

MBD301, MMBD301LT1

Preferred Device

Silicon Hot-Carrier Diodes

SCHOTTKY Barrier Diodes

These devices are designed primarily for high-efficiency UHF and VHF detector applications. They are readily adaptable to many other fast switching RF and digital applications. They are supplied in an inexpensive plastic package for low-cost, high-volume consumer and industrial/commercial requirements. They are also available in a Surface Mount package.

Features

- Extremely Low Minority Carrier Lifetime – 15 ps (Typ)
- Very Low Capacitance – 1.5 pF (Max) @ $V_R = 15\text{ V}$
- Low Reverse Leakage – $I_R = 13\text{ nA}$ dc (Typ) MBD301, MMBD301
- Pb-Free Packages are Available

MAXIMUM RATINGS

Rating	Symbol	MBD301	MMBD301LT1	Unit
		Value		
Reverse Voltage	V_R	30		V
Total Device Dissipation @ $T_A = 25^\circ\text{C}$ Derate above 25°C	P_F	280	200	mW
		2.8	2.0	mW/ $^\circ\text{C}$
Operating Junction Temperature Range	T_J	-55 to +125		$^\circ\text{C}$
Storage Temperature Range	T_{stg}	-55 to +150		$^\circ\text{C}$

Stresses exceeding Maximum Ratings may damage the device. Maximum Ratings are stress ratings only. Functional operation above the Recommended Operating Conditions is not implied. Extended exposure to stresses above the Recommended Operating Conditions may affect device reliability.



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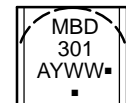
30 VOLTS SILICON HOT-CARRIER DETECTOR AND SWITCHING DIODES

MBD301



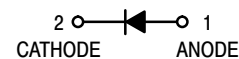
TO-92
(TO-226AC)
CASE 182
STYLE 1

MARKING DIAGRAM

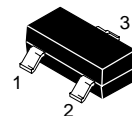


- A = Assembly Location
- Y = Year
- WW = Work Week
- = Pb-Free Package

(Note: Microdot may be in either location)

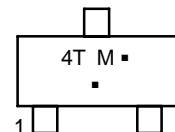


MMBD301LT1



SOT-23
(TO-236)
CASE 318
STYLE 8

MARKING DIAGRAM



- M = Date Code
- = Pb-Free Package

(Note: Microdot may be in either location)



ORDERING INFORMATION

See detailed ordering and shipping information in the package dimensions section on page 2 of this data sheet.

Preferred devices are recommended choices for future use and best overall value.

MBD301, MMBD301LT1

ELECTRICAL CHARACTERISTICS ($T_A = 25^\circ\text{C}$ unless otherwise noted)

Characteristic	Symbol	Min	Typ	Max	Unit
Reverse Breakdown Voltage ($I_R = 10 \mu\text{A}$)	$V_{(BR)R}$	30	–	–	V
Total Capacitance ($V_R = 15 \text{ V}$, $f = 1.0 \text{ MHz}$) Figure 1	C_T	–	0.9	1.5	pF
Reverse Leakage ($V_R = 25 \text{ V}$) Figure 3	I_R	–	13	200	nA _{dc}
Forward Voltage ($I_F = 1.0 \text{ mA}_{dc}$) Figure 4	V_F	–	0.38	0.45	V _{dc}
Forward Voltage ($I_F = 10 \text{ mA}_{dc}$) Figure 4	V_F	–	0.52	0.6	V _{dc}

ORDERING INFORMATION

Device	Package	Shipping†
MBD301	TO-92	5000 Units / Bulk
MBD301G	TO-92 (Pb-Free)	5000 Units / Bulk
MMBD301LT1	SOT-23	3000 / Tape & Reel
MMBD301LT1G	SOT-23 (Pb-Free)	3000 / Tape & Reel
MMBD301LT3	SOT-23	10,000 / Tape & Reel
MMBD301LT3G	SOT-23 (Pb-Free)	10,000 / Tape & Reel

†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.

