

# RMK-3-123+



|                       |                |
|-----------------------|----------------|
| 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.

|        |         |
|--------|---------|
| INPUT  | 1       |
| OUTPUT | 4       |
| GROUND | 2,3,5,6 |

**TOP VIEW**

**SIDE VIEW**

**PCB Land Pattern**

**BOTTOM VIEW**

Suggested Layout,  
Tolerance to be within  $\pm 0.02$

| A    | B    | C    | D    | E    | F    | G    | H     |
|------|------|------|------|------|------|------|-------|
| .25  | .31  | .16  | .100 | .040 | .055 | .060 | .065  |
| 6.35 | 7.87 | 4.06 | 2.54 | 1.02 | 1.40 | 1.52 | 1.65  |
| J    | K    | L    | M    | N    | P    | Q    | wt.   |
| .300 | .060 | .160 | .025 | .100 | .110 | .070 | grams |
| 7.62 | 1.52 | 4.06 | 0.64 | 2.54 | 2.79 | 1.78 | 0.16  |

NOTES: 1. TRACE WIDTH IS SHOWN FOR ROGERS RO4350B WITH DIELECTRIC THICKNESS .030"  $\pm$  .002"; COPPER: 1/2 OZ. EACH SIDE.  
FOR OTHER MATERIALS TRACE WIDTH MAY NEED TO BE MODIFIED.

2. BOTTOM SIDE OF THE PCB IS CONTINUOUS GROUND PLANE.

 DENOTES PCB COPPER LAYOUT WITH SMOBC (SOLDER MASK OVER BARE COPPER)

 DENOTES COPPER LAND PATTERN FREE OF SOLDER MASK

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.

**B.** Electrical specifications and performance data contained in this specification document are based on Mini-Circuit's applicable established test performance criteria and measurement instructions.

C. 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/MCJStore/terms](http://www.minicircuits.com/MCJStore/terms).

- broadband
- high rejection F2, -33 dBc typ.; F4, -45 dBc typ.
- low cost
- aqueous washable

- synthesizers
- local oscillators
- satellite up and down converters

| 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     |                         |                            | Typ. Min.                 | Typ. Min. | Typ. Min. |
| 3                        | 2200-4000          | 6600-12000 | 13 17                   | 15.5 21                    | 5 -5                      | 33 22     | 45 24     |

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

| INPUT RF= 13 dBm      |                      |                                 |       |       | INPUT RF= 17 dBm     |                                 |       |       |  |
|-----------------------|----------------------|---------------------------------|-------|-------|----------------------|---------------------------------|-------|-------|--|
| Input Frequency (MHz) | Conversion Loss (dB) | Harmonic Output Below F3 (-dBc) |       |       | Conversion Loss (dB) | Harmonic Output Below F3 (-dBc) |       |       |  |
|                       | F3                   | F1                              | F2    | F4    | F3                   | F1                              | F2    | F4    |  |
| 2200.00               | 17.10                | 6.46                            | 43.81 | 41.26 | 15.62                | 10.66                           | 45.36 | 50.70 |  |
| 2400.00               | 14.76                | 7.47                            | 42.53 | 40.96 | 14.11                | 10.86                           | 44.54 | 52.89 |  |
| 2500.00               | 14.46                | 7.00                            | 42.64 | 36.29 | 15.01                | 9.37                            | 42.60 | 41.84 |  |
| 2700.00               | 14.39                | 6.21                            | 41.67 | 46.46 | 14.73                | 8.74                            | 43.18 | 50.24 |  |
| 2800.00               | 14.82                | 5.27                            | 41.35 | 54.46 | 15.28                | 7.70                            | 42.28 | 54.65 |  |
| 2900.00               | 15.15                | 4.65                            | 41.77 | 62.55 | 15.56                | 7.05                            | 40.84 | 53.91 |  |
| 3000.00               | 15.71                | 3.85                            | 42.22 | 52.88 | 15.82                | 6.46                            | 38.36 | 53.31 |  |
| 3100.00               | 15.33                | 3.81                            | 40.33 | 45.93 | 15.53                | 6.25                            | 35.03 | 51.83 |  |
| 3150.00               | 15.36                | 3.71                            | 39.92 | 44.99 | 15.55                | 5.93                            | 33.63 | 52.04 |  |
| 3240.00               | 15.22                | 3.51                            | 37.49 | 43.68 | 15.53                | 5.65                            | 31.88 | 51.49 |  |
| 3360.00               | 15.07                | 3.32                            | 35.11 | 43.68 | 15.36                | 5.45                            | 30.38 | 49.72 |  |
| 3430.00               | 14.88                | 3.22                            | 33.83 | 43.88 | 15.58                | 5.07                            | 30.14 | 47.92 |  |
| 3460.00               | 15.07                | 3.03                            | 33.08 | 43.58 | 15.58                | 4.96                            | 30.01 | 47.07 |  |
| 3520.00               | 15.17                | 2.71                            | 31.33 | 43.53 | 15.86                | 4.48                            | 28.99 | 45.90 |  |
| 3580.00               | 15.55                | 2.23                            | 30.04 | 43.74 | 16.17                | 4.07                            | 28.81 | 44.40 |  |
| 3640.00               | 15.82                | 1.77                            | 29.35 | 44.29 | 16.43                | 3.58                            | 29.12 | 43.44 |  |
| 3700.00               | 16.22                | 1.25                            | 28.63 | 47.10 | 16.79                | 3.08                            | 29.36 | 41.94 |  |
| 3820.00               | 17.26                | -0.08                           | 38.02 | 50.31 | 17.81                | 1.85                            | 34.73 | 38.30 |  |
| 3880.00               | 17.64                | -0.56                           | 35.44 | 40.65 | 18.20                | 1.29                            | 36.72 | 38.63 |  |
| 4000.00               | 18.82                | -1.97                           | 28.32 | 37.36 | 19.11                | -0.09                           | 30.37 | 41.63 |  |

| Output Frequency (MHz) | Conversion Loss (dB) for INPUT RF=13 dBm | Conversion Loss (dB) for INPUT RF=17 dBm |
|------------------------|------------------------------------------|------------------------------------------|
| 6500                   | 17.0                                     | 15.5                                     |
| 7000                   | 14.5                                     | 14.0                                     |
| 7500                   | 14.2                                     | 14.5                                     |
| 8000                   | 14.5                                     | 15.0                                     |
| 8500                   | 15.0                                     | 15.5                                     |
| 9000                   | 15.5                                     | 15.8                                     |
| 9500                   | 15.2                                     | 15.5                                     |
| 10000                  | 15.0                                     | 15.2                                     |
| 10500                  | 15.5                                     | 15.8                                     |
| 11000                  | 16.5                                     | 17.0                                     |
| 11500                  | 17.5                                     | 18.0                                     |
| 12000                  | 18.5                                     | 19.0                                     |

| F1 Frequency (MHz) | Harmonic Output (dBc) at 13 dBm | Harmonic Output (dBc) at 17 dBm |
|--------------------|---------------------------------|---------------------------------|
| 2200               | 6.5                             | 10.5                            |
| 2400               | 7.5                             | 11.0                            |
| 2600               | 6.5                             | 9.5                             |
| 2800               | 5.5                             | 8.5                             |
| 3000               | 4.0                             | 7.0                             |
| 3200               | 3.5                             | 6.5                             |
| 3400               | 3.0                             | 6.0                             |
| 3600               | 1.5                             | 4.5                             |
| 3800               | 0.5                             | 2.5                             |
| 4000               | -1.5                            | 0.5                             |

| F2 Frequency (MHz) | Harmonic Output (c-dBc) at 13 dBm | Harmonic Output (c-dBc) at 17 dBm |
|--------------------|-----------------------------------|-----------------------------------|
| 4500               | 43                                | 45                                |
| 5000               | 42                                | 43                                |
| 5500               | 41                                | 43                                |
| 6000               | 42                                | 38                                |
| 6500               | 38                                | 32                                |
| 7000               | 34                                | 30                                |
| 7500               | 29                                | 29                                |
| 7800               | 38                                | 38                                |
| 8000               | 29                                | 29                                |

| F4 Frequency (MHz) | Harmonic Output (-dBc) for 13 dBm | Harmonic Output (-dBc) for 17 dBm |
|--------------------|-----------------------------------|-----------------------------------|
| 9000               | 40                                | 50                                |
| 10000              | 35                                | 52                                |
| 11000              | 45                                | 55                                |
| 11500              | 55                                | 53                                |
| 11800              | 62                                | 52                                |
| 12500              | 45                                | 50                                |
| 13500              | 43                                | 45                                |
| 15000              | 50                                | 38                                |
| 16000              | 38                                | 40                                |

