Surface Mount

Bi-Directional Coupler SYBDC-26-52VHP+

50Ω 26 dB Coupling 30 to 540 MHz 50 Watt

The Big Deal

- High power handling, 50 W
- Low mainline loss, 0.12 dB typ.
- High directivity, 24 dB typ.
- Excellent VSWR, 1.12:1 typ.

CASE STYLE: AH202-1

Product Overview

Mini-Circuits' SYBDC-26-52VHP+ surface mount bi-directional coupler provides high power handling up to 50W and low mainline loss of 0.12 dB or better for applications from 30 to 540 MHz. The coupler features core and wire construction mounted on an 8-lead printed laminate base with wraparound terminations for excellent solderability. The unit measures 0.38 x 0.50 x 0.25", accommodating dense circuit board layouts.

Key Features

Feature	Advantages
High power handling, 50W	Usable in many systems with high-power requirements
Low mainline loss, 0.12 dB typ.	Provides excellent through-path signal power transmission.
Good directivity, 24 dB typ.	High directivity allows accurate signal sampling through the coupled port with minimal measurement error.
Excellent VSWR, 1.12 dB typ. (input/output/coupling)	Provides excellent matching in 50Ω systems with minimal signal reflection.
Small size, 0.38 x 0.50 x 0.25"	Provides high power capability while saving space in systems with tight layouts.

Surface Mount

Bi-Directional Coupler

SYBDC-26-52VHP+

50Ω 26 dB Coupling 30 to 540 MHz 50 Watt

Generic photo used for illustration purposes

CASE STYLE: AH202-1

+RoHS Compliant

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

Maximum Ratings

Operating Temperature	-40°C to 85°C*
Storage Temperature	-55°C to 100°C

*Case temperature is defined as temperature on ground
Permanent damage may occur if any of these limits are exceeded.

Features

- low mainline loss, 0.12 dB typ.
- excellent VSWR, 1.12:1 typ.
- high directivity, 24 dB typ.
- high power, 50W max with output load VSWR 2.0 max.
- high power, 30W max. with output open or short

Applications

- VHF/UHF
- signal monitoring
- communications
- military mobile

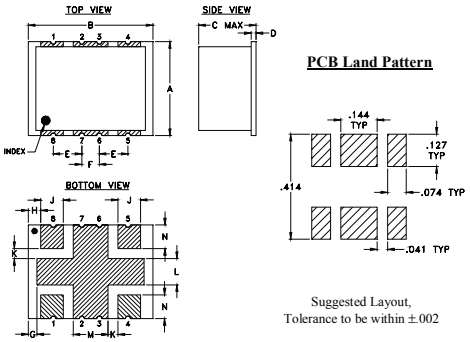
Available Tape and Reel at no extra cost

Reel Size	Devices/Reel
13"	200

Pad Connections

INPUT	8
OUTPUT	1
COUPLED (forward)	5
COUPLED (reverse)	4
GROUND	2,3,6,7

Outline Drawing

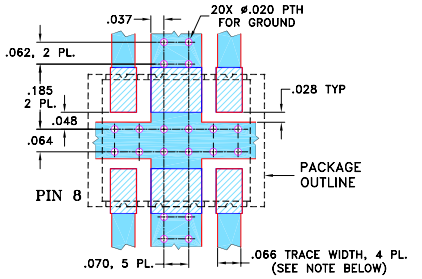


Outline Dimensions (inch / mm)

A	B	C	D	E	F	G
.38	.50	.25	.020	.115	.070	.035
9.65	12.70	6.35	0.51	2.92	1.78	0.89

H	J	K	L	M	N	wt
.050	.090	.040	.105	.140	.095	grams
1.27	2.29	1.02	2.67	3.56	2.41	0.80

Demo Board MCL P/N: TB-349
Suggested PCB Layout (PL-246)



NOTES:
1. TRACE WIDTH IS SHOWN FOR ROGERS RO4350B WITH DIELECTRIC THICKNESS .030" ± .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)

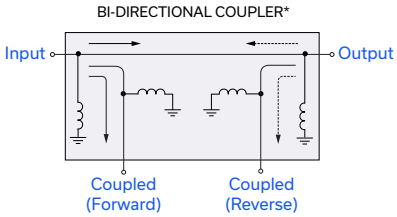
DENOTES COPPER LAND PATTERN FREE OF SOLDER MASK

