

# Bandpass Filter

50Ω 260 to 310 MHz

## RBP-280+



Generic photo used for illustration purposes only  
CASE STYLE: GP731

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

Available Tape and Reel at no extra cost		
Reel Size	Devices/Reel	
7"	10, 20, 50, 100, 200	
13"	500, 1000	

### Maximum Ratings

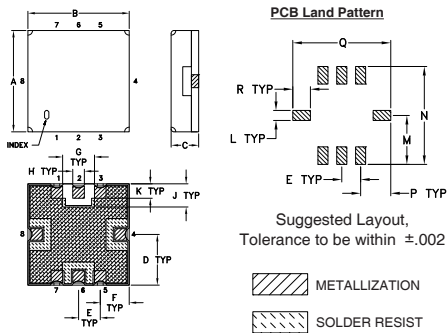
Operating Temperature	-40°C to 85°C
Storage Temperature	-55°C to 100°C
RF Power Input	0.5W at 25°C

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

### Pin Connections

RF IN	2
RF OUT	6
GROUND	1,3,4,5,7,8

### Outline Drawing

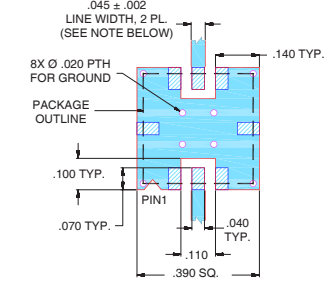


### Outline Dimensions (inch/mm)

A	B	C	D	E	F	G	H	J
.350	.350	.100	.175	.075	.100	.110	.040	.080
8.89	8.89	2.54	4.45	1.91	2.54	2.79	1.02	2.03
K	L	M	N	P	Q	R	wt	
.050	.040	.195	.390	.120	.390	.070	grams	
1.27	1.02	4.95	9.91	3.05	9.91	1.78	0.25	

Note: Please refer to case style drawing for details

### Demo Board MCL P/N: TB-332 Suggested PCB Layout (PL-176)



- TRACE WIDTH IS SHOWN FOR FR4 WITH DIELECTRIC THICKNESS .025 ± .002; COPPER: 1/2 OZ. EACH SIDE. FOR OTHER MATERIALS TRACE WIDTH MAY NEED TO BE MODIFIED.
  - 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

### Features

- linear phase, up to ±6deg typ. @ Fc ±30MHz
- good VSWR, 1.6:1 typ. @ passband
- small size 0.35" x 0.35"
- shielded case
- aqueous washable

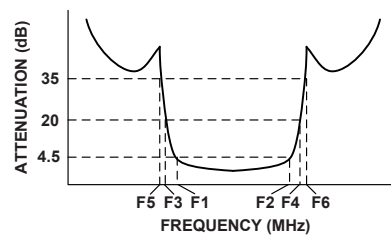
### Applications

- harmonic rejection
- transmitters / receivers
- military radio

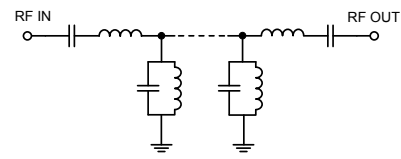
### Bandpass Filter Electrical Specifications (T<sub>AMB</sub> = 25°C)

CENTER FREQ. (MHz)	PASSBAND (MHz) (Loss < 4.5dB)	STOPBANDS (MHz)				MAXIMUM DEVIATION FROM LINEAR PHASE (deg.)	VSWR (:1)		
		Loss > 20dB	Loss > 35dB	F3	F4		F5	F6	Passband
Fc	F1 - F2	F3	F4	F5	F6	Fc ± 30MHz	Typ.	Max.	Typ.
280	260 - 310	205	375	185	420 - 2000	±12	1.6	2.4	30

### Typical Frequency Response

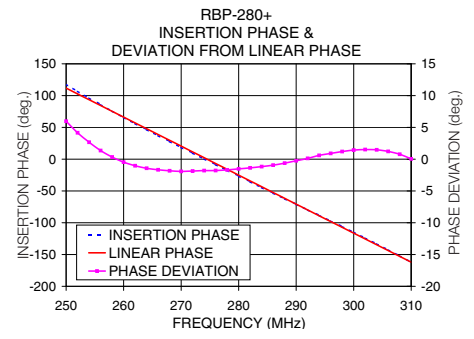
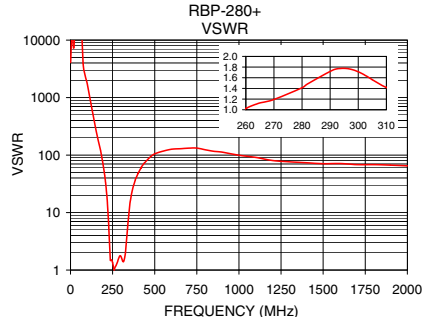


