X5 Frequency Multiplier

RMK-5-2251+

50Ω Output 2100 to 3000 MHz

The Big Deal

- Wide bandwidth, 1500 to 2250 output
- High harmonic suppression, F4, 52 dBc; F6, 56 dBc
- Small size, 0.25 x 0.31 x 0.16”



CASE STYLE: TT1224

Product Overview

Mini-Circuits’ RMK-5-2251+ frequency multiplier provides a multiplication factor of 5 converting input frequencies from 300 to 450 MHz into output frequencies from 1500 to 2250 MHz, supporting applications including synthesizers, local oscillators, satellite up and down converters and more. The unit supports input power of +17 dBm with conversion loss of 21 dB and excellent harmonic suppression. The multiplier comes housed in a miniature surface-mount package (0.25 x 0.31 x 0.16”) ideal for dense circuit board layouts.

Feature	Advantages
Wide bandwidth	With an output frequency range spanning 1500-2250 MHz, this multiplier covers a wide range of applications.
Excellent harmonic suppression • F4, 52 dBc • F6, 56 dBc	Reduces spurious signals and the need for additional filtering.
Low conversion loss, 21 dB	With a low conversion loss, the unit produces higher output power signal level and less amplification may be used.
Wide input power range, +12 to +17 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	Measuring only 0.25 x 0.31 x 0.16”, the RMK-5-2251+ saves space in crowded PCB layouts.

Notes
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RMK-5-2251+

50Ω Output 1500 to 2250 MHz



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

Available Tape and Reel at no extra cost

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

Maximum Ratings

Operating Temperature	-40°C to 85°C
Storage Temperature	-55°C to 100°C
RF Input Power	20 dBm

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

Pin Connections

INPUT	1
OUTPUT	4
GROUND	2,3,5,6

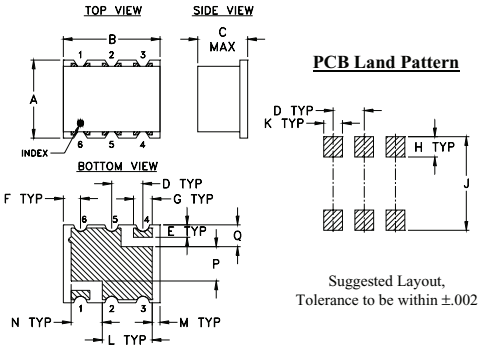
Features

- low conversion loss, 21 dB typ.
- high rejection of adjacent harmonics, 56 dBc typ.
- aqueous washable

Applications

- synthesizers
- local oscillators
- satellite up and down converters

Outline Drawing

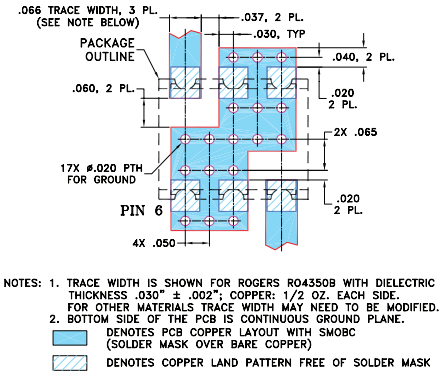


Outline Dimensions (inch / mm)

A	B	C	D	E	F	G	H
.25	.31	.16	.100	.040	.055	.060	.065
6.35	7.87	4.06	2.54	1.02	1.40	1.52	1.65

J	K	L	M	N	P	Q	wt.
.300	.060	.160	.025	.100	.110	.070	grams
7.62	1.52	4.06	0.64	2.54	2.79	1.78	0.16

Demo Board MCL P/N: TB-393
Suggested PCB Layout (PL-258)



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			5		
Frequency Range, Input (F1)		300	—	450	MHz
Frequency Range, Output (F5)		1500	—	2250	MHz
Input Power		—	17	—	dBm
Conversion Loss		—	21	24.8	dB
Harmonic Ouput*	F1	-3.5	5.3	—	-dBc
	F2	38	64	—	
	F3	-7.6	-0.34	—	
	F4	35	52	—	
	F6	35	56	—	
	F7	2.5	6.5	—	

