

X3 Frequency Multiplier

ZX90-3-452+

50Ω Output 3000 to 4500 MHz

Maximum Ratings

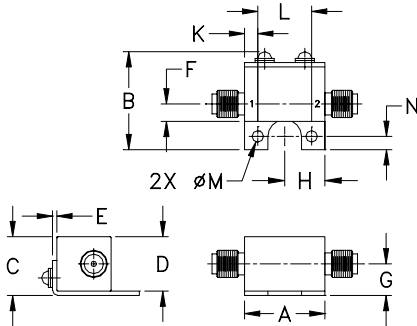
Operating Temperature	-40°C to 85°C
Storage Temperature	-55°C to 100°C
RF Input Power	20 dBm

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

Coaxial Connections

INPUT	1
OUTPUT	2

Outline Drawing



Outline Dimensions (inch/mm)

A	B	C	D	E	F	G
.74	.90	.54	.50	.04	.16	.29
18.80	22.86	13.72	12.70	1.02	4.06	7.37
H	J	K	L	M	N	wt
.37	--	.122	.496	.106	.122	grams
9.40	--	3.10	12.60	2.69	3.10	19.0

Features

- broadband
- low conversion loss, 14.7 dB typ.
- high rejection F2, and F4, 55 dBc typ.
- rugged construction
- protected by US Patent 6,790,049

Applications

- synthesizers
- local oscillators
- satellite up and down converters

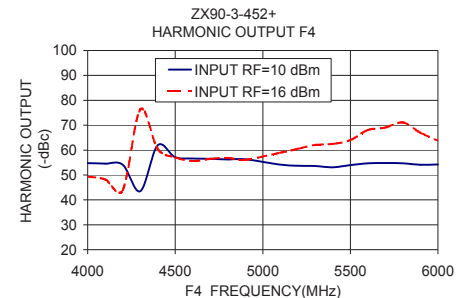
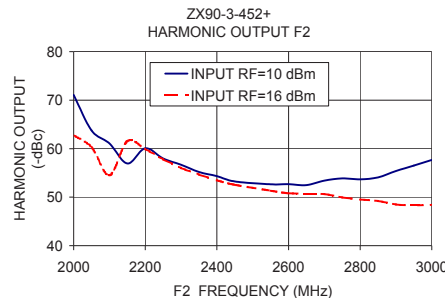
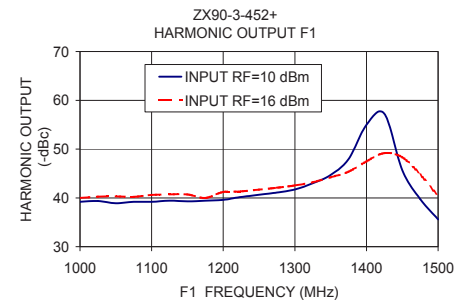
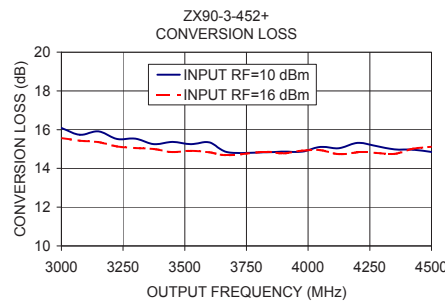
Electrical Specifications

MULTIPLICATION FACTOR	FREQUENCY (MHz)		INPUT POWER (dBm)		CONVERSION LOSS (dB)		*HARMONIC OUTPUT (dBc)					
	F1 Input	F3 Output	Min.	Max.	Typ.	Max.	F1		F2		F4	
3	1000-1500	3000-4500	10	16	14.7	18	Typ.	Min.	Typ.	Min.	Typ.	Min.
							40	30	55	40	55	38

