

X2 Frequency Multiplier

50Ω Output 10 to 20 GHz

ZX90-2-24-S+



Generic photo used for illustration purposes only

CASE STYLE: JA1242

Connectors	Model
SMA	ZX90-2-24-S+

+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, 25°C	20 dBm

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

Coaxial Connections

INPUT	2
OUTPUT	1

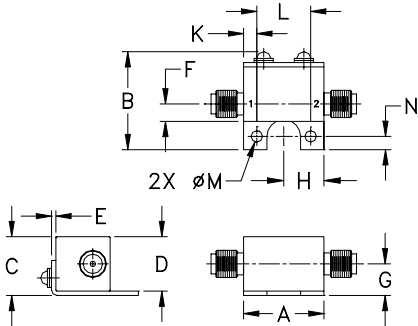
Features

- broadband
- low conversion loss, 12 dB typ.
- rugged construction
- protected by US Patent 6,790,049

Applications

- synthesizers
- local oscillators

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

Electrical Specifications

Parameter	Min.	Typ.	Max.	Unit
Multiplier Factor		2		
Frequency Range, Input (F1)		5 - 10		GHz
Frequency Range, Output (F2)		10 - 20		GHz
Input Power	11	—	16	dBm
Conversion Loss	—	12	19.5	dB
Harmonic Output*, dBc	F1	30	—	dBc
	F3	30	—	
	F4	30	—	

* Harmonics of input frequency below the power level of F2

Typical Performance Data

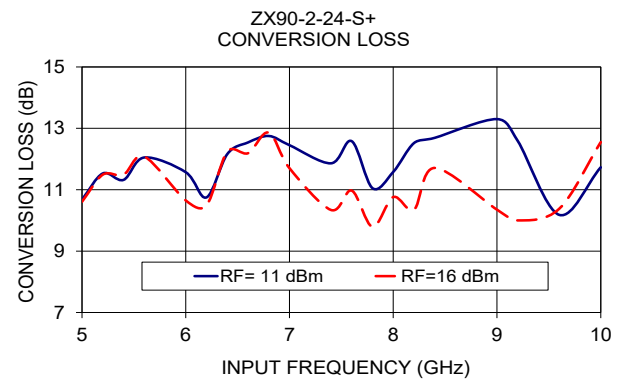
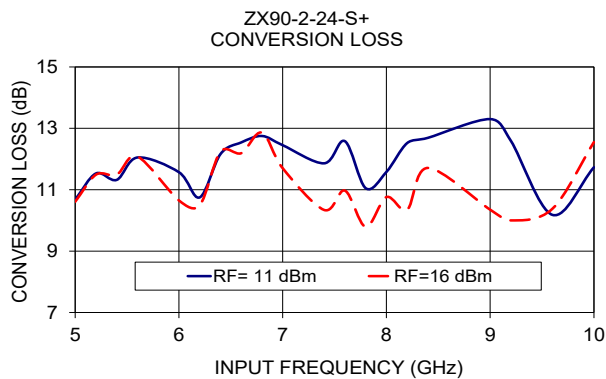
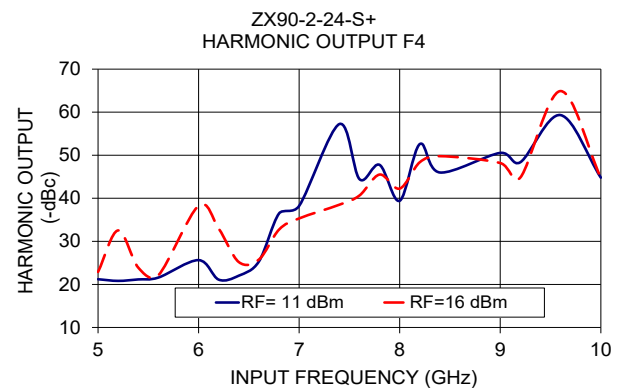
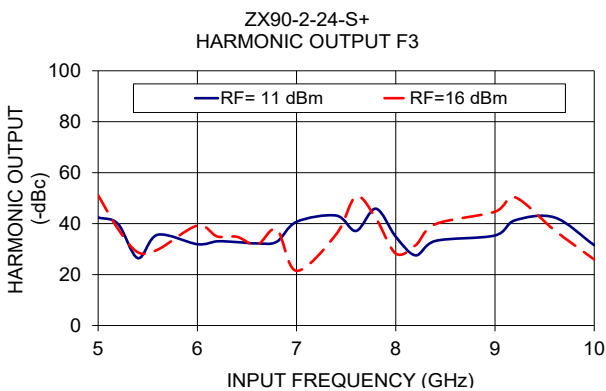
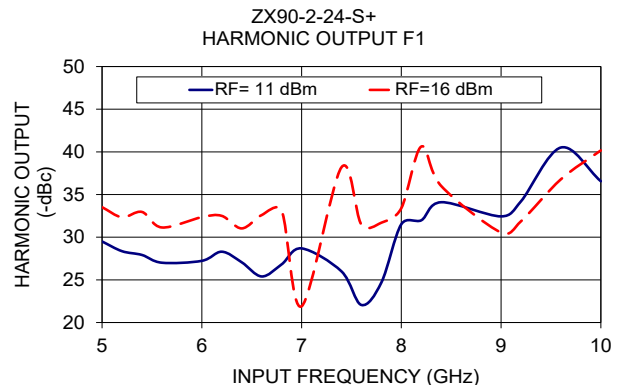
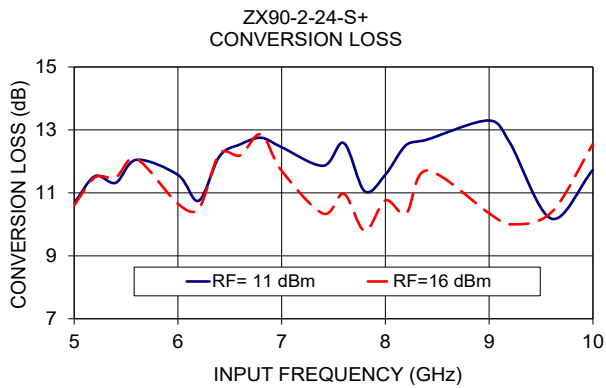
Input Frequency (GHz)	INPUT RF= 11 dBm					INPUT RF= 16 dBm			
	Conversion Loss (dB)	Harmonic Output Below F2 (-dBc)			Conversion Loss (dB)	Harmonic Output Below F2 (-dBc)			
		F1	F3	F4		F1	F3	F4	
5.0	10.68	29.50	42.43	21.20	10.61	33.52	51.13	22.90	
5.2	11.53	28.36	39.91	20.82	11.49	32.34	37.95	32.54	
5.4	11.32	27.92	26.46	21.16	11.49	32.96	28.75	23.90	
5.6	12.05	27.01	35.64	21.59	12.08	31.14	29.77	22.12	
6.0	11.57	27.23	31.92	25.64	10.65	32.35	39.24	38.26	
6.2	10.75	28.30	33.05	21.11	10.49	32.50	34.97	32.96	
6.4	12.16	27.06	32.74	22.03	12.24	31.03	34.82	25.19	
6.6	12.54	25.40	32.23	25.33	12.19	32.59	31.62	25.78	
6.8	12.75	26.82	32.88	36.47	12.86	33.12	37.78	32.73	
7.0	12.45	28.69	40.72	38.23	11.70	21.90	21.46	35.32	
7.4	11.86	26.00	43.16	57.24	10.34	38.19	35.85	38.51	
7.6	12.58	22.06	37.13	44.45	10.97	31.47	50.63	40.65	
7.8	11.05	24.69	45.87	47.76	9.79	31.70	42.08	45.51	
8.0	11.58	31.52	34.86	39.42	10.76	33.40	28.26	42.25	
8.2	12.52	31.98	27.54	52.59	10.35	40.62	31.53	48.38	
8.4	12.69	34.10	33.21	45.99	11.71	36.00	39.80	49.78	
9.0	13.30	32.44	35.36	50.54	10.35	30.55	44.69	48.19	
9.2	12.59	34.21	41.28	48.38	10.00	31.87	50.37	44.83	
9.6	10.18	40.51	42.43	59.32	10.38	36.79	37.39	64.90	
10.0	11.73	36.56	31.54	44.80	12.55	40.17	25.93	44.76	

