CERAMIC RESONATOR SURFACE MOUNT

Bandpass Filter

CBP4-3180AG+

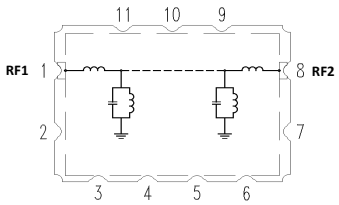
50Ω 3126 to 3234 MHz

THE BIG DEAL

- Low Insertion Loss, 1.5 dB Typ.
- High Rejection, 70 dB Typ.
- Fractional Bandwidth from <1 to 25%
- Power Handling: 10 Watts
- Compact Size, 19.05 x 14 mm

Generic photo used for illustration purposes only

FUNCTIONAL DIAGRAM



APPLICATIONS

- Aerospace and Defense
  - S-band Radar
- Satellite
  - S-band Communication Systems

PRODUCT OVERVIEW

All our Surface Mount 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.

KEY FEATURES

Features	Advantages
Low Insertion Loss, 1.5 dB Typ.	Low signal loss results in better SNR in signal chain.
Fast roll-off (98%, 0.29dB/MHz at 20dB point)	Higher selectivity results in better adjacent channel rejection and dynamic range.
Excellent power handling, 10W	Well suited for transmitter applications.
Rugged Construction	These filter assemblies have been qualified over a wide range of thermal, mechanical and environmental conditions including withstanding the stress of extensive solder reflow cycles.
Small Size, 19.05 x 14 mm	Very well suited for high performance applications where size is a constraint.

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ELECTRICAL SPECIFICATIONS[1] AT +25°C

Parameter		F#	Frequency (MHz)	Min.	Typ.	Max.	Units
Passband	Center Frequency	—	—	—	3180	—	MHz
	Insertion Loss	F1-F2	3126 - 3234	—	1.5	2.2	dB
	Return Loss	F1-F2	3126 - 3234	10	15	—	dB
Stop Band, Lower	Rejection	DC-F3	DC - 2600	55	70	—	dB
		F3-F4	2600 - 2990	20	30	—	
Stop Band, Upper	Rejection	F5-F6	3360 - 3460	20	30	—	dB
		F6-F7	3460 - 4000	37	50	—	
		F7-F8	4000 - 6300	—	35	—	

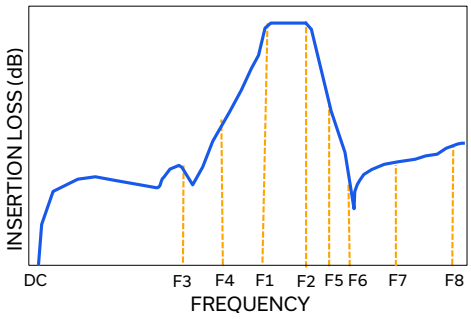
1. Tested in Evaluation Board P/N TB-CBP4-3180AG+.

ABSOLUTE MAXIMUM RATINGS[2]

Parameter	Ratings
Operating Temperature	-40°C to +85°C
Storage Temperature	-55°C to +100°C
Input Power[3]	10W at 25°C

