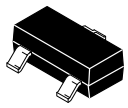
Diode – Small Signal

MMBD1501A, MMBD1503A, MMBD1504A, MMBD1505A



SOT−23 (TO−236)
CASE 318−08

SOT−23
CASE 318BM

ABSOLUTE MAXIMUM RATINGS

(Values are at T_A = 25°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	A
		Pulse Width = 1.0 μs	2.0	
T_{STG}	Storage Temperature Range		−55 to +150	°C
T_J	Operating Junction Temperature		−55 to +150	°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.

1. These ratings are based on a maximum junction temperature of 150°C.
2. 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°C unless otherwise noted.)

Symbol	Parameter	Value	Unit
P_D	Power Dissipation	350	mW
$R_{\theta JA}$	Thermal Resistance, Junction−to−Ambient	357	°C/W

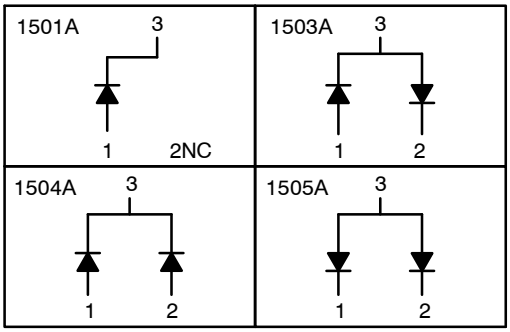
ELECTRICAL CHARACTERISTICS

(Values are at T_A = 25°C unless otherwise noted.)

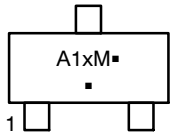
Symbol	Parameter	Conditions	Min	Max	Unit
V_R	Breakdown Voltage	I_R = 5.0 μA	200	–	V
V_F	Forward Voltage	I_F = 1.0 mA	620	720	mV
		I_F = 10 mA	720	830	mV
		I_F = 50 mA	800	890	mV
		I_F = 100 mA	830	930	mV
		I_F = 200 mA	0.87	1.10	V
		I_F = 300 mA	0.90	1.15	V
I_R	Reverse Current	V_R = 125 V	–	1.0	nA
		V_R = 125 V, T_A = 150°C	–	3.0	μA
		V_R = 180 V	–	10.0	nA
		V_R = 180 V, T_A = 150°C	–	5.0	μA
C_T	Total Capacitance	V_R = 0, f = 1.0 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

