

2 Way-90° Power Splitter

QCS-152+

50Ω 820 to 1600 MHz



CASE STYLE: GE0805C-1

The Big Deal

- High Power handling (15W)
- Low Unbalance, 0.5 dB & 4 deg. typ.
- Industry leading combination of size/bandwidth

Product Overview

Mini-Circuits new 90° Power Splitter, model: QCS-152+, offers an industry leading combination of operating bandwidth and size; supporting nearly an octave band in a miniature EIA-0805 form factor. The outstanding phase and amplitude unbalance make this component a versatile building block for use in a variety of systems and sub-system designs.

Key Features

| Feature | Advantages |
|-----------------------------------|--|
| Small Size | Offered in the EIA-0805 package size, the QCS-152+ offers an industry leading combination of size, bandwidth and frequency. The small footprint (2.0mm x 1.25mm) allows for reduced parasitics in systems with improved performance and simplified layout. |
| Low Phase and Amplitude Unbalance | Supporting 4 deg. and 0.5 dB unbalance make this 90° hybrid applicable for use in higher level integrated components such as image reject mixers, single sideband modulators, phase shifters, variable attenuators, and balance amplifiers. |
| High Power Handling | Capable of operating up to 15W, the LTCC construction of the QCS-152+ makes this 90° hybrid a robust, rugged product that can be used effectively in either the transmit or receive paths. |

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-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/MCLStore/terms.jsp



Power Splitter/Combiner

QCS-152+

2 Way-90° 50Ω 820 to 1600 MHz



Generic photo used for illustration purposes only
CASE STYLE: GE0805C-1

Maximum Ratings

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

*Derate linearly to 7W at 100°C ambient.
Permanent damage may occur if any of these limits are exceeded.

Pin Connections

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

Features

- Low insertion loss, 0.5 dB typ.
- High isolation, 19 dB typ.
- Miniature size, 0.079"x0.049"x0.033"
- LTCC construction
- High power

Applications

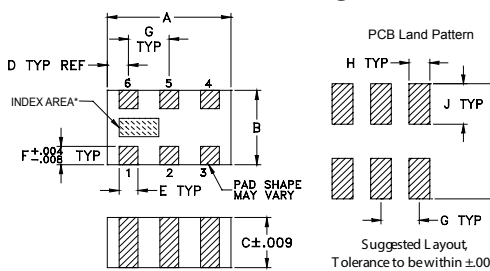
- Balanced amplifiers
- Modulators
- DCS, PCS, UMTS
- WiMax
- WiFi • ISM
- Phase Shifter
- Attenuator
- Point to Point

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

Available Tape and Reel at no extra cost

| Reel Size | Devices/Reel |
|-----------|-----------------------------------|
| 7" | 20, 50, 100, 200, 500, 1000, 2000 |

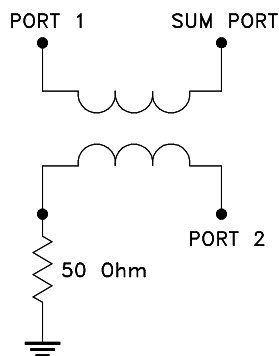
Outline Drawing



Outline Dimensions (inch/mm)

| A | B | C | D | E | F |
|------|------|------|------|-------|------|
| .079 | .049 | .033 | .014 | .012 | .012 |
| 2.01 | 1.24 | 0.84 | 0.36 | 0.30 | 0.30 |
| G | H | J | K | wt | |
| .026 | .014 | .039 | .110 | grams | |
| 0.66 | 0.36 | 1.00 | 2.80 | .008 | |

Electrical Schematic



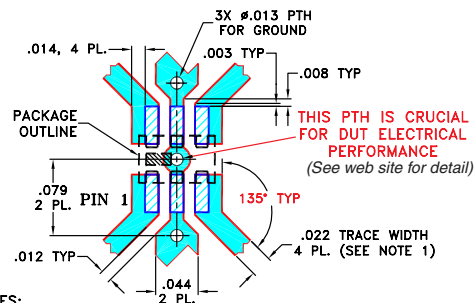
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Electrical Specifications at 25°C

| Parameter | Frequency (MHz) | Min. | Typ. | Max. | Unit |
|--|---|----------------------|--------------------------|--------------------------|--------|
| Frequency | | 820 | | 1600 | MHz |
| Insertion Loss (Avg. Of Coupled Outputs) above 3 dB | 820-1000 1000-1200 1200-1400 1400-1600 | — | 0.5 0.5 0.5 0.6 | 0.8 0.7 0.7 0.9 | dB |
| Isolation | 820-1000 1000-1200 1200-1400 1400-1600 | 15 16 17 18 | 17 19 20 21 | — — — — | dB |
| Phase Unbalance | 820-1000 1000-1200 1200-1400 1400-1600 | — — — — | 5 4 4 3 | 7 6 6 5 | Degree |
| Amplitude Unbalance | 820-1000 1000-1200 1200-1400 1400-1600 | — — — — | 1.0 0.5 0.5 1.0 | 1.5 0.8 0.8 1.5 | dB |
| VSWR (Port S) | 820-1600 | — | 1.3 | 1.5 | :1 |
| VSWR (Port 1-2) | 820-1600 | — | 1.4 | 1.6 | :1 |

Demo Board MCL P/N: TB-489-152+ Suggested PCB Layout (PL-304)



