GaAs Hyperabrupt Junction Varactor Diodes

Alpha

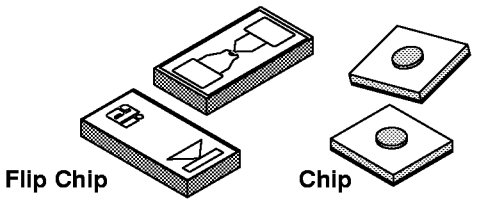
GMV7811–GMV7815, GMV7821–GMV7825
GMV9801–GMV9806, GMV9821–GMV9826

Features

- Constant Gamma of 1.0 and 1.25
- Highly Linear Frequency Tuning
- Constant Modulation Sensitivity
- Lower Series Resistance and Higher Q in Comparison to Equivalent Silicon Hyperabrupt Varactors
- Available in a Wide Range of Packages Including Surface Mountable Outlines, and in Die Form

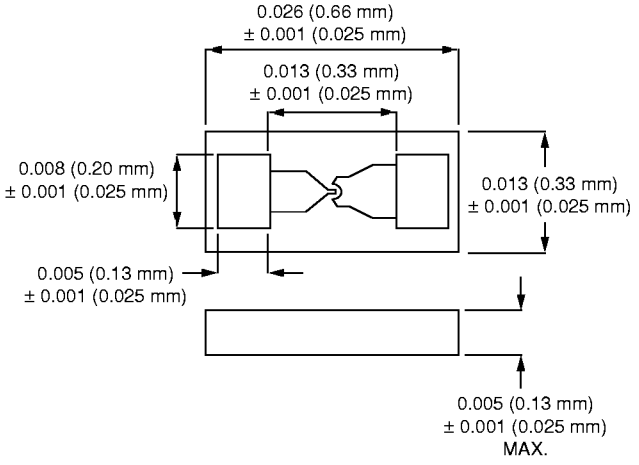
Description

This series of GaAs hyperabrupt varactor diodes features a constant gamma of 1.0 and 1.25, which allows for a relatively linear frequency tuning for VCOs, modulators and tunable filters. Varactors in this series are grown by MBE (Molecular Beam Epitaxy), which allows monolayer control of the doping profile. This translates to superb wafer-to-wafer uniformity. The series resistance is lower, and Q is higher when compared to an equivalent silicon hyperabrupt varactor. These diodes are suited for applications at X band frequencies and above, where wide change in frequency is desired. However, in certain applications the GaAs hyperabrupt varactor exhibits a higher surface noise in comparison to an equivalent silicon varactor.

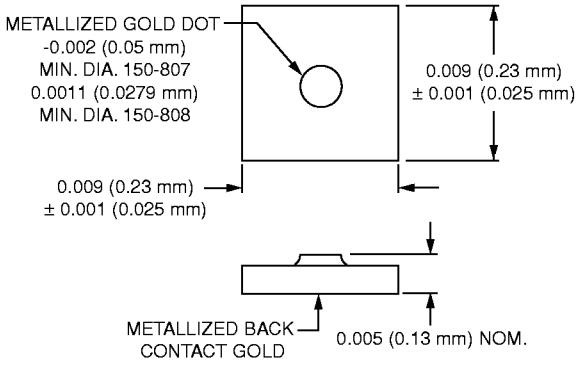


Outline Drawings

540-011



150-807, 150-808



Specifications subject to change without notice. 2/99A

Electrical Characteristics

GaAs Hyperabrupt Junction Varactor Chips
Gamma = 1.0 ±10%

Part Number	V_B @ 10 μA (V)	I_R @ 14.4 V (nA)	Typical Voltage Range of Gamma (V)	Junction Capacitance C_J @ 4 V (pF)		$\frac{C_J @ 2 V}{C_J @ 12 V}$ (Ratio)		Q @ 4 V 50 MHz	Outline Drawing Number
	Min.	Max.		Min.	Max.	Min.	Max.	Min.	
GMV7811-000	18	100	2–12	0.4	0.6	3.63	4.43	4000	150-808
GMV7812-000	18	100	2–12	0.6	0.8	3.63	4.43	3500	150-808
GMV7813-000	18	100	2–12	0.8	1.0	3.63	4.43	3200	150-807
GMV7814-000	18	100	2–12	1.0	1.5	3.63	4.43	3000	150-807
GMV7815-000	18	100	2–12	1.5	2.0	3.63	4.43	2500	150-807

Gamma = 1.25 ±10%

Part Number	V_B @ 10 μA (V)	I_R @ 14.4 V (nA)	Typical Voltage Range of Gamma (V)	Junction Capacitance (pF)		$\frac{C_J @ 2 V}{C_J @ 12 V}$ (Ratio)		Q @ 4 V 50 MHz	Outline Drawing Number
	Min.	Max.		Min.	Max.	Min.	Max.	Min.	
GMV9801-000	18	100	2–12	0.3	0.4	5.14	6.28	4000	150-808
GMV9802-000	18	100	2–12	0.4	0.6	5.14	6.28	3500	150-808
GMV9803-000	18	100	2–12	0.6	0.8	5.14	6.28	3500	150-808
GMV9804-000	18	100	2–12	0.8	1.0	5.14	6.28	3200	150-807
GMV9805-000	18	100	2–12	1.0	1.5	5.14	6.28	3000	150-807
GMV9806-000	18	100	2–12	1.5	2.0	5.14	6.28	2500	150-807