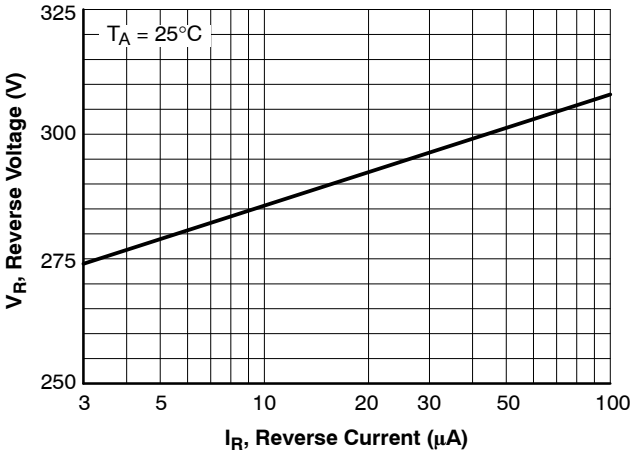


Figure 1. Reverse Voltage vs. Reverse Current I_R – 3.0 to 100 μA

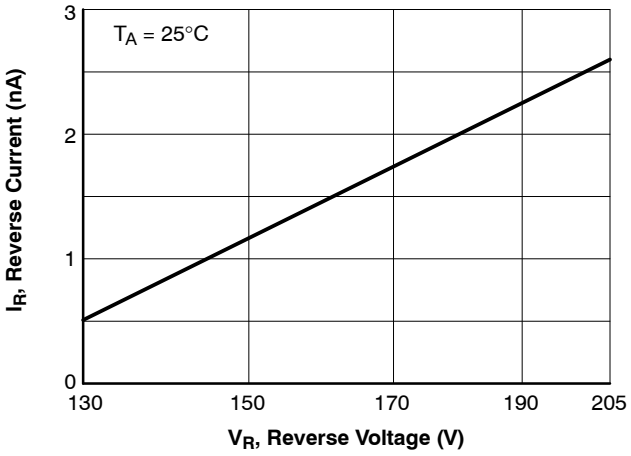


Figure 2. Reverse Current vs. Reverse Voltage V_R – 130 to 205 V

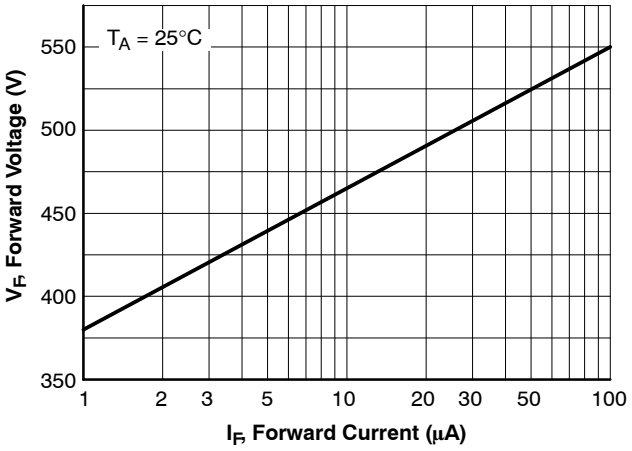


Figure 3. Forward Voltage vs. Forward Current I_F – 1 to 100 μA

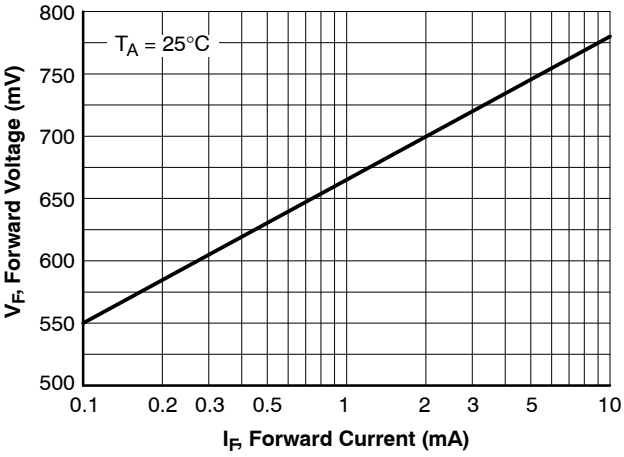


Figure 4. Forward Voltage vs. Forward Current I_F – 0.1 to 10 mA

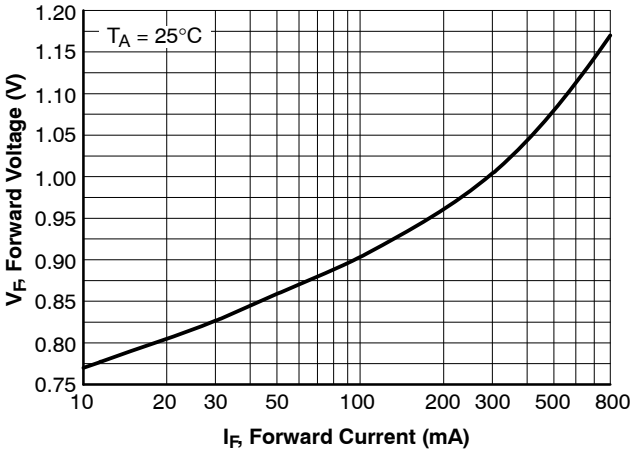


Figure 5. Forward Voltage vs. Forward Current I_F – 10 to 800 mA

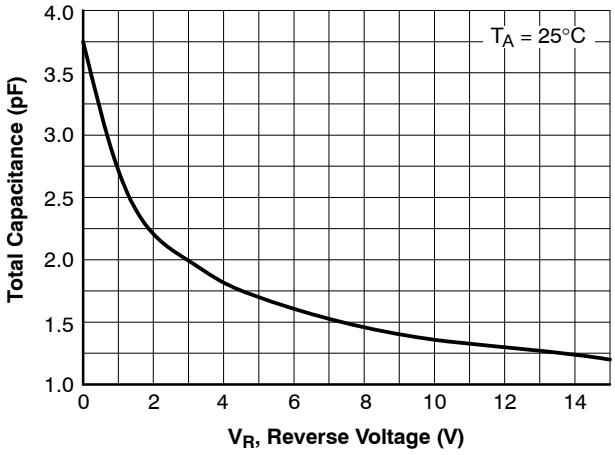


Figure 6. Total Capacitance vs. Reverse Voltage V_R – 0 to 15 V

TYPICAL CHARACTERISTICS (Continued)

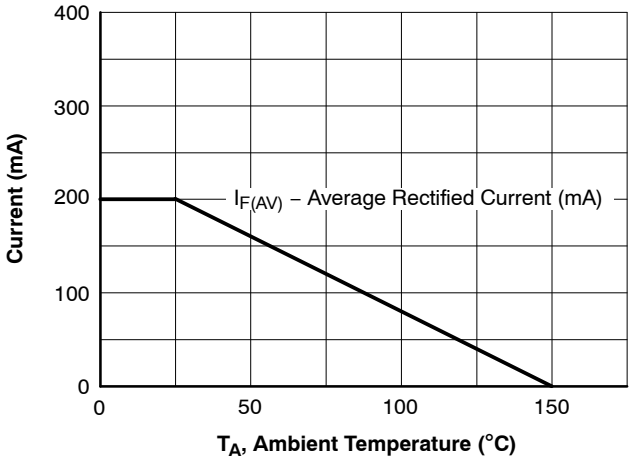


Figure 7. Average Rectified Current ($I_{F(AV)}$) vs. Ambient Temperature (T_A)

