

# X5 Frequency Multiplier

## RMK-5-13+

50Ω Output 750 to 1000 MHz

### The Big Deal

- Broadband, 750 to 1000 MHz output
- Good harmonic suppression:  
F4, 63 dBc; F6, 68 dBc
- Small size, 0.25 x 0.31 x 0.16"



CASE STYLE: TT1224

### Product Overview

i-Circuits' RMK-5-13+ frequency multiplier provides a multiplication factor of 5, converting input frequencies from 150 to 200 MHz into output frequencies from 750 to 1000 MHz, supporting applications including synthesizers, local oscillators, satellite up and down converters and more. The unit supports signal input power of +17 dBm with 21.2 dB conversion loss and very good 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.

### Key Features

Feature	Advantages
Low conversion loss, 21.2 dB	With a low conversion loss, the unit produces higher output power, reducing the need for amplification.
Very good harmonic suppression <ul style="list-style-type: none"><li>• F4, 63 dBc</li><li>• F6, 68 dBc</li></ul>	Reduces spurious signals and the need for additional filtering.
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-5-13+ saves space in crowded PCB layouts.

#### 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.  
C. The parts covered by this specification document are subject to Mini-Circuits standard limited warranty and terms and conditions (collectively, "Standard Terms"); Purchasers of this part are entitled to the rights and benefits contained therein. For a full statement of the Standard Terms and the exclusive rights and remedies thereunder, please visit Mini-Circuits' website at [www.minicircuits.com/MCLStore/terms.jsp](http://www.minicircuits.com/MCLStore/terms.jsp)



# X5 Frequency Multiplier

## RMK-5-13+

50Ω Output 750 to 1000 MHz

### Maximum Ratings

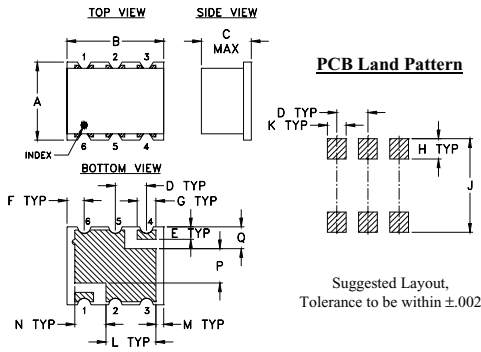
Operating Temperature	-40°C to 85°C
Storage Temperature	-55°C to 100°C
RF Input Power	21 dBm

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

### Pin Connections

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

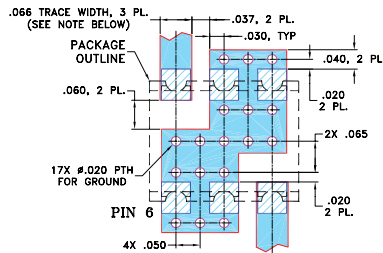
### Outline Drawing



### 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

### 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.
- C. The parts covered by this specification document are subject to Mini-Circuit's standard limited warranty and terms and conditions (collectively, "Standard Terms"); Purchasers of this part are entitled to the rights and benefits contained therein. For a full statement of the Standard Terms and the exclusive rights and remedies thereunder, please visit Mini-Circuit's website at [www.minicircuits.com/MCLStore/terms.jsp](http://www.minicircuits.com/MCLStore/terms.jsp)

### Features

- low conversion loss, 21.2 dB typ.
- excellent adjacent harmonic rejection, F4, 63 dBc typ., F6, 68 dBc typ
- aqueous washable

### Applications

- synthesizers
- local oscillators
- satellite up and down converters



Generic photo used for illustration purposes only  
CASE STYLE: TT1224

### +RoHS Compliant

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

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

### Electrical Specifications at 25°C

Parameter	Min.	Typ.	Max.	Unit
Multiplier Factor		5		
Frequency Range, Input (F1)	150	—	200	MHz
Frequency Range, Output (F3)	750	—	1000	MHz
Input Power	—	17.0	—	dBm
Conversion Loss	—	21.2	24.5	dB
Harmonic Output*				dBc
	F1	-3	2.0	
	F2	40	65	
	F3	-10	5	
	F4	40	63	
	F6	40	68	
	F7	-1	4.0	

