

50Ω High Output 5 to 150 MHz

## Maximum Ratings

|                       |                |
|-----------------------|----------------|
| Operating Temperature | -55°C to 100°C |
| Storage Temperature   | -55°C to 100°C |
| Input Power           | 50mW           |
| Peak IF current       | 20mA           |

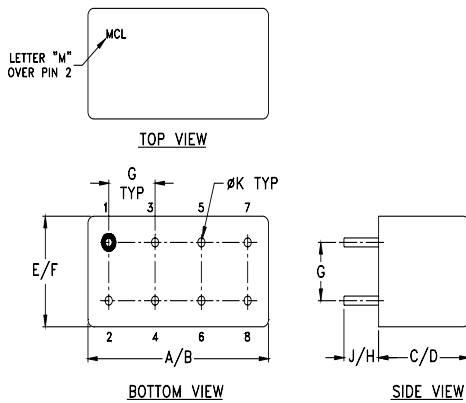
Permanent damage may occur if any of these limits are exceeded.

## Pin Connections

|              |         |
|--------------|---------|
| RF REF (RF2) | 8       |
| RF IN (RF1)  | 1       |
| DC OUT (I)   | 3,4^    |
| GROUND       | 2,5,6,7 |
| CASE GROUND  | 2       |

^ pins must be connected together externally

## Outline Drawing



## Outline Dimensions (inch mm)

|       |       |      |       |       |       |
|-------|-------|------|-------|-------|-------|
| A     | B     | C    | D     | E     | F     |
| .770  | .800  | .385 | .400  | .370  | .400  |
| 19.56 | 20.32 | 9.78 | 10.16 | 9.40  | 10.16 |
| G     | H     | J    | K     |       |       |
| .200  | .20   | .14  | .031  |       |       |
| 5.08  | 5.08  | 3.56 | 0.79  |       |       |
|       |       |      |       | wt    |       |
|       |       |      |       | grams |       |
|       |       |      |       | 5.2   |       |

## Features

- wideband, 5 to 150 MHz
- hermetic case
- low DC offset, 0.3 mV typ.
- high DC output, 1000 mV typ.

## Applications

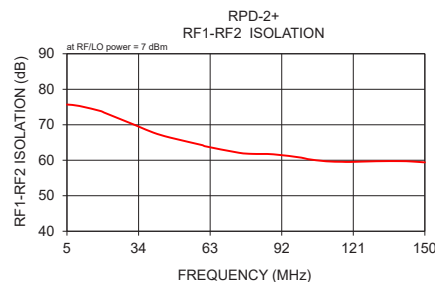
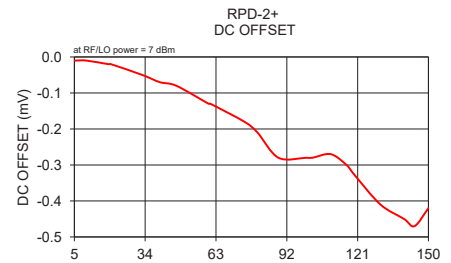
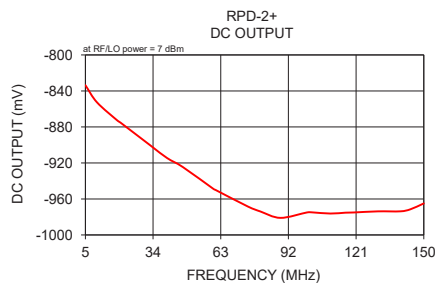
- monitoring circuits
- leveling circuits
- PLL

## Phase Detector Electrical Specifications

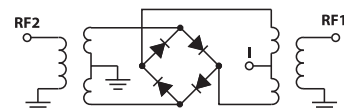
| FREQUENCY (MHz) | POWER IN | SCALE FACTOR | IMPEDANCE (ohms) | ISOLATION (dB) | OUTPUT POLARITY | DC OUTPUT (mV)      | FIGURE OF MERIT    |
|-----------------|----------|--------------|------------------|----------------|-----------------|---------------------|--------------------|
| RF1             | RF1      |              |                  |                |                 | Max.                |                    |
| RF2             | RF2      |              |                  |                |                 | Offset              |                    |
|                 | (dBm)    | mV/deg.      | Output Load I    | RF1/RF2        | RF1/RF2         | Typ. Min. Typ. Max. | Typ.               |
| 5-150           | DC-50    | 7            | 8                | 500            | 40              | neg.                | 1000 700 0.3 1 143 |

