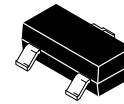
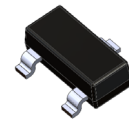


# Diode – Small Signal

## MMBD1501A, MMBD1503A, MMBD1504A, MMBD1505A



SOT-23 (TO-236)  
CASE 318-08



SOT-23  
CASE 318BM

### ABSOLUTE MAXIMUM RATINGS

(Values are at  $T_A = 25^\circ\text{C}$  unless otherwise noted.) (Notes 1, 2)

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 s	1.0
		Pulse Width = 1.0 $\mu\text{s}$	2.0
$T_{STG}$	Storage Temperature Range	-55 to +150	$^\circ\text{C}$
$T_J$	Operating Junction Temperature	-55 to +150	$^\circ\text{C}$

Stresses exceeding those listed in the Maximum Ratings table may damage the device. If any of these limits are exceeded, device functionality should not be assumed, damage may occur and reliability may be affected.

- These ratings are based on a maximum junction temperature of  $150^\circ\text{C}$ .
- These are steady-state limits. onsemi 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	$^\circ\text{C}/\text{W}$

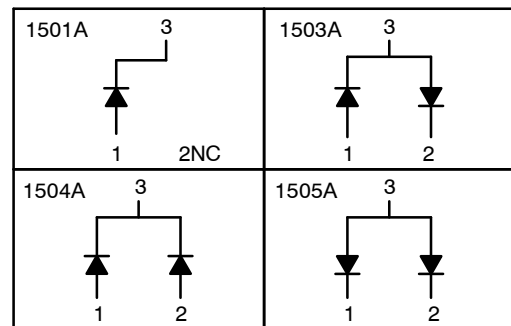
### ELECTRICAL CHARACTERISTICS

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

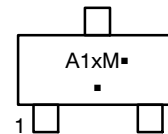
Symbol	Parameter	Conditions	Min	Max	Unit
$V_R$	Breakdown Voltage	$I_R = 5.0 \mu\text{A}$	200	-	V
$V_F$	Forward Voltage	$I_F = 1.0 \text{ mA}$	620	720	mV
		$I_F = 10 \text{ mA}$	720	830	mV
		$I_F = 50 \text{ mA}$	800	890	mV
		$I_F = 100 \text{ mA}$	830	930	mV
		$I_F = 200 \text{ mA}$	0.87	1.10	V
		$I_F = 300 \text{ mA}$	0.90	1.15	V
$I_R$	Reverse Current	$V_R = 125 \text{ V}$	-	1.0	nA
		$V_R = 125 \text{ V}$ , $T_A = 150^\circ\text{C}$	-	3.0	$\mu\text{A}$
		$V_R = 180 \text{ V}$	-	10.0	nA
		$V_R = 180 \text{ V}$ , $T_A = 150^\circ\text{C}$	-	5.0	$\mu\text{A}$
$C_T$	Total Capacitance	$V_R = 0$ , $f = 1.0 \text{ MHz}$	-	4.0	pF

Product parametric performance is indicated in the Electrical Characteristics for the listed test conditions, unless otherwise noted. Product performance may not be indicated by the Electrical Characteristics if operated under different conditions.

### CONNECTION DIAGRAMS



### MARKING DIAGRAM



- A1x = Specific Device Code  
x = 1, 3, 4, 5
- M = Date Code
- = Pb-Free Package

### ORDERING INFORMATION

See detailed ordering and shipping information on page 3 of this data sheet.

