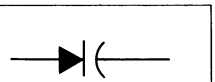
Silicon Epicap Diodes

MMBV409L
MV409

VOLTAGE VARIABLE CAPACITANCE DIODES
26–32 pF

. . . designed for general frequency control and tuning applications; providing solid-state reliability in replacement of mechanical tuning methods.

- High Q with Guaranteed Minimum Values at VHF Frequencies
- Controlled and Uniform Tuning Ratio
- Available in Surface Mount Package



MAXIMUM RATINGS

Rating	Symbol	MV409	MMBV409L	Unit
		Value		
Reverse Voltage	V_R	20		Volts
Forward Current	I_F	200		mA
Forward Power Dissipation @ T_A = 25°C Derate above 25°C	P_D	280 2.8	225* 1.8	mW mW/°C
Junction Temperature	T_J	+125		°C
Storage Temperature Range	T_{stg}	−65 to +150		°C

*FR5 Board 1.0 x 0.75 x 0.62 in.

CASE 182-02, STYLE 1
(TO-226AC)
MV409

CASE 318-07, STYLE 8
(TO-236AB)
SOT-23
MMBV409L

DEVICE MARKING

MMBV409L = X5

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

Characteristic — All Types	Symbol	Min	Typ	Max	Unit
Reverse Breakdown Voltage (I_R = 10 μAdc)	$V_{(BR)R}$	20	—	—	Vdc
Reverse Voltage Leakage Current (V_R = 15 Vdc)	I_R	—	—	0.1	μAdc
Diode Capacitance Temperature Coefficient (V_R = 3.0 Vdc, f = 1.0 MHz)	TC_C	—	300	—	ppm/°C

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	C_t, Diode Capacitance V_R = 3 Vdc, f = 1 MHz pF			Q, Figure of Merit V_R = 3 Vdc f = 50 MHz (Note 1)	C_R, Capacitance Ratio C_3/C_8 f = 1 MHz (Note 2)	
Device	**Min**	**Nom**	**Max**	**Min**	**Min**	**Max**
MMBV409L/MV409	26	29	32	200	1.5	1.9

NOTES ON TESTING AND SPECIFICATIONS

(1) Q is calculated by taking the G and C readings of an admittance bridge, such as Boonton Electronics Model 33AS8, at the specified frequency and substituting in the following equation:

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

(2) C_R is the ratio of C_t measured at 3 Vdc divided by C_t measured at 8 Vdc.

