MMBV2101LT1 Series, MV2105, MV2101, MV2109, LV2205, LV2209

Silicon Tuning Diodes

6.8–100 pF, 30 Volts
Voltage Variable Capacitance Diodes

ON Semiconductor™

http://onsemi.com

These devices are designed in popular plastic packages for the 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. Also available in a Surface Mount Package up to 33 pF.

- High Q
- Controlled and Uniform Tuning Ratio
- Standard Capacitance Tolerance – 10%
- Complete Typical Design Curves

SOT–23

TO–92

MAXIMUM RATINGS

Rating		Symbol	Value	Unit
Reverse Voltage		V_R	30	Vdc
Forward Current		I_F	200	mAdc
Forward Power Dissipation		P_D		mW
@ T_A = 25°C	MMBV21xx		225	mW/°C
Derate above 25°C			1.8	
@ T_A = 25°C	MV21xx		280	
Derate above 25°C	LV22xx		2.8	
Junction Temperature		T_J	+150	°C
Storage Temperature Range		T_{stg}	–55 to +150	°C

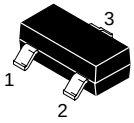
DEVICE MARKING

MMBV2101LT1 = M4G	MMBV2108LT1 = 4X	MV2109 = MV2109
MMBV2103LT1 = 4H	MMBV2109LT1 = 4J	LV2205 = LV2205
MMBV2105LT1 = 4U	MV2101 = MV2101	LV2209 = LV2209
MMBV2107LT1 = 4W	MV2105 = MV2105	

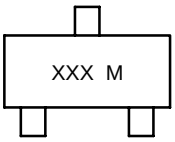
ELECTRICAL CHARACTERISTICS (T_A = 25°C unless otherwise noted)

Characteristic	Symbol	Min	Typ	Max	Unit
Reverse Breakdown Voltage (I_R = 10 μAdc)	$V_{(BR)R}$				Vdc
MMBV21xx, MV21xx		30	–	–	
LV22xx		25	–	–	
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

MARKING DIAGRAM

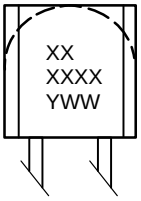


TO–236AB, SOT–23
CASE 318–08
STYLE 8



XXX = Device Code*
M = Date Code
* See Table

TO–226AC, TO–92
CASE 182
STYLE 1



XX = Device Code Line 1*
XXXX = Device Code Line 2*
M = Date Code
* See Table

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

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
MMBV2101LT1/MV2101	6.1	6.8	7.5	450	2.5	2.7	3.2
MMBV2103LT1	9.0	10	11	400	2.5	2.9	3.2
LV2205/MMBV2105LT1/MV2105	13.5	15	16.5	400	2.5	2.9	3.2
MMBV2107LT1	19.8	22	24.2	350	2.5	2.9	3.2
MMBV2108LT1	24.3	27	29.7	300	2.5	3.0	3.2
LV2209MMBV2109LT1/MV2109	29.7	33	36.3	200	2.5	3.0	3.2

MMBV2101LT1, MMBV2103LT1, MMBV2105LT1, MMBV2107LT1 thru MMBV2109LT1, are also available in bulk. Use the device title and drop the "T1" suffix when ordering any of these devices in bulk.

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:

$$Q = \frac{2\pi fC}{G}$$

(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 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.