TYPICAL CHARACTERISTICS

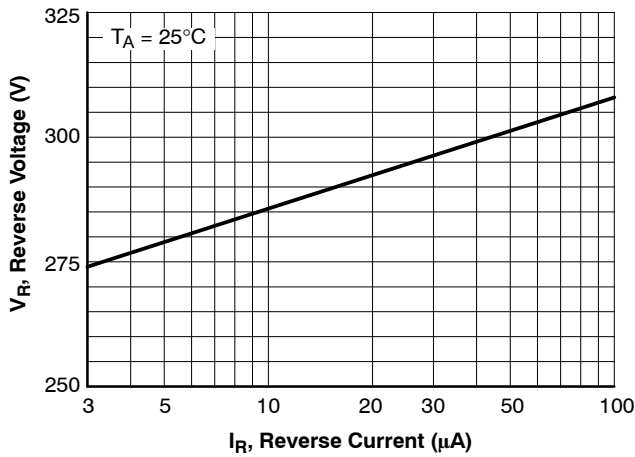


Figure 1. Reverse Voltage vs. Reverse Current  
 $I_R$  – 3.0 to 100  $\mu\text{A}$

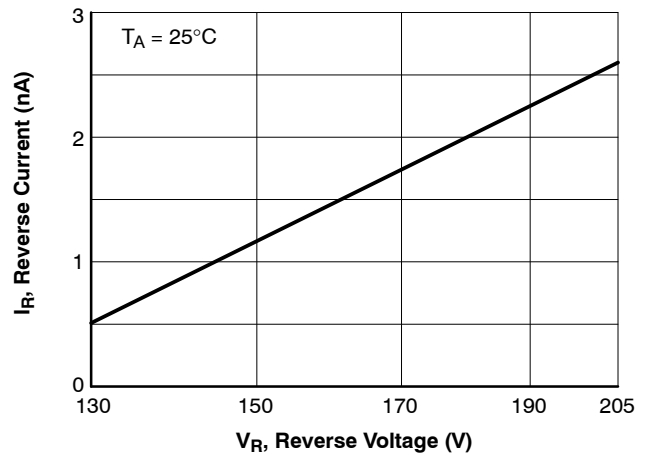


Figure 2. Reverse Current vs. Reverse Voltage  
 $V_R$  – 130 to 205 V

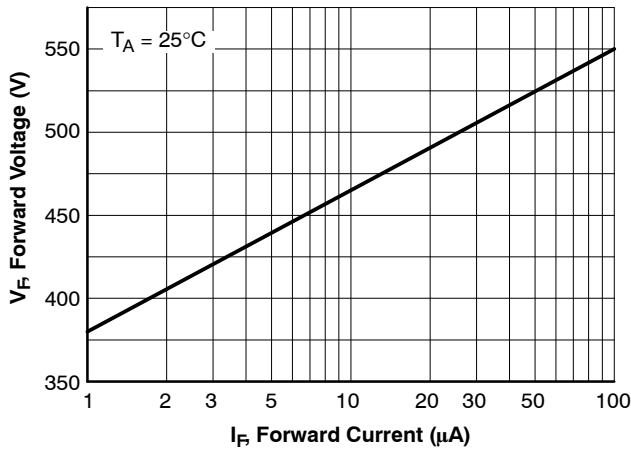


Figure 3. Forward Voltage vs. Forward Current  
 $I_F$  – 1 to 100  $\mu\text{A}$

