

# Surface Mount Bandpass Filter

## SYBP-1950+

50Ω 1700 to 2200 MHz



Generic photo used for illustration purposes only  
CASE STYLE: TT1423

### The Big Deal

- Small size (0.25" X 0.31" X 0.15")
- Excellent power handling, 10 W
- Low insertion loss, 1.2 dB typ.

### Product Overview

SYBP-1950+ is a 50Ω bandpass filter fabricated using SMT technology. The bandpass filter covers from 1700 to 2200 MHz offering low insertion loss and good matching within the passband. It is fabricated in a tiny housing with very good power handling capabilities.

### Key Features

Feature	Advantages
Small size (0.25" X 0.31" X 0.15")	Saves space in dense circuit board layouts.
Excellent power handling, 10 W	Supports a wide range of system power requirements.
Low insertion loss, 1.2 dB typ.	Low insertion loss enables usage in satellite transmitters.

#### Notes

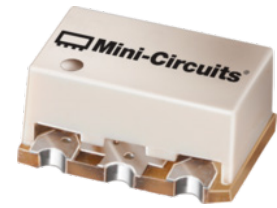
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CASE STYLE: TT1423

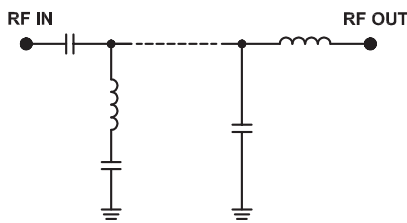
### Features

- Excellent power handling
- Small size
- Temperature stable

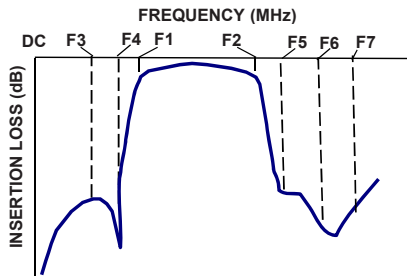
### Applications

- Military radio
- Lab use
- Satellite communication

### Functional Schematic

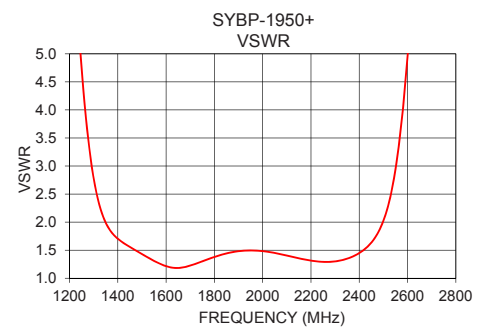
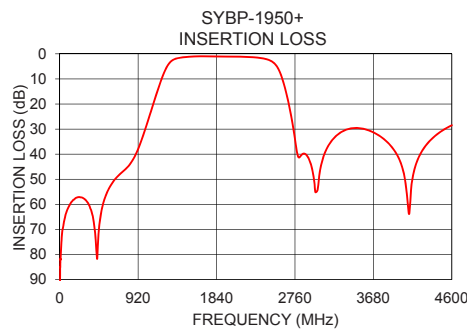
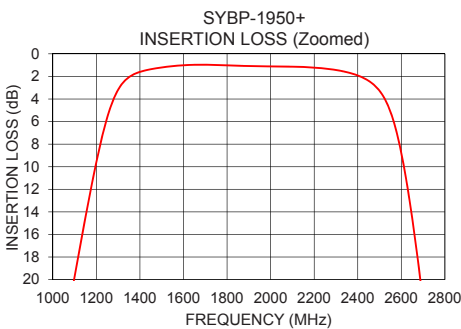


### Typical Frequency Response



**+RoHS Compliant**

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



### Electrical Specifications at 25°C

Parameter	F#	Frequency (MHz)	Min.	Typ.	Max.	Unit	
Pass Band	Center frequency	-	-	1950	-	MHz	
	Insertion Loss	F1-F2	1700 - 2200	-	1.2	2.2	dB
	VSWR	F1-F2	1700 - 2200	-	1.9	-	:1
Stop Band, Lower	Insertion Loss	DC-F3	DC - 880	30	39	-	dB
	VSWR	F3-F4	880 - 1030	20	26	-	dB
	VSWR	DC-F4	DC - 1030	-	29	-	:1
Stop Band, Upper	Insertion Loss	F5-F6	2900 - 4000	20	28	-	dB
	VSWR	F6-F7	4000 - 4600	-	20	-	dB
	VSWR	F5-F7	2900 - 4600	-	23	-	:1

