

# MBD301G, MMBD301LT1G, MMBD301LT3G, SMMBD301LT3G

## 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) @  $V_R = 15$  V
- Low Reverse Leakage –  $I_R = 13$  nAdc (Typ) MBD301, MMBD301
- S Prefix for Automotive and Other Applications Requiring Unique Site and Control Change Requirements; AEC-Q101 Qualified and PPAP Capable
- These Devices are Pb-Free, Halogen Free/BFR Free and are RoHS Compliant

#### MAXIMUM RATINGS

Rating	Symbol	Value	Unit
Reverse Voltage	$V_R$	30	V
Forward Current (DC)	$I_F$	200 (Max)	mA
Total Device Dissipation @ $T_A = 25^\circ\text{C}$ MBD301G MMBD301LT1G, MMBD301LT3G, SMMBD301LT3G	$P_F$	280 200	MW
Derate above $25^\circ\text{C}$ MBD301G MMBD301LT1G, MMBD301LT3G, SMMBD301LT3G		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.



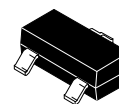
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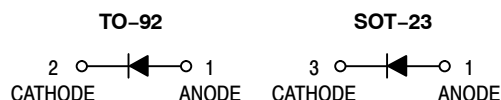
### 30 VOLTS SILICON HOT-CARRIER DETECTOR AND SWITCHING DIODES



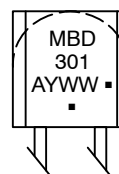
TO-92 2-Lead  
CASE 182  
STYLE 1



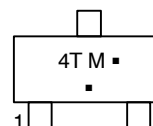
SOT-23 (TO-236)  
CASE 318  
STYLE 8



#### MARKING DIAGRAMS



TO-92



SOT-23

A = Assembly Location  
Y = Year  
WW = Work Week  
4T = Device Code (SOT-23)  
M = Date Code\*  
▪ = Pb-Free Package

(Note: Microdot may be in either location)

\*Date Code orientation and/or overbar may vary depending upon manufacturing location.

#### ORDERING INFORMATION

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

# MBD301G, MMBD301LT1G, MMBD301LT3G, SMMBD301LT3G

## ELECTRICAL CHARACTERISTICS (T<sub>A</sub> = 25°C unless otherwise noted)

Characteristic	Symbol	Min	Typ	Max	Unit
Reverse Breakdown Voltage (I <sub>R</sub> = 10 μA)	V <sub>(BR)R</sub>	30	–	–	V
Total Capacitance (V <sub>R</sub> = 15 V, f = 1.0 MHz) Figure 1	C <sub>T</sub>	–	0.9	1.5	pF
Reverse Leakage (V <sub>R</sub> = 25 V) Figure 3	I <sub>R</sub>	–	13	200	nAdc
Forward Voltage (I <sub>F</sub> = 1.0 mAdc) Figure 4	V <sub>F</sub>	–	0.38	0.45	Vdc
Forward Voltage (I <sub>F</sub> = 10 mAdc) Figure 4	V <sub>F</sub>	–	0.52	0.6	Vdc

## ORDERING INFORMATION

Device	Package	Shipping <sup>†</sup>
MBD301G	TO-92 (Pb-Free)	5,000 Units / Bulk
MMBD301LT1G	SOT-23 (Pb-Free)	3,000 / Tape & Reel
MMBD301LT3G	SOT-23 (Pb-Free)	10,000 / Tape & Reel
SMMBD301LT3G	SOT-23 (Pb-Free)	10,000 / Tape & Reel

<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.

