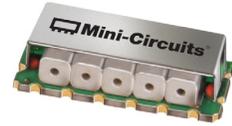




50Ω 1590 to 1610 MHz

### THE BIG DEAL

- Narrow Band Design with Fast Roll-off
- High Rejection, 70 dB Typ.
- Insertion Loss, 4.8 dB Typ.

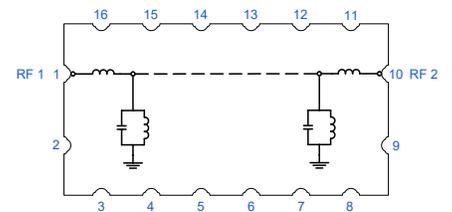


Generic photo used for illustration purposes only

### APPLICATIONS

- Test and Measurement Systems
- Radionavigation-Satellite Services

### FUNCTIONAL DIAGRAM



### PRODUCT OVERVIEW

All our coaxial-ceramic resonator filters are built with rugged construction, qualified to withstand multiple demanding reflow cycles. Excellent repeatability across units is achieved through precise tuning and process control.

### ELECTRICAL SPECIFICATIONS<sup>1,2</sup> AT +25°C

Parameter	F#	Frequency (MHz)	Min.	Typ.	Max.	Units	
Passband	Center Frequency	—	—	1600	—	MHz	
	Insertion Loss	F1-F2	1590 - 1610	—	4.8	5.5	dB
	Return Loss	F1-F2	1590 - 1610	10	15	—	dB
Stopband, Lower	Rejection	DC-F3	DC - 1500	65	80	—	dB
		F3-F4	1500 - 1572	20	30	—	dB
Stopband, Upper	Rejection	F5-F6	1627 - 1680	20	30	—	dB
		F6-F7	1680 - 3000	55	70	—	dB
		F7-F8	3000 - 3800	—	50	—	dB

1. Tested in Evaluation Board P/N TB-CBP4-1600A+.

2. This component should not be used as a DC-block. In applications where DC voltage and/or current is present at either the input or output ports, external DC blocking capacitors are required.

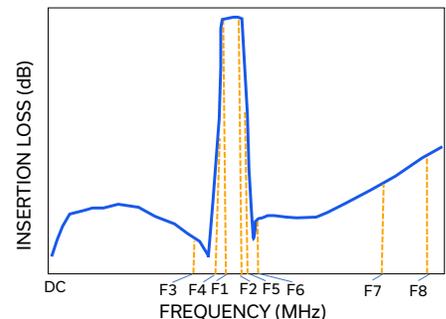
### ABSOLUTE MAXIMUM RATINGS<sup>3</sup>

Operating Temperature	-40°C to +85°C
Storage Temperature	-55°C to +100°C
Input Power <sup>4</sup>	4 W at +25°C

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

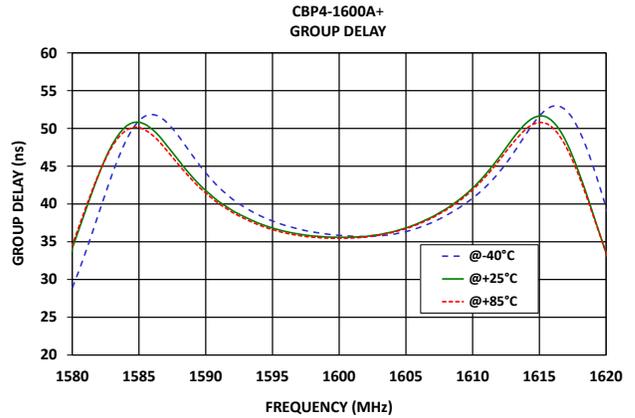
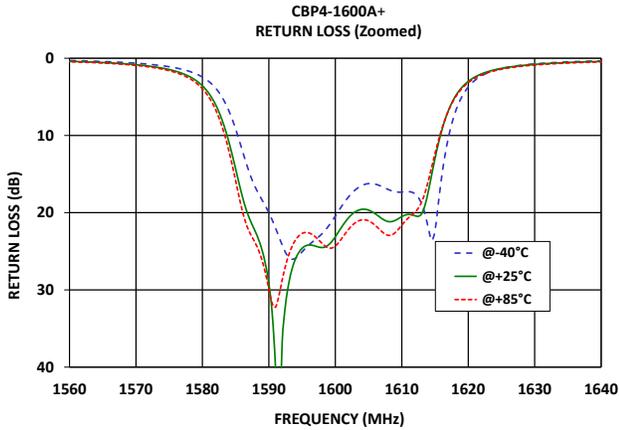
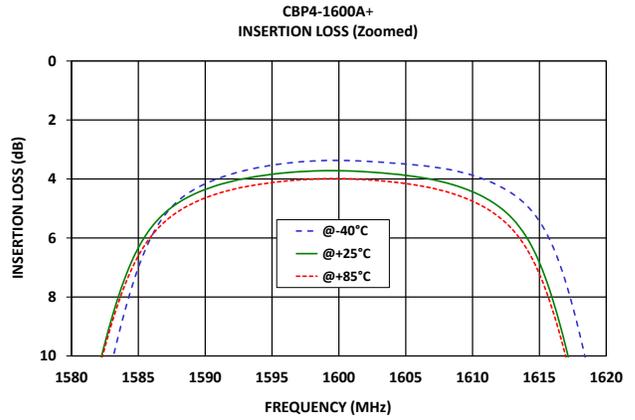
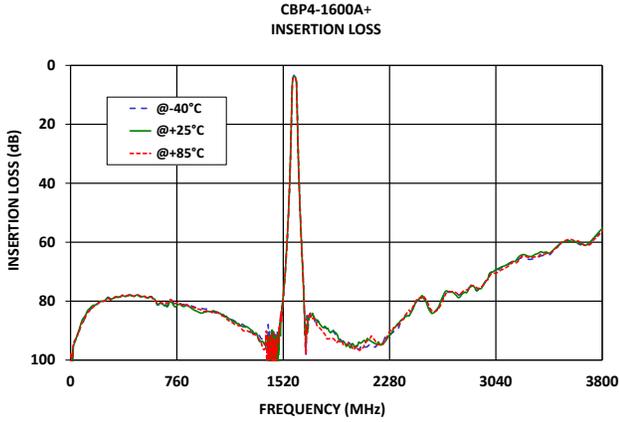
4. Power rating applies only to signals within the passband. Power rating above +25°C operating temperature decreases linearly to 1 W at +85°C.