### Functional Schematic



### Typical Performance Data at 25°C

Frequency (MHz)	Insertion Loss (dB)	VSWR (:1)	Frequency (MHz)	Deviation from Linear Phase (deg.)
0.5	77.98	4076.40	250.0	5.97
185.0	46.30	93.42	254.0	2.66
205.0	31.89	39.49	258.0	0.33
217.0	21.40	17.82	262.0	-1.03
228.0	10.22	4.89	266.0	-1.67
236.0	4.64	1.55	270.0	-1.92
260.0	2.56	1.03	274.0	-1.80
280.0	2.55	1.41	278.0	-1.69
295.0	2.95	1.78	282.0	-1.37
300.0	3.03	1.71	286.0	-0.94
310.0	3.16	1.42	290.0	-0.25
326.0	4.48	1.98	294.0	0.59
339.0	10.05	5.53	298.0	1.20
355.0	20.78	15.92	300.0	1.43
375.0	31.30	29.96	302.0	1.51
420.0	46.22	59.81	306.0	1.22
1000.0	74.26	99.25	308.0	0.77
2000.0	60.49	65.03	310.0	0.04



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.  
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# Metal Shield Band Pass Filter

# RBP-280+

## Typical Performance Data

FREQ. (MHz)	INSERTION LOSS (dB)			INPUT RETURN LOSS (dB)			OUTPUT RETURN LOSS (dB)		
	@ -40° C	@ +25° C	@ +85° C	@ -40° C	@ +25° C	@ +85° C	@ -40° C	@ +25° C	@ +85° C
1	103.23	90.18	98.52	0.00	0.00	0.00	0.00	0.00	0.00
50	92.29	92.06	87.14	0.01	0.01	0.02	0.00	0.01	0.01
100	89.45	89.64	91.89	0.00	0.04	0.06	0.01	0.03	0.05
150	68.73	68.96	69.09	0.04	0.09	0.11	0.05	0.09	0.10
160	63.02	62.11	61.50	0.06	0.12	0.14	0.07	0.10	0.13
170	56.04	56.01	55.60	0.07	0.14	0.17	0.09	0.13	0.17
185	46.78	46.54	46.13	0.15	0.22	0.27	0.15	0.21	0.26
200	36.29	35.88	35.48	0.27	0.37	0.44	0.30	0.39	0.46
205	32.38	31.96	31.52	0.35	0.46	0.54	0.39	0.51	0.60
220	18.85	18.32	17.77	0.97	1.23	1.45	1.19	1.51	1.81
228	10.28	9.94	9.58	2.76	3.43	4.01	3.60	4.63	5.64
230	8.28	8.08	7.88	3.89	4.72	5.42	5.26	6.74	8.18
236	4.31	4.70	4.95	9.49	9.56	9.49	20.38	19.01	16.68
240	3.53	4.01	4.34	10.33	9.96	9.77	14.18	12.70	11.88
250	2.75	3.16	3.45	12.77	13.33	13.85	12.10	12.38	12.68
260	2.25	2.65	2.94	28.23	30.60	32.64	18.75	18.83	19.09
280	2.20	2.65	3.00	16.34	15.27	14.47	17.04	16.01	15.05
300	2.68	3.17	3.53	11.56	11.59	11.60	10.60	10.51	10.42
310	2.76	3.29	3.71	15.13	15.29	15.49	13.10	13.31	13.57
326	4.27	5.24	6.03	10.56	9.84	9.30	13.68	12.63	11.74
340	11.94	13.14	14.11	2.61	2.77	2.82	2.71	2.83	2.87
350	18.95	19.94	20.78	1.31	1.50	1.62	1.27	1.44	1.53
360	25.08	25.91	26.60	0.83	1.02	1.12	0.79	0.93	1.02
375	32.64	33.30	33.83	0.52	0.67	0.76	0.48	0.61	0.67
390	38.56	39.06	39.55	0.37	0.52	0.60	0.35	0.47	0.53
400	41.73	42.25	42.69	0.32	0.46	0.53	0.30	0.40	0.46
420	47.24	47.61	48.10	0.24	0.37	0.44	0.22	0.33	0.38
500	60.23	60.91	60.44	0.12	0.25	0.32	0.10	0.21	0.26
600	70.02	70.27	73.25	0.09	0.23	0.30	0.07	0.19	0.24
700	78.22	79.21	79.29	0.08	0.24	0.31	0.06	0.21	0.26
