

## Voltage Controlled Oscillator **ZX95-4000R-S+**

50Ω      3850 to 4000 MHz

### The Big Deal:

- Good Harmonic Suppression
- Low Phase Noise
- Robust design and construction
- Rigid unibody construction



*Generic photo used for illustration purposes only*  
CASE STYLE: GB956

### Product Overview:

The ZX95-4000R-S+ is a Voltage Controlled Oscillator, designed to operate from 3850 to 4000 MHz for WiMAX applications. The ZX95-4000R-S+ is built using Mini-Circuits proven unibody construction (size of 1.20" x .75" x .46") which integrates the RF connectors with the case body to shield against unwanted signals and noise.

### Key Features

Feature	Advantages
Good Harmonic Suppression, -26 dBc typ.	Provides clear signals suitable for systems requiring high spectral purity.
Low Phase Noise: -99 dBc/Hz typ at 10 kHz offset	Low phase noise improves system EVM (Error Vector Magnitude).
Good Pushing, 1.5 MHz/V typ.	Provides increased immunity against noisy DC lines and improves output frequency stability vs. variations in supply voltage.

Coaxial

## Voltage Controlled Oscillator

## ZX95-4000R-S+

Low Noise 3850 to 4000 MHz

### Features

- low phase noise, -99 dBc/Hz typ. @ 10kHz offset
- low harmonics, -26 dBc typ
- low pushing, 1.5 MHz/V typ.
- protected by US patent 6,790,049

### Applications

- r & d
- lab
- instrumentation
- wireless communications
- WiMAX



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Connectors	Model
SMA	ZX95-4000R-S+

### +RoHS Compliant

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

### Electrical Specifications

MODEL NO.	FREQ. (MHz)		POWER OUTPUT (dBm)	PHASE NOISE dBc/Hz SSB at offset frequencies, kHz				TUNING					NON HARMONIC SPURIOUS (dBc)		HARMONICS (dBc)		PULLING pk-pk @12 dB (MHz)	PUSHING (MHz/V)	DC OPERATING POWER				
	Min.	Max.		Typ.	1	10	100	1000	VOLTAGE RANGE (V)		SENSI- TIVITY (MHz/V)	PORT CAP (pF)	3 dB MODULATION BANDWIDTH (MHz)	Typ.	Typ.	Typ.			Max.	Typ.	Max.	Vcc	Current (mA)
									Min.	Max.													
ZX95-4000R-S+	3850	4000	+5	-74	-99	-120	-140	0.5	10.0	24	36	20	13	-90	-26	-16	5	1.5	5	42			

### Maximum Ratings

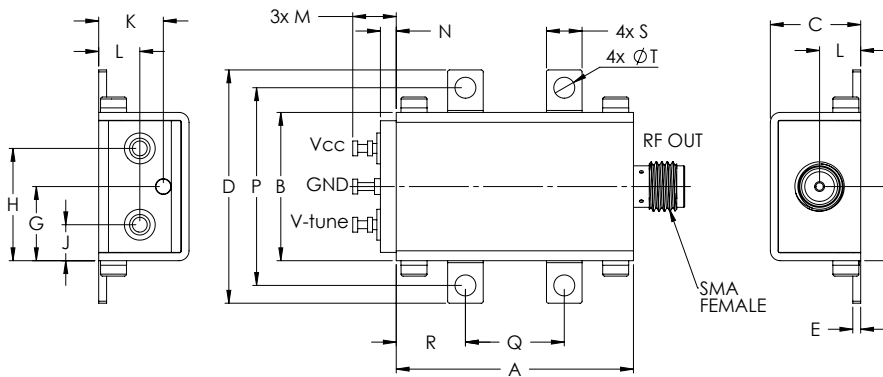
Operating Temperature	-55°C to 85°C
Storage Temperature	-55°C to 100°C
Absolute Max. Supply Voltage (Vcc)	6.5V
Absolute Max. Tuning Voltage (Vtune)	12V
All specifications	50 ohm system

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



NOTE: When soldering the DC connections, caution must be used to avoid overheating the DC terminals. See Application Note [AN-40-10](#).

