

X3 Frequency Multiplier

50Ω Output 6000 to 8100 MHz

ZX90-3-812+



Generic photo used for illustration purposes only

CASE STYLE: JA1242

| Connectors | Model |
|------------|---------------|
| SMA | ZX90-3-812-S+ |

+RoHS Compliant

The +Suffix identifies RoHS Compliance. See our web site for RoHS Compliance methodologies and qualifications

Maximum Ratings

| | |
|-----------------------|----------------|
| Operating Temperature | -40°C to 85°C |
| Storage Temperature | -55°C to 100°C |
| RF Input Power | 17 dBm |

Permanent damage may occur if any of these limits are exceeded.

Coaxial Connections

| | |
|--------|---|
| INPUT | 1 |
| OUTPUT | 2 |

Features

- broadband
- high rejection F1, 30 dBc typ.; F2, 48 dBc typ., F4, 55 dBc typ.
- rugged construction
- protected by US Patent 6,790,049

Applications

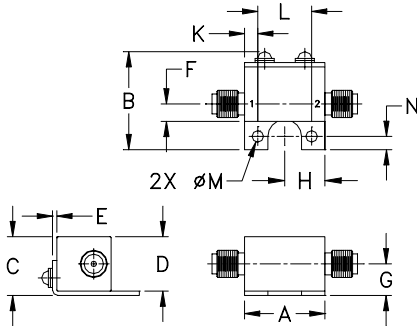
- synthesizers
- local oscillators
- satellite up and down converters

Electrical Specifications

| MULTIPLICATION FACTOR | FREQUENCY (MHz) | | INPUT POWER (dBm) | | CONVERSION LOSS (dB) | | *HARMONIC OUTPUT (dBc) | | | | | | |
|-----------------------|-----------------|-----------|-------------------|------|----------------------|------|------------------------|------|------|------|------|------|------|
| | F1 Input | F3 Output | Min. | Max. | Typ. | Max. | F1 | | F2 | | F4 | | |
| | | | | | | | | Typ. | Min. | Typ. | Min. | Typ. | Min. |
| 3 | 2000-2700 | 6000-8100 | 0 | 5 | 15 | 22 | 30 | 21 | 48 | 30 | 48 | 27 | |

* Harmonics of input frequency below the power level of F3

Outline Drawing



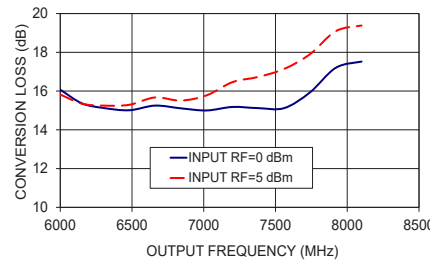
Outline Dimensions (inch/mm)

| A | B | C | D | E | F | G |
|-------|-------|-------|-------|------|------|-------|
| .74 | .90 | .54 | .50 | .04 | .16 | .29 |
| 18.80 | 22.86 | 13.72 | 12.70 | 1.02 | 4.06 | 7.37 |
| H | J | K | L | M | N | wt |
| .37 | -- | .122 | .496 | .106 | .122 | grams |
| 9.40 | -- | 3.10 | 12.60 | 2.69 | 3.10 | 19.0 |

