



MV30001 – MV34010

GaAs Hyperabrupt Varactor Diodes

GENERAL DESCRIPTION

Microsemi's GaAs hyperabrupt junction varactor diodes are fabricated from epitaxial layers grown at Microsemi by the Chemical Vapor Deposition technique. The layers are processed using proprietary techniques resulting in varactors with constant gamma, high Q factor² and repeatable tuning curves. These varactors are available in a variety of microwave ceramic packages or bondable chips for operation from UHF to millimeter wave frequencies. As is the case with all microwave application, chip devices (Package style –P00) are recommended for best wide bandwidth and highest frequency performance. When ordering, specify the desired package style by adding its number as a suffix to the basic part number. A few package styles are illustrated here-in. Consult the factory for a wider selection. Some limitations apply.

KEY FEATURES

- High Q Values for Higher Frequency Performance
- Large Tuning Ratios
- Low Reverse Current
- Gamma Values to 1.5
- Available as Bondable Chips and as Packaged Diodes
- Available in Chip-on-Board Packaging
- Custom Designs Available

APPLICATION/BENEFITS

- VCOs
- Phase-Locked Oscillators
- High Q Tunable Filters
- Phase Shifters
- Pre-Selectors

ABSOLUTE MAXIMUM RATINGS @ 25°C

Reverse Voltage	Breakdown Voltage
Forward Current	50 mA
Incident Power	+20 dBm
Operating Temperature	-55°C to +175°C
Storage Temperature	-55°C to +200°C



1. The maximum operating and storage temperature for an epoxy encapsulated package is +125°C.

*For the most current data, consult MICROSEMI's website: www.MICROSEMI.com
Specifications are subject to change, consult the factory at (978) 442-5600 for the latest information.*



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DEVICE ELECTRICAL PARAMETERS AT 25°C

Gamma = 0.75⁶				
Part Number	$C_T^{1, 3, 4}$ @4V±10% (pF)	C_T^5 @2V / C_T @20V (TYP)	V_{BR} @10μA (V) (MIN)	Q^2 @-4V (TYP)
MV32001 ⁷	0.6	4.0	22	4000
MV32002	1.0	3.1	22	3000
MV32003	1.2	3.2	22	3000
MV32004	1.5	3.3	22	3000
MV32005	1.8	3.4	22	3000
MV32006	2.2	3.5	22	3000
MV32007	2.5	3.6	22	2500
MV32008	3.0	3.6	22	2500
MV32009	3.6	3.7	22	2000
MV32010	4.5	3.8	22	1500

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Gamma = 1.00 ⁶				
Part Number	C _T ^{1, 3, 4} @4V±10% (pF)	C _T ⁵ @2V / C _T @12V (TYP)	V _{BR} @10μA (V) (MIN)	Q ² @-4V (TYP)
MV30001 ⁷	0.6	4.25	15	4000
MV30002	1.0	3.1	15	3000
MV30003	1.2	3.2	15	3000
MV30004	1.5	3.4	15	3000
MV30005	1.8	3.5	15	3000
MV30006	2.2	3.6	15	3000
MV30007	2.5	3.7	15	2500
MV30008	3.0	3.8	15	2500
MV30009	3.6	3.8	15	2000
MV30010	4.5	3.9	15	1500

Gamma = 1.00 ⁶				
Part Number	C _T ^{1, 3, 4} @4V±10% (pF)	C _T ⁵ @2V / C _T @20V (TYP)	V _{BR} @10μA (V) (MIN)	Q ² @-4V (TYP)
MV30011 ⁷	0.6	7.0	22	4000
MV30012	1.0	4.1	22	3000
MV30013	1.2	4.3	22	3000
MV30014	1.5	4.8	22	3000
MV30015	1.8	5.0	22	3000
MV30016	2.2	5.3	22	3000
MV30017	2.5	5.5	22	2500
MV30018	3.0	5.7	22	2500
MV30019	3.6	5.9	22	2000
MV30020	4.5	6.1	22	1500

