

Frequency Mixer

ADE-12

Typical Performance Data

RF (IN) (MHz)	LO (MHz)	CONVERSION LOSS IF FIXED @IF(OUT)=30MHz (dB)			RF (IN) (MHz)	LO (MHz)	IP3 INPUT (dBm)			RF (IN) (MHz)	LO (MHz)	COMPRESSION @RF IN=+1dBm (dB)		
		@LO (dBm)					@LO (dBm)					@LO (dBm)		
		+4	+7	+10			+4	+7	+10			+4	+7	+10
50.1	80.1	7.86	7.27	6.99	50.1	80.1	14.69	18.03	19.39	50.1	80.1	0.54	0.34	0.24
90.4	120.4	7.85	7.28	6.99	90.4	120.4	14.75	16.97	19.34	90.4	120.4	0.50	0.32	0.23
130.6	160.6	7.77	7.22	6.96	130.6	160.6	15.16	22.60	20.94	130.6	160.6	0.52	0.34	0.24
170.9	200.9	7.72	7.19	6.96	170.9	200.9	15.87	18.57	20.05	170.9	200.9	0.52	0.33	0.21
211.1	241.1	7.62	7.13	6.91	211.1	241.1	16.97	17.76	22.51	211.1	241.1	0.51	0.32	0.22
251.4	281.4	7.58	7.12	6.92	251.4	281.4	19.28	19.53	21.62	251.4	281.4	0.52	0.31	0.23
291.7	321.7	7.53	7.09	6.88	291.7	321.7	16.67	21.16	20.82	291.7	321.7	0.53	0.32	0.21
331.9	361.9	7.49	7.09	6.89	331.9	361.9	18.47	19.43	24.90	331.9	361.9	0.53	0.32	0.20
372.2	402.2	7.49	7.09	6.88	372.2	402.2	17.61	19.85	20.43	372.2	402.2	0.52	0.30	0.20
412.4	442.4	7.41	7.02	6.82	412.4	442.4	19.15	17.48	22.49	412.4	442.4	0.53	0.33	0.22
452.7	482.7	7.46	7.08	6.87	452.7	482.7	17.77	19.74	22.64	452.7	482.7	0.51	0.31	0.23
493.0	523.0	7.47	7.06	6.85	493.0	523.0	17.63	23.53	27.35	493.0	523.0	0.51	0.32	0.24
533.2	563.2	7.45	7.06	6.82	533.2	563.2	16.46	19.39	21.02	533.2	563.2	0.47	0.31	0.23
573.5	603.5	7.49	7.10	6.87	573.5	603.5	17.22	18.06	21.97	573.5	603.5	0.51	0.32	0.23
613.7	643.7	7.48	7.11	6.89	613.7	643.7	17.03	18.56	17.02	613.7	643.7	0.52	0.32	0.23
654.0	684.0	7.48	7.10	6.89	654.0	684.0	17.98	19.30	17.69	654.0	684.0	0.67	0.42	0.30
694.3	724.3	7.49	7.09	6.87	694.3	724.3	18.55	22.73	17.96	694.3	724.3	0.68	0.43	0.32
734.5	764.5	7.51	7.09	6.87	734.5	764.5	18.03	22.33	20.61	734.5	764.5	0.78	0.48	0.35
774.8	804.8	7.54	7.13	6.90	774.8	804.8	16.86	23.50	27.97	774.8	804.8	0.79	0.55	0.38
