

3 Way-0° 50Ω 20 to 1200 MHz

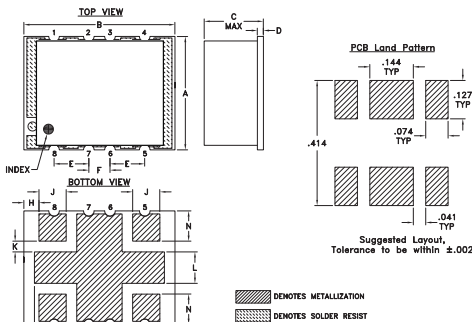
Maximum Ratings

Operating Temperature	-40°C to 85°C
Storage Temperature	-55°C to 100°C
Power Input (as a splitter)	1W max.
Internal Dissipation	0.15W max.
Permanent damage may occur if any of these limits are exceeded.	

Pin Connections

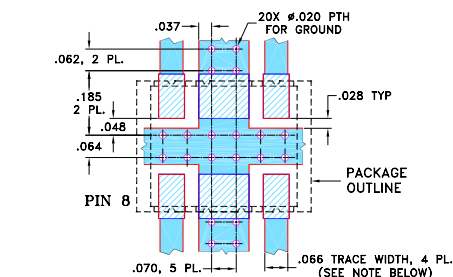
SUM PORT	8
PORT 1	1
PORT 2	4
PORT 3	5
GROUND	2,3,6,7

Outline Drawing



Outline Dimensions (inch/mm)

A	B	C	D	E	F	G	H
.38	.50	.25	.020	.115	.070	.035	.050
9.65	12.70	6.35	0.51	2.92	1.78	0.89	1.27
J	K	L	M	N		wt	
.090	.040	.105	.140	.095		grams	
2.29	1.02	2.67	3.56	2.41		0.80	

Demo Board MCL P/N: TB-364
Suggested PCB Layout (PL-231)

NOTES:

- 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.
- BOTTOM SIDE OF THE PCB IS CONTINUOUS GROUND PLANE.

- DEMOTES PCB COPPER LAYOUT WITH SMOBC (SOLDER MASK OVER BARE COPPER)
- DEMOTES COPPER LAND PATTERN FREE OF SOLDER MASK

Notes

- 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.
- Electrical specifications and performance data contained in this specification document are based on Mini-Circuit's applicable established test performance criteria and measurement instructions.
- 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

Features

- low insertion loss 1.0 dB typ.
- wide frequency band, 20 to 1200 MHz, usable 5 to 1250 MHz
- low amplitude unbalance, 0.1 dB typ.

Applications

- VHF/UHF CATV
- cellular



CASE STYLE: AH202

+RoHS Compliant

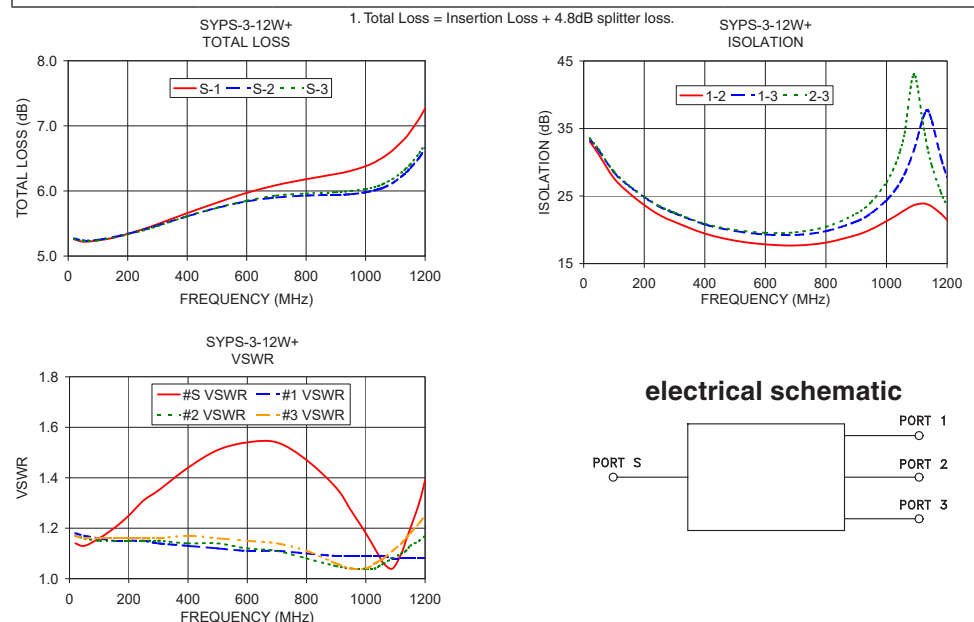
The +Suffix identifies RoHS Compliance. See our web site for RoHS Compliance methodologies and qualifications

Electrical Specifications

FREQ. RANGE (MHz)	ISOLATION (dB)		INSERTION LOSS (dB) ABOVE 4.8 dB		PHASE UNBALANCE (Degrees)	AMPLITUDE UNBALANCE (dB)
f_L - f_U	Typ.	Min.	Typ.	Max.	Max.	Max.
20-500	24	16	0.7	1.4	2.0	0.3
500-1000	20	15	1.2	2.0	4.0	0.7
1000-1200	24	16	1.7	2.9	6.0	0.9

