



SURFACE MOUNT

Thin-Film Filters

50Ω DC to 40 GHz

THE BIG DEAL

- Low Passband Insertion Loss
- High Rejection
- Good Power Handling
- Temperature Stability -55°C to 125°C
- High Repeatability
- RoHS Complaint
- Small Size



PRODUCT OVERVIEW

Mini-Circuits' Surface Mount Thin-Film filters offer low insertion loss and high rejection realized via Thin-Film on Alumina substrate, using a sputtering process that can guarantee an enhanced Q and repeatable performance. Low pass, high pass, and bandpass surface mount thin-film designs can be realized with this technology up to 40 GHz in a small form factor helping customers achieve their SWaP objectives. Using our high quality thin-film manufacturing process we can guarantee repeatability on large batches of filters.

KEY FEATURES

Feature	Advantages
Low insertion loss	High Q material and sputtering process results in lower insertion loss, better SNR is obtained.
Fast roll-off (steeper skirts)	Higher selectivity results in better adjacent channel rejection and dynamic range
Wider stopband	Wide spur-free stopband results in better adjacent channel rejection and dynamic range
Temperature stability	Very minimal change in electrical performance across temperature makes these filters suitable for a wide range of operating conditions.
Small Size	Various design techniques are employed to realize small size.

REV. A
 ECO-015961
 ABF-8R075G+
 EDU4240
 URJ
 221202





SURFACE MOUNT THIN-FILM

Bandpass Filter

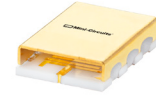
ABF-8R075G+

Mini-Circuits

50Ω 7750 to 8400 MHz

FEATURES

- Low Passband Insertion Loss of 1.6dB Typ.
- High Rejection of 56dB Typ.
- Good Return Loss of 14dB Typ.
- Small Size, 5.59 x 8.13 x 2.03 mm



Generic photo used for illustration purposes only

CASE STYLE: UC2731

APPLICATIONS

- Phased Array SATCOM Antenna
- Aerospace and Defense Signal Conditioning
- Test and Measurement Equipment

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

ELECTRICAL SPECIFICATIONS¹ AT 25°C

Parameter	F#	Frequency (MHz)	Min.	Typ.	Max.	Units
Pass Band	Insertion Loss	F1-F2	—	1.6	2.7	dB
	Return Loss	F1-F2	—	14	—	dB
Stop Band, Lower	Rejection	DC-F3	40	56	—	dB
		F3-F4	20	41	—	dB
Stop Band, Upper	Rejection	F5-F6	20	42	—	dB
		F6-F7	—	40	—	dB

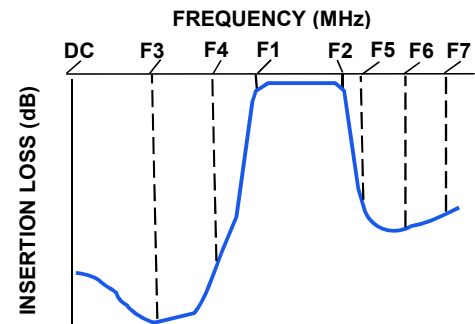
1. Measured on Mini-Circuits Characterization Test Board TB-ABF-8R075G+ with feedline losses removed by normalization of S12 and S21 traces to measurement of TB thru-line.

ABSOLUTE MAXIMUM RATINGS

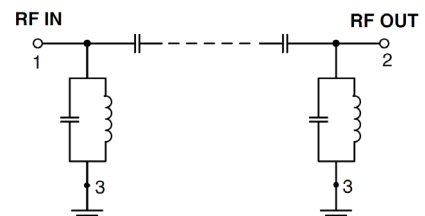
Parameter	Ratings
Operating temperature	-55°C to +125°C
Storage temperature	-55°C to +125°C
RF Power Input at Passband	1W max. at 25°C