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.
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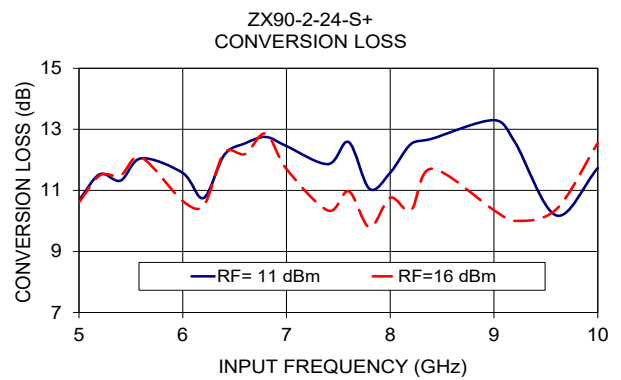
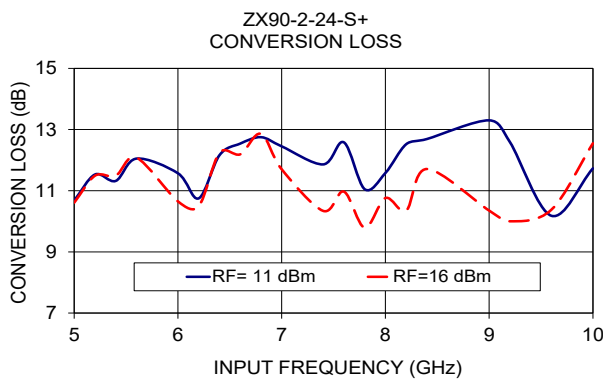
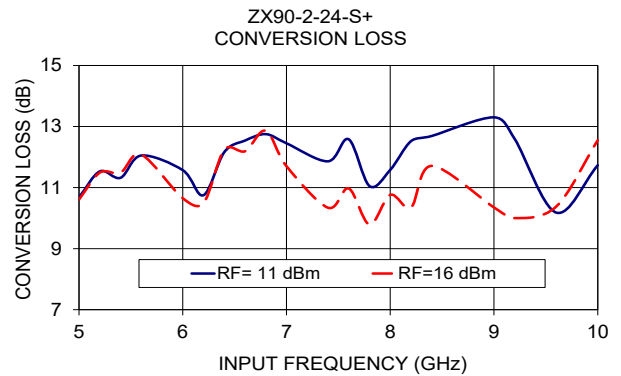
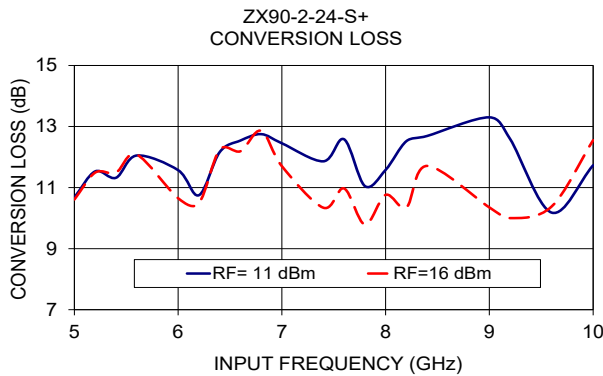
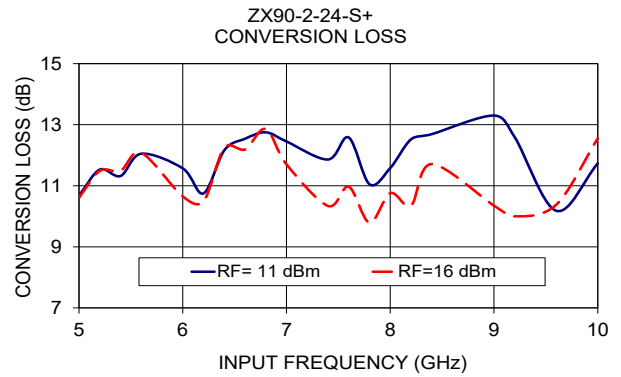
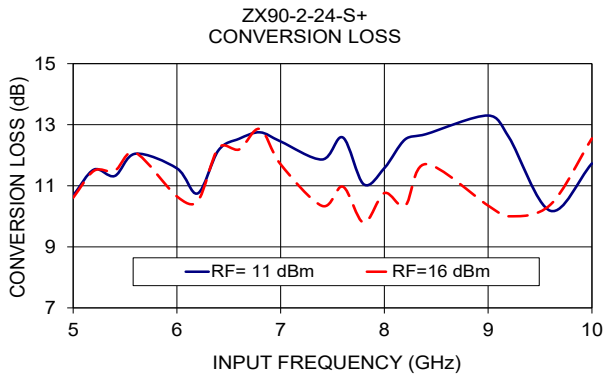
ZX90-2-24-S+