## Typical Performance Data

| Frequency (MHz) | DC Output mV       | DC Offset mV       | RF1-RF2 Isolation (dB) |
|-----------------|--------------------|--------------------|------------------------|
|                 | $\bar{X}$ $\sigma$ | $\bar{X}$ $\sigma$ | $\bar{X}$              |
| 5.00            | -833.63 2.72       | -0.01 0.26         | 75.70                  |
| 10.00           | -852.76 1.95       | -0.01 0.27         | 75.30                  |
| 18.93           | -873.33 1.77       | -0.02 0.26         | 73.81                  |
| 20.00           | -875.10 1.78       | -0.02 0.26         | 73.45                  |
| 32.86           | -900.53 2.55       | -0.05 0.24         | 69.84                  |
| 40.00           | -914.52 3.03       | -0.07 0.24         | 67.79                  |
| 46.79           | -924.59 3.49       | -0.08 0.23         | 66.39                  |
| 60.00           | -949.07 4.67       | -0.13 0.23         | 64.23                  |
| 60.71           | -949.90 4.72       | -0.13 0.23         | 63.98                  |
| 74.64           | -968.41 6.47       | -0.18 0.22         | 62.11                  |
| 80.00           | -973.90 7.19       | -0.21 0.22         | 61.80                  |
| 88.57           | -981.00 8.49       | -0.28 0.23         | 61.68                  |
| 100.00          | -974.94 9.96       | -0.28 0.26         | 60.73                  |
| 102.50          | -974.94 10.38      | -0.28 0.27         | 60.33                  |
| 110.00          | -976.18 11.49      | -0.27 0.25         | 59.71                  |
| 116.43          | -975.23 12.62      | -0.30 0.23         | 59.57                  |
| 120.00          | -975.00 13.37      | -0.33 0.22         | 59.53                  |
| 130.36          | -973.76 16.20      | -0.41 0.19         | 59.73                  |
| 140.00          | -973.73 19.18      | -0.45 0.22         | 59.76                  |
| 144.29          | -971.46 20.99      | -0.47 0.25         | 59.67                  |
| 150.00          | -964.95 23.54      | -0.42 0.33         | 59.40                  |



## electrical schematic



## Notes

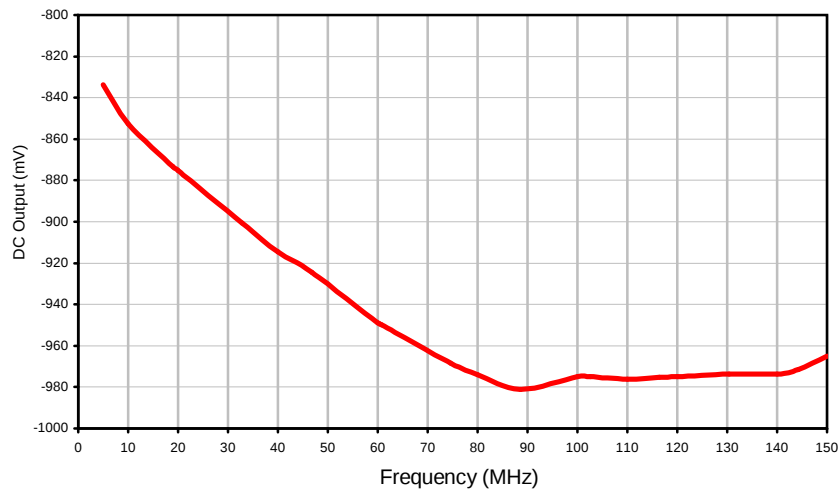
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## Typical Performance Data

