

Up Converter Frequency Mixer

Level 13 (LO Power +13 dBm) 0.1 to 7400 MHz

SIM-U742MH+



Generic photo used for illustration purposes only

CASE STYLE: HV1195

Maximum Ratings

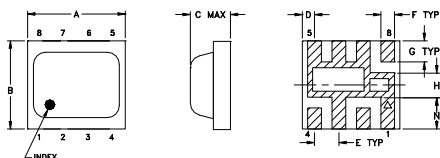
Operating Temperature	-40°C to 85°C
Storage Temperature	-55°C to 100°C
IF Power	50mW

For extended temperature range, consult factory.
Permanent damage may occur if any of these limits are exceeded.

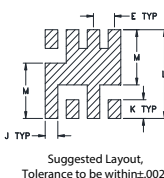
Pin Connections

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

Outline Drawing



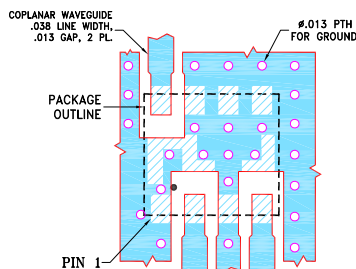
PCB Metal Land Pattern



Outline Dimensions (inch/mm)

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, 8.0 dB typ.
- high IP3, 20 dBm typ.
- ceramic, tiny size
- aqueous washable
- protected by US Patent, 7,027,795

Applications

- instrumentation
- wide band receivers

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.	
0.1-3300	2300-7400	2300-7400	8.0	0.4	9.8	17	11	23	13	20

1 dB Compression: +9 dBm typ.

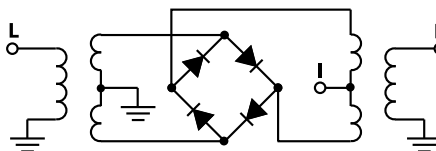
* Conversion loss at 4075 MHz RF

** σ is a standard deviation

Typical Performance Data

Frequency (MHz)			Conver. Loss (dB)	Freq. (MHz)	Isolation L-I (dB)	Isolation L-R (dB)	VSWR LO Port (:1)	Freq. (MHz)	VSWR RF (OUT) Port (:1)
IF (IN)	LO	RF (OUT)	LO +13dBm		LO +13dBm	LO +13dBm	LO +13dBm		LO +13dBm
21.10	4096.10	4075.00	6.03	2280.00	21.11	35.76	3.36	2250.00	2.32
31.10	4106.10	4075.00	6.05	2500.00	25.02	42.09	2.74	2470.00	2.72
41.10	4116.10	4075.00	6.03	2720.00	27.47	35.87	2.40	2690.00	2.91
194.85	4141.10	3946.25	5.99	2950.00	28.05	31.81	2.29	2920.00	3.19
338.60	4156.10	3817.50	5.95	3250.00	26.76	29.17	1.91	3220.00	2.90
482.35	4171.10	3688.75	5.94	3370.00	25.09	28.95	2.13	3340.00	3.02
769.85	4236.10	3466.25	5.95	3430.00	24.87	29.31	1.95	3400.00	2.90
1057.35	4617.35	3560.00	6.14	3650.00	23.46	29.32	1.80	3620.00	2.78
1201.10	4807.98	3606.88	6.52	4750.00	16.89	26.01	3.68	4720.00	3.43
1344.85	4998.60	3653.75	7.08	5630.00	16.30	22.90	4.40	5600.00	3.03
1632.35	5379.85	3747.50	8.67	5720.00	16.72	22.41	4.23	5690.00	2.88
1919.85	5761.10	3841.25	9.09	5900.00	17.80	21.43	5.30	5870.00	2.54
2207.35	6142.35	3935.00	8.72	6080.00	19.31	20.77	3.32	6050.00	2.28
2351.10	6332.98	3981.88	8.28	6260.00	21.40	21.15	2.84	6230.00	2.41
2494.85	6523.60	4028.75	7.97	6350.00	22.67	21.56	2.38	6320.00	2.34
2782.35	6904.85	4122.50	7.83	6440.00	24.00	22.02	1.86	6410.00	2.30
2926.10	7095.48	4169.38	7.66	6780.00	26.39	22.15	1.59	6750.00	2.79
3069.85	7286.10	4216.25	8.23	7030.00	21.16	19.85	1.96	7000.00	3.11
3213.60	7376.10	4162.50	8.62	7280.00	17.83	20.22	2.73	7250.00	3.84
3357.35	7476.10	4118.75	9.08	7530.00	15.28	21.99	6.61	7500.00	5.23