### Maximum Ratings

Operating Temperature	-55°C to 100°C
Storage Temperature	-55°C to 100°C
RF Power Input*	10 W max. at 25°C

\*Passband rating, derate linearly to 3.75 W at 100°C ambient. Permanent damage may occur if any of these limits are exceeded.

### Typical Performance Data at 25°C

Frequency (MHz)	Insertion Loss (dB)	VSWR (:1)
10	81.78	386.31
100	61.33	626.21
200	57.33	686.16
250	57.20	552.76
800	45.00	64.90
880	40.90	51.78
1000	30.40	35.57
1030	27.25	31.55
1090	20.82	23.13
1300	3.18	2.39
1700	0.97	1.35
1950	1.10	1.54
2200	1.22	1.27
2490	3.04	1.50
2690	20.43	6.36
2750	31.68	8.77
2900	40.53	13.34
3000	55.15	14.52
4000	43.40	16.96
4600	28.46	26.27

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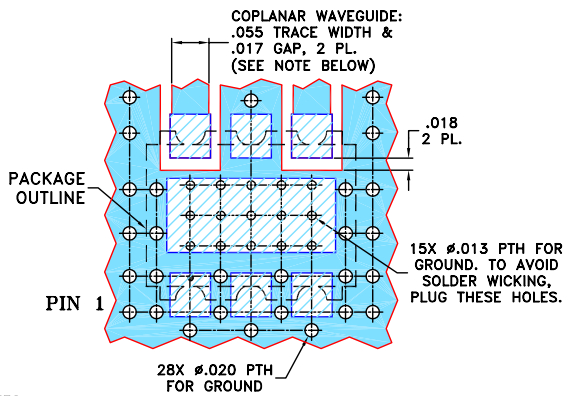
REV. OR  
M175559  
SYBP-1950+  
EDU3636  
URJ  
191114  
Page 2 of 3

**Pad Connections**

INPUT	4
OUTPUT	6
GROUND	1,2,3,5

Demo Board MCL P/N: TB-1122+  
Suggested PCB Layout (PL-308)

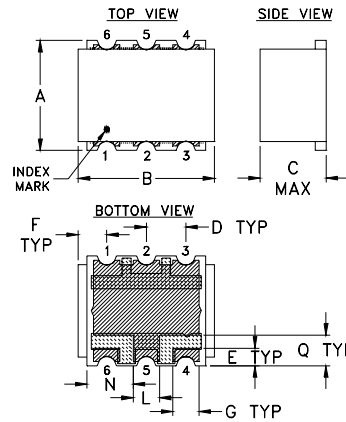
**SUGGESTED MOUNTING CONFIGURATION FOR TT1423 CASE STYLE "06FL04" PIN CONNECTION**



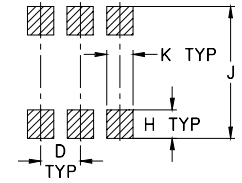
**NOTES:**

1. COPLANAR WAVEGUIDE PARAMETERS ARE SHOWN FOR ROGERS RO4350B WITH THICKNESS .030" ± .002"; 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 LAYOUT WITH SMOBC (SOLDER MASK OVER BARE COPPER)
  - DENOTES COPPER LAND PATTERN FREE OF SOLDER MASK

**Outline Drawing**



**PCB Land Pattern**



Suggested Layout, Tolerance to be within ±.002

- METALLIZATION
- SOLDER RESIST

**Outline Dimensions (inch/mm)**

A	B	C	D	E	F	G	H
.25	.31	.15	.090	.040	.065	.060	.065
6.35	7.87	3.81	2.29	1.02	1.65	1.52	1.65
J	K	L	N	Q	wt.		
.300	.060	.060	.105	.070	grams		
7.62	1.52	1.52	2.67	1.78	0.50		

