

X12 Frequency Multiplier

50Ω Output 4500 to 6000 MHz

ZX90-12-63-S+



Generic photo used for illustration purposes only

CASE STYLE: BY1298

Connectors Model
SMA ZX90-12-63-S+

+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	13dBm
DC Voltage	8.5 V

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

Coaxial Connections

INPUT	1
OUTPUT	2

Features

- broadband
- excellent spurious and harmonics suppression, 40 dBc typ.

Applications

- military radio
- test equipment
- mobile

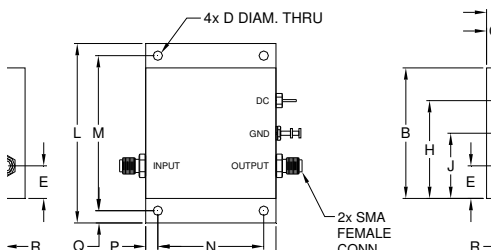
Electrical Specifications T_{AMB} = 25°C

MULTIPLICATION FACTOR	FREQUENCY (MHz)		INPUT POWER (dBm)		CONVERSION LOSS (dB)		*HARMONIC OUTPUT (dBc)						DC POWER	
	F1 Input	F12 Output	Min.	Max.	Typ.	Max.	F1 to F3	F4	F5 to F9	F10 to F16			Volts ¹ (V)	Current (mA)
12	375-500	4500-6000	-4	0	6.5	12	65 50	34 23	48 33	26 20			8	200

* Harmonics of input frequency below the power level of F12

1. Other volts available upon request.

Outline Drawing



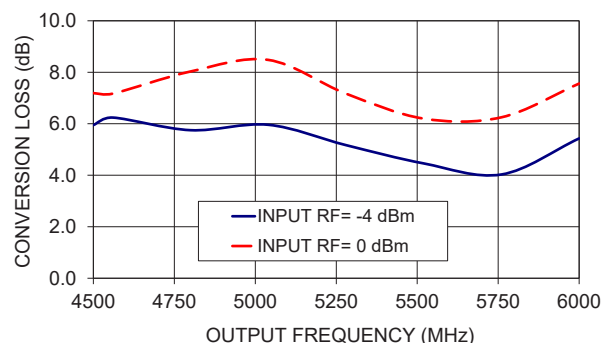
Outline Dimensions (inch)

A	B	C	D	E	F	G	H	J
2.00	2.00	.62	.144	.50	--	.26	1.50	1.00
50.80	50.80	15.75	3.66	12.70	--	6.60	38.10	25.40
K	L	M	N	P	Q	R		wt
.100	2.75	2.375	1.625	.19	.19	.31		grams
2.54	69.85	60.33	41.28	4.83	4.83	7.87		71.80

Typical Performance Data

Frequency		Conversion Loss (dB) at RF Input Power	
Input (MHz)	Output (MHz)	-4 dBm	0 dBm
375.00	4500.00	5.95	7.19
380.00	4560.00	6.24	7.17
400.00	4800.00	5.75	8.03
420.00	5040.00	5.96	8.48
440.00	5280.00	5.17	7.17
460.00	5520.00	4.46	6.20
480.00	5760.00	4.03	6.25
500.00	6000.00	5.43	7.56

ZX90-12-63-S+
CONVERSION LOSS



Notes

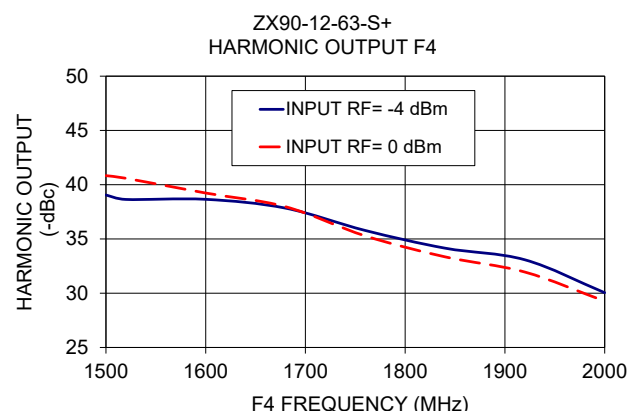
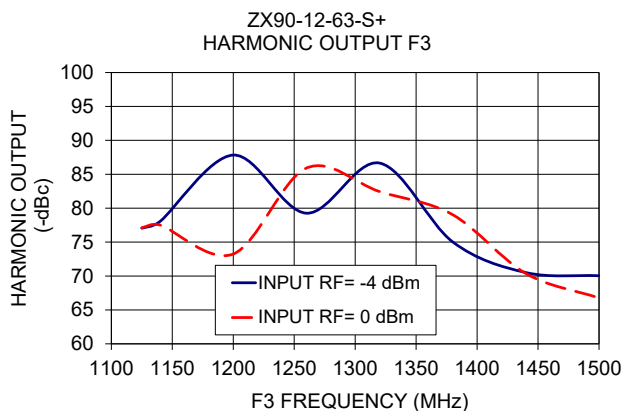
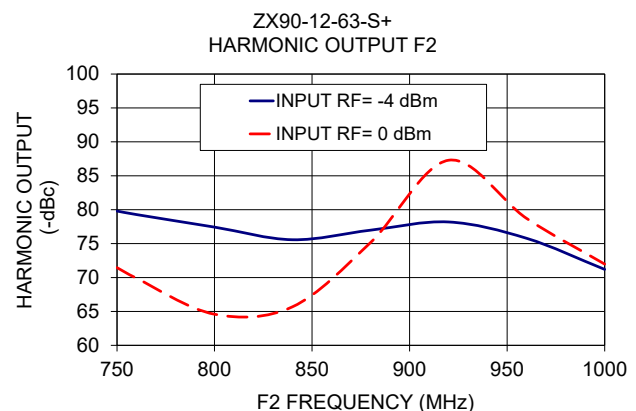
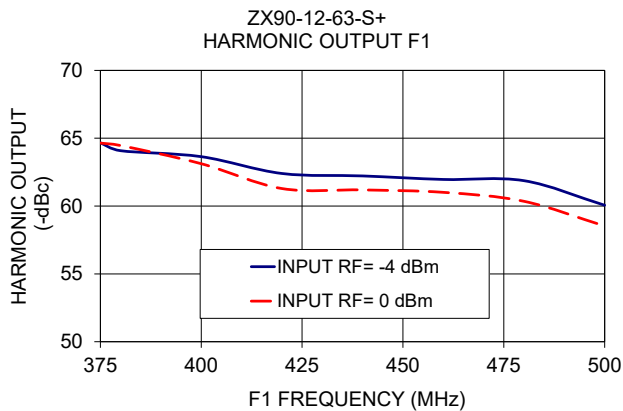
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Typical Performance Data

