

# MMBV109LT1, MV209

Preferred Devices

## Silicon Epicap Diodes

Designed for general frequency control and tuning applications; providing solid-state reliability in replacement of mechanical tuning methods.

### Features

- High Q with Guaranteed Minimum Values at VHF Frequencies
- Controlled and Uniform Tuning Ratio
- Available in Surface Mount Package
- Pb-Free Packages are Available

### MAXIMUM RATINGS ( $T_C = 25^\circ\text{C}$ unless otherwise noted)

Rating	Symbol	Value	Unit
Reverse Voltage	$V_R$	30	Vdc
Forward Current	$I_F$	200	mAdc
Forward Power Dissipation MMBV109LT1 @ $T_A = 25^\circ\text{C}$ Derate above $25^\circ\text{C}$ MV209	$P_D$	200 2.0	mW mW/ $^\circ\text{C}$
@ $T_A = 25^\circ\text{C}$ Derate above $25^\circ\text{C}$		200 1.6	mW mW/ $^\circ\text{C}$
Junction Temperature	$T_J$	+125	$^\circ\text{C}$
Storage Temperature Range	$T_{stg}$	-55 to +150	$^\circ\text{C}$

Maximum ratings are those values beyond which device damage can occur. Maximum ratings applied to the device are individual stress limit values (not normal operating conditions) and are not valid simultaneously. If these limits are exceeded, device functional operation is not implied, damage may occur and reliability may be affected.

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

Characteristic	Symbol	Min	Typ	Max	Unit
Reverse Breakdown Voltage ( $I_R = 10 \mu\text{Adc}$ )	$V_{(BR)R}$	30	-	-	Vdc
Reverse Voltage Leakage Current ( $V_R = 25 \text{Vdc}$ )	$I_R$	-	-	0.1	$\mu\text{Adc}$
Diode Capacitance Temperature Coefficient ( $V_R = 3.0 \text{Vdc}$ , $f = 1.0 \text{MHz}$ )	$TC_C$	-	300	-	ppm/ $^\circ\text{C}$



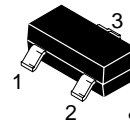
ON Semiconductor®

<http://onsemi.com>

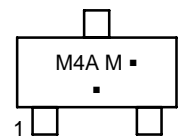
## 26–32 pF VOLTAGE VARIABLE CAPACITANCE DIODES



### MARKING DIAGRAMS



SOT-23 (TO-236)  
CASE 318-08  
STYLE 8



M4A = Device Code

M = Date Code\*

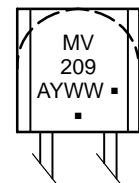
▪ = Pb-Free Package

(Note: Microdot may be in either location)

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



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



MV209 = Device Code

A = Assembly Location

Y = Year

WW = Work Week

▪ = 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.

# MMBV109LT1, MV209

Device	Package	Shipping†	C <sub>t</sub> , Diode Capacitance V <sub>R</sub> = 3.0 Vdc, f = 1.0 MHz pF			Q, Figure of Merit V <sub>R</sub> = 3.0 Vdc f = 50 MHz	C <sub>R</sub> , Capacitance Ratio C <sub>3</sub> /C <sub>25</sub> f = 1.0 MHz (Note 1)	
			Min	Nom	Max	Min	Min	Max
MMBV109LT1	SOT-23	3,000 / Tape & Reel	26	29	32	200	5.0	6.5
MMBV109LT1G	SOT-23 (Pb-Free)	3,000 / Tape & Reel						
MMBV109LT3	SOT-23	10,000 / Tape & Reel						
MMBV109LT3G	SOT-23 (Pb-Free)	10,000 / Tape & Reel						
MV209	TO-92	1,000 Units / Bag						
MV209G	TO-92 (Pb-Free)	1,000 Units / Bag						

