

Frequency Mixer

HJK-ED12173

Typical Performance Data

RF (IN) (MHz)	LO (MHz)	CONVERSION LOSS IF FIXED @IF(OUT)=30MHz (dB)		
		@LO (dBm)		
		+14	+17	+20
40.1	10.1	6.69	6.60	6.53
50.1	20.1	6.80	6.70	6.64
60.1	30.1	6.89	6.77	6.71
70.1	40.1	7.04	6.95	6.87
80.1	50.1	7.16	7.06	6.99
90.1	60.1	7.22	7.12	7.05
100.1	70.1	7.21	7.10	7.03
110.1	80.1	7.18	7.07	6.99
120.1	90.1	7.14	7.02	6.94
130.1	100.1	7.13	7.00	6.92
140.1	110.1	7.11	6.98	6.89
150.1	120.1	7.15	7.01	6.92
160.1	130.1	7.24	7.11	7.02
170.1	140.1	7.36	7.21	7.11
180.1	150.1	7.48	7.33	7.24
190.1	160.1	7.57	7.43	7.34
200.1	170.1	7.65	7.51	7.41
210.1	180.1	7.74	7.60	7.49
220.1	190.1	7.80	7.65	7.54
230.1	200.1	7.74	7.56	7.43
240.1	210.1	7.68	7.49	7.36
250.1	220.1	7.76	7.58	7.45
260.1	230.1	7.91	7.72	7.59
270.1	240.1	8.09	7.91	7.77
280.1	250.1	8.26	8.08	7.95
290.1	260.1	8.43	8.24	8.11
300.1	270.1	8.58	8.39	8.26
310.1	280.1	8.71	8.52	8.38
320.1	290.1	8.78	8.59	8.45
335.1	305.1	8.90	8.70	8.56
345.1	315.1	9.07	8.88	8.74
360.1	330.1	9.42	9.24	9.10
370.1	340.1	9.68	9.50	9.36
385.1	355.1	10.11	9.92	9.78
395.1	365.1	10.39	10.21	10.08
410.1	380.1	10.83	10.62	10.49
420.1	390.1	11.52	11.27	11.12
435.1	405.1	11.08	10.67	10.38
445.1	415.1	10.87	10.58	10.37
460.1	430.1	10.97	10.73	10.56

RF (IN) (MHz)	LO (MHz)	IP3 INPUT (dBm)		
		@LO (dBm)		
		+14	+17	+20
40.1	10.1	31.66	35.39	39.08
50.1	20.1	30.77	34.26	33.81
60.1	30.1	29.21	30.52	30.91
70.1	40.1	29.81	30.70	32.13
80.1	50.1	28.85	30.02	33.64
90.1	60.1	28.27	30.84	37.39
100.1	70.1	28.51	32.41	39.12
110.1	80.1	29.38	34.49	38.63
120.1	90.1	29.72	35.14	38.73
130.1	100.1	30.64	36.79	39.87
140.1	110.1	29.95	35.75	40.06
150.1	120.1	29.74	34.93	38.86
160.1	130.1	30.96	34.16	36.09
170.1	140.1	30.63	33.65	35.14
180.1	150.1	31.25	34.49	36.14
190.1	160.1	31.75	35.17	38.23
200.1	170.1	31.63	35.48	37.53
210.1	180.1	32.26	32.91	32.83
220.1	190.1	30.11	29.51	29.99
230.1	200.1	30.72	32.21	33.14
240.1	210.1	28.51	31.17	36.27
250.1	220.1	29.06	32.80	36.75
260.1	230.1	30.05	33.97	35.69
270.1	240.1	30.77	34.64	36.29
280.1	250.1	30.53	34.56	36.02
290.1	260.1	30.34	34.74	35.41
300.1	270.1	30.64	34.96	35.06
310.1	280.1	31.55	35.40	35.11
320.1	290.1	31.68	35.39	36.78
335.1	305.1	30.81	34.42	38.01
345.1	315.1	30.81	34.33	33.24
360.1	330.1	30.77	31.69	33.49
370.1	340.1	30.39	32.50	36.26
385.1	355.1	29.38	29.78	28.02
395.1	365.1	27.05	26.47	26.09
410.1	380.1	22.00	23.29	24.33
420.1	390.1	18.45	18.64	19.53
435.1	405.1	22.02	23.49	26.35
445.1	415.1	23.36	25.56	26.83
460.1	430.1	24.56	26.03	27.59