Frequency		Harmonic Rejection Below F12 (-dBc) at RF Input Power -4 dBm														
Input (MHz)	Output (MHz)	F1	F2	F3	F4	F5	F6	F7	F8	F9	F10	F11	F13	F14	F15	F16
375.00	4500.00	64.66	79.80	77.05	39.05	62.08	55.81	64.27	71.85	71.12	42.22	32.97	24.73	28.12	48.25	31.03
380.00	4560.00	64.08	79.28	78.05	38.64	62.22	56.04	63.03	63.68	73.49	38.30	33.03	25.13	28.42	47.76	31.68
400.00	4800.00	63.64	77.43	87.83	38.65	61.23	59.64	62.54	63.22	58.33	38.54	38.24	30.38	30.61	53.46	30.96
420.00	5040.00	62.40	75.57	79.26	37.84	61.73	57.78	66.74	54.32	50.14	38.04	38.07	34.73	30.83	50.99	32.06
440.00	5280.00	62.22	76.98	86.65	35.78	64.41	67.28	77.48	61.62	49.55	43.77	31.07	32.03	53.14	51.43	34.49
460.00	5520.00	61.96	78.19	75.03	34.15	62.06	70.03	71.28	47.47	46.70	38.28	30.83	32.41	56.21	49.98	46.38
480.00	5760.00	61.87	75.78	70.51	33.08	58.06	64.02	68.63	42.16	48.94	34.41	27.95	31.70	42.42	57.20	49.95
500.00	6000.00	60.06	71.20	70.04	30.05	54.70	63.89	58.01	43.20	49.53	30.60	24.01	28.91	38.06	62.56	57.80

Frequency		Harmonic Rejection Below F12 (-dBc) at RF Input Power 0 dBm														
Input (MHz)	Output (MHz)	F1	F2	F3	F4	F5	F6	F7	F8	F9	F10	F11	F13	F14	F15	F16
375.00	4500.00	64.64	71.46	77.11	40.83	57.63	54.72	63.03	49.41	56.29	41.40	32.78	25.37	28.28	45.86	29.60
380.00	4560.00	64.46	69.90	77.51	40.59	57.54	54.96	60.50	47.64	58.19	37.48	33.89	26.28	28.11	46.11	30.60
400.00	4800.00	63.12	64.59	73.24	39.23	58.38	62.79	52.58	53.99	57.95	35.91	44.77	29.96	30.64	53.53	31.81
420.00	5040.00	61.29	65.69	85.91	37.97	57.50	54.15	41.63	46.14	49.55	39.42	26.32	26.03	32.55	49.93	34.58
440.00	5280.00	61.19	75.16	82.45	35.28	59.51	62.90	54.34	61.47	46.75	41.37	25.32	26.12	53.65	46.65	38.53
460.00	5520.00	61.01	87.29	79.04	33.35	62.18	61.94	65.60	47.47	43.06	42.98	26.59	28.42	44.73	49.11	50.63
480.00	5760.00	60.35	78.71	70.37	31.95	62.17	61.17	60.69	43.05	38.82	36.28	26.22	30.12	39.82	52.65	53.32
500.00	6000.00	58.53	71.98	66.76	29.27	68.41	52.10	58.78	43.19	41.26	32.15	24.96	28.59	39.01	59.79	60.16