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

TYPICAL FREQUENCY RESPONSE



FUNCTIONAL DIAGRAM

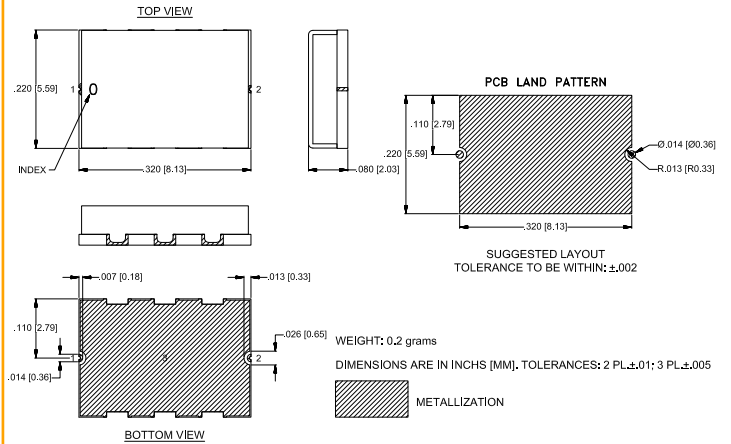




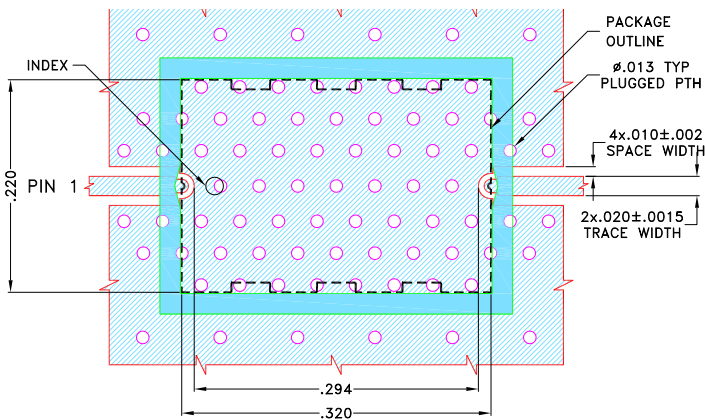
PAD CONNECTIONS

RF IN	1
RF OUT	2
GROUND	3

OUTLINE DRAWING



DEMO BOARD MCL P/N: TB-ABF-8R075G+ SUGGESTED PCB LAYOUT (PL-652)



NOTES:

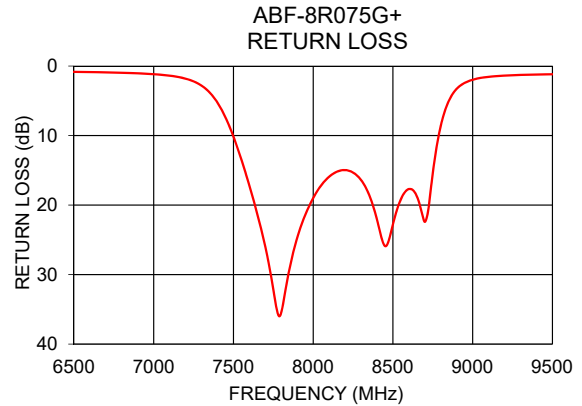
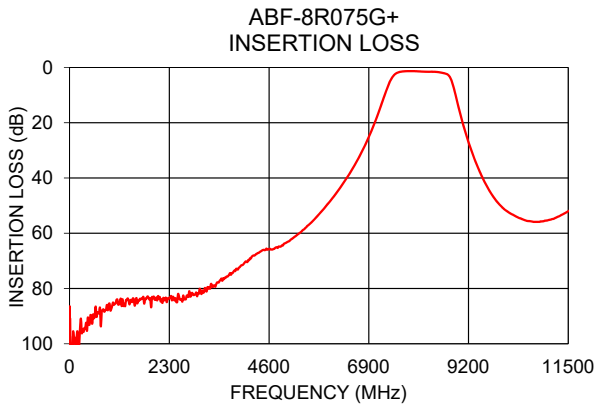
1. COPLANAR WAVEGUIDE PARAMETERS ARE SHOWN FOR ROGERS (R04350B) WITH DIELECTRIC THICKNESS .010±.0010. COPPER: 1/2 Oz. EACH SIDE. FOR OTHER MATERIALS TRACE WIDTH AND GAP MAY NEED TO BE MODIFIED.
2. BOTTOM SIDE OF THE PCB IS CONTINUOUS GROUND PLANE.

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



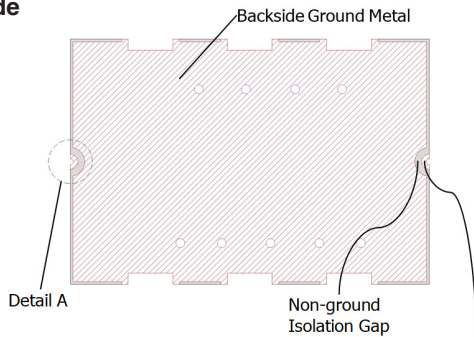
TYPICAL PERFORMANCE DATA AT 25°C

Frequency (MHz)	Insertion Loss (dB)	Return Loss (dB)
10	93.95	0.00
1000	85.09	0.14
5500	57.15	0.63
6300	42.19	0.78
7000	21.48	1.17
7460	3.19	7.89
7750	1.38	32.17
8000	1.39	18.99
8075	1.46	16.47
8400	1.58	22.10
8760	3.24	13.67
9100	21.99	1.55
9600	42.31	1.15
10500	55.27	1.05
11500	52.06	1.02



