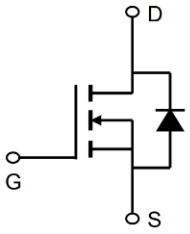
AP10N06D

60V N-Channel Enhancement Mode MOSFET

Description

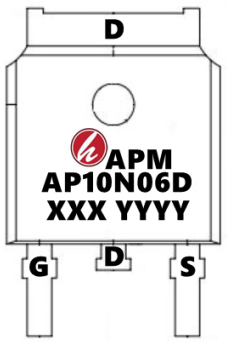
The AP10N06D uses advanced trench technology to provide excellent $R_{DS(ON)}$, low gate charge and operation with gate voltages as low as 4.5V. This device is suitable for use as a Battery protection or in other Switching application.



General Features

V_{DS} = 60V I_D =13A

$R_{DS(ON)}$ < 80mΩ @ V_{GS}=10V (Type: 65mΩ)



Application

Battery protection

Load switch

Uninterruptible power supply

Package Marking and Ordering Information

Product ID	Pack	Marking	Qty(PCS)
AP10N06D	TO-252-3L	AP10N06D XXXX YYYY	2500

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

Symbol	Parameter	Rating	Units
V_{DS}	Drain-Source Voltage	60	V
V_{GS}	Gate-Source Voltage	±20	V
I_D@T_C=25℃	Continuous Drain Current, V_{GS} @ 10V[1]	13	A
I_D@T_C=100℃	Continuous Drain Current, V_{GS} @ 10V[1]	10	A
I_{DM}	Pulsed Drain Current[2]	50	A
EAS	Single Pulse Avalanche Energy[3]	11	mJ
I_{AS}	Avalanche Current	10	A
P_D@T_C=25℃	Total Power Dissipation[4]	42	W
T_{STG}	Storage Temperature Range	-55 to 150	℃
T_J	Operating Junction Temperature Range	-55 to 150	℃
$R_{\theta JA}$	Thermal Resistance Junction-ambient [1]	62	℃/W
$R_{\theta JC}$	Thermal Resistance Junction-Case[1]	3	℃/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	60	64	---	V
△BVDSS/△TJ	BVDSS Temperature Coefficient	Reference to 25℃ , I_D=1mA	---	0.044	---	V/℃
RDS(ON)	Static Drain-Source On-Resistance[2]	V_{GS}=10V , I_D=10A	---	65	80	mΩ
		V_{GS}=4.5V , I_D=5A	---	75	90	
VGS(th)	Gate Threshold Voltage	V_{GS}=V_{DS} , I_D =250uA	1.0	1.6	2.5	V
△$V_{GS(th)}$	$V_{GS(th)}$ Temperature Coefficient		---	-4.8	---	mV/℃
IDSS	Drain-Source Leakage Current	V_{DS}=60V , V_{GS}=0V , T_J=25℃	---	---	1	uA
		V_{DS}=60V , V_{GS}=0V , T_J=55℃	---	---	5	
IGSS	Gate-Source Leakage Current	V_{GS}=±20V , V_{DS}=0V	---	---	±100	nA
Q_g	Total Gate Charge (10V)	V_{DS}=30V , V_{GS}=10V , I_D=3A	---	5.1	---	nC
Q_{gs}	Gate-Source Charge		---	1.2	---	
Q_{gd}	Gate-Drain Charge		---	1.5	---	
Td(on)	Turn-On Delay Time	V_{DD}=30V , V_{GS}=10V , R_G=1.0Ω I_D=1.5A	---	13	---	ns
T_r	Rise Time		---	51	---	
Td(off)	Turn-Off Delay Time		---	15.2	---	
T_f	Fall Time		---	10.3	---	
C_{iss}	Input Capacitance	V_{DS}=30V , V_{GS}=0V , f=1MHz	---	330	---	pF
Coss	Output Capacitance		---	65	---	
Crss	Reverse Transfer Capacitance		---	46	---	
I_S	Continuous Source Current[1,6]	V_G=V_D=0V , Force Current	---	---	3	A
ISM	Pulsed Source Current[2,6]		---	---	10	A
VSD	Diode Forward Voltage[2]	V_{GS}=0V , I_S=1A , T_J=25℃	---	---	1.2	V
t_{rr}	Reverse Recovery Time	IF=15A , dI/dt=100A/μs , T_J=25℃	---	12.2	---	nS
Q_{rr}	Reverse Recovery Charge		---	7.3	---	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,IAS =10A

