

Frequency Mixer

LRMS-5

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
5.0	35.0	6.56	6.17	5.95	10.1	40.1	14.42	17.18	19.19	10.1	40.1	0.32	0.22	0.13
10.0	40.0	6.45	6.03	5.79	70.4	100.4	18.34	20.22	16.43	70.4	100.4	0.76	0.49	0.33
70.4	100.4	6.36	5.99	5.79	130.7	160.7	14.53	13.46	18.76	130.7	160.7	0.87	0.59	0.38
130.7	160.7	6.15	5.81	5.64	190.9	220.9	13.23	15.76	26.19	190.9	220.9	0.87	0.63	0.41
190.9	220.9	6.11	5.79	5.62	251.2	281.2	12.74	16.96	26.18	251.2	281.2	0.92	0.63	0.46
251.2	281.2	6.13	5.81	5.64	311.5	341.5	13.68	19.29	21.81	311.5	341.5	0.91	0.65	0.48
311.5	341.5	6.15	5.84	5.67	371.8	401.8	14.55	20.94	18.48	371.8	401.8	0.92	0.68	0.53
371.8	401.8	6.24	5.90	5.70	432.0	462.0	17.00	18.67	17.73	432.0	462.0	0.99	0.77	0.61
432.0	462.0	6.27	5.96	5.74	492.3	522.3	18.02	21.33	18.91	492.3	522.3	1.08	0.84	0.70
492.3	522.3	6.36	6.00	5.76	552.6	582.6	18.36	18.60	17.78	552.6	582.6	1.24	1.00	0.77
552.6	582.6	6.46	6.09	5.86	612.9	642.9	23.86	15.60	16.85	612.9	642.9	1.35	1.10	0.89
612.9	642.9	6.54	6.14	5.88	673.1	703.1	17.70	17.67	14.51	673.1	703.1	1.39	1.14	0.96
673.1	703.1	6.66	6.22	5.92	733.4	763.4	16.57	14.88	12.24	733.4	763.4	1.45	1.17	1.01
733.4	763.4	6.81	6.36	6.01	793.7	823.7	14.17	13.27	10.45	793.7	823.7	1.47	1.23	1.05
793.7	823.7	6.93	6.43	6.08	854.0	884.0	13.20	15.01	13.87	854.0	884.0	1.53	1.30	1.11
854.0	884.0	7.06	6.46	6.12	914.2	944.2	12.79	14.31	15.76	914.2	944.2	1.53	1.38	1.14
914.2	944.2	7.30	6.60	6.21	974.5	1004.5	11.14	13.73	15.50	974.5	1004.5	1.40	1.33	1.14
974.5	1004.5	7.65	6.86	6.40	1034.8	1064.8	9.20	13.27	15.32	1034.8	1064.8	1.08	1.07	1.02
1034.8	1064.8	8.00	7.26	6.74	1095.1	1125.1	7.65	10.23	12.45	1095.1	1125.1	0.90	0.83	0.80
1095.1	1125.1	8.25	7.65	7.14	1155.3	1185.3	7.49	8.89	11.20	1155.3	1185.3	0.80	0.72	0.65
1155.3	1185.3	8.36	7.90	7.49	1215.6	1245.6	7.75	7.96	10.10	1215.6	1245.6	0.68	0.55	0.58
1215.6	1245.6	8.41	8.03	7.70	1275.9	1305.9	8.28	7.98	8.65	1275.9	1305.9	0.64	0.49	0.54
1275.9	1305.9	8.50	8.16	7.89	1336.2	1366.2	9.11	8.45	8.55	1336.2	1366.2	0.65	0.51	0.48
1336.2	1366.2	8.58	8.29	8.07	1396.4	1426.4	9.94	9.50	10.04	1396.4	1426.4	0.66	0.50	0.46
1396.4	1426.4	8.68	8.41	8.24	1436.6	1466.6	10.97	10.91	11.21	1436.6	1466.6	0.74	0.53	0.48
1436.6	1466.6	8.71	8.46	8.29	1496.9	1526.9	10.82	12.84	12.02	1496.9	1526.9	0.80	0.50	0.41
1496.9	1526.9	8.76	8.48	8.33	1537.1	1567.1	11.55	12.80	12.97	1537.1	1567.1	0.78	0.52	0.42
1537.1	1567.1	8.90	8.57	8.46	1597.3	1627.3	11.76	13.62	14.81	1597.3	1627.3	0.76	0.47	0.42
1597.3	1627.3	8.93	8.58	8.48	1637.5	1667.5	11.34	15.02	14.17	1637.5	1667.5	0.78	0.42	0.43
1637.5	1667.5	9.02	8.63	8.54	1697.8	1727.8	11.42	13.01	14.43	1697.8	1727.8	0.80	0.42	0.39
1697.8	1727.8	9.12	8.64	8.55	1738.0	1768.0	11.50	11.61	14.43	1738.0	1768.0	0.81	0.45	0.35
1738.0	1768.0	9.30	8.71	8.55	1798.3	1828.3	10.63	11.66	13.06	1798.3	1828.3	0.87	0.44	0.35
1798.3	1828.3	9.46	8.74	8.54	1838.4	1868.4	9.81	12.58	14.25	1838.4	1868.4	0.94	0.48	0.35
1838.4	1868.4	9.75	8.80	8.51	1898.7	1928.7	9.44	13.14	13.55	1898.7	1928.7	0.88	0.45	0.35
1898.7	1928.7	10.09	8.91	8.53	1938.9	1968.9	9.53	11.89	14.34	1938.9	1968.9	0.88	0.52	0.35
1938.9	1968.9	10.52	9.12	8.63	1999.2	2029.2	10.36	10.65	12.84	1999.2	2029.2	0.77	0.45	0.33
1999.2	2029.2	11.00	9.34	8.74	2039.4	2069.4	10.82	11.03	12.83	2039.4	2069.4	0.62	0.51	0.30
2039.4	2069.4	11.46	9.60	8.89	2099.6	2129.6	12.28	13.12	13.13	2099.6	2129.6	0.39	0.45	0.27
2099.6	2129.6	12.24	9.86	9.01	2139.8	2169.8	12.85	14.85	13.11	2139.8	2169.8	0.20	0.40	0.28
2139.8	2169.8	12.90	10.06	9.09	2200.1	2230.1	9.11	14.78	19.64	2200.1	2230.1	-0.27	0.35	0.20