TYPICAL ELECTRICAL CHARACTERISTICS

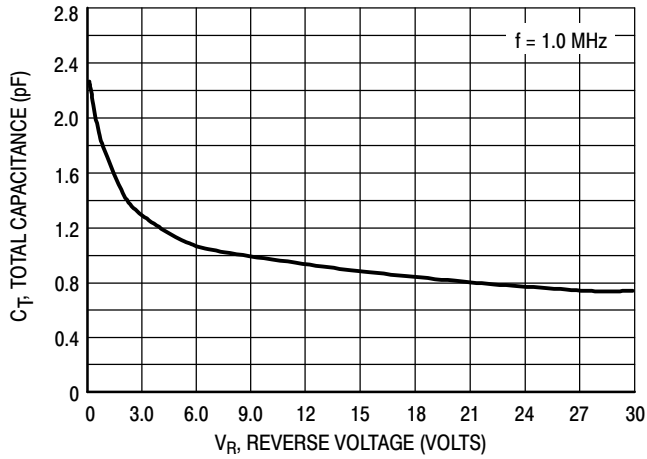


Figure 1. Total Capacitance

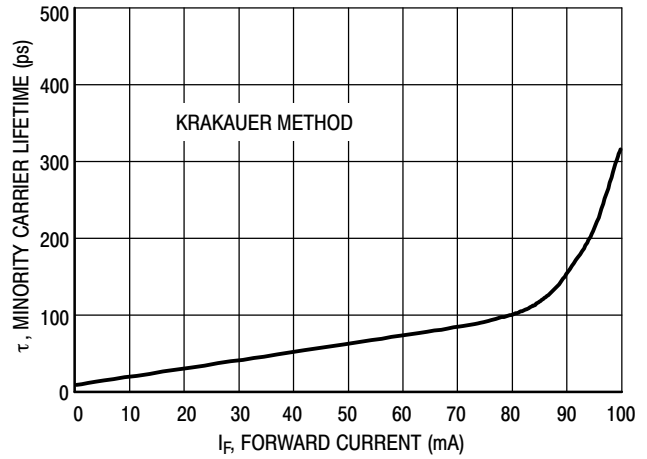


Figure 2. Minority Carrier Lifetime

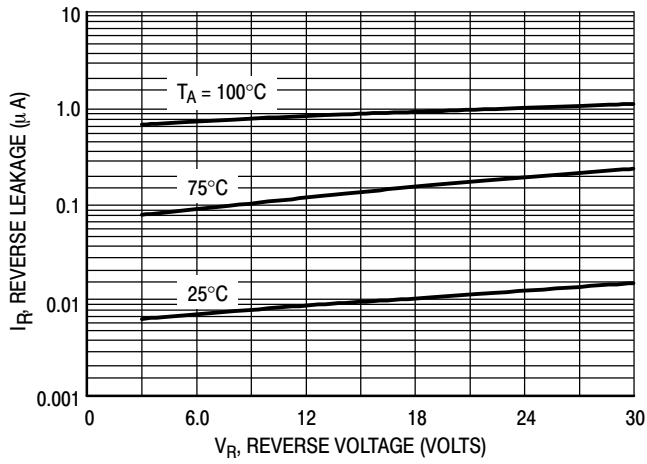


Figure 3. Reverse Leakage

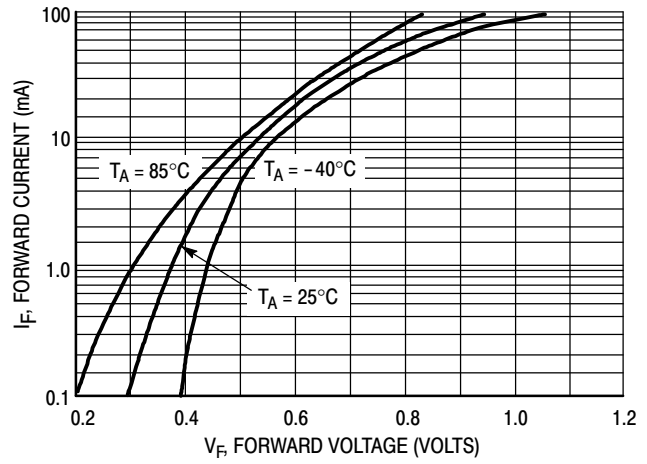


Figure 4. Forward Voltage

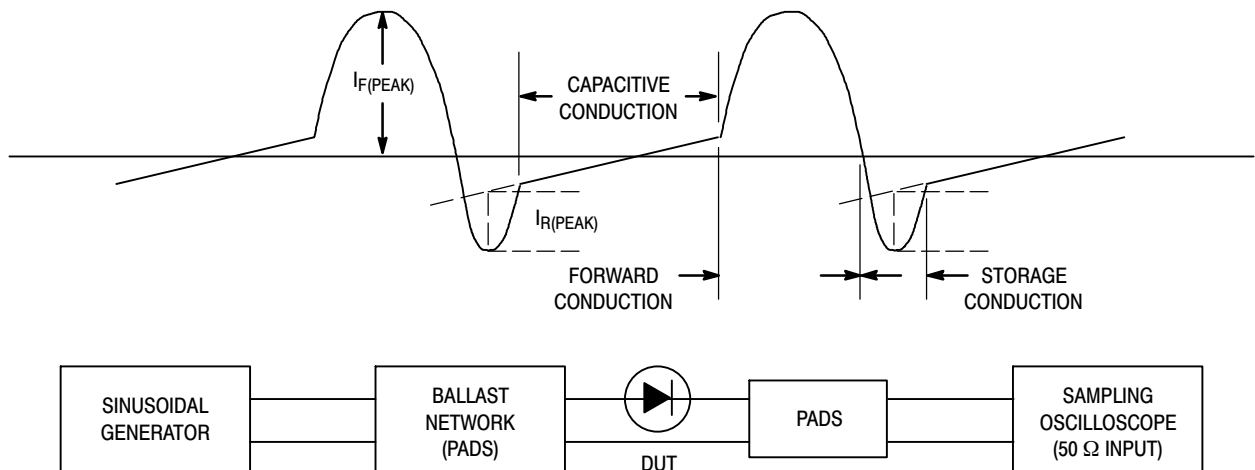
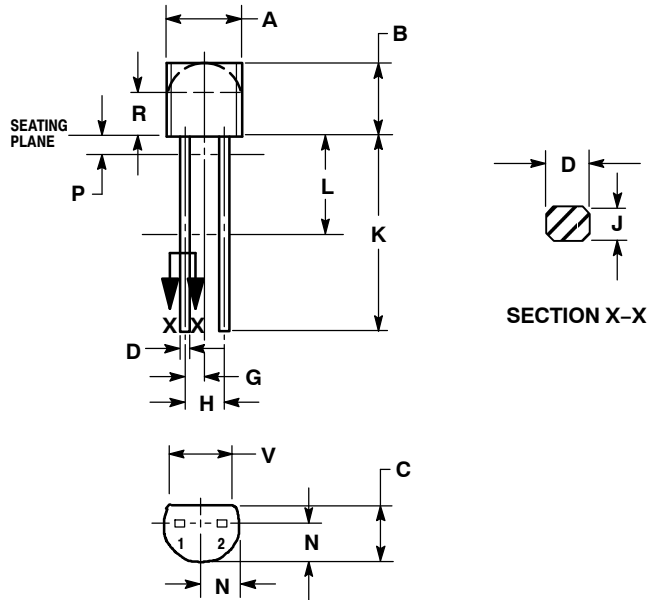


Figure 5. Krakauer Method of Measuring Lifetime

# MBD301G, MMBD301LT1G, MMBD301LT3G, SMMBD301LT3G

## 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	---

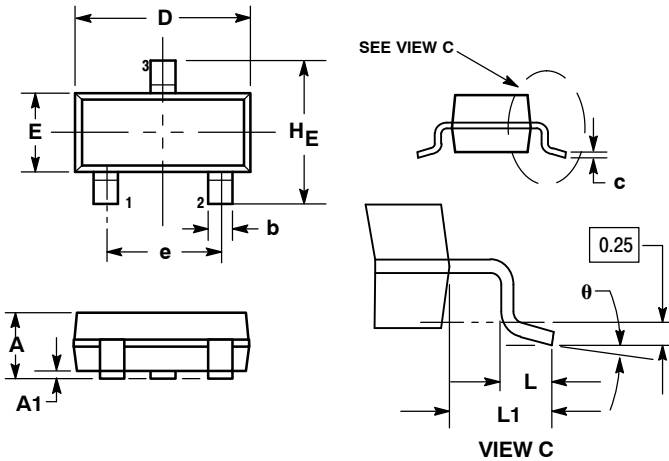
### STYLE 1:

- PIN 1. ANODE
- CATHODE