Electrical Specifications at 25°C

Parameter	Condition (MHz)	Min.	Typ.	Max.	Units
Frequency Range		30		540	MHz
Mainline Loss[1]	30-50 50-540	— —	0.25 0.12	0.45 0.25	
Nominal Coupling	30-540	—	26±1.0	—	dB
Coupling Flatness (±)	30-260 260-540	— —	0.4 0.7	0.6 1.0	dB
Directivity	30-50 50-540	17 18	20 24	— —	dB
Return Loss (Input)	30-100 100-540	12 18	15 25	— —	dB
Return Loss (Output)	30-100 100-540	12 18	15 25	— —	dB
Return Loss (Coupling)	30-100 100-540	12 18	15 25	— —	dB
Input Power[2]	30-540	—	—	50	W

1. Mainline Loss includes theoretical power loss at coupled port.
2. At 25°C case temperature. Derate to 25W linearly at 85°C case temperature.

Electrical Schematic



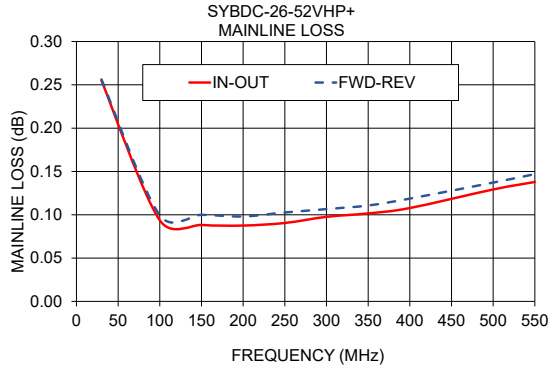
*Electrical schematic is for Bi-Directional coupler with internal transformer(s) that routes DC from all ports to ground

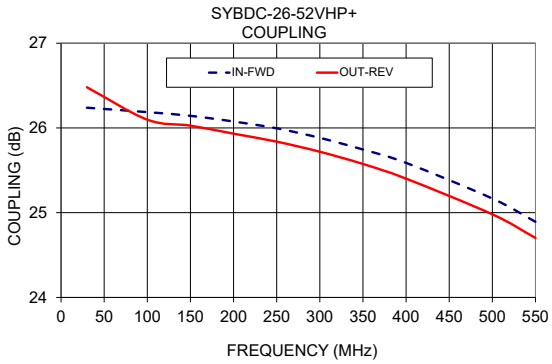
Notes
A. Performance and quality attributes and conditions not expressly stated in this specification document are intended to be excluded and do not form a part of this specification document.
B. Electrical specifications and performance data contained in this specification document are based on Mini-Circuit's 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

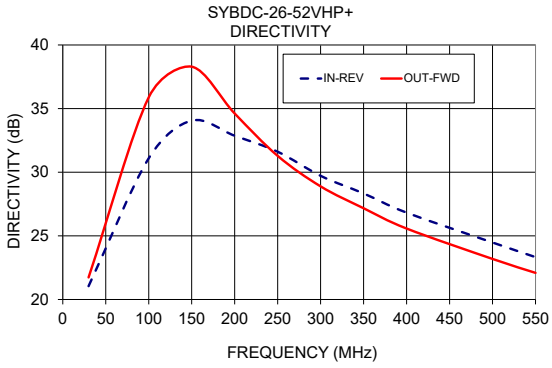
REV. A
ECO-015369
ED19071101
SYBDC-26-52VHP+
YL/CP/AM
221018