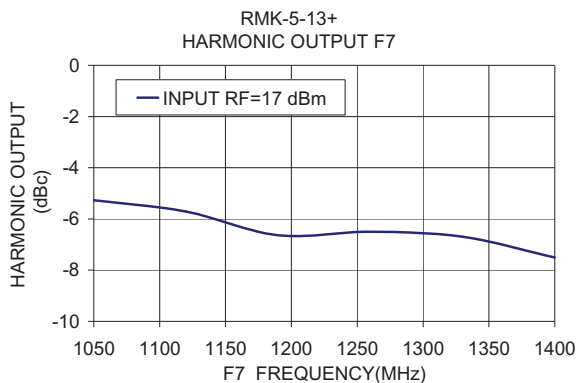
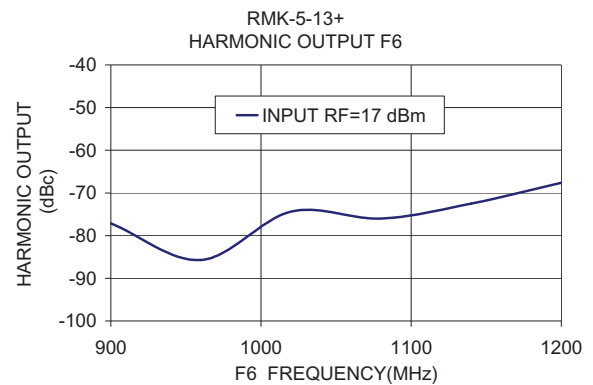
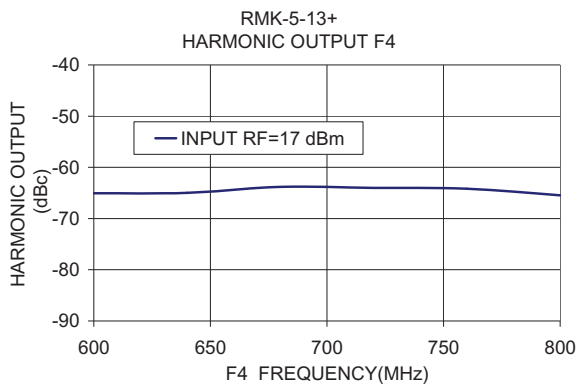
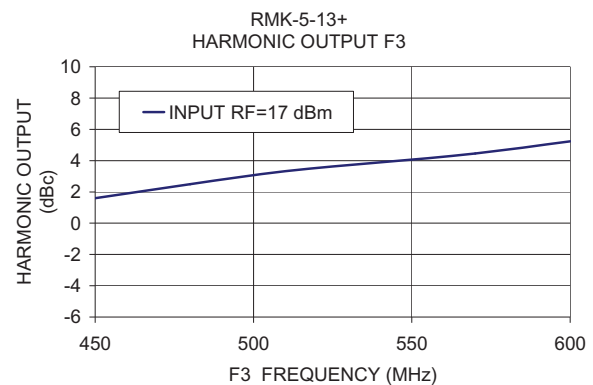
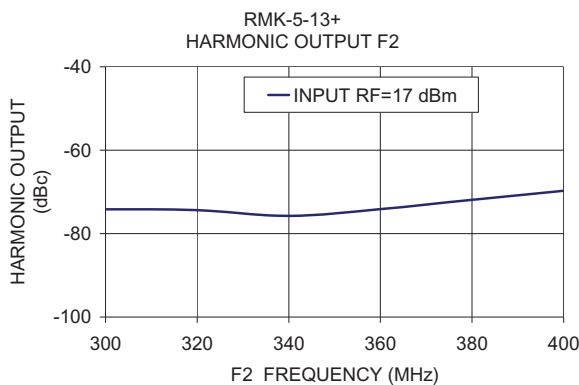
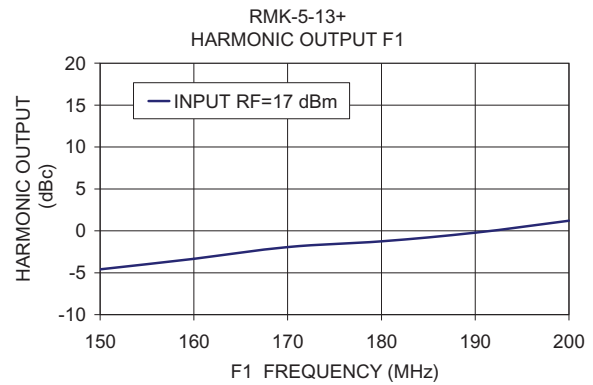
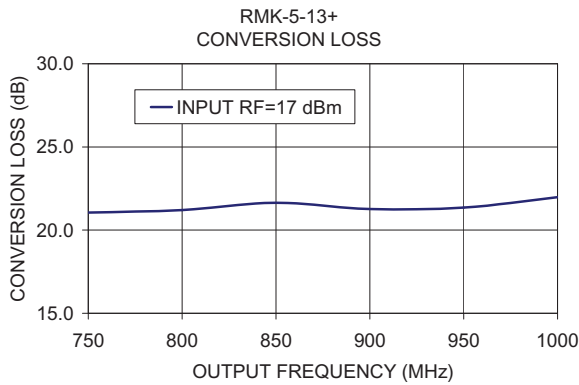
\* Harmonics of input frequency below the power level of F5

### Typical Performance Data

Frequency	Conv. Loss (dB)	Harmonic Rejection Below F5, (dBc) at RF Input Power 17 dBm						
		Input (MHz)	Output (MHz)	F5	F1	F2	F3	F4
150.00	750.00	21.06	-4.59	-74.17	1.60	-65.07	-77.10	-5.27
160.00	800.00	21.21	-3.35	-74.39	2.49	-64.97	-85.69	-5.71
170.00	850.00	21.64	-1.94	-75.77	3.32	-63.82	-74.36	-6.64
180.00	900.00	21.27	-1.26	-74.11	3.89	-64.03	-76.02	-6.50
190.00	950.00	21.35	-0.22	-71.91	4.45	-64.16	-72.50	-6.69
200.00	1000.00	21.98	1.20	-69.72	5.23	-65.48	-67.62	-7.51



# RMK-5-13+



**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.
- C. The parts covered by this specification document are subject to Mini-Circuits standard limited warranty and terms and conditions (collectively, "Standard Terms"); Purchasers of this part are entitled to the rights and benefits contained therein. For a full statement of the Standard Terms and the exclusive rights and remedies thereunder, please visit Mini-Circuits' website at [www.minicircuits.com/MCLStore/terms.jsp](http://www.minicircuits.com/MCLStore/terms.jsp)

