

Frequency Mixer

ADE-ED13397/1

Typical Performance Data

RF (IN) (MHz)	LO (MHz)	CONVERSION LOSS IF FIXED @IF(OUT)=109.65MHz (dB)		
		@LO (dBm)		
		+17	+20	+23
10.0	119.7	8.23	7.86	7.75
80.0	189.7	8.19	7.78	7.66
150.0	259.7	8.00	7.63	7.55
220.0	329.7	8.03	7.66	7.57
290.0	399.7	7.97	7.67	7.59
360.0	469.7	7.95	7.65	7.56
430.0	539.7	7.89	7.58	7.50
500.0	609.7	7.87	7.56	7.48
570.0	679.7	7.92	7.61	7.52
640.0	749.7	7.81	7.51	7.43
710.0	819.7	7.81	7.52	7.44
780.0	889.7	7.77	7.51	7.44
850.0	959.7	7.84	7.57	7.49
920.0	1029.7	7.69	7.47	7.42
990.0	1099.7	7.65	7.42	7.43
1060.0	1169.7	7.56	7.36	7.42
1130.0	1239.7	7.67	7.43	7.39
1200.0	1309.7	7.56	7.35	7.31
1270.0	1379.7	7.61	7.36	7.31
1340.0	1449.7	7.55	7.30	7.28
1410.0	1519.7	7.59	7.32	7.27
1475.0	1584.7	7.49	7.24	7.18
1545.0	1654.6	7.58	7.32	7.24
1610.0	1719.7	7.60	7.34	7.26
1680.0	1789.7	7.57	7.32	7.25
1745.0	1854.6	7.69	7.42	7.34
1815.0	1924.7	7.88	7.59	7.49
1880.0	1989.7	8.00	7.68	7.60
1950.0	2059.6	8.26	7.91	7.77
2015.0	2124.7	8.60	8.24	8.06
2085.0	2194.6	8.77	8.34	8.12
2150.0	2259.7	8.97	8.51	8.30
2220.0	2329.6	9.35	8.81	8.56
2285.0	2394.6	9.74	9.12	8.88
2355.0	2464.7	10.08	9.46	9.14
2420.0	2529.6	10.36	9.67	9.36
2490.0	2599.6	10.53	9.78	9.45
2555.0	2664.7	10.58	9.77	9.42
2625.0	2734.6	10.75	9.99	9.62
2690.0	2799.6	10.83	10.10	9.82

RF (IN) (MHz)	LO (MHz)	IP3 INPUT (dBm)		
		@LO (dBm)		
		+17	+20	+23
10.0	119.7	26.13	32.51	28.62
80.0	189.7	27.48	26.67	29.55
150.0	259.7	25.91	27.90	37.15
220.0	329.7	24.55	30.24	35.21
290.0	399.7	25.73	32.90	34.42
360.0	469.7	26.29	33.22	31.60
430.0	539.7	28.05	32.91	29.30
500.0	609.7	28.27	31.89	30.90
570.0	679.7	28.98	32.33	28.27
640.0	749.7	29.37	29.84	28.93
710.0	819.7	29.33	29.30	28.03
780.0	889.7	29.13	27.21	26.11
850.0	959.7	26.26	26.08	25.74
920.0	1029.7	25.47	25.74	25.41
990.0	1099.7	25.91	27.14	23.91
1060.0	1169.7	25.69	27.63	27.34
1130.0	1239.7	27.03	30.04	28.88
1200.0	1309.7	26.27	25.36	24.93
1270.0	1379.7	26.10	24.35	23.79
1340.0	1449.7	25.55	27.13	27.56
1410.0	1519.7	26.50	29.53	27.50
1475.0	1584.7	26.60	29.88	27.80
1545.0	1654.6	26.36	28.75	32.99
1610.0	1719.7	25.33	28.35	32.51
1680.0	1789.7	25.90	30.37	30.41
1745.0	1854.6	26.77	29.76	29.21
1815.0	1924.7	24.95	28.88	32.79
1880.0	1989.7	24.58	26.15	31.61
1950.0	2059.6	26.25	25.87	27.61
2015.0	2124.7	27.60	28.03	29.23
2085.0	2194.6	28.37	31.07	33.88
2150.0	2259.7	27.04	29.60	32.21
2220.0	2329.6	29.33	34.89	38.60
2285.0	2394.6	33.21	28.51	27.51
2355.0	2464.7	28.39	27.36	26.68
2420.0	2529.6	29.86	27.62	26.28
2490.0	2599.6	33.58	29.53	28.74
2555.0	2664.7	36.84	33.24	34.28
2625.0	2734.6	25.79	25.54	22.74
2690.0	2799.6	20.82	19.85	19.61

