X2 Frequency Multiplier ZXF90-2-24-K+

50Ω Output 12 to 20 GHz

The Big Deal

- Ultra-wideband, output from 12 to 20 GHz
- Wide input power range, +16 to +22 dBm
- Low conversion loss, 17 dB
- Good fundamental and harmonic suppression: F1, 35 dBc; F3, 38 dBc
- Patented, Reflectionless Filters on Input and Output absorb and terminate out-of-band signals internally.
- Reduced need for external attenuator pads that increase overall conversion loss.

CASE STYLE: UU2776

Product Overview

Mini-Circuits' ZXF90-2-24-K+ is an ultra-wideband frequency doubler, converting input frequencies from 6 to 10 GHz into output frequencies from 12 to 20 GHz. Its wide output range makes this model ideal for a wide range of broadband systems including satellite up and down converters, defense radar and communications and more. The multiplier comes housed in a rugged, 2.92mm connectorized housing (0.68 x 0.73 x 0.36"), saving space in crowded layouts.

Key Features

Feature	Advantages
Broadband, 12 to 20 GHz output	With an output frequency range spanning 12 to 20 GHz, this multiplier supports broadband applications such as defense and instrumentation as well as a wide range of narrowband system requirements.
Low conversion loss, 17 dB typ.	With a low conversion loss, ZXF90-2-24-K+ produces higher output power, reducing the need for amplification.
Excellent fundamental and harmonic suppression: • F1, 35 dBc • F3, 38 dBc • F4, 20 dBc	Reduces spurious signals and the need for additional filtering.
Wide input power range, +16 to +22 dBm	Wide input power signal range accommodates different input signal levels while still maintaining a low conversion loss.
2.92mm-F connectorized housing	Ideal for assembled systems and lab use. High frequency connector mates with 2.92mm and SMA connectors.
Small size, 0.68 x 0.73 x 0.36"	Saves space in crowded layouts.

X2 Frequency Multiplier

ZXF90-2-24-K+

50Ω Output 12 to 20 GHz

Generic photo used for illustration purposes only

CASE STYLE: UU2776

Connectors	Model
2.92 mm Female	ZXF90-2-24-K+

+RoHS Compliant

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

Maximum Ratings

Operating Temperature	-55°C to 100°C
Storage Temperature	-55°C to 100°C
RF Input Power, 25°C	24 dBm

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

Coaxial Connections

INPUT	1
OUTPUT	2

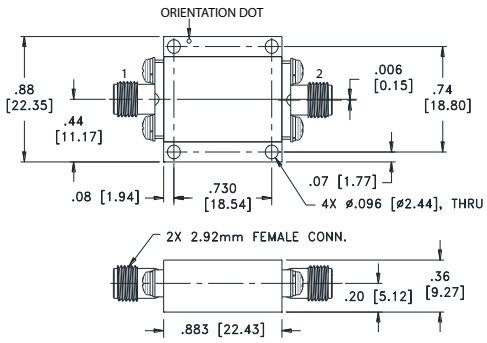
Features

- broadband
- low conversion loss, 17 dB typ.
- excellent harmonics suppression F1, 35 dBc typ F3 38 dBc typ.
- rugged construction

Applications

- synthesizers
- local oscillators
- sattelite up and down converters
- defense radar and communications
- mobile
- fixed microwave

Outline Drawing



Weight: 35 grams

Dimensions are in inches [mm]

Electrical Specifications

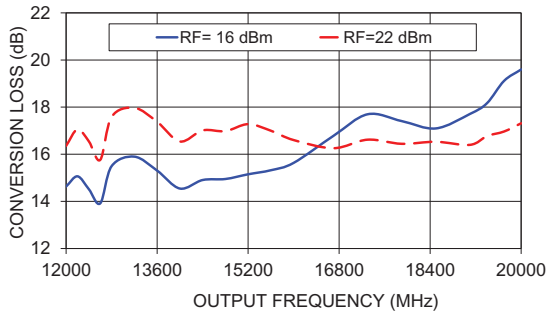
Parameter		Min.	Typ.	Max.	Unit
Multiplier Factor			2		
Frequency Range, Input (F1)		6	—	10	GHz
Frequency Range, Output (F2)		12	—	20	GHz
Input Power		16	—	22	dBm
Conversion Loss		—	17	23	dB
Harmonic Ouput*, dBc	F1	—	35	—	dBc
	F3	—	38	—	
	F4	—	20	—	

