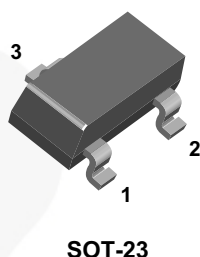




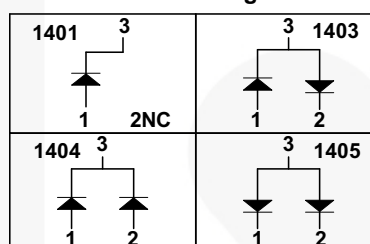
November 2014

## MMBD1401 / MMBD1403 / MMBD1404 / MMBD1405 Small Signal Diodes



SOT-23

Connection Diagrams



### Ordering Information

| Part Number | Top Mark | Package   | Packing Method |
|-------------|----------|-----------|----------------|
| MMBD1401    | 29       | SOT-23 3L | Tape and Reel  |
| MMBD1403    | 32       | SOT-23 3L | Tape and Reel  |
| MMBD1404    | 33       | SOT-23 3L | Tape and Reel  |
| MMBD1405    | 34       | SOT-23 3L | Tape and Reel  |

### 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             |
|-------------|-------------------------------------------|-------------------------------|------------------|
| $V_{RRM}$   | Maximum Repetitive Reverse Voltage        | 200                           | 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 = 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:

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

## Thermal Characteristics

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   | $^\circ\text{C/W}$ |

## Electrical Characteristics

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

| Symbol   | Parameter             | Conditions                                                                       | Min. | Max. | Unit |
|----------|-----------------------|----------------------------------------------------------------------------------|------|------|------|
| $B_V$    | Breakdown Voltage     | $I_R = 100\ \mu\text{A}$                                                         | 200  |      | V    |
| $V_F$    | Forward Voltage       | $I_F = 10\ \text{mA}$                                                            |      | 800  | mV   |
|          |                       | $I_F = 50\ \text{mA}$                                                            | 760  | 920  | mV   |
|          |                       | $I_F = 200\ \text{mA}$                                                           |      | 1.0  | V    |
|          |                       | $I_F = 300\ \text{mA}$                                                           |      | 1.1  | V    |
| $I_R$    | Reverse Current       | $V_R = 120\ \text{V}$                                                            |      | 40   | nA   |
|          |                       | $V_R = 175\ \text{V}$                                                            |      | 100  | nA   |
| $C_T$    | Total Capacitance     | $V_R = 0$ , $f = 1.0\ \text{MHz}$                                                |      | 2.0  | pF   |
| $t_{rr}$ | Reverse Recovery Time | $I_F = I_R = 30\ \text{mA}$ , $I_{RR} = 3.0\ \text{mA}$ ,<br>$R_L = 100\ \Omega$ |      | 50   | nS   |

## Typical Performance Characteristics

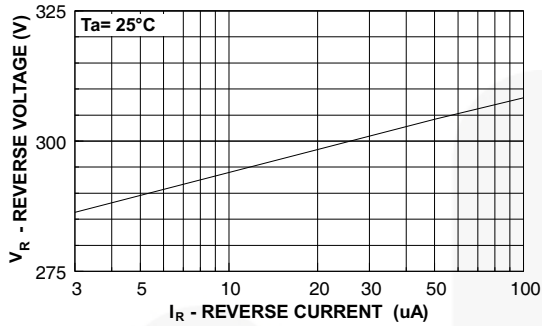


Figure 1. Reverse Voltage vs. Reverse Current  
 $V_R$  - 1.0 to 100  $\mu\text{A}$

