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April 2014

BAV99 — 200 mA 70 V High Conductance Ultra-Fast Switching Diode

# BAV99 200 mA 70 V High Conductance Ultra-Fast Switching Diode

## Features

- High Conductance:  $I_F = 200 \text{ mA}$
- Fast Switching Speed:  $t_{rr} < 6 \text{ ns}$  Maximum
- Small Plastic SOT-23 Package
- Series-Pair Configuration

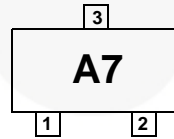
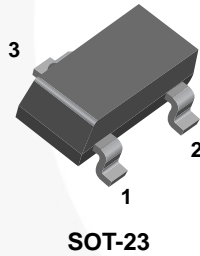
## Applications

- High-Speed Switching Applications

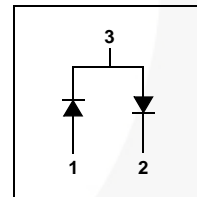
## Description

The BAV99 is a 350 mW high-speed switching diode array with series-pair diode configuration. It achieves high-current conductivity, up to 200 mA, in a very small  $7\text{mm}^2$  footprint. These features make the BAV99 optimal for area-constrained applications that need a little extra power capability.

For common cathode and common anode high-speed switching diodes, explore Fairchild's BAV70 and BAW56. Looking for more options in the SOT-23 package? Check Fairchild's MMBD family.



## Connection Diagram



## Ordering Information

| Part Number | Marking | Package   | Packing Method              |
|-------------|---------|-----------|-----------------------------|
| BAV99       | A7      | SOT-23 3L | Tape and Reel, Reel 7 inch  |
| BAV99_D87Z  | A7      | SOT-23 3L | Tape and Reel, Reel 13 inch |

## Absolute Maximum Ratings<sup>(1)</sup>

Stresses exceeding the absolute maximum ratings may damage the device. The device may not function or be operable above the recommended operating conditions and stressing the parts to these levels is not recommended. In addition, extended exposure to stresses above the recommended operating conditions may affect device reliability. The absolute maximum ratings are stress ratings only. Values are at  $T_A = 25^\circ\text{C}$  unless otherwise noted.

| Symbol      | Parameter                                 | Value                          | Unit             |
|-------------|---|--------------------------------|------------------|
| $V_{RRM}$   | Maximum Repetitive Reverse Voltage        | 70                             | V                |
| $I_{F(AV)}$ | Average Rectified Forward Current         | 200                            | mA               |
| $I_{FSM}$   | Non-Repetitive Peak Forward Surge Current | Pulse Width = 1.0 Second       | 1.0              |
|             |   | Pulse Width = 300 Microseconds | 8.0              |
| $T_{STG}$   | Storage Temperature Range                 | -55 to +150                    | $^\circ\text{C}$ |
| $T_J$       | Operating Junction Temperature Range      | -55 to +150                    | $^\circ\text{C}$ |

### Note:

- These ratings are based on a maximum junction temperature of  $150^\circ\text{C}$ .  
These are steady-state limits. Fairchild Semiconductor should be consulted on applications involving pulsed or low-duty cycle operations.

## Thermal Characteristics<sup>(2)</sup>

Values are at  $T_A = 25^\circ\text{C}$  unless otherwise noted.

| Symbol          | Parameter                               | Value | Unit                      |
|-----------------|---|-------|---------------------------|
| $P_D$           | Power Dissipation                       | 350   | mW                        |
| $R_{\theta JA}$ | Thermal Resistance, Junction to Ambient | 357   | $^\circ\text{C}/\text{W}$ |

### Note:

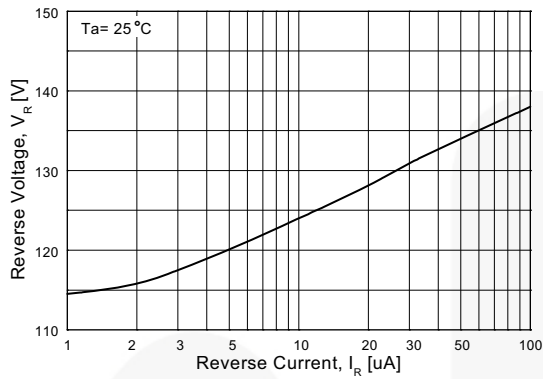
- PCB size: FR-4, 76 mm x 114 mm x 1.57 mm (3.0 inch x 4.5 inch x 0.062 inch) with minimum land pattern size.

