

# X3 Frequency Multiplier

50Ω Output 900 to 1200 MHz

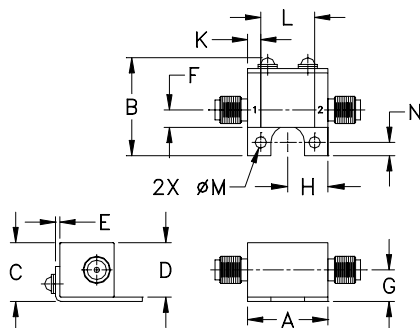
## Maximum Ratings

|                                                                 |                |
|-----------------------------------------------------------------|----------------|
| 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 |

## 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  |

## Features

- broadband
- low conversion loss, 16 dB typ.
- high rejection F2, and F4, 60 dBc typ.
- rugged construction
- protected by US Patent 6,790,049

## Applications

- synthesizers
- local oscillators
- satellite up and down converters

## Electrical Specifications

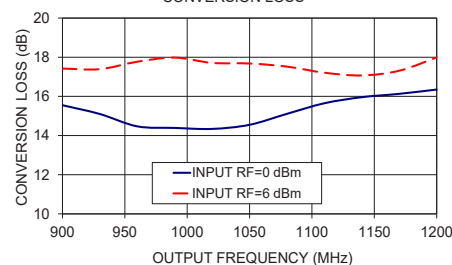
| MULTIPLICATION<br>FACTOR | FREQUENCY<br>(MHz) |          | INPUT<br>POWER<br>(dBm) | CONVERSION<br>LOSS<br>(dB) | *HARMONIC OUTPUT<br>(dBc) |      |      |      |      |      |    |    |
|--------------------------|--------------------|----------|-------------------------|----------------------------|---------------------------|------|------|------|------|------|----|----|
|                          | F1                 | F3       |                         |                            | F1                        |      | F2   |      | F4   |      |    |    |
|                          | Input              | Output   | Min.                    | Max.                       | Typ.                      | Max. | Typ. | Min. | Typ. | Min. |    |    |
| 3                        | 300-400            | 900-1200 | 0                       | 6                          | 16                        | 20   | 48   | 30   | 60   | 40   | 70 | 40 |

\* Harmonics of input frequency below the power level of F3

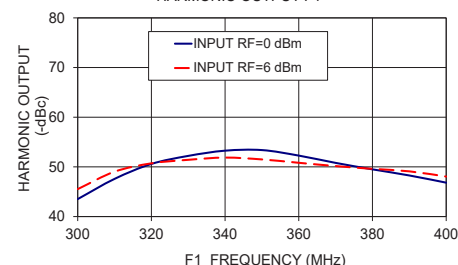
## Typical Performance Data

| Input Frequency (MHz) | INPUT RF= 0 dBm      |                                 |       |        | INPUT RF= 6 dBm      |                                 |       |        |
|-----------------------|----------------------|---------------------------------|-------|--------|----------------------|---------------------------------|-------|--------|
|                       | Conversion Loss (dB) | Harmonic Output Below F3 (-dBc) |       |        | Conversion Loss (dB) | Harmonic Output Below F3 (-dBc) |       |        |
|                       | F3                   | F1                              | F2    | F4     | F3                   | F1                              | F2    | F4     |
| 300.00                | 15.55                | 43.51                           | 79.89 | 80.52  | 17.42                | 45.52                           | 81.95 | 72.85  |
| 310.00                | 15.10                | 47.58                           | 75.44 | 79.10  | 17.39                | 49.03                           | 77.10 | 71.02  |
| 320.00                | 14.47                | 50.59                           | 70.39 | 74.60  | 17.77                | 50.71                           | 71.34 | 71.10  |
| 330.00                | 14.39                | 52.21                           | 65.30 | 73.18  | 17.98                | 51.42                           | 65.77 | 72.36  |
| 340.00                | 14.34                | 53.26                           | 64.86 | 75.14  | 17.71                | 51.87                           | 66.11 | 74.56  |
| 350.00                | 14.55                | 53.38                           | 66.15 | 78.09  | 17.68                | 51.50                           | 68.14 | 75.95  |
| 360.00                | 15.11                | 52.27                           | 66.02 | 84.26  | 17.52                | 50.82                           | 68.51 | 82.88  |
| 370.00                | 15.65                | 50.80                           | 64.82 | 95.71  | 17.21                | 50.16                           | 67.63 | 92.89  |
| 380.00                | 15.96                | 49.50                           | 64.04 | 101.73 | 17.07                | 49.60                           | 66.84 | 102.37 |
| 390.00                | 16.13                | 48.27                           | 63.93 | 100.52 | 17.31                | 49.10                           | 66.70 | 101.15 |
| 400.00                | 16.35                | 46.82                           | 64.25 | 100.80 | 17.99                | 48.05                           | 67.56 | 96.71  |