Recommended PCB Layout Pattern for Filter

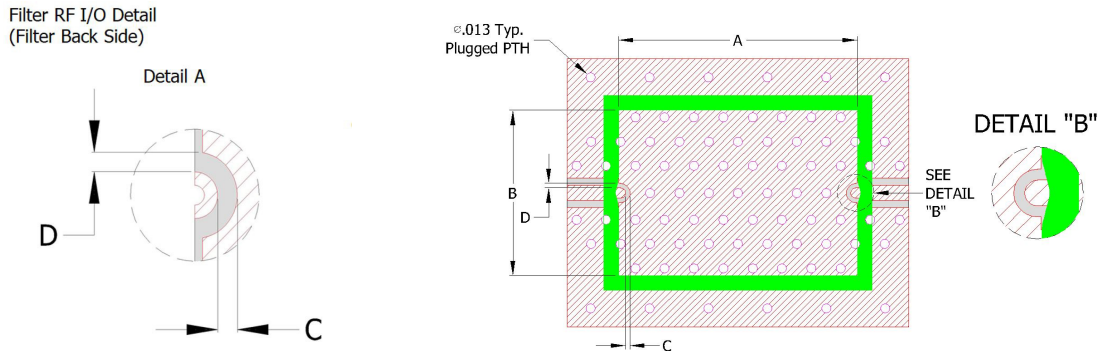
Filter Back side



I/O realized through a castellated via that mates directly to I/O pad on top of test board PCB



PCB Pattern Recommendations

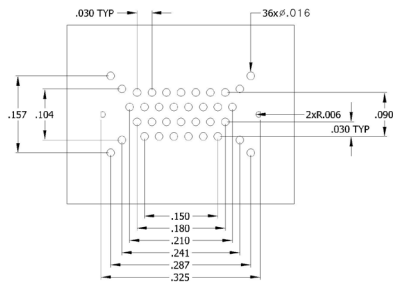


- 1) Customer PCB's ground pattern length (dimension A) can be similar to filter length.
- 2) Customer PCB's ground pattern width (dimension B) can be similar filter width.
- 3) Dimensions C and D on Filter RF I/O detail and Customer PCB pattern can be closely match. The dimensions of C and D on the Customer PCB pattern can be slightly larger to account for component alignment tolerance (ground metal can be pulled back from RF I/O trace).
- 4) Recommend to use Solder mask at Customer PCB at outer area of filter pattern/ footprint with a clearance of about 1.25mil at each side. (Tighter registration tolerance required for solder mask)
- 5) Recommended to use Solder mask at I/O of Customer PCB as per above diagram (refer detail B).

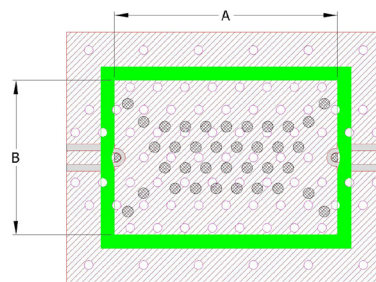
Comments on component handling and solder attach

- 1) Avoid using soldering iron directly to the ceramic filter. This would lead to development of crack in the component due to thermal shock.
- 2) Vacuum pick-up tool or plastic tweezers are recommended for handling the components. Extra care should be taken not to scratch the filter or metal area.
- 3) Use 2-3 mil thickness stencil plate and screen print the solder. Refer below picture for recommended stencil pattern to get the best solder attachment.

Stencil opening drawing



Solder location after screen print



- 4) Plugged ground vias in the PWB will improve attachment consistency.
- 5) Recommended to have a similar or closer test board material and thickness (refer Mini-Circuits evaluation board for details) to minimize the CTE over the temperature range.

