

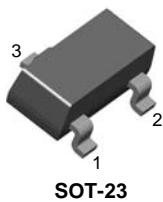


November 2014

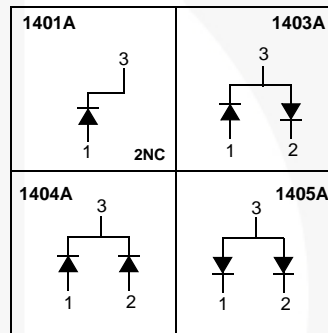
# MMBD1401A / MMBD1403A / MMBD1404A / MMBD1405A High-Voltage General-Purpose Diode

## 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:

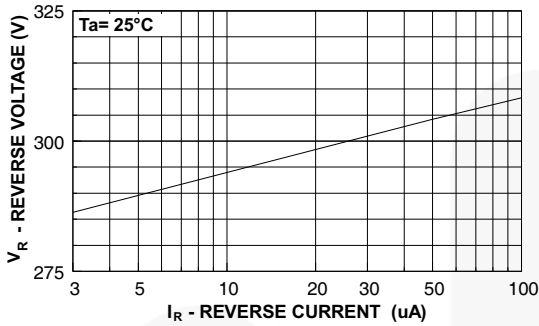
- Device is mounted on glass epoxy PCB 1.6 inch x 1.6 inch x 0.06 inch, mounting pad for the collector lead minimum  $0.93 \text{ in}^2$ .

## Electrical Characteristics

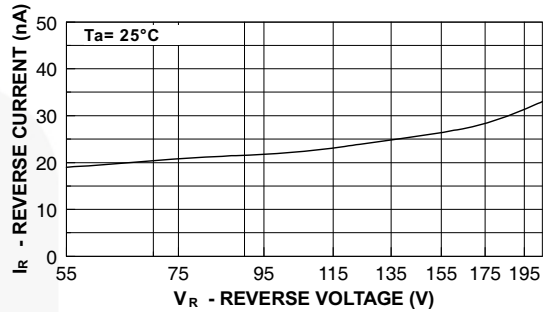
Values are at  $T_A = 25^\circ\text{C}$  unless otherwise noted.

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	$I_F = I_R = 30 \text{ mA}$ , $I_{RR} = 1.0 \text{ mA}, R_L = 100 \Omega$		50	nS

## Typical Performance Characteristics

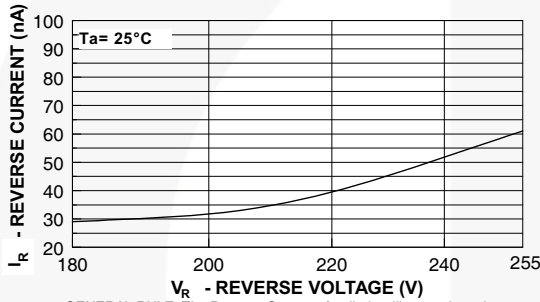


**Figure 1. Reverse Voltage vs. Reverse Current**  
BV - 1.0 to 100  $\mu$ A



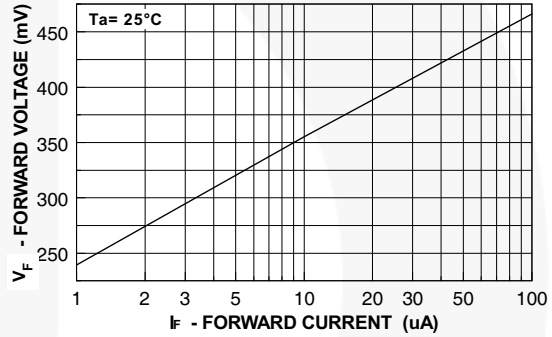
**Figure 2. Reverse Current vs. Reverse Voltage**  
 $I_R$  - 55 to 205 V

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

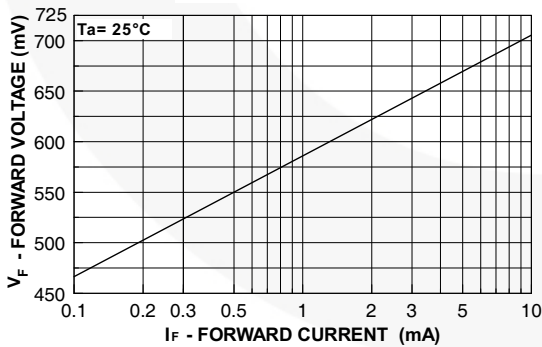


**Figure 3. Reverse Current vs. Reverse Voltage**  
 $I_R$  - 180 to 255 V

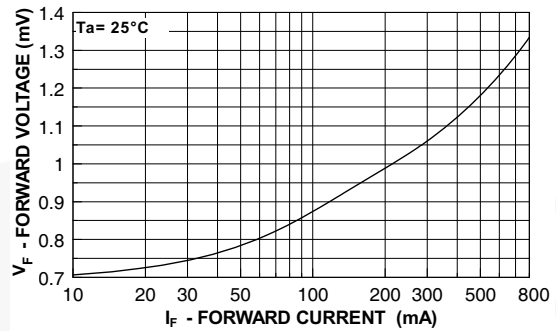
GENERAL RULE: The Reverse Current of a diode will approximately double for every ten Degree C increase in Temperature



