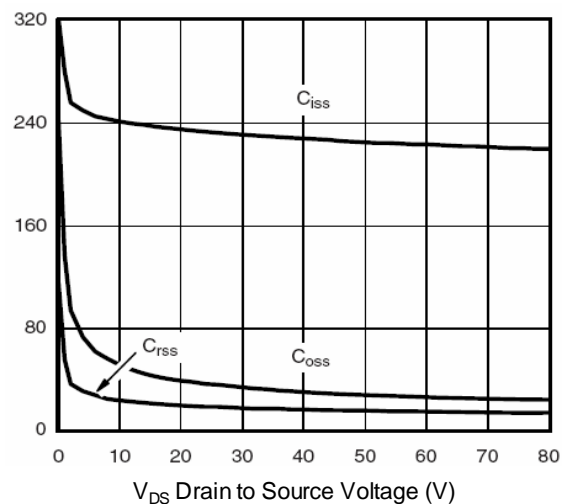**Fig.2 On-Resistance vs. Gate-Source**

Fig.3 Forward Characteristics of Reverse

Fig.4 Gate-Charge Characteristics

Fig.5 Normalized $V_{GS(th)}$ vs. T_J

Fig.6 Capacitance
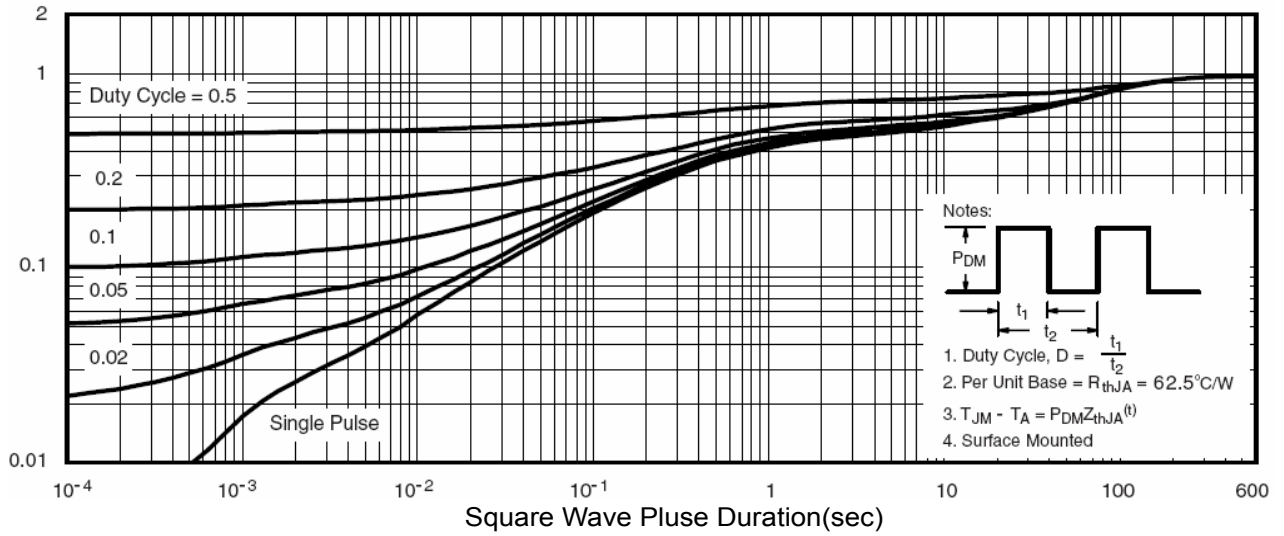
Fig.9 Normalized Maximum Transient Thermal Impedance
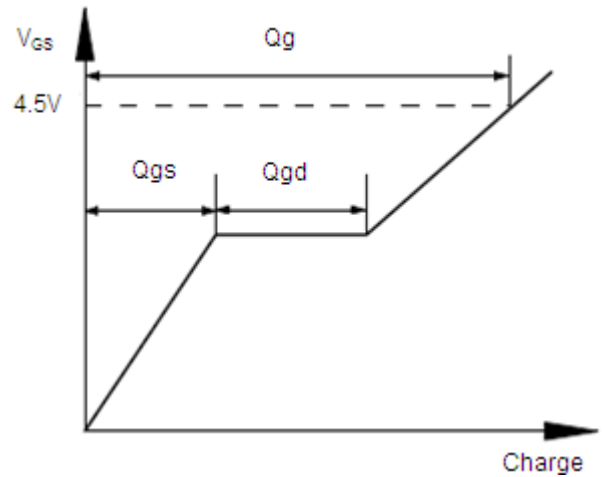
Notes:
1. Duty Cycle, $D = \dfrac{t_1}{t_2}$
2. Per Unit Base = R_{thJA} = 62.5°C/W
3. $T_{JM} - T_A = P_{DM}Z_{thJA}^{(t)}$
4. Surface Mounted
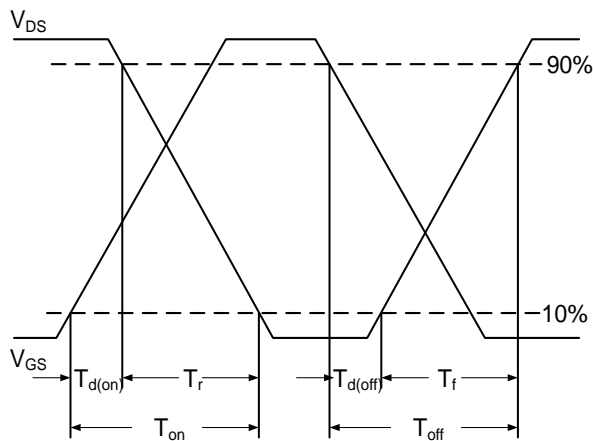
Fig.10 Switching Time Waveform

