

# X3 Frequency Multiplier

RMK-3-31+

50Ω      Output 27 to 36 MHz

## The Big Deal

- Low conversion loss, 14 dB
- Wide input power range, +12 to +17 dBm
- Excellent harmonic suppression: F2 & F4, 60 dBc



CASE STYLE: TT1224

## Product Overview

Mini-Circuits' RMK-3-31+ frequency multiplier provides a multiplication factor of 3 converting input frequencies from 9 to 12 MHz into output frequencies from 27 to 36 MHz, supporting applications including synthesizers, local oscillators, transceiver chains, satellite up and down converters and more. It provides an input power range from +12 to +17 dBm, low conversion loss, and 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, 14 dB typ.	With a low conversion loss, RMK-3-31+ produces higher output power, reducing the need for amplification.
Excellent harmonic suppression <ul style="list-style-type: none"><li>• F2, 60 dBc</li><li>• F4, 60 dBc</li></ul>	Reduces spurious signals and the need for additional filtering.
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-3-31+ 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.  
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## Maximum Ratings

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

## Pin Connections

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

## Features

- broadband
- low conversion loss, 14 dB typ.
- high rejection F2, -60 dBc typ.; F4, -60 dBc typ.
- low cost
- aqueous washable

## Applications

- synthesizers
- local oscillators
- satellite up and down converters
- mobile radio

+RoHS Compliant

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

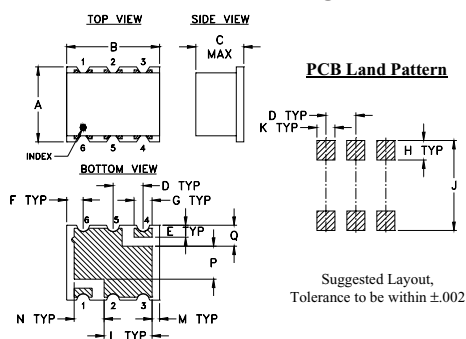
## Electrical Specifications at 25°C

Parameter	Min.	Typ.	Max.	Unit
Multiplier Factor		3		
Frequency Range, Input (F1)	9	—	12	MHz
Frequency Range, Output (F3)	27	—	36	MHz
Input Power	12	—	17	dBm
Conversion Loss	—	14	17	dB
Harmonic Output*	F1	-7	4	—
	F2	40	60	—
	F4	40	60	—

## Typical Performance Data

INPUT RF= 12 dBm					INPUT RF= 17 dBm			
Input Frequency (MHz)	Conversion Loss (dB)	Harmonic Output Below F3 (-dBc)			Conversion Loss (dB)	Harmonic Output Below F3 (-dBc)		
	F3	F1	F2	F4		F3	F1	F2
9.00	14.51	2.72	65.74	63.66	14.78	6.18	65.14	61.05
9.40	14.22	2.17	63.77	62.13	14.54	5.71	64.06	60.55
9.80	13.87	1.75	62.94	61.28	14.38	5.17	62.19	59.92
10.00	13.80	1.45	62.73	61.01	14.33	4.86	61.38	59.62
10.40	13.82	0.73	62.36	60.95	14.18	4.28	60.07	59.36
10.80	13.99	0.07	61.91	60.99	14.10	3.63	59.22	59.21
11.00	14.11	-0.54	61.57	61.02	14.04	3.33	59.05	59.32
11.40	14.27	-1.38	61.00	61.15	14.00	2.68	59.13	59.75
11.80	14.27	-1.96	60.69	61.34	14.02	2.03	59.44	60.20
12.00	14.31	-2.30	60.48	61.41	14.09	1.71	59.46	60.32

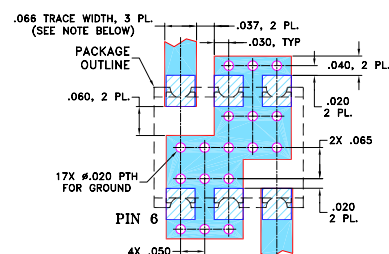
## Outline Drawing



## Outline Dimensions (inch)

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.  
3. DENOTES PCB COPPER LAYOUT WITH SMOBC (SOLDER MASK OVER BARE COPPER)  
4. DENOTES COPPER LAND PATTERN FREE OF SOLDER MASK

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