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

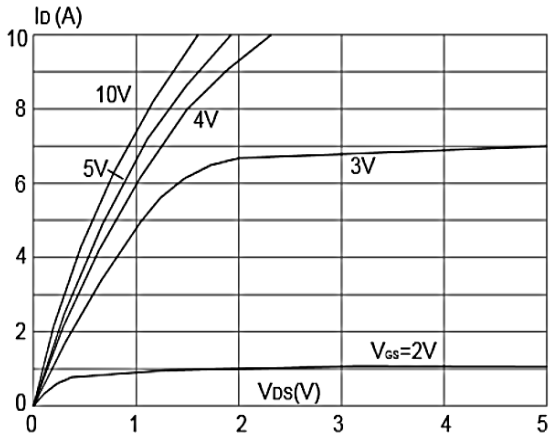


Figure1: Output Characteristics

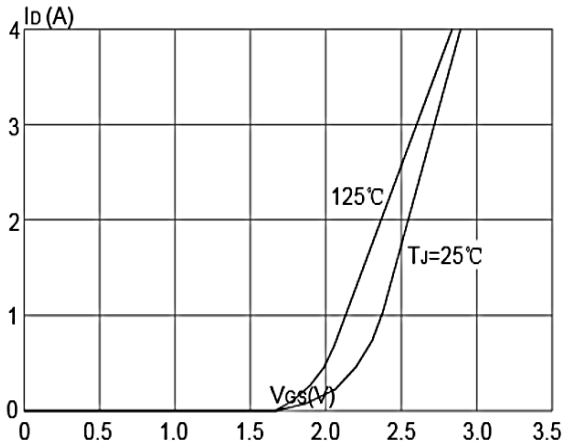


Figure 2: Typical Transfer Characteristics

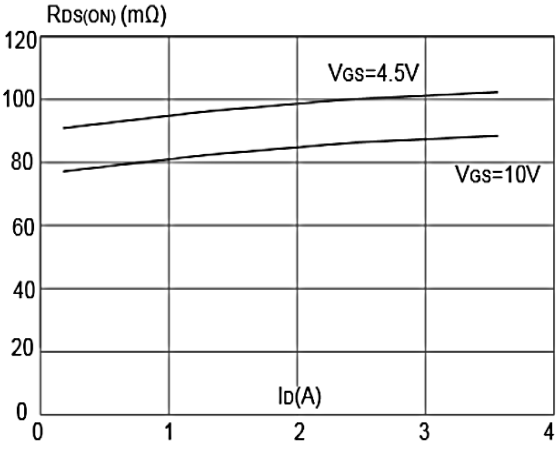


Figure 3:On-resistance vs. Drain Current

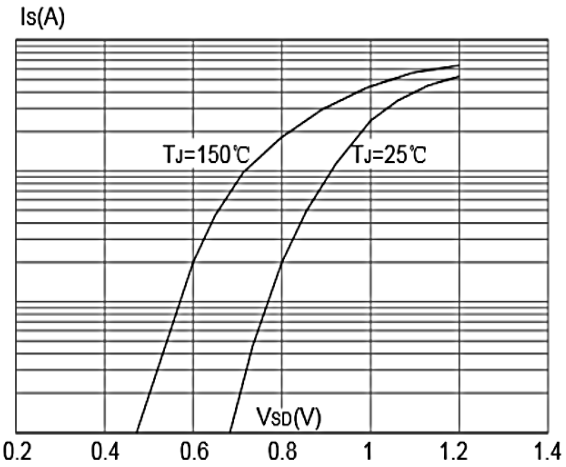


Figure 4: Body Diode Characteristics

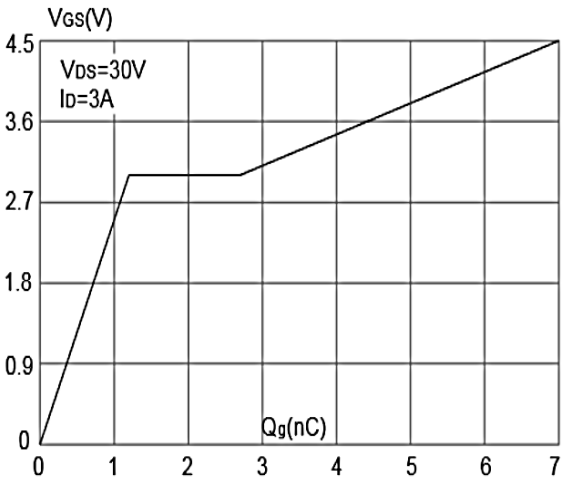


Figure 5: Gate Charge Characteristics