RF (IN) (MHz)	LO (MHz)	COMPRESSION @RF IN=+20dBm (dB)		
		@LO (dBm)		
		+14	+17	+20
40.1	10.1	0.83	0.39	0.19
50.1	20.1	1.17	0.48	0.22
60.1	30.1	1.52	0.70	0.32
70.1	40.1	1.24	0.48	0.20
80.1	50.1	1.07	0.39	0.16
90.1	60.1	0.89	0.37	0.16
100.1	70.1	0.77	0.31	0.14
110.1	80.1	0.71	0.29	0.11
120.1	90.1	0.72	0.25	0.10
130.1	100.1	0.84	0.27	0.10
140.1	110.1	1.00	0.35	0.14
150.1	120.1	1.14	0.41	0.17
160.1	130.1	1.12	0.40	0.16
170.1	140.1	1.02	0.36	0.17
180.1	150.1	0.89	0.33	0.15
190.1	160.1	0.83	0.31	0.13
200.1	170.1	0.79	0.29	0.12
210.1	180.1	0.77	0.23	0.09
220.1	190.1	0.86	0.22	0.07
230.1	200.1	1.15	0.32	0.18
240.1	210.1	1.33	0.46	0.25
250.1	220.1	1.33	0.48	0.24
260.1	230.1	1.23	0.43	0.21
270.1	240.1	1.05	0.37	0.17
280.1	250.1	0.97	0.35	0.15
290.1	260.1	0.93	0.34	0.15
300.1	270.1	0.94	0.34	0.15
310.1	280.1	0.96	0.33	0.15
320.1	290.1	1.06	0.36	0.16
335.1	305.1	1.20	0.41	0.19
345.1	315.1	1.16	0.39	0.18
360.1	330.1	1.00	0.34	0.18
370.1	340.1	0.92	0.34	0.20
385.1	355.1	0.88	0.36	0.20
395.1	365.1	0.95	0.42	0.19
410.1	380.1	1.40	0.83	0.49
420.1	390.1	1.40	1.05	0.85
435.1	405.1	1.74	1.46	1.15
445.1	415.1	1.77	1.32	0.84
460.1	430.1	1.65	1.02	0.49

REV. X2

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Typical Performance Data

IF (OUT) (MHz)	LO (MHz)	CONVERSION LOSS VS. IF FREQUENCY @RF(IN)=160.1MHz (dB)
		@LO (dBm)
		+17
150.0	10.1	7.00
143.3	16.8	7.03
136.7	23.4	7.07
130.0	30.1	7.10
123.3	36.8	7.12
116.7	43.4	7.14
110.0	50.1	7.16
103.3	56.8	7.15
96.7	63.4	7.16
90.0	70.1	7.16
83.3	76.8	7.16
76.7	83.4	7.14
70.0	90.1	7.17
63.3	96.8	7.15
56.7	103.4	7.12
50.0	110.1	7.14
43.3	116.8	7.15
36.7	123.4	7.12
30.0	130.1	7.11
23.3	136.8	7.11
16.7	143.4	7.08
10.0	150.1	7.29
10.0	170.1	7.25
23.3	183.4	7.02
36.7	196.8	6.95
50.0	210.1	7.08
63.3	223.4	7.03
76.7	236.8	6.96
90.0	250.1	6.92
103.3	263.4	6.87
116.7	276.8	6.79
130.0	290.1	6.74
156.7	316.8	6.75
170.0	330.1	6.78
196.7	356.8	6.97
210.0	370.1	7.20
236.7	396.8	10.84
250.0	410.1	8.48
276.7	436.8	7.74
290.0	450.1	7.58

