



Mini-Circuits®

ULTRA-SMALL CERAMIC

## Power Splitter/Combiner

QCN-19D+

2 Way-90° 50Ω 1100 to 1925 MHz

## FEATURES

- Low insertion loss, 0.4 dB typ.
- High isolation, 26 dB typ.
- Wrap-around terminal for excellent solderability
- Ultra small, 0.12"X0.06"X0.035"
- Patent pending



Generic photo used for illustration purposes only

CASE STYLE: FV1206-1

**+RoHS Compliant**

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

## APPLICATIONS

- Balanced amplifiers
- Modulators
- GPS
- PCS/DCS

## ELECTRICAL SPECIFICATIONS AT +25°C

| Parameter                            | Frequency (MHz) | Min. | Typ. | Max. | Unit   |
|--------------------------------------|-----------------|------|------|------|--------|
| Frequency Range                      |                 | 1100 |      | 1925 | MHz    |
| Average Insertion Loss, above 3.0 dB | 1100-1400       |      | 0.4  | 0.7  | dB     |
|                                      | 1400-1600       |      | 0.4  | 0.8  |        |
|                                      | 1600-1925       |      | 0.5  | 0.9  |        |
| Isolation                            | 1100-1400       | 19   | 25   |      | dB     |
|                                      | 1400-1600       | 20   | 26   |      |        |
|                                      | 1600-1925       | 20   | 26   |      |        |
| Phase Unbalance                      | 1100-1400       |      | 1    | 3    | Degree |
|                                      | 1400-1600       |      | 2    | 4    |        |
|                                      | 1600-1925       |      | 2    | 4    |        |
| Amplitude Unbalance                  | 1100-1400       |      | 0.4  | 1.1  | dB     |
|                                      | 1400-1600       |      | 0.5  | 1.0  |        |
|                                      | 1600-1925       |      | 0.4  | 1.1  |        |
| VSWR                                 | 1100-1400       |      | 1.15 |      | (:1)   |
|                                      | 1400-1600       |      | 1.2  |      |        |
|                                      | 1600-1925       |      | 1.2  |      |        |

1. For applications requiring DC voltage to be applied to the RF ports. DC resistance to ground is 100 Mohms min.

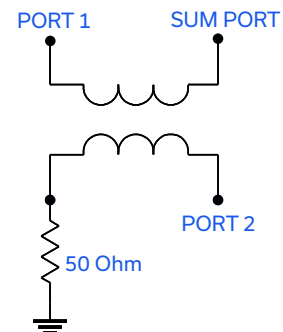
## ABSOLUTE MAXIMUM RATINGS

| Parameter                   | Ratings         |
|-----------------------------|-----------------|
| Operating Temperature       | -55°C to +100°C |
| Storage Temperature         | -55°C to +100°C |
| Power Input (as a splitter) | 15 W* max.      |

\* Derate linearly to 7 W at +100°C ambient.

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

## ELECTRICAL SCHEMATIC (NOTE 1)



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## PIN CONNECTIONS

|                      |     |
|----------------------|-----|
| SUM PORT             | 1   |
| PORT 1 (0°)          | 4   |
| PORT 2 (+90°)        | 6   |
| GROUND               | 2,5 |
| 50 OHM TERM EXTERNAL | 3   |

PRODUCT MARKING: PJ

DEMO BOARD MCL P/N: TB-QCN-19D+  
SUGGESTED PCB LAYOUT (PL-131)



NOTES: 1. TRACE WIDTH IS SHOWN FOR ROGERS RO4350B WITH DIELECTRIC THICKNESS  $0.020" \pm 0.0015"$ ; COPPER: 1/2 OZ. EACH SIDE. FOR OTHER MATERIALS TRACE WIDTH MAY NEED TO BE MODIFIED.

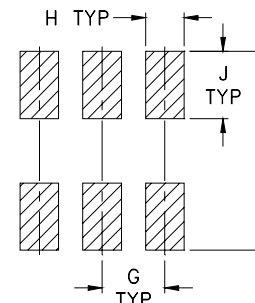
2. BOTTOM SIDE OF THE PCB IS CONTINUOUS GROUND PLANE.