### TYPICAL FREQUENCY RESPONSE





### TYPICAL PERFORMANCE GRAPHS





### FUNCTIONAL DIAGRAM

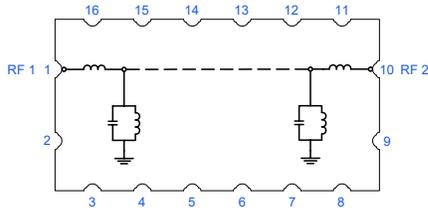
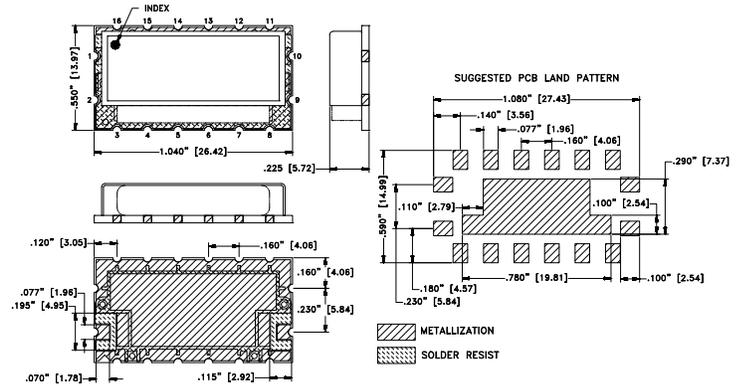


Figure 1. CBP4-1600A+ Functional Diagram

### PAD DESCRIPTION

Function	Pad Number	Description
RF1	1	Connects to RF Input Port
RF2	10	Connects to RF Output Port
GROUND	2-9, 11-16	Connects to Ground on PCB, (See drawing PL-331)

### CASE STYLE DRAWING

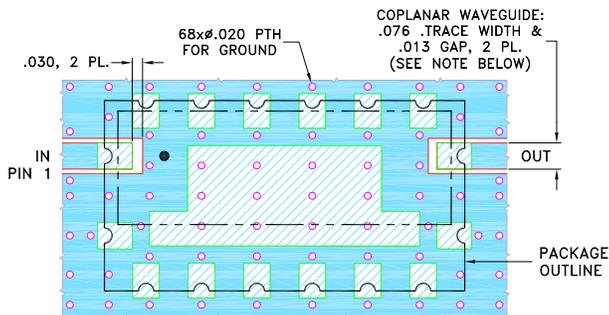


Weight: 4.8 gram

Dimensions are in inches (mm). Tolerances: 2Pl. ± .03; 3Pl. ± .015

### SUGGESTED PCB LAYOUT

SUGGESTED MOUNTING CONFIGURATION FOR  
KU1513/KV1514 CASE STYLE, "16FL02" PIN CODE



- NOTE: 1. COPLANAR WAVEGUIDE PARAMETERS ARE SHOWN FOR ROGERS RO4350B WITH DIELECTRIC THICKNESS  $.060 \pm .004$ ; 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 SOLDER MASK

Figure 2. Suggested PCB Layout

### PRODUCT MARKING\*: CBP4-1600A

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



# Band Pass Filter

## CBP4-1600A+

50Ω

1590 to 1610 MHz

ADDITIONAL DETAILED INFORMATION IS AVAILABLE ON OUR DASHBOARD

[CLICK HERE](#)

Performance Data & Graphs	Data Graphs S-Parameter (S2P Files) Data Set (.zip file) De-embedded to device pads
Case Style	KV1514 Lead Finish: Gold over Nickel Plate
RoHS/REACH Status	Compliant
Tape and Reel	F106
Suggested Layout for PCB Design	PL-331
Evaluation Board	TB-CBP4-1600A+ Gerber File
Environmental Rating	ENV54
MSL Level	MSL1

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](http://www.minicircuits.com/terms/viewterm.html)