* Harmonics of input frequency below the power level of F3

Typical Performance Data

Input Frequency (MHz)	INPUT RF= 10 dBm				INPUT RF= 16 dBm			
	Conversion Loss (dB)	Harmonic Output Below F3 (-dBc)			Conversion Loss (dB)	Harmonic Output Below F3 (-dBc)		
	F3	F1	F2	F4	F3	F1	F2	F4
1000.00	16.09	39.18	71.08	54.75	15.57	39.98	62.79	49.36
1025.00	15.74	39.36	63.74	54.58	15.43	40.24	60.28	48.18
1050.00	15.91	38.91	61.07	54.12	15.36	40.31	54.49	43.90
1075.00	15.52	39.21	56.95	43.52	15.13	40.21	61.52	76.34
1100.00	15.54	39.19	60.08	61.88	15.05	40.61	59.92	60.50
1125.00	15.25	39.42	57.98	57.14	15.00	40.70	57.79	57.04
1150.00	15.37	39.29	56.69	56.62	14.84	40.70	56.02	55.62
1175.00	15.25	39.44	55.21	56.51	14.91	39.98	54.67	56.48
1200.00	15.34	39.58	54.32	56.21	14.83	41.21	53.48	56.88
1225.00	14.83	40.17	53.25	56.33	14.68	41.32	52.55	56.09
1275.00	14.83	41.09	52.64	54.19	14.86	42.10	51.32	58.97
1300.00	14.87	41.74	52.70	53.70	14.77	42.53	50.80	60.50
1325.00	14.87	43.01	52.48	53.61	14.92	43.20	50.72	62.07
1350.00	15.11	44.72	53.42	53.10	14.94	44.23	50.64	62.45
1375.00	15.04	47.96	53.88	53.98	14.73	45.38	49.94	64.00
1400.00	15.32	54.99	53.67	54.67	14.82	47.46	49.50	68.05
1425.00	15.16	57.22	54.08	54.80	14.80	49.18	49.21	69.05
1450.00	14.98	45.68	55.39	54.67	14.75	48.33	48.48	71.09
1475.00	14.97	39.76	56.52	54.08	15.02	44.77	48.34	66.99
1500.00	14.85	35.58	57.67	54.23	15.12	40.35	48.41	63.76



Notes

- 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.
- Electrical specifications and performance data contained in this specification document are based on Mini-Circuit's applicable established test performance criteria and measurement instructions.
- 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



CASE STYLE: JA1242

Connectors	Model
SMA	ZX90-3-452-S+

+RoHS Compliant

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

Frequency Multiplier (Tripler)

ZX90-3-452+

Typical Performance Data

FREQUENCY (MHz)				RF IN=+10dBm			
				CONVERSION LOSS (dB)	HARMONIC OUTPUT*		
					X 3 OUTPUT	X 1 OUTPUT	X 2 OUTPUT
X 1 OUTPUT	X 2 OUTPUT	X 3 OUTPUT	X 4 OUTPUT				
900	1800	2700	3600	17.00	39.22	57.48	47.45
925	1850	2775	3700	16.62	39.33	63.87	47.30
950	1900	2850	3800	16.66	39.15	74.55	50.41
975	1950	2925	3900	16.13	39.32	71.01	55.40
1000	2000	3000	4000	16.09	39.18	71.08	54.75
1025	2050	3075	4100	15.74	39.36	63.74	54.58
1050	2100	3150	4200	15.91	38.91	61.07	54.12
1075	2150	3225	4300	15.52	39.21	56.95	43.52
1100	2200	3300	4400	15.54	39.19	60.08	61.88
1125	2250	3375	4500	15.25	39.42	57.98	57.14
1150	2300	3450	4600	15.37	39.29	56.69	56.62
1175	2350	3525	4700	15.25	39.44	55.21	56.51
1200	2400	3600	4800	15.34	39.58	54.32	56.21
1225	2450	3675	4900	14.83	40.17	53.25	56.33
1250	2500	3750	5000	14.97	40.35	52.83	54.78
1275	2550	3825	5100	14.83	41.09	52.64	54.19
1300	2600	3900	5200	14.87	41.74	52.70	53.70
1325	2650	3975	5300	14.87	43.01	52.48	53.61
1350	2700	4050	5400	15.11	44.72	53.42	53.10
1375	2750	4125	5500	15.04	47.96	53.88	53.98
1400	2800	4200	5600	15.32	54.99	53.67	54.67
1425	2850	4275	5700	15.16	57.22	54.08	54.80
1450	2900	4350	5800	14.98	45.68	55.39	54.67
1475	2950	4425	5900	14.97	39.76	56.52	54.08
1500	3000	4500	6000	14.85	35.58	57.67	54.23
1525	3050	4575	6100	14.98	31.85	58.73	54.44
1550	3100	4650	6200	15.50	27.99	63.26	53.81
1575	3150	4725	6300	15.64	24.83	70.78	53.40
1600	3200	4800	6400	15.93	21.48	66.73	52.38

*Harmonic Output below power level of X 3 Output .



