

Up Converter Frequency Mixer

SIM-U712H+

Level 17 (LO Power +17 dBm) 10 to 7100 MHz

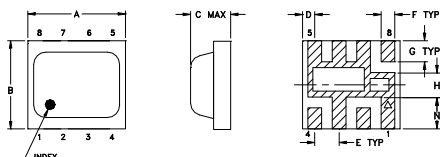
Maximum Ratings

Operating Temperature	-40°C to 85°C
Storage Temperature	-55°C to 100°C
IF Power	100mW
For extended temperature range, consult factory.	
Permanent damage may occur if any of these limits are exceeded.	

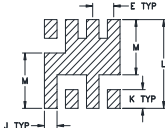
Pin Connections

LO	2
IF (IN)	8
RF (OUT)	4
GROUND	1,3,5,6,7

Outline Drawing



PCB Metal Land Pattern



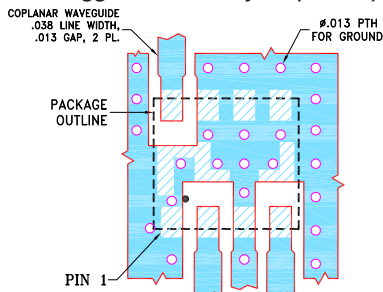
Suggested Layout,
Tolerance to be within ±.002

Outline Dimensions (inch)

A	B	C	D	E	F	G
.200	.180	.087	.025	.050	.028	.043
5.08	4.57	2.2098	0.64	1.27	0.71	1.09
H	J	K	L	M	N	wt
.050	.030	.043	.204	.127	0.065	grams
1.27	0.76	1.09	5.18	3.23	1.65	0.08

Demo Board MCL P/N: TB-382

Suggested PCB Layout (PL-239)



NOTES:

- TRACE WIDTH AND GAP ARE SHOWN FOR ROGERS RO4350B WITH DIELECTRIC THICKNESS .020" ±.0015"; COPPER: 1/2 OZ. EACH SIDE.
FOR OTHER MATERIALS TRACE WIDTH AND GAP 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

- up converter mixer
- low conversion loss, 7.3 dB typ.
- high IP3, 27 dBm typ.
- ceramic, tiny size
- aqueous washable
- protected by US patent, 7,027,795

Applications

- cellular infrastructure
- WIMAX
- line-of-sight links
- wide band receivers

Generic photo used for illustration purposes only

CASE STYLE: HV1195

+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, 500

Electrical Specifications

FREQUENCY (MHz)			CONVERSION LOSS* (dB)			LO-IF (IN) ISOLATION (dB)		LO-RF (OUT) ISOLATION (dB)		IP3 at center band (dBm)
IF (IN)	LO	RF (OUT)	Typ.	σ **	Max.	Typ.	Min.	Typ.	Min.	
2600-7100	10-1780	2600-7100	7.3	0.3	9.5	27	14	19	11	27

1 dB Compression: +14 dBm typ.

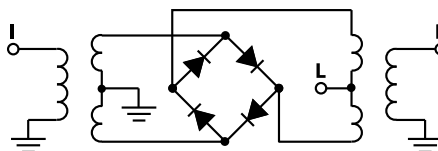
* Conversion Loss at 30 MHz LO

** σ is a standard deviation

Typical Performance Data

Frequency (MHz)			Conversion Loss (dB)	VSWR RF Port (:1)	Frequency (MHz)			VSWR LO Port (:1)
IF (IN)	LO	RF (OUT)			LO	Isolation L-I (dB)	Isolation L-R (dB)	
			LO +17dBm	LO +17dBm		LO +17dBm	LO +17dBm	LO +17dBm
2600.10	30.00	2630.10	7.80	1.34	11.00	67.68	51.44	1.47
2800.10	30.00	2830.10	7.15	1.41	51.00	55.46	42.85	1.50
3000.10	30.00	3030.10	6.88	1.59	91.00	50.53	38.59	1.50
3200.10	30.00	3230.10	6.61	1.52	153.60	46.33	35.04	1.53
3400.10	30.00	3430.10	6.74	1.60	238.80	42.47	31.79	1.55
3600.10	30.00	3630.10	6.62	1.69	324.00	39.73	29.14	1.59
3800.10	30.00	3830.10	6.81	1.91	409.20	37.68	27.14	1.60
4000.10	30.00	4030.10	7.00	2.30	494.40	35.96	25.30	1.58
4400.10	30.00	4430.10	7.21	2.77	664.80	33.22	22.36	1.52
4600.10	30.00	4630.10	7.42	2.80	750.00	31.84	21.29	1.49
4800.10	30.00	4830.10	7.52	3.53	776.67	31.61	21.20	1.53
5000.10	30.00	5030.10	7.64	3.83	803.33	31.30	21.00	1.54
5400.10	30.00	5430.10	7.58	2.09	871.67	30.30	20.66	1.67
5600.10	30.00	5630.10	7.45	1.43	913.33	29.80	20.50	1.69
5800.10	30.00	5830.10	7.59	1.78	955.00	29.17	20.11	1.79
6280.10	30.00	6310.10	8.08	1.46	1080.00	27.50	19.86	1.93
6440.10	30.00	6470.10	7.68	1.23	1121.67	26.99	19.53	2.10
6600.10	30.00	6630.10	7.98	1.49	1205.00	25.85	19.07	2.23
6920.10	30.00	6950.10	7.75	2.82	1436.67	23.03	17.93	2.37
7240.10	30.00	7270.10	8.80	3.39	1796.50	19.26	16.94	2.29

