

30V N-Channel Enhancement Mode MOSFET

Description

The AP80N03D 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

$V_{DS}=30V$ $I_D=80A$

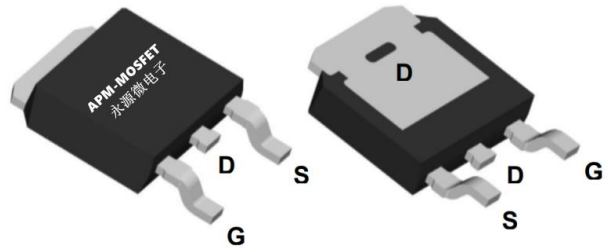
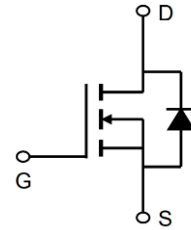
$R_{DS(ON)} < 6.5m\Omega @ V_{GS}=10V$ (Type: 4.0m Ω)

Application

Battery protection

Load switch

Uninterruptible power supply



Package Marking and Ordering Information

Product ID	Pack	Marking	Qty(PCS)
AP80N03D	TO-252-3L	AP80N03D XXXX YYYYY	2500

Absolute Maximum Ratings ($T_C=25^\circ\text{C}$ unless otherwise noted)

Symbol	Parameter	Rating	Units
V_{DS}	Drain-Source Voltage	30	V
V_{GS}	Gate-Source Voltage	± 20	V
$I_D@T_C=25^\circ\text{C}$	Continuous Drain Current, $V_{GS} @ 10V^1$	80	A
$I_D@T_C=75^\circ\text{C}$	Continuous Drain Current, $V_{GS} @ 10V^1$	50	A
I_{DM}	Pulsed Drain Current ²	240	A
EAS	Single Pulse Avalanche Energy ³	56	mJ
I_{AS}	Avalanche Current	15	A
$P_D@T_C=25^\circ\text{C}$	Total Power Dissipation ⁴	46	W
$P_D@T_A=25^\circ\text{C}$	Total Power Dissipation ⁴	2.72	W
T_{STG}	Storage Temperature Range	-55 to 150	$^\circ\text{C}$
T_J	Operating Junction Temperature Range	-55 to 150	$^\circ\text{C}$
$R_{\theta JA}$	Thermal Resistance Junction-Ambient ¹	62	$^\circ\text{C/W}$
$R_{\theta JC}$	Thermal Resistance Junction-Case ¹	2.72	$^\circ\text{C/W}$



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Electrical Characteristics (T_J=25 °C, unless otherwise noted)

Symbol	Parameter	Test Condition	Min.	Typ.	Max.	Units
V(BR)DSS	Drain-Source Breakdown Voltage	V _{GS} =0V, I _D =250μA	30	32	-	V
IDSS	Zero Gate Voltage Drain Current	V _{DS} =30V, V _{GS} =0V,	-	-	1.0	μA
IGSS	Gate to Body Leakage Current	V _{DS} =0V, V _{GS} =±20V	-	-	±100	nA
VGS(th)	Gate Threshold Voltage	V _{DS} =V _{GS} , I _D =250μA	1.0	1.6	2.5	V
RDS(on)	Static Drain-Source on-Resistance	V _{GS} =10V, I _D =30A	-	4.0	6.5	mΩ
		V _{GS} =4.5V, I _D =20A	-	6.1	8.5	
Ciss	Input Capacitance	V _{DS} =15V, V _{GS} =0V, f=1.0MHz	-	1614	-	pF
Coss	Output Capacitance		-	245	-	pF
Crss	Reverse Transfer Capacitance		-	215	-	pF
Q _g	Total Gate Charge	V _{DS} =15V, I _D =30A, V _{GS} =10V	-	33.7	-	nC
Q _{gs}	Gate-Source Charge		-	8.5	-	nC
Q _{gd}	Gate-Drain("Miller") Charge		-	7.5	-	nC
td(on)	Turn-on Delay Time	V _{DS} =15V, I _D =30A, R _{GEN} =3Ω, V _{GS} =10V	-	7.5	-	ns
t _r	Turn-on Rise Time		-	14.5	-	ns
td(off)	Turn-off Delay Time		-	35.2	-	ns
t _f	Turn-off Fall Time		-	9.6	-	ns
IS	Maximum Continuous Drain to Source Diode Forward Current		-	-	70	A
ISM	Maximum Pulsed Drain to Source Diode Forward Current		-	-	280	A
VSD	Drain to Source Diode Forward Voltage	V _{GS} =0V, I _S =30A	-	-	1.2	V

Note :

- 1、 The data tested by surface mounted on a 1 inch² 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=24V, VGS=10V, L=0.5mH, IAS=18A
- 4、 The power dissipation is limited by 175°C junction temperature
- 5、 The data is theoretically the same as ID and IDM , in real applications , should be limited by total power dissipation.