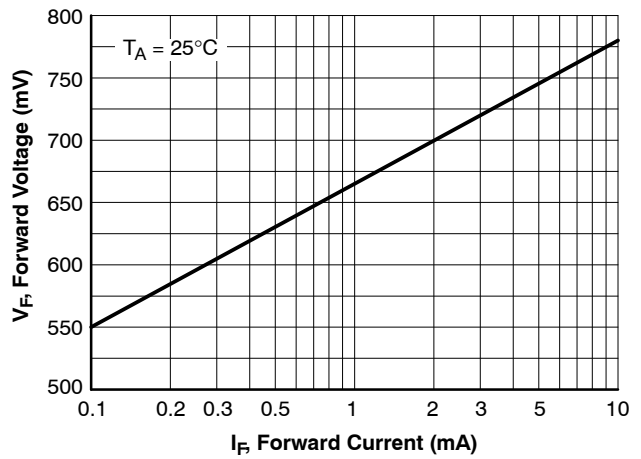


Figure 4. Forward Voltage vs. Forward Current  
 $I_F$  – 0.1 to 10 mA

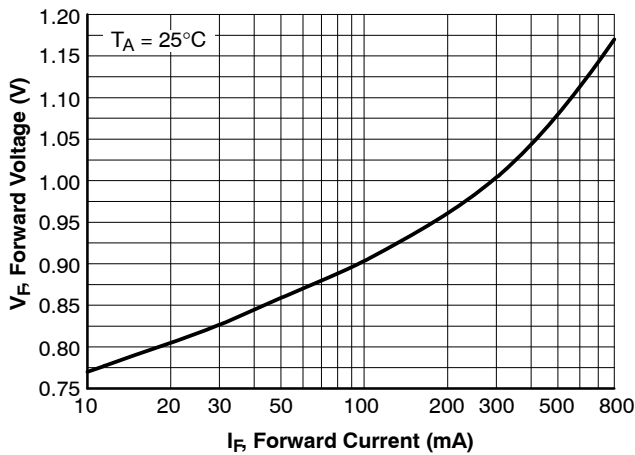


Figure 5. Forward Voltage vs. Forward Current  
 $I_F$  – 10 to 800 mA

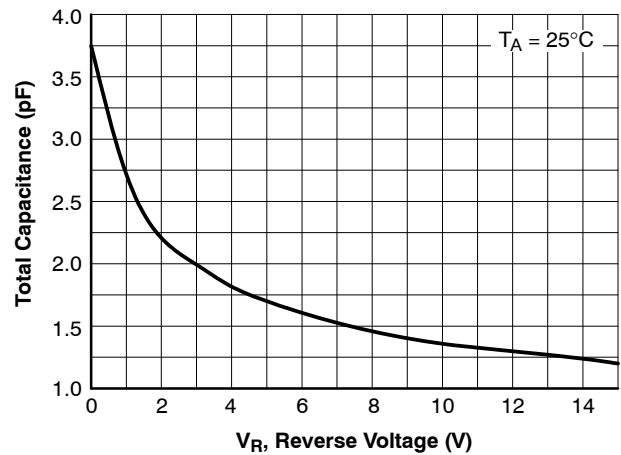


Figure 6. Total Capacitance vs. Reverse Voltage  
 $V_R$  – 0 to 15 V

# MMBD1501A, MMBD1503A, MMBD1504A, MMBD1505A

## TYPICAL CHARACTERISTICS (Continued)

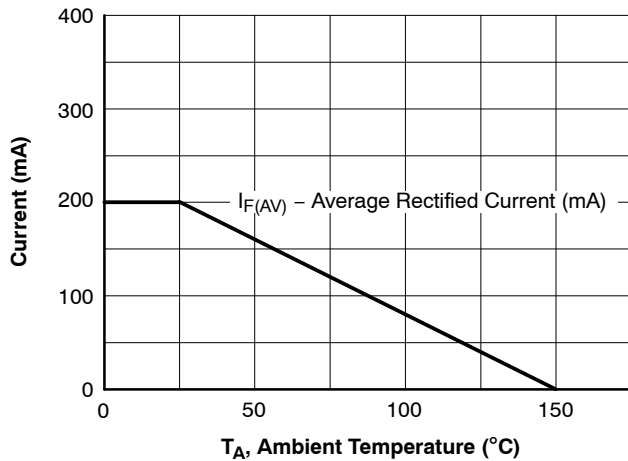


Figure 7. Average Rectified Current ( $I_{F(AV)}$ ) vs. Ambient Temperature ( $T_A$ )

