

Frequency Mixer

HJK-251H+

Typical Performance Data

RF (IN) (MHz)	LO (MHz)	CONVERSION LOSS IF FIXED @IF(OUT)=30MHz (dB)			RF (IN) (MHz)	LO (MHz)	IP-3 INPUT (dBm)			RF (IN) (MHz)	LO (MHz)	COMPRESSION @RF IN=+20dBm (dB)		
		@LO (dBm)					@LO (dBm)					@LO (dBm)		
		+14	+17	+20			+14	+17	+20			+14	+17	+20
40.1	10.1	6.60	6.52	6.46	40.1	10.1	34.86	38.45	41.82	40.1	10.1	0.28	0.12	0.08
52.1	22.1	6.70	6.66	6.59	52.1	22.1	33.64	34.87	32.92	52.1	22.1	0.35	0.13	0.06
64.1	34.1	6.91	6.81	6.76	64.1	34.1	31.76	34.66	36.86	64.1	34.1	0.36	0.20	0.09
79.1	49.1	7.10	7.02	6.99	79.1	49.1	31.83	35.07	39.42	79.1	49.1	0.30	0.14	0.05
91.1	61.1	7.12	7.05	7.02	91.1	61.1	32.41	39.88	36.28	91.1	61.1	0.30	0.14	0.06
106.1	76.1	7.00	6.93	6.88	106.1	76.1	34.46	34.95	36.79	106.1	76.1	0.33	0.16	0.10
118.1	88.1	6.91	6.82	6.78	118.1	88.1	34.12	33.76	36.29	118.1	88.1	0.34	0.17	0.07
130.1	100.1	6.88	6.78	6.70	130.1	100.1	35.29	33.03	35.15	130.1	100.1	0.37	0.16	0.08
145.1	115.1	6.86	6.77	6.70	145.1	115.1	32.00	32.47	34.83	145.1	115.1	0.49	0.22	0.11
157.1	127.1	6.94	6.86	6.77	157.1	127.1	31.07	32.36	35.50	157.1	127.1	0.45	0.20	0.11
172.1	142.1	7.08	7.00	6.91	172.1	142.1	31.10	33.05	36.47	172.1	142.1	0.37	0.15	0.08
184.1	154.1	7.15	7.05	6.98	184.1	154.1	30.72	33.32	35.55	184.1	154.1	0.48	0.21	0.11
196.1	166.1	7.14	7.04	6.96	196.1	166.1	28.91	30.87	34.35	196.1	166.1	0.58	0.26	0.12
211.1	181.1	7.10	6.99	6.90	211.1	181.1	28.11	30.38	33.89	211.1	181.1	0.69	0.29	0.15
223.1	193.1	7.07	6.95	6.86	223.1	193.1	27.55	29.45	32.55	223.1	193.1	0.88	0.35	0.16
238.1	208.1	7.03	6.90	6.80	238.1	208.1	28.19	30.87	33.31	238.1	208.1	1.04	0.42	0.20
250.1	220.1	7.04	6.92	6.82	250.1	220.1	29.22	32.12	34.71	250.1	220.1	0.91	0.36	0.18
262.1	232.1	7.16	7.03	6.93	262.1	232.1	28.12	30.89	33.08	262.1	232.1	1.00	0.37	0.17
277.1	247.1	7.27	7.13	7.04	277.1	247.1	27.18	29.30	31.23	277.1	247.1	1.46	0.51	0.21
289.1	259.1	7.30	7.16	7.05	289.1	259.1	26.60	28.76	31.13	289.1	259.1	1.70	0.60	0.26
304.1	274.1	7.34	7.19	7.05	304.1	274.1	26.49	28.75	31.07	304.1	274.1	2.35	0.85	0.33
316.1	286.1	7.36	7.19	7.05	316.1	286.1	26.03	28.62	31.69	316.1	286.1	3.00	1.25	0.40
331.1	301.1	7.32	7.16	7.03	331.1	301.1	24.37	27.19	32.19	331.1	301.1	3.06	1.31	0.40
343.1	313.1	7.40	7.23	7.10	343.1	313.1	23.69	26.59	31.07	343.1	313.1	3.01	1.29	0.38
355.1	325.1	7.57	7.41	7.28	355.1	325.1	22.96	25.93	30.24	355.1	325.1	3.59	1.71	0.46
370.1	340.1	7.69	7.53	7.39	370.1	340.1	21.36	23.49	25.81	370.1	340.1	4.27	2.27	0.73
382.1	352.1	7.76	7.59	7.45	382.1	352.1	20.11	21.64	23.31	382.1	352.1	4.55	2.58	0.96
397.1	367.1	7.88	7.69	7.56	397.1	367.1	19.28	20.32	21.54	397.1	367.1	5.32	3.26	1.46
409.1	379.1	7.78	7.56	7.38	409.1	379.1	19.19	20.48	22.01	409.1	379.1	5.88	3.75	1.85
421.1	391.1	7.70	7.43	7.23	421.1	391.1	19.13	21.21	23.73	421.1	391.1	5.93	3.78	1.92
436.1	406.1	7.76	7.45	7.21	436.1	406.1	18.34	19.70	21.92	436.1	406.1	5.84	3.76	1.96
448.1	418.1	7.83	7.51	7.26	448.1	418.1	18.63	19.51	20.27	448.1	418.1	6.22	4.03	2.09
463.1	433.1	7.84	7.53	7.30	463.1	433.1	18.96	20.46	21.45	463.1	433.1	6.57	4.36	2.35
475.1	445.1	7.97	7.64	7.40	475.1	445.1	18.58	20.80	22.54	475.1	445.1	6.80	4.60	2.58
487.1	457.1	8.10	7.75	7.48	487.1	457.1	18.29	20.90	23.28	487.1	457.1	7.24	5.03	2.95
502.1	472.1	8.19	7.79	7.52	502.1	472.1	17.95	20.91	23.68	502.1	472.1	7.69	5.51	3.39
514.1	484.1	8.24	7.84	7.55	514.1	484.1	17.48	20.36	23.43	514.1	484.1	7.61	5.43	3.35
529.1	499.1	8.35	7.93	7.60	529.1	499.1	17.30	20.19	23.57	529.1	499.1	7.64	5.45	3.35
541.1	511.1	8.41	7.94	7.64	541.1	511.1	17.15	19.99	23.57	541.1	511.1	7.59	5.35	3.25
556.1	526.1	8.62	8.14	7.81	556.1	526.1	16.45	19.01	22.28	556.1	526.1	7.63	5.45	3.44