# Frequency Multiplier (Tripler)

**RMK-3-123+**

## Typical Performance Data

Test Conditions: RF Input Power = 13 dBm @ +25°C

| FREQUENCY<br>(MHz) |           |           |           | CONVERSION<br>LOSS<br>(dB) | HARMONIC OUTPUT*<br>(-dBc) |           |           |
|--------------------|-----------|-----------|-----------|----------------------------|----------------------------|-----------|-----------|
| X1 OUTPUT          | X2 OUTPUT | X3 OUTPUT | X4 OUTPUT | X3 OUTPUT                  | X1 OUTPUT                  | X2 OUTPUT | X4 OUTPUT |
| 2200.0             | 4400.0    | 6600.0    | 8800.0    | 16.70                      | 7.14                       | 44.35     | 43.13     |
| 2250.0             | 4500.0    | 6750.0    | 9000.0    | 16.30                      | 6.91                       | 43.15     | 41.48     |
| 2300.0             | 4600.0    | 6900.0    | 9200.0    | 16.35                      | 6.76                       | 42.57     | 41.06     |
| 2350.0             | 4700.0    | 7050.0    | 9400.0    | 15.25                      | 7.33                       | 42.63     | 41.30     |
| 2400.0             | 4800.0    | 7200.0    | 9600.0    | 14.70                      | 7.65                       | 43.11     | 41.54     |
| 2450.0             | 4900.0    | 7350.0    | 9800.0    | 14.06                      | 8.20                       | 43.00     | 41.94     |
| 2500.0             | 5000.0    | 7500.0    | 10000.0   | 14.34                      | 7.39                       | 42.83     | 37.71     |
| 2550.0             | 5100.0    | 7650.0    | 10200.0   | 15.20                      | 6.35                       | 44.21     | 31.64     |
| 2600.0             | 5200.0    | 7800.0    | 10400.0   | 14.20                      | 7.13                       | 43.60     | 38.65     |
| 2650.0             | 5300.0    | 7950.0    | 10600.0   | 14.44                      | 6.84                       | 42.48     | 42.96     |
| 2700.0             | 5400.0    | 8100.0    | 10800.0   | 14.40                      | 6.48                       | 42.17     | 45.88     |
| 2750.0             | 5500.0    | 8250.0    | 11000.0   | 14.59                      | 6.24                       | 41.75     | 49.78     |
| 2800.0             | 5600.0    | 8400.0    | 11200.0   | 14.37                      | 6.18                       | 42.05     | 52.71     |
| 2850.0             | 5700.0    | 8550.0    | 11400.0   | 14.72                      | 5.77                       | 41.30     | 55.86     |
| 2900.0             | 5800.0    | 8700.0    | 11600.0   | 14.91                      | 5.27                       | 41.51     | 59.32     |
| 2950.0             | 5900.0    | 8850.0    | 11800.0   | 14.59                      | 5.42                       | 41.72     | 57.37     |
| 3000.0             | 6000.0    | 9000.0    | 12000.0   | 15.20                      | 4.64                       | 41.59     | 51.06     |
| 3050.0             | 6100.0    | 9150.0    | 12200.0   | 14.66                      | 4.79                       | 41.06     | 47.34     |
| 3100.0             | 6200.0    | 9300.0    | 12400.0   | 15.07                      | 4.35                       | 40.47     | 46.15     |
| 3150.0             | 6300.0    | 9450.0    | 12600.0   | 15.17                      | 4.06                       | 38.83     | 45.38     |
| 3200.0             | 6400.0    | 9600.0    | 12800.0   | 15.27                      | 3.61                       | 38.33     | 44.75     |
| 3240.0             | 6480.0    | 9720.0    | 12960.0   | 15.36                      | 3.51                       | 37.46     | 44.47     |
| 3280.0             | 6560.0    | 9840.0    | 13120.0   | 15.27                      | 3.33                       | 36.95     | 43.99     |
| 3320.0             | 6640.0    | 9960.0    | 13280.0   | 14.99                      | 3.45                       | 36.58     | 44.09     |
| 3360.0             | 6720.0    | 10080.0   | 13440.0   | 14.80                      | 3.55                       | 34.93     | 43.44     |
| 3400.0             | 6800.0    | 10200.0   | 13600.0   | 15.62                      | 2.68                       | 34.55     | 42.69     |
| 3430.0             | 6860.0    | 10290.0   | 13720.0   | 14.93                      | 3.30                       | 34.20     | 42.55     |
| 3460.0             | 6920.0    | 10380.0   | 13840.0   | 15.01                      | 2.86                       | 33.28     | 42.17     |
| 3490.0             | 6980.0    | 10470.0   | 13960.0   | 14.99                      | 3.10                       | 33.62     | 41.95     |
| 3520.0             | 7040.0    | 10560.0   | 14080.0   | 14.55                      | 3.32                       | 31.97     | 42.06     |
| 3550.0             | 7100.0    | 10650.0   | 14200.0   | 14.31                      | 3.27                       | 30.99     | 44.02     |
| 3580.0             | 7160.0    | 10740.0   | 14320.0   | 14.88                      | 2.99                       | 30.48     | 43.66     |
| 3610.0             | 7220.0    | 10830.0   | 14440.0   | 15.20                      | 2.26                       | 29.26     | 45.61     |
| 3640.0             | 7280.0    | 10920.0   | 14560.0   | 15.29                      | 2.01                       | 29.37     | 48.41     |
| 3670.0             | 7340.0    | 11010.0   | 14680.0   | 15.50                      | 2.06                       | 28.88     | 48.51     |
| 3700.0             | 7400.0    | 11100.0   | 14800.0   | 15.97                      | 1.21                       | 28.77     | 47.98     |
| 3730.0             | 7460.0    | 11190.0   | 14920.0   | 16.22                      | 0.79                       | 28.29     | 48.89     |
| 3760.0             | 7520.0    | 11280.0   | 15040.0   | 16.24                      | 0.67                       | 28.49     | 54.51     |
| 3790.0             | 7580.0    | 11370.0   | 15160.0   | 16.58                      | 0.23                       | 29.47     | 52.30     |
| 3820.0             | 7640.0    | 11460.0   | 15280.0   | 16.97                      | -0.17                      | 31.73     | 51.20     |
| 3850.0             | 7700.0    | 11550.0   | 15400.0   | 16.83                      | -0.06                      | 45.36     | 43.93     |
| 3880.0             | 7760.0    | 11640.0   | 15520.0   | 16.74                      | -0.21                      | 35.23     | 42.54     |
| 3910.0             | 7820.0    | 11730.0   | 15640.0   | 17.14                      | -0.30                      | 31.76     | 40.74     |
| 3940.0             | 7880.0    | 11820.0   | 15760.0   | 17.24                      | -0.67                      | 29.88     | 40.26     |
| 3970.0             | 7940.0    | 11910.0   | 15880.0   | 16.82                      | -0.66                      | 30.16     | 40.89     |
| 4000.0             | 8000.0    | 12000.0   | 16000.0   | 17.18                      | -0.61                      | 29.39     | 40.28     |

\* Harmonic Output below power level of X3 Output.