* Harmonics of input frequency below the power level of F2

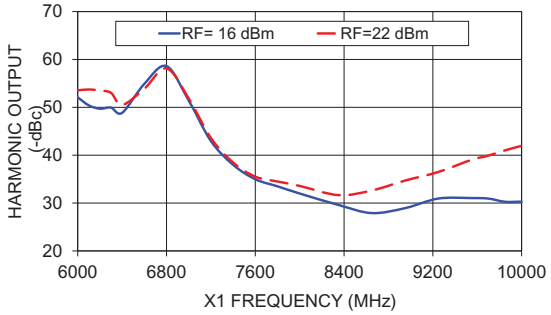
Typical Performance Data

	INPUT RF= 16 dBm				INPUT RF= 22 dBm			
Input Frequency (GHz)	Conversion Loss (dB)	Harmonic Output Below F2 (-dBc)			Conversion Loss (dB)	Harmonic Output Below F2 (-dBc)		
		F1	F3	F4		F1	F3	F4
6000	14.63	52.09	44.64	14.42	16.36	53.55	32.26	18.92
6100	15.06	50.41	45.40	13.70	17.06	53.72	33.30	17.78
6200	14.52	49.71	47.10	13.52	16.55	53.51	36.81	17.42
6300	13.92	49.95	48.41	14.33	15.76	53.03	41.45	18.08
6400	15.50	48.84	43.56	13.05	17.59	50.49	39.38	16.07
6600	15.90	54.89	40.37	13.16	17.97	53.86	44.37	15.39
6800	15.31	58.61	43.88	14.83	17.38	58.14	38.80	15.88
7000	14.55	51.43	40.41	16.41	16.54	51.87	36.41	17.32
7200	14.91	42.97	39.05	17.25	17.01	43.61	34.75	17.68
7400	14.95	38.00	39.11	17.95	16.98	38.48	34.54	18.21
7600	15.15	34.98	39.45	18.53	17.28	35.52	33.88	18.52
7800	15.32	33.50	40.59	21.02	17.00	34.50	33.47	20.74
8000	15.63	31.99	40.57	23.82	16.60	33.58	32.26	23.50
8350	16.78	29.60	39.96	26.59	16.26	31.65	31.67	27.28
8650	17.70	27.90	52.20	33.24	16.62	32.63	34.12	31.66
8950	17.41	28.94	39.66	37.11	16.44	34.69	40.76	34.31
9250	17.10	30.94	34.94	27.55	16.53	36.50	36.28	26.01
9550	17.71	31.04	37.38	30.11	16.40	39.04	39.76	26.92
9700	18.17	30.93	37.44	31.58	16.77	39.90	40.72	26.60
9850	19.12	30.27	37.10	33.47	16.97	41.00	41.88	26.66
10000	19.60	30.29	34.23	34.23	17.31	41.96	42.43	26.22