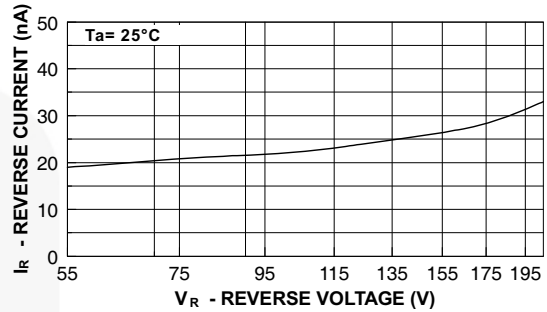


Figure 2. Reverse Current vs. Reverse Voltage  
 $I_R$  - 55 to 205 V

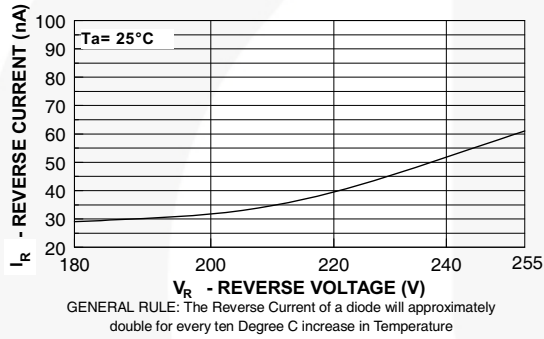


Figure 3. Reverse Current vs. Reverse Voltage  
 $I_R$  - 180 to 255 V

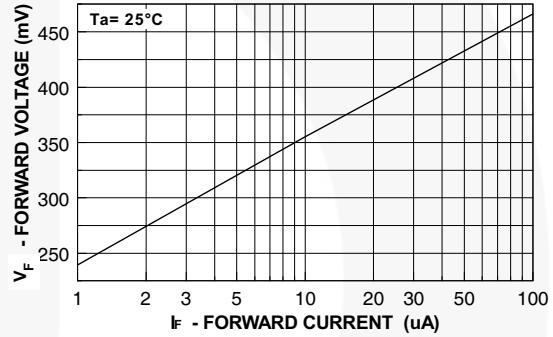


Figure 4. Forward Voltage vs. Forward Current  
 $V_F$  - 1.0 to 100  $\mu\text{A}$

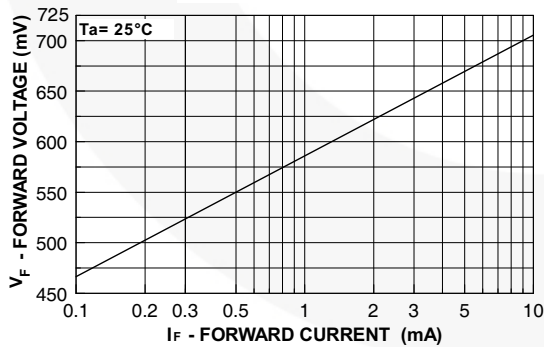


Figure 5. Forward Voltage vs. Forward Current  
 $V_F$  - 0.1 to 10 mA

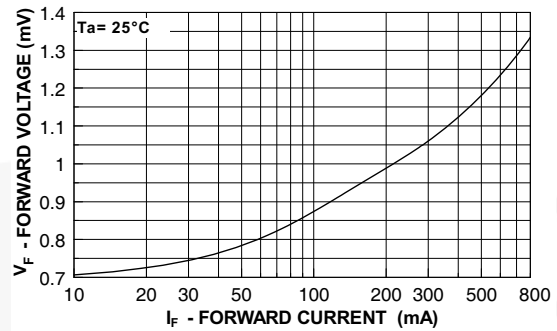


Figure 6. Forward Voltage vs. Forward Current  
 $V_F$  - 10 to 800 mA

## Typical Performance Characteristics (Continued)

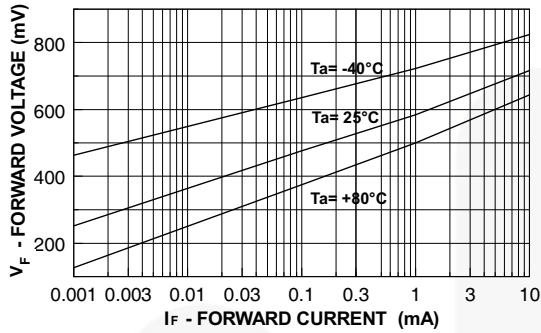


Figure 7. Forward Voltage vs. Ambient Temperature  
 $V_F$  - 1.0  $\mu$ A - 10 mA (- 40 to +80°C)

