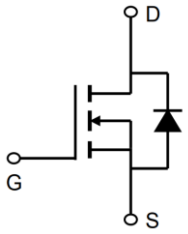
AP80N06D

60V N-Channel Enhancement Mode MOSFET

Description

The AP80N06D uses advanced trench technology to provide excellent $R_{DS(ON)}$, low gate charge and operation with gate voltages as low as 7.5V. This device is suitable for use as a Battery protection or in other Switching application.



General Features

V_{DS} = 60V I_D =80 A

$R_{DS(ON)}$ < 10mΩ @ V_{GS}=10V

Application

Battery protection

Load switch

Uninterruptible power supply

Package Marking and Ordering Information

Product ID	Pack	Marking	Qty(PCS)
AP80N06D	TO-252-3L	AP80N06D XXX YYYY	2500

Absolute Maximum Ratings at T_j=25℃ unless otherwise noted

Parameter	Symbol	Value	Unit
Drain source voltage	VDS	60	V
Gate source voltage	VGS	±20	V
Continuous drain current[1)]	ID	80	A
Pulsed drain current[2)]	ID, pulse	180	A
Power dissipation[3)]	P_D	125	W
Single pulsed avalanche energy[4)]	EAS	30	mJ
Operation and storage temperature	Tstg，Tj	-55 to 150	℃
Thermal resistance, junction-case	RθJC	1	°C/W
Thermal resistance, junction-ambient[5)]	RθJA	62	°C/W

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

Symbol	Parameter	Test condition	Min.	Typ.	Max.	Unit
BV_{DSS}	Drain-source breakdown voltage	V_{GS}=0 V, I_D=250 μA	60	71		V
$V_{GS(th)}$	Gate threshold voltage	V_{DS}=V_{GS}, I_D=250 μA	1.0	2.0	2.5	V
$R_{DS(ON)}$	Drain-source on-state resistance	V_{GS}=10 V, I_D=20 A		8	10	mΩ
$R_{DS(ON)}$	Drain-source on-state resistance	V_{GS}=4.5 V, I_D=10 A		10	13	mΩ
I_{GSS}	Gate-source leakage current	V_{GS}=20 V			100	nA
		V_{GS}=-20 V			-100	
I_{DSS}	Drain-source leakage current	V_{DS}=40 V, V_{GS}=0 V			1	μA
C_{iss}	Input capacitance	V_{GS}=0 V, V_{DS}=50 V, f=100 kHz		1182.1		pF
C_{oss}	Output capacitance			199.5		pF
C_{rss}	Reverse transfer capacitance			4.1		pF
$t_{d(on)}$	Turn-on delay time	V_{GS}=10 V, V_{DS}=50 V, R_G=2 Ω, I_D=10 A		17.9		ns
t_r	Rise time			4.0		ns
$t_{d(off)}$	Turn-off delay time			34.9		ns
t_f	Fall time			5.5		ns
Q_g	Total gate charge	I_D=10 A, V_{DS}=50 V, V_{GS}=10 V		18.4		nC
Q_{gs}	Gate-source charge			3.3		nC
Q_{gd}	Gate-drain charge			3.1		nC
$V_{plateau}$	Gate plateau voltage			2.8		V
I_S	Diode forward current	V_{GS}<V_{th}			60	A
I_{SP}	Pulsed source current				180	
V_{SD}	Diode forward voltage	I_S=20 A, V_{GS}=0 V			1.3	V
t_{rr}	Reverse recovery time	I_S=10 A, di/dt=100 A/μs		41.8		ns
Q_{rr}	Reverse recovery charge			36.1		nC
I_{rrm}	Peak reverse recovery current			1.4		A

Note

1) Calculated continuous current based on maximum allowable junction temperature.
2) Repetitive rating; pulse width limited by max. junction temperature.
3) Pd is based on max. junction temperature, using junction-case thermal resistance.
4) V_{DD}=50 V, R_G=50 Ω, L=0.3 mH, starting T_j=25 ℃.
5) The value of $R_{\theta JA}$ is measured with the device mounted on 1 in 2 FR-4 board with 2oz. Copper, in a still air environment with T_a=25 ℃.