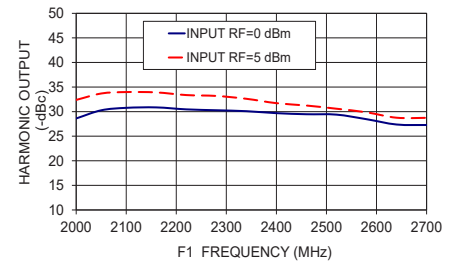
Typical Performance Data

| Input Frequency (MHz) | INPUT RF= 0 dBm | | | | INPUT RF= 5 dBm | | | |
|-----------------------|----------------------|---------------------------------|-------|-------|----------------------|---------------------------------|-------|-------|
| | Conversion Loss (dB) | Harmonic Output Below F3 (-dBc) | | | Conversion Loss (dB) | Harmonic Output Below F3 (-dBc) | | |
| | | F3 | F1 | F2 | | F4 | F3 | F1 |
| 2000.00 | 16.07 | 28.61 | 39.71 | 32.76 | 15.82 | 32.38 | 40.92 | 47.75 |
| 2050.00 | 15.37 | 30.27 | 43.04 | 36.29 | 15.35 | 33.69 | 42.23 | 44.35 |
| 2100.00 | 15.13 | 30.77 | 52.29 | 38.99 | 15.25 | 33.98 | 55.15 | 40.09 |
| 2160.00 | 15.01 | 30.86 | 54.04 | 44.45 | 15.29 | 33.91 | 64.18 | 43.05 |
| 2220.00 | 15.25 | 30.46 | 54.81 | 46.76 | 15.67 | 33.37 | 58.33 | 47.65 |
| 2280.00 | 15.11 | 30.28 | 57.32 | 48.63 | 15.51 | 33.19 | 53.77 | 53.41 |
| 2340.00 | 15.00 | 30.09 | 55.94 | 49.94 | 15.78 | 32.61 | 49.10 | 55.01 |
| 2400.00 | 15.18 | 29.69 | 50.59 | 52.35 | 16.46 | 31.72 | 45.50 | 55.73 |
| 2460.00 | 15.12 | 29.47 | 46.97 | 51.62 | 16.73 | 31.24 | 43.44 | 51.87 |
| 2520.00 | 15.12 | 29.39 | 44.21 | 49.41 | 17.14 | 30.59 | 41.38 | 47.42 |
| 2580.00 | 15.93 | 28.46 | 43.39 | 47.25 | 17.90 | 29.86 | 39.40 | 44.54 |
| 2640.00 | 17.20 | 27.38 | 42.79 | 44.54 | 19.09 | 28.76 | 37.26 | 41.18 |
| 2700.00 | 17.52 | 27.28 | 42.93 | 43.92 | 19.38 | 28.74 | 36.75 | 39.96 |

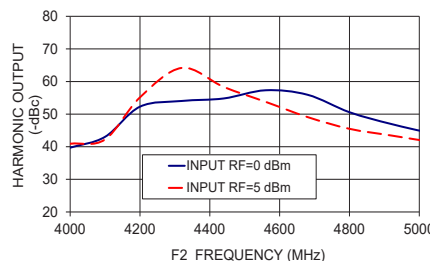
ZX90-3-812-S+
CONVERSION LOSS



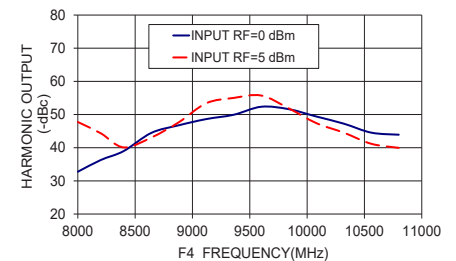
ZX90-3-812-S+
HARMONIC OUTPUT F1



ZX90-3-812-S+
HARMONIC OUTPUT F2



ZX90-3-812-S+
HARMONIC OUTPUT F4



Notes

- Performance and quality attributes and conditions not expressly stated in this specification document are intended to be excluded and do not form a part of this specification document.
- Electrical specifications and performance data contained in this specification document are based on Mini-Circuit's applicable established test performance criteria and measurement instructions.
- The parts covered by this specification document are subject to Mini-Circuits standard limited warranty and terms and conditions (collectively, "Standard Terms"); Purchasers of this part are entitled to the rights and benefits contained therein. For a full statement of the Standard Terms and the exclusive rights and remedies thereunder, please visit Mini-Circuits' website at www.minicircuits.com/MCLStore/terms.jsp



Frequency Multiplier (Tripler)

