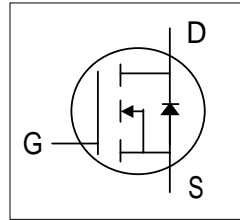




- Repetitive Avalanche Rated
- Fast Switching Speed
- Simple Drive Requirement
- RoHS Compliant

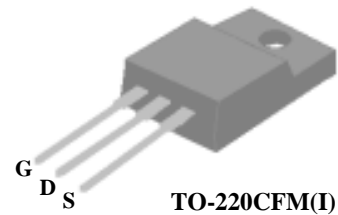


$BV_{DSS}$	700V
$R_{DS(ON)}$	4.4
$I_D$	2.5A

## Description

AP03N70 series are specially designed as main switching devices for universal 90~265VAC off-line AC/DC converter applications.

TO-220CFM 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.



## Absolute Maximum Ratings

Symbol	Parameter	Rating	Units
$V_{DS}$	Drain-Source Voltage	700	V
$V_{GS}$	Gate-Source Voltage	$\pm 30$	V
$I_D @ T_C=25$	Continuous Drain Current, $V_{GS} @ 10V$	2.5	A
$I_D @ T_C=100$	Continuous Drain Current, $V_{GS} @ 10V$	1.6	A
$I_{DM}$	Pulsed Drain Current <sup>1</sup>	8	A
$P_D @ T_C=25$	Total Power Dissipation	29	W
	Linear Derating Factor	0.23	W/
$E_{AS}$	Single Pulse Avalanche Energy <sup>2</sup>	32	mJ
$I_{AR}$	Avalanche Current	2.5	A
$T_{STG}$	Storage Temperature Range	-55 to 150	
$T_J$	Operating Junction Temperature Range	-55 to 150	

## Thermal Data

Symbol	Parameter	Value	Units
Rthj-c	Thermal Resistance Junction-case	Max. 4.3	/W
Rthj-a	Thermal Resistance Junction-ambient	Max. 65	/W



**Electrical Characteristics @T<sub>j</sub>=25°C (unless otherwise specified)**

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Units
BV <sub>DSS</sub>	Drain-Source Breakdown Voltage	V <sub>GS</sub> =0V, I <sub>D</sub> =1mA	700	-	-	V
BV <sub>DSS</sub> / T <sub>j</sub>	Breakdown Voltage Temperature Coefficient	Reference to 25 , I <sub>D</sub> =1mA	-	0.6	-	V/
R <sub>DS(ON)</sub>	Static Drain-Source On-Resistance	V <sub>GS</sub> =10V, I <sub>D</sub> =1.6A	-	-	4.4	
V <sub>GS(th)</sub>	Gate Threshold Voltage	V <sub>DS</sub> =V <sub>GS</sub> , I <sub>D</sub> =250uA	2	-	4	V
g <sub>fs</sub>	Forward Transconductance	V <sub>DS</sub> =10V, I <sub>D</sub> =1.6A	-	2	-	S
I <sub>DSS</sub>	Drain-Source Leakage Current (T <sub>j</sub> =25°C)	V <sub>DS</sub> =600V, V <sub>GS</sub> =0V	-	-	10	uA
	Drain-Source Leakage Current (T <sub>j</sub> =150°C)	V <sub>DS</sub> =480V, V <sub>GS</sub> =0V	-	-	100	uA
I <sub>GSS</sub>	Gate-Source Leakage	V <sub>GS</sub> =±30V	-	-	±100	nA
Q <sub>g</sub>	Total Gate Charge <sup>3</sup>	I <sub>D</sub> =1A	-	12	20	nC
Q <sub>gs</sub>	Gate-Source Charge	V <sub>DS</sub> =480V	-	3	-	nC
Q <sub>gd</sub>	Gate-Drain ("Miller") Charge	V <sub>GS</sub> =10V	-	4	-	nC
t <sub>d(on)</sub>	Turn-on Delay Time <sup>3</sup>	V <sub>DD</sub> =300V	-	8.5	-	ns
t <sub>r</sub>	Rise Time	I <sub>D</sub> =2.5A	-	6	-	ns
t <sub>d(off)</sub>	Turn-off Delay Time	R <sub>G</sub> =10 , V <sub>GS</sub> =10V	-	19	-	ns
t <sub>f</sub>	Fall Time	R <sub>D</sub> =120	-	8	-	ns
C <sub>iss</sub>	Input Capacitance	V <sub>GS</sub> =0V	-	590	950	pF
C <sub>oss</sub>	Output Capacitance	V <sub>DS</sub> =25V	-	50	-	pF
C <sub>rss</sub>	Reverse Transfer Capacitance	f=1.0MHz	-	6	-	pF

