

# X2 Frequency Multiplier

## KSX2-442+

50Ω Output 1200 to 4400 MHz



Generic photo used for illustration purposes only

CASE STYLE: HV1195

**+RoHS Compliant**  
The +Suffix identifies RoHS Compliance. See our web site for RoHS Compliance methodologies and qualifications

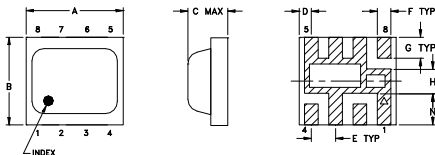
### Maximum Ratings

Operating Temperature	-40°C to 85°C
Storage Temperature	-55°C to 100°C
RF Input, 25°C	100 mW
Permanent damage may occur if any of these limits are exceeded.	

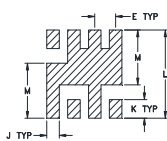
### Pin Connections

INPUT	4
OUTPUT	8
50Ω TERMINATE EXT.	2
GROUND	1,3,5,6,7

### Outline Drawing



PCB Metal Land Pattern

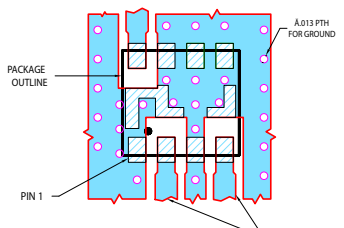


Suggested Layout, Tolerance to be within .002

### Outline Dimensions (inch)

A	B	C	D	E	F	G
.200	.180	.087	.025	.050	.028	.043
5.08	4.57	2.2098	0.64	1.27	0.71	1.09
H	J	K	L	M	N	wt
.050	.030	.043	.204	.127	0.065	grams
1.27	0.76	1.09	5.18	3.23	1.65	0.08

### Demo Board MCL P/N: TB-473+ Suggested PCB Layout (PL-287)



**NOTES:**  
1. TRACE WIDTH AND GAP ARE SHOWN FOR ROGERS RO4350B WITH DIELECTRIC THICKNESS .002"±.0015". COPPER: 1/2 OZ EACH SIDE. FOR OTHER MATERIALS TRACE WIDTH AND GAP MAY NEED TO BE MODIFIED.  
2. BOTTOM SIDE OF THE PCB IS CONTINUOUS GROUND PLANE.

DENOTES PCB COPPER LAYOUT WITH SMOBC SOLDER MASK OVER BARE COPPER.  
DENOTES COPPER LAND PATTERN FREE OF SOLDER MASK.

### Notes

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- Electrical specifications and performance data contained in this specification document are based on Mini-Circuit's applicable established test performance criteria and measurement instructions.
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### Features

- low conversion loss, 11.0 dB typ.
- high fundamental & harmonic suppression, F1, 24 dBc typ.; F3, 30 dBc typ.; F4, 20 dBc typ.
- LTCC design
- low profile, 0.085"
- aqueous washable

### Applications

- synthesizers
- local oscillators

### Electrical Specifications

MULTIPLICATION FACTOR	FREQUENCY (MHz)		INPUT POWER (dBm)		CONVERSION LOSS (dB)		*HARMONIC OUTPUT (dBc)					
	F1	F2					F3		F4			
	Input	Output	Min.	Max.	Typ.	Max.	Typ.	Min.	Typ.	Min.		
2	600-1200	1200-2400	7	13	11	14	26	18	35	22	16	11
	1200-2200	2400-4400	10	15	11	14.5	18	11	36	22	25	14

