



STRIPLINE SURFACE MOUNT

2 Way 90° Power Splitter

QCH-451+

50Ω 2 Way-90° 225 to 450 MHz 250W

KEY FEATURES

- High power handling, up to 250W
- Wide bandwidth
- Excellent Amplitude Unbalance, $\pm 0.25\text{dB}$

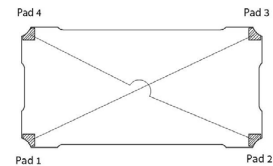
APPLICATIONS

- Balanced Amplifiers
- I & Q Modulators
- Defense and Military



Generic photo used for illustration purposes only

FUNCTIONAL DIAGRAM



PRODUCT OVERVIEW

Mini-Circuits new 2-way 90° power splitter, QCH-451+ capable of handling up to 250W with amplitude unbalance of $\pm 0.25\text{ dB}$ typ and phase unbalance of $\pm 1.4\text{ deg. typ}$. Operating over a frequency range of 225 to 450 MHz, the outstanding phase and amplitude unbalance make this component a versatile building block for use in a variety of systems and sub-system designs from balanced amplifiers and antenna feeds to military applications and more. The splitter is fabricated using laminated PCB process (1.26 x 0.5 x 0.088") and includes wrap-around terminations for good solderability and easy visual inspection.

ELECTRICAL SPECIFICATIONS^{1,2} AT +25°C

Parameter	Frequency (MHz)	Min.	Typ.	Max.	Units
Frequency Range		225		450	MHz
Mainline Loss ³	225-450	-	0.2	0.3	dB
Isolation	225-450	21	27	-	dB
Phase Unbalance	225-450	-	± 1.4	± 5	dB
Amplitude Unbalance	225-450	-	± 0.25	± 0.5	dB
Return Loss	225-450	21	26	-	dB
Thermal Resistance ⁴	225-450	-	0.5	-	°C/W

1. Tested on Evaluation Board TB-914+. De-embedded to the device reference plane.
2. Symmetrical all ports are interchangeable. See Pad Configuration Table and S-Parameters for actual performance.
3. Does not include theoretical loss due to coupling. Nominal theoretical loss is 3 dB.
4. Thermal Resistance is defined as, example $(\theta_{jc}) = (\text{Hot Spot Temperature on DUT} - \text{Base Plate Temperature}) / \text{Input Power}$

ABSOLUTE MAXIMUM RATINGS⁵

Operating Case Temperature ⁶		-55 °C to +105 °C
Storage Temperature		-55 °C to +105 °C
Power Input	+85 °C case	250 W
	+95 °C case	230 W
	+105 °C case	200 W

5. Permanent damage may occur if any of these limits are exceeded.
6. Case temperature is defined as temperature on base plate.





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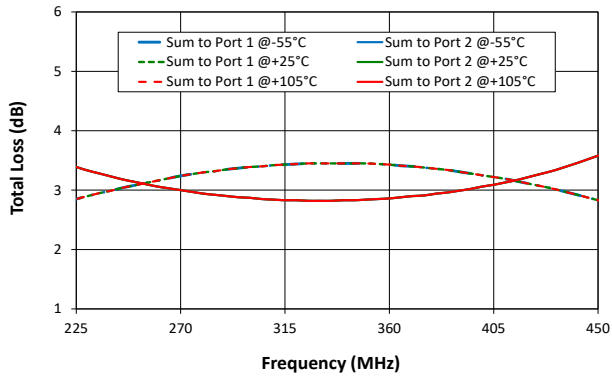
Mini-Circuits

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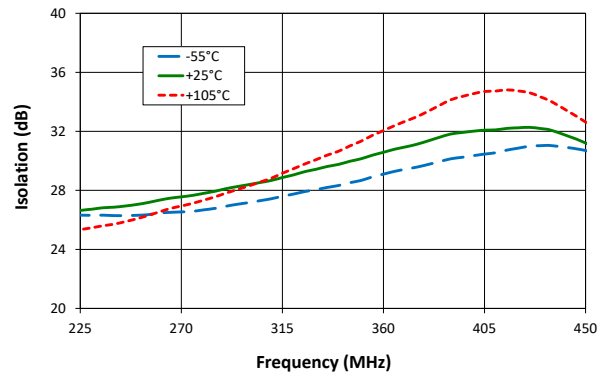
TYPICAL PERFORMANCE GRAPHS

Data corresponds to Configuration A at +25°C unless specified otherwise.

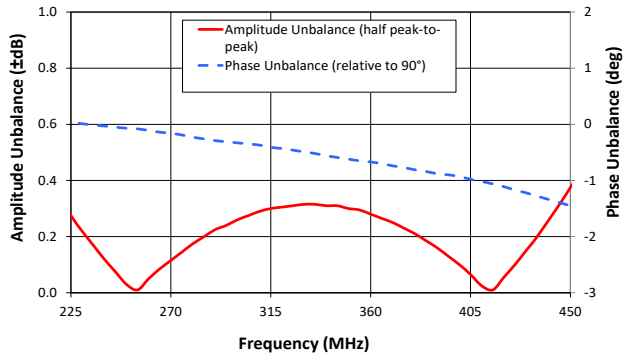
QCH-451+
Total Loss (dB)