**Source-Drain Diode**

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Units
V <sub>SD</sub>	Forward On Voltage <sup>3</sup>	I <sub>S</sub> =3A, V <sub>GS</sub> =0V	-	-	1.5	V
t <sub>rr</sub>	Reverse Recovery Time <sup>2</sup>	I <sub>S</sub> =3A, V <sub>GS</sub> =0V,	-	407	-	ns
Q <sub>rr</sub>	Reverse Recovery Charge	dI/dt=100A/μs	-	2110	-	nC

**Notes:**

- 1.Pulse width limited by safe operating area.
- 2.Starting T<sub>j</sub>=25°C , V<sub>DD</sub>=50V , L=15mH , R<sub>G</sub>=25 , I<sub>AS</sub>=3A.
- 3.Pulse width ≤300us , duty cycle ≤2%.

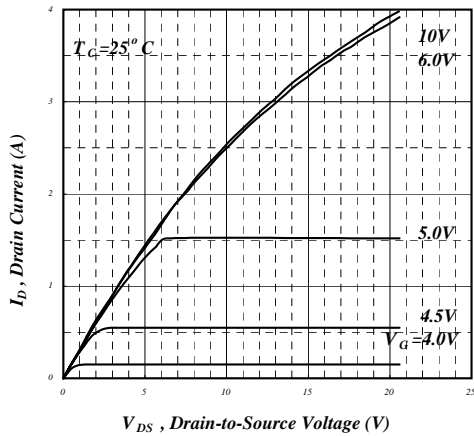


Fig 1. Typical Output Characteristics

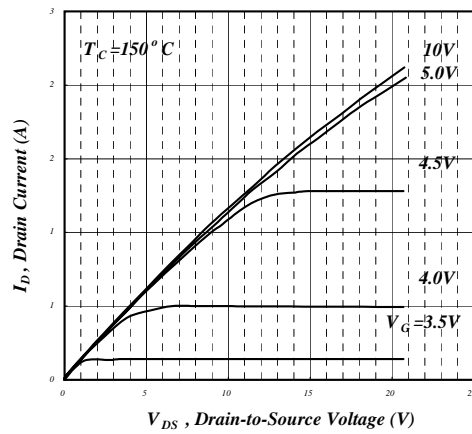


Fig 2. Typical Output Characteristics

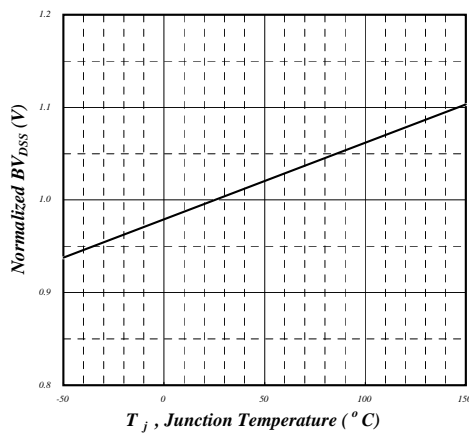


Fig 3. Normalized BV<sub>DSS</sub> v.s. Junction Temperature