815.0	845.0	7.58	7.16	6.93	815.0	845.0	13.18	19.60	18.12	815.0	845.0	0.91	0.65	0.47
855.3	885.3	7.69	7.24	6.97	855.3	885.3	11.45	17.11	22.48	855.3	885.3	0.92	0.65	0.50
895.6	925.6	7.75	7.28	6.99	895.6	925.6	9.71	16.20	20.41	895.6	925.6	0.94	0.70	0.53
935.8	965.8	7.92	7.43	7.11	935.8	965.8	8.25	12.49	18.66	935.8	965.8	0.99	0.75	0.60
976.1	1006.1	8.10	7.56	7.22	976.1	1006.1	6.93	10.38	15.85	976.1	1006.1	1.03	0.80	0.66
1016.3	1046.3	8.23	7.70	7.31	1016.3	1046.3	6.64	9.00	12.72	1016.3	1046.3	1.00	0.82	0.66
1056.6	1086.6	8.40	7.82	7.42	1056.6	1086.6	6.69	8.55	12.19	1056.6	1086.6	0.98	0.80	0.70
1096.9	1126.9	8.54	7.95	7.51	1096.9	1126.9	7.15	9.60	12.87	1096.9	1126.9	0.92	0.80	0.71
1137.1	1167.1	8.64	8.02	7.57	1137.1	1167.1	8.16	10.78	15.64	1137.1	1167.1	0.94	0.84	0.73
1177.4	1207.4	8.77	8.09	7.63	1177.4	1207.4	8.91	12.15	16.11	1177.4	1207.4	0.93	0.82	0.73
1217.6	1247.6	8.82	8.14	7.67	1217.6	1247.6	10.80	12.66	14.68	1217.6	1247.6	0.92	0.80	0.74
1257.9	1287.9	8.94	8.25	7.77	1257.9	1287.9	9.83	13.28	14.01	1257.9	1287.9	0.98	0.87	0.76
1298.2	1328.2	9.04	8.32	7.86	1298.2	1328.2	10.29	12.01	13.90	1298.2	1328.2	0.98	0.88	0.77
1338.4	1368.4	9.27	8.53	8.05	1338.4	1368.4	9.73	12.51	14.01	1338.4	1368.4	0.97	0.87	0.74
1378.7	1408.7	9.48	8.73	8.24	1378.7	1408.7	9.62	11.88	12.94	1378.7	1408.7	0.89	0.78	0.68
1418.9	1448.9	9.71	8.96	8.47	1418.9	1448.9	9.22	11.68	12.90	1418.9	1448.9	0.83	0.77	0.69
1459.2	1489.2	9.92	9.17	8.67	1459.2	1489.2	9.06	10.82	12.06	1459.2	1489.2	0.78	0.73	0.66
1499.5	1529.5	10.13	9.42	8.95	1499.5	1529.5	9.38	10.15	12.05	1499.5	1529.5	0.76	0.70	0.67
1539.7	1569.7	10.29	9.66	9.21	1539.7	1569.7	9.59	11.26	12.01	1539.7	1569.7	0.69	0.63	0.60
1580.0	1610.0	10.64	10.08	9.66	1580.0	1610.0	9.47	10.43	12.12	1580.0	1610.0	0.58	0.58	0.55
1600.1	1630.1	10.74	10.23	9.83	1600.1	1630.1	9.63	10.92	11.80	1600.1	1630.1	0.55	0.50	0.48