# Frequency Multiplier (Tripler)

**RMK-3-123+**

## Typical Performance Data

Test Conditions: RF Input Power = 13 dBm @ -40°C

| FREQUENCY<br>(MHz) |           |           |           | CONVERSION<br>LOSS<br>(dB) | HARMONIC OUTPUT*<br>(-dBc) |           |           |
|--------------------|-----------|-----------|-----------|----------------------------|----------------------------|-----------|-----------|
| X1 OUTPUT          | X2 OUTPUT | X3 OUTPUT | X4 OUTPUT | X3 OUTPUT                  | X1 OUTPUT                  | X2 OUTPUT | X4 OUTPUT |
| 2200.0             | 4400.0    | 6600.0    | 8800.0    | 16.31                      | 6.76                       | 45.07     | 41.81     |
| 2250.0             | 4500.0    | 6750.0    | 9000.0    | 15.87                      | 6.68                       | 42.96     | 39.66     |
| 2300.0             | 4600.0    | 6900.0    | 9200.0    | 15.84                      | 6.42                       | 41.54     | 39.12     |
| 2350.0             | 4700.0    | 7050.0    | 9400.0    | 15.38                      | 6.80                       | 40.93     | 39.24     |
| 2400.0             | 4800.0    | 7200.0    | 9600.0    | 14.32                      | 7.38                       | 42.41     | 39.61     |
| 2450.0             | 4900.0    | 7350.0    | 9800.0    | 13.59                      | 7.80                       | 42.94     | 39.25     |
| 2500.0             | 5000.0    | 7500.0    | 10000.0   | 13.72                      | 7.25                       | 43.29     | 36.40     |
| 2550.0             | 5100.0    | 7650.0    | 10200.0   | 14.57                      | 6.07                       | 44.85     | 30.01     |
| 2600.0             | 5200.0    | 7800.0    | 10400.0   | 13.54                      | 6.95                       | 44.30     | 36.28     |
| 2650.0             | 5300.0    | 7950.0    | 10600.0   | 13.86                      | 6.71                       | 42.72     | 40.04     |
| 2700.0             | 5400.0    | 8100.0    | 10800.0   | 13.75                      | 6.47                       | 42.12     | 42.71     |
| 2750.0             | 5500.0    | 8250.0    | 11000.0   | 14.10                      | 6.09                       | 41.27     | 47.56     |
| 2800.0             | 5600.0    | 8400.0    | 11200.0   | 13.82                      | 5.95                       | 40.78     | 52.19     |
| 2850.0             | 5700.0    | 8550.0    | 11400.0   | 14.05                      | 5.64                       | 40.43     | 58.20     |
| 2900.0             | 5800.0    | 8700.0    | 11600.0   | 14.32                      | 5.02                       | 40.91     | 62.36     |
| 2950.0             | 5900.0    | 8850.0    | 11800.0   | 13.87                      | 5.31                       | 42.14     | 59.87     |
| 3000.0             | 6000.0    | 9000.0    | 12000.0   | 14.66                      | 4.31                       | 42.49     | 59.08     |
| 3050.0             | 6100.0    | 9150.0    | 12200.0   | 13.96                      | 4.59                       | 42.05     | 50.96     |
| 3100.0             | 6200.0    | 9300.0    | 12400.0   | 14.62                      | 3.96                       | 42.04     | 48.09     |
| 3150.0             | 6300.0    | 9450.0    | 12600.0   | 14.85                      | 3.66                       | 41.37     | 45.50     |
| 3200.0             | 6400.0    | 9600.0    | 12800.0   | 15.08                      | 3.00                       | 41.24     | 44.40     |
| 3240.0             | 6480.0    | 9720.0    | 12960.0   | 14.86                      | 3.35                       | 40.02     | 44.24     |
| 3280.0             | 6560.0    | 9840.0    | 13120.0   | 14.85                      | 2.91                       | 39.39     | 43.40     |
| 3320.0             | 6640.0    | 9960.0    | 13280.0   | 14.48                      | 3.18                       | 38.79     | 43.03     |
| 3360.0             | 6720.0    | 10080.0   | 13440.0   | 14.15                      | 3.52                       | 36.88     | 42.99     |
| 3400.0             | 6800.0    | 10200.0   | 13600.0   | 15.10                      | 2.45                       | 36.60     | 41.84     |
| 3430.0             | 6860.0    | 10290.0   | 13720.0   | 14.09                      | 3.17                       | 35.94     | 41.85     |
| 3460.0             | 6920.0    | 10380.0   | 13840.0   | 14.18                      | 2.92                       | 35.66     | 41.10     |
| 3490.0             | 6980.0    | 10470.0   | 13960.0   | 14.25                      | 3.18                       | 35.58     | 40.58     |
| 3520.0             | 7040.0    | 10560.0   | 14080.0   | 13.35                      | 3.69                       | 34.27     | 40.37     |
| 3550.0             | 7100.0    | 10650.0   | 14200.0   | 13.18                      | 3.60                       | 32.55     | 40.73     |
| 3580.0             | 7160.0    | 10740.0   | 14320.0   | 13.84                      | 3.25                       | 32.23     | 40.73     |
| 3610.0             | 7220.0    | 10830.0   | 14440.0   | 14.06                      | 2.53                       | 30.94     | 40.64     |
| 3640.0             | 7280.0    | 10920.0   | 14560.0   | 14.09                      | 2.49                       | 30.71     | 41.73     |
| 3670.0             | 7340.0    | 11010.0   | 14680.0   | 14.27                      | 2.56                       | 30.22     | 40.59     |
| 3700.0             | 7400.0    | 11100.0   | 14800.0   | 14.85                      | 1.28                       | 29.63     | 39.64     |
| 3730.0             | 7460.0    | 11190.0   | 14920.0   | 14.77                      | 1.45                       | 28.87     | 41.71     |
| 3760.0             | 7520.0    | 11280.0   | 15040.0   | 14.94                      | 1.39                       | 28.11     | 45.62     |
| 3790.0             | 7580.0    | 11370.0   | 15160.0   | 15.24                      | 0.58                       | 29.62     | 55.80     |
| 3820.0             | 7640.0    | 11460.0   | 15280.0   | 15.68                      | 0.44                       | 31.62     | 57.65     |
| 3850.0             | 7700.0    | 11550.0   | 15400.0   | 15.60                      | 0.28                       | 43.56     | 44.56     |
| 3880.0             | 7760.0    | 11640.0   | 15520.0   | 15.92                      | -0.28                      | 35.48     | 39.82     |
| 3910.0             | 7820.0    | 11730.0   | 15640.0   | 16.46                      | -0.44                      | 32.58     | 37.75     |
| 3940.0             | 7880.0    | 11820.0   | 15760.0   | 16.49                      | -0.96                      | 29.85     | 36.49     |
| 3970.0             | 7940.0    | 11910.0   | 15880.0   | 15.69                      | -0.31                      | 29.79     | 38.90     |
| 4000.0             | 8000.0    | 12000.0   | 16000.0   | 16.52                      | -0.73                      | 28.57     | 35.91     |

\* Harmonic Output below power level of X3 Output.



# Frequency Multiplier (Tripler)

**RMK-3-123+**

## Typical Performance Data

Test Conditions: RF Input Power = 13 dBm @ +85°C

| FREQUENCY<br>(MHz) |           |           |           | CONVERSION<br>LOSS<br>(dB) | HARMONIC OUTPUT*<br>(-dBc) |           |           |
|--------------------|-----------|-----------|-----------|----------------------------|----------------------------|-----------|-----------|
| X1 OUTPUT          | X2 OUTPUT | X3 OUTPUT | X4 OUTPUT | X3 OUTPUT                  | X1 OUTPUT                  | X2 OUTPUT | X4 OUTPUT |
| 2200.0             | 4400.0    | 6600.0    | 8800.0    | 16.95                      | 7.43                       | 43.93     | 45.31     |
| 2250.0             | 4500.0    | 6750.0    | 9000.0    | 16.60                      | 7.18                       | 43.78     | 44.50     |
| 2300.0             | 4600.0    | 6900.0    | 9200.0    | 16.42                      | 7.37                       | 43.53     | 44.36     |
| 2350.0             | 4700.0    | 7050.0    | 9400.0    | 15.29                      | 7.85                       | 43.55     | 44.64     |
| 2400.0             | 4800.0    | 7200.0    | 9600.0    | 14.91                      | 8.04                       | 43.30     | 44.70     |
| 2450.0             | 4900.0    | 7350.0    | 9800.0    | 14.53                      | 8.33                       | 42.87     | 43.96     |
| 2500.0             | 5000.0    | 7500.0    | 10000.0   | 14.80                      | 7.55                       | 42.70     | 39.33     |
| 2550.0             | 5100.0    | 7650.0    | 10200.0   | 15.56                      | 6.63                       | 43.82     | 33.60     |
| 2600.0             | 5200.0    | 7800.0    | 10400.0   | 14.71                      | 7.22                       | 43.60     | 40.14     |
| 2650.0             | 5300.0    | 7950.0    | 10600.0   | 14.99                      | 6.92                       | 42.52     | 44.30     |
| 2700.0             | 5400.0    | 8100.0    | 10800.0   | 14.89                      | 6.58                       | 42.23     | 47.35     |
| 2750.0             | 5500.0    | 8250.0    | 11000.0   | 15.09                      | 6.35                       | 42.15     | 50.23     |
| 2800.0             | 5600.0    | 8400.0    | 11200.0   | 15.08                      | 6.00                       | 42.03     | 52.12     |
| 2850.0             | 5700.0    | 8550.0    | 11400.0   | 15.25                      | 5.82                       | 41.38     | 52.90     |
| 2900.0             | 5800.0    | 8700.0    | 11600.0   | 15.40                      | 5.37                       | 41.18     | 54.07     |
| 2950.0             | 5900.0    | 8850.0    | 11800.0   | 15.12                      | 5.42                       | 40.86     | 51.30     |
| 3000.0             | 6000.0    | 9000.0    | 12000.0   | 15.75                      | 4.70                       | 40.44     | 47.93     |
| 3050.0             | 6100.0    | 9150.0    | 12200.0   | 15.40                      | 4.64                       | 39.71     | 46.10     |
| 3100.0             | 6200.0    | 9300.0    | 12400.0   | 15.69                      | 4.31                       | 38.68     | 45.72     |
| 3150.0             | 6300.0    | 9450.0    | 12600.0   | 15.66                      | 4.07                       | 37.17     | 45.51     |
| 3200.0             | 6400.0    | 9600.0    | 12800.0   | 15.73                      | 3.80                       | 36.92     | 45.08     |
| 3240.0             | 6480.0    | 9720.0    | 12960.0   | 15.90                      | 3.54                       | 36.02     | 44.86     |
| 3280.0             | 6560.0    | 9840.0    | 13120.0   | 15.88                      | 3.35                       | 35.44     | 44.29     |
| 3320.0             | 6640.0    | 9960.0    | 13280.0   | 15.43                      | 3.48                       | 35.10     | 44.84     |
| 3360.0             | 6720.0    | 10080.0   | 13440.0   | 15.62                      | 3.42                       | 33.70     | 43.76     |
| 3400.0             | 6800.0    | 10200.0   | 13600.0   | 16.19                      | 2.60                       | 32.73     | 44.25     |
| 3430.0             | 6860.0    | 10290.0   | 13720.0   | 15.62                      | 3.25                       | 32.35     | 44.77     |
| 3460.0             | 6920.0    | 10380.0   | 13840.0   | 15.80                      | 2.69                       | 31.34     | 44.70     |
| 3490.0             | 6980.0    | 10470.0   | 13960.0   | 15.81                      | 2.82                       | 31.63     | 44.62     |
| 3520.0             | 7040.0    | 10560.0   | 14080.0   | 15.56                      | 2.84                       | 30.36     | 45.62     |
| 3550.0             | 7100.0    | 10650.0   | 14200.0   | 15.36                      | 2.77                       | 30.02     | 48.60     |
| 3580.0             | 7160.0    | 10740.0   | 14320.0   | 15.83                      | 2.59                       | 29.49     | 48.24     |
| 3610.0             | 7220.0    | 10830.0   | 14440.0   | 16.24                      | 1.92                       | 28.56     | 50.75     |
| 3640.0             | 7280.0    | 10920.0   | 14560.0   | 16.35                      | 1.45                       | 28.60     | 54.42     |
| 3670.0             | 7340.0    | 11010.0   | 14680.0   | 16.48                      | 1.65                       | 28.35     | 52.81     |
| 3700.0             | 7400.0    | 11100.0   | 14800.0   | 16.90                      | 0.95                       | 28.31     | 51.44     |
| 3730.0             | 7460.0    | 11190.0   | 14920.0   | 17.15                      | 0.40                       | 27.95     | 51.48     |
| 3760.0             | 7520.0    | 11280.0   | 15040.0   | 17.13                      | 0.45                       | 28.58     | 56.51     |
| 3790.0             | 7580.0    | 11370.0   | 15160.0   | 17.43                      | 0.07                       | 29.26     | 52.08     |
| 3820.0             | 7640.0    | 11460.0   | 15280.0   | 17.82                      | -0.45                      | 31.89     | 53.61     |
| 3850.0             | 7700.0    | 11550.0   | 15400.0   | 17.49                      | -0.04                      | 48.61     | 46.25     |
| 3880.0             | 7760.0    | 11640.0   | 15520.0   | 17.26                      | -0.09                      | 36.60     | 45.12     |
| 3910.0             | 7820.0    | 11730.0   | 15640.0   | 17.67                      | -0.30                      | 32.12     | 43.24     |
| 3940.0             | 7880.0    | 11820.0   | 15760.0   | 17.88                      | -0.54                      | 30.62     | 42.64     |
| 3970.0             | 7940.0    | 11910.0   | 15880.0   | 17.47                      | -0.73                      | 30.70     | 43.67     |
| 4000.0             | 8000.0    | 12000.0   | 16000.0   | 17.84                      | -0.74                      | 29.84     | 42.37     |