## Electrical Characteristics

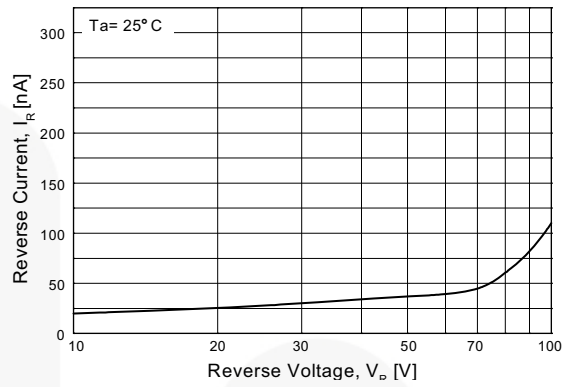
Values are at  $T_A = 25^\circ\text{C}$  unless otherwise noted.

| Symbol   | Parameter                        | Conditions   | Min. | Max. | Unit          |
|----------|----------------------------------|--|------|------|---------------|
| $V_R$    | Breakdown Voltage, per Diode     | $I_R = 100 \mu\text{A}$  | 70   |      | V             |
| $V_F$    | Forward Voltage, per Diode       | $I_F = 1 \text{ mA}$   |      | 715  | mV            |
|          |                                  | $I_F = 10 \text{ mA}$  |      | 855  |               |
|          |                                  | $I_F = 50 \text{ mA}$  |      | 1.00 | V             |
|          |                                  | $I_F = 150 \text{ mA}$   |      | 1.25 |               |
| $I_R$    | Reverse Leakage, per Diode       | $V_R = 70 \text{ V}$   |      | 2.5  | $\mu\text{A}$ |
|          |                                  | $V_R = 25 \text{ V}, T_A = 150^\circ\text{C}$                                  |      | 30.0 |               |
|          |                                  | $V_R = 70 \text{ V}, T_A = 150^\circ\text{C}$                                  |      | 50.0 |               |
| $C_T$    | Total Capacitance, per Diode     | $V_R = 0 \text{ V}, f = 1.0 \text{ MHz}$                                       |      | 1.5  | pF            |
| $t_{rr}$ | Reverse-Recovery Time, per Diode | $I_F = I_R = 10 \text{ mA},$<br>$I_{RR} = 1 \text{ mA},$<br>$R_L = 100 \Omega$ |      | 6.0  | ns            |

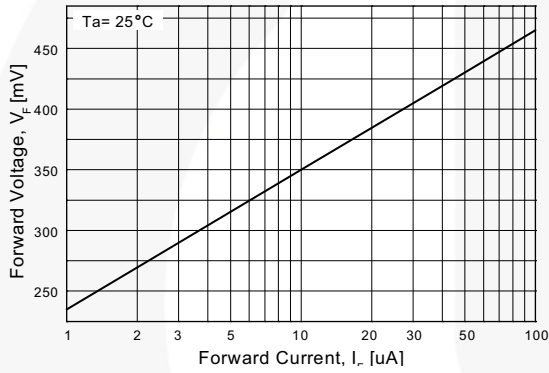
## Typical Performance Characteristics



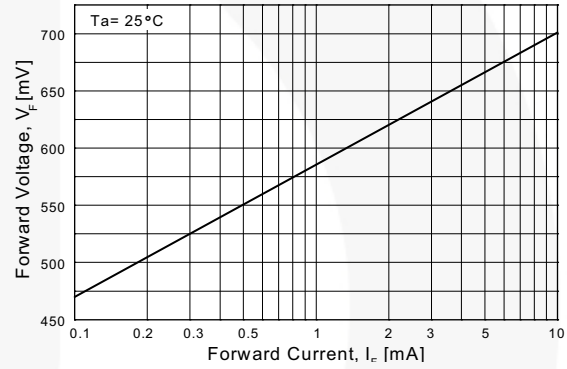
**Figure 1. Reverse Voltage vs. Reverse Current**