### Outline Drawing

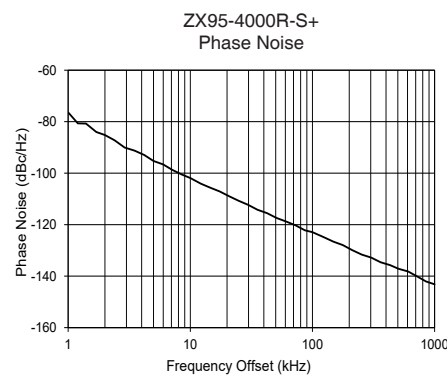
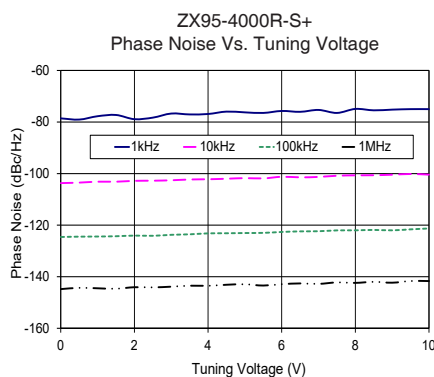
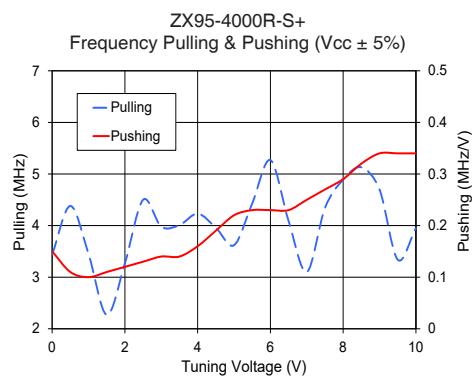
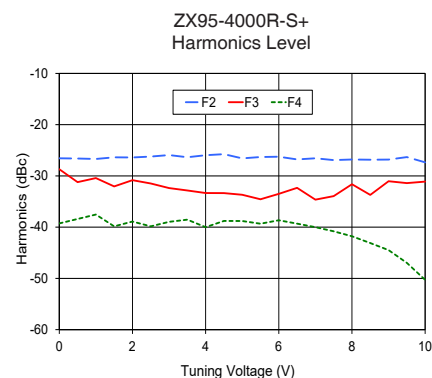
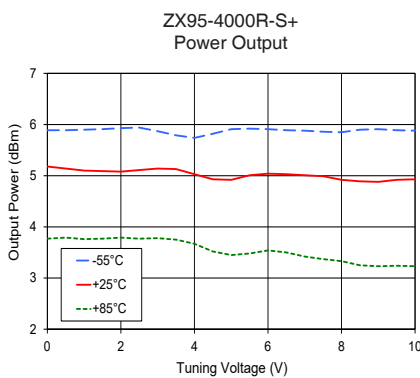
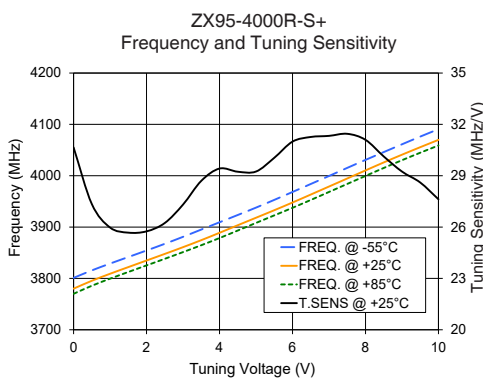


### Outline Dimensions (inch/mm)

A	B	C	D	E	F	G	H	J	K	L	M	N	P	Q	R	S	T	wt.
1.20	.75	.46	1.18	.04	.38	.38	.57	.18	.33	.21	.22	.08	1.00	.50	.35	.18	.106	grams
30.48	19.05	11.68	29.97	1.02	9.65	9.65	14.48	4.57	8.38	5.33	5.59	2.03	25.40	12.70	8.89	4.57	2.69	35.0

