Plug-in

Diplexer

DPLC-8510A01+

75Ω 5 to 1225 MHz
(5-85, 102-1225 MHz)

Generic photo used for illustration purposes only

CASE STYLE: QB2223

The Big Deal

- Plug-in design
- Field replaceable
- Low insertion loss
- Excellent return loss, 24 dB typ.
- High cross over isolation
- Low group delay variation in passband
- Mirrored version available for ease of routing
- DOCSIS 3.1 standard

Product Overview

DPLC-8510A01+ is a high performance field replaceable plug-in diplexer with the lowpass port at 5-85 MHz and highpass port at 102-1225 MHz. Excellent return loss combined with high out of channel rejection makes it an ideal part in cable TV and multiband radio systems

Key Features

Feature	Advantages
Low passband insertion loss	Ensures low signal loss through both the channels.
Excellent Stopband rejection	Co-channel rejection of 50dB typical ensures unwanted spurious are eliminated.
Excellent return loss at 5-85 and 102-1225 MHz	This makes signal transmission with very less reflection and well-matched with the adjacent component used in the system.

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

Plug-in

Diplexer

DPLC-8510A01+

75Ω 5 to 1225 MHz (5-85, 102-1225 MHz)

Maximum Ratings

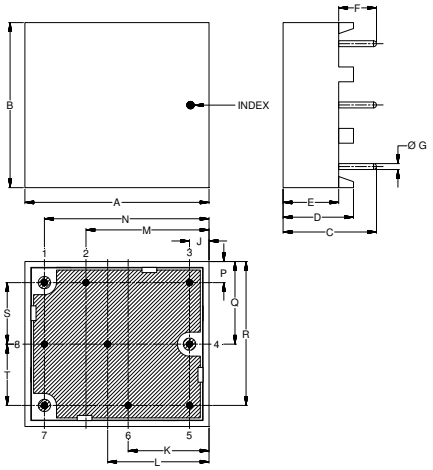
Operating Temperature	-40° to 85°C
Storage Temperature	-55°C to 100°C
RF Power Input	30dBm Max.

Permanent damage may occur if any of these limits are exceeded. These ratings are not intended for continuous normal operation

Pin Connections

HIGH PASS PORT	7
LOW PASS PORT	1
COMMON PORT	4
GROUND	2,3,5,6,8,9

Outline Drawing



Outline Dimensions (inch / mm)

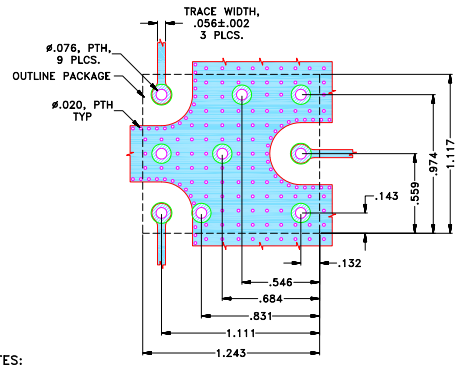
A	B	C	D	E	F	G	H	J	K
1.243	**1.117**	**.630**	**.475**	**.375**	**.255**	**.040**	**--**	**.132**	**.546**
31.56	28.36	16.00	12.07	9.53	6.48	1.02	--	3.35	13.87

L	M	N	P	Q	R	S	T	Wt.
.684	**.831**	**1.111**	**.143**	**.559**	**.974**	**.417**	**.415**	grams
17.37	21.10	28.22	3.63	14.21	24.74	10.58	10.53	7

Note: Please refer to case style drawing for details

Demo Board MCL P/N: TB-897+
Suggested PCB Layout (PL-485)

SUGGESTED MOUNTING CONFIGURATION FOR QB2223 CASE STYLE



NOTES:

1. TRACE WIDTH IS SHOWN FOR IT180, WITH DIELECTRIC THICKNESS .059"±.005". COPPER: 1/2 Oz EACH SIDE. FOR OTHER MATERIALS TRACE WIDTH MAY NEED TO BE MODIFIED.
2. 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

Features

- Low insertion loss
- 75Ω Impedance
- Excellent return loss 24 dB typ.
- Low group delay variation
- High cross isolation
- High rejection

Applications

- Cable TV systems (DOCSIS 3.1 standard)
- Multiband radio systems

Generic photo used for illustration purposes only
CASE STYLE: QB2223

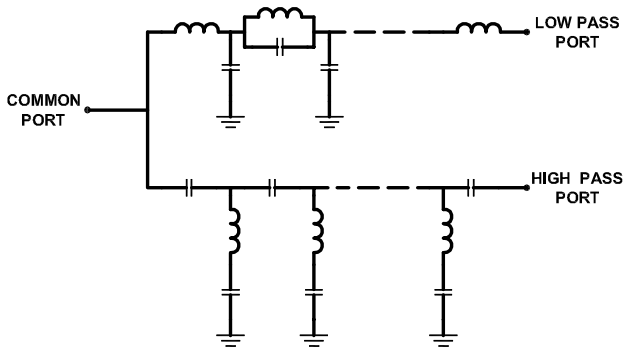
+RoHS Compliant
The +Suffix identifies RoHS Compliance. See our web site for RoHS Compliance methodologies and qualifications