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Frequency Multiplier (Doublers)

ZX90-2-24-S+

Typical Performance Data

Test Conditions: RF Input Power = 11 dBm @ +25°C

FREQUENCY (GHz)				CONVERSION LOSS (dB)	HARMONIC OUTPUT* (-dBc)		
X1 OUTPUT	X2 OUTPUT	X3 OUTPUT	X4 OUTPUT		X2 OUTPUT	X1 OUTPUT	X3 OUTPUT
5.0	10.0	15.0	20.0	10.69	29.16	39.23	21.67
5.1	10.2	15.3	20.4	11.05	28.91	46.83	21.20
5.2	10.4	15.6	20.8	10.98	28.81	38.93	22.16
5.3	10.6	15.9	21.2	10.95	28.17	37.05	19.94
5.5	11.0	16.5	22.0	10.96	28.38	31.98	18.83
5.6	11.2	16.8	22.4	10.90	27.60	47.45	20.93
5.7	11.4	17.1	22.8	11.10	28.10	45.04	21.48
5.8	11.6	17.4	23.2	10.75	28.40	36.86	20.47
5.9	11.8	17.7	23.6	10.28	28.39	33.47	19.91
6.0	12.0	18.0	24.0	11.31	28.01	35.17	25.36
6.1	12.2	18.3	24.4	11.45	27.63	32.84	21.77
6.2	12.4	18.6	24.8	11.43	27.49	33.51	19.48
6.3	12.6	18.9	25.2	11.55	28.72	33.65	21.98
6.4	12.8	19.2	25.6	12.40	26.76	30.68	21.89
6.5	13.0	19.5	26.0	14.04	23.33	29.88	21.31
6.6	13.2	19.8	26.4	12.54	25.91	33.02	25.54
6.7	13.4	20.1	26.8	13.49	25.74	32.04	29.31
6.8	13.6	20.4	27.2	13.22	26.88	38.08	35.36
6.9	13.8	20.7	27.6	13.04	25.96	35.55	36.21
7.0	14.0	21.0	28.0	12.93	30.46	31.52	33.92
7.1	14.2	21.3	28.4	11.79	29.33	33.34	36.89
7.2	14.4	21.6	28.8	14.00	27.01	35.13	43.75
7.3	14.6	21.9	29.2	12.37	27.59	38.02	43.88
7.4	14.8	22.2	29.6	11.27	27.23	41.11	54.20
7.5	15.0	22.5	30.0	13.05	21.92	38.89	58.25
7.6	15.2	22.8	30.4	12.87	24.53	35.67	43.01
7.7	15.4	23.1	30.8	12.31	20.98	42.99	43.32
7.8	15.6	23.4	31.2	11.44	29.13	40.16	47.43
7.9	15.8	23.7	31.6	11.06	27.60	32.17	44.83
8.0	16.0	24.0	32.0	12.48	35.43	30.39	41.92
8.1	16.2	24.3	32.4	11.94	34.36	30.18	43.43
8.2	16.4	24.6	32.8	12.35	32.40	23.52	51.65
8.3	16.6	24.9	33.2	12.76	32.05	29.48	62.42
8.4	16.8	25.2	33.6	11.22	35.13	30.53	51.55
8.5	17.0	25.5	34.0	12.01	34.47	36.62	49.55
8.6	17.2	25.8	34.4	12.39	36.93	44.77	40.62
8.7	17.4	26.1	34.8	12.39	35.91	31.92	42.06
8.8	17.6	26.4	35.2	12.62	35.73	30.29	41.82
8.9	17.8	26.7	35.6	12.32	34.02	33.81	51.10
9.0	18.0	27.0	36.0	12.80	30.75	33.21	52.55
9.1	18.2	27.3	36.4	11.07	34.32	39.27	57.90
9.2	18.4	27.6	36.8	11.43	32.40	41.34	48.22
9.3	18.6	27.9	37.2	11.49	36.71	33.08	45.07
9.4	18.8	28.2	37.6	10.26	34.95	33.62	43.46
9.5	19.0	28.5	38.0	10.48	41.52	41.96	54.45
9.6	19.2	28.8	38.4	10.84	40.89	52.06	59.80
9.7	19.4	29.1	38.8	10.26	40.76	31.33	64.40
9.8	19.6	29.4	39.2	10.04	40.01	29.91	54.64
9.9	19.8	29.7	39.6	12.83	34.22	28.66	52.93
10.0	20.0	30.0	40.0	11.14	37.66	32.54	36.85

* Harmonic Output below power level of X2 Output.