Note: Please refer to case style drawing for details

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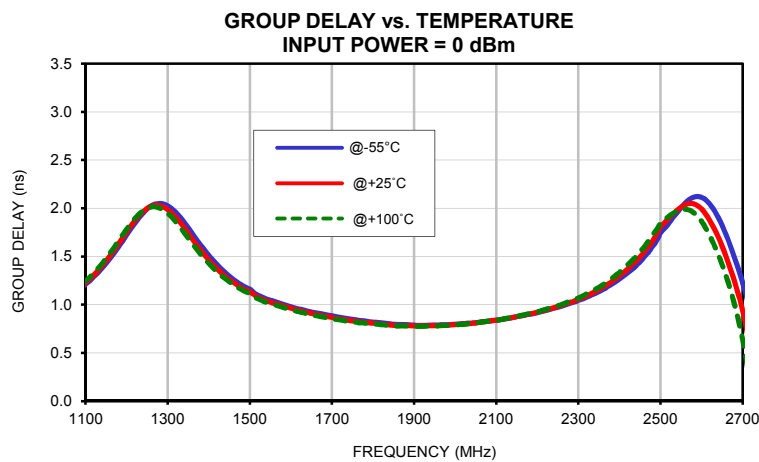
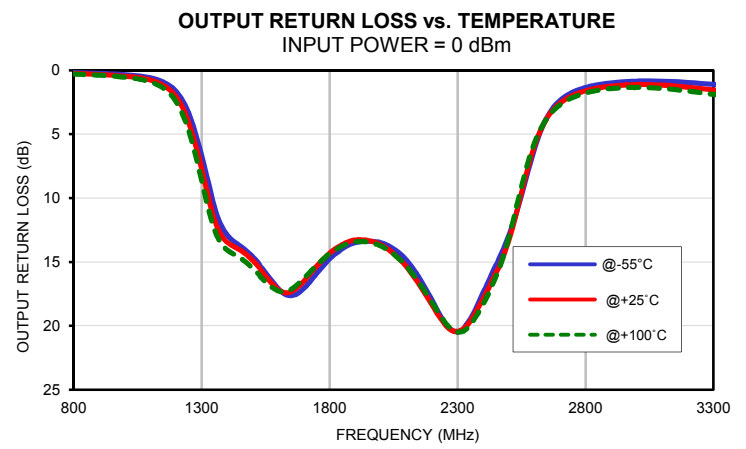
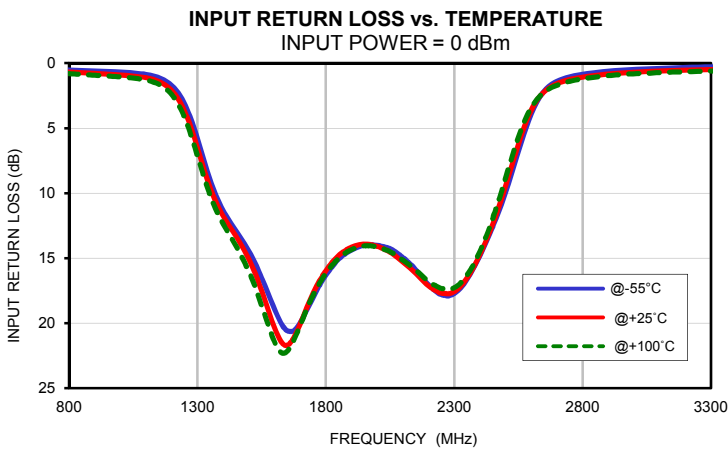
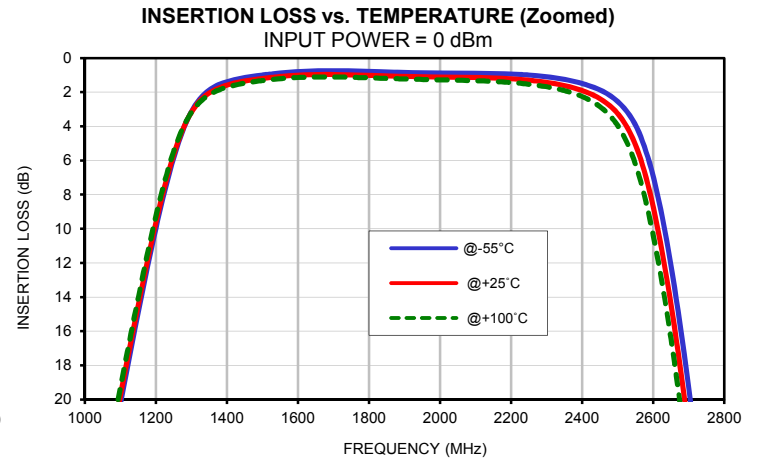
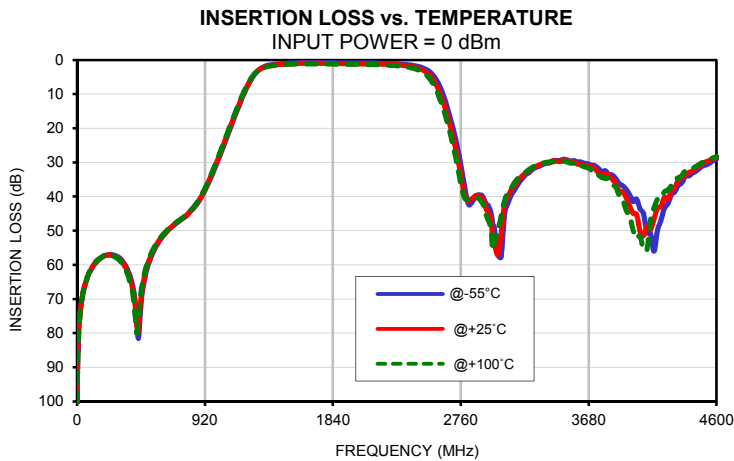
Typical Performance Data

