



STRIPLINE SURFACE MOUNT

Power Splitter/Combiner

QCH-83+

50Ω 4000 to 8000 MHz 2-Way 90° 75W

KEY FEATURES

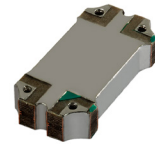
- High power handling, up to 75W
- Wide bandwidth
- Good phase unbalance, ± 5 deg
- Good amplitude unbalance, ± 0.45 deg

APPLICATIONS

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

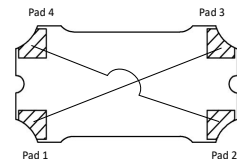
PRODUCT OVERVIEW

Mini-Circuits' QCH-83+ is a 2-way 90° power splitter, capable of handling up to 75W with amplitude unbalance of ± 0.45 dB typ and phase unbalance of ± 5 deg. typ. Operating over a frequency range of 4000 to 8000 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 (0.4 x 0.2 x 0.083") and includes wrap-around terminations for good solderability and easy visual inspection.



Generic photo used for illustration purposes only

FUNCTIONAL DIAGRAM



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

Parameter	Conditions (MHz)	Min.	Typ.	Max.	Unit
Frequency Range	–	4000	–	8000	MHz
Insertion Loss ³	4000 - 8000	–	0.15	0.45	dB
Isolation	4000 - 8000	16.5	23	–	dB
Phase Unbalance	4000 - 8000	–	± 5	–	deg
Amplitude Unbalance	4000 - 8000	–	± 0.45	± 0.65	dB
Return Loss	4000 - 8000	16	25	–	dB
Thermal Resistance ⁴	4000 - 8000	–	0.7	–	°C/W

1. Tested in Evaluation Board TB-QCH-83+. De-embedded to the device reference plane.

2. Model is symmetrical and all ports are interchangeable, see Port Function Description/Configuration table for details 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 $\theta_{jc} = (\text{Hot Spot Temperature on DUT} - \text{Base Plate Temperature}) / \text{Input Power}$.

ABSOLUTE MAXIMUM RATINGS ⁵

Operating Case Temperature ⁶		-55°C to +105°C
Storage Temperature		-55°C to +105°C
Power Input	+85°C case	75 W
	+95°C case	55 W
	+105°C case	40 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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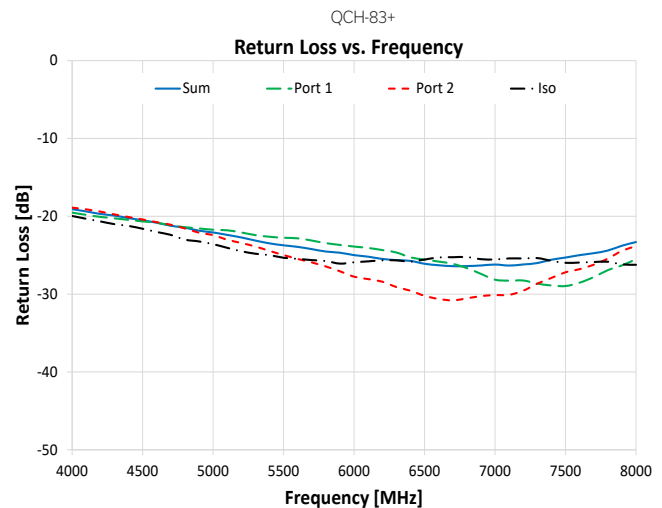
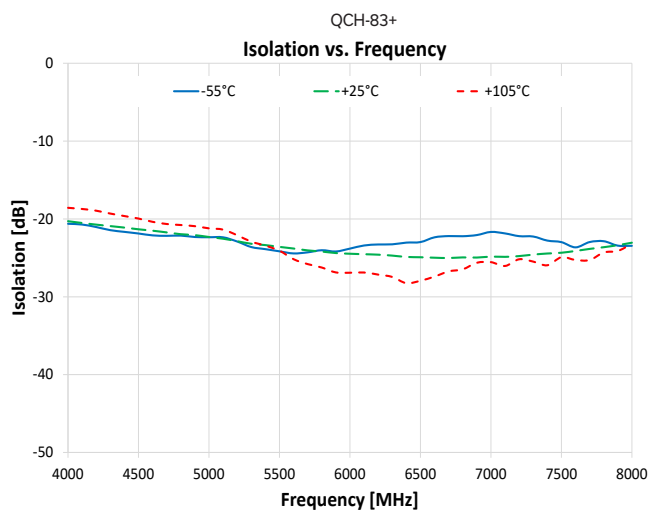
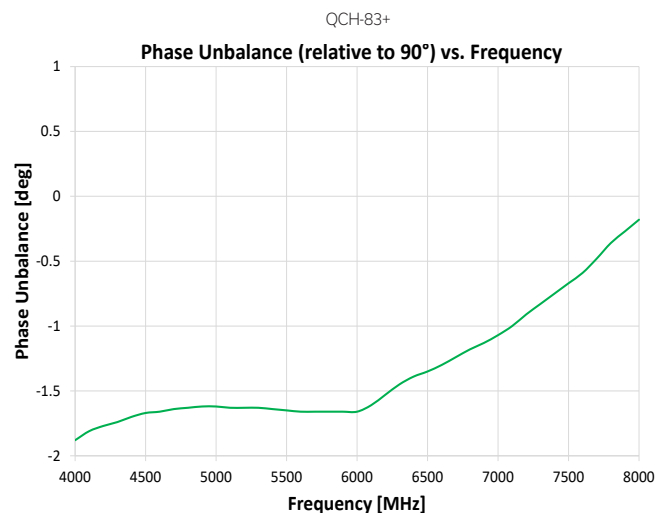
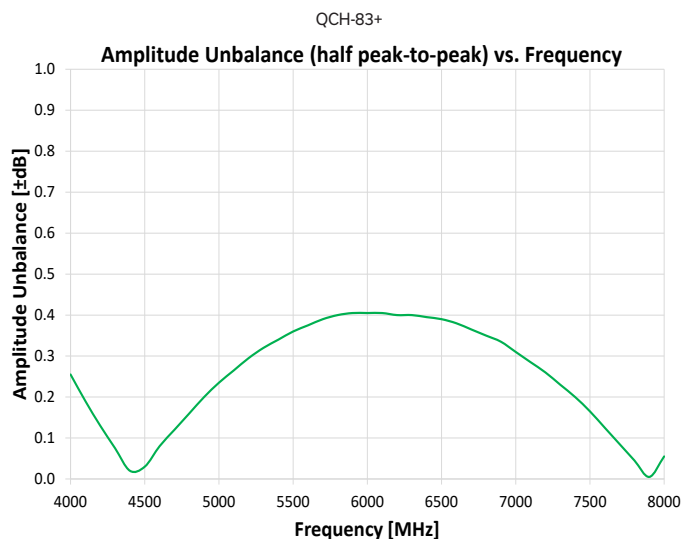
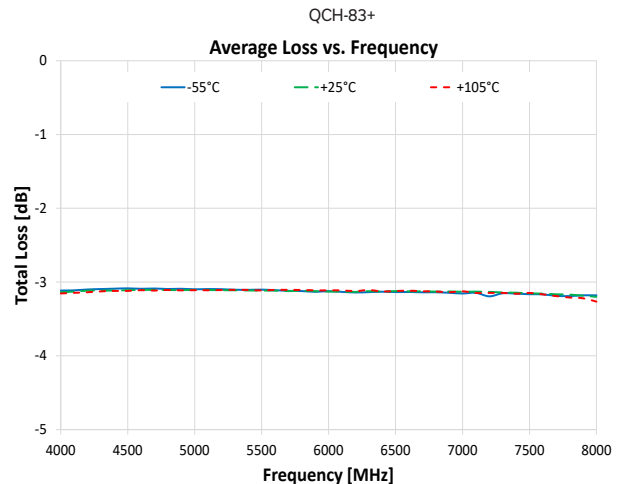
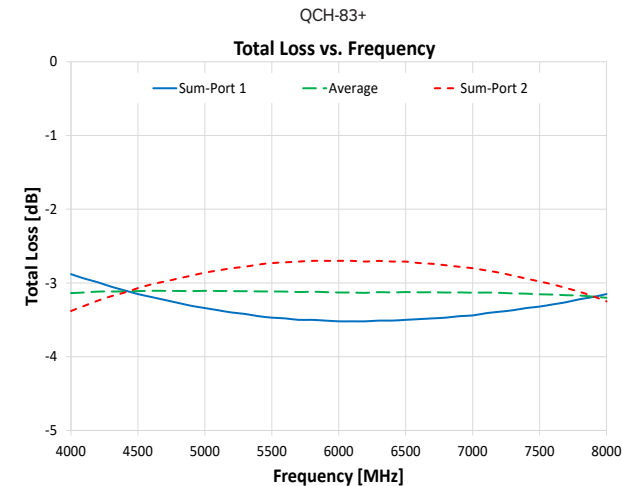
Power Splitter/Combiner

QCH-83+

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TYPICAL PERFORMANCE GRAPHS*

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





STRIPLINE SURFACE MOUNT

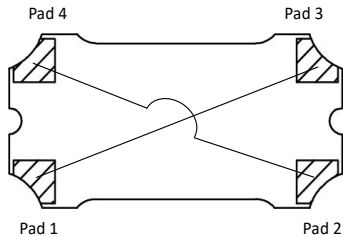
Power Splitter/Combiner

QCH-83+

Mini-Circuits

50Ω 4000 to 8000 MHz 2-Way 90° 75W

FUNCTIONAL DIAGRAM



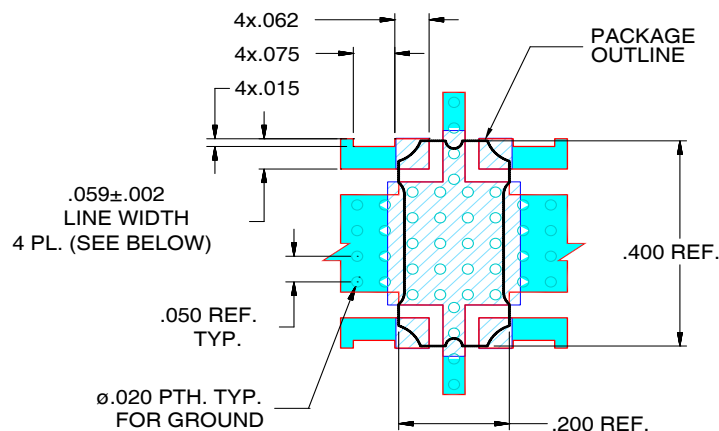
PAD DESCRIPTION/CONFIGURATION ⁷

Function	Pad	Description
Sum	1	Sum port
Isolation	2	Isolation port
Port 1 (0°)	3	0° port
Port 2 (90°)	4	90° port
Ground	5	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 Configurations table and s-parameters for actual performance.

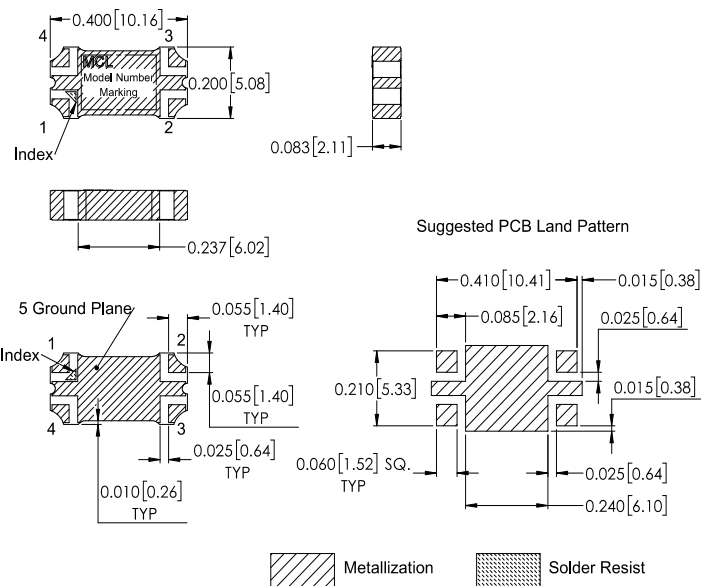
SUGGESTED PCB LAYOUT (PL-525A)



NOTES:

- TRACE WIDTH IS SHOWN FOR ROGERS RT/DUROID5880 WITH DIELECTRIC THICKNESS 0.02 ± 0.0015 ". 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

CASE STYLE DRAWING (PQ2481)



NOTES:

- Base material: Printed wiring laminate.
- Termination finish: 2-5 µinch (.05-.13 microns) Immersion Gold.
- Dimensions: Inches [mm]. Tolerances 2 PL. ± 0.3 inch; 3 PL. ± 0.010 inch.
- Weight: 1.0 grams
- Marking may contain other features or characters for internal lot control.

PRODUCT MARKING*: QCH-83+

* Marking may contain other features or characters for internal lot control.

Mini-Circuits



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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	PQ2481 Lead finish: 2-5 inch (0.05-0.13 microns) immersion gold
RoHS Status	Compliant
Tape and Reel	F34
Suggested Layout for PCB Design	PL-525A
Evaluation Board	TB-QCH-83+ 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-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 <https://www.minicircuits.com/terms/viewterm.html>



2-Way 90° Power Splitter/Combiner

QCH-83+

Typical Performance Data

Test Conditions: Input Power = +5 dbm, Temperature = -55°C, Configuration A.

Freq. (MHz)	Total Loss*			Amp. Unb.	Ph. Unb.	Isolation	Return Loss			
	(dB)			(±dB)	(deg)	(dB)	(dB)			
	Sum-Port 1	Sum-Port 2	Average	Half P-P	Rel. to 90°	Port1-Port2	Sum	Port 1	Port 2	Iso
4000	-2.90	-3.32	-3.12	0.21	-2.17	-20.62	-19.48	-20.18	-19.45	-20.22
4100	-2.96	-3.26	-3.11	0.15	-2.13	-20.72	-19.58	-20.21	-19.77	-20.48
4200	-3.01	-3.19	-3.10	0.09	-2.09	-21.04	-19.85	-20.39	-19.98	-21.01
4300	-3.06	-3.13	-3.10	0.04	-2.00	-21.44	-20.40	-20.60	-20.57	-21.51
4400	-3.11	-3.07	-3.09	0.02	-2.02	-21.66	-20.81	-20.86	-21.19	-21.80
4500	-3.16	-3.01	-3.09	0.08	-2.02	-21.87	-20.82	-21.04	-21.27	-22.24
4600	-3.21	-2.97	-3.09	0.12	-2.08	-22.11	-20.92	-20.94	-21.51	-23.15
4700	-3.24	-2.93	-3.09	0.16	-2.07	-22.17	-21.34	-21.27	-21.80	-23.07
4800	-3.29	-2.89	-3.09	0.20	-2.16	-22.14	-21.59	-21.88	-21.90	-23.03
4900	-3.32	-2.85	-3.09	0.24	-2.10	-22.32	-21.79	-22.09	-21.97	-23.53
5000	-3.36	-2.82	-3.10	0.27	-2.13	-22.35	-21.96	-21.97	-22.10	-23.54
5100	-3.38	-2.79	-3.10	0.30	-2.12	-22.36	-22.29	-22.03	-22.64	-23.44
5200	-3.41	-2.76	-3.10	0.33	-2.08	-22.90	-22.74	-22.33	-23.12	-24.50
5300	-3.44	-2.74	-3.10	0.35	-2.05	-23.61	-23.47	-22.51	-23.69	-25.46
5400	-3.46	-2.72	-3.11	0.38	-2.06	-23.88	-24.28	-22.70	-24.45	-25.23
5500	-3.48	-2.69	-3.10	0.40	-2.04	-24.16	-24.46	-22.90	-25.31	-25.36
5600	-3.51	-2.67	-3.11	0.42	-2.09	-24.43	-24.35	-22.87	-25.64	-25.89
5700	-3.51	-2.69	-3.12	0.42	-2.07	-24.29	-23.91	-23.08	-25.11	-25.47
5800	-3.54	-2.66	-3.12	0.44	-2.26	-24.02	-24.30	-23.73	-25.54	-25.14
5900	-3.55	-2.67	-3.13	0.45	-2.18	-24.18	-24.28	-23.59	-25.77	-24.67
6000	-3.55	-2.65	-3.12	0.45	-2.25	-23.81	-24.56	-23.02	-25.87	-24.06
6100	-3.56	-2.66	-3.13	0.45	-2.25	-23.41	-24.11	-23.35	-25.54	-23.45
6200	-3.55	-2.69	-3.14	0.43	-2.10	-23.28	-23.79	-23.32	-25.56	-23.39
6300	-3.55	-2.68	-3.14	0.44	-2.15	-23.26	-24.01	-23.11	-25.94	-23.07
6400	-3.54	-2.68	-3.13	0.43	-2.13	-23.04	-24.25	-23.20	-26.22	-22.66
6500	-3.54	-2.69	-3.14	0.43	-2.05	-22.97	-24.23	-23.19	-26.74	-22.49
6600	-3.53	-2.70	-3.13	0.42	-2.18	-22.36	-23.58	-22.86	-27.30	-21.94
6700	-3.53	-2.71	-3.14	0.41	-2.08	-22.20	-23.08	-22.85	-26.74	-21.50
6800	-3.52	-2.72	-3.14	0.40	-2.04	-22.22	-23.37	-23.02	-26.41	-21.83
6900	-3.50	-2.76	-3.15	0.37	-2.03	-22.07	-22.97	-23.35	-25.79	-21.98
7000	-3.50	-2.78	-3.15	0.36	-2.06	-21.67	-22.28	-23.89	-25.52	-21.91
7100	-3.45	-2.82	-3.15	0.32	-1.96	-21.86	-21.94	-24.30	-24.88	-22.21
7200	-3.46	-2.91	-3.19	0.28	-1.64	-22.21	-21.76	-24.22	-24.52	-22.40
7300	-3.39	-2.90	-3.15	0.25	-1.73	-22.26	-22.52	-25.01	-24.78	-23.16
7400	-3.39	-2.91	-3.16	0.25	-1.80	-22.78	-22.82	-25.41	-24.60	-23.25
7500	-3.37	-2.95	-3.17	0.21	-1.86	-22.98	-23.74	-26.23	-24.64	-24.69
7600	-3.29	-3.04	-3.17	0.13	-1.51	-23.65	-23.47	-26.29	-24.49	-24.96
7700	-3.32	-3.05	-3.19	0.14	-1.32	-22.97	-23.97	-27.65	-25.14	-25.23
7800	-3.22	-3.16	-3.19	0.03	-1.32	-22.86	-22.97	-29.46	-24.34	-26.13
7900	-3.20	-3.16	-3.18	0.02	-1.36	-23.43	-22.80	-28.97	-23.80	-26.69
8000	-3.12	-3.24	-3.18	0.07	-1.42	-23.45	-23.23	-28.43	-24.80	-27.14

* Total loss is the loss from Sum to each coupled port including the 3 dB theoretical split.

