X3 Frequency Multiplier

RMK-3-312+

50Ω Output 1200 to 2100 MHz

CASE STYLE: TT1224

The Big Deal

- Wide bandwidth, 1200 to 2100 MHz output
- Wide input power range, +12 to +17 dBm
- Low conversion loss, 14 dB typ.
- Good harmonic suppression: F2, 50 dBc; F4, 53 dBc

Product Overview

Mini-Circuits' RMK-3-212+ frequency multiplier provides a multiplication factor of 3, converting input frequencies from 400 to 700 MHz into output frequencies from 1200 to 2100 MHz, supporting applications such as synthesizers, local oscillators, satellite up and down converters and more. The unit provides an input power range from +12 to +17 dBm, low conversion loss of 14 dB 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.

Feature	Advantages
Low conversion loss, 14 dB typ.	With a low conversion loss, the unit produces higher output power, reducing the need for amplification.
Very good harmonic suppression • F2, 50 dBc • F4, 53 dBc	Reduces spurious signals and the need for additional filtering.
Wide bandwidth	With an output frequency range spanning 1200 to 2100 MHz, this multiplier covers a wide range of applications.
Wide input power range, +12 to +17 dBm	Wide input power signal range accommodates different input signal levels while still maintaining 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-3-212+ saves space in crowded PCB layouts.

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RMK-3-212+

50Ω Output 1200 to 2100 MHz

CASE STYLE: TT1224
PRICE: $8.95 ea. QTY (10-49)

+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	20 dBm

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

Pin Connections

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

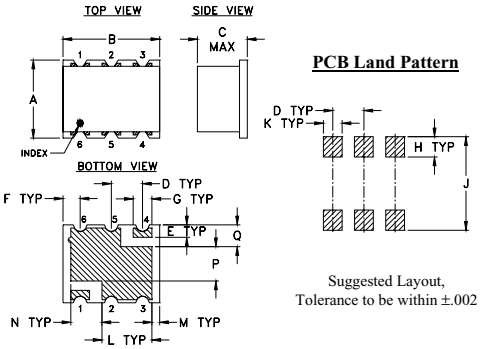
Features

- broadband
- low conversion loss, 14 dB typ.
- high rejection F2, 50 dBc typ; F4, 53 dBc typ
- low cost
- 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

Electrical Specifications at 25°C

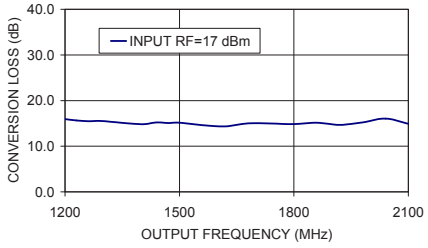
Parameter		Min.	Typ.	Max.	Unit
Multiplier Factor			3		
Frequency Range, Input (F1)		400	—	700	MHz
Frequency Range, Output (F3)		1200	—	2100	MHz
Input Power		12	—	17	dBm
Conversion Loss			14	19	dB
Harmonic Ouput*	F1	-10	-1.4	—	-dBc
	F2	33	50	—	
	F4	30	53	—	

* Harmonics of input frequency below the power level of F3

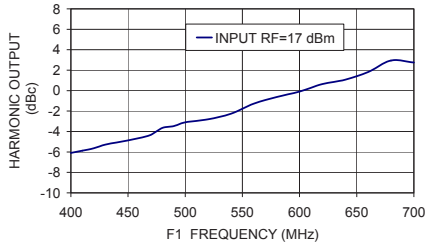
Typical Performance Data

Frequency Input (MHz)	Frequency Output (MHz)	Conv. Loss (dB) F3	Harmonic Rejection Below F3, (dBc) at RF Input Power 17 dBm F1	F2	F4
400.00	1200.00	15.96	-6.10	-54.79	-54.66
420.00	1260.00	15.48	-5.64	-65.42	-56.75
450.00	1350.00	15.10	-4.87	-58.81	-57.48
500.00	1500.00	15.14	-3.10	-56.70	-60.08
540.00	1620.00	14.36	-2.26	-55.71	-59.08
600.00	1800.00	14.85	-0.09	-53.88	-55.14
620.00	1860.00	15.16	0.64	-52.35	-55.34
640.00	1920.00	14.68	1.07	-53.47	-53.53
660.00	1980.00	15.22	1.82	-53.78	-51.42
700.00	2100.00	14.91	2.75	-53.19	-50.71

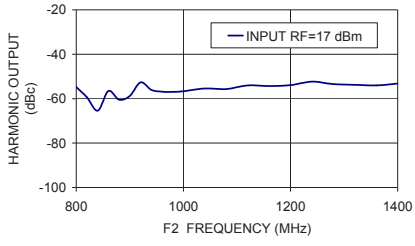
RMK-3-212+
CONVERSION LOSS



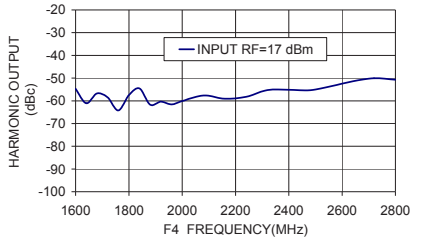
RMK-3-212+
HARMONIC OUTPUT F1



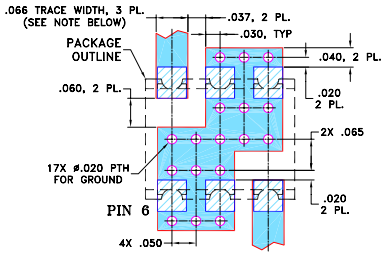
RMK-3-212+
HARMONIC OUTPUT F2



RMK-3-212+
HARMONIC OUTPUT F4



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.
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