CAUTION NOTE: *Not designed for reflow process.*

Electrical Specifications at 25°C

Parameter		Port	Frequency (MHz)	Min.	Typ.	Max.	Unit
Pass Band	Insertion Loss	Low Pass	5	-	-	0.20	dB
			85	-	-	1.30	dB
		High Pass	102	-	-	1.75	dB
			105	-	-	1.30	dB
			130	-	-	0.60	dB
			870	-	-	0.50	dB
			1000	-	-	0.55	dB
			1218	-	-	0.60	dB
			1225	-	-	0.65	dB
	Return Loss	Low Pass	5-85	22	24	-	dB
		High Pass	102-104.9	20	24	-	dB
			105-1225	20	24	-	dB
		Common	5-85	22	24	-	dB
			102-104.9	20	24	-	dB
			105-1225	20	24	-	dB
Stop Band Isolation		High Pass	5-84.9	48	50	-	dB
		Cross over	85-104.9	38	40	-	dB
		Low Pass	105-1225	45	50	-	dB
Group Delay Variation		High Pass	109.275-112.855	-	6	8	ns
			115.275-118.855	-	3	6	ns
			121.2625-124.843	-	2	5	ns
		Low Pass	82-83.5	-	-	6	ns
			83.5-85	-	-	8	ns

Functional Schematic

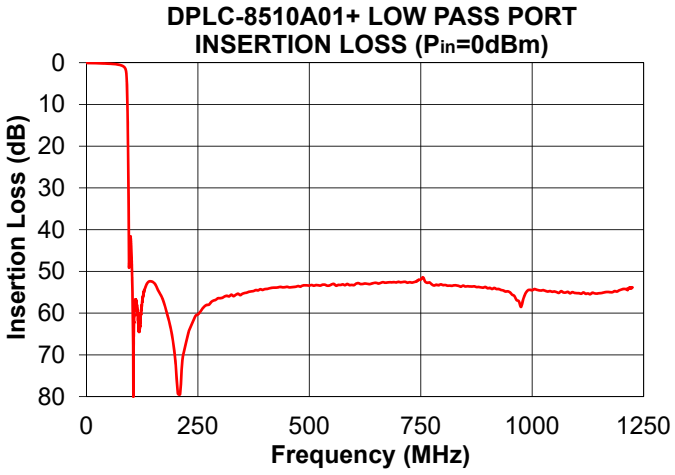


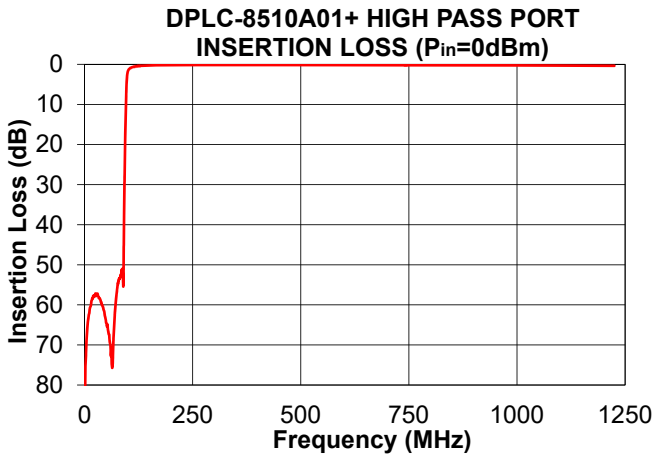
Notes
A. Performance and quality attributes and conditions not expressly stated in this specification document are intended to be excluded and do not form a part of this specification document.
B. Electrical specifications and performance data contained in this specification document are based on Mini-Circuit's 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

Typical Performance Data at 25°C

FREQUENCY (MHz)	INSERTION LOSS (dB)		RETURN LOSS (dB)		
	Low Pass Port	High Pass Port	Common Port	Low Pass Port	High Pass Port
1.000	0.05	85.10	52.32	52.63	0.04
5.000	0.08	68.49	44.84	47.51	0.04
82.000	0.83	53.20	32.54	31.83	0.28
83.500	0.93	52.84	34.89	35.57	0.31
84.900	1.07	52.28	38.71	34.59	0.35
85.000	1.08	52.11	39.29	34.29	0.35
90.000	3.36	52.98	11.22	10.83	0.54
92.400	13.59	29.55	4.01	2.68	0.76
93.300	20.63	23.33	3.48	1.90	0.91
94.000	27.55	19.01	3.41	1.58	1.11
94.300	31.11	17.27	3.46	1.47	1.22
98.000	42.28	3.39	11.63	0.88	8.46
99.000	41.72	2.34	17.66	0.81	12.94
102.000	49.49	1.33	32.26	0.66	28.73
104.900	72.10	1.00	29.52	0.59	29.84
105.000	75.57	0.99	29.50	0.59	29.64
109.275	56.94	0.76	27.42	0.53	25.98
112.855	58.02	0.63	26.13	0.50	26.01
115.275	61.06	0.57	26.04	0.49	26.82
118.855	64.39	0.50	26.76	0.47	28.52
120.000	62.96	0.48	27.14	0.47	29.21
121.263	60.91	0.46	27.62	0.47	30.02
124.843	57.39	0.42	29.19	0.46	32.63
130.000	54.48	0.37	31.58	0.45	36.40
500.000	53.40	0.19	26.80	0.32	26.15
870.000	53.58	0.25	32.56	0.40	31.23
1000.000	54.53	0.28	42.10	0.46	29.23
1218.000	53.86	0.36	34.38	0.58	33.97
1225.000	53.85	0.37	33.95	0.59	34.37