Frequency Multiplier (Tripler)

ZX90-3-452+

Typical Performance Data

FREQUENCY (MHz)				RF IN=+13dBm			
				CONVERSION LOSS (dB)	HARMONIC OUTPUT*		
					X 3 OUTPUT	X 1 OUTPUT	X 2 OUTPUT
X 1 OUTPUT	X 2 OUTPUT	X 3 OUTPUT	X 4 OUTPUT				
900	1800	2700	3600	16.24	40.44	54.19	45.88
925	1850	2775	3700	15.81	40.59	67.85	50.11
950	1900	2850	3800	15.39	40.68	63.25	47.64
975	1950	2925	3900	15.28	40.83	66.53	52.33
1000	2000	3000	4000	15.10	40.82	65.91	51.88
1025	2050	3075	4100	14.79	40.99	61.73	50.66
1050	2100	3150	4200	14.84	41.00	54.68	43.86
1075	2150	3225	4300	14.63	41.01	60.55	76.38
1100	2200	3300	4400	14.40	41.25	59.57	58.79
1125	2250	3375	4500	14.50	41.19	57.66	56.36
1150	2300	3450	4600	14.41	41.27	56.22	56.09
1175	2350	3525	4700	14.29	41.43	55.00	56.56
1200	2400	3600	4800	14.40	41.62	53.91	57.22
1225	2450	3675	4900	14.29	41.90	53.23	56.94
1250	2500	3750	5000	14.34	42.14	52.48	57.08
1275	2550	3825	5100	14.56	42.54	51.89	56.89
1300	2600	3900	5200	14.39	43.35	51.78	57.12
1325	2650	3975	5300	14.41	44.26	51.47	57.91
1350	2700	4050	5400	14.63	45.72	50.82	58.91
1375	2750	4125	5500	14.40	47.98	50.92	59.41
1400	2800	4200	5600	14.49	51.59	51.15	59.95
1425	2850	4275	5700	14.67	54.29	51.39	59.88
1450	2900	4350	5800	14.47	48.34	50.97	60.29
1475	2950	4425	5900	14.72	42.59	51.68	58.19
1500	3000	4500	6000	15.03	37.75	52.47	57.05
1525	3050	4575	6100	14.78	34.35	51.76	56.68
1550	3100	4650	6200	15.18	30.74	51.18	57.37
1575	3150	4725	6300	15.27	27.43	52.06	56.98
1600	3200	4800	6400	15.19	24.48	53.32	55.21

*Harmonic Output below power level of X 3 Output .



Frequency Multiplier (Tripler)

ZX90-3-452+

Typical Performance Data

FREQUENCY (MHz)				RF IN=+16dBm			
				CONVERSION LOSS (dB)	HARMONIC OUTPUT*		
					X 3 OUTPUT	X 1 OUTPUT	X 2 OUTPUT
X 1 OUTPUT	X 2 OUTPUT	X 3 OUTPUT	X 4 OUTPUT				
900	1800	2700	3600	17.12	39.15	52.10	46.22
925	1850	2775	3700	16.51	39.38	61.04	48.02
950	1900	2850	3800	16.11	39.74	60.54	46.27
975	1950	2925	3900	15.87	39.99	65.84	51.85
1000	2000	3000	4000	15.57	39.98	62.79	49.36
1025	2050	3075	4100	15.43	40.24	60.28	48.18
1050	2100	3150	4200	15.36	40.31	54.49	43.90
1075	2150	3225	4300	15.13	40.21	61.52	76.34
1100	2200	3300	4400	15.05	40.61	59.92	60.50
1125	2250	3375	4500	15.00	40.70	57.79	57.04
1150	2300	3450	4600	14.84	40.70	56.02	55.62
1175	2350	3525	4700	14.91	40.93	54.67	56.48
1200	2400	3600	4800	14.83	41.21	53.48	56.88
1225	2450	3675	4900	14.68	41.32	52.55	56.09
1250	2500	3750	5000	14.83	41.62	52.03	57.51
1275	2550	3825	5100	14.86	42.10	51.32	58.97
1300	2600	3900	5200	14.77	42.53	50.80	60.50
1325	2650	3975	5300	14.92	43.20	50.72	62.07
1350	2700	4050	5400	14.94	44.23	50.64	62.45
1375	2750	4125	5500	14.73	45.38	49.94	64.00
1400	2800	4200	5600	14.82	47.46	49.50	68.05
1425	2850	4275	5700	14.80	49.18	49.21	69.05
1450	2900	4350	5800	14.75	48.33	48.48	71.09
1475	2950	4425	5900	15.02	44.77	48.34	66.99
1500	3000	4500	6000	15.12	40.35	48.41	63.78
1525	3050	4575	6100	15.31	36.45	48.32	61.52
1550	3100	4650	6200	15.72	32.75	47.83	60.29
1575	3150	4725	6300	15.58	29.55	47.85	59.26
1600	3200	4800	6400	15.68	26.39	48.22	58.06

