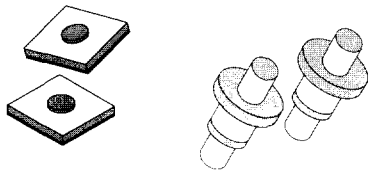
Multiplier Diodes

Alpha

CVB1015, CVB1030 and CVB1116 Series

Features

- Silicon Step Recovery Diodes for High Order–Narrow Band Multiplication
- Silicon A–Mode Multiplier Diodes for High Power–Low Order Multiplier
- Capability to Supply GaAs Varactor Multiplier Diodes for Low Order Multiplication Applications in the Millimeter Wave Spectrum
- Available in a Wide Range of Package Outlines with Different Power Dissipation Capabilities, as wells as in Die Form



Maximum Ratings

Reverse Voltage, V_R:	Same as Min. V_{BR}
Operating Temperature:	–55 to 150°C
Storage Temperature:	–65 to 200°C

Description

The three types of diodes used for frequency multiplication are (a) step recovery diodes; (b) A–mode diodes; and (c) varactor diodes. The guidelines for selection of the suitable diode type for a given application are shown in the Application Notes section. Also described are the mechanisms which give rise to harmonics generation in these diodes.

This section includes relatively low breakdown voltage (V_B or 45V and less) step recovery diodes and A–mode diodes. This selection is principally based on their relative popularity. Although the higher breakdown voltage SRDs, stacked multiplier diodes and gallium arsenide multiplier varactors are not included in this section, Alpha continues to manufacture these products in limited quantities. We encourage the reader to contact the factory to discuss requirements which are not listed in this section.

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Electrical Characteristics of the Junction Die (TA = 25°C)

Reverse Breakdown Voltage, V_{BR} (10 µA): 22V Minimum
Reverse Leakage Current, I_R (24V): 100 nA Maximum
Junction Capacitance Ratio, C_J (0)/C_J (25): 5.5 Minimum/7.0 Maximum

Step Recovery Diode Chips

Part Number	V_{BR} @ 10 µA (Volts)	C_J @ –6V (pF)		T[1] (ns)	T_t[1] (ps)	F_C @ –6V (GHz)	Typical Input Frequency (GHz)	Typical Output Frequency (GHz)	Outline Drawing Number	Package Availability[2]
		Min.	Max.	Min.	Max.	Min.				Ceramic
Step Recovery Diode Chips										
CVB1015–06	15	0.25	0.5	10	70	300	0.5 – 3.0	9.0 – 1.8	150–806	023–001/247–001
CVB1015–12	15	0.5	1.0	10	70	300	0.5 – 3.0	9.0 1.8	150–801	023–001/247–001
CVB1015–18	15	1.0	1.5	10	70	300	0.5 – 3.0	9.0 1.8	150–801	023–001/247–001
CVB1030–06	30	0.25	0.5	10	100	300	0.5 – 3.0	5.0 – 15.0	150–801	023–001/247–001
CVB1030–12	30	0.5	1.0	10	100	300	0.5 – 3.0	5.0 – 15.0	150–801	023–001/247–001
CVB1030–18	30	1.0	1.5	10	100	300	0.5 – 3.0	5.0 – 15.0	150–801	023–001/247–001
CVB1045–06	45	0.5	1.0	25	200	250	0.25 – 1.5	2.0 – 7.5	150–801	023–001/247–001
CVB1045–12	45	1.0	2.0	25	200	250	0.25 – 1.5	2.0 – 7.5	150–802	023–001/247–001
CVB1045–18	45	2.0	3.0	25	200	250	0.25 – 1.5	2.0 – 7.5	150–802	023–001/247–001
A–Mode Multiplier Diode Chips										
CVB1116–06	30	0.25	0.5	10	150	200	12 – 15	30	150–801	023–001/247–001
CVB1116–12	30	0.50	1.0	10	150	200	8 – 12	35	150–801	023–001/247–001
CVB1116–18	45	0.50	1.0	20	200	175	8 – 12	40	150–801	023–001/247–001
CVB1116–24	45	1.0	1.5	25	200	160	5 – 8	50	150–801	023–001/247–001

1. The test set–up and test conditions for Minority Carrier Lifetime (T) and Transition Time (T_T) are specified in the Application Notes section. Test conditions for Minority Carrier Lifetime are I_F = 10 mA and I_R = 6 mA. Test conditions for Transition Time are V_R = 10V and I_F = 10 mA.
2. For availability and delivery of other package styles please consult the factory.

Package Outlines

The multiplier diodes in this section are available as dice and in a variety of package outlines. Consult the factory for availability of packages not listed. 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, CVB1015–023–001 represents the varactor diode formed by assembling CVB1015 die in a 023–001 (ceramic) package outline.

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.