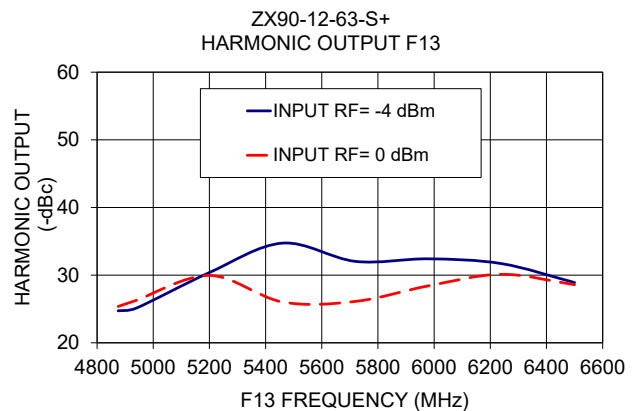
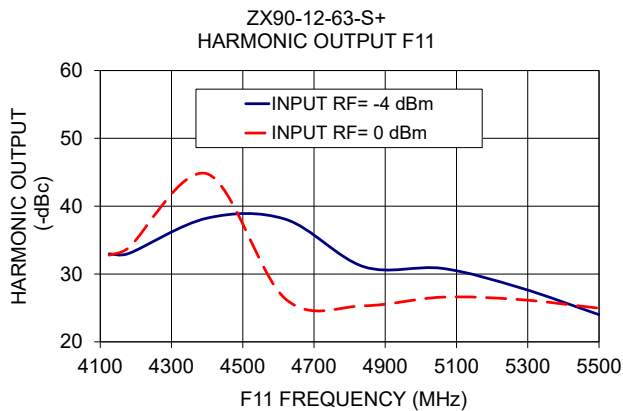
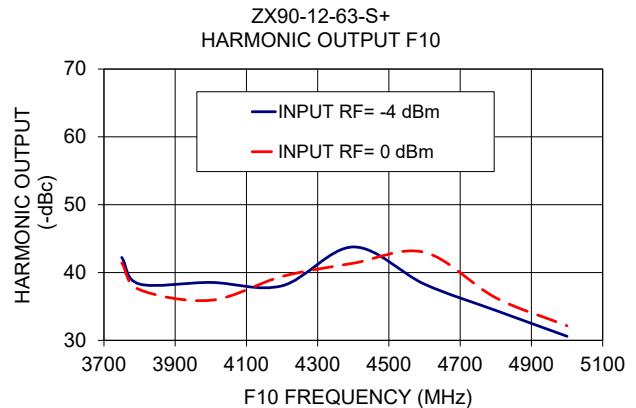
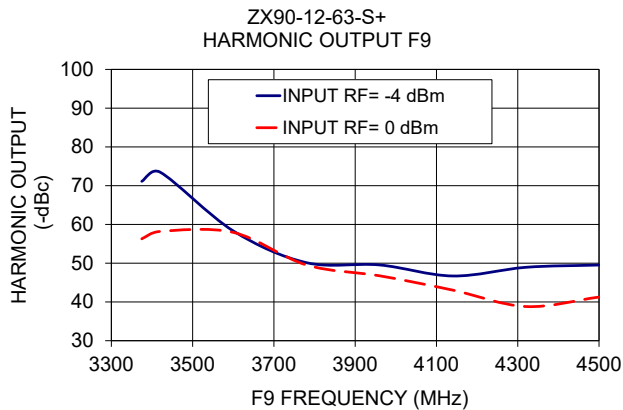
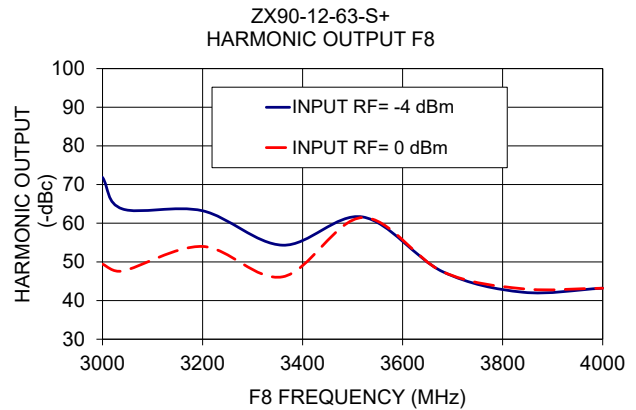
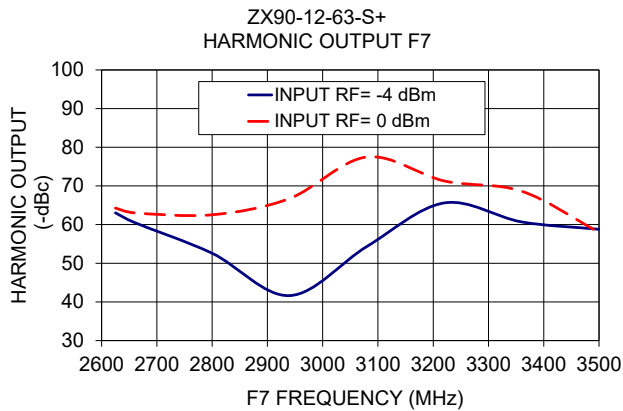
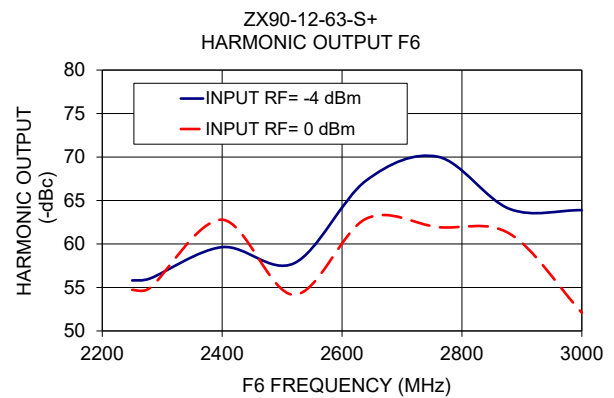
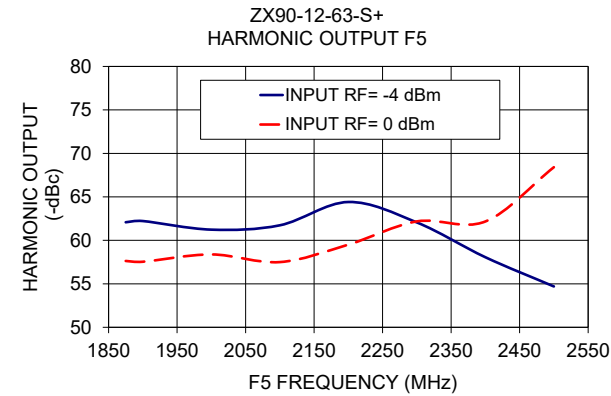


