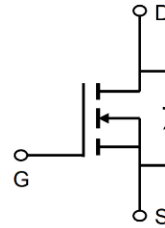


## 30V N-Channel Enhancement Mode MOSFET

### Description

The AP100N03D 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

$V_{DS} = 30V$   $I_D = 100A$

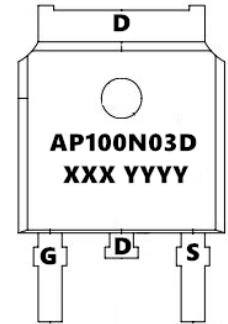
$R_{DS(ON)} < 5.5m\Omega @ V_{GS}=10V$  (Type:  $3.6m\Omega$ )

### Application

Battery protection

Load switch

Uninterruptible power supply



### Package Marking and Ordering Information

Product ID	Pack	Marking	Qty(PCS)
AP100N03D	TO-252-3L	AP100N03D XXX YYYY	2500

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

Symbol	Parameter	Max.	Units
$V_{DS}$	Drain-Source Voltage	30	V
$V_{GS}$	Gate-Source Voltage	$\pm 20$	V
$I_D @ T_C=25^\circ\text{C}$	Continuous Drain Current, $V_{GS} @ 10V$	100	A
$I_D @ T_C=100^\circ\text{C}$	Continuous Drain Current, $V_{GS} @ 10V$	59	A
IDM	Pulsed Drain Current <sup>note1</sup>	360	A
EAS	Single Pulsed Avalanche Energy <sup>note2</sup>	95	mJ
IAS	Avalanche Current	19.5	A
$P_D @ T_C=25^\circ\text{C}$	Total Power Dissipation <sup>4</sup>	68	W
$R_{\theta JA}$	Thermal Resistance Junction-ambient (Steady State) <sup>1</sup>	62	$^\circ\text{C}/\text{W}$
$R_{\theta JA}$	Thermal Resistance Junction-Ambient <sup>1</sup> ( $t \leq 10s$ )	25	$^\circ\text{C}/\text{W}$
$R_{\theta JC}$	Thermal Resistance, Junction to Case	2.2	$^\circ\text{C}/\text{W}$
$T_J, T_{STG}$	Operating and Storage Temperature Range	-55 to +175	$^\circ\text{C}$

## 30V N-Channel Enhancement Mode MOSFET

### Electrical Characteristics (T<sub>J</sub>=25°C, unless otherwise noted)

Symbol	Parameter	Test Condition	Min.	Typ.	Max.	Units
V(BR)DSS	Drain-Source Breakdown Voltage	V <sub>GS</sub> =0V, I <sub>D</sub> =250μA	30	32	-	V
ΔBVDSS/ΔTJ	BVDSS Temperature Coefficient	Reference to 25°C, I <sub>D</sub> =1mA	---	0.028	---	V/°C
VGS(th)	Gate Threshold Voltage	V <sub>DS</sub> =V <sub>GS</sub> , I <sub>D</sub> =250μA	1.0	1.6	2.5	V
RDS(on)	Static Drain-Source on-Resistance note3	V <sub>GS</sub> =10V, I <sub>D</sub> =30A	-	3.6	5.5	mΩ
RDS(on)	Static Drain-Source on-Resistance note3	V <sub>GS</sub> =4.5V, I <sub>D</sub> =20A	-	6.7	9.5	mΩ
IDSS	Zero Gate Voltage Drain Current	V <sub>DS</sub> =30V, V <sub>GS</sub> =0V,	-	-	1.0	μA
IGSS	Gate to Body Leakage Current	V <sub>DS</sub> =0V, V <sub>GS</sub> =±20V	-	-	±100	nA
Ciss	Input Capacitance	V <sub>DS</sub> =15V, V <sub>GS</sub> =0V, f=1.0MHz	-	2100	-	pF
Coss	Output Capacitance		-	326	-	pF
Crss	Reverse Transfer Capacitance		-	282	-	pF
Q <sub>g</sub>	Total Gate Charge	V <sub>DS</sub> =15V, I <sub>D</sub> =30A, V <sub>GS</sub> =10V	-	45	-	nC
Q <sub>gs</sub>	Gate-Source Charge		-	3	-	nC
Q <sub>gd</sub>	Gate-Drain("Miller") Charge		-	15	-	nC
td(on)	Turn-on Delay Time	V <sub>DS</sub> =15V, I <sub>D</sub> =30A, R <sub>GEN</sub> =3Ω, V <sub>GS</sub> =10V	-	21	-	ns
t <sub>r</sub>	Turn-on Rise Time		-	32	-	ns
td(off)	Turn-off Delay Time		-	59	-	ns
t <sub>f</sub>	Turn-off Fall Time		-	34	-	ns
IS	Maximum Continuous Drain to Source Diode Forward Current		-	-	90	A
ISM	Maximum Pulsed Drain to Source Diode Forward Current		-	-	360	A
VSD	Drain to Source Diode Forward Voltage	V <sub>GS</sub> =0V, I <sub>S</sub> =30A	-	-	1.2	V
trr	Body Diode Reverse Recovery Time	I <sub>F</sub> =20A, dI/dt=100A/μs	-	15	-	ns
Qrr	Body Diode Reverse Recovery Charge		-	4	-	nC

