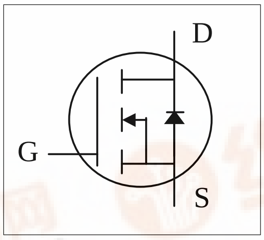
AP03N70P-H

Pb Free Plating Product

Advanced Power Electronics Corp.

N-CHANNEL ENHANCEMENT MODE POWER MOSFET

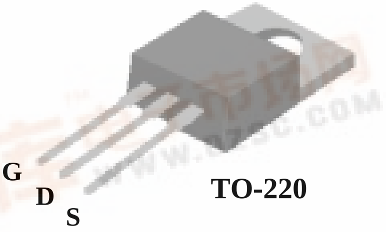
- **Repetitive Avalanche Rated**
- **Fast Switching Speed**
- **Simple Drive Requirement**
- **RoHS Compliant**



BV_{DSS}	700V
$R_{DS(ON)}$	4.4Ω
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-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	700	V
V_{GS}	Gate-Source Voltage	±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[1]	8	A
$P_D@T_C=25℃$	Total Power Dissipation	54.3	W
	Linear Derating Factor	0.44	W/℃
E_{AS}	Single Pulse Avalanche Energy[2]	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.	2.3	℃/W
Rthj-a	Thermal Resistance Junction-ambient	Max.	62	℃/W

Data & specifications subject to change without notice

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	700	-	-	V
$\Delta BV_{DSS}/\Delta T_j$	Breakdown Voltage Temperature Coefficient	Reference to 25℃, I_D=1mA	-	0.6	-	V/℃
$R_{DS(ON)}$	Static Drain-Source On-Resistance	V_{GS}=10V, I_D=1.6A	-	-	4.4	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=1A	-	12	20	nC
Q_{gs}	Gate-Source Charge	V_{DS}=480V	-	3	-	nC
Q_{gd}	Gate-Drain ("Miller") Charge	V_{GS}=10V	-	4	-	nC
$t_{d(on)}$	Turn-on Delay Time[3]	V_{DD}=300V	-	8.5	-	ns
t_r	Rise Time	I_D=2.5A	-	6	-	ns
$t_{d(off)}$	Turn-off Delay Time	R_G=10Ω,V_{GS}=10V	-	19	-	ns
t_f	Fall Time	R_D=120Ω	-	8	-	ns
C_{iss}	Input Capacitance	V_{GS}=0V	-	590	950	pF
C_{oss}	Output Capacitance	V_{DS}=25V	-	50	-	pF
C_{rss}	Reverse Transfer Capacitance	f=1.0MHz	-	6	-	pF
R_g	Gate Resistance	f=1.0MHz	-	3.4	5.1	Ω

Source-Drain Diode

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Units
V_{SD}	Forward On Voltage[3]	I_S=2.5A, V_{GS}=0V	-	-	1.5	V
t_{rr}	Reverse Recovery Time[2]	I_S=2.5A, V_{GS}=0V,	-	407	-	ns
Q_{rr}	Reverse Recovery Charge	dI/dt=100A/µs	-	2110	-	nC

Notes:

1.Pulse width limited by safe operating area.

2.Starting T_j=25°C , V_{DD}=50V , L=1mH , R_G=25Ω , I_{AS}=2.5A.

3.Pulse width $\le$300us , duty cycle $\le$2%.

