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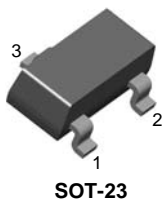


November 2014

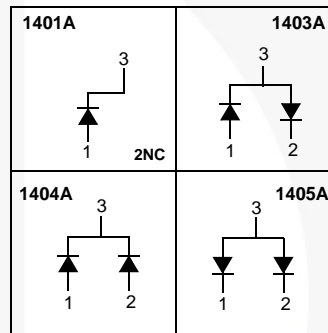
# MMBD1401A / MMBD1403A / MMBD1404A / MMBD1405A High-Voltage General-Purpose Diode

## Descriptions

Sourced from process 2V.



Connection Diagram



## Ordering Information

| Part Number | Top Mark | Package   | Packing Method |
|-------------|----------|-----------|----------------|
| MMBD1401A   | A29      | SOT-23 3L | Tape and Reel  |
| MMBD1403A   | A32      | SOT-23 3L | Tape and Reel  |
| MMBD1404A   | A33      | SOT-23 3L | Tape and Reel  |
| MMBD1405A   | A34      | SOT-23 3L | Tape and Reel  |

MMBD1401A / MMBD1403A / MMBD1404A / MMBD1405A — High-Voltage General-Purpose Diode

## Absolute Maximum Ratings<sup>(1), (2)</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             |
|-----------------------|---|-------------------------------|------------------|
| $W_{IV}$              | Working Inverse Voltage                   | 175                           | V                |
| $I_O$                 | Average Rectified Current                 | 200                           | mA               |
| $I_F$                 | DC Forward Current                        | 600                           | mA               |
| $i_f$                 | Recurrent Peak Forward Current            | 700                           | mA               |
| $i_{f(\text{surge})}$ | Non-Repetitive Peak Forward Surge Current | Pulse Width = 1.0 second      | 1.0              |
|                       |   | Pulse Width = 1.0 microsecond | 2.0              |
| $T_{STG}$             | Storage Temperature Range                 | -55 to +150                   | $^\circ\text{C}$ |
| $T_J$                 | Operating Junction Temperature            | 150                           | $^\circ\text{C}$ |

### Notes:

- 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>(3)</sup>

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

| Symbol          | Parameter                               | Max. | Unit                      |
|-----------------|---|------|---------------------------|
| $P_D$           | Power Dissipation                       | 350  | mW                        |
|                 | Derate above $25^\circ\text{C}$         | 2.8  | mW/ $^\circ\text{C}$      |
| $R_{\theta JA}$ | Thermal Resistance, Junction-to-Ambient | 357  | $^\circ\text{C}/\text{W}$ |

### Note:

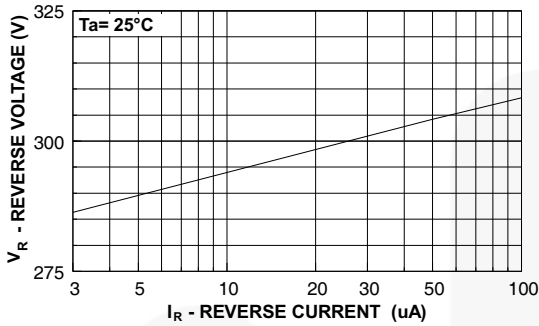
- Device is mounted on glass epoxy PCB 1.6 inch x 1.6 inch x 0.06 inch, mounting pad for the collector lead minimum  $0.93 \text{ in}^2$ .

## Electrical Characteristics

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

| Symbol   | Parameter             | Conditions   | Min. | Max. | Unit |
|----------|-----------------------|--|------|------|------|
| $B_V$    | Breakdown Voltage     | $I_R = 100 \mu\text{A}$  | 250  |      | V    |
| $I_R$    | Reverse Current       | $V_R = 120 \text{ V}$  |      | 40   | nA   |
|          |                       | $V_R = 175 \text{ V}$  |      | 100  | nA   |
| $V_F$    | Forward Voltage       | $I_F = 10 \text{ mA}$  |      | 800  | mV   |
|          |                       | $I_F = 50 \text{ mA}$  | 760  | 920  | mV   |
|          |                       | $I_F = 200 \text{ mA}$   |      | 1.1  | V    |
|          |                       | $I_F = 300 \text{ mA}$   |      | 1.25 | V    |
| $C_O$    | Diode Capacitance     | $V_R = 0, f = 1.0 \text{ MHz}$   |      | 2.0  | pF   |
| $T_{RR}$ | Reverse Recovery Time | $I_F = I_R = 30 \text{ mA}$ ,<br>$I_{RR} = 1.0 \text{ mA}, R_L = 100 \Omega$ |      | 50   | nS   |

## Typical Performance Characteristics

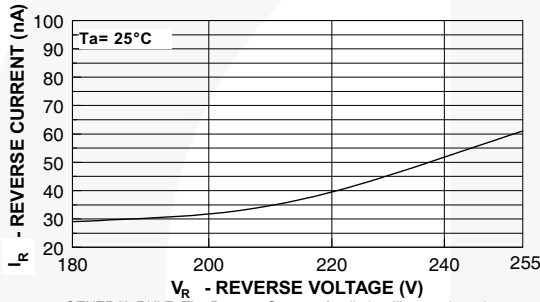


**Figure 1. Reverse Voltage vs. Reverse Current**  
BV - 1.0 to 100  $\mu$ A



**Figure 2. Reverse Current vs. Reverse Voltage**  
 $I_R$  - 55 to 205 V

GENERAL RULE: The Reverse Current of a diode will approximately double for every ten (10) Degree C increase in Temperature