## Typical Performance Data

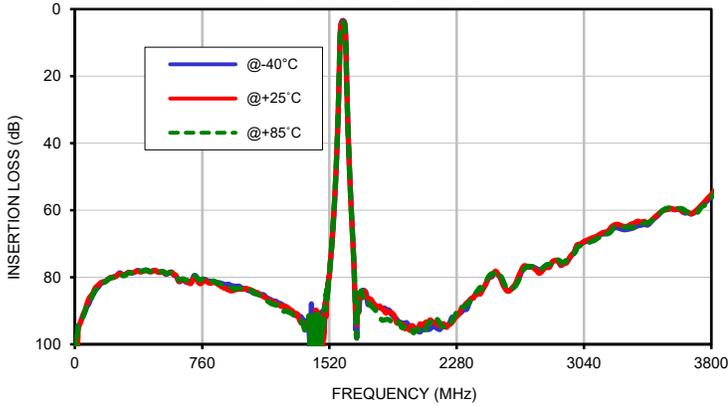
FREQ.  (MHz)	INSERTION LOSS			INPUT RETURN LOSS			OUTPUT RETURN LOSS		
	(dB)			(dB)			(dB)		
	@-40°C	@+25°C	@+85°C	@-40°C	@+25°C	@+85°C	@-40°C	@+25°C	@+85°C
10	100.36	104.02	99.39	0.07	0.07	0.08	0.07	0.07	0.07
20	94.48	95.49	94.30	0.09	0.09	0.10	0.09	0.09	0.10
50	91.41	91.02	91.65	0.10	0.11	0.12	0.11	0.11	0.11
100	85.82	85.29	86.15	0.14	0.14	0.15	0.14	0.15	0.15
150	82.24	81.79	82.64	0.15	0.16	0.17	0.16	0.16	0.17
200	80.51	80.54	80.63	0.15	0.17	0.17	0.15	0.17	0.17
300	79.25	79.15	79.44	0.13	0.15	0.16	0.12	0.15	0.16
400	78.22	78.36	78.15	0.10	0.12	0.13	0.09	0.12	0.13
500	78.40	78.53	78.37	0.07	0.10	0.11	0.06	0.09	0.10
600	79.48	79.29	79.51	0.05	0.08	0.10	0.04	0.07	0.09
700	80.91	81.27	80.29	0.04	0.07	0.08	0.02	0.05	0.07
1000	83.34	83.57	83.52	0.01	0.03	0.05	0.03	0.02	0.04
1300	90.60	90.03	91.06	0.03	0.02	0.04	0.04	0.02	0.05
1500	86.28	91.80	84.84	0.00	0.06	0.10	0.02	0.08	0.12
1572	32.00	30.28	30.22	0.78	1.02	1.13	0.81	1.01	1.09
1575	26.79	24.87	24.81	1.10	1.46	1.61	1.15	1.44	1.54
1576	24.92	22.92	22.87	1.25	1.69	1.86	1.31	1.66	1.77
1580	16.66	14.53	14.54	2.44	3.57	3.95	2.65	3.56	3.76
1590	4.17	4.36	4.64	20.01	29.22	29.89	18.84	20.92	21.76
1593	3.71	3.98	4.26	25.80	29.13	25.46	20.22	22.31	21.69
1595	3.53	3.84	4.12	25.07	24.61	22.69	23.75	23.65	21.75
1600	3.37	3.72	3.99	20.43	23.11	24.32	24.60	25.20	25.43
1601	3.38	3.73	4.00	19.11	21.80	23.30	21.49	23.01	23.96
1603	3.43	3.79	4.06	17.05	19.89	21.31	18.34	20.71	21.69
1605	3.50	3.88	4.16	16.24	19.67	21.06	17.98	21.32	21.91
1610	3.87	4.43	4.76	17.33	20.52	21.62	33.67	24.77	24.04
1615	5.43	6.83	7.22	22.35	12.98	12.35	13.96	12.67	13.61
1620	13.47	16.06	16.24	3.73	3.00	3.16	3.36	3.07	3.38
1622	18.04	20.44	20.56	2.27	2.03	2.16	2.12	2.09	2.31
1627	28.33	30.18	30.22	1.02	1.05	1.15	0.99	1.08	1.21
1650	59.01	60.02	60.03	0.19	0.26	0.31	0.19	0.27	0.33
1680	93.96	90.05	97.39	0.04	0.11	0.15	0.05	0.12	0.17
1700	87.30	86.57	85.39	0.01	0.08	0.12	0.02	0.10	0.14
1800	88.64	88.86	90.19	0.03	0.03	0.07	0.01	0.06	0.10
2000	94.58	95.85	94.82	0.04	0.03	0.07	0.00	0.07	0.11
2050	96.16	95.26	95.58	0.03	0.03	0.07	0.01	0.07	0.12
2100	95.46	93.31	94.84	0.03	0.03	0.07	0.01	0.08	0.12
2150	94.62	93.70	91.79	0.03	0.03	0.07	0.01	0.08	0.12
2200	94.56	93.80	94.83	0.03	0.03	0.07	0.01	0.08	0.12
2250	92.02	93.63	93.13	0.03	0.03	0.07	0.02	0.09	0.13
2300	90.73	90.26	90.08	0.03	0.04	0.08	0.02	0.09	0.13
2350	88.29	87.21	87.74	0.03	0.04	0.07	0.02	0.09	0.13
2400	84.53	85.16	84.29	0.03	0.03	0.07	0.02	0.09	0.13
2450	82.43	82.30	81.67	0.03	0.04	0.07	0.02	0.09	0.13
2500	78.95	78.95	78.88	0.03	0.03	0.07	0.02	0.09	0.13
2550	81.19	81.46	80.27	0.03	0.03	0.07	0.03	0.09	0.13
2600	83.79	83.80	83.63	0.02	0.04	0.07	0.03	0.10	0.13
2650	80.68	79.51	80.80	0.03	0.03	0.07	0.03	0.09	0.13
2700	76.97	76.76	76.78	0.02	0.04	0.07	0.03	0.09	0.13
2750	77.23	77.74	76.97	0.02	0.03	0.07	0.02	0.09	0.13
2800	77.19	77.54	76.89	0.03	0.03	0.07	0.02	0.09	0.13
3000	70.41	70.29	71.05	0.03	0.03	0.06	0.01	0.08	0.12
3100	68.36	68.06	69.05	0.03	0.03	0.06	0.01	0.08	0.12
3200	65.91	65.13	66.41	0.03	0.03	0.06	0.00	0.08	0.11
3300	65.70	64.75	65.12	0.03	0.03	0.06	0.00	0.07	0.11
3400	64.23	63.34	63.86	0.03	0.03	0.06	0.01	0.07	0.11
3500	60.56	60.46	60.56	0.02	0.04	0.07	0.01	0.07	0.11
3600	59.55	59.74	59.48	0.03	0.04	0.07	0.02	0.06	0.11
3700	60.65	60.43	61.06	0.03	0.04	0.07	0.02	0.06	0.11
3800	55.90	55.34	56.22	0.03	0.05	0.08	0.02	0.06	0.11