Typical Characteristics

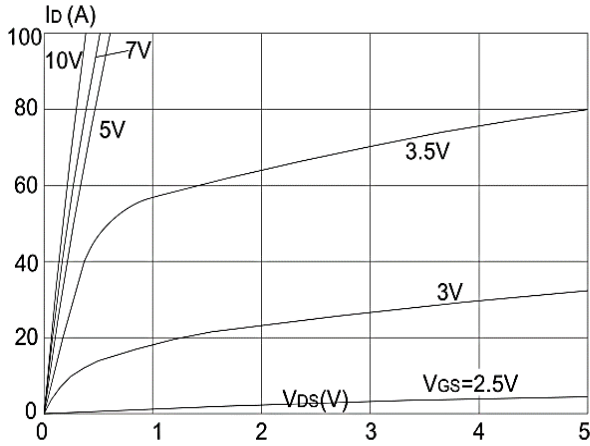


Figure 1: Output Characteristics

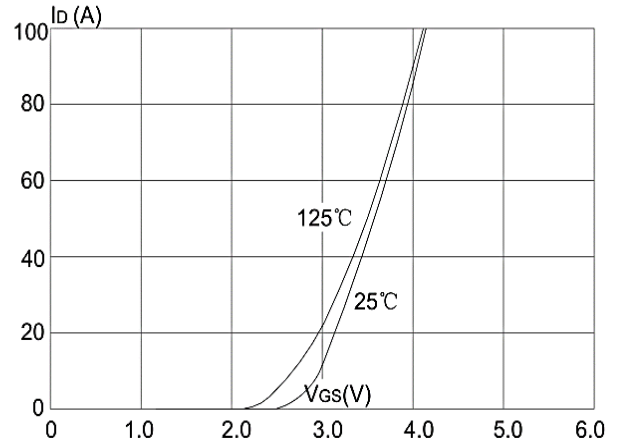


Figure 2: Typical Transfer Characteristics

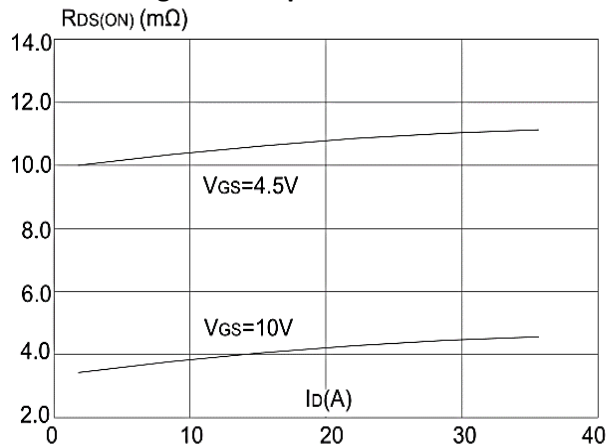


Figure 3: On-resistance vs. Drain Current

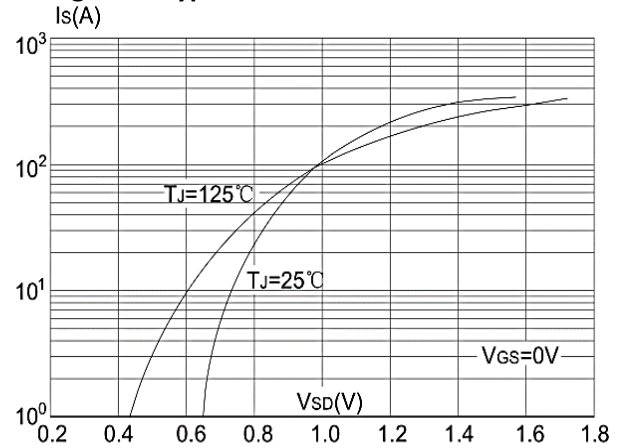


Figure 4: Body Diode Characteristics

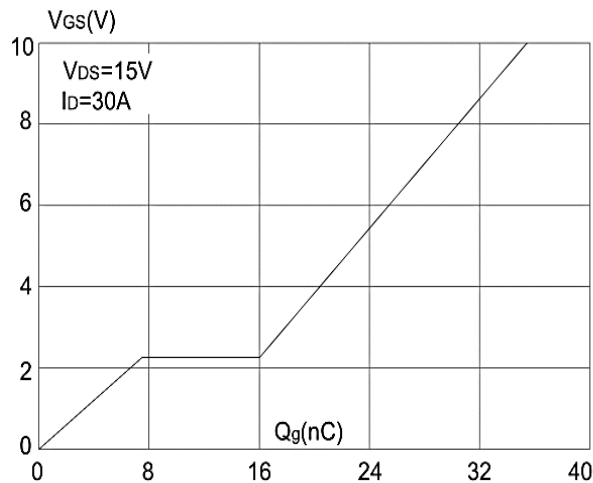


Figure 5: Gate Charge Characteristics

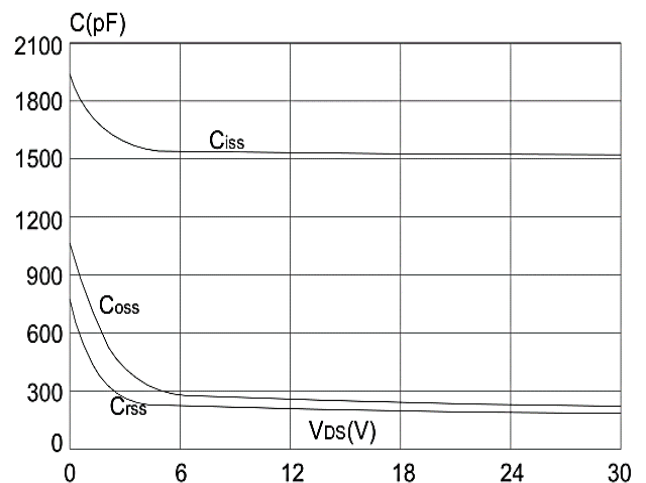


Figure 6: Capacitance Characteristics