\* Harmonic Output below power level of X3 Output.



# Frequency Multiplier (Tripler)

**RMK-3-123+**

## Typical Performance Data

Test Conditions: RF Input Power = 17 dBm @ +25°C

| FREQUENCY<br>(MHz) |           |           |           | CONVERSION<br>LOSS<br>(dB) | HARMONIC OUTPUT*<br>(-dBc) |           |           |
|--------------------|-----------|-----------|-----------|----------------------------|----------------------------|-----------|-----------|
| X1 OUTPUT          | X2 OUTPUT | X3 OUTPUT | X4 OUTPUT | X3 OUTPUT                  | X1 OUTPUT                  | X2 OUTPUT | X4 OUTPUT |
| 2200.0             | 4400.0    | 6600.0    | 8800.0    | 15.93                      | 10.54                      | 45.58     | 54.35     |
| 2250.0             | 4500.0    | 6750.0    | 9000.0    | 15.24                      | 10.71                      | 45.73     | 54.12     |
| 2300.0             | 4600.0    | 6900.0    | 9200.0    | 15.33                      | 10.57                      | 45.01     | 55.80     |
| 2350.0             | 4700.0    | 7050.0    | 9400.0    | 14.52                      | 10.88                      | 44.46     | 53.89     |
| 2400.0             | 4800.0    | 7200.0    | 9600.0    | 14.52                      | 10.70                      | 44.59     | 54.05     |
| 2450.0             | 4900.0    | 7350.0    | 9800.0    | 14.55                      | 10.33                      | 43.76     | 50.59     |
| 2500.0             | 5000.0    | 7500.0    | 10000.0   | 15.12                      | 9.41                       | 42.90     | 42.64     |
| 2550.0             | 5100.0    | 7650.0    | 10200.0   | 16.20                      | 8.21                       | 42.69     | 34.20     |
| 2600.0             | 5200.0    | 7800.0    | 10400.0   | 14.88                      | 9.26                       | 44.70     | 42.05     |
| 2650.0             | 5300.0    | 7950.0    | 10600.0   | 15.08                      | 9.01                       | 43.83     | 46.90     |
| 2700.0             | 5400.0    | 8100.0    | 10800.0   | 14.96                      | 9.06                       | 43.63     | 49.75     |
| 2750.0             | 5500.0    | 8250.0    | 11000.0   | 15.14                      | 8.58                       | 43.02     | 53.16     |
| 2800.0             | 5600.0    | 8400.0    | 11200.0   | 15.12                      | 8.16                       | 42.39     | 54.36     |
| 2850.0             | 5700.0    | 8550.0    | 11400.0   | 15.20                      | 7.95                       | 41.43     | 53.83     |
| 2900.0             | 5800.0    | 8700.0    | 11600.0   | 15.37                      | 7.37                       | 40.42     | 54.48     |
| 2950.0             | 5900.0    | 8850.0    | 11800.0   | 15.27                      | 7.37                       | 39.72     | 52.88     |
| 3000.0             | 6000.0    | 9000.0    | 12000.0   | 15.46                      | 7.18                       | 38.01     | 52.31     |
| 3050.0             | 6100.0    | 9150.0    | 12200.0   | 15.48                      | 6.73                       | 36.58     | 51.84     |
| 3100.0             | 6200.0    | 9300.0    | 12400.0   | 15.82                      | 6.39                       | 34.58     | 53.51     |
| 3150.0             | 6300.0    | 9450.0    | 12600.0   | 16.25                      | 5.62                       | 33.30     | 52.24     |
| 3200.0             | 6400.0    | 9600.0    | 12800.0   | 15.86                      | 5.70                       | 32.83     | 52.50     |
| 3240.0             | 6480.0    | 9720.0    | 12960.0   | 15.82                      | 5.61                       | 32.49     | 50.76     |
| 3280.0             | 6560.0    | 9840.0    | 13120.0   | 15.36                      | 5.67                       | 31.83     | 52.53     |
| 3320.0             | 6640.0    | 9960.0    | 13280.0   | 15.50                      | 5.10                       | 30.75     | 52.52     |
| 3360.0             | 6720.0    | 10080.0   | 13440.0   | 15.15                      | 5.51                       | 30.33     | 52.40     |
| 3400.0             | 6800.0    | 10200.0   | 13600.0   | 15.58                      | 5.36                       | 30.37     | 50.37     |
| 3430.0             | 6860.0    | 10290.0   | 13720.0   | 15.41                      | 5.40                       | 30.32     | 49.17     |
| 3460.0             | 6920.0    | 10380.0   | 13840.0   | 15.44                      | 4.86                       | 29.91     | 48.76     |
| 3490.0             | 6980.0    | 10470.0   | 13960.0   | 15.20                      | 5.40                       | 30.06     | 48.44     |
| 3520.0             | 7040.0    | 10560.0   | 14080.0   | 15.21                      | 4.94                       | 29.35     | 46.01     |
| 3550.0             | 7100.0    | 10650.0   | 14200.0   | 15.09                      | 4.63                       | 29.52     | 45.06     |
| 3580.0             | 7160.0    | 10740.0   | 14320.0   | 15.63                      | 4.60                       | 29.38     | 43.76     |
| 3610.0             | 7220.0    | 10830.0   | 14440.0   | 16.12                      | 3.76                       | 28.99     | 43.18     |
| 3640.0             | 7280.0    | 10920.0   | 14560.0   | 16.44                      | 3.27                       | 29.45     | 41.96     |
| 3670.0             | 7340.0    | 11010.0   | 14680.0   | 16.80                      | 3.13                       | 29.05     | 42.33     |
| 3700.0             | 7400.0    | 11100.0   | 14800.0   | 17.15                      | 2.63                       | 29.35     | 41.79     |
| 3730.0             | 7460.0    | 11190.0   | 14920.0   | 17.06                      | 2.56                       | 28.92     | 42.04     |
| 3760.0             | 7520.0    | 11280.0   | 15040.0   | 17.42                      | 2.43                       | 29.12     | 40.79     |
| 3790.0             | 7580.0    | 11370.0   | 15160.0   | 17.51                      | 1.79                       | 28.75     | 39.52     |
| 3820.0             | 7640.0    | 11460.0   | 15280.0   | 17.66                      | 1.55                       | 28.86     | 38.33     |
| 3850.0             | 7700.0    | 11550.0   | 15400.0   | 17.70                      | 1.55                       | 38.36     | 38.28     |
| 3880.0             | 7760.0    | 11640.0   | 15520.0   | 18.00                      | 0.80                       | 35.24     | 39.31     |
| 3910.0             | 7820.0    | 11730.0   | 15640.0   | 18.15                      | 1.10                       | 32.98     | 40.49     |
| 3940.0             | 7880.0    | 11820.0   | 15760.0   | 17.94                      | 1.04                       | 32.21     | 41.29     |
| 3970.0             | 7940.0    | 11910.0   | 15880.0   | 17.90                      | 0.60                       | 32.20     | 41.48     |
| 4000.0             | 8000.0    | 12000.0   | 16000.0   | 18.20                      | 0.73                       | 31.21     | 42.65     |

\* Harmonic Output below power level of X3 Output.