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

TYPICAL FREQUENCY RESPONSE

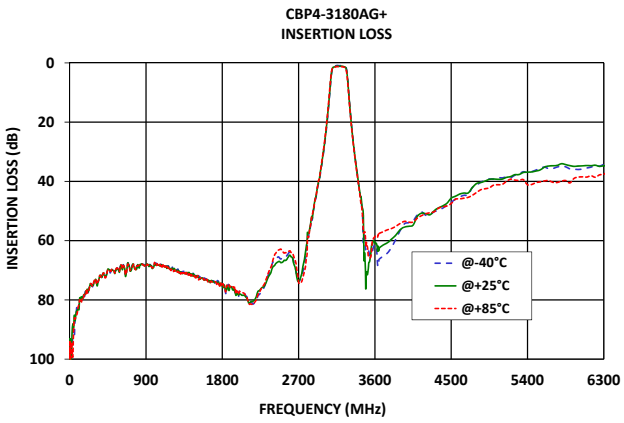


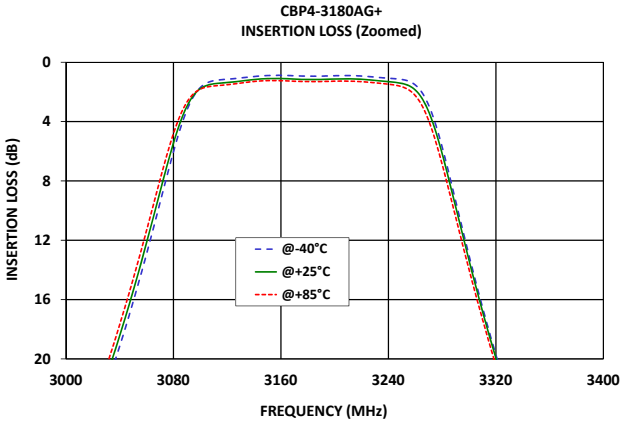
Bandpass Filter

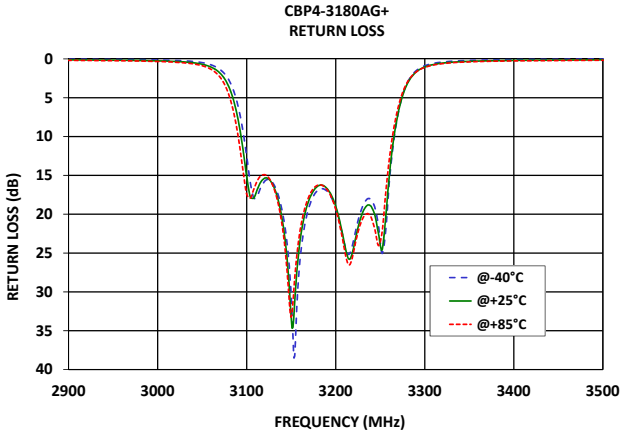
CBP4-3180AG+

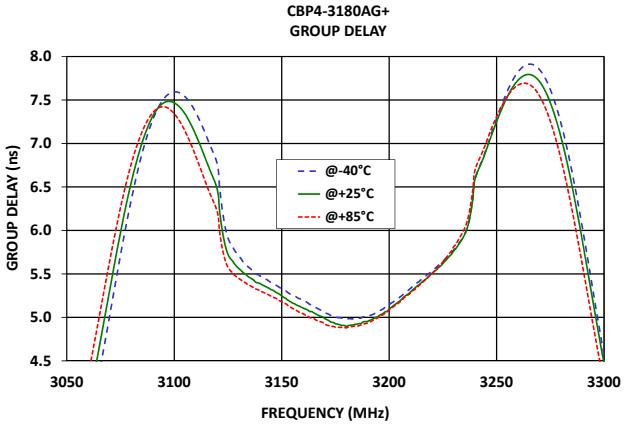
50Ω 3126 to 3234 MHz

TYPICAL PERFORMANCE GRAPHS









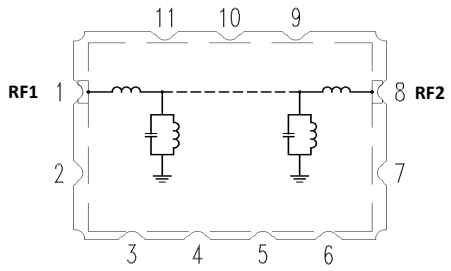
CERAMIC RESONATOR SURFACE MOUNT

Bandpass Filter

CBP4-3180AG+

50Ω 3126 to 3234 MHz

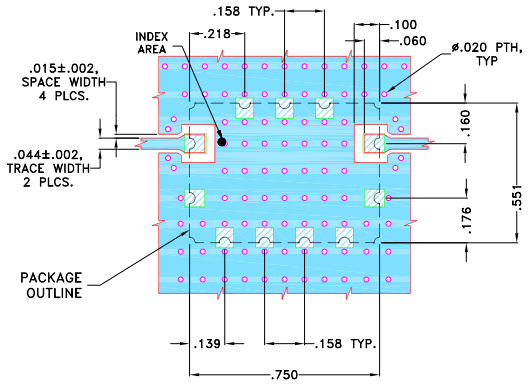
FUNCTIONAL DIAGRAM



PAD DESCRIPTION

Function	Pad Number	Description
RF1	1	Connects to RF Input Port
RF2	8	Connects to RF Output Port
GROUND	2,3,4,5,6,7 9,10,11	Connects to Ground on PCB, (See drawing PL-581)
NC	—	No connection, not used internally. See drawing PL-581 for connection to PCB

SUGGESTED PCB LAYOUT (PL-581)



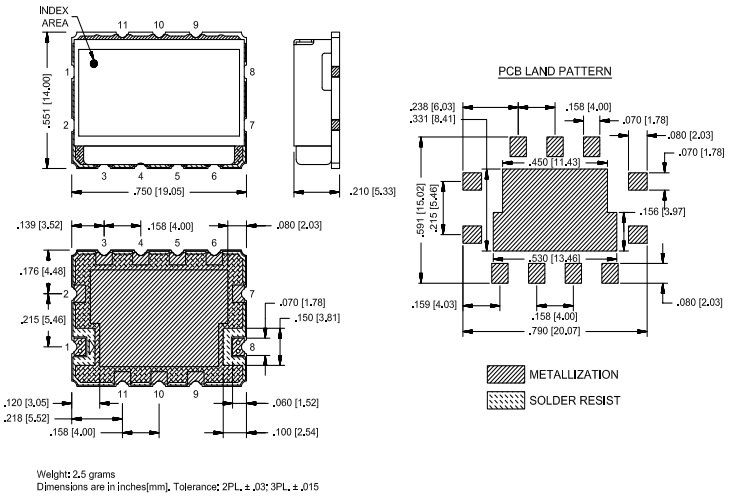
NOTES:

1. TRACE WIDTH IS SHOWN FOR ROGERS (RO4350B) WITH DIELECTRIC THICKNESS .023"±.002". 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 SOLDERMASK

CASE STYLE DRAWING



Weight: 2.5 grams
Dimensions are in inches[mm]. Tolerance: 2PL. ± .03: 3PL. ± .015