Electrical Schematic



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.

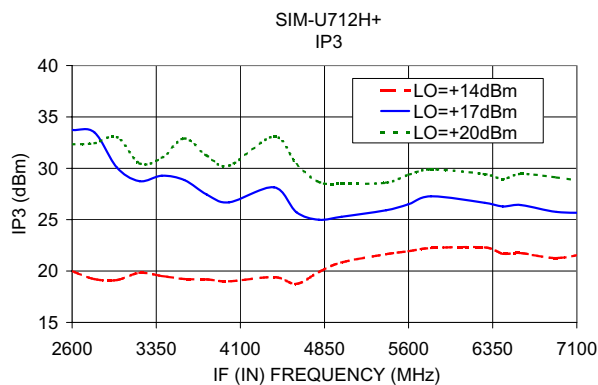
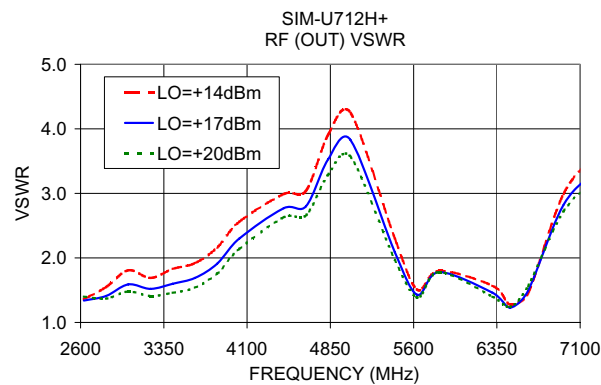
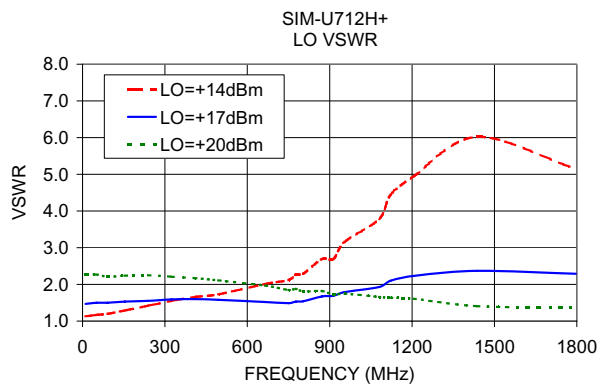
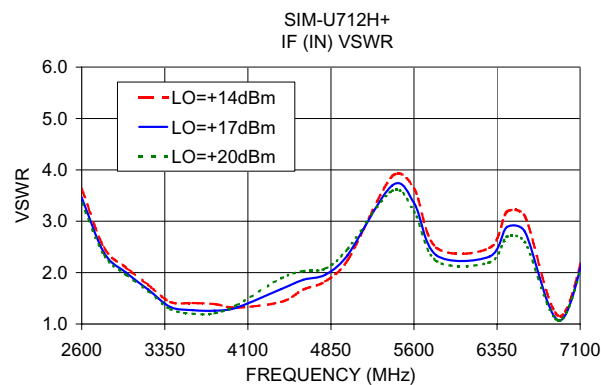
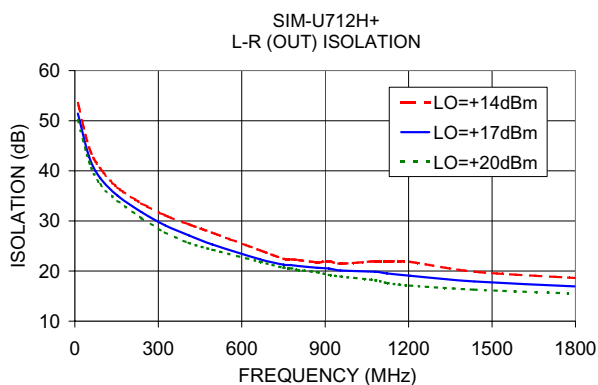
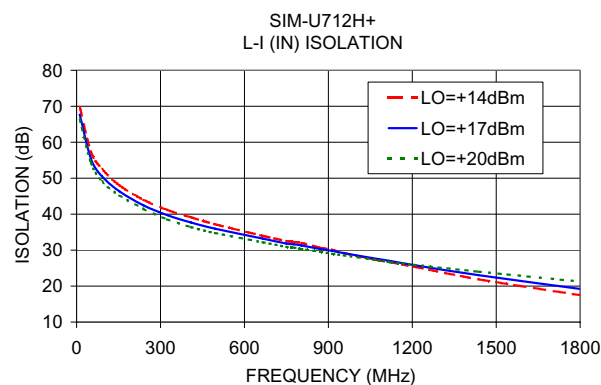
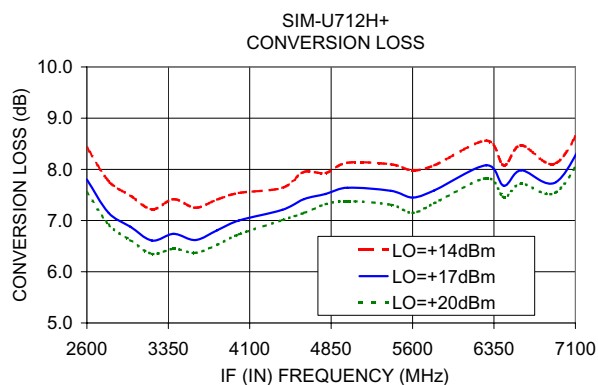
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Frequency Mixer (Upconverter)

