

## 30V N-Channel Enhancement Mode MOSFET

### Description

The AP100N03P/T 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

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

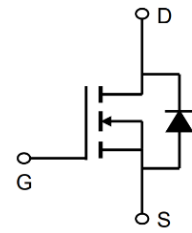
$R_{DS(ON)} < 5.5m\Omega @ V_{GS}=10V$  (Type: 4.5m $\Omega$ )

### Application

Battery protection

Load switch

Uninterruptible power supply



### Package Marking and Ordering Information

Product ID	Pack	Marking	Qty(PCS)
AP100N03P	TO-220-3L	AP100N03P XXX YYYY	1000
AP100N03T	TO-263-3L	AP100N03T XXX YYYY	800

### 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, $V_{GS} @ 10V$	46	A
IDM	Pulsed Drain Current <sup>note1</sup>	300	A
EAS	Single Pulsed Avalanche Energy <sup>note2</sup>	56	mJ
$P_D @ T_C=25^\circ\text{C}$	Total Power Dissipation <sup>4</sup>	68	W
$R_{\theta JA}$	Thermal Resistance Junction-ambient (Steady State) <sup>1</sup>	62	$^\circ\text{C/W}$
$R_{\theta JA}$	Thermal Resistance Junction-Ambient <sup>1</sup> ( $t \leq 10s$ )	25	$^\circ\text{C/W}$
$R_{\theta JC}$	Thermal Resistance, Junction to Case	2.2	$^\circ\text{C/W}$
TJ, TSTG	Operating and Storage Temperature Range	-55 to +175	$^\circ\text{C}$

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

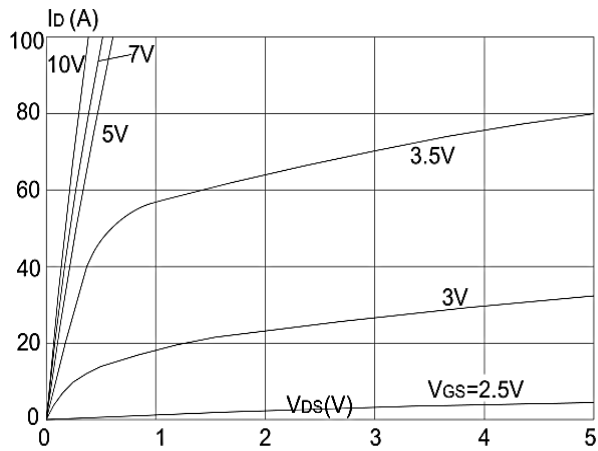
Symbol	Parameter	Test Condition	Min.	Typ.	Max.	Units
V(BR)DSS	Drain-Source Breakdown Voltage	V <sub>GS</sub> =0V, I <sub>D</sub> =250μA	30	32	-	V
ΔBVDSS/ΔTJ	BVDSS Temperature Coefficient	Reference to 25°C, I <sub>D</sub> =1mA	---	0.028	---	V/°C
VGS(th)	Gate Threshold Voltage	V <sub>DS</sub> =V <sub>GS</sub> , I <sub>D</sub> =250μA	1.2	1.6	2.5	V
RDS(on)	Static Drain-Source on-Resistance note3	V <sub>GS</sub> =10V, I <sub>D</sub> =30A	-	4.5	5.5	mΩ
RDS(on)	Static Drain-Source on-Resistance note3	V <sub>GS</sub> =4.5V, I <sub>D</sub> =20A	-	8.0	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
C <sub>iss</sub>	Input Capacitance	V <sub>DS</sub> =15V, V <sub>GS</sub> =0V, f=1.0MHz	-	1614	-	pF
C <sub>oss</sub>	Output Capacitance		-	245	-	pF
C <sub>rss</sub>	Reverse Transfer Capacitance		-	215	-	pF
Q <sub>g</sub>	Total Gate Charge	V <sub>DS</sub> =15V, I <sub>D</sub> =30A, V <sub>GS</sub> =10V	-	33.7	-	nC
Q <sub>gs</sub>	Gate-Source Charge		-	8.5	-	nC
Q <sub>gd</sub>	Gate-Drain("Miller") Charge		-	7.5	-	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	-	7.5	-	ns
t <sub>r</sub>	Turn-on Rise Time		-	14.5	-	ns
td(off)	Turn-off Delay Time		-	35.2	-	ns
t <sub>f</sub>	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 <sub>GS</sub> =0V, I <sub>S</sub> =30A	-	-	1.2	V