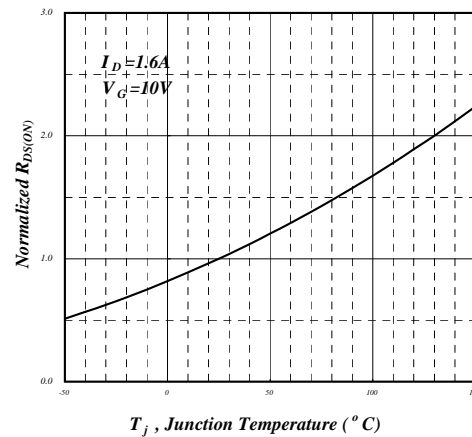


Fig 4. Normalized On-Resistance v.s. Junction Temperature

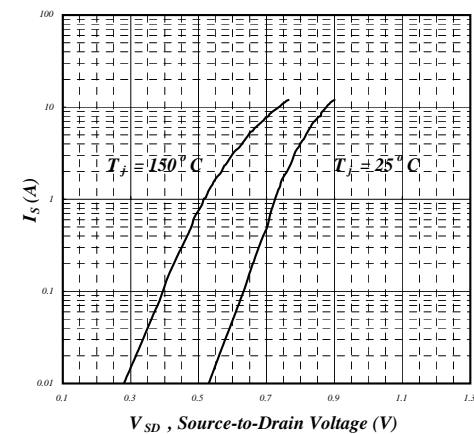


Fig 5. Forward Characteristic of Reverse Diode

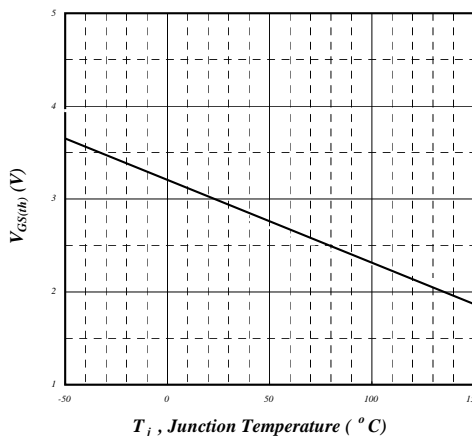


Fig 6. Gate Threshold Voltage v.s. Junction Temperature



# AP03N70I-H

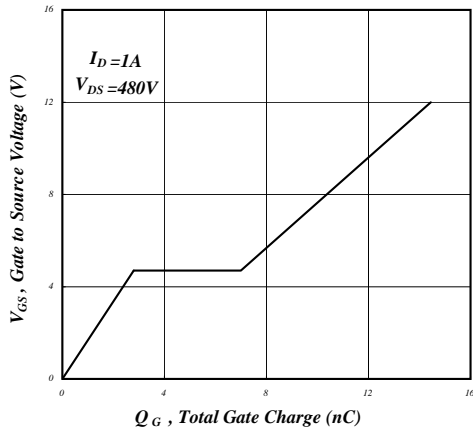


Fig 7. Gate Charge Characteristics

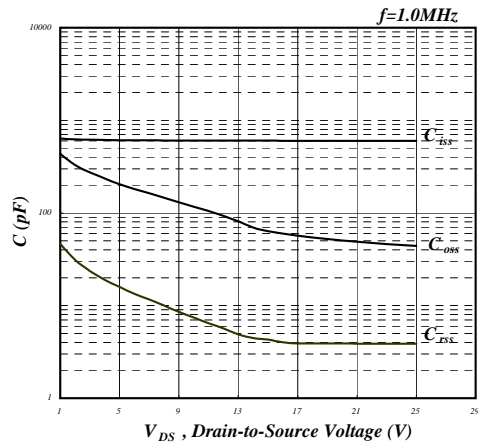


Fig 8. Typical Capacitance Characteristics

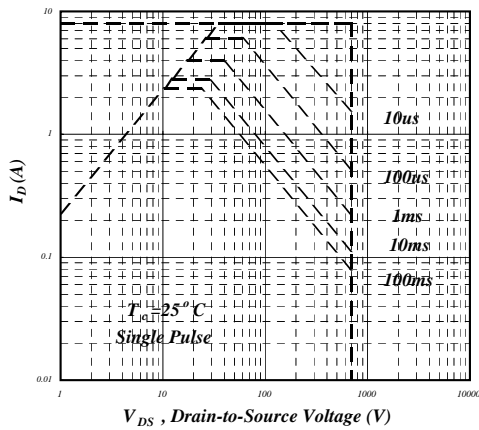


Fig 9. Maximum Safe Operating Area

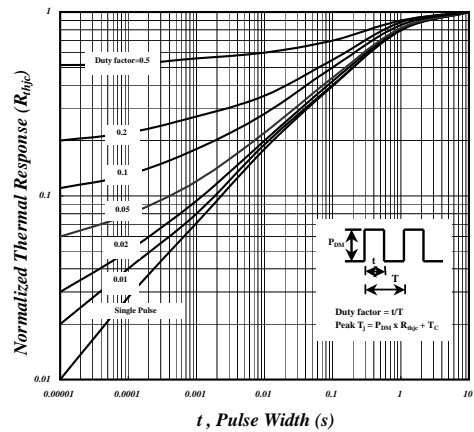


Fig 10. Effective Transient Thermal Impedance

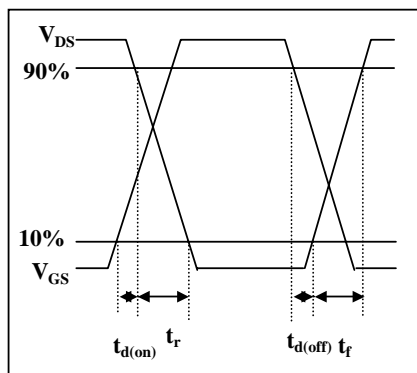


Fig 11. Switching Time Waveform

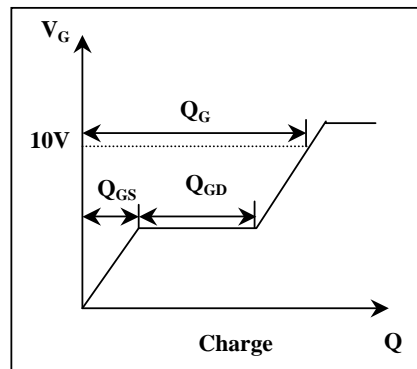


Fig 12. Gate Charge Waveform