

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



MAXIMUM RATINGS

Rating	Symbol	Value	Unit
Continuous Reverse Voltage	V_R	75	Vdc
Peak Forward Current	I_F	200	mAdc
Peak Forward Surge Current	$I_{FM}(\text{surge})$	500	mAdc

THERMAL CHARACTERISTICS

Characteristic	Symbol	Max	Unit
Total Device Dissipation FR-5 Board,* $T_A = 25^\circ\text{C}$ Derate above 25°C	P_D	200 1.57	mW 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	$^\circ\text{C}$

*FR-4 Minimum Pad

DEVICE MARKING

MMVL2101T1 = 4G

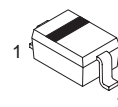
ELECTRICAL CHARACTERISTICS ($T_A = 25^\circ\text{C}$ unless otherwise noted)

Characteristic	Symbol	Min	Typ	Max	Unit
Reverse Breakdown Voltage ($I_R = 10 \mu\text{Adc}$)	$V_{(BR)R}$	30	—	—	Vdc
Reverse Voltage Leakage Current ($V_R = 25 \text{Vdc}, T_A = 25^\circ\text{C}$)	I_R	—	—	0.1	μAdc
Diode Capacitance Temperature Coefficient ($V_R = 4.0 \text{Vdc}, f = 1.0 \text{MHz}$)	TC_C	—	280	—	ppm/ $^\circ\text{C}$

MMVL2101T1

Motorola Preferred Device

**30 VOLTS
VOLTAGE VARIABLE
CAPACITANCE DIODE**



**CASE 477-02, STYLE 1
SOD323**

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

MMVL2101T1

Device	C_T , Diode Capacitance $V_R = 4.0$ Vdc, $f = 1.0$ MHz pF			Q , Figure of Merit $V_R = 4.0$ Vdc, $f = 50$ MHz	TR, Tuning Ratio C_2/C_{30} $f = 1.0$ 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. T_{CC} , DIODE CAPACITANCE TEMPERATURE COEFFICIENT

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

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

Accuracy limited by measurement of C_T to ± 0.1 pF.