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Typical Performance Data

IF (OUT) (MHz)	LO (MHz)	CONVERSION LOSS VS. IF FREQUENCY @RF(IN)=182.1MHz (dB)
		@LO (dBm)
		+17
172.0	10.1	6.91
164.0	18.1	6.92
156.0	26.1	6.93
148.0	34.1	6.98
139.0	43.1	7.05
131.0	51.1	7.03
123.0	59.1	7.02
115.0	67.1	7.01
106.0	76.1	7.07
98.0	84.1	7.04
89.0	93.1	6.91
81.0	101.1	6.93
72.0	110.1	7.06
64.0	118.1	7.08
56.0	126.1	7.12
48.0	134.1	7.08
39.0	143.1	7.08
31.0	151.1	7.07
23.0	159.1	7.09
15.0	167.1	7.21
10.0	192.1	7.58
26.0	208.1	7.22
42.0	224.1	7.13
58.0	240.1	7.11
74.0	256.1	7.07
90.0	272.1	7.06
106.0	288.1	7.30
122.0	304.1	7.26
138.0	320.1	7.39
154.0	336.1	7.34
170.0	352.1	7.34
186.0	368.1	7.52
202.0	384.1	7.53
218.0	400.1	7.52
234.0	416.1	7.61
250.0	432.1	7.65
266.0	448.1	7.70
282.0	464.1	7.82
298.0	480.1	7.81
314.0	496.1	7.93

