

High Power

2 Way-90° Power Splitter

QCH-392+

50Ω 2 Way-90° 130W 600 to 3900 MHz

The Big Deal

- High power handling, up to 130W
- Ultra wide bandwidth
- Good amplitude unbalance, ± 1.3 dB
- Excellent phase unbalance, ± 5 deg



Generic photo used for illustration purposes only
CASE STYLE: PQ2098-1

Product Overview

Mini-Circuits' new 2-way 90° power splitter, QCH-392+ capable of handling up to 130W with amplitude unbalance of ± 1.3 dB typ and phase unbalance of ± 5 deg. typ. Operating over a frequency range of 600 to 3900 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 (1.00 x 0.50 x 0.20") and includes wrap-around terminations for good solderability and easy visual inspection.

Key Features

Feature	Advantages
Ultra wide bandwidth	The QCH-392+ ultra wide band width (600 - 3900 MHz) makes it suitable for a wide range of applications.
High power handling: 130W @ +85°C 90W @ +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: • ± 1.3 dB Amplitude Unbalance • $\pm 5^\circ$ Phase Unbalance	QCH-392+ produces nearly equal signals with 90° phase shift - ideal for I/Q systems, balanced amplifiers, antenna feeds, phase shifters, and many more applications.



Power Splitter/Combiner

QCH-392+

50Ω 2 Way-90° 130W 600 to 3900 MHz

Maximum Ratings

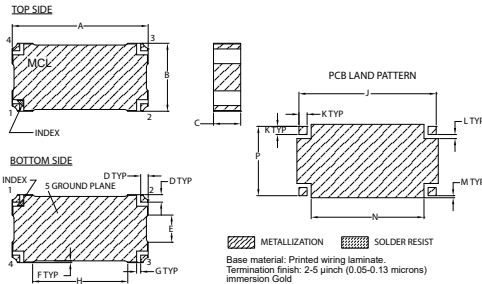
Operating Temperature, case**	-55°C to 105°C
Storage Temperature	-55°C to 105°C
Power Input*	130W @ +85°C, case

*Derate to 110W at +95°C and 90W 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°)	4
PORT 2 (+90°)	3
GROUND	5

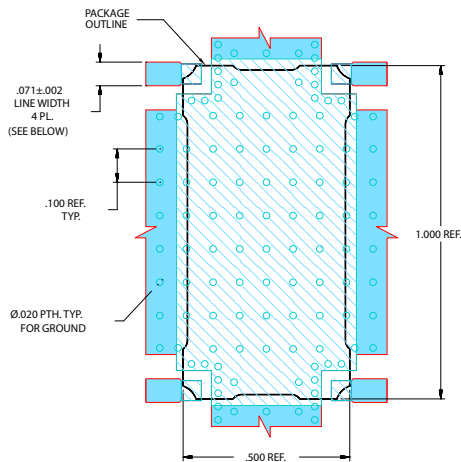
Outline Drawing



Outline Dimensions (inch/mm)

A	B	C	D	E	F	G		
1.000	.500	.200	.055	.200	.013	.030		
25.40	12.70	5.08	1.40	5.08	0.33	0.76		
H	J	K	L	M	N	P	wt.	
.700	1.010	.060	.030	.015	.830	.510	grams	
17.78	25.65	1.52	0.76	0.38	21.08	12.95		8.0

Demo Board MCL P/N: TB-863 Suggested PCB Layout (PL-469)



- 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.
 [Blue hatched box] DENOTES PCB COPPER LAYOUT WITH SMOBRC (SOLDER MASK OVER BARE COPPER)
 [Blue solid box] DENOTES COPPER LAND PATTERN FREE OF SOLDERMASK

Features

- High power, up to 130W
- Ultra wide bandwidth
- Good amplitude unbalance, ±1.3 dB Typ
- Good phase unbalance, ±5 deg Typ