Typical Performance Data

Freq. (MHz)	Total Loss ¹ (dB)			Amp. Unbal. (dB)	Isolation (dB)			Phase Unbal. (deg.)	VSWR S	VSWR 1	VSWR 2	VSWR 3
	S-1	S-2	S-3		1-2	1-3	2-3					
20.00	5.26	5.27	5.26	0.01	33.11	33.43	33.56	0.08	1.14	1.18	1.17	1.17
50.00	5.22	5.24	5.23	0.01	31.13	31.72	31.88	0.10	1.13	1.17	1.16	1.16
100.00	5.24	5.25	5.24	0.01	27.63	28.50	28.60	0.18	1.16	1.16	1.15	1.16
200.00	5.34	5.34	5.33	0.01	23.67	24.84	24.91	0.32	1.25	1.15	1.15	1.16
300.00	5.49	5.47	5.46	0.03	21.17	22.46	22.54	0.44	1.35	1.14	1.15	1.16
400.00	5.66	5.61	5.61	0.05	19.44	20.80	20.90	0.52	1.44	1.13	1.14	1.17
500.00	5.82	5.74	5.74	0.09	18.40	19.82	19.98	0.56	1.51	1.12	1.14	1.16
600.00	5.97	5.84	5.85	0.13	17.84	19.31	19.56	0.52	1.54	1.11	1.12	1.15
700.00	6.09	5.90	5.93	0.18	17.68	19.24	19.63	0.40	1.54	1.11	1.11	1.14
800.00	6.18	5.93	5.96	0.25	18.11	19.80	20.45	0.19	1.47	1.10	1.08	1.11
900.00	6.26	5.94	5.98	0.32	19.22	21.23	22.40	0.19	1.36	1.09	1.05	1.06
1000.00	6.38	5.98	6.03	0.41	21.28	24.38	27.02	0.71	1.18	1.09	1.04	1.04
1090.00	6.62	6.12	6.18	0.50	23.65	31.70	42.96	1.40	1.04	1.08	1.08	1.11
1150.00	6.91	6.35	6.41	0.56	23.44	36.09	29.45	1.96	1.20	1.08	1.13	1.18
1200.00	7.27	6.65	6.72	0.62	21.47	27.81	23.54	2.56	1.39	1.08	1.17	1.25



electrical schematic



3 Way-0° Power Splitter/Combiner

SYPS-3-12W+

Typical Performance Data

TEST CONDITIONS: INPUT POWER = 0dBm @Temperature = +25°C

FREQ. (MHz)	TOTAL LOSS ¹			AMP. UNBAL. (dB)	PHASE UNBAL. (deg.)	ISOLATION			VSWR			
	(dB)					(dB)			(:1)			
	S-1	S-2	S-3			1-2	1-3	2-3	S	1	2	3
10	5.36	5.36	5.34	0.02	0.05	33.33	33.21	33.56	1.21	1.20	1.20	1.20
20	5.30	5.31	5.29	0.02	0.04	33.70	33.60	33.90	1.15	1.18	1.18	1.18
30	5.27	5.27	5.26	0.01	0.05	33.05	33.09	33.32	1.13	1.18	1.17	1.18
40	5.25	5.26	5.24	0.02	0.02	32.40	32.54	32.73	1.12	1.17	1.17	1.17
50	5.24	5.25	5.23	0.02	0.01	31.77	32.05	32.19	1.12	1.17	1.16	1.17
100	5.24	5.25	5.23	0.02	0.05	28.95	29.72	29.75	1.13	1.15	1.15	1.16
150	5.27	5.28	5.27	0.01	0.05	26.71	27.77	27.73	1.15	1.14	1.14	1.15
200	5.32	5.32	5.31	0.01	0.11	24.90	26.15	26.08	1.18	1.13	1.14	1.15
250	5.37	5.36	5.36	0.01	0.12	23.46	24.80	24.73	1.22	1.12	1.13	1.14
300	5.42	5.41	5.41	0.01	0.16	22.28	23.69	23.61	1.25	1.11	1.12	1.14
350	5.48	5.46	5.47	0.02	0.19	21.31	22.79	22.72	1.29	1.10	1.12	1.13
400	5.54	5.51	5.53	0.03	0.20	20.53	22.05	22.00	1.32	1.09	1.11	1.13
450	5.60	5.56	5.59	0.04	0.24	19.87	21.46	21.43	1.35	1.08	1.10	1.13
500	5.66	5.61	5.65	0.05	0.28	19.36	20.96	20.96	1.37	1.07	1.09	1.12
550	5.72	5.66	5.71	0.06	0.31	18.95	20.61	20.63	1.39	1.06	1.09	1.12
600	5.78	5.70	5.76	0.08	0.38	18.64	20.37	20.43	1.40	1.06	1.08	1.11
650	5.82	5.73	5.81	0.09	0.47	18.45	20.23	20.35	1.41	1.07	1.08	1.11
700	5.87	5.76	5.85	0.11	0.57	18.36	20.21	20.38	1.42	1.08	1.07	1.10
750	5.91	5.78	5.89	0.13	0.71	18.37	20.31	20.57	1.41	1.09	1.07	1.10
800	5.95	5.79	5.91	0.16	0.85	18.51	20.57	20.94	1.39	1.10	1.07	1.09
850	5.99	5.79	5.93	0.20	1.10	18.79	21.01	21.52	1.37	1.12	1.08	1.08
900	6.01	5.80	5.95	0.21	1.30	19.21	21.67	22.38	1.33	1.13	1.08	1.07
950	6.04	5.79	5.97	0.25	1.58	19.82	22.68	23.70	1.27	1.14	1.08	1.06
1000	6.07	5.80	5.99	0.27	1.82	20.63	24.19	25.70	1.21	1.15	1.08	1.04
1050	6.13	5.81	6.02	0.32	2.15	21.61	26.44	28.82	1.14	1.16	1.09	1.02
1100	6.22	5.86	6.09	0.36	2.58	22.52	29.69	32.59	1.08	1.16	1.09	1.02
1150	6.35	5.95	6.20	0.40	3.09	22.68	31.92	30.33	1.14	1.15	1.10	1.05
1200	6.59	6.13	6.40	0.45	3.61	21.49	27.83	24.87	1.29	1.14	1.11	1.09
1250	6.94	6.43	6.71	0.51	4.36	19.33	23.26	20.85	1.50	1.11	1.13	1.14
1300	7.46	6.89	7.20	0.57	5.14	17.01	19.81	17.86	1.80	1.08	1.16	1.21
1350	8.19	7.56	7.89	0.63	6.07	14.99	17.24	15.58	2.19	1.04	1.20	1.27
1400	9.16	8.45	8.81	0.71	7.35	13.34	15.33	13.87	2.69	1.03	1.25	1.35