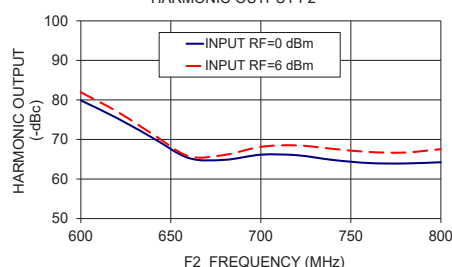
ZX90-3-122-S+  
CONVERSION LOSS



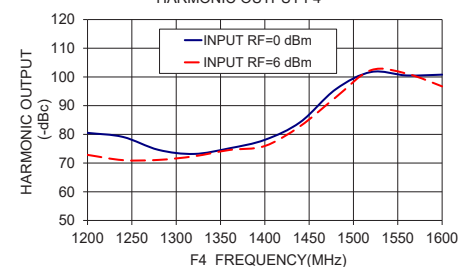
ZX90-3-122-S+  
HARMONIC OUTPUT F1



ZX90-3-122-S+  
HARMONIC OUTPUT F2



ZX90-3-122-S+  
HARMONIC OUTPUT F4



## Notes

A. 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.  
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ZX90-3-122-S+



Generic photo used for illustration purposes only

CASE STYLE: JA1242

| Connectors | Model         |
|------------|---------------|
| SMA        | ZX90-3-122-S+ |

+RoHS Compliant

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

REV. B  
M171494  
ZX90-3-122-S+  
ED-13273/1  
AD/CP  
200811

# Frequency Multiplier (Tripler)

**ZX90-3-122-S+**

## Typical Performance Data

| FREQUENCY<br>(MHz) |           |           |           | RF IN=+0dBm                |                            |           |           |
|--------------------|-----------|-----------|-----------|----------------------------|----------------------------|-----------|-----------|
|                    |           |           |           | CONVERSION<br>LOSS<br>(dB) | HARMONIC OUTPUT*<br>(-dBc) |           |           |
|                    |           |           |           | X3 OUTPUT                  | X1 OUTPUT                  | X2 OUTPUT | X4 OUTPUT |
| X1 OUTPUT          | X2 OUTPUT | X3 OUTPUT | X4 OUTPUT | X3 OUTPUT                  | X1 OUTPUT                  | X2 OUTPUT | X4 OUTPUT |
| 300                | 600       | 900       | 1200      | 15.55                      | 43.51                      | 79.89     | 80.52     |
| 310                | 620       | 930       | 1240      | 15.10                      | 47.58                      | 75.44     | 79.10     |
| 320                | 640       | 960       | 1280      | 14.47                      | 50.59                      | 70.39     | 74.60     |
| 330                | 660       | 990       | 1320      | 14.39                      | 52.21                      | 65.30     | 73.18     |
| 340                | 680       | 1020      | 1360      | 14.34                      | 53.26                      | 64.86     | 75.14     |
| 350                | 700       | 1050      | 1400      | 14.55                      | 53.38                      | 66.15     | 78.09     |
| 360                | 720       | 1080      | 1440      | 15.11                      | 52.27                      | 66.02     | 84.26     |
| 370                | 740       | 1110      | 1480      | 15.65                      | 50.80                      | 64.82     | 95.71     |
| 380                | 760       | 1140      | 1520      | 15.96                      | 49.50                      | 64.04     | 101.73    |
| 390                | 780       | 1170      | 1560      | 16.13                      | 48.27                      | 63.93     | 100.52    |
| 400                | 800       | 1200      | 1600      | 16.35                      | 46.82                      | 64.25     | 100.80    |

\* Harmonic Output below power level of X3 Output.