800	81.46	81.29	102.73	0.08	0.25	0.35	0.06	0.21	0.27
900	82.91	78.87	78.19	0.09	0.27	0.36	0.06	0.23	0.29
1000	76.46	78.10	77.34	0.10	0.29	0.39	0.06	0.25	0.32
1200	75.35	74.04	76.24	0.11	0.33	0.44	0.06	0.28	0.37
1300	73.96	75.35	75.23	0.12	0.35	0.46	0.07	0.32	0.40
1400	72.64	72.34	72.98	0.14	0.37	0.48	0.08	0.32	0.43
1500	86.19	77.83	78.79	0.15	0.38	0.51	0.09	0.35	0.45
1600	79.90	73.82	76.05	0.17	0.41	0.54	0.08	0.35	0.47
1800	70.85	76.16	73.81	0.16	0.42	0.56	0.13	0.39	0.52
2000	55.95	63.83	58.55	0.17	0.42	0.57	0.16	0.41	0.57
2200	62.18	62.53	58.64	0.15	0.42	0.59	0.17	0.43	0.60
2300	58.34	65.91	64.99	0.13	0.43	0.59	0.18	0.46	0.63
2400	60.98	56.85	60.41	0.11	0.44	0.61	0.20	0.47	0.66
2500	55.05	54.88	54.08	0.13	0.44	0.60	0.21	0.46	0.69
2600	49.88	56.31	50.35	0.13	0.45	0.63	0.23	0.49	0.73
2800	44.59	49.65	47.41	0.14	0.44	0.65	0.26	0.53	0.77
3000	46.34	46.52	44.91	0.11	0.42	0.67	0.22	0.53	0.77
3200	44.62	43.97	45.93	0.16	0.50	0.73	0.25	0.62	0.89
3300	44.28	42.88	41.26	0.11	0.49	0.75	0.27	0.62	0.87
3400	40.59	39.27	39.65	0.10	0.49	0.75	0.20	0.61	0.86
3500	41.60	40.67	38.97	0.14	0.52	0.80	0.20	0.63	0.91
3600	39.91	40.05	38.71	0.12	0.52	0.80	0.27	0.73	0.97
3800	37.04	36.50	36.28	0.15	0.60	0.91	0.48	1.27	1.62
4000	33.34	32.73	32.90	0.23	0.68	1.08	1.34	1.43	1.60

REV. X2  
RBP-280+  
101011  
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# Metal Shield Band Pass Filter

# RBP-280+

## Typical Performance Data

FREQ. (MHz)	GROUP DELAY (nsec)		
	@ -40° C	@ +25° C	@ +85° C
260	14.34	14.22	14.15
262	14.08	13.98	13.91
264	13.80	13.73	13.68
266	13.60	13.54	13.50
268	13.41	13.35	13.34
270	13.22	13.18	13.16
272	13.07	13.05	13.03
274	12.96	12.96	12.93
276	12.85	12.81	12.78
278	12.73	12.70	12.65
280	12.63	12.59	12.55
282	12.53	12.46	12.42
284	12.41	12.34	12.29
286	12.31	12.26	12.22
288	12.22	12.14	12.11
290	12.16	12.11	12.08
292	12.09	12.06	12.05
294	12.08	12.07	12.07
296	12.10	12.10	12.12
298	12.17	12.22	12.26
300	12.28	12.35	12.43
310	13.64	13.82	13.98
320	16.24	16.39	16.53
330	17.96	17.33	16.80
340	12.88	12.16	11.53
350	7.57	7.31	7.13
360	4.96	4.84	4.73
370	3.37	3.37	3.28
375	2.91	2.89	2.88
380	2.46	2.50	2.43
385	2.20	2.16	2.19
390	2.01	2.00	1.99
395	1.88	1.84	1.91
400	1.77	1.72	1.67
405	1.67	1.71	1.75
410	1.70	1.63	1.63
415	1.39	1.35	1.42
420	1.23	1.46	1.38
425	1.25	1.10	1.48
430	0.98	1.07	1.08
440	0.76	0.99	0.80
450	0.96	0.83	0.70
455	0.70	0.59	0.78
460	0.89	0.80	0.76
470	1.03	0.98	1.03
475	0.52	1.20	0.93
480	0.98	0.85	1.00
490	1.04	0.20	0.93
495	0.11	0.24	0.00
500	0.42	0.09	0.40
510	0.68	0.04	0.71
515	0.37	1.01	0.07
520	0.91	0.96	1.29
530	0.12	0.15	0.02