Frequency Mixer

LRMS-5

Typical Performance Data

IF (OUT) (MHz)	LO (MHz)	CONVERSION LOSS VS. IF FREQUENCY @RF(IN)=500.1MHz (dB)	IF (OUT) (MHz)	LO (MHz)	CONVERSION LOSS VS. IF FREQUENCY @RF(IN)=10.1MHz (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
490.0	10.1	6.07	10.0	20.1	6.96	990.0	10.1	7.12
477.7	22.4	6.02	30.0	40.1	6.84	970.0	30.1	7.15
465.4	34.7	6.00	50.0	60.1	6.86	950.0	50.1	7.14
453.1	47.0	6.01	70.0	80.1	6.88	930.0	70.1	7.20
440.8	59.3	6.01	90.0	100.1	6.91	910.0	90.1	7.23
428.5	71.6	6.00	110.0	120.1	6.88	890.0	110.1	7.23
416.2	83.9	5.99	130.0	140.1	6.85	870.0	130.1	7.18
403.8	96.3	5.97	150.0	160.1	6.88	850.0	150.1	7.20
391.5	108.6	5.97	170.0	180.1	6.92	830.0	170.1	7.21
379.2	120.9	5.95	190.0	200.1	6.91	810.0	190.1	7.19
366.9	133.2	5.95	210.0	220.1	6.89	790.0	210.1	7.17
354.6	145.5	5.97	230.0	240.1	6.91	770.0	230.1	7.13
342.3	157.8	5.97	250.0	260.1	6.95	750.0	250.1	6.96
330.0	170.1	5.97	270.0	280.1	6.96	730.0	270.1	7.11
317.7	182.4	5.98	290.0	300.1	6.96	710.0	290.1	7.11
305.4	194.7	5.98	310.0	320.1	6.98	690.0	310.1	7.03
293.1	207.0	5.95	330.0	340.1	6.99	670.0	330.1	7.00
280.8	219.3	5.93	350.0	360.1	7.00	650.0	350.1	7.00
268.5	231.6	5.91	370.0	380.1	7.04	630.0	370.1	6.98
256.2	243.9	5.86	390.0	400.1	7.05	610.0	390.1	6.95
243.8	256.3	5.87	430.0	440.1	7.10	570.0	430.1	6.90
231.5	268.6	5.93	450.0	460.1	7.12	550.0	450.1	6.90
219.2	280.9	5.95	490.0	500.1	7.15	510.0	490.1	6.77
206.9	293.2	5.97	510.0	520.1	7.16	490.0	510.1	6.72
194.6	305.5	5.96	550.0	560.1	7.22	450.0	550.1	6.83
182.3	317.8	5.95	570.0	580.1	7.22	430.0	570.1	6.83
170.0	330.1	5.96	610.0	620.1	7.21	390.0	610.1	6.74
157.7	342.4	5.97	630.0	640.1	7.23	370.0	630.1	6.74
145.4	354.7	5.98	670.0	680.1	7.27	330.0	670.1	6.78
133.1	367.0	6.00	690.0	700.1	7.29	310.0	690.1	6.82
120.8	379.3	5.98	730.0	740.1	7.40	270.0	730.1	6.88
108.5	391.6	5.96	750.0	760.1	7.42	250.0	750.1	6.91
96.2	403.9	5.97	790.0	800.1	7.48	210.0	790.1	6.92
83.8	416.3	5.96	810.0	820.1	7.50	190.0	810.1	6.92
71.5	428.6	5.97	850.0	860.1	7.57	150.0	850.1	6.94
59.2	440.9	5.98	870.0	880.1	7.60	130.0	870.1	6.92