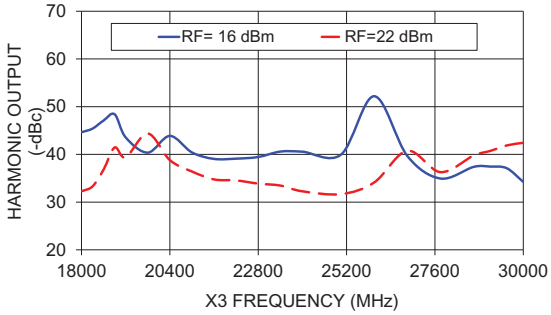
ZXF90-2-24-K+
CONVERSION LOSS



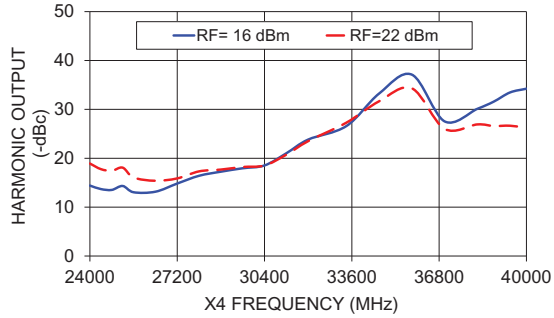
ZXF90-2-24-K+
HARMONIC OUTPUT X1



ZXF90-2-24-K+
HARMONIC OUTPUT X3



ZXF90-2-24-K+
HARMONIC OUTPUT X4



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

Frequency Multiplier (Doubler) ZXF90-2-24-K+

Typical Performance Data

Frequency (MHz)				RF IN = 16dBm			
				Conversion Loss (dB)	Harmonic Output* (-dBc)		
X1 Output	X2 Output	X3 Output	X4 Output	X2 Output	X1 Output	X3 Output	X4 Output
5800	11600	17400	23200	14.31	53.44	41.01	15.67
5850	11700	17550	23400	14.39	53.22	41.71	15.17
5900	11800	17700	23600	13.93	53.42	42.80	15.82
5950	11900	17850	23800	14.55	52.07	42.67	15.59
6000	12000	18000	24000	14.63	52.09	44.64	14.42
6100	12200	18300	24400	15.06	50.41	45.40	13.70
6200	12400	18600	24800	14.52	49.71	47.10	13.52
6300	12600	18900	25200	13.92	49.95	48.41	14.33
6400	12800	19200	25600	15.50	48.84	43.56	13.05
6500	13000	19500	26000	15.98	50.29	40.03	12.79
6600	13200	19800	26400	15.90	54.89	40.37	13.16
6700	13400	20100	26800	15.85	57.38	46.45	14.26
6800	13600	20400	27200	15.31	58.61	43.88	14.83
6900	13800	20700	27600	15.20	56.12	41.26	15.22
7000	14000	21000	28000	14.55	51.43	40.41	16.41
7100	14200	21300	28400	14.74	46.69	39.51	16.70
7200	14400	21600	28800	14.91	42.97	39.05	17.25
7300	14600	21900	29200	15.14	39.85	38.49	17.38
7400	14800	22200	29600	14.95	38.00	39.11	17.95
7500	15000	22500	30000	15.46	35.83	39.00	17.82
7600	15200	22800	30400	15.15	34.98	39.45	18.53
7700	15400	23100	30800	15.63	33.75	39.92	19.18
7800	15600	23400	31200	15.32	33.50	40.59	21.02
7900	15800	23700	31600	15.38	32.75	40.73	22.45
8000	16000	24000	32000	15.63	31.99	40.57	23.82
8200	16400	24600	32800	16.53	30.22	38.89	25.20
8350	16700	25050	33400	16.78	29.60	39.96	26.59
8500	17000	25500	34000	16.99	28.96	43.59	29.48
8650	17300	25950	34600	17.70	27.90	52.20	33.24
8800	17600	26400	35200	17.46	28.40	48.17	36.81
8950	17900	26850	35800	17.41	28.94	39.66	37.11
9100	18200	27300	36400	17.45	29.83	35.24	31.07
9250	18500	27750	37000	17.10	30.94	34.94	27.55
9400	18800	28200	37600	17.13	31.39	36.93	28.59
9550	19100	28650	38200	17.71	31.04	37.38	30.11
9700	19400	29100	38800	18.17	30.93	37.44	31.58
9850	19700	29550	39400	19.12	30.27	37.10	33.47
10000	20000	30000	40000	19.60	30.29	36.56	34.23
10100	20200	30300	40400	19.97	30.17	36.68	34.99
10200	20400	30600	40800	20.38	29.84	36.58	35.32

*Harmonic Output below power level of X2 Output .