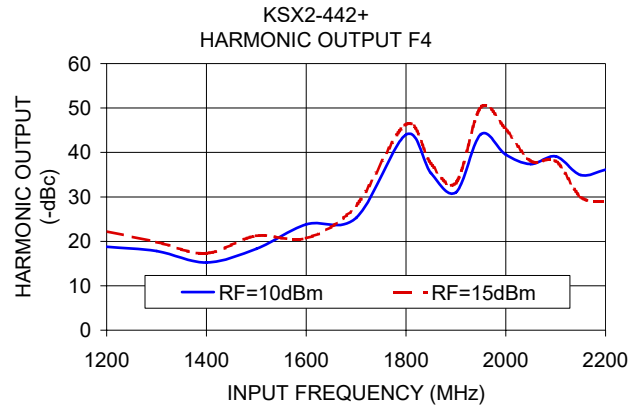
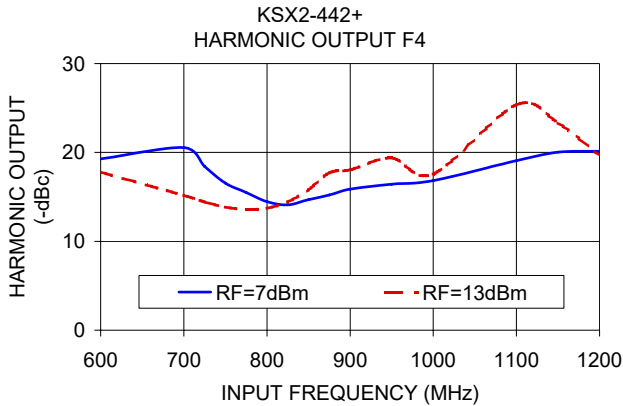
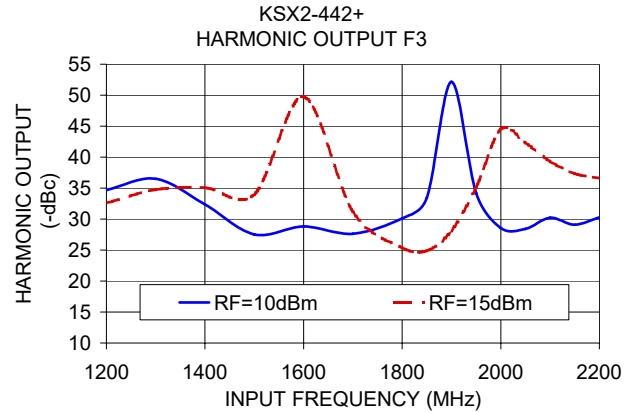
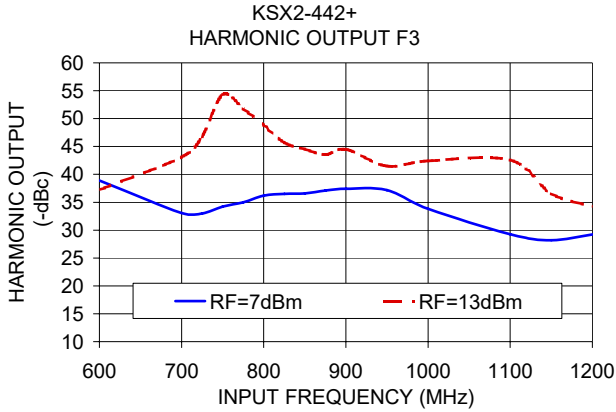
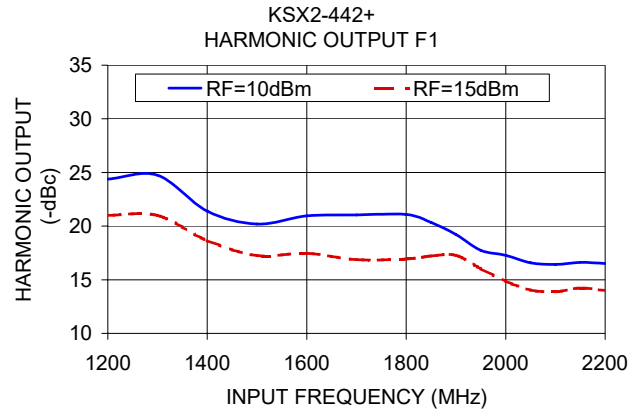
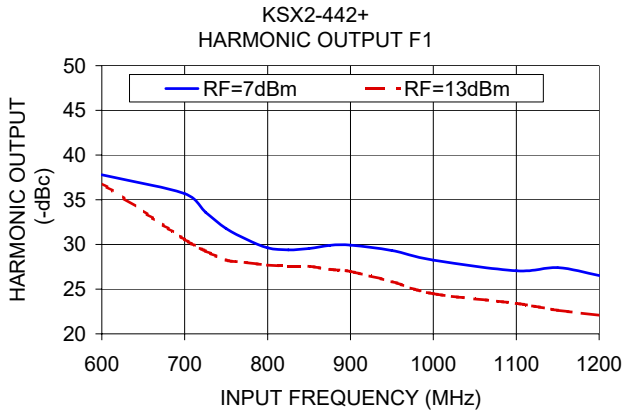
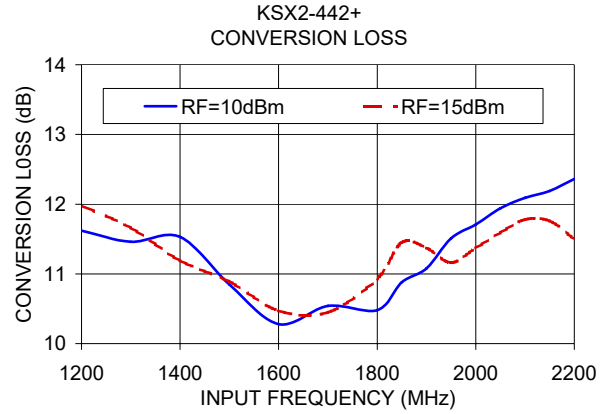
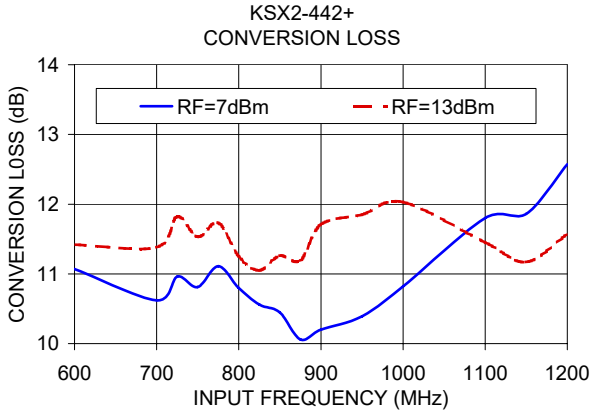
\* Harmonics of input frequency below the power level of F2