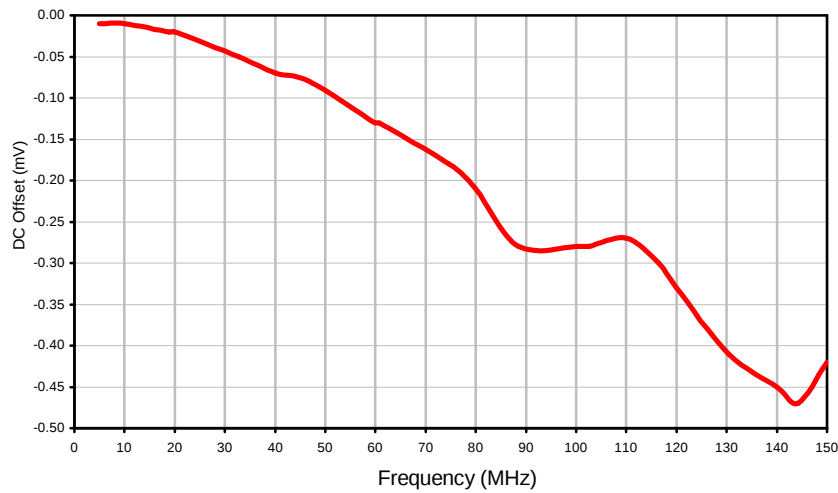
| FREQUENCY<br>(MHz) | DC OUTPUT<br>(mV) | DC OFFSET<br>(mV) | RF1-RF2<br>ISOLATION<br>(dB) |
|--------------------|-------------------|-------------------|------------------------------|
| 5.00               | -833.63           | -0.01             | 75.70                        |
| 10.00              | -852.76           | -0.01             | 75.30                        |
| 18.93              | -873.33           | -0.02             | 73.81                        |
| 20.00              | -875.10           | -0.02             | 73.45                        |
| 32.86              | -900.53           | -0.05             | 69.84                        |
| 40.00              | -914.52           | -0.07             | 67.79                        |
| 46.79              | -924.59           | -0.08             | 66.39                        |
| 60.00              | -949.07           | -0.13             | 64.23                        |
| 60.71              | -949.90           | -0.13             | 63.98                        |
| 74.64              | -968.41           | -0.18             | 62.11                        |
| 80.00              | -973.90           | -0.21             | 61.80                        |
| 88.57              | -981.00           | -0.28             | 61.68                        |
| 100.00             | -974.94           | -0.28             | 60.73                        |
| 102.50             | -974.94           | -0.28             | 60.33                        |
| 110.00             | -976.18           | -0.27             | 59.71                        |
| 116.43             | -975.23           | -0.30             | 59.57                        |
| 120.00             | -975.00           | -0.33             | 59.53                        |
| 130.36             | -973.76           | -0.41             | 59.73                        |
| 140.00             | -973.73           | -0.45             | 59.76                        |
| 144.29             | -971.46           | -0.47             | 59.67                        |
| 150.00             | -964.95           | -0.42             | 59.40                        |