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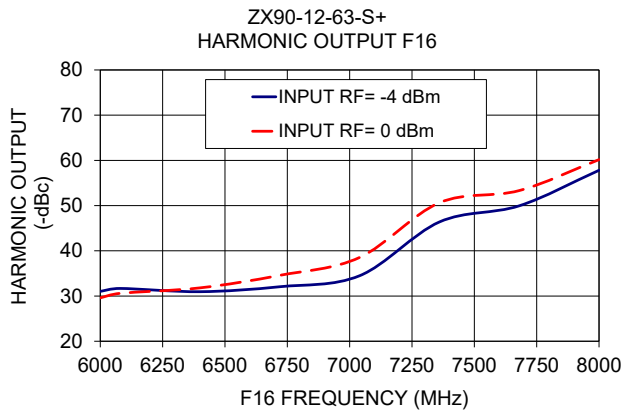
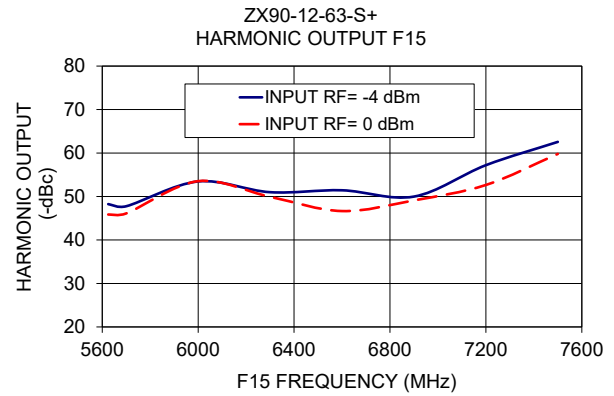
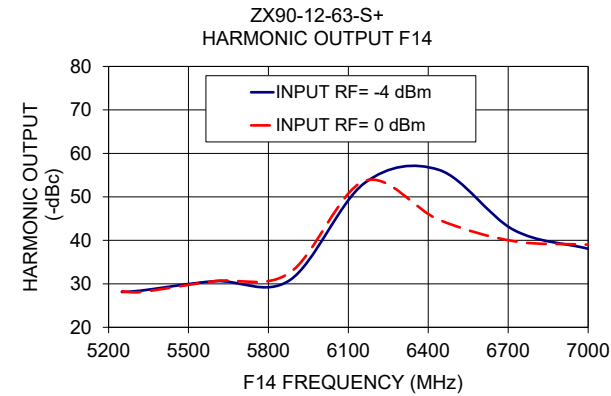


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Typical Performance Data

Frequency (MHz)															
X12 Output	X1 Output	X2 Output	X3 Output	X4 Output	X5 Output	X6 Output	X7 Output	X8 Output	X9 Output	X10 Output	X11 Output	X13 Output	X14 Output	X15 Output	X16 Output
4500	375	750	1125	1500	1875	2250	2625	3000	3375	3750	4125	4875	5250	5625	6000
4560	380	760	1140	1520	1900	2280	2660	3040	3420	3800	4180	4940	5320	5700	6080
4800	400	800	1200	1600	2000	2400	2800	3200	3600	4000	4400	5200	5600	6000	6400
5040	420	840	1260	1680	2100	2520	2940	3360	3780	4200	4620	5460	5880	6300	6720
5280	440	880	1320	1760	2200	2640	3080	3520	3960	4400	4840	5720	6160	6600	7040
5520	460	920	1380	1840	2300	2760	3220	3680	4140	4600	5060	5980	6440	6900	7360
5760	480	960	1440	1920	2400	2880	3360	3840	4320	4800	5280	6240	6720	7200	7680
6000	500	1000	1500	2000	2500	3000	3500	4000	4500	5000	5500	6500	7000	7500	8000