Applications

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



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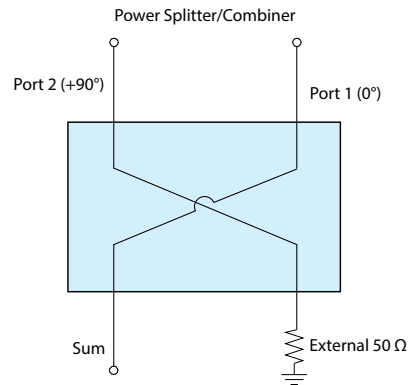
+RoHS Compliant

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.	Unit
Frequency Range		600		3900	MHz
Insertion Loss (Avg. of Coupled outputs less 3 dB)	600 - 3900	—	0.80	1.40	dB
Isolation	600 - 3900	11.5	14	—	dB
Phase Unbalance	600 - 3900	—	±5	±12	deg
Amplitude Unbalance	600 - 3900	—	±1.30	±1.40	dB
VSWR	600 - 3900	—	1.45	2.0	:1
Input RF Power	@+85°C, case	600 - 3900	—	130	W
	@+95°C, case	600 - 3900	—	110	
	@+105°C, case	600 - 3900	—	90	
Thermal Resistance	600 - 3900	—	0.5	—	°C/W

Electrical Schematic

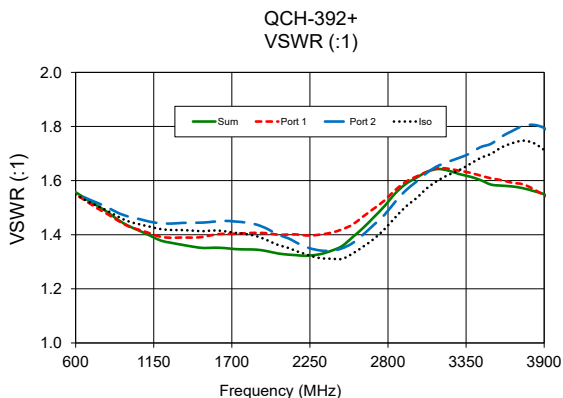
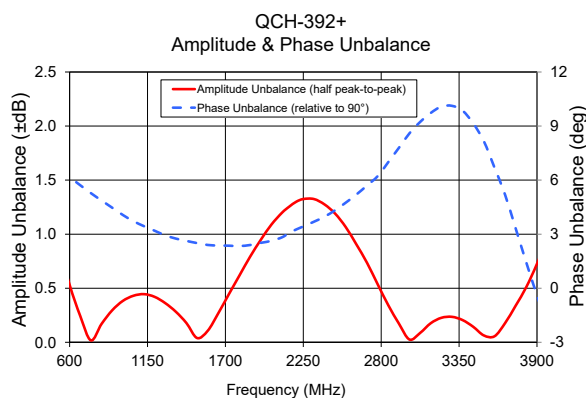
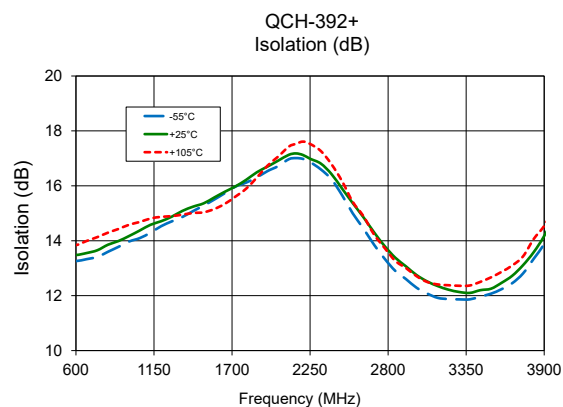
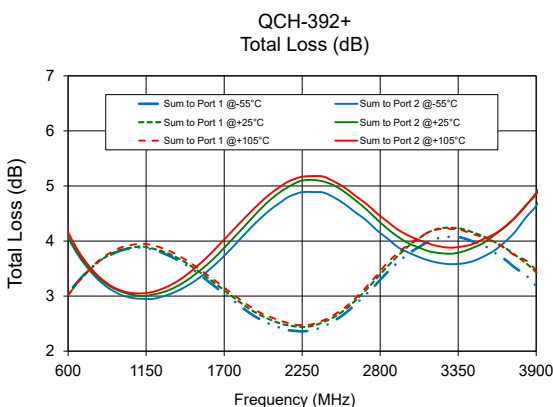