#### Note :

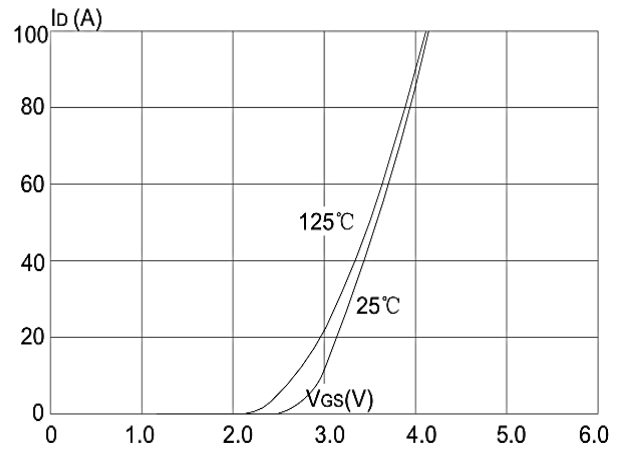
- 1、The data tested by surface mounted on a 1 inch<sup>2</sup> FR-4 board with 2OZ copper.
- 2、The data tested by pulsed , pulse width .The EAS data shows Max. rating .
- 3、The test cond<sub>≤</sub> 300us duty cycle <sub>≤</sub> 2%, duty cycle ition is VDD=24VGS=10V,L=0.1mH,IAS=15A
- 4、The power dissipation 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.

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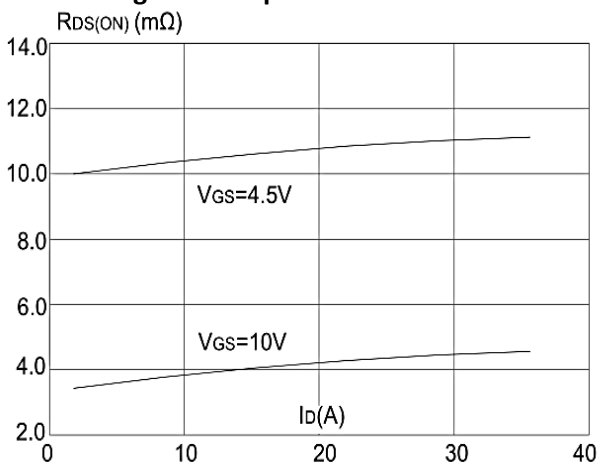
### Typical Characteristics



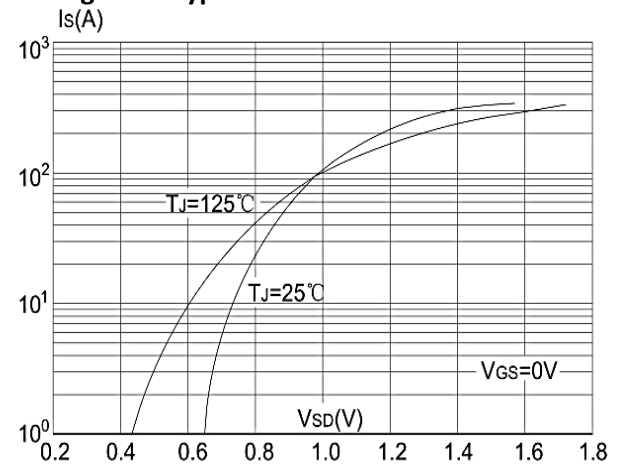
**Figure 1: Output Characteristics**



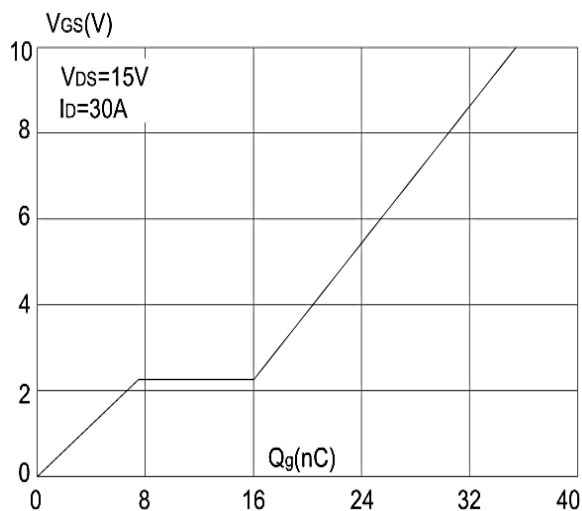
**Figure 2: Typical Transfer Characteristics**



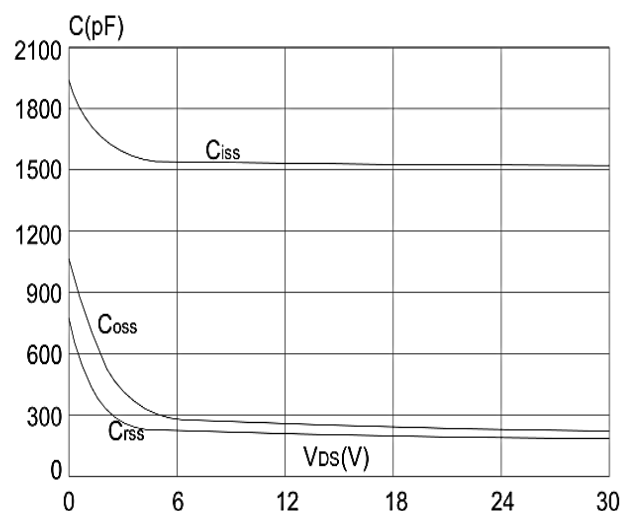
**Figure 3: On-resistance vs. Drain Current**