FREQ.  (MHz)	INSERTION LOSS			INPUT RETURN LOSS			OUTPUT RETURN LOSS		
	(dB)			(dB)			(dB)		
	@-55°C	@+25°C	@+100°C	@-55°C	@+25°C	@+100°C	@-55°C	@+25°C	@+100°C
10	79.07	80.73	81.01	0.05	0.05	0.05	0.05	0.05	0.05
40	68.85	68.83	68.67	0.03	0.04	0.04	0.04	0.04	0.04
50	66.76	66.76	66.84	0.03	0.04	0.04	0.04	0.04	0.04
60	65.47	65.29	65.36	0.03	0.04	0.04	0.04	0.04	0.04
70	64.07	64.28	63.96	0.03	0.04	0.04	0.03	0.04	0.04
80	63.03	62.93	62.91	0.03	0.04	0.04	0.03	0.04	0.04
100	61.54	61.33	61.20	0.02	0.04	0.05	0.02	0.03	0.03
110	60.70	60.51	60.39	0.02	0.04	0.05	0.02	0.03	0.04
120	60.06	59.94	59.83	0.02	0.04	0.05	0.02	0.03	0.03
150	58.65	58.64	58.47	0.02	0.05	0.07	0.01	0.03	0.04
160	58.37	58.27	58.25	0.03	0.06	0.08	0.01	0.03	0.04
200	57.33	57.33	57.33	0.04	0.08	0.10	0.01	0.03	0.04
230	56.99	57.11	57.27	0.06	0.10	0.12	0.01	0.03	0.05
250	57.02	57.23	57.35	0.07	0.12	0.14	0.01	0.04	0.05
280	57.36	57.67	57.78	0.10	0.15	0.17	0.01	0.04	0.06
300	57.82	58.24	58.47	0.11	0.16	0.19	0.02	0.05	0.06
340	59.67	60.28	60.67	0.14	0.20	0.23	0.02	0.05	0.07
360	61.07	61.70	62.39	0.16	0.22	0.25	0.03	0.06	0.08
400	66.21	67.21	68.33	0.19	0.26	0.30	0.03	0.07	0.09
430	75.69	78.38	80.07	0.22	0.30	0.34	0.04	0.08	0.10
450	76.93	74.13	71.12	0.23	0.31	0.36	0.04	0.08	0.11
480	65.28	64.25	63.18	0.26	0.35	0.40	0.05	0.10	0.12
500	61.74	60.99	60.19	0.27	0.37	0.43	0.06	0.11	0.13
550	56.01	55.60	55.15	0.32	0.42	0.49	0.07	0.13	0.15
600	52.50	52.29	51.99	0.36	0.48	0.55	0.09	0.14	0.17
650	50.14	49.93	49.77	0.40	0.53	0.61	0.11	0.17	0.20
700	48.24	48.14	47.93	0.45	0.58	0.68	0.13	0.20	0.23
800	45.09	44.98	44.80	0.53	0.69	0.81	0.18	0.25	0.30
880	41.13	40.94	40.66	0.59	0.77	0.91	0.23	0.31	0.37