#### Notes:

- 1、 Repetitive Rating: Pulse Width Limited by Maximum Junction Temperature
- 2、 The test condition is, VDD =15V, VG =10V, RG =25Ω, L=0.5mH, IAS =19.5A
- 3、 The data tested by pulsed Pulse Test: Pulse Width≤300μs, Duty Cycle≤0.5%
- 4、 The power dissipation is limited by 150°C junction temperature

### Typical Characteristics

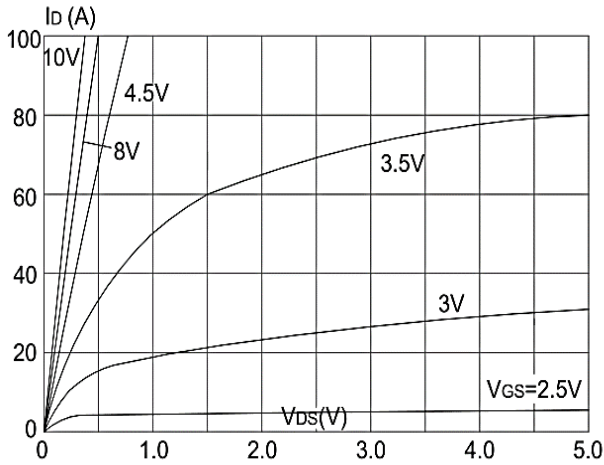