46.9	453.2	5.96	910.0	920.1	7.70	90.0	910.1	6.88
34.6	465.5	5.99	930.0	940.1	7.76	70.0	930.1	6.88
22.3	477.8	5.99	970.0	980.1	7.91	30.0	970.1	6.93
10.0	490.1	6.11	990.0	1000.1	7.97	10.0	990.1	7.11



Frequency Mixer

LRMS-5

Typical Performance Data

LO (MHz)	LO-RF ISOLATION (dB)			LO-IF ISOLATION (dB)		
	@LO (dBm)			@LO (dBm)		
	+4	+7	+10	+4	+7	+10
5.0	77.61	78.28	78.52	69.01	82.08	77.02
10.0	71.70	73.09	73.85	63.30	75.39	72.75
70.4	65.98	70.75	75.15	55.71	54.44	48.39
130.7	58.67	62.99	67.62	52.15	49.84	43.44
190.9	54.28	58.40	63.13	47.90	47.91	40.71
251.2	52.27	56.50	61.37	46.03	45.17	38.03
311.5	51.38	56.44	61.50	45.55	43.27	36.00
371.8	51.25	56.99	61.67	45.61	41.13	34.26
432.0	52.36	60.32	60.73	48.35	38.17	32.34
492.3	54.14	64.18	55.72	53.97	36.34	30.65
552.6	61.77	57.50	50.77	57.32	34.08	29.19
612.9	75.15	51.09	46.59	43.57	31.25	27.20
673.1	57.74	46.55	42.98	39.77	29.23	25.46
733.4	51.82	44.16	40.83	35.90	27.79	24.00
793.7	47.74	42.23	39.60	32.70	26.52	23.22
854.0	44.79	40.97	38.92	29.04	24.86	22.04
914.2	43.52	39.97	38.40	25.93	22.33	20.25
974.5	43.31	39.67	38.00	24.04	20.70	18.84
1034.8	44.01	39.76	38.00	22.69	19.38	17.59
1095.1	46.32	41.37	39.13	21.48	18.49	16.78
1155.3	48.99	43.52	40.77	20.43	17.77	16.13
1215.6	53.53	47.47	43.45	19.40	17.13	15.36
1275.9	54.65	53.78	47.58	18.59	16.56	14.90
1336.2	46.97	55.22	54.17	17.90	15.91	14.46
1396.4	43.12	47.13	50.60	17.22	15.36	14.09
1436.6	41.71	45.06	48.03	16.71	15.10	13.78
1496.9	39.54	42.01	43.87	16.01	14.58	13.24
1597.3	37.06	38.80	40.26	14.94	13.85	12.71
1637.5	35.39	36.90	37.83	14.52	13.38	12.41
1697.8	33.62	34.99	35.83	13.99	13.13	12.28
1738.0	32.66	33.89	34.81	13.65	12.93	12.21
1798.3	30.90	32.08	33.05	13.04	12.68	12.09
1838.4	30.13	31.29	32.24	12.73	12.43	11.95
1898.7	28.79	29.90	30.83	12.27	12.18	11.73
1938.9	28.02	29.09	30.00	12.06	11.97	11.63
1999.2	27.02	27.95	28.86	11.75	11.73	11.42
2039.4	26.67	27.54	28.36	11.70	11.68	11.36
2099.6	25.91	26.69	27.53	11.65	11.58	11.43
2139.8	25.47	26.37	27.16	11.60	11.68	11.52
2200.1	24.84	25.62	26.45	11.70	11.76	11.68