RF IN = -4dBm															
Conversion Loss (dB)	Harmonic Output*(-dBc)														
X12 Output	X1 Output	X2 Output	X3 Output	X4 Output	X5 Output	X6 Output	X7 Output	X8 Output	X9 Output	X10 Output	X11 Output	X13 Output	X14 Output	X15 Output	X16 Output
5.95	64.66	79.80	77.05	39.05	62.08	55.81	64.27	71.85	71.12	42.22	32.97	24.73	28.12	48.25	31.03
6.24	64.08	79.28	78.05	38.64	62.22	56.04	63.03	63.68	73.49	38.30	33.03	25.13	28.42	47.76	31.68
5.75	63.64	77.43	87.83	38.65	61.23	59.64	62.54	63.22	58.33	38.54	38.24	30.38	30.61	53.46	30.96
5.96	62.40	75.57	79.26	37.84	61.73	57.78	66.74	54.32	50.14	38.04	38.07	34.73	30.83	50.99	32.06
5.17	62.22	76.98	86.65	35.78	64.41	67.28	77.48	61.62	49.55	43.77	31.07	32.03	53.14	51.43	34.49
4.46	61.96	78.19	75.03	34.15	62.06	70.03	71.28	47.47	46.70	38.28	30.83	32.41	56.21	49.98	46.38
4.03	61.87	75.78	70.51	33.08	58.06	64.02	68.63	42.16	48.94	34.41	27.95	31.70	42.42	57.20	49.95
5.43	60.06	71.20	70.04	30.05	54.70	63.89	58.01	43.20	49.53	30.60	24.01	28.91	38.06	62.56	57.80

*Harmonic Output below power level of X12 Output .

RF IN = 0dBm															
Conversion Loss (dB)	Harmonic Output*(-dBc)														
X12 Output	X1 Output	X2 Output	X3 Output	X4 Output	X5 Output	X6 Output	X7 Output	X8 Output	X9 Output	X10 Output	X11 Output	X13 Output	X14 Output	X15 Output	X16 Output
7.19	64.64	71.46	77.11	40.83	57.63	54.72	63.03	49.41	56.29	41.40	32.78	25.37	28.28	45.86	29.60
7.17	64.46	69.90	77.51	40.59	57.54	54.96	60.50	47.64	58.19	37.48	33.89	26.28	28.11	46.11	30.60
8.03	63.12	64.59	73.24	39.23	58.38	62.79	52.58	53.99	57.95	35.91	44.77	29.96	30.64	53.53	31.81
8.48	61.29	65.69	85.91	37.97	57.50	54.15	41.63	46.14	49.55	39.42	26.32	26.03	32.55	49.93	34.58
7.17	61.19	75.16	82.45	35.28	59.51	62.90	54.34	61.47	46.75	41.37	25.32	26.12	53.65	46.65	38.53
6.20	61.01	87.29	79.04	33.35	62.18	61.94	65.60	47.47	43.06	42.98	26.59	28.42	44.73	49.11	50.63
6.25	60.35	78.71	70.37	31.95	62.17	61.17	60.69	43.05	38.82	36.28	26.22	30.12	39.82	52.65	53.32
7.56	58.53	71.98	66.76	29.27	68.41	52.10	58.78	43.19	41.26	32.15	24.96	28.59	39.01	59.79	60.16

*Harmonic Output below power level of X12 Output .