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

Thin-Film Bandpass Filter

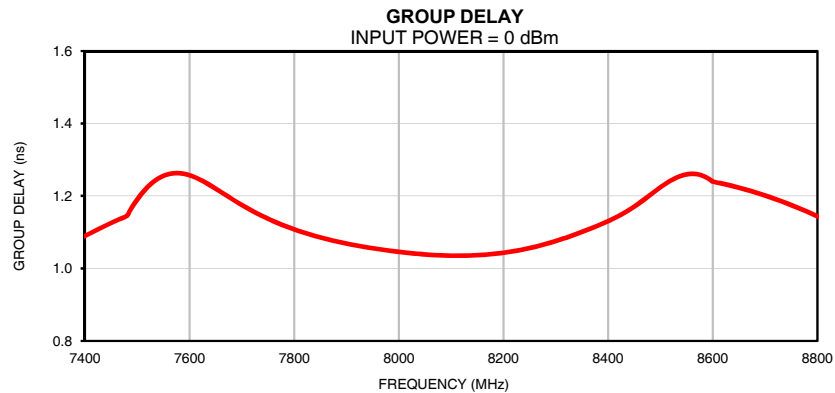
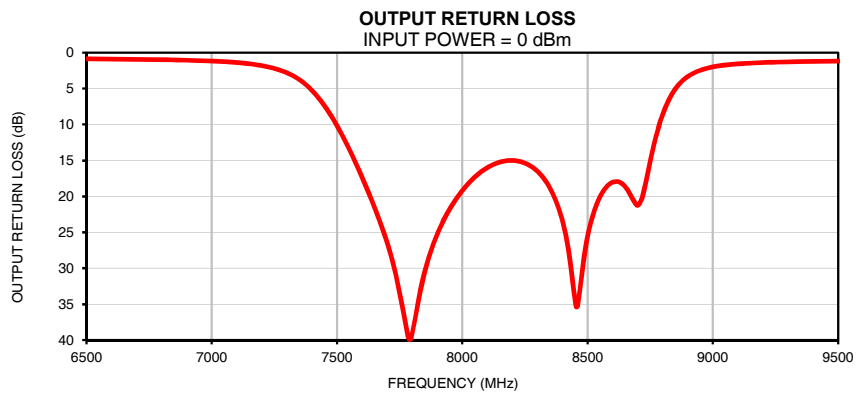
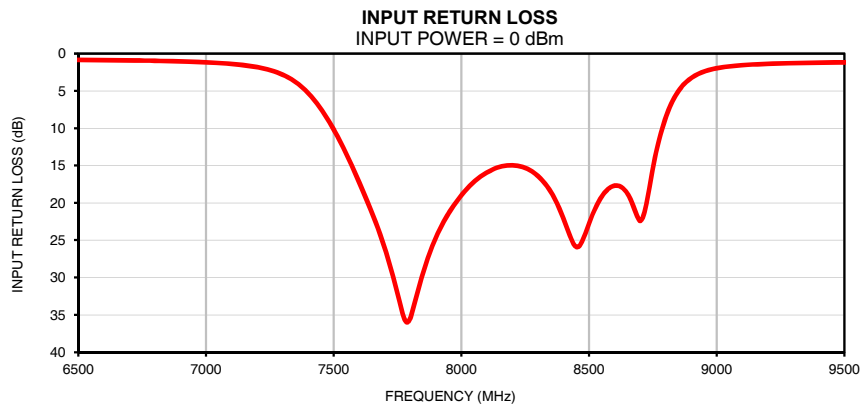
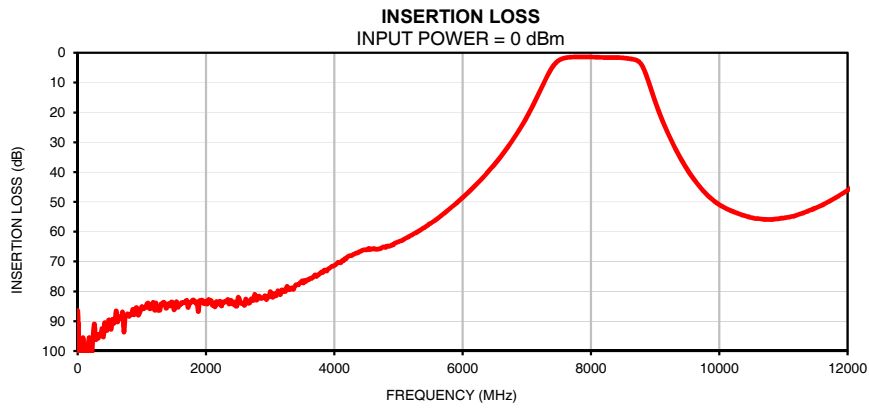
ABF-8R075G+