IF (OUT) (MHz)	LO (MHz)	CONVERSION LOSS VS. IF FREQUENCY @RF(IN)=140.1MHz (dB)
		@LO (dBm)
		+17
10.0	150.1	7.16
20.0	160.1	6.87
30.0	170.1	6.86
40.0	180.1	6.84
50.0	190.1	6.81
55.0	195.1	6.83
65.0	205.1	6.93
70.0	210.1	6.95
80.0	220.1	6.96
85.0	225.1	6.92
95.0	235.1	6.86
100.0	240.1	6.83
110.0	250.1	6.78
115.0	255.1	6.74
125.0	265.1	6.70
130.0	270.1	6.68
140.0	280.1	6.65
145.0	285.1	6.66
155.0	295.1	6.64
160.0	300.1	6.63
170.0	310.1	6.65
175.0	315.1	6.65
185.0	325.1	6.66
190.0	330.1	6.70
200.0	340.1	6.76
205.0	345.1	6.77
215.0	355.1	6.88
220.0	360.1	6.95
230.0	370.1	7.11
235.0	375.1	7.24
245.0	385.1	8.08
250.0	390.1	10.29
260.0	400.1	9.58
265.0	405.1	8.66
275.0	415.1	8.01
280.0	420.1	7.85
290.0	430.1	7.63
295.0	435.1	7.56
305.0	445.1	7.42
310.0	450.1	7.37

IF (OUT) (MHz)	LO (MHz)	CONVERSION LOSS VS. IF FREQUENCY @RF(IN)=180.1MHz (dB)
		@LO (dBm)
		+17
170.0	10.1	7.24
165.9	14.2	7.26
161.8	18.3	7.28
157.7	22.4	7.30
153.6	26.5	7.32
149.5	30.6	7.35
145.4	34.7	7.37
141.3	38.8	7.37
137.2	42.9	7.38
133.1	47.0	7.39
129.0	51.1	7.40
124.9	55.2	7.41
120.8	59.3	7.39
116.7	63.4	7.39
112.6	67.5	7.38
108.5	71.6	7.42
104.4	75.7	7.42
100.3	79.8	7.41
96.2	83.9	7.41
92.1	88.0	7.43
87.9	92.2	7.42
83.8	96.3	7.44
79.7	100.4	7.44
75.6	104.5	7.42
71.5	108.6	7.41
67.4	112.7	7.41
63.3	116.8	7.43
59.2	120.9	7.45
55.1	125.0	7.46
51.0	129.1	7.44
46.9	133.2	7.39
42.8	137.3	7.37
38.7	141.4	7.38
34.6	145.5	7.37
30.5	149.6	7.34
26.4	153.7	7.33
22.3	157.8	7.32
18.2	161.9	7.31
14.1	166.0	7.38
10.0	170.1	7.57