Electrical Characteristics Diagrams

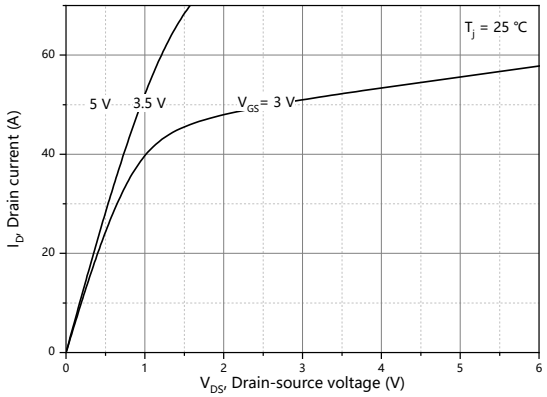


Figure 1, Typ. output characteristics

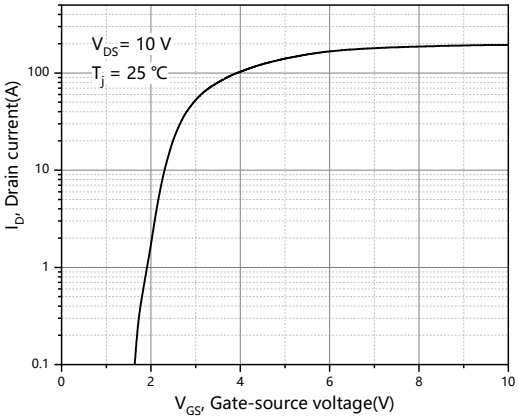


Figure 2, Typ. transfer characteristics

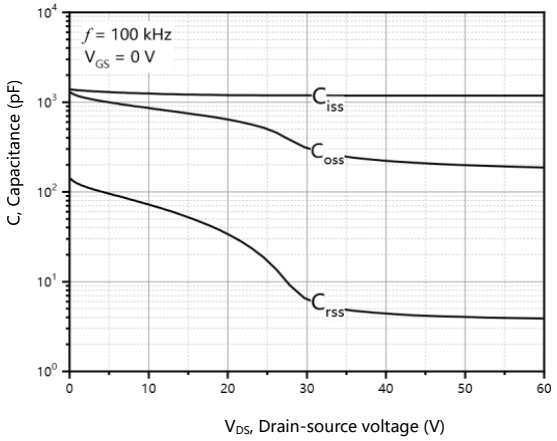


Figure 3, Typ. capacitances

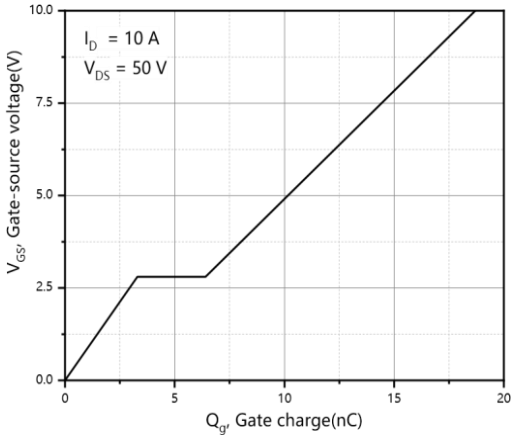


Figure 4, Typ. gate charge

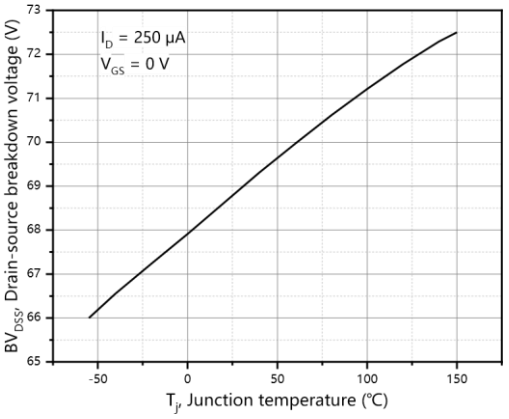


Figure 5, Drain-source breakdown voltage

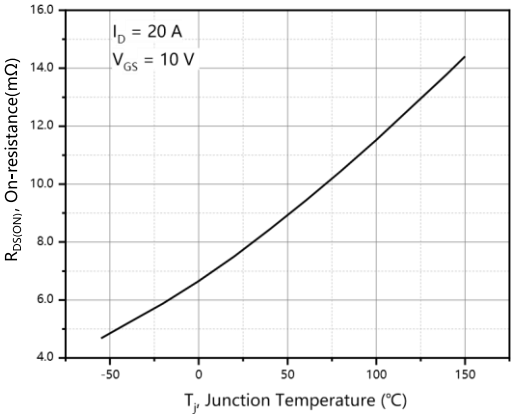