Typical Performance Data

FREQ.	Insertion Loss	Input Return Loss	Output Return Loss
(MHz)	(dB)	(dB)	(dB)
10	93.95	0.00	0.00
100	98.87	0.00	0.00
200	100.79	0.00	0.00
300	94.66	0.00	0.00
500	89.94	0.03	0.03
700	87.04	0.07	0.07
1000	85.09	0.14	0.14
1200	86.34	0.20	0.19
1400	84.39	0.26	0.25
1600	84.47	0.32	0.30
1800	82.87	0.37	0.35
2000	83.28	0.41	0.39
2500	82.04	0.48	0.46
3000	80.11	0.49	0.48
3500	76.43	0.47	0.46
4000	71.37	0.45	0.44
4500	66.13	0.48	0.48
5000	63.37	0.54	0.55
5500	57.15	0.63	0.63
6000	48.53	0.72	0.71
6300	42.19	0.78	0.78
6700	31.75	0.91	0.91
7000	21.48	1.17	1.16
7260	10.27	2.31	2.27
7460	3.19	7.89	7.87
7750	1.38	32.17	33.30
7800	1.35	35.44	39.19
7850	1.34	29.32	30.50
7900	1.34	24.68	25.24
8000	1.39	18.99	19.20
8075	1.46	16.47	16.57
8150	1.52	15.18	15.22
8200	1.56	14.96	14.99
8250	1.57	15.31	15.36
8300	1.57	16.39	16.50
8400	1.58	22.10	23.43
8760	3.24	13.67	13.49
8900	9.88	3.27	3.30
9100	21.99	1.55	1.55
9280	30.70	1.29	1.28
9600	42.31	1.15	1.13
9640	43.44	1.14	1.12
9680	44.54	1.13	1.11
9720	45.56	1.13	1.11