TYPICAL DEVICE CHARACTERISTICS

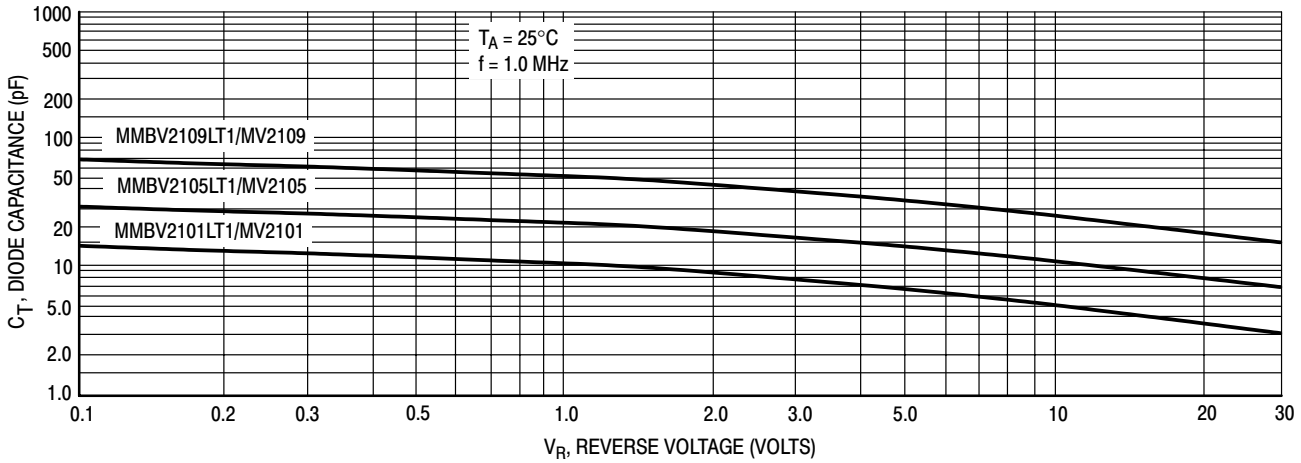


Figure 1. Diode Capacitance versus Reverse Voltage

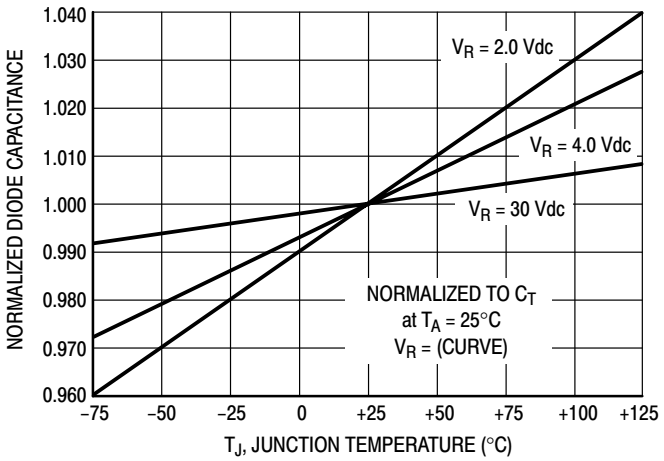


Figure 2. Normalized Diode Capacitance versus Junction Temperature

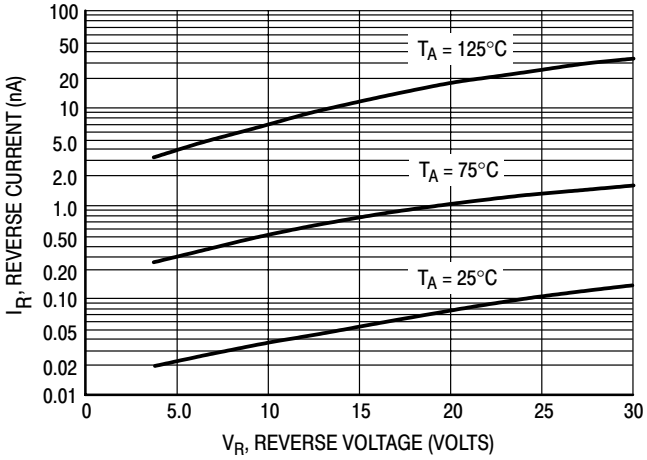


Figure 3. Reverse Current versus Reverse Bias Voltage

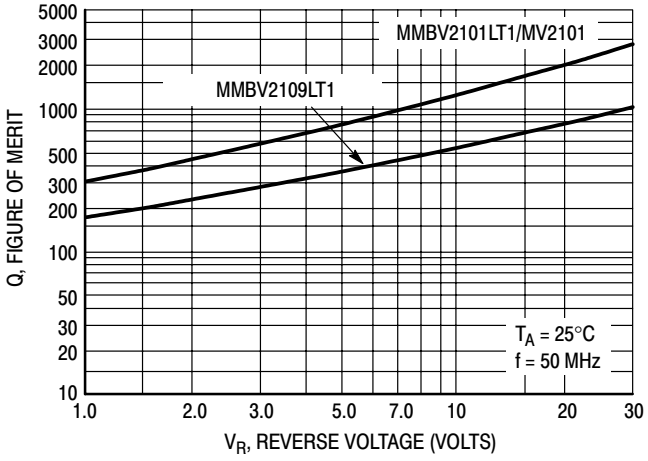


Figure 4. Figure of Merit versus Reverse Voltage

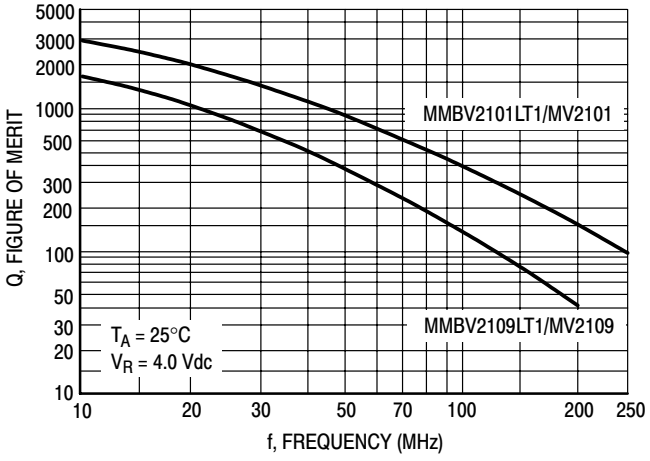


Figure 5. Figure of Merit versus Frequency