## Typical Performance Data

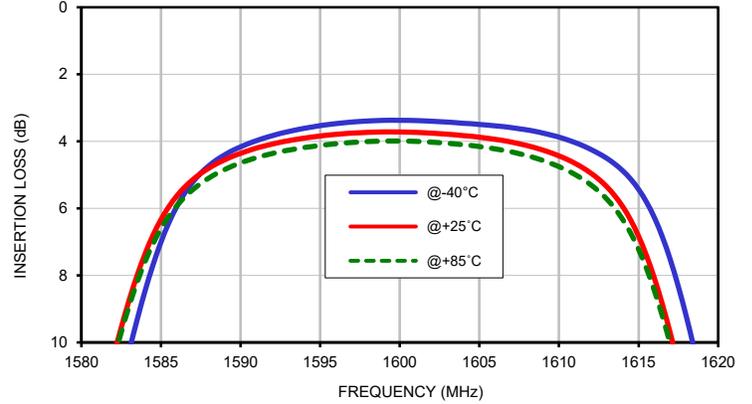
FREQ.	GROUP DELAY		
(MHz)	(nsec)		
	@-40°C	@+25°C	@+85°C
1590.0	44.13	41.78	41.46
1590.5	43.11	41.02	40.71
1591.0	42.17	40.29	40.01
1591.5	41.39	39.71	39.46
1592.0	40.65	39.13	38.88
1592.5	40.03	38.65	38.42
1593.0	39.48	38.22	37.98
1593.5	38.96	37.80	37.57
1594.0	38.51	37.43	37.22
1594.5	38.10	37.11	36.88
1595.0	37.76	36.82	36.61
1595.5	37.42	36.57	36.35
1596.0	37.14	36.35	36.15
1596.5	36.90	36.17	35.97
1597.0	36.67	36.01	35.82
1597.5	36.47	35.88	35.69
1598.0	36.30	35.76	35.60
1598.5	36.16	35.71	35.54
1599.0	36.03	35.64	35.49
1599.5	35.93	35.60	35.46
1600.0	35.85	35.59	35.47
1600.5	35.78	35.59	35.48
1601.0	35.72	35.61	35.50
1601.5	35.69	35.65	35.55
1602.0	35.68	35.70	35.62
1602.5	35.74	35.84	35.76
1603.0	35.77	35.94	35.86
1603.5	35.87	36.13	36.05
1604.0	35.97	36.31	36.23
1604.5	36.15	36.57	36.48
1605.0	36.34	36.83	36.72
1605.5	36.60	37.15	37.04
1606.0	36.89	37.50	37.39
1606.5	37.23	37.91	37.78
1607.0	37.57	38.32	38.19
1607.5	38.00	38.83	38.69
1608.0	38.47	39.34	39.18
1608.5	38.97	39.94	39.77
1609.0	39.51	40.58	40.40
1609.5	40.12	41.30	41.10
1610.0	40.77	42.10	41.87

## Typical Performance Curves

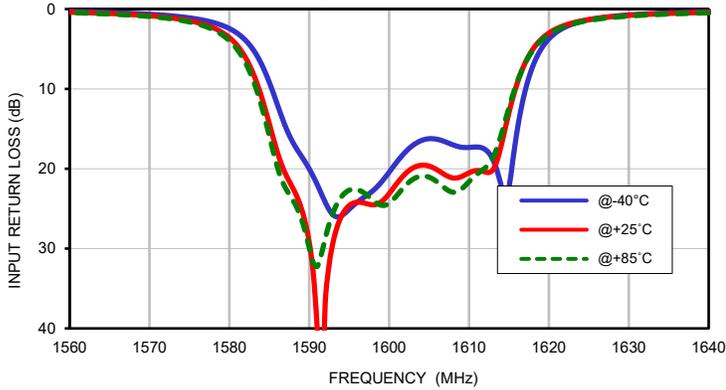
**INSERTION LOSS vs. TEMPERATURE**  
INPUT POWER = 0 dBm



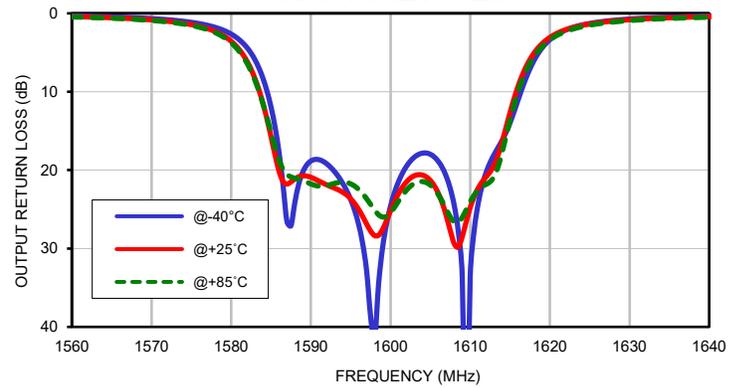
**INSERTION LOSS vs. TEMPERATURE (Zoomed)**  
INPUT POWER = 0 dBm