2-Way 90° Power Splitter/Combiner

QCH-83+

Typical Performance Data

Test Conditions: Input Power = +5 dbm, Temperature = -55°C, Configuration B.

Freq. (MHz)	Total Loss*			Amp. Unb.	Ph. Unb.	Isolation	Return Loss			
	(dB)			(±dB)	(deg)	(dB)	(dB)			
	Sum-Port 1	Sum-Port 2	Average	Half P-P	Rel. to 90°	Port1-Port2	Sum	Port 1	Port 2	Iso
4000	-2.92	-3.31	-3.12	0.20	0.34	-20.63	-20.22	-19.45	-20.18	-19.48
4100	-2.97	-3.24	-3.11	0.14	0.41	-20.73	-20.48	-19.77	-20.21	-19.58
4200	-3.02	-3.18	-3.10	0.08	0.54	-21.04	-21.01	-19.98	-20.39	-19.85
4300	-3.07	-3.12	-3.10	0.03	0.68	-21.44	-21.51	-20.57	-20.60	-20.40
4400	-3.12	-3.07	-3.10	0.03	0.74	-21.66	-21.80	-21.19	-20.86	-20.81
4500	-3.17	-3.01	-3.09	0.08	0.82	-21.87	-22.24	-21.27	-21.04	-20.82
4600	-3.21	-2.97	-3.09	0.12	0.85	-22.11	-23.15	-21.51	-20.94	-20.92
4700	-3.25	-2.92	-3.09	0.16	0.94	-22.18	-23.07	-21.80	-21.27	-21.34
4800	-3.30	-2.88	-3.10	0.21	1.03	-22.15	-23.03	-21.90	-21.88	-21.59
4900	-3.33	-2.85	-3.10	0.24	1.07	-22.33	-23.53	-21.97	-22.09	-21.79
5000	-3.37	-2.82	-3.10	0.27	1.08	-22.36	-23.54	-22.10	-21.97	-21.96
5100	-3.39	-2.80	-3.11	0.30	1.09	-22.38	-23.44	-22.64	-22.03	-22.29
5200	-3.42	-2.76	-3.10	0.33	1.21	-22.91	-24.50	-23.12	-22.33	-22.74
5300	-3.44	-2.74	-3.10	0.35	1.33	-23.62	-25.46	-23.69	-22.51	-23.47
5400	-3.47	-2.73	-3.12	0.37	1.42	-23.89	-25.23	-24.45	-22.70	-24.28
5500	-3.48	-2.70	-3.11	0.39	1.51	-24.16	-25.36	-25.31	-22.90	-24.46
5600	-3.51	-2.69	-3.12	0.41	1.53	-24.44	-25.89	-25.64	-22.87	-24.35
5700	-3.53	-2.68	-3.13	0.42	1.61	-24.30	-25.47	-25.11	-23.08	-23.91
5800	-3.55	-2.67	-3.13	0.44	1.53	-24.03	-25.14	-25.54	-23.73	-24.30
5900	-3.56	-2.66	-3.13	0.45	1.74	-24.19	-24.67	-25.77	-23.59	-24.28
6000	-3.57	-2.67	-3.14	0.45	1.69	-23.81	-24.06	-25.87	-23.02	-24.56
6100	-3.58	-2.69	-3.16	0.45	1.63	-23.42	-23.45	-25.54	-23.35	-24.11
6200	-3.58	-2.68	-3.15	0.45	1.91	-23.29	-23.39	-25.56	-23.32	-23.79
6300	-3.57	-2.69	-3.15	0.44	1.93	-23.25	-23.07	-25.94	-23.11	-24.01
6400	-3.57	-2.70	-3.16	0.44	2.01	-23.05	-22.66	-26.22	-23.20	-24.25
6500	-3.56	-2.71	-3.16	0.43	2.20	-22.99	-22.49	-26.74	-23.19	-24.23
6600	-3.55	-2.71	-3.15	0.42	2.20	-22.37	-21.94	-27.30	-22.86	-23.58
6700	-3.54	-2.74	-3.16	0.40	2.30	-22.21	-21.50	-26.74	-22.85	-23.08
6800	-3.55	-2.76	-3.17	0.40	2.49	-22.24	-21.83	-26.41	-23.02	-23.37
6900	-3.53	-2.78	-3.17	0.38	2.65	-22.08	-21.98	-25.79	-23.35	-22.97
7000	-3.52	-2.79	-3.17	0.37	2.54	-21.68	-21.91	-25.52	-23.89	-22.28
7100	-3.47	-2.83	-3.16	0.32	2.66	-21.87	-22.21	-24.88	-24.30	-21.94
7200	-3.50	-2.86	-3.19	0.32	2.89	-22.26	-22.40	-24.52	-24.22	-21.76
7300	-3.42	-2.91	-3.17	0.26	3.02	-22.27	-23.16	-24.78	-25.01	-22.52
7400	-3.42	-2.93	-3.18	0.25	3.21	-22.76	-23.25	-24.60	-25.41	-22.82
7500	-3.40	-2.93	-3.17	0.24	3.10	-23.00	-24.69	-24.64	-26.23	-23.74
7600	-3.32	-3.01	-3.17	0.16	3.35	-23.65	-24.96	-24.49	-26.29	-23.47
7700	-3.35	-3.06	-3.21	0.15	3.79	-22.99	-25.23	-25.14	-27.65	-23.97
7800	-3.27	-3.14	-3.21	0.06	3.80	-22.91	-26.13	-24.34	-29.46	-22.97
7900	-3.22	-3.14	-3.18	0.04	3.47	-23.43	-26.69	-23.80	-28.97	-22.80
8000	-3.18	-3.25	-3.22	0.04	3.95	-23.45	-27.14	-24.80	-28.43	-23.23

* Total loss is the loss from Sum to each coupled port including the 3 dB theoretical split.

2-Way 90° Power Splitter/Combiner

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Typical Performance Data

Test Conditions: Input Power = +5 dbm, Temperature = -55°C, Configuration C.

Freq. (MHz)	Total Loss*			Amp. Unb.	Ph. Unb.	Isolation	Return Loss			
	(dB)			(±dB)	(deg)	(dB)	(dB)			
	Sum-Port 1	Sum-Port 2	Average	Half P-P	Rel. to 90°	Port1-Port2	Sum	Port 1	Port 2	Iso
4000	-2.89	-3.31	-3.11	0.21	-0.51	-20.51	-20.18	-19.48	-20.22	-19.45
4100	-2.95	-3.24	-3.10	0.15	-0.43	-20.62	-20.21	-19.58	-20.48	-19.77
4200	-3.00	-3.18	-3.09	0.09	-0.33	-20.76	-20.39	-19.85	-21.01	-19.98
4300	-3.06	-3.13	-3.10	0.03	-0.23	-21.00	-20.60	-20.40	-21.51	-20.57
4400	-3.10	-3.07	-3.09	0.02	-0.21	-21.32	-20.86	-20.81	-21.80	-21.19
4500	-3.15	-3.01	-3.08	0.08	-0.15	-21.53	-21.04	-20.82	-22.24	-21.27
4600	-3.20	-2.97	-3.09	0.12	-0.14	-21.41	-20.94	-20.92	-23.15	-21.51
4700	-3.24	-2.93	-3.09	0.16	-0.09	-21.62	-21.27	-21.34	-23.07	-21.80
4800	-3.28	-2.88	-3.08	0.21	-0.10	-21.80	-21.88	-21.59	-23.03	-21.90
4900	-3.31	-2.85	-3.09	0.24	-0.06	-21.84	-22.09	-21.79	-23.53	-21.97
5000	-3.35	-2.83	-3.10	0.27	-0.04	-21.83	-21.97	-21.96	-23.54	-22.10
5100	-3.38	-2.80	-3.10	0.29	0.01	-21.80	-22.03	-22.29	-23.44	-22.64
5200	-3.40	-2.76	-3.09	0.33	0.11	-22.22	-22.33	-22.74	-24.50	-23.12
5300	-3.43	-2.74	-3.10	0.35	0.15	-22.47	-22.51	-23.47	-25.46	-23.69
5400	-3.45	-2.73	-3.10	0.37	0.22	-22.81	-22.70	-24.28	-25.23	-24.45
5500	-3.47	-2.70	-3.10	0.39	0.31	-23.19	-22.90	-24.46	-25.36	-25.31
5600	-3.50	-2.69	-3.11	0.41	0.28	-23.40	-22.87	-24.35	-25.89	-25.64
5700	-3.50	-2.68	-3.11	0.42	0.28	-23.46	-23.08	-23.91	-25.47	-25.11
5800	-3.53	-2.67	-3.12	0.44	0.15	-23.67	-23.73	-24.30	-25.14	-25.54
5900	-3.55	-2.66	-3.13	0.45	0.36	-24.10	-23.59	-24.28	-24.67	-25.77
6000	-3.54	-2.67	-3.13	0.44	0.33	-23.74	-23.02	-24.56	-24.06	-25.87
6100	-3.56	-2.69	-3.15	0.44	0.28	-23.74	-23.35	-24.11	-23.45	-25.54
6200	-3.54	-2.68	-3.13	0.44	0.52	-23.78	-23.32	-23.79	-23.39	-25.56
6300	-3.55	-2.69	-3.14	0.44	0.42	-23.82	-23.11	-24.01	-23.07	-25.94
6400	-3.53	-2.70	-3.13	0.42	0.65	-24.08	-23.20	-24.25	-22.66	-26.22
6500	-3.53	-2.71	-3.14	0.42	0.75	-24.13	-23.19	-24.23	-22.49	-26.74
6600	-3.53	-2.71	-3.14	0.41	0.80	-24.25	-22.86	-23.58	-21.94	-27.30
6700	-3.52	-2.74	-3.15	0.40	0.85	-24.20	-22.85	-23.08	-21.50	-26.74
6800	-3.51	-2.76	-3.15	0.38	0.96	-24.08	-23.02	-23.37	-21.83	-26.41
6900	-3.49	-2.78	-3.15	0.36	1.06	-24.22	-23.35	-22.97	-21.98	-25.79
7000	-3.49	-2.79	-3.15	0.36	1.08	-24.18	-23.89	-22.28	-21.91	-25.52
7100	-3.45	-2.83	-3.15	0.31	1.13	-24.20	-24.30	-21.94	-22.21	-24.88
7200	-3.46	-2.86	-3.17	0.30	1.44	-24.29	-24.22	-21.76	-22.40	-24.52
7300	-3.38	-2.91	-3.15	0.24	1.31	-24.47	-25.01	-22.52	-23.16	-24.78
7400	-3.38	-2.93	-3.16	0.23	1.51	-24.78	-25.41	-22.82	-23.25	-24.60
7500	-3.36	-2.93	-3.15	0.22	1.42	-24.21	-26.23	-23.74	-24.69	-24.64
7600	-3.28	-3.01	-3.15	0.14	1.65	-24.50	-26.29	-23.47	-24.96	-24.49
7700	-3.31	-3.06	-3.19	0.13	2.10	-24.89	-27.65	-23.97	-25.23	-25.14
7800	-3.21	-3.14	-3.18	0.04	2.07	-24.23	-29.46	-22.97	-26.13	-24.34
7900	-3.19	-3.14	-3.17	0.03	1.88	-24.45	-28.97	-22.80	-26.69	-23.80
8000	-3.10	-3.24	-3.17	0.07	2.27	-23.93	-28.43	-23.23	-27.14	-24.80

* Total loss is the loss from Sum to each coupled port including the 3 dB theoretical split.

2-Way 90° Power Splitter/Combiner

QCH-83+

Typical Performance Data

Test Conditions: Input Power = +5 dbm, Temperature = -55°C, Configuration D.

Freq. (MHz)	Total Loss*			Amp. Unb.	Ph. Unb.	Isolation	Return Loss			
	(dB)			(±dB)	(deg)	(dB)	(dB)			
	Sum-Port 1	Sum-Port 2	Average	Half P-P	Rel. to 90°	Port1-Port2	Sum	Port 1	Port 2	Iso
4000	-2.92	-3.32	-3.12	0.20	-1.33	-20.50	-19.45	-20.22	-19.48	-20.18
4100	-2.97	-3.25	-3.11	0.15	-1.29	-20.61	-19.77	-20.48	-19.58	-20.21
4200	-3.02	-3.18	-3.10	0.09	-1.23	-20.74	-19.98	-21.01	-19.85	-20.39
4300	-3.07	-3.13	-3.10	0.04	-1.10	-20.99	-20.57	-21.51	-20.40	-20.60
4400	-3.12	-3.06	-3.09	0.03	-1.08	-21.31	-21.19	-21.80	-20.81	-20.86
4500	-3.17	-3.01	-3.09	0.08	-1.07	-21.52	-21.27	-22.24	-20.82	-21.04
4600	-3.21	-2.96	-3.09	0.12	-1.10	-21.40	-21.51	-23.15	-20.92	-20.94
4700	-3.25	-2.92	-3.09	0.16	-1.06	-21.61	-21.80	-23.07	-21.34	-21.27
4800	-3.30	-2.88	-3.10	0.21	-1.04	-21.79	-21.90	-23.03	-21.59	-21.88
4900	-3.33	-2.85	-3.10	0.24	-0.99	-21.83	-21.97	-23.53	-21.79	-22.09
5000	-3.37	-2.81	-3.10	0.28	-1.02	-21.82	-22.10	-23.54	-21.96	-21.97
5100	-3.39	-2.79	-3.10	0.30	-1.05	-21.80	-22.64	-23.44	-22.29	-22.03
5200	-3.42	-2.76	-3.10	0.33	-0.99	-22.22	-23.12	-24.50	-22.74	-22.33
5300	-3.44	-2.73	-3.10	0.36	-0.89	-22.46	-23.69	-25.46	-23.47	-22.51
5400	-3.47	-2.71	-3.11	0.38	-0.89	-22.80	-24.45	-25.23	-24.28	-22.70
5500	-3.48	-2.69	-3.10	0.40	-0.86	-23.19	-25.31	-25.36	-24.46	-22.90
5600	-3.51	-2.66	-3.11	0.42	-0.85	-23.40	-25.64	-25.89	-24.35	-22.87
5700	-3.53	-2.68	-3.13	0.42	-0.76	-23.47	-25.11	-25.47	-23.91	-23.08
5800	-3.55	-2.65	-3.12	0.45	-0.92	-23.67	-25.54	-25.14	-24.30	-23.73
5900	-3.56	-2.66	-3.13	0.45	-0.81	-24.10	-25.77	-24.67	-24.28	-23.59
6000	-3.57	-2.64	-3.13	0.46	-0.90	-23.73	-25.87	-24.06	-24.56	-23.02
6100	-3.58	-2.66	-3.14	0.46	-0.92	-23.74	-25.54	-23.45	-24.11	-23.35
6200	-3.58	-2.68	-3.15	0.45	-0.75	-23.78	-25.56	-23.39	-23.79	-23.32
6300	-3.57	-2.67	-3.14	0.45	-0.68	-23.81	-25.94	-23.07	-24.01	-23.11
6400	-3.57	-2.67	-3.14	0.45	-0.79	-24.08	-26.22	-22.66	-24.25	-23.20
6500	-3.56	-2.68	-3.14	0.44	-0.60	-24.13	-26.74	-22.49	-24.23	-23.19
6600	-3.55	-2.69	-3.14	0.43	-0.79	-24.26	-27.30	-21.94	-23.58	-22.86
6700	-3.54	-2.70	-3.14	0.42	-0.65	-24.21	-26.74	-21.50	-23.08	-22.85
6800	-3.55	-2.72	-3.15	0.42	-0.53	-24.08	-26.41	-21.83	-23.37	-23.02
6900	-3.53	-2.75	-3.16	0.39	-0.45	-24.23	-25.79	-21.98	-22.97	-23.35
7000	-3.51	-2.77	-3.16	0.37	-0.62	-24.17	-25.52	-21.91	-22.28	-23.89
7100	-3.47	-2.82	-3.16	0.33	-0.43	-24.22	-24.88	-22.21	-21.94	-24.30
7200	-3.50	-2.90	-3.21	0.30	-0.17	-24.32	-24.52	-22.40	-21.76	-24.22
7300	-3.42	-2.89	-3.16	0.26	-0.01	-24.46	-24.78	-23.16	-22.52	-25.01
7400	-3.42	-2.90	-3.17	0.26	-0.11	-24.71	-24.60	-23.25	-22.82	-25.41
7500	-3.40	-2.94	-3.18	0.23	-0.19	-24.21	-24.64	-24.69	-23.74	-26.23
7600	-3.32	-3.03	-3.18	0.14	0.22	-24.50	-24.49	-24.96	-23.47	-26.29
7700	-3.35	-3.05	-3.20	0.15	0.38	-24.90	-25.14	-25.23	-23.97	-27.65
7800	-3.26	-3.15	-3.21	0.06	0.39	-24.30	-24.34	-26.13	-22.97	-29.46
7900	-3.21	-3.15	-3.18	0.03	0.25	-24.44	-23.80	-26.69	-22.80	-28.97
8000	-3.17	-3.23	-3.20	0.04	0.27	-23.93	-24.80	-27.14	-23.23	-28.43

* Total loss is the loss from Sum to each coupled port including the 3 dB theoretical split.