**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)

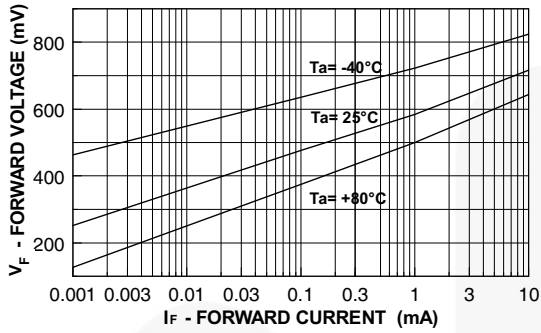


Figure 7. Forward Voltage vs. Ambient Temperature  
 $V_F - 1.0 \mu A - 10 mA (-40 \text{ to } +80^\circ C)$

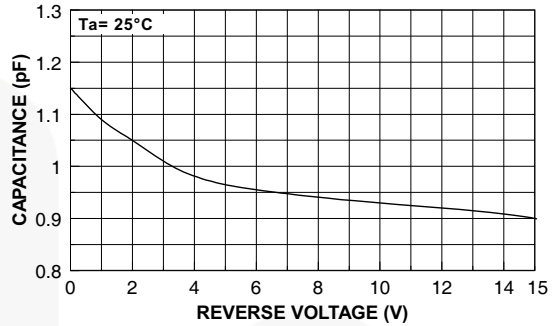


Figure 8. Capacitance vs. Reverse Voltage

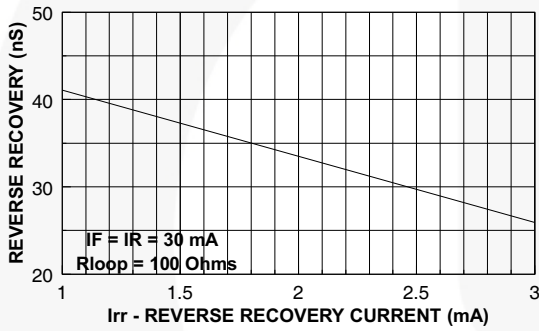


Figure 9. Reverse Recovery Time vs. Reverse Recovery Current ( $I_{rr}$ )

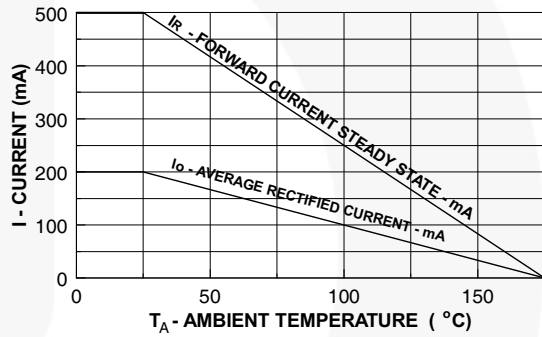


Figure 10. Average Rectified Current ( $I_O$ ) and Forward Current ( $I_F$ ) vs. Ambient Temperature ( $T_A$ )

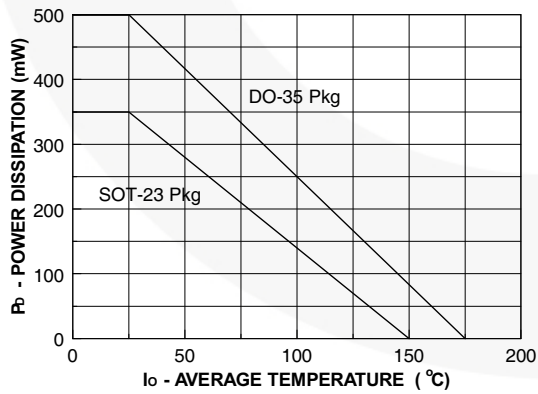
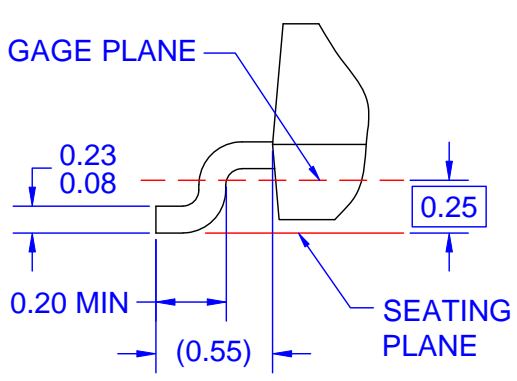
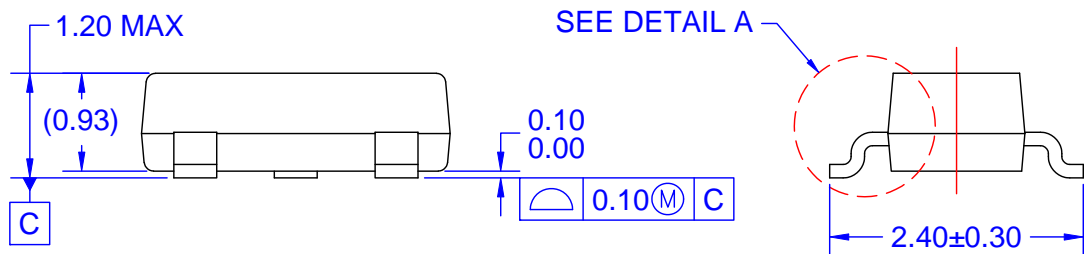


Figure 11. Power Derating Curve








**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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