1000	30.79	30.39	29.97	0.68	0.90	1.06	0.35	0.46	0.55
1030	27.70	27.27	26.82	0.72	0.95	1.11	0.40	0.52	0.62
1090	21.29	20.85	20.39	0.84	1.09	1.26	0.55	0.71	0.85
1200	9.98	9.62	9.26	1.72	2.10	2.42	1.65	2.07	2.46
1300	3.13	3.17	3.18	5.82	6.52	7.13	6.69	7.74	8.62
1500	0.99	1.19	1.32	14.45	15.07	16.02	14.60	14.89	15.51
1520	0.94	1.14	1.27	15.18	15.92	16.95	15.03	15.32	15.90
1550	0.87	1.08	1.21	16.52	17.50	18.64	15.85	16.12	16.55
1600	0.79	1.00	1.14	18.90	20.32	21.42	17.11	17.17	17.27
1700	0.74	0.96	1.10	19.97	20.04	20.15	17.06	16.49	16.29
1710	0.74	0.96	1.11	19.63	19.57	19.67	16.85	16.26	16.08
1950	0.86	1.10	1.25	14.02	13.92	14.05	13.38	13.33	13.46
1750	0.75	0.98	1.13	18.05	17.70	17.86	15.89	15.31	15.23
1800	0.78	1.01	1.16	16.31	15.98	16.18	14.77	14.32	14.36
1875	0.82	1.06	1.21	14.67	14.42	14.62	13.68	13.41	13.54
1900	0.84	1.08	1.23	14.37	14.14	14.33	13.49	13.28	13.42
1950	0.86	1.10	1.25	14.02	13.92	14.05	13.38	13.33	13.46
2000	0.87	1.11	1.27	14.02	14.09	14.15	13.49	13.66	13.75
2200	0.93	1.21	1.43	17.06	17.14	16.79	18.01	18.37	18.18
2490	2.37	3.02	3.67	10.47	10.06	9.46	13.43	13.93	13.82
2600	6.93	8.72	10.38	3.89	3.61	3.42	6.22	5.96	5.72
2690	17.75	20.27	22.54	1.49	1.66	1.77	2.55	2.75	2.87
2750	28.41	31.49	34.14	1.05	1.26	1.40	1.71	1.96	2.12
2900	39.54	40.04	41.01	0.62	0.83	0.96	0.98	1.23	1.43
3000	48.86	53.48	53.37	0.48	0.69	0.82	0.85	1.12	1.35
3100	41.80	40.00	38.76	0.40	0.61	0.73	0.85	1.16	1.42
3700	30.85	31.18	32.25	0.19	0.41	0.55	1.01	1.44	1.72
4000	41.45	44.94	49.90	0.18	0.37	0.51	0.59	0.98	1.24
4200	46.96	42.94	40.56	0.19	0.39	0.49	0.49	0.84	1.12
4300	38.61	37.28	35.12	0.20	0.38	0.48	0.43	0.76	0.98
4600	29.05	28.41	28.27	0.16	0.36	0.42	0.36	0.67	0.85