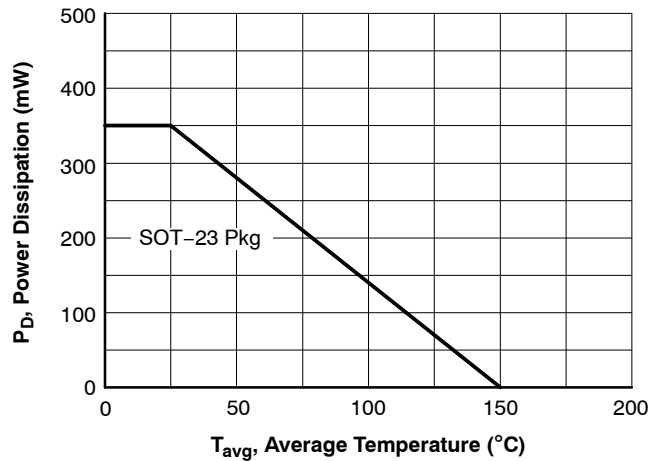


Figure 8. Power Derating Curve

### ORDERING INFORMATION

Part Number	Specific Device Marking	Package Type	Shipping <sup>†</sup>
MMBD1501A	A11	SOT-23 (TO-236) (Pb-Free)	3,000 / Tape & Reel (7")
MMBD1503A	A13		
MMBD1504A	A14		
MMBD1505A	A15		
NSVMMBD1504ALT1G*	A16		
MMBD1503A_D87Z	A13	SOT-23 (Pb-Free)	10,000 / Tape & Reel (13")
NSVMMBD1501ALT3G*	A11	SOT-23 (TO-236) (Pb-Free)	10,000 / Tape & Reel (13")

<sup>†</sup>For information on tape and reel specifications, including part orientation and tape sizes, please refer to our Tape and Reel Packaging Specifications Brochure, [BRD8011/D](#).

\*NSV Prefix for Automotive and Other Applications Requiring Unique Site and Control Change Requirements; AEC-Q101 Qualified and PPAP Capable.

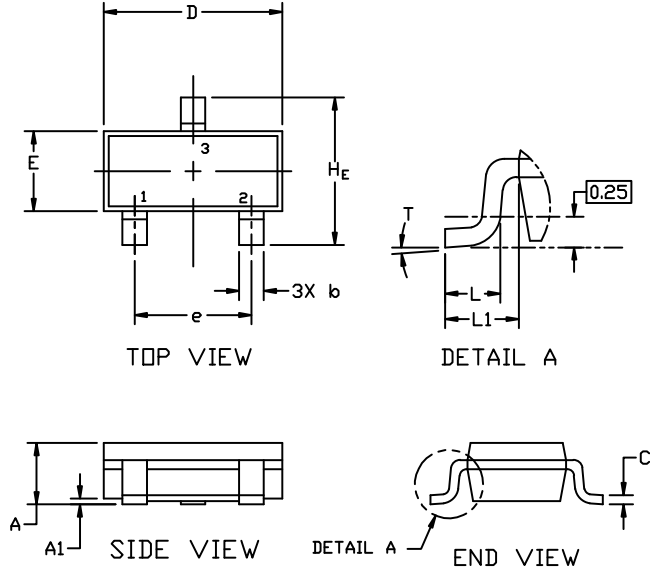
# MECHANICAL CASE OUTLINE PACKAGE DIMENSIONS



**SOT-23 (TO-236)**  
CASE 318  
ISSUE AT

DATE 01 MAR 2023

SCALE 4:1



**NOTES:**

1. DIMENSIONING AND TOLERANCING PER ASME Y14.5M,1994.
2. CONTROLLING DIMENSION: MILLIMETERS
3. MAXIMUM LEAD THICKNESS INCLUDES LEAD FINISH. MINIMUM LEAD THICKNESS IS THE MINIMUM THICKNESS OF THE BASE MATERIAL.
4. DIMENSIONS D AND E DO NOT INCLUDE MOLD FLASH, PROTRUSIONS, OR GATE BURRS.