Figure 1: Output Characteristics

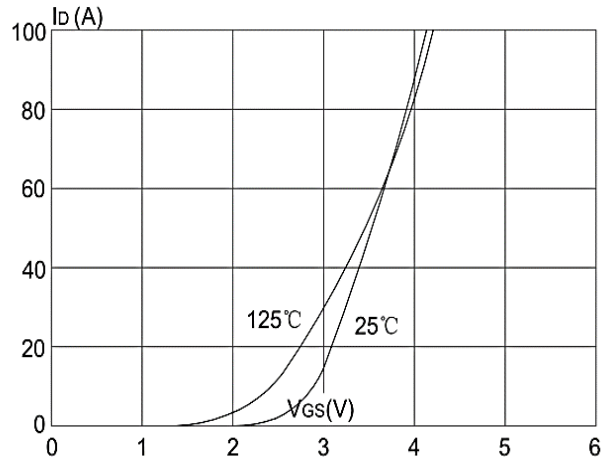


Figure 2: Typical Transfer Characteristics

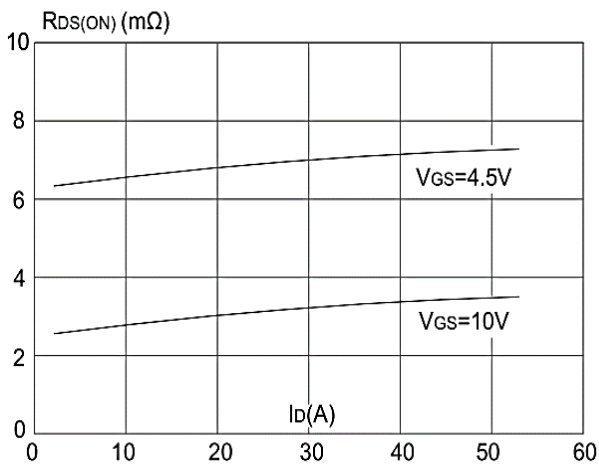


Figure 3: On-resistance vs. Drain Current

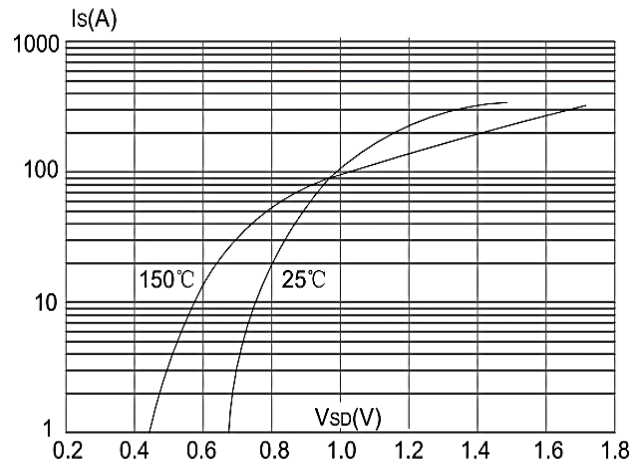


Figure 4: Body Diode Characteristics

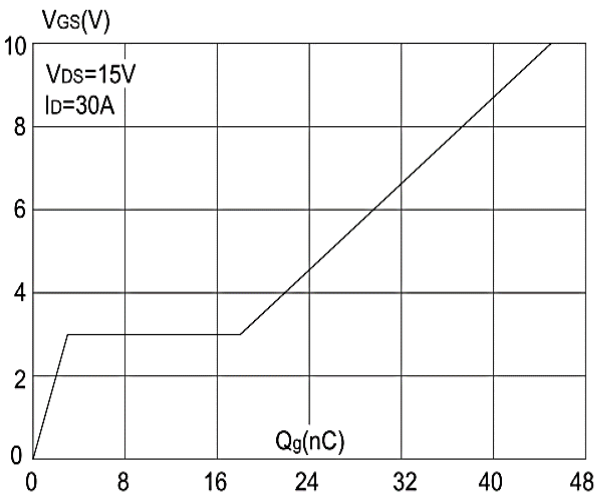


Figure 5: Gate Charge Characteristics