RF (IN) (MHz)	LO (MHz)	RF-IF ISOLATION (dB)		
		@LO (dBm)		
		+4	+7	+10
10.1	40.1	44.47	46.28	48.71
70.4	100.4	40.94	39.29	39.31
130.7	160.7	36.23	35.94	35.48
190.9	220.9	34.48	33.93	33.45
251.2	281.2	33.51	33.07	32.66
311.5	341.5	32.83	32.31	32.11
371.8	401.8	31.67	31.31	31.10
432.0	462.0	29.66	29.57	29.46
492.3	522.3	27.26	27.27	27.17
552.6	582.6	24.83	24.82	24.88
612.9	642.9	22.76	22.63	22.54
673.1	703.1	21.19	21.03	20.94
733.4	763.4	20.02	19.97	19.96
793.7	823.7	19.12	19.25	19.51
854.0	884.0	18.67	18.94	19.38
914.2	944.2	18.50	18.77	19.18
974.5	1004.5	18.44	18.77	19.02
1034.8	1064.8	18.45	18.78	19.16
1095.1	1125.1	18.32	18.76	19.12
1155.3	1185.3	18.14	18.53	18.90
1215.6	1245.6	17.77	18.18	18.46
1275.9	1305.9	17.22	17.59	17.82
1336.2	1366.2	16.74	17.02	17.26
1396.4	1426.4	16.20	16.44	16.71
1436.6	1466.6	15.91	16.18	16.37
1496.9	1526.9	15.59	15.77	16.01
1537.1	1567.1	15.36	15.56	15.78
1597.3	1627.3	15.09	15.37	15.56
1637.5	1667.5	14.96	15.22	15.42
1697.8	1727.8	14.67	15.06	15.26
1738.0	1768.0	14.42	14.82	15.11
1798.3	1828.3	14.12	14.60	14.98
1838.4	1868.4	13.93	14.43	14.87
1898.7	1928.7	13.69	14.25	14.75
1938.9	1968.9	13.54	14.08	14.63
1999.2	2029.2	13.52	14.07	14.64
2039.4	2069.4	13.52	14.02	14.52
2099.6	2129.6	13.62	14.10	14.54
2139.8	2169.8	13.70	14.25	14.63
2200.1	2230.1	13.92	14.51	14.90

REV. X2
LRMS-5
100817
Page 3 of 5



IF/RF MICROWAVE COMPONENTS • ISO 9001 ISO 14001 AS 9100 CERTIFIED • RoHS compliant
P.O. Box 350166, Brooklyn, New York 11235-0006 (718) 934-4500 Fax (718) 332-4661



The Design Engineers Search Engine finds the model you need, Instantly • For detailed performance specs & shopping online see