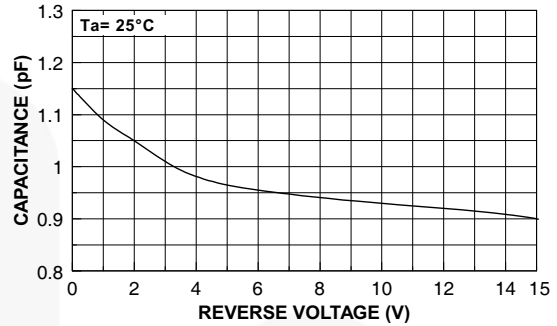


Figure 8. Capacitance vs. Reverse Voltage

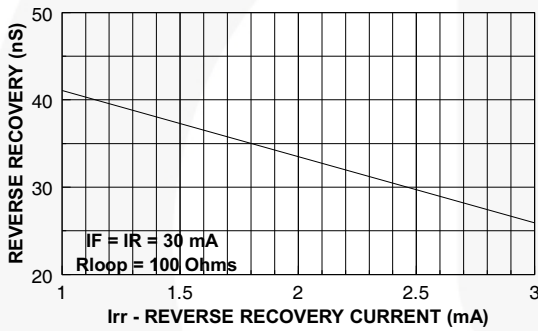


Figure 9. Reverse Recovery Time vs. Reverse Recovery Current ( $I_{RR}$ )

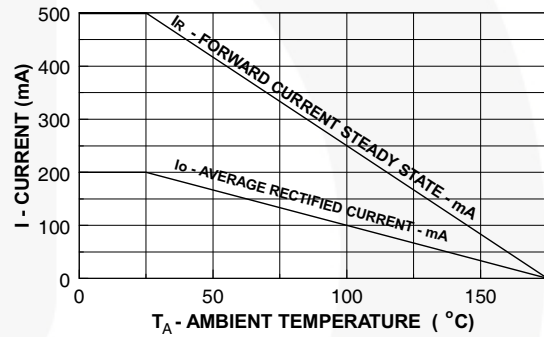


Figure 10. Average Rectified Current ( $I_O$ ) and Forward Current ( $I_F$ ) vs. Ambient Temperature ( $T_A$ )