Typical Performance Data

LO (MHz)	LO-RF ISOLATION (dB)			LO-IF ISOLATION (dB)		
	@LO (dBm)			@LO (dBm)		
	+14	+17	+20	+14	+17	+20
10.1	69.48	84.33	81.11	70.99	71.10	71.34
20.1	74.35	74.62	74.05	65.26	65.44	65.42
30.1	73.79	72.32	75.61	61.95	61.83	61.90
40.1	70.46	72.33	73.26	59.50	59.56	59.64
50.1	70.32	70.67	71.82	57.77	57.84	57.87
60.1	68.50	68.93	70.06	56.21	56.23	56.29
70.1	67.01	67.81	68.25	55.21	55.25	55.33
80.1	65.29	65.85	66.50	53.86	53.96	54.01
90.1	64.13	64.38	64.89	53.12	53.14	53.19
100.1	62.88	63.37	63.72	52.28	52.35	52.42
110.1	61.88	62.51	63.08	51.52	51.58	51.66
120.1	59.83	60.25	60.53	50.95	51.00	51.01
130.1	58.60	58.81	59.00	50.31	50.38	50.44
140.1	59.43	59.84	60.44	50.04	50.18	50.28
150.1	58.16	58.57	59.25	49.14	49.18	49.28
160.1	56.56	56.97	57.50	48.72	48.80	48.87
170.1	55.00	55.16	55.53	48.02	48.06	48.11
180.1	53.43	53.44	53.59	47.55	47.57	47.58
190.1	51.68	51.60	51.58	47.24	47.29	47.30
200.1	52.71	52.83	53.02	47.47	47.60	47.73
210.1	55.19	56.02	56.94	47.10	47.29	47.46
220.1	54.61	55.31	56.14	46.06	46.19	46.31
230.1	53.34	53.87	54.52	45.43	45.49	45.58
240.1	52.22	52.69	53.23	44.65	44.70	44.72
250.1	51.22	51.63	52.18	44.19	44.22	44.27
260.1	50.27	50.62	51.13	43.83	43.88	43.97
270.1	49.34	49.62	50.02	43.05	43.07	43.14
280.1	48.43	48.67	48.97	42.47	42.49	42.46
290.1	47.52	47.70	47.97	41.84	41.82	41.78
305.1	46.43	46.51	46.77	41.01	40.89	40.86
315.1	45.69	45.76	45.92	40.46	40.33	40.28
330.1	44.45	44.41	44.49	39.74	39.62	39.56
340.1	43.61	43.53	43.59	39.25	39.15	39.13
355.1	42.54	42.50	42.54	38.70	38.66	38.65
365.1	41.81	41.78	41.76	38.47	38.43	38.39
380.1	40.66	40.55	40.44	38.43	38.36	38.31
390.1	40.47	40.28	40.09	39.54	39.60	39.66
405.1	46.45	46.32	46.15	38.36	38.29	38.22
415.1	49.84	49.57	49.16	37.62	37.56	37.54
430.1	57.27	57.01	56.00	36.75	36.75	36.79

RF (IN) (MHz)	LO (MHz)	RF-IF ISOLATION (dB)		
		@LO (dBm)		
		+14	+17	+20
40.1	10.1	53.82	61.61	63.24
50.1	20.1	57.17	62.71	59.45
60.1	30.1	48.31	49.82	50.51
70.1	40.1	50.35	54.12	57.15
80.1	50.1	54.72	56.23	52.34
90.1	60.1	51.19	53.74	54.95
100.1	70.1	47.59	47.80	47.32
110.1	80.1	46.27	46.19	45.63
120.1	90.1	47.64	48.42	49.02
130.1	100.1	50.32	51.30	50.21
140.1	110.1	48.45	49.25	49.51
150.1	120.1	45.95	46.47	46.71
160.1	130.1	44.52	44.86	44.92
170.1	140.1	44.55	45.26	46.07
180.1	150.1	45.94	46.37	46.45
190.1	160.1	44.81	45.15	45.43
200.1	170.1	43.18	43.20	42.99
210.1	180.1	43.01	43.14	43.08
220.1	190.1	42.62	42.98	43.31
230.1	200.1	41.89	42.80	44.25
240.1	210.1	41.74	42.51	43.21
250.1	220.1	41.51	41.89	42.23
260.1	230.1	41.37	41.78	42.09
270.1	240.1	41.97	42.34	42.77
280.1	250.1	41.87	42.07	42.15
290.1	260.1	40.88	40.80	40.67
300.1	270.1	41.51	41.73	42.07
310.1	280.1	41.51	41.70	41.94
320.1	290.1	41.24	41.32	41.41
335.1	305.1	42.22	42.63	43.05
345.1	315.1	42.30	42.77	43.29
360.1	330.1	42.08	42.34	42.54
370.1	340.1	42.16	42.36	42.54
385.1	355.1	42.96	43.24	43.53
395.1	365.1	42.77	43.07	43.26
410.1	380.1	41.98	42.75	42.90
420.1	390.1	30.77	29.85	28.82
435.1	405.1	34.13	34.04	34.00
445.1	415.1	34.20	33.89	33.52
460.1	430.1	34.98	34.69	34.31