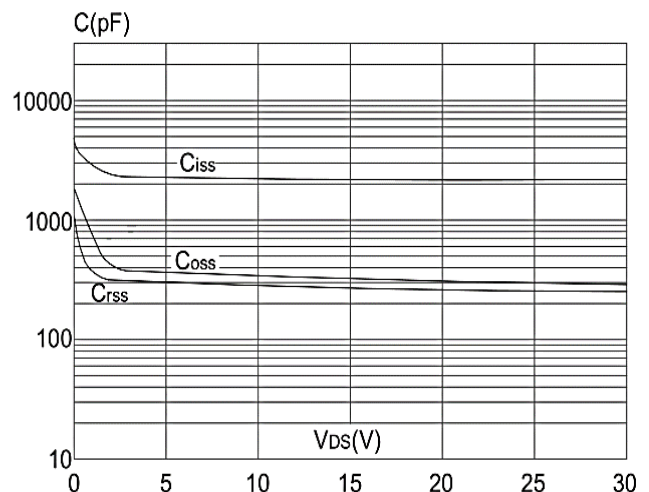
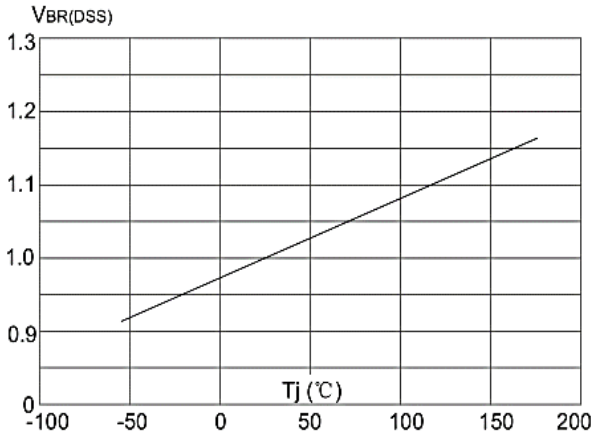
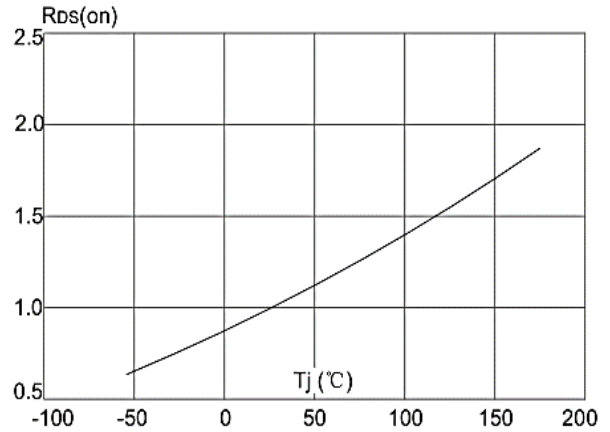


Figure 6: Capacitance Characteristics

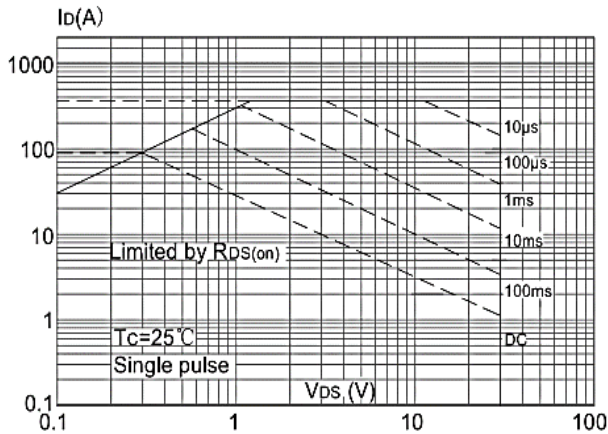
## 30V N-Channel Enhancement Mode MOSFET



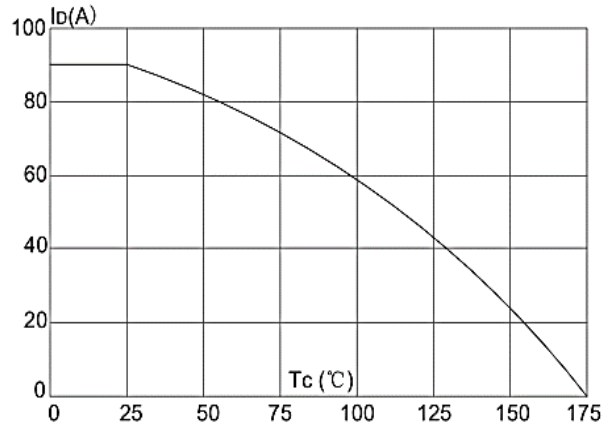
**Figure 7: Normalized Breakdown Voltage vs. Junction Temperature**