SIM-U712H+

Typical Performance Data

IF INPUT (MHz)	LO INPUT (MHz)	RF OUTPUT (MHz)	CONVERSION LOSS (dB)			IP3 INPUT (dBm)			LO INPUT (MHz)	LO-IF ISOLATION (dB)			LO-RF ISOLATION (dB)		
			@LO (dBm)			@LO (dBm)				@LO (dBm)			@LO (dBm)		
			+14	+17	+20	+14	+17	+20		+14	+17	+20	+14	+17	+20
2600.1	30.0	2630.1	8.43	7.80	7.55	19.99	33.73	32.34	11.0	69.76	67.68	66.25	53.52	51.44	50.10
2800.1	30.0	2830.1	7.77	7.15	6.92	19.22	33.49	32.44	51.0	57.34	55.46	54.31	44.64	42.85	41.79
3000.1	30.0	3030.1	7.49	6.88	6.62	19.13	30.07	33.05	91.0	52.55	50.53	49.14	40.50	38.59	37.32
3200.1	30.0	3230.1	7.22	6.61	6.35	19.83	28.75	30.48	153.6	48.01	46.33	45.23	36.66	35.04	34.02
3400.1	30.0	3430.1	7.42	6.74	6.45	19.53	29.28	31.02	238.8	44.02	42.47	41.47	33.55	31.79	30.59
3600.1	30.0	3630.1	7.25	6.62	6.37	19.23	28.86	32.91	324.0	41.19	39.73	38.57	31.15	29.14	27.75
3800.1	30.0	3830.1	7.41	6.81	6.53	19.19	27.45	31.24	409.2	39.12	37.68	36.42	29.34	27.14	25.64
4000.1	30.0	4030.1	7.54	7.00	6.73	19.01	26.69	30.27	494.4	37.23	35.96	34.78	27.64	25.30	24.27
4200.1	30.0	4230.1	7.55	7.05	6.83	19.02	27.34	30.82	579.6	35.60	34.64	33.55	25.89	23.69	23.16
4400.1	30.0	4430.1	7.64	7.21	7.01	19.41	28.15	33.10	664.8	33.99	33.22	32.21	24.17	22.36	21.88
4600.1	30.0	4630.1	7.95	7.42	7.15	18.75	25.72	30.39	750.0	32.54	31.84	30.94	22.46	21.29	20.67
4800.1	30.0	4830.1	7.93	7.52	7.32	19.91	24.99	28.68	776.7	32.32	31.61	30.73	22.35	21.20	20.58
5000.1	30.0	5030.1	8.13	7.64	7.38	20.83	25.28	28.49	803.3	32.03	31.30	30.33	22.21	21.00	20.19
5200.1	30.0	5230.1	8.18	7.65	7.35	21.42	25.73	28.83	830.0	31.41	30.79	29.89	21.73	20.67	19.80
5400.1	30.0	5430.1	8.10	7.58	7.31	21.65	25.92	28.61	871.7	30.68	30.30	29.57	21.75	20.66	19.80
5600.1	30.0	5630.1	7.98	7.45	7.15	21.93	26.51	29.38	913.3	30.11	29.80	28.98	21.99	20.50	19.24
5800.1	30.0	5830.1	8.08	7.59	7.34	22.24	27.28	29.89	955.0	29.18	29.17	28.56	21.48	20.11	18.92
5960.1	30.0	5990.1	8.24	7.75	7.49	22.22	27.26	29.91	996.7	28.78	28.79	28.19	22.13	20.27	18.76
6120.1	30.0	6150.1	8.26	7.83	7.59	21.93	26.91	29.42	1038.3	27.81	27.97	27.47	21.79	19.86	18.31
6280.1	30.0	6310.1	8.56	8.08	7.83	22.31	26.64	29.44	1080.0	27.18	27.50	27.20	21.96	19.86	18.18
6440.1	30.0	6470.1	8.08	7.68	7.46	21.69	26.28	28.95	1121.7	26.66	26.99	26.68	21.95	19.53	17.64
6600.1	30.0	6630.1	8.47	7.98	7.72	21.76	26.42	29.46	1205.0	25.43	25.85	25.94	21.84	19.07	17.11
6760.1	30.0	6790.1	8.12	7.71	7.49	21.52	25.91	28.85	1288.3	24.21	24.83	25.22	21.14	18.50	16.68
6920.1	30.0	6950.1	8.12	7.75	7.55	21.27	25.75	29.11	1436.7	21.90	23.03	24.04	19.88	17.93	16.30
7080.1	30.0	7110.1	8.70	8.28	8.05	21.24	25.74	28.94	1650.0	16.72	18.24	19.80	16.25	14.64	13.17
7240.1	30.0	7270.1	9.19	8.80	8.57	21.86	25.65	28.62	1796.5	17.53	19.26	21.30	18.63	16.94	15.50