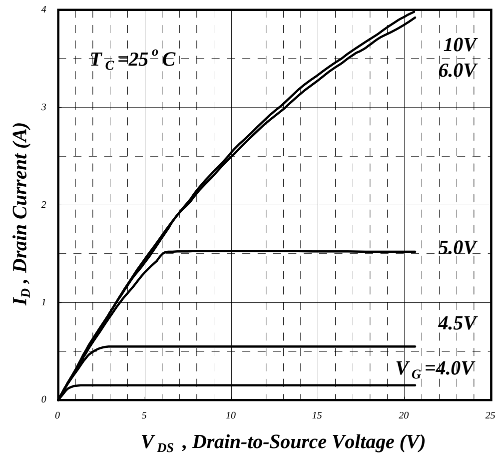


Fig 1. Typical Output Characteristics

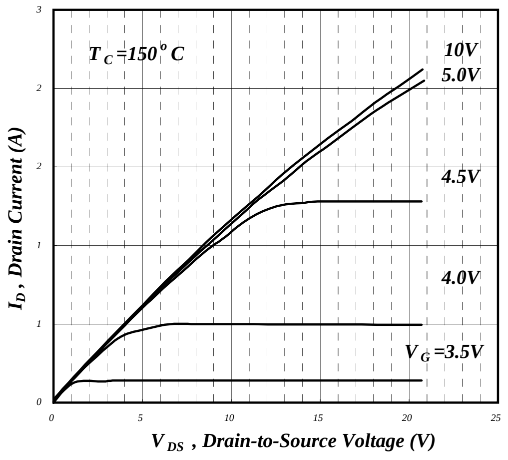


Fig 2. Typical Output Characteristics

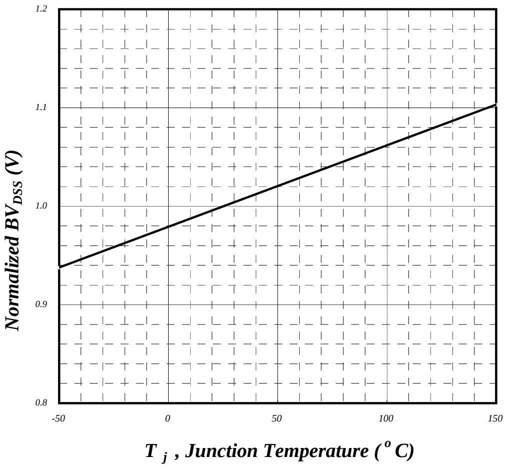


Fig 3. Normalized BV_{DSS} v.s. Junction Temperature

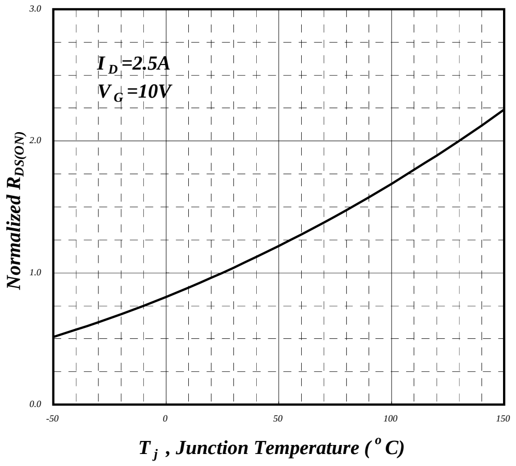


Fig 4. Normalized On-Resistance v.s. Junction Temperature

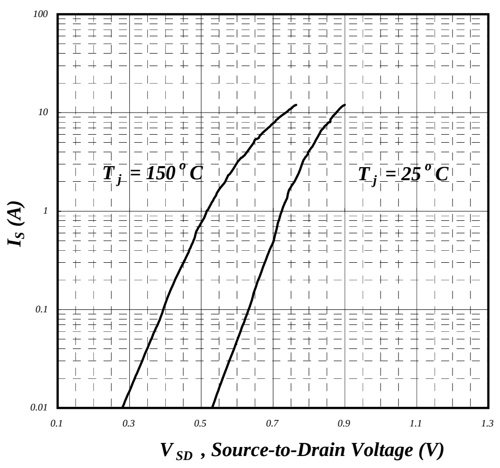


Fig 5. Forward Characteristic of Reverse Diode

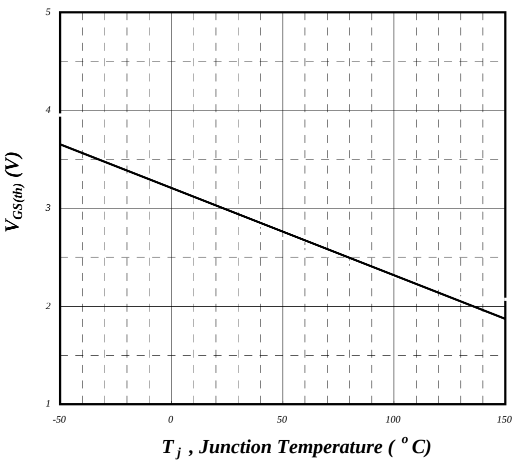