# MBD301G, MMBD301LT1G, MMBD301LT3G, SMMBD301LT3G

## PACKAGE DIMENSIONS

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



### NOTES:

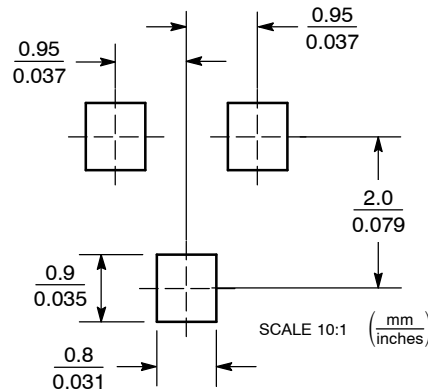
1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.
2. CONTROLLING DIMENSION: INCH.
3. MAXIMUM LEAD THICKNESS INCLUDES LEAD FINISH THICKNESS. MINIMUM LEAD THICKNESS IS THE MINIMUM THICKNESS OF BASE MATERIAL.
4. DIMENSIONS D AND E DO NOT INCLUDE MOLD FLASH, PROTRUSIONS, OR GATE BURRS.

DIM	MILLIMETERS			INCHES		
	MIN	NOM	MAX	MIN	NOM	MAX
A	0.89	1.00	1.11	0.035	0.040	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
θ	0°		10°	0°		10°


### STYLE 8:

- PIN 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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