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# Frequency Multiplier (Tripler)

**RMK-3-123+**

## Typical Performance Data

Test Conditions: RF Input Power = 17 dBm @ -40°C

| FREQUENCY<br>(MHz) |           |           |           | CONVERSION<br>LOSS<br>(dB) | HARMONIC OUTPUT*<br>(-dBc) |           |           |
|--------------------|-----------|-----------|-----------|----------------------------|----------------------------|-----------|-----------|
| X1 OUTPUT          | X2 OUTPUT | X3 OUTPUT | X4 OUTPUT | X3 OUTPUT                  | X1 OUTPUT                  | X2 OUTPUT | X4 OUTPUT |
| 2200.0             | 4400.0    | 6600.0    | 8800.0    | 14.85                      | 10.93                      | 46.11     | 53.43     |
| 2250.0             | 4500.0    | 6750.0    | 9000.0    | 14.02                      | 11.40                      | 45.73     | 49.64     |
| 2300.0             | 4600.0    | 6900.0    | 9200.0    | 14.24                      | 10.92                      | 44.79     | 54.98     |
| 2350.0             | 4700.0    | 7050.0    | 9400.0    | 13.72                      | 11.17                      | 43.74     | 53.14     |
| 2400.0             | 4800.0    | 7200.0    | 9600.0    | 13.29                      | 11.28                      | 44.45     | 54.75     |
| 2450.0             | 4900.0    | 7350.0    | 9800.0    | 13.25                      | 10.97                      | 44.18     | 51.08     |
| 2500.0             | 5000.0    | 7500.0    | 10000.0   | 13.82                      | 9.97                       | 43.48     | 43.41     |
| 2550.0             | 5100.0    | 7650.0    | 10200.0   | 15.29                      | 8.37                       | 41.99     | 33.09     |
| 2600.0             | 5200.0    | 7800.0    | 10400.0   | 13.70                      | 9.68                       | 45.07     | 41.29     |
| 2650.0             | 5300.0    | 7950.0    | 10600.0   | 13.77                      | 9.49                       | 44.32     | 46.64     |
| 2700.0             | 5400.0    | 8100.0    | 10800.0   | 13.78                      | 9.64                       | 44.06     | 50.01     |
| 2750.0             | 5500.0    | 8250.0    | 11000.0   | 14.00                      | 8.92                       | 43.40     | 55.30     |
| 2800.0             | 5600.0    | 8400.0    | 11200.0   | 13.81                      | 8.82                       | 42.69     | 59.58     |
| 2850.0             | 5700.0    | 8550.0    | 11400.0   | 13.95                      | 8.48                       | 41.99     | 61.60     |
| 2900.0             | 5800.0    | 8700.0    | 11600.0   | 14.15                      | 7.97                       | 41.34     | 61.38     |
| 2950.0             | 5900.0    | 8850.0    | 11800.0   | 14.14                      | 7.84                       | 40.93     | 61.34     |
| 3000.0             | 6000.0    | 9000.0    | 12000.0   | 14.54                      | 7.35                       | 38.88     | 57.59     |
| 3050.0             | 6100.0    | 9150.0    | 12200.0   | 14.72                      | 6.84                       | 36.86     | 53.57     |
| 3100.0             | 6200.0    | 9300.0    | 12400.0   | 15.09                      | 6.25                       | 34.95     | 50.43     |
| 3150.0             | 6300.0    | 9450.0    | 12600.0   | 15.43                      | 5.80                       | 34.28     | 47.00     |
| 3200.0             | 6400.0    | 9600.0    | 12800.0   | 15.15                      | 5.79                       | 33.38     | 46.68     |
| 3240.0             | 6480.0    | 9720.0    | 12960.0   | 14.69                      | 6.16                       | 33.34     | 45.88     |
| 3280.0             | 6560.0    | 9840.0    | 13120.0   | 14.35                      | 5.90                       | 32.40     | 47.80     |
| 3320.0             | 6640.0    | 9960.0    | 13280.0   | 14.27                      | 5.63                       | 31.48     | 47.45     |
| 3360.0             | 6720.0    | 10080.0   | 13440.0   | 14.07                      | 5.99                       | 30.57     | 50.04     |
| 3400.0             | 6800.0    | 10200.0   | 13600.0   | 14.34                      | 6.00                       | 30.77     | 50.14     |
| 3430.0             | 6860.0    | 10290.0   | 13720.0   | 14.00                      | 6.16                       | 30.88     | 50.66     |
| 3460.0             | 6920.0    | 10380.0   | 13840.0   | 13.97                      | 5.74                       | 31.03     | 50.59     |
| 3490.0             | 6980.0    | 10470.0   | 13960.0   | 13.67                      | 6.28                       | 31.01     | 50.64     |
| 3520.0             | 7040.0    | 10560.0   | 14080.0   | 13.60                      | 5.79                       | 29.73     | 47.58     |
| 3550.0             | 7100.0    | 10650.0   | 14200.0   | 13.58                      | 5.57                       | 29.66     | 45.42     |
| 3580.0             | 7160.0    | 10740.0   | 14320.0   | 14.22                      | 5.44                       | 29.37     | 43.79     |
| 3610.0             | 7220.0    | 10830.0   | 14440.0   | 14.65                      | 4.48                       | 28.90     | 43.00     |
| 3640.0             | 7280.0    | 10920.0   | 14560.0   | 14.86                      | 4.29                       | 29.57     | 41.92     |
| 3670.0             | 7340.0    | 11010.0   | 14680.0   | 15.03                      | 4.36                       | 29.42     | 41.92     |
| 3700.0             | 7400.0    | 11100.0   | 14800.0   | 15.41                      | 3.62                       | 29.58     | 41.08     |
| 3730.0             | 7460.0    | 11190.0   | 14920.0   | 15.44                      | 3.54                       | 29.20     | 41.22     |
| 3760.0             | 7520.0    | 11280.0   | 15040.0   | 15.77                      | 3.31                       | 29.15     | 39.88     |
| 3790.0             | 7580.0    | 11370.0   | 15160.0   | 16.02                      | 2.52                       | 29.45     | 38.60     |
| 3820.0             | 7640.0    | 11460.0   | 15280.0   | 16.26                      | 2.19                       | 28.26     | 37.09     |
| 3850.0             | 7700.0    | 11550.0   | 15400.0   | 16.62                      | 1.92                       | 35.20     | 36.96     |
| 3880.0             | 7760.0    | 11640.0   | 15520.0   | 17.08                      | 1.40                       | 34.52     | 36.89     |
| 3910.0             | 7820.0    | 11730.0   | 15640.0   | 17.30                      | 1.48                       | 32.56     | 38.77     |
| 3940.0             | 7880.0    | 11820.0   | 15760.0   | 17.13                      | 1.12                       | 31.44     | 38.52     |
| 3970.0             | 7940.0    | 11910.0   | 15880.0   | 16.97                      | 0.99                       | 31.57     | 39.38     |
| 4000.0             | 8000.0    | 12000.0   | 16000.0   | 17.23                      | 1.13                       | 30.89     | 39.85     |

\* Harmonic Output below power level of X3 Output.



