

High Power

2 Way-90° Power Splitter

QCH-123+

50Ω 2 Way-90° Up to 50W* 8000 to 12000 MHz

The Big Deal

- High power handling up to 50W
- Wide bandwidth
- Good Amplitude Unbalance, ± 0.35 dB
- Good Phase Unbalance, ± 6 deg



CASE STYLE: PQ2482

Product Overview

Mini-Circuits' new 2-way 90° power splitter, QCH-123+ capable of handling up to 50W with amplitude unbalance of ± 0.35 dB typ and phase unbalance of ± 6 deg. typ. Operating over a frequency range of 8000 to 12000 MHz, the good 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 (0.2 x 0.25 x 0.069") and includes wrap-around terminations for good solderability and easy visual inspection.

Key Features

Feature	Advantages
Wide bandwidth	The QCH-123+ wide band width (8000 - 12000 MHz) makes it suitable for a wide range of applications.
High power handling: 50W @ +85°C 25W @ +105°C	Usable in many systems with high-power requirements such as antenna feeds, power amplifiers, and others that require balanced high power outputs.
Good Phase and Amplitude Unbalance: • ± 0.35 dB Amplitude Unbalance • $\pm 6^\circ$ Phase Unbalance	QCH-123+ produces nearly equal signals with 90° phase shift - ideal for I/Q systems, balanced amplifiers, antenna feeds, phase shifters, and many more applications.

*See power derating on page 2



High Power Power Splitter/Combiner

QCH-123+

50Ω 2 Way-90° Up to 50W* 8000 to 12000 MHz



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Maximum Ratings

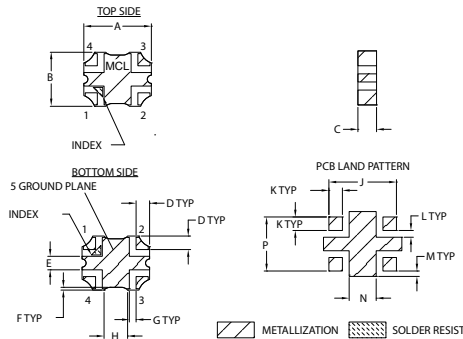
Operating Temperature, case**	-55°C to 105°C
Storage Temperature	-55°C to 105°C
Power Input*	50W @ +85°C, case

*Derate to 35W at +95°C and 25W at +105°C case temperature
 **Case temperature is defined as temperature on base plate.
 Permanent damage may occur if any of these limits are exceeded.

Pad Connections***

SUM	1
ISOLATION	2
PORT 1 (0°)	3
PORT 2 (+90°)	4
GROUND	5

***Model is symmetrical and all ports are interchangeable, see port function table.

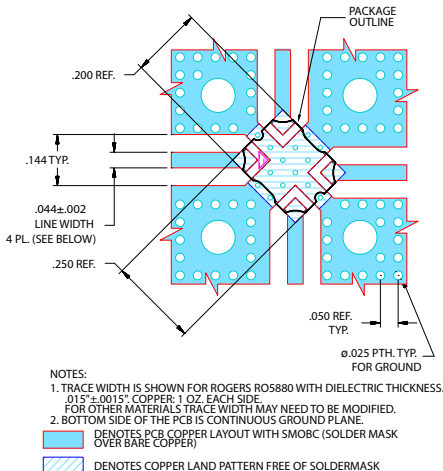


Base material: Printed wiring laminate.
 Termination Finish: 2-5 μinch (0.05-0.13 microns)
 Gold over 120-240 μinch

Outline Dimensions (inch/mm)

A	B	C	D	E	F	G	
.250	.200	.069	.050	.050	.010	.025	
6.35	5.08	1.75	1.27	1.27	0.25	0.63	
H	J	K	L	M	N	P	wt.
.087	.260	.055	.025	.020	.100	.210	grams
2.21	6.35	1.40	0.63	0.51	2.54	5.33	0.5

Demo Board MCL P/N: TB-977+
 Suggested PCB Layout (PL-526)



Features

- high power, up to 50W
- wide bandwidth
- good amplitude unbalance, ±0.35 dB Typ
- good phase unbalance, ±6 deg Typ