PRODUCT MARKING*: CBP4-3180AG

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

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50Ω 3126 to 3234 MHz

ADDITIONAL DETAILED INFORMATION IS AVAILABLE ON OUR DASH BOARD. CLICK HERE

Performance Data and Graphs	Data Graphs S-Parameter (S2P Files) Data Set (.zip file) De-embedded to device pads
Case Style	RZ2511-1 Lead Finish: Electroless Nickel Immersion Gold
RoHs Status	Compliant
Tape and Reel	TR-F122
Suggested Layout for PCB Design	PL-581
Evaluation Board	TB-CBP4-3180AG+
	Gerber File
Environmental Rating	ENV54

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

Surface mount Band Pass Filter CBP4-3180AG+

Typical Performance Data

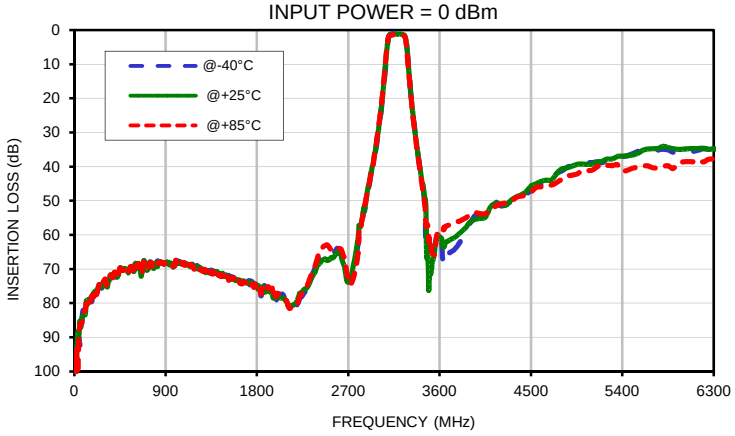
FREQ. (MHz)	INSERTION LOSS (dB)			INPUT RETURN LOSS (dB)			OUTPUT RETURN LOSS (dB)		
	@-40°C	@+25°C	@+85°C	@-40°C	@+25°C	@+85°C	@-40°C	@+25°C	@+85°C
10	102.46	96.67	99.62	0.06	0.06	0.07	0.05	0.06	0.06
19	94.52	99.88	94.27	0.06	0.07	0.08	0.06	0.07	0.08
28	95.38	91.10	96.65	0.07	0.08	0.08	0.06	0.07	0.08
37	91.52	88.14	99.15	0.07	0.08	0.09	0.07	0.08	0.09
55	92.20	85.20	86.18	0.08	0.09	0.10	0.08	0.09	0.11
82	82.74	83.70	85.15	0.09	0.10	0.12	0.08	0.10	0.12
100	83.30	83.13	82.29	0.09	0.11	0.12	0.09	0.10	0.13
208	77.27	76.41	77.63	0.10	0.12	0.14	0.10	0.12	0.14
325	74.28	75.27	74.02	0.08	0.11	0.14	0.09	0.11	0.14
415	72.36	71.95	72.49	0.07	0.10	0.13	0.07	0.10	0.13
505	69.81	70.01	69.80	0.06	0.10	0.12	0.06	0.10	0.12
640	68.83	68.79	68.84	0.05	0.09	0.11	0.05	0.09	0.12
730	69.05	69.65	69.39	0.03	0.07	0.10	0.04	0.08	0.11
820	67.59	69.23	68.25	0.02	0.06	0.09	0.02	0.07	0.10
910	67.47	67.91	68.01	0.01	0.06	0.09	0.02	0.06	0.10
1000	67.56	67.77	67.40	0.01	0.04	0.08	0.00	0.05	0.09
1200	69.21	69.68	69.87	0.02	0.04	0.08	0.01	0.05	0.09
1400	71.11	70.80	71.61	0.03	0.04	0.08	0.02	0.05	0.10
1600	72.84	73.22	73.67	0.02	0.05	0.10	0.00	0.07	0.13
1800	74.53	75.16	74.20	0.01	0.07	0.11	0.02	0.09	0.15
2000	77.16	78.00	77.12	0.00	0.08	0.13	0.03	0.10	0.17
2600	64.20	64.96	63.48	0.02	0.10	0.15	0.05	0.12	0.18
2990	31.09	30.48	30.03	0.12	0.23	0.30	0.13	0.23	0.31
3032	21.35	20.67	19.98	0.26	0.41	0.53	0.29	0.43	0.55
3064	11.55	10.80	9.97	0.95	1.29	1.65	1.04	1.37	1.74
3088	3.70	3.36	3.01	5.07	6.56	8.38	5.52	7.10	9.16
3126	1.10	1.32	1.45	15.59	15.61	15.52	16.15	15.98	15.71
3140	0.97	1.17	1.30	19.68	20.78	21.60	19.40	20.30	20.87
3150	0.90	1.10	1.24	30.54	33.36	33.25	26.47	27.39	26.90
3160	0.88	1.10	1.24	25.69	23.30	22.03	23.41	21.92	20.93
3180	0.93	1.17	1.30	16.89	16.36	16.24	16.29	15.73	15.57
3190	0.94	1.16	1.30	17.01	16.65	16.79	16.20	15.75	15.76
3200	0.91	1.13	1.28	19.25	18.99	19.39	17.65	17.19	17.27
3210	0.90	1.12	1.27	23.89	23.91	24.66	19.92	19.47	19.46
3234	1.04	1.26	1.42	18.21	19.02	20.00	17.33	17.97	19.00
3268	2.51	2.93	3.49	8.38	8.18	7.27	8.40	8.19	7.28
3292	10.08	10.45	11.14	1.37	1.53	1.54	1.35	1.50	1.52
3320	19.72	19.96	20.44	0.40	0.54	0.61	0.41	0.54	0.62
3360	30.43	30.58	30.96	0.16	0.28	0.35	0.18	0.29	0.37
3460	58.68	49.75	54.66	0.04	0.15	0.21	0.08	0.18	0.25
3600	61.38	60.51	58.60	0.01	0.10	0.16	0.01	0.11	0.19
3700	65.18	61.45	56.98	0.03	0.09	0.17	0.00	0.13	0.20
3800	62.09	59.41	55.87	0.03	0.09	0.16	0.01	0.11	0.19
3900	56.49	56.24	54.18	0.05	0.08	0.17	0.01	0.10	0.20
4000	53.94	55.15	53.75	0.02	0.11	0.18	0.00	0.13	0.20
4100	51.34	51.82	52.42	0.04	0.10	0.19	0.01	0.12	0.22
4200	51.43	50.91	50.92	0.04	0.11	0.20	0.00	0.12	0.23
4300	50.23	49.87	50.23	0.00	0.14	0.22	0.05	0.17	0.24
4400	49.04	48.28	48.59	0.04	0.11	0.23	0.02	0.19	0.29
4500	47.05	45.65	47.47	0.04	0.17	0.27	0.06	0.19	0.29
4600	45.25	44.29	45.91	0.05	0.20	0.30	0.02	0.19	0.29
4800	41.27	40.71	43.73	0.06	0.26	0.34	0.18	0.34	0.41
5000	39.23	39.19	41.26	0.08	0.30	0.33	0.18	0.31	0.36
5200	38.82	38.39	39.26	0.07	0.23	0.40	0.19	0.31	0.46
5400	37.06	36.89	41.15	0.24	0.43	0.48	0.26	0.43	0.48
5600	35.19	35.17	39.84	0.36	0.50	0.53	0.46	0.59	0.67
5800	34.89	34.04	39.93	0.18	0.34	0.48	0.34	0.45	0.60
6000	35.99	34.81	38.55	0.27	0.37	0.49	0.37	0.50	0.66
6100	35.47	34.65	38.54	0.15	0.32	0.00	0.27	0.41	0.68
6300	34.33	34.72	37.61	0.31	0.44	0.64	0.60	0.61	0.78