# Frequency Multiplier (Tripler)

**RMK-3-123+**

## Typical Performance Data

Test Conditions: RF Input Power = 17 dBm @ +85°C

| FREQUENCY<br>(MHz) |           |           |           | CONVERSION<br>LOSS<br>(dB) | HARMONIC OUTPUT*<br>(-dBc) |           |           |
|--------------------|-----------|-----------|-----------|----------------------------|----------------------------|-----------|-----------|
| X1 OUTPUT          | X2 OUTPUT | X3 OUTPUT | X4 OUTPUT | X3 OUTPUT                  | X1 OUTPUT                  | X2 OUTPUT | X4 OUTPUT |
| 2200.0             | 4400.0    | 6600.0    | 8800.0    | 16.86                      | 10.19                      | 45.43     | 49.01     |
| 2250.0             | 4500.0    | 6750.0    | 9000.0    | 16.19                      | 10.40                      | 46.07     | 49.64     |
| 2300.0             | 4600.0    | 6900.0    | 9200.0    | 15.97                      | 10.66                      | 45.60     | 51.50     |
| 2350.0             | 4700.0    | 7050.0    | 9400.0    | 15.14                      | 10.88                      | 45.15     | 52.22     |
| 2400.0             | 4800.0    | 7200.0    | 9600.0    | 15.39                      | 10.45                      | 44.65     | 53.24     |
| 2450.0             | 4900.0    | 7350.0    | 9800.0    | 15.55                      | 9.93                       | 43.40     | 51.74     |
| 2500.0             | 5000.0    | 7500.0    | 10000.0   | 16.05                      | 9.20                       | 42.79     | 44.08     |
| 2550.0             | 5100.0    | 7650.0    | 10200.0   | 16.99                      | 8.16                       | 42.48     | 35.30     |
| 2600.0             | 5200.0    | 7800.0    | 10400.0   | 15.97                      | 8.71                       | 44.34     | 42.30     |
| 2650.0             | 5300.0    | 7950.0    | 10600.0   | 16.00                      | 8.81                       | 43.47     | 46.48     |
| 2700.0             | 5400.0    | 8100.0    | 10800.0   | 15.84                      | 8.53                       | 43.10     | 48.30     |
| 2750.0             | 5500.0    | 8250.0    | 11000.0   | 16.08                      | 8.11                       | 42.85     | 49.79     |
| 2800.0             | 5600.0    | 8400.0    | 11200.0   | 16.21                      | 7.84                       | 42.07     | 51.31     |
| 2850.0             | 5700.0    | 8550.0    | 11400.0   | 16.17                      | 7.57                       | 40.66     | 50.20     |
| 2900.0             | 5800.0    | 8700.0    | 11600.0   | 16.31                      | 6.98                       | 39.29     | 51.17     |
| 2950.0             | 5900.0    | 8850.0    | 11800.0   | 16.15                      | 7.03                       | 38.38     | 51.27     |
| 3000.0             | 6000.0    | 9000.0    | 12000.0   | 16.40                      | 6.65                       | 36.94     | 50.75     |
| 3050.0             | 6100.0    | 9150.0    | 12200.0   | 16.55                      | 6.15                       | 35.55     | 52.70     |
| 3100.0             | 6200.0    | 9300.0    | 12400.0   | 16.75                      | 5.75                       | 33.58     | 58.11     |
| 3150.0             | 6300.0    | 9450.0    | 12600.0   | 16.99                      | 5.40                       | 32.51     | 58.99     |
| 3200.0             | 6400.0    | 9600.0    | 12800.0   | 16.53                      | 5.32                       | 32.27     | 57.60     |
| 3240.0             | 6480.0    | 9720.0    | 12960.0   | 16.87                      | 4.99                       | 31.66     | 55.36     |
| 3280.0             | 6560.0    | 9840.0    | 13120.0   | 16.37                      | 5.49                       | 31.47     | 54.67     |
| 3320.0             | 6640.0    | 9960.0    | 13280.0   | 16.65                      | 4.90                       | 30.67     | 52.60     |
| 3360.0             | 6720.0    | 10080.0   | 13440.0   | 16.23                      | 5.17                       | 30.31     | 51.59     |
| 3400.0             | 6800.0    | 10200.0   | 13600.0   | 16.58                      | 4.84                       | 29.80     | 48.94     |
| 3430.0             | 6860.0    | 10290.0   | 13720.0   | 16.56                      | 4.58                       | 29.51     | 47.28     |
| 3460.0             | 6920.0    | 10380.0   | 13840.0   | 16.71                      | 4.07                       | 28.95     | 46.64     |
| 3490.0             | 6980.0    | 10470.0   | 13960.0   | 16.67                      | 4.40                       | 29.22     | 46.54     |
| 3520.0             | 7040.0    | 10560.0   | 14080.0   | 16.83                      | 3.95                       | 28.51     | 44.80     |
| 3550.0             | 7100.0    | 10650.0   | 14200.0   | 16.63                      | 3.45                       | 28.97     | 44.01     |
| 3580.0             | 7160.0    | 10740.0   | 14320.0   | 16.99                      | 3.86                       | 29.07     | 43.55     |
| 3610.0             | 7220.0    | 10830.0   | 14440.0   | 17.42                      | 3.24                       | 28.75     | 43.09     |
| 3640.0             | 7280.0    | 10920.0   | 14560.0   | 17.49                      | 2.49                       | 29.15     | 43.20     |
| 3670.0             | 7340.0    | 11010.0   | 14680.0   | 17.93                      | 2.50                       | 28.71     | 44.72     |
| 3700.0             | 7400.0    | 11100.0   | 14800.0   | 18.13                      | 1.48                       | 28.58     | 45.14     |
| 3730.0             | 7460.0    | 11190.0   | 14920.0   | 18.26                      | 1.41                       | 28.12     | 45.10     |
| 3760.0             | 7520.0    | 11280.0   | 15040.0   | 18.41                      | 1.24                       | 28.39     | 43.85     |
| 3790.0             | 7580.0    | 11370.0   | 15160.0   | 18.54                      | 1.34                       | 27.89     | 42.06     |
| 3820.0             | 7640.0    | 11460.0   | 15280.0   | 18.73                      | 1.07                       | 28.60     | 40.84     |
| 3850.0             | 7700.0    | 11550.0   | 15400.0   | 18.68                      | 1.24                       | 38.48     | 39.89     |
| 3880.0             | 7760.0    | 11640.0   | 15520.0   | 18.76                      | 0.65                       | 37.53     | 41.78     |
| 3910.0             | 7820.0    | 11730.0   | 15640.0   | 18.96                      | 0.61                       | 33.81     | 42.70     |
| 3940.0             | 7880.0    | 11820.0   | 15760.0   | 19.01                      | 0.22                       | 32.36     | 43.69     |
| 3970.0             | 7940.0    | 11910.0   | 15880.0   | 18.83                      | 0.19                       | 32.26     | 43.75     |
| 4000.0             | 8000.0    | 12000.0   | 16000.0   | 19.08                      | 0.37                       | 31.01     | 44.25     |

\* Harmonic Output below power level of X3 Output.

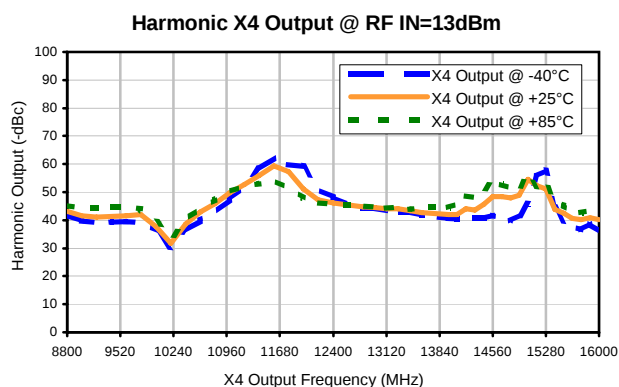
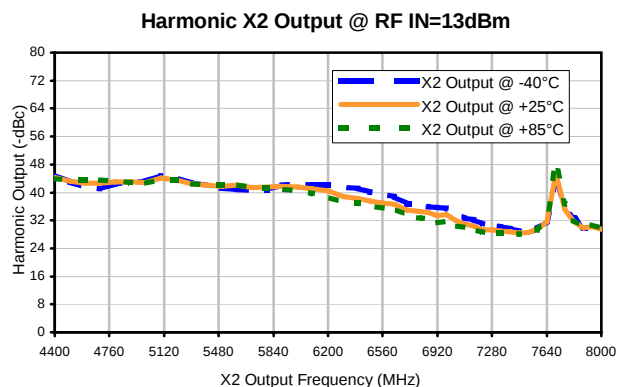
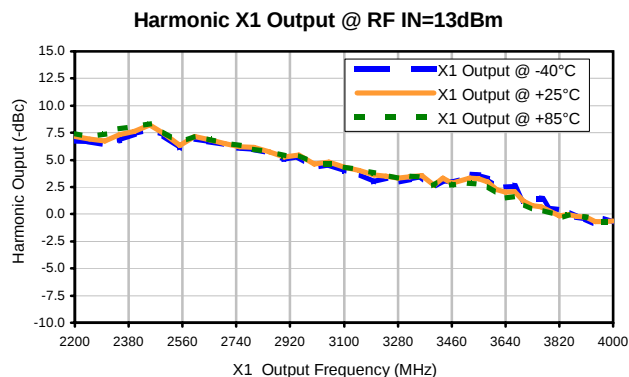
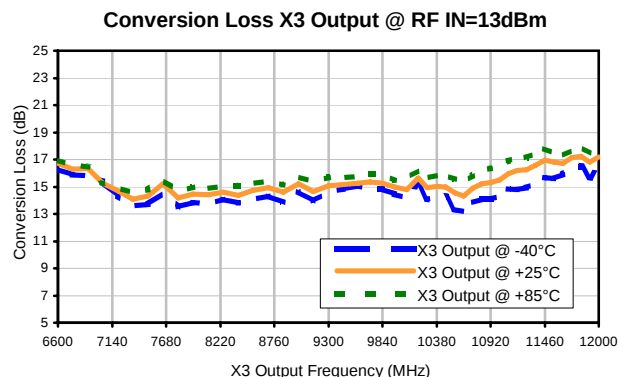