Electrical Schematic



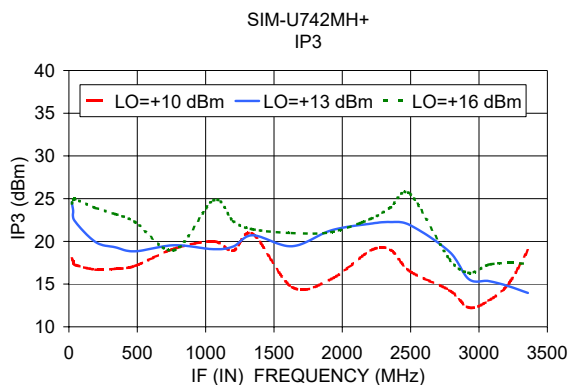
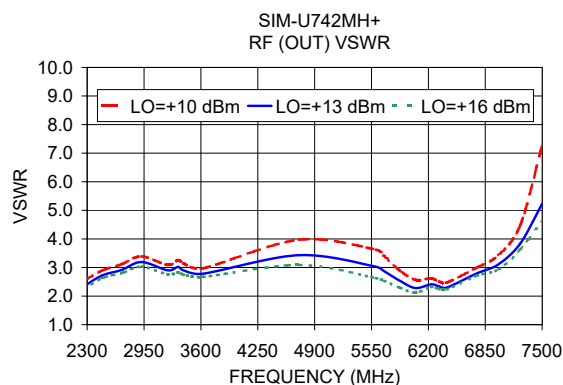
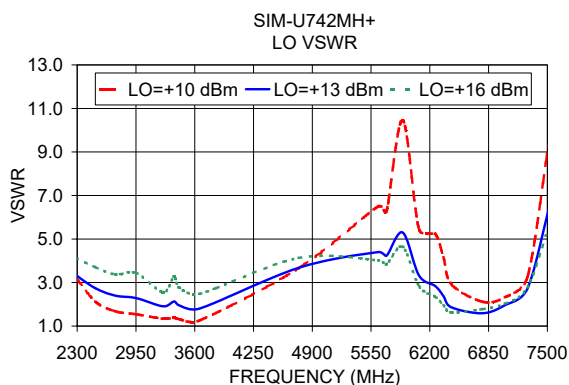
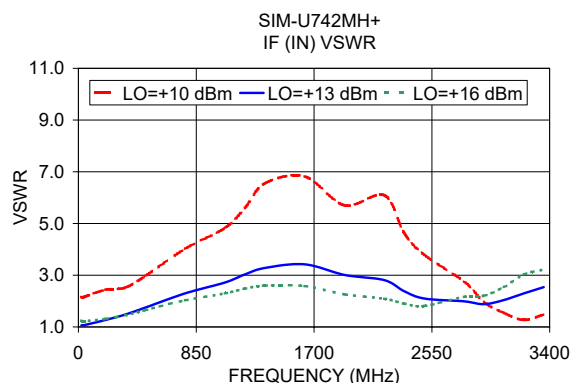
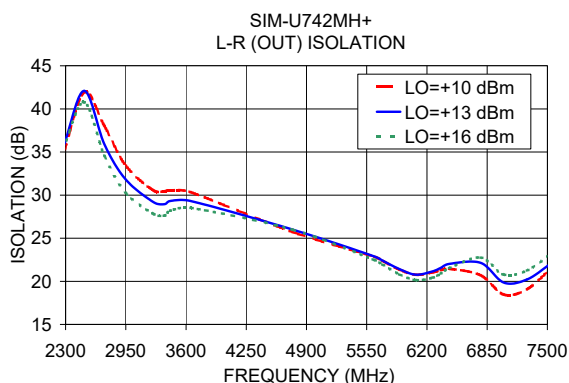
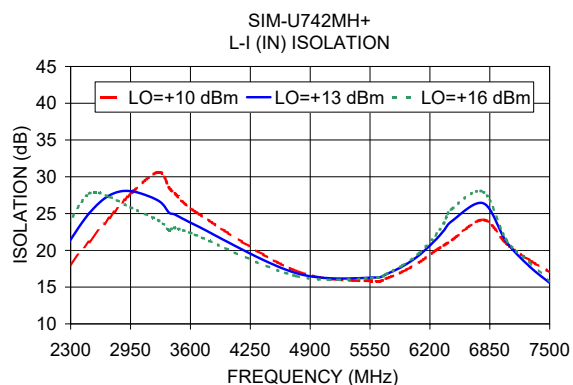
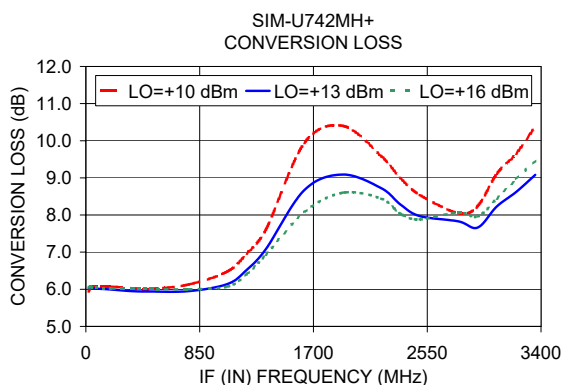
Notes