9760	46.51	1.12	1.10
9800	47.40	1.11	1.09
9840	48.27	1.11	1.09
9880	49.01	1.11	1.08
9920	49.70	1.10	1.07
9960	50.33	1.09	1.07
10000	50.96	1.08	1.07
10040	51.52	1.09	1.06
10080	51.96	1.08	1.05
10120	52.36	1.07	1.05
10160	52.77	1.07	1.05
10200	53.15	1.07	1.05
10500	55.27	1.05	1.02
10600	55.58	1.04	1.01
11000	55.40	1.02	1.01
11500	52.06	1.02	1.04

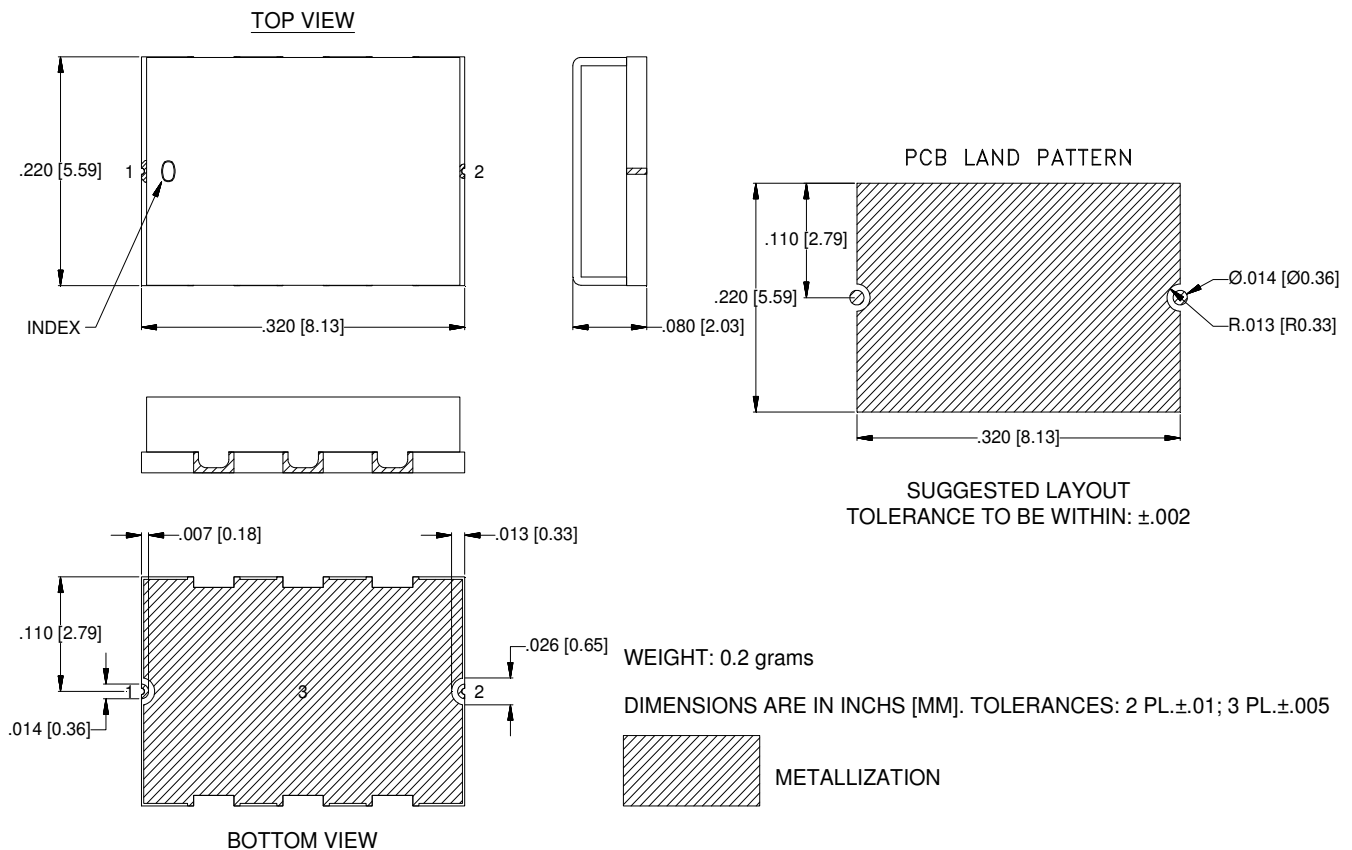
FREQ.	Group Delay
(MHz)	(ns)
7750	1.14
7760	1.13
7770	1.12
7780	1.12
7790	1.11
7800	1.11
7810	1.10
7820	1.10
7830	1.09
7840	1.09
7850	1.09
7860	1.08
7870	1.08
7880	1.07
7890	1.07
7900	1.07
7910	1.07
7920	1.06
7930	1.06
7940	1.06
7950	1.06
7960	1.05
7970	1.05
7980	1.05
7990	1.05
8000	1.05
8010	1.04
8020	1.04
8030	1.04
8040	1.04
8050	1.04
8060	1.04
8075	1.04
8090	1.04
8100	1.04
8110	1.04
8120	1.04
8130	1.04
8140	1.04
8150	1.04
8160	1.04
8170	1.04
8180	1.04
8190	1.04
8200	1.04
8210	1.05
8220	1.05
8230	1.05
8240	1.05
8250	1.06
8260	1.06
8270	1.06
8280	1.07
8290	1.07
8300	1.08
8310	1.08
8320	1.09
8330	1.09
8350	1.10
8400	1.13