DIM	MILLIMETERS			INCHES		
	MIN.	NOM.	MAX.	MIN.	NOM.	MAX.
A	0.89	1.00	1.11	0.035	0.039	0.044
A1	0.01	0.06	0.10	0.000	0.002	0.004
b	0.37	0.44	0.50	0.015	0.017	0.020
c	0.08	0.14	0.20	0.003	0.006	0.008
D	2.80	2.90	3.04	0.110	0.114	0.120
E	1.20	1.30	1.40	0.047	0.051	0.055
e	1.78	1.90	2.04	0.070	0.075	0.080
L	0.30	0.43	0.55	0.012	0.017	0.022
L1	0.35	0.54	0.69	0.014	0.021	0.027
H <sub>E</sub>	2.10	2.40	2.64	0.083	0.094	0.104
T	0°	---	10°	0°	---	10°

**GENERIC MARKING DIAGRAM\***



- XXX = Specific Device Code
- M = Date Code
- = Pb-Free Package

\*This information is generic. Please refer to device data sheet for actual part marking. Pb-Free indicator, "G" or microdot "▪", may or may not be present. Some products may not follow the Generic Marking.



**RECOMMENDED MOUNTING FOOTPRINT**

\* For additional information on our Pb-Free strategy and soldering details, please download the ON Semiconductor Soldering and Mounting Techniques Reference Manual, SOLDERRM/D.

**STYLES ON PAGE 2**

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# MECHANICAL CASE OUTLINE

## PACKAGE DIMENSIONS



### SOT-23 (TO-236) CASE 318 ISSUE AT

DATE 01 MAR 2023

STYLE 1 THRU 5: CANCELLED	STYLE 6: PIN 1. BASE 2. EMITTER 3. COLLECTOR	STYLE 7: PIN 1. EMITTER 2. BASE 3. COLLECTOR	STYLE 8: PIN 1. ANODE 2. NO CONNECTION 3. CATHODE		
STYLE 9: PIN 1. ANODE 2. ANODE 3. CATHODE	STYLE 10: PIN 1. DRAIN 2. SOURCE 3. GATE	STYLE 11: PIN 1. ANODE 2. CATHODE 3. CATHODE-ANODE	STYLE 12: PIN 1. CATHODE 2. CATHODE 3. ANODE	STYLE 13: PIN 1. SOURCE 2. DRAIN 3. GATE	STYLE 14: PIN 1. CATHODE 2. GATE 3. ANODE
STYLE 15: PIN 1. GATE 2. CATHODE 3. ANODE	STYLE 16: PIN 1. ANODE 2. CATHODE 3. CATHODE	STYLE 17: PIN 1. NO CONNECTION 2. ANODE 3. CATHODE	STYLE 18: PIN 1. NO CONNECTION 2. CATHODE 3. ANODE	STYLE 19: PIN 1. CATHODE 2. ANODE 3. CATHODE-ANODE	STYLE 20: PIN 1. CATHODE 2. ANODE 3. GATE
STYLE 21: PIN 1. GATE 2. SOURCE 3. DRAIN	STYLE 22: PIN 1. RETURN 2. OUTPUT 3. INPUT	STYLE 23: PIN 1. ANODE 2. ANODE 3. CATHODE	STYLE 24: PIN 1. GATE 2. DRAIN 3. SOURCE	STYLE 25: PIN 1. ANODE 2. CATHODE 3. GATE	STYLE 26: PIN 1. CATHODE 2. ANODE 3. NO CONNECTION
STYLE 27: PIN 1. CATHODE 2. CATHODE 3. CATHODE	STYLE 28: PIN 1. ANODE 2. ANODE 3. ANODE				

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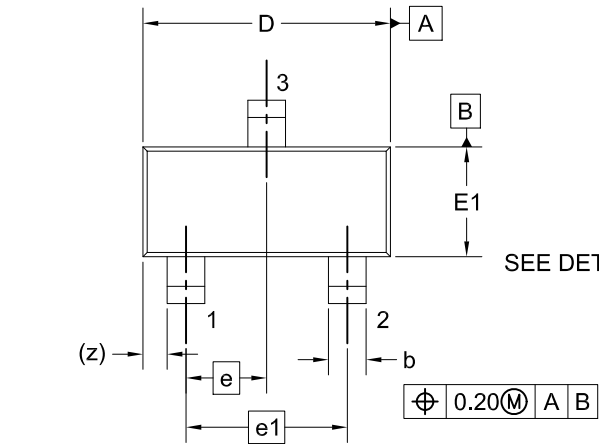