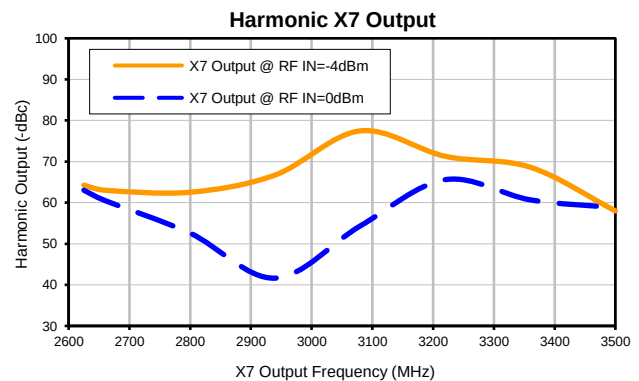
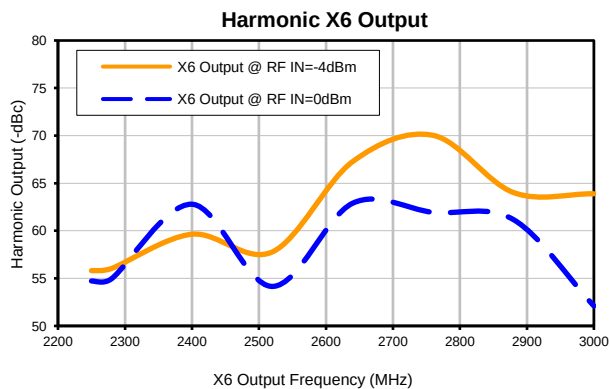
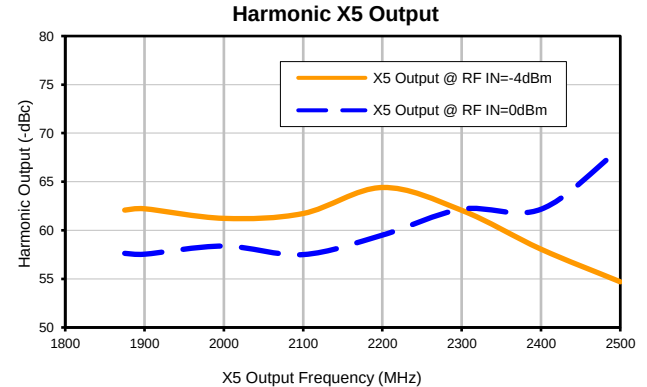
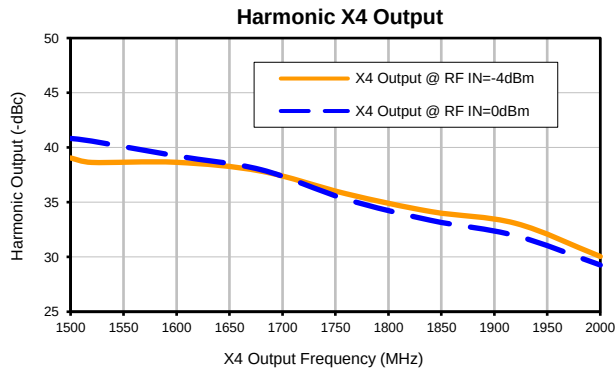
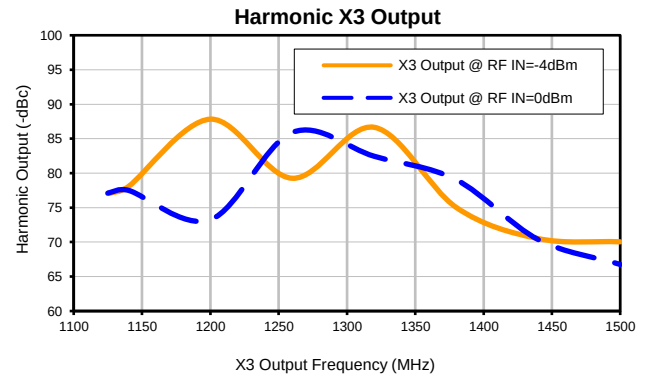
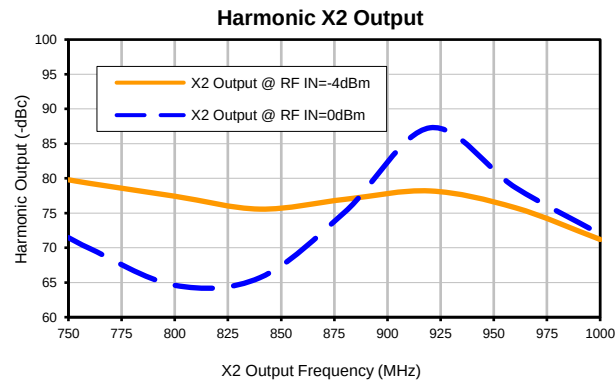
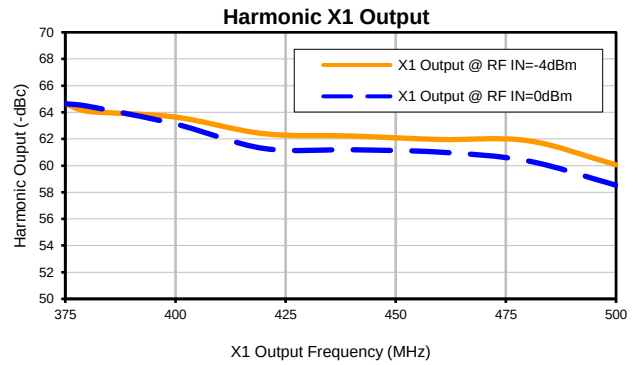
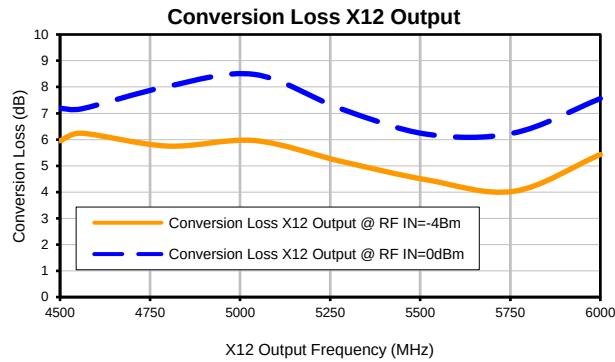
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The Design Engineers Search Engine Provides ACTUAL Data Instantly From MINI-CIRCUITS At: www.minicircuits.com