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Gamma = 1.25⁶				
Part Number	C_T^{1, 3, 4} @4V±10% (pF)	C_T⁵ @2V / C_T @12V (TYP)	V_{BR} @10μA (V) (MIN)	Q² @-4V (TYP)
MV31001 ⁷	0.6	5.5	15	4000
MV31002	1.0	3.7	15	3000
MV31003	1.2	3.9	15	3000
MV31004	1.5	4.2	15	3000
MV31005	1.8	4.4	15	3000
MV31006	2.2	4.6	15	3000
MV31007	2.5	4.7	15	2000
MV31008	3.0	4.8	15	2000
MV31009	3.6	4.9	15	2000
MV31010	4.5	5.0	15	1500

Gamma = 1.25⁶				
Part Number	C_T^{1, 3, 4} @4V±10% (pF)	C_T⁵ @2V / C_T @20V (TYP)	V_{BR} @10μA (V) (MIN)	Q² @-4V (TYP)
MV31011 ⁷	0.5	9.5	22	4000
MV31012	0.7	4.0	22	4000
MV31013	1.0	5.0	22	3000
MV31014	1.2	5.4	22	3000
MV31015	1.5	6.0	22	3000
MV31016	1.8	6.4	22	3000
MV31017	2.0	6.6	22	3000
MV31018	2.2	6.8	22	3000
MV31019	2.7	7.2	22	2000
MV31020	3.3	7.6	22	2000
MV31021	3.7	7.8	22	2000
MV31022	4.7	8.1	22	1500

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Gamma = 1.25 ⁶				
Part Number	C _T ^{1, 3, 4} @4V±10% (pF)	C _T ⁵ @2V / C _T @20V (TYP)	V _{BR} @10μA (V) (MIN)	Q ² @-4V (TYP)
MV31023	5.6	8.3	22	1500
MV31024	6.8	8.5	22	1500
MV31025	8.2	8.7	22	1500
MV31026	10.0	8.8	22	1500

Gamma = 1.50 ⁶				
Part Number	C _T ^{1, 3, 4} @4V±10% (pF)	C _T ⁵ @2V / C _T @12V (TYP)	V _{BR} @10μA (V) (MIN)	Q ² @-4V (TYP)
MV34001 ⁷	0.5	9.0	15	3000
MV34002	1.0	5.9	15	2500
MV34003	1.8	7.1	15	2500
MV34004	2.0	7.3	15	2500
MV34005	2.2	7.4	15	1800
MV34006	2.5	7.6	15	1800
MV34007	3.0	7.9	15	1800
MV34008	3.8	8.1	15	1800
MV34009	4.5	8.3	15	1200
MV34010	10.0	8.9	15	1200

Notes:

1. Capacitance is specified at 1 MHz.
2. Measured by DeLoach Technique and referenced to 50 MHz.
3. Tightened tolerances available upon request.
4. Package capacitance of 0.18 pF is included in the above specification in the -30 package. Except where noted.
5. The capacitance ratio is calculated using Cp = 0.18 pF. Ratios will vary depending upon package selection.
6. Gamma value guaranteed for unpackaged chips only. Package parasitic capacitance will affect the total capacitance versus voltage curve.
7. Specification values are for die only. Consult factory for packaged devices.

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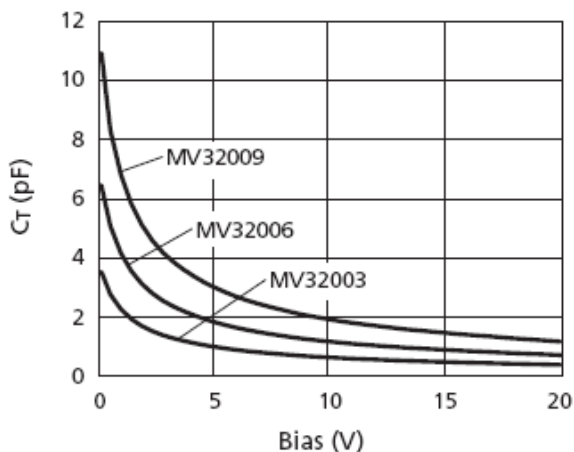