ZX90-3-812+

Typical Performance Data

| FREQUENCY (MHz) | | | | RF IN=0 dBm | | | |
|--------------------|------------|------------|------------|----------------------------|------------------|------------|------------|
| | | | | CONVERSION LOSS (dB) | HARMONIC OUTPUT* | | |
| | | | | | X 3 OUTPUT | X 1 OUTPUT | X 2 OUTPUT |
| X 1 OUTPUT | X 2 OUTPUT | X 3 OUTPUT | X 4 OUTPUT | | | | |
| 1700 | 3400 | 5100 | 6800 | 19.29 | 36.60 | 53.52 | 38.60 |
| 1750 | 3500 | 5250 | 7000 | 19.09 | 37.05 | 49.33 | 39.47 |
| 1800 | 3600 | 5400 | 7200 | 18.66 | 38.55 | 46.43 | 37.94 |
| 1840 | 3680 | 5520 | 7360 | 18.56 | 41.97 | 43.47 | 36.31 |
| 1880 | 3760 | 5640 | 7520 | 18.06 | 47.02 | 41.86 | 31.32 |
| 1920 | 3840 | 5760 | 7680 | 19.33 | 25.14 | 39.70 | 26.36 |
| 1960 | 3920 | 5880 | 7840 | 16.86 | 25.52 | 48.03 | 30.69 |
| 2000 | 4000 | 6000 | 8000 | 16.07 | 28.61 | 39.71 | 32.76 |
| 2050 | 4100 | 6150 | 8200 | 15.37 | 30.27 | 43.04 | 36.29 |
| 2100 | 4200 | 6300 | 8400 | 15.13 | 30.77 | 52.29 | 38.99 |
| 2160 | 4320 | 6480 | 8640 | 15.01 | 30.86 | 54.04 | 44.45 |
| 2220 | 4440 | 6660 | 8880 | 15.25 | 30.46 | 54.81 | 46.76 |
| 2280 | 4560 | 6840 | 9120 | 15.11 | 30.28 | 57.32 | 48.63 |
| 2340 | 4680 | 7020 | 9360 | 15.00 | 30.09 | 55.94 | 49.94 |
| 2400 | 4800 | 7200 | 9600 | 15.18 | 29.69 | 50.59 | 52.35 |
| 2460 | 4920 | 7380 | 9840 | 15.12 | 29.47 | 46.97 | 51.62 |
| 2520 | 5040 | 7560 | 10080 | 15.12 | 29.39 | 44.21 | 49.41 |
| 2580 | 5160 | 7740 | 10320 | 15.93 | 28.46 | 43.39 | 47.25 |
| 2640 | 5280 | 7920 | 10560 | 17.20 | 27.38 | 42.79 | 44.54 |
| 2700 | 5400 | 8100 | 10800 | 17.52 | 27.28 | 42.93 | 43.92 |
| 2750 | 5500 | 8250 | 11000 | 18.52 | 26.71 | 41.28 | 42.69 |
| 2800 | 5600 | 8400 | 11200 | 19.64 | 26.14 | 39.04 | 41.57 |
| 2840 | 5680 | 8520 | 11360 | 20.07 | 26.47 | 36.83 | 41.17 |
| 2886 | 5772 | 8658 | 11544 | 20.37 | 27.41 | 35.32 | 41.56 |
| 2932 | 5864 | 8796 | 11728 | 20.64 | 29.07 | 34.47 | 40.56 |
| 2978 | 5956 | 8934 | 11912 | 21.55 | 31.52 | 32.68 | 39.17 |
| 3024 | 6048 | 9072 | 12096 | 22.22 | 36.43 | 30.83 | 38.12 |
| 3070 | 6140 | 9210 | 12280 | 22.11 | 33.80 | 29.85 | 36.95 |
| 3116 | 6232 | 9348 | 12464 | 22.04 | 26.50 | 28.99 | 35.71 |
| 3162 | 6324 | 9486 | 12648 | 22.75 | 20.99 | 27.53 | 33.83 |
| 3208 | 6416 | 9624 | 12832 | 23.73 | 16.08 | 25.70 | 32.78 |
| 3254 | 6508 | 9762 | 13016 | 23.33 | 13.17 | 25.06 | 33.39 |
| 3300 | 6600 | 9900 | 13200 | 22.74 | 10.92 | 25.13 | 35.32 |

*Harmonic Output below power level of X 3 Output .