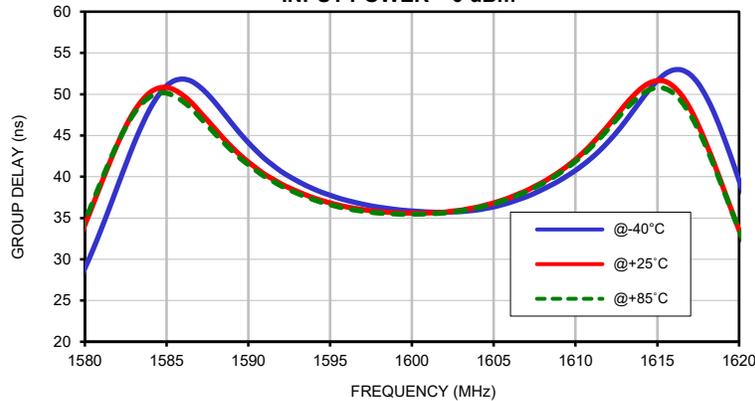
**INPUT RETURN LOSS vs. TEMPERATURE**  
INPUT POWER = 0 dBm



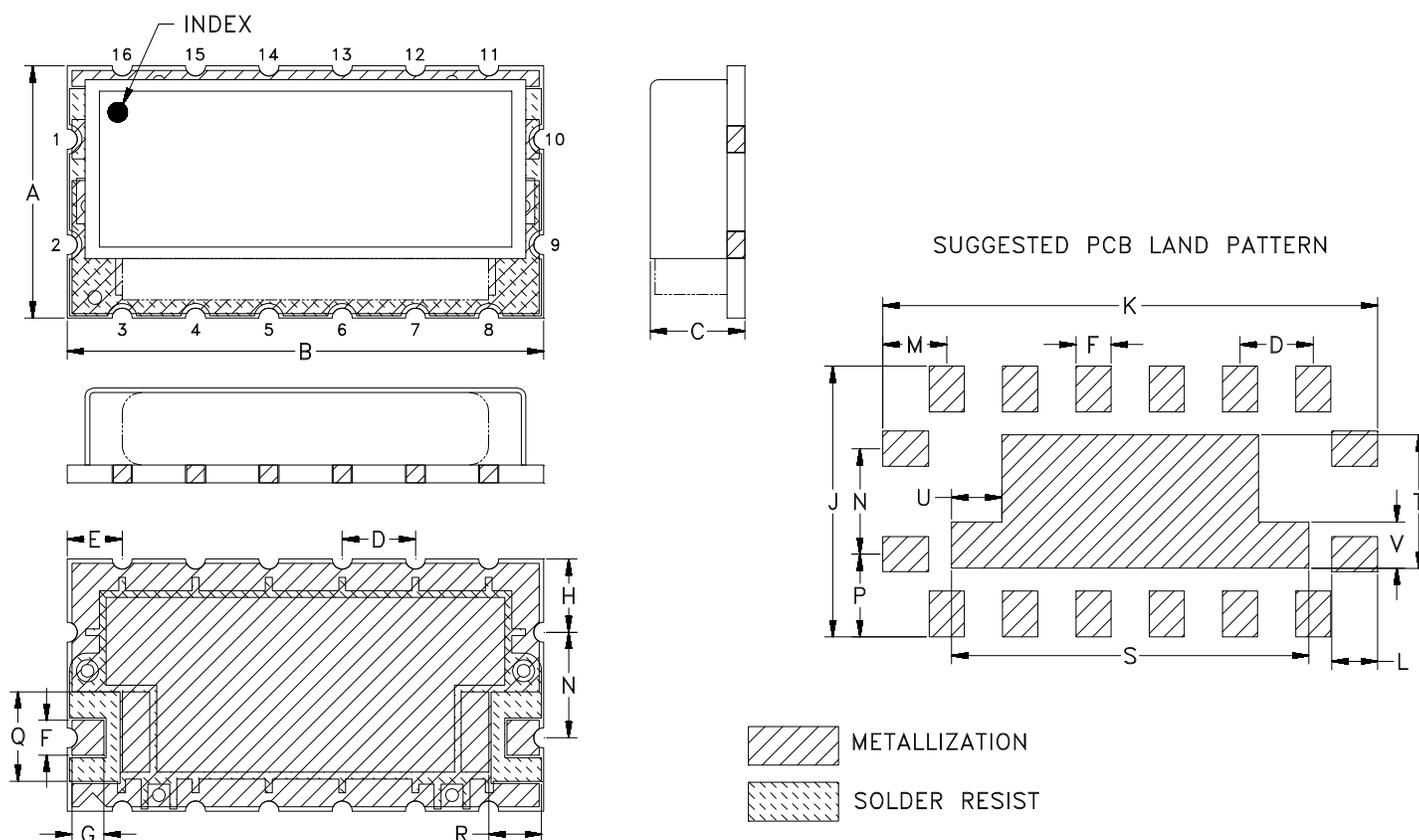
**OUTPUT RETURN LOSS vs. TEMPERATURE**  
INPUT POWER = 0 dBm