IF (OUT) (MHz)	LO (MHz)	CONVERSION LOSS VS. IF FREQUENCY @RF(IN)=145.1MHz (dB)
		@LO (dBm)
		+17
11.0	156.1	7.22
16.0	161.1	6.94
26.0	171.1	6.95
36.0	181.1	6.91
46.0	191.1	6.89
56.0	201.1	6.86
66.0	211.1	6.88
76.0	221.1	6.77
86.0	231.1	6.85
96.0	241.1	6.90
101.0	246.1	6.93
111.0	256.1	6.89
121.0	266.1	6.96
131.0	276.1	6.99
141.0	286.1	7.08
151.0	296.1	7.13
161.0	306.1	7.15
171.0	316.1	7.23
181.0	326.1	7.20
191.0	336.1	7.25
196.0	341.1	7.25
206.0	351.1	7.19
216.0	361.1	7.28
226.0	371.1	7.24
236.0	381.1	7.27
246.0	391.1	7.18
256.0	401.1	7.24
266.0	411.1	7.25
276.0	421.1	7.36
286.0	431.1	7.32
291.0	436.1	7.31
301.0	446.1	7.46
311.0	456.1	7.58
321.0	466.1	7.66
331.0	476.1	7.64
341.0	486.1	7.75
351.0	496.1	7.86
361.0	506.1	7.86
371.0	516.1	7.94
381.0	526.1	7.94

IF (OUT) (MHz)	LO (MHz)	CONVERSION LOSS VS. IF FREQUENCY @RF(IN)=220.1MHz (dB)
		@LO (dBm)
		+17
210.0	10.1	6.72
206.0	14.1	6.73
200.0	20.1	6.73
196.0	24.1	6.75
190.0	30.1	6.76
186.0	34.1	6.76
180.0	40.1	6.84
176.0	44.1	6.85
170.0	50.1	6.86
166.0	54.1	6.87
160.0	60.1	6.86
156.0	64.1	6.86
150.0	70.1	6.88
144.0	76.1	6.89
140.0	80.1	6.87
134.0	86.1	6.87
130.0	90.1	6.87
124.0	96.1	6.90
120.0	100.1	6.91
114.0	106.1	6.93
108.0	112.1	6.80
102.0	118.1	6.82
98.0	122.1	6.83
92.0	128.1	6.90
88.0	132.1	6.88
82.0	138.1	6.90
76.0	144.1	6.93
72.0	148.1	6.93
66.0	154.1	6.93
62.0	158.1	6.95
56.0	164.1	6.93
52.0	168.1	6.95
46.0	174.1	6.98
42.0	178.1	6.97
36.0	184.1	7.02
32.0	188.1	7.01
26.0	194.1	7.02
22.0	198.1	7.01
16.0	204.1	7.05
10.0	210.1	7.43

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LO (MHz)	LO-RF ISOLATION (dB)			LO-IF ISOLATION (dB)		
	@LO (dBm)			@LO (dBm)		
	+14	+17	+20	+14	+17	+20
10.1	72.66	65.14	79.51	65.44	64.99	65.48
22.1	65.16	65.97	66.75	59.60	59.83	59.98
34.1	64.80	63.22	64.21	56.37	56.26	56.36
49.1	60.03	60.32	61.05	52.62	52.67	52.89
61.1	57.70	57.80	58.35	50.16	50.17	50.69
76.1	56.87	56.82	57.45	48.34	48.33	48.68
88.1	56.48	56.80	56.88	47.72	47.71	47.83
100.1	55.56	55.93	55.74	47.20	47.18	47.22
115.1	54.42	54.76	54.78	46.42	46.40	46.40
127.1	53.37	53.76	53.80	45.32	45.29	45.29
142.1	52.35	52.76	52.75	44.08	44.04	44.02
154.1	51.74	52.05	52.11	43.63	43.57	43.56
166.1	52.00	52.05	52.21	43.57	43.50	43.49
181.1	52.28	52.45	52.50	43.80	43.72	43.71
193.1	52.36	52.57	52.62	43.75	43.65	43.63
208.1	52.23	52.53	52.65	43.48	43.42	43.37
220.1	52.00	52.06	52.18	43.08	42.97	42.94
232.1	51.24	51.28	51.38	42.82	42.72	42.66
247.1	51.31	51.35	51.42	43.06	42.96	42.91
259.1	51.87	51.88	52.05	43.44	43.33	43.28
274.1	51.79	51.79	51.83	43.89	43.76	43.68
286.1	51.20	51.23	51.34	43.96	43.79	43.72
301.1	51.03	50.93	51.03	43.66	43.48	43.37
313.1	50.76	50.59	50.63	43.44	43.23	43.11
325.1	50.60	50.33	50.26	43.35	43.13	42.99
340.1	51.36	51.18	51.22	43.65	43.39	43.23
352.1	52.64	52.35	52.30	44.04	43.78	43.59
367.1	55.07	54.75	54.63	44.64	44.33	44.13
379.1	57.50	57.88	58.38	44.99	44.69	44.47
391.1	58.49	58.54	58.36	45.49	45.14	44.88
406.1	58.23	57.96	57.68	45.94	45.52	45.23
418.1	58.00	57.49	56.89	46.67	46.24	45.93
433.1	56.92	56.24	55.54	47.70	47.24	46.91
445.1	55.91	55.18	54.51	48.95	48.41	48.00
457.1	55.36	54.61	53.91	50.25	49.70	49.25
472.1	54.40	53.58	52.93	51.63	50.87	50.30
484.1	55.28	54.40	53.66	53.10	52.30	51.60
499.1	52.54	51.74	51.11	56.20	54.83	53.67
511.1	53.01	52.11	51.55	58.13	56.09	54.49
526.1	52.01	51.20	50.65	59.78	57.09	55.11