30V N-Channel Enhancement Mode MOSFET

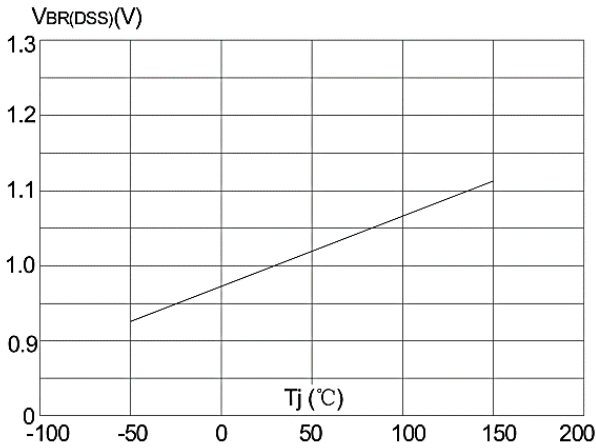


Figure 7: Normalized Breakdown Voltage vs. Junction Temperature

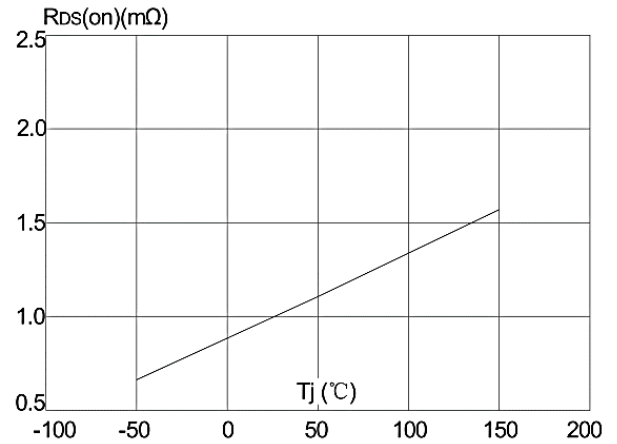


Figure 8: Normalized on Resistance vs. Junction Temperature

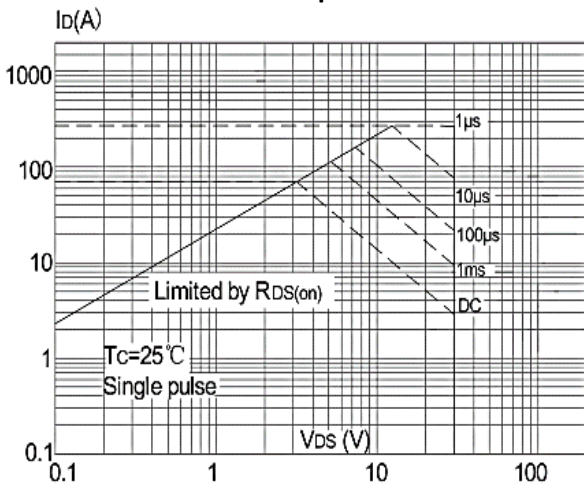


Figure 9: Maximum Safe Operating Area vs. Case Temperature

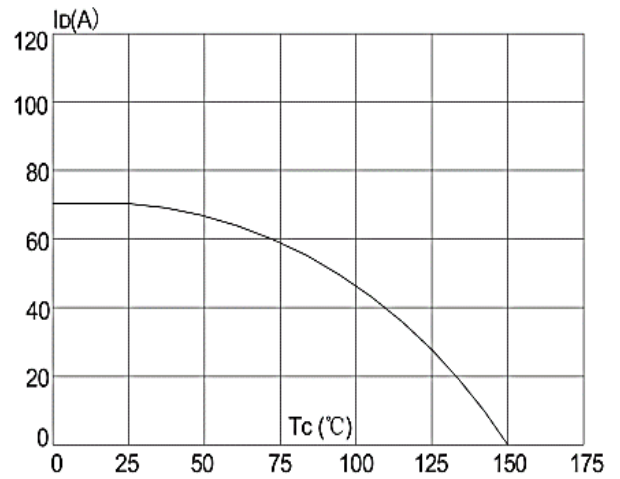


Figure 10: Maximum Continuous Drain Current vs. Case Temperature

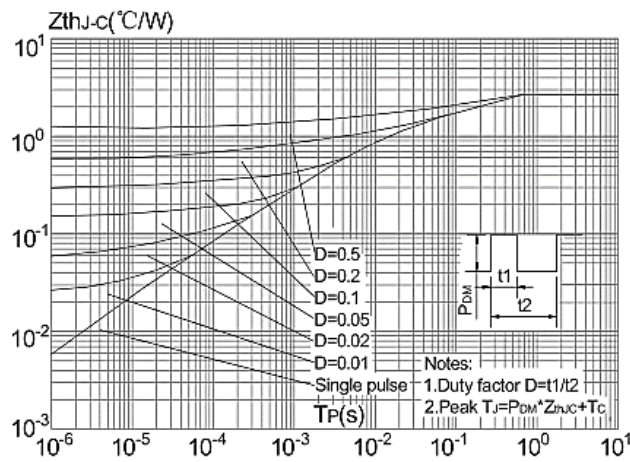