Frequency Mixer (Upconverter)

SIM-U712H+

Typical Performance Data

IF INPUT (MHz)	IF VSWR (:1)			LO INPUT (MHz)	LO VSWR (:1)			RF OUTPUT (MHz)	RF VSWR (:1)		
	@LO (dBm)				@LO (dBm)				@LO (dBm)		
	+14	+17	+20		+14	+17	+20		+14	+17	+20
2600.1	3.63	3.46	3.36	11.0	1.13	1.47	2.27	2630.1	1.36	1.34	1.40
2800.1	2.49	2.39	2.34	51.0	1.17	1.50	2.27	2830.1	1.55	1.41	1.37
3000.1	2.10	2.00	1.96	91.0	1.20	1.50	2.21	3030.1	1.81	1.59	1.48
3200.1	1.76	1.67	1.64	153.6	1.29	1.53	2.24	3230.1	1.69	1.52	1.41
3400.1	1.43	1.33	1.29	238.8	1.42	1.55	2.25	3430.1	1.83	1.60	1.46
3600.1	1.41	1.27	1.20	324.0	1.55	1.59	2.21	3630.1	1.92	1.69	1.54
3800.1	1.39	1.26	1.21	409.2	1.66	1.60	2.17	3830.1	2.16	1.91	1.76
4000.1	1.32	1.32	1.37	494.4	1.73	1.58	2.11	4030.1	2.56	2.30	2.14
4200.1	1.38	1.54	1.70	579.6	1.90	1.56	2.05	4230.1	2.77	2.56	2.42
4400.1	1.43	1.68	1.89	664.8	2.01	1.52	1.97	4430.1	2.99	2.77	2.63
4600.1	1.67	1.86	2.03	750.0	2.12	1.49	1.85	4630.1	3.04	2.80	2.66
4800.1	1.83	1.96	2.08	776.7	2.27	1.53	1.88	4830.1	3.91	3.53	3.29
5000.1	2.24	2.34	2.46	803.3	2.29	1.54	1.81	5030.1	4.25	3.83	3.57
5200.1	2.91	2.91	2.94	830.0	2.30	1.56	1.76	5230.1	3.69	3.32	3.10
5400.1	3.87	3.69	3.59	871.7	2.69	1.67	1.82	5430.1	2.30	2.09	1.97
5600.1	3.64	3.36	3.19	913.3	2.69	1.69	1.72	5630.1	1.51	1.43	1.39
5800.1	2.49	2.34	2.23	955.0	3.16	1.79	1.75	5830.1	1.80	1.78	1.78
5960.1	2.25	2.08	1.97	996.7	3.13	1.79	1.67	5990.1	2.07	2.01	1.99
6120.1	2.13	1.98	1.89	1038.3	3.72	1.93	1.69	6150.1	1.92	1.82	1.76
6280.1	2.48	2.31	2.20	1080.0	3.78	1.93	1.66	6310.1	1.57	1.46	1.40
6440.1	3.19	2.89	2.70	1121.7	4.44	2.10	1.64	6470.1	1.28	1.23	1.24
6600.1	3.10	2.80	2.60	1205.0	4.94	2.23	1.61	6630.1	1.45	1.49	1.56
6760.1	2.05	1.87	1.76	1288.3	5.27	2.27	1.53	6790.1	2.07	2.04	2.05
6920.1	1.15	1.07	1.07	1436.7	6.02	2.37	1.41	6950.1	2.99	2.82	2.72
7080.1	2.07	2.08	2.10	1650.0	5.76	2.33	1.33	7110.1	3.53	3.30	3.15
7240.10	3.34	3.23	3.16	1796.5	5.15	2.29	1.36	7270.1	3.64	3.39	3.23