RF (IN) (MHz)	LO (MHz)	RF-IF ISOLATION (dB)		
		@LO (dBm)		
		+14	+17	+20
40.1	10.1	52.94	49.44	54.77
52.1	22.1	47.18	46.47	47.96
64.1	34.1	62.29	63.24	64.83
79.1	49.1	57.41	57.81	58.57
91.1	61.1	56.91	55.65	56.49
106.1	76.1	54.34	50.47	55.49
118.1	88.1	58.29	57.94	58.21
130.1	100.1	54.32	54.50	54.22
145.1	115.1	54.76	52.78	50.88
157.1	127.1	53.78	53.50	53.82
172.1	142.1	52.82	53.53	53.00
184.1	154.1	52.79	51.92	50.23
196.1	166.1	53.11	52.41	51.61
211.1	181.1	48.23	49.41	49.47
223.1	193.1	48.46	48.76	48.88
238.1	208.1	48.26	48.27	48.11
250.1	220.1	46.69	46.87	46.61
262.1	232.1	48.30	48.56	48.96
277.1	247.1	50.44	50.77	51.75
289.1	259.1	49.07	49.84	50.04
304.1	274.1	46.57	47.19	47.77
316.1	286.1	45.64	45.68	46.19
331.1	301.1	43.19	43.24	42.88
343.1	313.1	40.97	40.97	40.72
355.1	325.1	39.56	39.07	38.88
370.1	340.1	37.15	36.67	36.20
382.1	352.1	35.60	34.92	34.44
397.1	367.1	36.00	35.74	35.51
409.1	379.1	35.62	35.45	34.50
421.1	391.1	35.45	35.72	35.60
436.1	406.1	35.84	36.05	36.02
448.1	418.1	35.63	35.90	35.90
463.1	433.1	35.02	35.14	35.30
475.1	445.1	33.86	33.77	33.52
487.1	457.1	33.06	32.91	32.33
502.1	472.1	31.73	31.30	30.97
514.1	484.1	30.30	29.67	29.10
529.1	499.1	28.79	27.97	27.58
541.1	511.1	27.97	27.25	26.86
556.1	526.1	27.00	26.04	25.43