Frequency Multiplier (Doublers)

ZX90-2-24-S+

Typical Performance Data

Test Conditions: RF Input Power = 11 dBm @ -40°C

FREQUENCY (GHz)				CONVERSION LOSS (dB)	HARMONIC OUTPUT* (-dBc)		
X1 OUTPUT	X2 OUTPUT	X3 OUTPUT	X4 OUTPUT		X2 OUTPUT	X1 OUTPUT	X3 OUTPUT
5.0	10.0	15.0	20.0	10.88	28.21	40.38	21.40
5.1	10.2	15.3	20.4	10.63	28.53	38.50	21.14
5.2	10.4	15.6	20.8	10.36	28.81	43.59	21.48
5.3	10.6	15.9	21.2	10.28	28.21	36.81	19.19
5.5	11.0	16.5	22.0	10.68	27.63	31.25	17.92
5.6	11.2	16.8	22.4	10.13	27.19	46.95	21.98
5.7	11.4	17.1	22.8	10.64	27.56	43.56	21.18
5.8	11.6	17.4	23.2	10.75	27.47	36.01	19.09
5.9	11.8	17.7	23.6	10.07	27.59	32.28	18.60
6.0	12.0	18.0	24.0	10.78	27.59	35.55	24.43
6.1	12.2	18.3	24.4	10.98	26.92	33.51	21.09
6.2	12.4	18.6	24.8	11.03	26.54	33.80	19.21
6.3	12.6	18.9	25.2	11.46	27.37	32.65	20.30
6.4	12.8	19.2	25.6	11.96	25.98	30.46	21.75
6.5	13.0	19.5	26.0	13.03	23.99	30.73	20.65
6.6	13.2	19.8	26.4	12.52	24.67	32.28	24.13
6.7	13.4	20.1	26.8	13.39	24.45	31.27	28.26
6.8	13.6	20.4	27.2	12.87	26.19	36.87	34.50
6.9	13.8	20.7	27.6	12.69	24.81	34.98	36.53
7.0	14.0	21.0	28.0	12.99	28.88	30.06	34.77
7.1	14.2	21.3	28.4	12.01	27.96	32.27	37.20
7.2	14.4	21.6	28.8	14.00	25.44	31.89	43.70
7.3	14.6	21.9	29.2	12.87	25.43	36.87	41.99
7.4	14.8	22.2	29.6	11.13	26.73	40.31	66.61
7.5	15.0	22.5	30.0	13.25	20.63	40.37	47.89
7.6	15.2	22.8	30.4	12.34	24.71	34.72	43.28
7.7	15.4	23.1	30.8	11.98	20.23	36.88	45.10
7.8	15.6	23.4	31.2	11.83	25.03	42.26	47.49
7.9	15.8	23.7	31.6	10.95	25.97	32.85	45.05
8.0	16.0	24.0	32.0	12.28	28.12	29.51	40.86
8.1	16.2	24.3	32.4	12.04	31.44	28.13	38.16
8.2	16.4	24.6	32.8	12.14	36.72	20.59	53.21
8.3	16.6	24.9	33.2	12.95	31.23	26.70	63.85
8.4	16.8	25.2	33.6	11.22	37.26	28.07	50.82
8.5	17.0	25.5	34.0	11.32	30.74	33.70	50.58
8.6	17.2	25.8	34.4	12.49	37.09	42.51	42.83
8.7	17.4	26.1	34.8	12.64	33.78	30.30	41.84
8.8	17.6	26.4	35.2	12.53	36.68	26.80	41.14
8.9	17.8	26.7	35.6	12.65	34.56	29.93	49.99
9.0	18.0	27.0	36.0	13.09	29.82	30.63	54.43
9.1	18.2	27.3	36.4	11.24	33.42	36.55	52.32
9.2	18.4	27.6	36.8	11.20	32.06	42.44	49.38
9.3	18.6	27.9	37.2	11.70	36.53	32.18	47.33
9.4	18.8	28.2	37.6	9.87	35.41	31.98	47.21
9.5	19.0	28.5	38.0	10.72	40.41	37.17	55.71
9.6	19.2	28.8	38.4	10.70	43.00	46.97	61.94
9.7	19.4	29.1	38.8	9.57	38.51	32.25	65.56
9.8	19.6	29.4	39.2	9.36	41.32	30.20	58.69
9.9	19.8	29.7	39.6	12.71	34.97	28.45	60.94
10.0	20.0	30.0	40.0	11.22	36.70	30.07	39.28

* Harmonic Output below power level of X2 Output.



Frequency Multiplier (Doublers)

ZX90-2-24-S+

Typical Performance Data

Test Conditions: RF Input Power = 11 dBm @ +85°C

FREQUENCY (GHz)				CONVERSION LOSS (dB)	HARMONIC OUTPUT* (-dBc)		
X1 OUTPUT	X2 OUTPUT	X3 OUTPUT	X4 OUTPUT		X2 OUTPUT	X1 OUTPUT	X3 OUTPUT
5.0	10.0	15.0	20.0	12.09	28.04	37.05	17.86
5.1	10.2	15.3	20.4	12.60	27.80	50.68	20.51
5.2	10.4	15.6	20.8	10.71	29.31	36.42	23.25
5.3	10.6	15.9	21.2	11.04	28.42	36.03	20.01
5.5	11.0	16.5	22.0	10.88	28.61	32.97	19.94
5.6	11.2	16.8	22.4	10.76	28.45	48.37	21.07
5.7	11.4	17.1	22.8	10.68	28.84	42.55	21.35
5.8	11.6	17.4	23.2	10.82	28.55	36.67	21.11
5.9	11.8	17.7	23.6	10.55	28.85	34.97	20.01
6.0	12.0	18.0	24.0	10.93	28.71	35.44	26.05
6.1	12.2	18.3	24.4	11.34	27.96	33.31	21.03
6.2	12.4	18.6	24.8	11.64	27.75	33.80	19.42
6.3	12.6	18.9	25.2	11.60	29.00	34.23	21.62
6.4	12.8	19.2	25.6	12.44	27.19	31.57	21.75
6.5	13.0	19.5	26.0	13.78	23.71	30.21	21.54
6.6	13.2	19.8	26.4	12.61	26.69	33.23	25.55
6.7	13.4	20.1	26.8	13.49	26.31	32.82	30.14
6.8	13.6	20.4	27.2	12.89	27.29	39.31	36.60
6.9	13.8	20.7	27.6	13.04	26.89	36.52	36.51
7.0	14.0	21.0	28.0	12.67	31.05	32.13	34.10
7.1	14.2	21.3	28.4	12.03	28.85	33.13	36.41
7.2	14.4	21.6	28.8	13.71	27.94	36.05	43.63
7.3	14.6	21.9	29.2	11.91	28.64	38.15	44.45
7.4	14.8	22.2	29.6	11.49	27.14	40.55	49.35
7.5	15.0	22.5	30.0	12.92	22.70	37.74	47.98
7.6	15.2	22.8	30.4	12.59	25.31	36.16	43.49
7.7	15.4	23.1	30.8	12.12	22.30	42.41	43.21
7.8	15.6	23.4	31.2	11.43	31.05	39.05	47.15
7.9	15.8	23.7	31.6	11.17	29.06	33.06	43.97
8.0	16.0	24.0	32.0	12.37	41.21	31.53	42.36
8.1	16.2	24.3	32.4	12.01	33.77	30.02	45.68
8.2	16.4	24.6	32.8	12.34	31.71	25.15	50.06
8.3	16.6	24.9	33.2	12.90	33.31	30.22	59.47
8.4	16.8	25.2	33.6	11.41	35.19	31.13	51.35
8.5	17.0	25.5	34.0	12.18	37.29	38.06	46.75
8.6	17.2	25.8	34.4	12.51	37.12	41.70	39.94
8.7	17.4	26.1	34.8	12.52	35.90	31.97	41.92
8.8	17.6	26.4	35.2	12.53	34.58	31.74	43.84
8.9	17.8	26.7	35.6	12.35	33.93	35.03	48.45
9.0	18.0	27.0	36.0	12.76	31.14	35.25	52.88
9.1	18.2	27.3	36.4	11.18	34.19	41.46	59.07
9.2	18.4	27.6	36.8	11.47	33.20	40.53	47.21
9.3	18.6	27.9	37.2	11.43	38.36	34.48	43.84
9.4	18.8	28.2	37.6	10.37	36.59	35.04	42.59
9.5	19.0	28.5	38.0	10.40	42.85	44.45	52.79
9.6	19.2	28.8	38.4	11.05	44.79	52.18	57.51
9.7	19.4	29.1	38.8	10.48	43.57	30.63	65.29
9.8	19.6	29.4	39.2	10.61	41.83	29.52	50.65
9.9	19.8	29.7	39.6	13.06	38.31	29.39	50.52
10.0	20.0	30.0	40.0	11.56	38.05	33.43	35.66