**GROUP DELAY vs. TEMPERATURE**  
INPUT POWER = 0 dBm



### Outline Dimensions



CASE#	A	B	C	D	E	F	G	H	J	K	L	M
KV1514	.550 (13.97)	1.040 (26.24)	.225 (5.72)	.160 (4.06)	.120 (3.05)	.077 (1.96)	.070 (1.78)	.160 (4.06)	.590 (14.99)	1.080 (27.43)	.100 (2.54)	.140 (3.56)

CASE#	N	P	Q	R	S	T	U	V	WT, GRAMS
KV1514	.230 (5.84)	.180 (4.57)	.195 (4.95)	.115 (2.92)	.780 (19.81)	.290 (7.37)	.110 (2.79)	.100 (2.54)	4.8

Dimensions are in inches (mm). Tolerances: 2PL. ± .03; 3PL. ± .015

#### Notes:

- Case material: Nickel-Silver alloy.
- Base: Printed wiring laminate.
- Termination finish:  
For RoHS Case Styles: 2-5 μ inch (.05-.13 microns) Gold over 120-240 μ inch (3.05-6.10 microns) Nickel plate.  
All models, (+) suffix.

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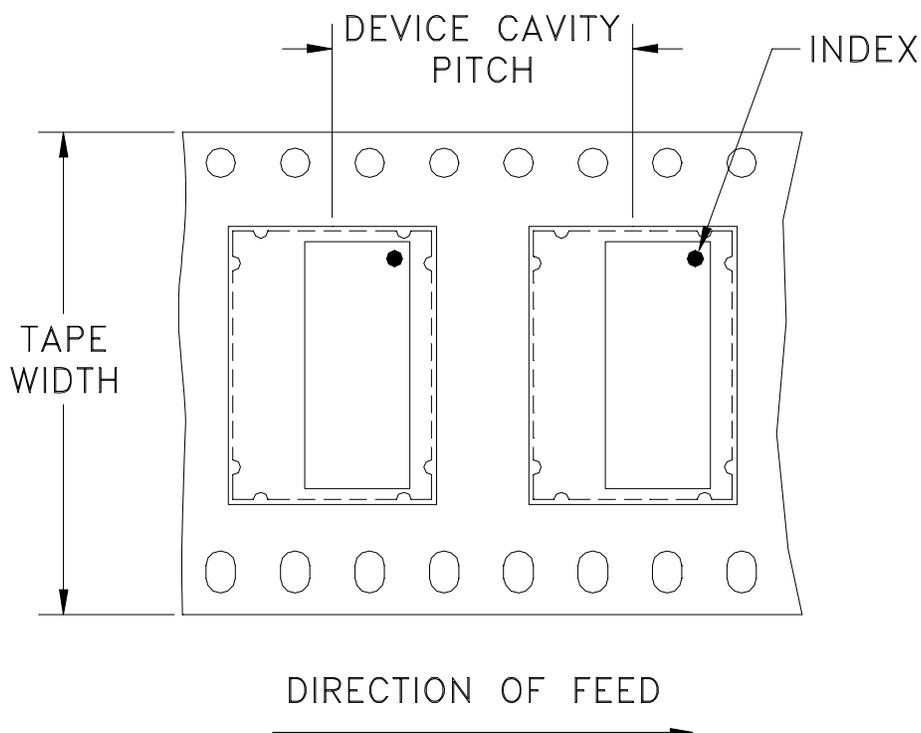


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RF/IF MICROWAVE COMPONENTS

# Tape & Reel Packaging TR-F106

## DEVICE ORIENTATION IN T&R



Tape Width, mm	Device Cavity Pitch, mm	Reel Size, inches	Devices per Reel
44	24	13	250

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](http://www.minicircuits.com/pages/pdfs/tape.pdf)