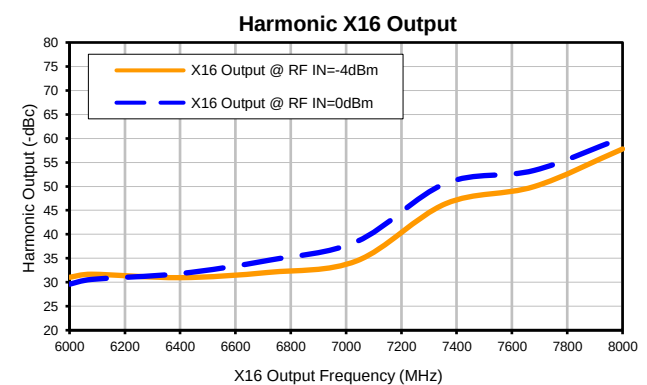
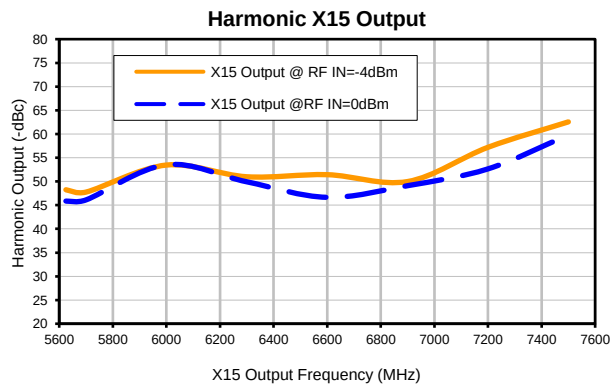
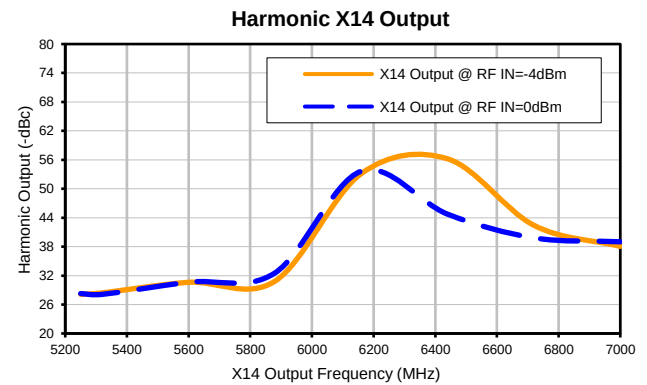
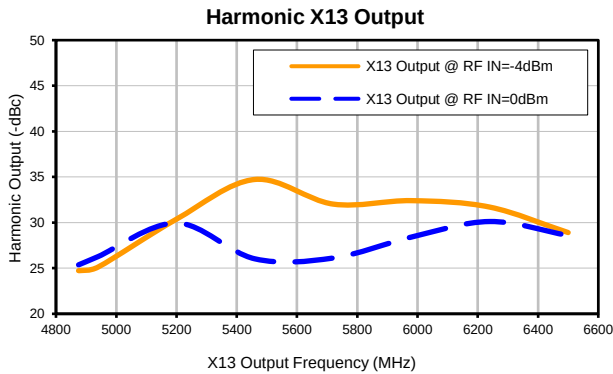
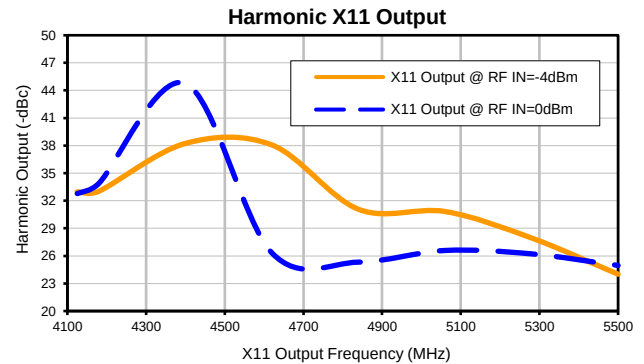
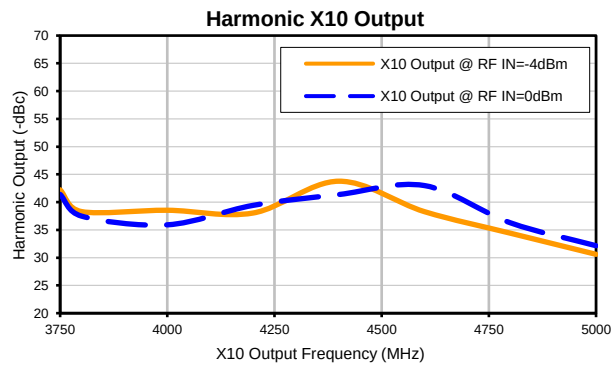
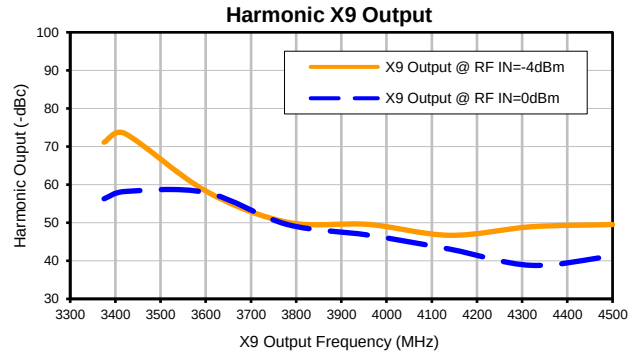
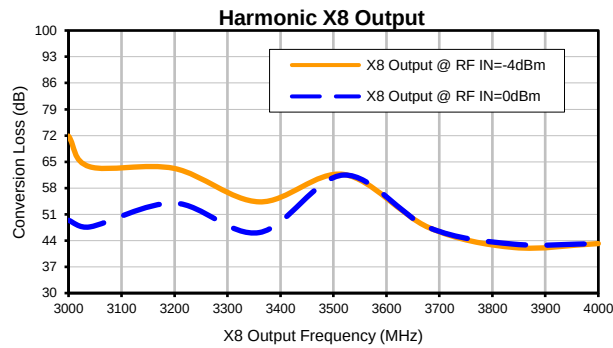
IF/RF MICROWAVE COMPONENTS