2-Way 90° Power Splitter/Combiner

QCH-83+

Typical Performance Data

Test Conditions: Input Power = +5 dbm, Temperature = +25°C, Configuration A.

Freq. (MHz)	Total Loss*			Amp. Unb.	Ph. Unb.	Isolation	Return Loss			
	(dB)			(±dB)	(deg)	(dB)	(dB)			
	Sum-Port 1	Sum-Port 2	Average	Half P-P	Rel. to 90°	Port1-Port2	Sum	Port 1	Port 2	Iso
4000	-2.88	-3.38	-3.14	0.26	-1.88	-20.29	-19.09	-19.53	-18.89	-19.96
4100	-2.94	-3.31	-3.13	0.19	-1.81	-20.52	-19.38	-19.82	-19.11	-20.32
4200	-2.99	-3.24	-3.12	0.13	-1.77	-20.73	-19.70	-20.08	-19.40	-20.66
4300	-3.05	-3.18	-3.12	0.08	-1.74	-20.92	-19.91	-20.26	-19.76	-21.01
4400	-3.10	-3.13	-3.12	0.02	-1.70	-21.11	-20.23	-20.46	-20.10	-21.24
4500	-3.15	-3.07	-3.11	0.03	-1.67	-21.33	-20.52	-20.66	-20.41	-21.60
4600	-3.19	-3.02	-3.11	0.08	-1.66	-21.51	-20.83	-20.82	-20.76	-22.02
4700	-3.23	-2.98	-3.11	0.12	-1.64	-21.73	-21.22	-21.16	-21.09	-22.39
4800	-3.27	-2.94	-3.11	0.16	-1.63	-21.96	-21.47	-21.40	-21.56	-23.00
4900	-3.31	-2.90	-3.11	0.20	-1.62	-22.08	-21.85	-21.56	-22.11	-23.23
5000	-3.34	-2.86	-3.11	0.24	-1.62	-22.32	-22.08	-21.73	-22.42	-23.58
5100	-3.37	-2.83	-3.11	0.27	-1.63	-22.54	-22.39	-21.80	-23.01	-24.05
5200	-3.40	-2.80	-3.11	0.30	-1.63	-22.86	-22.72	-22.08	-23.43	-24.49
5300	-3.42	-2.78	-3.11	0.32	-1.63	-23.19	-23.12	-22.42	-23.88	-24.81
5400	-3.45	-2.75	-3.11	0.34	-1.64	-23.36	-23.48	-22.63	-24.45	-24.99
5500	-3.47	-2.73	-3.12	0.36	-1.65	-23.59	-23.73	-22.76	-24.98	-25.33
5600	-3.48	-2.72	-3.12	0.38	-1.66	-23.80	-23.93	-22.83	-25.48	-25.47
5700	-3.50	-2.71	-3.12	0.39	-1.66	-24.04	-24.22	-23.12	-25.93	-25.63
5800	-3.50	-2.70	-3.12	0.40	-1.66	-24.19	-24.53	-23.45	-26.45	-25.75
5900	-3.51	-2.70	-3.12	0.41	-1.66	-24.38	-24.68	-23.68	-27.07	-26.08
6000	-3.52	-2.70	-3.13	0.41	-1.66	-24.47	-24.99	-23.89	-27.76	-25.91
6100	-3.52	-2.70	-3.13	0.41	-1.61	-24.53	-25.19	-24.07	-28.07	-25.79
6200	-3.52	-2.71	-3.13	0.40	-1.53	-24.59	-25.48	-24.34	-28.40	-25.66
6300	-3.51	-2.70	-3.12	0.40	-1.45	-24.71	-25.63	-24.65	-29.09	-25.66
6400	-3.51	-2.71	-3.13	0.40	-1.39	-24.88	-25.73	-25.28	-29.56	-25.83
6500	-3.50	-2.71	-3.12	0.39	-1.35	-24.92	-26.10	-25.56	-30.22	-25.56
6600	-3.49	-2.73	-3.13	0.38	-1.30	-24.98	-26.29	-25.82	-30.62	-25.29
6700	-3.48	-2.74	-3.13	0.37	-1.24	-25.02	-26.41	-26.11	-30.80	-25.26
6800	-3.47	-2.76	-3.13	0.35	-1.18	-24.94	-26.40	-26.66	-30.55	-25.24
6900	-3.45	-2.78	-3.13	0.34	-1.13	-24.96	-26.32	-27.40	-30.25	-25.51
7000	-3.44	-2.80	-3.13	0.31	-1.07	-24.84	-26.20	-28.15	-30.13	-25.55
7100	-3.41	-2.83	-3.13	0.29	-1.00	-24.87	-26.33	-28.27	-30.09	-25.41
7200	-3.39	-2.86	-3.13	0.26	-0.91	-24.77	-26.19	-28.25	-29.56	-25.42
7300	-3.37	-2.90	-3.14	0.23	-0.83	-24.58	-26.01	-28.65	-28.65	-25.37
7400	-3.34	-2.94	-3.14	0.20	-0.75	-24.44	-25.58	-28.89	-27.92	-25.72
7500	-3.32	-2.98	-3.15	0.17	-0.67	-24.34	-25.30	-28.96	-27.19	-25.98
7600	-3.29	-3.02	-3.16	0.13	-0.59	-24.11	-24.99	-28.53	-26.79	-25.94
7700	-3.26	-3.07	-3.17	0.09	-0.48	-23.85	-24.74	-27.81	-26.22	-25.88
7800	-3.22	-3.12	-3.17	0.05	-0.36	-23.63	-24.40	-26.92	-25.44	-25.84
7900	-3.19	-3.18	-3.19	0.01	-0.27	-23.37	-23.78	-26.31	-24.44	-26.18
8000	-3.15	-3.25	-3.20	0.06	-0.18	-23.05	-23.31	-25.51	-23.84	-26.23

* Total loss is the loss from Sum to each coupled port including the 3 dB theoretical split.

2-Way 90° Power Splitter/Combiner

QCH-83+

Typical Performance Data

Test Conditions: Input Power = +5 dbm, Temperature = +25°C, Configuration B.

Freq. (MHz)	Total Loss*			Amp. Unb.	Ph. Unb.	Isolation	Return Loss			
	(dB)			(±dB)	(deg)	(dB)	(dB)			
	Sum-Port 1	Sum-Port 2	Average	Half P-P	Rel. to 90°	Port1-Port2	Sum	Port 1	Port 2	Iso
4000	-2.90	-3.36	-3.14	0.23	0.16	-20.31	-19.96	-18.89	-19.53	-19.09
4100	-2.96	-3.29	-3.13	0.16	0.23	-20.55	-20.32	-19.11	-19.82	-19.38
4200	-3.01	-3.22	-3.12	0.10	0.31	-20.75	-20.66	-19.40	-20.08	-19.70
4300	-3.06	-3.16	-3.11	0.05	0.40	-20.94	-21.01	-19.76	-20.26	-19.91
4400	-3.11	-3.11	-3.11	0.01	0.47	-21.13	-21.24	-20.10	-20.46	-20.23
4500	-3.16	-3.06	-3.11	0.06	0.52	-21.35	-21.60	-20.41	-20.66	-20.52
4600	-3.20	-3.01	-3.11	0.11	0.57	-21.54	-22.02	-20.76	-20.82	-20.83
4700	-3.25	-2.97	-3.11	0.15	0.64	-21.74	-22.39	-21.09	-21.16	-21.22
4800	-3.28	-2.92	-3.10	0.19	0.70	-21.98	-23.00	-21.56	-21.40	-21.47
4900	-3.32	-2.89	-3.11	0.22	0.77	-22.10	-23.23	-22.11	-21.56	-21.85
5000	-3.35	-2.85	-3.11	0.26	0.82	-22.34	-23.58	-22.42	-21.73	-22.08
5100	-3.38	-2.82	-3.11	0.29	0.87	-22.56	-24.05	-23.01	-21.80	-22.39
5200	-3.41	-2.80	-3.12	0.32	0.95	-22.89	-24.49	-23.43	-22.08	-22.72
5300	-3.43	-2.77	-3.11	0.34	1.00	-23.21	-24.81	-23.88	-22.42	-23.12
5400	-3.46	-2.74	-3.11	0.36	1.05	-23.37	-24.99	-24.45	-22.63	-23.48
5500	-3.48	-2.73	-3.12	0.38	1.12	-23.60	-25.33	-24.98	-22.76	-23.73
5600	-3.49	-2.71	-3.12	0.40	1.16	-23.81	-25.47	-25.48	-22.83	-23.93
5700	-3.51	-2.70	-3.12	0.41	1.19	-24.06	-25.63	-25.93	-23.12	-24.22
5800	-3.52	-2.69	-3.12	0.42	1.24	-24.21	-25.75	-26.45	-23.45	-24.53
5900	-3.53	-2.68	-3.13	0.43	1.26	-24.39	-26.08	-27.07	-23.68	-24.68
6000	-3.53	-2.68	-3.13	0.43	1.31	-24.48	-25.91	-27.76	-23.89	-24.99
6100	-3.53	-2.68	-3.13	0.43	1.40	-24.54	-25.79	-28.07	-24.07	-25.19
6200	-3.53	-2.69	-3.13	0.43	1.48	-24.61	-25.66	-28.40	-24.34	-25.48
6300	-3.53	-2.69	-3.13	0.42	1.62	-24.73	-25.66	-29.09	-24.65	-25.63
6400	-3.52	-2.69	-3.12	0.42	1.76	-24.90	-25.83	-29.56	-25.28	-25.73
6500	-3.52	-2.70	-3.13	0.41	1.86	-24.94	-25.56	-30.22	-25.56	-26.10
6600	-3.51	-2.71	-3.13	0.41	1.98	-25.00	-25.29	-30.62	-25.82	-26.29
6700	-3.50	-2.72	-3.13	0.40	2.06	-25.04	-25.26	-30.80	-26.11	-26.41
6800	-3.49	-2.74	-3.13	0.38	2.15	-24.96	-25.24	-30.55	-26.66	-26.40
6900	-3.48	-2.76	-3.13	0.36	2.27	-24.98	-25.51	-30.25	-27.40	-26.32
7000	-3.46	-2.79	-3.14	0.34	2.36	-24.86	-25.55	-30.13	-28.15	-26.20
7100	-3.44	-2.81	-3.14	0.32	2.48	-24.88	-25.41	-30.09	-28.27	-26.33
7200	-3.41	-2.84	-3.13	0.30	2.59	-24.79	-25.42	-29.56	-28.25	-26.19
7300	-3.40	-2.88	-3.15	0.27	2.71	-24.60	-25.37	-28.65	-28.65	-26.01
7400	-3.37	-2.91	-3.15	0.24	2.83	-24.46	-25.72	-27.92	-28.89	-25.58
7500	-3.34	-2.95	-3.15	0.20	2.95	-24.35	-25.98	-27.19	-28.96	-25.30
7600	-3.31	-3.00	-3.16	0.17	3.09	-24.13	-25.94	-26.79	-28.53	-24.99
7700	-3.28	-3.05	-3.17	0.13	3.20	-23.87	-25.88	-26.22	-27.81	-24.74
7800	-3.25	-3.10	-3.18	0.08	3.33	-23.66	-25.84	-25.44	-26.92	-24.40
7900	-3.21	-3.16	-3.19	0.03	3.47	-23.38	-26.18	-24.44	-26.31	-23.78
8000	-3.18	-3.22	-3.20	0.02	3.63	-23.07	-26.23	-23.84	-25.51	-23.31

* Total loss is the loss from Sum to each coupled port including the 3 dB theoretical split.

2-Way 90° Power Splitter/Combiner

QCH-83+

Typical Performance Data

Test Conditions: Input Power = +5 dbm, Temperature = +25°C, Configuration C.

Freq. (MHz)	Total Loss*			Amp. Unb.	Ph. Unb.	Isolation	Return Loss			
	(dB)			(±dB)	(deg)	(dB)	(dB)			
	Sum-Port 1	Sum-Port 2	Average	Half P-P	Rel. to 90°	Port1-Port2	Sum	Port 1	Port 2	Iso
4000	-2.89	-3.36	-3.13	0.24	-0.48	-19.99	-19.53	-19.09	-19.96	-18.89
4100	-2.95	-3.29	-3.12	0.18	-0.40	-20.16	-19.82	-19.38	-20.32	-19.11
4200	-3.00	-3.22	-3.11	0.12	-0.34	-20.33	-20.08	-19.70	-20.66	-19.40
4300	-3.05	-3.16	-3.11	0.06	-0.28	-20.53	-20.26	-19.91	-21.01	-19.76
4400	-3.10	-3.11	-3.11	0.01	-0.22	-20.68	-20.46	-20.23	-21.24	-20.10
4500	-3.15	-3.05	-3.10	0.05	-0.16	-20.86	-20.66	-20.52	-21.60	-20.41
4600	-3.20	-3.01	-3.11	0.09	-0.14	-20.93	-20.82	-20.83	-22.02	-20.76
4700	-3.24	-2.96	-3.10	0.14	-0.08	-21.14	-21.16	-21.22	-22.39	-21.09
4800	-3.28	-2.92	-3.10	0.18	-0.03	-21.36	-21.40	-21.47	-23.00	-21.56
4900	-3.31	-2.89	-3.11	0.21	0.01	-21.49	-21.56	-21.85	-23.23	-22.11
5000	-3.35	-2.85	-3.11	0.25	0.05	-21.74	-21.73	-22.08	-23.58	-22.42
5100	-3.38	-2.82	-3.11	0.28	0.08	-21.81	-21.80	-22.39	-24.05	-23.01
5200	-3.41	-2.79	-3.11	0.31	0.13	-22.11	-22.08	-22.72	-24.49	-23.43
5300	-3.43	-2.77	-3.11	0.33	0.17	-22.32	-22.42	-23.12	-24.81	-23.88
5400	-3.46	-2.75	-3.12	0.35	0.19	-22.57	-22.63	-23.48	-24.99	-24.45
5500	-3.47	-2.73	-3.12	0.37	0.23	-22.83	-22.76	-23.73	-25.33	-24.98
5600	-3.49	-2.72	-3.12	0.39	0.28	-23.08	-22.83	-23.93	-25.47	-25.48
5700	-3.51	-2.70	-3.12	0.40	0.30	-23.41	-23.12	-24.22	-25.63	-25.93
5800	-3.52	-2.70	-3.13	0.41	0.34	-23.65	-23.45	-24.53	-25.75	-26.45
5900	-3.53	-2.69	-3.13	0.42	0.36	-24.03	-23.68	-24.68	-26.08	-27.07
6000	-3.54	-2.69	-3.14	0.42	0.38	-24.31	-23.89	-24.99	-25.91	-27.76
6100	-3.54	-2.70	-3.14	0.42	0.46	-24.53	-24.07	-25.19	-25.79	-28.07
6200	-3.53	-2.70	-3.13	0.42	0.55	-24.76	-24.34	-25.48	-25.66	-28.40
6300	-3.53	-2.71	-3.14	0.41	0.64	-25.07	-24.65	-25.63	-25.66	-29.09
6400	-3.53	-2.71	-3.14	0.41	0.76	-25.55	-25.28	-25.73	-25.83	-29.56
6500	-3.52	-2.72	-3.14	0.40	0.86	-25.90	-25.56	-26.10	-25.56	-30.22
6600	-3.51	-2.73	-3.14	0.39	0.95	-26.21	-25.82	-26.29	-25.29	-30.62
6700	-3.50	-2.74	-3.14	0.38	1.03	-26.55	-26.11	-26.41	-25.26	-30.80
6800	-3.49	-2.76	-3.14	0.37	1.10	-26.83	-26.66	-26.40	-25.24	-30.55
6900	-3.48	-2.78	-3.14	0.35	1.19	-27.17	-27.40	-26.32	-25.51	-30.25
7000	-3.46	-2.80	-3.14	0.33	1.29	-27.35	-28.15	-26.20	-25.55	-30.13
7100	-3.44	-2.83	-3.15	0.30	1.38	-27.44	-28.27	-26.33	-25.41	-30.09
7200	-3.42	-2.86	-3.15	0.28	1.47	-27.36	-28.25	-26.19	-25.42	-29.56
7300	-3.40	-2.90	-3.16	0.25	1.55	-27.31	-28.65	-26.01	-25.37	-28.65
7400	-3.38	-2.93	-3.16	0.22	1.65	-26.87	-28.89	-25.58	-25.72	-27.92
7500	-3.35	-2.97	-3.16	0.19	1.82	-26.51	-28.96	-25.30	-25.98	-27.19
7600	-3.32	-3.02	-3.17	0.15	1.88	-26.13	-28.53	-24.99	-25.94	-26.79
7700	-3.29	-3.07	-3.18	0.11	1.96	-25.49	-27.81	-24.74	-25.88	-26.22
7800	-3.25	-3.12	-3.19	0.06	2.09	-24.85	-26.92	-24.40	-25.84	-25.44
7900	-3.22	-3.18	-3.20	0.02	2.19	-24.21	-26.31	-23.78	-26.18	-24.44
8000	-3.18	-3.24	-3.21	0.04	2.36	-23.66	-25.51	-23.31	-26.23	-23.84

* Total loss is the loss from Sum to each coupled port including the 3 dB theoretical split.

2-Way 90° Power Splitter/Combiner

QCH-83+

Typical Performance Data

Test Conditions: Input Power = +5 dbm, Temperature = +25°C, Configuration D.