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IF/RF MICROWAVE COMPONENTS

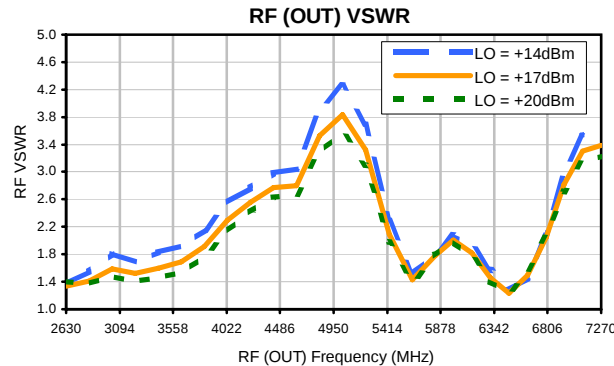
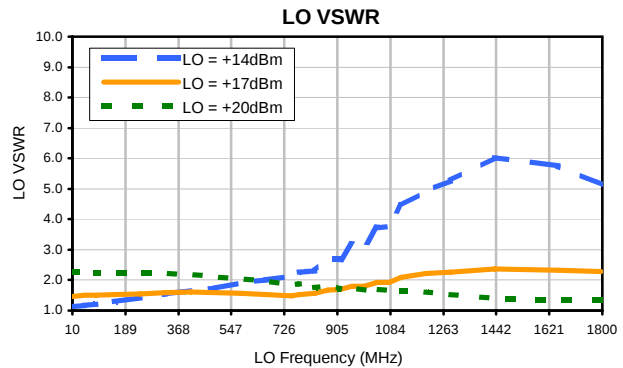
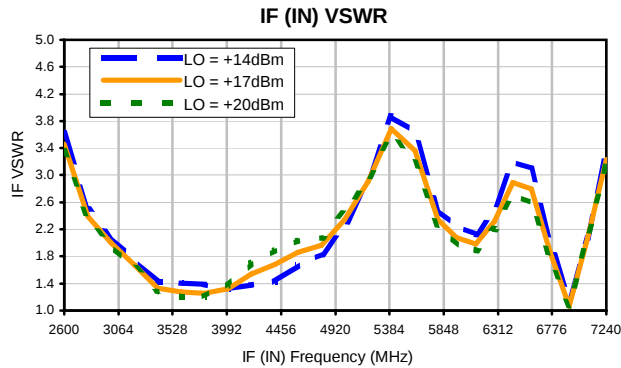
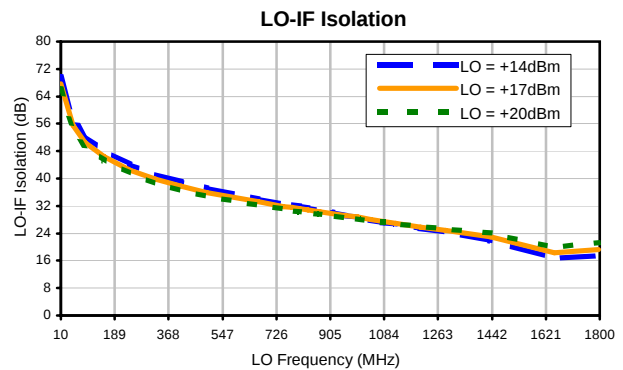
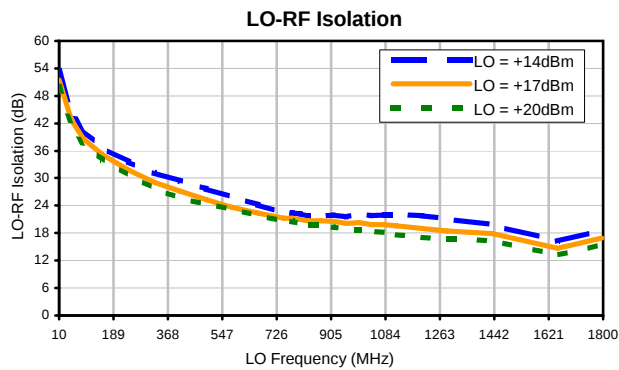
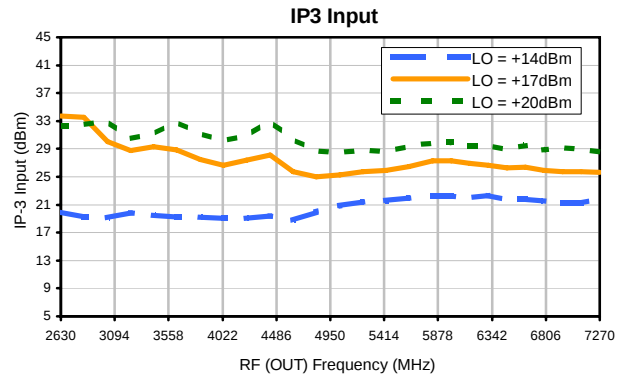
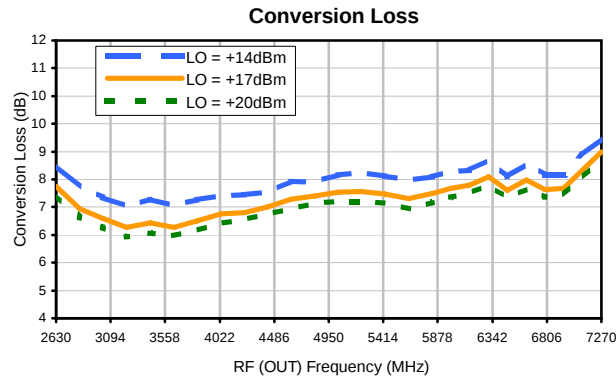