**Figure 4: Body Diode Characteristics**

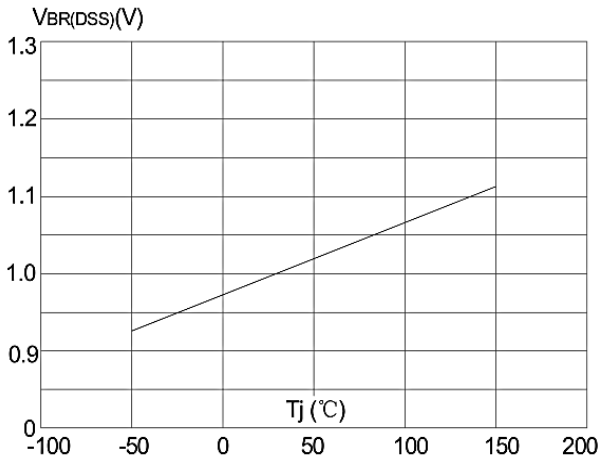


**Figure 5: Gate Charge Characteristics**

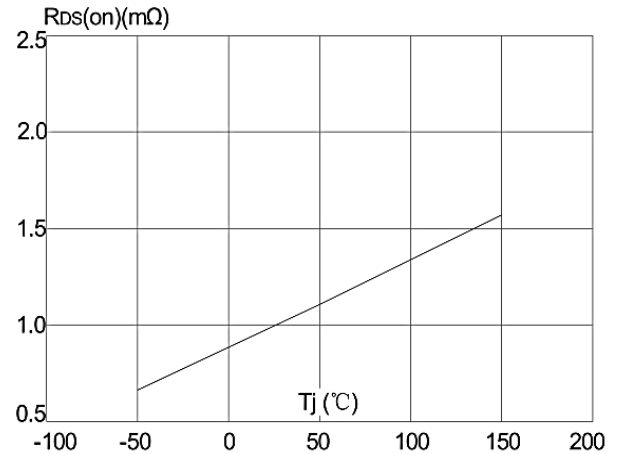


**Figure 6: Capacitance Characteristics**

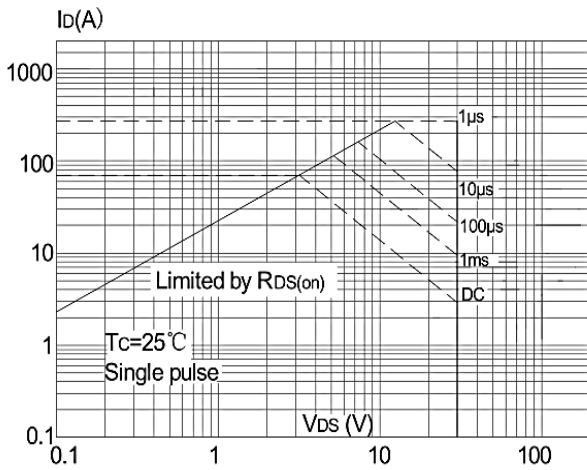
## 30V N-Channel Enhancement Mode MOSFET



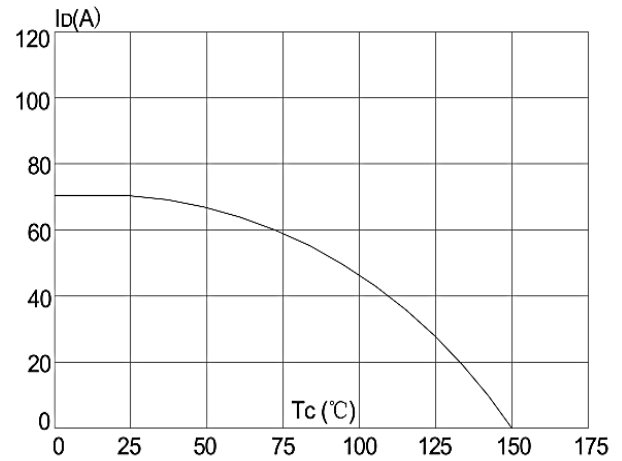
**Figure 7: Normalized Breakdown Voltage vs. Junction Temperature**