-  DENOTES PCB COPPER LAYOUT WITH SMOBC (SOLDER MASK OVER BARE COPPER)
-  DENOTES COPPER LAND PATTERN FREE OF SOLDER MASK

## OUTLINE DRAWING



## PCB Land Pattern



Suggested Layout,  
Tolerance to be within  $\pm 0.002$

## OUTLINE DIMENSIONS (Inches/mm)

| A    | B    | C    | D    | E    | F     |
|------|------|------|------|------|-------|
| .126 | .063 | .035 | .024 | .022 | .011  |
| 3.20 | 1.60 | 0.89 | 0.61 | 0.56 | 0.28  |
| G    | H    | J    | K    |      | wt    |
| .039 | .024 | .042 | .123 |      | grams |
| 0.99 | 0.61 | 1.07 | 3.12 |      | .020  |

## TAPE &amp; REEL INFORMATION: F75

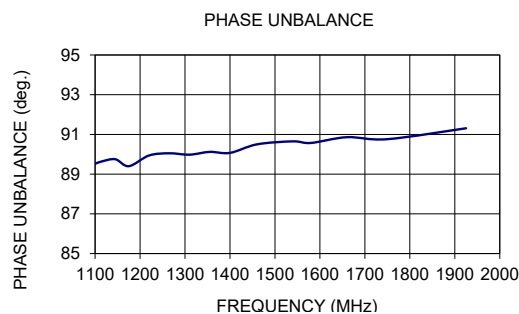
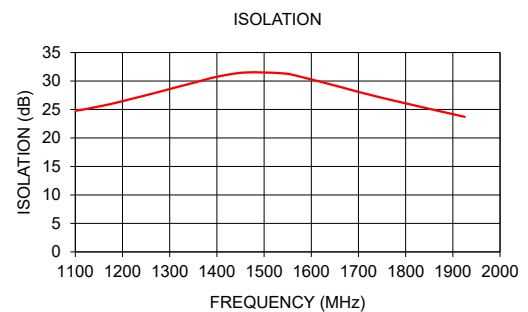
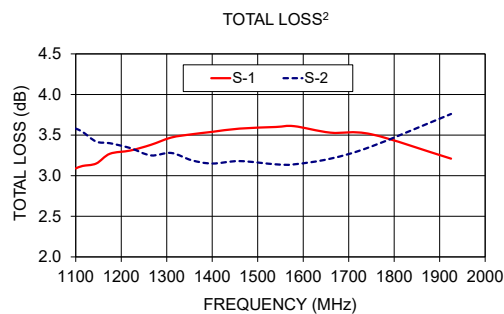




## TYPICAL PERFORMANCE DATA

| Frequency (MHz) | Total Loss <sup>2</sup> (dB) |      | Amplitude Unbalance (dB) | Isolation (dB) | Phase Unbalance (deg.) | VSWR (:1) |      |      |
|-----------------|------------------------------|------|--------------------------|----------------|------------------------|-----------|------|------|
|                 | S-1                          | S-2  |                          |                |                        | S         | 1    | 2    |
| 1100            | 3.09                         | 3.58 | 0.49                     | 24.79          | 89.52                  | 1.10      | 1.11 | 1.15 |
| 1115            | 3.12                         | 3.54 | 0.42                     | 24.96          | 89.64                  | 1.09      | 1.10 | 1.14 |
| 1145            | 3.15                         | 3.42 | 0.27                     | 25.45          | 89.75                  | 1.08      | 1.10 | 1.14 |
| 1175            | 3.27                         | 3.40 | 0.13                     | 25.96          | 89.40                  | 1.07      | 1.09 | 1.13 |
| 1220            | 3.31                         | 3.34 | 0.03                     | 26.88          | 89.94                  | 1.06      | 1.08 | 1.12 |
| 1265            | 3.38                         | 3.25 | 0.13                     | 27.82          | 90.05                  | 1.05      | 1.07 | 1.11 |
| 1310            | 3.47                         | 3.28 | 0.19                     | 28.81          | 89.98                  | 1.04      | 1.06 | 1.10 |
| 1355            | 3.51                         | 3.19 | 0.31                     | 29.78          | 90.12                  | 1.04      | 1.05 | 1.09 |
| 1400            | 3.54                         | 3.15 | 0.39                     | 30.74          | 90.07                  | 1.04      | 1.04 | 1.07 |
| 1460            | 3.58                         | 3.18 | 0.39                     | 31.49          | 90.50                  | 1.04      | 1.03 | 1.06 |
| 1540            | 3.60                         | 3.14 | 0.45                     | 31.34          | 90.65                  | 1.06      | 1.02 | 1.04 |
| 1580            | 3.61                         | 3.14 | 0.46                     | 30.69          | 90.57                  | 1.07      | 1.02 | 1.04 |
| 1660            | 3.53                         | 3.21 | 0.32                     | 28.99          | 90.86                  | 1.10      | 1.02 | 1.02 |
| 1750            | 3.51                         | 3.36 | 0.16                     | 27.04          | 90.76                  | 1.14      | 1.03 | 1.01 |
| 1925            | 3.21                         | 3.76 | 0.55                     | 23.71          | 91.31                  | 1.21      | 1.06 | 1.05 |

2. Total Loss = Insertion Loss + 3 dB splitter loss.



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