GaAs Hyperabrupt Junction Varactor Flip Chips
Gamma = 1.0 ±10%

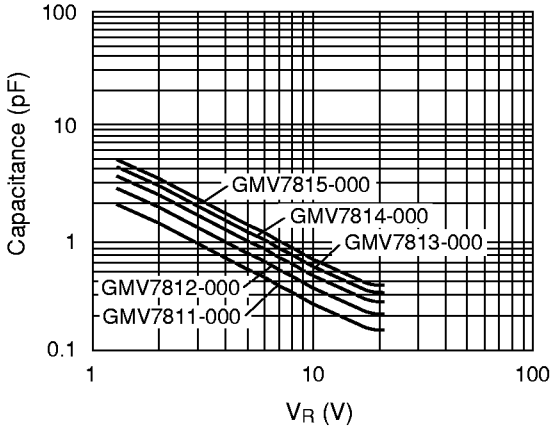
Part Number	V_B @ 10 μA (V)	I_R @ 14.4 V (nA)	Junction Capacitance C_J @ 4 V (pF)		$\frac{C_J @ 2 V}{C_J @ 12 V}$ (Ratio)		Q @ 4 V 50 MHz	Outline Drawing Number
	Min.	Max.	Min.	Max.	Min.	Max.	Min.	
GMV7821-000	18	100	0.4	0.6	3.30	4.10	4000	540-011
GMV7822-000	18	100	0.6	0.8	3.35	4.15	3500	540-011
GMV7823-000	18	100	0.8	1.0	3.30	4.10	3200	540-011
GMV7824-000	18	100	1.0	1.5	3.40	4.20	3000	540-011
GMV7825-000	18	100	1.5	2.0	3.45	4.25	2500	540-011

Gamma = 1.25 ±10%

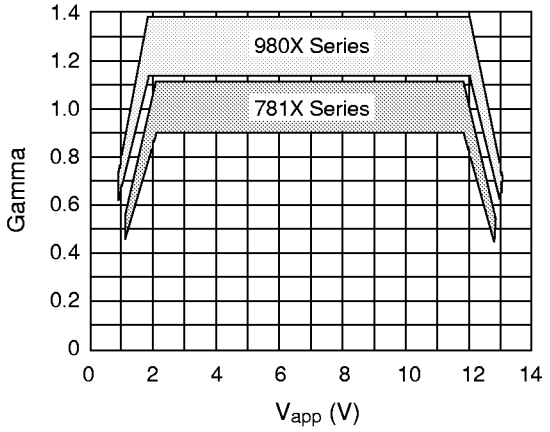
Part Number	V_B @ 10 μA (V)	I_R @ 14.4 V (nA)	Junction Capacitance C_J @ 4 V (pF)		$\frac{C_J @ 2 V}{C_J @ 12 V}$ (Ratio)		Q @ 4 V 50 MHz	Outline Drawing Number
	Min.	Max.	Min.	Max.	Min.	Max.	Min.	
GMV9821-000	18	100	0.3	0.4	4.30	5.27	4000	540-011
♦ GMV9822-000	18	100	0.4	0.6	4.53	5.55	3500	540-011
GMV9823-000	18	100	0.6	0.8	4.45	5.45	3500	540-011
GMV9824-000	18	100	0.8	1.0	4.59	5.62	3200	540-011
GMV9825-000	18	100	1.0	1.5	4.73	5.80	3000	540-011
GMV9826-000	18	100	1.5	2.0	4.84	5.93	2500	540-011

♦ Available through distribution.

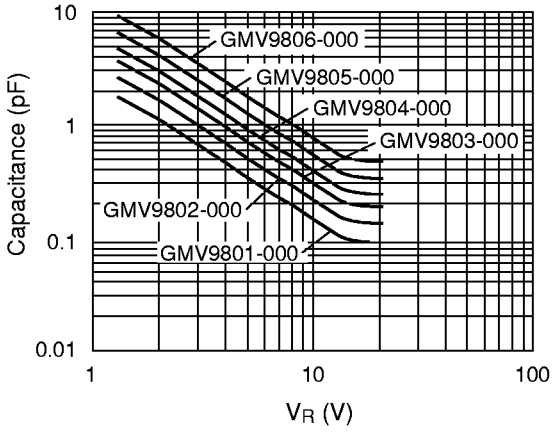
Typical Performance Data



781X Series Capacitance vs. Voltage



Sensitivity Factor (γ)



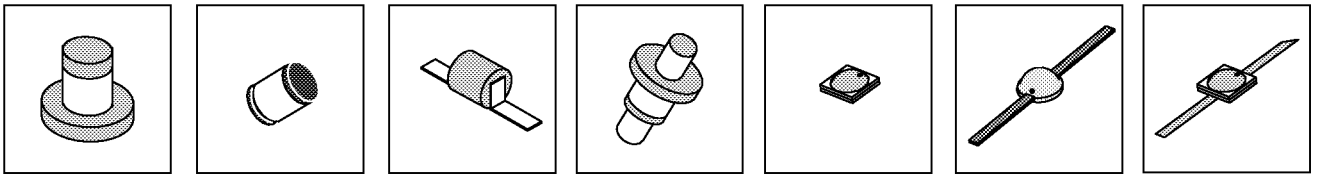
980X Series Capacitance vs. Voltage

Absolute Maximum Ratings

Characteristic	Value
Reverse Voltage (V_R)	18 V
Forward Current (I_F)	100 mA
Power Dissipation at 25°C	250 mW
Operating Temperature (T_{OP})	-55°C to +150°C
Storage Temperature (T_{ST})	-65°C to +200°C

Ordering Information

The following packages are also available. To order a part in a different package, just replace the dash number with a package style listed below. For example: GMV9801-000 becomes GMV9801-210.



202 **203** **204** **210** **219** **230** **240**

Refer to the Outline Drawings section in the "Discrete Semiconductors for RF/Microwave Applications" Catalogue for these package dimensions.