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 I/RF MICROWAVE COMPONENTS

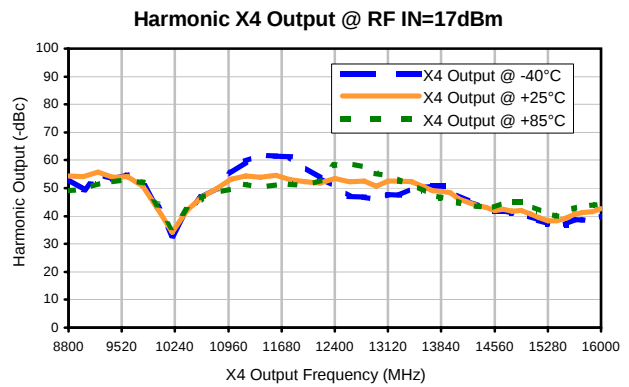
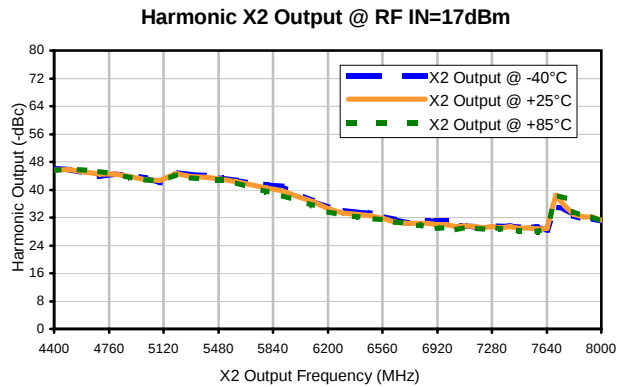
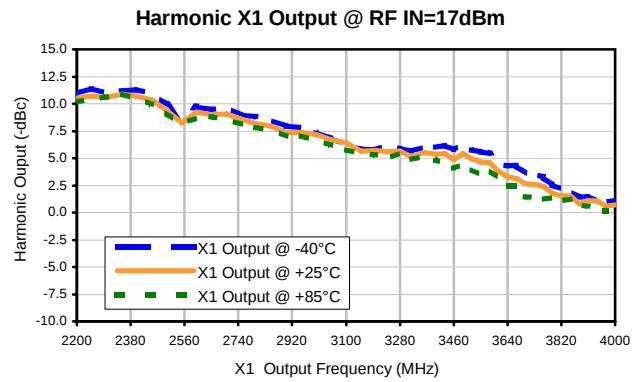
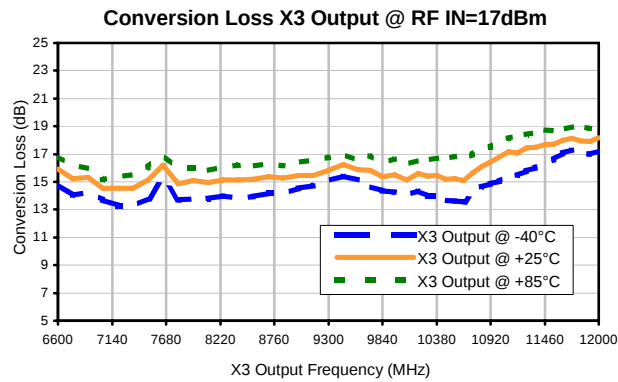


REV. X2  
 RMK-3-123+  
 7/8/2009  
 Page 6 of 6

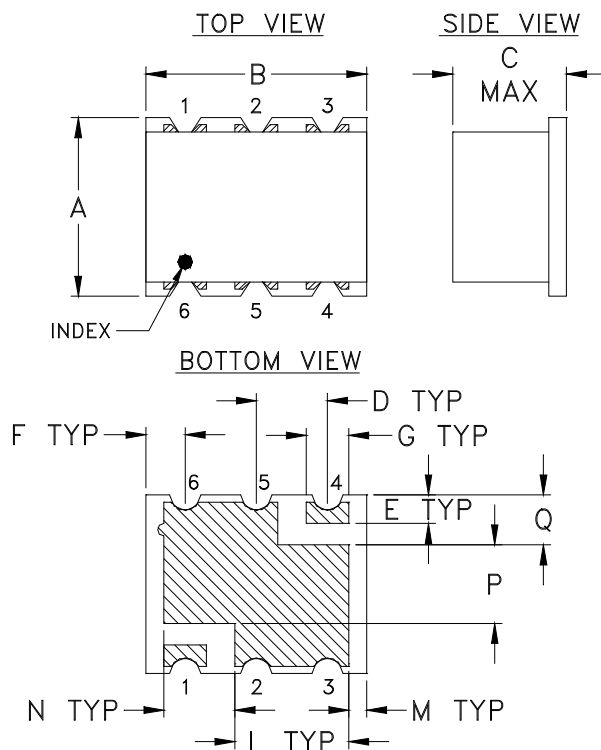
## Typical Performance Curves



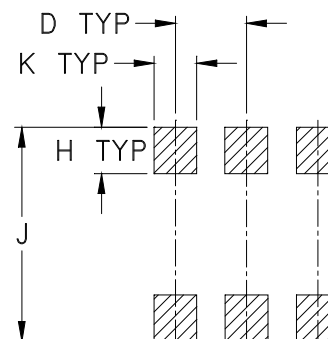
## Typical Performance Curves



### Outline Dimensions



### PCB Land Pattern



Suggested Layout,  
Tolerance to be within  $\pm .002$

| CASE # | A             | B             | C             | D              | E              | F              | G              | H              | J              | K              | L              |
|--------|---------------|---------------|---------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|
| TT1224 | .25<br>(6.35) | .31<br>(7.87) | .16<br>(4.06) | .100<br>(2.54) | .040<br>(1.02) | .055<br>(1.40) | .060<br>(1.52) | .065<br>(1.65) | .300<br>(7.62) | .060<br>(1.52) | .160<br>(4.06) |

| CASE # | M             | N              | P              | Q              | WT. GRAM |
|--------|---------------|----------------|----------------|----------------|----------|
| TT1224 | .025<br>(.64) | .100<br>(2.54) | .110<br>(2.79) | .070<br>(1.78) | .16      |

Dimensions are in inches (mm). Tolerances: 2Pl.  $\pm .01$ ; 3 Pl.  $\pm .005$

### Notes:

- Case material: Plastic.
- Termination: 2-10  $\mu$  inch (.05-.25 microns) Gold over 100-300  $\mu$  inch (2.54-7.62 microns) Nickel plate



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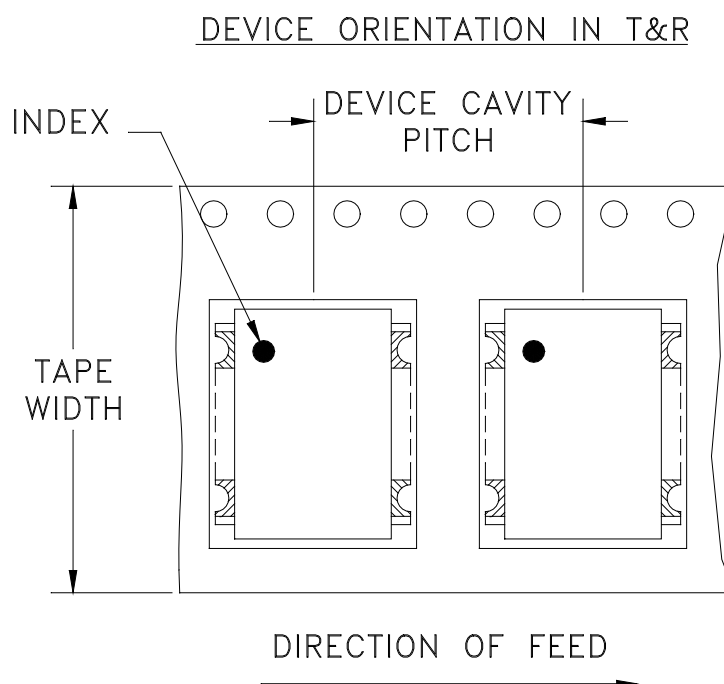


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RF/IF MICROWAVE COMPONENTS



# Tape & Reel Packaging TR-F2



| Tape Width, mm | Device Cavity Pitch, mm | Reel Size, inches | Devices per Reel<br>See note |
|----------------|-------------------------|-------------------|------------------------------|
| 16             | 12                      | 7                 | 10                           |
|                |                         |                   | 20                           |
|                |                         |                   | 50                           |
|                |                         |                   | 100                          |
|                |                         |                   | 200                          |
|                |                         | 13                | 500                          |
|                |                         |                   | 1000                         |

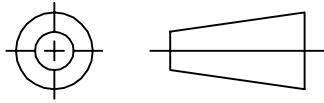
Mini-Circuits carrier tape materials provide protection from ESD (Electro-Static Discharge) during handling and transportation. Tapes are static dissipative and comply with industry standards EIA-481/EIA-541.

