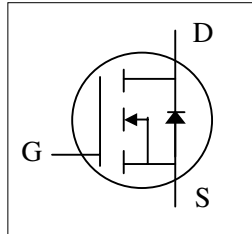




- ▼ 100% Avalanche Test
- ▼ Fast Switching Characteristic
- ▼ Simple Drive Requirement

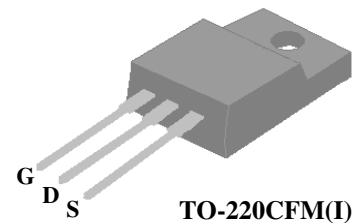


$BV_{DSS}$	620V
$R_{DS(ON)}$	1.3 $\Omega$
$I_D$	6A

## Description

AP3986 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.



TO-220CFM(I)

## Absolute Maximum Ratings

Symbol	Parameter	Rating	Units
$V_{DS}$	Drain-Source Voltage	620	V
$V_{GS}$	Gate-Source Voltage	$\pm 30$	V
$I_D@T_C=25^\circ C$	Continuous Drain Current, $V_{GS}$ @ 10V	6	A
$I_D@T_C=100^\circ C$	Continuous Drain Current, $V_{GS}$ @ 10V	3.3	A
$I_{DM}$	Pulsed Drain Current <sup>1</sup>	20	A
$P_D@T_C=25^\circ C$	Total Power Dissipation	36.8	W
$E_{AS}$	Single Pulse Avalanche Energy <sup>2</sup>	20	mJ
$I_{AR}$	Avalanche Current	6	A
$T_{STG}$	Storage Temperature Range	-55 to 150	$^\circ C$
$T_J$	Operating Junction Temperature Range	-55 to 150	$^\circ C$

## Thermal Data

Symbol	Parameter	Value	Units
Rthj-c	Maximum Thermal Resistance, Junction-case	3.4	$^\circ C/W$
Rthj-a	Maximum Thermal Resistance, Junction-ambient	65	$^\circ C/W$


**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> =250μA	620	-	-	V
R <sub>DS(ON)</sub>	Static Drain-Source On-Resistance <sup>3</sup>	V <sub>GS</sub> =10V, I <sub>D</sub> =2.8A	-	-	1.3	Ω
V <sub>GS(th)</sub>	Gate Threshold Voltage	V <sub>DS</sub> =V <sub>GS</sub> , I <sub>D</sub> =250μA	2	-	4	V
g <sub>fs</sub>	Forward Transconductance	V <sub>DS</sub> =10V, I <sub>D</sub> =3A	-	2.8	-	S
I <sub>DSS</sub>	Drain-Source Leakage Current	V <sub>DS</sub> =480V, V <sub>GS</sub> =0V	-	-	100	μA
I <sub>GSS</sub>	Gate-Source Leakage	V <sub>GS</sub> =±30V, V <sub>DS</sub> =0V	-	-	±100	nA
Q <sub>g</sub>	Total Gate Charge <sup>3</sup>	I <sub>D</sub> =3A	-	34	55	nC
Q <sub>gs</sub>	Gate-Source Charge	V <sub>DS</sub> =300V	-	6	-	nC
Q <sub>gd</sub>	Gate-Drain ("Miller") Charge	V <sub>GS</sub> =10V	-	15	-	nC
t <sub>d(on)</sub>	Turn-on Delay Time <sup>3</sup>	V <sub>DD</sub> =300V	-	30	-	ns
t <sub>r</sub>	Rise Time	I <sub>D</sub> =3A	-	32	-	ns
t <sub>d(off)</sub>	Turn-off Delay Time	R <sub>G</sub> =50Ω, V <sub>GS</sub> =10V	-	205	-	ns
t <sub>f</sub>	Fall Time	R <sub>D</sub> =100Ω	-	55	-	ns
C <sub>iss</sub>	Input Capacitance	V <sub>GS</sub> =0V	-	1310	2100	pF
C <sub>oss</sub>	Output Capacitance	V <sub>DS</sub> =25V	-	210	-	pF
C <sub>rss</sub>	Reverse Transfer Capacitance	f=1.0MHz	-	35	-	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	-	-	1.3	V
trr	Reverse Recovery Time <sup>3</sup>	I <sub>S</sub> =3A, V <sub>GS</sub> =0V	-	400	-	ns
Q <sub>rr</sub>	Reverse Recovery Charge	dI/dt=100A/μs	-	4.2	-	μC

**Notes:**

- 1.Pulse width limited by max. junction temperature.
- 2.Starting T<sub>j</sub>=25°C , V<sub>DD</sub>=50V , L=1mH , R<sub>G</sub>=25Ω
- 3.Pulse test

THIS PRODUCT IS SENSITIVE TO ELECTROSTATIC DISCHARGE, PLEASE HANDLE WITH CAUTION.

USE OF THIS PRODUCT AS A CRITICAL COMPONENT IN LIFE SUPPORT OR OTHER SIMILAR SYSTEMS IS NOT AUTHORIZED.