Typical Performance Data

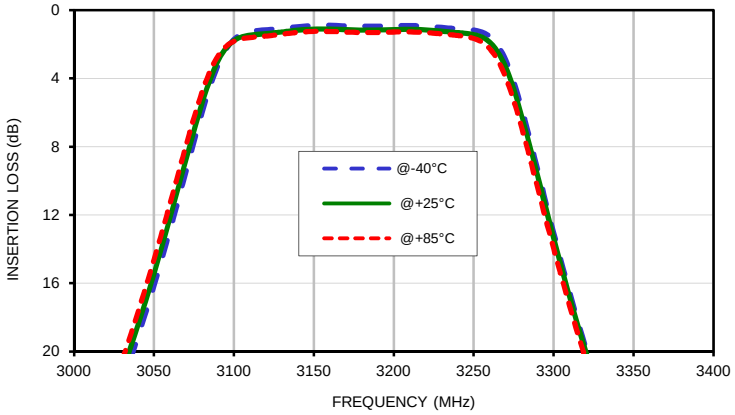
FREQ. (MHz)	GROUP DELAY (nsec)		
	@-40°C	@+25°C	@+85°C
3126	5.85	5.68	5.54
3128	5.77	5.62	5.49
3130	5.70	5.56	5.45
3132	5.64	5.52	5.41
3134	5.59	5.48	5.38
3136	5.55	5.45	5.36
3138	5.50	5.40	5.33
3140	5.48	5.39	5.31
3142	5.44	5.36	5.28
3144	5.42	5.34	5.26
3146	5.39	5.31	5.23
3148	5.36	5.28	5.21
3150	5.33	5.25	5.18
3152	5.30	5.22	5.16
3154	5.27	5.18	5.12
3156	5.25	5.16	5.09
3158	5.22	5.13	5.06
3160	5.20	5.11	5.04
3162	5.17	5.09	5.02
3164	5.14	5.07	4.99
3166	5.11	5.04	4.97
3168	5.09	5.01	4.95
3170	5.06	4.99	4.92
3172	5.03	4.96	4.90
3174	5.02	4.94	4.90
3176	5.00	4.92	4.89
3178	4.99	4.91	4.88
3180	4.98	4.90	4.88
3182	4.99	4.91	4.89
3184	4.99	4.92	4.90
3186	4.99	4.93	4.91
3188	5.01	4.95	4.92
3190	5.01	4.95	4.94
3192	5.03	4.98	4.96
3194	5.06	5.00	4.99
3196	5.08	5.03	5.02
3198	5.11	5.06	5.05
3200	5.15	5.10	5.08
3210	5.34	5.29	5.28
3220	5.54	5.51	5.51
3234	5.91	5.90	5.97

