Ceramic Surface Mount

Frequency Mixer WIDE BAND

Level 17 (LO Power +17 dBm) 7.3 to 19 GHz

SIM-193H+

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

Maximum Ratings

Operating Temperature	-40°C to 85°C
Storage Temperature	-55°C to 100°C
RF Power	120mW

For extended temperature range, consult factory.

Permanent damage may occur if any of these limits are exceeded.

Pin Connections

LO	8
RF	4
IF	2
GROUND	1,3,5,6,7

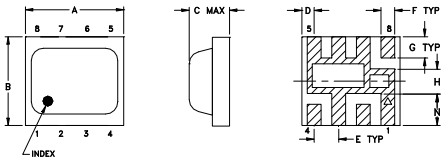
Features

- wide bandwidth, 7.3 to 19 GHz
- low conversion loss, 6.2 dB typ.
- high L-R isolation, 33 dB typ.
- excellent IF BW, DC to 7.5 GHz
- LTCC double balanced mixer
- tiny size, low profile, 0.08"
- useable as up and down converter
- aqueous washable
- protected under U.S Patent 7,027,795

Applications

- fixed satellite
- mobile
- radio location

Outline Drawing

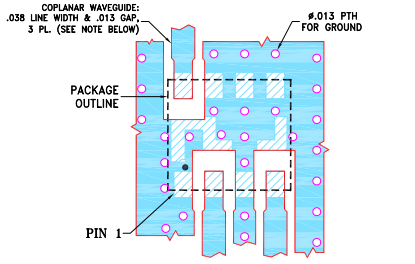


Outline Dimensions (inch / mm)

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-458+
Suggested PCB Layout (PL-284)



NOTES:
1. 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.
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

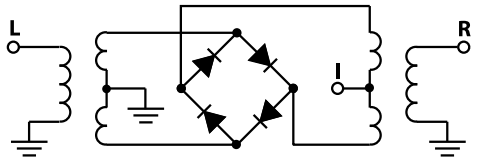
Parameter	Condition (GHz)	Min.	Typ.	Max.	Unit
Frequency Range, LO/RF		7.3	—	19	GHz
Frequency Range, IF		DC	—	7.5	GHz
Conversion Loss[1]	7.3-10	—	8.6	10.5	dB
	10-15	—	7.6	10.0	
	15-18	—	9.7	11.8	
	18-19	—	10.0	13.0	
LO to RF Isolation	7.3-10	24	32	—	dB
	10-15	20	28	—	
	15-18	16	21	—	
	18-19	20	26	—	
LO to IF Isolation	7.3-10	13	18	—	dB
	10-15	13	18	—	
	15-18	8	11	—	
	18-19	12	17	—	
IP3	7.3-10	—	17	—	dBm
	10-15	—	19	—	
	15-18	—	16	—	
	18-19	—	25	—	
RF Input Power at 1 dB Compression	7.3-19	—	+14	—	dBm

1. Conversion loss at 30 MHz IF.

Typical Performance Data

Frequency (MHz)		Conversion Loss (dB)	Isolation L-R (dB)	Isolation L-I (dB)	VSWR RF Port (:1)	VSWR LO Port (:1)
RF	LO	LO +17dBm	LO +17dBm	LO +17dBm	LO +17dBm	LO +17dBm
7300.10	7330.00	7.07	42.48	17.69	4.20	10.62
8500.10	8530.00	8.48	37.26	22.30	4.64	3.67
9000.10	9030.00	8.13	41.03	21.66	4.38	3.72
9500.10	9530.00	7.44	43.94	20.41	4.15	3.39
10000.10	10030.00	6.54	44.16	20.71	3.79	3.26
11000.10	11030.00	6.32	40.24	19.18	2.23	2.34
11500.10	11530.00	5.89	38.41	18.90	2.17	3.62
12000.10	12030.00	5.81	37.27	18.55	2.39	2.98
12500.10	12530.00	5.74	34.00	20.03	2.23	2.03
13000.10	13030.00	6.00	32.41	20.42	1.39	2.90
14000.10	14030.00	6.89	33.02	20.39	2.29	3.72
14500.10	14530.00	7.16	32.23	22.45	3.00	2.84
15000.10	15030.00	7.02	30.11	24.95	3.34	2.77
15500.10	15530.00	7.39	25.82	22.24	2.22	3.08
16000.10	16030.00	8.48	21.35	16.00	2.67	3.72
16500.10	16530.00	8.95	21.99	14.20	3.74	2.73
17000.10	17030.00	8.62	26.46	14.84	3.61	2.14
17500.10	17530.00	8.32	29.85	19.38	4.43	2.36
18000.10	18030.00	8.47	31.75	24.25	4.67	1.44
19000.10	19030.00	9.02	25.80	24.87	2.89	1.62

Electrical Schematic



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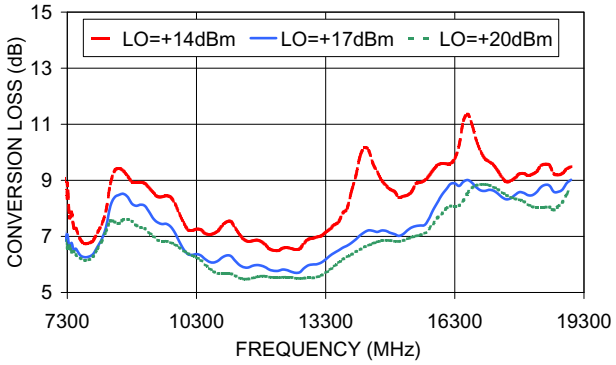
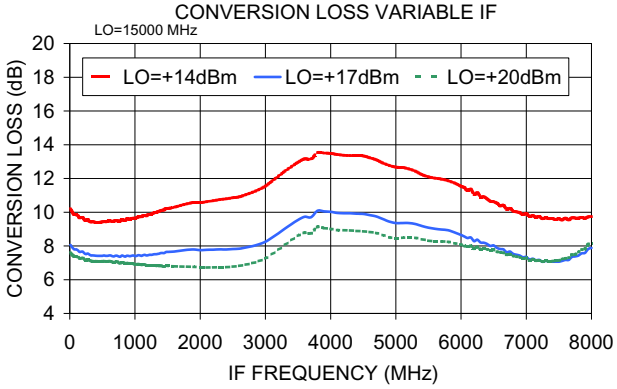
C. The parts covered by this specification document are subject to Mini-Circuits standard limited warranty and terms and conditions (collectively, "Standard Terms"); Purchasers of this part are entitled to the rights and benefits contained therein. For a full statement of the Standard Terms and the exclusive rights and remedies thereunder, please visit Mini-Circuits' website at www.minicircuits.com/MCLStore/terms.jsp