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Frequency Mixer

ADE-12

Typical Performance Data

IF (OUT) (MHz)	LO (MHz)	CONVERSION LOSS VS. IF FREQUENCY @RF(IN)=500.6MHz (dB)	IF (OUT) (MHz)	LO (MHz)	CONVERSION LOSS VS. IF FREQUENCY @RF(IN)=50.1MHz (dB)	IF (OUT) (MHz)	LO (MHz)	CONVERSION LOSS VS. IF FREQUENCY @RF(IN)=1000.1MHz (dB)
		@LO (dBm)			@LO (dBm)			@LO (dBm)
		+7			+7			+7
400.5	100.1	7.02	10.0	60.1	7.27	950.0	50.1	7.73
390.5	110.1	7.02	30.0	80.1	7.29	930.0	70.1	7.74
380.5	120.1	6.99	50.0	100.1	7.26	910.0	90.1	7.69
370.5	130.1	6.93	70.0	120.1	7.32	890.0	110.1	7.62
360.5	140.1	6.91	90.0	140.1	7.32	870.0	130.1	7.55
350.5	150.1	6.92	110.0	160.1	7.33	850.0	150.1	7.55
340.5	160.1	6.90	130.0	180.1	7.33	830.0	170.1	7.52
330.5	170.1	6.89	150.0	200.1	7.36	810.0	190.1	7.47
320.5	180.1	6.88	170.0	220.1	7.35	790.0	210.1	7.45
310.5	190.1	6.88	190.0	240.1	7.38	770.0	230.1	7.41
300.5	200.1	6.88	210.0	260.1	7.39	750.0	250.1	7.37
290.5	210.1	6.87	230.0	280.1	7.40	730.0	270.1	7.44
280.5	220.1	6.86	250.0	300.1	7.43	710.0	290.1	7.44
270.5	230.1	6.85	270.0	320.1	7.41	690.0	310.1	7.38
260.5	240.1	6.84	290.0	340.1	7.46	670.0	330.1	7.35
250.5	250.1	6.44	310.0	360.1	7.46	650.0	350.1	7.37
240.5	260.1	6.82	330.0	380.1	7.47	630.0	370.1	7.36
230.5	270.1	6.81	350.0	400.1	7.49	610.0	390.1	7.37
220.5	280.1	6.82	370.0	420.1	7.52	590.0	410.1	7.34
210.5	290.1	6.90	390.0	440.1	7.55	570.0	430.1	7.35
200.5	300.1	6.90	410.0	460.1	7.52	550.0	450.1	7.35
190.5	310.1	6.91	430.0	480.1	7.67	530.0	470.1	7.34
180.5	320.1	6.90	450.0	500.1	7.58	510.0	490.1	7.32
170.5	330.1	6.91	470.0	520.1	7.56	490.0	510.1	7.35
160.5	340.1	6.90	510.0	560.1	7.59	450.0	550.1	7.36
150.5	350.1	6.91	530.0	580.1	7.66	430.0	570.1	7.43
140.5	360.1	6.93	570.0	620.1	7.72	390.0	610.1	7.33
130.5	370.1	6.95	590.0	640.1	7.71	370.0	630.1	7.34
120.5	380.1	6.99	630.0	680.1	7.75	330.0	670.1	7.38
110.5	390.1	7.00	650.0	700.1	7.74	310.0	690.1	7.37
100.5	400.1	6.96	690.0	740.1	7.70	270.0	730.1	7.36
90.5	410.1	6.97	710.0	760.1	7.78	250.0	750.1	7.36
80.5	420.1	6.95	750.0	800.1	7.71	210.0	790.1	7.37
70.5	430.1	7.01	770.0	820.1	7.68	190.0	810.1	7.38
60.5	440.1	7.00	810.0	860.1	7.66	150.0	850.1	7.44
50.5	450.1	7.00	830.0	880.1	7.65	130.0	870.1	7.43
40.5	460.1	7.02	870.0	920.1	7.57	90.0	910.1	7.47
30.5	470.1	7.04	890.0	940.1	7.62	70.0	930.1	7.45
20.5	480.1	7.09	930.0	980.1	7.60	30.0	970.1	7.55
10.5	490.1	7.05	950.0	1000.1	7.63	10.0	990.1	7.68