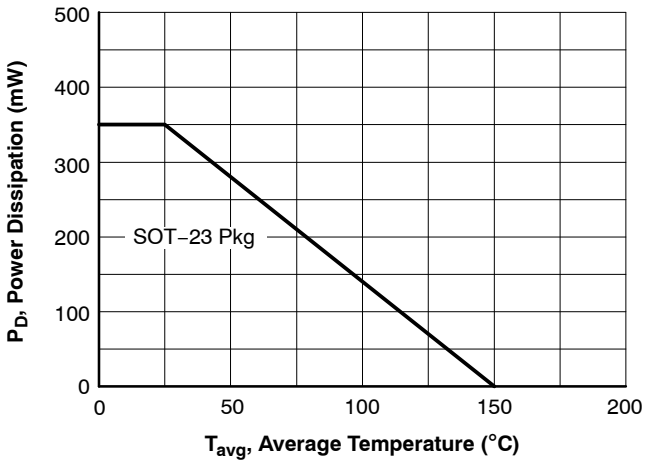


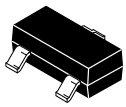
Figure 8. Power Derating Curve

ORDERING INFORMATION

Part Number	Specific Device Marking	Package Type	Shipping†
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″)

†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.

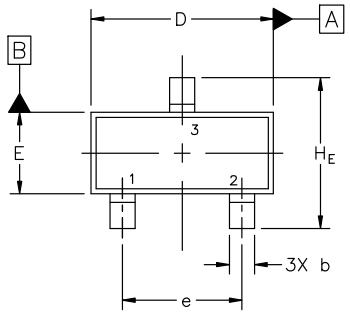
*NSV Prefix for Automotive and Other Applications Requiring Unique Site and Control Change Requirements; AEC−Q101 Qualified and PPAP Capable.



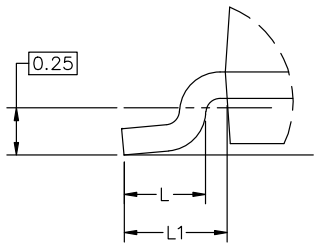
SCALE 4:1

SOT−23 (TO−236) 2.90x1.30x1.00 1.90P
CASE 318
ISSUE AU

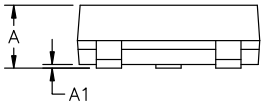
DATE 14 AUG 2024



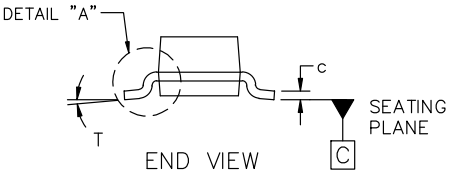
TOP VIEW



DETAIL "A"
Scale 3:1



SIDE VIEW

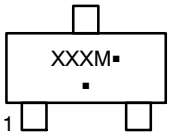


END VIEW

MILLIMETERS			
DIM	MIN	NOM	MAX
A	0.89	1.00	1.11
A1	0.01	0.06	0.10
b	0.37	0.44	0.50
c	0.08	0.14	0.20
D	2.80	2.90	3.04
E	1.20	1.30	1.40
e	1.78	1.90	2.04
L	0.30	0.43	0.55
L1	0.35	0.54	0.69
H_E	2.10	2.40	2.64
T	0°	−−−	10°

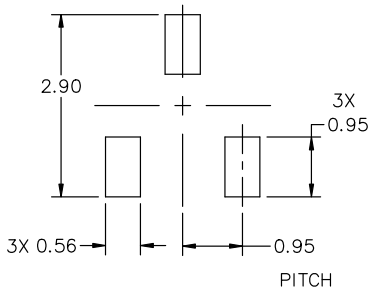
NOTES:
1. DIMENSIONING AND TOLERANCING PER ASME Y14.5M, 2018.
2. CONTROLLING DIMENSIONS: MILLIMETERS.
3. MAXIMUM LEAD THICKNESS INCLUDES LEAD FINISH. MINIMUM LEAD THICKNESS IS THE MINIMUM THICKNESS OF THE BASE MATERIAL.
4. DIMENSIONS D AND E DO NOT INCLUDE MOLD FLASH, PROTRUSIONS, OR GATE BURRS.

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 onsemi Soldering and Mounting Techniques Reference Manual, SOLDERRM/D.

