



LTCC SURFACE MOUNT

Diplexer

LDPQ-550-252+

50 Ω DC to 2500 MHz

THE BIG DEAL

- Low Insertion loss, 0.4 dB Typ
- Stop Band Rejection, 37 dB Typ.
- 1008 Surface Mount Footprint
- Power Handling: 4 W

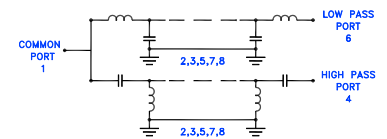


Generic photo used for illustration purposes only

APPLICATIONS

- Military Applications
- Communication Systems
- GSM and GPS
- IoT

FUNCTIONAL DIAGRAM



PRODUCT OVERVIEW

Mini-Circuits' LDPQ-550-252+ is a miniature low temperature co-fired ceramic (LTCC) diplexer with a low pass passband of DC-550 MHz and high pass passband of 1300-2500 MHz that supports a variety of applications. This model provides 0.4 dB typical insertion loss over a wide band due to its rugged monolithic construction. Housed in an 1008 ceramic form factor, it is ideal for dense signal chain PCB layouts where it complements MMIC size and performance. The LTCC fabrication process assures minimal RF performance variation while delivering a product that is well suited for environmental extremes of high humidity and temperature.

KEY FEATURES

Features	Advantages
Low Insertion loss	The low insertion loss of Low Pass and High Pass channels ensures less power dissipation in the diplexer.
LTCC Construction	The use of LTCC technology allows for repeatable performance in a rugged ceramic package, well suited for tough environments such as high humidity and temperature extremes. See Mini-Circuits Environmental Rating ENV06T11 for more information.
Small Size, 1008	1008 package allows for space to be saved in dense circuit board layouts, while also minimizing the effects of parasitics.
Good Power Handling, 4 W	Handles up to 4 Watts in a small 1008 package.

REV. B
ECO-021583
EDU4745
LDPQ-550-252+
URJ
240423



ELECTRICAL SPECIFICATIONS^{1,2,3} AT +25°C

Parameter		Function (Port)	Frequency (MHz)	Min.	Typ.	Max.	Unit
Passband	Insertion Loss	Low Pass (RF COM-RF1)	DC-550	—	0.6	1.2	dB
		High Pass (RF COM-RF2)	1300-1800	—	0.6	1.4	
			1800-2500		0.4	1.4	
	Return Loss	Low Pass (RF1)	DC-550	—	19		dB
		High Pass (RF2)	1300-1800	—	16	—	
			1800-2500		16		
		Common (COM)	DC-550	—	17	—	
Stop band	Rejection		1300-1800	—	15	—	dB
			1800-2500		13		
		Low Pass (RF COM-RF1)	1300-2500	25	37	—	
		High Pass (RF COM-RF2)	DC-550	28	35	—	

1. Tested on Evaluation Board P/N TB-LDPQ-550252+.

2. Bi-Directional. See S-Parameters for actual performance.

3. In applications where DC voltage and/or current is present at either the input or output ports, external DC blocking capacitors are required.

ABSOLUTE MAXIMUM RATINGS³

Parameter	Ratings
Operating Temperature	-55°C to +125°C
Storage Temperature	-55°C to +125°C
Input Power (RF COM) ⁴	4 W
Input Power (RF1) ⁵	4 W
Input Power (RF2) ⁶	4 W

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

4. Power rating applies only to signals within the passband. Power rating above +25°C operating temperature decreases linearly to 1.3 W at +125°C.

5. Power rating applies only to signals within the passband. Power rating above +25°C operating temperature decreases linearly to 1.3 W at +125°C.

6. Power rating applies only to signals within the passband. Power rating above +25°C operating temperature decreases linearly to 1.3 W at +125°C.