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Frequency Mixer (Upconverter)

SIM-U712H+

Typical Performance Curves



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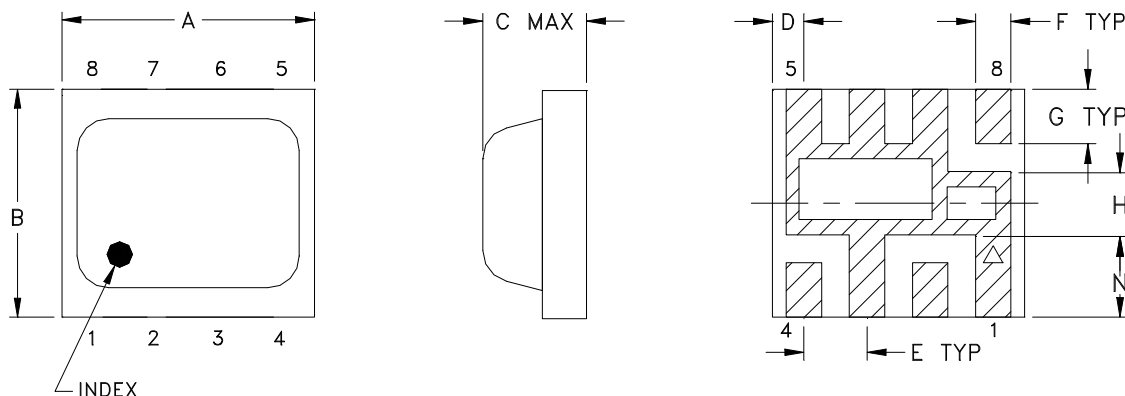
IF/RF MICROWAVE COMPONENTS



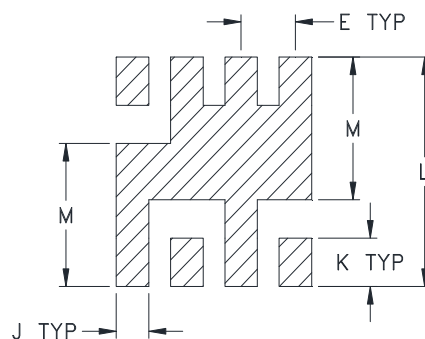
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Outline Dimensions