REV. X2  
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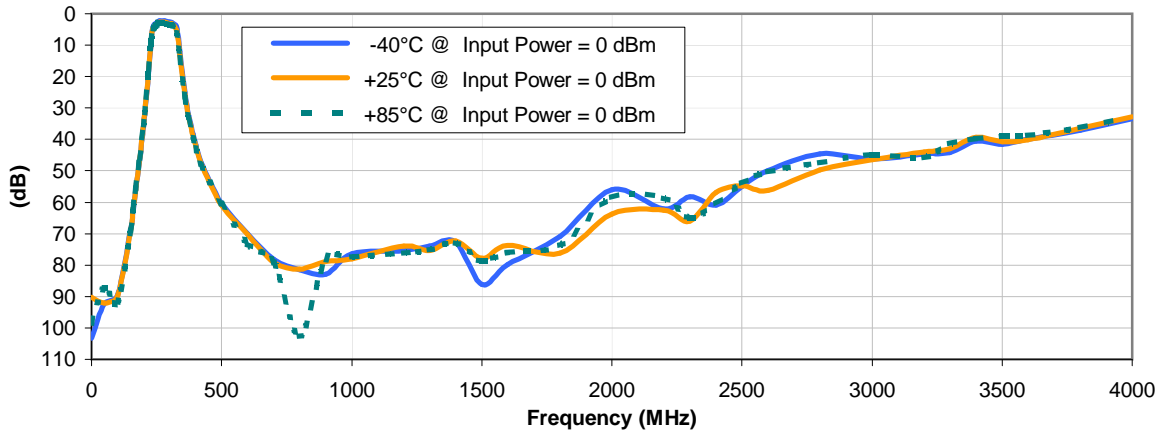


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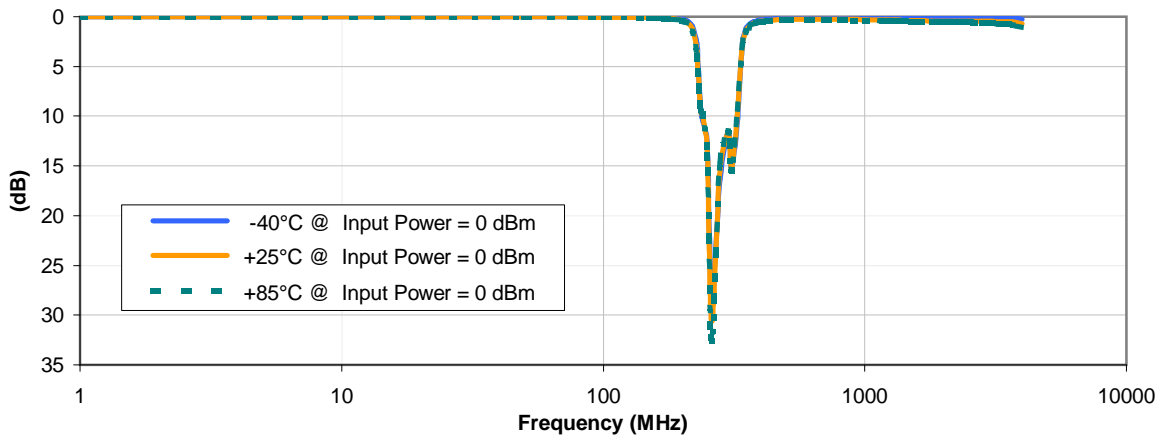


