

High Power

2 Way-90° Power Splitter

QCH-382+

50Ω 2 Way-90° Up to 150W* 800 to 3800 MHz

The Big Deal

- High power handling up to 150W
- Ultra wide bandwidth (over two octaves)
- Excellent Amplitude Unbalance, ± 0.35 dB
- Excellent Phase Unbalance, ± 1.6 deg



CASE STYLE: PQ2181

Product Overview

Mini-Circuits new 2-way 90° power splitter, QCH-382+ capable of handling up to 150W with amplitude unbalance of ± 0.35 dB typ and phase unbalance of ± 1.6 deg. typ. Operating over a frequency range of 800 to 3800 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 (1.8 x 0.4 x 0.19") and includes wrap-around terminations for good solderability and easy visual inspection.

Key Features

Feature	Advantages
Ultra Wide bandwidth	The QCH-382+ ultra wide bandwidth (800 - 3800 MHz) makes it suitable for a wide range of applications.
High power handling: 150W @ +85°C 100W @ +105°C	Usable in many systems with high-power requirements such as antenna feeds, power amplifiers, and others that require balanced high power outputs.
Excellent Phase and Amplitude Unbalance: • ± 0.35 dB Amplitude Unbalance • $\pm 1.6^\circ$ Phase Unbalance	QCH-382+ 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

50Ω 2 Way-90° Up to 150W* 800 to 3800 MHz

Maximum Ratings

Operating Temperature, case** -55°C to 105°C

Storage Temperature -55°C to 105°C

Power Input* 150W @ +85°C, case

*Derate to 125W at +95°C and 100W at +105°C case temperature

**Case temperature is defined as temperature on base plate.

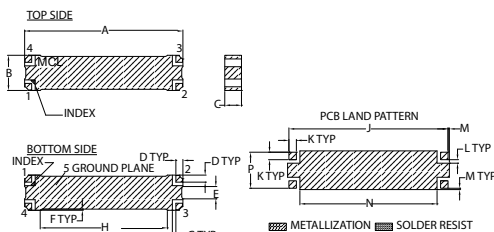
Permanent damage may occur if any of these limits are exceeded.

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.

Outline Drawing



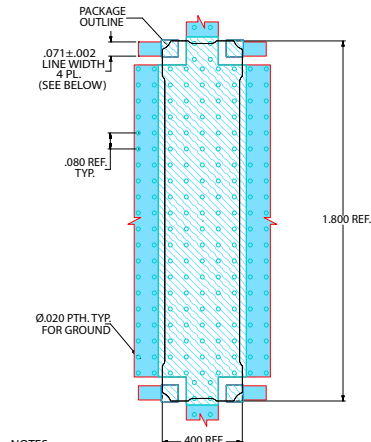
Base material: Printed wiring laminate.

Termination Finish: 2-5 μinch (0.05-0.13 microns) Gold over 120-240 μinch (3.05-6.10 microns) Nickel

Outline Dimensions (inch/mm)

A	B	C	D	E	F	G		
1.800	.400	.190	.080	.140	.013	.040		
45.72	10.16	4.83	2.03	3.56	0.33	1.02		
H	J	K	L	M	N	P	wt.	
1.446	1.810	.085	.040	.015	1.560	.410	grams	
36.73	45.97	2.16	1.02	0.38	39.62	10.41	1.0	

Demo Board MCL P/N: TB-998+ Suggested PCB Layout (PL-539)



- NOTES:
1. 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.
 2. BOTTOM SIDE OF THE PCB IS CONTINUOUS GROUND PLANE.
 3. DENOTES PCB COPPER LAYOUT WITH SMOBC (SOLDER MASK OVER BARE COPPER)
 4. DENOTES COPPER LAND PATTERN FREE OF SOLDER MASK

Features

- high power, up to 150W
- ultra wide bandwidth (over two octaves)
- excellent amplitude unbalance, ±0.35 dB Typ
- excellent phase unbalance, ±1.6 deg Typ