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Frequency Mixer (Upconverter)

SIM-U742MH+

Typical Performance Data

IF INPUT (MHz)	LO INPUT (MHz)	RF OUTPUT (MHz)	CONVERSION LOSS (dB)			IP3 Input (dBm)		
			@LO (dBm)			@LO (dBm)		
			+10	+13	+16	+10	+13	+16
21.1	4096.1	4075.00	5.94	6.03	6.05	18.00	24.58	24.43
31.1	4106.1	4075.00	6.03	6.05	6.08	17.65	23.61	24.87
41.1	4116.1	4075.00	6.06	6.03	6.05	17.27	22.41	24.98
194.9	4141.1	3946.25	6.07	5.99	6.02	16.69	19.92	23.91
338.6	4156.1	3817.50	6.03	5.95	6.01	16.79	19.31	23.19
482.4	4171.1	3688.75	6.01	5.94	6.01	17.12	18.84	22.27
769.9	4236.1	3466.25	6.13	5.95	6.00	19.15	19.55	18.97
1057.4	4617.4	3560.00	6.48	6.14	6.07	20.00	19.09	24.79
1201.1	4808.0	3606.88	6.96	6.52	6.41	18.91	19.39	22.38
1344.9	4998.6	3653.75	7.60	7.08	6.93	20.87	20.72	21.41
1632.4	5379.9	3747.50	9.94	8.67	8.08	14.65	19.43	20.98
1919.9	5761.1	3841.25	10.40	9.09	8.60	15.59	21.29	21.08
2207.4	6142.4	3935.00	9.58	8.72	8.44	18.93	22.07	22.64
2351.1	6333.0	3981.88	8.99	8.28	8.03	19.02	22.26	23.96
2494.9	6523.6	4028.75	8.54	7.97	7.88	16.50	21.91	25.55
2782.4	6904.9	4122.50	8.05	7.83	8.07	14.28	18.80	17.92
2926.1	7095.5	4169.38	8.24	7.66	7.96	12.26	15.57	16.30
3069.9	7286.1	4216.25	9.11	8.23	8.44	13.06	15.36	17.27
3213.6	7376.1	4162.50	9.65	8.62	8.97	14.99	14.77	17.47
3357.4	7476.1	4118.75	10.38	9.08	9.46	18.95	13.96	17.37

LO INPUT (MHz)	LO-IF ISOLATION (dB)			LO-RF ISOLATION (dB)		
	@LO (dBm)			@LO (dBm)		
	+10	+13	+16	+10	+13	+16
2280.0	17.81	21.11	23.74	34.94	35.76	35.61
2500.0	21.15	25.02	27.71	41.92	42.09	40.79
2720.0	24.41	27.47	27.26	37.99	35.87	34.52
2950.0	27.67	28.05	25.84	33.41	31.81	30.26
3250.0	30.63	26.76	24.10	30.53	29.17	27.82
3370.0	28.47	25.09	22.75	30.45	28.95	27.62
3430.0	27.74	24.87	23.05	30.56	29.31	28.18
3650.0	25.29	23.46	22.12	30.35	29.32	28.52
4750.0	17.19	16.89	16.50	25.73	26.01	25.99
5630.0	15.79	16.30	16.27	22.87	22.90	22.48
5720.0	16.15	16.72	16.74	22.38	22.41	21.96
5900.0	17.08	17.80	17.91	21.38	21.43	20.82
6080.0	18.34	19.31	19.58	20.76	20.77	20.15
6260.0	19.95	21.40	22.02	21.04	21.15	20.41
6350.0	20.65	22.67	23.65	21.29	21.56	20.89
6440.0	21.40	24.00	25.64	21.46	22.02	21.53
6780.0	24.15	26.39	27.95	20.71	22.15	22.76
7030.0	20.89	21.16	21.38	18.46	19.85	20.78
7280.0	18.68	17.83	18.42	19.08	20.22	21.25
7530.0	16.86	15.28	15.36	21.39	21.99	23.10