MBD301, MMBD301LT1

TYPICAL ELECTRICAL CHARACTERISTICS

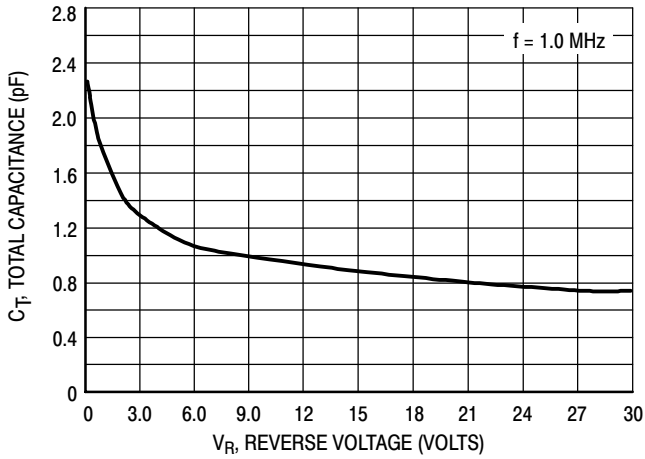


Figure 1. Total Capacitance

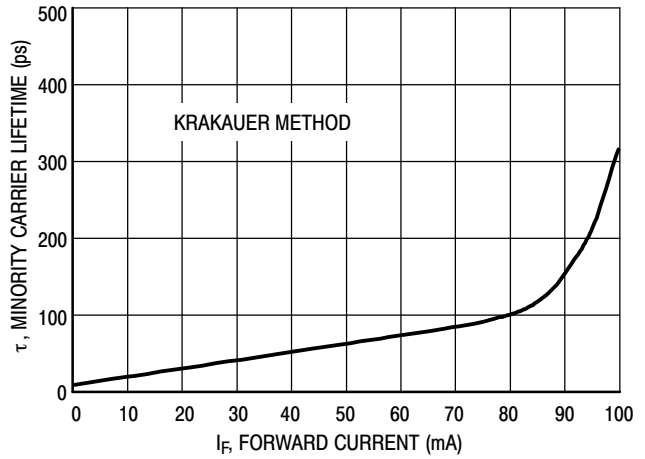


Figure 2. Minority Carrier Lifetime

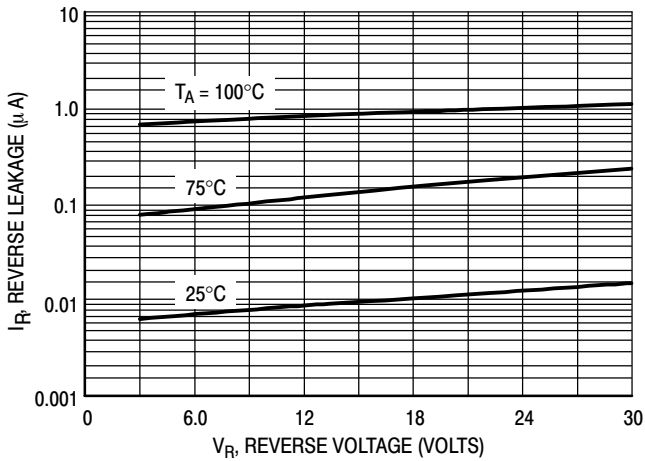


Figure 3. Reverse Leakage

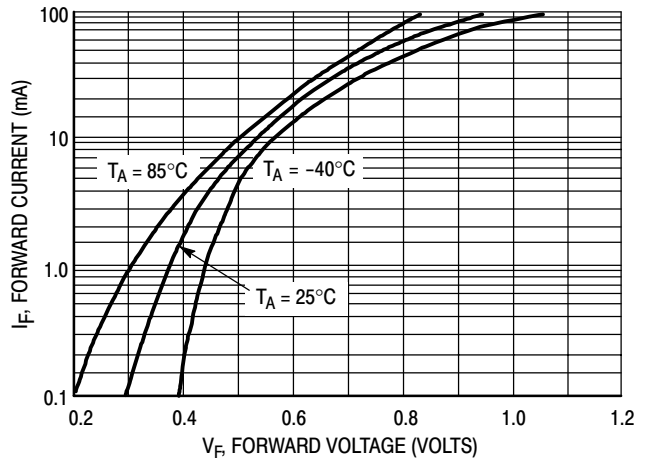


Figure 4. Forward Voltage

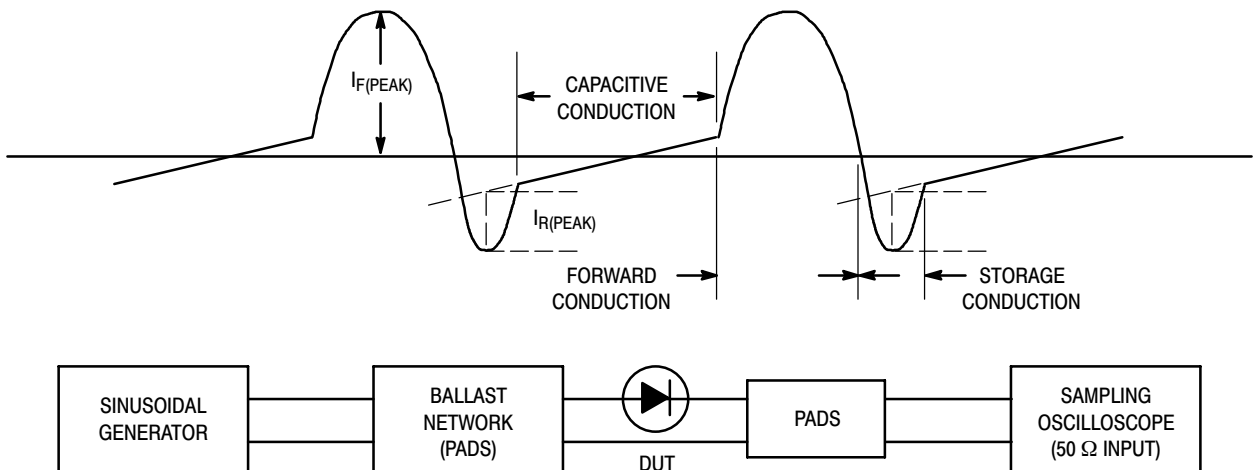
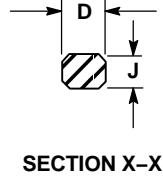
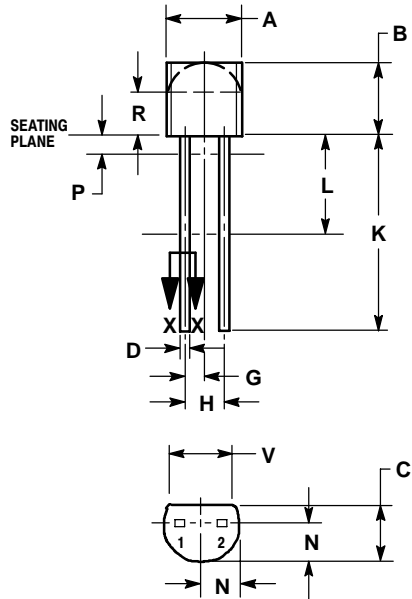