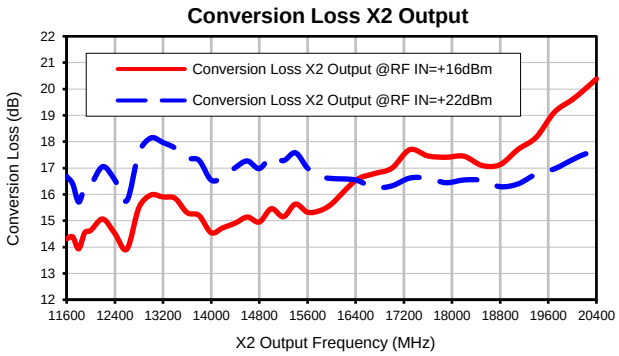
Typical Performance Data

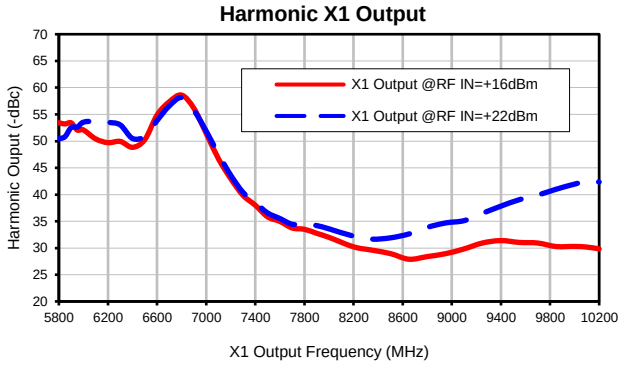
Frequency (MHz)				RF IN = 22dBm			
				Conversion Loss (dB)	Harmonic Output* (-dBc)		
X1 Output	X2 Output	X3 Output	X4 Output	X2 Output	X1 Output	X3 Output	X4 Output
5800	11600	17400	23200	16.68	50.43	30.21	20.46
5850	11700	17550	23400	16.40	50.84	30.25	19.96
5900	11800	17700	23600	15.71	52.54	32.23	20.55
5950	11900	17850	23800	16.28	52.63	33.26	20.22
6000	12000	18000	24000	16.36	53.55	32.26	18.92
6100	12200	18300	24400	17.06	53.72	33.30	17.78
6200	12400	18600	24800	16.55	53.51	36.81	17.42
6300	12600	18900	25200	15.76	53.03	41.45	18.08
6400	12800	19200	25600	17.59	50.49	39.38	16.07
6500	13000	19500	26000	18.14	50.94	39.17	15.40
6600	13200	19800	26400	17.97	53.86	44.37	15.39
6700	13400	20100	26800	17.76	56.61	45.59	15.88
6800	13600	20400	27200	17.38	58.14	38.80	15.88
6900	13800	20700	27600	17.29	55.73	36.60	16.09
7000	14000	21000	28000	16.54	51.87	36.41	17.32
7100	14200	21300	28400	16.66	47.52	35.44	17.47
7200	14400	21600	28800	17.01	43.61	34.75	17.68
7300	14600	21900	29200	17.27	40.40	34.40	17.70
7400	14800	22200	29600	16.98	38.48	34.54	18.21
7500	15000	22500	30000	17.43	36.56	33.94	18.04
7600	15200	22800	30400	17.28	35.52	33.88	18.52
7700	15400	23100	30800	17.58	34.44	33.40	18.98
7800	15600	23400	31200	17.00	34.50	33.47	20.74
7900	15800	23700	31600	16.68	34.20	33.35	22.11
8000	16000	24000	32000	16.60	33.58	32.26	23.50
8200	16400	24600	32800	16.55	32.21	31.32	26.07
8350	16700	25050	33400	16.26	31.65	31.67	27.28
8500	17000	25500	34000	16.32	31.91	32.88	28.84
8650	17300	25950	34600	16.62	32.63	34.12	31.66
8800	17600	26400	35200	16.61	33.86	37.62	35.15
8950	17900	26850	35800	16.44	34.69	40.76	34.31
9100	18200	27300	36400	16.55	35.12	36.43	28.48
9250	18500	27750	37000	16.53	36.50	36.28	26.01
9400	18800	28200	37600	16.29	37.83	38.24	26.58
9550	19100	28650	38200	16.40	39.04	39.76	26.92
9700	19400	29100	38800	16.77	39.90	40.72	26.60
9850	19700	29550	39400	16.97	41.00	41.88	26.66
10000	20000	30000	40000	17.31	41.96	42.43	26.22
10100	20200	30300	40400	17.52	42.47	43.33	25.86
10200	20400	30600	40800	17.67	42.35	43.84	25.18

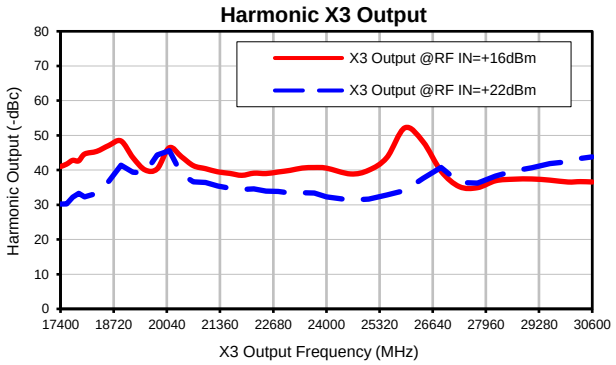
*Harmonic Output below power level of X2 Output .