RF (IN) (MHz)	LO (MHz)	COMPRESSION @RF IN=+17dBm (dB)		
		@LO (dBm)		
		+17	+20	+23
10.0	119.7	1.02	0.48	0.25
80.0	189.7	0.99	0.49	0.24
150.0	259.7	1.08	0.51	0.26
220.0	329.7	1.08	0.53	0.28
290.0	399.7	1.14	0.55	0.31
360.0	469.7	1.19	0.61	0.35
430.0	539.7	1.18	0.60	0.35
500.0	609.7	1.23	0.65	0.39
570.0	679.7	1.18	0.65	0.41
640.0	749.7	1.29	0.73	0.50
710.0	819.7	1.23	0.70	0.50
780.0	889.7	1.26	0.70	0.53
850.0	959.7	1.20	0.65	0.53
920.0	1029.7	1.33	0.75	0.66
990.0	1099.7	1.38	0.80	0.64
1060.0	1169.7	1.47	0.82	0.60
1130.0	1239.7	1.34	0.72	0.56
1200.0	1309.7	1.46	0.75	0.56
1270.0	1379.7	1.39	0.69	0.49
1340.0	1449.7	1.42	0.71	0.48
1410.0	1519.7	1.36	0.68	0.47
1475.0	1584.7	1.51	0.76	0.54
1545.0	1654.6	1.42	0.70	0.49
1610.0	1719.7	1.39	0.73	0.53
1680.0	1789.7	1.51	0.80	0.60
1745.0	1854.6	1.48	0.83	0.61
1815.0	1924.7	1.35	0.77	0.60
1880.0	1989.7	1.45	0.91	0.71
1950.0	2059.6	1.51	0.99	0.77
2015.0	2124.7	1.36	0.92	0.69
2085.0	2194.6	1.42	0.99	0.75
2150.0	2259.7	1.43	0.98	0.76
2220.0	2329.6	1.25	0.91	0.75
2285.0	2394.6	1.11	0.86	0.69
2355.0	2464.7	0.95	0.68	0.54
2420.0	2529.6	0.83	0.58	0.45
2490.0	2599.6	0.83	0.71	0.52
2555.0	2664.7	0.88	0.88	0.71
2625.0	2734.6	0.71	0.79	0.66
2690.0	2799.6	0.72	0.75	0.58

REV. X2

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Typical Performance Data

IF (OUT) (MHz)	LO (MHz)	CONVERSION LOSS VS. IF FREQUENCY @RF(IN)=436.5MHz (dB)
		@LO (dBm) +20
426.4	10.1	7.54
407.8	28.7	7.50
389.1	47.4	7.57
370.5	66.0	7.62
345.6	90.9	7.63
327.0	109.5	7.58
302.1	134.4	7.57
283.5	153.0	7.58
258.6	177.9	7.58
240.0	196.5	7.51
215.1	221.4	7.41
196.4	240.1	7.47
171.6	264.9	7.52
152.9	283.6	7.57
128.1	308.4	7.56
109.4	327.1	7.64
84.6	351.9	7.61
65.9	370.6	7.67
41.1	395.4	7.68
22.4	414.1	7.80
43.8	480.3	7.67
145.1	581.6	7.54
280.3	716.8	7.48
381.6	818.1	7.39
516.8	953.3	7.50
618.1	1054.6	7.49
753.3	1189.8	7.44
854.6	1291.1	7.46
989.8	1426.3	7.40
1091.1	1527.6	7.23
1226.3	1662.8	7.05
1327.6	1764.1	7.06
1462.8	1899.3	7.08
1564.1	2000.6	7.15
1699.3	2135.8	7.86
1800.6	2237.1	8.45
1935.7	2372.2	9.25
2037.1	2473.6	9.78
2172.2	2608.7	9.76
2273.6	2710.1	9.90