REV. C
ECO-000060
SIM-193H+
ED-14252/1
DJ/CP/AM
200821

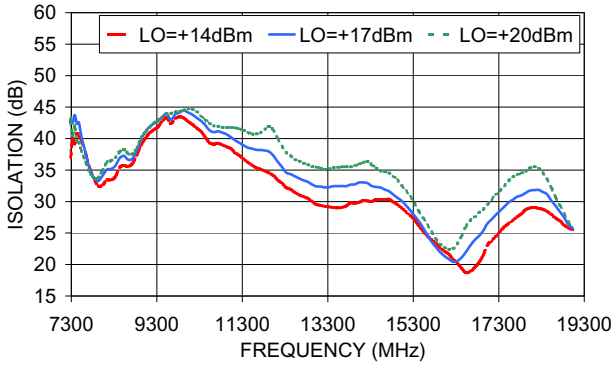
SIM-193H+
CONVERSION LOSS



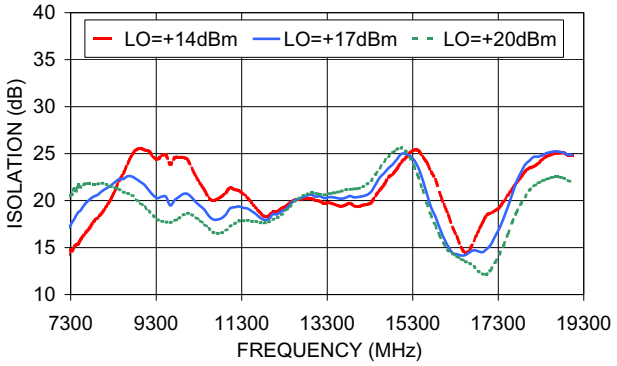
SIM-193H+
CONVERSION LOSS VARIABLE IF



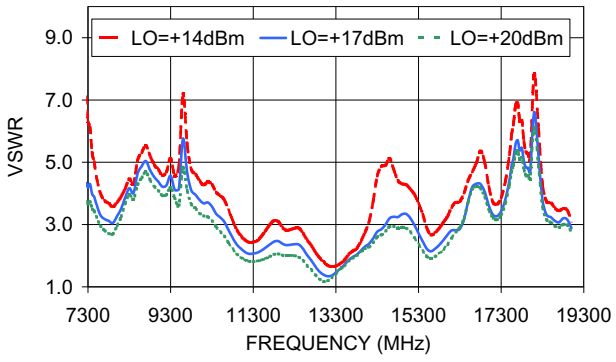
SIM-193H+
L-R ISOLATION



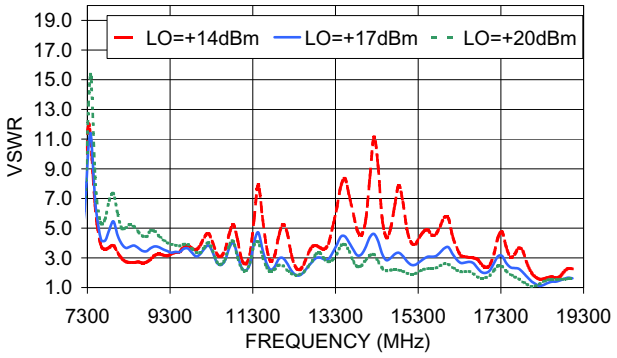
SIM-193H+
L-I ISOLATION



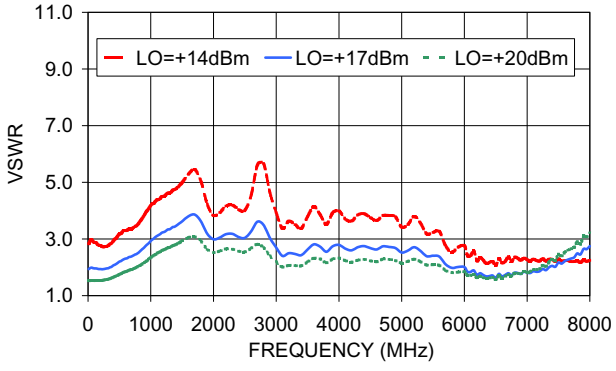
SIM-193H+
RF VSWR



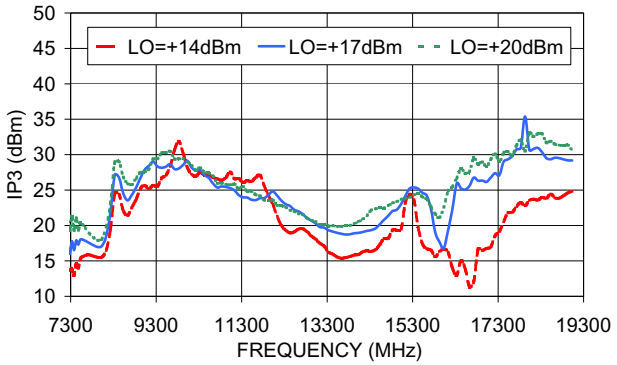
SIM-193H+
LO VSWR



SIM-193H+
IF VSWR



SIM-193H+
IP3



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Typical Performance Data

RF (IN) (GHz)	LO (GHz)	CONVERSION LOSS IF FIXED @IF(OUT)=0.030GHz (dB) @LO (dBm)		
		+14	+17	+20
7.22	7.25	11.41	7.31	6.72
7.30	7.33	8.37	6.99	6.55
7.52	7.55	7.36	6.63	6.25
7.86	7.89	7.09	6.50	6.11
8.20	8.23	8.08	7.44	6.90
8.52	8.55	9.02	8.04	7.21
8.86	8.89	8.94	8.11	7.51
9.20	9.23	8.40	7.57	7.02
9.54	9.57	7.40	6.58	6.11
9.86	9.89	7.76	6.78	6.30
10.20	10.23	7.72	6.65	6.08
10.54	10.57	7.81	6.57	5.93
10.88	10.91	7.21	6.03	5.47
11.22	11.25	7.06	6.01	5.57
11.54	11.57	6.70	5.73	5.30
11.88	11.91	6.88	6.01	5.59
12.22	12.25	6.57	5.80	5.37
12.56	12.59	6.80	5.95	5.46
12.88	12.91	6.65	5.76	5.29
13.22	13.25	7.10	6.05	5.58
13.56	13.59	7.37	6.31	5.84
13.90	13.93	7.48	6.48	6.03
14.22	14.25	7.94	6.86	6.41
14.56	14.59	8.22	6.90	6.45
14.90	14.93	9.93	7.57	6.96
15.24	15.27	9.76	7.31	6.79
15.58	15.61	9.29	7.52	7.14
15.90	15.93	9.25	7.97	7.57
16.24	16.27	9.37	8.62	8.02
16.58	16.61	10.00	8.66	8.08
16.92	16.95	10.61	8.83	8.60
17.24	17.27	9.95	8.49	8.22
17.58	17.61	10.16	8.57	8.29
17.92	17.95	9.61	8.66	8.38
18.26	18.29	9.20	8.67	8.41
18.58	18.61	9.07	8.60	8.36
19.00	19.03	9.20	8.78	8.58
19.26	19.29	9.62	9.13	8.93
19.60	19.63	10.89	10.15	9.94
19.94	19.97	12.12	10.84	10.62

RF (IN) (GHz)	LO (GHz)	IP-3 INPUT (dBm) @LO (dBm)		
		+14	+17	+20
7.22	7.25	15.09	17.08	20.23
7.30	7.33	14.95	18.15	21.34
7.52	7.55	16.39	18.96	21.06
7.86	7.89	16.99	18.97	21.01
8.20	8.23	19.75	22.64	24.97
8.52	8.55	23.22	25.07	26.81
8.86	8.89	24.95	26.77	27.81
9.20	9.23	25.05	27.29	27.02
9.54	9.57	24.69	25.96	26.46
9.86	9.89	24.88	24.97	25.79
10.20	10.23	23.48	23.25	24.50
10.54	10.57	22.20	21.89	23.12
10.88	10.91	21.82	21.47	22.64
11.22	11.25	22.35	21.42	22.84
11.54	11.57	22.14	21.25	22.62
11.88	11.91	23.06	21.98	22.76
12.22	12.25	20.84	20.62	21.29
12.56	12.59	18.53	19.70	20.24
12.88	12.91	16.75	18.81	19.75
13.22	13.25	15.78	19.01	20.18
13.56	13.59	16.04	19.55	21.20
13.90	13.93	16.75	19.88	21.63
14.22	14.25	16.94	20.77	22.74
14.56	14.59	16.77	21.70	23.21
14.90	14.93	19.32	22.09	23.20
15.24	15.27	20.79	24.45	23.68
15.58	15.61	21.10	26.38	24.01
15.90	15.93	21.68	23.68	22.09
16.24	16.27	14.85	24.59	24.91
16.58	16.61	14.87	25.98	27.97
16.92	16.95	17.97	24.72	28.37
17.24	17.27	19.16	26.04	28.82
17.58	17.61	19.01	28.08	30.04
17.92	17.95	20.76	29.28	30.65
18.26	18.29	21.83	30.09	31.29
18.58	18.61	22.57	29.43	31.79
19.00	19.03	23.27	27.91	31.35
19.26	19.29	23.21	27.59	30.89
19.60	19.63	22.15	27.87	29.93
19.94	19.97	19.93	28.32	29.88