LTCC SURFACE MOUNT

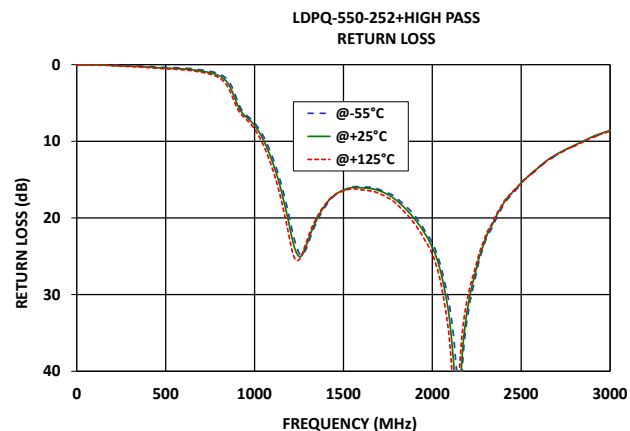
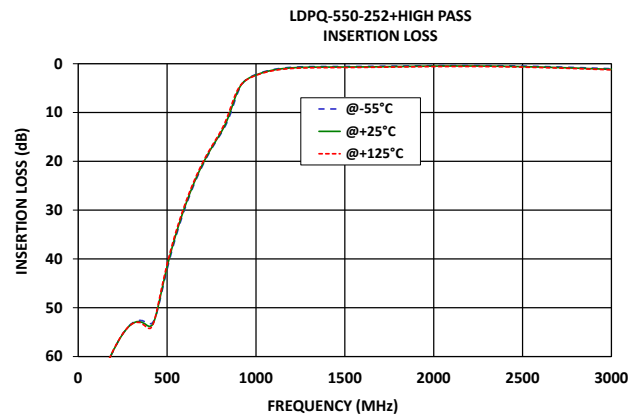
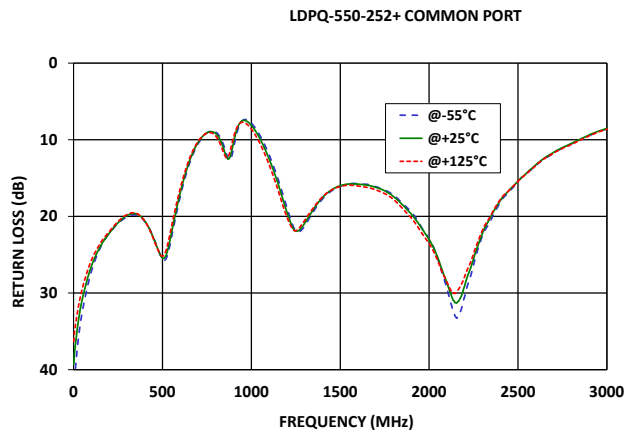
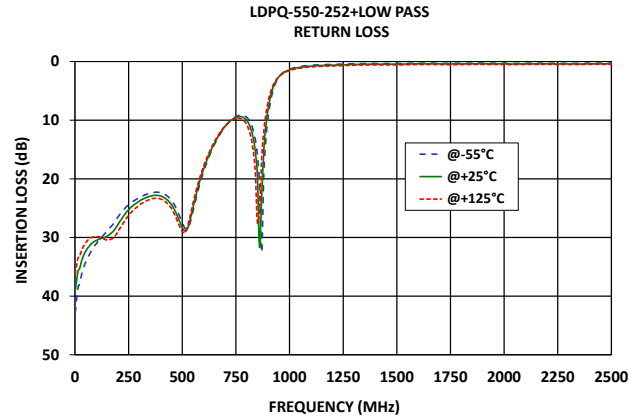
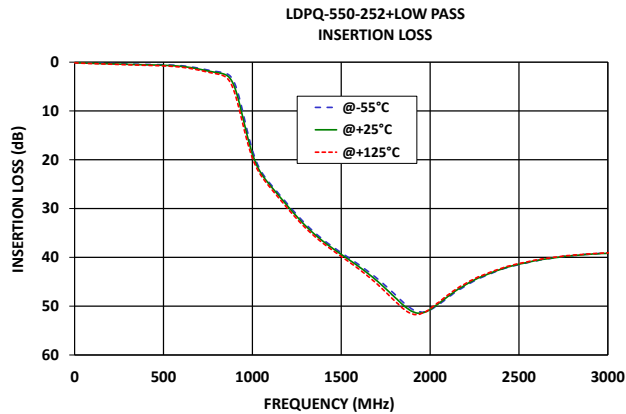
Diplexer

LDPQ-550-252+

Mini-Circuits

50 Ω DC to 2500 MHz

TYPICAL PERFORMANCE GRAPHS





Mini-Circuits

LTCC SURFACE MOUNT

Diplexer

LDPQ-550-252+

50 Ω DC to 2500 MHz

FUNCTIONAL DIAGRAM

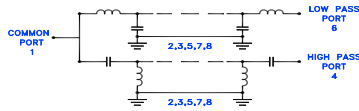
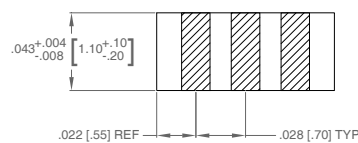
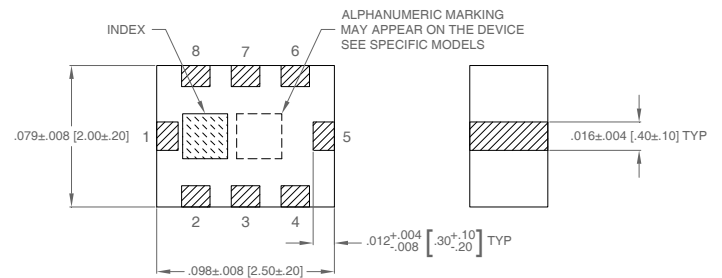


Figure 1. LDPQ-550-252+ Functional Diagram

PAD DESCRIPTION

Function	Pad Number	Description
RF COM	1	Connects to RF COM Port.
LOW PASS PORT	6	Connects to Low Pass Port.
HIGH PASS PORT	4	Connects to High Pass Port.
GND	2, 3, 5, 7, 8	Connects to Ground on PCB, (See drawing PL-762).

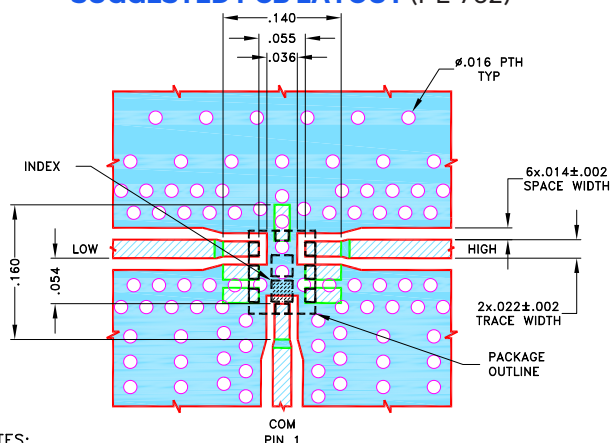
CASE STYLE DRAWING


 METALLIZATION

Weight : .019 grams.