IF (OUT) (MHz)	LO (MHz)	CONVERSION LOSS VS. IF FREQUENCY @RF(IN)=403.1MHz (dB)
		@LO (dBm) +20
10.0	413.1	8.08
70.0	473.1	7.66
130.0	533.1	7.57
190.0	593.1	7.59
250.0	653.1	7.51
310.0	713.1	7.55
370.0	773.1	7.42
430.0	833.1	7.58
490.0	893.1	7.53
550.0	953.1	7.56
610.0	1013.1	7.55
670.0	1073.1	7.47
730.0	1133.1	7.49
790.0	1193.1	7.47
850.0	1253.1	7.50
910.0	1313.1	7.50
970.0	1373.1	7.51
1030.0	1433.1	7.43
1090.0	1493.1	7.30
1150.0	1553.1	7.23
1210.0	1613.1	7.16
1270.0	1673.1	7.13
1330.0	1733.1	7.07
1390.0	1793.1	7.11
1450.0	1853.1	7.17
1510.0	1913.1	7.18
1570.0	1973.1	7.23
1630.0	2033.1	7.34
1690.0	2093.1	7.71
1750.0	2153.1	8.19
1810.0	2213.1	8.48
1870.0	2273.1	8.84
1930.0	2333.1	9.15
1990.0	2393.1	9.56
2030.0	2433.1	9.75
2090.0	2493.1	9.81
2130.0	2533.1	9.92
2190.0	2593.1	9.81
2230.0	2633.1	9.88
2290.0	2693.1	9.95

IF (OUT) (MHz)	LO (MHz)	CONVERSION LOSS VS. IF FREQUENCY @RF(IN)=470.1MHz (dB)
		@LO (dBm) +20
460.0	10.1	7.50
450.0	20.1	7.47
440.0	30.1	7.55
430.0	40.1	7.52
420.0	50.1	7.52
410.0	60.1	7.56
400.0	70.1	7.53
390.0	80.1	7.62
380.0	90.1	7.59
370.0	100.1	7.57
360.0	110.1	7.58
350.0	120.1	7.56
340.0	130.1	7.57
330.0	140.1	7.58
320.0	150.1	7.58
310.0	160.1	7.58
300.0	170.1	7.58
290.0	180.1	7.59
280.0	190.1	7.55
270.0	200.1	7.55
260.0	210.1	7.49
250.0	220.1	7.55
240.0	230.1	7.49
230.0	240.1	7.43
220.0	250.1	7.46
210.0	260.1	7.42
200.0	270.1	7.55
190.0	280.1	7.56
170.0	300.1	7.55
160.0	310.1	7.53
140.0	330.1	7.53
130.0	340.1	7.59
110.0	360.1	7.62
100.0	370.1	7.57
80.0	390.1	7.65
70.0	400.1	7.59
50.0	420.1	7.66
40.0	430.1	7.71
20.0	450.1	7.79
10.0	460.1	8.01