Typical Performance Curves

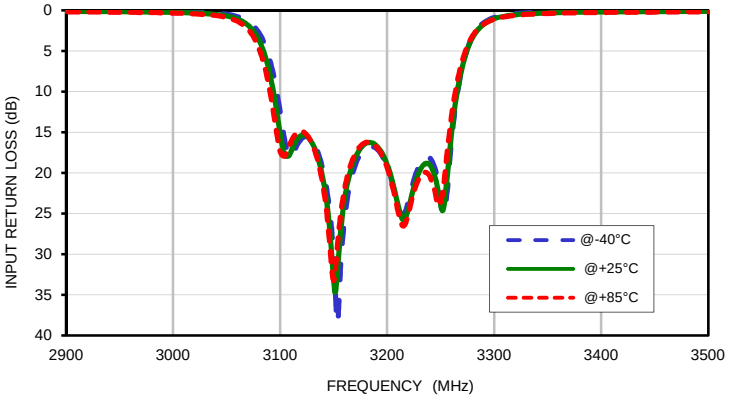
INSERTION LOSS vs. TEMPERATURE
INPUT POWER = 0 dBm



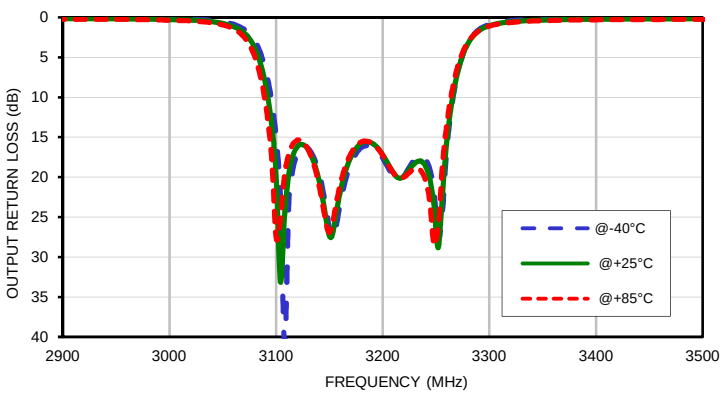
INSERTION LOSS vs. TEMPERATURE (Zoomed)
INPUT POWER = 0 dBm



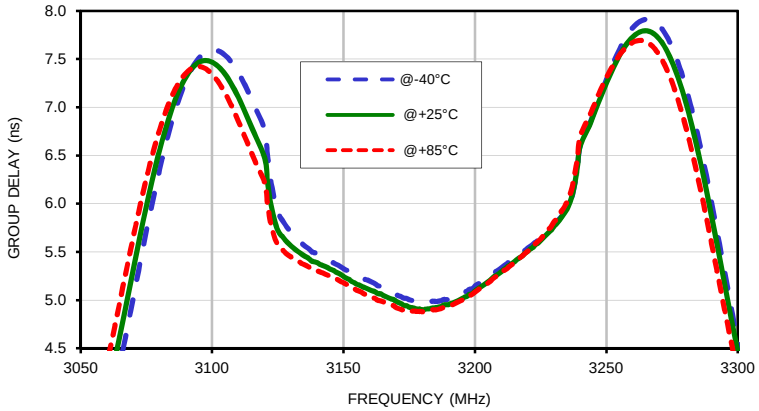
INPUT RETURN LOSS vs. TEMPERATURE
INPUT POWER = 0 dBm



OUTPUT RETURN LOSS vs. TEMPERATURE
INPUT POWER = 0 dBm



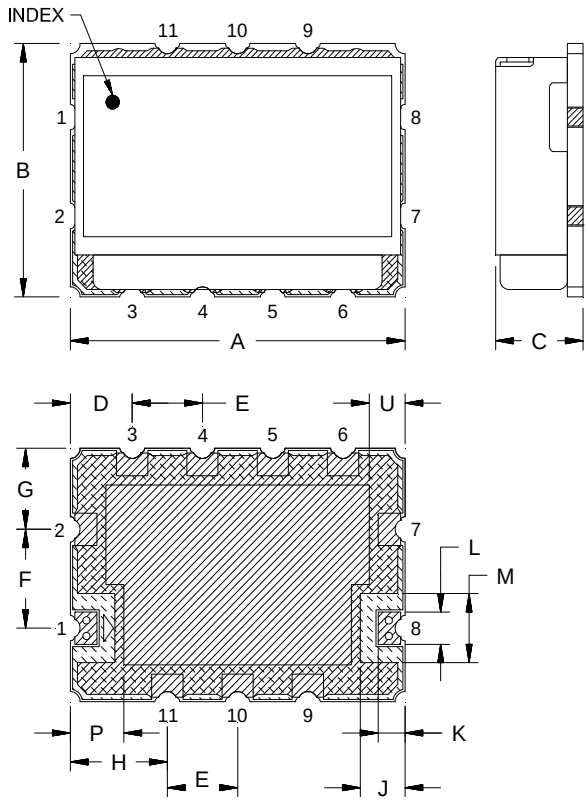
GROUP DELAY vs. TEMPERATURE
INPUT POWER = 0 dBm