## Typical Performance Curves

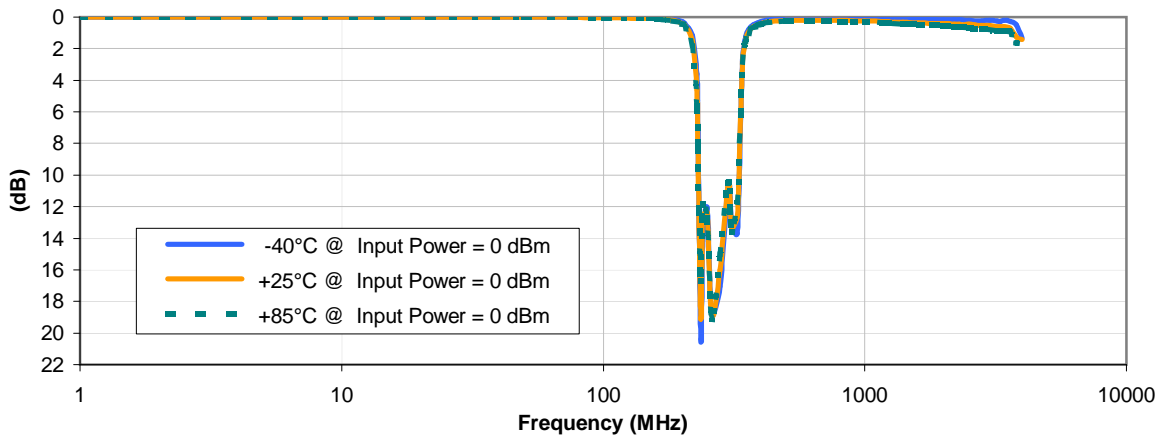
### INSERTION LOSS vs. TEMPERATURE



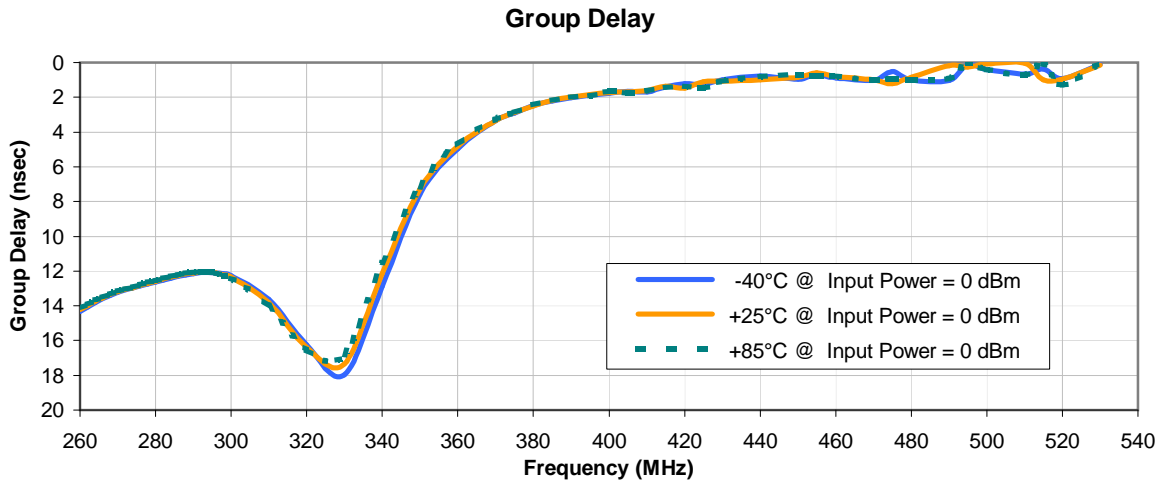
### INPUT RETURN LOSS vs. TEMPERATURE



### OUTPUT RETURN LOSS vs. TEMPERATURE

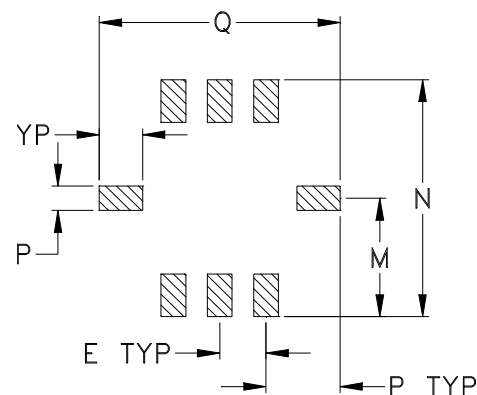
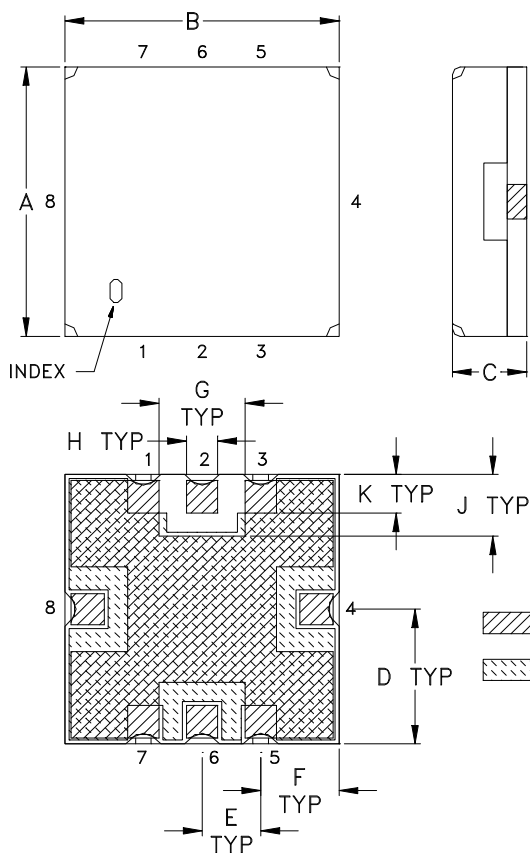


## Typical Performance Curves



## Outline Dimensions

## GP731



CASE #	A	B	C	D	E	F	G	H	J	K	L	M
GP731	.350 (8.89)	.350 (8.89)	.100 (2.54)	.175 (4.45)	.075 (1.91)	.100 (2.54)	.110 (2.79)	.040 (1.02)	.080 (2.03)	.050 (1.27)	.040 (1.02)	.195 (4.95)

CASE #	N	P	Q	R	WT. GRAM
GP731	.390 (9.91)	.120 (3.05)	.390 (9.91)	.070 (1.78)	.4 +0.3 -0.0

