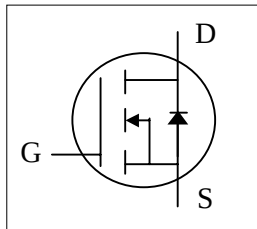




- ▼ Repetitive Avalanche Rated
- ▼ Fast Switching Speed
- ▼ Simple Drive Requirement
- ▼ RoHS Compliant

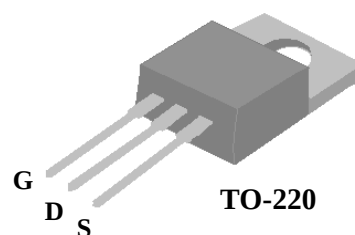


BV_{DSS}	650V
$R_{DS(ON)}$	3.6Ω
I_D	3.3A

Description

AP03N70 series are specially designed as main switching devices for universal 90~265VAC off-line AC/DC converter applications. TO-220 type provide high blocking voltage to overcome voltage surge and sag in the toughest power system with the best combination of fast switching, ruggedized design and cost-effectiveness.

The TO-220 package is universally preferred for all commercial-industrial applications. The device is suited for switch mode power supplies, DC-AC converters and high current high speed switching circuits.



Absolute Maximum Ratings

Symbol	Parameter	Rating	Units
V_{DS}	Drain-Source Voltage	650	V
V_{GS}	Gate-Source Voltage	± 30	V
$I_D@T_C=25^\circ\text{C}$	Continuous Drain Current, V_{GS} @ 10V	3.3	A
$I_D@T_C=100^\circ\text{C}$	Continuous Drain Current, V_{GS} @ 10V	2.1	A
I_{DM}	Pulsed Drain Current ¹	10	A
$P_D@T_C=25^\circ\text{C}$	Total Power Dissipation	54.3	W
	Linear Derating Factor	0.44	W/ $^\circ\text{C}$
E_{AS}	Single Pulse Avalanche Energy ²	67	mJ
I_{AR}	Avalanche Current	3	A
E_{AR}	Repetitive Avalanche Energy	3	mJ
T_{STG}	Storage Temperature Range	-55 to 150	$^\circ\text{C}$
T_J	Operating Junction Temperature Range	-55 to 150	$^\circ\text{C}$

Thermal Data

Symbol	Parameter	Value	Units
Rthj-c	Thermal Resistance Junction-case	Max. 2.3	$^\circ\text{C}/\text{W}$
Rthj-a	Thermal Resistance Junction-ambient	Max. 62	$^\circ\text{C}/\text{W}$

Electrical Characteristics@T_j=25°C(unless otherwise specified)

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Units
BV _{DSS}	Drain-Source Breakdown Voltage	V _{GS} =0V, I _D =1mA	650	-	-	V
ΔBV _{DSS} /ΔT _j	Breakdown Voltage Temperature Coefficient	Reference to 25°C, I _D =1mA	-	0.6	-	V/°C
R _{DS(ON)}	Static Drain-Source On-Resistance	V _{GS} =10V, I _D =1.6A	-	-	3.6	Ω
V _{GS(th)}	Gate Threshold Voltage	V _{DS} =V _{GS} , I _D =250uA	2	-	4	V
g _{fs}	Forward Transconductance	V _{DS} =10V, I _D =1.6A	-	2	-	S
I _{DSS}	Drain-Source Leakage Current (T _j =25°C)	V _{DS} =600V, V _{GS} =0V	-	-	10	uA
	Drain-Source Leakage Current (T _j =150°C)	V _{DS} =480V, V _{GS} =0V	-	-	100	uA
I _{GSS}	Gate-Source Leakage	V _{GS} =±30V	-	-	±100	nA
Q _g	Total Gate Charge ³	I _D =3A	-	12	20	nC
Q _{gs}	Gate-Source Charge	V _{DS} =480V	-	3	-	nC
Q _{gd}	Gate-Drain ("Miller") Charge	V _{GS} =10V	-	5	-	nC
t _{d(on)}	Turn-on Delay Time ³	V _{DD} =300V	-	9	-	ns
t _r	Rise Time	I _D =3A	-	5	-	ns
t _{d(off)}	Turn-off Delay Time	R _G =10Ω, V _{GS} =10V	-	18	-	ns
t _f	Fall Time	R _D =100Ω	-	6	-	ns
C _{iss}	Input Capacitance	V _{GS} =0V	-	600	960	pF
C _{oss}	Output Capacitance	V _{DS} =25V	-	45	-	pF
C _{rss}	Reverse Transfer Capacitance	f=1.0MHz	-	4	-	pF

Source-Drain Diode

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Units
V _{SD}	Forward On Voltage ³	I _S =3A, V _{GS} =0V	-	-	1.5	V
t _{rr}	Reverse Recovery Time ²	I _S =3A, V _{GS} =0V,	-	422	-	ns
Q _{rr}	Reverse Recovery Charge	dI/dt=100A/μs	-	2580	-	nC

Notes:

- 1.Pulse width limited by safe operating area.
- 2.Starting T_j=25°C, V_{DD}=50V, L=15mH, R_G=25Ω, I_{AS}=3A.
- 3.Pulse width ≤300us, duty cycle ≤2%.