HV1195



PCB Metal Land Pattern



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

CASE#	A	B	C	D	E	F	G	H	J	K	L	M	N
HV1195	0.200 (5.08)	0.180 (4.57)	0.087 (2.21)	0.025 (0.64)	0.050 (1.27)	0.028 (0.71)	0.043 (1.09)	0.050 (1.27)	0.030 (0.76)	0.043 (1.09)	0.204 (5.18)	0.127 (3.23)	0.065 (1.65)

CASE#	WT, GRAM
HV1195	.08

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

Notes:

1. Case material: Plastic encapsulation on Ceramic base.
2. Termination finish: Palladium Silver.



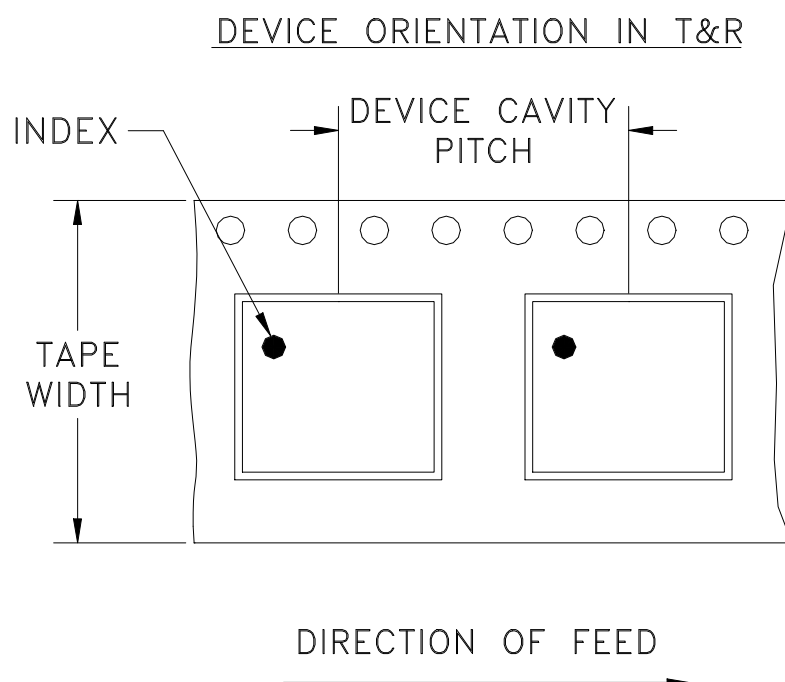
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RF/IF MICROWAVE COMPONENTS

Tape & Reel Packaging TR-F82



Tape Width, mm	Device Cavity Pitch, mm	Reel Size, inches	Devices per Reel
12	8	7	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



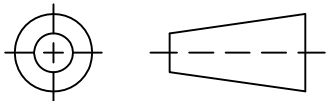
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THIRD ANGLE PROJECTION



REVISIONS

REV	ECN No.	DESCRIPTION	DATE	DR	AUTH
OR	M104559	NEW RELEASE	04/11/06	MMG	DJ
A	M109513	MODIFIED SMOBC AREA, REMOVED NOTE 3	01/31/07	PW	DJ
B	M176274	MODIFIED CASE STYLE	09/23/19	ITG	RB

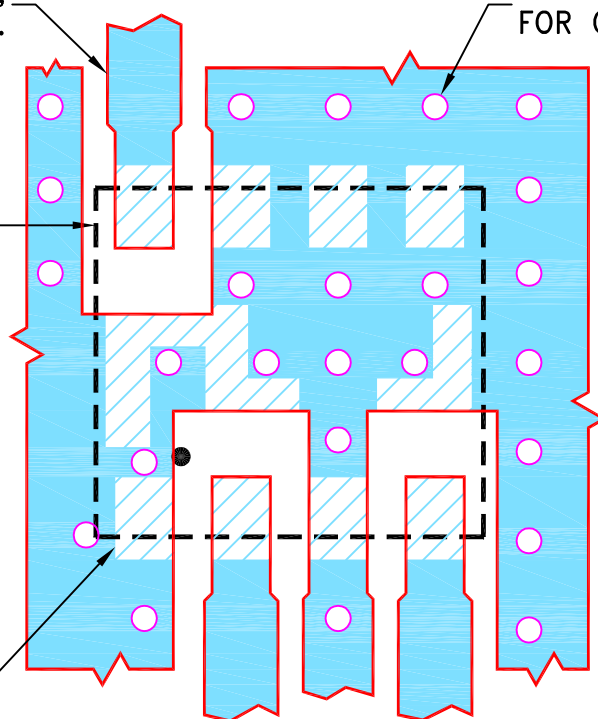
SUGGESTED MOUNTING CONFIGURATION FOR HV1195 CASE STYLE, "rh" PIN CONNECTION

COPLANAR WAVEGUIDE
.038 LINE WIDTH,
.013 GAP, 2 PL.