Frequency Mixer

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Typical Performance Data

RF (IN) (MHz)	LO (MHz)	RF VSWR (:1)			LO (MHz)	LO VSWR (:1)			IF (OUT) (MHz)	IF VSWR @LO=190MHz (:1)		
		@LO (dBm)				@LO (dBm)				@LO (dBm)		
		+14	+17	+20		+14	+17	+20		+14	+17	+20
40.1	10.1	2.37	2.40	2.43	10.1	2.17	2.19	1.77	10.1	1.60	1.47	1.75
52.1	22.1	2.31	2.36	2.40	22.1	2.21	2.23	1.89	12.1	1.58	1.66	1.56
64.1	34.1	2.26	2.30	2.35	34.1	2.26	2.27	2.10	16.1	1.57	1.57	1.55
79.1	49.1	2.26	2.30	2.35	49.1	2.31	2.33	2.05	20.1	1.60	1.49	1.46
91.1	61.1	2.21	2.27	2.31	61.1	2.38	2.39	1.98	24.1	1.56	1.53	1.45
106.1	76.1	2.19	2.24	2.28	76.1	2.49	2.50	2.20	28.1	1.50	1.51	1.51
118.1	88.1	2.17	2.20	2.26	88.1	2.58	2.59	2.51	32.1	1.55	1.51	1.53
130.1	100.1	2.14	2.18	2.23	100.1	2.69	2.70	2.68	36.1	1.53	1.52	1.50
145.1	115.1	2.08	2.13	2.17	115.1	2.81	2.82	2.82	40.1	1.52	1.47	1.47
157.1	127.1	2.09	2.13	2.17	127.1	2.92	2.93	2.92	44.1	1.48	1.46	1.42
172.1	142.1	2.04	2.08	2.13	142.1	3.04	3.04	3.04	48.1	1.46	1.47	1.43
184.1	154.1	2.01	2.05	2.10	154.1	3.12	3.12	3.11	52.1	1.47	1.48	1.41
196.1	166.1	1.99	2.03	2.07	166.1	3.18	3.18	3.18	56.1	1.48	1.43	1.43
211.1	181.1	1.94	1.99	2.02	181.1	3.25	3.25	3.24	60.1	1.47	1.45	1.42
223.1	193.1	1.91	1.95	1.99	193.1	3.28	3.28	3.27	62.1	1.51	1.48	1.44
238.1	208.1	1.96	2.01	2.05	208.1	3.30	3.31	3.30	66.1	1.57	1.52	1.51
250.1	220.1	1.90	1.95	2.00	220.1	3.31	3.31	3.30	70.1	1.52	1.49	1.46
262.1	232.1	1.89	1.94	1.98	232.1	3.31	3.31	3.30	74.1	1.50	1.48	1.44
277.1	247.1	1.87	1.92	1.97	247.1	3.28	3.28	3.27	78.1	1.51	1.48	1.46
289.1	259.1	1.83	1.88	1.93	259.1	3.25	3.25	3.25	82.1	1.52	1.49	1.47
304.1	274.1	1.80	1.84	1.89	274.1	3.21	3.21	3.21	86.1	1.53	1.49	1.46
316.1	286.1	1.78	1.82	1.86	286.1	3.18	3.18	3.17	90.1	1.51	1.49	1.45
331.1	301.1	1.71	1.74	1.78	301.1	3.12	3.12	3.12	94.1	1.51	1.49	1.46
343.1	313.1	1.70	1.73	1.76	313.1	3.08	3.08	3.08	98.1	1.53	1.49	1.46
355.1	325.1	1.67	1.69	1.71	325.1	3.04	3.04	3.03	102.1	1.53	1.51	1.47
370.1	340.1	1.62	1.63	1.64	340.1	2.96	2.96	2.95	106.1	1.53	1.50	1.48
382.1	352.1	1.65	1.65	1.66	352.1	2.91	2.91	2.90	110.1	1.55	1.53	1.51
397.1	367.1	1.67	1.67	1.68	367.1	2.85	2.84	2.83	112.1	1.54	1.52	1.50
409.1	379.1	1.70	1.71	1.73	379.1	2.80	2.79	2.78	116.1	1.54	1.51	1.49
421.1	391.1	1.75	1.77	1.79	391.1	2.77	2.76	2.75	120.1	1.56	1.51	1.50
436.1	406.1	1.83	1.85	1.88	406.1	2.72	2.71	2.70	124.1	1.54	1.51	1.48
448.1	418.1	1.85	1.88	1.92	418.1	2.69	2.68	2.67	128.1	1.51	1.49	1.47
463.1	433.1	1.91	1.95	2.00	433.1	2.65	2.65	2.64	132.1	1.49	1.48	1.46
475.1	445.1	1.94	1.99	2.05	445.1	2.62	2.61	2.60	136.1	1.50	1.47	1.44
487.1	457.1	1.95	2.01	2.08	457.1	2.58	2.58	2.57	140.1	1.48	1.46	1.44
502.1	472.1	2.00	2.05	2.12	472.1	2.54	2.54	2.53	144.1	1.49	1.46	1.43
514.1	484.1	2.04	2.10	2.17	484.1	2.50	2.50	2.49	148.1	1.50	1.48	1.44
529.1	499.1	2.06	2.13	2.20	499.1	2.47	2.46	2.46	152.1	1.52	1.49	1.46
541.1	511.1	2.11	2.18	2.25	511.1	2.43	2.43	2.42	156.1	1.54	1.52	1.48
556.1	526.1	2.13	2.20	2.27	526.1	2.39	2.39	2.38	160.1	1.54	1.51	1.49