Applications

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

QCH-382+



CASE STYLE: PQ2181

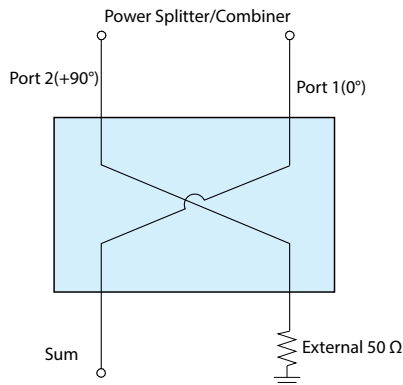
+RoHS Compliant

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		800		3800	MHz
Insertion Loss (Avg. of Coupled outputs less 3 dB)	800 - 3800	—	0.25	0.5	dB
Isolation	800 - 3800	18	28	—	dB
Phase Unbalance	800 - 3800	—	±1.6	±7.5	deg
Amplitude Unbalance	800 - 3800	—	±0.35	±0.65	dB
VSWR	800 - 3800	—	1.10	1.30	:1
Input RF Power	@+85°C, case	800 - 3800	—	150	W
	@+95°C, case	800 - 3800	—	125	
	@+105°C, case	800 - 3800	—	100	
Thermal Resistance	800 - 3800	—	0.6	—	°C/W

Electrical Schematic



Port Function Configurations

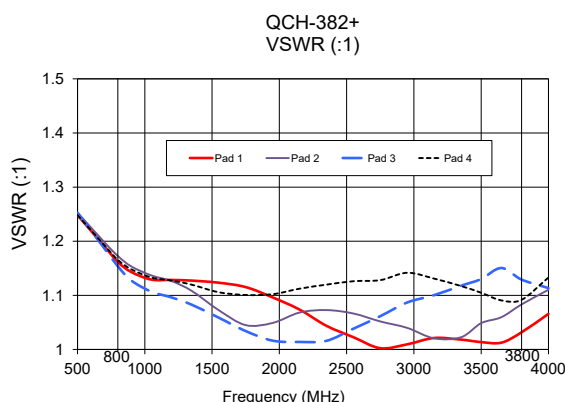
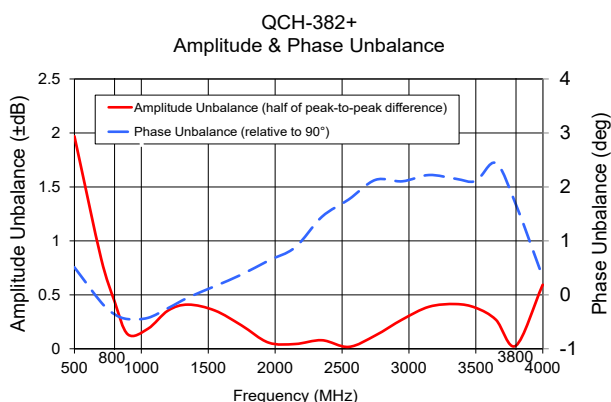
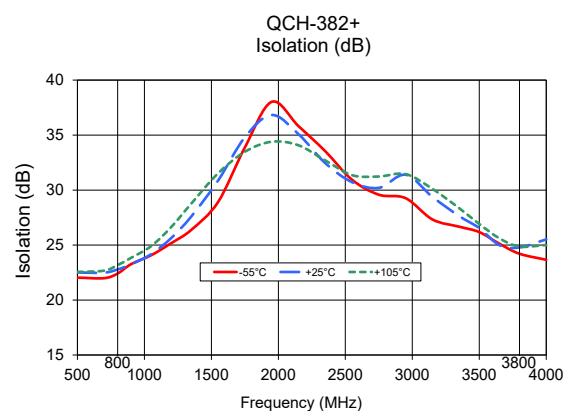
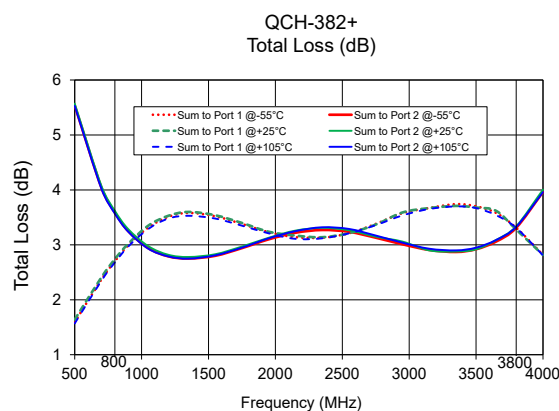
Sum	Isolation	Port 1 (0°)	Port 2 (90°)
1	2	3	4
2	1	4	3
3	4	1	2
4	3	2	1