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Typical Performance Data

LO (MHz)	LO-RF ISOLATION (dB)			LO-IF ISOLATION (dB)		
	@LO (dBm)			@LO (dBm)		
	+4	+7	+10	+4	+7	+10
50.1	56.42	55.89	56.18	59.50	57.49	56.61
90.4	50.80	51.03	50.98	57.18	55.04	53.32
130.6	47.64	47.78	48.27	54.39	52.63	51.71
170.9	45.32	45.77	45.73	52.43	51.00	50.16
211.1	43.60	43.84	44.25	51.23	50.30	49.28
251.4	42.25	42.58	42.72	49.98	49.04	48.37
291.7	41.04	41.45	41.53	49.00	48.34	47.08
331.9	40.09	40.30	40.80	47.33	46.76	46.29
372.2	39.27	39.66	39.59	45.81	45.38	44.69
412.4	38.56	38.75	39.09	44.38	44.44	44.16
452.7	37.97	38.34	38.34	42.44	42.75	42.99
493.0	37.39	37.69	37.98	40.99	41.52	41.77
533.2	36.83	37.12	37.36	39.58	40.05	40.53
573.5	36.33	36.85	36.77	38.44	39.27	39.52
613.7	36.04	36.15	36.61	37.21	38.06	39.26
654.0	35.75	36.16	36.01	36.40	36.97	37.85
694.3	35.63	35.77	36.12	35.88	36.39	37.00
734.5	35.51	35.81	35.70	35.22	35.53	35.95
774.8	35.57	35.69	35.80	34.85	35.42	35.46
815.0	35.70	35.64	35.67	34.07	35.28	35.76
855.3	35.80	35.95	35.60	33.05	34.89	35.80
895.6	35.96	35.83	35.98	32.16	34.00	35.60
935.8	36.15	36.27	35.84	31.33	33.11	34.71
976.1	36.16	36.25	36.25	30.65	32.39	34.16
1016.3	36.25	36.37	36.15	30.16	31.72	33.60
1056.6	36.12	36.41	36.27	29.60	31.16	32.76
1096.9	36.24	36.33	36.67	28.94	30.37	32.14
1137.1	36.25	36.60	36.52	28.28	29.50	30.72
1177.4	36.54	36.78	37.20	27.88	28.78	29.90
1217.6	36.97	37.43	37.36	27.56	28.10	28.92
1257.9	37.47	37.79	38.18	28.02	28.65	29.32
1298.2	37.88	38.46	38.54	28.69	29.34	30.09
1338.4	38.32	39.31	39.65	28.81	29.63	30.26
1378.7	38.42	39.59	40.51	28.55	29.27	30.23
1418.9	38.15	39.77	40.66	27.80	28.45	29.01
1459.2	37.25	38.69	40.12	27.13	27.68	28.36
1499.5	35.99	37.35	38.46	26.55	26.85	27.40
1539.7	34.80	35.98	37.40	26.17	26.49	26.99
1580.0	34.02	35.19	36.27	25.73	25.80	26.29
1600.1	33.58	34.83	35.73	25.72	25.83	26.09

RF (IN) (MHz)	LO (MHz)	RF-IF ISOLATION (dB)		
		@LO (dBm)		
		+4	+7	+10
50.1	80.1	42.26	41.38	43.45
90.4	120.4	37.48	38.26	37.93
130.6	160.6	34.44	35.14	35.84
170.9	200.9	32.16	32.85	33.60
211.1	241.1	30.68	31.39	31.98
251.4	281.4	29.30	30.12	30.67
291.7	321.7	28.21	29.11	29.68
331.9	361.9	27.55	28.33	28.84
372.2	402.2	26.78	27.66	28.38
412.4	442.4	26.30	27.29	28.01
452.7	482.7	25.85	26.88	27.71
493.0	523.0	25.61	26.73	27.53
533.2	563.2	25.57	26.61	27.48
573.5	603.5	25.71	26.77	27.59
613.7	643.7	26.10	27.27	28.33
654.0	684.0	26.51	27.83	29.13
694.3	724.3	26.72	28.37	29.73
734.5	764.5	26.80	28.57	29.94
774.8	804.8	26.23	27.58	28.35
815.0	845.0	25.66	26.55	26.85
855.3	885.3	24.92	25.44	25.58
895.6	925.6	24.18	24.43	24.39
935.8	965.8	23.55	23.62	23.52
976.1	1006.1	23.20	23.11	22.95
1016.3	1046.3	22.75	22.57	22.28
1056.6	1086.6	22.65	22.37	22.04
1096.9	1126.9	22.64	22.25	21.78
1137.1	1167.1	22.49	21.97	21.37
1177.4	1207.4	22.46	21.75	21.00
1217.6	1247.6	22.29	21.54	20.74
1257.9	1287.9	21.77	21.06	20.35
1298.2	1328.2	20.91	20.24	19.63
1338.4	1368.4	19.77	19.14	18.64
1378.7	1408.7	18.63	18.01	17.51
1418.9	1448.9	17.52	16.92	16.47
1459.2	1489.2	16.40	15.78	15.35
1499.5	1529.5	15.40	14.77	14.35
1539.7	1569.7	14.38	13.72	13.31
1580.0	1610.0	13.49	12.81	12.39
1600.1	1630.1	13.16	12.44	12.03