Frequency Mixer

HJK-ED12173

Typical Performance Data

RF (IN) (MHz)	LO (MHz)	RF VSWR (:1)			LO (MHz)	LO VSWR (:1)			IF (OUT) (MHz)	IF VSWR @LO=150MHz (:1)		
		@LO (dBm)				@LO (dBm)				@LO (dBm)		
		+14	+17	+20		+14	+17	+20		+14	+17	+20
40.1	10.1	2.72	2.80	2.83	10.1	4.41	4.41	4.41	10.0	1.25	1.26	1.28
50.1	20.1	2.52	2.57	2.60	20.1	4.22	4.22	4.21	23.8	1.21	1.23	1.24
60.1	30.1	2.34	2.37	2.40	30.1	4.18	4.17	4.17	37.7	1.22	1.23	1.24
70.1	40.1	2.22	2.25	2.27	40.1	4.20	4.19	4.18	51.5	1.23	1.25	1.26
80.1	50.1	2.17	2.19	2.22	50.1	4.12	4.12	4.11	65.4	1.25	1.26	1.28
90.1	60.1	2.10	2.12	2.14	60.1	4.12	4.11	4.10	79.2	1.26	1.27	1.29
100.1	70.1	2.08	2.10	2.12	70.1	4.00	3.99	3.98	93.1	1.28	1.30	1.31
110.1	80.1	2.07	2.09	2.10	80.1	3.91	3.91	3.90	106.9	1.29	1.31	1.33
120.1	90.1	2.09	2.10	2.11	90.1	3.92	3.92	3.91	120.8	1.29	1.31	1.33
130.1	100.1	2.12	2.13	2.14	100.1	3.92	3.92	3.91	134.6	1.30	1.32	1.34
140.1	110.1	2.15	2.16	2.17	110.1	3.98	3.97	3.96	148.5	1.42	1.44	1.47
150.1	120.1	2.20	2.20	2.21	120.1	3.89	3.89	3.88	162.3	1.35	1.37	1.39
160.1	130.1	2.26	2.26	2.26	130.1	3.82	3.82	3.80	176.2	1.37	1.39	1.41
170.1	140.1	2.32	2.32	2.32	140.1	3.81	3.80	3.79	190.0	1.41	1.44	1.46
180.1	150.1	2.39	2.38	2.37	150.1	3.85	3.84	3.83	203.8	1.42	1.44	1.46
190.1	160.1	2.46	2.45	2.43	160.1	3.86	3.86	3.86	217.7	1.40	1.42	1.45
200.1	170.1	2.55	2.54	2.52	170.1	3.83	3.83	3.82	231.5	1.43	1.46	1.49
210.1	180.1	2.66	2.64	2.62	180.1	3.77	3.76	3.76	245.4	1.47	1.49	1.52
220.1	190.1	2.77	2.75	2.73	190.1	3.75	3.74	3.73	259.2	1.47	1.50	1.53
230.1	200.1	2.79	2.75	2.72	200.1	3.76	3.75	3.73	273.1	1.50	1.53	1.56
240.1	210.1	2.82	2.77	2.73	210.1	3.79	3.78	3.77	286.9	1.53	1.56	1.59
250.1	220.1	2.96	2.90	2.86	220.1	3.77	3.76	3.76	300.8	1.51	1.54	1.57
260.1	230.1	3.12	3.06	3.00	230.1	3.75	3.74	3.73	314.6	1.53	1.56	1.59
270.1	240.1	3.29	3.22	3.17	240.1	3.72	3.71	3.70	328.5	1.57	1.60	1.63
280.1	250.1	3.46	3.39	3.33	250.1	3.73	3.73	3.72	342.3	1.59	1.62	1.65
290.1	260.1	3.65	3.58	3.52	260.1	3.75	3.74	3.74	356.2	1.59	1.62	1.65
300.1	270.1	3.84	3.78	3.70	270.1	3.76	3.76	3.75	370.0	1.62	1.65	1.68
310.1	280.1	4.06	3.99	3.91	280.1	3.72	3.71	3.71	383.8	1.65	1.68	1.71
320.1	290.1	4.29	4.21	4.14	290.1	3.68	3.67	3.67	397.7	1.64	1.67	1.69
335.1	305.1	4.66	4.59	4.52	305.1	3.66	3.66	3.65	411.5	1.65	1.67	1.70
345.1	315.1	4.99	4.91	4.86	315.1	3.67	3.66	3.66	425.4	1.67	1.70	1.73
360.1	330.1	5.41	5.34	5.30	330.1	3.62	3.62	3.61	439.2	1.67	1.70	1.72
370.1	340.1	5.75	5.70	5.66	340.1	3.57	3.57	3.56	453.1	1.66	1.69	1.71
385.1	355.1	6.30	6.28	6.28	355.1	3.52	3.52	3.51	466.9	1.68	1.70	1.73
395.1	365.1	6.73	6.73	6.73	365.1	3.48	3.48	3.47	480.8	1.69	1.71	1.74
410.1	380.1	7.38	7.44	7.47	380.1	3.35	3.34	3.33	494.6	1.67	1.69	1.71
420.1	390.1	6.35	6.56	6.61	390.1	3.21	3.19	3.17	508.5	1.67	1.69	1.71
435.1	405.1	4.44	4.26	4.11	405.1	3.26	3.25	3.25	522.3	1.64	1.66	1.68
445.1	415.1	4.64	4.48	4.36	415.1	3.35	3.35	3.34	536.2	1.65	1.67	1.69
460.1	430.1	5.10	4.93	4.82	430.1	3.47	3.47	3.45	550.0	1.63	1.65	1.67