Ø.013 PTH
FOR GROUND

PACKAGE
OUTLINE

PIN 1

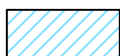


NOTES:

1. TRACE WIDTH AND GAP ARE SHOWN FOR ROGERS R04350B WITH DIELECTRIC THICKNESS .020"±.0015"; 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

DIMENSIONS ARE IN INCHES

TOLERANCES ON:

2 PL DECIMALS ±

3 PL DECIMALS ± .005

ANGLES ±

FRACTIONS ±

DRAWN

MMG

04/10/06

CHECKED

IL

04/11/06

APPROVED

DJ

04/11/06



Mini-Circuits®

13 Neptune Avenue
Brooklyn NY 11235

PL, rh, HV1195, SIM, TB-382

SIZE

CODE IDENT

DRAWING NO:

REV:

A

15542

98-PL-239

B

FILE:

98PL239

SCALE:

10:1

SHEET:

1 OF 1

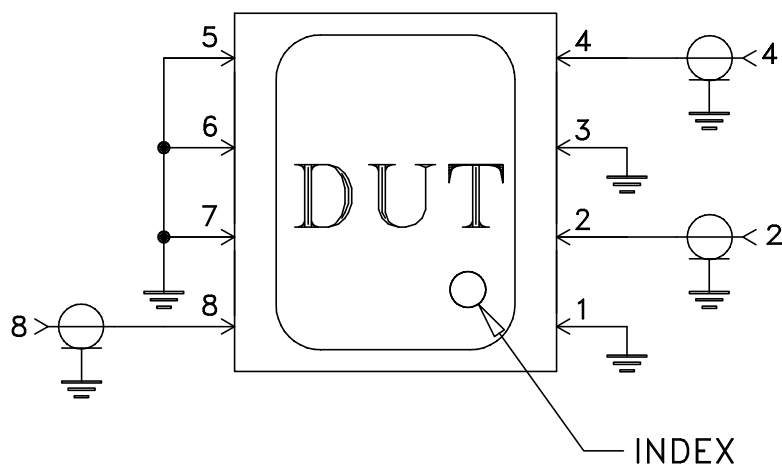
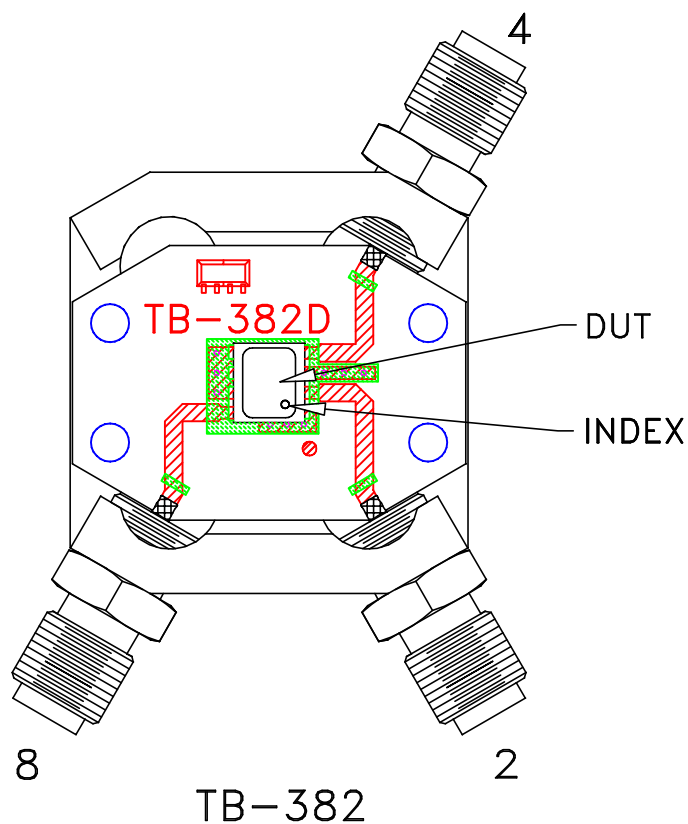
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ASHEETA1.DWG REV:A DATE:01/12/95

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=.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 Case Temperature	Individual Model Data Sheet
Storage Temperature	-55° to 100° C Ambient Environment	Individual Model Data Sheet
Autoclave	15 psig, 100% RH, 121°C, 96 hours	JESD22-A102-C, Condition 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: 250°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, 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