X4

Frequency Multiplier RKK-4-112+

50Ω Output 800 to 1100 MHz

The Big Deal

- Broadband, output from 800 to 1100 MHz
- Wide input power range, +17 to +23 dBm
- Low conversion loss, 22.5 dB
- Good harmonic suppression:
  F3, 30 dBc; F5, 23 dBc

CASE STYLE: CK1246

Product Overview

Mini-Circuits' RKK-4-112+ frequency multiplier provides a multiplication factor of 4, converting input frequencies from 200 to 275 MHz into output frequencies from 800 to 1100 MHz, supporting applications including synthesizers, local oscillators, satellite up and down converters and more. This model provides an input power range from +17 to +23 dBm, low conversion loss and good harmonic suppression. The multiplier comes housed in a miniature, shielded surface-mount package (0.50 x 0.50 x 0.18") with wrap-around terminations for excellent solderability.

Key Features

Feature	Advantages
Low conversion loss, 22.5 dB typ	With a low conversion loss, RKK-4-112+ produces higher output power, reducing the need for amplification.
Very good harmonic suppression • F3, 30 dBc • F5, 23 dBc	Reduces spurious signals and the need for additional filtering.
Broadband, 800 to 1100 MHz output	With an output frequency range spanning 800 to 1100 MHz, this multiplier covers a wide range of applications.
Wide input power range, +17 to +23 dBm	Wide input power signal range accommodates different input signal levels while still maintaining a low conversion loss.
Low cost	Provides an easy, cost-effective solution for generating high-frequency signals from a lower frequency signal source.
Small size, 0.50 x 0.50 x 0.18"	Saves space in crowded PCB layouts.

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Generic photo used for illustration purposes only

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+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 Power	25dBm

Permanent damage may occur if any of these limits are exceeded.

Pin Connections

INPUT	2
OUTPUT	10
GROUND	1,3,4,5,6,7,8,9,11,12,13,14,15,16

Features

- broadband
- high rejection F1, 36 dBc typ; F2, 30 dBc typ; F3, 30 dBc typ; F5, 23 dBc typ.
- aqueous washable

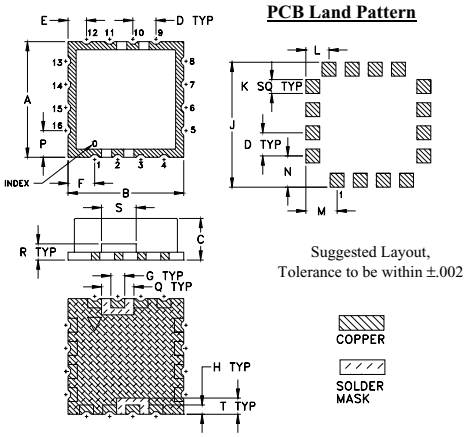
Applications

- synthesizers
- local oscillators
- satellite up and down converters

Available Tape and Reel at no extra cost

Reel Size	Devices/Reel
7"	10, 20, 50, 100
13"	200, 500

Outline Drawing

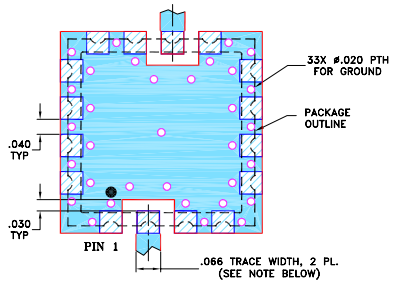


Outline Dimensions (inch / mm)

A	B	C	D	E	F	G	H	J	K
.500	.500	.180	.100	.080	.115	.060	.040	.540	.060
12.70	12.70	4.57	2.54	2.03	2.92	1.52	1.02	13.72	1.52

L	M	N	P	Q	R	S	T	wt.
.100	.135	.135	.115	.140	.070	.150	.070	grams
2.54	3.43	3.43	2.92	3.56	1.78	3.81	1.78	1.0

Demo Board MCL P/N: TB-435+
Suggested PCB Layout (PL-267)



NOTES: 1. TRACE WIDTH IS SHOWN FOR ROGERS RO4350B WITH DIELECTRIC THICKNESS .030" ± .002"; COPPER: 1/2 OZ. EACH SIDE. FOR OTHER MATERIALS TRACE WIDTH 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

Electrical Specifications at 25°C

Parameter		Min.	Typ.	Max.	Unit
Multiplier Factor			4		
Frequency Range, Input (F1)		200	—	275	MHz
Frequency Range, Output (F4)		800	—	1100	MHz
Input Power		17	—	23	dBm
Conversion Loss		—	22.5	29	dB
Harmonic Ouput*	F1	25	36	—	dBc
	F2	20	30	—	
	F3	20	30		
	F5	18	23	—	

* Harmonics of input frequency below the power level of F4.