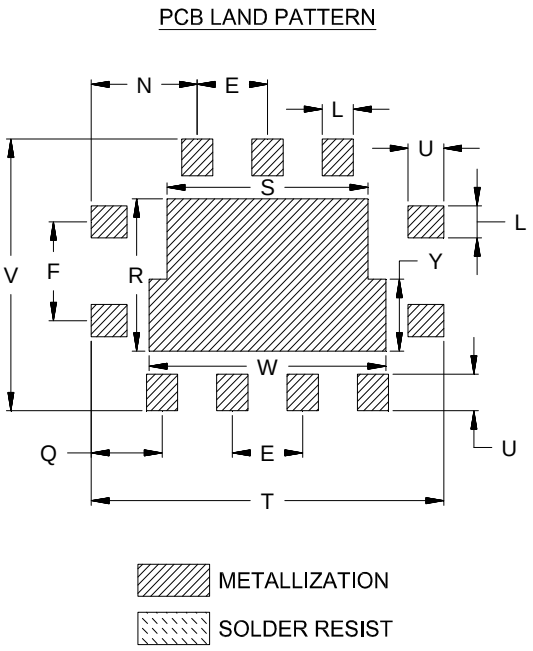


Case Style RZ

Outline Dimensions

RZ2511-1





CASE#	A	B	C	D	E	F	G	H	J	K	L	M
RZ2511-1	.750 (19.05)	.551 (14.00)	.210 (5.33)	.139 (3.53)	.158 (4.01)	.215 (5.46)	.176 (4.47)	.218 (5.54)	.100 (2.54)	.060 (1.52)	.070 (1.78)	.150 (3.81)

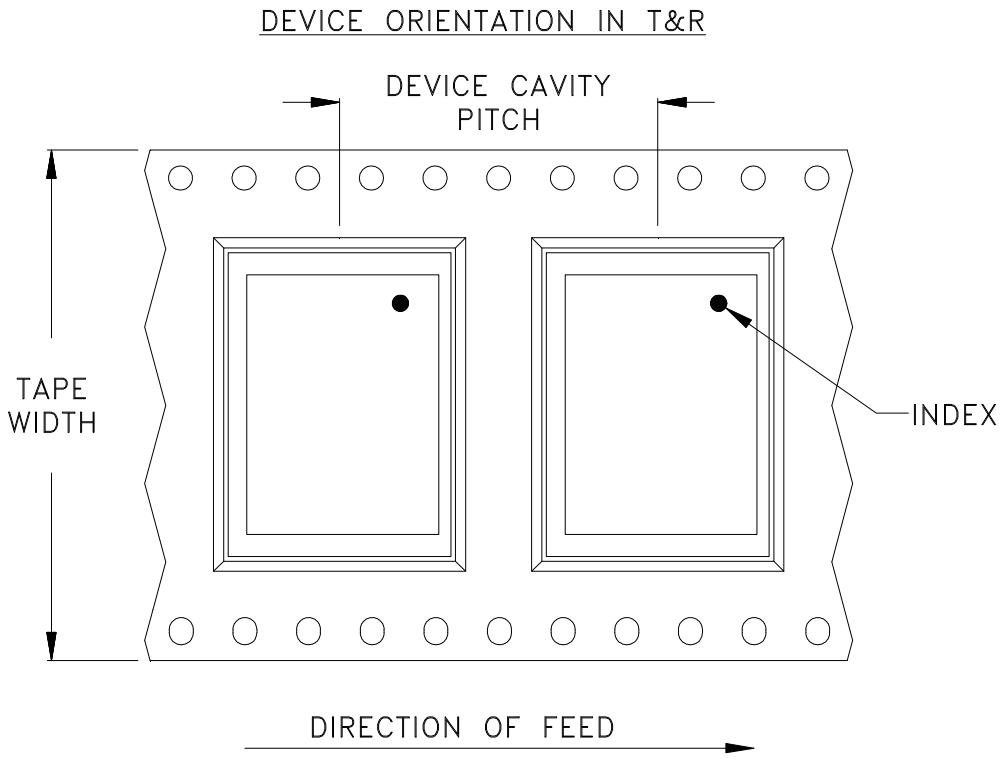
CASE#	N	P	Q	R	S	T	U	V	W	Y	WT.GRAMS
RZ2511-1	.238 (6.05)	.120 (3.05)	.159 (4.04)	.331 (8.41)	.450 (11.43)	.790 (20.07)	.080 (2.03)	.591 (15.01)	.530 (13.46)	.156 (3.96)	4.6

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

Notes:

1. Case material: Nickel-Silver alloy.
2. Base: Printed wiring laminate.
3. 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.

Tape & Reel Packaging TR-F122



Tape Width, mm	Device Cavity Pitch, mm	Reel Size, inches	Devices per Reel
32	20	13	500