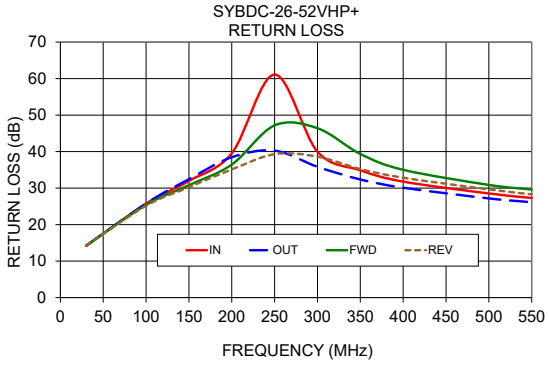
Typical Performance Data

Frequency (MHz)	Mainline Loss (dB)	Coupling (dB)		Directivity (dB)		Return Loss (dB)			
	In-Out	In-Cpl Fwd	Out-Cpl Rev	In-Cpl Rev	Out-Cpl Fwd	In	Out	Cpl Fwd	Cpl Rev
30.00	0.25	26.24	26.48	21.05	21.73	14.18	14.16	14.21	14.16
100.00	0.09	26.19	26.10	31.10	35.89	25.75	25.79	25.41	25.17
150.00	0.09	26.14	26.03	34.06	38.29	31.96	32.45	30.79	30.23
200.00	0.09	26.08	25.93	32.87	34.61	39.54	38.45	36.45	35.12
250.00	0.09	26.00	25.84	31.61	31.29	61.10	40.27	47.19	39.30
300.00	0.10	25.88	25.72	29.72	28.89	39.98	35.84	46.41	38.62
350.00	0.10	25.75	25.57	28.33	27.17	34.88	32.36	39.36	35.21
400.00	0.11	25.59	25.40	26.83	25.58	31.78	30.11	35.01	32.85
500.00	0.13	25.17	24.98	24.48	23.19	28.53	27.17	30.87	29.64
550.00	0.14	24.89	24.70	23.33	22.09	27.30	26.13	29.61	28.30









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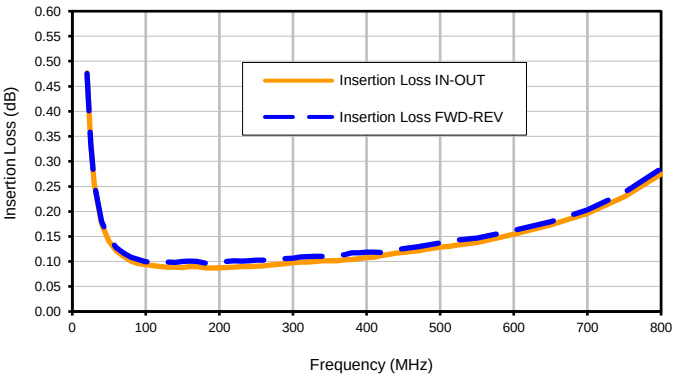
Bi-Directional Coupler SYBDC-26-52VHP+