RF (IN) (GHz)	LO (GHz)	COMPRESSION @RF IN=+14dBm (dB) @LO (dBm)		
		+14	+17	+20
7.22	7.25	1.89	0.79	0.44
7.30	7.33	2.49	1.06	0.54
7.52	7.55	1.94	0.80	0.44
7.86	7.89	2.02	0.94	0.57
8.20	8.23	1.22	0.79	0.58
8.52	8.55	0.74	0.53	0.40
8.86	8.89	0.42	0.34	0.22
9.20	9.23	0.51	0.39	0.31
9.54	9.57	0.37	0.29	0.22
9.86	9.89	0.37	0.29	0.23
10.20	10.23	0.52	0.42	0.35
10.54	10.57	0.45	0.35	0.31
10.88	10.91	0.48	0.40	0.34
11.22	11.25	0.33	0.30	0.24
11.54	11.57	0.45	0.38	0.34
11.88	11.91	0.18	0.19	0.15
12.22	12.25	0.42	0.36	0.30
12.56	12.59	0.30	0.28	0.23
12.88	12.91	0.39	0.32	0.25
13.22	13.25	0.29	0.24	0.20
13.56	13.59	0.29	0.24	0.19
13.90	13.93	0.16	0.19	0.17
14.22	14.25	0.18	0.20	0.15
14.56	14.59	0.19	0.19	0.16
14.90	14.93	0.22	0.18	0.14
15.24	15.27	0.27	0.19	0.14
15.58	15.61	0.38	0.33	0.31
15.90	15.93	0.58	0.64	0.54
16.24	16.27	0.46	0.40	0.32
16.58	16.61	0.64	0.34	0.24
16.92	16.95	0.68	0.31	0.21
17.24	17.27	0.20	0.16	0.11
17.58	17.61	0.22	0.15	0.09
17.92	17.95	0.55	0.26	0.15
18.26	18.29	0.23	0.16	0.09
18.58	18.61	0.16	0.14	0.08
19.00	19.03	0.22	0.16	0.09
19.26	19.29	0.24	0.18	0.10
19.60	19.63	0.21	0.15	0.11
19.94	19.97	0.19	0.13	0.06

Typical Performance Data

IF (OUT) (GHz)	LO (GHz)	CONVERSION LOSS VS. IF FREQUENCY @RF(IN)=13.150GHz (dB) @LO (dBm) +17
6.050	7.100	6.17
5.750	7.400	6.19
5.450	7.700	6.56
5.130	8.020	6.51
4.830	8.320	6.55
4.510	8.640	7.08
4.210	8.940	7.59
3.890	9.260	7.81
3.590	9.560	7.60
3.270	9.880	6.88
2.970	10.180	6.62
2.650	10.500	6.49
2.350	10.800	6.31
2.030	11.120	6.03
1.730	11.420	5.79
1.410	11.740	5.73
1.110	12.040	5.63
0.790	12.360	5.39
0.490	12.660	5.33
0.170	12.980	5.56
0.010	13.160	5.96
0.350	13.500	5.85
0.690	13.840	5.81
1.050	14.200	6.13
1.390	14.540	6.42
1.750	14.900	6.31
2.090	15.240	6.35
2.450	15.600	6.48
2.790	15.940	6.82
3.130	16.280	7.41
3.490	16.640	7.07
3.830	16.980	6.86
4.190	17.340	6.79
4.530	17.680	6.78
4.890	18.040	6.85
5.230	18.380	6.95
5.570	18.720	7.19
5.930	19.080	7.03
6.270	19.420	7.40
6.630	19.780	7.27

IF (OUT) (GHz)	LO (GHz)	CONVERSION LOSS VS. IF FREQUENCY @RF(IN)=7.300GHz (dB) @LO (dBm) +17
0.050	7.350	6.58
0.270	7.570	6.32
0.510	7.810	6.01
0.730	8.030	5.73
0.970	8.270	5.67
1.190	8.490	5.85
1.430	8.730	6.40
1.650	8.950	7.34
1.890	9.190	8.57
2.110	9.410	9.35
2.350	9.650	9.50
2.570	9.870	10.35
2.810	10.110	10.77
3.050	10.350	10.80
3.270	10.570	10.59
3.510	10.810	10.45
3.730	11.030	10.35
3.970	11.270	10.43
4.190	11.490	10.40
4.430	11.730	10.15
4.650	11.950	10.19
4.890	12.190	9.83
5.110	12.410	9.76
5.350	12.650	9.96
5.570	12.870	9.63
5.810	13.110	9.34
6.050	13.350	8.89
6.270	13.570	8.62
6.510	13.810	8.63
6.730	14.030	8.36
6.970	14.270	8.23
7.190	14.490	8.55
7.430	14.730	8.98
7.650	14.950	9.55
7.890	15.190	10.25
8.110	15.410	10.76
8.350	15.650	11.56
8.570	15.870	12.32
8.810	16.110	13.53
9.050	16.350	15.18

IF (OUT) (GHz)	LO (GHz)	CONVERSION LOSS VS. IF FREQUENCY @RF(IN)=19GHz (dB) @LO (dBm) +17
9.3	9.7	15.30
9.1	9.9	14.89
8.8	10.2	14.28
8.6	10.4	13.74
8.3	10.7	13.13
8.1	10.9	12.30
7.9	11.1	11.22
7.6	11.4	10.28
7.4	11.6	9.74
7.2	11.8	9.86
6.9	12.1	9.87
6.7	12.3	9.95
6.4	12.6	10.01
6.2	12.8	10.00
6.0	13.0	10.05
5.7	13.3	10.37
5.5	13.5	10.78
5.3	13.7	11.09
5.0	14.0	11.36
4.8	14.2	11.66
4.6	14.4	11.63
4.3	14.7	11.34
4.1	14.9	11.03
3.8	15.2	11.03
3.6	15.4	10.79
3.4	15.6	10.93
3.1	15.9	11.62
2.9	16.1	11.94
2.7	16.3	11.26
2.4	16.6	11.20
2.2	16.8	11.05
1.9	17.1	10.94
1.7	17.3	10.81
1.5	17.5	10.57
1.2	17.8	10.29
1.0	18.0	9.96
0.8	18.2	9.72
0.5	18.5	9.64
0.3	18.7	9.47
0.0	19.0	9.41