Typical Performance Data

RF (IN) (MHz)	LO (MHz)	RF VSWR (:1)		
		@LO (dBm)		
		+4	+7	+10
50.1	80.1	1.29	1.38	1.46
90.4	120.4	1.20	1.29	1.36
130.6	160.6	1.24	1.34	1.41
170.9	200.9	1.21	1.31	1.37
211.1	241.1	1.28	1.38	1.45
251.4	281.4	1.28	1.38	1.44
291.7	321.7	1.29	1.39	1.45
331.9	361.9	1.32	1.40	1.47
372.2	402.2	1.33	1.42	1.48
412.4	442.4	1.35	1.43	1.50
452.7	482.7	1.35	1.43	1.50
493.0	523.0	1.37	1.46	1.51
533.2	563.2	1.40	1.48	1.54
573.5	603.5	1.43	1.51	1.57
613.7	643.7	1.47	1.55	1.61
654.0	684.0	1.54	1.62	1.69
694.3	724.3	1.56	1.64	1.70
734.5	764.5	1.64	1.72	1.78
774.8	804.8	1.63	1.71	1.76
815.0	845.0	1.67	1.74	1.80
855.3	885.3	1.67	1.73	1.79
895.6	925.6	1.69	1.75	1.80
935.8	965.8	1.70	1.74	1.79
976.1	1006.1	1.74	1.77	1.81
1016.3	1046.3	1.84	1.85	1.89
1056.6	1086.6	1.92	1.93	1.95
1096.9	1126.9	2.13	2.12	2.13
1137.1	1167.1	2.31	2.29	2.29
1177.4	1207.4	2.55	2.52	2.50
1217.6	1247.6	2.77	2.71	2.68
1257.9	1287.9	2.98	2.91	2.86
1298.2	1328.2	3.13	3.03	2.98
1338.4	1368.4	3.42	3.31	3.24
1378.7	1408.7	3.47	3.34	3.27
1418.9	1448.9	3.78	3.65	3.54
1459.2	1489.2	3.91	3.78	3.67
1499.5	1529.5	4.26	4.10	3.97
1539.7	1569.7	4.34	4.19	4.05
1580.0	1610.0	4.54	4.39	4.25
1600.1	1630.1	4.55	4.40	4.27

LO (MHz)	LO VSWR (:1)		
	@LO (dBm)		
	+4	+7	+10
50.1	1.75	2.51	3.50
90.4	1.74	2.48	3.41
130.6	1.73	2.47	3.40
170.9	1.72	2.44	3.38
211.1	1.72	2.42	3.28
251.4	1.75	2.47	3.38
291.7	1.74	2.44	3.31
331.9	1.76	2.49	3.38
372.2	1.81	2.55	3.48
412.4	1.82	2.55	3.42
452.7	1.85	2.59	3.51
493.0	1.85	2.53	3.38
533.2	1.87	2.58	3.44
573.5	1.90	2.58	3.41
613.7	1.95	2.65	3.50
654.0	2.01	2.70	3.56
694.3	2.03	2.71	3.52
734.5	2.08	2.78	3.61
774.8	2.10	2.75	3.52
815.0	2.13	2.77	3.54
855.3	2.19	2.82	3.56
895.6	2.22	2.84	3.56
935.8	2.30	2.94	3.69
976.1	2.34	2.96	3.66
1016.3	2.39	3.02	3.76
1056.6	2.40	3.00	3.71
1096.9	2.38	2.97	3.67
1137.1	2.38	2.94	3.60
1177.4	2.39	2.92	3.56
1217.6	2.39	2.89	3.55
1257.9	2.44	2.92	3.54
1298.2	2.44	2.92	3.54
1338.4	2.51	2.96	3.57
1378.7	2.54	2.97	3.58
1418.9	2.58	2.98	3.55
1459.2	2.63	2.99	3.54
1499.5	2.65	2.97	3.50
1539.7	2.72	3.01	3.51
1580.0	2.79	3.06	3.54
1600.1	2.82	3.07	3.54