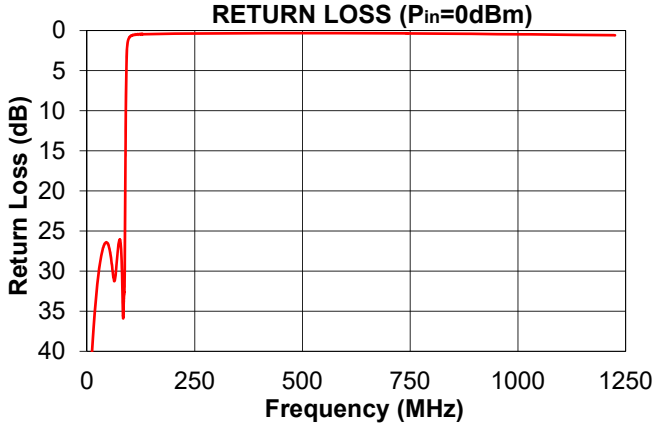
Performance Charts



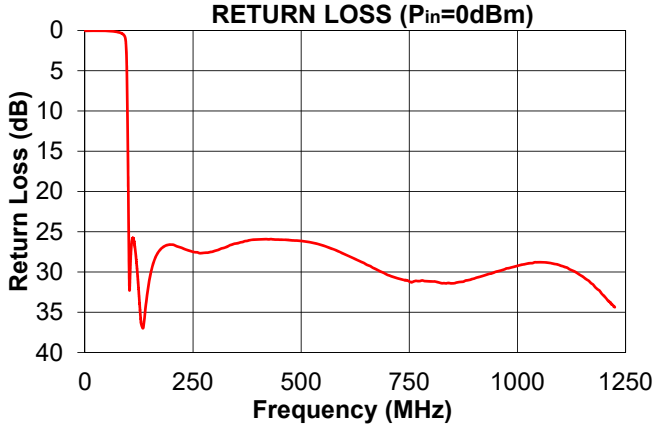


Notes
A. Performance and quality attributes and conditions not expressly stated in this specification document are intended to be excluded and do not form a part of this specification document.
B. Electrical specifications and performance data contained in this specification document are based on Mini-Circuit's 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

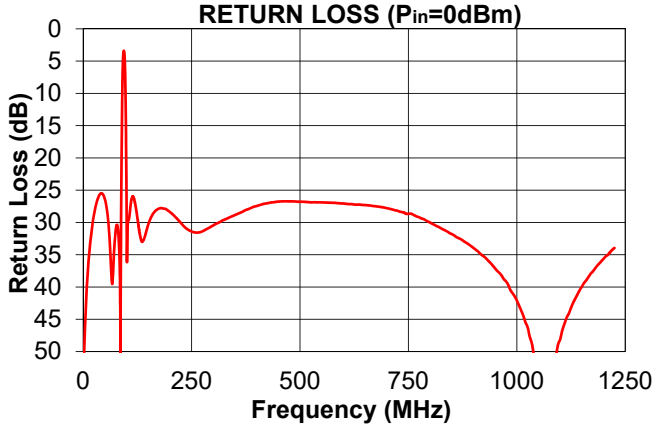
DPLC-8510A01+ LOW PASS PORT
RETURN LOSS (P_{in}=0dBm)



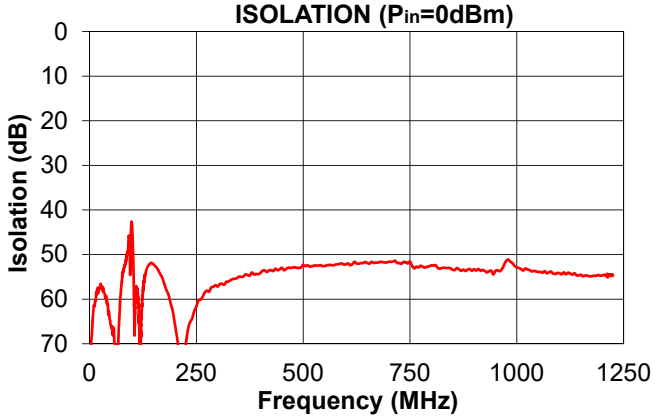
DPLC-8510A01+ HIGH PASS PORT
RETURN LOSS (P_{in}=0dBm)



DPLC-8510A01+ COMMON PORT
RETURN LOSS (P_{in}=0dBm)



DPLC-8510A01+ CROSS OVER
ISOLATION (P_{in}=0dBm)