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

### Notes:

- Case material: Nickel-Silver alloy.
- Base: Printed wiring laminate.
- Termination finish:

For RoHS Case Styles: 3-5  $\mu$  inch (.08-.13 microns) Gold over 120-240  $\mu$  inch (3.05-6.10 microns) Nickel plate.  
 For RoHS-5 Case Styles: Tin-Lead plate.



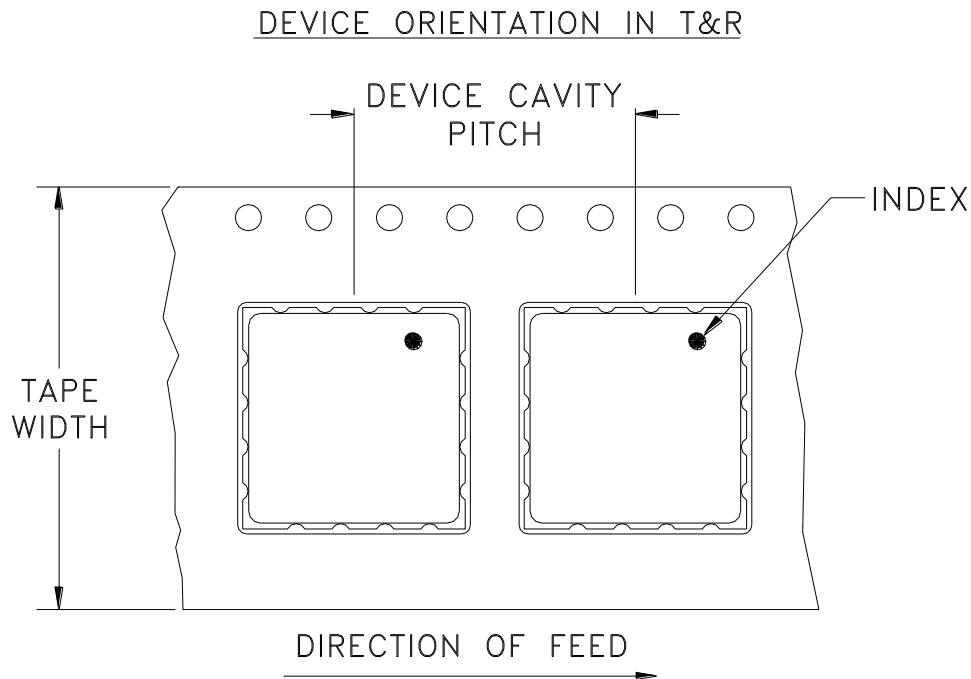
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RF/IF MICROWAVE COMPONENTS

# Tape & Reel Packaging TR-F78



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

Note: Please consult individual model data sheet to determine device per reel availability.