### Typical Performance Data

Input Frequency (MHz)	INPUT RF= 7dBm				INPUT RF= 13dBm			
	Conversion Loss (dB)	Harmonic Output Below F2 (-dBc)			Conversion Loss (dB)	Harmonic Output Below F2 (-dBc)		
		F1	F3	F4		F1	F3	F4
600.00	11.07	37.78	38.89	19.27	11.42	36.83	37.22	17.78
700.00	10.62	35.69	33.05	20.55	11.38	30.55	43.10	15.17
725.00	10.96	33.61	32.98	18.42	11.82	29.27	46.76	14.44
750.00	10.81	31.77	34.21	16.56	11.53	28.24	54.28	13.86
775.00	11.11	30.55	34.97	15.48	11.73	27.98	51.80	13.59
800.00	10.80	29.63	36.19	14.47	11.25	27.69	48.85	13.72
825.00	10.56	29.39	36.48	14.11	11.05	27.58	45.69	14.42
850.00	10.45	29.55	36.57	14.68	11.26	27.56	44.52	15.79
875.00	10.06	29.91	37.08	15.22	11.19	27.21	43.53	17.71
900.00	10.20	29.93	37.43	15.88	11.71	26.98	44.51	18.04
950.00	10.39	29.32	37.16	16.42	11.85	25.83	41.50	19.39
1000.00	10.82	28.26	33.82	16.84	12.03	24.49	42.41	17.55
1100.00	11.80	27.05	29.27	19.07	11.45	23.40	42.59	25.36
1150.00	11.86	27.42	28.19	20.03	11.17	22.65	36.52	23.32
1200.00	12.57	26.52	29.22	20.14	11.57	22.07	34.21	19.68

Input Frequency (MHz)	INPUT RF= 10dBm			INPUT RF= 15dBm				
	Conversion Loss (dB)	Harmonic Output Below F2 (-dBc)			Conversion Loss (dB)	Harmonic Output Below F2 (-dBc)		
		F1	F3	F4		F1	F3	F4
1200.00	11.62	24.39	34.69	18.76	11.98	20.99	32.59	22.26
1300.00	11.46	24.74	36.51	17.80	11.66	20.99	34.74	19.84
1400.00	11.53	21.40	32.39	15.23	11.19	18.65	35.06	17.29
1500.00	10.85	20.20	27.53	18.33	10.89	17.25	34.00	21.23
1600.00	10.28	20.96	28.80	23.83	10.47	17.46	49.70	20.69
1700.00	10.54	21.05	27.62	25.30	10.45	16.88	31.19	28.07
1800.00	10.48	21.09	30.11	44.00	10.93	16.93	25.40	46.31
1850.00	10.88	20.35	33.46	35.37	11.45	17.22	24.89	37.47
1900.00	11.08	19.22	52.15	31.03	11.37	17.27	28.09	33.16
1950.00	11.51	17.74	34.22	44.11	11.16	16.02	35.11	50.14
2000.00	11.71	17.28	28.56	39.52	11.37	14.87	44.49	45.20
2050.00	11.94	16.57	28.40	37.40	11.59	14.04	42.35	38.11
2100.00	12.09	16.42	30.20	39.12	11.78	13.87	39.30	38.07
2150.00	12.19	16.62	29.11	34.90	11.76	14.22	37.34	29.99
2200.00	12.36	16.51	30.27	36.11	11.50	14.00	36.61	29.03



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