¹ Total Loss = Insertion Loss+ 4.8dB Splitter Loss

3 Way-0° Power Splitter/Combiner

SYPS-3-12W+

Typical Performance Data

TEST CONDITIONS: INPUT POWER = 0dBm @Temperature = -40°C

FREQ. (MHz)	TOTAL LOSS ¹			AMP. UNBAL. (dB)	PHASE UNBAL. (deg.)	ISOLATION			VSWR			
	(dB)					(dB)			(:1)			
	S-1	S-2	S-3			1-2	1-3	2-3	S	1	2	3
10	5.11	5.11	5.08	0.03	0.05	30.60	30.56	30.85	1.36	1.27	1.27	1.27
20	5.19	5.19	5.17	0.02	0.02	35.60	35.51	36.01	1.18	1.17	1.17	1.17
30	5.19	5.19	5.18	0.01	0.03	35.42	35.67	36.00	1.15	1.15	1.14	1.15
40	5.18	5.18	5.18	0.00	0.05	34.60	35.06	35.25	1.14	1.13	1.13	1.14
50	5.17	5.17	5.16	0.01	0.09	33.72	34.39	34.53	1.13	1.12	1.12	1.13
100	5.17	5.17	5.16	0.01	0.20	29.89	31.12	31.07	1.14	1.11	1.11	1.11
150	5.19	5.18	5.18	0.01	0.25	27.13	28.54	28.44	1.17	1.11	1.11	1.11
200	5.22	5.21	5.21	0.01	0.38	25.12	26.64	26.52	1.21	1.09	1.10	1.12
250	5.26	5.24	5.25	0.02	0.47	23.62	25.20	25.07	1.25	1.09	1.10	1.12
300	5.30	5.28	5.29	0.02	0.56	22.44	24.06	23.93	1.28	1.08	1.10	1.11
350	5.35	5.32	5.34	0.03	0.65	21.45	23.14	23.02	1.32	1.08	1.10	1.11
400	5.40	5.36	5.39	0.04	0.74	20.63	22.38	22.27	1.35	1.08	1.10	1.12
450	5.45	5.41	5.45	0.04	0.82	19.94	21.74	21.65	1.39	1.07	1.10	1.12
500	5.50	5.44	5.49	0.06	0.88	19.43	21.25	21.17	1.41	1.08	1.09	1.12
550	5.56	5.49	5.55	0.07	0.94	19.02	20.90	20.85	1.43	1.08	1.09	1.12
600	5.61	5.52	5.58	0.09	1.02	18.70	20.66	20.64	1.44	1.08	1.09	1.12
650	5.65	5.54	5.63	0.11	1.07	18.49	20.51	20.54	1.45	1.09	1.09	1.11
700	5.68	5.56	5.66	0.12	1.10	18.38	20.47	20.55	1.46	1.10	1.09	1.11
750	5.72	5.57	5.69	0.15	1.13	18.37	20.57	20.73	1.44	1.12	1.09	1.10
800	5.74	5.58	5.71	0.16	1.10	18.50	20.85	21.10	1.43	1.13	1.09	1.10
850	5.77	5.57	5.71	0.20	1.09	18.78	21.31	21.70	1.40	1.14	1.09	1.09
900	5.78	5.56	5.72	0.22	1.08	19.16	22.01	22.58	1.35	1.15	1.10	1.08
950	5.80	5.55	5.71	0.25	1.01	19.74	23.05	23.88	1.30	1.16	1.10	1.07
1000	5.82	5.54	5.72	0.28	1.14	20.48	24.59	25.82	1.23	1.17	1.10	1.05
1050	5.86	5.54	5.74	0.32	1.26	21.33	26.89	28.68	1.15	1.18	1.11	1.03
1100	5.93	5.57	5.78	0.36	1.47	22.05	29.65	30.98	1.09	1.18	1.11	1.03
1150	6.04	5.64	5.88	0.40	1.70	22.02	30.16	28.32	1.14	1.17	1.11	1.05
1200	6.25	5.79	6.04	0.45	1.97	20.76	26.10	23.69	1.29	1.15	1.11	1.08
1250	6.57	6.07	6.33	0.50	2.29	18.65	22.03	20.00	1.52	1.13	1.13	1.13
1300	7.07	6.50	6.78	0.56	3.00	16.39	18.85	17.15	1.83	1.09	1.15	1.20
1350	7.78	7.15	7.45	0.63	3.77	14.39	16.40	14.94	2.27	1.05	1.18	1.27
1400	8.75	8.04	8.35	0.71	4.97	12.77	14.56	13.25	2.84	1.02	1.23	1.35