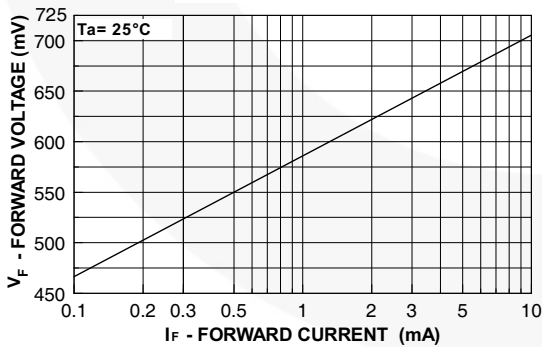


**Figure 3. Reverse Current vs. Reverse Voltage**  
 $I_R$  - 180 to 255 V

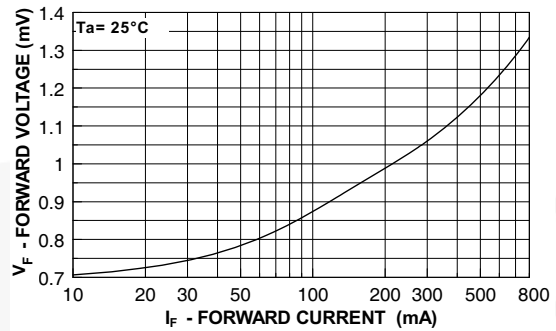
GENERAL RULE: The Reverse Current of a diode will approximately double for every ten Degree C increase in Temperature



**Figure 4. Forward Voltage vs. Forward Current**  
 $V_F$  - 1.0 to 100  $\mu$ A



**Figure 5. Forward Voltage vs. Forward Current**  
 $V_F$  - 0.1 to 10 mA



**Figure 6. Forward Voltage vs. Forward Current**  
 $V_F$  - 10 to 800 mA

Typical Performance Characteristics (Continued)

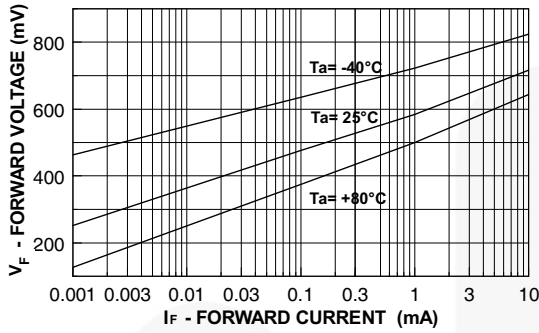


Figure 7. Forward Voltage vs. Ambient Temperature  
 $V_F$  - 1.0  $\mu$ A - 10 mA (- 40 to +80°C)

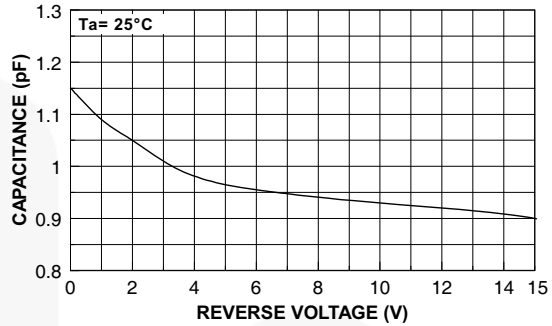


Figure 8. Capacitance vs. Reverse Voltage

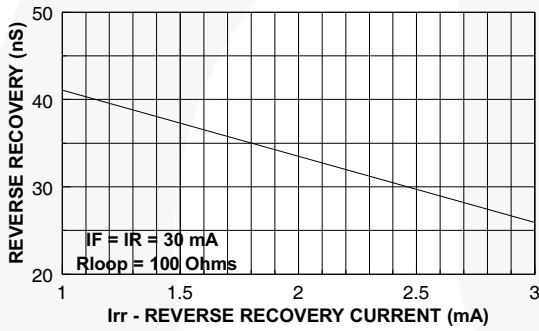


Figure 9. Reverse Recovery Time vs. Reverse Recovery Current ( $I_{rr}$ )

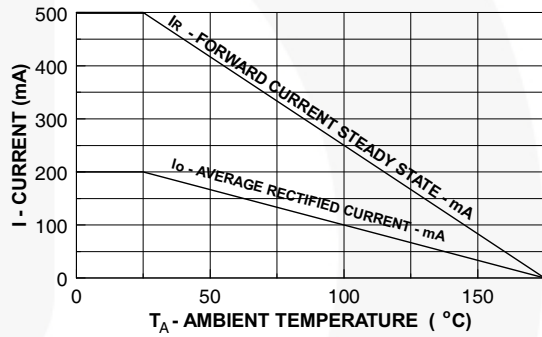


Figure 10. Average Rectified Current ( $I_O$ ) and Forward Current ( $I_F$ ) vs. Ambient Temperature ( $T_A$ )

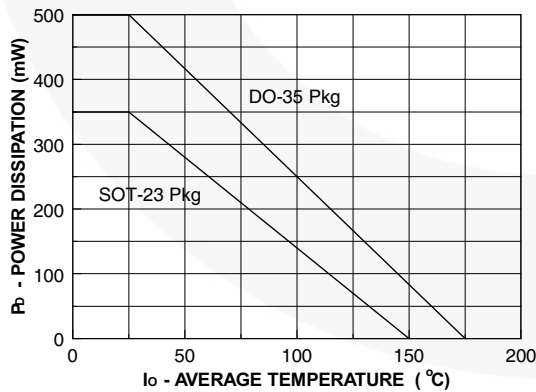


Figure 11. Power Derating Curve



LAND PATTERN  
RECOMMENDATION



SEE DETAIL A



**DETAIL A**  
SCALE: 2X

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