 REV. OR
 ZX90-12-63-S+
 1/3/2019
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Typical Performance Curves



Typical Performance Curves

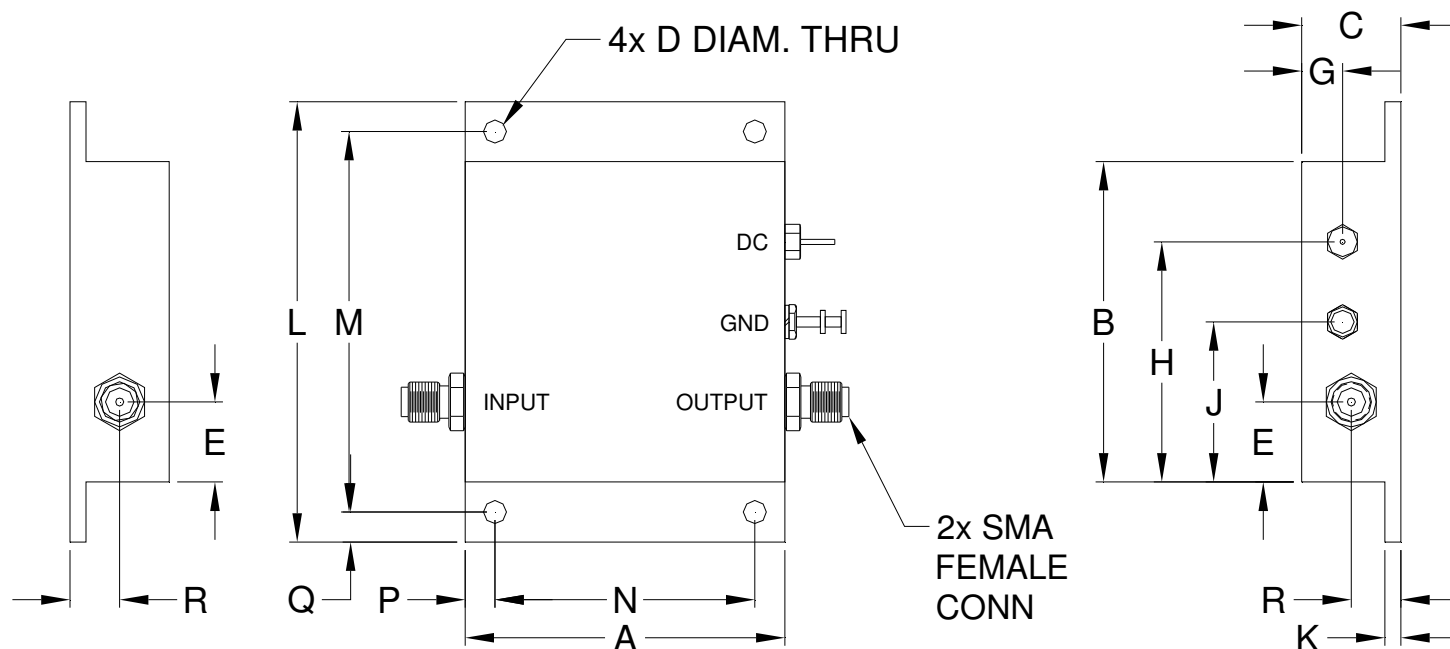


Case Style

BY

Outline Dimensions

BY1298



CASE#	A	B	C	D	E	F	G	H	J	K	L	M	N
BY1298	2.00 (50.80)	2.00 (50.80)	.62 (15.75)	.144 (3.66)	.50 (12.70)	- -	.26 (6.60)	1.50 (38.10)	1.00 (25.40)	.100 (2.54)	2.75 (69.85)	2.375 (60.33)	1.625 (41.28)

CASE#	P	Q	R	WT. GRAMS
BY1298	.19 (4.83)	.19 (4.83)	.31 (7.87)	71.80

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

Notes:

- Case material: Aluminum alloy.
- Case finish: Clear chemical conversion coating, non-chrome or trivalent chrome based.



INTERNET <http://www.minicircuits.com>

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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