Typical Performance Data

LO (GHz)	LO-RF ISOLATION (dB) @LO (dBm)			LO-IF ISOLATION (dB) @LO (dBm)		
	+14	+17	+20	+14	+17	+20
7.25	39.93	40.01	40.26	14.58	17.39	19.15
7.33	39.90	41.80	41.76	14.16	17.13	19.08
7.55	37.28	38.55	38.73	15.57	17.90	18.81
7.89	29.65	30.72	32.02	16.95	18.26	18.44
8.23	32.40	34.36	36.16	17.84	18.01	17.51
8.55	39.39	43.09	41.45	19.32	17.89	16.89
8.89	36.92	38.18	38.18	20.18	17.74	16.33
9.23	37.38	38.18	38.66	17.57	15.11	13.76
9.57	38.44	39.52	40.41	17.50	15.36	14.17
9.89	39.78	40.93	41.08	17.75	15.43	14.23
10.23	39.27	40.85	40.72	16.80	14.77	13.77
10.57	38.89	41.72	43.29	16.16	14.49	13.63
10.91	36.36	38.67	39.57	16.19	14.65	13.78
11.25	35.25	37.89	38.61	15.94	14.57	13.80
11.57	33.17	34.04	34.30	16.35	15.47	14.94
11.91	34.78	37.07	36.34	15.38	14.69	14.32
12.25	32.34	35.36	37.83	16.42	16.11	15.85
12.59	31.46	34.31	37.00	16.40	16.13	15.88
12.91	29.34	31.73	34.04	16.71	16.70	16.63
13.25	29.06	31.34	33.44	17.05	17.28	17.35
13.59	29.03	31.35	33.22	17.30	17.68	17.84
13.93	29.56	31.75	33.39	17.47	17.97	18.22
14.25	29.68	32.17	33.91	17.93	18.62	19.04
14.59	28.91	31.35	33.37	18.83	19.83	20.47
14.93	27.70	29.60	31.17	21.23	21.80	22.15
15.27	25.07	26.29	27.31	21.25	20.84	20.49
15.61	22.15	22.88	23.50	18.06	17.30	16.84
15.93	18.33	18.97	19.62	14.14	13.38	13.15
16.27	16.21	17.53	18.91	10.87	10.92	11.03
16.61	18.78	20.71	22.38	11.02	10.44	9.85
16.95	20.96	22.59	23.98	11.81	10.25	9.09
17.27	24.92	26.50	27.78	12.30	10.90	9.97
17.61	25.94	27.43	28.41	17.05	15.71	14.87
17.95	27.03	28.83	29.81	20.70	19.90	19.09
18.29	31.21	33.98	36.28	21.30	19.27	17.83
18.61	30.22	30.76	30.75	20.46	18.92	18.04
19.03	25.17	24.89	24.66	20.49	19.81	19.31
19.29	22.95	21.97	21.41	20.04	19.03	18.27
19.63	19.55	18.62	18.14	19.06	18.52	18.08
19.97	16.25	15.48	15.06	17.79	17.69	17.47

RF (IN) (GHz)	LO (GHz)	RF-IF ISOLATION (dB) @LO (dBm)		
		+14	+17	+20
7.22	7.25	20.17	20.18	19.98
7.30	7.33	20.11	20.17	20.29
7.52	7.55	19.97	19.68	19.34
7.86	7.89	17.94	17.75	17.48
8.20	8.23	17.44	17.79	17.98
8.52	8.55	21.11	21.59	21.69
8.86	8.89	23.54	23.96	24.11
9.20	9.23	25.32	25.48	25.47
9.54	9.57	27.43	27.34	27.15
9.86	9.89	29.82	29.43	29.12
10.20	10.23	30.55	30.00	29.63
10.54	10.57	31.60	30.95	30.33
10.88	10.91	31.60	30.77	30.00
11.22	11.25	31.03	30.37	29.78
11.54	11.57	30.50	30.04	29.59
11.88	11.91	30.07	29.41	29.07
12.22	12.25	30.18	29.41	28.92
12.56	12.59	29.87	28.99	28.36
12.88	12.91	29.51	28.57	27.88
13.22	13.25	28.94	27.74	26.89
13.56	13.59	27.72	26.42	25.64
13.90	13.93	26.22	24.83	24.09
14.22	14.25	24.40	23.04	22.32
14.56	14.59	22.63	21.68	21.13
14.90	14.93	21.48	20.64	20.12
15.24	15.27	20.31	19.52	19.00
15.58	15.61	18.66	18.09	17.72
15.90	15.93	17.78	17.19	17.07
16.24	16.27	18.56	19.30	19.87
16.58	16.61	24.03	24.88	25.38
16.92	16.95	25.97	26.30	26.51
17.24	17.27	24.84	24.86	24.77
17.58	17.61	23.77	23.55	23.41
17.92	17.95	22.58	22.28	22.14
18.26	18.29	20.82	20.63	20.52
18.58	18.61	19.94	19.84	19.80
19.00	19.03	18.28	18.25	18.25
19.26	19.29	16.42	16.40	16.38
19.60	19.63	14.65	14.65	14.64
19.94	19.97	13.44	13.51	13.53

Typical Performance Data

RF (IN) (GHz)	LO (GHz)	RF VSWR (:1) @LO (dBm)		
		+14	+17	+20
7.22	7.25	4.50	3.56	3.24
7.30	7.33	4.99	3.50	3.12
7.52	7.55	3.61	3.07	2.78
7.86	7.89	3.13	2.68	2.41
8.20	8.23	3.93	3.63	3.43
8.52	8.55	5.55	5.05	4.67
8.86	8.89	6.12	5.48	5.02
9.20	9.23	4.91	4.35	3.97
9.54	9.57	4.21	3.72	3.39
9.86	9.89	4.09	3.52	3.12
10.20	10.23	4.20	3.54	3.12
10.54	10.57	3.79	3.16	2.75
10.88	10.91	3.66	2.99	2.57
11.22	11.25	3.26	2.66	2.26
11.54	11.57	3.38	2.65	2.30
11.88	11.91	2.43	2.00	1.73
12.22	12.25	2.26	1.90	1.62
12.56	12.59	2.03	1.72	1.49
12.88	12.91	2.15	1.81	1.59
13.22	13.25	2.04	1.66	1.50
13.56	13.59	2.56	1.87	1.76
13.90	13.93	2.32	1.85	1.79
14.22	14.25	2.57	2.18	2.18
14.56	14.59	3.24	3.09	3.03
14.90	14.93	3.51	3.02	2.82
15.24	15.27	3.58	2.80	2.63
15.58	15.61	3.89	2.99	2.76
15.90	15.93	3.25	2.55	2.20
16.24	16.27	2.08	1.69	1.68
16.58	16.61	2.34	2.41	2.44
16.92	16.95	3.45	3.29	3.32
17.24	17.27	4.20	4.15	4.11
17.58	17.61	5.66	5.51	5.42
17.92	17.95	5.99	5.23	5.04
18.26	18.29	4.26	3.98	3.84
18.58	18.61	3.57	3.44	3.35
19.00	19.03	3.52	3.44	3.38
19.26	19.29	2.85	2.78	2.75
19.60	19.63	3.60	3.48	3.42
19.94	19.97	2.51	2.44	2.41

LO (GHz)	LO VSWR (:1) @LO (dBm)		
	+14	+17	+20
7.22	7.51	6.02	6.36
7.33	8.14	5.58	5.74
7.55	4.46	4.61	5.31
7.89	3.04	3.75	4.59
8.23	2.35	3.16	4.04
8.55	2.27	3.04	3.85
8.89	2.48	2.96	3.56
9.23	2.87	3.13	3.61
9.57	3.19	3.08	3.28
9.89	3.72	3.11	3.08
10.23	3.69	3.02	2.96
10.57	3.91	2.97	2.75
10.91	4.26	2.91	2.57
11.25	4.29	2.81	2.43
11.57	4.78	2.79	2.38
11.91	3.46	2.44	2.21
12.25	3.72	2.50	2.23
12.59	3.42	2.50	2.34
12.91	4.22	2.81	2.52
13.25	5.49	3.29	2.77
13.59	7.48	3.89	3.00
13.93	7.76	3.96	2.97
14.25	8.23	4.26	2.99
14.59	6.29	3.53	2.68
14.93	5.68	3.36	2.54
15.27	5.83	3.28	2.42
15.61	4.54	2.76	2.17
15.93	4.13	2.76	2.13
16.27	3.23	2.59	2.17
16.61	3.24	2.87	2.48
16.95	3.38	2.98	2.65
17.27	2.77	2.30	2.05
17.61	2.49	2.07	1.81
17.95	2.67	2.09	1.73
18.29	2.07	1.49	1.24
18.61	1.58	1.31	1.25
19.03	1.77	1.53	1.43
19.29	1.83	1.60	1.54
19.63	2.09	1.87	1.78
19.97	2.63	2.32	2.18