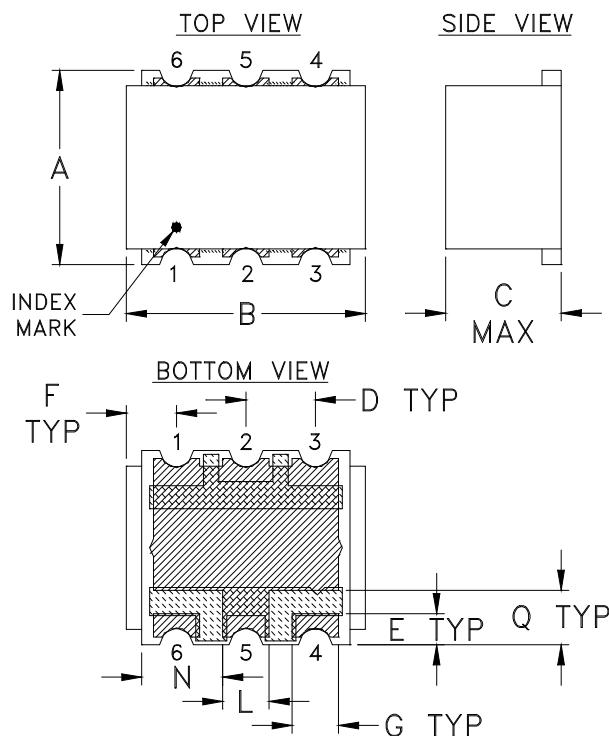
## Typical Performance Data

FREQ.  (MHz)	GROUP DELAY		
	(nsec)		
	@-55°C	@+25°C	@+100°C
1700	0.88	0.87	0.86
1710	0.87	0.86	0.85
1720	0.87	0.85	0.84
1730	0.86	0.85	0.83
1740	0.85	0.84	0.83
1750	0.85	0.83	0.82
1760	0.84	0.83	0.82
1770	0.84	0.82	0.81
1780	0.83	0.82	0.81
1790	0.82	0.81	0.80
1800	0.82	0.81	0.80
1810	0.82	0.80	0.80
1820	0.81	0.80	0.79
1830	0.81	0.79	0.79
1840	0.80	0.79	0.78
1850	0.80	0.78	0.78
1860	0.79	0.78	0.78
1870	0.80	0.78	0.78
1880	0.79	0.78	0.78
1890	0.79	0.78	0.78
1900	0.79	0.78	0.78
1910	0.79	0.78	0.78
1920	0.79	0.78	0.78
1930	0.79	0.78	0.78
1940	0.79	0.78	0.78
1950	0.79	0.78	0.78
1960	0.79	0.78	0.78
1970	0.79	0.79	0.78
1980	0.79	0.79	0.79
1990	0.79	0.79	0.79
2000	0.80	0.79	0.79
2010	0.80	0.79	0.79
2020	0.80	0.80	0.80
2030	0.81	0.80	0.80
2040	0.81	0.81	0.81
2050	0.81	0.81	0.81
2060	0.82	0.82	0.82
2070	0.82	0.82	0.82
2080	0.83	0.83	0.83
2100	0.84	0.84	0.84
2200	0.92	0.92	0.93

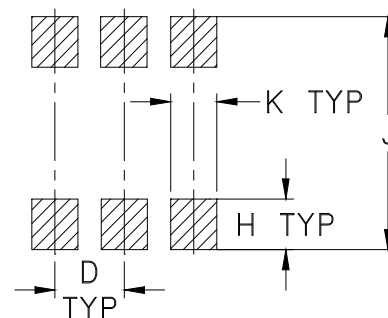
## Typical Performance Curves





### Outline Dimensions



### PCB Land Pattern



Suggested Layout,  
Tolerance to be within  $\pm .002$

 METALLIZATION  
 SOLDER RESIST

CASE #	A	B	C	D	E	F	G	H	J	K	L	M
TT1423	.25 (6.35)	.31 (7.87)	.15 (3.81)	.090 (2.29)	.040 (1.02)	.065 (1.65)	.060 (1.52)	.065 (1.65)	.300 (7.62)	.060 (1.52)	.060 (1.52)	- -

CASE #	N	P	Q	WT. GRAM
TT1423	.105 (2.67)	- -	.070 (1.78)	.50

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

### Notes:

- Case material: Plastic.
- Terminations: 2-10  $\mu$  inch (.05-.25 microns) Gold over 100-300  $\mu$  inch (2.54-7.62 microns) Nickel plate.