Frequency Mixer

LRMS-5

Typical Performance Data

RF (IN) (MHz)	LO (MHz)	RF VSWR (:1)			LO (MHz)	LO VSWR (:1)			IF (OUT) (MHz)	IF VSWR @LO=1010.1MHz (:1)		
		@LO (dBm)				@LO (dBm)				@LO (dBm)		
		+4	+7	+10		+4	+7	+10		+4	+7	+10
5.0	35.0	1.68	2.43	3.47	5.0	2.73	2.64	2.55	5.0	1.51	1.21	1.03
10.0	40.0	1.67	2.43	3.47	10.0	1.68	1.62	1.58	10.0	1.52	1.22	1.03
70.4	100.4	1.20	1.19	1.21	70.4	1.81	2.57	3.52	30.3	1.61	1.30	1.11
130.7	160.7	1.10	1.08	1.11	130.7	1.81	2.56	3.50	50.5	1.59	1.26	1.06
190.9	220.9	1.07	1.01	1.06	190.9	1.77	2.49	3.38	70.7	1.53	1.21	1.03
251.2	281.2	1.09	1.04	1.05	251.2	1.82	2.55	3.45	90.9	1.58	1.27	1.07
311.5	341.5	1.12	1.07	1.07	311.5	1.84	2.55	3.42	111.1	1.61	1.28	1.09
371.8	401.8	1.16	1.11	1.10	371.8	1.87	2.57	3.41	131.3	1.57	1.25	1.05
432.0	462.0	1.19	1.16	1.15	432.0	1.94	2.64	3.48	151.5	1.55	1.23	1.04
492.3	522.3	1.23	1.20	1.19	492.3	1.96	2.64	3.43	171.7	1.53	1.23	1.06
552.6	582.6	1.30	1.27	1.25	552.6	2.03	2.70	3.48	191.9	1.54	1.24	1.07
612.9	642.9	1.39	1.35	1.32	612.9	2.08	2.73	3.47	212.1	1.55	1.24	1.07
673.1	703.1	1.50	1.44	1.41	673.1	2.14	2.76	3.45	232.3	1.53	1.23	1.06
733.4	763.4	1.61	1.55	1.50	733.4	2.21	2.82	3.50	252.5	1.51	1.22	1.07
793.7	823.7	1.77	1.70	1.63	793.7	2.25	2.83	3.48	272.8	1.51	1.23	1.08
854.0	884.0	1.95	1.86	1.79	854.0	2.32	2.86	3.48	293.0	1.52	1.24	1.09
914.2	944.2	2.19	2.07	2.00	914.2	2.40	2.91	3.49	313.2	1.52	1.24	1.09
974.5	1004.5	2.44	2.29	2.19	974.5	2.47	2.96	3.50	333.4	1.50	1.23	1.09
1034.8	1064.8	2.61	2.49	2.37	1034.8	2.57	3.06	3.58	353.6	1.50	1.23	1.10
1095.1	1125.1	2.68	2.60	2.52	1095.1	2.59	3.05	3.54	373.8	1.49	1.23	1.11
1155.3	1185.3	2.72	2.68	2.64	1155.3	2.67	3.11	3.58	394.0	1.48	1.23	1.12
1215.6	1245.6	2.78	2.76	2.73	1215.6	2.69	3.11	3.56	434.4	1.45	1.21	1.13
1275.9	1305.9	2.84	2.82	2.78	1275.9	2.72	3.10	3.52	454.6	1.44	1.22	1.14
1336.2	1366.2	2.89	2.86	2.82	1336.2	2.80	3.15	3.55	495.0	1.43	1.21	1.14
1396.4	1426.4	2.89	2.84	2.82	1396.4	2.80	3.11	3.48	515.2	1.41	1.20	1.16
1436.6	1466.6	2.88	2.85	2.80	1436.6	2.88	3.16	3.52	555.6	1.40	1.22	1.18
1496.9	1526.9	2.87	2.84	2.83	1496.9	2.91	3.14	3.47	575.8	1.40	1.21	1.18
1537.1	1567.1	2.91	2.87	2.85	1537.1	3.00	3.21	3.52	616.2	1.35	1.19	1.19
1597.3	1627.3	2.96	2.93	2.90	1597.3	3.05	3.20	3.47	636.4	1.36	1.20	1.20
1637.5	1667.5	2.99	2.96	2.92	1637.5	3.16	3.30	3.56	676.8	1.34	1.19	1.19
1697.8	1727.8	3.01	2.93	2.90	1697.8	3.30	3.36	3.58	697.0	1.30	1.16	1.18
1738.0	1768.0	3.03	2.93	2.89	1738.0	3.46	3.47	3.67	737.4	1.28	1.18	1.23
1798.3	1828.3	3.02	2.88	2.83	1798.3	3.65	3.59	3.75	757.7	1.28	1.18	1.23
1838.4	1868.4	3.08	2.89	2.82	1838.4	3.86	3.74	3.86	798.1	1.23	1.13	1.21
1898.7	1928.7	3.20	2.96	2.85	1898.7	4.09	3.87	3.92	818.3	1.20	1.13	1.23
1938.9	1968.9	3.35	3.07	2.94	1938.9	4.30	4.02	4.06	858.7	1.21	1.15	1.25
1999.2	2029.2	3.53	3.23	3.05	1999.2	4.52	4.15	4.10	878.9	1.19	1.13	1.22
2039.4	2069.4	3.63	3.31	3.09	2039.4	4.72	4.33	4.24	919.3	1.12	1.12	1.26
2099.6	2129.6	3.70	3.33	3.11	2099.6	4.96	4.47	4.31	939.5	1.12	1.15	1.30
2139.8	2169.8	3.83	3.39	3.16	2139.8	5.20	4.64	4.46	979.9	1.10	1.16	1.31
2200.1	2230.1	3.90	3.39	3.14	2200.1	5.36	4.79	4.50	1000.1	1.11	1.24	1.41