Typical Performance Data

Input Frequency (MHz)	INPUT RF= 17dBm Conversion Loss (dB)	Harmonic Output Below F4 (dBc)				INPUT RF= 23dBm Conversion Loss (dB)	Harmonic Output Below F4 (dBc)			
	F4	F1	F2	F3	F5	F4	F1	F2	F3	F5
200	24.85	38.38	37.98	41.62	25.90	24.89	38.23	38.34	39.01	27.01
205	24.80	38.04	38.23	40.30	25.87	24.42	38.28	38.93	38.41	27.63
210	24.48	37.97	38.63	37.95	25.38	23.89	38.40	39.56	38.71	27.38
215	24.09	38.01	38.93	35.62	24.76	23.46	38.44	39.82	39.62	26.86
220	23.66	38.12	39.05	33.91	24.37	23.10	38.48	39.85	40.80	26.43
225	23.26	38.24	39.11	32.83	24.15	22.78	38.51	39.61	41.62	26.10
230	22.95	38.26	38.91	32.29	24.01	22.53	38.47	39.04	42.23	25.98
235	22.67	38.22	38.49	32.29	23.95	22.36	38.33	37.96	42.00	25.90
240	22.49	38.04	37.86	33.21	23.90	22.29	38.05	36.51	40.82	25.54
245	22.36	37.80	36.99	35.39	23.82	22.25	37.73	35.09	39.16	24.92
250	22.08	37.72	35.60	39.28	23.93	22.21	37.44	33.68	37.50	24.11
255	21.81	37.67	33.79	36.64	23.85	22.19	37.16	32.13	35.50	23.40
260	21.56	37.66	32.01	32.25	23.75	22.22	36.89	30.42	33.27	22.81
265	21.34	37.63	30.49	29.61	23.87	22.23	36.66	28.77	31.00	22.39
270	21.10	37.59	29.14	27.97	24.34	22.22	36.45	27.20	28.89	22.30
275	20.87	37.51	27.82	27.01	25.11	22.16	36.23	25.65	27.29	22.56

Notes

A. Performance and quality attributes and conditions not expressly stated in this specification document are intended to be excluded and do not form a part of this specification document.
B. 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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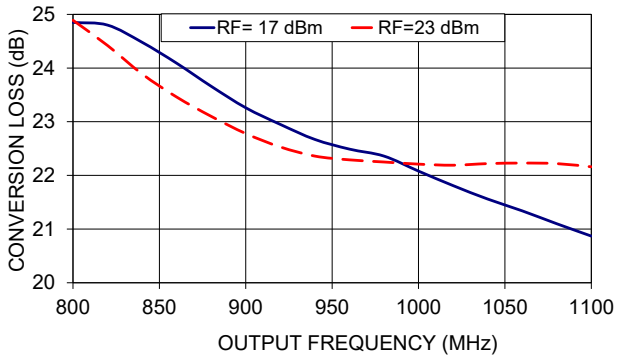
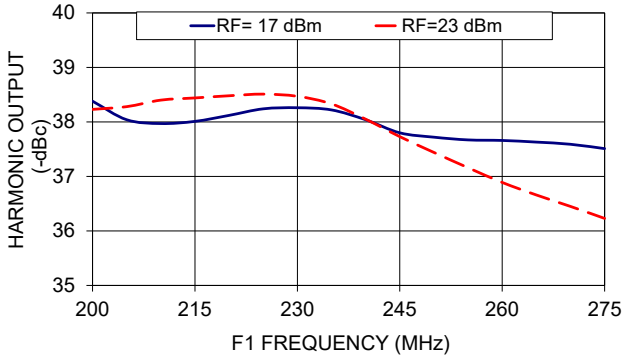
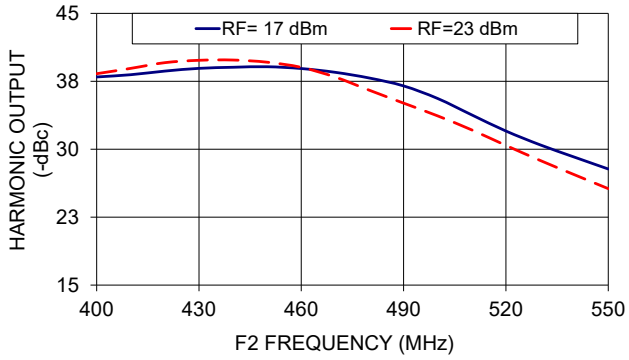
RKK-4-112+
CONVERSION LOSS



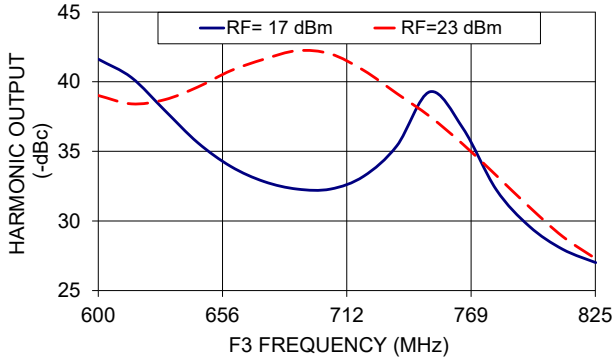
RKK-4-112+
HARMONIC OUTPUT F1



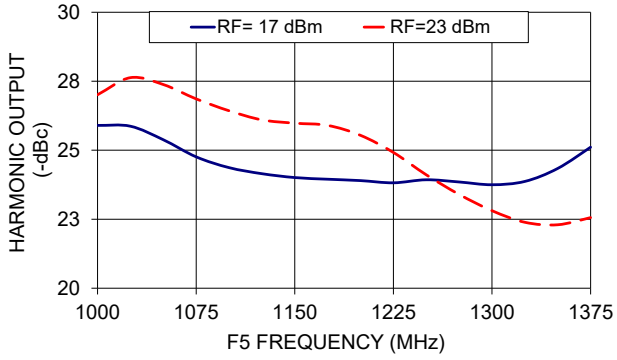
RKK-4-112+
HARMONIC OUTPUT F2



RKK-4-112+
HARMONIC OUTPUT F3



RKK-4-112+
HARMONIC OUTPUT F5



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