Dimensions are in inches (mm). Tolerances: 2Pl. $\pm$.01; 3Pl. $\pm$.005

SUGGESTED PCB LAYOUT (PL-762)



NOTES:

1. COPLANAR WAVEGUIDE PARAMETERS ARE SHOWN FOR ROGERS (R04350B) WITH DIELECTRIC THICKNESS .010 $\pm$.001; COPPER: 1/2 Oz. EACH SIDE.

FOR OTHER MATERIALS TRACE WIDTH AND GAP MAY NEED TO BE MODIFIED.

2. BOTTOM SIDE OF THE PCB IS CONTINUOUS GROUND PLANE.

 DENOTES PCB COPPER PATTERN WITH SMOBC (SOLDER MASK OVER BARE COPPER) DENOTES PCB COPPER PATTERN FREE OF SOLDERMASK

Figure 2. Suggested PCB Layout PL-762

PRODUCT MARKING*: YA

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

Mini-Circuits

www.minicircuits.com P.O. Box 350166, Brooklyn, NY 11235-0003 (718) 934-4500 sales@minicircuits.com

PAGE 4 OF 5



Mini-Circuits

LTCC SURFACE MOUNT

Diplexer

LDPQ-550-252+

50 Ω DC to 2500 MHz

ADDITIONAL DETAILED INFORMATION IS AVAILABLE ON OUR DASH BOARD.

[CLICK HERE](#)

Performance Data & Graphs	Data Graphs S-Parameter (S3P Files) Data Set (.zip file) De-embedded to device pads (if applicable)
Case Style	NL1008C-8 Lead Finish: Tin over Nickel Plating.
RoHS Status	Compliant
Tape and Reel	F71
Suggested Layout for PCB Design	PL-762
Evaluation Board	TB-LDPQ-550252+ Gerber File
Environmental Rating	ENV06T11

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-Circuits' 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/terms/viewterm.html



Ceramic Diplexer

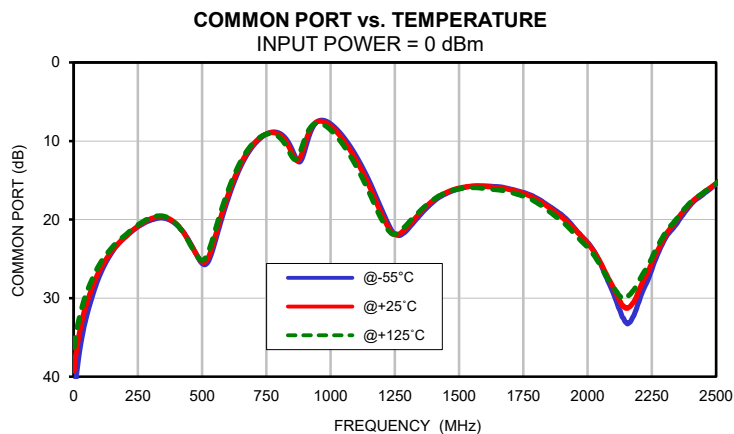
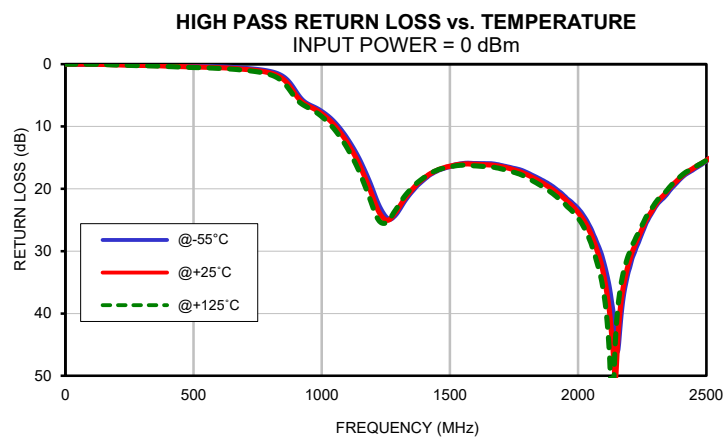
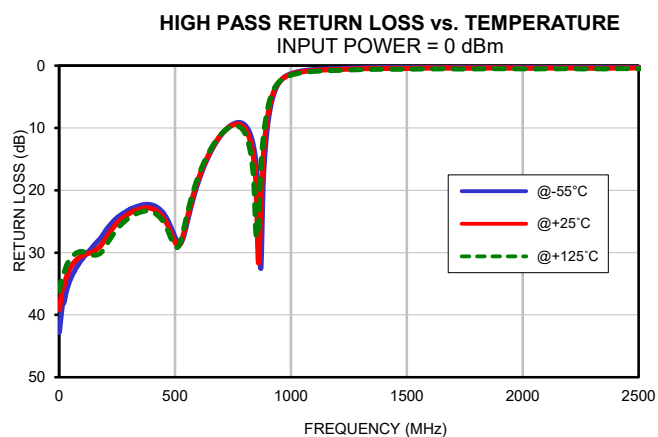
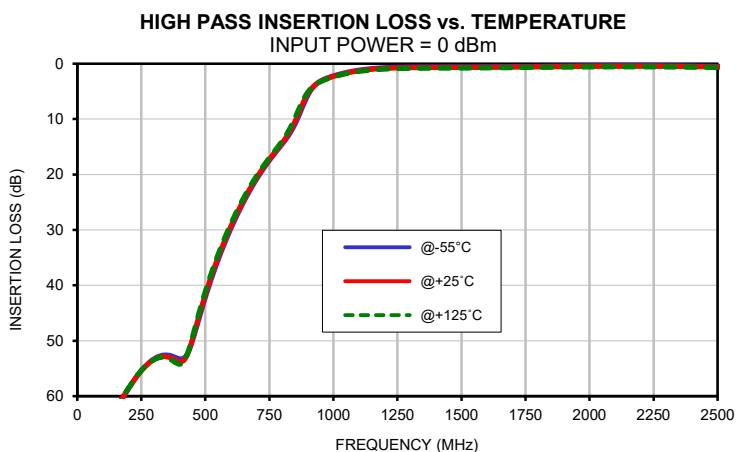
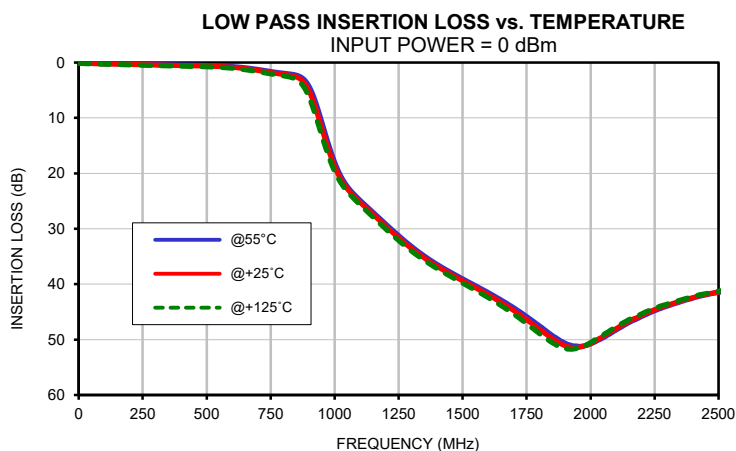
LDPQ-550-252+