IF (OUT) (MHz)	IF VSWR @LO=1000.1MHz (:1)		
	@LO (dBm)		
	+4	+7	+10
10.0	2.30	1.90	1.55
30.2	2.16	1.88	1.63
50.4	2.05	1.73	1.51
70.6	2.05	1.73	1.53
90.8	2.10	1.77	1.56
111.0	2.11	1.78	1.57
131.2	2.10	1.78	1.57
151.4	2.07	1.75	1.55
171.6	2.07	1.76	1.56
191.8	2.08	1.78	1.58
212.0	2.08	1.77	1.57
232.2	2.06	1.77	1.57
252.4	2.05	1.75	1.57
272.7	2.04	1.75	1.57
292.9	2.04	1.77	1.59
313.1	2.04	1.76	1.59
333.3	2.01	1.74	1.57
353.5	1.99	1.72	1.57
373.7	1.99	1.73	1.58
393.9	2.00	1.74	1.60
434.3	1.97	1.73	1.60
454.5	1.96	1.73	1.60
494.9	1.97	1.75	1.63
515.1	1.97	1.75	1.64
555.5	1.96	1.75	1.66
575.7	1.98	1.78	1.69
616.1	1.96	1.76	1.69
636.3	1.97	1.78	1.70
676.7	1.98	1.80	1.73
696.9	2.00	1.81	1.74
737.3	1.99	1.80	1.74
757.6	2.00	1.81	1.75
798.0	2.00	1.81	1.75
818.2	2.00	1.81	1.76
858.6	2.01	1.83	1.77
878.8	2.02	1.82	1.76
919.2	2.01	1.82	1.76
939.4	2.02	1.83	1.76
979.8	2.05	1.85	1.79
1000.0	1.85	1.89	2.10

Harmonics Tables

RF HARMONICS ORDER

	(-dBm)	(-dBc)										
0	-	-	17	16	16	35	15	30	21	38	37	51
1	-	19	0	39	12	50	20	37	40	44	47	42
2	109	68	58	71	58	68	57	67	56	69	57	67
3	113	68	71	69	67	77	63	74	69	91	72	85
4	120	100	97	106	90	78	95	97	95	97	96	102
5	119	98	105	104	96	91	86	92	98	100	99	107
6	128	105	109	115	103	94	96	91	96	103	105	111
7	112	117	104	101	100	95	97	91	91	96	101	113
8	116	99	101	108	103	110	105	100	90	88	99	114
9	111	107	100	106	110	101	122	99	93	94	89	108
10	120	104	101	108	111	103	107	111	109	103	97	94
	RF CAL	0	1	2	3	4	5	6	7	8	9	10

LO HARMONICS ORDER

Test conditions: RF IN: 500.1 MHz; -14.00 dBm.
 LO IN: 530.01 MHz; +7.00 dBm
 IF OUT: 29.91 MHz; -20.92 dBm

RF HARMONICS ORDER

	(-dBm)	(-dBc)										
0	-	-	26	26	27	45	27	42	34	53	53	77
1	-	20	0	38	12	49	21	40	40	49	52	48
2	94	62	49	78	49	63	50	65	49	59	50	62
3	110	48	51	50	67	62	47	59	56	61	59	63
4	109	78	76	72	72	71	75	70	65	72	68	81
5	142	80	70	89	61	79	58	79	57	70	59	76
6	112	104	92	89	86	91	84	87	81	89	81	87
7	113	91	88	89	79	95	81	89	82	87	98	89
8	112	107	97	106	100	103	117	104	98	101	100	104
9	109	107	115	104	102	109	96	111	97	103	89	102
10	113	116	110	127	119	115	108	110	112	105	102	105
	RF CAL	0	1	2	3	4	5	6	7	8	9	10

LO HARMONICS ORDER

Test conditions: RF IN: 500.1 MHz; -4.00 dBm.
 LO IN: 530.01 MHz; +7.00 dBm
 IF OUT: 29.91 MHz; -10.85 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.

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