V TUNE	TUNE SENS (MHz/V)	FREQUENCY (MHz)			POWER OUTPUT (dBm)			I <sub>cc</sub> (mA)	HARMONICS (dBc)			FREQ. PUSH (MHz/V)	FREQ. PULL (MHz)	PHASE NOISE (dBc/Hz) at offsets				FREQ OFFSET (kHz)	PHASE NOISE at 3925 MHz (dBc/Hz)
		-55°C	+25°C	+85°C	-55°C	+25°C	+85°C		F2	F3	F4			1kHz	10kHz	100kHz	1MHz		
0.00	30.66	3801.0	3780.1	3770.0	5.89	5.18	3.77	34.44	-26.6	-28.7	-39.3	0.15	3.44	-78.58	-103.7	-124.6	-144.8	1.0	-76.41
1.00	25.97	3828.9	3809.1	3799.5	5.90	5.10	3.76	34.45	-26.7	-30.4	-37.5	0.10	3.45	-77.74	-103.1	-124.4	-144.5	2.0	-85.18
1.50	25.67	3841.7	3822.1	3812.5	5.91	5.09	3.77	34.45	-26.4	-32.1	-39.9	0.11	2.27	-77.26	-103.2	-124.3	-144.7	3.5	-91.26
2.00	25.75	3854.4	3834.9	3825.3	5.93	5.08	3.79	34.46	-26.4	-30.8	-38.9	0.12	3.27	-78.89	-102.8	-124.0	-144.1	6.0	-96.60
2.50	26.24	3867.4	3847.8	3838.2	5.94	5.11	3.77	34.45	-26.2	-31.5	-39.9	0.13	4.50	-78.29	-102.8	-124.1	-144.1	8.5	-100.52
3.00	27.31	3881.0	3860.9	3851.2	5.87	5.14	3.78	34.44	-25.9	-32.4	-39.0	0.14	3.98	-76.71	-102.6	-123.7	-143.9	10.0	-101.90
3.50	28.70	3895.2	3874.5	3864.6	5.79	5.13	3.75	34.42	-26.4	-32.8	-38.5	0.14	4.01	-77.05	-102.3	-123.5	-143.5	20.8	-108.97
4.00	29.42	3909.4	3888.9	3878.6	5.74	5.03	3.67	34.41	-26.0	-33.4	-40.0	0.16	4.23	-76.88	-102.2	-123.2	-143.5	35.5	-114.22
4.50	29.23	3923.5	3903.6	3893.3	5.82	4.93	3.52	34.42	-25.8	-33.4	-38.8	0.19	3.96	-75.96	-102.0	-123.1	-143.1	60.7	-118.76
5.00	29.24	3937.9	3918.2	3908.1	5.91	4.92	3.45	34.42	-26.6	-33.7	-38.8	0.22	3.62	-76.25	-101.8	-123.0	-142.9	86.7	-122.18
5.50	30.05	3952.9	3932.8	3922.8	5.92	5.01	3.48	34.41	-26.3	-34.6	-39.3	0.23	4.43	-76.47	-101.9	-123.0	-143.4	100.0	-122.93
6.00	30.99	3968.3	3947.9	3937.5	5.91	5.04	3.54	34.39	-26.3	-33.5	-38.7	0.23	5.27	-75.71	-101.2	-122.6	-142.9	148.1	-126.58
6.50	31.26	3983.9	3963.4	3952.8	5.89	5.03	3.50	34.38	-26.8	-32.3	-39.3	0.23	4.09	-76.04	-101.5	-122.4	-142.6	177.0	-127.92
7.00	31.33	3999.5	3979.0	3968.4	5.88	5.01	3.42	34.38	-26.6	-34.6	-40.0	0.25	3.10	-75.31	-101.3	-122.4	-142.8	211.6	-129.89
7.50	31.45	4015.3	3994.7	3984.0	5.86	4.99	3.37	34.37	-26.9	-33.9	-40.8	0.27	4.34	-76.47	-100.8	-122.0	-142.2	302.4	-132.78
8.00	31.10	4030.8	4010.4	3999.6	5.85	4.92	3.33	34.37	-26.8	-31.6	-41.8	0.29	4.89	-74.92	-100.7	-122.0	-142.4	361.5	-134.62
8.50	30.12	4046.0	4025.9	4015.1	5.90	4.89	3.25	34.37	-26.8	-33.7	-43.1	0.32	5.13	-75.46	-100.6	-121.8	-142.0	507.5	-137.16
9.00	29.24	4061.2	4041.0	4030.2	5.91	4.88	3.23	34.36	-26.8	-31.0	-44.5	0.34	4.70	-75.19	-100.4	-122.0	-142.3	606.7	-138.19
9.50	28.60	4076.2	4055.6	4044.8	5.89	4.92	3.24	34.35	-26.3	-31.4	-47.0	0.34	3.34	-75.00	-100.2	-121.6	-141.7	851.6	-142.09
10.00	27.62	4090.7	4069.9	4058.9	5.88	4.93	3.23	34.35	-27.4	-31.1	-50.3	0.34	3.95	-75.00	-100.4	-121.3	-141.7	1000.0	-143.15