| FREQUENCY<br>(MHz) |           |           |           | RF IN=+6dBm                |                            |           |           |
|--------------------|-----------|-----------|-----------|----------------------------|----------------------------|-----------|-----------|
|                    |           |           |           | CONVERSION<br>LOSS<br>(dB) | HARMONIC OUTPUT*<br>(-dBc) |           |           |
|                    |           |           |           | X3 OUTPUT                  | X1 OUTPUT                  | X2 OUTPUT | X4 OUTPUT |
| X1 OUTPUT          | X2 OUTPUT | X3 OUTPUT | X4 OUTPUT | X3 OUTPUT                  | X1 OUTPUT                  | X2 OUTPUT | X4 OUTPUT |
| 300                | 600       | 900       | 1200      | 17.42                      | 45.52                      | 81.95     | 72.85     |
| 310                | 620       | 930       | 1240      | 17.39                      | 49.03                      | 77.10     | 71.02     |
| 320                | 640       | 960       | 1280      | 17.77                      | 50.71                      | 71.34     | 71.10     |
| 330                | 660       | 990       | 1320      | 17.98                      | 51.42                      | 65.77     | 72.36     |
| 340                | 680       | 1020      | 1360      | 17.71                      | 51.87                      | 66.11     | 74.56     |
| 350                | 700       | 1050      | 1400      | 17.68                      | 51.50                      | 68.14     | 75.95     |
| 360                | 720       | 1080      | 1440      | 17.52                      | 50.82                      | 68.51     | 82.88     |
| 370                | 740       | 1110      | 1480      | 17.21                      | 50.16                      | 67.63     | 92.89     |
| 380                | 760       | 1140      | 1520      | 17.07                      | 49.60                      | 66.84     | 102.37    |
| 390                | 780       | 1170      | 1560      | 17.31                      | 49.10                      | 66.70     | 101.15    |
| 400                | 800       | 1200      | 1600      | 17.99                      | 48.05                      | 67.56     | 96.71     |

\* Harmonic Output below power level of X3 Output.



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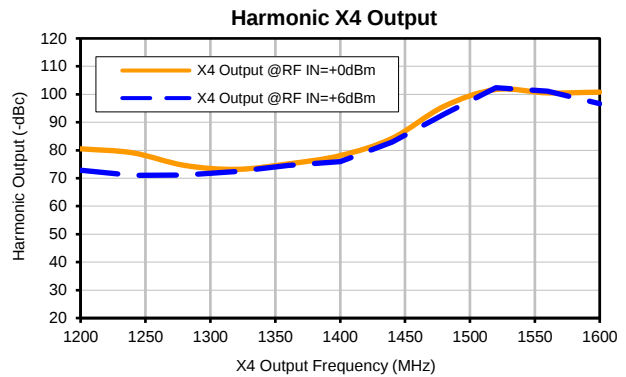
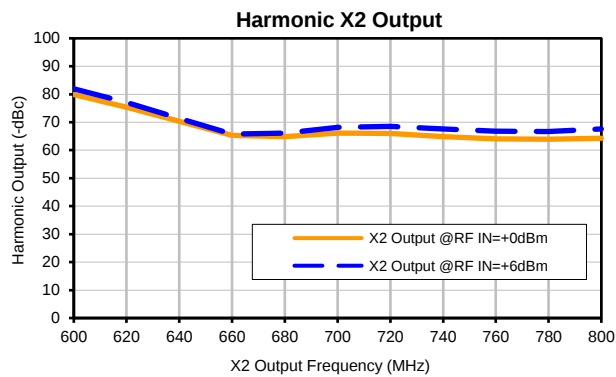
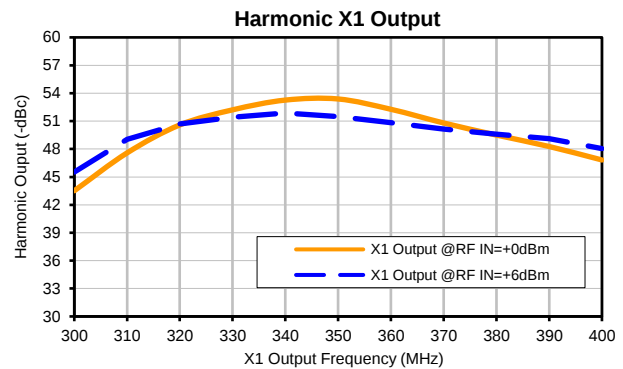
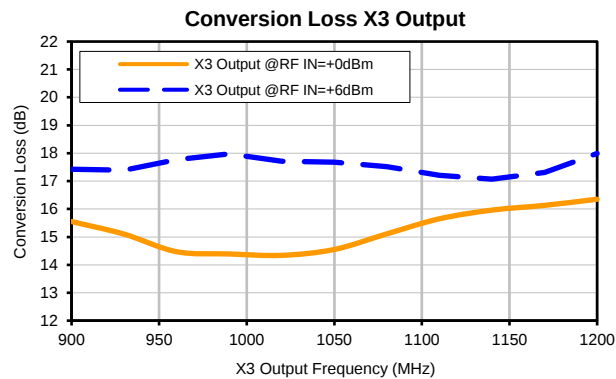
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IF/RF MICROWAVE COMPONENTS