IF (OUT) (GHz)	IF VSWR @LO=19GHz (:1) @LO (dBm)		
	+14	+17	+20
0.04	1.61	1.45	1.35
0.24	1.68	1.49	1.40
0.44	1.78	1.59	1.50
0.64	1.94	1.74	1.65
0.88	2.14	1.93	1.83
1.08	2.35	2.11	2.00
1.28	2.51	2.25	2.13
1.48	2.63	2.36	2.23
1.72	2.73	2.45	2.31
1.92	2.79	2.50	2.36
2.12	2.84	2.54	2.39
2.32	2.87	2.55	2.40
2.56	2.95	2.61	2.45
2.76	2.97	2.62	2.45
2.96	2.96	2.59	2.42
3.16	2.98	2.60	2.42
3.40	3.09	2.70	2.51
3.60	3.21	2.81	2.62
3.80	3.32	2.91	2.71
4.00	3.46	3.03	2.82
4.23	3.83	3.36	3.13
4.43	3.91	3.44	3.22
4.63	4.11	3.63	3.40
4.83	4.10	3.65	3.43
5.07	4.02	3.59	3.39
5.27	3.74	3.38	3.21
5.47	3.46	3.13	2.98
5.67	3.08	2.79	2.66
5.91	2.61	2.37	2.26
6.11	2.28	2.09	2.02
6.31	2.09	1.94	1.90
6.51	2.14	2.04	2.01
6.75	2.35	2.27	2.25
6.95	2.55	2.48	2.45
7.15	2.47	2.38	2.34
7.35	2.43	2.42	2.40
7.59	2.29	2.34	2.36
7.79	2.24	2.36	2.41
7.99	2.22	2.41	2.50
8.23	2.38	2.66	2.79

Harmonics Tables

RF HARMONICS ORDER

	(-dBm)	(-dBc)										
0	---	---	-15.92	32.30	---	---	---	---	---	---	---	---
1	---	25.12	---	32.76	38.32	---	---	---	---	---	---	---
2	-104.18	77.79	69.93	59.81	70.54	76.72	---	---	---	---	---	---
3	-126.21	---	92.49	100.15	80.34	95.23	93.11	---	---	---	---	---
4	-124.18	---	---	92.05	101.08	105.11	101.18	92.86	---	---	---	---
5	-122.93	---	---	---	93.07	102.01	91.44	101.31	---	---	---	---
6	-123.50	---	---	---	---	91.84	89.03	95.06	89.54	---	---	---
7	-125.26	---	---	---	---	---	91.81	89.72	95.90	91.46	---	---
8	-125.01	---	---	---	---	---	---	92.89	99.03	96.14	97.00	---
9	-124.81	---	---	---	---	---	---	---	92.80	99.47	98.19	98.08
10	-126.17	---	---	---	---	---	---	---	---	90.62	100.82	103.18
	RF CAL	0	1	2	3	4	5	6	7	8	9	10

LO HARMONICS ORDER

Test conditions: RF IN: 13150 MHz; -15 dBm.
LO IN: 13180 MHz; +17.00 dBm
IF OUT: 30 MHz; -21.14 dBm

RF HARMONICS ORDER

	(-dBm)	(-dBc)										
0	---	---	-5.99	43.11	---	---	---	---	---	---	---	---
1	---	25.69	---	32.80	38.06	---	---	---	---	---	---	---
2	-91.45	67.62	60.04	49.89	60.78	67.58	---	---	---	---	---	---
3	-113.83	---	82.64	81.07	60.37	78.67	89.18	---	---	---	---	---
4	-114.17	---	---	102.36	104.36	89.73	103.71	98.09	---	---	---	---
5	-111.38	---	---	---	102.59	111.69	93.95	111.21	---	---	---	---
6	-114.65	---	---	---	---	103.17	99.67	95.69	100.33	---	---	---
7	-114.09	---	---	---	---	---	102.30	99.78	95.63	101.48	---	---
8	-113.95	---	---	---	---	---	---	100.31	107.72	100.28	107.42	---
9	-112.34	---	---	---	---	---	---	---	100.85	110.44	99.48	109.14
10	-113.17	---	---	---	---	---	---	---	---	102.69	111.37	113.77
	RF CAL	0	1	2	3	4	5	6	7	8	9	10

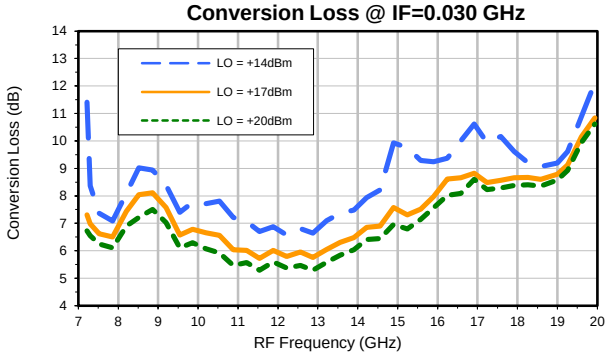
LO HARMONICS ORDER

Test conditions: RF IN: 13150 MHz; -5 dBm.
LO IN: 13180 MHz; +17.00 dBm
IF OUT: 30 MHz; -10.99 dBm

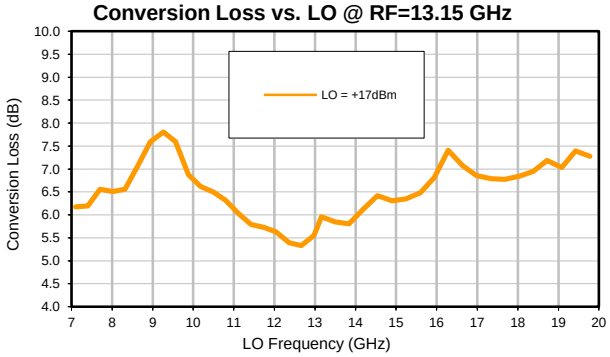
Notes: 1. All Harmonics are in (dBc) relative to IF OUTPUT.
2. + entry denotes harmonics are in (dBc) above IF OUTPUT.
3. RF Cal represent the Harmonics level of the RF input signal to the mixer.