Typical Performance Data

FREQUENCY (MHz)	INSERTION LOSS (dB)					
	Lowpass port			Highpass port		
	@-55°C	@+25°C	@+125°C	@-55°C	@+25°C	@+125°C
1.0	0.08	0.11	0.14	94.42	90.20	94.29
3.0	0.08	0.11	0.15	82.17	92.92	88.56
5.0	0.08	0.12	0.15	86.05	92.34	90.41
50.0	0.14	0.18	0.23	72.17	71.93	71.88
100.0	0.19	0.24	0.30	66.35	66.26	66.36
150.0	0.23	0.29	0.36	62.35	62.38	62.43
170.0	0.25	0.31	0.38	60.85	60.84	60.80
180.0	0.26	0.32	0.39	60.03	60.07	60.06
200.0	0.28	0.34	0.42	58.62	58.53	58.53
220.0	0.30	0.36	0.44	57.23	57.24	57.15
260.0	0.34	0.40	0.49	54.90	54.92	54.86
280.0	0.35	0.43	0.52	53.96	54.03	53.98
300.0	0.37	0.44	0.54	53.27	53.36	53.38
350.0	0.42	0.49	0.60	52.59	52.92	53.06
450.0	0.49	0.58	0.70	49.92	49.66	49.27
500.0	0.53	0.64	0.77	42.16	41.64	41.08
550.0	0.60	0.72	0.87	35.37	34.91	34.40
600.0	0.73	0.86	1.03	29.71	29.31	28.85
950.0	10.76	11.88	13.22	3.12	3.18	3.24
700.0	1.25	1.42	1.64	20.84	20.58	20.26
750.0	1.62	1.80	2.04	17.46	17.25	16.97
800.0	1.93	2.13	2.40	14.51	14.28	13.94
850.0	2.28	2.59	3.05	10.89	10.40	9.75
900.0	4.30	5.12	6.26	5.72	5.42	5.14
950.0	10.76	11.88	13.22	3.12	3.18	3.24
1000.0	17.99	18.76	19.62	2.20	2.30	2.39
1050.0	22.40	22.81	23.30	1.60	1.70	1.80
1100.0	24.89	25.24	25.69	1.17	1.28	1.39
1150.0	27.03	27.41	27.89	0.89	1.01	1.13
1180.0	28.30	28.70	29.19	0.78	0.90	1.03
1200.0	29.16	29.56	30.06	0.73	0.85	0.97
1220.0	30.00	30.41	30.90	0.69	0.80	0.93
1260.0	31.63	32.03	32.51	0.63	0.74	0.87
1280.0	32.43	32.82	33.28	0.61	0.73	0.86
1300.0	33.17	33.56	34.02	0.60	0.71	0.84
1340.0	34.57	34.94	35.36	0.58	0.69	0.82
1360.0	35.22	35.58	36.00	0.58	0.69	0.81
1380.0	35.84	36.19	36.60	0.57	0.69	0.81
1400.0	36.42	36.77	37.17	0.57	0.69	0.80
1420.0	36.98	37.32	37.73	0.57	0.68	0.80
1440.0	37.51	37.85	38.26	0.57	0.68	0.79
1460.0	38.03	38.37	38.78	0.57	0.68	0.79
1480.0	38.54	38.89	39.30	0.57	0.68	0.79
1500.0	39.04	39.39	39.82	0.57	0.67	0.78
1520.0	39.54	39.88	40.32	0.57	0.67	0.78
1540.0	40.02	40.39	40.83	0.56	0.67	0.77
1560.0	40.51	40.89	41.35	0.56	0.66	0.77
1580.0	41.02	41.39	41.87	0.56	0.66	0.76
1600.0	41.51	41.91	42.42	0.55	0.65	0.75
1650.0	42.85	43.30	43.86	0.53	0.63	0.73
1700.0	44.27	44.76	45.40	0.51	0.61	0.71
1750.0	45.84	46.40	47.11	0.49	0.59	0.69
1800.0	47.52	48.13	48.91	0.47	0.57	0.67
1900.0	50.63	51.09	51.61	0.42	0.52	0.62
2000.0	50.79	50.72	50.53	0.38	0.49	0.59
2100.0	48.26	48.01	47.70	0.36	0.47	0.57
2200.0	45.82	45.59	45.35	0.36	0.46	0.57
2300.0	43.95	43.78	43.58	0.37	0.48	0.59
2400.0	42.52	42.44	42.26	0.42	0.53	0.64
2500.0	41.48	41.40	41.27	0.48	0.59	0.70