\*at 25°C unless mentioned otherwise



### Additional Notes

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# Voltage Controlled Oscillator

# ZX95-4000R+

## Typical Performance Data

V TUNE	TUNE SENS (MHz/V)	FREQUENCY (MHz)			POWER OUTPUT (dBm)			HARMONICS (dBc)			FREQ. PUSH (MHz/V)	FREQ OFFSET (kHz)	PHASE NOISE (dBc/Hz)
		-55°C	+25°C	+85°C	-55°C	+25°C	+85°C	F2	F3	F4			
0.0	30.7	3801.0	3780.1	3770.0	5.9	5.2	3.8	-26.6	-28.7	-39.3	0.2	1	-74
0.5	27.3	3815.6	3795.4	3785.7	5.9	5.1	3.8	-26.6	-31.2	-38.4	0.1	10	-99
1.0	26.0	3828.9	3809.1	3799.5	5.9	5.1	3.8	-26.7	-30.4	-37.5	0.1	100	-120
1.5	25.7	3841.7	3822.1	3812.5	5.9	5.1	3.8	-26.4	-32.1	-39.9	0.1	1000	-140
2.0	25.7	3854.4	3834.9	3825.3	5.9	5.1	3.8	-26.4	-30.8	-38.9	0.1		
2.5	26.2	3867.4	3847.8	3838.2	5.9	5.1	3.8	-26.2	-31.5	-39.9	0.1		
3.0	27.3	3881.0	3860.9	3851.2	5.9	5.1	3.8	-25.9	-32.4	-39.0	0.1		
3.5	28.7	3895.2	3874.5	3864.6	5.8	5.1	3.8	-26.4	-32.8	-38.5	0.1		
4.0	29.4	3909.4	3888.9	3878.6	5.7	5.0	3.7	-26.0	-33.4	-40.0	0.2		
4.5	29.2	3923.5	3903.6	3893.3	5.8	4.9	3.5	-25.8	-33.4	-38.8	0.2		
5.0	29.2	3937.9	3918.2	3908.1	5.9	4.9	3.5	-26.6	-33.7	-38.8	0.2		
5.5	30.0	3952.9	3932.8	3922.8	5.9	5.0	3.5	-26.3	-34.6	-39.3	0.2		
6.0	31.0	3968.3	3947.9	3937.5	5.9	5.0	3.5	-26.3	-33.5	-38.7	0.2		
6.5	31.3	3983.9	3963.4	3952.8	5.9	5.0	3.5	-26.8	-32.3	-39.3	0.2		
7.0	31.3	3999.5	3979.0	3968.4	5.9	5.0	3.4	-26.6	-34.6	-40.0	0.3		
7.5	31.4	4015.3	3994.7	3984.0	5.9	5.0	3.4	-26.9	-33.9	-40.8	0.3		
8.0	31.1	4030.8	4010.4	3999.6	5.9	4.9	3.3	-26.8	-31.6	-41.8	0.3		
8.5	30.1	4046.0	4025.9	4015.1	5.9	4.9	3.3	-26.8	-33.7	-43.1	0.3		
9.0	29.2	4061.2	4041.0	4030.2	5.9	4.9	3.2	-26.8	-31.0	-44.5	0.3		
9.5	28.6	4076.2	4055.6	4044.8	5.9	4.9	3.2	-26.3	-31.4	-47.0	0.3		
10.0	27.6	4090.7	4069.9	4058.9	5.9	4.9	3.2	-27.4	-31.1	-50.3	0.3		
10.5	26.1	4104.5	4083.7	4072.6	5.9	4.9	3.2	-27.2	-31.1	-52.6	0.3		
11.0	24.5	4117.7	4096.8	4085.7	5.8	4.9	3.2	-26.4	-30.3	-55.4	0.3		
11.5	22.9	4130.2	4109.0	4097.9	5.8	4.9	3.2	-27.0	-29.2	-55.5	0.3		
12.0	22.9	4141.6	4120.5	4109.2	5.8	4.9	3.1	-27.4	-31.1	-53.3	0.3		