Frequency Multiplier (Tripler)

ZX90-3-812+

Typical Performance Data

| FREQUENCY (MHz) | | | | RF IN=+5 dBm | | | |
|--------------------|------------|------------|------------|----------------------------|------------------|------------|------------|
| | | | | CONVERSION LOSS (dB) | HARMONIC OUTPUT* | | |
| | | | | | X 3 OUTPUT | X 1 OUTPUT | X 2 OUTPUT |
| X 1 OUTPUT | X 2 OUTPUT | X 3 OUTPUT | X 4 OUTPUT | | | | |
| 1700 | 3400 | 5100 | 6800 | 19.04 | 36.96 | 62.95 | 30.39 |
| 1750 | 3500 | 5250 | 7000 | 18.49 | 37.72 | 57.42 | 32.68 |
| 1800 | 3600 | 5400 | 7200 | 17.83 | 38.97 | 52.47 | 33.65 |
| 1840 | 3680 | 5520 | 7360 | 17.54 | 41.69 | 46.94 | 35.25 |
| 1880 | 3760 | 5640 | 7520 | 16.92 | 56.69 | 46.51 | 34.82 |
| 1920 | 3840 | 5760 | 7680 | 17.06 | 31.56 | 47.98 | 34.76 |
| 1960 | 3920 | 5880 | 7840 | 16.31 | 29.83 | 55.19 | 36.24 |
| 2000 | 4000 | 6000 | 8000 | 15.82 | 32.38 | 40.92 | 47.75 |
| 2050 | 4100 | 6150 | 8200 | 15.35 | 33.69 | 42.23 | 44.35 |
| 2100 | 4200 | 6300 | 8400 | 15.25 | 33.98 | 55.15 | 40.09 |
| 2160 | 4320 | 6480 | 8640 | 15.29 | 33.91 | 64.18 | 43.05 |
| 2220 | 4440 | 6660 | 8880 | 15.67 | 33.37 | 58.33 | 47.65 |
| 2280 | 4560 | 6840 | 9120 | 15.51 | 33.19 | 53.77 | 53.41 |
| 2340 | 4680 | 7020 | 9360 | 15.78 | 32.61 | 49.10 | 55.01 |
| 2400 | 4800 | 7200 | 9600 | 16.46 | 31.72 | 45.50 | 55.73 |
| 2460 | 4920 | 7380 | 9840 | 16.73 | 31.24 | 43.44 | 51.87 |
| 2520 | 5040 | 7560 | 10080 | 17.14 | 30.59 | 41.38 | 47.42 |
| 2580 | 5160 | 7740 | 10320 | 17.90 | 29.86 | 39.40 | 44.54 |
| 2640 | 5280 | 7920 | 10560 | 19.09 | 28.76 | 37.26 | 41.18 |
| 2700 | 5400 | 8100 | 10800 | 19.38 | 28.74 | 36.75 | 39.96 |
| 2750 | 5500 | 8250 | 11000 | 20.20 | 28.34 | 35.67 | 38.65 |
| 2800 | 5600 | 8400 | 11200 | 21.09 | 28.03 | 34.44 | 37.17 |
| 2840 | 5680 | 8520 | 11360 | 21.39 | 28.62 | 33.41 | 36.95 |
| 2886 | 5772 | 8658 | 11544 | 21.33 | 30.06 | 32.56 | 37.24 |
| 2932 | 5864 | 8796 | 11728 | 21.29 | 32.16 | 31.75 | 36.63 |
| 2978 | 5956 | 8934 | 11912 | 21.86 | 35.55 | 30.53 | 35.74 |
| 3024 | 6048 | 9072 | 12096 | 22.44 | 44.64 | 29.33 | 35.29 |
| 3070 | 6140 | 9210 | 12280 | 22.14 | 38.06 | 28.98 | 34.47 |
| 3116 | 6232 | 9348 | 12464 | 21.92 | 29.73 | 29.27 | 33.64 |
| 3162 | 6324 | 9486 | 12648 | 22.56 | 24.25 | 28.73 | 32.46 |
| 3208 | 6416 | 9624 | 12832 | 23.25 | 19.59 | 28.47 | 32.21 |
| 3254 | 6508 | 9762 | 13016 | 22.60 | 16.97 | 28.93 | 33.46 |
| 3300 | 6600 | 9900 | 13200 | 21.75 | 14.90 | 29.34 | 35.89 |