Typical Performance Data

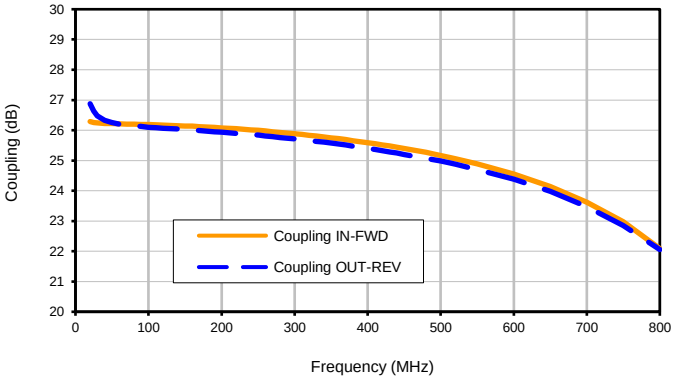
FREQ. (MHz)	INSERTION LOSS (dB)		COUPLING (dB)		DIRECTIVITY (dB)		RETURN LOSS (dB)			
	IN-OUT	FWD-REV	IN-FWD	OUT-REV	IN-REV	OUT-FWD	IN	OUT	FWD	REV
20	0.48	0.48	26.29	26.88	18.03	18.06	10.85	10.82	10.90	10.85
25	0.34	0.34	26.26	26.63	19.63	20.04	12.63	12.62	12.68	12.62
30	0.25	0.26	26.24	26.48	21.05	21.73	14.18	14.16	14.21	14.16
40	0.17	0.18	26.23	26.33	23.32	24.43	16.66	16.65	16.66	16.62
50	0.14	0.15	26.22	26.25	25.15	26.69	18.67	18.64	18.62	18.58
60	0.12	0.13	26.21	26.20	26.68	28.66	20.37	20.34	20.27	20.25
70	0.11	0.12	26.20	26.17	28.05	30.40	21.88	21.90	21.72	21.69
80	0.10	0.11	26.20	26.14	29.25	32.23	23.28	23.28	23.04	22.98
90	0.10	0.10	26.19	26.12	30.21	34.02	24.57	24.58	24.27	24.12
100	0.09	0.10	26.19	26.10	31.10	35.89	25.75	25.79	25.41	25.17
110	0.09	0.10	26.18	26.08	31.84	37.19	26.92	26.87	26.42	26.22
120	0.09	0.10	26.17	26.06	32.19	38.09	28.10	27.91	27.37	27.28
130	0.09	0.10	26.16	26.05	32.83	38.42	29.33	29.14	28.40	28.31
140	0.09	0.10	26.15	26.04	33.29	38.55	30.60	30.76	29.58	29.27
150	0.09	0.10	26.14	26.03	34.06	38.29	31.96	32.45	30.79	30.23
160	0.09	0.10	26.14	26.01	34.25	37.68	33.23	33.76	31.86	31.13
170	0.09	0.10	26.12	25.99	34.07	36.75	34.37	34.63	32.73	32.01
180	0.09	0.10	26.11	25.97	33.61	35.83	35.69	35.36	33.70	32.99
190	0.09	0.10	26.09	25.95	33.17	35.48	37.35	36.71	34.94	34.03
200	0.09	0.10	26.08	25.93	32.87	34.61	39.54	38.45	36.45	35.12
210	0.09	0.10	26.07	25.92	32.97	33.93	42.57	40.02	38.19	36.22
220	0.09	0.10	26.05	25.90	32.83	33.24	46.45	41.01	40.10	37.24
230	0.09	0.10	26.03	25.88	32.61	32.51	51.82	41.10	42.01	38.05
240	0.09	0.10	26.01	25.86	32.18	32.09	61.13	40.88	44.25	38.65
250	0.09	0.10	26.00	25.84	31.61	31.29	61.10	40.27	47.19	39.30
260	0.09	0.10	25.97	25.81	31.16	30.75	51.71	39.71	51.69	39.87
270	0.09	0.10	25.95	25.79	30.78	30.40	47.46	38.85	59.93	40.10
280	0.09	0.10	25.93	25.76	30.40	29.71	44.26	37.81	56.00	39.98
290	0.10	0.11	25.91	25.74	30.09	29.29	41.95	36.84	50.11	39.39
300	0.10	0.11	25.88	25.72	29.72	28.89	39.98	35.84	46.41	38.62
310	0.10	0.11	25.86	25.69	29.39	28.39	38.50	35.02	44.30	37.90
320	0.10	0.11	25.84	25.67	29.09	28.04	37.34	34.23	42.70	37.17
330	0.10	0.11	25.81	25.63	28.89	27.76	36.41	33.54	41.38	36.43
340	0.10	0.11	25.78	25.60	28.62	27.37	35.56	32.97	40.29	35.74
350	0.10	0.11	25.75	25.57	28.33	27.17	34.88	32.36	39.36	35.21
360	0.10	0.11	25.73	25.54	28.13	26.83	34.18	31.83	38.30	34.73
370	0.10	0.11	25.69	25.51	27.77	26.53	33.49	31.40	37.30	34.19
380	0.10	0.12	25.65	25.47	27.44	26.22	32.81	30.95	36.40	33.70
390	0.11	0.12	25.62	25.44	27.18	25.92	32.30	30.50	35.66	33.31
400	0.11	0.12	25.59	25.40	26.83	25.58	31.78	30.11	35.01	32.85
410	0.11	0.12	25.55	25.37	26.40	25.29	31.39	29.79	34.42	32.40
420	0.11	0.12	25.52	25.33	26.13	25.03	31.04	29.48	34.04	32.09
430	0.11	0.12	25.48	25.28	25.86	24.78	30.73	29.22	33.68	31.77
440	0.12	0.12	25.44	25.25	25.63	24.46	30.37	28.94	33.33	31.47
450	0.12	0.13	25.40	25.20	25.37	24.32	30.07	28.66	32.89	31.15
460	0.12	0.13	25.36	25.16	25.17	24.09	29.71	28.37	32.51	30.86
470	0.12	0.13	25.31	25.11	25.03	23.88	29.43	28.04	32.15	30.62
480	0.12	0.13	25.27	25.07	24.84	23.63	29.12	27.72	31.74	30.30
490	0.13	0.13	25.22	25.03	24.73	23.40	28.83	27.47	31.30	30.00
500	0.13	0.14	25.17	24.98	24.48	23.19	28.53	27.17	30.87	29.64
512	0.13	0.14	25.10	24.92	24.20	22.89	28.21	26.90	30.47	29.28
520	0.13	0.14	25.06	24.88	24.06	22.68	27.97	26.71	30.27	29.05
550	0.14	0.15	24.89	24.70	23.33	22.09	27.30	26.13	29.61	28.30
600	0.15	0.16	24.55	24.38	22.43	21.08	26.33	25.19	28.63	27.20
650	0.17	0.18	24.14	23.98	21.18	20.00	25.59	24.52	27.66	26.41
700	0.20	0.20	23.62	23.47	20.11	19.15	25.21	23.85	27.23	25.58
750	0.23	0.24	22.98	22.85	19.02	18.40	24.70	23.24	26.96	25.02
800	0.27	0.29	22.09	22.06	17.85	17.36	24.66	22.80	27.23	24.42