TYPICAL DEVICE CHARACTERISTICS

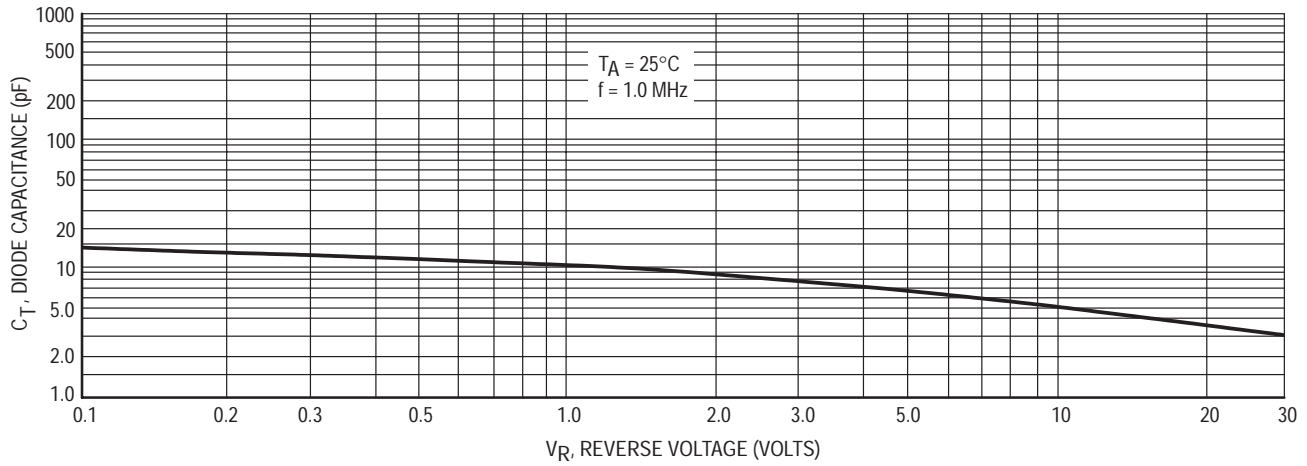


Figure 1. Diode Capacitance versus Reverse Voltage

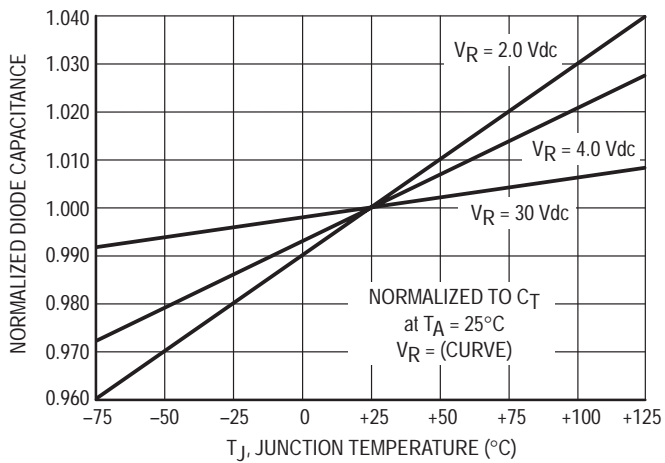


Figure 2. Normalized Diode Capacitance versus Junction Temperature

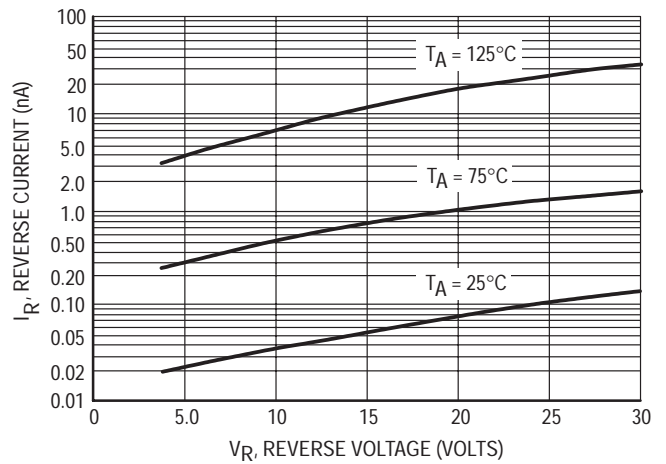


Figure 3. Reverse Current versus Reverse Bias Voltage

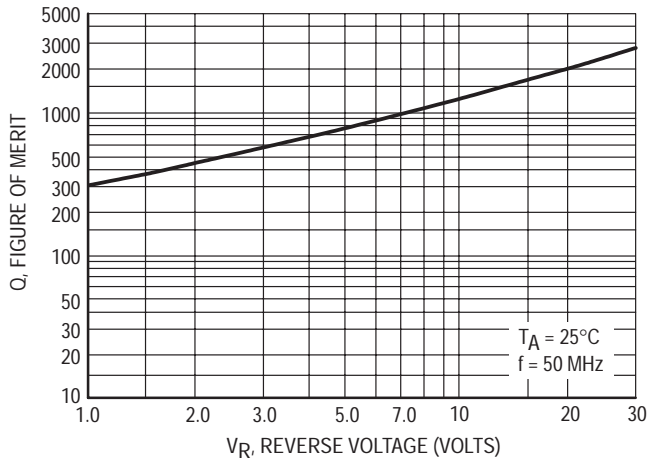


Figure 4. Figure of Merit versus Reverse Voltage

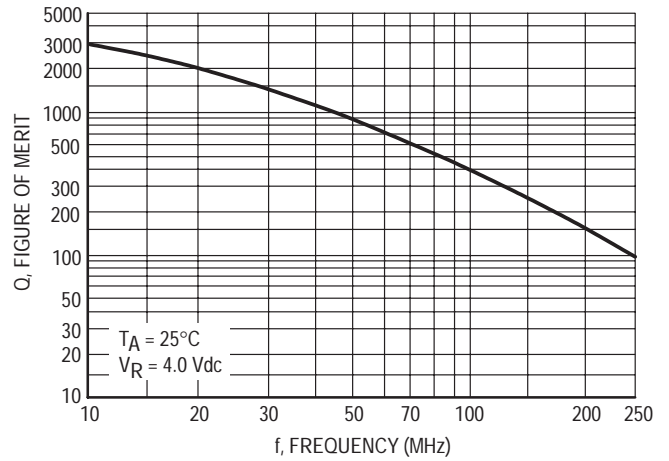


Figure 5. Figure of Merit versus Frequency

PACKAGE DIMENSIONS

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
2. ANODE

**CASE 477-02
ISSUE A
SOD323**

0.63 mm
0.025"

1.60 mm
0.063"

2.85 mm
0.112"

0.83 mm
0.033"

(mm / inches)

**SOD-323
Soldering Footprint**

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