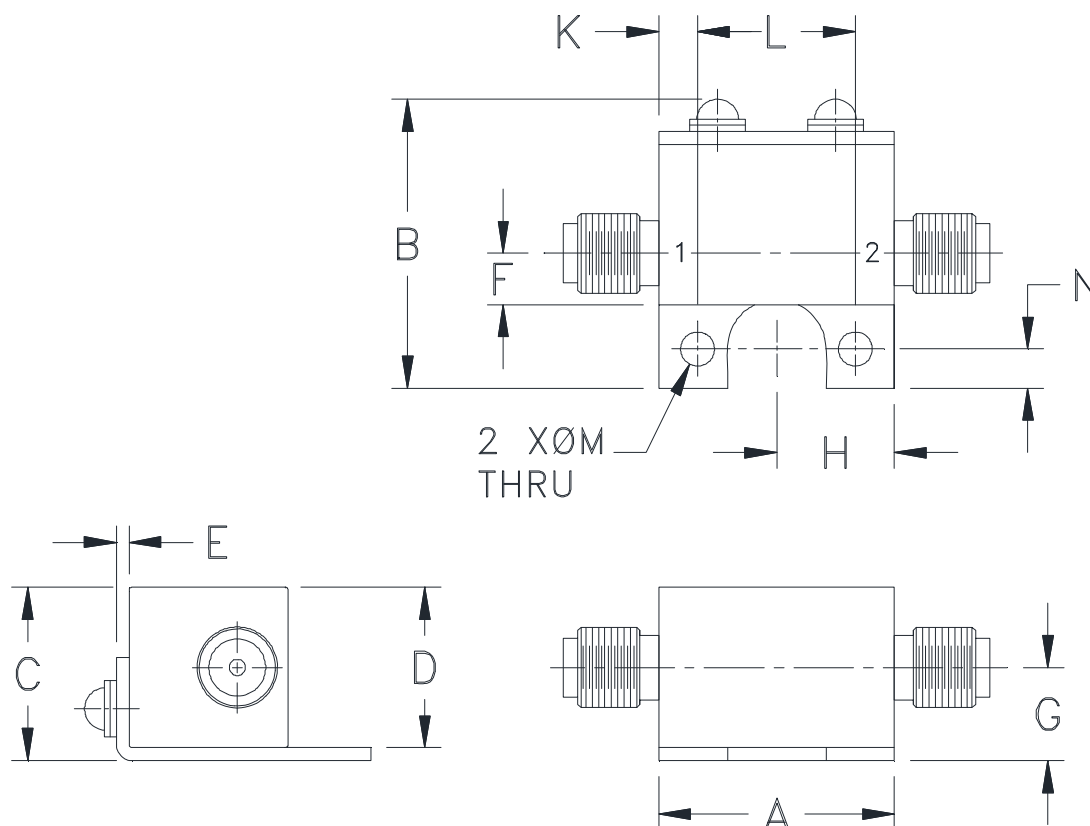


REV. OR  
 ZX90-3-122-S+  
 1/3/2019  
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## Typical Performance Curves



### Outline Dimensions



| CASE #. | A              | B              | C              | D              | E             | F             | G             | H             | J      | K              | L               | M              | N              | WT, GRAM |
|---------|----------------|----------------|----------------|----------------|---------------|---------------|---------------|---------------|--------|----------------|-----------------|----------------|----------------|----------|
| JA1242  | .74<br>(18.80) | .90<br>(22.86) | .54<br>(13.72) | .50<br>(12.70) | .04<br>(1.02) | .16<br>(4.06) | .29<br>(7.37) | .37<br>(9.40) | -<br>- | .122<br>(3.10) | .496<br>(12.60) | .106<br>(2.69) | .122<br>(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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All Mini-Circuits products are manufactured under exacting quality assurance and control standards, and are capable of meeting published specifications after being subjected to any or all of the following physical and environmental test.

| Specification              | Test/Inspection Condition                                                              | Reference/Spec                       |
|----------------------------|----------------------------------------------------------------------------------------|--------------------------------------|
| Operating Temperature      | -40° to 85°C                                                                           | Individual Model Data Sheet          |
| Storage Temperature        | -55° to 100° C<br>Ambient Environment                                                  | Individual Model Data Sheet          |
| Barometric Pressure        | 100,000 Feet                                                                           | MIL-STD-202, Method 105, Condition D |
| Humidity                   | 90% RH, 65°C<br>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 |