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

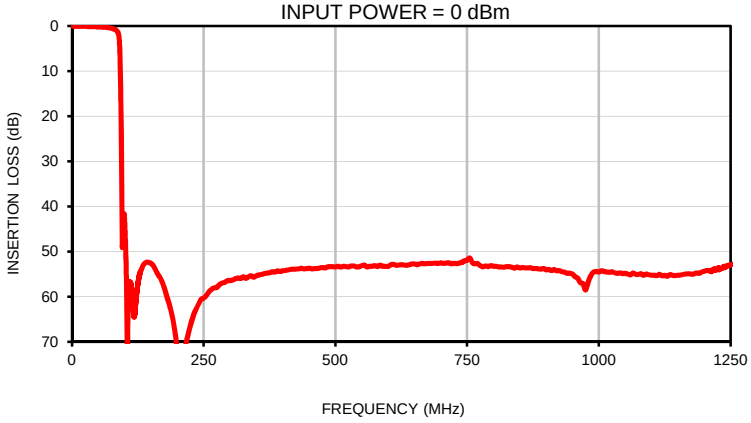
Plug-in Diplexer DPLC-8510A01+

Typical Performance Data

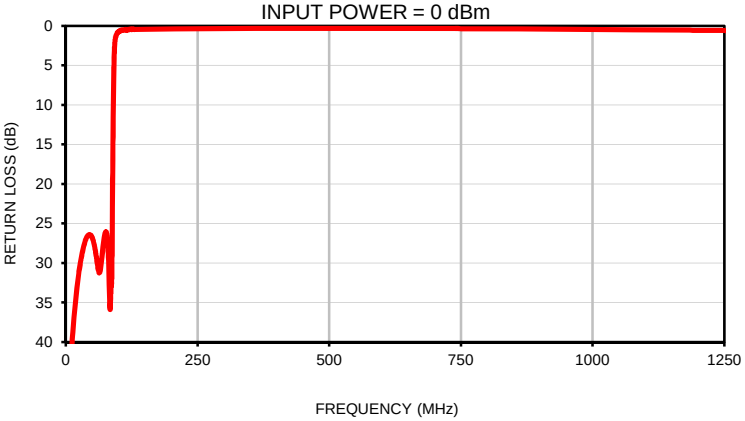
FREQUENCY (MHz)	INSERTION LOSS (dB)		Cross over isolation (dB) (between LPF and HPF)	RETURN LOSS (dB)		
	Lowpass port	Highpass port		Common port	Lowpass port	Highpass port
1.000	0.05	85.10	76.44	52.32	52.63	0.04
5.000	0.08	68.49	68.25	44.84	47.51	0.04
10.000	0.09	62.41	61.47	38.14	41.46	0.03
15.000	0.10	59.92	59.58	34.08	37.22	0.03
20.000	0.11	57.77	58.65	31.03	33.75	0.03
30.000	0.15	57.20	57.31	27.18	29.05	0.03
40.000	0.19	60.01	60.81	25.55	26.72	0.03
50.000	0.24	64.51	65.90	26.37	26.78	0.05
60.000	0.30	70.07	70.15	31.55	30.22	0.08
70.000	0.43	62.11	63.92	36.44	28.28	0.14
80.000	0.72	53.57	53.57	30.91	28.23	0.25
82.000	0.83	53.20	52.69	32.54	31.83	0.28
82.500	0.86	53.05	52.40	33.18	33.16	0.29
83.000	0.89	52.96	52.08	33.95	34.50	0.30
84.000	0.98	52.60	52.18	35.76	35.89	0.32
84.500	1.02	52.33	51.87	37.22	35.29	0.34
84.900	1.07	52.28	51.44	38.71	34.59	0.35
85.000	1.08	52.11	51.63	39.29	34.29	0.35
85.500	1.14	51.87	51.14	42.68	33.42	0.36
86.000	1.21	51.57	50.86	50.51	32.91	0.38
87.000	1.39	51.21	50.21	35.48	32.07	0.41
87.500	1.51	51.11	50.01	29.65	30.11	0.43
88.000	1.66	51.57	49.79	25.00	26.26	0.45
89.000	2.18	53.75	49.50	17.37	17.79	0.49
90.000	3.36	52.98	49.10	11.22	10.83	0.54
92.000	11.00	32.67	45.93	4.49	3.27	0.71
92.400	13.59	29.55	45.85	4.01	2.68	0.76
93.000	18.09	25.32	46.30	3.59	2.10	0.85
94.000	27.55	19.01	48.93	3.41	1.58	1.11
94.300	31.11	17.27	50.30	3.46	1.47	1.22
95.000	41.83	13.48	54.03	3.77	1.29	1.63
96.000	48.15	8.83	49.59	4.92	1.11	2.75
98.000	42.28	3.39	42.81	11.63	0.88	8.46
99.000	41.72	2.34	43.07	17.66	0.81	12.94
100.000	43.24	1.82	44.59	26.03	0.75	17.97
102.000	49.49	1.33	50.17	32.26	0.66	28.73
103.000	54.21	1.18	54.16	30.14	0.63	32.13
104.000	60.72	1.08	59.32	29.61	0.61	31.43
104.500	65.70	1.03	63.13	29.55	0.60	30.53
104.900	72.10	1.00	65.51	29.52	0.59	29.84
105.000	75.57	0.99	65.34	29.50	0.59	29.64
109.275	56.94	0.76	58.24	27.42	0.53	25.98
112.855	58.02	0.63	58.76	26.13	0.50	26.01
115.275	61.06	0.57	64.08	26.04	0.49	26.82
118.855	64.39	0.50	73.52	26.76	0.47	28.52
120.000	62.96	0.48	68.13	27.14	0.47	29.21
121.263	60.91	0.46	63.93	27.62	0.47	30.02
124.843	57.39	0.42	58.49	29.19	0.46	32.63
130.000	54.48	0.37	54.60	31.58	0.45	36.40
250.000	60.31	0.18	61.66	31.41	0.36	27.49
500.000	53.40	0.19	52.29	26.80	0.32	26.15
750.000	51.95	0.23	51.58	28.67	0.36	31.17
870.000	53.58	0.25	53.63	32.56	0.40	31.23
900.000	54.05	0.25	53.28	33.94	0.41	30.81
1000.000	54.53	0.28	52.90	42.10	0.46	29.23
1100.000	55.22	0.31	54.17	48.09	0.51	29.22
1150.000	55.23	0.33	54.54	39.93	0.54	30.54
1200.000	54.36	0.35	54.69	35.61	0.57	32.96
1218.000	53.86	0.36	54.48	34.38	0.58	33.97
1225.000	53.85	0.37	54.66	33.95	0.59	34.37