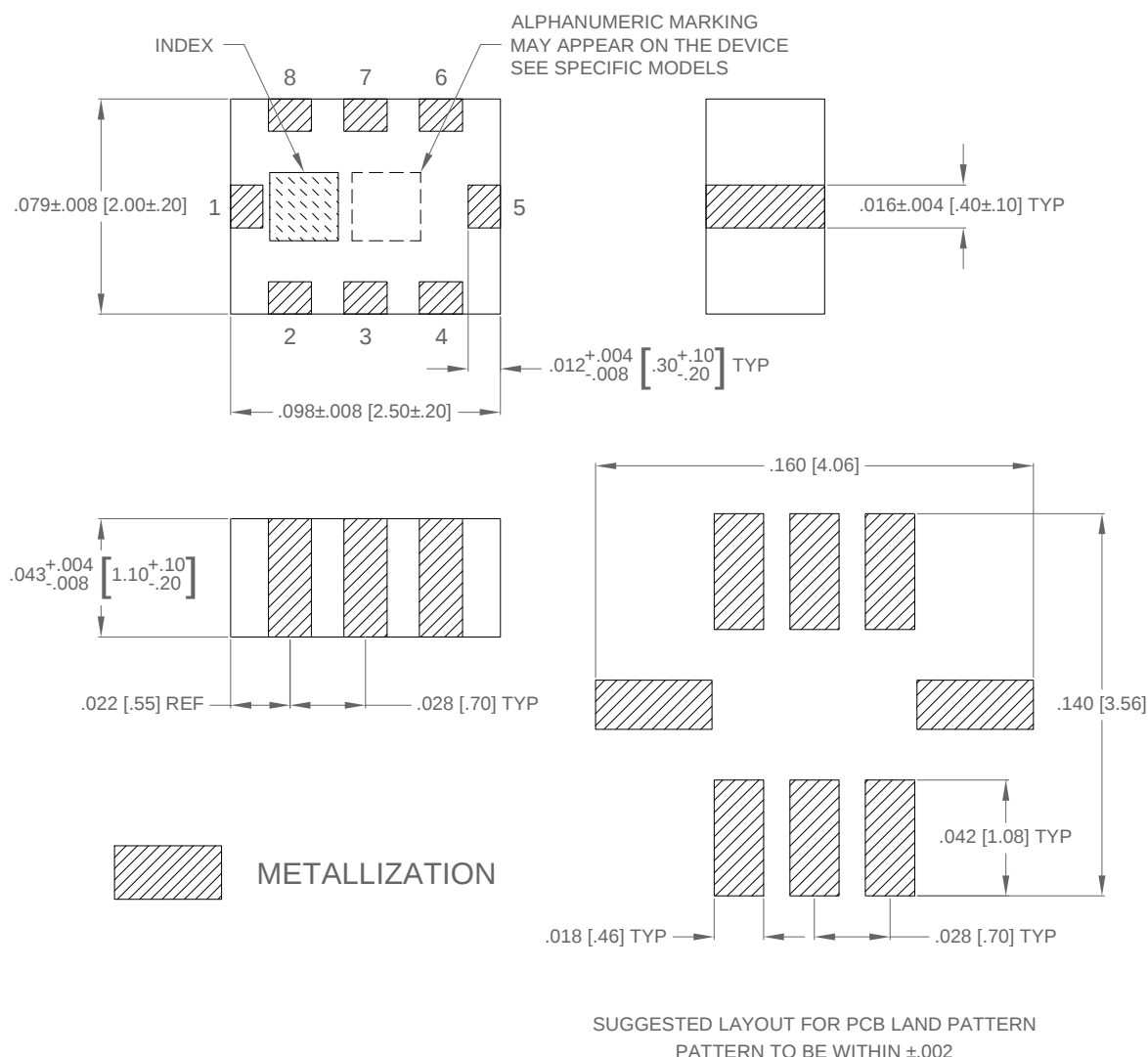
FREQUENCY (MHz)	RETURN LOSS (dB)								
	Common port			Lowpass port			Highpass port		
	@-55°C	@+25°C	@+125°C	@-55°C	@+25°C	@+125°C	@-55°C	@+25°C	@+125°C
1.0	43.00	39.30	36.32	42.81	39.15	36.18	0.00	0.00	0.00
3.0	41.95	38.51	35.62	42.18	38.62	35.68	0.00	0.00	0.00
5.0	41.29	37.87	35.13	41.44	37.97	35.20	0.00	0.00	0.00
50.0	32.31	30.69	29.32	34.19	32.34	30.90	0.01	0.01	0.01
100.0	27.19	26.51	25.73	31.05	30.51	29.87	0.02	0.01	0.01
150.0	24.11	23.94	23.52	28.83	29.76	30.40	0.01	0.04	0.06
170.0	23.24	23.18	22.85	28.06	29.23	30.26	0.01	0.07	0.09
180.0	22.88	22.84	22.56	27.63	28.88	30.03	0.02	0.08	0.10
200.0	22.26	22.22	22.00	26.52	27.80	28.99	0.04	0.11	0.13
220.0	21.67	21.62	21.44	25.59	26.69	27.82	0.06	0.13	0.16
260.0	20.72	20.61	20.46	24.13	24.89	25.80	0.09	0.17	0.21
280.0	20.35	20.19	20.05	23.63	24.29	25.09	0.10	0.19	0.23
300.0	20.08	19.89	19.77	23.24	23.80	24.50	0.12	0.20	0.25
350.0	19.82	19.65	19.57	22.42	22.97	23.50	0.15	0.24	0.29
450.0	22.81	22.87	22.99	23.66	24.39	25.07	0.29	0.39	0.46
500.0	25.60	25.42	25.18	27.52	28.30	28.99	0.35	0.45	0.54
550.0	22.83	22.22	21.42	25.55	24.92	24.19	0.38	0.49	0.59
600.0	17.42	16.93	16.37	18.72	18.26	17.78	0.45	0.57	0.68
950.0	7.50	7.51	7.72	2.68	2.61	2.57	6.51	6.75	7.06
700.0	10.54	10.36	10.21	11.11	11.03	10.96	0.68	0.84	0.99
750.0	9.11	9.09	9.13	9.39	9.52	9.68	0.87	1.05	1.24
800.0	9.01	9.20	9.52	9.49	10.00	10.75	1.20	1.44	1.71
850.0	11.12	11.59	12.04	15.89	19.39	27.47	2.03	2.43	2.92
900.0	11.10	10.33	9.66	9.49	8.07	6.83	4.47	5.01	5.56
950.0	7.50	7.51	7.72	2.68	2.61	2.57	6.51	6.75	7.06
1000.0	7.83	8.11	8.60	1.30	1.41	1.53	7.61	7.95	8.42
1050.0	9.51	9.93	10.57	0.85	0.98	1.12	9.35	9.84	10.50
1100.0	11.97	12.50	13.26	0.64	0.77	0.92	12.00	12.63	13.53
1150.0	15.11	15.73	16.56	0.54	0.68	0.82	15.57	16.42	17.63