* Harmonics of input frequency below the power level of F5

Typical Performance

Frequency Input (MHz)	Frequency Output (MHz)	Conv. Loss (dB) F5	Harmonic Rejection Below F5, (dBc) at RF Input Power 17 dBm F1	F2	F3	F4	F6	F7
300.00	1500.00	21.29	-9.07	-66.02	-2.50	-49.79	-52.79	-6.72
310.00	1550.00	20.95	-9.02	-64.33	-2.53	-53.20	-64.41	-7.42
320.00	1600.00	20.55	-9.01	-61.09	-2.44	-52.78	-63.19	-7.78
330.00	1650.00	20.35	-8.58	-62.47	-2.29	-52.01	-69.13	-7.79
335.00	1675.00	20.47	-8.03	-61.99	-1.98	-51.61	-70.09	-7.65
340.00	1700.00	20.54	-7.43	-62.35	-1.67	-51.64	-71.09	-7.78
350.00	1750.00	20.87	-6.28	-61.96	-1.14	-50.88	-70.48	-7.83
355.00	1775.00	20.89	-5.97	-62.85	-0.80	-51.30	-62.01	-7.54
360.00	1800.00	21.00	-5.65	-61.96	-0.36	-50.66	-67.29	-7.22
365.00	1825.00	20.95	-5.57	-64.33	-0.18	-51.44	-56.87	-7.03
370.00	1850.00	20.90	-5.51	-62.59	0.00	-50.06	-63.01	-6.78
375.00	1875.00	21.04	-5.24	-64.25	0.31	-50.00	-62.20	-6.51
380.00	1900.00	21.13	-4.90	-64.89	0.71	-49.59	-58.94	-6.48
390.00	1950.00	21.28	-4.09	-67.78	1.34	-49.25	-59.11	-6.48
395.00	1975.00	21.45	-3.53	-68.70	1.69	-48.97	-58.36	-6.58
400.00	2000.00	21.77	-2.84	-68.89	2.26	-48.88	-58.96	-6.59
410.00	2050.00	21.91	-2.11	-68.06	2.81	-49.48	-58.45	-7.07
420.00	2100.00	22.14	-1.47	-66.25	3.48	-49.46	-58.71	-7.34
430.00	2150.00	22.20	-0.98	-63.87	4.06	-49.67	-58.03	-7.88
435.00	2175.00	22.42	-0.46	-62.03	4.47	-50.16	-56.62	-8.21
440.00	2200.00	22.76	0.15	-60.29	4.93	-50.15	-56.72	-8.52
445.00	2225.00	22.96	0.61	-59.06	5.26	-50.43	-55.81	-8.96
450.00	2250.00	23.07	0.94	-57.99	5.64	-50.47	-55.24	-9.43

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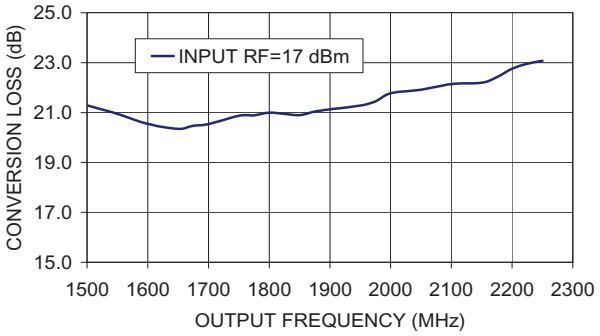
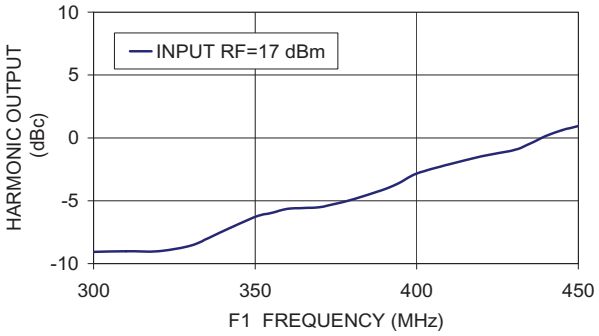
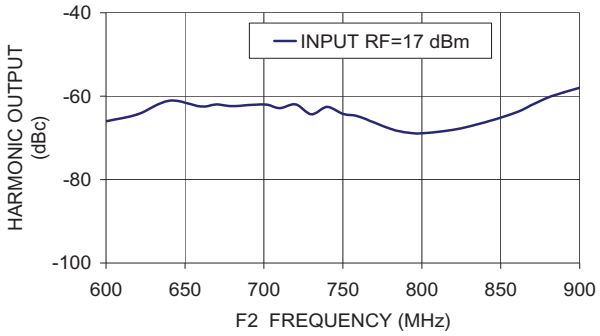
RMK-5-2251+
CONVERSION LOSS