* Harmonic Output below power level of X2 Output.



Frequency Multiplier (Doublers)

ZX90-2-24-S+

Typical Performance Data

Test Conditions: RF Input Power = 16 dBm @ +25°C

FREQUENCY (GHz)				CONVERSION LOSS (dB)	HARMONIC OUTPUT* (-dBc)		
X1 OUTPUT	X2 OUTPUT	X3 OUTPUT	X4 OUTPUT		X2 OUTPUT	X1 OUTPUT	X3 OUTPUT
5.0	10.0	15.0	20.0	10.80	32.41	46.22	31.60
5.1	10.2	15.3	20.4	12.38	31.64	33.28	26.61
5.2	10.4	15.6	20.8	11.39	32.06	32.61	27.74
5.3	10.6	15.9	21.2	10.53	32.90	40.02	23.53
5.5	11.0	16.5	22.0	11.19	32.24	33.02	19.46
5.6	11.2	16.8	22.4	10.25	32.72	33.90	20.80
5.7	11.4	17.1	22.8	10.38	32.46	32.23	22.36
5.8	11.6	17.4	23.2	10.09	32.90	36.28	22.51
5.9	11.8	17.7	23.6	9.49	33.03	35.94	26.36
6.0	12.0	18.0	24.0	10.57	33.02	40.98	33.64
6.1	12.2	18.3	24.4	10.30	32.28	35.88	36.76
6.2	12.4	18.6	24.8	10.59	32.46	35.89	26.57
6.3	12.6	18.9	25.2	11.14	33.01	35.58	27.42
6.4	12.8	19.2	25.6	11.36	31.59	33.99	24.65
6.5	13.0	19.5	26.0	12.70	28.18	36.29	22.69
6.6	13.2	19.8	26.4	11.63	31.71	39.62	24.92
6.7	13.4	20.1	26.8	12.25	32.69	35.40	27.82
6.8	13.6	20.4	27.2	11.95	33.49	37.45	33.90
6.9	13.8	20.7	27.6	11.58	33.86	38.88	32.68
7.0	14.0	21.0	28.0	11.65	25.97	24.18	32.24
7.1	14.2	21.3	28.4	10.66	30.28	28.49	31.32
7.2	14.4	21.6	28.8	11.50	29.41	30.25	36.78
7.3	14.6	21.9	29.2	10.90	33.64	32.65	36.81
7.4	14.8	22.2	29.6	9.94	32.74	34.43	36.94
7.5	15.0	22.5	30.0	10.69	29.31	33.37	34.74
7.6	15.2	22.8	30.4	10.12	33.37	38.90	41.67
7.7	15.4	23.1	30.8	10.00	28.07	36.96	41.06
7.8	15.6	23.4	31.2	9.73	35.47	33.39	44.77
7.9	15.8	23.7	31.6	9.25	35.93	34.44	45.88
8.0	16.0	24.0	32.0	10.54	35.18	29.43	44.03
8.1	16.2	24.3	32.4	10.49	45.01	28.63	45.72
8.2	16.4	24.6	32.8	9.80	36.54	34.33	46.62
8.3	16.6	24.9	33.2	10.24	38.13	38.02	51.31
8.4	16.8	25.2	33.6	10.30	31.83	34.19	47.19
8.5	17.0	25.5	34.0	11.62	33.50	35.88	40.13
8.6	17.2	25.8	34.4	11.96	33.76	30.56	36.55
8.7	17.4	26.1	34.8	11.39	33.64	32.49	41.52
8.8	17.6	26.4	35.2	11.27	29.00	35.24	51.92
8.9	17.8	26.7	35.6	10.00	32.94	41.77	55.17
9.0	18.0	27.0	36.0	10.26	31.05	43.40	49.41
9.1	18.2	27.3	36.4	9.85	33.69	47.59	55.52
9.2	18.4	27.6	36.8	9.81	34.58	54.49	44.86
9.3	18.6	27.9	37.2	9.58	38.20	51.58	41.62
9.4	18.8	28.2	37.6	9.33	33.51	41.41	40.96
9.5	19.0	28.5	38.0	9.25	39.04	44.28	50.32
9.6	19.2	28.8	38.4	10.20	38.15	39.36	59.19
9.7	19.4	29.1	38.8	10.88	37.61	26.04	60.61
9.8	19.6	29.4	39.2	10.80	37.03	24.20	51.42
9.9	19.8	29.7	39.6	13.06	35.88	23.17	65.04
10.0	20.0	30.0	40.0	11.96	39.16	26.95	42.95

* Harmonic Output below power level of X2 Output.