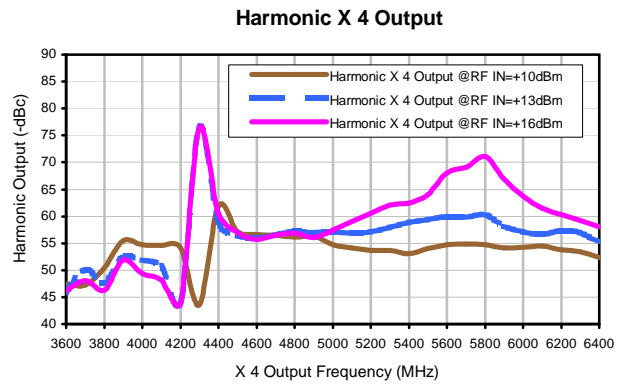
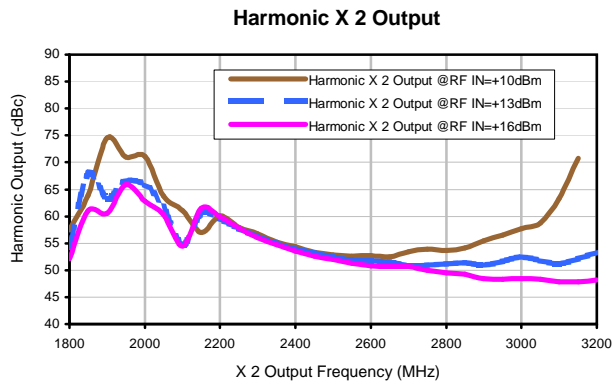
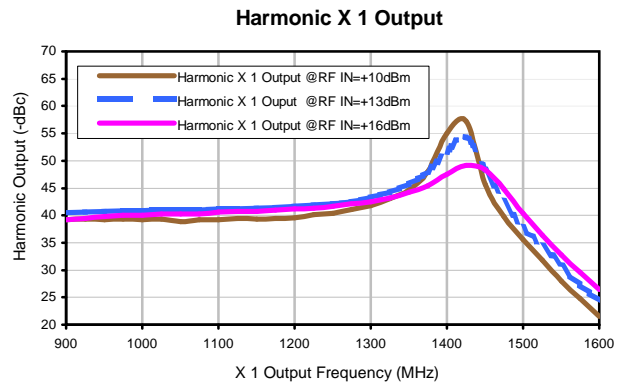
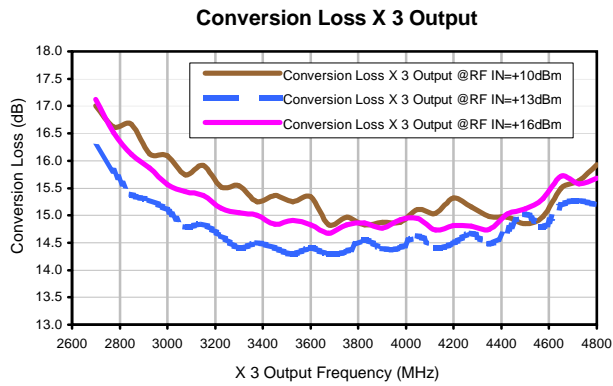
*Harmonic Output below power level of X 3 Output .