Freq. (MHz)	Total Loss*			Amp. Unb.	Ph. Unb.	Isolation	Return Loss			
	(dB)			(±dB)	(deg)	(dB)	(dB)			
	Sum-Port 1	Sum-Port 2	Average	Half P-P	Rel. to 90°	Port1-Port2	Sum	Port 1	Port 2	Iso
4000	-2.91	-3.40	-3.16	0.24	-1.25	-20.00	-18.89	-19.96	-19.09	-19.53
4100	-2.97	-3.33	-3.15	0.18	-1.19	-20.17	-19.11	-20.32	-19.38	-19.82
4200	-3.02	-3.26	-3.14	0.12	-1.13	-20.34	-19.40	-20.66	-19.70	-20.08
4300	-3.08	-3.20	-3.14	0.06	-1.08	-20.54	-19.76	-21.01	-19.91	-20.26
4400	-3.12	-3.14	-3.13	0.01	-1.02	-20.69	-20.10	-21.24	-20.23	-20.46
4500	-3.17	-3.09	-3.13	0.05	-1.01	-20.87	-20.41	-21.60	-20.52	-20.66
4600	-3.21	-3.04	-3.13	0.09	-0.97	-20.93	-20.76	-22.02	-20.83	-20.82
4700	-3.26	-2.99	-3.13	0.14	-0.93	-21.15	-21.09	-22.39	-21.22	-21.16
4800	-3.29	-2.95	-3.12	0.18	-0.91	-21.36	-21.56	-23.00	-21.47	-21.40
4900	-3.33	-2.92	-3.13	0.21	-0.87	-21.50	-22.11	-23.23	-21.85	-21.56
5000	-3.36	-2.88	-3.13	0.25	-0.85	-21.75	-22.42	-23.58	-22.08	-21.73
5100	-3.39	-2.85	-3.13	0.28	-0.84	-21.82	-23.01	-24.05	-22.39	-21.80
5200	-3.42	-2.82	-3.13	0.31	-0.82	-22.11	-23.43	-24.49	-22.72	-22.08
5300	-3.45	-2.79	-3.13	0.33	-0.81	-22.33	-23.88	-24.81	-23.12	-22.42
5400	-3.47	-2.77	-3.13	0.35	-0.79	-22.58	-24.45	-24.99	-23.48	-22.63
5500	-3.49	-2.75	-3.14	0.37	-0.78	-22.83	-24.98	-25.33	-23.73	-22.76
5600	-3.51	-2.74	-3.14	0.39	-0.80	-23.09	-25.48	-25.47	-23.93	-22.83
5700	-3.53	-2.73	-3.15	0.40	-0.79	-23.42	-25.93	-25.63	-24.22	-23.12
5800	-3.54	-2.72	-3.15	0.41	-0.77	-23.66	-26.45	-25.75	-24.53	-23.45
5900	-3.55	-2.72	-3.15	0.42	-0.78	-24.04	-27.07	-26.08	-24.68	-23.68
6000	-3.56	-2.73	-3.16	0.42	-0.75	-24.31	-27.76	-25.91	-24.99	-23.89
6100	-3.56	-2.73	-3.16	0.42	-0.68	-24.53	-28.07	-25.79	-25.19	-24.07
6200	-3.55	-2.73	-3.16	0.42	-0.62	-24.76	-28.40	-25.66	-25.48	-24.34
6300	-3.55	-2.73	-3.16	0.41	-0.50	-25.08	-29.09	-25.66	-25.63	-24.65
6400	-3.55	-2.73	-3.16	0.41	-0.42	-25.55	-29.56	-25.83	-25.73	-25.28
6500	-3.54	-2.74	-3.16	0.40	-0.35	-25.90	-30.22	-25.56	-26.10	-25.56
6600	-3.54	-2.75	-3.16	0.40	-0.28	-26.21	-30.62	-25.29	-26.29	-25.82
6700	-3.53	-2.77	-3.17	0.38	-0.22	-26.56	-30.80	-25.26	-26.41	-26.11
6800	-3.52	-2.79	-3.17	0.37	-0.16	-26.83	-30.55	-25.24	-26.40	-26.66
6900	-3.50	-2.81	-3.17	0.35	-0.06	-27.17	-30.25	-25.51	-26.32	-27.40
7000	-3.49	-2.84	-3.18	0.33	0.01	-27.36	-30.13	-25.55	-26.20	-28.15
7100	-3.47	-2.87	-3.18	0.31	0.10	-27.44	-30.09	-25.41	-26.33	-28.27
7200	-3.45	-2.90	-3.18	0.28	0.21	-27.38	-29.56	-25.42	-26.19	-28.25
7300	-3.42	-2.93	-3.18	0.25	0.32	-27.32	-28.65	-25.37	-26.01	-28.65
7400	-3.40	-2.98	-3.20	0.22	0.44	-26.88	-27.92	-25.72	-25.58	-28.89
7500	-3.37	-3.02	-3.20	0.18	0.47	-26.52	-27.19	-25.98	-25.30	-28.96
7600	-3.34	-3.07	-3.21	0.15	0.62	-26.14	-26.79	-25.94	-24.99	-28.53
7700	-3.31	-3.12	-3.22	0.11	0.76	-25.50	-26.22	-25.88	-24.74	-27.81
7800	-3.28	-3.17	-3.23	0.07	0.89	-24.86	-25.44	-25.84	-24.40	-26.92
7900	-3.24	-3.23	-3.24	0.02	1.00	-24.22	-24.44	-26.18	-23.78	-26.31
8000	-3.20	-3.29	-3.25	0.04	1.10	-23.68	-23.84	-26.23	-23.31	-25.51

* Total loss is the loss from Sum to each coupled port including the 3 dB theoretical split.

2-Way 90° Power Splitter/Combiner

QCH-83+

Typical Performance Data

Test Conditions: Input Power = +5 dbm, Temperature = +105°C, Configuration A.

Freq. (MHz)	Total Loss*			Amp. Unb.	Ph. Unb.	Isolation	Return Loss			
	(dB)			(±dB)	(deg)	(dB)	(dB)			
	Sum-Port 1	Sum-Port 2	Average	Half P-P	Rel. to 90°	Port1-Port2	Sum	Port 1	Port 2	Iso
4000	-2.85	-3.44	-3.16	0.31	-0.85	-18.57	-17.72	-18.15	-17.34	-18.09
4100	-2.91	-3.37	-3.15	0.25	-0.67	-18.72	-17.91	-18.35	-17.65	-18.39
4200	-2.96	-3.31	-3.14	0.19	-0.44	-18.94	-18.26	-18.56	-17.92	-18.66
4300	-3.01	-3.24	-3.13	0.13	-0.29	-19.31	-18.67	-18.65	-18.38	-19.17
4400	-3.06	-3.18	-3.12	0.07	-0.12	-19.63	-19.06	-18.92	-19.05	-19.54
4500	-3.12	-3.12	-3.12	0.02	-0.01	-19.95	-19.26	-19.26	-19.51	-20.17
4600	-3.16	-3.06	-3.11	0.04	0.04	-20.37	-19.63	-19.35	-19.95	-20.98
4700	-3.21	-3.02	-3.12	0.09	0.06	-20.65	-20.34	-19.89	-20.26	-21.17
4800	-3.24	-2.97	-3.11	0.13	0.16	-20.78	-20.68	-20.52	-20.62	-21.35
4900	-3.28	-2.94	-3.11	0.16	0.23	-20.93	-20.87	-20.66	-21.14	-21.86
5000	-3.32	-2.89	-3.11	0.20	0.28	-21.21	-21.03	-20.87	-21.38	-22.23
5100	-3.34	-2.87	-3.11	0.23	0.39	-21.37	-21.36	-21.24	-21.94	-22.51
5200	-3.37	-2.83	-3.11	0.26	0.48	-22.09	-21.97	-21.85	-22.72	-23.57
5300	-3.40	-2.79	-3.11	0.30	0.51	-22.92	-22.49	-21.98	-23.74	-25.04
5400	-3.42	-2.77	-3.11	0.32	0.56	-23.43	-22.98	-22.43	-24.46	-25.44
5500	-3.45	-2.75	-3.11	0.34	0.57	-24.08	-23.31	-23.16	-25.25	-26.48
5600	-3.46	-2.72	-3.11	0.36	0.53	-25.17	-23.90	-23.18	-26.53	-28.41
5700	-3.47	-2.71	-3.11	0.37	0.51	-25.80	-24.57	-23.69	-26.87	-28.87
5800	-3.48	-2.70	-3.11	0.38	0.57	-26.24	-25.34	-24.53	-27.12	-28.81
5900	-3.49	-2.70	-3.11	0.39	0.64	-26.87	-25.63	-24.91	-27.70	-29.42
6000	-3.49	-2.70	-3.11	0.39	0.55	-26.91	-26.33	-25.02	-27.82	-28.92
6100	-3.49	-2.70	-3.11	0.39	0.64	-26.88	-26.86	-25.50	-27.09	-28.36
6200	-3.50	-2.71	-3.12	0.39	0.72	-27.15	-27.88	-25.75	-27.56	-28.18
6300	-3.49	-2.69	-3.11	0.39	0.84	-27.45	-28.94	-26.27	-29.23	-28.27
6400	-3.50	-2.72	-3.13	0.39	1.13	-28.25	-29.44	-26.76	-29.61	-27.79
6500	-3.49	-2.72	-3.12	0.38	1.07	-27.94	-30.22	-27.35	-31.15	-27.77
6600	-3.48	-2.72	-3.12	0.37	1.00	-27.40	-29.48	-27.20	-33.93	-26.59
6700	-3.47	-2.75	-3.12	0.35	1.31	-26.74	-29.65	-27.65	-37.15	-25.43
6800	-3.45	-2.78	-3.13	0.33	1.34	-26.47	-30.24	-29.32	-39.26	-26.17
6900	-3.46	-2.79	-3.14	0.33	1.44	-25.63	-31.16	-30.79	-51.27	-26.15
7000	-3.42	-2.81	-3.13	0.29	1.24	-25.55	-29.41	-30.97	-47.21	-26.07
7100	-3.41	-2.87	-3.15	0.26	1.66	-26.04	-28.58	-30.49	-40.41	-25.70
7200	-3.40	-2.88	-3.15	0.25	1.80	-25.18	-28.78	-32.51	-35.96	-26.41
7300	-3.38	-2.90	-3.15	0.24	1.85	-25.48	-29.10	-31.95	-32.06	-27.40
7400	-3.34	-2.97	-3.16	0.18	1.88	-25.95	-27.97	-31.54	-30.63	-27.68
7500	-3.29	-3.00	-3.15	0.13	1.77	-24.92	-28.55	-30.16	-28.67	-28.29
7600	-3.30	-3.03	-3.17	0.12	2.28	-25.27	-28.43	-28.96	-28.48	-29.22
7700	-3.25	-3.13	-3.19	0.06	2.33	-25.28	-25.57	-28.28	-27.28	-27.35
7800	-3.22	-3.20	-3.21	0.01	2.56	-24.31	-24.17	-26.44	-24.67	-27.50
7900	-3.19	-3.25	-3.22	0.05	2.39	-24.11	-23.51	-26.44	-23.84	-29.34
8000	-3.19	-3.34	-3.27	0.08	2.90	-23.19	-23.29	-24.03	-22.43	-29.15

* Total loss is the loss from Sum to each coupled port including the 3 dB theoretical split.

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 <https://www.minicircuits.com/terms/viewterm.html>



2-Way 90° Power Splitter/Combiner

QCH-83+

Typical Performance Data

Test Conditions: Input Power = +5 dbm, Temperature = +105°C, Configuration B.

Freq. (MHz)	Total Loss*			Amp. Unb.	Ph. Unb.	Isolation	Return Loss			
	(dB)			(±dB)	(deg)	(dB)	(dB)			
	Sum-Port 1	Sum-Port 2	Average	Half P-P	Rel. to 90°	Port1-Port2	Sum	Port 1	Port 2	Iso
4000	-2.89	-3.41	-3.16	0.26	-1.63	-18.61	-18.09	-17.34	-18.15	-17.72
4100	-2.93	-3.35	-3.15	0.20	-1.49	-18.76	-18.39	-17.65	-18.35	-17.91
4200	-2.98	-3.29	-3.14	0.15	-1.29	-18.97	-18.66	-17.92	-18.56	-18.26
4300	-3.03	-3.22	-3.13	0.09	-1.15	-19.34	-19.17	-18.38	-18.65	-18.67
4400	-3.07	-3.17	-3.12	0.04	-1.02	-19.67	-19.54	-19.05	-18.92	-19.06
4500	-3.11	-3.11	-3.11	0.02	-0.95	-19.98	-20.17	-19.51	-19.26	-19.26
4600	-3.15	-3.06	-3.11	0.07	-0.85	-20.40	-20.98	-19.95	-19.35	-19.63
4700	-3.21	-3.01	-3.11	0.12	-0.77	-20.68	-21.17	-20.26	-19.89	-20.34
4800	-3.25	-2.96	-3.11	0.16	-0.66	-20.81	-21.35	-20.62	-20.52	-20.68
4900	-3.28	-2.93	-3.11	0.19	-0.64	-20.96	-21.86	-21.14	-20.66	-20.87
5000	-3.32	-2.89	-3.11	0.23	-0.61	-21.24	-22.23	-21.38	-20.87	-21.03
5100	-3.35	-2.86	-3.11	0.26	-0.56	-21.40	-22.51	-21.94	-21.24	-21.36
5200	-3.38	-2.82	-3.11	0.30	-0.47	-22.13	-23.57	-22.72	-21.85	-21.97
5300	-3.40	-2.78	-3.10	0.32	-0.45	-22.95	-25.04	-23.74	-21.98	-22.49
5400	-3.42	-2.75	-3.10	0.35	-0.41	-23.46	-25.44	-24.46	-22.43	-22.98
5500	-3.45	-2.73	-3.10	0.37	-0.47	-24.10	-26.48	-25.25	-23.16	-23.31
5600	-3.46	-2.71	-3.10	0.39	-0.42	-25.19	-28.41	-26.53	-23.18	-23.90
5700	-3.47	-2.69	-3.10	0.40	-0.48	-25.83	-28.87	-26.87	-23.69	-24.57
5800	-3.49	-2.68	-3.10	0.42	-0.46	-26.26	-28.81	-27.12	-24.53	-25.34
5900	-3.52	-2.68	-3.12	0.43	-0.42	-26.88	-29.42	-27.70	-24.91	-25.63
6000	-3.51	-2.67	-3.11	0.43	-0.46	-26.92	-28.92	-27.82	-25.02	-26.33
6100	-3.51	-2.68	-3.11	0.43	-0.48	-26.90	-28.36	-27.09	-25.50	-26.86
6200	-3.51	-2.69	-3.12	0.42	-0.36	-27.17	-28.18	-27.56	-25.75	-27.88
6300	-3.50	-2.68	-3.11	0.42	-0.44	-27.48	-28.27	-29.23	-26.27	-28.94
6400	-3.51	-2.70	-3.12	0.41	-0.03	-28.27	-27.79	-29.61	-26.76	-29.44
6500	-3.50	-2.70	-3.12	0.41	-0.18	-27.96	-27.77	-31.15	-27.35	-30.22
6600	-3.50	-2.71	-3.12	0.40	-0.12	-27.42	-26.59	-33.93	-27.20	-29.48
6700	-3.49	-2.75	-3.14	0.38	0.02	-26.78	-25.43	-37.15	-27.65	-29.65
6800	-3.47	-2.76	-3.13	0.37	0.10	-26.48	-26.17	-39.26	-29.32	-30.24
6900	-3.46	-2.79	-3.14	0.34	0.18	-25.65	-26.15	-51.27	-30.79	-31.16
7000	-3.43	-2.81	-3.13	0.33	0.07	-25.56	-26.07	-47.21	-30.97	-29.41
7100	-3.43	-2.85	-3.15	0.30	0.48	-26.08	-25.70	-40.41	-30.49	-28.58
7200	-3.41	-2.86	-3.14	0.29	0.62	-25.19	-26.41	-35.96	-32.51	-28.78
7300	-3.40	-2.88	-3.15	0.27	0.34	-25.43	-27.40	-32.06	-31.95	-29.10
7400	-3.36	-2.93	-3.15	0.22	0.61	-25.96	-27.68	-30.63	-31.54	-27.97
7500	-3.30	-2.99	-3.15	0.17	0.65	-24.96	-28.29	-28.67	-30.16	-28.55
7600	-3.32	-3.01	-3.17	0.18	0.70	-25.31	-29.22	-28.48	-28.96	-28.43
7700	-3.27	-3.06	-3.17	0.12	0.95	-25.31	-27.35	-27.28	-28.28	-25.57
7800	-3.21	-3.15	-3.18	0.04	0.88	-24.36	-27.50	-24.67	-26.44	-24.17
7900	-3.20	-3.19	-3.20	0.01	1.12	-24.09	-29.34	-23.84	-26.44	-23.51
8000	-3.18	-3.25	-3.22	0.03	1.47	-23.23	-29.15	-22.43	-24.03	-23.29

* Total loss is the loss from Sum to each coupled port including the 3 dB theoretical split.

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2-Way 90° Power Splitter/Combiner

QCH-83+

Typical Performance Data

Test Conditions: Input Power = +5 dbm, Temperature = +105°C, Configuration C.