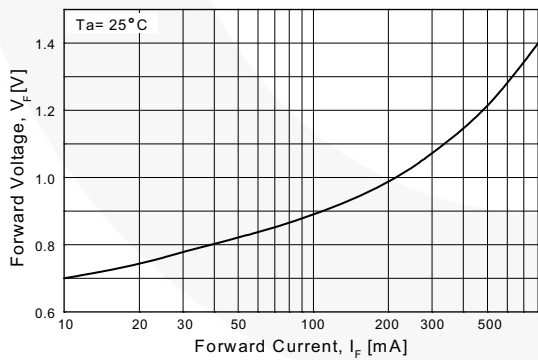
**Figure 2. Reverse Current vs. Reverse Voltage**



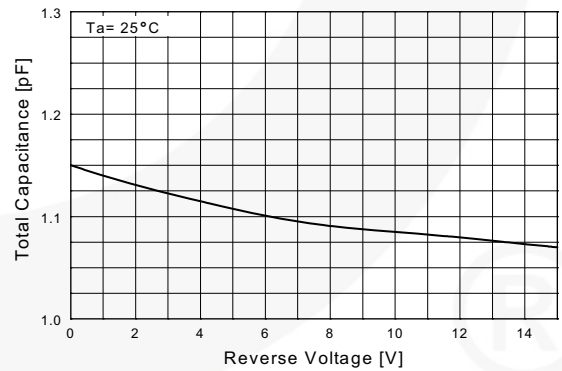
**Figure 3. Forward Voltage vs. Forward Current**  
 $V_F$  - 1 to 100  $\mu$ A



**Figure 4. Forward Voltage vs. Forward Current**  
 $V_F$  - 0.1 to 10 mA



**Figure 5. Forward Voltage vs. Forward Current**  
 $V_F$  - 10 to 800 mA



**Figure 6. Total Capacitance vs. Reverse Voltage**

Typical Performance Characteristics (Continued)

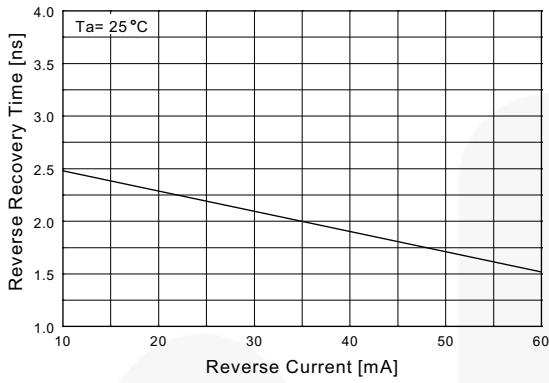


Figure 7. Reverse-Recovery Time vs. Reverse Current

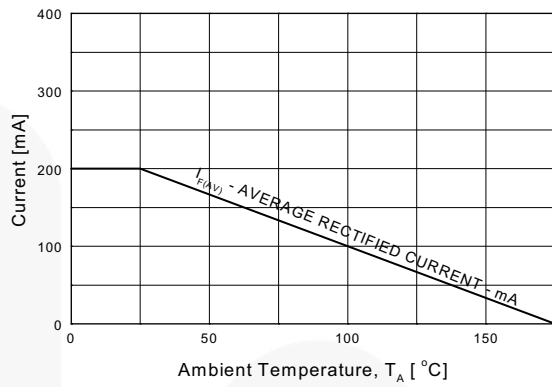


Figure 8. Average Rectified Current ( $I_{F(AV)}$ ) vs. Ambient Temperature ( $T_A$ )

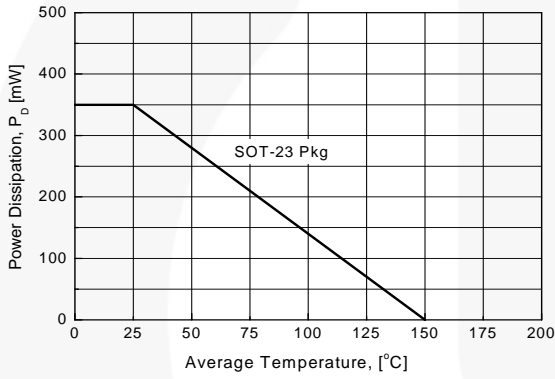


Figure 9. Power Derating Curve





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