Applications

- Balanced amplifiers
- I&Q Modulators
- Defense and military

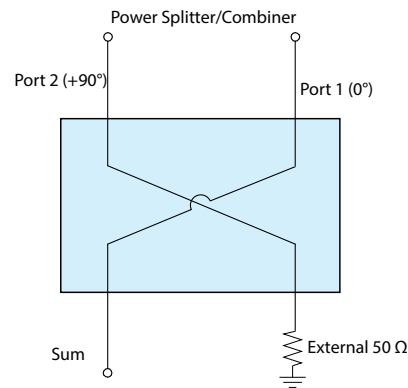
+RoHS Compliant

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

Electrical Specifications @ +25°C

Parameter	Condition (MHz)	Min.	Typ.	Max.	Units
Frequency Range		8000		12000	MHz
Insertion Loss (Avg. of Coupled outputs less 3 dB)	8000 - 12000	—	0.25	0.40	dB
Isolation	8000 - 12000	18	23	—	dB
Phase Unbalance	8000 - 12000	—	±6	—	deg
Amplitude Unbalance	8000 - 12000	—	±0.35	±0.50	dB
VSWR	8000 - 12000	—	1.15	1.35	:1
Input RF Power	@+85°C, case	8000 - 12000	—	50	W
	@+95°C, case	8000 - 12000	—	35	
	@+105°C, case	8000 - 12000	—	25	
Thermal Resistance	8000 - 12000	—	1.1	—	°C/W

Electrical Schematic



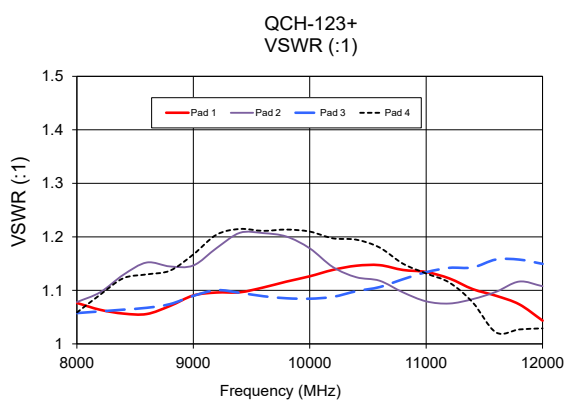
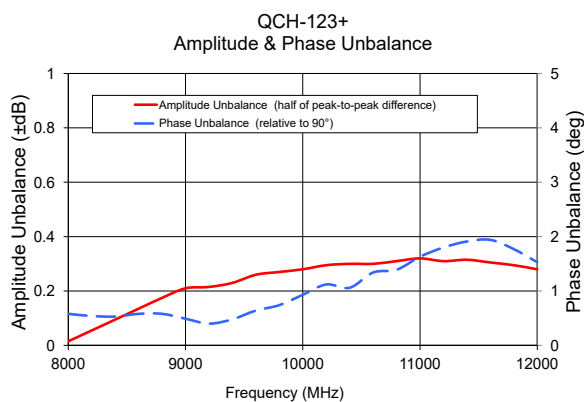
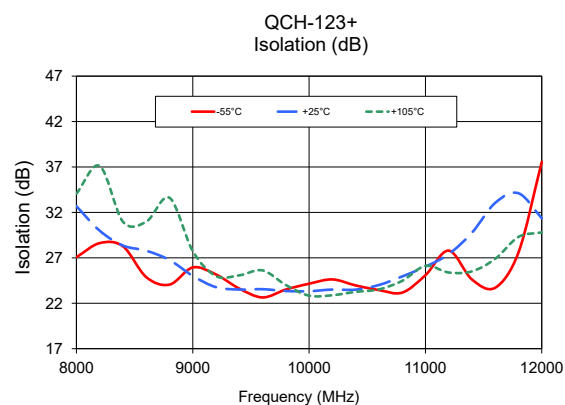
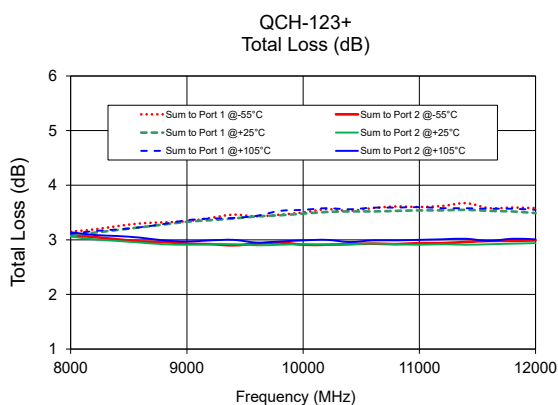
Port Function Configurations