Freq. (MHz)	Total Loss*			Amp. Unb.	Ph. Unb.	Isolation	Return Loss			
	(dB)			(±dB)	(deg)	(dB)	(dB)			
	Sum-Port 1	Sum-Port 2	Average	Half P-P	Rel. to 90°	Port1-Port2	Sum	Port 1	Port 2	Iso
4000	-2.89	-3.42	-3.16	0.28	-0.53	-18.41	-18.15	-17.72	-18.09	-17.34
4100	-2.94	-3.36	-3.16	0.22	-0.35	-18.59	-18.35	-17.91	-18.39	-17.65
4200	-2.99	-3.30	-3.15	0.17	-0.12	-18.73	-18.56	-18.26	-18.66	-17.92
4300	-3.04	-3.23	-3.14	0.11	0.05	-18.96	-18.65	-18.67	-19.17	-18.38
4400	-3.09	-3.17	-3.13	0.05	0.21	-19.30	-18.92	-19.06	-19.54	-19.05
4500	-3.14	-3.11	-3.13	0.00	0.35	-19.61	-19.26	-19.26	-20.17	-19.51
4600	-3.19	-3.06	-3.13	0.06	0.40	-19.77	-19.35	-19.63	-20.98	-19.95
4700	-3.23	-3.00	-3.12	0.10	0.46	-20.06	-19.89	-20.34	-21.17	-20.26
4800	-3.27	-2.96	-3.12	0.14	0.64	-20.47	-20.52	-20.68	-21.35	-20.62
4900	-3.31	-2.93	-3.12	0.18	0.65	-20.58	-20.66	-20.87	-21.86	-21.14
5000	-3.34	-2.89	-3.12	0.22	0.72	-20.97	-20.87	-21.03	-22.23	-21.38
5100	-3.37	-2.86	-3.12	0.25	0.83	-21.21	-21.24	-21.36	-22.51	-21.94
5200	-3.40	-2.82	-3.12	0.28	0.98	-21.77	-21.85	-21.97	-23.57	-22.72
5300	-3.44	-2.79	-3.13	0.31	0.98	-22.16	-21.98	-22.49	-25.04	-23.74
5400	-3.46	-2.76	-3.12	0.34	1.05	-22.71	-22.43	-22.98	-25.44	-24.46
5500	-3.48	-2.74	-3.13	0.36	0.99	-23.48	-23.16	-23.31	-26.48	-25.25
5600	-3.50	-2.72	-3.13	0.38	1.07	-24.09	-23.18	-23.90	-28.41	-26.53
5700	-3.51	-2.71	-3.13	0.39	1.02	-24.50	-23.69	-24.57	-28.87	-26.87
5800	-3.52	-2.70	-3.13	0.40	1.04	-24.99	-24.53	-25.34	-28.81	-27.12
5900	-3.54	-2.70	-3.14	0.41	1.18	-25.85	-24.91	-25.63	-29.42	-27.70
6000	-3.54	-2.70	-3.14	0.41	1.05	-25.92	-25.02	-26.33	-28.92	-27.82
6100	-3.54	-2.71	-3.14	0.41	1.19	-25.96	-25.50	-26.86	-28.36	-27.09
6200	-3.54	-2.72	-3.15	0.41	1.32	-26.18	-25.75	-27.88	-28.18	-27.56
6300	-3.53	-2.71	-3.14	0.41	1.25	-26.73	-26.27	-28.94	-28.27	-29.23
6400	-3.56	-2.74	-3.17	0.40	1.68	-27.68	-26.76	-29.44	-27.79	-29.61
6500	-3.54	-2.73	-3.15	0.40	1.57	-28.16	-27.35	-30.22	-27.77	-31.15
6600	-3.53	-2.75	-3.16	0.39	1.56	-29.42	-27.20	-29.48	-26.59	-33.93
6700	-3.52	-2.78	-3.17	0.36	1.85	-30.41	-27.65	-29.65	-25.43	-37.15
6800	-3.50	-2.80	-3.16	0.35	1.99	-30.42	-29.32	-30.24	-26.17	-39.26
6900	-3.51	-2.83	-3.18	0.34	2.02	-30.33	-30.79	-31.16	-26.15	-51.27
7000	-3.47	-2.85	-3.17	0.31	1.90	-30.86	-30.97	-29.41	-26.07	-47.21
7100	-3.47	-2.89	-3.19	0.28	2.47	-30.64	-30.49	-28.58	-25.70	-40.41
7200	-3.47	-2.90	-3.19	0.27	2.48	-28.57	-32.51	-28.78	-26.41	-35.96
7300	-3.45	-2.92	-3.19	0.25	2.34	-28.02	-31.95	-29.10	-27.40	-32.06
7400	-3.41	-2.98	-3.20	0.21	2.43	-27.17	-31.54	-27.97	-27.68	-30.63
7500	-3.35	-3.04	-3.20	0.15	2.71	-26.31	-30.16	-28.55	-28.29	-28.67
7600	-3.37	-3.04	-3.21	0.15	2.82	-26.00	-28.96	-28.43	-29.22	-28.48
7700	-3.33	-3.10	-3.22	0.10	2.86	-24.87	-28.28	-25.57	-27.35	-27.28
7800	-3.28	-3.19	-3.24	0.04	3.08	-23.34	-26.44	-24.17	-27.50	-24.67
7900	-3.26	-3.24	-3.25	0.00	3.04	-23.79	-26.44	-23.51	-29.34	-23.84
8000	-3.27	-3.29	-3.28	0.03	3.56	-23.02	-24.03	-23.29	-29.15	-22.43

* Total loss is the loss from Sum to each coupled port including the 3 dB theoretical split.

NOTES:

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2-Way 90° Power Splitter/Combiner

QCH-83+

Typical Performance Data

Test Conditions: Input Power = +5 dbm, Temperature = +105°C, Configuration D.

Freq. (MHz)	Total Loss*			Amp. Unb.	Ph. Unb.	Isolation	Return Loss			
	(dB)			(±dB)	(deg)	(dB)	(dB)			
	Sum-Port 1	Sum-Port 2	Average	Half P-P	Rel. to 90°	Port1-Port2	Sum	Port 1	Port 2	Iso
4000	-2.91	-3.50	-3.22	0.28	-1.94	-18.43	-17.34	-18.09	-17.72	-18.15
4100	-2.97	-3.43	-3.21	0.22	-1.79	-18.61	-17.65	-18.39	-17.91	-18.35
4200	-3.01	-3.37	-3.19	0.17	-1.61	-18.76	-17.92	-18.66	-18.26	-18.56
4300	-3.06	-3.29	-3.18	0.11	-1.49	-18.99	-18.38	-19.17	-18.67	-18.65
4400	-3.10	-3.23	-3.17	0.05	-1.35	-19.33	-19.05	-19.54	-19.06	-18.92
4500	-3.14	-3.17	-3.16	0.01	-1.31	-19.64	-19.51	-20.17	-19.26	-19.26
4600	-3.18	-3.11	-3.15	0.05	-1.21	-19.80	-19.95	-20.98	-19.63	-19.35
4700	-3.24	-3.06	-3.15	0.10	-1.16	-20.08	-20.26	-21.17	-20.34	-19.89
4800	-3.27	-3.02	-3.15	0.14	-1.13	-20.50	-20.62	-21.35	-20.68	-20.52
4900	-3.31	-2.99	-3.15	0.17	-1.03	-20.61	-21.14	-21.86	-20.87	-20.66
5000	-3.34	-2.94	-3.14	0.22	-1.03	-21.00	-21.38	-22.23	-21.03	-20.87
5100	-3.37	-2.91	-3.15	0.24	-0.99	-21.23	-21.94	-22.51	-21.36	-21.24
5200	-3.41	-2.88	-3.15	0.28	-0.95	-21.80	-22.72	-23.57	-21.97	-21.85
5300	-3.43	-2.85	-3.15	0.30	-0.92	-22.19	-23.74	-25.04	-22.49	-21.98
5400	-3.45	-2.82	-3.15	0.33	-0.89	-22.74	-24.46	-25.44	-22.98	-22.43
5500	-3.48	-2.80	-3.15	0.35	-0.88	-23.51	-25.25	-26.48	-23.31	-23.16
5600	-3.49	-2.78	-3.15	0.37	-0.94	-24.11	-26.53	-28.41	-23.90	-23.18
5700	-3.51	-2.77	-3.16	0.38	-0.98	-24.52	-26.87	-28.87	-24.57	-23.69
5800	-3.53	-2.76	-3.16	0.40	-0.92	-25.01	-27.12	-28.81	-25.34	-24.53
5900	-3.56	-2.77	-3.18	0.41	-0.95	-25.87	-27.70	-29.42	-25.63	-24.91
6000	-3.56	-2.77	-3.18	0.41	-0.95	-25.94	-27.82	-28.92	-26.33	-25.02
6100	-3.55	-2.77	-3.18	0.40	-1.03	-25.97	-27.09	-28.36	-26.86	-25.50
6200	-3.55	-2.76	-3.17	0.40	-0.95	-26.18	-27.56	-28.18	-27.88	-25.75
6300	-3.55	-2.76	-3.17	0.41	-0.84	-26.74	-29.23	-28.27	-28.94	-26.27
6400	-3.56	-2.79	-3.19	0.40	-0.57	-27.68	-29.61	-27.79	-29.44	-26.76
6500	-3.55	-2.78	-3.18	0.39	-0.67	-28.17	-31.15	-27.77	-30.22	-27.35
6600	-3.55	-2.79	-3.19	0.39	-0.66	-29.43	-33.93	-26.59	-29.48	-27.20
6700	-3.54	-2.83	-3.20	0.37	-0.49	-30.43	-37.15	-25.43	-29.65	-27.65
6800	-3.53	-2.85	-3.20	0.35	-0.54	-30.42	-39.26	-26.17	-30.24	-29.32
6900	-3.51	-2.86	-3.20	0.34	-0.38	-30.33	-51.27	-26.15	-31.16	-30.79
7000	-3.50	-2.89	-3.21	0.31	-0.57	-30.91	-47.21	-26.07	-29.41	-30.97
7100	-3.49	-2.95	-3.23	0.28	-0.31	-30.65	-40.41	-25.70	-28.58	-30.49
7200	-3.48	-2.97	-3.23	0.27	-0.05	-28.71	-35.96	-26.41	-28.78	-32.51
7300	-3.46	-2.98	-3.23	0.25	-0.09	-28.07	-32.06	-27.40	-29.10	-31.95
7400	-3.42	-3.06	-3.24	0.20	0.10	-27.21	-30.63	-27.68	-27.97	-31.54
7500	-3.37	-3.09	-3.23	0.15	-0.27	-26.31	-28.67	-28.29	-28.55	-30.16
7600	-3.39	-3.13	-3.26	0.15	0.18	-26.06	-28.48	-29.22	-28.43	-28.96
7700	-3.34	-3.22	-3.28	0.07	0.46	-24.91	-27.28	-27.35	-25.57	-28.28
7800	-3.26	-3.29	-3.28	0.01	0.37	-23.38	-24.67	-27.50	-24.17	-26.44
7900	-3.26	-3.35	-3.31	0.03	0.52	-23.83	-23.84	-29.34	-23.51	-26.44
8000	-3.24	-3.43	-3.34	0.08	0.84	-23.03	-22.43	-29.15	-23.29	-24.03

* Total loss is the loss from Sum to each coupled port including the 3 dB theoretical split.

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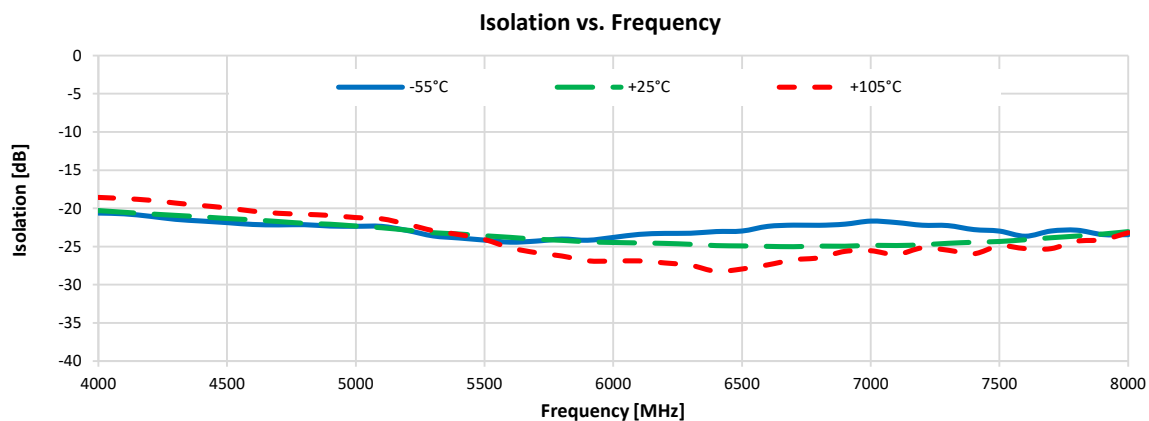
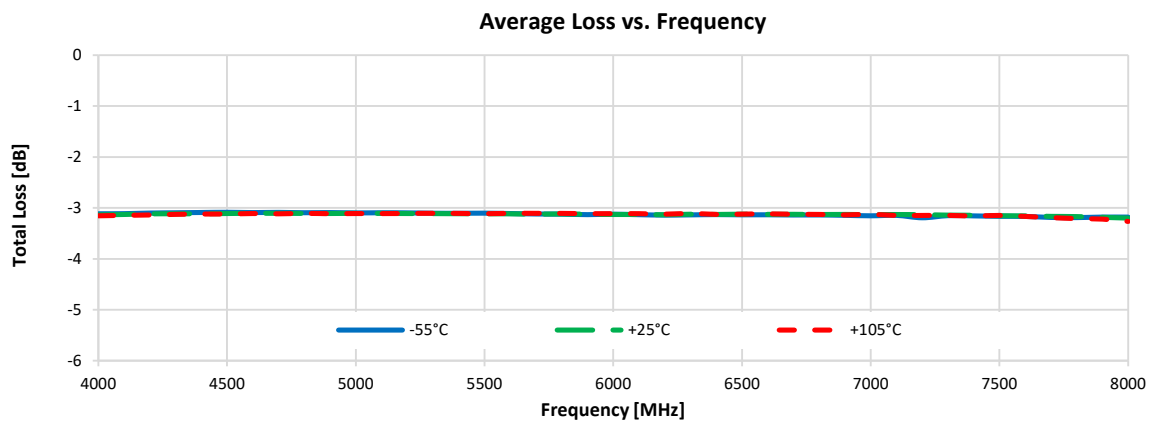
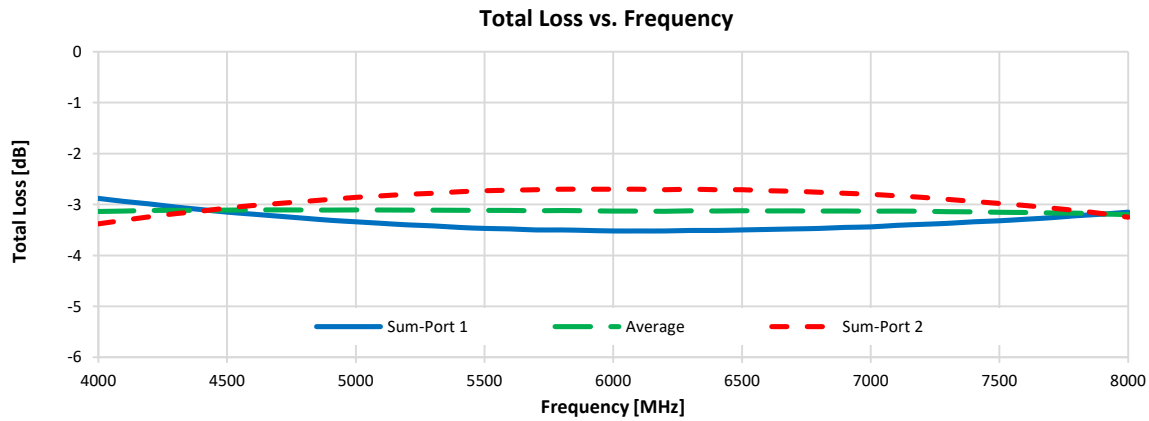


2-Way 90° Power Splitter/Combiner

QCH-83+

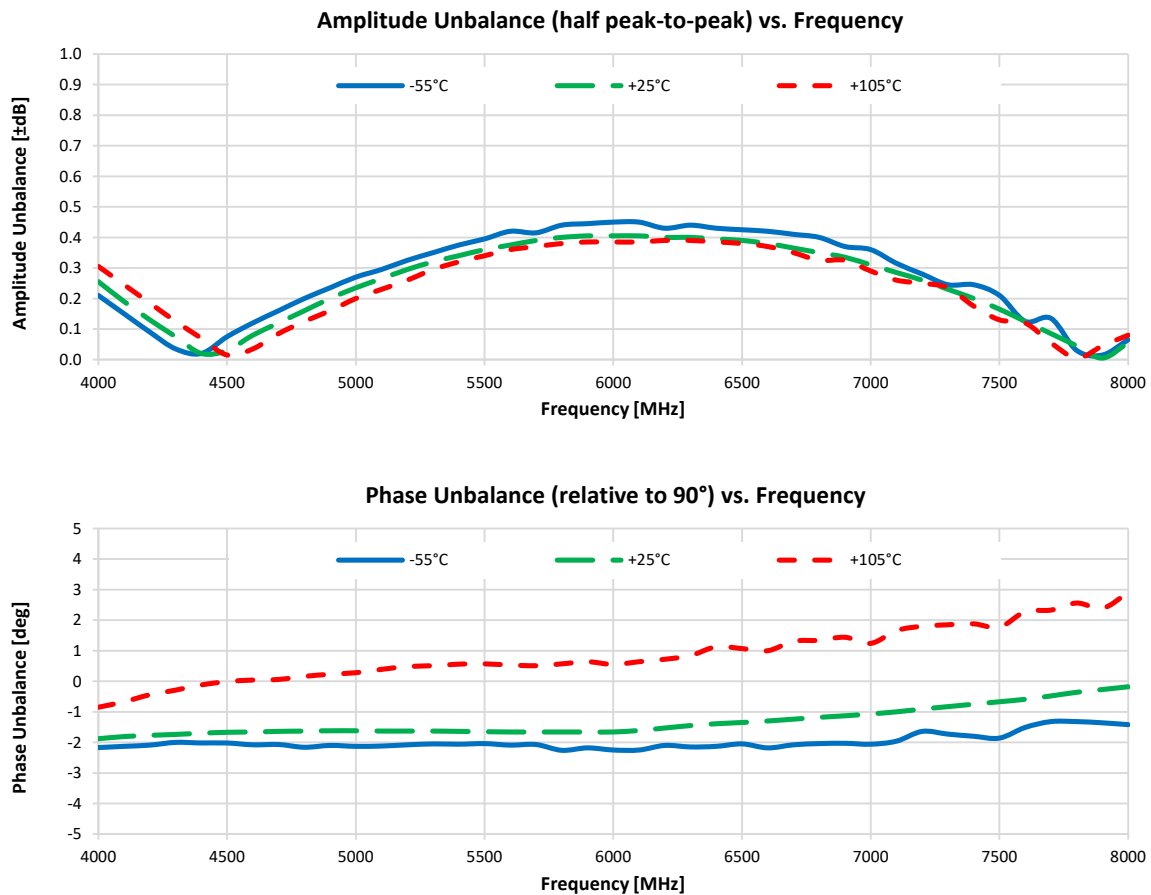
Typical Performance Graphs

Test Conditions: Input Power = +5 dbm, Configuration A.