Frequency Multiplier (Doublers)

ZX90-2-24-S+

Typical Performance Data

Test Conditions: RF Input Power = 16 dBm @ -40°C

FREQUENCY (GHz)				CONVERSION LOSS (dB)	HARMONIC OUTPUT* (-dBc)		
X1 OUTPUT	X2 OUTPUT	X3 OUTPUT	X4 OUTPUT		X2 OUTPUT	X1 OUTPUT	X3 OUTPUT
5.0	10.0	15.0	20.0	10.18	32.58	51.18	24.60
5.1	10.2	15.3	20.4	10.81	32.55	35.56	30.61
5.2	10.4	15.6	20.8	11.08	31.84	32.61	27.77
5.3	10.6	15.9	21.2	10.10	32.66	40.19	24.14
5.5	11.0	16.5	22.0	10.60	32.58	33.30	21.10
5.6	11.2	16.8	22.4	9.62	32.43	33.74	22.00
5.7	11.4	17.1	22.8	10.02	32.55	32.44	22.05
5.8	11.6	17.4	23.2	9.88	32.74	33.55	20.70
5.9	11.8	17.7	23.6	8.86	32.66	34.10	20.19
6.0	12.0	18.0	24.0	10.16	33.04	41.45	38.46
6.1	12.2	18.3	24.4	9.95	32.12	35.68	33.38
6.2	12.4	18.6	24.8	9.63	32.82	36.65	28.09
6.3	12.6	18.9	25.2	10.59	32.99	34.39	25.93
6.4	12.8	19.2	25.6	10.78	31.59	32.86	25.07
6.5	13.0	19.5	26.0	11.98	29.85	42.91	21.86
6.6	13.2	19.8	26.4	11.31	30.64	39.11	23.56
6.7	13.4	20.1	26.8	11.64	32.84	33.87	26.51
6.8	13.6	20.4	27.2	11.88	33.72	35.19	31.14
6.9	13.8	20.7	27.6	10.97	33.78	40.05	31.65
7.0	14.0	21.0	28.0	11.25	24.47	23.21	32.07
7.1	14.2	21.3	28.4	10.26	30.37	28.11	31.19
7.2	14.4	21.6	28.8	10.91	27.87	28.41	36.23
7.3	14.6	21.9	29.2	10.92	33.67	32.09	35.16
7.4	14.8	22.2	29.6	9.21	32.92	32.65	37.79
7.5	15.0	22.5	30.0	10.14	29.20	34.63	35.00
7.6	15.2	22.8	30.4	9.69	33.22	36.56	38.83
7.7	15.4	23.1	30.8	9.60	26.96	46.59	39.19
7.8	15.6	23.4	31.2	9.48	34.13	32.34	40.50
7.9	15.8	23.7	31.6	8.51	35.92	33.30	44.26
8.0	16.0	24.0	32.0	9.93	33.85	30.03	38.18
8.1	16.2	24.3	32.4	10.11	44.59	30.34	41.45
8.2	16.4	24.6	32.8	9.31	36.23	28.08	46.31
8.3	16.6	24.9	33.2	9.57	36.37	35.33	51.38
8.4	16.8	25.2	33.6	9.74	32.33	34.28	52.49
8.5	17.0	25.5	34.0	10.65	34.10	33.89	42.76
8.6	17.2	25.8	34.4	11.59	33.34	31.00	35.85
8.7	17.4	26.1	34.8	11.27	34.34	30.02	37.69
8.8	17.6	26.4	35.2	11.03	30.07	31.88	46.37
8.9	17.8	26.7	35.6	9.69	30.48	39.19	57.97
9.0	18.0	27.0	36.0	9.89	29.35	42.31	48.65
9.1	18.2	27.3	36.4	9.52	31.56	48.72	53.38
9.2	18.4	27.6	36.8	9.41	30.27	49.19	45.18
9.3	18.6	27.9	37.2	9.32	34.13	44.63	40.91
9.4	18.8	28.2	37.6	8.68	32.77	41.37	41.58
9.5	19.0	28.5	38.0	8.79	35.74	42.14	46.61
9.6	19.2	28.8	38.4	9.20	37.22	39.28	58.08
9.7	19.4	29.1	38.8	10.39	35.90	25.93	62.61
9.8	19.6	29.4	39.2	9.86	37.04	24.76	52.47
9.9	19.8	29.7	39.6	12.28	33.94	22.43	61.71
10.0	20.0	30.0	40.0	11.75	36.95	24.80	47.01

* Harmonic Output below power level of X2 Output.



Frequency Multiplier (Doublers)

