

2 Way-90° Power Splitter

QCS-312+

50Ω 1700 to 3100 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-312+, 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-312+ 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-312+ 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



2 Way-90° 50Ω

1700 to 3100 MHz

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

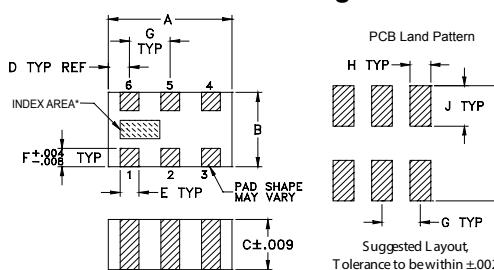
Operating Temperature -55°C to 100°C
 Storage Temperature -55°C to 100°C
 Power Input (as a splitter) 15W* max.

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

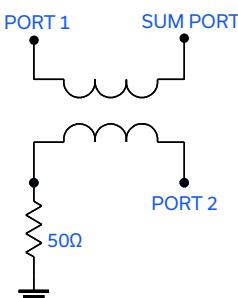
Permanent damage may occur if any of these limits are exceeded.

Pin Connections

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

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**Features**

- Low insertion loss, 0.5 dB typ.
- High isolation, 25 dB typ.
- Miniature size, 0.079" x 0.049" x 0.033"
- LTCC construction
- High power

Applications

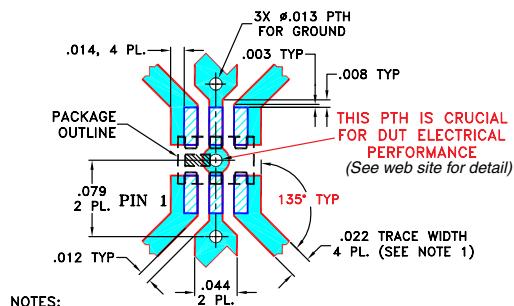
- Balanced amplifiers
- Modulators
- DCS, PCS, UMTS
- ISM
- WiMAX
- Phase Shifter
- Attenuator

+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 7" Devices/Reel 20, 50, 100, 200, 500, 1000, 2000

Electrical Specifications at 25°C

Parameter	Frequency (MHz)	Min.	Typ.	Max.	Unit
Frequency	1700			3100	MHz
Insertion Loss (Avg. Of Coupled Outputs) above 3 dB	1700-1850 1850-1990 1990-2170 2170-2400 2400-2700 2700-3100		0.4 0.4 0.5 0.5 0.5 0.6	0.6 0.6 0.7 0.7 0.7 0.8	dB
Isolation	1700-1850 1850-1990 1990-2170 2170-2400 2400-2700 2700-3100	17 18 18 18 18 18	23 24 25 25 25 25		dB
Phase Unbalance	1700-1850 1850-1990 1990-2170 2170-2400 2400-2700 2700-3100		2.0 2.0 2.0 2.0 2.0 2.0	7.0 7.0 7.0 7.0 7.0 7.0	Degree
Amplitude Unbalance	1700-1850 1850-1990 1990-2170 2170-2400 2400-2700 2700-3100		0.6 0.2 0.5 0.5 0.5 0.7	1.2 0.7 1.0 1.0 1.0 1.2	dB
VSWR	1700-3100			1.2	:1

**Demo Board MCL P/N: TB-489-312+
Suggested PCB Layout (PL-304)**

NOTES:

- TRACE WIDTH IS SHOWN FOR ROGERS RO4350B WITH DIELECTRIC THICKNESS $.010" \pm .001"$; COPPER: 1/2 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 SOLDER MASK

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/MCLStore/terms.jsp

Minicircuits®

www.minicircuits.com P.O. Box 350166, Brooklyn, NY 11235-0003 (718) 934-4500 sales@minicircuits.com

