

# MMVL2101T1

Preferred Device

## Silicon Tuning Diode

These devices are designed in the popular Plastic Surface Mount Package for high volume requirements of FM Radio and TV tuning and AFC, general frequency control and tuning applications. They provide solid-state reliability in replacement of mechanical tuning methods.

- High Q
- Controlled and Uniform Tuning Ratio
- Standard Capacitance Tolerance – 10%
- Complete Typical Design Curves
- Device Marking: 4G

### MAXIMUM RATINGS

Symbol	Rating	Value	Unit
$V_R$	Continuous Reverse Voltage	30	Vdc
$I_F$	Peak Forward Current	200	mAdc

### THERMAL CHARACTERISTICS

Symbol	Characteristic	Max	Unit
$P_D$	Total Device Dissipation FR-5 Board,* $T_A = 25^\circ\text{C}$ Derate above $25^\circ\text{C}$	200 1.57	mW mW/ $^\circ\text{C}$
$R_{\theta JA}$	Thermal Resistance Junction to Ambient	635	$^\circ\text{C}/\text{W}$
$T_J, T_{stg}$	Junction and Storage Temperature	150	$^\circ\text{C}$

\*FR-4 Minimum Pad

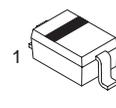


**ON Semiconductor**

Formerly a Division of Motorola

<http://onsemi.com>

**30 VOLTS  
VOLTAGE VARIABLE  
CAPACITANCE DIODE**



**PLASTIC  
SOD-323  
CASE 477**



### ORDERING INFORMATION

Device	Package	Shipping
MMVL2101T1	SOD-323	3000 / Tape & Reel

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

# MMVL2101T1

## 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	—	—	Vdc
Reverse Voltage Leakage Current ( $V_R = 25 \text{ Vdc}$ , $T_A = 25^\circ\text{C}$ )	$I_R$	—	—	0.1	$\mu\text{A}$
Diode Capacitance Temperature Coefficient ( $V_R = 4.0 \text{ Vdc}$ , $f = 1.0 \text{ MHz}$ )	$TC_C$	—	280	—	ppm/ $^\circ\text{C}$

Device	$C_T$ , Diode Capacitance $V_R = 4.0 \text{ Vdc}$ , $f = 1.0 \text{ MHz}$ pF			$Q$ , Figure of Merit $V_R = 4.0 \text{ Vdc}$ , $f = 50 \text{ MHz}$	TR, Tuning Ratio $C_2/C_{30}$ $f = 1.0 \text{ MHz}$		
	Min	Nom	Max	Typ	Min	Typ	Max
MMVL2101T1	6.1	6.8	7.5	450	2.5	2.7	3.2

## PARAMETER TEST METHODS

### 1. $C_T$ , DIODE CAPACITANCE

( $C_T = C_C + C_J$ ).  $C_T$  is measured at 1.0 MHz using a capacitance bridge (Boonton Electronics Model 75A or equivalent).

### 2. TR, TUNING RATIO

TR is the ratio of  $C_T$  measured at 2.0 Vdc divided by  $C_T$  measured at 30 Vdc.

### 3. Q, FIGURE OF MERIT

Q is calculated by taking the G and C readings of an admittance bridge at the specified frequency and substituting in the following equations:

$$Q = \frac{2\pi f C}{G}$$

(Boonton Electronics Model 33AS8 or equivalent). Use Lead Length  $\approx 1/16''$ .

### 4. $TC_C$ , DIODE CAPACITANCE TEMPERATURE COEFFICIENT

$TC_C$  is guaranteed by comparing  $C_T$  at  $V_R = 4.0 \text{ Vdc}$ ,  $f = 1.0 \text{ MHz}$ ,  $T_A = -65^\circ\text{C}$  with  $C_T$  at  $V_R = 4.0 \text{ Vdc}$ ,  $f = 1.0 \text{ MHz}$ ,  $T_A = +85^\circ\text{C}$  in the following equation, which defines  $TC_C$ :

$$TC_C = \left| \frac{C_T(+85^\circ\text{C}) - C_T(-65^\circ\text{C})}{85 + 65} \right| \cdot \frac{10^6}{C_T(25^\circ\text{C})}$$

Accuracy limited by measurement of  $C_T$  to  $\pm 0.1 \text{ pF}$ .