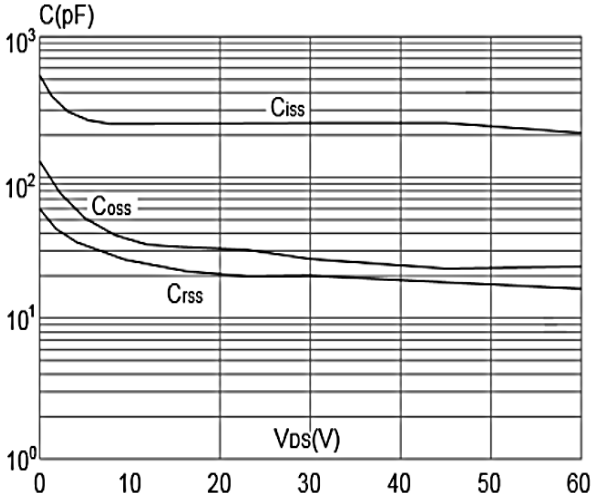


Figure 6: Capacitance Characteristics

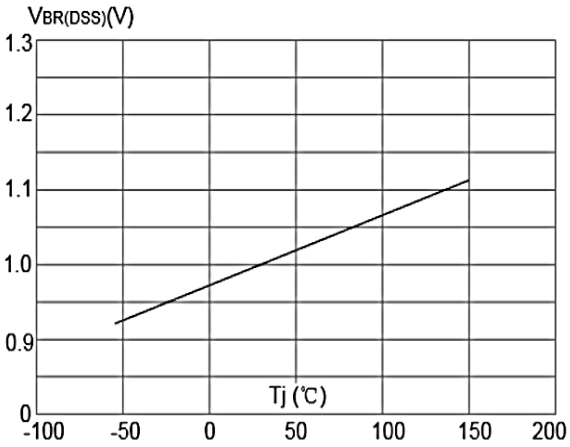


Figure 7: Normalized Breakdown Voltage vs Junction Temperature

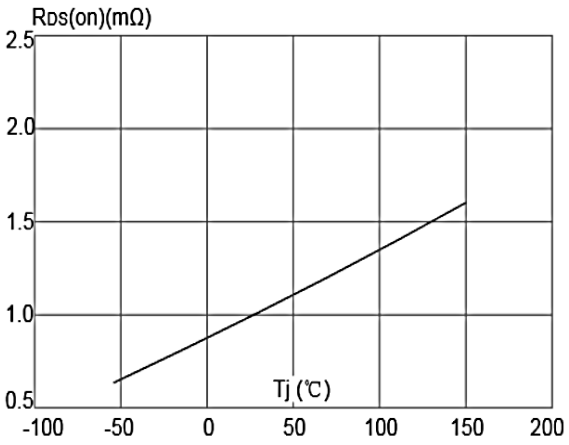


Figure 8: Normalized on Resistance vs. Junction Temperature

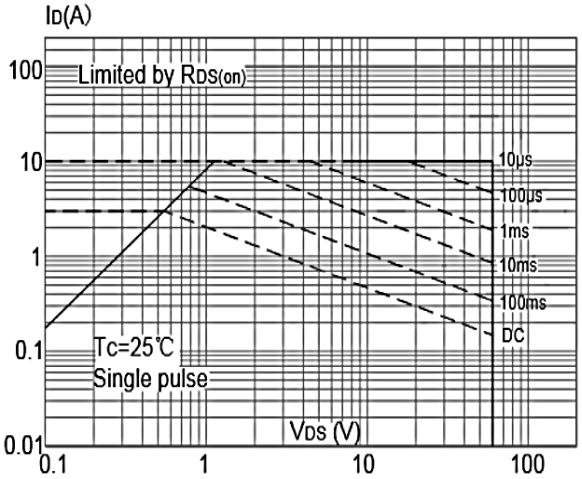


Figure 9: Maximum Safe Operating Area

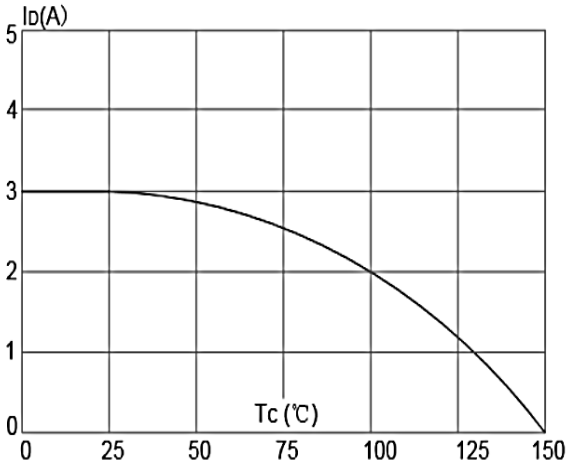


Figure 10: Maximum Continuous Drain Current vs. Ambient Temperature