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Frequency Mixer (Upconverter)

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Typical Performance Data

IF INPUT (MHz)	LO INPUT (MHz)	RF OUTPUT (MHz)	CONVERSION LOSS (dB)			IP3 Input (dBm)		
			@LO (dBm)			@LO (dBm)		
			+10	+13	+16	+10	+13	+16
21.1	4096.1	4075	5.94	6.03	6.05	18.00	24.58	24.43
31.1	4106.1	4075	6.03	6.05	6.08	17.65	23.61	24.87
41.1	4116.1	4075	6.06	6.03	6.05	17.27	22.41	24.98
194.9	4141.1	4075	6.07	5.99	6.02	16.69	19.92	23.91
338.6	4156.1	4075	6.03	5.95	6.01	16.79	19.31	23.19
482.4	4171.1	4075	6.01	5.94	6.01	17.12	18.84	22.27
769.9	4236.1	4075	6.13	5.95	6.00	19.15	19.55	18.97
1057.4	4617.4	4075	6.48	6.14	6.07	20.00	19.09	24.79
1201.1	4808.0	4075	6.96	6.52	6.41	18.91	19.39	22.38
1344.9	4998.6	4075	7.60	7.08	6.93	20.87	20.72	21.41
1632.4	5379.9	4075	9.94	8.67	8.08	14.65	19.43	20.98
1919.9	5761.1	4075	10.40	9.09	8.60	15.59	21.29	21.08
2207.4	6142.4	4075	9.58	8.72	8.44	18.93	22.07	22.64
2351.1	6333.0	4075	8.99	8.28	8.03	19.02	22.26	23.96
2494.9	6523.6	4075	8.54	7.97	7.88	16.50	21.91	25.55
2782.4	6904.9	4075	8.05	7.83	8.07	14.28	18.80	17.92
2926.1	7095.5	4075	8.24	7.66	7.96	12.26	15.57	16.30
3069.9	7286.1	4075	9.11	8.23	8.44	13.06	15.36	17.27
3213.6	7376.1	4075	9.65	8.62	8.97	14.99	14.77	17.47
3357.4	7476.1	4075	10.38	9.08	9.46	18.95	13.96	17.37

LO INPUT (MHz)	LO-IF ISOLATION (dB)			LO-RF ISOLATION (dB)		
	@LO (dBm)			@LO (dBm)		
	+10	+13	+16	+10	+13	+16
2280.0	17.81	21.11	23.74	34.94	35.76	35.61
2500.0	21.15	25.02	27.71	41.92	42.09	40.79
2720.0	24.41	27.47	27.26	37.99	35.87	34.52
2950.0	27.67	28.05	25.84	33.41	31.81	30.26
3250.0	30.63	26.76	24.10	30.53	29.17	27.82
3370.0	28.47	25.09	22.75	30.45	28.95	27.62
3430.0	27.74	24.87	23.05	30.56	29.31	28.18
3650.0	25.29	23.46	22.12	30.35	29.32	28.52
4750.0	17.19	16.89	16.50	25.73	26.01	25.99
5630.0	15.79	16.30	16.27	22.87	22.90	22.48
5720.0	16.15	16.72	16.74	22.38	22.41	21.96
5900.0	17.08	17.80	17.91	21.38	21.43	20.82
6080.0	18.34	19.31	19.58	20.76	20.77	20.15
6260.0	19.95	21.40	22.02	21.04	21.15	20.41
6350.0	20.65	22.67	23.65	21.29	21.56	20.89
6440.0	21.40	24.00	25.64	21.46	22.02	21.53
6780.0	24.15	26.39	27.95	20.71	22.15	22.76
7030.0	20.89	21.16	21.38	18.46	19.85	20.78
7280.0	18.68	17.83	18.42	19.08	20.22	21.25
7530.0	16.86	15.28	15.36	21.39	21.99	23.10