STYLES ON PAGE 2

DOCUMENT NUMBER:	**98ASB42226B**	Electronic versions are uncontrolled except when accessed directly from the Document Repository. Printed versions are uncontrolled except when stamped "CONTROLLED COPY" in red.	
DESCRIPTION:	**SOT−23 (TO−236) 2.90x1.30x1.00 1.90P**		**PAGE 1 OF 2**

SOT−23 (TO−236) 2.90x1.30x1.00 1.90P
CASE 318
ISSUE AU

DATE 14 AUG 2024

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

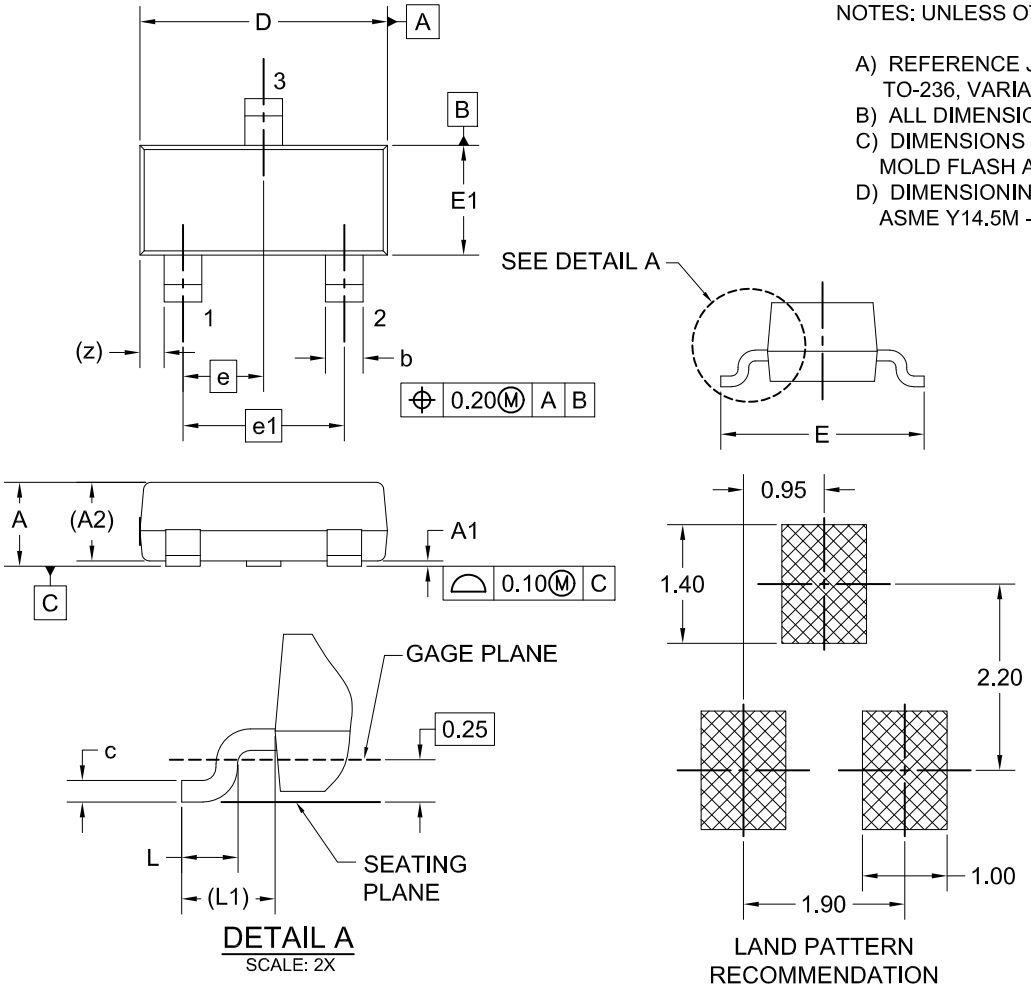
STYLE 26:
PIN 1. CATHODE
2. ANODE
3. NO CONNECTION

STYLE 27:
PIN 1. CATHODE
2. CATHODE
3. CATHODE

STYLE 28:
PIN 1. ANODE
2. ANODE
3. ANODE

SOT−23
CASE 318BM
ISSUE A

DATE 01 SEP 2021



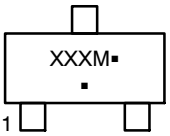
NOTES: UNLESS OTHERWISE SPECIFIED

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.

DIM	MILLIMETERS		
	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	

*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.

DOCUMENT NUMBER:	98AON13784G	Electronic versions are uncontrolled except when accessed directly from the Document Repository. Printed versions are uncontrolled except when stamped “CONTROLLED COPY” in red.
DESCRIPTION:	SOT−23	PAGE 1 OF 1

ADDITIONAL INFORMATION

TECHNICAL PUBLICATIONS:
Technical Library: www.onsemi.com/design/resources/technical−documentation
onsemi Website: www.onsemi.com

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