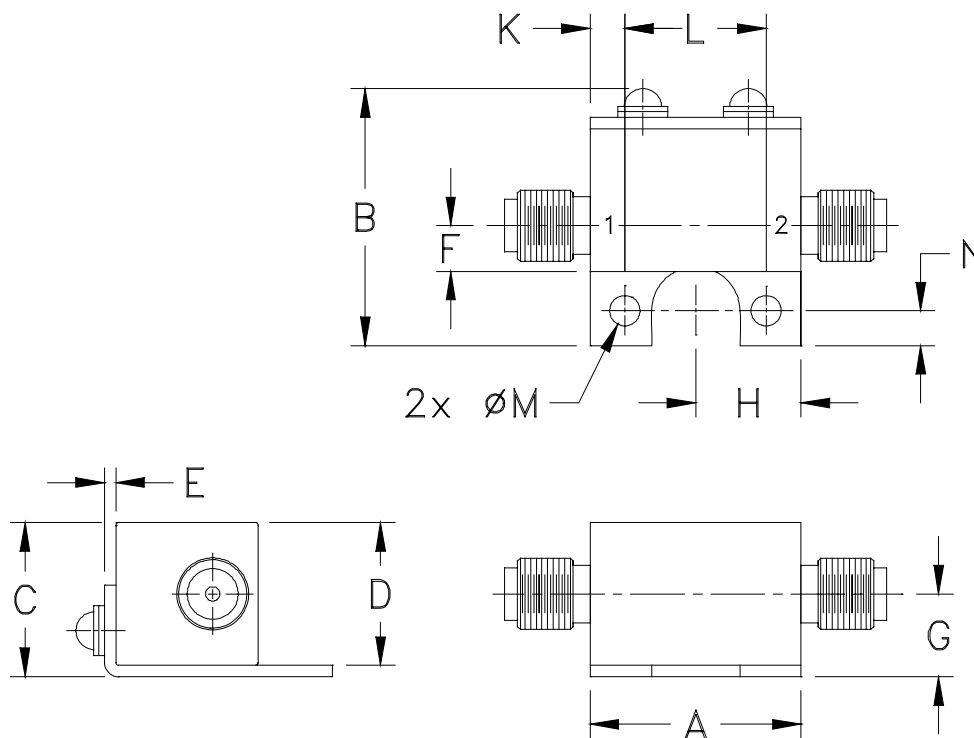
Frequency Multiplier (Tripler)

ZX90-3-452+

Typical Performance Curves



Outline Dimensions



CASE #.	A	B	C	D	E	F	G	H	J	K	L	M	N	WT, GRAM
JA1242	.74 (18.80)	.90 (22.86)	.54 (13.72)	.50 (12.70)	.04 (1.02)	.16 (4.06)	.29 (7.37)	.37 (9.40)	- -	.122 (3.10)	.496 (12.60)	.106 (2.69)	.122 (3.10)	19.0

**Dimensions are in inches (mm). Tolerances: 2Pl. $\pm .03$; 3Pl. $\pm .015$.
Tolerance on hole size and interaxes dimensions to be $\pm .005$.**

Notes:

1. Case material: Brass.
2. Case finish: Nickel plate.

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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	-40° to 85°C	Individual Model Data Sheet
Storage Temperature	-55° to 100° C Ambient Environment	Individual Model Data Sheet
Barometric Pressure	100,000 Feet	MIL-STD-202, Method 105, Condition D
Humidity	90% RH, 65°C Units may require bake-out after humidity to restore full performance.	MIL-STD-202, Method 103
Thermal Shock	-65° to 125°C, 5 cycles	MIL-STD-202, Method 107, Condition B
Vibration (High Frequency)	20g peak, 10-2000 Hz, 12 times in each of three perpendicular directions (total 36)	MIL-STD-202, Method 204, Condition D
Mechanical Shock	100g, 6ms sawtooth, 3 shocks each direction 3 axes (total 18)	MIL-STD-202, Method 213, Condition I