¹ Total Loss = Insertion Loss+ 4.8dB Splitter Loss

REV. X2
SYPS-3-12W+
100627
Page 2 of 3

3 Way-0° Power Splitter/Combiner

SYPS-3-12W+

Typical Performance Data

TEST CONDITIONS: INPUT POWER = 0dBm @Temperature = +85°C

FREQ.	TOTAL LOSS ¹			AMP. UNBAL.	PHASE UNBAL.	ISOLATION			VSWR			
(MHz)	(dB)			(dB)	(deg.)	(dB)			(:1)			
	S-1	S-2	S-3			1-2	1-3	2-3	S	1	2	3
10	5.40	5.40	5.39	0.01	0.00	32.65	32.07	32.45	1.18	1.25	1.25	1.25
20	5.32	5.32	5.31	0.01	0.03	31.92	31.31	31.69	1.14	1.24	1.23	1.24
30	5.29	5.30	5.28	0.02	0.03	31.25	30.78	31.10	1.12	1.23	1.23	1.23
40	5.28	5.29	5.27	0.02	0.05	30.73	30.34	30.63	1.11	1.23	1.22	1.23
50	5.28	5.29	5.27	0.02	0.03	30.25	29.99	30.23	1.11	1.23	1.22	1.22
100	5.30	5.31	5.30	0.01	0.08	28.08	28.37	28.48	1.12	1.21	1.20	1.21
150	5.34	5.35	5.34	0.01	0.07	26.20	26.85	26.90	1.14	1.19	1.19	1.20
200	5.39	5.39	5.39	0.00	0.13	24.60	25.51	25.51	1.17	1.18	1.18	1.19
250	5.45	5.44	5.45	0.01	0.16	23.25	24.30	24.28	1.20	1.16	1.17	1.18
300	5.51	5.50	5.51	0.01	0.20	22.11	23.26	23.25	1.23	1.15	1.16	1.17
350	5.57	5.55	5.57	0.02	0.25	21.17	22.41	22.40	1.26	1.13	1.14	1.16
400	5.63	5.61	5.63	0.02	0.25	20.40	21.72	21.72	1.29	1.11	1.13	1.16
450	5.71	5.67	5.70	0.03	0.27	19.77	21.16	21.18	1.32	1.10	1.12	1.15
500	5.76	5.72	5.76	0.04	0.37	19.29	20.69	20.74	1.34	1.08	1.11	1.14
550	5.83	5.78	5.84	0.06	0.42	18.91	20.37	20.45	1.36	1.07	1.10	1.13
600	5.90	5.82	5.89	0.08	0.51	18.62	20.14	20.27	1.38	1.06	1.09	1.12
650	5.96	5.86	5.95	0.10	0.60	18.45	20.01	20.20	1.39	1.06	1.08	1.12
700	6.01	5.90	6.00	0.11	0.72	18.37	20.00	20.25	1.39	1.06	1.07	1.11
750	6.06	5.92	6.05	0.14	0.87	18.39	20.11	20.45	1.38	1.07	1.07	1.10
800	6.11	5.95	6.08	0.16	1.02	18.54	20.36	20.81	1.37	1.09	1.07	1.09
850	6.15	5.96	6.10	0.19	1.25	18.84	20.78	21.39	1.34	1.10	1.07	1.08
900	6.18	5.97	6.13	0.21	1.47	19.27	21.42	22.26	1.31	1.12	1.07	1.07
950	6.22	5.97	6.16	0.25	1.73	19.92	22.40	23.57	1.25	1.13	1.07	1.05
1000	6.27	5.98	6.19	0.29	2.00	20.80	23.85	25.58	1.19	1.14	1.07	1.03
1050	6.33	6.01	6.24	0.32	2.31	21.86	26.12	28.90	1.12	1.15	1.07	1.01
1100	6.43	6.07	6.31	0.36	2.82	22.93	29.47	33.78	1.07	1.15	1.08	1.02
1150	6.58	6.18	6.44	0.40	3.30	23.27	33.40	32.10	1.14	1.14	1.09	1.06
1200	6.84	6.38	6.65	0.46	3.88	22.14	29.57	25.79	1.29	1.13	1.11	1.10
1250	7.20	6.70	6.99	0.50	4.62	19.92	24.41	21.48	1.50	1.10	1.14	1.15
1300	7.74	7.17	7.49	0.56	5.51	17.55	20.69	18.38	1.78	1.07	1.17	1.22
1350	8.48	7.85	8.20	0.63	6.42	15.47	17.97	16.06	2.14	1.04	1.22	1.28
1400	9.45	8.75	9.12	0.70	7.76	13.81	15.97	14.31	2.59	1.03	1.26	1.35