1180.0	17.34	17.99	18.77	0.50	0.64	0.78	18.30	19.33	20.79
1200.0	18.84	19.43	20.08	0.49	0.62	0.76	20.36	21.47	23.05
1220.0	20.29	20.76	21.16	0.47	0.59	0.73	22.45	23.49	24.93
1260.0	22.00	21.91	21.72	0.42	0.54	0.68	24.84	25.03	25.12
1280.0	21.81	21.51	21.18	0.39	0.52	0.65	24.50	24.19	23.87
1300.0	21.24	20.89	20.52	0.37	0.50	0.63	23.48	23.05	22.61
1340.0	19.73	19.43	19.16	0.34	0.46	0.59	21.01	20.71	20.37
1360.0	18.98	18.70	18.52	0.33	0.45	0.59	20.04	19.76	19.52
1380.0	18.33	18.08	17.96	0.32	0.44	0.58	19.17	18.92	18.77
1400.0	17.73	17.53	17.46	0.32	0.44	0.58	18.46	18.25	18.15
1420.0	17.21	17.06	17.02	0.33	0.45	0.58	17.79	17.65	17.58
1440.0	16.85	16.71	16.71	0.32	0.44	0.58	17.31	17.21	17.18
1460.0	16.54	16.41	16.44	0.33	0.45	0.58	16.93	16.84	16.86
1480.0	16.28	16.16	16.24	0.32	0.45	0.57	16.65	16.58	16.65
1500.0	16.09	15.99	16.10	0.32	0.44	0.57	16.42	16.37	16.48
1520.0	15.93	15.87	16.00	0.32	0.44	0.56	16.19	16.18	16.32
1540.0	15.79	15.79	15.94	0.30	0.42	0.54	16.02	16.07	16.22
1560.0	15.72	15.76	15.94	0.29	0.41	0.53	15.92	16.01	16.19
1580.0	15.70	15.76	15.97	0.28	0.40	0.52	15.92	16.03	16.25
1600.0	15.72	15.80	16.04	0.27	0.38	0.51	15.95	16.06	16.32
1650.0	15.81	15.92	16.21	0.27	0.38	0.51	15.98	16.16	16.46
1700.0	16.13	16.21	16.55	0.28	0.39	0.52	16.27	16.44	16.80
1750.0	16.55	16.66	17.02	0.29	0.41	0.53	16.74	16.96	17.36
1800.0	17.24	17.41	17.80	0.28	0.40	0.51	17.42	17.72	18.19
1900.0	19.43	19.71	20.22	0.26	0.37	0.49	19.65	20.11	20.74
2000.0	22.92	23.03	23.55	0.30	0.41	0.52	23.23	23.82	24.72
2100.0	29.38	28.65	28.56	0.29	0.40	0.50	31.95	33.97	36.86
2200.0	30.45	29.06	27.86	0.28	0.39	0.49	32.66	31.62	30.26
2300.0	22.53	22.21	21.81	0.31	0.41	0.51	22.91	22.67	22.30
2400.0	18.16	17.94	17.81	0.28	0.38	0.48	18.32	18.11	17.97
2500.0	15.46	15.40	15.43	0.28	0.38	0.48	15.52	15.44	15.42