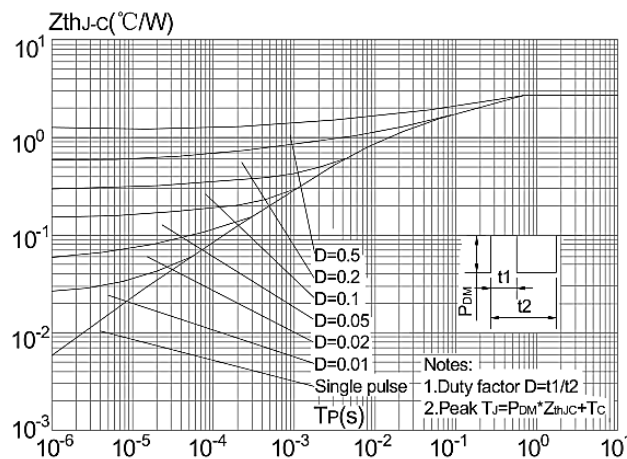
**Figure 8: Normalized on Resistance vs. Junction Temperature**



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



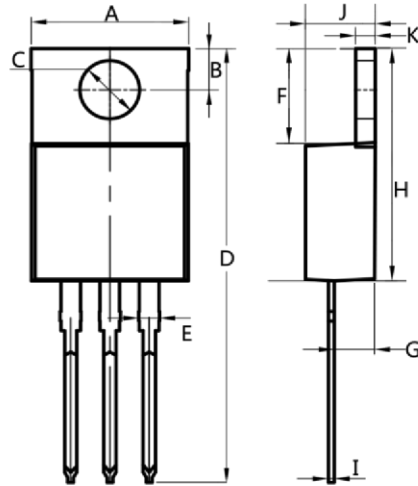
**Figure 10: Maximum Continuous Drain Current vs. Case Temperature**



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

## 30V N-Channel Enhancement Mode MOSFET

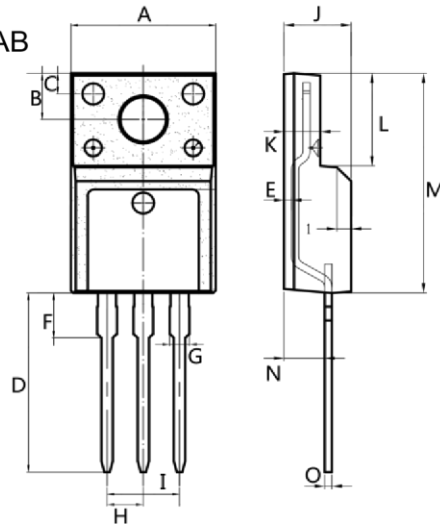
TO-220AB



Dim.	Min.	Max.
A	10.0	10.4
B	2.5	3.0
C	3.5	4.0
D	28.0	30.0
E	1.1	1.5
F	6.2	6.6
G	2.9	3.3
H	15.0	16.0
I	0.35	0.45
J	4.3	4.7
K	1.2	1.4

All Dimensions in millimeter

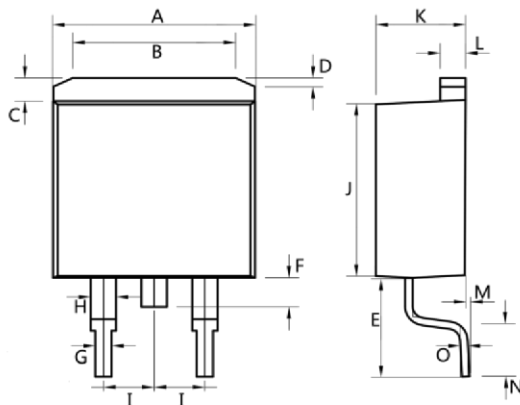
ITO-220AB



Dim.	Min.	Max.
A	9.9	10.3
B	2.9	3.5
C	1.15	1.45
D	12.75	13.25
E	0.55	0.75
F	3.1	3.5
G	1.25	1.45
H	Typ 2.54	
I	Typ 5.08	
J	4.55	4.75
K	2.4	2.7
L	6.35	6.75
M	15.0	16.0
N	2.75	3.15
O	0.45	0.60

All Dimensions in millimeter

TO-263



Dim.	Min.	Max.
A	10.0	10.5
B	7.25	7.75
C	1.3	1.5
D	0.55	0.75
E	5.0	6.0
F	1.4	1.6
G	0.75	0.95
H	1.15	1.35
I	Typ 2.54	
J	8.4	8.6
K	4.4	4.6
L	1.25	1.45
M	0.02	0.1
N	2.4	2.8
O	0.35	0.45

All Dimensions in millimeter

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

<b>Edition</b>	<b>Date</b>	<b>Change</b>
Rve3.8	2018/1/31	Initial release
Rve3.9	2019/12/01	Reduce RDS(on) and QG Ciss

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