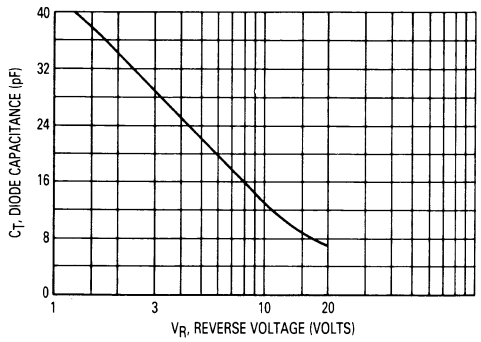


Figure 1. Diode Capacitance

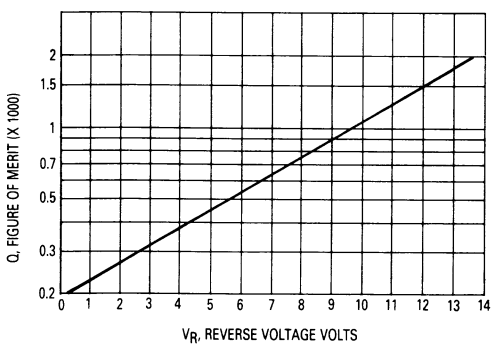


Figure 2. Figure of Merit

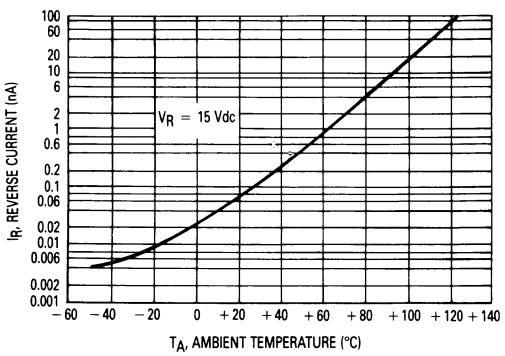


Figure 3. Leakage Current

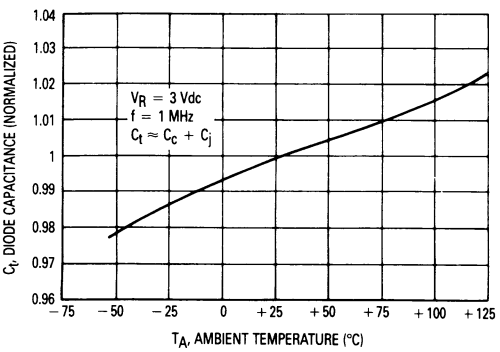


Figure 4. Diode Capacitance

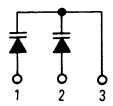
Silicon Epicap Diode

MMBV432L

DUAL VOLTAGE-VARIABLE CAPACITANCE DIODE

. . . designed for FM tuning, general frequency control and tuning, or any top-of-the-line application requiring back-to-back diode configuration for minimum signal distortion and detuning. This device is supplied in the SOT-23 plastic package for high volume, pick and place assembly requirements.

- High Figure of Merit — Q = 150 (Typ) @ V_R = 2 Vdc, f = 50 MHz
- Guaranteed Capacitance Range
- Dual Diodes — Save Space and Reduce Cost
- Surface Mount Package
- Available in 8 mm Tape and Reel
- Monolithic Chip Provides Improved Matching — Guaranteed ±1% (Max) Over Specified Tuning Range



CASE 318-07, STYLE 9 (TO-236AB)

MAXIMUM RATINGS (Each Diode)

Rating	Symbol	Value	Unit
Reverse Voltage	V_R	14	Volts
Forward Current	I_F	200	mA
Total Power Dissipation @ T_A = 25°C Derate above 25°C	P_D	350 2.8	mW mW/°C
Junction Temperature	T_J	+125	°C
Storage Temperature Range	T_{stg}	−55 to +125	°C

DEVICE MARKING

MMBV432L = M4B

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

Characteristic	Symbol	Min	Typ	Max	Unit
Reverse Breakdown Voltage (I_R = 10 μAdc)	$V_{(BR)R}$	14	—	—	Vdc
Reverse Voltage Leakage Current (V_R = 9 Vdc)	I_R	—	—	100	nAdc
Diode Capacitance (V_R = 2 Vdc, f = 1 MHz)	C_T	43	—	48.1	pF
Capacitance Ratio C2/C8 (f = 1 MHz)	C_R	1.5	—	2	—
Figure of Merit* (V_R = 2 Vdc, f = 50 MHz)	Q	100	150	—	—