Typical Performance Curves



Outline Dimensions

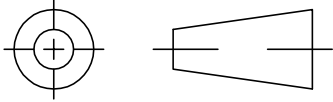
UC2731



Notes:

1. Case material: Gold over Nickel over Annealed Stainless Steel.
2. Base: Ceramic
3. Termination finish: **as shown below or indicated on Data Sheet.**
For RoHS Case Styles: Gold over Nickel plate. All models, (+) suffix.

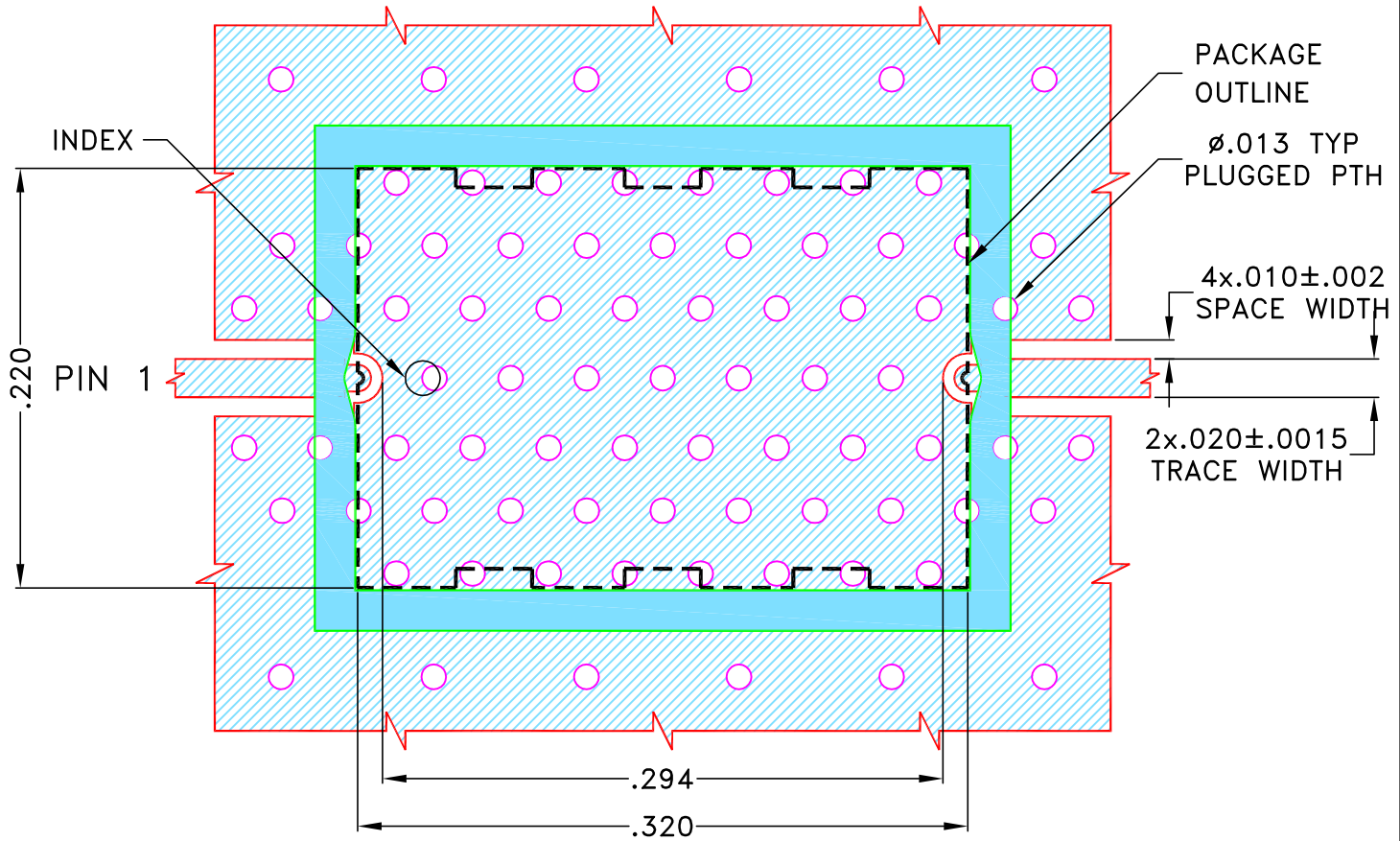
THIRD ANGLE PROJECTION



REVISIONS

REV	ECN No.	DESCRIPTION	DATE	DR	AUTH
OR	ECO-007104	NEW RELEASE	MAR 21	DDR	VC
A	ECO-010633	UPDATED AS PER CURRENT TEST BOARD	NOV 21	DDR	VC

SUGGESTED MOUNTING CONFIGURATION
FOR UC2731 CASE STYLE



NOTES:

1. COPLANAR WAVEGUIDE PARAMETERS ARE SHOWN FOR ROGERS (R04350B) WITH DIELECTRIC THICKNESS $.010 \pm .0010$. 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
DIMENSIONS ARE IN INCHES	DRAWN: DDR	29 MAR 21
TOLERANCES ON:	CHECKED: RR	29 MAR 21
2 PL DECIMALS ±	APPROVED: NN	29 MAR 21
3 PL DECIMALS ± .005		
ANGLES ±		
FRACTIONS ±		