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

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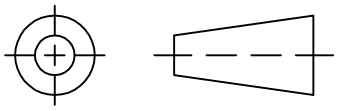
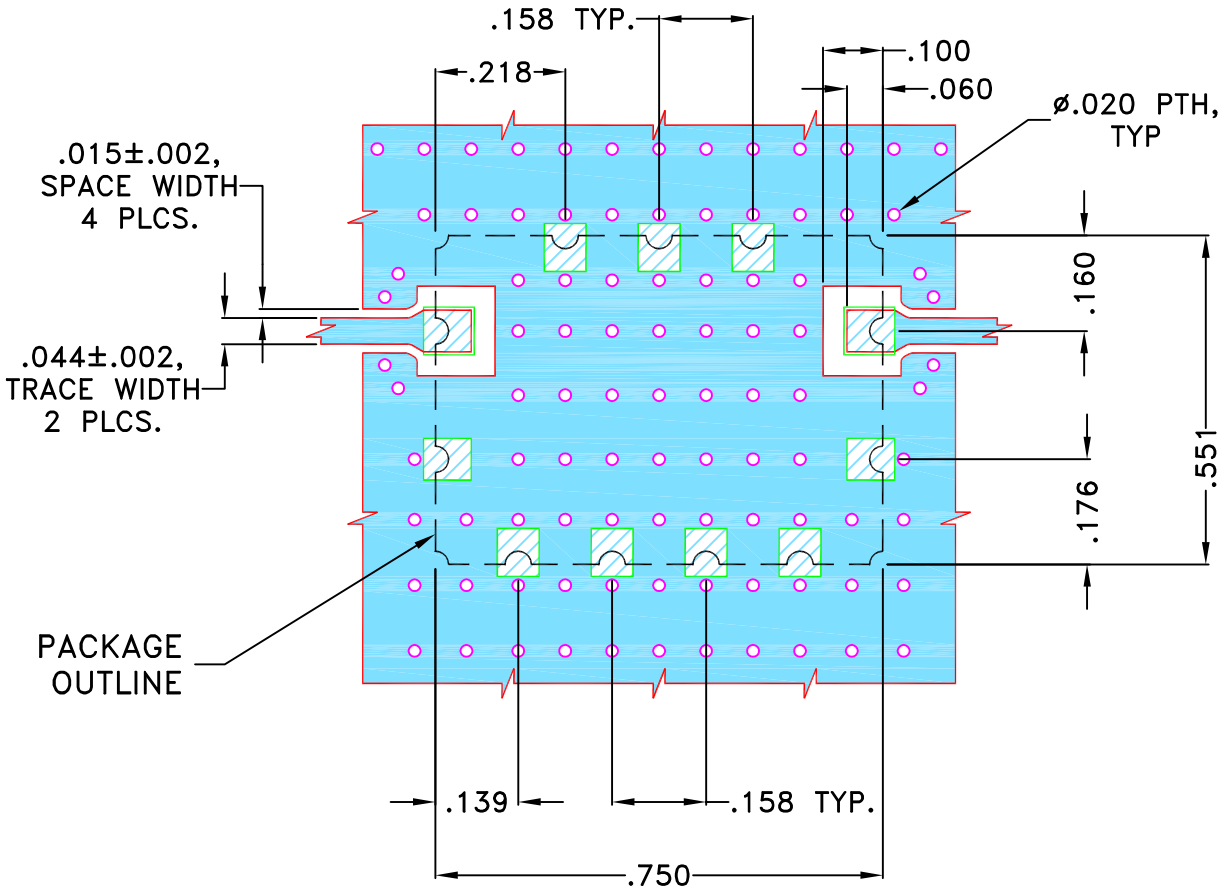
THIRD ANGLE PROJECTION



REVISIONS

REV	ECN No.	DESCRIPTION	DATE	DR	AUTH
OR	M167003	NEW RELEASE	APR 18	TM	VC

SUGGESTED MOUNTING CONFIGURATION FOR RZ2511 CASE STYLE "11FL02" PIN CODE



NOTES:

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   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 SOLDERMASK

UNLESS OTHERWISE SPECIFIED		INITIALS	DATE
DIMENSIONS ARE IN INCHES	DRAWN	TM	07 APR 18
TOLERANCES ON:	CHECKED	MD	07 APR 18
2 PL DECIMALS ±	APPROVED	KK	07 APR 18
3 PL DECIMALS ± .005"			
ANGLES ±			
FRACTIONS ±			