¹ Total Loss = Insertion Loss+ 4.8dB Splitter Loss

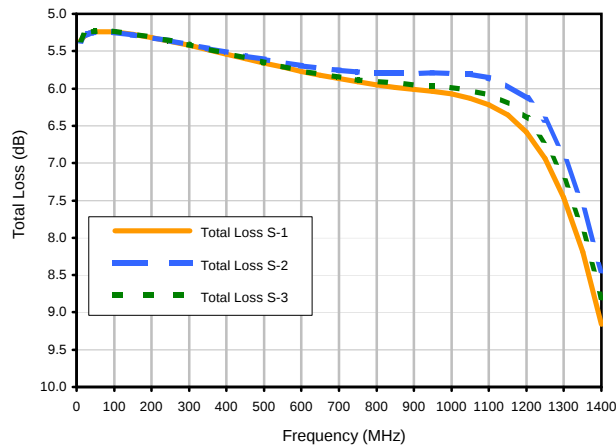
REV. X2
SYPS-3-12W+
100627
Page 3 of 3

3 Way-0° Power Splitter/Combiner

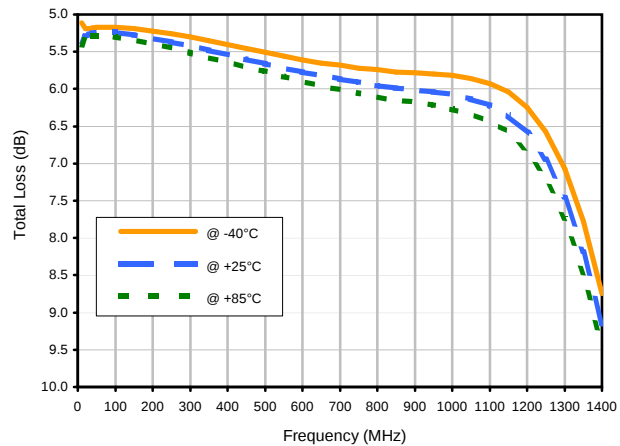
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Typical Performance Curves