# MMVL2101T1

## TYPICAL DEVICE CHARACTERISTICS

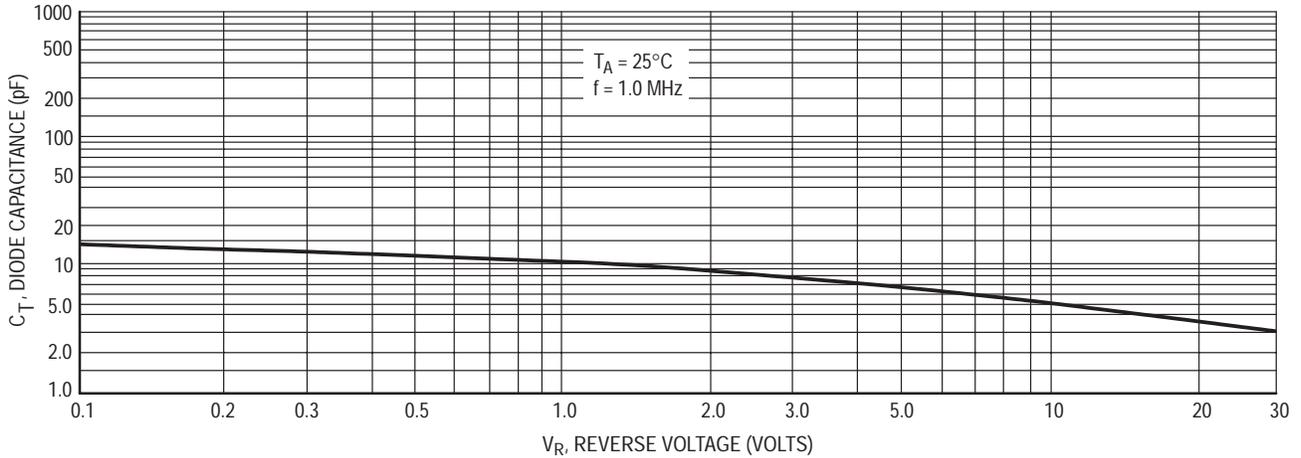


Figure 1. Diode Capacitance versus Reverse Voltage

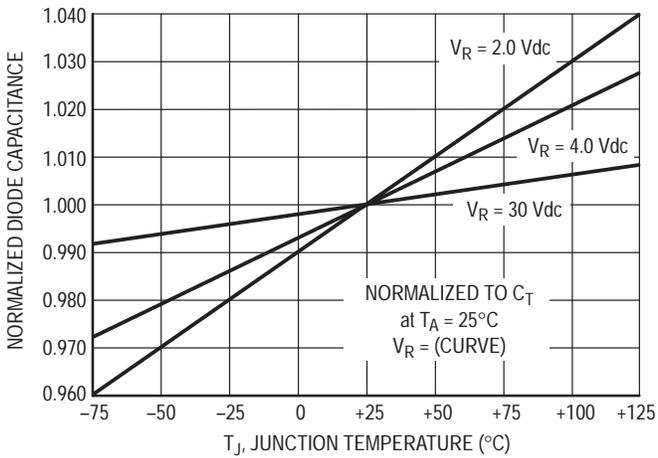


Figure 2. Normalized Diode Capacitance versus Junction Temperature

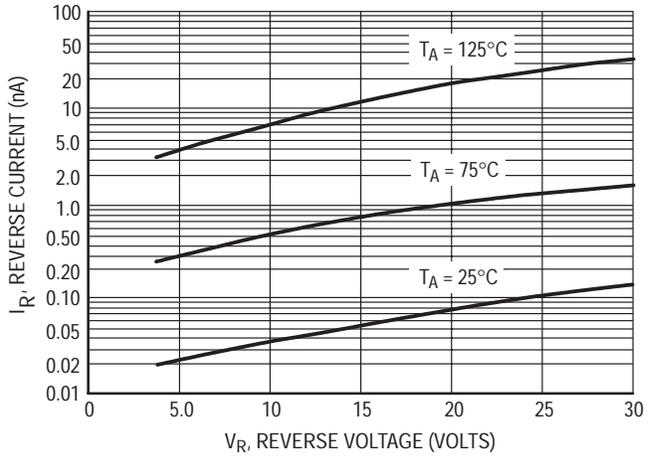


Figure 3. Reverse Current versus Reverse Bias Voltage

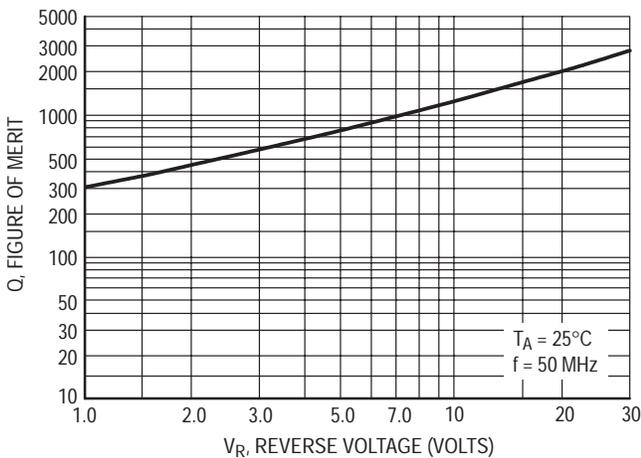


Figure 4. Figure of Merit versus Reverse Voltage

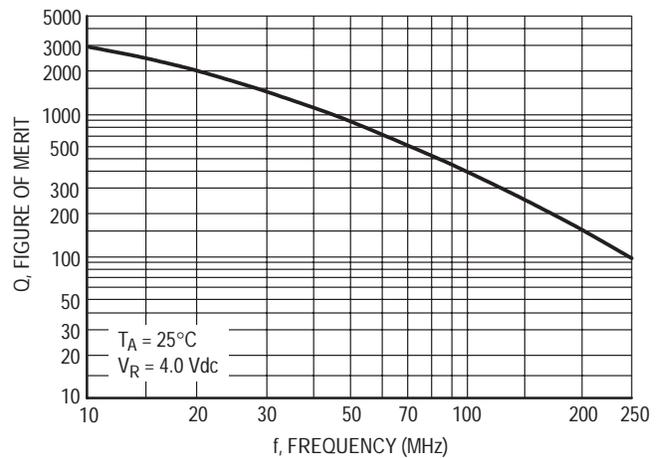
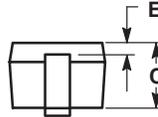
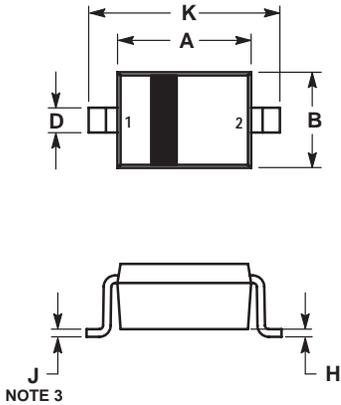


Figure 5. Figure of Merit versus Frequency

# MMVL2101T1

## PACKAGE DIMENSIONS

### SOD-323 PLASTIC PACKAGE CASE 477-02 ISSUE A



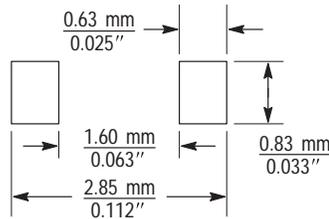
NOTES:

1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.
2. CONTROLLING DIMENSION: MILLIMETERS.
3. LEAD THICKNESS SPECIFIED PER L/F DRAWING WITH SOLDER PLATING.

DIM	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	1.60	1.80	0.063	0.071
B	1.15	1.35	0.045	0.053
C	0.80	1.00	0.031	0.039
D	0.25	0.40	0.010	0.016
E	0.15 REF		0.006 REF	
H	0.00	0.10	0.000	0.004
J	0.089	0.177	0.0035	0.0070
K	2.30	2.70	0.091	0.106

STYLE 1:

- PIN 1. CATHODE
- ANODE



( $\frac{\text{mm}}{\text{inches}}$ )

### SOD-323 Soldering Footprint

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