Typical Performance Curves

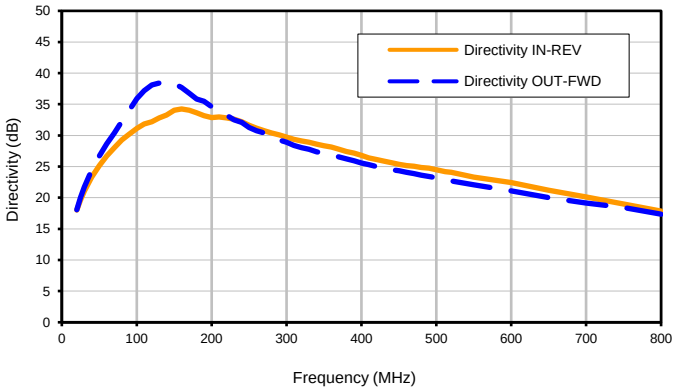
Insertion Loss



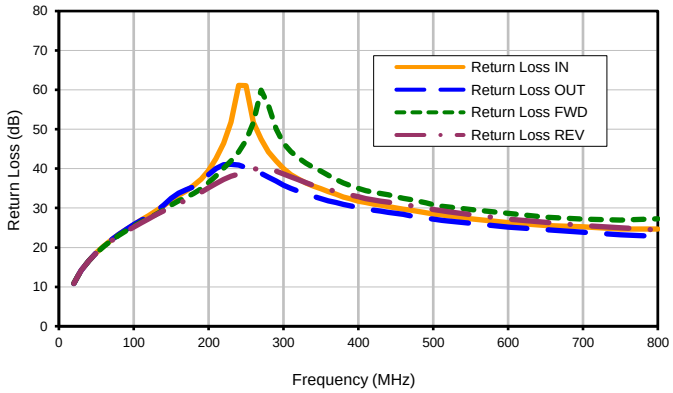
Coupling



Directivity



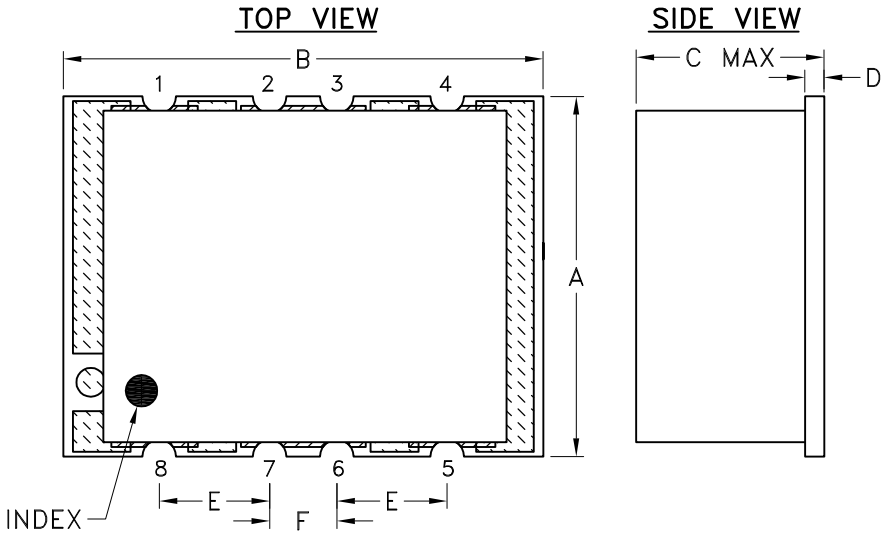
Return Loss

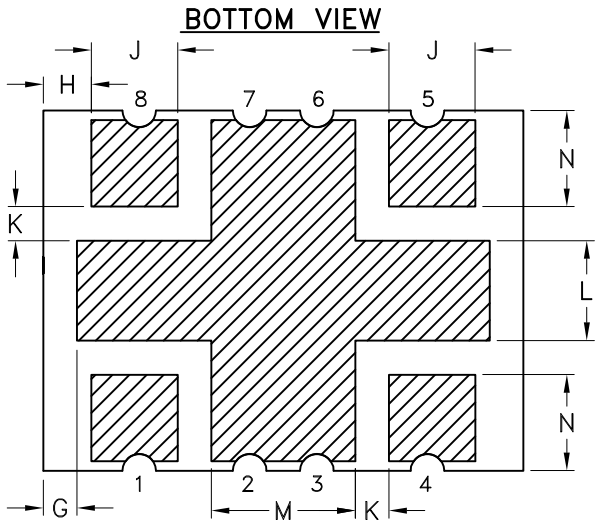


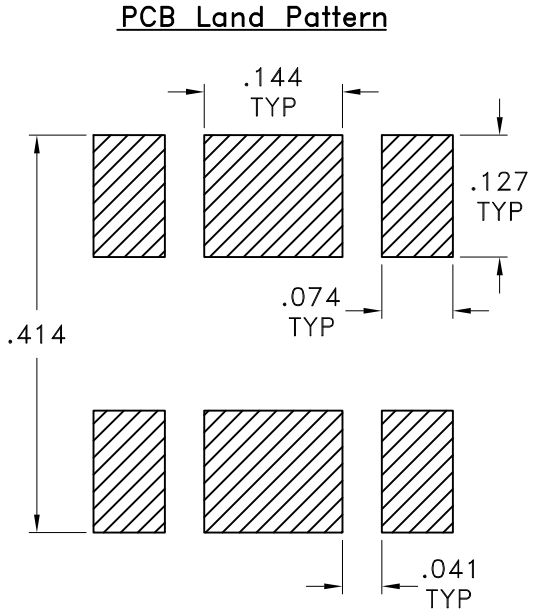
Case Style AH

Outline Dimensions

AH202-1







Suggested Layout,
Tolerance to be within ±.002

DENOTES METALLIZATION

DENOTES SOLDER RESIST

CASE#	A	B	C	D	E	F	G	H	J	K	L	M	N	WT, GRAM