Typical Performance Graphs

Test Conditions: Input Power = +5 dbm, Configuration A.

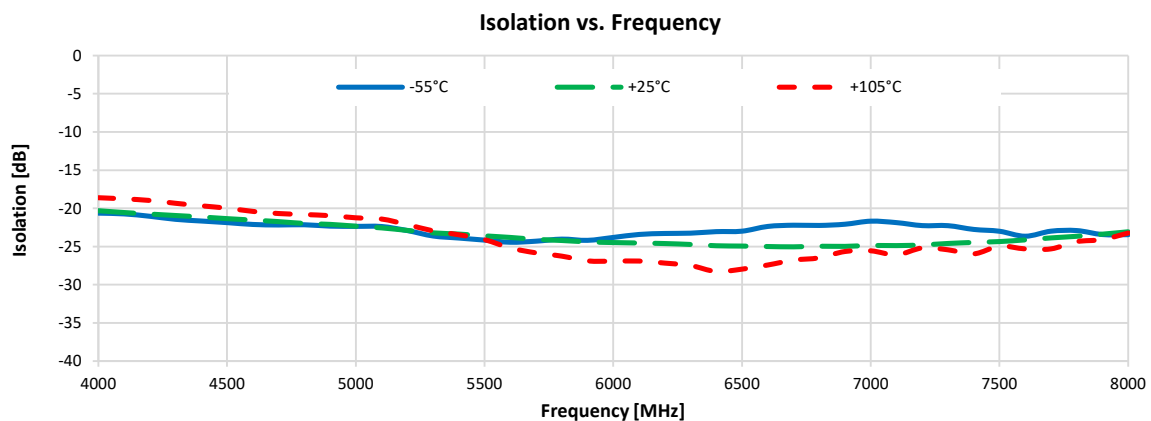
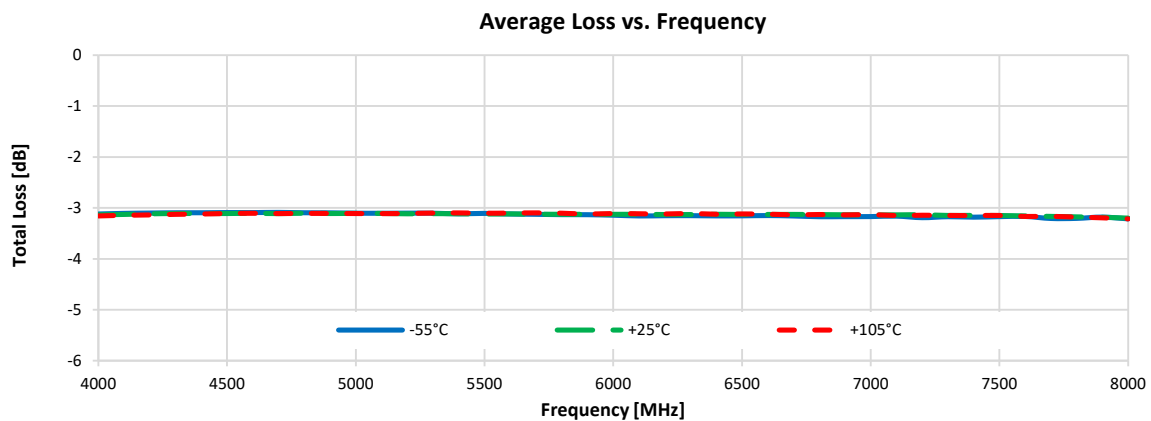
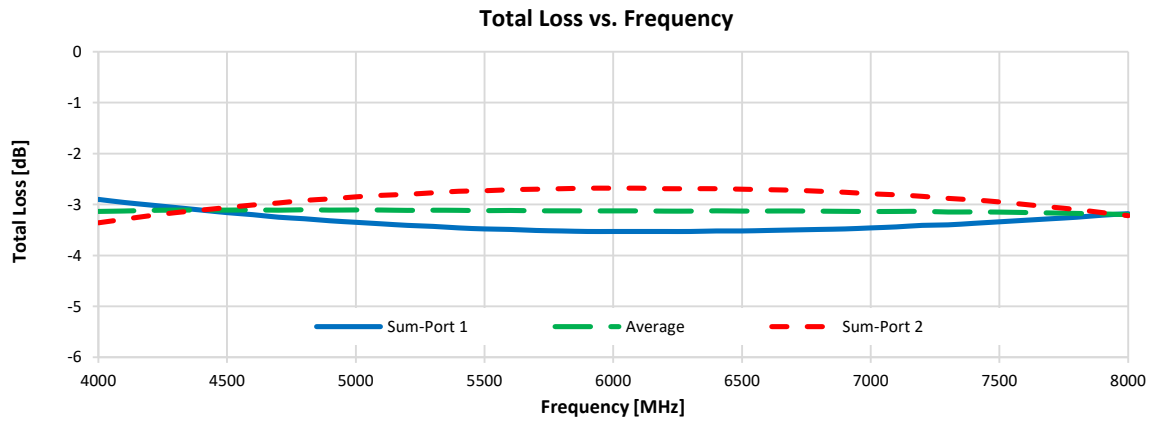


2-Way 90° Power Splitter/Combiner

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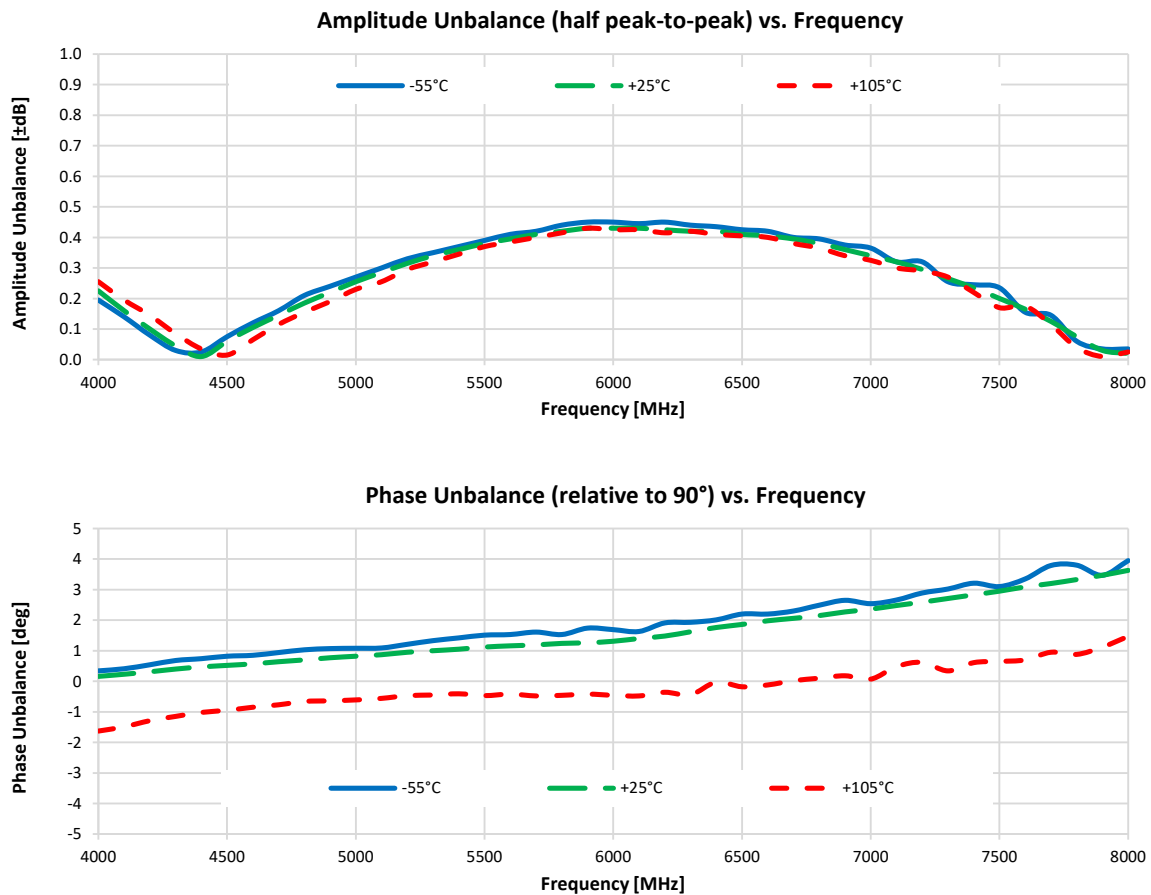
Typical Performance Graphs

Test Conditions: Input Power = +5 dbm, Configuration B.



Typical Performance Graphs

Test Conditions: Input Power = +5 dbm, Configuration B.

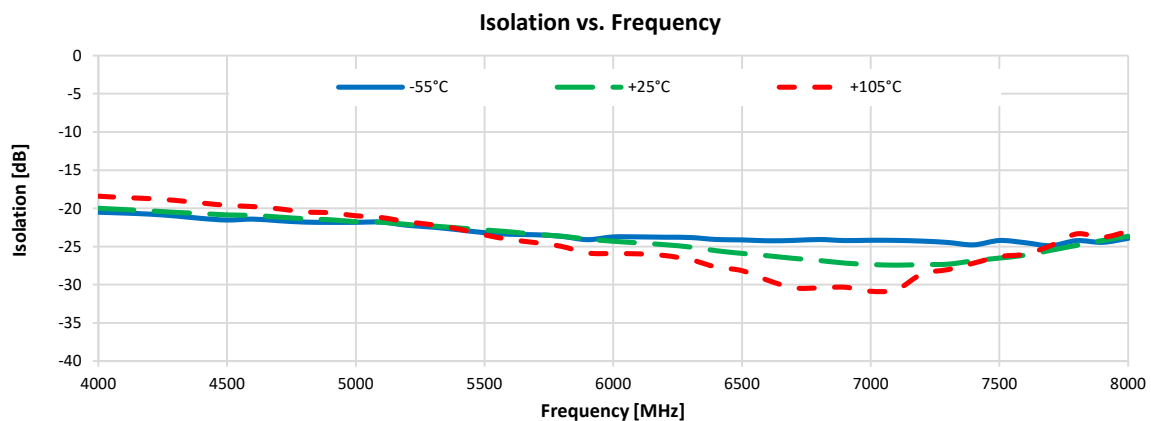
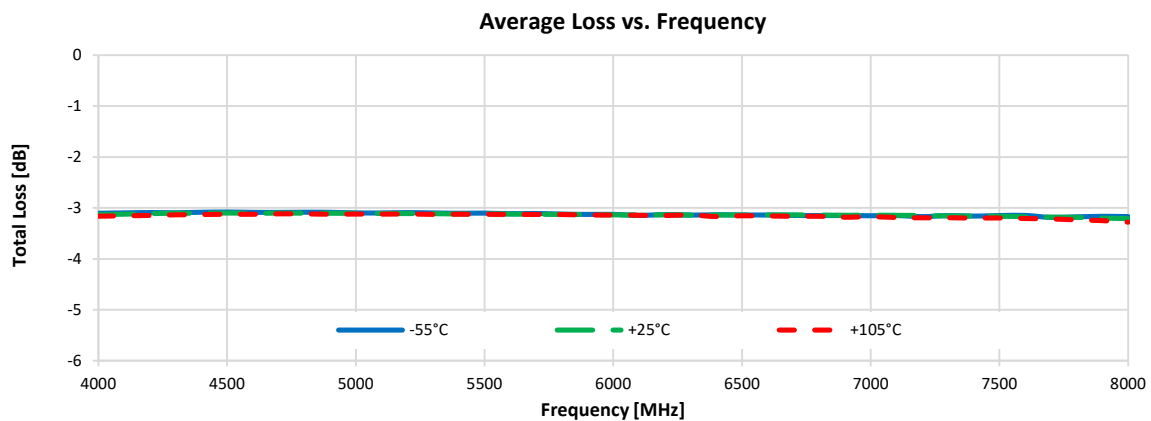
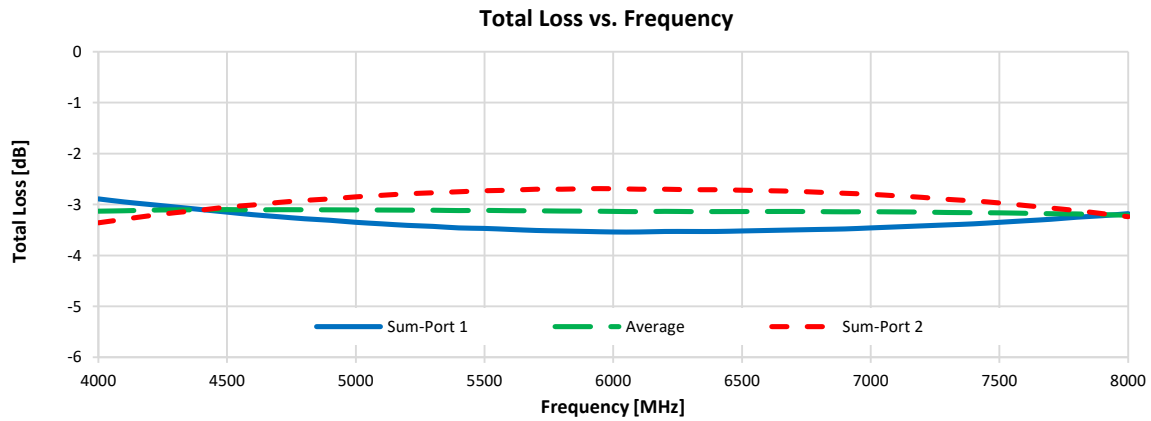


2-Way 90° Power Splitter/Combiner

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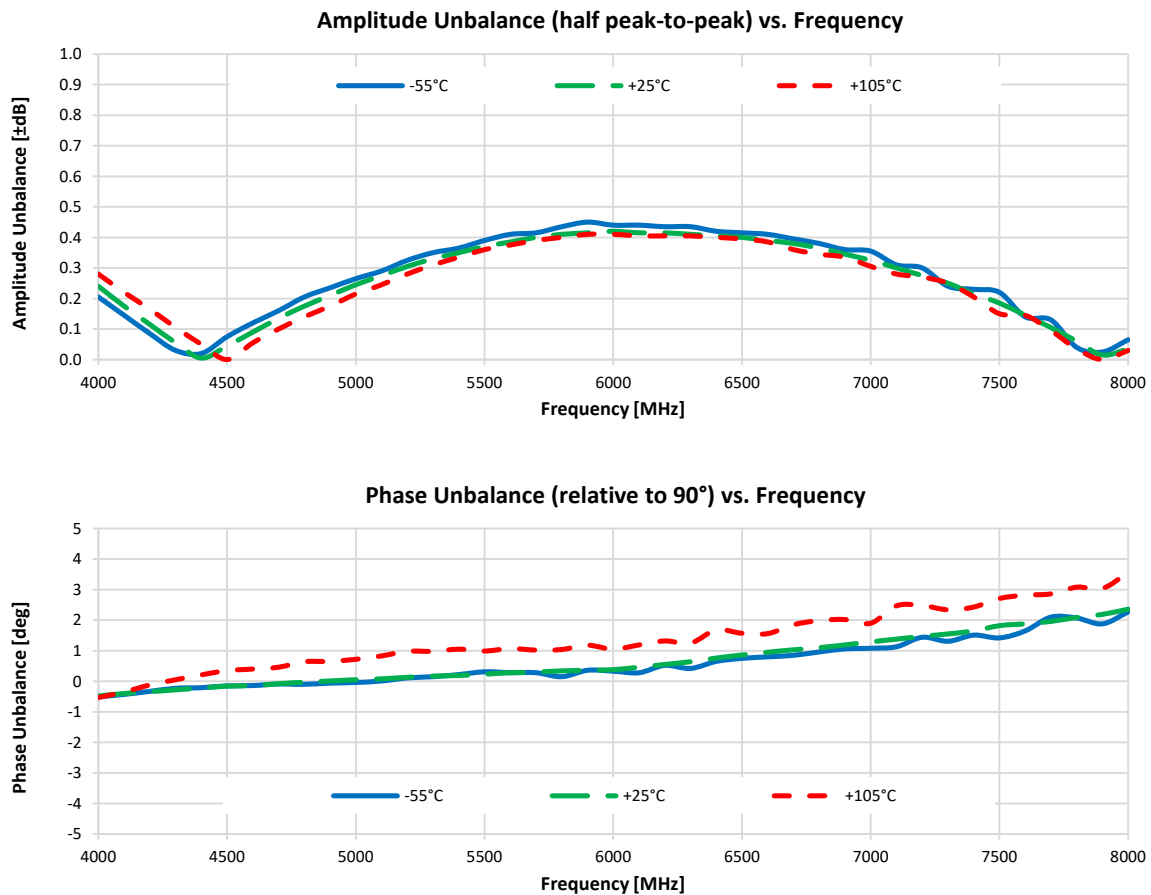
Typical Performance Graphs

Test Conditions: Input Power = +5 dbm, Configuration C.