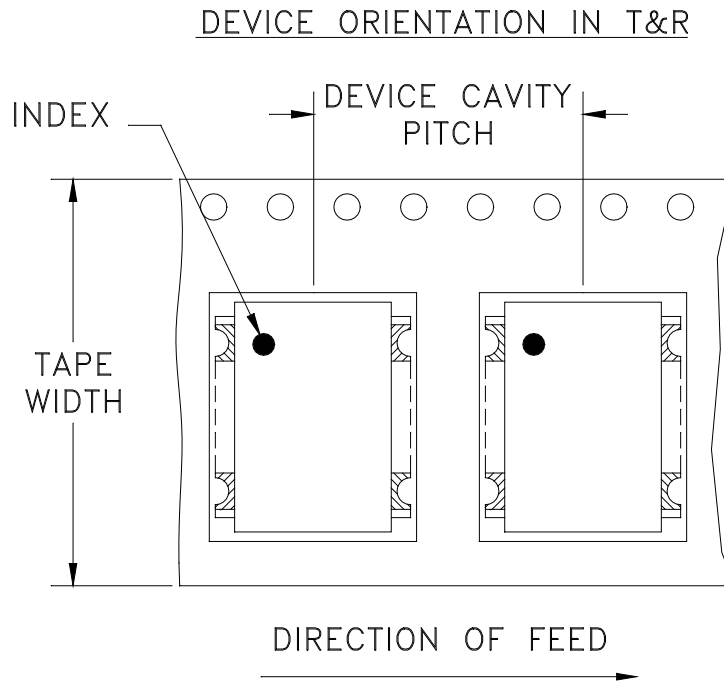
P.O. Box 350166, Brooklyn, New York 11235-0003 (718) 934-4500 Fax (718) 332-4661 For detailed performance specs & shopping online see Mini-Circuits web site



The Design Engineers Search Engine Provides ACTUAL Data Instantly From MINI-CIRCUITS At: [www.minicircuits.com](http://www.minicircuits.com)

RF/IF MICROWAVE COMPONENTS

# Tape & Reel Packaging TR-F2



Tape Width, mm	Device Cavity Pitch, mm	Reel Size, inches	Devices per Reel See note
16	12	7	10
			20
			50
			100
			200
		13	500
			1000