1. C<sub>R</sub> is the ratio of C<sub>t</sub> measured at 3 Vdc divided by C<sub>t</sub> measured at 25 Vdc.

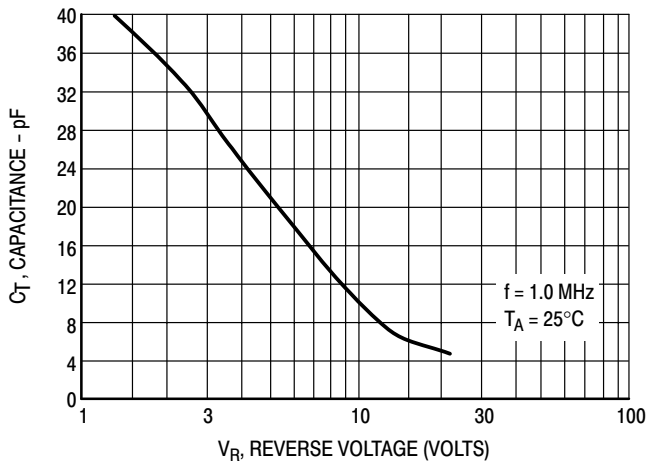


Figure 1. DIODE CAPACITANCE

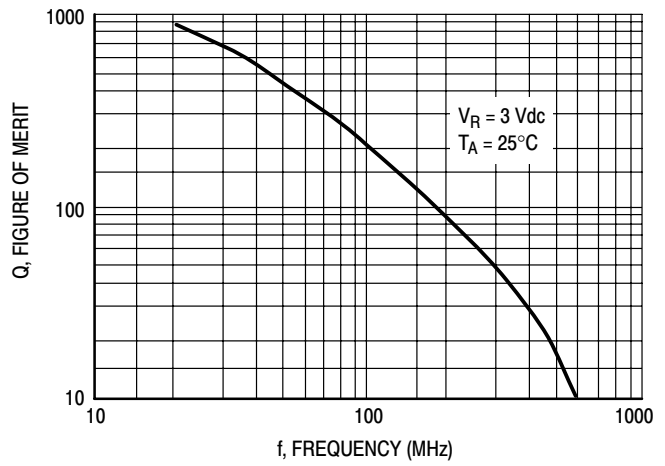


Figure 2. FIGURE OF MERIT

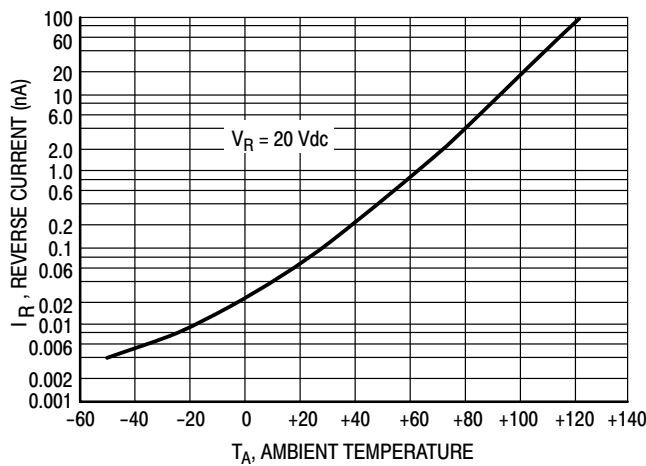


Figure 3. LEAKAGE CURRENT

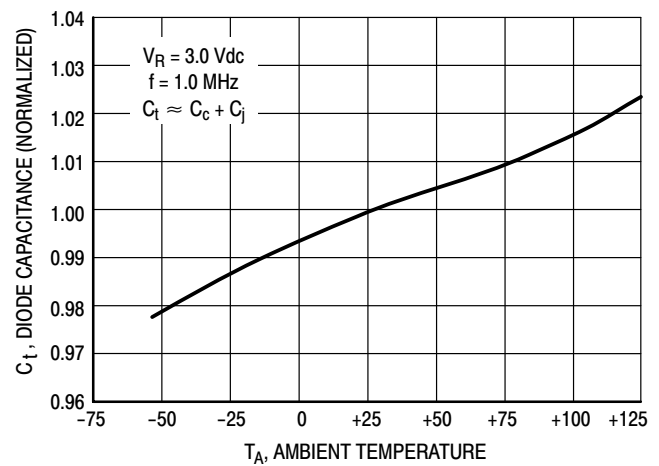


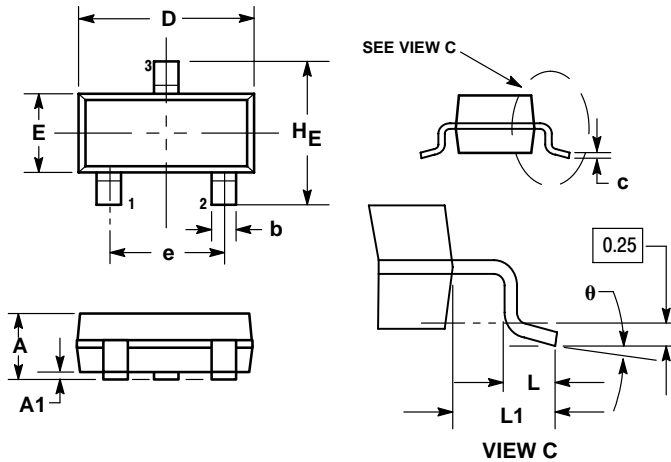
Figure 4. DIODE CAPACITANCE

## NOTES ON TESTING AND SPECIFICATIONS

# MMBV109LT1, MV209

## PACKAGE DIMENSIONS

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

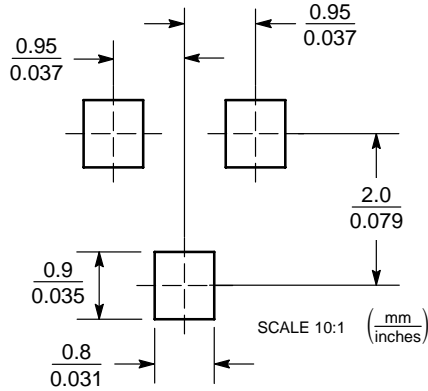


- NOTES:
1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.
  2. CONTROLLING DIMENSION: INCH.
  3. MAXIMUM LEAD THICKNESS INCLUDES LEAD FINISH THICKNESS. MINIMUM LEAD THICKNESS IS THE MINIMUM THICKNESS OF BASE MATERIAL.
  4. 318-01 THRU -07 AND -09 OBSOLETE, NEW STANDARD 318-08.

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

### SOLDERING FOOTPRINT\*

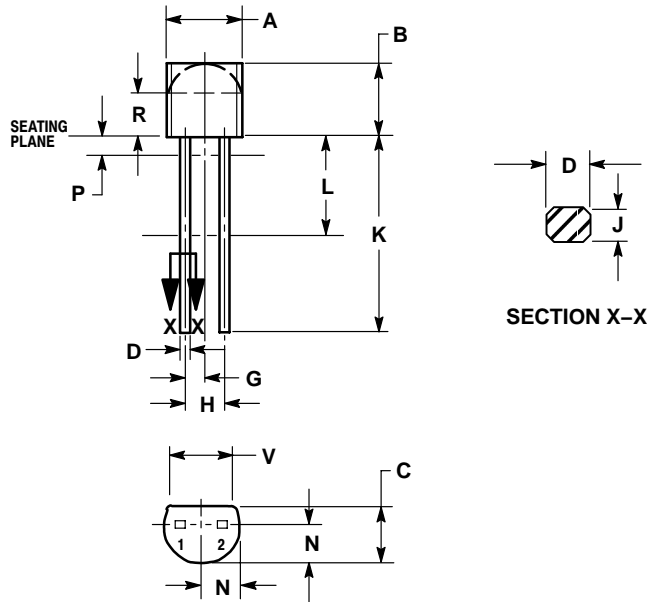


\*For additional information on our Pb-Free strategy and soldering details, please download the ON Semiconductor Soldering and Mounting Techniques Reference Manual, SOLDERRM/D.

# MMBV109LT1, MV209

## 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

ON Semiconductor and are registered trademarks of Semiconductor Components Industries, LLC (SCILLC). SCILLC reserves the right to make changes without further notice to any products herein. SCILLC makes no warranty, representation or guarantee regarding the suitability of its products for any particular purpose, nor does SCILLC assume any liability arising out of the application or use of any product or circuit, and specifically disclaims any and all liability, including without limitation special, consequential or incidental damages. "Typical" parameters which may be provided in SCILLC data sheets and/or specifications can and do vary in different applications and