Typical Performance Curves

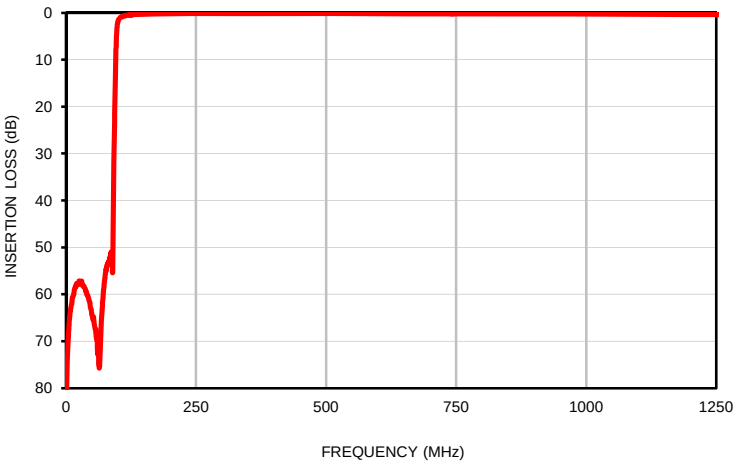
LOWPASS INSERTION LOSS
INPUT POWER = 0 dBm



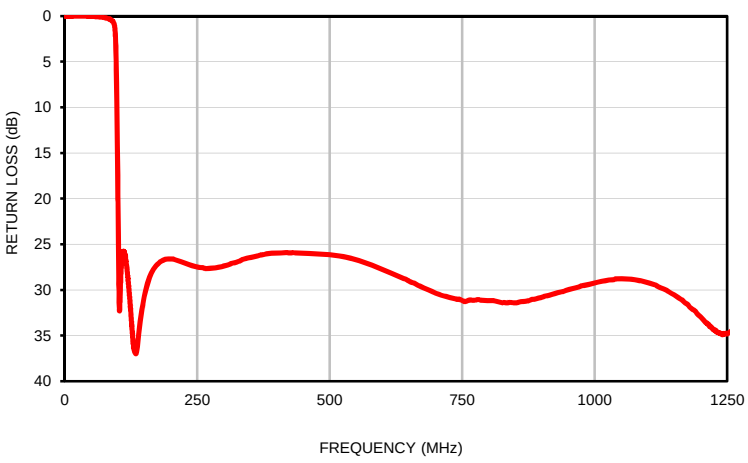
LOWPASS RETURN LOSS
INPUT POWER = 0 dBm



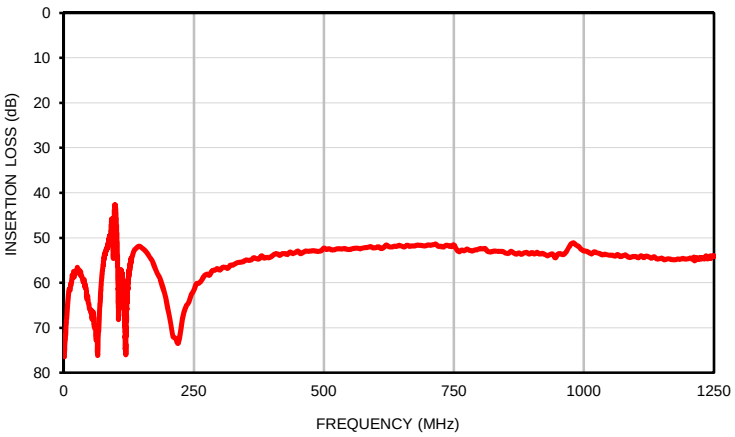
HIGHPASS INSERTION LOSS
INPUT POWER = 0 dBm



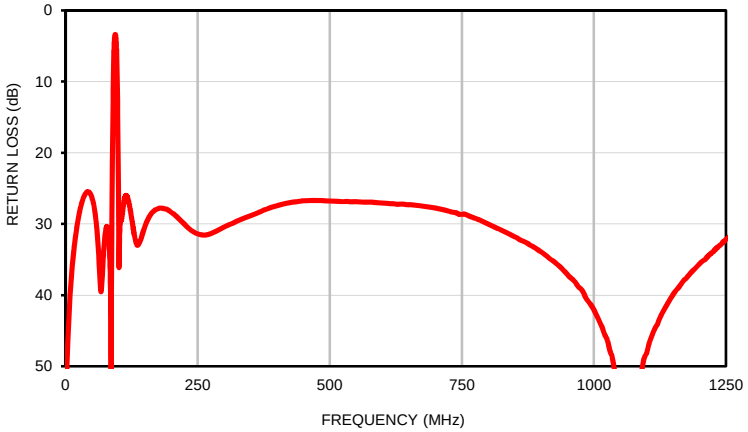
HIGHPASS RETURN LOSS
INPUT POWER = 0 dBm



