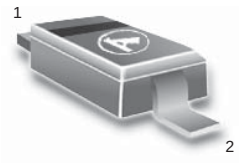
Silicon Tuning Diode

MMVL2101T1

30 VOLTS
VOLTAGE VARIABLE
CAPACITANCE 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



PLASTIC, CASE 477
SOD– 323

ORDERING INFORMATION

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

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°C	200	mW
	Derate above 25°C	1.57	mW/°C
$R_{\theta JA}$	Thermal Resistance Junction to Ambient	635	°C/W
T_J, T_{stg}	Junction and Storage Temperature	150	°C

*FR–4 Minimum Pad

ELECTRICAL CHARACTERISTICS (T_A = 25°C unless otherwise noted)

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

	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	
Device	Min	Nom	Max	Min	Min	Max
MMVL2101T1	6.1	6.8	7.5450	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:

$$Q = 2\pi fC/G$$

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

4. TC_C, DIODE CAPACITANCE TEMPERATURE COEFFICIENT
TC_C is guaranteed by comparing C_T at V_R = 4.0 Vdc, f = 1.0 MHz, T_A = –65°C with C_T at V_R = 4.0 Vdc, f = 1.0 MHz, T_A = +85°C in the following equation, which defines TC_C:

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

Accuracy limited by measurement of C_T to ±0.1 pF.

MMVL2101T1

TYPICAL DEVICE CHARACTERISTICS

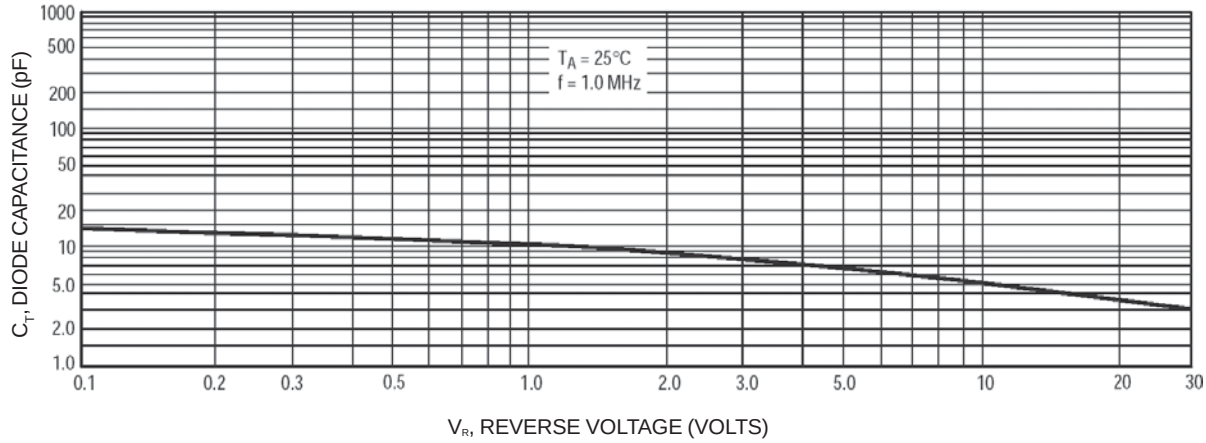


Figure 1. Diode Capacitance versus Reverse Voltage

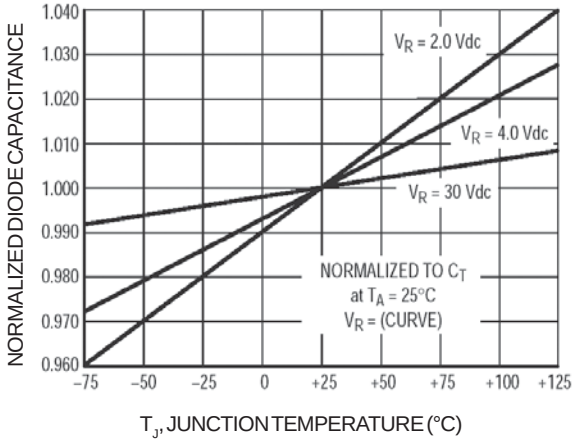


Figure 2. Normalized Diode Capacitance versus Junction Temperature

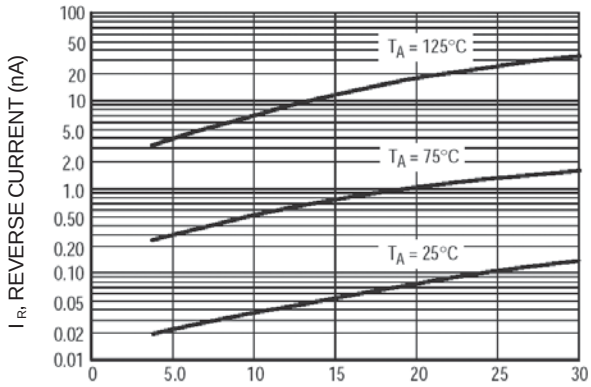


Figure 3. Reverse Current versus Reverse Bias Voltage

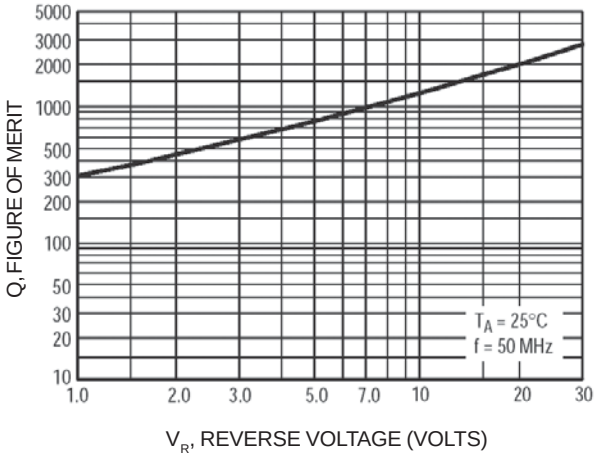


Figure 4. Figure of Merit versus Reverse Voltage

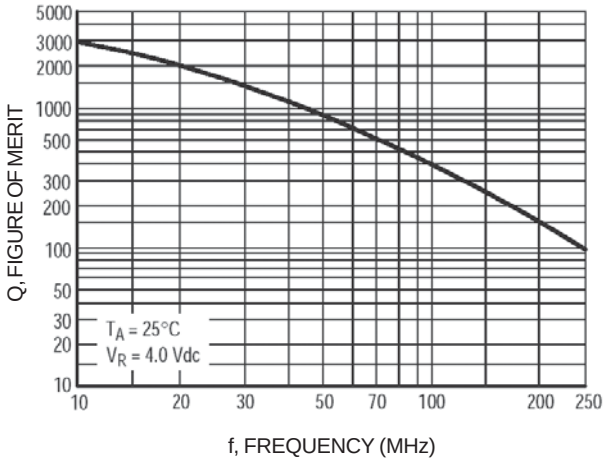


Figure 5. Figure of Merit versus Frequency