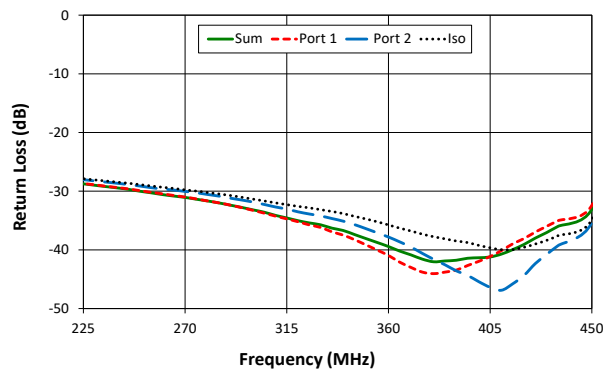
QCH-451+
Isolation (dB)



QCH-451+
Amplitude & Phase Unbalance



QCH-451+
Return Loss (dB)





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FUNCTIONAL DIAGRAM

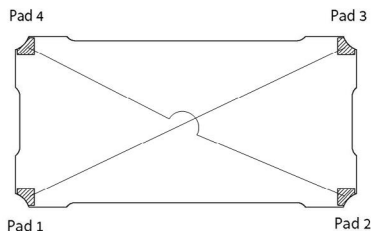


Figure 1. QCH-451+ Functional Diagram

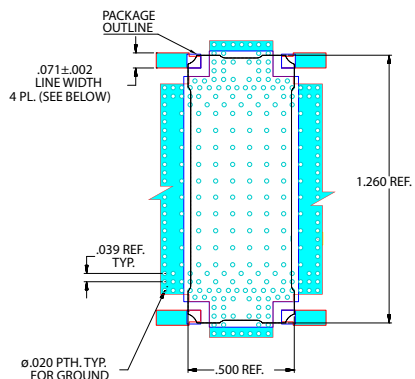
PAD DESCRIPTION/CONFIGURATION⁷

Function	Pad Number	Description
Input	1	Connects to RF Input Port
Output	2	Connects to RF Output Port
Coupled Forward	4	Connects to Coupled Forward Port
Coupled Reverse	3	Connects to Coupled Reverse Port
Ground	5	Connects to Ground

Configuration	Sum	Isolation	Port 1 (0°)	Port 2 (90°)
A	1	2	3	4
B	2	1	4	3
C	3	4	1	2
D	4	3	2	1

7. Model is symmetrical and all ports are interchangeable, see Port Function Description/Configuration table for details and S-Parameters for actual performance.

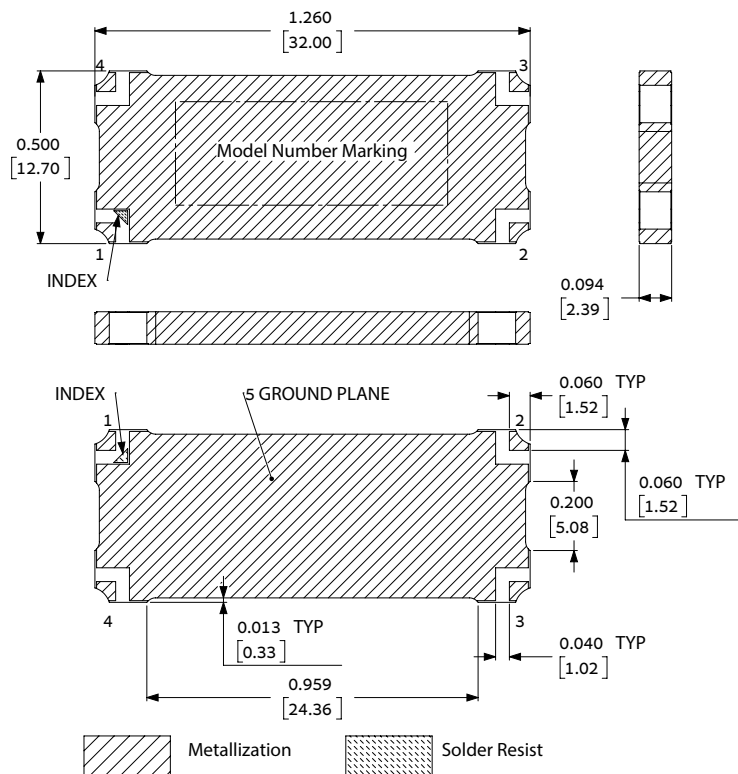
SUGGESTED PCB LAYOUT (PL-529)



- NOTES:
- TRACE WIDTH IS SHOWN FOR ROGERS RO4003C WITH DIELECTRIC THICKNESS 0.032±.0015". COPPER: 1 OZ. EACH SIDE. FOR OTHER MATERIALS TRACE WIDTH MAY NEED TO BE MODIFIED.
 - 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 SOLDERMASK

Figure 2. Suggested PCB Layout PL-529

CASE STYLE DRAWING (PQ2185-1)



NOTES:

- Base material: Printed wiring laminate.
- Termination finish: 2-5 μinch (.05-.13 microns) Immersion Gold.
- Weight: 4.5 grams
- Marking may contain other features or characters for internal lot control.

PRODUCT MARKING*: QCH-451+

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ADDITIONAL DETAILED INFORMATION IS AVAILABLE ON OUR DASH BOARD.

[CLICK HERE](#)

Performance Data & Graphs	Data
	Graphs S-Parameter (S4P Files) Data Set (.zip file) De-embedded to device pads
Case Style	PQ2185-1 Lead Finish: 2-5 inch (0.05-0.13 microns) Immersion Gold.
RoHS Status	Compliant
Tape and Reel	F118
Suggested Layout for PCB Design	PL-529
Evaluation Board	TB-914+
	Gerber File
Environmental Rating	ENV02T8

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.
- 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/terms/viewterm.html