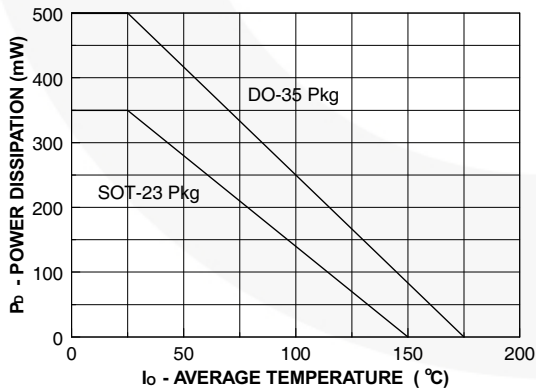
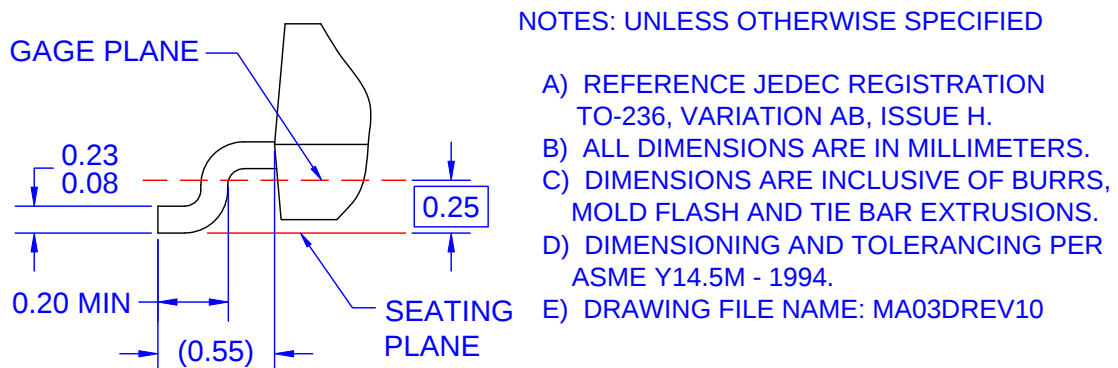
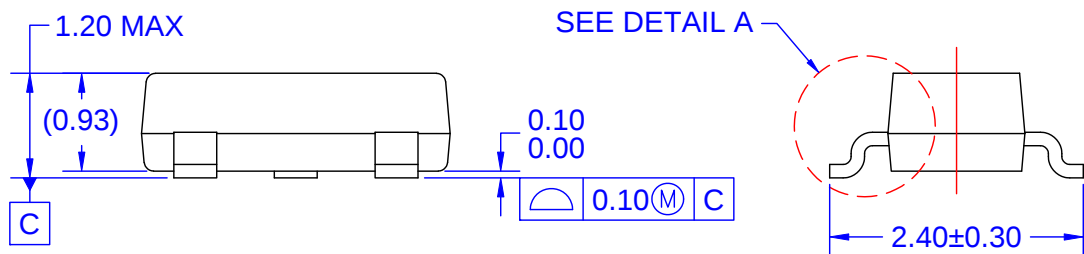
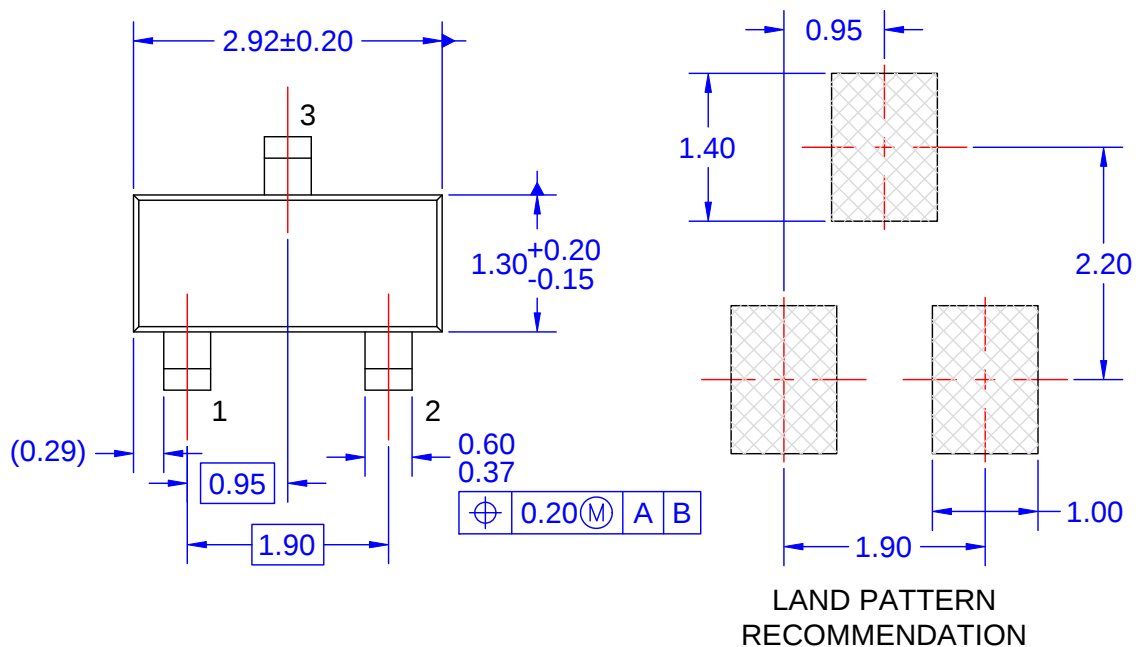


Figure 11. Power Derating Curve



**DETAIL A**  
SCALE: 2X

NOTES: UNLESS OTHERWISE SPECIFIED

- A) REFERENCE JEDEC REGISTRATION TO-236, VARIATION AB, ISSUE H.
- B) ALL DIMENSIONS ARE IN MILLIMETERS.
- C) DIMENSIONS ARE INCLUSIVE OF BURRS, MOLD FLASH AND TIE BAR EXTRUSIONS.
- D) DIMENSIONING AND TOLERANCING PER ASME Y14.5M - 1994.
- E) DRAWING FILE NAME: MA03DREV10



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