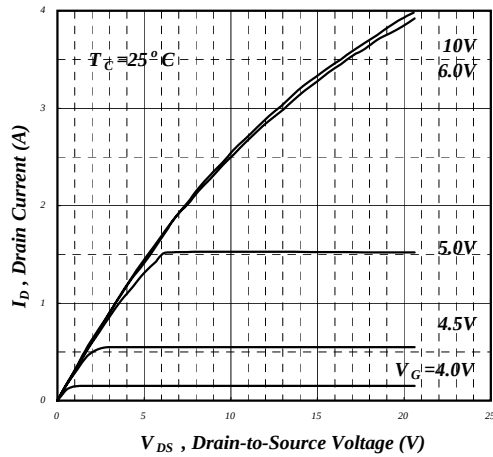


Fig 1. Typical Output Characteristics

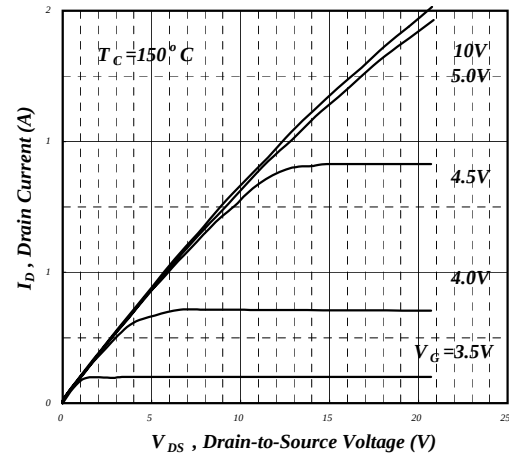


Fig 2. Typical Output Characteristics

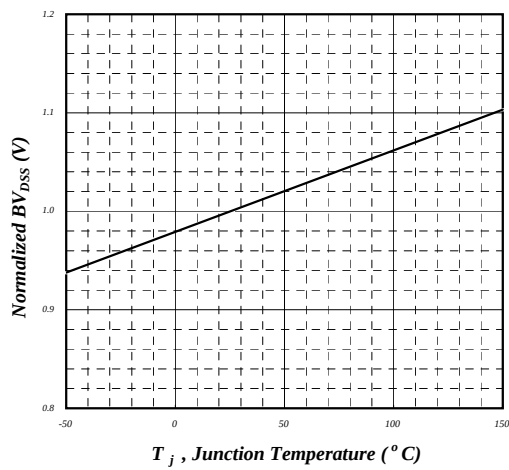


Fig 3. Normalized BV_{DSS} v.s. Junction Temperature

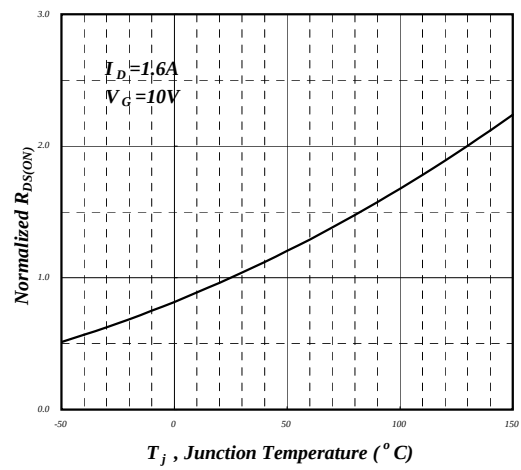


Fig 4. Normalized On-Resistance v.s. Junction Temperature

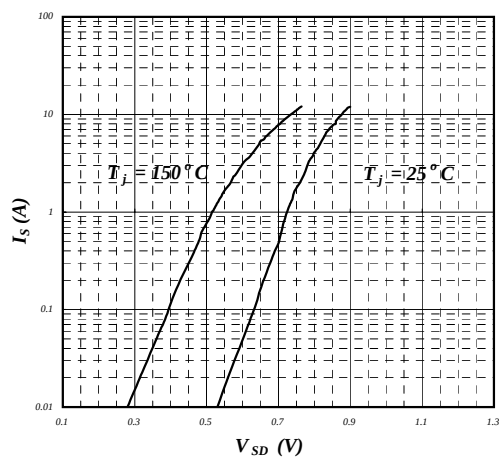


Fig 5. Forward Characteristic of Reverse Diode

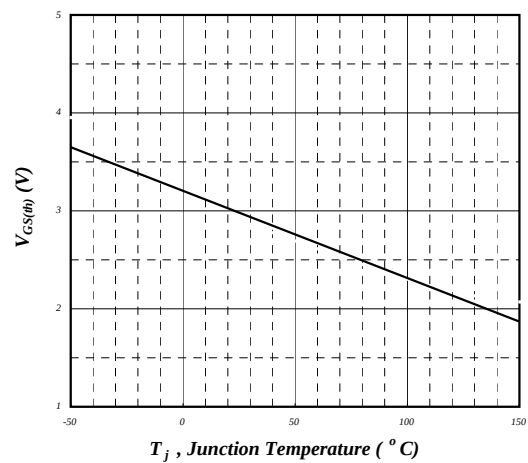


Fig 6. Gate Threshold Voltage v.s. Junction Temperature