CROSS OVER ISOLATION
INPUT POWER = 0 dBm



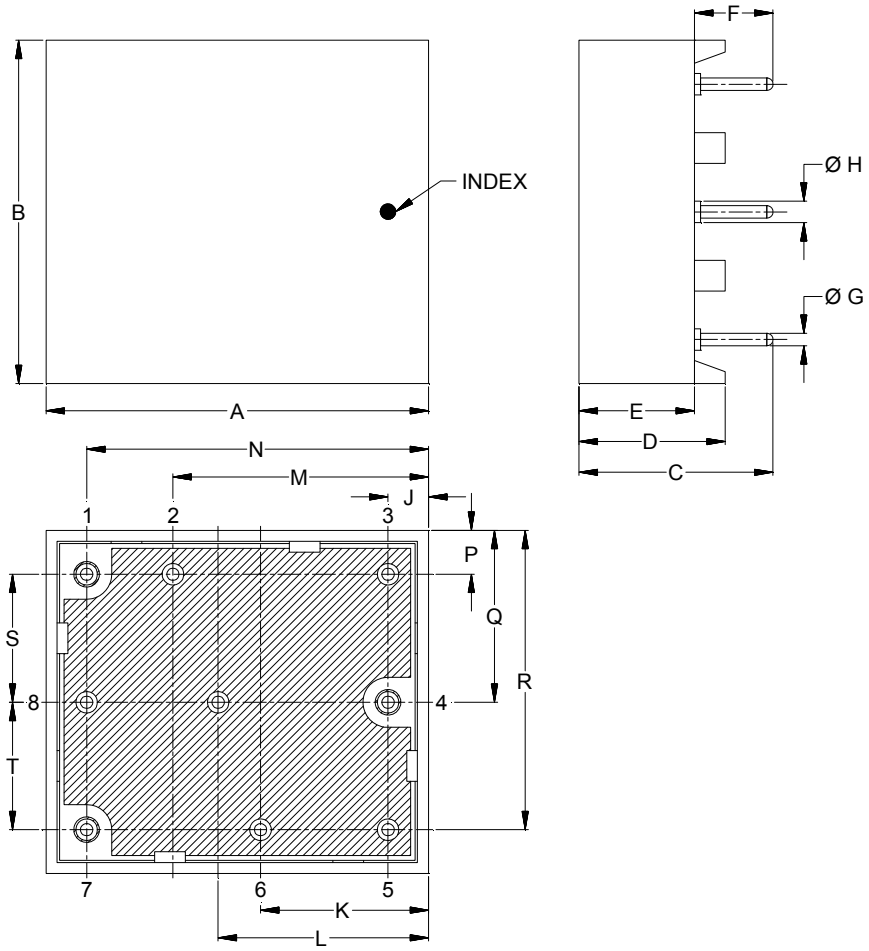
COMMON PORT RETURN LOSS
INPUT POWER = 0 dBm



Case Style QB

Outline Dimensions

QB2223



CASE#	A	B	C	D	E	F	G	H	J	K
QB2223	1.243 (31.56)	1.117 (28.36)	.630 (16.00)	.475 (12.07)	.375 (9.53)	.255 (6.48)	.040 (1.02)	.070 (1.78)	.132 (3.35)	.546 (13.87)

CASE#	L	M	N	P	Q	R	S	T	WT.GRAMS
QB2223	.684 (17.37)	.831 (21.10)	1.111 (28.22)	.143 (3.63)	.559 (14.21)	.974 (24.74)	.417 (10.58)	.415 (10.53)	7

Dimensions are in inches (mm). Tolerances: 2 Pl. ± .015; 3 Pl. ± .030

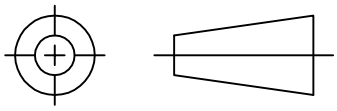
Notes:

1. Cover material: Fortan PPS
2. Pin material: Brass alloy [C3604]
3. Pin finish: Gold flash
4. Tolerance on pin diameter +/-.001
5. Base: Printed wiring laminate.