Typical Performance Curves



Outline Dimensions

NL1008C-8



Dimensions are in inches (mm). Tolerances: 2Pl. ± .01; 3Pl. ± .005

Notes:

1. Open style, Ceramic base.
2. Termination finish: For RoHS Case Styles: Tin plate over Nickel plate. All models, (+) suffix.
For RoHS-5 Case Styles: Tin-lead plate. All models, no (+) suffix.
3. Weight : .019 grams.
4. Pad tolerance is non-cumulative.

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

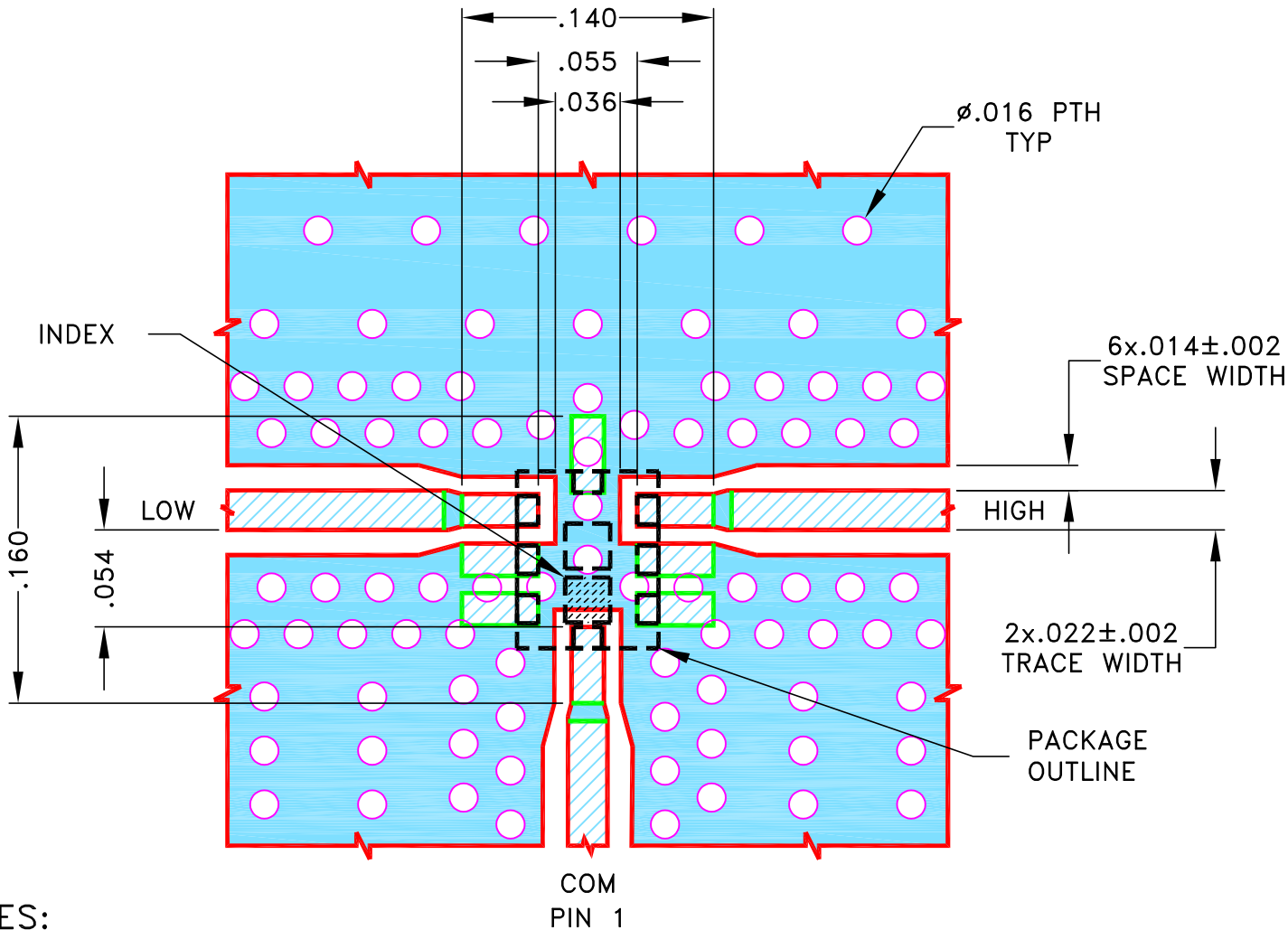


The Design Engineers Search Engine Provides ACTUAL Data Instantly From MINI-CIRCUITS At: www.minicircuits.com