Mini-Circuits® 13 Neptune Avenue
Brooklyn NY 11235

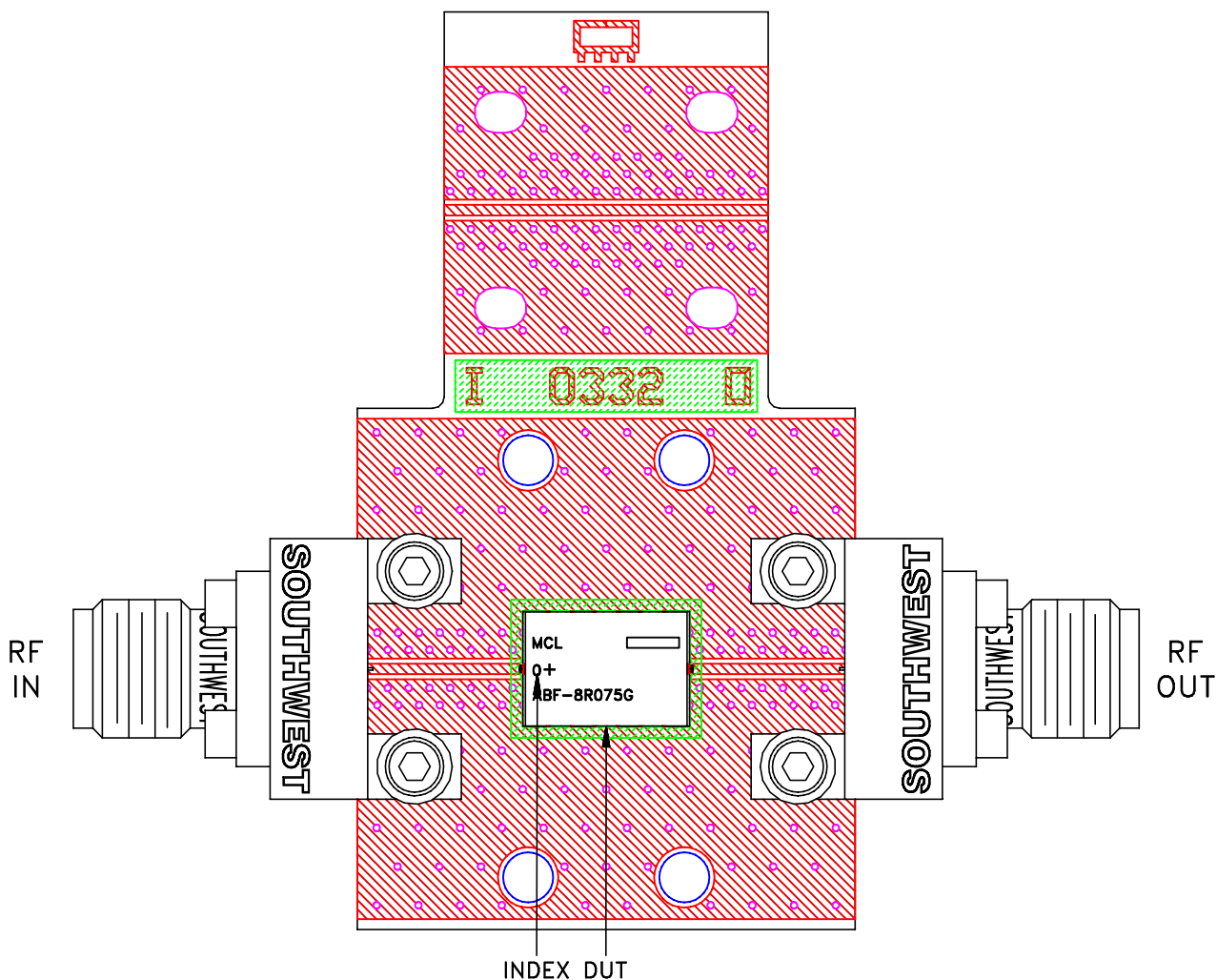
PL DWG, UC2731 C.S, 50 OHM, ABF

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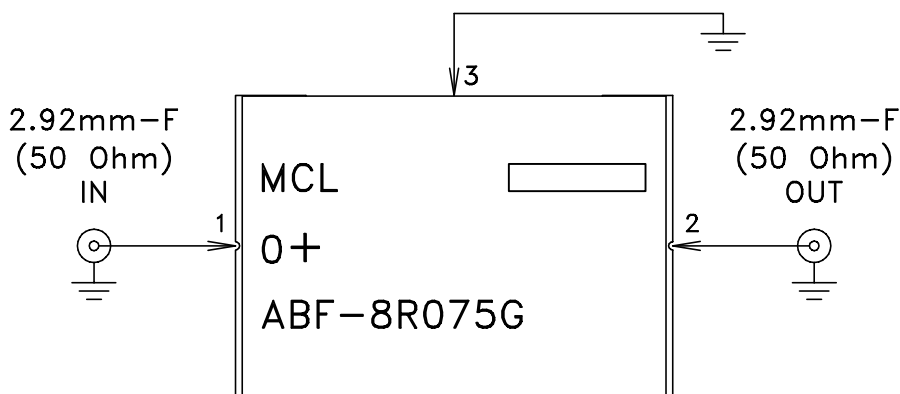
SIZE: A	CODE IDENT: 15542	DRAWING NO: 98-PL-652	REV: A
FILE: 98-PL-652	SCALE: 10:1	SHEET: 1 OF 1	

Evaluation Board and Circuit

TB-ABF-8R075G+




Schematic diagram



Notes:

1. PCB Material: ROGERS (R04350B) OR Equivalent, Dielectric Constant=3.48±.05
Dielectric Thickness: .010±.001
2. 50 Ohm 2.92mm 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
Solderability	10X Magnification	J-STD-002, Para 4.2.5, Test S, 95% Coverage
Thermal Shock	-55° to 125°C, 100 cycles	MIL-STD-202, Method 107, Condition A-3, Except +125°C