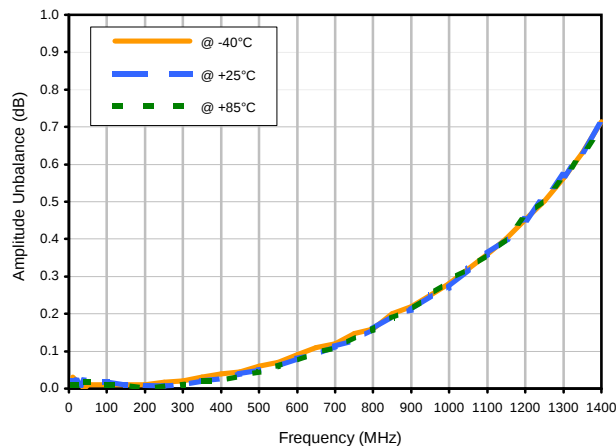
Total Loss



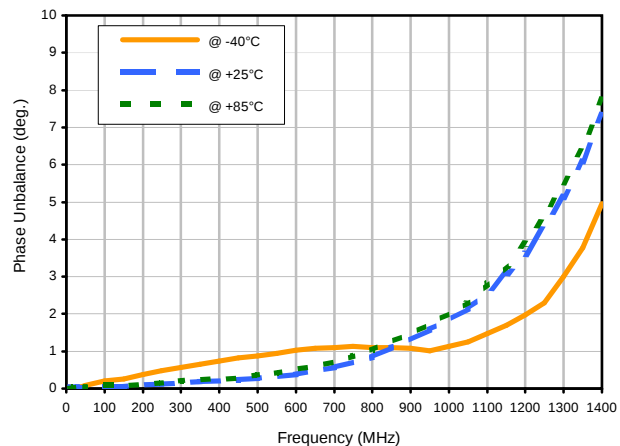
Total Loss S-1 vs. TEMPERATURE



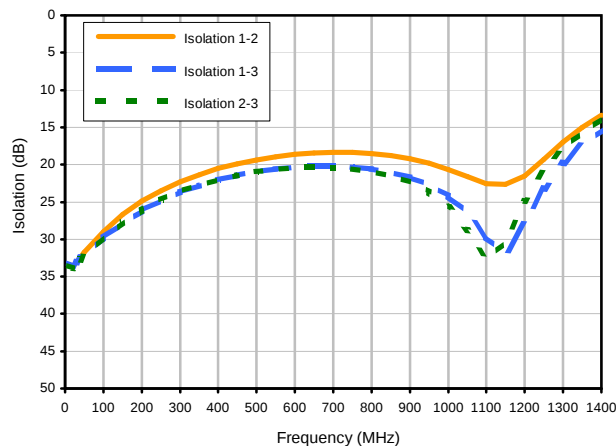
Amplitude Unbalance vs. TEMPERATURE



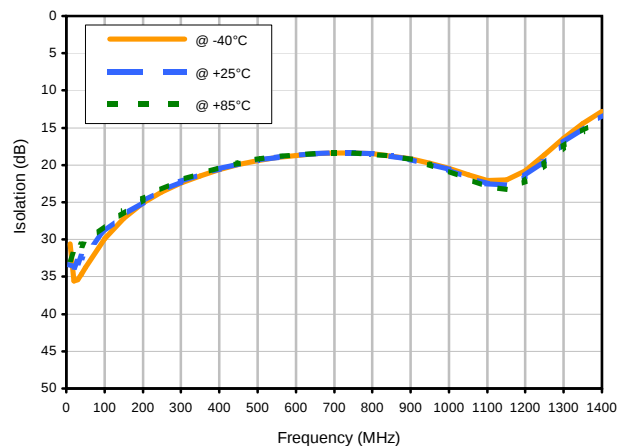
Phase Unbalance vs. TEMPERATURE



Isolation



Isolation 1-2 vs. TEMPERATURE



REV. X2

SYPS-3-12W+

100627

Page 1 of 2



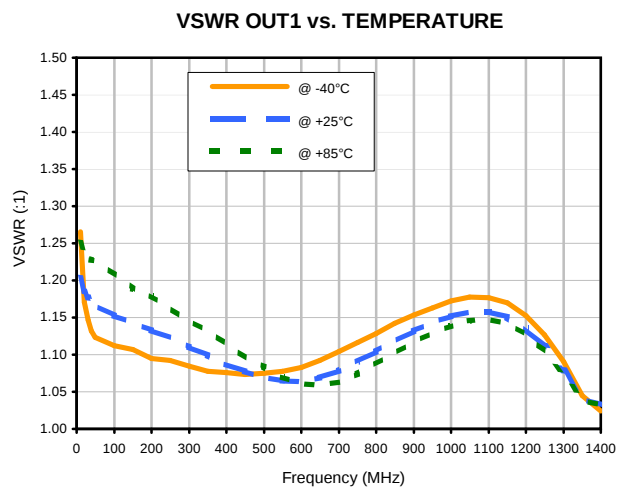
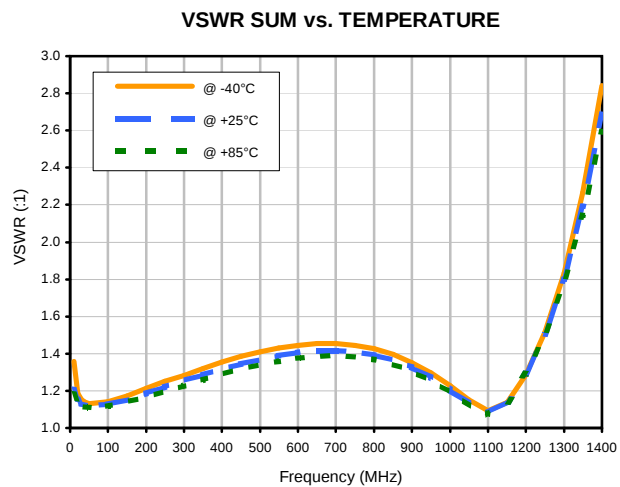
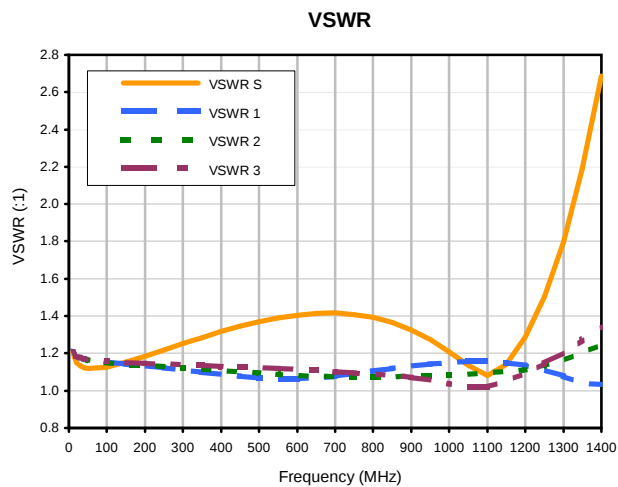
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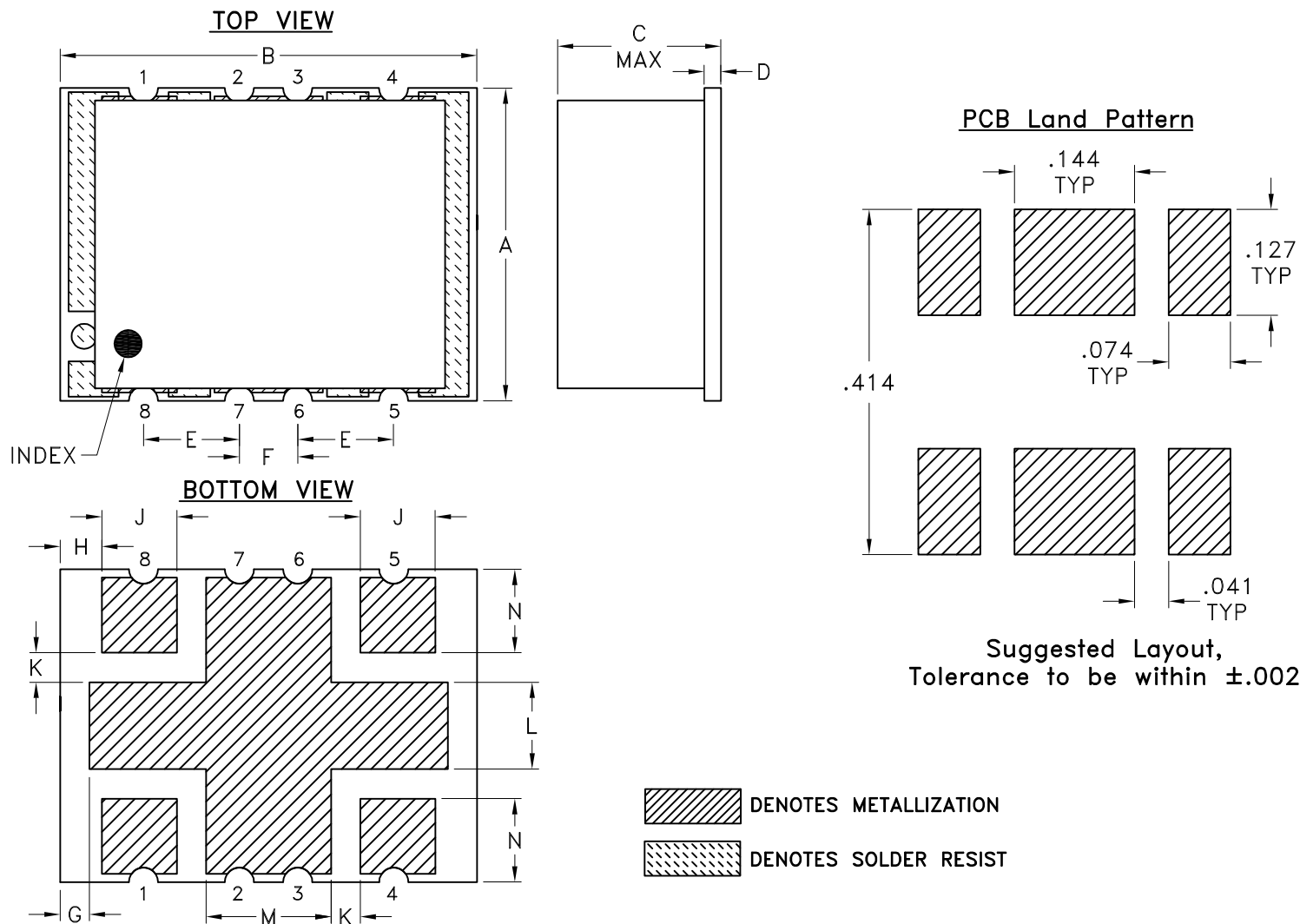