Mini-Circuits®
ISO 9001 ISO 14001 CERTIFIED
ALL NEW minicircuits.com
P.O. Box 350166, Brooklyn, New York 11235-0003 (718) 934-4500 Fax (718) 332-4661 For detailed performance specs & shopping online see Mini-Circuits web site
The Design Engineers Search Engine Provides ACTUAL Data Instantly From MINI-CIRCUITS At: www.minicircuits.com
RF/IF MICROWAVE COMPONENTS

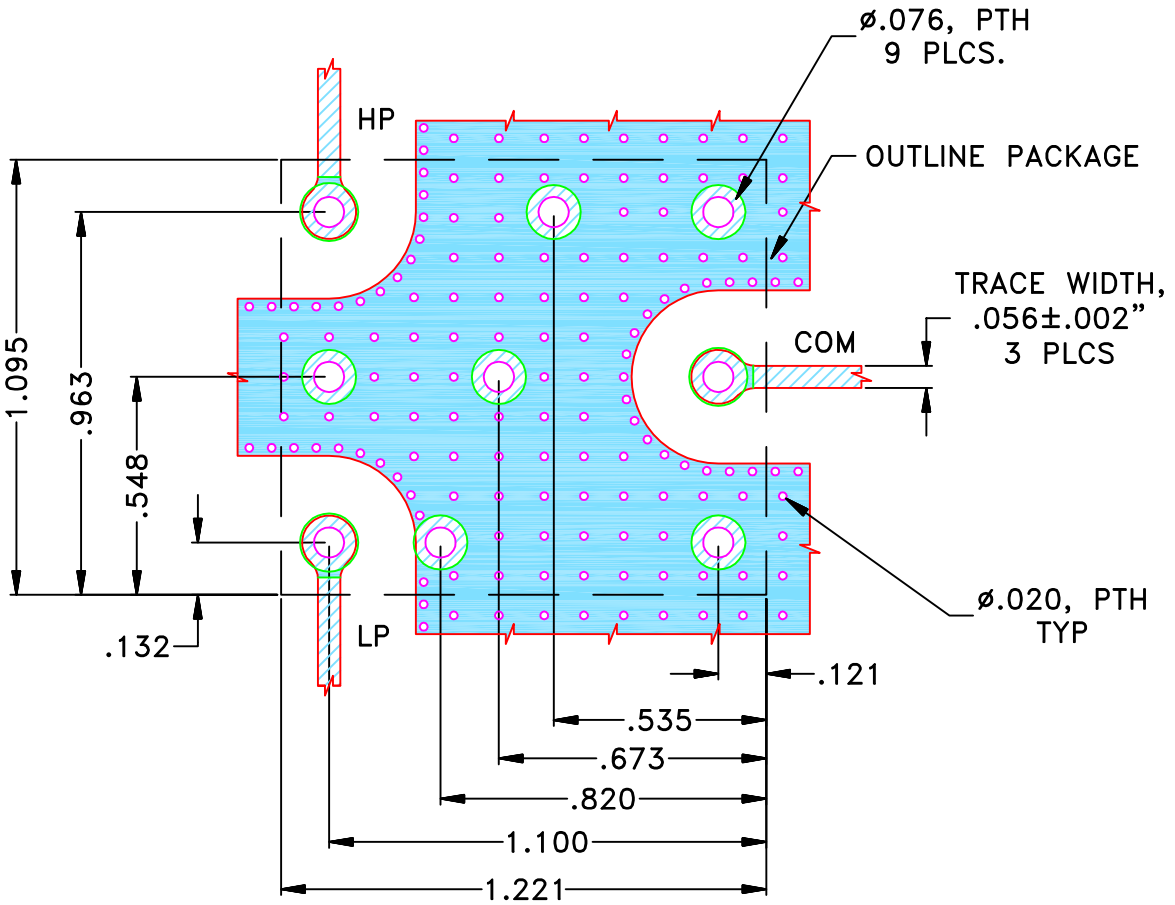
This document and its contents are the property of Mini-Circuits

THIRD ANGLE PROJECTION



REVISIONS					
REV	ECN No.	DESCRIPTION	DATE	DR	AUTH
OR	M156280	NEW RELEASE	MAY 16	SSA	MD

SUGGESTED MOUNTING CONFIGURATION FOR QB2223 CASE STYLE



NOTES:

1. TRACE WIDTH IS SHOWN FOR IT180, WITH DIELECTRIC THICKNESS .059"±.005". COPPER: 1/2 Oz EACH SIDE.
   FOR OTHER MATERIALS TRACE WIDTH MAY NEED TO BE MODIFIED.
2. 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	DRAWN	SSA	05 MAY 16
TOLERANCES ON:	CHECKED	MD	05 MAY 16
2 PL DECIMALS ± .005"	APPROVED	MD	05 MAY 16
3 PL DECIMALS ±			
ANGLES ±			
FRACTIONS ±			

Mini-Circuits ®

THIS DOCUMENT AND ITS CONTENTS ARE THE PROPERTY OF MINI-CIRCUITS. EXCEPT FOR USE EXPRESSLY GRANTED, IN WRITING, TO ITS VENDORS, VENDEE AND THE UNITED STATES GOVERNMENT, MINI-CIRCUITS RESERVES ALL PROPRIETARY DESIGN, USE , MANUFACTURING AND REPRODUCTION RIGHTS THERETO. THESE CONTENTS SHALL NOT BE USED, DUPLICATED OR DISCLOSED TO ANY OUTSIDE PARTY, IN WHOLE OR IN PART, WITHOUT WRITTEN PERMISSION OF MINI-CIRCUITS.