AH202-1	.38 (9.65)	.50 (12.70)	.25 (6.35)	.020 (0.51)	.115 (2.92)	.070 (1.78)	.035 (0.89)	.050 (1.27)	.090 (2.29)	.040 (1.02)	.105 (2.67)	.140 (3.56)	.095 (2.41)	.80

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

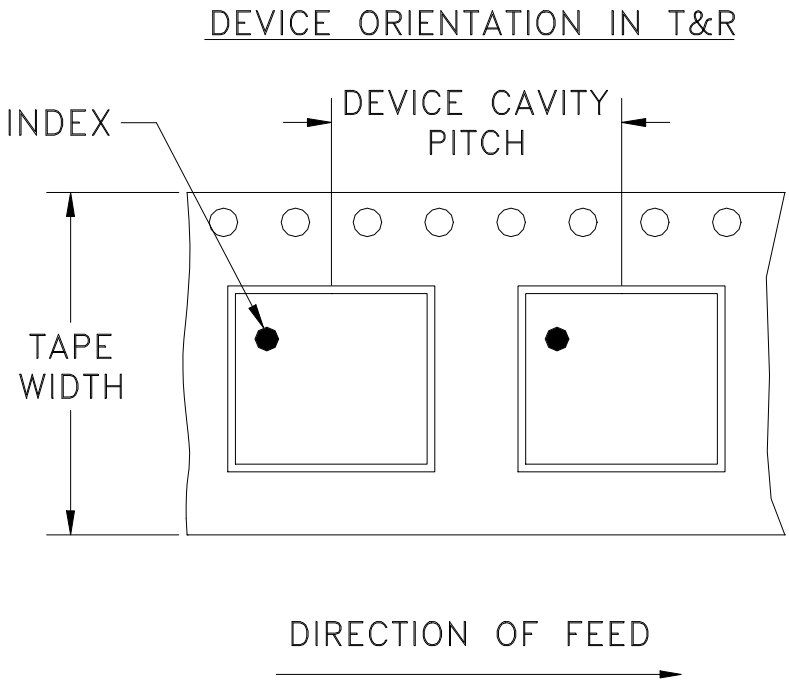
Notes:

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

For RoHS 3-5 μ inch (.08-.13 microns) Gold over 120-240 μ inch (3.05-6.10 microns) Nickel plate. All models, (+) suffix.

