

# MMVL3102T1

Preferred Device

## Silicon Tuning Diode

This device is designed in the Surface Mount package for general frequency control and tuning applications. It provides solid-state reliability in replacement of mechanical tuning methods.

### Features

- High Q with Guaranteed Minimum Values at VHF Frequencies
- Controlled and Uniform Tuning Ratio
- Pb-Free Package is Available

### MAXIMUM RATINGS

| Rating                     | Symbol | Value | Unit             |
|----------------------------|--------|-------|------------------|
| Continuous Reverse Voltage | $V_R$  | 30    | Vdc              |
| Peak Forward Current       | $I_F$  | 200   | mA <sub>dc</sub> |

### THERMAL CHARACTERISTICS

| Characteristic                                                                                               | Symbol          | Max         | Unit                       |
|--------------------------------------------------------------------------------------------------------------|-----------------|-------------|----------------------------|
| Total Device Dissipation FR-5 Board,<br>$T_A = 25^\circ\text{C}$ (Note 1)<br>Derate above $25^\circ\text{C}$ | $P_D$           | 200<br>1.57 | mW<br>mW/ $^\circ\text{C}$ |
| Thermal Resistance Junction-to-Ambient                                                                       | $R_{\theta JA}$ | 635         | $^\circ\text{C}/\text{W}$  |
| Junction and Storage Temperature                                                                             | $T_J, T_{stg}$  | 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.

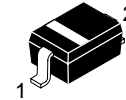
1. FR-4 Minimum Pad



ON Semiconductor®

<http://onsemi.com>

**22 pF (Nominal) 30 VOLTS  
VOLTAGE VARIABLE  
CAPACITANCE DIODE**



PLASTIC  
SOD-323  
CASE 477  
STYLE 1

### MARKING DIAGRAM



4C = Device Code  
M = Date Code\*  
▪ = Pb-Free Package

(Note: Microdot may be in either location)  
\*Date Code orientation may vary depending upon manufacturing location.

### ORDERING INFORMATION

| Device      | Package              | Shipping†          |
|-------------|----------------------|--------------------|
| MMVL3102T1  | SOD-323              | 3000 / Tape & Reel |
| MMVL3102T1G | SOD-323<br>(Pb-Free) | 3000 / 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.

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

# MMVL3102T1

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

| Characteristic                                                                                   | Symbol      | Min | Typ | Max | Unit                  |
|--------------------------------------------------------------------------------------------------|-------------|-----|-----|-----|-----------------------|
| Reverse Breakdown Voltage<br>( $I_R = 10 \mu\text{A}$ )                                          | $V_{(BR)R}$ | 30  | –   | –   | Vdc                   |
| Reverse Voltage Leakage Current<br>( $V_R = 25 \text{ Vdc}$ , $T_A = 25^\circ\text{C}$ )         | $I_R$       | –   | –   | 0.1 | $\mu\text{A}$         |
| Diode Capacitance Temperature Coefficient<br>( $V_R = 4.0 \text{ Vdc}$ , $f = 1.0 \text{ MHz}$ ) | $TC_C$      | –   | 300 | –   | ppm/ $^\circ\text{C}$ |

| Device     | $C_T$ , Diode Capacitance<br>$V_R = 3.0 \text{ Vdc}$ , $f = 1.0 \text{ MHz}$<br>pF |     |     | $Q$ , Figure of Merit<br>$V_R = 3.0 \text{ Vdc}$<br>$f = 50 \text{ MHz}$ | $C_R$ , Capacitance Ratio<br>$C_3/C_{25}$<br>$f = 1.0 \text{ MHz}$ |     |
|------------|------------------------------------------------------------------------------------|-----|-----|--------------------------------------------------------------------------|--------------------------------------------------------------------|-----|
|            | Min                                                                                | Nom | Max | Min                                                                      | Min                                                                | Typ |
| MMVL3102T1 | 20                                                                                 | 22  | 25  | 200                                                                      | 4.5                                                                | 4.8 |