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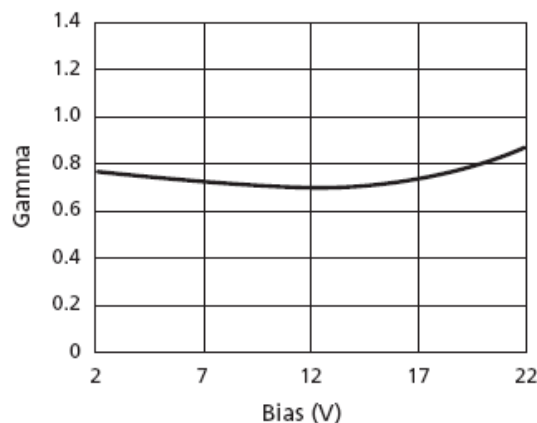
GaAs Hyperabrupt Varactor Diodes

ALL CAPACITANCE VS. BIAS GRAPHS ARE TAKEN USING -30 PACKAGE.
ALL GAMMA CURVES ARE TAKEN IN CHIP FORM.

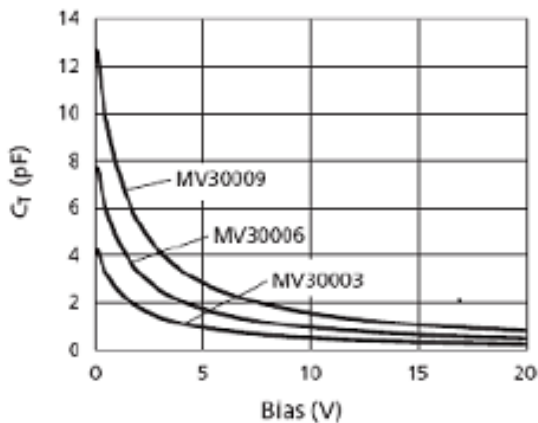
TYPICAL CHARACTERISTICS



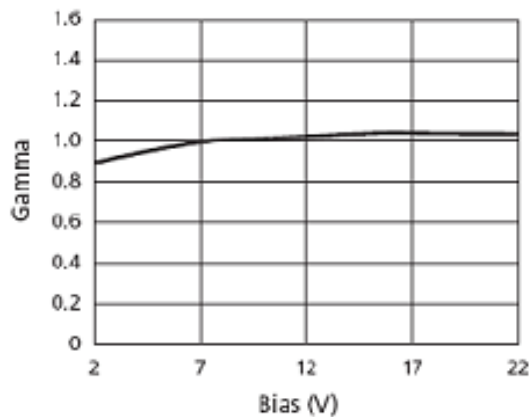
Typical Total Capacitance vs. Bias
Gamma = 0.75



Typical Gamma vs. Bias
Gamma = 0.75



Typical Total Capacitance vs. Bias
Gamma = 1.00



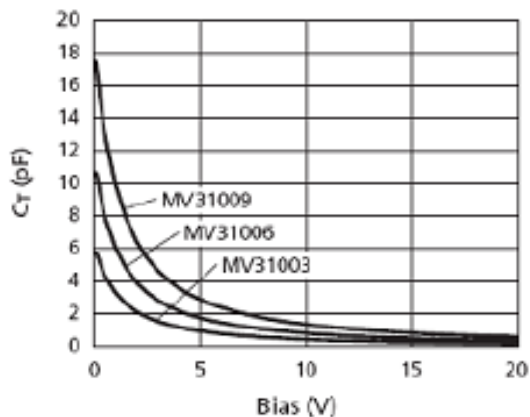
Typical Gamma vs. Bias
Gamma = 1.00

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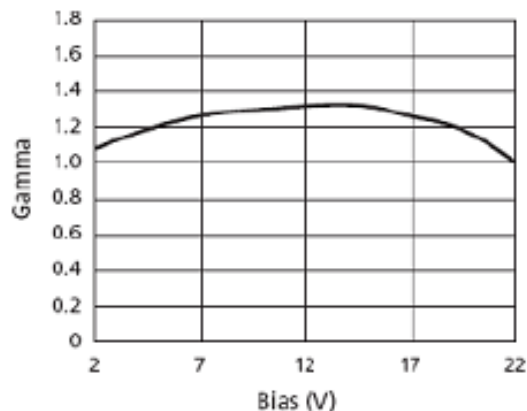