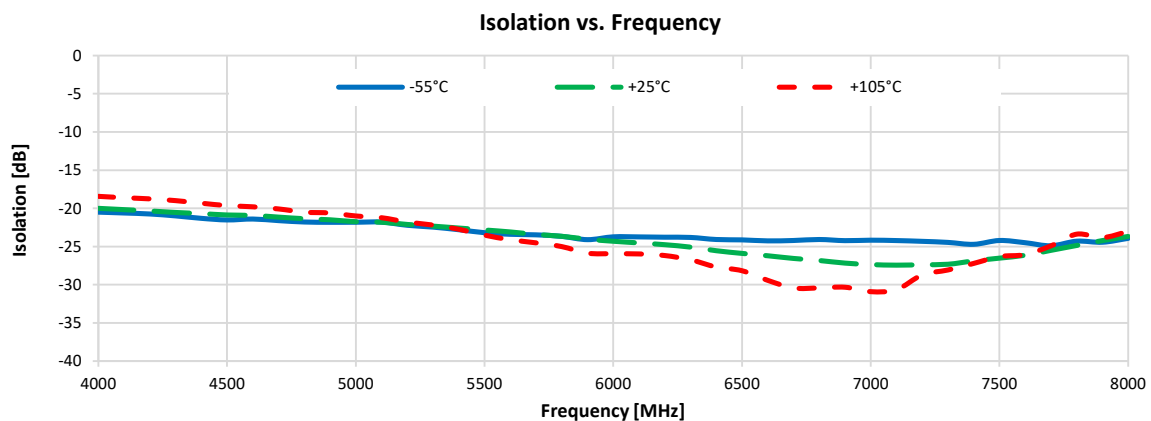
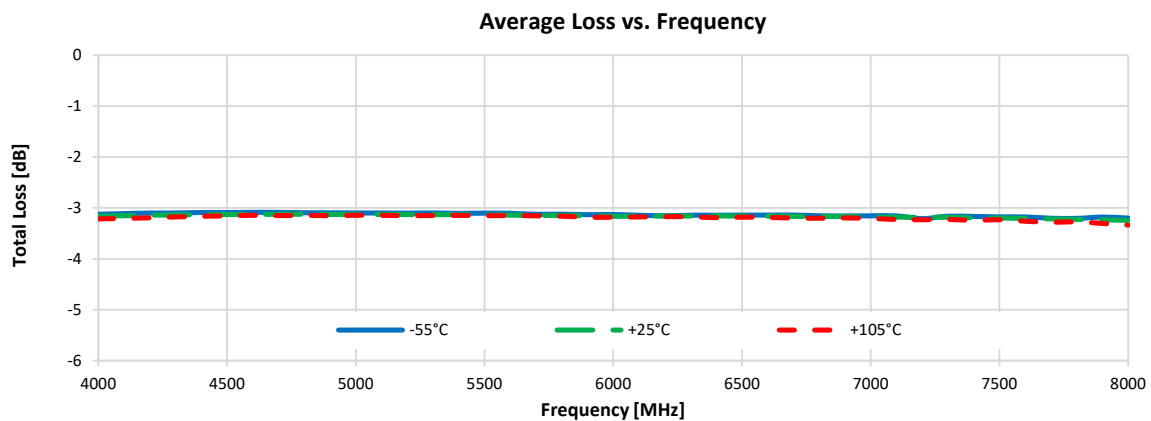
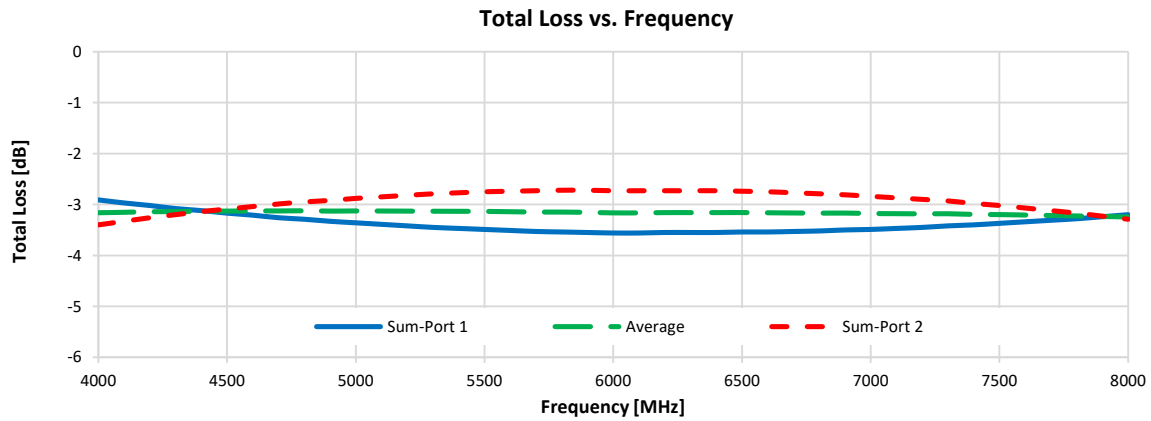
Typical Performance Graphs

Test Conditions: Input Power = +5 dbm, Configuration C.



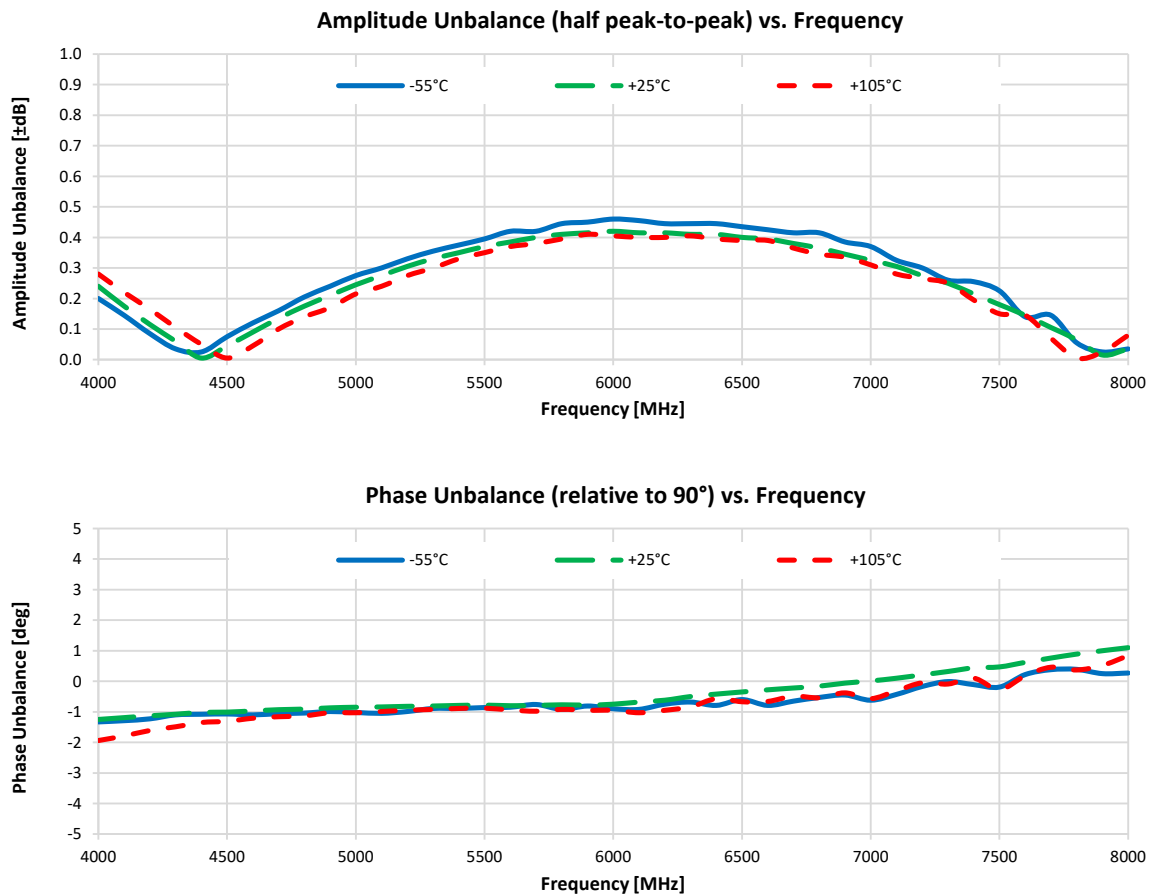
Typical Performance Graphs

Test Conditions: Input Power = +5 dbm, Configuration D.



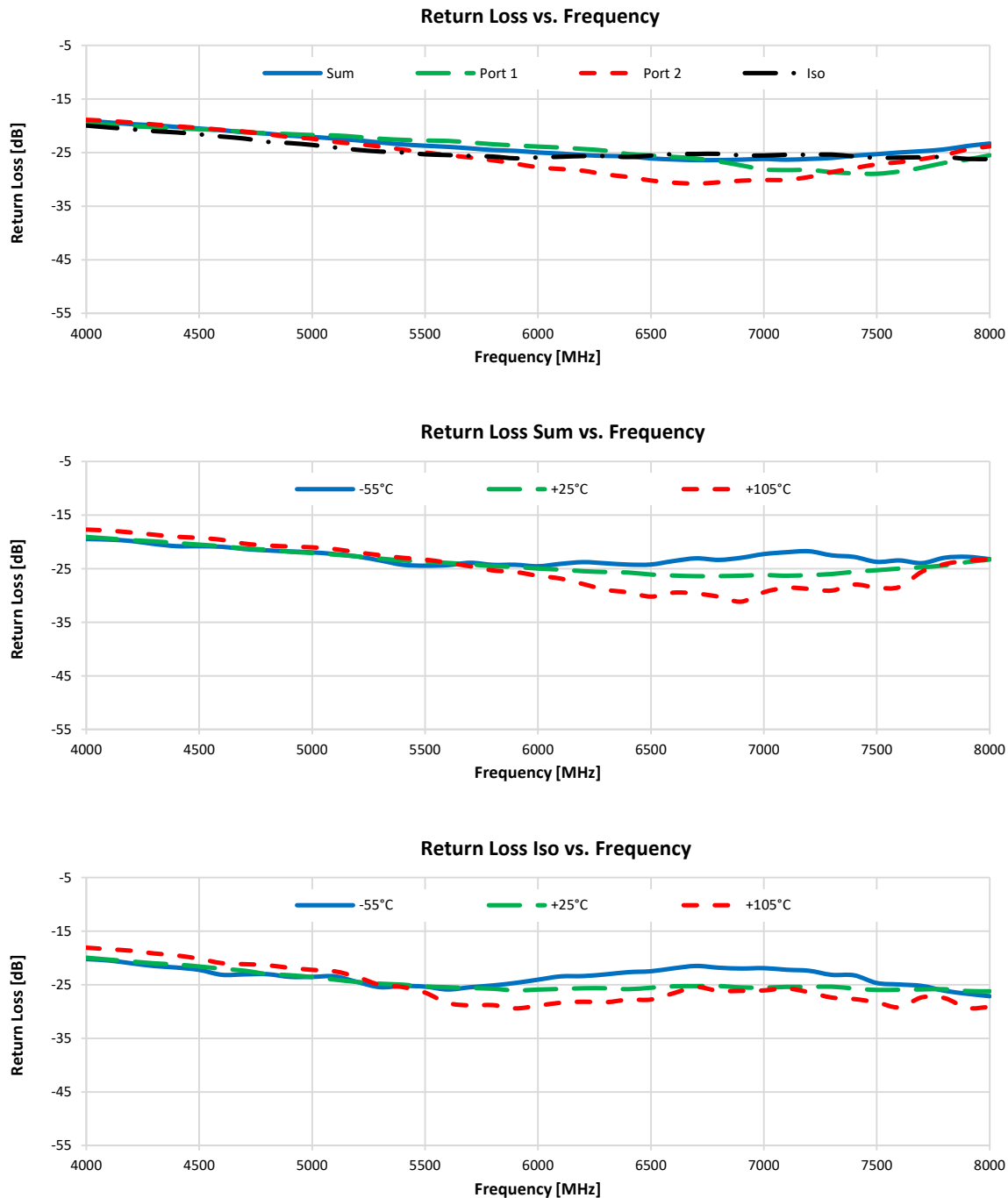
Typical Performance Graphs

Test Conditions: Input Power = +5 dbm, Configuration D.



Typical Performance Graphs

Test Conditions: Input Power = +5 dbm, Configuration A.



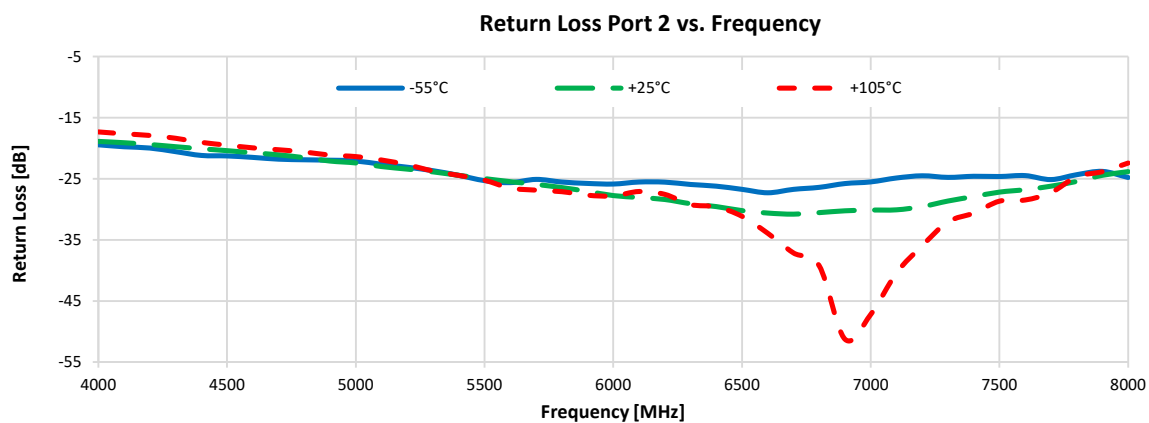
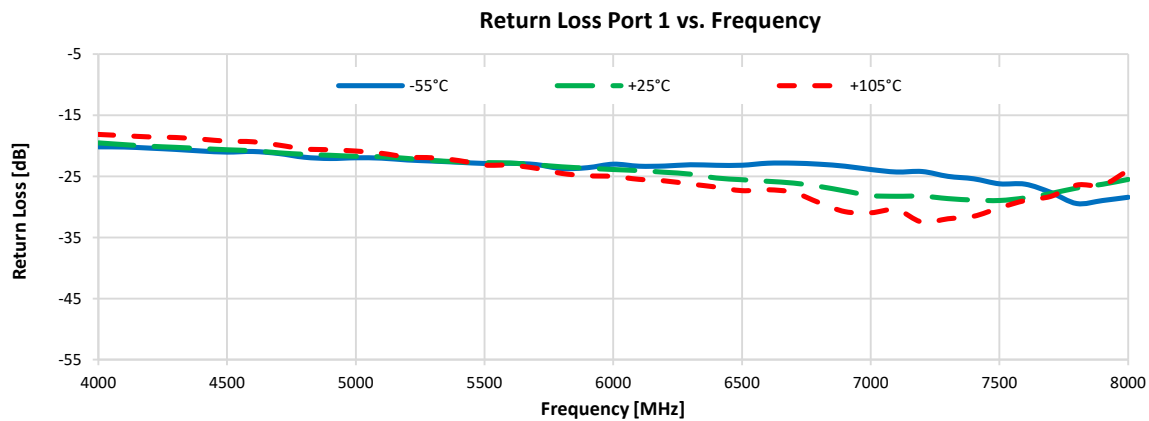
NOTES:

- 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 <https://www.minicircuits.com/terms/viewterm.html>



Typical Performance Graphs

Test Conditions: Input Power = +5 dbm, Configuration A.