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>

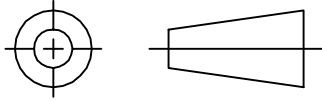
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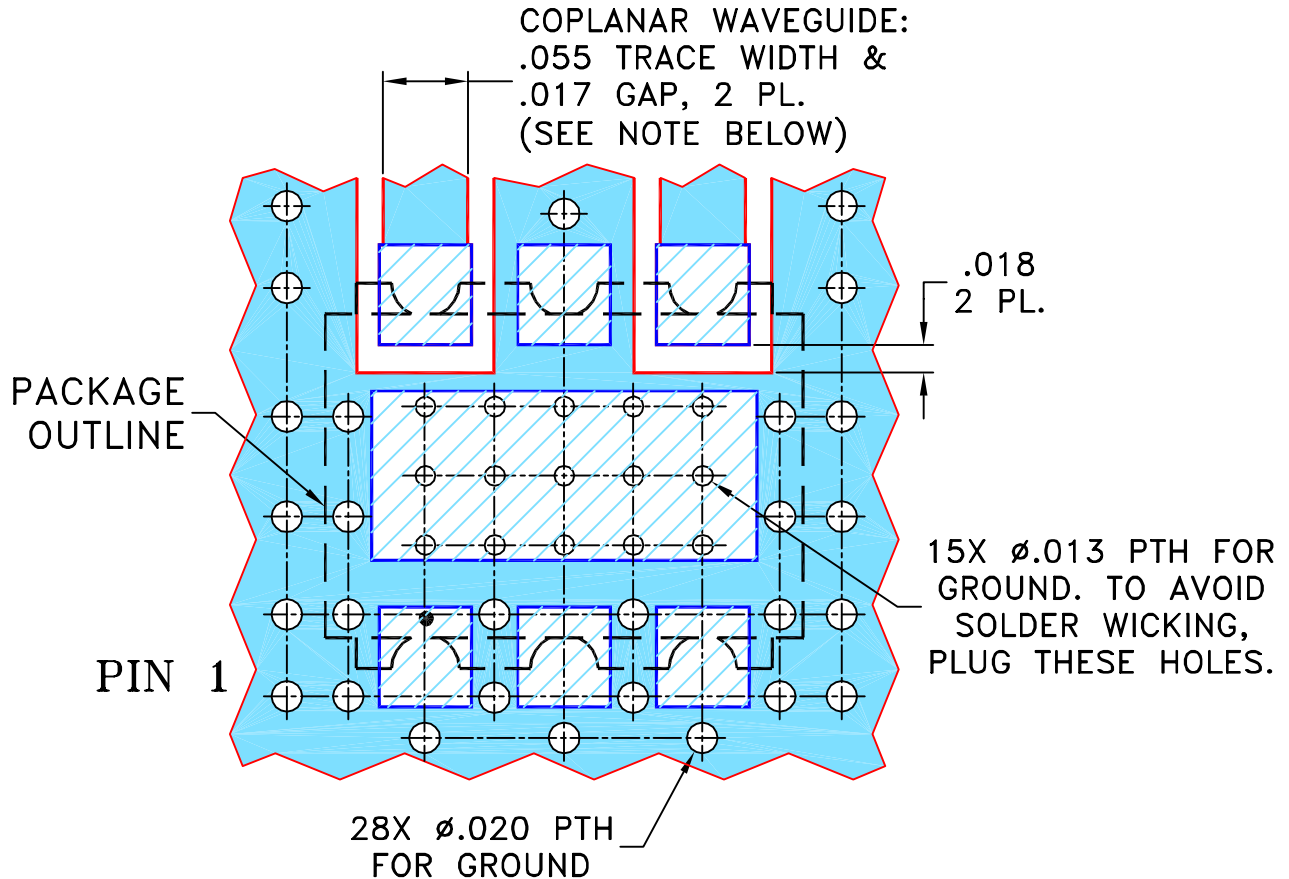
THIRD ANGLE PROJECTION



REVISIONS

REV	ECN No.	DESCRIPTION	DATE	DR	AUTH
OR	M123346	NEW RELEASE	07/10/09	AV	DY

**SUGGESTED MOUNTING CONFIGURATION  
FOR TT1423 CASE STYLE "06FL04" PIN CONNECTION**



**NOTES:**

1. COPLANAR WAVEGUIDE PARAMETERS ARE SHOWN FOR ROGERS RO4350B WITH THICKNESS .030" ± .002"; 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 LAYOUT WITH SMOBC (SOLDER MASK OVER BARE COPPER)



DENOTES COPPER LAND PATTERN FREE OF SOLDER MASK

UNLESS OTHERWISE SPECIFIED	INITIALS	DATE
DRAWN	AV	06/22/09
CHECKED	IL	07/10/09
APPROVED	DY	07/10/09

DIMENSIONS ARE IN INCHES  
TOLERANCES ON:  
2 PL DECIMALS ±  
3 PL DECIMALS ± .005  
ANGLES ±  
FRACTIONS ±

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PL, 06FL04, TT1423, SYBP, TB-517+

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SIZE A	CODE IDENT 15542	DRAWING NO: 98-PL-308	REV: OR
FILE: 98PL308	SCALE: 8:1	SHEET: 1 OF 1	

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, 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 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, 95% Coverage
Vibration (High Frequency)	20g peak, 10-2000 Hz, 12 times in each of three perpendicular directions (total 36)	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
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