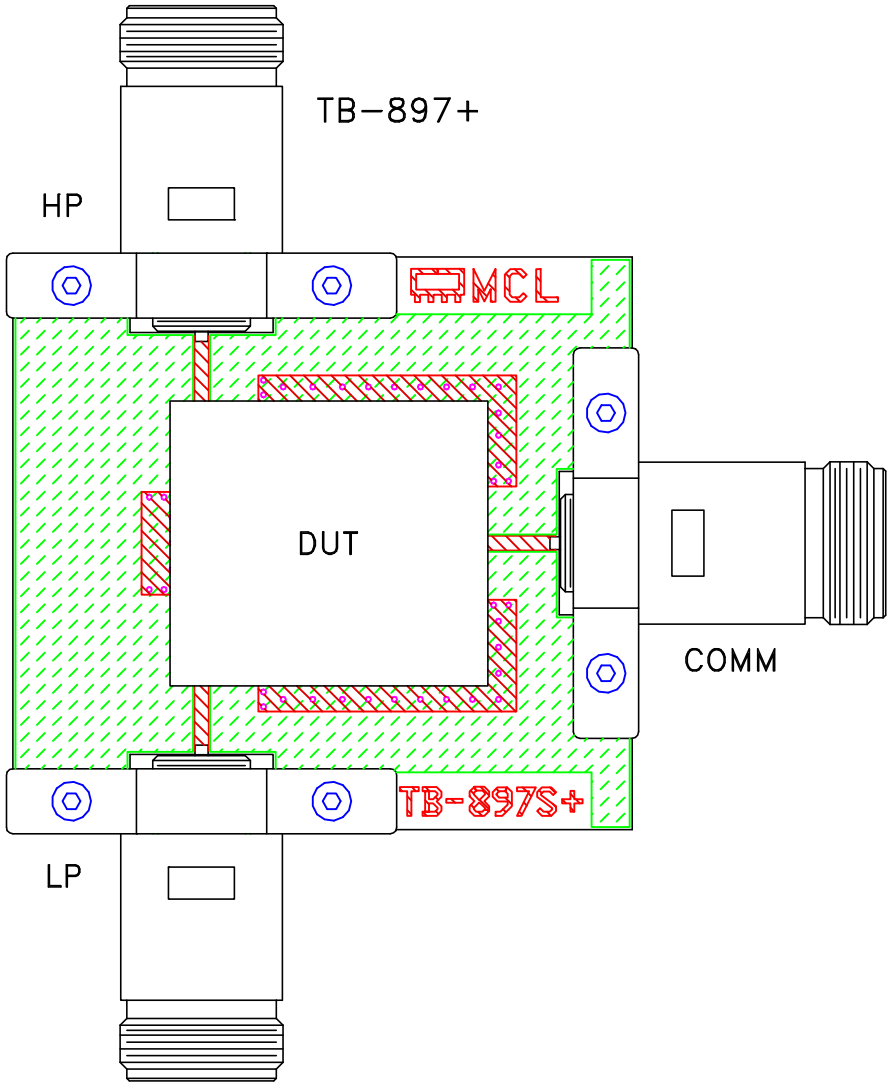
ASHEETA1.DWG REV:A DATE:01/12/95

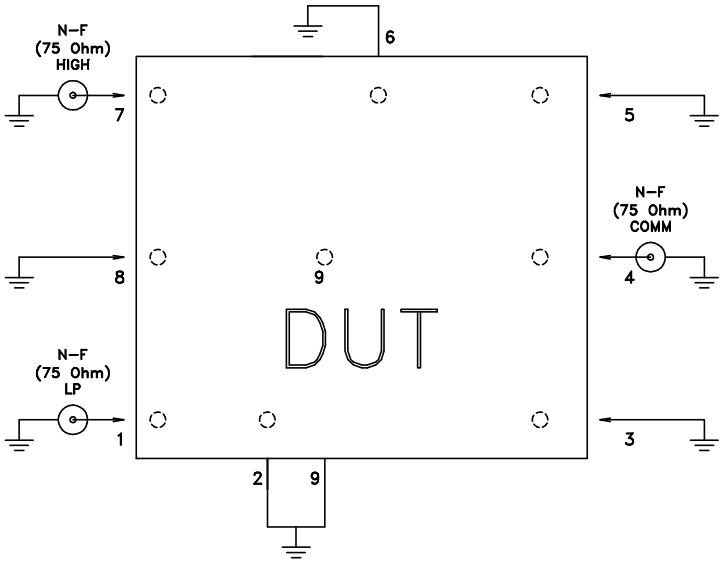
Mini-Circuits® 13 Neptune Avenue Brooklyn NY 11235

PL, QB2223, DPLC, 75 Ohm

SIZE	CODE IDENT	DRAWING NO:	REV:
A	15542	98-PL-485	OR
FILE: 98PL485		SCALE: 3:1	SHEET: 1 OF 1

Evaluation Board and Circuit





Schematic Diagram

Notes:

1. PCB Material: FR4, GADE IT-180TC OR Equivalent
   Dielectric Constant=4.7, Thickness=.059 inch.

Mini-Circuits®

THIS DOCUMENT AND ITS CONTENTS ARE THE PROPERTY OF MINI-CIRCUITS.

Mini-Circuits

Environmental Specifications **ENV85**

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	-40° to 85° C Ambient Environment	Individual Model Data Sheet
Storage Temperature	-55° to 100° C Ambient Environment	Individual Model Data Sheet
HAST	130°C, 85% RH, 96 hours	JESD22-A110
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

This document and its contents are the property of Mini-Circuits.