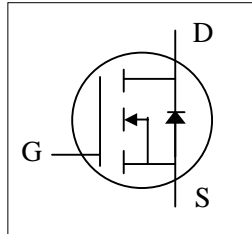




- ▼ 100% Avalanche Test
- ▼ Fast Switching Characteristic
- ▼ Simple Drive Requirement

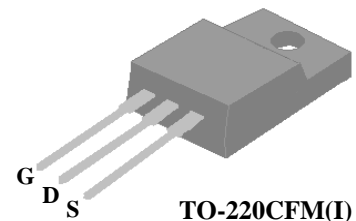


| | |
|--------------|--------------|
| BV_{DSS} | 620V |
| $R_{DS(ON)}$ | 1.3 Ω |
| I_D | 6A |

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.



Absolute Maximum Ratings

| Symbol | Parameter | Rating | Units |
|---------------------------|--|------------|------------|
| V_{DS} | Drain-Source Voltage | 620 | V |
| V_{GS} | Gate-Source Voltage | ± 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 ¹ | 20 | A |
| $P_D @ T_C = 25^\circ C$ | Total Power Dissipation | 36.8 | W |
| E_{AS} | Single Pulse Avalanche Energy ² | 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 @ $T_j=25^\circ\text{C}$ (unless otherwise specified)

| Symbol | Parameter | Test Conditions | Min. | Typ. | Max. | Units |
|--------------|--|-------------------------------|------|------|-----------|----------|
| BV_{DSS} | Drain-Source Breakdown Voltage | $V_{GS}=0V, I_D=250\mu A$ | 620 | - | - | V |
| $R_{DS(ON)}$ | Static Drain-Source On-Resistance ³ | $V_{GS}=10V, I_D=2.8A$ | - | - | 1.3 | Ω |
| $V_{GS(th)}$ | Gate Threshold Voltage | $V_{DS}=V_{GS}, I_D=250\mu A$ | 2 | - | 4 | V |
| g_{fs} | Forward Transconductance | $V_{DS}=10V, I_D=3A$ | - | 2.8 | - | S |
| I_{DSS} | Drain-Source Leakage Current | $V_{DS}=480V, V_{GS}=0V$ | - | - | 100 | μA |
| I_{GSS} | Gate-Source Leakage | $V_{GS}=\pm 30V, V_{DS}=0V$ | - | - | ± 100 | nA |
| Q_g | Total Gate Charge ³ | $I_D=3A$ | - | 34 | 55 | nC |
| Q_{gs} | Gate-Source Charge | $V_{DS}=300V$ | - | 6 | - | nC |
| Q_{gd} | Gate-Drain ("Miller") Charge | $V_{GS}=10V$ | - | 15 | - | nC |
| $t_{d(on)}$ | Turn-on Delay Time ³ | $V_{DD}=300V$ | - | 30 | - | ns |
| t_r | Rise Time | $I_D=3A$ | - | 32 | - | ns |
| $t_{d(off)}$ | Turn-off Delay Time | $R_G=50\Omega, V_{GS}=10V$ | - | 205 | - | ns |
| t_f | Fall Time | $R_D=100\Omega$ | - | 55 | - | ns |
| C_{iss} | Input Capacitance | $V_{GS}=0V$ | - | 1310 | 2100 | pF |
| C_{oss} | Output Capacitance | $V_{DS}=25V$ | - | 210 | - | pF |
| C_{rss} | Reverse Transfer Capacitance | $f=1.0\text{MHz}$ | - | 35 | - | pF |

Source-Drain Diode

| Symbol | Parameter | Test Conditions | Min. | Typ. | Max. | Units |
|----------|------------------------------------|---------------------|------|------|------|---------|
| V_{SD} | Forward On Voltage ³ | $I_S=3A, V_{GS}=0V$ | - | - | 1.3 | V |
| t_{rr} | Reverse Recovery Time ³ | $I_S=3A, V_{GS}=0V$ | - | 400 | - | ns |
| Q_{rr} | Reverse Recovery Charge | $dI/dt=100A/\mu s$ | - | 4.2 | - | μC |

Notes:

1. Pulse width limited by max. junction temperature.
2. Starting $T_j=25^\circ\text{C}$, $V_{DD}=50V$, $L=1\text{mH}$, $R_G=25\Omega$
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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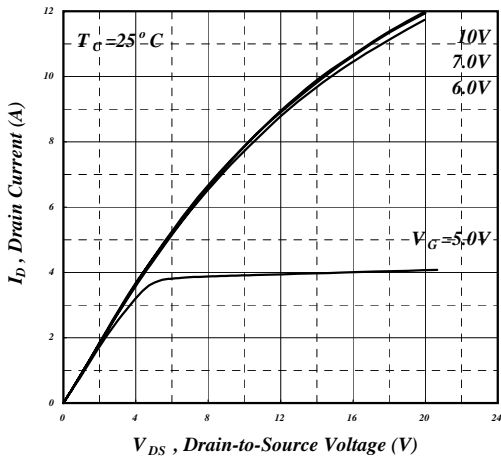