**SOT-23**  
**CASE 318BM**  
**ISSUE A**

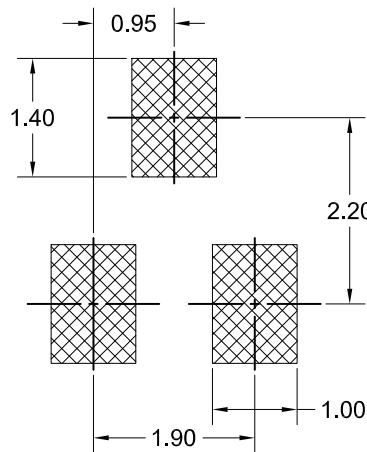
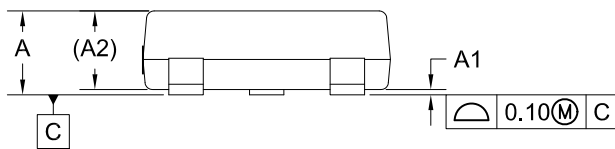
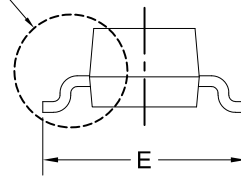
DATE 01 SEP 2021

NOTES: UNLESS OTHERWISE SPECIFIED

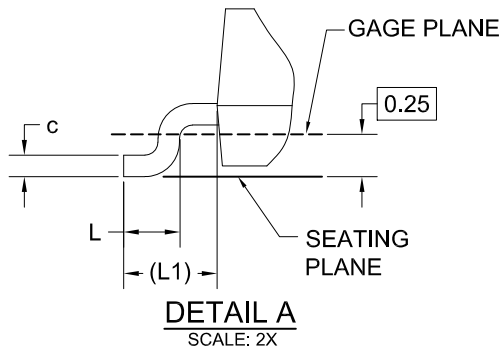
- A) REFERENCE JEDEC REGISTRATION TO-236, VARIATION AB, ISSUE H.
- B) ALL DIMENSIONS ARE IN MILLIMETERS.
- C) DIMENSIONS ARE INCLUSIVE OF BURRS, MOLD FLASH AND TIE BAR EXTRUSIONS.
- D) DIMENSIONING AND TOLERANCING PER ASME Y14.5M - 2009.



SEE DETAIL A



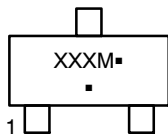
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	MIN.	NOM.	MAX.
A	---	---	1.20
A1	0.00	0.05	0.10
A2	0.93 REF		
b	0.37	0.44	0.60
c	0.08	0.15	0.23
D	2.72	2.92	3.12
E	2.10	2.40	2.70
E1	1.15	1.30	1.50
e	0.95 BSC		
e1	1.90 BSC		
L	0.20	---	---
L1	0.55 REF		
z	0.29 REF		



LAND PATTERN  
RECOMMENDATION

\*FOR ADDITIONAL INFORMATION ON OUR PB-FREE STRATEGY AND SOLDERING DETAILS, PLEASE DOWNLOAD THE ON SEMICONDUCTOR SOLDERING AND MOUNTING TECHNIQUES REFERENCE MANUAL, SOLDERRM/D.

### GENERIC MARKING DIAGRAM\*



- XXX = Specific Device Code
- M = Date Code
- = Pb-Free Package

\*This information is generic. Please refer to device data sheet for actual part marking. Pb-Free indicator, "G" or microdot "▪", may or may not be present. Some products may not follow the Generic Marking.

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