Typical Performance Curves



Outline Dimensions

AH202



CASE#	A	B	C	D	E	F	G	H	J	K	L	M	N	WT, GRAM
AH202	.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. $\pm.01$; 3 Pl. $\pm.005$

Notes:

- Case material: Plastic.
- Base material: Printed wiring laminate.
- 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.

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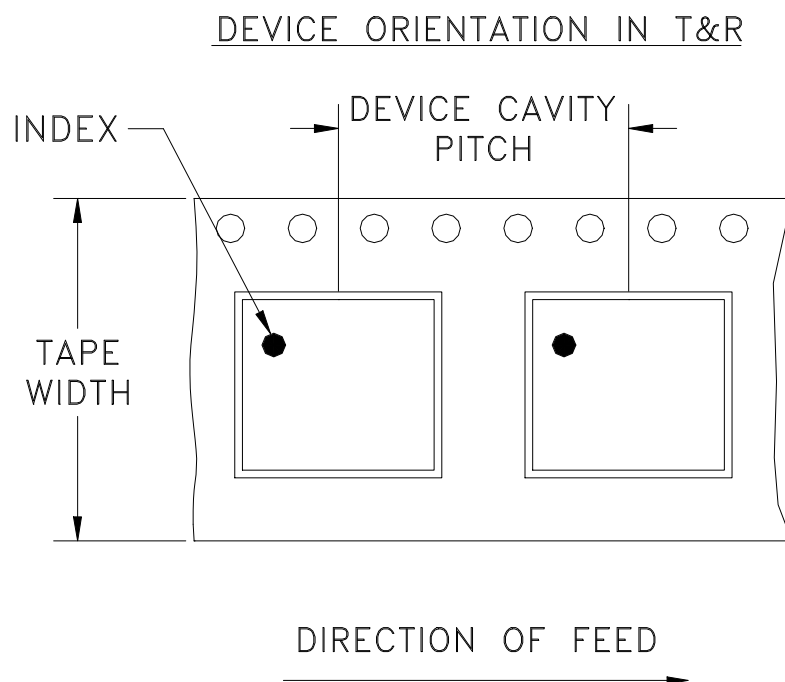
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RF/IF MICROWAVE COMPONENTS

