

# Open Carrier Double-Balanced Mixer For Microwave Telecommunications

**MC4113**  
V2

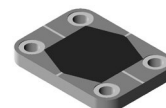
## Features

- LO & RF: 2.0 TO 10.0 GHz
- IF: DC TO 2.0 GHz
- LO DRIVE: +13 dBm (NOMINAL)
- MICROSTRIP INTERFACE

## Description

The MC4113 is a double balanced mixer, designed for use in military, commercial and test equipment applications. The design utilizes Schottky ring quad diodes and broadband soft dielectric and ferrite baluns to attain excellent performance. This mixer can also be used as a phase detector and/or bi-phase modulator since the IF port is DC coupled to the diodes. The use of high temperature solder and welded assembly processes used internally makes it ideal for use in manual, semi-automated assembly. Environmental screening available to MIL-STD-883, MIL-STD-202, or MIL-DTL-28837, consult factory.

## Product Image



## Ordering Information

| Part Number | Package      |
|-------------|--------------|
| MC4113      | Open Carrier |
| MC4113-2    | Open Carrier |

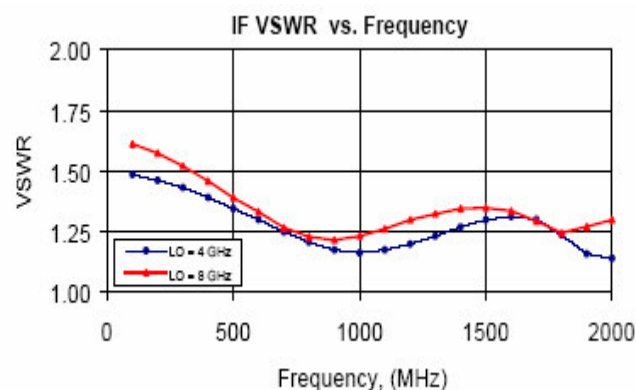
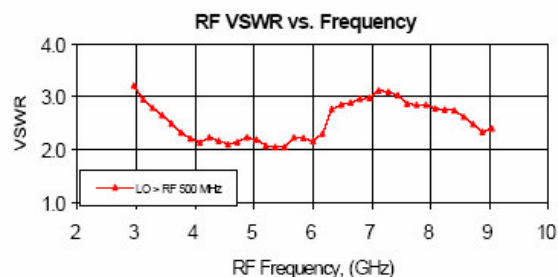
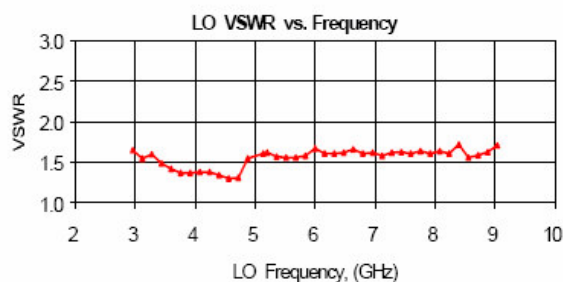
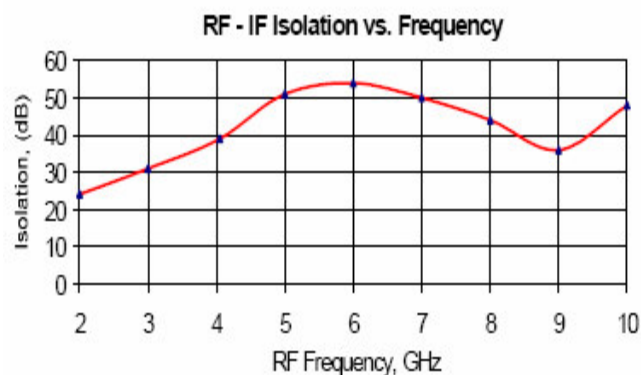
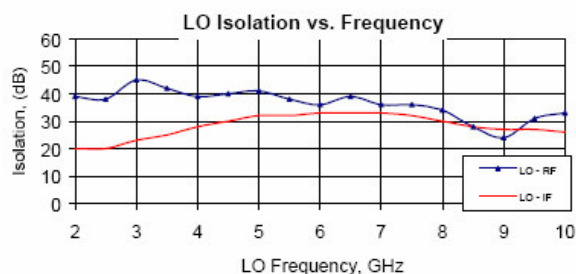
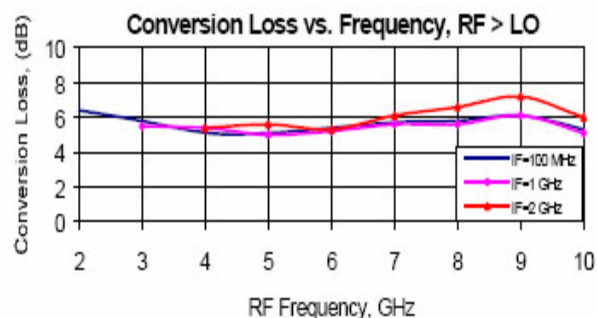
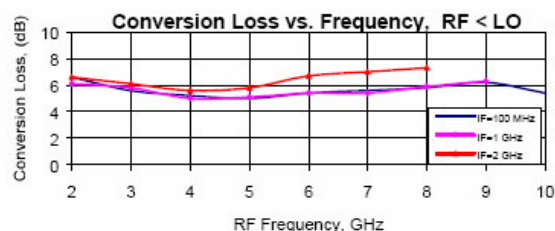
## Electrical Specifications: $Z_0 = 50\Omega$ $L_o = +13$ dBm (Downconverter application only)