Typical Performance Curves

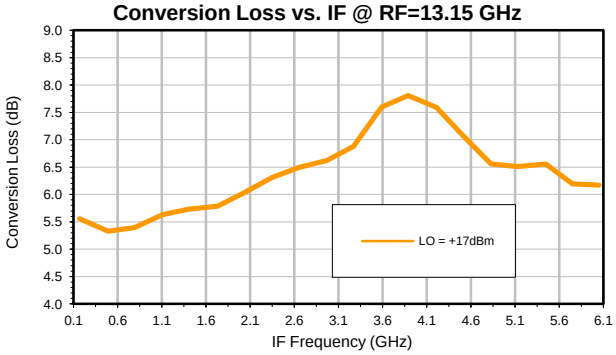
Conversion Loss @ IF=0.030 GHz



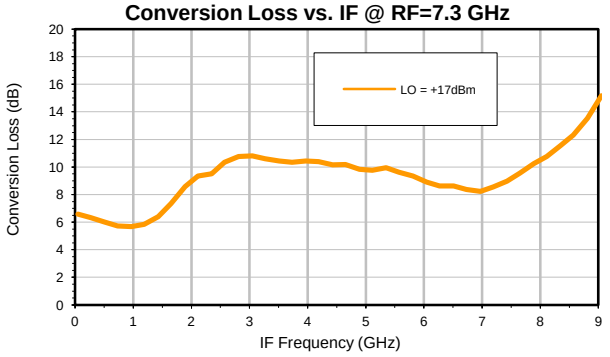
Conversion Loss vs. LO @ RF=13.15 GHz



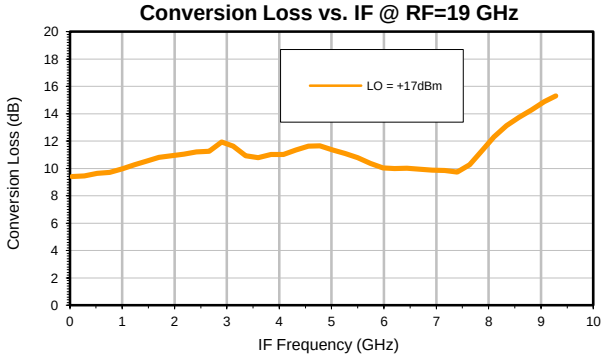
Conversion Loss vs. IF @ RF=13.15 GHz



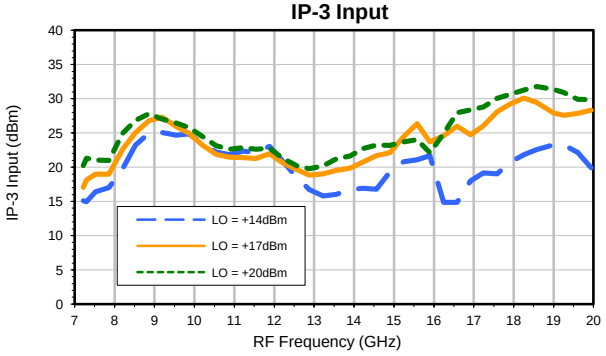
Conversion Loss vs. IF @ RF=7.3 GHz



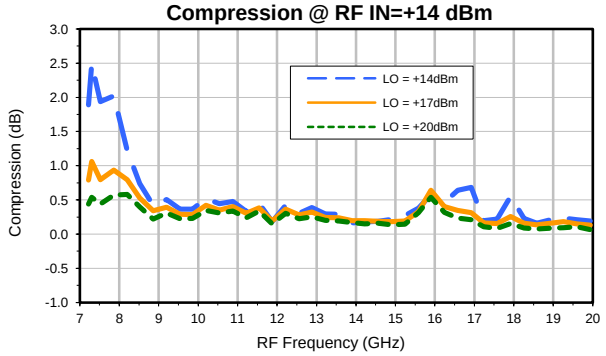
Conversion Loss vs. IF @ RF=19 GHz



IP-3 Input

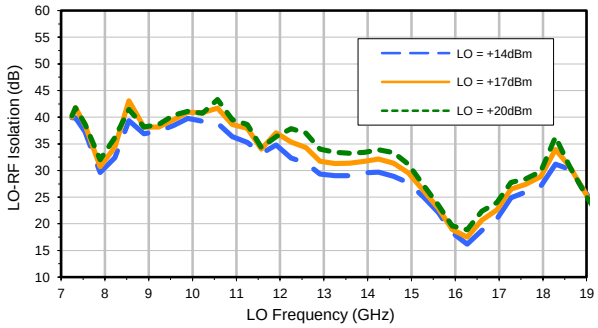


Compression @ RF IN=+14 dBm

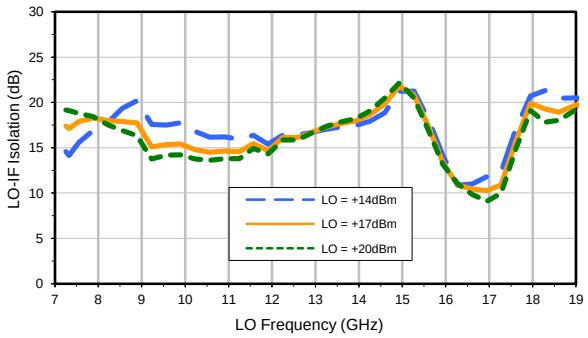


Typical Performance Curves

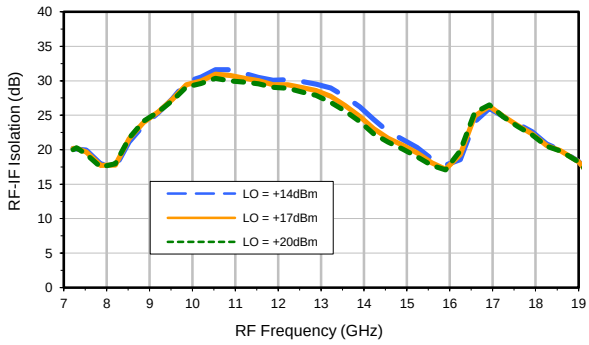
LO-RF Isolation



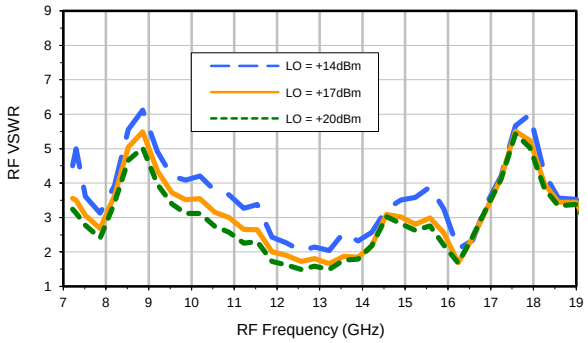
LO-IF Isolation



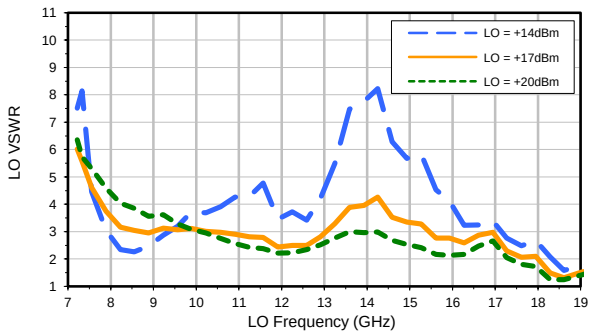
RF-IF Isolation



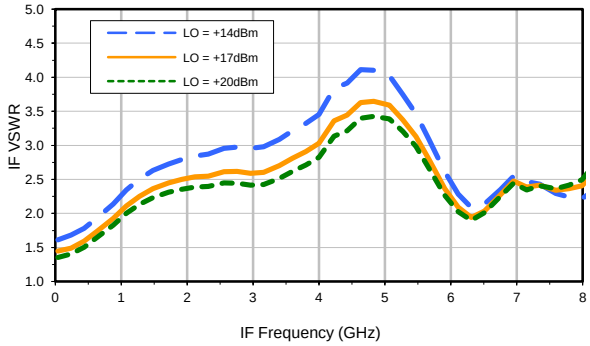
RF VSWR



LO VSWR



IF VSWR



Harmonics Tables

RF HARMONICS ORDER

	(-dBm)	(-dBc)										
0	---	---	-15.92	32.30	---	---	---	---	---	---	---	---
1	---	25.12	---	32.76	38.32	---	---	---	---	---	---	---
2	-104.18	77.79	69.93	59.81	70.54	76.72	---	---	---	---	---	---
3	-126.21	---	92.49	100.15	80.34	95.23	93.11	---	---	---	---	---
4	-124.18	---	---	92.05	101.08	105.11	101.18	92.86	---	---	---	---
5	-122.93	---	---	---	93.07	102.01	91.44	101.31	---	---	---	---
6	-123.50	---	---	---	---	91.84	89.03	95.06	89.54	---	---	---
7	-125.26	---	---	---	---	---	91.81	89.72	95.90	91.46	---	---
8	-125.01	---	---	---	---	---	---	92.89	99.03	96.14	97.00	---
9	-124.81	---	---	---	---	---	---	---	92.80	99.47	98.19	98.08
10	-126.17	---	---	---	---	---	---	---	---	90.62	100.82	103.18
RF CAL		0	1	2	3	4	5	6	7	8	9	10