Harmonics Tables

RF HARMONICS ORDER

	(-dBm)	(-dBc)										
0	---	---	17.16	35.04	43.12	41.75	38.25	33.50	42.64	35.38	51.62	39.99
1	---	44.24	---	60.75	9.90	61.44	15.41	54.30	19.01	67.21	24.50	72.62
2	104.19	55.42	62.67	57.33	85.33	57.51	68.55	55.62	67.47	54.54	71.45	56.28
3	112.54	78.77	78.21	81.76	70.12	80.53	67.36	79.80	61.06	79.18	60.42	78.28
4	121.67	89.49	95.69	90.84	97.46	90.63	116.04	94.52	97.23	87.71	92.86	85.19
5	121.38	88.98	84.53	89.35	81.22	89.37	86.89	89.85	86.90	89.39	80.60	88.44
6	120.63	100.59	115.09	97.42	115.19	94.42	114.46	90.24	105.37	102.10	110.63	103.41
7	122.71	104.72	92.65	101.92	90.14	101.92	89.61	100.88	90.87	102.93	90.90	102.46
8	122.31	118.46	116.92	113.45	115.31	107.74	117.71	103.91	115.81	94.37	117.37	95.72
9	121.37	115.06	109.70	115.56	104.28	112.74	105.14	114.09	101.68	110.57	99.85	114.33
10	121.61	117.97	117.84	115.84	119.32	118.28	115.01	117.40	116.19	118.49	116.82	113.37
	RF CAL	0	1	2	3	4	5	6	7	8	9	10

LO HARMONICS ORDER

Test conditions: RF IN: 183 MHz; 0 dBm.
 LO IN: 153 MHz; +17.00 dBm
 IF OUT: 30 MHz; - 7.06 dBm

RF HARMONICS ORDER

	(-dBm)	(-dBc)										
0	---	---	21.10	28.50	41.10	39.13	43.08	38.87	50.06	41.73	64.38	44.81
1	---	30.34	---	49.77	10.11	55.83	15.97	52.68	20.36	76.89	26.59	69.31
2	93.53	45.66	50.51	46.77	58.16	47.37	57.40	47.06	62.36	47.41	72.41	51.43
3	103.31	72.32	56.63	74.11	50.90	73.81	47.66	71.80	43.74	70.21	42.51	81.52
4	107.59	68.35	67.68	69.64	65.20	71.54	66.62	70.59	64.77	65.55	65.90	63.39
5	105.17	84.32	68.45	85.14	75.46	84.50	67.95	84.45	65.32	82.27	69.65	80.76
6	106.43	78.97	86.02	80.81	82.47	80.38	82.00	84.91	82.49	86.88	80.49	82.69
7	106.21	87.81	77.24	86.22	80.64	87.78	81.17	86.28	79.09	85.70	80.05	85.11
8	106.72	92.20	104.83	90.77	115.60	89.82	99.99	89.83	99.49	94.36	97.50	93.15
9	106.96	96.19	86.01	94.03	85.12	91.36	79.96	91.52	83.44	90.65	82.97	90.15
10	107.62	109.13	101.78	110.74	99.69	106.38	96.15	99.92	97.74	100.29	97.03	105.82
	RF CAL	0	1	2	3	4	5	6	7	8	9	10

LO HARMONICS ORDER

Test conditions: RF IN: 183 MHz; 10 dBm.
 LO IN: 153 MHz; +17.00 dBm
 IF OUT: 30 MHz; 2.73 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 represents the Harmonics level of the RF Input Signal to the mixer