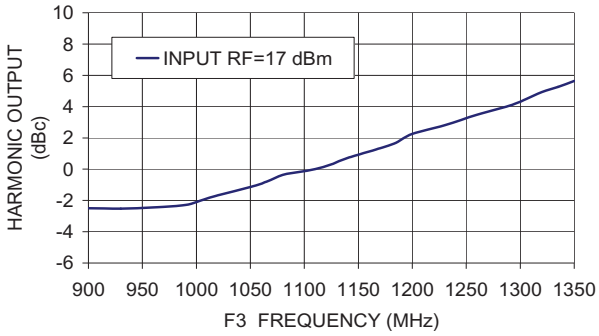
RMK-5-2251+
HARMONIC OUTPUT F1



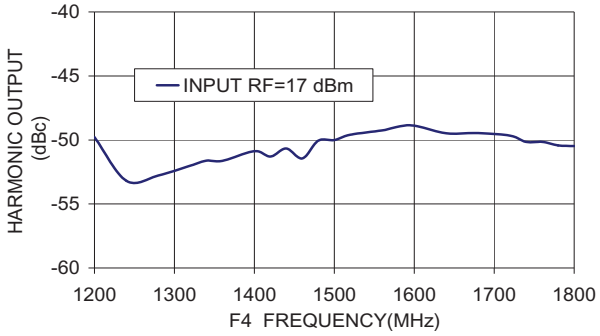
RMK-5-2251+
HARMONIC OUTPUT F2



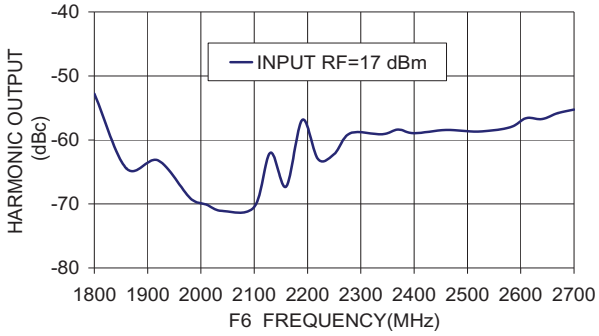
RMK-5-2251+
HARMONIC OUTPUT F3



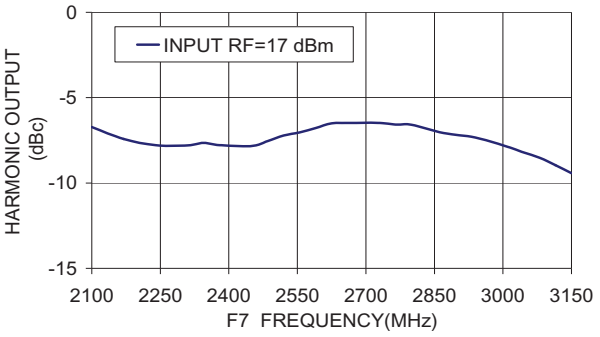
RMK-5-2251+
HARMONIC OUTPUT F4



RMK-5-2251+
HARMONIC OUTPUT F6



RMK-5-2251+
HARMONIC OUTPUT F7



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