LO HARMONICS ORDER

Test conditions: RF IN: 13150 MHz; -15 dBm.
LO IN: 13180 MHz; +17.00 dBm
IF OUT: 30 MHz; -21.14 dBm

RF HARMONICS ORDER

	(-dBm)	(-dBc)										
0	---	---	-5.99	43.11	---	---	---	---	---	---	---	---
1	---	25.69	---	32.80	38.06	---	---	---	---	---	---	---
2	-91.45	67.62	60.04	49.89	60.78	67.58	---	---	---	---	---	---
3	-113.83	---	82.64	81.07	60.37	78.67	89.18	---	---	---	---	---
4	-114.17	---	---	102.36	104.36	89.73	103.71	98.09	---	---	---	---
5	-111.38	---	---	---	102.59	111.69	93.95	111.21	---	---	---	---
6	-114.65	---	---	---	---	103.17	99.67	95.69	100.33	---	---	---
7	-114.09	---	---	---	---	---	102.30	99.78	95.63	101.48	---	---
8	-113.95	---	---	---	---	---	---	100.31	107.72	100.28	107.42	---
9	-112.34	---	---	---	---	---	---	---	100.85	110.44	99.48	109.14
10	-113.17	---	---	---	---	---	---	---	---	102.69	111.37	113.77
RF CAL		0	1	2	3	4	5	6	7	8	9	10

LO HARMONICS ORDER

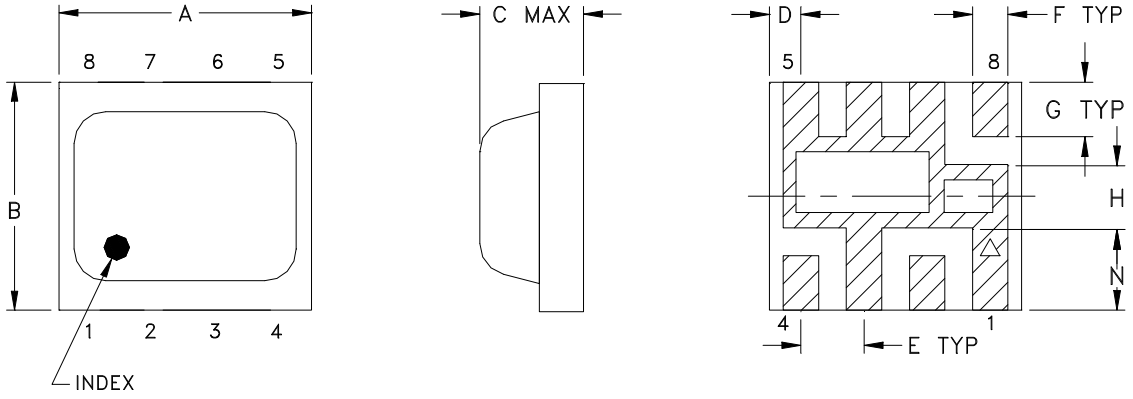
Test conditions: RF IN: 13150 MHz; -5 dBm.
LO IN: 13180 MHz; +17.00 dBm
IF OUT: 30 MHz; -10.99 dBm

Notes: 1. All Harmonics are in (dBc) relative to IF OUTPUT.
2. + entry denotes harmonics are in (dBc) above IF OUTPUT.
3. RF Cal represent the Harmonics level of the RF input signal to the mixer.

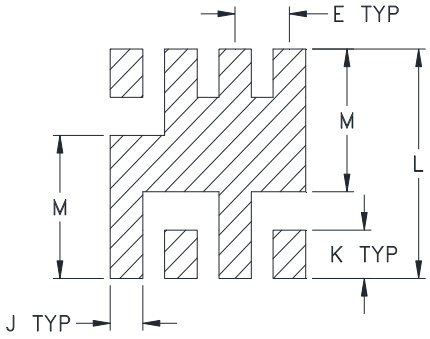
Case Style HV

Outline Dimensions

HV1195



PCB Metal Land Pattern



Suggested Layout,
Tolerance to be within ±.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)

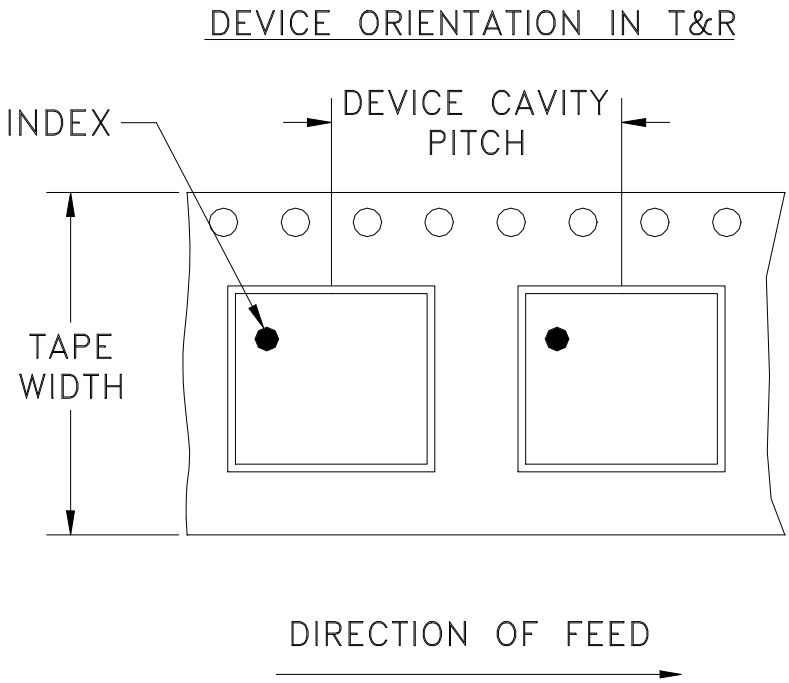
CASE#	WT, GRAM
HV1195	.08

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

Notes:

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

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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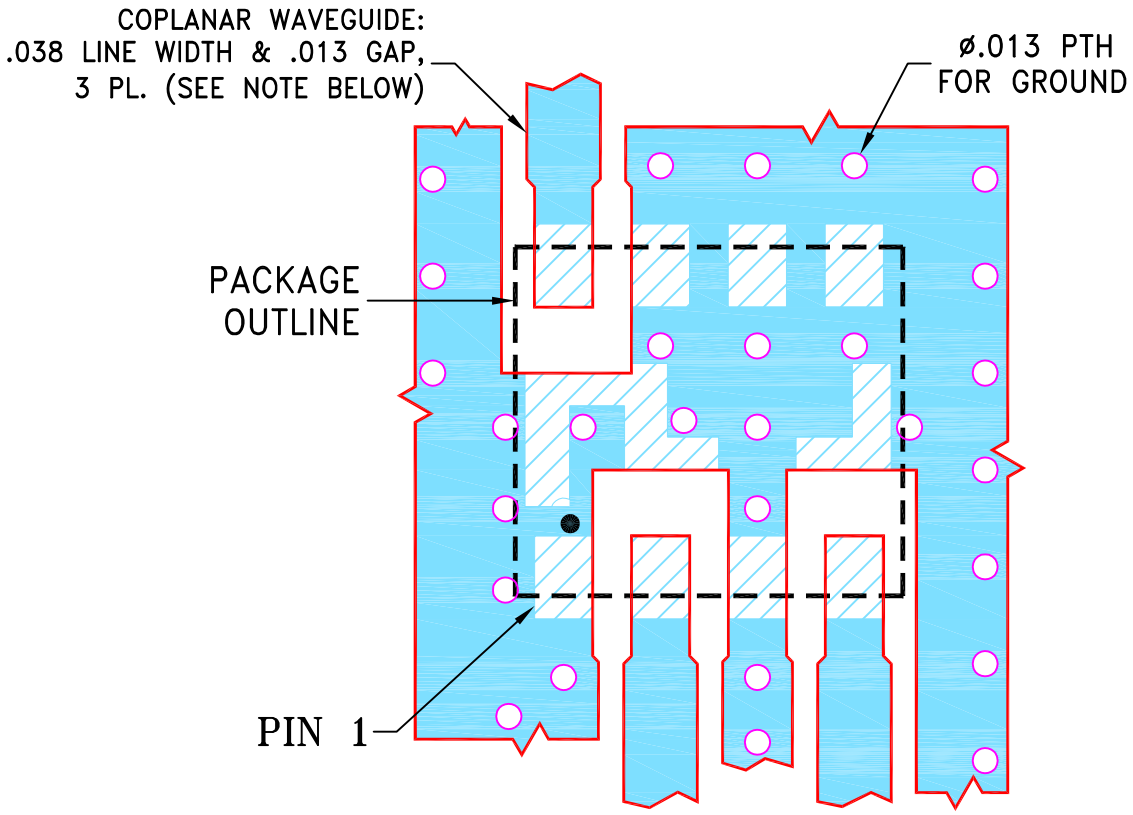
THIRD ANGLE PROJECTION

REVISIONS					
REV	ECN No.	DESCRIPTION	DATE	DR	AUTH
OR	M116031	NEW RELEASE	02/14/08	MMG	DJ
A	ECO-000060	MODIFIED CASE STYLE	10/16/19	ITG	RB

SUGGESTED MOUNTING CONFIGURATION FOR HV1195 CASE STYLE, "08MX05" PIN CODE



NOTES:

1. 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.
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	MMG	02/13/08
TOLERANCES ON:	CHECKED	AV	02/14/08
2 PL DECIMALS ±	APPROVED	DJ	02/14/08
3 PL DECIMALS ± .005			
ANGLES ±			
FRACTIONS ±			

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

Mini-Circuits® 13 Neptune Avenue Brooklyn NY 11235

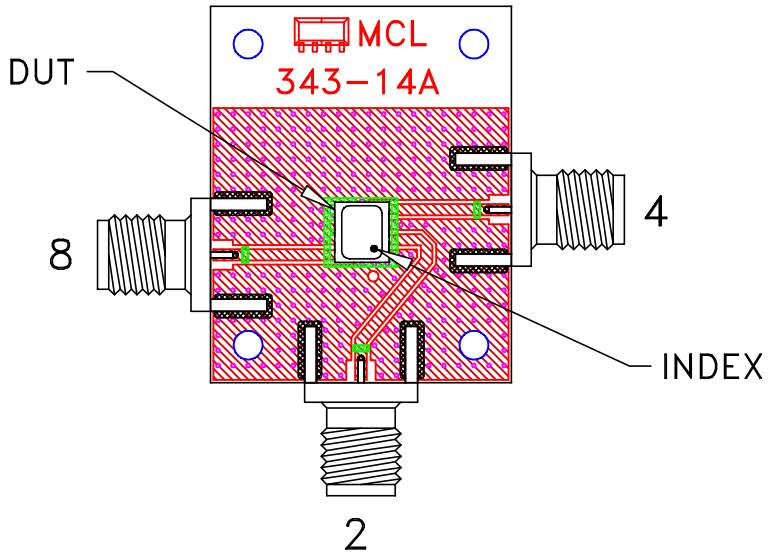
PL, 08MX05, HV1195, SIM, TB-458+

SIZE	CODE IDENT	DRAWING NO:	REV:
A	15542	98-PL-284	A

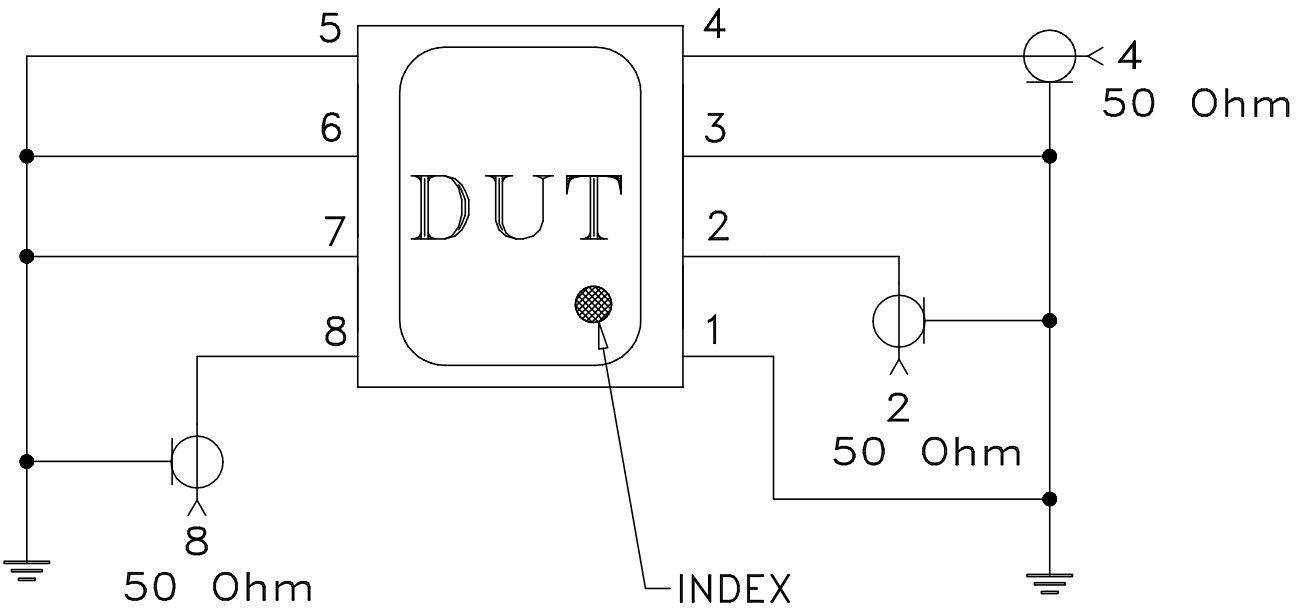
FILE:	SCALE:	SHEET:
98PL284	10:1	1 OF 1

Evaluation Board and Circuit

For Pin Connections refer to Data Sheet of the DUT



TB-458+



Schematic Diagram

Notes:

1. SMA Female connectors.
2. PCB Material: Rogers RO4350 or equivalent, Dielectric Constant=3.5, Thickness=.020 inch.

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Environmental Specifications ENV10T1

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