ZX90-2-24-S+

Typical Performance Data

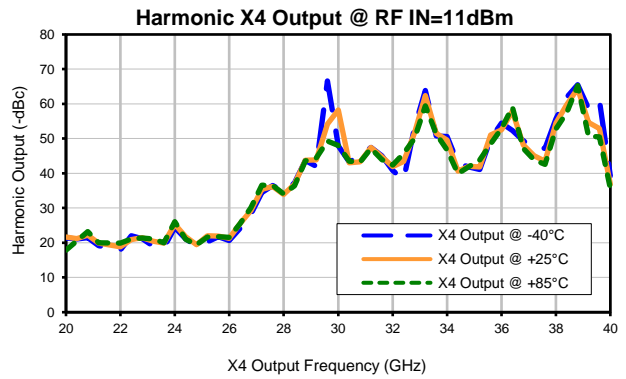
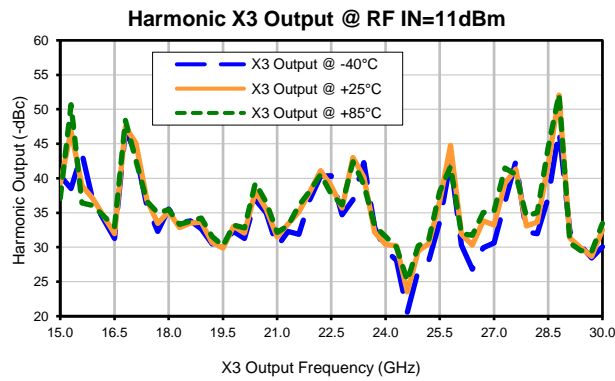
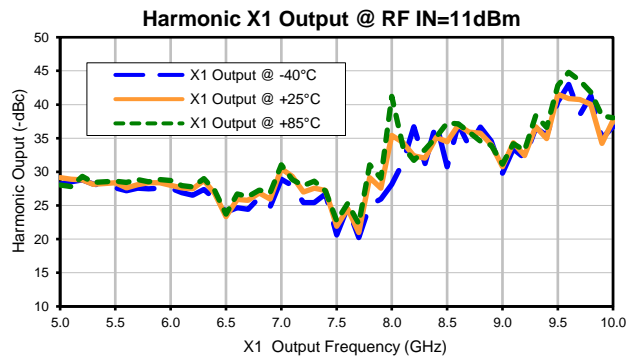
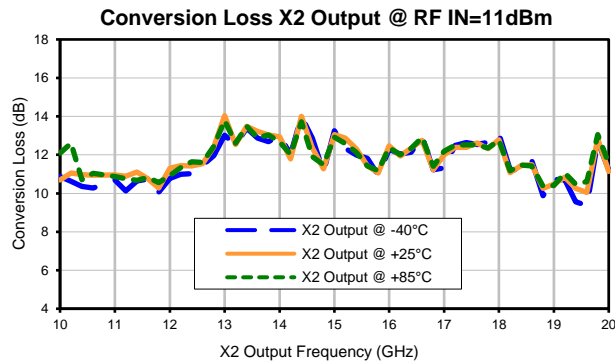
Test Conditions: RF Input Power = 16 dBm @ +85°C

FREQUENCY (GHz)				CONVERSION LOSS (dB)	HARMONIC OUTPUT* (-dBc)		
X1 OUTPUT	X2 OUTPUT	X3 OUTPUT	X4 OUTPUT		X2 OUTPUT	X1 OUTPUT	X3 OUTPUT
5.0	10.0	15.0	20.0	15.13	28.85	45.66	18.95
5.1	10.2	15.3	20.4	16.98	27.29	27.85	18.74
5.2	10.4	15.6	20.8	13.16	30.34	32.64	27.39
5.3	10.6	15.9	21.2	12.54	31.51	37.78	21.33
5.5	11.0	16.5	22.0	11.71	31.90	32.16	19.38
5.6	11.2	16.8	22.4	11.06	32.39	33.34	20.75
5.7	11.4	17.1	22.8	10.86	32.21	32.27	21.54
5.8	11.6	17.4	23.2	10.53	32.87	37.82	23.60
5.9	11.8	17.7	23.6	10.11	32.90	36.77	31.57
6.0	12.0	18.0	24.0	10.84	32.93	40.24	30.86
6.1	12.2	18.3	24.4	10.76	32.39	36.11	32.42
6.2	12.4	18.6	24.8	11.19	32.12	35.96	26.43
6.3	12.6	18.9	25.2	11.58	32.85	36.72	27.57
6.4	12.8	19.2	25.6	11.91	31.53	34.85	24.94
6.5	13.0	19.5	26.0	13.23	27.40	33.54	23.55
6.6	13.2	19.8	26.4	12.07	32.05	38.30	26.08
6.7	13.4	20.1	26.8	12.66	32.62	35.93	29.17
6.8	13.6	20.4	27.2	12.21	33.28	39.17	35.09
6.9	13.8	20.7	27.6	12.10	33.52	38.66	33.73
7.0	14.0	21.0	28.0	12.04	27.25	25.81	32.64
7.1	14.2	21.3	28.4	11.21	30.18	28.71	31.93
7.2	14.4	21.6	28.8	12.06	30.56	31.78	36.69
7.3	14.6	21.9	29.2	11.22	33.24	32.75	37.87
7.4	14.8	22.2	29.6	10.64	32.51	35.11	36.58
7.5	15.0	22.5	30.0	11.25	29.32	32.73	34.48
7.6	15.2	22.8	30.4	10.62	32.51	40.14	42.68
7.7	15.4	23.1	30.8	10.50	29.09	35.17	42.42
7.8	15.6	23.4	31.2	10.31	35.96	34.78	47.65
7.9	15.8	23.7	31.6	10.02	34.22	34.42	43.23
8.0	16.0	24.0	32.0	11.32	35.72	29.17	44.90
8.1	16.2	24.3	32.4	11.19	47.05	28.63	46.24
8.2	16.4	24.6	32.8	10.58	37.27	43.81	44.93
8.3	16.6	24.9	33.2	11.10	37.66	39.06	50.73
8.4	16.8	25.2	33.6	11.20	32.14	35.01	45.04
8.5	17.0	25.5	34.0	12.58	33.20	37.54	38.19
8.6	17.2	25.8	34.4	12.32	32.26	31.30	38.67
8.7	17.4	26.1	34.8	11.69	31.61	34.01	42.51
8.8	17.6	26.4	35.2	11.61	27.79	38.11	68.01
8.9	17.8	26.7	35.6	10.51	30.52	43.76	52.94
9.0	18.0	27.0	36.0	10.85	28.90	44.74	48.90
9.1	18.2	27.3	36.4	10.37	32.11	49.85	57.80
9.2	18.4	27.6	36.8	10.40	30.54	56.45	44.45
9.3	18.6	27.9	37.2	10.19	34.71	51.39	42.14
9.4	18.8	28.2	37.6	10.24	32.63	42.43	41.47
9.5	19.0	28.5	38.0	10.08	36.51	45.47	52.22
9.6	19.2	28.8	38.4	11.43	36.99	39.33	60.37
9.7	19.4	29.1	38.8	11.69	39.72	25.26	56.73
9.8	19.6	29.4	39.2	12.20	34.52	23.22	51.73
9.9	19.8	29.7	39.6	13.83	37.46	25.03	56.92
10.0	20.0	30.0	40.0	12.95	42.83	28.14	39.31