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## THIRD ANGLE PROJECTION

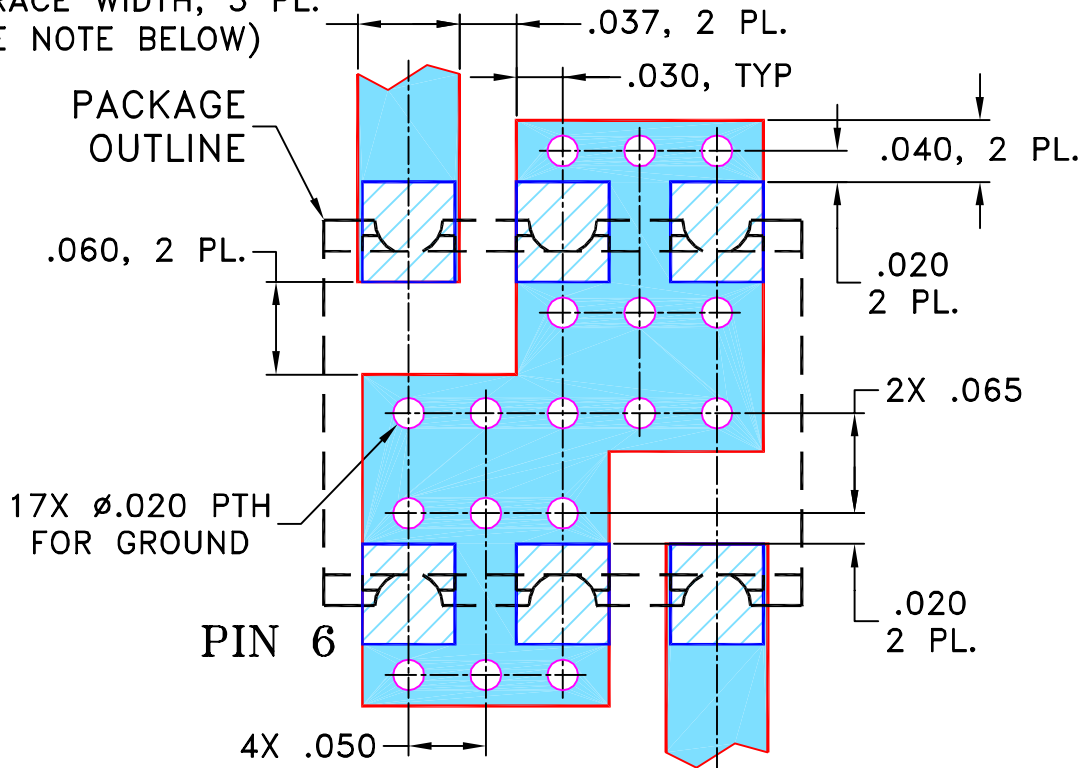


## REVISIONS

| REV | ECN No. | DESCRIPTION | DATE     | DR | AUTH |
|-----|---------|-------------|----------|----|------|
| OR  | M108897 | NEW RELEASE | 01/04/07 | AV | DJ   |
|     |         |             |          |    |      |
|     |         |             |          |    |      |

### SUGGESTED MOUNTING CONFIGURATION FOR TT1224 CASE STYLE "rv" PIN CONNECTION

.066 TRACE WIDTH, 3 PL.  
(SEE NOTE BELOW)



- NOTES: 1. TRACE WIDTH IS SHOWN FOR ROGERS R04350B WITH DIELECTRIC THICKNESS .030"  $\pm$  .002"; COPPER: 1/2 OZ. EACH SIDE. FOR OTHER MATERIALS TRACE WIDTH MAY NEED TO BE MODIFIED.
2. BOTTOM SIDE OF THE PCB IS CONTINUOUS GROUND PLANE.



DENOTES PCB COPPER LAYOUT WITH SMOBC  
(SOLDER MASK OVER BARE COPPER)



DENOTES COPPER LAND PATTERN FREE OF SOLDER MASK

UNLESS OTHERWISE SPECIFIED

INITIALS

DATE

DIMENSIONS ARE IN INCHES

DRAWN

AV

12/14/06

TOLERANCES ON:

CHECKED

IL

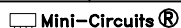
01/04/07

2 PL DECIMALS  $\pm$ 

APPROVED

DJ

01/04/07

3 PL DECIMALS  $\pm$  .005ANGLES  $\pm$ FRACTIONS  $\pm$ 

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ASHEETA1.DWG REV:A DATE:01/12/95



# Mini-Circuits®

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Brooklyn NY 11235

## PL, rv, TT1224, RMK-3-662+, TB-393

SIZE  
A

CODE IDENT  
15542

DRAWING NO:  
98-PL-258

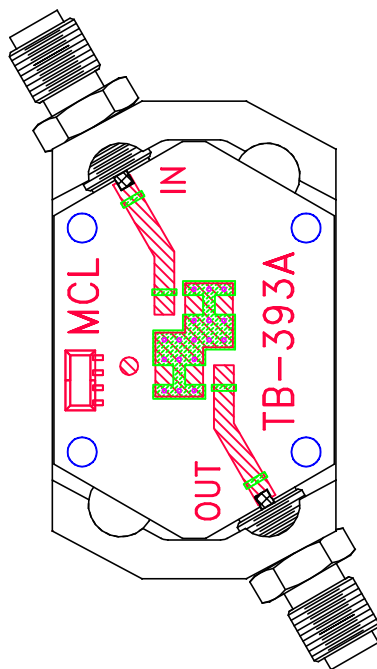
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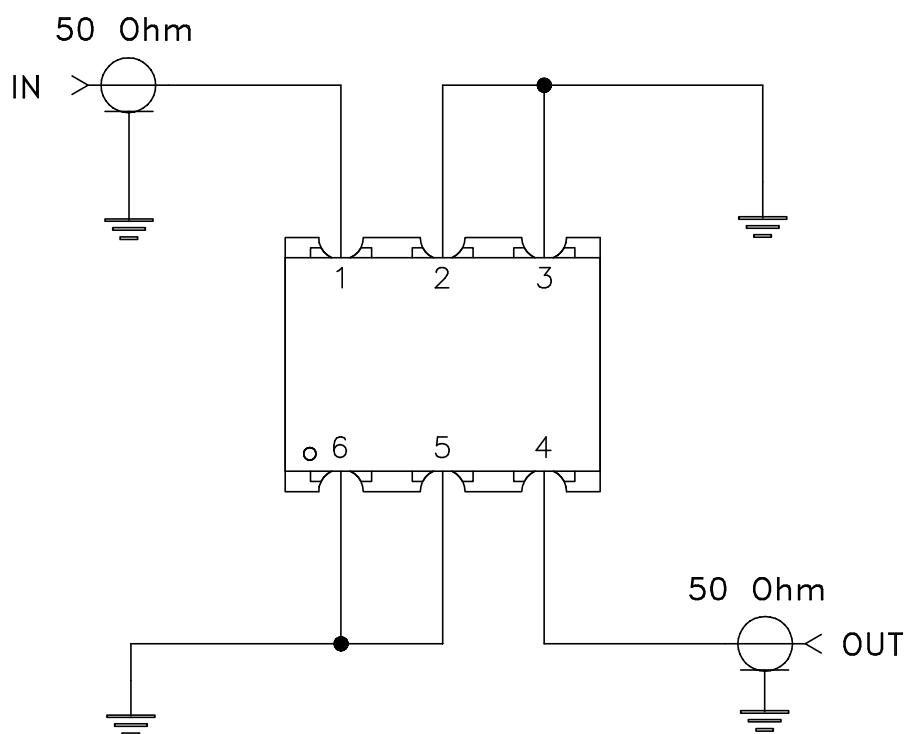
SCALE: 8:1

SHEET: 1 OF 1

# Evaluation Board and Circuit



TB-393



Schematic Diagram

## Notes:

1. SMA Female connectors.
2. PCB Material: Rogers R04350 or equivalent,  
Dielectric Constant=3.5, Thickness=.030 inch.

 Mini-Circuits®



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<br>Ambient Environment                                                                                                                             | Individual Model Data Sheet                                                                          |
| Storage Temperature            | -55° to 100° C<br>Ambient Environment                                                                                                                           | Individual Model Data Sheet                                                                          |
| Humidity                       | 90 to 95% RH, 240 hours, 50°C                                                                                                                                   | MIL-STD-202, Method 103, Condition A, Except 50°C and end-point electrical test done within 12 hours |
| Thermal Shock                  | -55° to 100°C, 100 cycles                                                                                                                                       | MIL-STD-202, Method 107, Condition A-3, except +100°C                                                |
| Solder Reflow Heat             | Sn-Pb Eutetic Process: 225°C peak<br>Pb-Free Process 245° - 250°C peak                                                                                          | J-STD-020, Table 4-1, 4-2 and 5-2, Figure 5-1                                                        |
| Solderability                  | 10X Magnification                                                                                                                                               | J-STD-002, 95% Coverage                                                                              |
| 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               | 50g, 11 ms, 1/2-sine, 18 shocks: 3 each direction, each of 3 axes                                                                                               | MIL-STD-202, Method 213, Condition A                                                                 |
| Marking Resistance to Solvents | Isopropyl alcohol + mineral spirits at 25°C; terpene defluxer at 25°C;<br>distilled water + proylene glycol monomethyl ether + monoethanolamine at 63°C to 70°C | MIL-STD-202, Method 215                                                                              |