* $Q = \frac{1}{2 \pi f C_T R_S}$

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TYPICAL CHARACTERISTICS

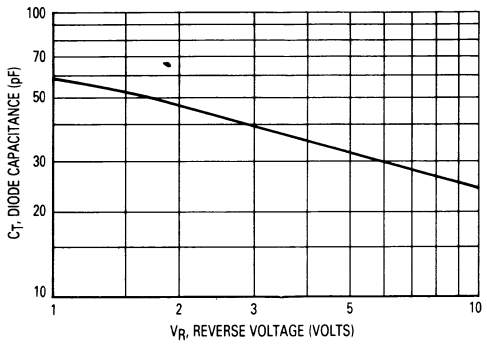

Figure 1. Diode Capacitance

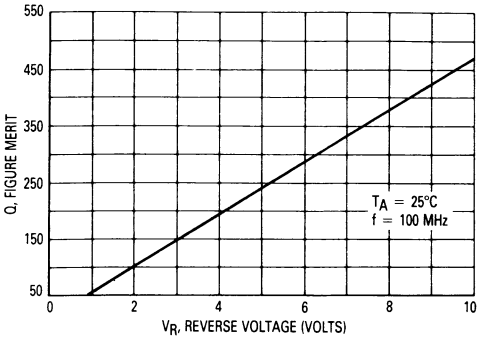

Figure 2. Figure of Merit versus Voltage

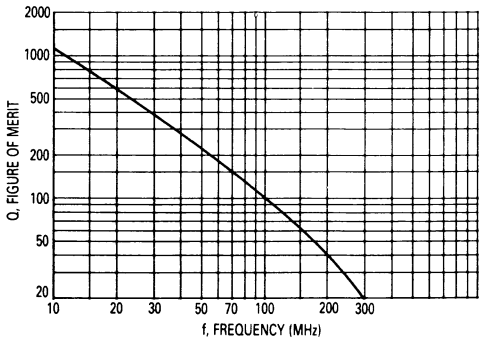

Figure 3. Figure of Merit versus Frequency

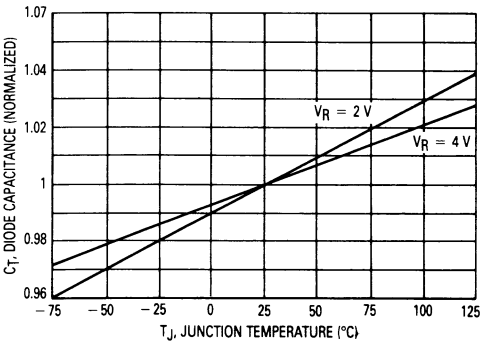

Figure 4. Diode Capacitance versus Temperature

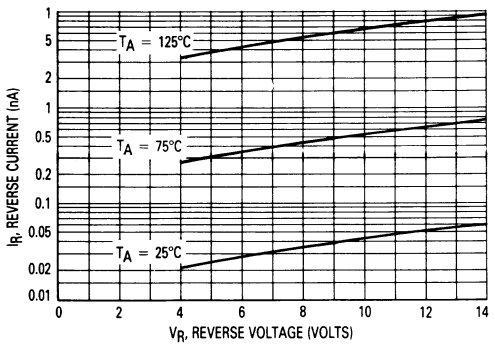

Figure 5. Reverse Current versus Reverse Voltage

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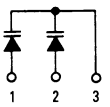
Silicon Epicap Diode

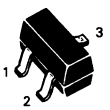
MMBV609L

DUAL VOLTAGE-VARIABLE CAPACITANCE DIODE

. . . designed for FM tuning, general frequency control and tuning, or any top-of-the-line application requiring back-to-back diode configuration for minimum signal distortion and detuning. This device is supplied in the SOT-23 plastic package for high volume, pick and place assembly requirements.

- High Figure of Merit — Q = 350 (Typ) @ V_R = 3.0 Vdc, f = 50 MHz
- Guaranteed Capacitance Range
- Dual Diodes — Save Space and Reduce Cost
- Surface Mount Package
- Available in 8 mm Tape and Reel
- Monolithic Chip Provides Improved Matching
- Hyper Abrupt Junction Process Provides High Tuning Ratio





CASE 318-07, STYLE 9
(TO-236AB)
SOT-23

DEVICE MARKING = 5L

MAXIMUM RATINGS (Each Diode)

Rating	Symbol	Value	Unit
Reverse Voltage	V_R	20	Volts
Forward Current	I_F	100	mA
Total Power Dissipation @ T_A = 25°C Derate above 25°C	P_D	225 1.8	mW mW/°C
Junction Temperature	T_J	+125	°C
Storage Temperature Range	T_{stg}	−55 to +125	°C