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Typical Performance Data

IF INPUT (MHz)	LO INPUT (MHz)	IF VSWR (:1)			LO INPUT (MHz)	LO VSWR (:1)			RF OUTPUT (MHz)	RF VSWR (:1)		
		@LO (dBm)				@LO (dBm)				@LO (dBm)		
		+10	+13	+16		+10	+13	+16		+10	+13	+16
21.1	4096.1	2.16	1.06	1.24	2280.0	3.26	3.36	4.16	2250	2.52	2.32	2.23
31.1	4106.1	2.14	1.07	1.22	2500.0	2.13	2.74	3.71	2470	2.89	2.72	2.63
41.1	4116.1	2.16	1.07	1.22	2720.0	1.68	2.40	3.37	2690	3.11	2.91	2.80
194.9	4141.1	2.44	1.27	1.31	2950.0	1.54	2.29	3.44	2920	3.39	3.19	3.03
338.6	4156.1	2.52	1.48	1.45	3250.0	1.34	1.91	2.56	3220	3.09	2.90	2.76
482.4	4171.1	2.97	1.75	1.65	3370.0	1.38	2.13	3.27	3340	3.26	3.02	2.83
769.9	4236.1	4.02	2.30	2.03	3430.0	1.32	1.95	2.76	3400	3.15	2.90	2.75
1057.4	4617.4	4.83	2.72	2.30	3650.0	1.25	1.80	2.48	3620	2.97	2.78	2.67
1201.1	4808.0	5.60	3.03	2.48	4750.0	3.66	3.68	4.13	4720	3.97	3.43	3.09
1344.9	4998.6	6.55	3.28	2.60	5630.0	6.50	4.40	4.02	5600	3.63	3.03	2.63
1632.4	5379.9	6.82	3.42	2.58	5720.0	6.26	4.23	3.84	5690	3.42	2.88	2.54
1919.9	5761.1	5.70	3.01	2.26	5900.0	10.46	5.30	4.64	5870	2.90	2.54	2.30
2207.4	6142.4	6.09	2.81	2.09	6080.0	5.45	3.32	2.83	6050	2.57	2.28	2.12
2351.1	6333.0	4.62	2.38	1.90	6260.0	5.23	2.84	2.35	6230	2.62	2.41	2.32
2494.9	6523.6	3.79	2.10	1.81	6350.0	4.16	2.38	1.95	6320	2.51	2.34	2.25
2782.4	6904.9	2.76	1.99	2.16	6440.0	2.92	1.86	1.63	6410	2.47	2.30	2.23
2926.1	7095.5	1.96	1.88	2.21	6780.0	2.12	1.59	1.78	6750	2.99	2.79	2.71
3069.9	7286.1	1.54	2.04	2.54	7030.0	2.32	1.96	2.03	7000	3.43	3.11	2.93
3213.6	7376.1	1.27	2.30	3.03	7280.0	3.25	2.73	2.78	7250	4.48	3.84	3.64
3357.4	7476.1	1.48	2.54	3.22	7530.0	9.82	6.61	5.75	7500	7.27	5.23	4.61

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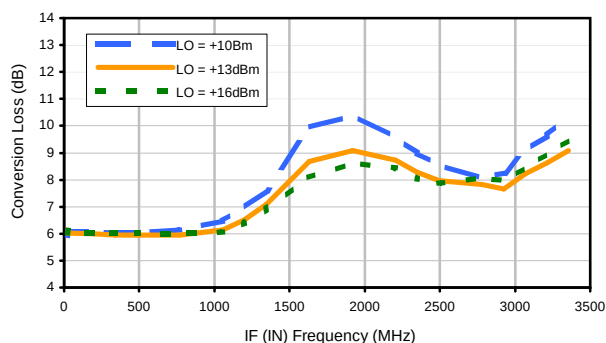


Frequency Mixer (Upconverter)

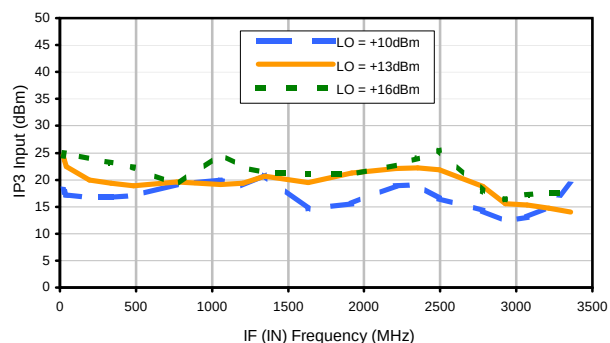
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Typical Performance Curves