Figure 6, Drain-source on-state resistance

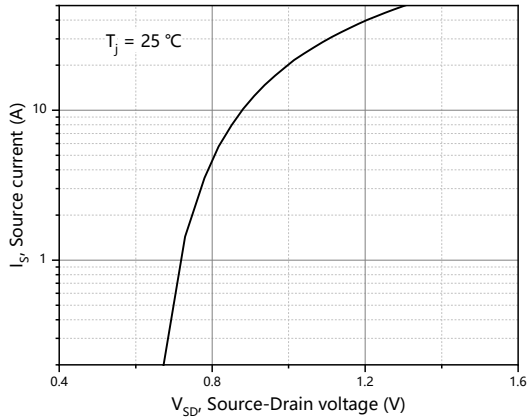


Figure 7, Forward characteristic of body diode

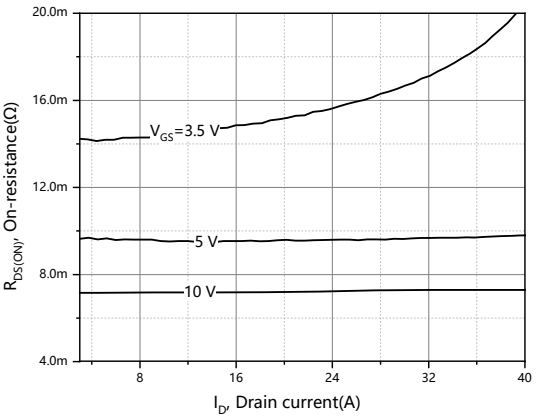


Figure 8, Drain-source on-state resistance

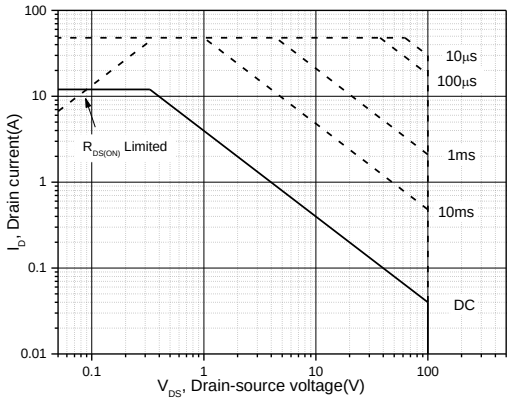


Figure 9, Safe operation area T_C=25 ℃

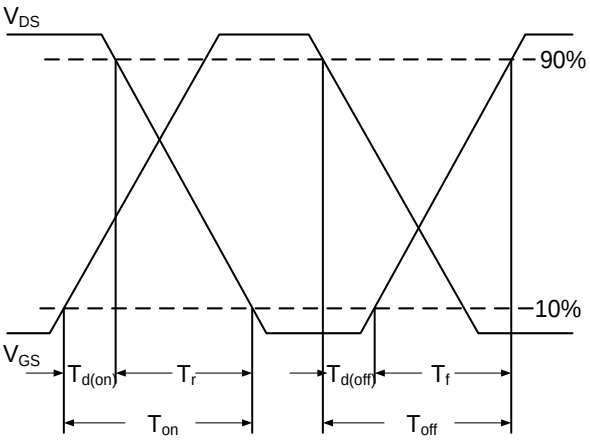


Fig.10 Switching Time Waveform

$$EAS = \frac{1}{2} L \times I_{AS}^2 \times \frac{BV_{DSS}}{BV_{DSS}-V_{DD}}$$