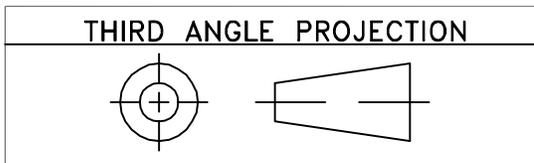


INTERNET <http://www.minicircuits.com>

P.O. Box 350166, Brooklyn, New York 11235-0003 (718) 934-4500 Fax (718) 332-4661

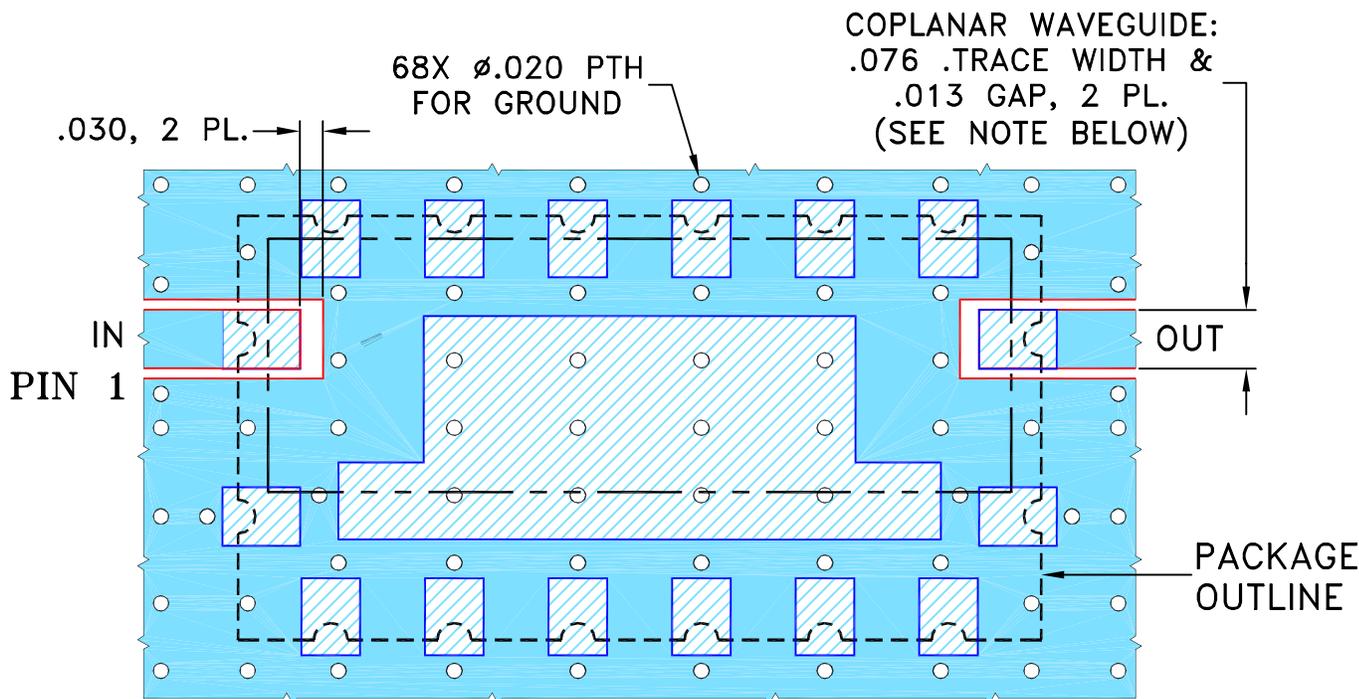
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REVISIONS					
REV OR	ECN No.	DESCRIPTION	DATE	DR	AUTH
	M126876	NEW RELEASE	04/21/10	MMG	RD

**SUGGESTED MOUNTING CONFIGURATION FOR  
KU1513/KV1514 CASE STYLE, "16FL02" PIN CODE**



- NOTE: 1. COPLANAR WAVEGUIDE PARAMETERS ARE SHOWN FOR ROGERS RO4350B WITH DIELECTRIC THICKNESS .060" ± .004"; 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 SOLDER MASK

UNLESS OTHERWISE SPECIFIED	INITIALS	DATE
DIMENSIONS ARE IN INCHES	DRAWN MMG	04/08/10
TOLERANCES ON:	CHECKED IL	04/21/10
2 PL DECIMALS ±	APPROVED RD	04/21/10
3 PL DECIMALS ± .005		
ANGLES ±		
FRACTIONS ±		