Fig 1. Typical Output Characteristics

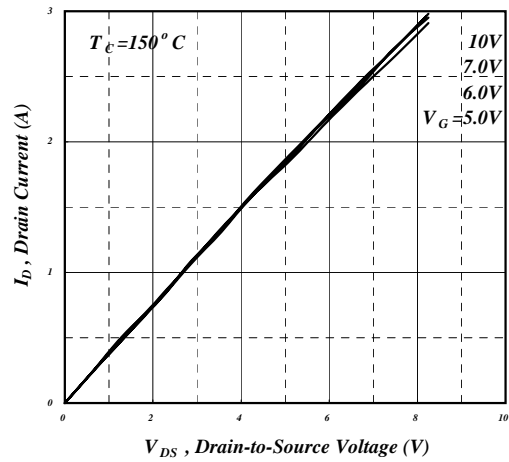


Fig 2. Typical Output Characteristics

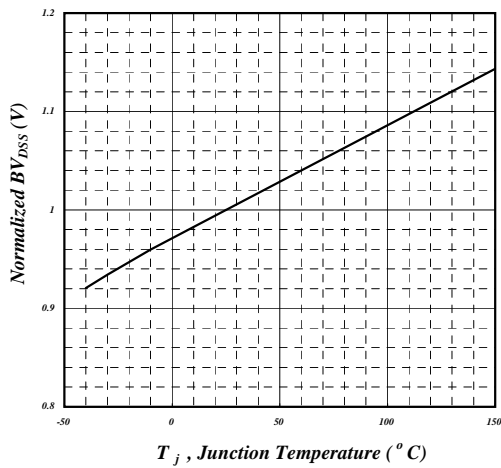


Fig 3. Normalized BV_{DSS} v.s. Junction Temperature

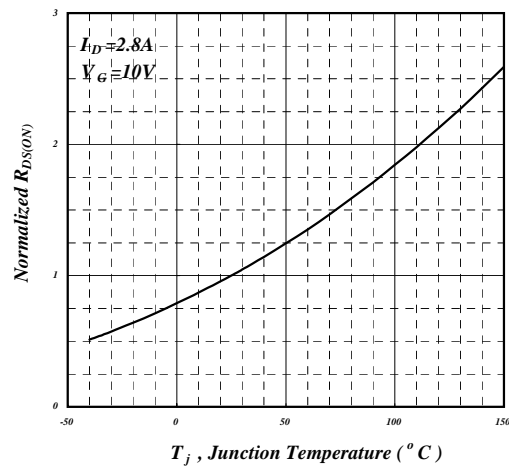


Fig 4. Normalized On-Resistance v.s. Junction Temperature

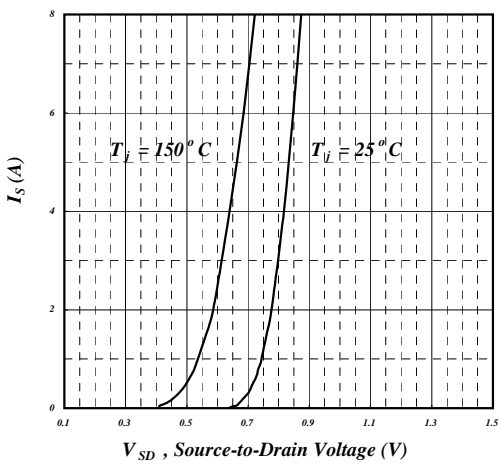


Fig 5. Forward Characteristic of Reverse Diode

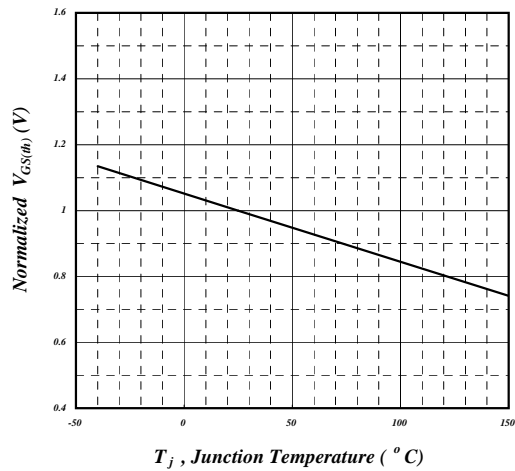


Fig 6. Gate Threshold Voltage v.s. Junction Temperature