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.

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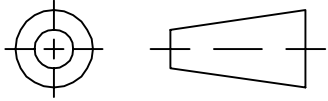
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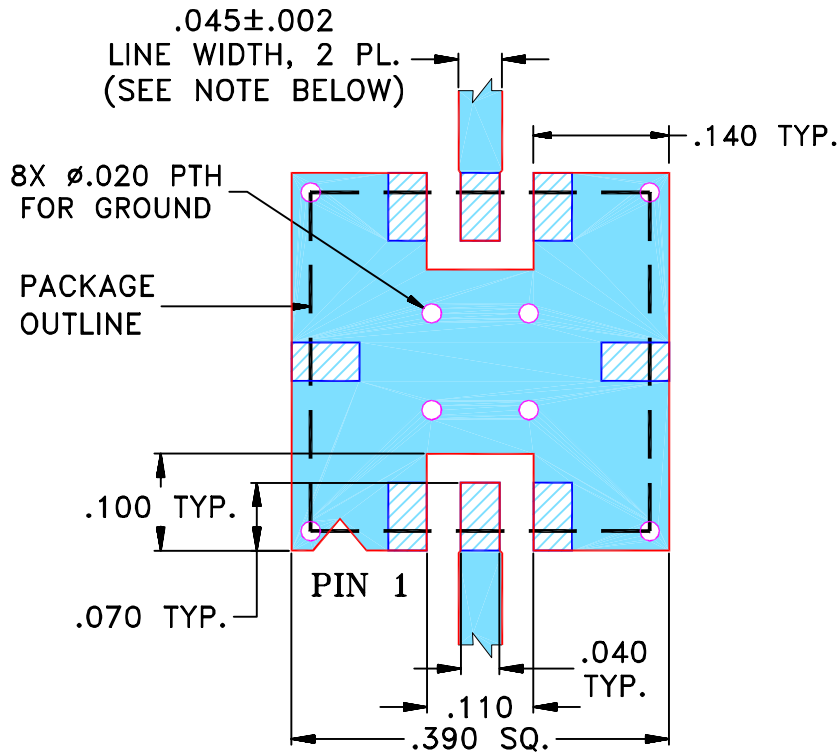
THIRD ANGLE PROJECTION



REVISIONS

REV	ECN No.	DESCRIPTION	DATE	DR	AUTH
OR	R59289	NEW RELEASE (FROM RAVON)	02/05	DK	HH
A	M101151	ADDED "RBP" & CORRECTED PIN CONNECTION TO DESCRIPTION OF PL-DWG.	10/10/05	MMG	DJ
B	M102713	UPDATED NOTES, ADDED "...WITH SMOBC"	01/20/06	GT	IL

**SUGGESTED MOUNTING CONFIGURATION  
FOR GP731 CASE STYLE, "qf" PIN CONNECTION.**



- NOTES:**
- TRACE WIDTH IS SHOWN FOR FR4 WITH DIELECTRIC THICKNESS .025" ± .002"; COPPER: 1/2 OZ. EACH SIDE. FOR OTHER MATERIALS TRACE WIDTH MAY NEED TO BE MODIFIED.
  - 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 DK (RAVON)	10 FEB 05
TOLERANCES ON:	CHECKED RZ (RAVON)	10 FEB 05
2 PL DECIMALS ±	APPROVED HH (RAVON)	10 FEB 05
3 PL DECIMALS ± .005		
ANGLES ±		
FRACTIONS ±		



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**PL, qf, GP731, RBP, TB-332**