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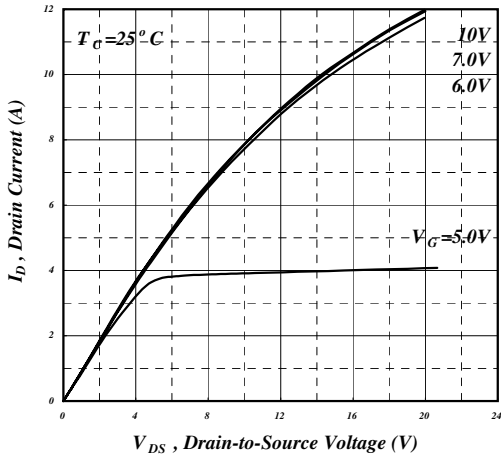


Fig 1. Typical Output Characteristics

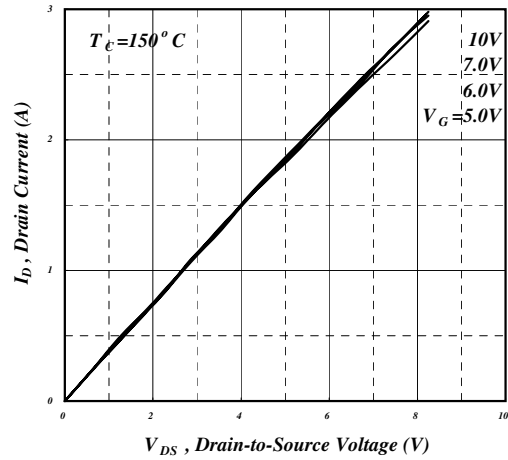


Fig 2. Typical Output Characteristics

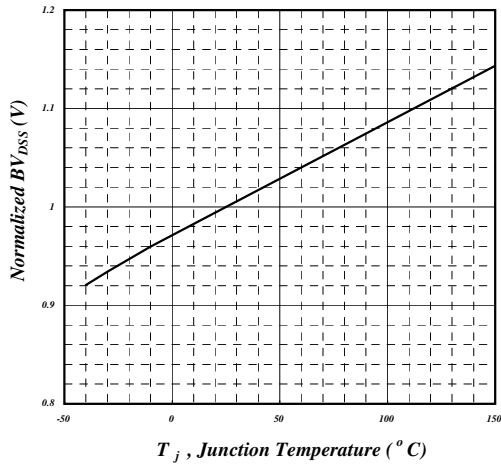


Fig 3. Normalized  $BV_{DSS}$  v.s. Junction Temperature

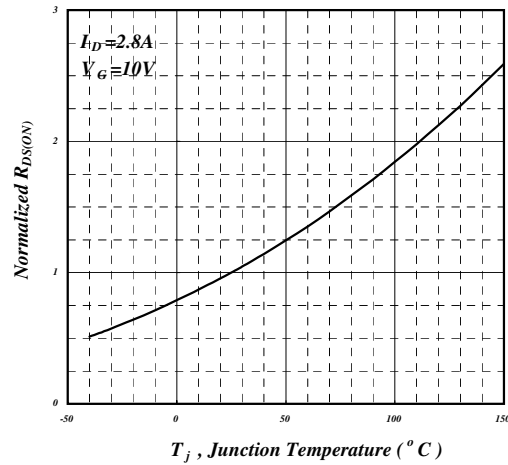


Fig 4. Normalized On-Resistance v.s. Junction Temperature

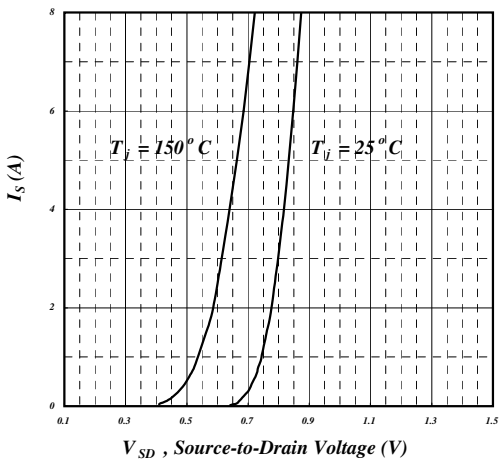


Fig 5. Forward Characteristic of Reverse Diode

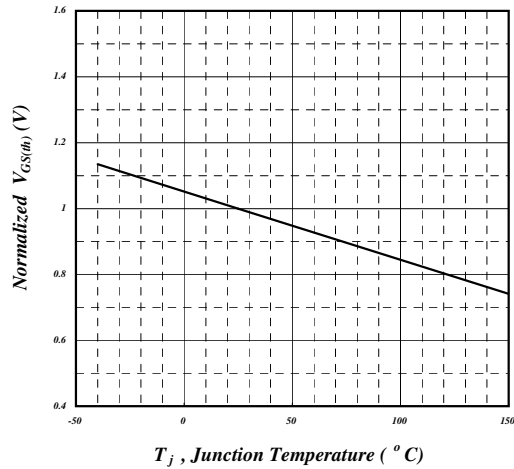


Fig 6. Gate Threshold Voltage v.s. Junction Temperature