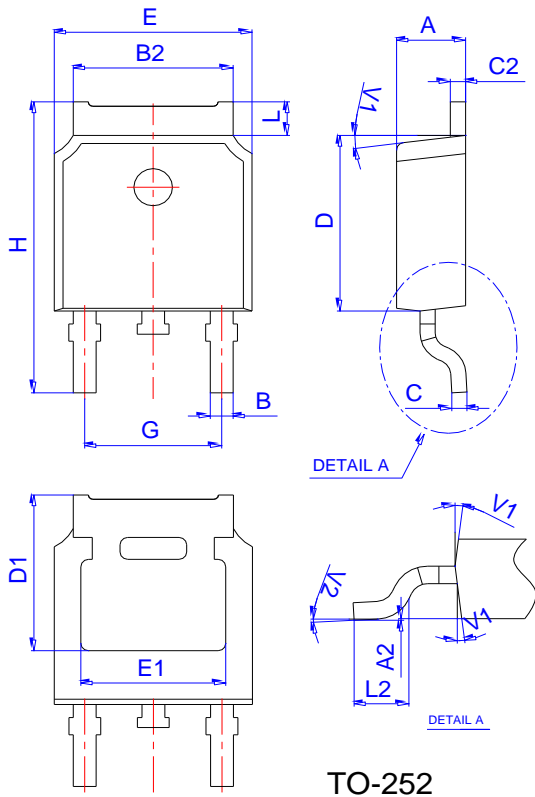


Figure.11: Maximum Effective Transient Thermal Impedance, Junction-to-Ca

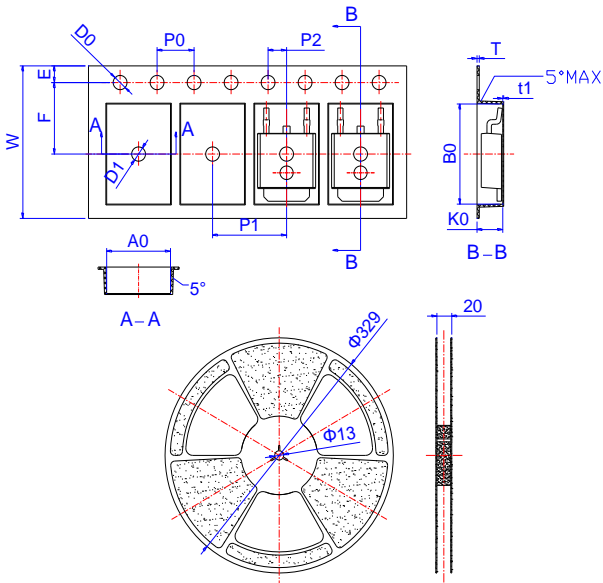
Package Mechanical Data:TO-252-3L



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

30V N-Channel Enhancement Mode MOSFET**Attention**

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Edition	Date	Change
Rve1.0	2021/5/1	Initial release
Rve1.1	2021/12/14	Reduce RDS

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