Figure 5. Krakauer Method of Measuring Lifetime

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PACKAGE DIMENSIONS

TO-92 (TO-226AC)
CASE 182-06
ISSUE L



NOTES:

1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.
2. CONTROLLING DIMENSION: INCH.
3. CONTOUR OF PACKAGE BEYOND ZONE R IS UNCONTROLLED.
4. LEAD DIMENSION IS UNCONTROLLED IN P AND BEYOND DIMENSION K MINIMUM.

DIM	INCHES		MILLIMETERS	
	MIN	MAX	MIN	MAX
A	0.175	0.205	4.45	5.21
B	0.170	0.210	4.32	5.33
C	0.125	0.165	3.18	4.19
D	0.016	0.021	0.407	0.533
G	0.050 BSC		1.27 BSC	
H	0.100 BSC		2.54 BSC	
J	0.014	0.016	0.36	0.41
K	0.500	---	12.70	---
L	0.250	---	6.35	---
N	0.080	0.105	2.03	2.66
P	---	0.050	---	1.27
R	0.115	---	2.93	---
V	0.135	---	3.43	---

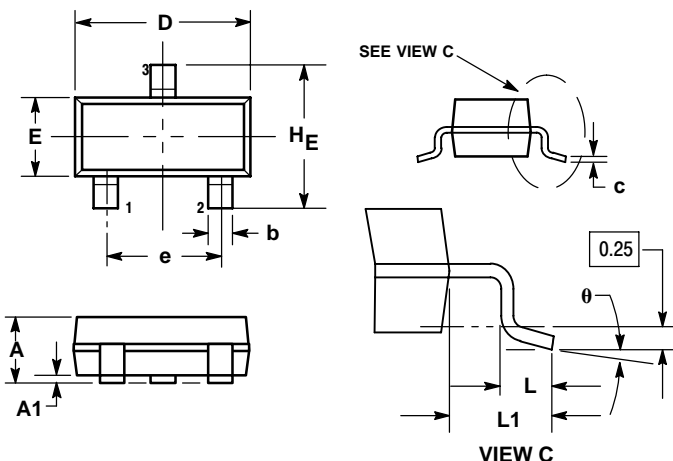
STYLE 1:

- PIN 1. ANODE
2. CATHODE

MBD301, MMBD301LT1

PACKAGE DIMENSIONS

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



NOTES:

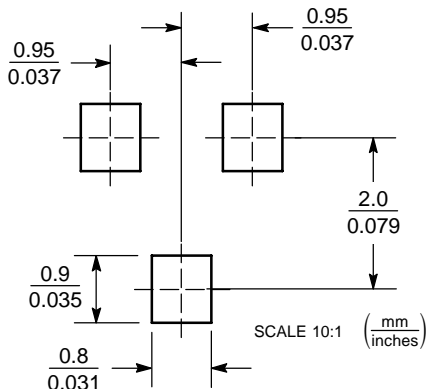
1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.
2. CONTROLLING DIMENSION: INCH.
3. MAXIMUM LEAD THICKNESS INCLUDES LEAD FINISH THICKNESS. MINIMUM LEAD THICKNESS IS THE MINIMUM THICKNESS OF BASE MATERIAL.
4. 318-01 THRU -07 AND -09 OBSOLETE, NEW STANDARD 318-08.

DIM	MILLIMETERS			INCHES		
	MIN	NOM	MAX	MIN	NOM	MAX
A	0.89	1.00	1.11	0.035	0.040	0.044
A1	0.01	0.06	0.10	0.001	0.002	0.004
b	0.37	0.44	0.50	0.015	0.018	0.020
c	0.09	0.13	0.18	0.003	0.005	0.007
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	0.081
L	0.10	0.20	0.30	0.004	0.008	0.012
L1	0.35	0.54	0.69	0.014	0.021	0.029
HE	2.10	2.40	2.64	0.083	0.094	0.104

STYLE 8:

1. ANODE
2. NO CONNECTION
3. CATHODE

SOLDERING 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.

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