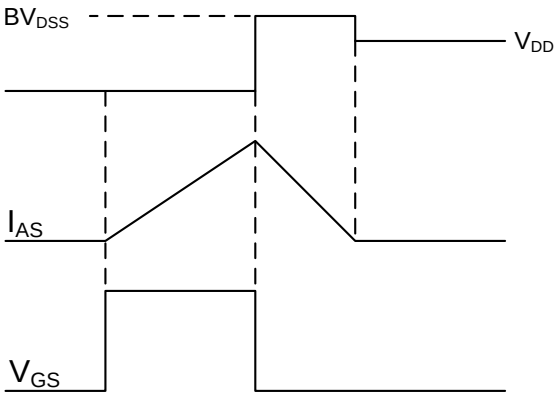
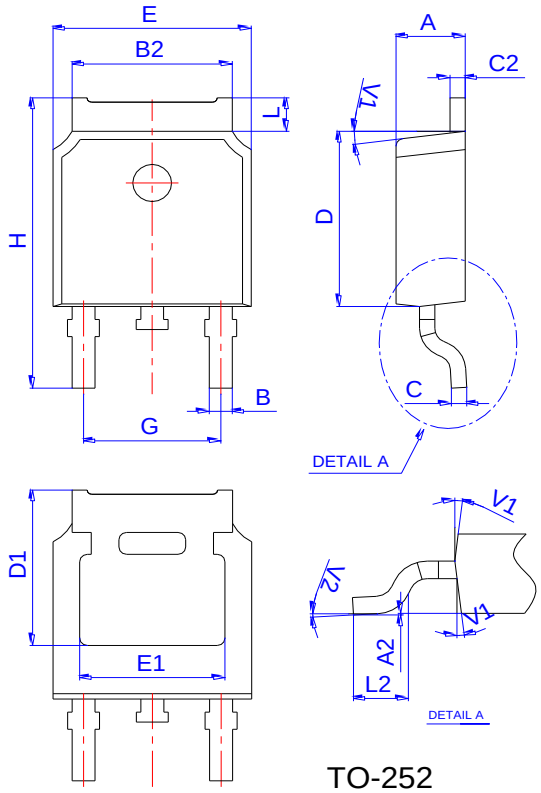


Fig.11 Unclamped Inductive Switching Waveform

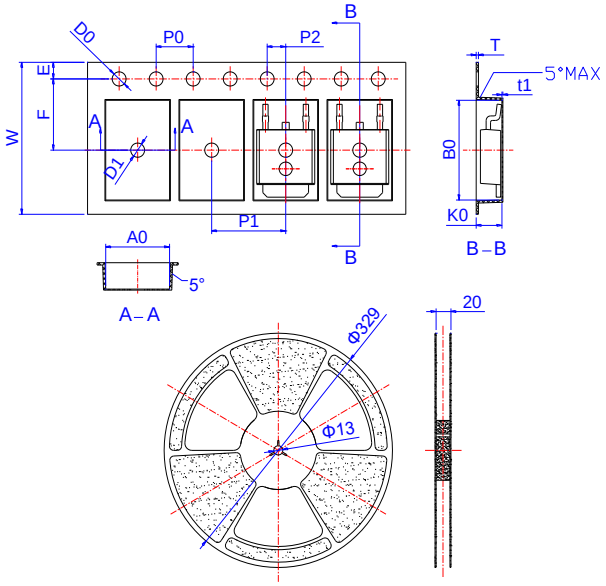
Package Mechanical Data TO-252-3L



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 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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60V N-Channel Enhancement Mode MOSFET

Edition	Date	Change
Rve1.0	2019/1/31	Initial release