Fig.11 Gate Charge Waveform

Package Mechanical Data
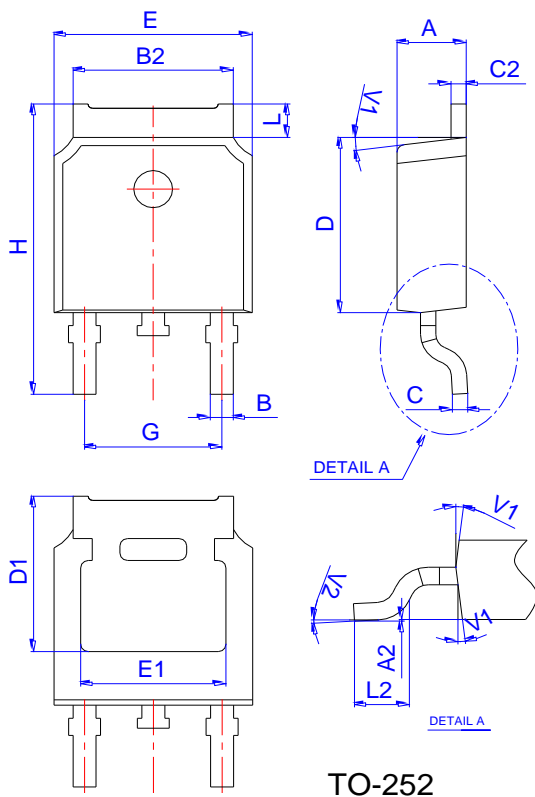
Ref.	Dimensions					
	Millimeters			Inches		
	Min.	Typ.	Max.	Min.	Typ.	Max.
A	2.10		2.50	0.083		0.098
A2	0		0.10	0		0.004
B	0.66		0.86	0.026		0.034
B2	5.18		5.48	0.202		0.216
C	0.40		0.60	0.016		0.024
C2	0.44		0.58	0.017		0.023
D	5.90		6.30	0.232		0.248
D1	5.30REF			0.209REF		
E	6.40		6.80	0.252		0.268
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°

TO-252

Reel Spectification-TO-252
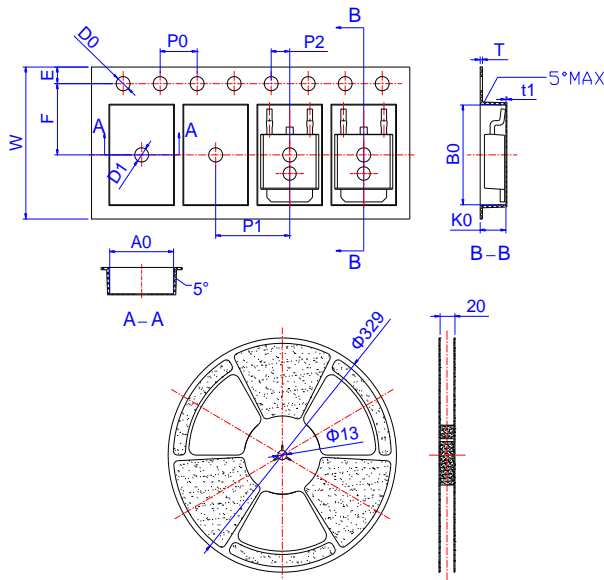
Ref.	Dimensions					
	Millimeters			Inches		
	Min.	Typ.	Max.	Min.	Typ.	Max.
W	15.90	16.00	16.10	0.626	0.630	0.634
E	1.65	1.75	1.85	0.065	0.069	0.073
F	7.40	7.50	7.60	0.291	0.295	0.299
D0	1.40	1.50	1.60	0.055	0.059	0.063
D1	1.40	1.50	1.60	0.055	0.059	0.063
P0	3.90	4.00	4.10	0.154	0.157	0.161
P1	7.90	8.00	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	2020/8/11	Initial release

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