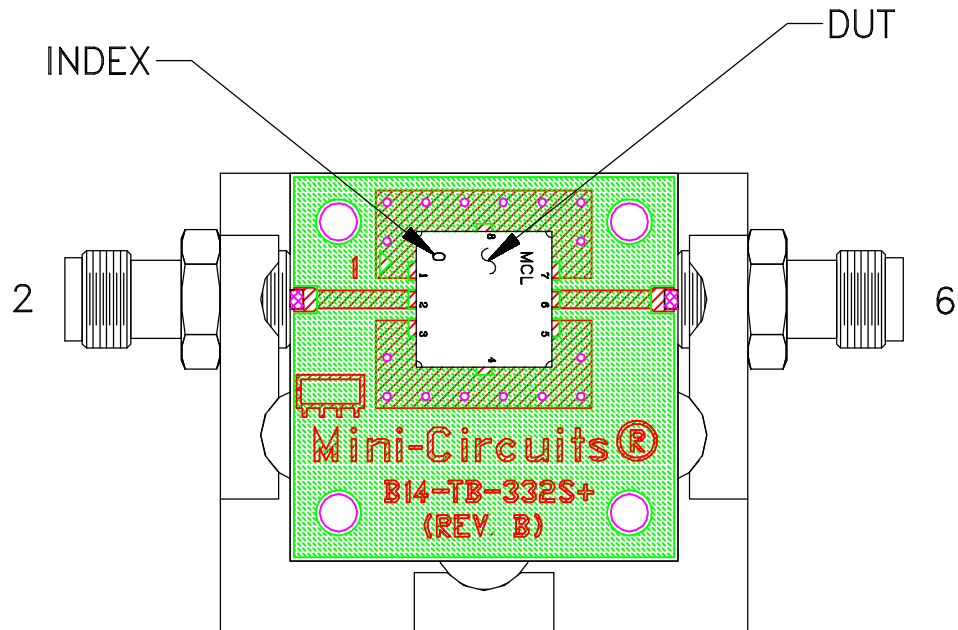
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ASHEETA1.DWG REV:A DATE:01/12/95

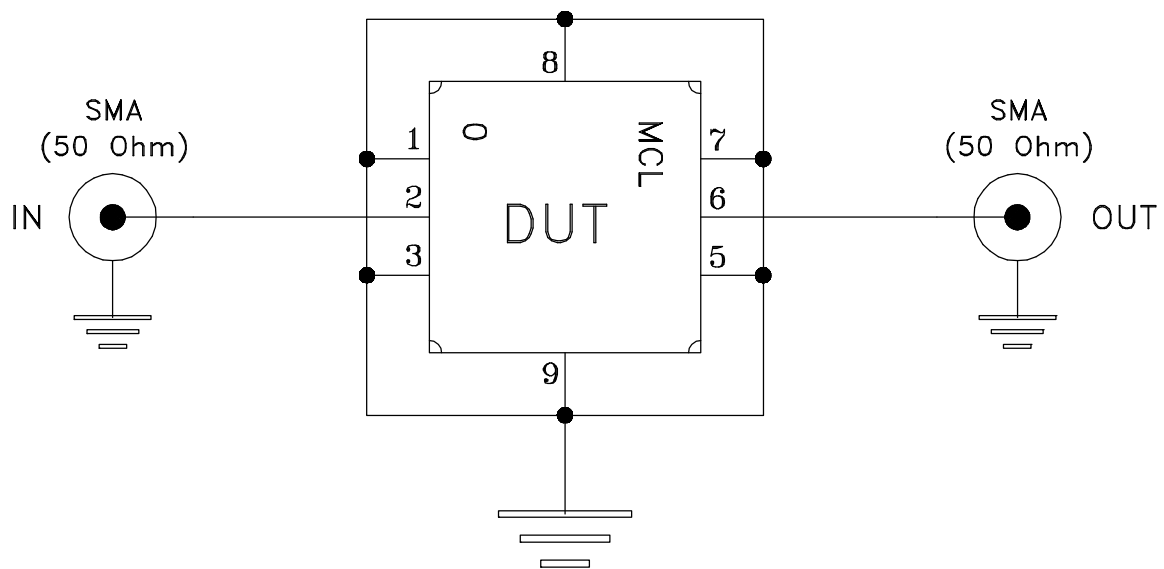
SIZE	CODE IDENT	DRAWING NO:	REV:
A	15542	98-PL-176	B
FILE:	98PL176	SCALE: 5:1	SHEET: 1 OF 1



# Evaluation Board and Circuit




TB-332



Schematic Diagram

## Notes:

1. 50 Ohm SMA Female connectors.
2. PCB Material: R04350 or equivalent,  
Dielectric Constant=3.5, Thickness=.020 inch.

 **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
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
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, 20-2000 Hz, 4 times in each of three axes (total 12)	MIL-STD-883, Method 2007.3, Condition A
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