## TYPICAL CHARACTERISTICS

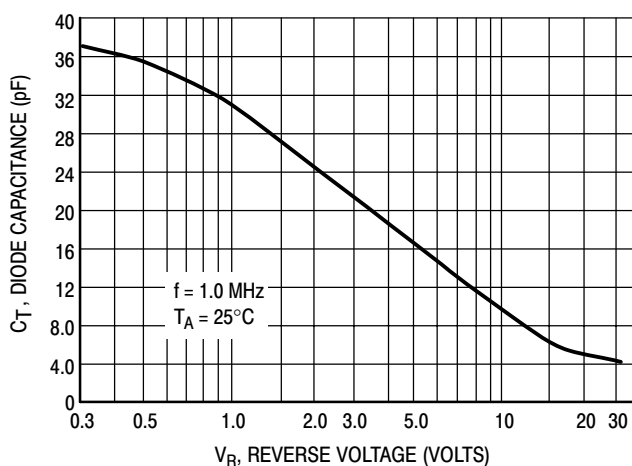


Figure 1. Diode Capacitance

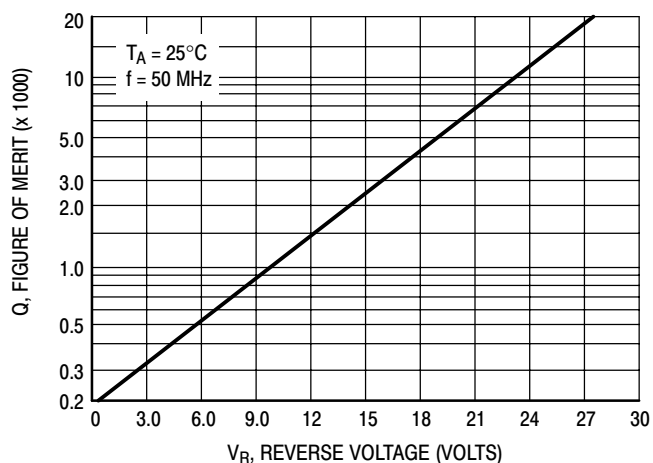


Figure 2. Figure of Merit

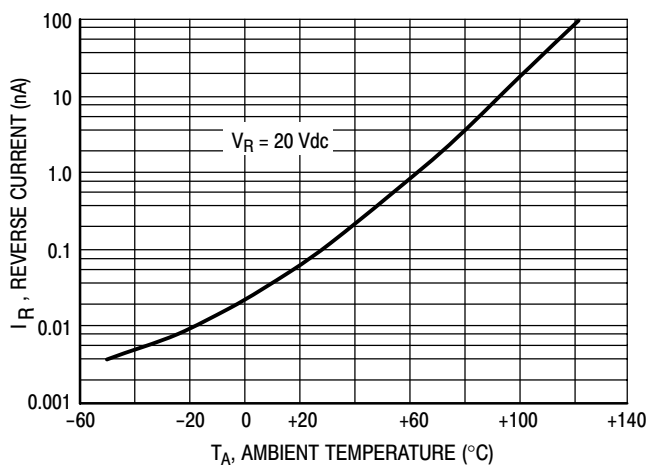


Figure 3. Leakage Current

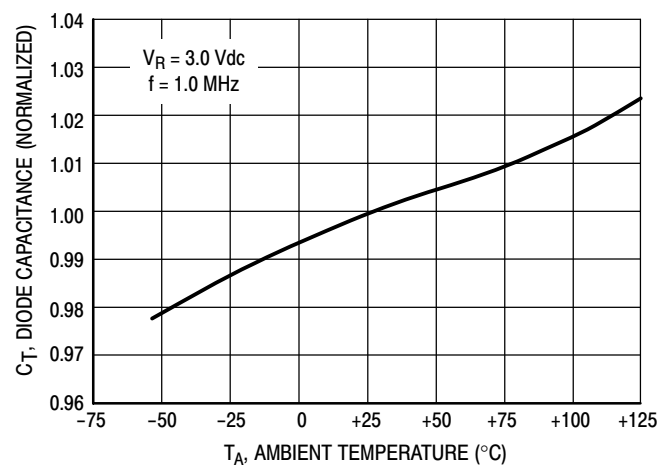


Figure 4. Diode Capacitance

### NOTES ON TESTING AND SPECIFICATIONS

$C_R$  is the ratio of  $C_T$  measured at 3.0 Vdc divided by  $C_T$  measured at 25 Vdc.

# MECHANICAL CASE OUTLINE

## PACKAGE DIMENSIONS

ON Semiconductor®



**SOD-323**  
CASE 477-02  
ISSUE H

DATE 13 MAR 2007



SCALE 4:1



**NOTES:**

1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.
2. CONTROLLING DIMENSION: MILLIMETERS.
3. LEAD THICKNESS SPECIFIED PER L/F DRAWING WITH SOLDER PLATING.
4. DIMENSIONS A AND B DO NOT INCLUDE MOLD FLASH, PROTRUSIONS OR GATE BURRS.
5. DIMENSION L IS MEASURED FROM END OF RADIUS.

| DIM | MILLIMETERS |      |       | INCHES    |       |       |
|-----|-------------|------|-------|-----------|-------|-------|
|     | MIN         | NOM  | MAX   | MIN       | NOM   | MAX   |
| A   | 0.80        | 0.90 | 1.00  | 0.031     | 0.035 | 0.040 |
| A1  | 0.00        | 0.05 | 0.10  | 0.000     | 0.002 | 0.004 |
| A3  | 0.15 REF    |      |       | 0.006 REF |       |       |
| b   | 0.25        | 0.32 | 0.4   | 0.010     | 0.012 | 0.016 |
| C   | 0.089       | 0.12 | 0.177 | 0.003     | 0.005 | 0.007 |
| D   | 1.60        | 1.70 | 1.80  | 0.062     | 0.066 | 0.070 |
| E   | 1.15        | 1.25 | 1.35  | 0.045     | 0.049 | 0.053 |
| L   | 0.08        |      |       | 0.003     |       |       |
| HE  | 2.30        | 2.50 | 2.70  | 0.090     | 0.098 | 0.105 |

**GENERIC MARKING DIAGRAM\***



XX = Specific Device Code  
M = Date Code

\*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.

**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.

STYLE 1:  
PIN 1. CATHODE (POLARITY BAND)  
2. ANODE

STYLE 2:  
NO POLARITY

|                         |                    |                                                                                                                                                                                  |
|-------------------------|--------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
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