Sum	Isolation	Port 1 (0°)	Port 2 (90°)
1	2	3	4
2	1	4	3
3	4	1	2
4	3	2	1

Typical Performance Data ¹

FREQUENCY (MHz)	Total Loss ² (dB)			Total Loss ² (dB)			Amplitude Unbalance (±dB) @ Sum=1	Isolation (dB)			Phase Unbalance (deg) Relative to 90° @ Sum=1	VSWR (:1)			
	Sum to Port 1 @ Sum=1			Sum to Port 2 @ Sum=1				Sum to Isolation @ Sum=1				Pad 1	Pad 2	Pad 3	Pad 4
	-55°C	+25°C	+105°C	-55°C	+25°C	+105°C		-55°C	+25°C	+105°C					
8000	3.15	3.08	3.11	3.09	3.06	3.14	0.02	27.07	32.67	34.07	0.58	1.08	1.08	1.06	1.06
8200	3.19	3.13	3.16	3.05	3.01	3.09	0.06	28.62	29.98	37.10	0.54	1.06	1.10	1.06	1.09
8400	3.25	3.18	3.19	3.01	2.98	3.07	0.10	28.26	28.35	30.96	0.53	1.06	1.13	1.06	1.12
8600	3.30	3.23	3.23	2.97	2.95	3.04	0.14	24.87	27.78	30.97	0.58	1.06	1.15	1.07	1.13
8800	3.32	3.28	3.29	2.96	2.92	2.99	0.18	24.05	26.76	33.60	0.58	1.07	1.14	1.07	1.14
9000	3.34	3.33	3.36	2.93	2.91	2.97	0.21	25.94	25.01	27.73	0.49	1.09	1.15	1.09	1.17
9200	3.40	3.36	3.39	2.92	2.92	2.99	0.22	25.16	23.77	24.98	0.40	1.10	1.18	1.10	1.20
9400	3.46	3.39	3.40	2.90	2.92	3.00	0.23	23.61	23.51	25.07	0.48	1.10	1.21	1.10	1.21
9600	3.43	3.43	3.44	2.93	2.90	2.95	0.26	22.64	23.55	25.61	0.64	1.11	1.21	1.09	1.21
9800	3.46	3.45	3.53	2.95	2.91	2.97	0.27	23.51	23.35	24.00	0.74	1.12	1.20	1.09	1.21
10000	3.50	3.48	3.55	2.91	2.92	2.99	0.28	24.15	23.33	22.83	0.93	1.13	1.18	1.08	1.21
10200	3.56	3.51	3.58	2.91	2.91	3.00	0.30	24.62	23.51	22.88	1.12	1.14	1.14	1.09	1.20
10400	3.53	3.52	3.56	2.92	2.92	2.96	0.30	23.96	23.50	23.25	1.06	1.15	1.12	1.10	1.19
10600	3.58	3.52	3.59	2.93	2.93	2.99	0.30	23.45	24.01	23.52	1.34	1.15	1.12	1.11	1.18
10800	3.61	3.53	3.59	2.92	2.92	2.99	0.31	23.17	24.95	24.46	1.39	1.14	1.10	1.12	1.15
11000	3.60	3.54	3.60	2.94	2.91	3.00	0.32	25.09	26.03	26.11	1.63	1.13	1.08	1.13	1.13
11200	3.62	3.54	3.58	2.94	2.92	3.01	0.31	27.79	27.41	25.38	1.80	1.12	1.08	1.14	1.11
11400	3.67	3.55	3.58	2.96	2.91	3.02	0.32	24.61	29.77	25.51	1.91	1.10	1.08	1.14	1.08
11600	3.58	3.53	3.57	2.98	2.92	2.98	0.31	23.71	33.05	26.89	1.94	1.09	1.10	1.16	1.02
11800	3.59	3.52	3.57	2.98	2.93	3.02	0.30	27.60	34.10	29.30	1.77	1.07	1.12	1.16	1.03
12000	3.58	3.49	3.55	2.99	2.94	3.01	0.28	37.56	31.35	29.79	1.53	1.04	1.11	1.15	1.03

1. Data at +25°C unless specified otherwise.
2. Total loss is the loss from Sum to each coupled port including the 3dB theoretical split.



Additional 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.
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