Typical Performance Data

LO (MHz)	LO-RF ISOLATION (dB)			LO-IF ISOLATION (dB)		
	@LO (dBm)			@LO (dBm)		
	+17	+20	+23	+17	+20	+23
119.7	30.67	33.31	35.49	28.76	31.40	33.64
189.7	30.55	33.07	35.07	29.02	31.61	33.32
259.7	31.56	34.10	35.72	29.22	31.70	33.09
329.7	31.33	33.84	35.28	29.70	31.90	32.80
399.7	32.66	34.95	35.78	29.85	31.83	32.45
469.7	32.51	34.64	35.31	30.46	32.13	32.18
539.7	33.75	35.52	35.62	30.86	32.15	31.82
609.7	33.96	35.77	35.74	31.21	31.98	31.22
679.7	35.12	36.42	35.86	31.64	32.04	30.97
749.7	35.44	36.42	35.75	32.01	31.84	30.64
819.7	36.47	36.92	35.90	32.28	31.63	30.22
889.7	37.57	37.65	36.51	32.81	31.71	30.25
959.7	38.85	38.17	36.75	33.03	31.67	30.13
1029.7	40.22	39.37	37.97	33.71	31.83	30.26
1099.7	41.85	40.86	39.56	33.72	31.79	30.27
1169.7	38.27	37.14	36.02	32.55	30.59	29.24
1239.7	37.66	36.30	34.87	32.84	30.59	28.99
1309.7	38.59	37.09	35.32	33.49	31.15	29.43
1379.7	39.01	37.85	35.73	34.41	31.94	29.95
1449.7	39.05	37.19	35.11	34.87	32.57	30.58
1519.7	38.95	36.31	34.19	35.06	33.00	31.33
1584.7	40.56	37.45	35.22	35.40	32.87	31.17
1654.7	40.84	37.93	35.36	35.74	33.33	31.56
1719.7	41.73	39.13	36.47	36.24	34.11	32.40
1789.7	42.99	40.82	38.06	36.92	35.16	33.64
1854.7	42.52	41.28	39.09	36.99	35.49	34.20
1924.7	42.81	42.20	40.77	36.61	35.63	34.85
1989.7	43.02	43.47	42.82	35.57	35.05	34.73
2059.7	42.20	42.94	43.02	35.06	34.65	34.18
2124.6	41.78	43.09	43.03	34.82	34.45	33.84
2194.7	41.87	43.60	44.22	34.02	34.05	33.65
2259.7	43.40	45.61	46.75	33.75	34.18	34.19
2329.6	44.89	47.62	49.50	33.35	33.31	33.52
2394.7	45.93	49.49	53.91	33.28	33.28	33.30
2464.6	45.71	48.07	53.37	33.48	33.70	33.96
2529.6	45.69	49.19	58.96	33.94	34.73	35.42
2599.7	42.83	45.90	54.70	34.44	35.41	36.03
2664.6	43.73	46.36	52.04	34.76	35.44	35.84
2734.7	44.43	48.29	52.70	35.34	35.90	36.06
2799.7	43.59	46.57	50.39	35.53	36.02	36.01

RF (IN) (MHz)	LO (MHz)	RF-IF ISOLATION (dB)		
		@LO (dBm)		
		+17	+20	+23
10.0	119.7	30.32	32.94	35.77
80.0	189.7	34.27	37.44	39.80
150.0	259.7	35.88	37.69	38.33
220.0	329.7	35.24	36.02	36.36
290.0	399.7	34.60	35.01	35.14
360.0	469.7	33.20	33.35	33.33
430.0	539.7	32.39	32.50	32.43
500.0	609.7	31.93	31.78	31.61
570.0	679.7	31.46	31.18	30.86
640.0	749.7	30.62	30.32	30.12
710.0	819.7	30.30	30.16	29.94
780.0	889.7	30.33	30.13	29.91
850.0	959.7	29.98	29.83	29.24
920.0	1029.7	29.71	29.62	29.43
990.0	1099.7	29.71	29.61	29.83
1060.0	1169.7	30.09	30.18	30.12
1130.0	1239.7	30.71	30.47	30.04
1200.0	1309.7	31.47	31.08	30.87
1270.0	1379.7	33.39	32.49	31.12
1340.0	1449.7	34.92	33.62	31.31
1410.0	1519.7	34.08	32.16	28.50
1475.0	1584.7	34.36	32.54	30.22
1545.0	1654.6	34.38	33.06	30.91
1610.0	1719.7	36.20	35.47	33.65
1680.0	1789.7	37.71	37.50	35.92
1745.0	1854.6	39.57	40.48	39.67
1815.0	1924.7	37.18	37.95	38.93
1880.0	1989.7	33.97	34.13	35.09
1950.0	2059.6	33.22	33.40	33.56
2015.0	2124.7	33.77	34.64	37.07
2085.0	2194.6	33.88	35.12	37.98
2150.0	2259.7	33.78	36.02	40.16
2220.0	2329.6	32.92	34.85	38.62
2285.0	2394.6	32.01	33.94	37.44
2355.0	2464.7	30.66	31.64	32.99
2420.0	2529.6	29.46	30.08	30.83
2490.0	2599.6	29.29	29.93	31.91
2555.0	2664.7	29.19	30.18	31.21
2625.0	2734.6	28.57	29.77	31.90
2690.0	2799.6	27.98	29.03	30.09