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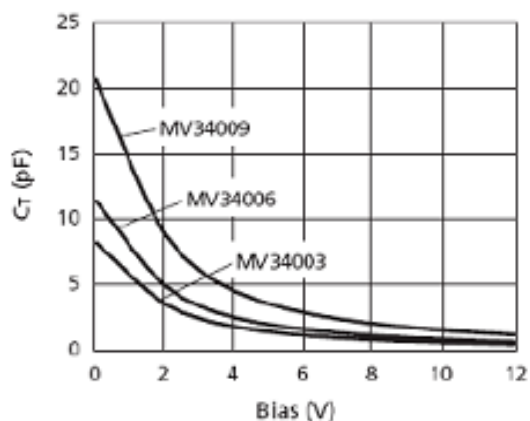
GaAs Hyperabrupt Varactor Diodes



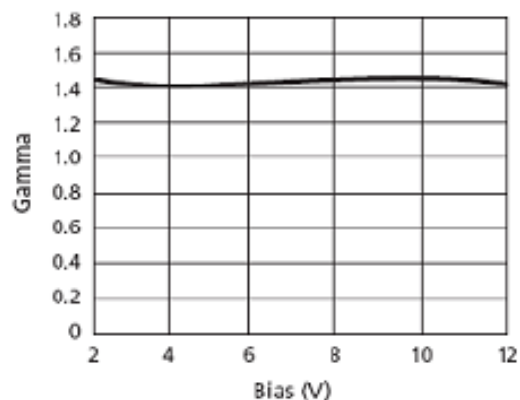
Typical Total Capacitance vs. Bias
Gamma = 1.25



Typical Gamma vs. Bias
Gamma = 1.25



Typical Total Capacitance vs. Bias
Gamma = 1.50

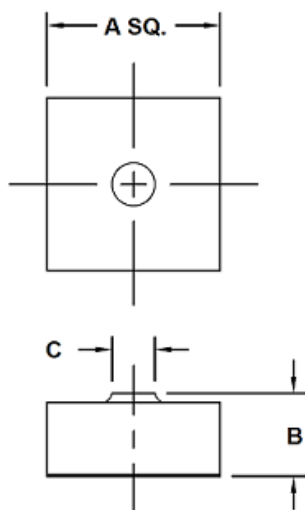
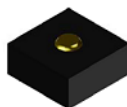


Typical Gamma vs. Bias
Gamma = 1.50

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PACKAGE STYLES

-P00 PACKAGE (CHIP FORM)



DIM	INCHES			MM		
	MIN	TYP	MAX	MIN	TYP	MAX
A	0.010		0.015	0.254		0.381
B	--	0.005	--	--	0.127	--
C	SEE NOTES			--		--

NOTES:

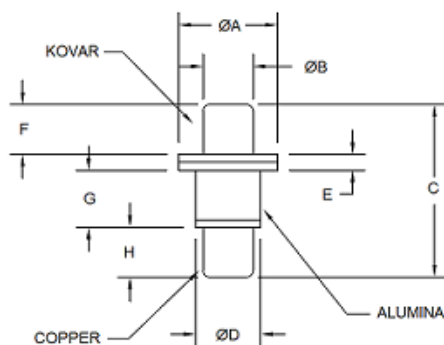
1. TOP CONTACT, CHIP SIZE AND CHIP THICKNESS DEPEND ON DIODE PARAMETERS. CONSULT FACTORY.
2. TOP AND BOTTOM CONTACTS ARE GOLD.

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MV30001 – MV34010 **GaAs Hyperabrupt Varactor Diodes**

-30 PACKAGE



DIM	INCHES		MM	
	MIN.	MAX.	MIN.	MAX.
A	0.119	0.127	3.02	3.23
B	0.060	0.064	1.52	1.63
C	0.205	0.225	5.21	5.72
D	0.079	0.083	2.01	2.11
E	0.016	0.024	0.41	0.61
F	0.060	0.064	1.52	1.63
G	0.069	0.073	1.75	1.85
H	0.060	0.064	1.52	1.63
Lp = 0.42 nH typ.			Cp = 0.18 pF typ.	