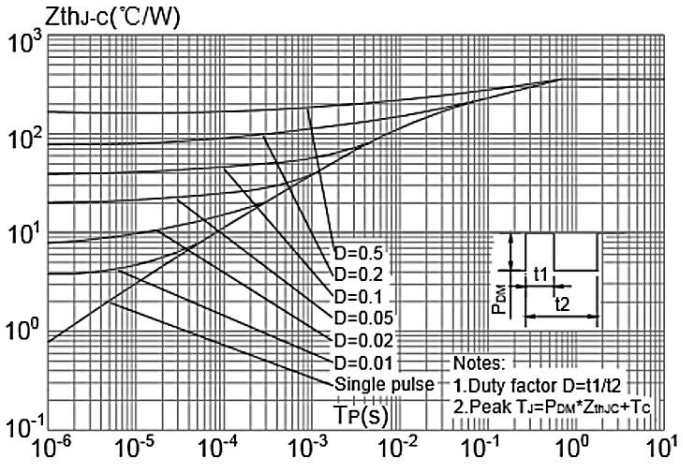
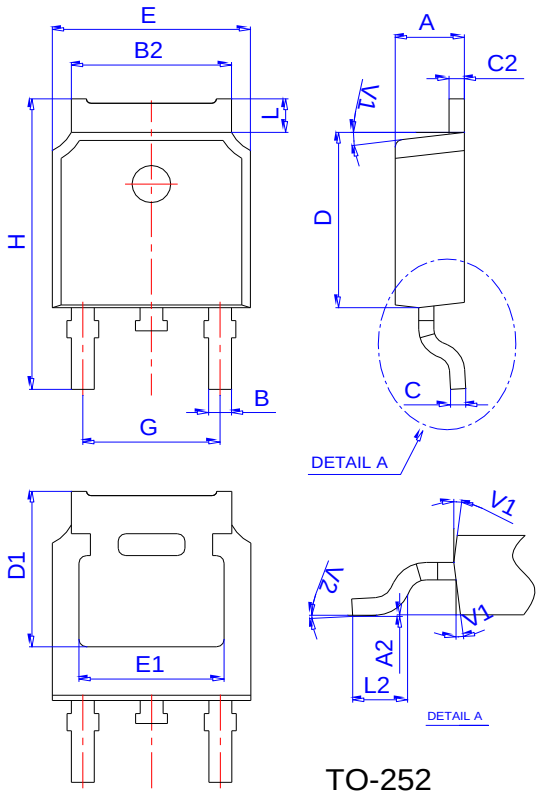


Figure.11: Maximum Effective Transient Thermal Impedance, Junction-to-Ambien

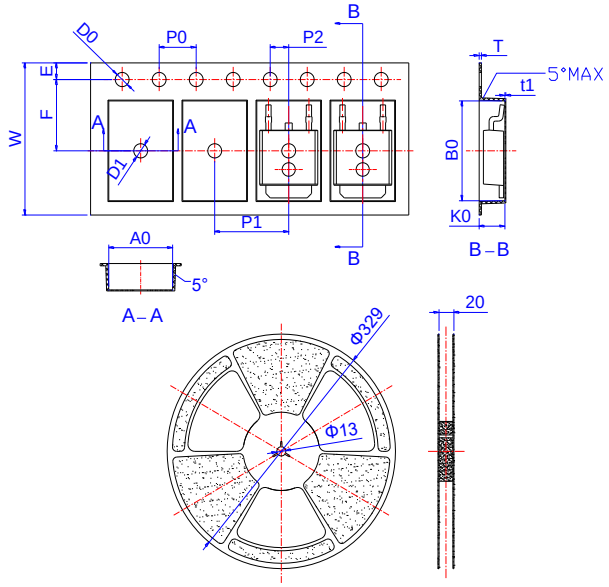
Package Mechanical Data



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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60V N-Channel Enhancement Mode MOSFET

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