| Parameter                                          | Test Conditions                                                        | Units | Typical | Guaranteed |               |
|----------------------------------------------------|------------------------------------------------------------------------|-------|---------|------------|---------------|
|                                                    |                                                                        |       |         | +25°C      | -54° to +85°C |
| SSB Conversion Loss (max) & SSB Noise Figure (max) | fR = 4 to 8 GHz, fL = 4 to 8 GHz, fl = 0 to 1 GHz                      | dB    | 5.5     | 6.5        | 7.0           |
|                                                    | fR = 3 to 9 GHz, fL = 3 to 9 GHz, fl = 0 to 1.5 GHz                    | dB    | 6.5     | 7.5        | 8.0           |
|                                                    | fR = 2 to 10 GHz, fL = 2 to 10 GHz, fl = 0 to 2 GHz                    | dB    | 7.3     | 8.0        | 8.5           |
| Isolation, L to R (min)                            | fR = 4 to 8 GHz                                                        | dB    | 35      | 28         | 25            |
|                                                    | fR = 3 to 9 GHz                                                        | dB    | 23      | 17         | 15            |
|                                                    | fR = 2 to 10 GHz                                                       | dB    | 23      | 17         | 15            |
| Isolation, L to I (min)                            | fR = 4 to 8 GHz                                                        | dB    | 27      | 20         | 18            |
|                                                    | fR = 3 to 9 GHz                                                        | dB    | 22      | 15         | 13            |
|                                                    | fR = 2 to 10 GHz                                                       | dB    | 20      | 12         | 10            |
| Isolation, R to I (min)                            | fl = 2 to 10 GHz                                                       | dB    | 30      |            |               |
| 1 dB Conversion Comp.                              | fl = +13 dBm                                                           | dBm   | +6      |            |               |
| Input IP3                                          | fR1 = 3.9 GHz at -5 dBm, fR2 = 3.92 at -5 dBm, fl = 4.2 GHz at +13 dBm | dBm   | +14     |            |               |
|                                                    | fR1 = 7.4 GHz at -5 dBm, fR2 = 7.42 at -5 dBm, fl = 6.4 GHz at +13 dBm | dBm   | +17     |            |               |

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## Typical Performance Curves



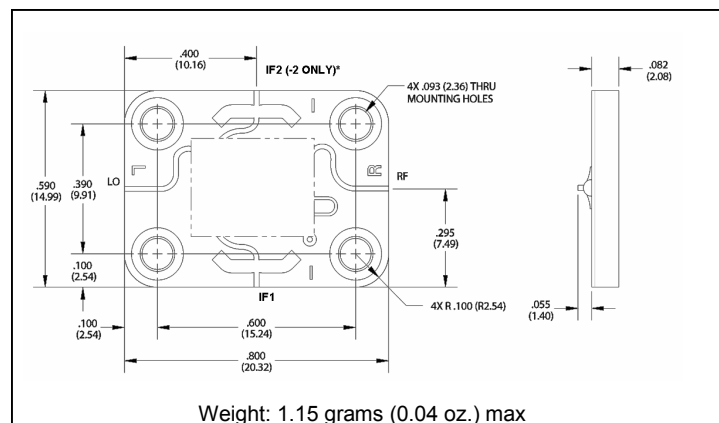
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## Absolute Maximum Ratings

| Parameter             | Absolute Maximum                           |
|-----------------------|--------------------------------------------|
| Operating Temperature | -40°C to +85°C                             |
| Storage Temperature   | -65°C to +100°C                            |
| Peak Input Power      | +20 dBm max @ +25°C<br>+17 dBm max @ +85°C |
| Peak Input Current    | 50 mA DC                                   |

## Outline Drawing: Open Carrier \* MC4113



\*For the base model, only IF1 port is connected.  
For the “-2” model only, the IF2 port is connected.

\* Dimensions are inches (millimeters) ±0.015 (0.38) unless otherwise specified.