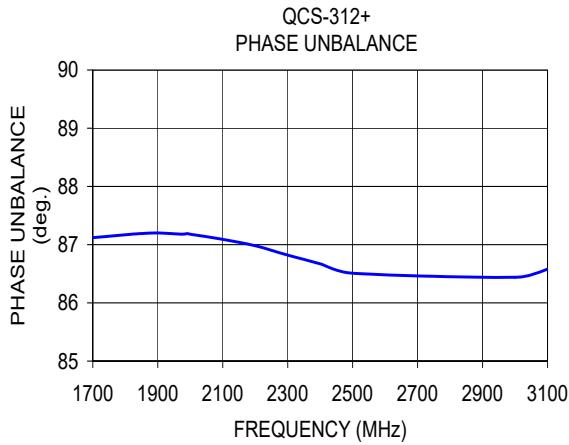
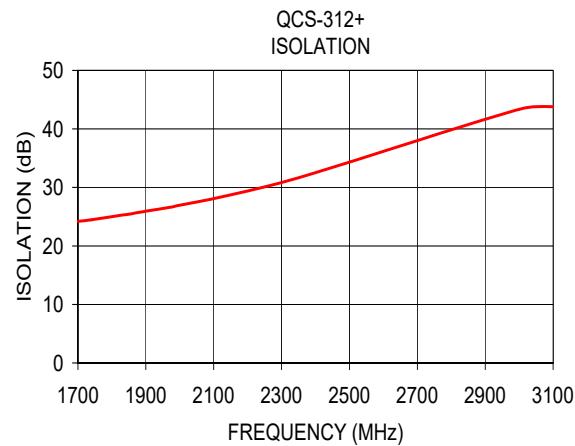
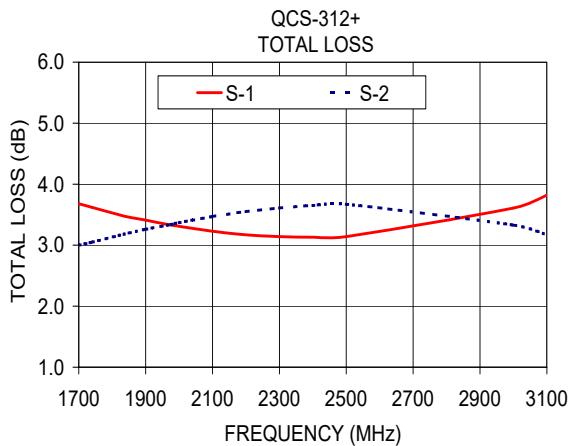
REV. D
 M172731
 QCS-312+
 ED-13415/1
 AD/CP/AM
 250930

Page 2 of 3

Typical Performance Data

Frequency (MHz)	Total Loss ¹ (dB)		Amplitude Unbalance (dB)	Isolation (dB)	Phase Unbalance (deg.)	VSWR		
	S-1	S-2				S	1	2
1700.00	3.68	3.00	0.69	24.22	87.12	1.01	1.30	1.02
1740.00	3.62	3.05	0.57	24.46	87.14	1.01	1.29	1.01
1820.00	3.50	3.16	0.34	25.20	87.18	1.02	1.28	1.02
1850.00	3.46	3.20	0.27	25.42	87.19	1.03	1.27	1.02
1900.00	3.41	3.26	0.14	25.94	87.20	1.03	1.26	1.03
1975.00	3.33	3.34	0.02	26.65	87.18	1.04	1.25	1.05
1990.00	3.32	3.36	0.05	26.85	87.19	1.04	1.24	1.05
2000.00	3.31	3.37	0.07	26.96	87.18	1.05	1.24	1.05
2100.00	3.23	3.47	0.24	28.10	87.09	1.06	1.22	1.07
2200.00	3.17	3.55	0.37	29.40	86.98	1.07	1.20	1.09
2300.00	3.14	3.61	0.47	30.83	86.82	1.08	1.17	1.11
2400.00	3.13	3.65	0.52	32.53	86.67	1.09	1.15	1.13
2500.00	3.14	3.67	0.52	34.34	86.51	1.10	1.13	1.14
3000.00	3.61	3.33	0.28	43.36	86.44	1.09	1.04	1.11
3100.00	3.82	3.17	0.65	43.80	86.58	1.07	1.04	1.08

1. Total Loss = Insertion Loss + 3dB 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-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