Typical Performance Data

RF (IN) (MHz)	LO (MHz)	RF VSWR (:1)			LO (MHz)	LO VSWR (:1)			IF (OUT) (MHz)	IF VSWR @LO=580MHz (:1)		
		@LO (dBm)				@LO (dBm)				@LO (dBm)		
		+17	+20	+23		+17	+20	+23		+17	+20	+23
10.0	119.7	1.28	1.38	1.49	119.7	1.10	1.54	2.17	10.0	1.40	1.42	1.46
80.0	189.7	1.04	1.09	1.17	189.7	1.15	1.50	2.06	20.0	1.22	1.25	1.31
150.0	259.7	1.02	1.08	1.14	259.7	1.15	1.49	2.03	30.0	1.15	1.20	1.27
220.0	329.7	1.07	1.06	1.12	329.7	1.18	1.54	2.09	40.0	1.13	1.19	1.26
290.0	399.7	1.09	1.07	1.12	399.7	1.17	1.54	2.08	50.0	1.11	1.17	1.24
360.0	469.7	1.14	1.11	1.12	469.7	1.20	1.56	2.10	60.0	1.10	1.16	1.23
430.0	539.7	1.18	1.15	1.16	539.7	1.19	1.60	2.15	80.0	1.07	1.12	1.19
500.0	609.7	1.24	1.20	1.20	609.7	1.22	1.65	2.22	90.0	1.06	1.11	1.19
570.0	679.7	1.29	1.24	1.23	679.7	1.23	1.68	2.23	110.0	1.04	1.09	1.17
640.0	749.7	1.32	1.27	1.26	749.7	1.26	1.72	2.27	120.0	1.03	1.09	1.18
710.0	819.7	1.38	1.33	1.32	819.7	1.28	1.77	2.34	140.0	1.03	1.11	1.19
780.0	889.7	1.41	1.36	1.34	889.7	1.31	1.82	2.40	150.0	1.04	1.11	1.19
850.0	959.7	1.44	1.39	1.37	959.7	1.33	1.85	2.44	170.0	1.04	1.08	1.16
920.0	1029.7	1.45	1.40	1.38	1029.7	1.36	1.90	2.51	180.0	1.03	1.08	1.16
990.0	1099.7	1.46	1.39	1.36	1099.7	1.39	1.93	2.55	200.0	1.03	1.07	1.15
1060.0	1169.7	1.44	1.35	1.32	1169.7	1.39	1.93	2.52	210.0	1.03	1.07	1.15
1130.0	1239.7	1.50	1.38	1.32	1239.7	1.44	1.98	2.58	230.0	1.01	1.09	1.17
1200.0	1309.7	1.55	1.42	1.34	1309.7	1.46	2.01	2.62	240.0	1.02	1.09	1.17
1270.0	1379.7	1.65	1.48	1.34	1379.7	1.49	2.05	2.65	260.0	1.03	1.08	1.16
1340.0	1449.7	1.69	1.51	1.34	1449.7	1.52	2.10	2.73	270.0	1.03	1.07	1.15
1410.0	1519.7	1.77	1.58	1.39	1519.7	1.55	2.14	2.79	290.0	1.04	1.05	1.13
1475.0	1584.7	1.82	1.62	1.44	1584.7	1.56	2.13	2.75	300.0	1.04	1.07	1.15
1545.0	1654.6	1.85	1.66	1.47	1654.7	1.61	2.19	2.81	320.0	1.03	1.09	1.17
1610.0	1719.7	1.86	1.68	1.50	1719.7	1.65	2.25	2.92	330.0	1.03	1.09	1.17
1680.0	1789.7	1.85	1.69	1.52	1789.7	1.66	2.25	2.91	350.0	1.03	1.08	1.17
1745.0	1854.6	1.88	1.72	1.58	1854.7	1.71	2.29	2.92	360.0	1.03	1.08	1.16
1815.0	1924.7	1.91	1.77	1.64	1924.7	1.80	2.40	3.08	380.0	1.05	1.07	1.15
1880.0	1989.7	2.01	1.86	1.73	1989.7	1.84	2.42	3.09	390.0	1.06	1.07	1.15
1950.0	2059.6	2.17	2.02	1.88	2059.7	1.89	2.44	3.04	410.0	1.06	1.09	1.17
2015.0	2124.7	2.26	2.12	1.99	2124.6	1.99	2.57	3.24	420.0	1.05	1.10	1.17
2085.0	2194.6	2.39	2.25	2.13	2194.7	2.01	2.59	3.27	440.0	1.05	1.10	1.18
2150.0	2259.7	2.48	2.33	2.24	2259.7	2.03	2.54	3.11	450.0	1.05	1.09	1.17
2220.0	2329.6	2.54	2.39	2.31	2329.6	2.11	2.64	3.27	470.0	1.06	1.09	1.16
2285.0	2394.6	2.63	2.48	2.44	2394.7	2.14	2.67	3.33	480.0	1.07	1.09	1.16
2355.0	2464.7	2.72	2.58	2.54	2464.6	2.13	2.58	3.14	500.0	1.08	1.10	1.17
2420.0	2529.6	2.78	2.62	2.58	2529.6	2.17	2.61	3.18	510.0	1.08	1.11	1.18
2490.0	2599.6	2.83	2.66	2.60	2599.7	2.19	2.63	3.24	530.0	1.08	1.12	1.19
2555.0	2664.7	2.87	2.69	2.62	2664.6	2.18	2.56	3.03	540.0	1.08	1.12	1.19
2625.0	2734.6	2.93	2.75	2.66	2734.7	2.18	2.57	3.06	560.0	1.09	1.13	1.20
2690.0	2799.6	2.95	2.77	2.63	2799.7	2.14	2.55	3.12	570.0	1.10	1.14	1.21