Harmonics Tables

RF HARMONICS ORDER

	(-dBm)	(-dBc)										
0	-	-	+1	23	11	18	8	40	25	44	36	41
1	-	13	+0	37	16	39	39	46	36	51	41	58
2	111	55	36	61	35	73	49	58	45	57	56	61
3	119	70	64	66	72	68	70	74	73	72	63	74
4	112	97	96	86	85	86	86	82	89	81	88	83
5	118	122	107	97	94	106	90	94	101	104	98	95
6	119	108	107	108	102	111	105	90	104	109	101	119
7	110	100	107	102	126	115	105	96	88	105	103	104
8	138	106	102	100	107	99	108	99	100	96	108	105
9	119	101	110	98	105	107	105	115	109	95	99	109
10	105	104	101	104	99	100	106	103	119	135	105	101
	RF CAL	0	1	2	3	4	5	6	7	8	9	10

LO HARMONICS ORDER

Test conditions: RF IN: 750.1 MHz; -14.00 dBm.
 LO IN: 780.01 MHz; +7.00 dBm
 IF OUT: 29.91 MHz; -20.3 dBm

RF HARMONICS ORDER

	(-dBm)	(-dBc)										
0	-	-	7	33	22	31	21	54	39	58	44	59
1	-	13	+0	38	17	44	42	49	48	57	50	65
2	90	47	27	50	27	57	43	57	38	56	55	62
3	112	45	43	47	47	51	47	59	74	66	54	69
4	107	62	65	61	55	55	44	62	57	58	58	63
5	109	64	66	65	57	67	56	62	64	79	68	68
6	116	79	80	70	82	68	57	66	59	68	71	71
7	117	85	76	83	77	90	72	75	68	72	73	81
8	117	99	95	88	84	85	97	85	76	79	69	92
9	122	96	105	95	88	99	87	100	84	78	76	77
10	112	105	102	115	101	93	91	88	96	88	80	88
	RF CAL	0	1	2	3	4	5	6	7	8	9	10

LO HARMONICS ORDER

Test conditions: RF IN: 750.1 MHz; -4.00 dBm.
 LO IN: 780.01 MHz; +7.00 dBm
 IF OUT: 29.91 MHz; -10.41 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.

REV. X2
 LRMS-5
 100817

Page 5 of 5



IF/RF MICROWAVE COMPONENTS • ISO 9001 ISO 14001 AS 9100 CERTIFIED • RoHS compliant
 P.O. Box 350166, Brooklyn, New York 11235-0006 (718) 934-4500 Fax (718) 332-4661



The Design Engineers Search Engine finds the model you need, Instantly • For detailed performance specs & shopping online see