actual performance may vary over time. All operating parameters, including "Typicals" must be validated for each customer application by customer's technical experts. SCILLC does not convey any license under its patent rights nor the rights of others. SCILLC products are not designed, intended, or authorized for use as components in systems intended for surgical implant into the body, or other applications intended to support or sustain life, or for any other application in which the failure of the SCILLC product could create a situation where personal injury or death may occur. Should Buyer purchase or use SCILLC products for any such unintended or unauthorized application, Buyer shall indemnify and hold SCILLC and its officers, employees, subsidiaries, affiliates, and distributors harmless against all claims, costs, damages, and expenses, and reasonable attorney fees arising out of, directly or indirectly, any claim of personal injury or death associated with such unintended or unauthorized use, even if such claim alleges that SCILLC was negligent regarding the design or manufacture of the part. SCILLC is an Equal Opportunity/Affirmative Action Employer. This literature is subject to all applicable copyright laws and is not for resale in any manner.

### PUBLICATION ORDERING INFORMATION

#### LITERATURE FULFILLMENT:

Literature Distribution Center for ON Semiconductor  
P.O. Box 61312, Phoenix, Arizona 85082-1312 USA  
Phone: 480-829-7710 or 800-344-3860 Toll Free USA/Canada  
Fax: 480-829-7709 or 800-344-3867 Toll Free USA/Canada  
Email: orderlit@onsemi.com

N. American Technical Support: 800-282-9855 Toll Free  
USA/Canada

Japan: ON Semiconductor, Japan Customer Focus Center  
2-9-1 Kamimeguro, Meguro-ku, Tokyo, Japan 153-0051  
Phone: 81-3-5773-3850

ON Semiconductor Website: <http://onsemi.com>

Order Literature: <http://www.onsemi.com/litorder>

For additional information, please contact your local Sales Representative.