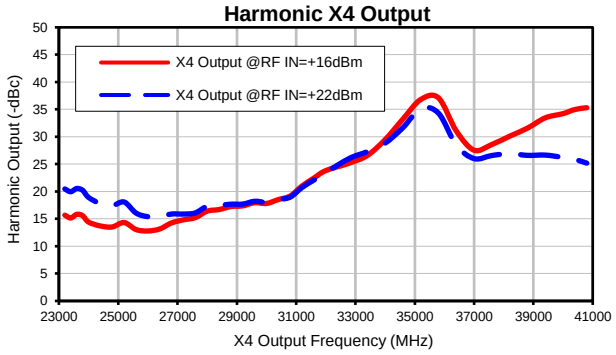
Frequency Multiplier (Doubler) ZXF90-2-24-K+

Typical Performance Curves





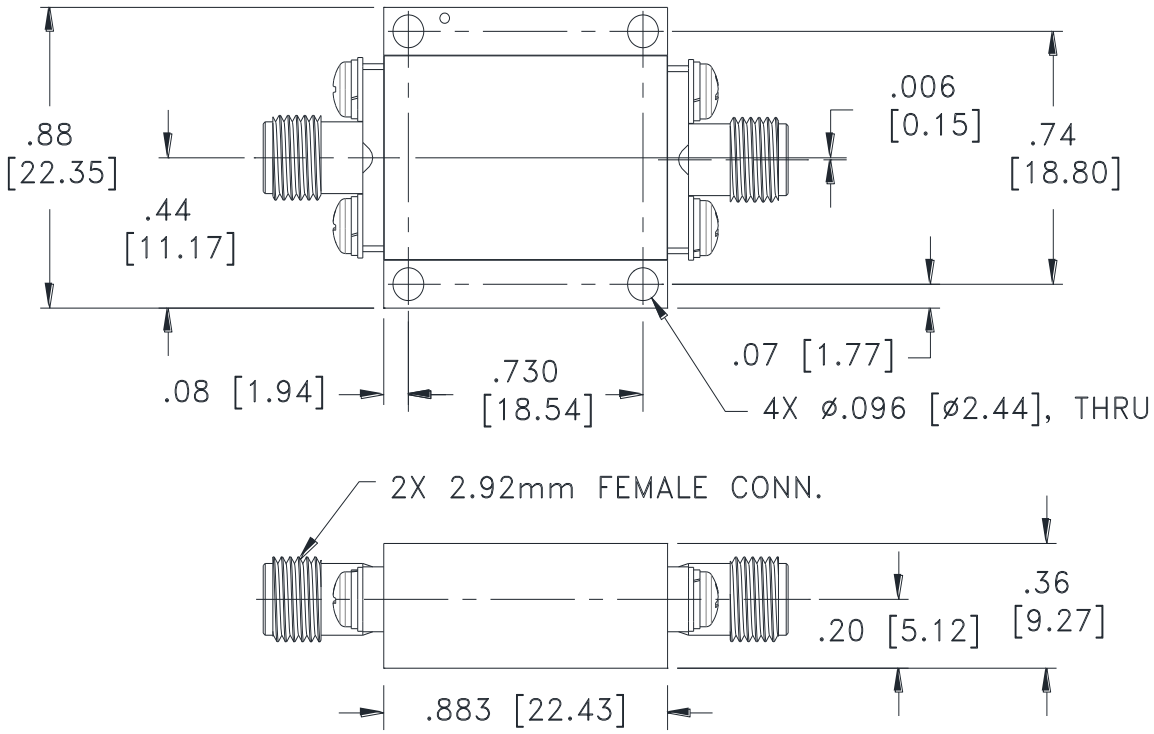




Case Style UU

Outline Dimensions

UU2776



Dimensions are in inches (mm). Tolerances: 2 Pl. ± .03; 3 Pl. ± .015

Notes:

1. Case material: Brass alloy 360.
2. Case finish: Gold Plating.
3. Weight: 35 grams.

Mini-Circuits

Environmental Specifications ENV97

All Mini-Circuits products are manufactured under exacting quality assurance and control standards, and are capable of meeting published specifications after being subjected to any or all of the following physical and environmental test.

Specification	Test/Inspection Condition	Reference/Spec
Operating Temperature	-55° to 100°C Ambient Environment	Individual Model Data Sheet
Storage Temperature	-55° to 100° C Ambient Environment	Individual Model Data Sheet
Thermal Shock	-55° to 85°C, 25 cycles	MIL-STD-202F: Method 107G