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

Characteristic	Symbol	Min	Typ	Max	Unit
Reverse Breakdown Voltage (I_R = 10 μAdc)	$V_{(BR)R}$	20	—	—	Vdc
Reverse Voltage Leakage Current (V_R = 15 Vdc)	I_R	—	—	10	nAdc
Diode Capacitance (V_R = 3.0 Vdc, f = 1.0 MHz)	C_T	26	—	32	pF
Capacitance Ratio C3/C8 (f = 1.0 MHz)	C_R	1.8	—	2.4	—
Figure of Merit (V_R = 3.0 Vdc, f = 50 MHz)	Q	250	350	—	—

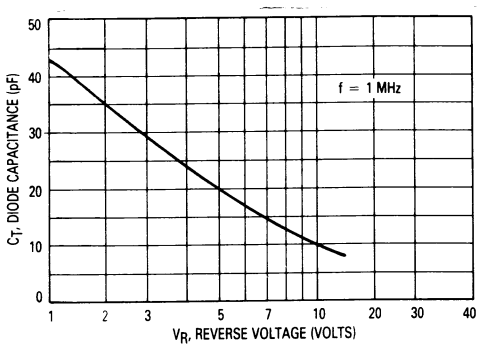


Figure 1. Diode Capacitance

Silicon Epicap Diode

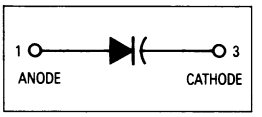
MMBV809L

. . . designed for 900 MHz frequency control and tuning applications; providing solid-state reliability in replacement of mechanical tuning methods.

- Controlled and Uniform Tuning Ratio
- Available in Surface Mount Package
- Available in 8 mm Tape and Reel

VOLTAGE VARIABLE CAPACITANCE DIODE
4.5–6.1 pF

DEVICE MARKING: 5K



MAXIMUM RATINGS

Rating	Symbol	Value	Unit
Reverse Voltage	V_R	20	Volts
Forward Current	I_F	20	mA
Forward Power Dissipation @ T_A = 25°C Derate above 25°C	P_D	225* 1.8	mW mW/°C
Junction Temperature	T_J	+125	°C
Storage Temperature Range	T_{stg}	−55 to +125	°C

*FR5 Board 1.0 x 0.75 x 0.62 in.

CASE 318-07, STYLE 8
TO-236AB
SOT-23

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

Characteristic — All Types	Symbol	Min	Typ	Max	Unit
Reverse Breakdown Voltage (I_R = 10 μAdc)	$V_{(BR)R}$	20	—	—	Vdc
Reverse Voltage Leakage Current (V_R = 15 Vdc)	I_R	—	—	50	nAdc

	C_t, Diode Capacitance V_R = 2.0 Vdc, f = 1.0 MHz pF			Q, Figure of Merit V_R = 3.0 Vdc f = 50 MHz (Note 1)	C_R, Capacitance Ratio C_2/C_8 f = 1.0 MHz (Note 2)	
Device	**Min**	**Typ**	**Max**	**Min**	**Min**	**Max**
MMBV809L	4.5	5.3	6.1	300	1.8	2.6

NOTES ON TESTING AND SPECIFICATIONS

(1) Q is calculated by taking the G and C readings of an admittance bridge, such as Boonton Electronics Model 33AS8, at the specified frequency and substituting in the following equation:

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

(2) C_R is the ratio of C_t measured at 2.0 Vdc divided by C_t measured at 8.0 Vdc.

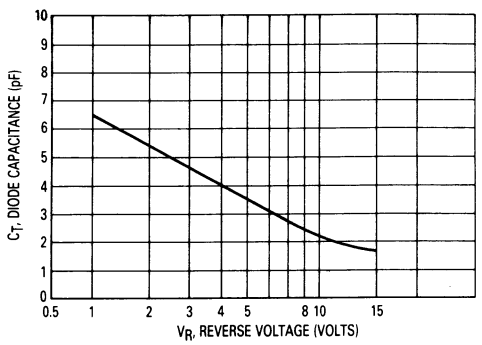


Figure 1. Diode Capacitance