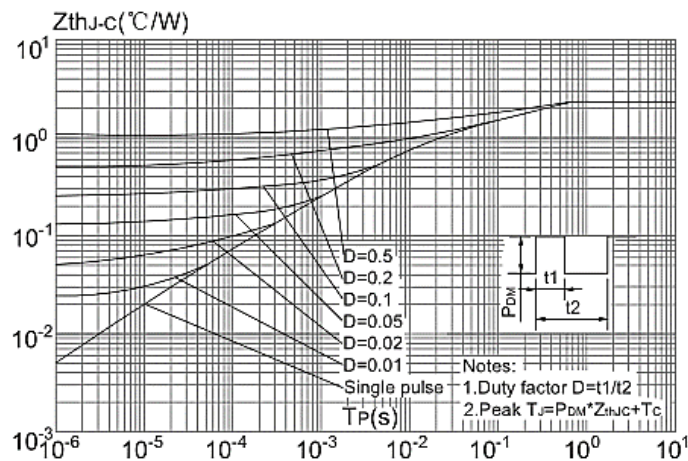
**Figure 8: Normalized on Resistance vs. Junction Temperature**



**Figure 9: Maximum Safe Operating Area vs. Case Temperature**

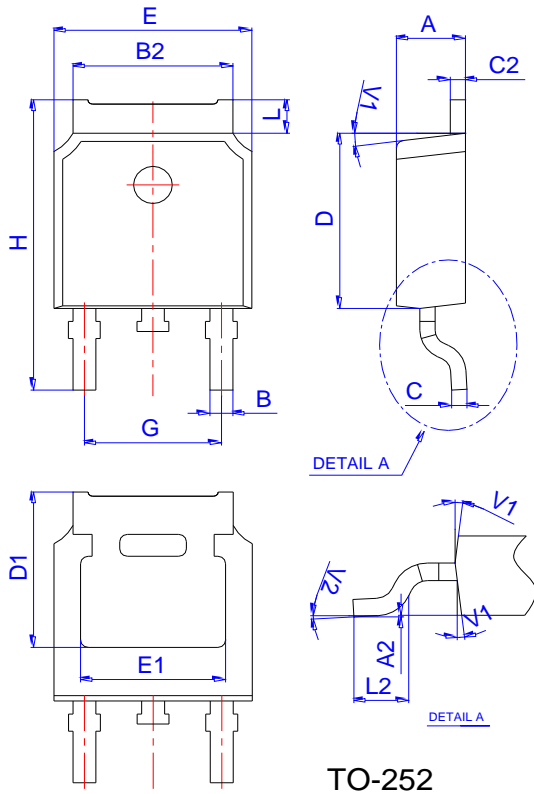


**Figure 10: Maximum Continuous Drain Current vs. Case Temperature**



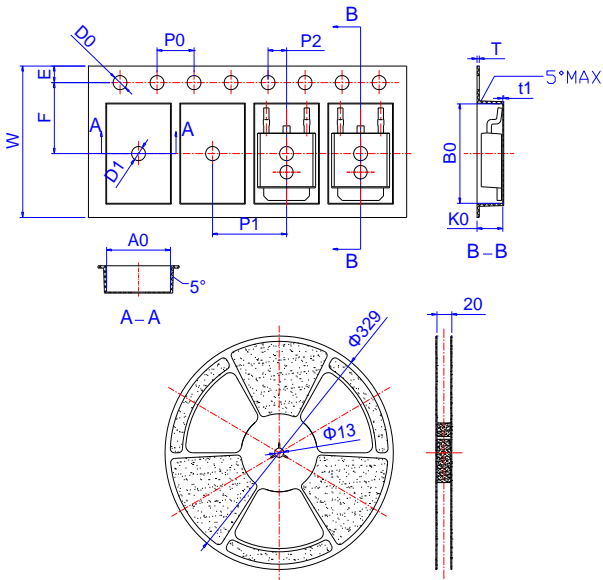
**Figure.11: Maximum Effective Transient Thermal Impedance, Junction-to-Case**

### Package Mechanical Data: TO-252-3L



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°	7°	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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Rve3.8	2018/1/31	Initial release
Rve3.9	2019/12/01	Reduce RDS(on)
Rve4.0	2020/5/02	Change of specification format

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### Test Report For 30PCS (30pcs 典型測試報告)