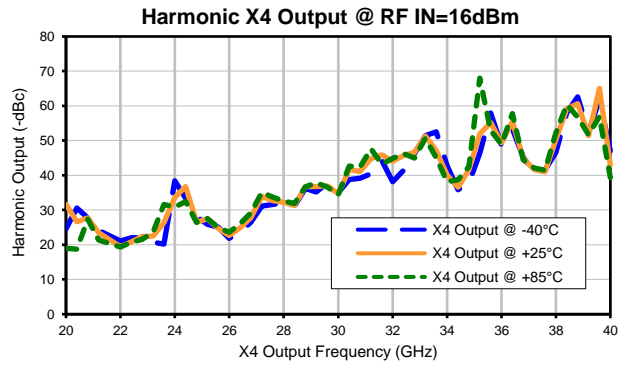
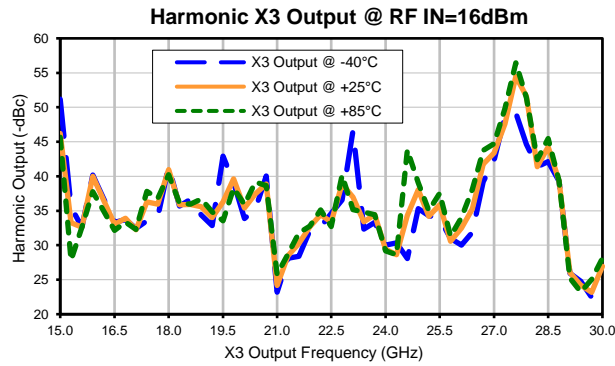
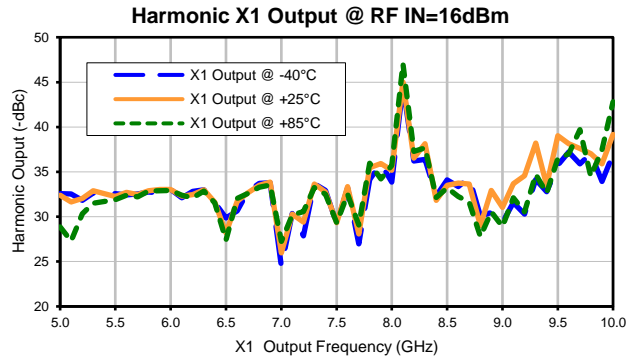
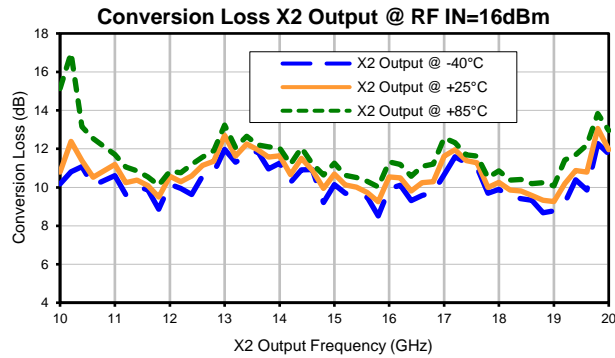
* Harmonic Output below power level of X2 Output.



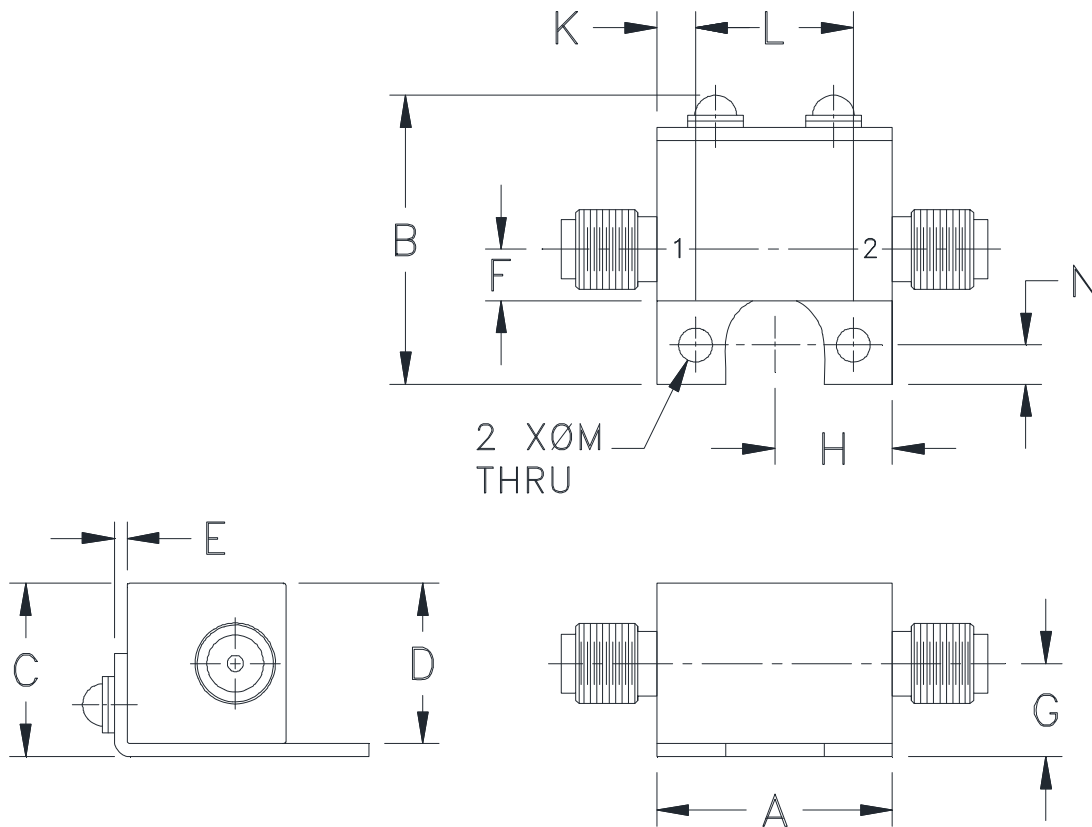
Typical Performance Curves



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	-55° to 100°C Ambient Environment	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