NOTES:

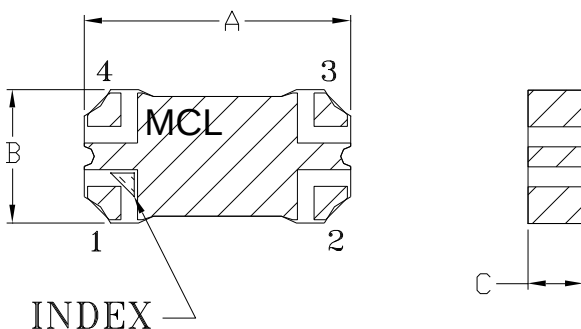
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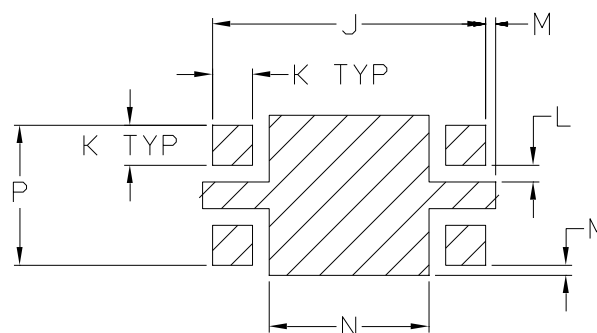
Outline Dimensions

PQ2481

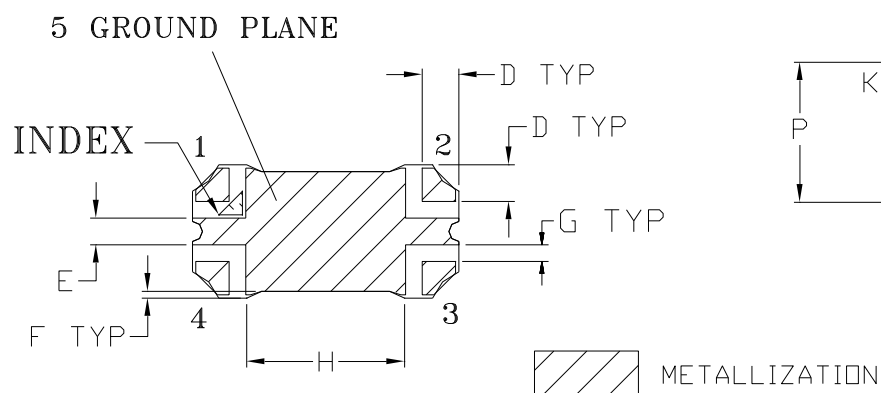
TOP SIDE



PCB LAND PATTERN



BOTTOM SIDE



CASE#	A	B	C	D	E	F	G	H	J	K	L	M	N	P	WT. GRAMS
PQ2481	.400 (10.16)	.200 (5.08)	.083 (2.11)	.055 (1.40)	.030 (0.76)	.010 (0.25)	.025 (0.63)	.237 (6.02)	.410 (10.41)	.060 (1.52)	.025 (0.63)	.015 (0.38)	.240 (6.10)	.210 (5.33)	1.0

Dimensions are in inches (mm). Tolerances: 2PL. +/- .03; 3PL. +/- .010

Notes:

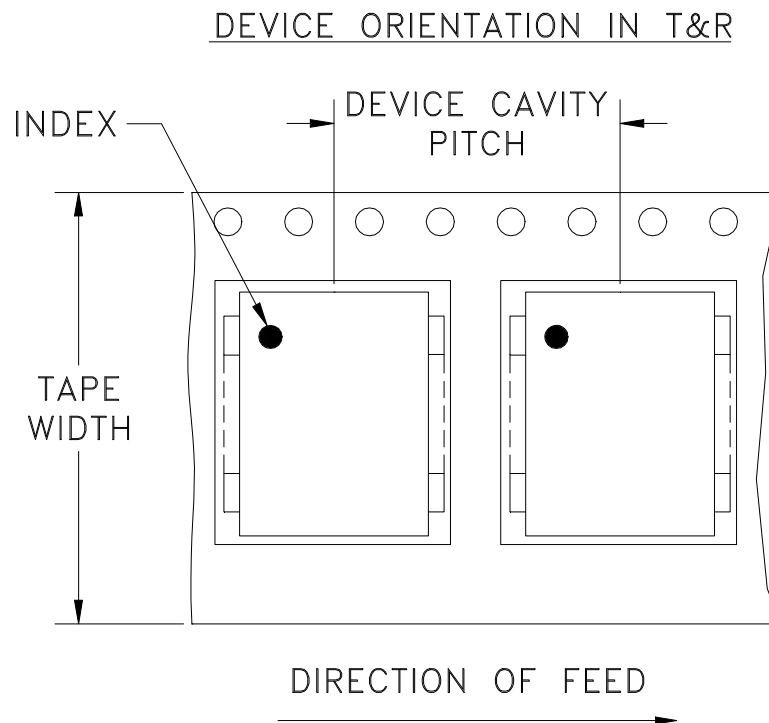
1. Base material: Printed wiring laminate.
2. Termination finish:
For RoHS Cases, all models (+) suffix: 2-5 μ inch (.05-.13 microns) Immersion Gold.
For RoHS-5 Cases, all models no (+) suffix: Tin-Lead plate.



INTERNET <http://www.minicircuits.com>

P.O. Box 350166, Brooklyn, New York 11235-0003 (718) 934-4500 Fax (718) 332-4661
Distribution Centers NORTH AMERICA 800-654-7949 • 417-335-5935 • Fax 417-335-5945 • EUROPE 44-1252-832600 • Fax 44-1252-837010
Mini-Circuits ISO 9001 & ISO 14001 Certified

Tape & Reel Packaging TR-F34



Tape Width, mm	Device Cavity Pitch, mm	Reel Size, inches	Devices per Reel see note	
16	12	7	Small quantity standard (see note)	20
				50
				100
				200
		13	Standard	500
				1000

Note: Availability of small reel quantity varies by model.
Refer to pricing and availability on individual model dashboard.

Mini-Circuits carrier tape materials provide protection from ESD (Electro-Static Discharge) during handling and transportation. Tapes are static dissipative and comply with industry standards EIA-481/EIA-541.

Go to: www.minicircuits.com/pages/pdfs/tape.pdf



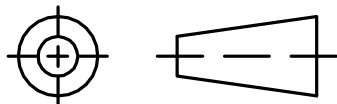
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THIRD ANGLE PROJECTION

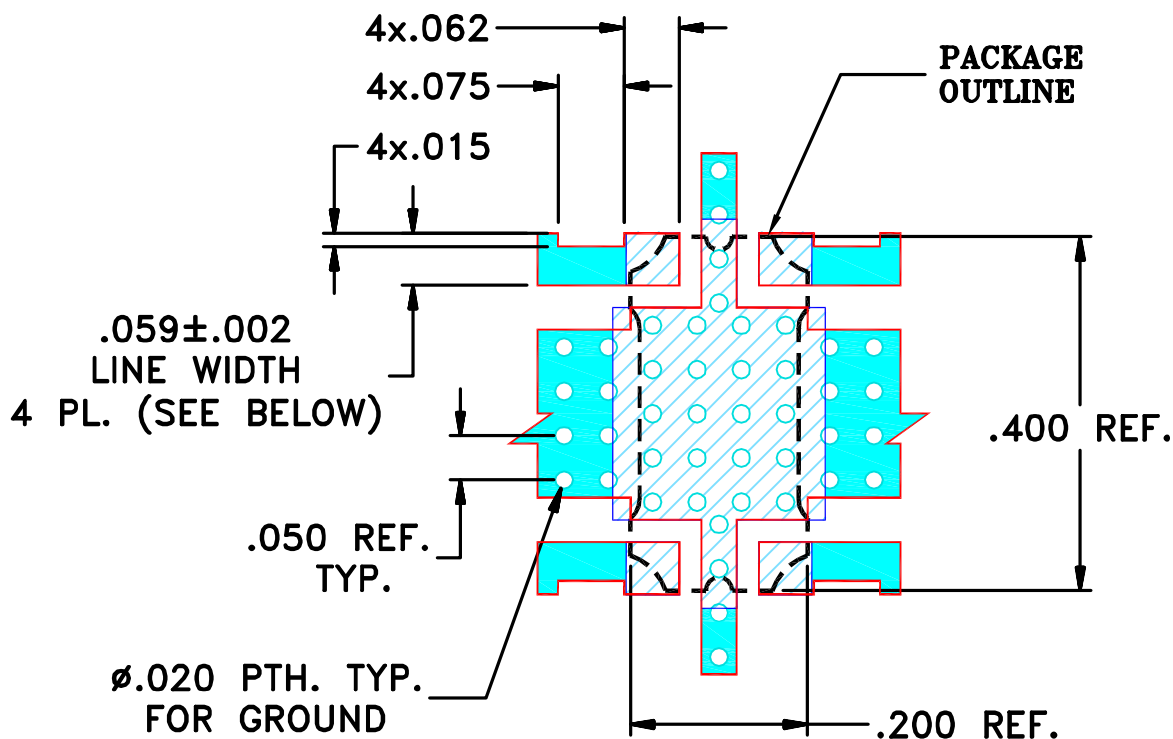


REVISIONS

REV	ECN No.	DESCRIPTION	DATE	DR	AUTH
OR	M165781	SAME AS 98-PL-525(OR), WITH CUT OUTS IN RF LINES	02/18	DK	YB
OR	R92753	SAME AS 98-PL-525(OR), WITH CUT OUTS IN RF LINES	02/18	DK	YB

SUGGESTED MOUNTING CONFIGURATION

FOR PQ2481 CASE STYLE 04DC01 PIN CONNECTION, 50 OHM



NOTES:

- TRACE WIDTH IS SHOWN FOR ROGERS R05880 WITH DIELECTRIC THICKNESS. $.020 \pm .0015$ ". 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

UNLESS OTHERWISE SPECIFIED

INITIALS

DATE

DIMENSIONS ARE IN INCHES

TOLERANCES ON:

2 PL DECIMALS $\pm$ 3 PL DECIMALS $\pm$.005ANGLES $\pm$ 1°FRACTIONS $\pm$

DRAWN

DK

28 FEB 18

CHECKED

RM

28 FEB 18

APPROVED

YB

28 FEB 18



Mini-Circuits®

13 Neptune Avenue
Brooklyn NY 11235PL FOR QCH PQ2481
TB-964A (50 Ω)SIZE
ACODE IDENT
15542DRAWING NO:
98-PL-525AREV:
OR

FILE: 98PL525A(OR)

SCALE: 1:1

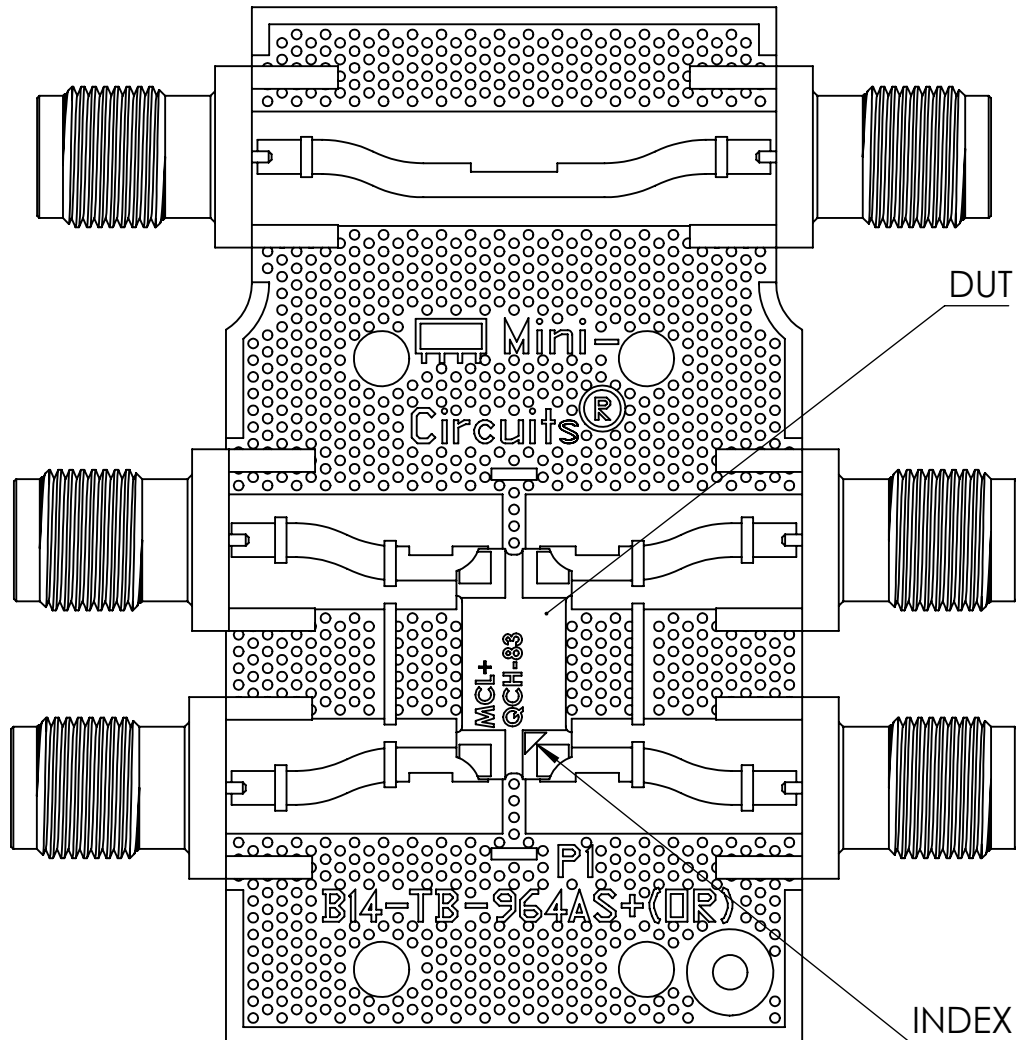
SHEET: 1 OF 3

ASHEETA1.DWG REV:A DATE:01/12/95

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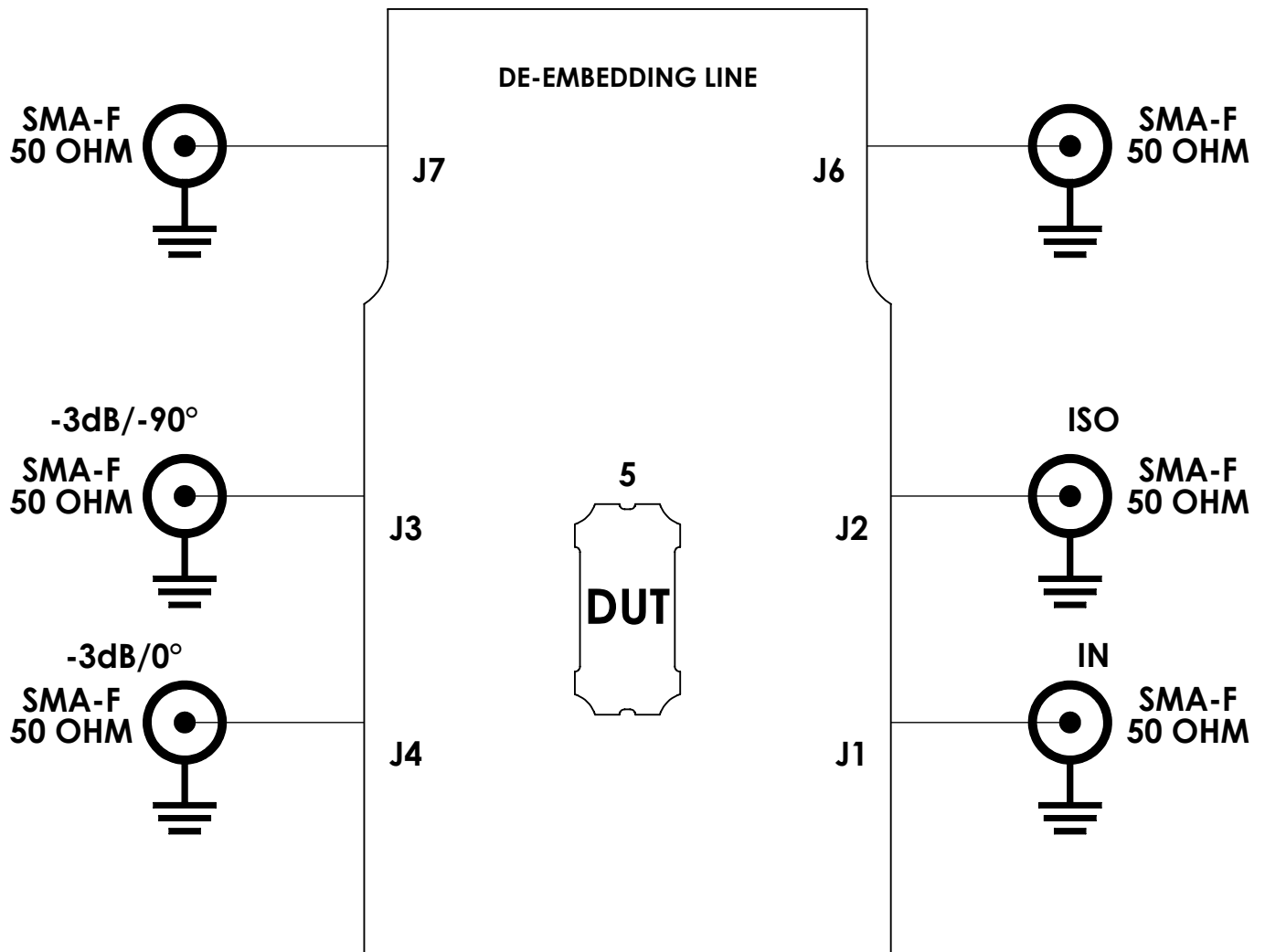
Evaluation Board and Circuit



TB-QCH-83+

NOTES:

- 1.SMA FEMALE CONNECTORS.
- 2.PCB MATERIAL: ROGERS RT/DUROID OR EQUIVALENT,
DIELECTRIC CONSTANT=2.2, DIELECTRIC THICKNESS=.020 INCH.



TB-QCH-83+
Schematic Diagram



All Mini-Circuits products are manufactured under exacting quality assurance and control standards, and are capable of meeting published specifications after being subjected to any or all of the following physical and environmental test.

Specification	Test/Inspection Condition	Reference/Spec
Operating Temperature	-55° to 105° C Case Environment	Individual Model Data Sheet
Storage Temperature	-55° to 105°C Ambient Environment	Individual Model Data Sheet
Humidity	90 to 95% RH, 240 hours, 50°C	MIL-STD-202, Method 103, Condition A, Except 50°C and end-point electrical test done within 12 hours
Thermal Shock	-55° to 100°C, 100 cycles	MIL-STD-202, Method 107, Condition A-3, except +100°C
Solder Reflow Heat	Sn-Pb Eutectic Process 225°C peak Pb-Free Process 245° - 250°C peak	J-STD-020C, Table 4-1, 4-2 and 5-2, Figure 5-1
Solderability	10X Magnification	J-STD-002, Para 4.2.5, Test S, 95% Coverage
Vibration (high Frequency)	20g peak, 10-2000 Hz, 12 times in each of three perpendicular directions (total 36)	MIL-STD-883, Method 2007.3, Condition A
Mechanical Shock	50g, 11 ms, 1/2-sine, 18 shocks: 3 each direction, each of 3 axes	MIL-STD-202, Method 213, Condition A
Marking Resistance to Solvents	Isopropyl alcohol + mineral spirits at 25°C; terpene defluxer at 25°C; distilled water + proylene glycol monomethyl ether + monoethanolamine at 63°C to 70°C	MIL-STD-202, Method 215