For RoHS-5 Case Styles: Tin-Lead plate. All models, no (+) suffix.

Tape & Reel Packaging TR-F61



Tape Width, mm	Device Cavity Pitch, mm	Reel Size, inches	Devices per Reel
24	12	13	200

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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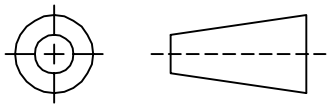
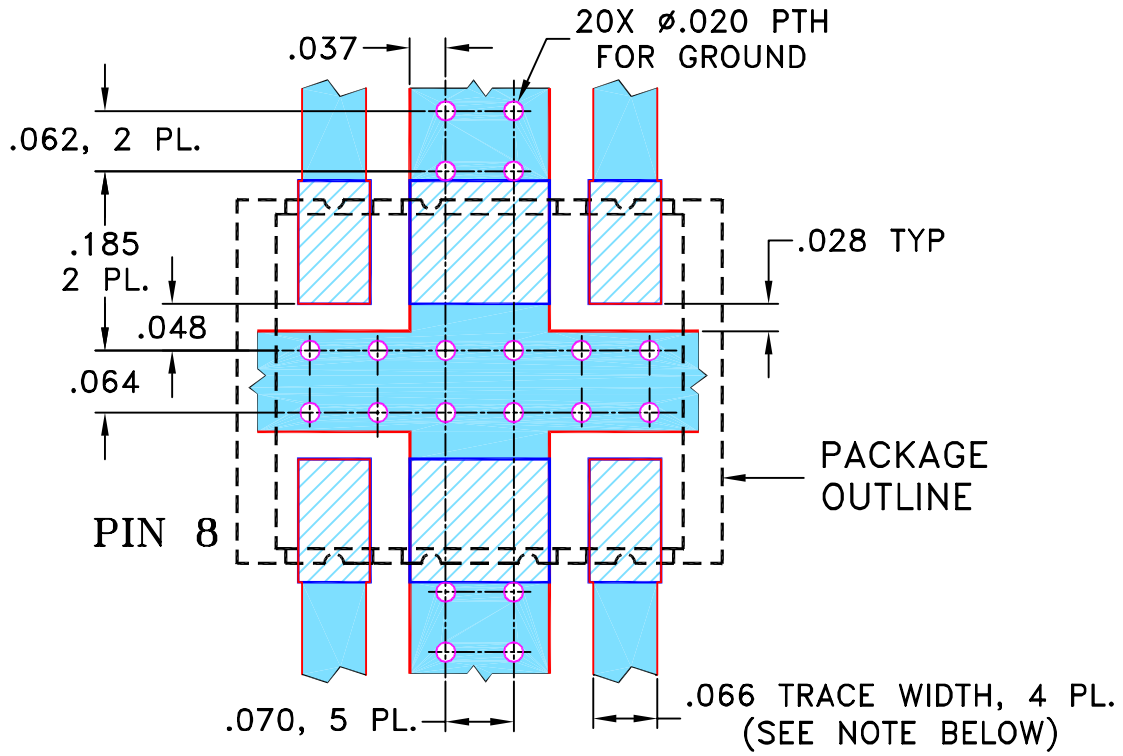
THIRD ANGLE PROJECTION



REVISIONS

REV	ECN No.	DESCRIPTION	DATE	DR	AUTH
OR	M107473	NEW RELEASE	09/25/06	AV	DY

SUGGESTED MOUNTING CONFIGURATION
FOR AH202-1 CASE STYLE, "rr" PIN CONNECTION



NOTES:

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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	AV	09/19/06
TOLERANCES ON:	CHECKED	IL	09/25/06
2 PL DECIMALS ±	APPROVED	DY	09/25/06
3 PL DECIMALS ± .005			
ANGLES ±			
FRACTIONS ±			

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

Mini-Circuits® 13 Neptune Avenue Brooklyn NY 11235

PL, rr, AH202-1, SYDC, TB-349

SIZE	CODE IDENT	DRAWING NO:	REV:
A	15542	98-PL-246	OR

FILE:	SCALE:	SHEET:
98PL246	5:1	1 OF 1

Mini-Circuits

Environmental Specifications ENV02T1

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