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					
500.0	1.59	1.64	1.57	5.54	5.57	5.53	1.97	22.04	22.50	22.55	0.51	1.25	1.25	1.25	1.25
700.0	2.37	2.41	2.35	4.04	4.07	4.02	0.84	21.99	22.49	22.67	-0.14	1.19	1.20	1.19	1.19
800.0	2.70	2.74	2.68	3.59	3.62	3.57	0.44	22.41	22.78	23.17	-0.36	1.16	1.17	1.15	1.17
900.0	2.99	3.02	2.97	3.25	3.29	3.24	0.13	23.26	23.24	23.83	-0.45	1.14	1.15	1.13	1.15
1050.0	3.31	3.35	3.29	2.94	2.98	2.93	0.19	24.07	24.17	24.89	-0.43	1.13	1.14	1.11	1.13
1200.0	3.51	3.53	3.48	2.79	2.82	2.79	0.36	25.17	25.63	26.63	-0.25	1.13	1.13	1.10	1.13
1350.0	3.58	3.60	3.53	2.75	2.78	2.75	0.41	26.38	27.59	28.77	-0.05	1.13	1.11	1.08	1.12
1550.0	3.52	3.54	3.48	2.80	2.83	2.81	0.36	28.91	30.86	31.52	0.16	1.12	1.07	1.06	1.11
1750.0	3.38	3.40	3.35	2.94	2.97	2.95	0.22	33.87	34.80	33.48	0.38	1.12	1.04	1.03	1.10
1950.0	3.23	3.24	3.21	3.10	3.13	3.12	0.06	38.02	36.83	34.39	0.63	1.10	1.05	1.02	1.10
2150.0	3.14	3.17	3.11	3.22	3.26	3.25	0.05	35.82	35.09	34.07	0.88	1.07	1.07	1.01	1.11
2350.0	3.13	3.14	3.12	3.27	3.31	3.32	0.08	33.54	32.45	32.69	1.45	1.04	1.07	1.02	1.12
2550.0	3.21	3.21	3.21	3.24	3.27	3.29	0.02	30.94	30.72	31.35	1.77	1.02	1.07	1.04	1.13
2750.0	3.38	3.37	3.36	3.13	3.15	3.17	0.13	29.58	30.20	31.23	2.13	1.00	1.05	1.06	1.13
2950.0	3.58	3.59	3.54	3.01	3.06	3.04	0.27	29.26	31.39	31.45	2.10	1.01	1.04	1.09	1.14
3150.0	3.67	3.67	3.65	2.91	2.90	2.93	0.39	27.33	29.38	30.11	2.22	1.02	1.02	1.10	1.13
3350.0	3.74	3.71	3.70	2.87	2.88	2.90	0.42	26.67	27.63	28.35	2.15	1.02	1.02	1.12	1.12
3500.0	3.70	3.68	3.67	2.92	2.92	2.95	0.38	26.18	26.54	26.91	2.11	1.01	1.05	1.13	1.10
3650.0	3.58	3.62	3.54	3.06	3.09	3.09	0.27	25.12	24.99	25.61	2.44	1.01	1.06	1.15	1.09
3800.0	3.31	3.28	3.31	3.31	3.34	3.33	0.03	24.21	24.78	24.86	1.67	1.03	1.08	1.13	1.09
4000.0	2.82	2.82	2.81	3.96	4.01	3.96	0.59	23.66	25.52	25.00	0.33	1.07	1.11	1.11	1.13

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

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