Harmonics Tables

RF HARMONICS ORDER

	(-dBm)	(dBc)										
0	-	-	31	41	42	45	47	40	41	48	51	57
1	-	39	+0	44	10	42	18	46	21	51	21	49
2	56	45	57	54	64	52	70	51	60	56	61	>88
3	82	74	49	78	51	58	47	68	42	66	47	77
4	>90	69	73	64	75	66	86	66	80	63	76	66
5	>90	85	61	81	64	87	65	>88	76	>88	62	>88
6	>90	>88	70	>88	68	81	73	81	82	80	79	77
7	>90	78	73	81	74	79	75	78	80	78	80	77
8	>90	81	62	81	59	81	57	>88	62	>88	76	>88
9	>90	73	79	68	81	73	79	66	76	63	82	66
10	>90	62	44	61	43	63	47	77	47	66	42	68
	RF CAL	0	1	2	3	4	5	6	7	8	9	10

LO HARMONICS ORDER

Test conditions: RF IN: 160 MHz; 5.00 dBm.
LO IN: 130 MHz; +17.00 dBm
IF OUT: 30 MHz; -2.2 dBm

RF HARMONICS ORDER

	(-dBm)	(dBc)										
0	-	-	38	44	47	45	51	45	51	48	66	51
1	-	40	+0	49	12	48	20	50	24	54	32	60
2	36	40	53	57	62	54	57	57	56	59	64	61
3	51	59	35	62	40	50	31	55	32	56	40	68
4	78	60	63	55	66	61	63	63	62	61	63	65
5	>90	77	55	71	49	68	47	68	50	63	44	64
6	>90	72	62	69	52	64	54	65	60	72	57	68
7	>90	77	60	74	60	69	61	68	57	72	60	65
8	>90	74	46	70	48	71	50	64	44	63	50	68
9	>90	74	71	72	65	69	62	65	63	61	63	63
10	>90	73	57	80	43	64	37	68	40	56	32	55
	RF CAL	0	1	2	3	4	5	6	7	8	9	10

LO HARMONICS ORDER

Test conditions: RF IN: 160 MHz; 15.00 dBm.
LO IN: 130 MHz; +17.00 dBm
IF OUT: 30 MHz; 7.68 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.