Harmonics Tables

RF HARMONICS ORDER

	(-dBm)	(-dBc)										
0	-	-	6	11	18	23	26	31	30	33	33	41
1	-	24	+0	39	11	37	21	45	40	47	31	42
2	60	55	54	54	49	58	52	59	55	74	52	64
3	>90	81	81	>84	65	79	65	75	73	81	62	80
4	>90	80	70	81	70	>84	71	>84	74	>84	83	>84
5	>90	>84	>84	>84	>84	>84	>84	>84	>84	>84	>84	>84
6	>90	>84	>84	>84	>84	>84	>84	>84	>84	>84	>84	>84
7	>90	>84	>84	>84	>84	>84	>84	>84	>84	>84	>84	>84
8	>90	>84	>84	>84	>84	>84	>84	>84	>84	>84	>84	>84
9	>90	>84	>84	>84	>84	>84	>84	>84	>84	>84	>84	>84
10	>90	>84	>84	>84	>84	>84	>84	>84	>84	>84	>84	>84
	RF CAL	0	1	2	3	4	5	6	7	8	9	10

LO HARMONICS ORDER

Test conditions:

RF IN: 435 MHz; 2.00 dBm.
LO IN: 544.65 MHz; +20.00 dBm
IF OUT: 109.65 MHz; -5.64 dBm

RF HARMONICS ORDER

	(-dBm)	(-dBc)										
0	-	-	15	22	28	35	37	44	46	51	53	60
1	-	24	+0	41	12	40	23	48	42	53	38	53
2	40	43	41	44	40	50	45	51	54	60	47	58
3	62	60	45	72	40	59	39	54	43	59	48	61
4	86	65	64	64	65	64	70	65	69	69	65	77
5	>90	70	63	76	59	82	70	74	68	70	63	72
6	>90	70	67	70	66	71	67	73	67	77	67	83
7	>90	79	72	77	75	78	71	77	69	79	68	77
8	>90	79	74	78	74	79	73	80	73	86	75	81
9	>90	86	86	87	84	85	87	84	82	85	79	86
10	>90	>94	89	94	86	90	89	91	93	91	93	90
	RF CAL	0	1	2	3	4	5	6	7	8	9	10

LO HARMONICS ORDER

Test conditions:

RF IN: 435 MHz; 12.00 dBm.
LO IN: 544.65 MHz; +20.00 dBm
IF OUT: 109.65 MHz; 4.18 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.