NOTES:

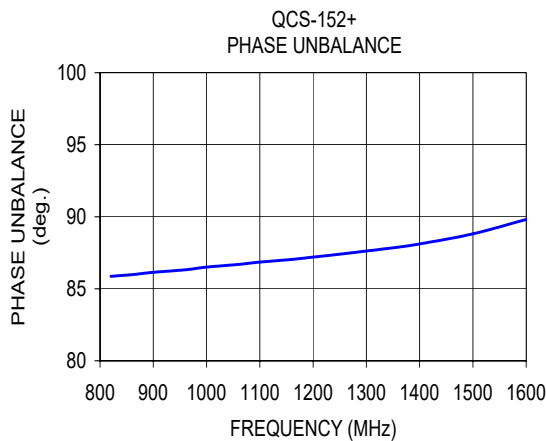
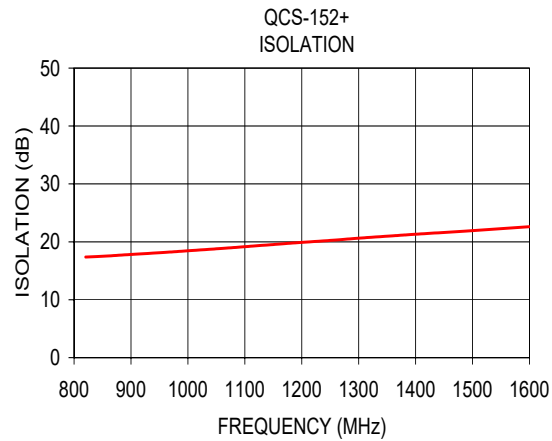
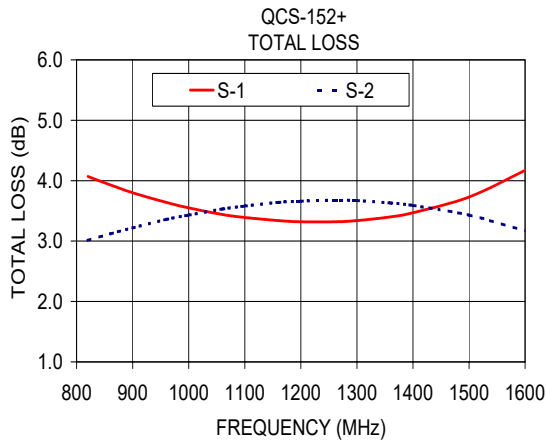
1. TRACE WIDTH IS SHOWN FOR ROGERS RO4350B WITH DIELECTRIC THICKNESS .010" ± .001"; COPPER: 1/2 OZ. EACH SIDE. FOR OTHER MATERIALS TRACE WIDTH MAY NEED TO BE MODIFIED.
2. BOTTOM SIDE OF THE PCB IS CONTINUOUS GROUND PLANE.

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

Typical Performance Data

| Frequency (MHz) | Total Loss ¹ (dB) | | Amplitude Unbalance (dB) | Isolation (dB) | Phase Unbalance (deg.) | VSWR S | VSWR 1 | VSWR 2 |
|-----------------|------------------------------|------|--------------------------|----------------|------------------------|--------|--------|--------|
| | S-1 | S-2 | | | | | | |
| 820.00 | 4.07 | 3.01 | 1.06 | 17.36 | 85.86 | 1.32 | 1.34 | 1.40 |
| 860.00 | 3.93 | 3.12 | 0.81 | 17.57 | 85.98 | 1.31 | 1.32 | 1.39 |
| 900.00 | 3.80 | 3.22 | 0.58 | 17.81 | 86.14 | 1.29 | 1.31 | 1.37 |
| 960.00 | 3.64 | 3.36 | 0.28 | 18.18 | 86.32 | 1.26 | 1.30 | 1.36 |
| 1000.00 | 3.55 | 3.43 | 0.11 | 18.45 | 86.50 | 1.24 | 1.29 | 1.34 |
| 1060.00 | 3.44 | 3.53 | 0.09 | 18.87 | 86.69 | 1.22 | 1.28 | 1.33 |
| 1100.00 | 3.39 | 3.58 | 0.19 | 19.16 | 86.85 | 1.20 | 1.27 | 1.32 |
| 1160.00 | 3.34 | 3.64 | 0.30 | 19.60 | 87.04 | 1.18 | 1.27 | 1.30 |
| 1200.00 | 3.32 | 3.66 | 0.35 | 19.91 | 87.20 | 1.17 | 1.27 | 1.29 |
| 1260.00 | 3.32 | 3.68 | 0.36 | 20.32 | 87.44 | 1.15 | 1.27 | 1.28 |
| 1300.00 | 3.34 | 3.67 | 0.33 | 20.64 | 87.62 | 1.14 | 1.28 | 1.28 |
| 1360.00 | 3.40 | 3.63 | 0.23 | 21.03 | 87.89 | 1.12 | 1.29 | 1.27 |
| 1400.00 | 3.47 | 3.59 | 0.13 | 21.32 | 88.11 | 1.12 | 1.30 | 1.28 |
| 1500.00 | 3.73 | 3.43 | 0.30 | 21.94 | 88.81 | 1.11 | 1.32 | 1.29 |
| 1600.00 | 4.17 | 3.17 | 0.99 | 22.61 | 89.81 | 1.12 | 1.36 | 1.34 |

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



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