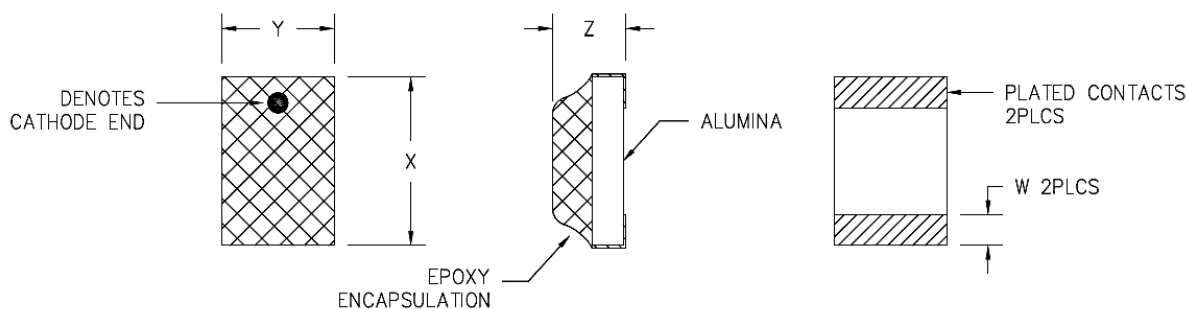
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GaAs Hyperabrupt Varactor Diodes

-150(X) PACKAGE



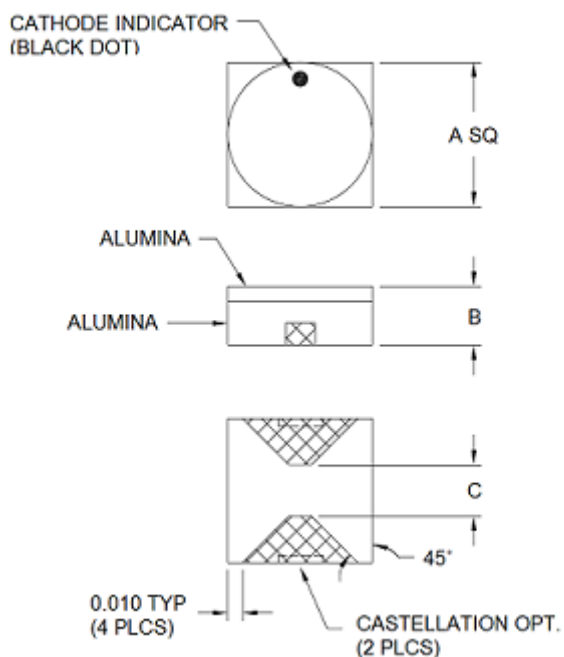
PKG STYLE	DIMENSIONS (MILS)					DIMENSIONS (MILLIMETERS)				
	W	X	Y	Z		W	X	Y	Z	
				MAX	NOM				MAX	NOM
150A	11±3	62±3	42±3	50	35	0.279±0.076	1.575±0.076	1.067±0.076	1.270	0.889
150B	15±3	75±3	50±3	50	35	0.381±0.076	1.575±0.076	1.270±0.076	1.270	0.889
150C	15±3	100±5	50±3	50	35	0.381±0.076	2.540±0.127	1.270±0.076	1.270	0.889
150D	20±3	120±5	60±3	50	35	0.508±0.076	3.048±0.127	1.524±0.076	1.270	0.889
150E	20±3	200±5	100±5	50	35	0.508±0.076	5.080±0.127	2.540±0.127	1.270	0.889
150F	18±3	50±3	50±3	60	45	0.457±0.076	1.575±0.076	1.270±0.076	1.524	1.143

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-183 PACKAGE



DIM	INCHES		MM	
	MIN	MAX	MIN	MAX
A	0.092	0.104	2.337	2.642
B	0.040	0.050	1.016	1.270
C	0.030	--	0.762	--
Cp = .08 TYP				

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