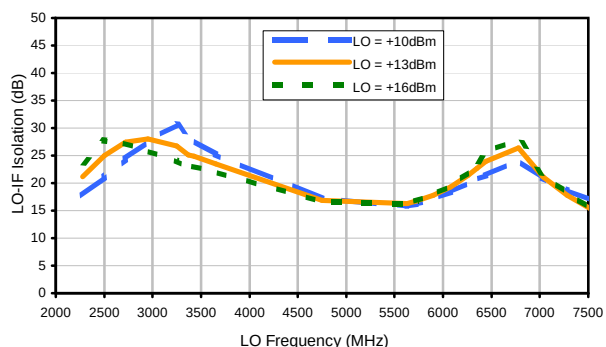
Conversion Loss



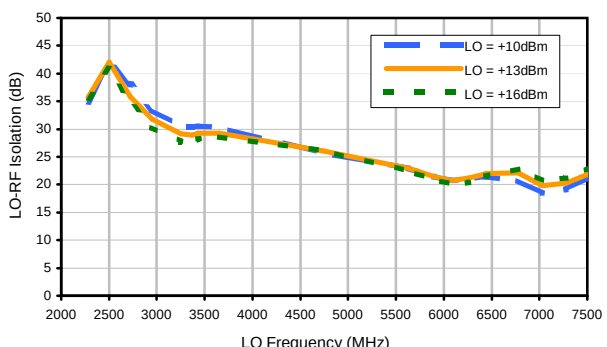
IP3 Input



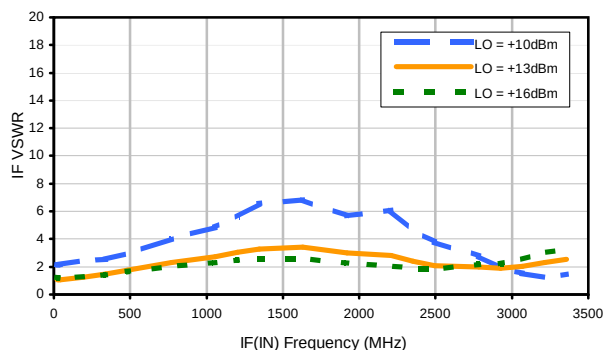
LO-IF Isolation



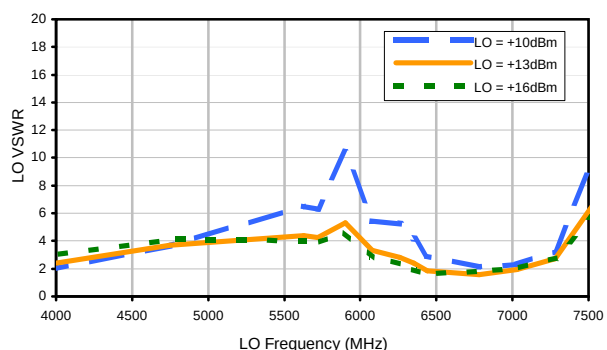
LO-RF Isolation



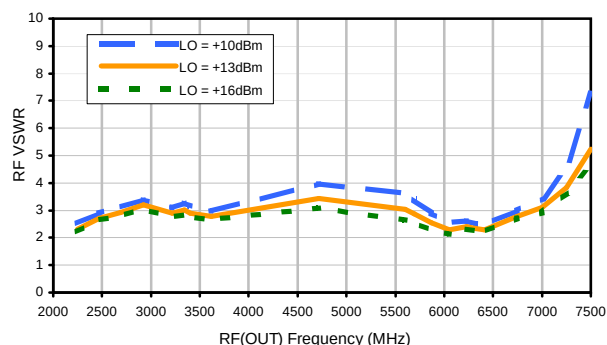
IF (IN) VSWR



LO VSWR



RF (OUT) VSWR



REV. X1
SIM-U742MH+
100620
Page 1 of 1

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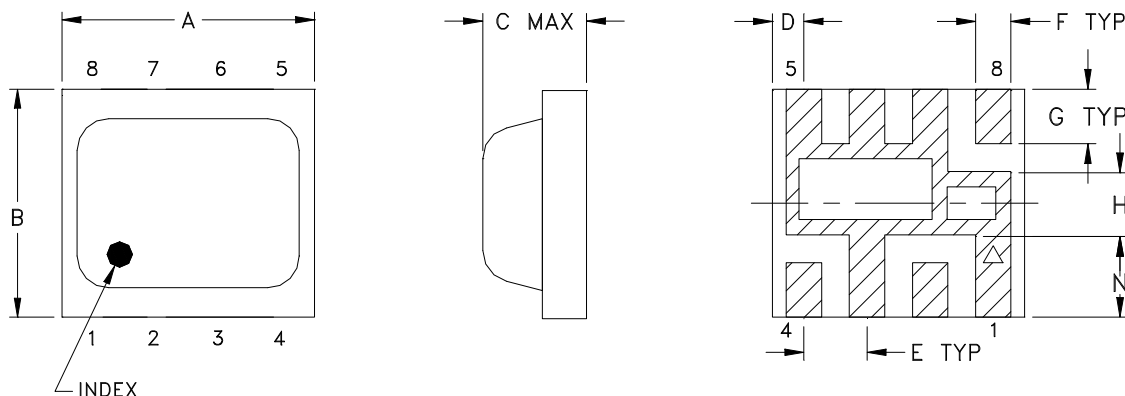