## Typical Performance Curves

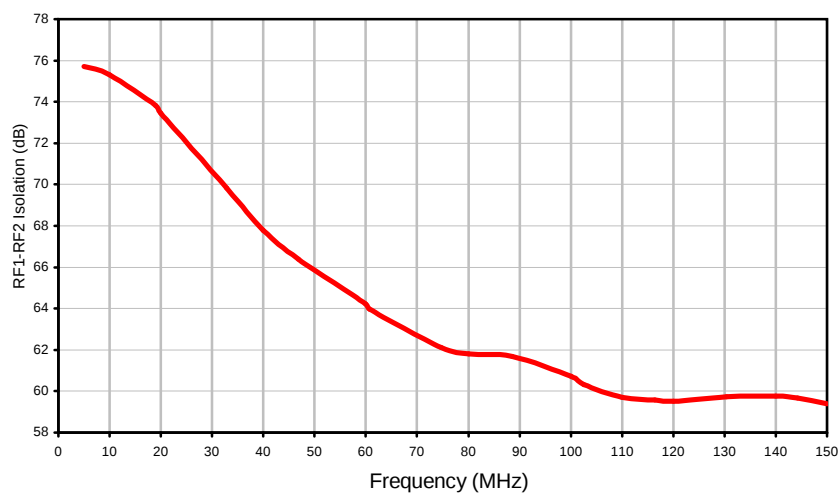
DC Output



DC Offset

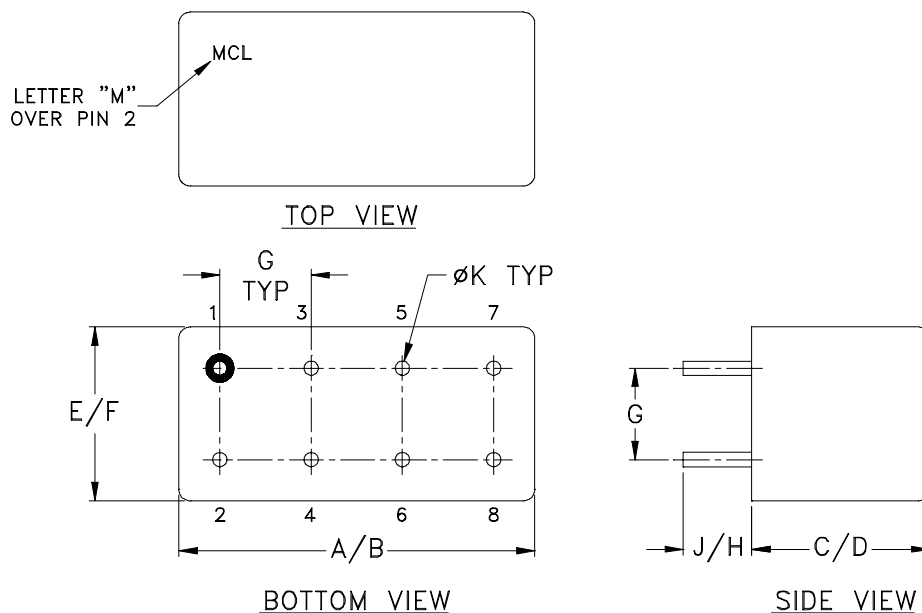


RF1-RF2 Isolation



A01  
A04  
A05  
A06

## Outline Dimensions



| CASE# | A               | B               | C              | D               | E              | F               | G              | H             | J             | K             | WT,<br>GRAM |
|-------|-----------------|-----------------|----------------|-----------------|----------------|-----------------|----------------|---------------|---------------|---------------|-------------|
| A01   | .770<br>(19.56) | .800<br>(20.32) | .385<br>(9.78) | .400<br>(10.16) | .370<br>(9.40) | .400<br>(10.16) | .200<br>(5.08) | .20<br>(5.08) | .14<br>(3.56) | .031<br>(.79) | 5.2         |
| A04   |                 |                 | .200<br>(5.08) | .210<br>(5.33)  |                |                 |                |               |               |               | 3.7         |
| A05   |                 |                 | .240<br>(6.10) | .250<br>(6.35)  |                |                 |                |               |               |               | 3.7         |
| A06   |                 |                 | .285<br>(7.24) | .310<br>(7.87)  |                |                 |                |               |               |               | 5.2         |

Dimensions are in inches (mm). Tolerances: 2 Pl.  $\pm .03$ ; 3 Pl.  $\pm .015$

### Notes:

- Header material: C.R.S.  
Pin material: #52 alloy.  
Cover material: Cupro-Nickel.
- Pin finish: Electro Tin-Silver.
- Insulated spacer available. Request P/N B14-045-01.
- Tolerance on pin diameter  $\pm .005$  inch.
- Glass meniscus 0.015 inch max.
- Blue bead indicates Pin 1. Pin numbers do not appear on unit, for reference only.



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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          | -55° to 100° C<br>Ambient Environment                                                                                                                           | Individual Model Data Sheet                                                                          |
| Storage Temperature            | -55° to 100° C<br>Ambient Environment                                                                                                                           | Individual Model Data Sheet                                                                          |
| Thermal Shock                  | -55° to 100°C, 100 cycles                                                                                                                                       | MIL-STD-202, Method 107, Condition A-3, except +100°C                                                |
| 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                                                                 |
| Moisture Resistance            | 10 cycles, 24 hours per cycle                                                                                                                                   | MIL-STD-202, Method 106, Condition A, except 50°C and end point electrical test done within 12 hours |
| Solderability                  | 10X Magnification                                                                                                                                               | J-STD-002, 95% Coverage                                                                              |
| Resistance to Solder Heat      | 260°C for 10 seconds                                                                                                                                            | MIL-STD-202, Method 210, Condition B                                                                 |
| 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                                                                              |
| Terminal Strength              | 4 1/2 Pound Pull                                                                                                                                                | MIL-STD-202, Method 211, Condition A                                                                 |



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| Specification       | Test/Inspection Condition | Reference/Spec                       |
|---------------------|---------------------------|--------------------------------------|
| Gross Leak          | 125°C Bubble Test         | MIL-STD-202, Method 112, Condition D |
| Barometric Pressure | 100,000 Feet              | MIL-STD-202, Method 105, Condition D |