**Mini-Circuits®** 13 Neptune Avenue  
Brooklyn NY 11235

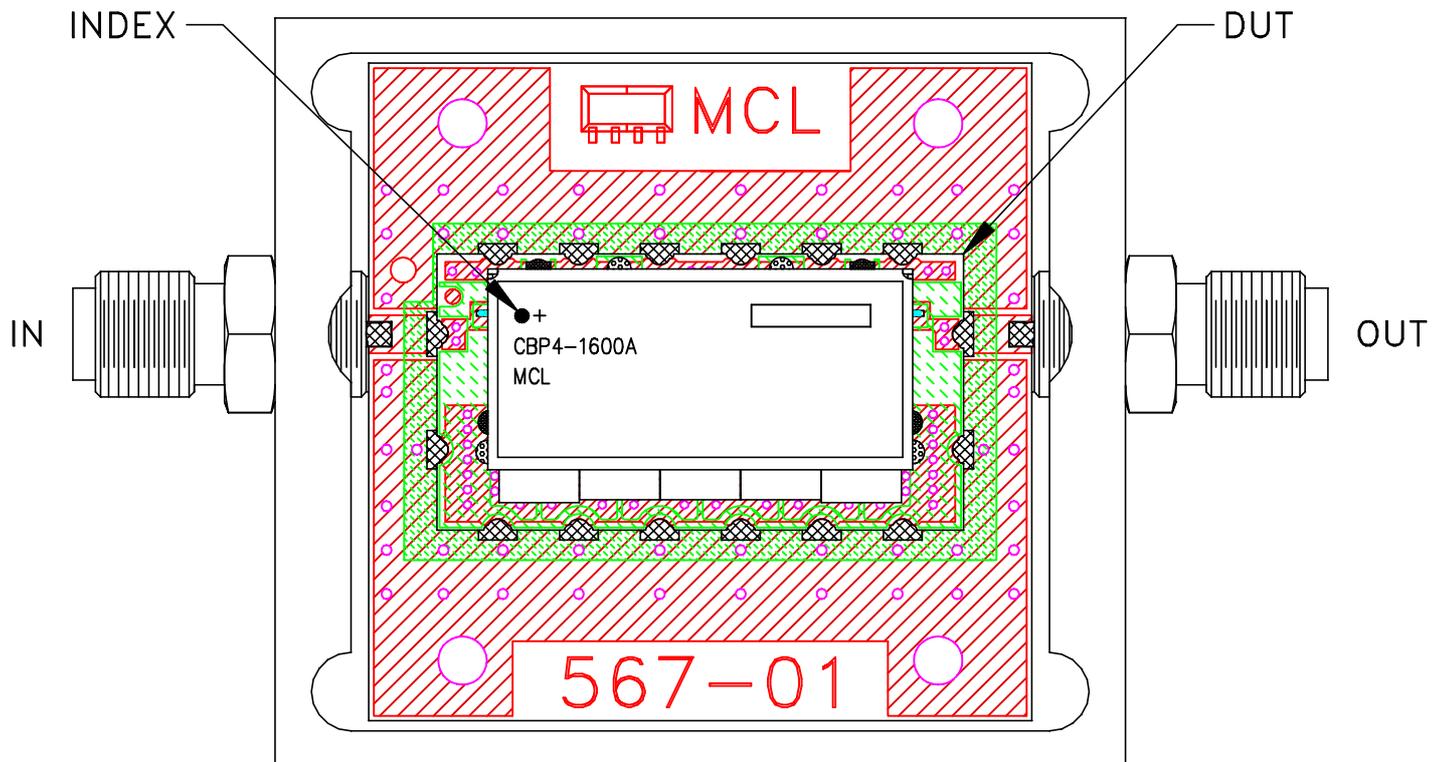
**PL, 16FL02, KU1513/KV1514, TB-578+**

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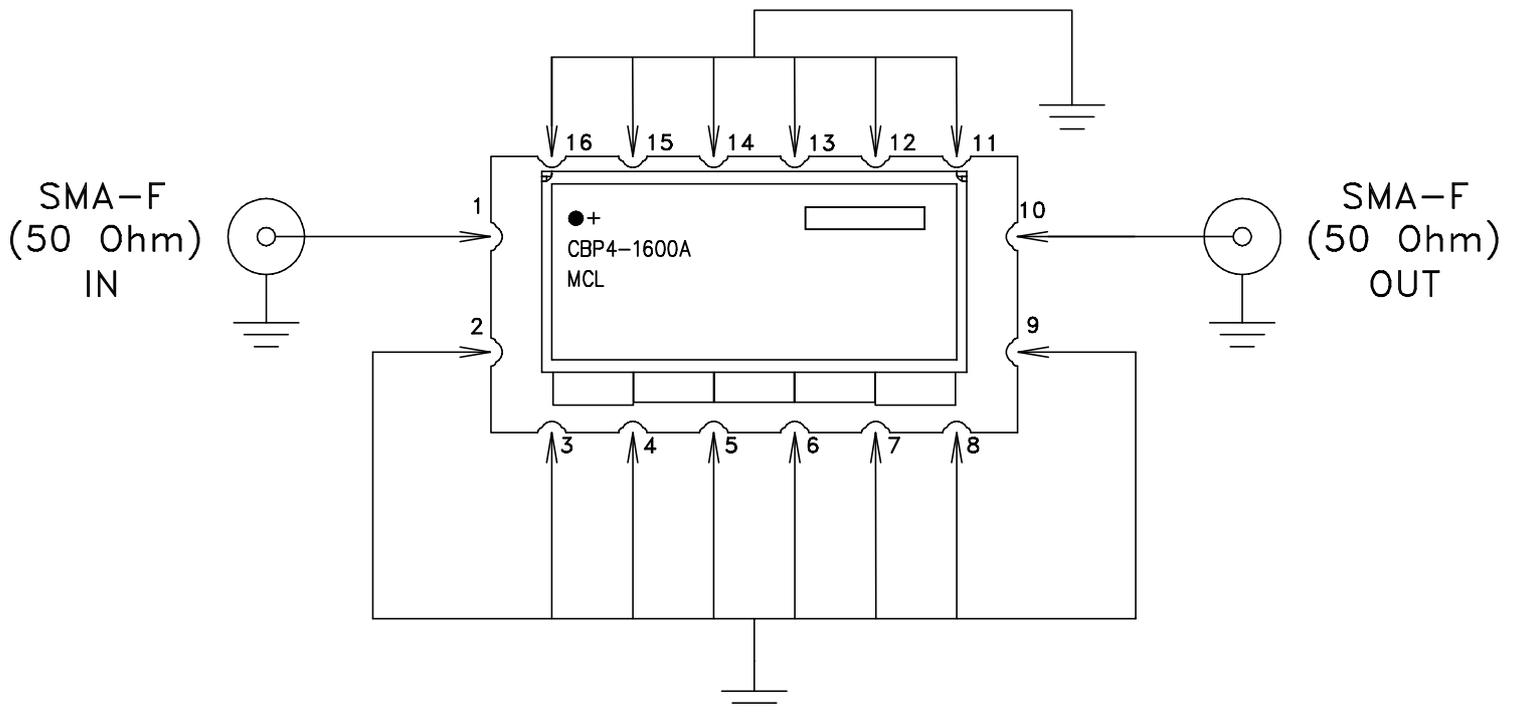
SIZE A	CODE IDENT 15542	DRAWING NO: 98-PL-331	REV: OR
FILE: 98PL331	SCALE: 4:1	SHEET: 1 OF 1	

# Evaluation Board and Circuit

TB-CBP4-1600A+



## Schematic diagram



### Notes:

1. PCB Material: ROGERS (R04350B) OR Equivalent, Dielectric Constant= $3.48 \pm 0.05$   
Dielectric Thickness:  $.060 \pm .004$  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	-40° to 85°C Ambient Environment	Individual Model Data Sheet
Storage Temperature	-55° to 100° C Ambient Environment	Individual Model Data Sheet
Humidity	90 to 95% RH, 96 hours, 40°C	MIL-STD-202, Method 103B, Condition B, Except 50°C
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°C peak	J-STD-020, 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, 4 times in each of three axes (total 12)	MIL-STD-202, Method 204, Condition D
Mechanical Shock	50g, 11 ms, 1/2-sine, 18 shocks: 3 each direction, each of 3 axes	MIL-STD-202, Method 213, Condition A