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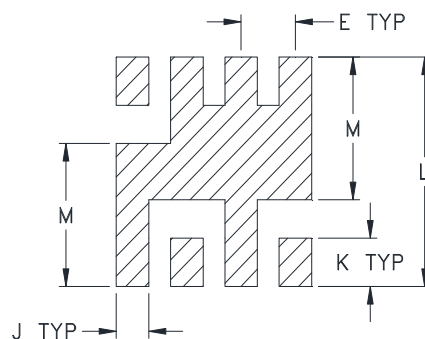


Outline Dimensions

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.



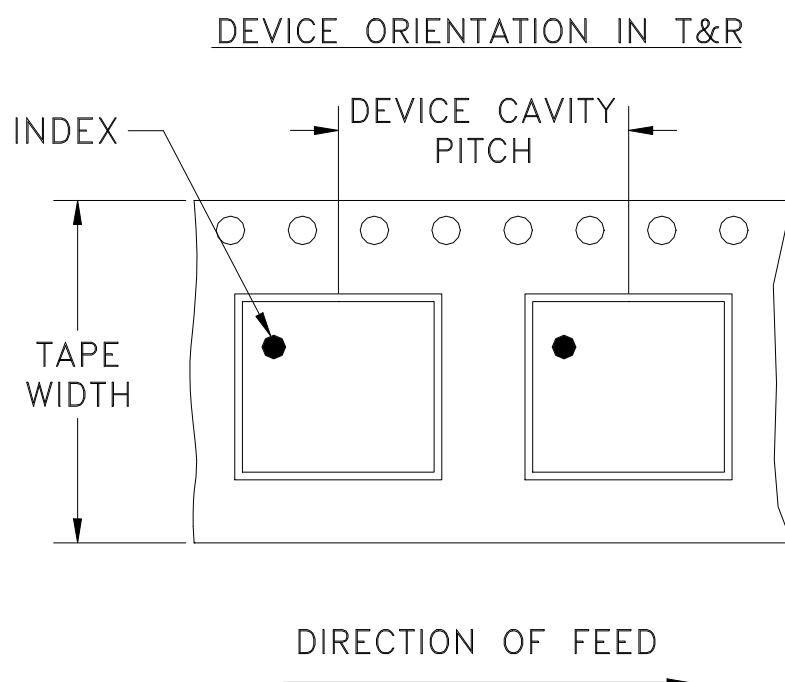
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RF/IF MICROWAVE COMPONENTS

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



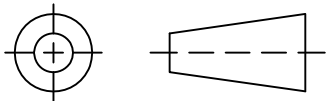
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THIRD ANGLE PROJECTION