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

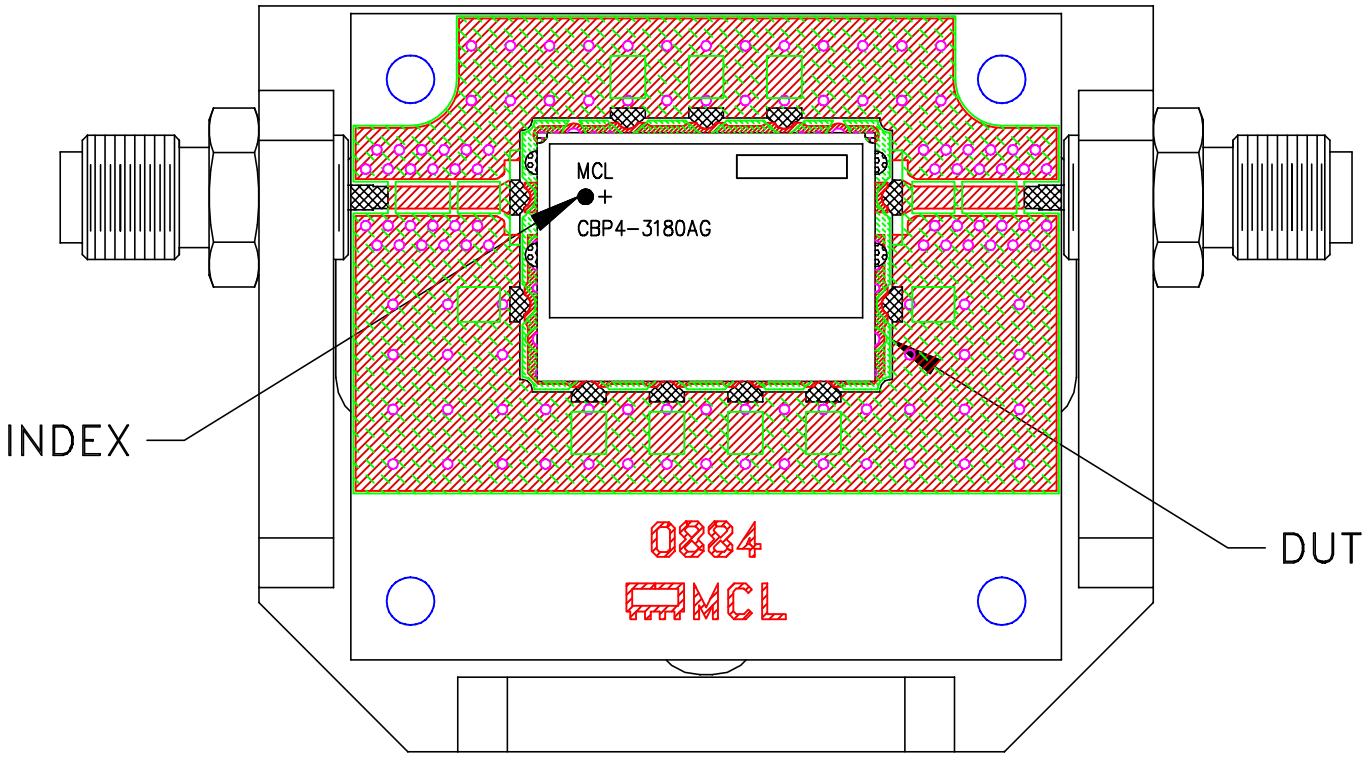
Mini-Circuits®
13 Neptune Avenue
Brooklyn NY 11235

PL, 11FL02, RZ2511, CBP, TB-984+, 50 Ohm

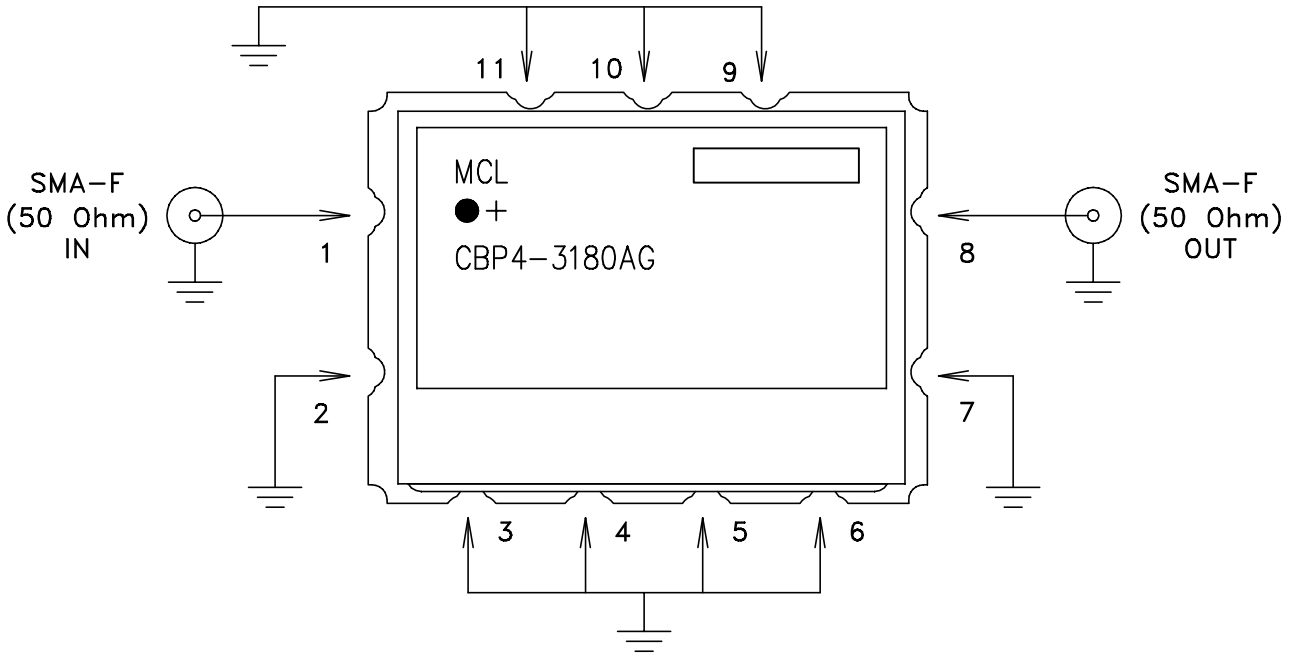
SIZE	CODE IDENT	DRAWING NO:	REV:
A	15542	98-PL-581	OR
FILE: 98PL581		SCALE: 3:1	SHEET: 1 OF 1

Evaluation Board and Circuit

TB-CBP4-3180AG+



Schematic diagram



Notes:

1. PCB Material: ROGERS (RO4350B) OR Equivalent, Dielectric Constant=3.48±.05
Dielectric Thickness: .023±.002
2. 50 Ohm SMA Female Connectors.

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Environmental Specifications ENV54

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