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

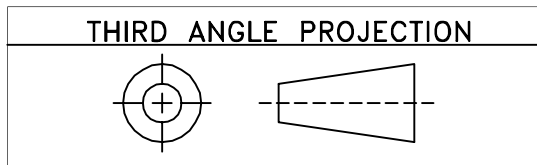


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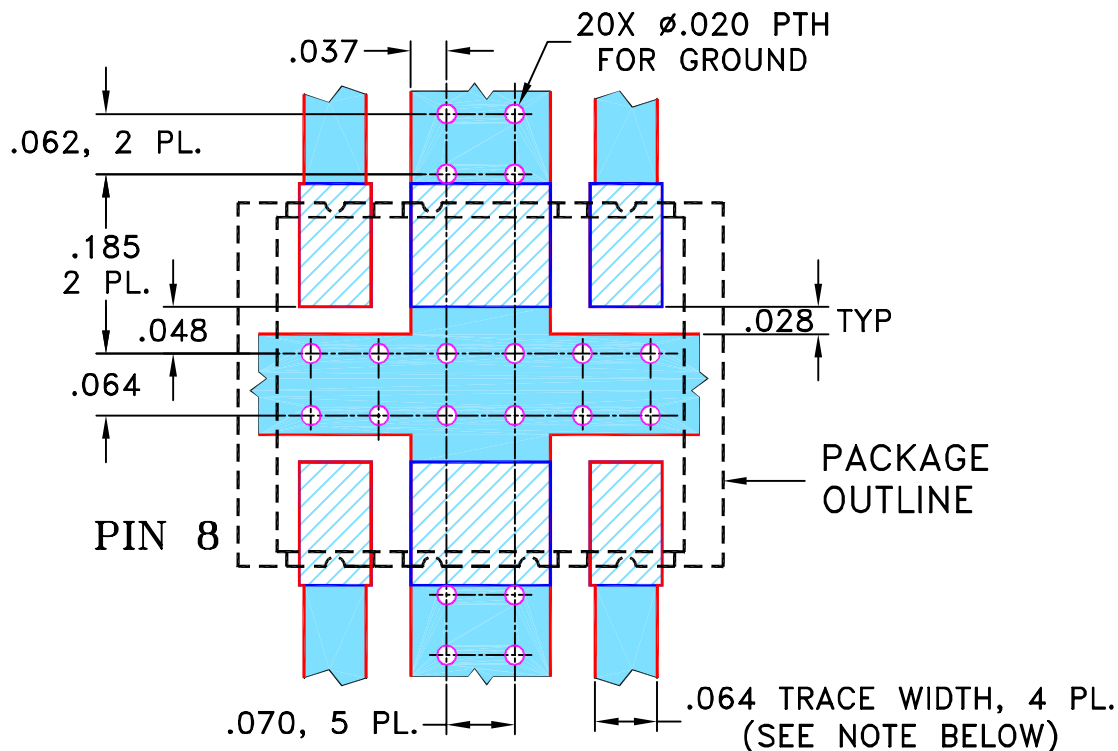
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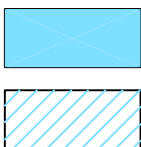
REVISIONS					
REV OR	ECN No.	DESCRIPTION	DATE	DR	AUTH
	M101222	NEW RELEASE	09/19/06	MMG	HY

**SUGGESTED MOUNTING CONFIGURATION
FOR AH202 CASE STYLE, "rd" PIN CONNECTION**



NOTES:

- TRACE WIDTH IS SHOWN FOR ROGERS RO4350B WITH DIELECTRIC THICKNESS .030" $\pm$.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 TOLERANCES ON: 2 PL DECIMALS $\pm$ 3 PL DECIMALS $\pm$.005 ANGLES $\pm$ FRACTIONS $\pm$	DRAWN	MMG	12/07/05
	CHECKED	AY	09/18/06
	APPROVED	HY	09/19/06



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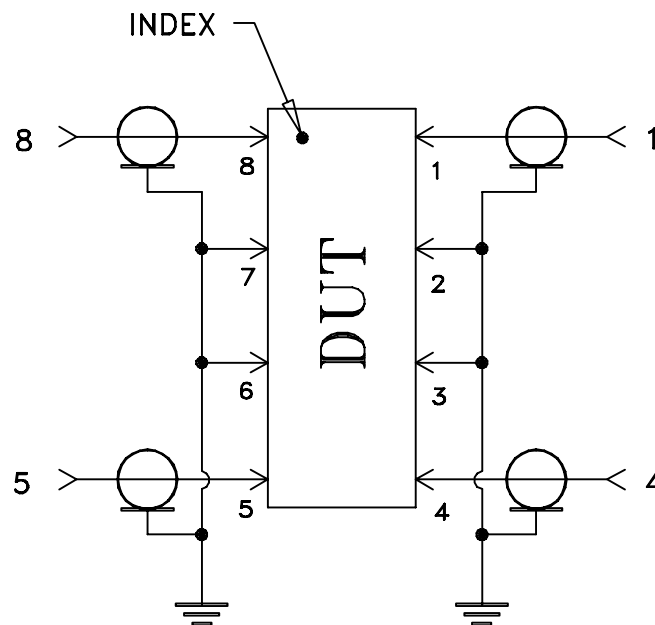
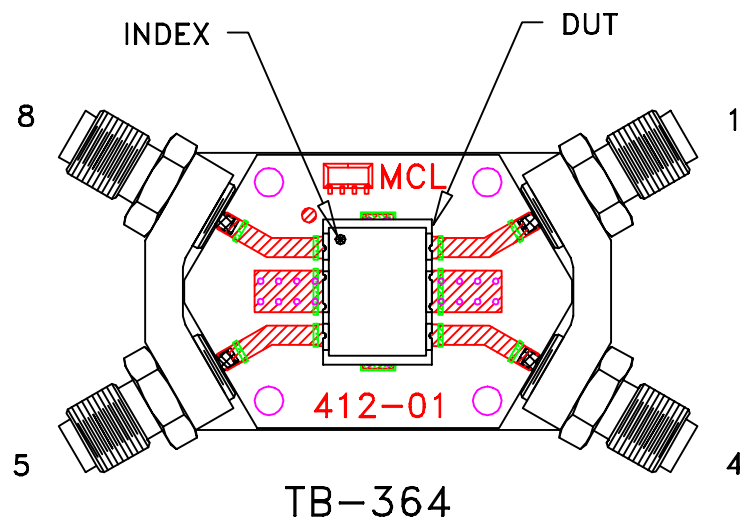
PL, rd, AH202, SYPS-3-12W, TB-364

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SIZE A	CODE IDENT 15542	DRAWING NO: 98-PL-231	REV: OR
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Evaluation Board and Circuit

For Pin Connections refer to Data Sheet of the DUT



Schematic Diagram

Notes:

1. SMA Female connectors.
2. PCB Material: Rogers R04350 or equivalent,
Dielectric Constant=3.5, Thickness=.030 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
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