# HARMONIC GENERATOR VARACTORS

## DESCRIPTION

The GC3200 series of harmonic generator varactors uses a single epitaxial silicon die. Strict material and process controls result in high reproducibility. A unique silicon dioxide passivation process assures greater stability, reliability and low leakage currents at high temperatures.

This series of diodes is available in a wide selection of capacitance values, breakdown voltages, transition times and cutoff frequencies for optimum circuit design. These device have the best efficiencies and thermal dissipation available in single chip multiplier varactors.

## APPLICATIONS

The GC3200 series multiplier varactors can be used for all orders of multiplication from X2 through X20. They are used primarily in low harmonic order, high efficiency, high power applications. They are used in narrow and wide bandwidth frequency generator chains for all multiplication stages. Other applications include: voltage controlled oscillators, frequency synthesizers and up converters.

## ELECTRICAL SPECIFICATIONS: $T_A$ = 25°C

| MODEL NUMBER | TYP. OUTPUT FREQ. RANGE (GHz) | TYP. OUTPUT POWER | | JUNCTION CAPACITANCE[1] (AT-6V, 1 MHz) $C_j$ -6 (pF) | MINIMUM BREAKDOWN VOLTAGE (AT 10μA MAX) $V_b$ (V) | MINIMUM[2] CUTOFF FREQUENCY (AT -6V) $F_c$ -6 (GHz) | MINIMUM[3] CARRIER LIFETIME (Ir = 6mA, If = 10mA) $T_l$ (nS) | TYPICAL[4] TRANSITION TIME Tt (ps) | MAXIMUM[5] THERMAL RESISTANCE (°C/W) |
|---|---|---|---|---|---|---|---|---|---|
| | | W | MULT | | | | | | |
| GC3202 | 0.15 - 0.50 | 24.0 | X3 | 18 - 25 | 180 | 20 | 400 | 8000 | 5 |
| GC3203 | 0.5 - 1.2 | 20.0 | X3 | 8 - 12 | 80 | 60 | 200 | 1000 | 11 |
| GC3204 | 1.2 - 2.5 | 6.0 | X4 | 3 - 6 | 80 | 110 | 200 | 650 | 20 |
| GC3205 | 2.5 - 5.0 | 2.5 | X5 | 1.5 - 3.0 | 45 | 140 | 70 | 300 | 30 |
| GC3206 | 5.0 - 8.0 | 1.5 | X2 | 1 - 2 | 40 | 150 | 35 | 150 | 40 |
| GC3207 | 8.0 - 12.0 | 1.0 | X2 | 0.5 - 1.0 | 35 | 175 | 30 | 120 | 50 |
| GC3208 | 12.0 - 18.0 | 0.5 | X2 | 0.3 - .6 | 25 | 200 | 15 | 100 | 75 |

Notes:
1. Junction Capacitance is measured at 1 MHz.
2. Cutoff frequency is calculated from: $F_c\text{-}6 = \frac{159}{C_j\text{-}6\ R_s\text{-}6}$
3. Carrier Lifetime is measure using test circuit shown in figure 1.
4. Transition time (snap time) is measure using test circuit shown in figure 2.
5. Thermal resistance is measure using pulsed conditions while measuring forward voltage drop across the diode mounted in an infinite heat sink.

Unless otherwise specified, capacitance will be within the range shown for each type. A capacitance tolerance of ±10% is available at an additional charge. Diodes can be optimized for custom electrical or mechanical specifications. Custom parameters for capacitance, voltage, transition time, cutoff frequency, etc. are available upon request.

All specifications shown above are based on the style 30 package, except for GC3202 and GC3203, which are based on the style 20 package. These latter two devices are available only in case styles 20, 25, or 55 due to die size. Consult factory for availability.

A complete list of case styles available along with dimensions and package parasitics are shown at the rear of this catalog. The cathode is the heat sink end of each package.

Diode chips, alone or mounted on carriers with gold wire/ribbon leads are also available.

## RATINGS

Operating Temperature: -55°C to +150°C

Storage Temperature: -65°C to +200°C

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