Fig 6. Gate Threshold Voltage v.s. Junction Temperature

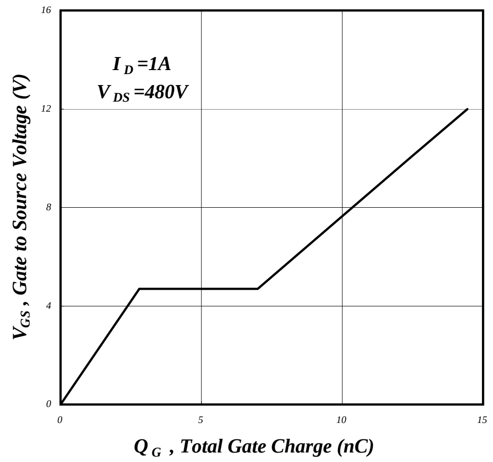


Fig 7. Gate Charge Characteristics

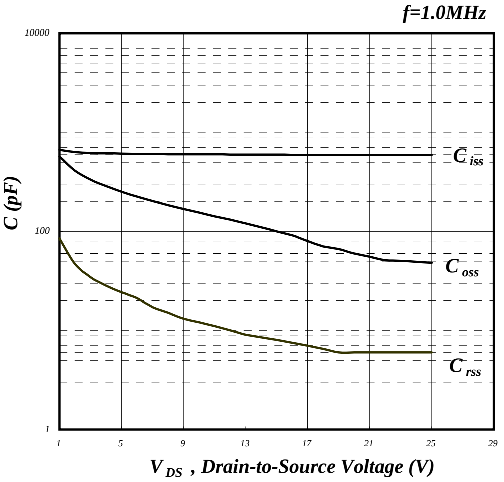


Fig 8. Typical Capacitance Characteristics

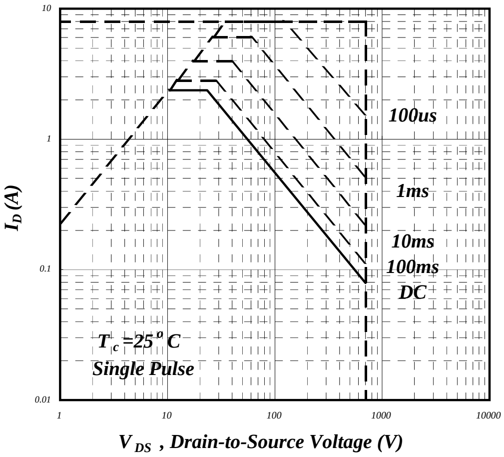


Fig 9. Maximum Safe Operating Area

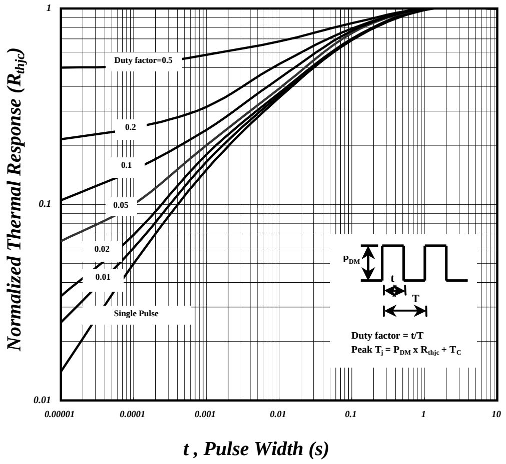
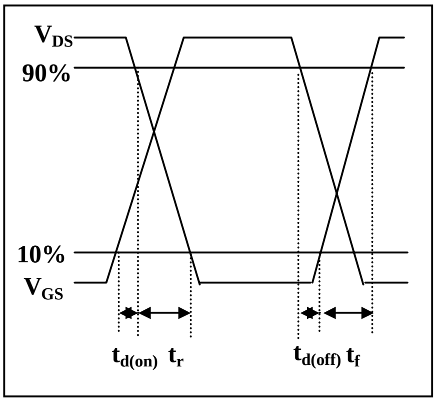


Fig 10. Effective Transient Thermal Impedance



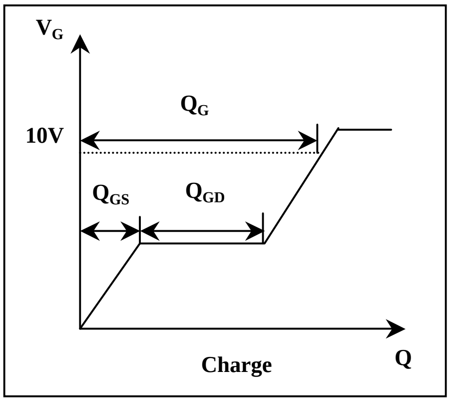


Fig 11. Switching Time Waveform

Fig 12. Gate Charge Waveform