Typical Performance Data ¹

Frequency (MHz)	Total Loss ² (dB) Sum to Port 1			Total Loss ² (dB) Sum to Port 2			Amplitude Unbalance (±dB)	Phase Unbalance (deg) Relative to 90°	Isolation (dB) Sum to Isolation			VSWR (:1) Sum Port 1 Port 2 Iso			
	-55°C	+25°C	+105°C	-55°C	+25°C	+105°C			-55°C	+25°C	+105°C	Sum	Port 1	Port 2	Iso
	600	3.05	3.02	3.01	4.06	4.08			4.16	0.53	6.13	13.26	13.48	13.84	1.56
750	3.48	3.47	3.48	3.47	3.51	3.54	0.02	5.28	13.41	13.65	14.13	1.51	1.50	1.52	1.51
900	3.75	3.76	3.79	3.12	3.17	3.19	0.30	4.47	13.78	13.99	14.43	1.45	1.45	1.48	1.47
1050	3.87	3.88	3.93	2.97	3.03	3.06	0.43	3.72	14.10	14.37	14.68	1.41	1.42	1.46	1.44
1200	3.84	3.86	3.92	2.95	3.03	3.08	0.42	3.19	14.53	14.71	14.87	1.38	1.39	1.44	1.42
1350	3.68	3.72	3.77	3.07	3.16	3.24	0.28	2.75	14.87	15.09	14.95	1.36	1.39	1.44	1.42
1500	3.44	3.48	3.53	3.29	3.41	3.53	0.04	2.50	15.28	15.36	15.04	1.35	1.39	1.44	1.41
1650	3.14	3.20	3.25	3.61	3.74	3.89	0.27	2.37	15.74	15.79	15.35	1.35	1.40	1.45	1.41
1800	2.85	2.91	2.96	4.00	4.15	4.30	0.62	2.34	16.12	16.22	15.90	1.35	1.41	1.44	1.40
1950	2.58	2.66	2.70	4.40	4.57	4.69	0.95	2.52	16.54	16.70	16.74	1.34	1.41	1.42	1.38
2100	2.42	2.50	2.55	4.71	4.90	5.00	1.20	2.83	16.97	17.13	17.43	1.33	1.40	1.39	1.35
2250	2.36	2.44	2.47	4.89	5.10	5.17	1.33	3.43	16.86	16.98	17.52	1.32	1.40	1.35	1.32
2400	2.45	2.53	2.56	4.88	5.08	5.17	1.28	3.97	16.24	16.43	16.79	1.34	1.41	1.34	1.31
2625	2.85	2.92	2.96	4.52	4.74	4.82	0.91	5.20	14.45	14.86	14.90	1.43	1.47	1.40	1.36
2775	3.22	3.32	3.37	4.20	4.40	4.51	0.54	6.22	13.35	13.81	13.74	1.51	1.53	1.47	1.42
3000	3.77	3.91	3.94	3.79	3.96	4.10	0.03	8.60	12.29	12.75	12.71	1.61	1.62	1.60	1.54
3150	4.00	4.17	4.17	3.64	3.81	3.95	0.18	9.73	11.92	12.35	12.41	1.64	1.65	1.65	1.60
3375	4.06	4.22	4.20	3.59	3.80	3.90	0.21	9.85	11.87	12.10	12.37	1.61	1.63	1.70	1.66
3525	3.93	4.09	4.07	3.71	3.96	4.03	0.06	8.16	12.07	12.25	12.67	1.59	1.61	1.74	1.70
3750	3.52	3.75	3.74	4.16	4.42	4.43	0.34	3.31	12.81	13.11	13.43	1.57	1.59	1.80	1.75
3900	3.18	3.43	3.47	4.64	4.88	4.85	0.73	-0.39	13.88	14.18	14.55	1.55	1.55	1.79	1.71

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.
- 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