

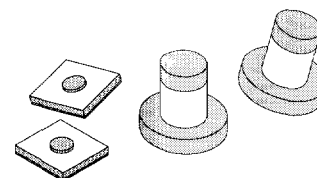
GaAs Abrupt Varactor Diodes



CVE7800 Series

Features

- Low Series Resistance – High Q
- Low Capacitance Values for Applications at Millimeter Wave Frequencies
- Available in Ceramic Packages with Low Parasitics and Also in Die Form



Description

Gallium arsenide abrupt junction varactor diodes changes capacitance as a function of applied reverse bias voltage, following the square root law ($\gamma \approx 0.5$). The high electron mobility of gallium arsenide translates into a very low series resistance and very high Q for the gallium arsenide varactor. For example, Q of a gallium arsenide abrupt junction varactor is two to three times higher than its silicon counterpart. However, in certain applications the gallium arsenide varactor exhibits a higher surface noise, in comparison to an equivalent silicon varactor.

Maximum Ratings

Reverse Voltage, V_R :	25V
Forward Current, I_F :	100 mA
Power Dissipation at 25°C:	250 mW
Operating Temperature:	-55 to 150°C
Storage Temperature:	-65 to 200°C

Electrical Specifications

Reverse Breakdown Voltage, V_{BR} (10 μ A): 25V Min

Reverse Leakage Current, I_R (20V):

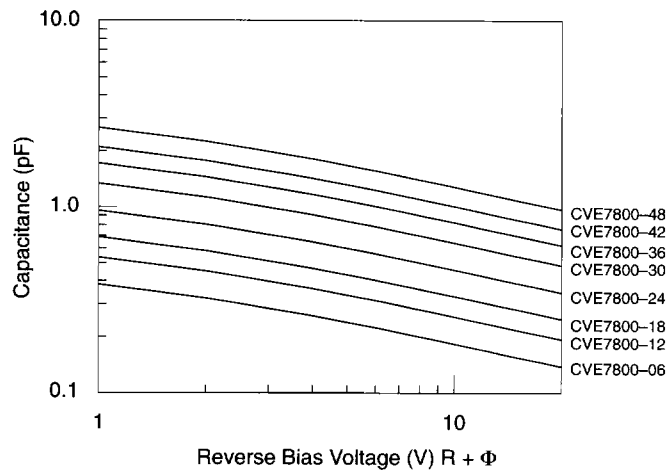
Junction Capacitance Ratio, $C_J(0)/C_J(25)$: 3.7 Min

Part Number	Junction Capacitance C_J @ 0V (pF)		Series Resistance ¹ R_S @ 4V, 50 MHz (Ω)	Q ¹ 4V, 50 MHz	Outline Chip Number	Available Package Outlines ²
	Min	Max	Max	Min		
CVE7800-06	0.4	0.6	1.1	15,000	150-808	023-011, 290-001
CVE7800-12	0.6	0.8	0.9	12,000	150-808	023-011, 290-001
CVE7800-18	0.8	1.0	0.8	10,000	150-807	023-011, 290-001
CVE7800-24	1.0	1.5	0.7	8,500	150-807	023-011, 290-001
CVE7800-30	1.5	2.0	0.6	7,000	150-807	023-011, 290-001
CVE7800-36	2.0	2.5	0.55	6,000	150-807	023-011, 290-001
CVE7800-42	2.5	3.0	0.5	5,000	150-807	023-011, 290-001
CVE7800-48	3.0	4.0	0.5	4,000	150-807	023-011, 290-001

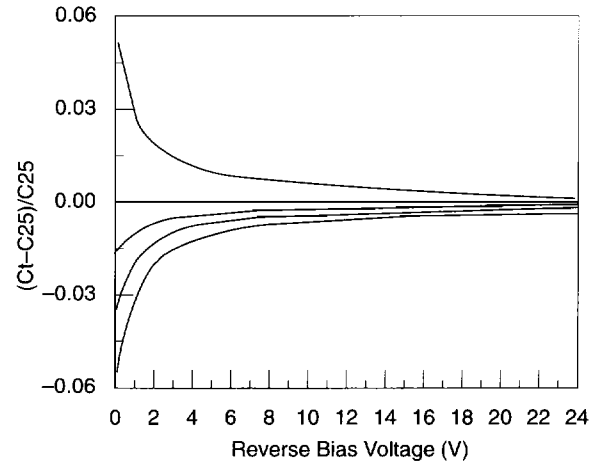
1. The measured values of figure of merit, Q, and series resistance, R_S , for a varactor diode are sensitive to the measurement method and set-up. The test set-up and test conditions used at Alpha are specified in the Application Notes section.

2. For availability and delivery on other package styles, please consult the factory.

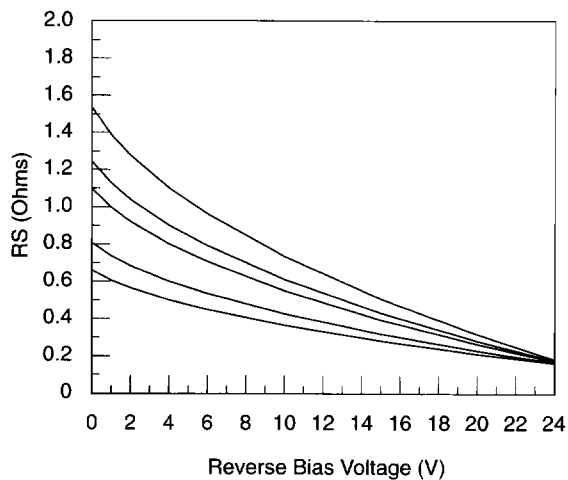
Performance Data



Capacitance vs. Voltage



Temperature Sensitivity of Capacitance



Series Resistance vs. Voltage

Package Outlines

GaAs diodes are available as dice and in a variety of package outlines. Consult the factory for availability. The packages are designed to facilitate the handling of devices and circuit placement. However, the package may influence the device's performance. Please refer to Outline Drawings section for catalog package outlines, their characteristics, and their effect on electrical parameters of the diode.

Ordering Information

To order an unpackaged die, simply identify the desired die by the part numbers as listed in the table of electrical specifications. To order a packaged diode, simply append the package part number to the die part number. For example, CVE7800-06-023-011 represents the varactor diode formed by assembling CVE7800-06 die in a 023-011 package outline.

Abrupt Varactor Diodes for High Reliability Applications

Please refer to Reliability section for recommended quality assurance and inspection sequences for varactor diodes. This section also covers package outlines available for high reliability applications and simplified ordering instructions.

Mathematical Model

Please refer to Application Notes section for a mathematical model for a varactor diode.