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

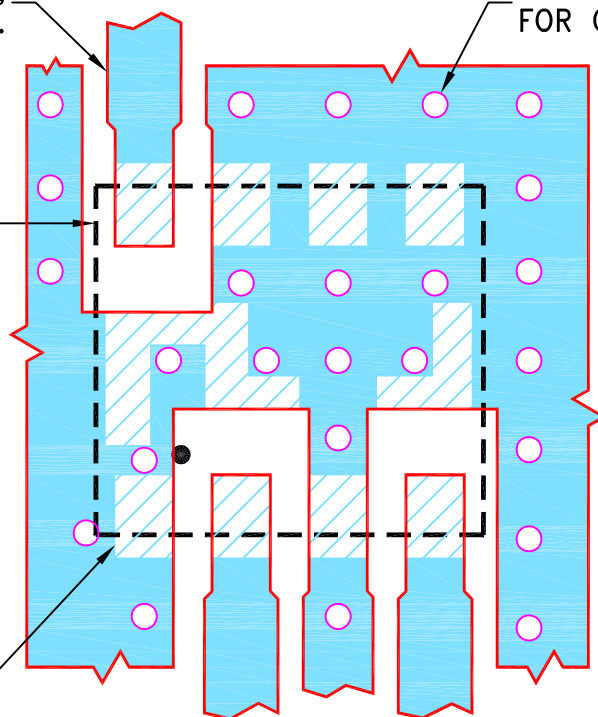
SUGGESTED MOUNTING CONFIGURATION FOR HV1195 CASE STYLE, "rh" PIN CONNECTION

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

Ø.013 PTH
FOR GROUND

PACKAGE
OUTLINE

PIN 1

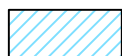


NOTES:

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

A

CODE IDENT

15542

DRAWING NO:

98-PL-239

REV:

B

FILE:

98PL239

SCALE:

10:1

SHEET:

1 OF 1

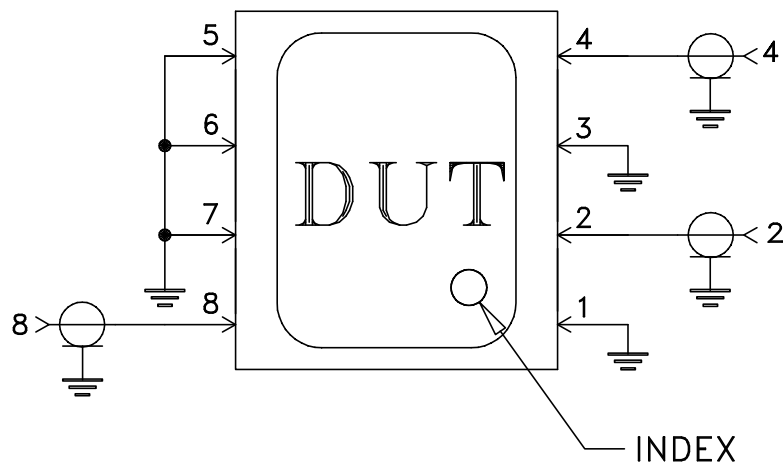
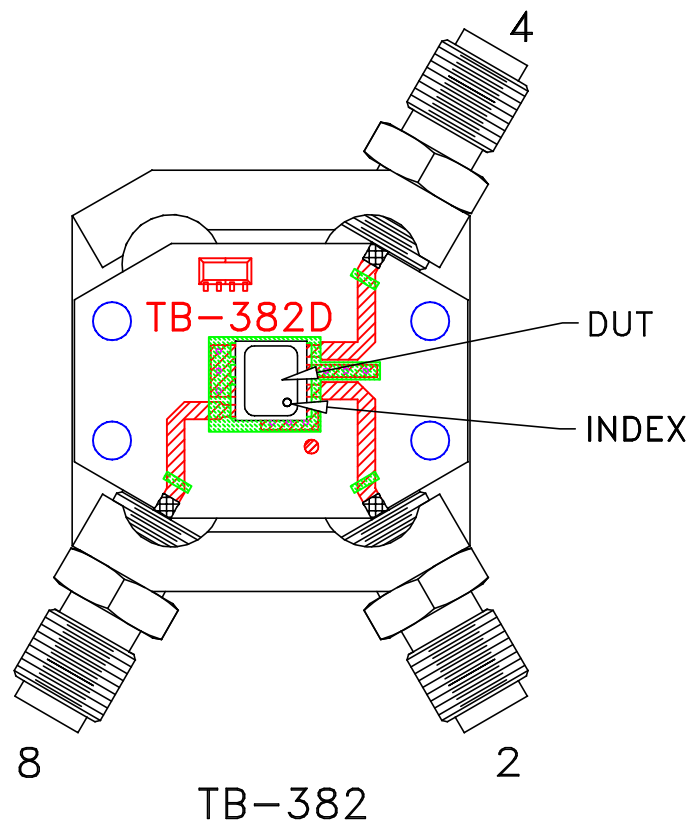
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ASHEETA1.DWG REV:A DATE:01/12/95

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