RF/IF MICROWAVE COMPONENTS

THIRD ANGLE PROJECTION		REVISIONS				
	REV	ECN No.	DESCRIPTION	DATE	DR	AUTH
	OR	NP0-003876	NEW RELEASE	OCT 23	AGS	VC

SUGGESTED MOUNTING CONFIGURATION
FOR NL1008C-8 CASE STYLE



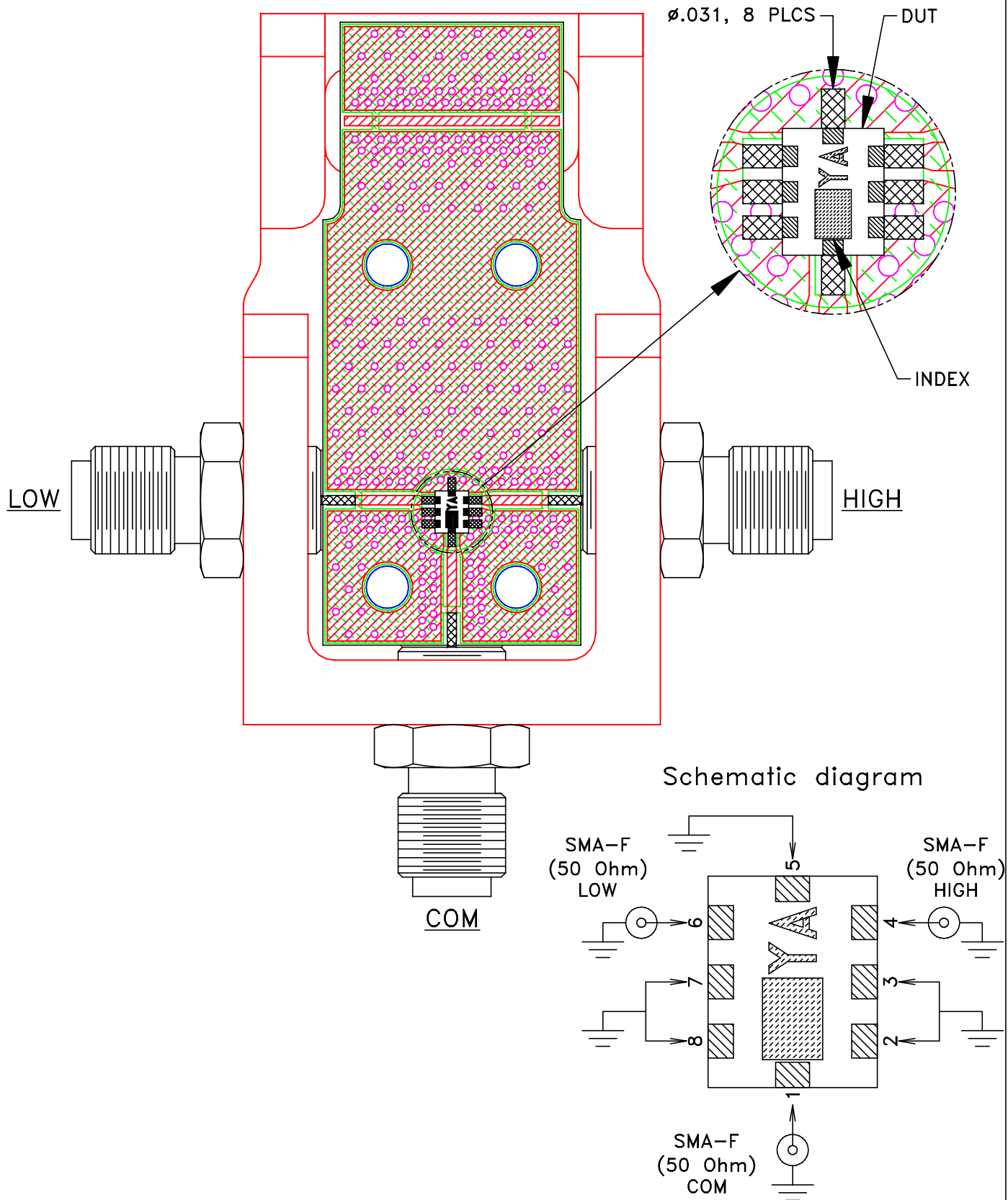
NOTES:

1. COPLANAR WAVEGUIDE PARAMETERS ARE SHOWN FOR ROGERS (R04350B) WITH DIELECTRIC THICKNESS .010±.001; COPPER: 1/2 Oz. EACH SIDE.
FOR OTHER MATERIALS TRACE WIDTH AND GAP MAY NEED TO BE MODIFIED.
2. BOTTOM SIDE OF THE PCB IS CONTINUOUS GROUND PLANE.
-  DENOTES PCB COPPER PATTERN WITH SMOBC (SOLDER MASK OVER BARE COPPER)
-  DENOTES PCB COPPER PATTERN FREE OF SOLDERMASK

UNLESS OTHERWISE SPECIFIED		INITIALS		DATE		Mini-Circuits® 13 Neptune Avenue Brooklyn NY 11235							
DIMENSIONS ARE IN INCHES TOLERANCES ON: 2 PL DECIMALS ± 3 PL DECIMALS ± .005 ANGLES ± FRACTIONS ±		DRAWN	AGS	03 OCT 23									
		CHECKED	GTP	03 OCT 23									
		APPROVED	RKS	03 OCT 23									
						PL, NL1008C-8, TB-1262							
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		SIZE A		CODE IDENT 15542		DRAWING NO: 98-PL-762		REV: OR	
						FILE:		98-PL-762		SCALE: 10:1		SHEET: 1 OF 1	

Evaluation Board and Circuit

TB-LDPQ-550252+



Notes:

1. PCB Material: ROGERS (R04350B) OR Equivalent, Dielectric Constant= 3.48 ± 0.05
Dielectric Thickness: $.010 \pm .001$ inch
2. 50 Ohm SMA Female Connectors.

 **Mini-Circuits®**



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 125° C Ambient Environment	Individual Model Data Sheet
Storage Temperature	-55° to 125° 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
Solder Reflow Heat	Sn-Pb Eutetic Process: 225°C peak Pb-Free Process 245° - 250°C peak	J-STD-020, Table 4-1, 4-2 and 5-2, Figure 5-1
Solderability	10X Magnification	J-STD-002, Test B,B1, 95% Coverage
Thermal Shock	-40° to +125°C, 15 min dwell, 100 cycles	MIL-STD-202, Method 107
Bend Test	1mm, deflection for 5 seconds Span of bending: 2.75"	--
High Temp Storage	125°C to 1000 Hrs	---