*Harmonic Output below power level of X 3 Output .

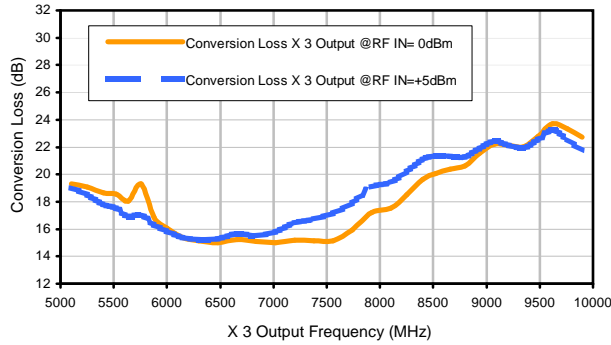


Frequency Multiplier (Tripler)

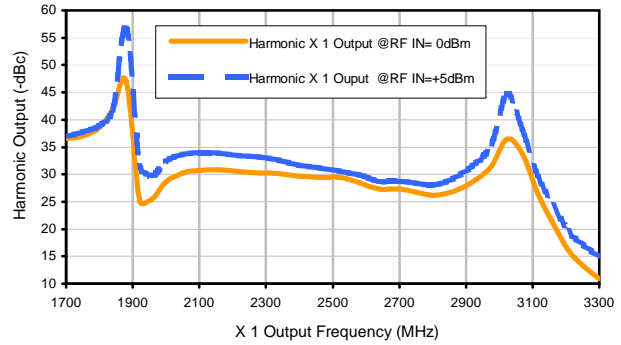
ZX90-3-812+

Typical Performance Curves

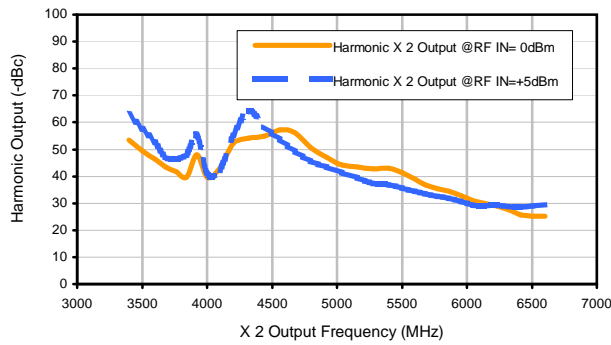
Conversion Loss X 3 Output



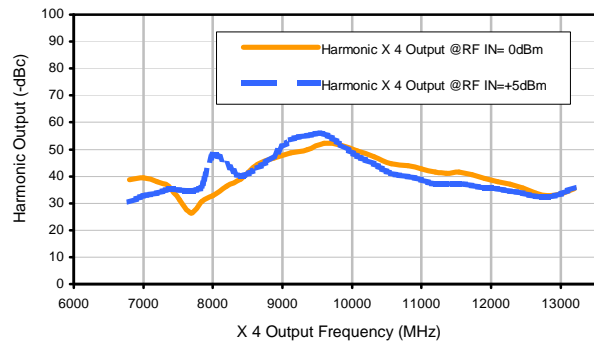
Harmonic X 1 Output



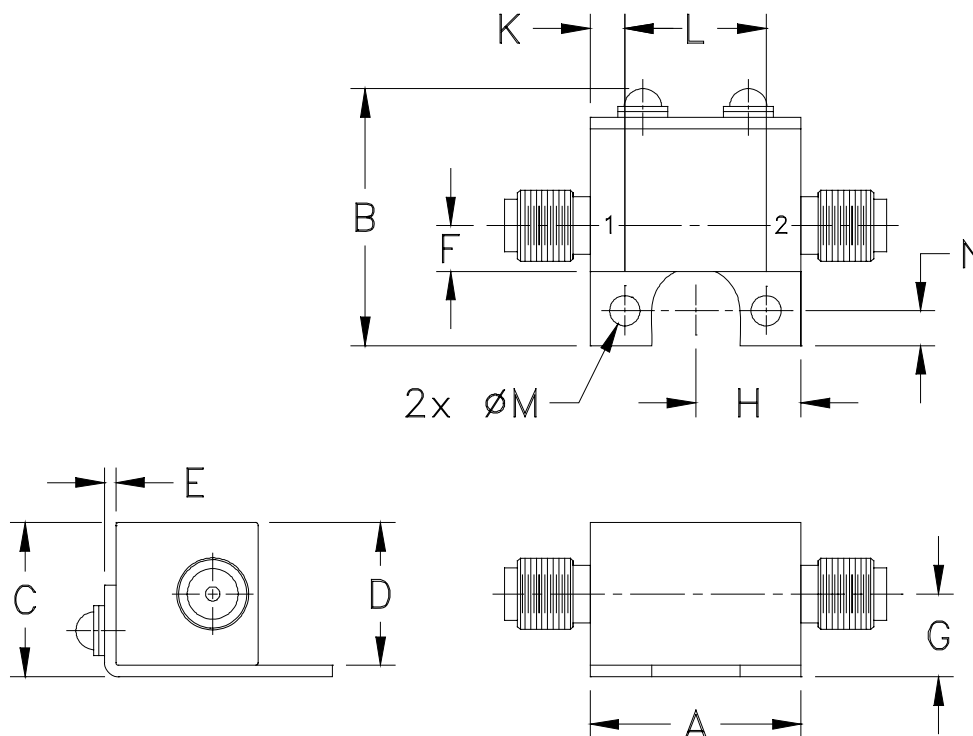
Harmonic X 2 Output



Harmonic X 4 Output



Outline Dimensions



| CASE #. | A | B | C | D | E | F | G | H | J | K | L | M | N | WT, GRAM |
|---------|----------------|----------------|----------------|----------------|---------------|---------------|---------------|---------------|--------|----------------|-----------------|----------------|----------------|-------------|
| JA1242 | .74 (18.80) | .90 (22.86) | .54 (13.72) | .50 (12.70) | .04 (1.02) | .16 (4.06) | .29 (7.37) | .37 (9.40) | - - | .122 (3.10) | .496 (12.60) | .106 (2.69) | .122 (3.10) | 19.0 |

Dimensions are in inches (mm). Tolerances: 2Pl. $\pm .03$; 3Pl. $\pm .015$.
Tolerance on hole size and interaxes dimensions to be $\pm .005$.

Notes:

1. Case material: Brass.
2. Case finish: Nickel plate.

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| Specification | Test/Inspection Condition | Reference/Spec |
|----------------------------|--|--------------------------------------|
| Operating Temperature | -40° to 85°C | Individual Model Data Sheet |
| Storage Temperature | -55° to 100° C Ambient Environment | Individual Model Data Sheet |
| Barometric Pressure | 100,000 Feet | MIL-STD-202, Method 105, Condition D |
| Humidity | 90% RH, 65°C Units may require bake-out after humidity to restore full performance. | MIL-STD-202, Method 103 |
| Thermal Shock | -65° to 125°C, 5 cycles | MIL-STD-202, Method 107, Condition B |
| Vibration (High Frequency) | 20g peak, 10-2000 Hz, 12 times in each of three perpendicular directions (total 36) | MIL-STD-202, Method 204, Condition D |
| Mechanical Shock | 100g, 6ms sawtooth, 3 shocks each direction 3 axes (total 18) | MIL-STD-202, Method 213, Condition I |