**Notes**

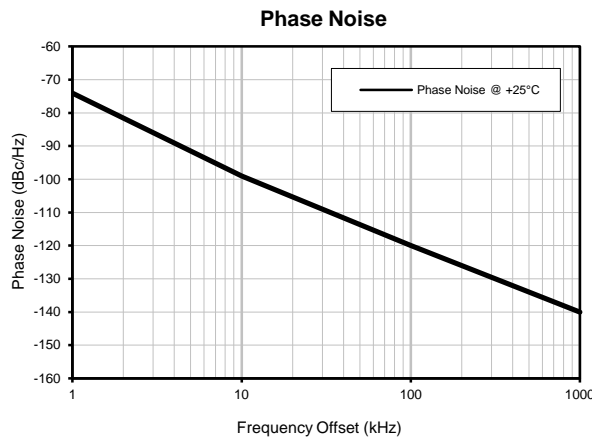
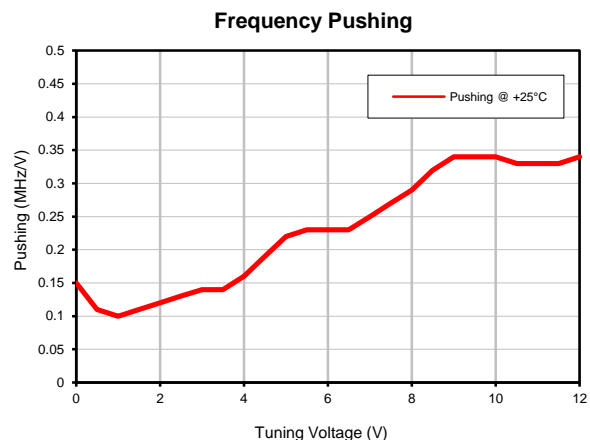
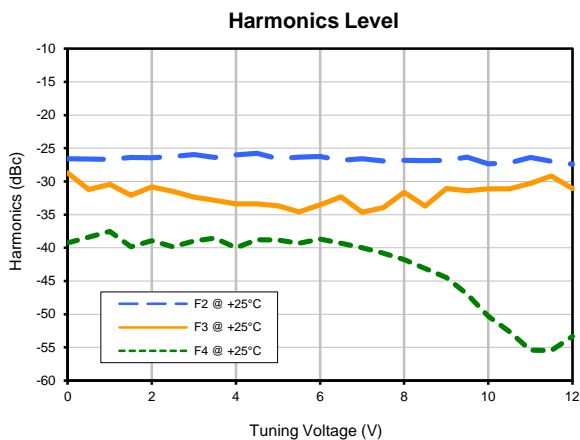
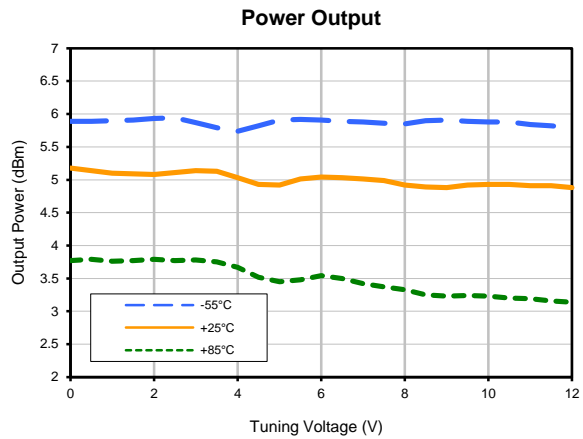
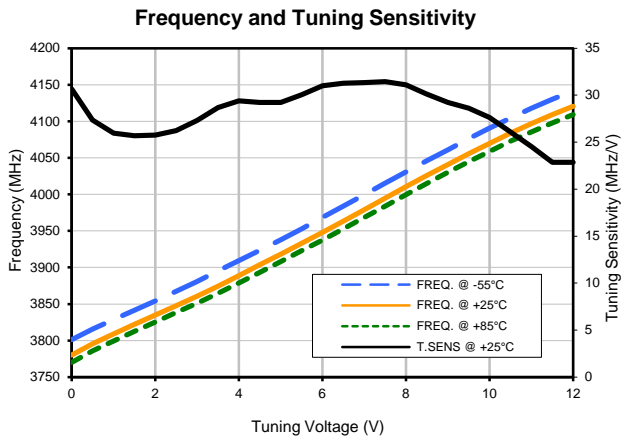
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# Voltage Controlled Oscillator

# ZX95-4000R+

## Typical Performance Data



**Notes**

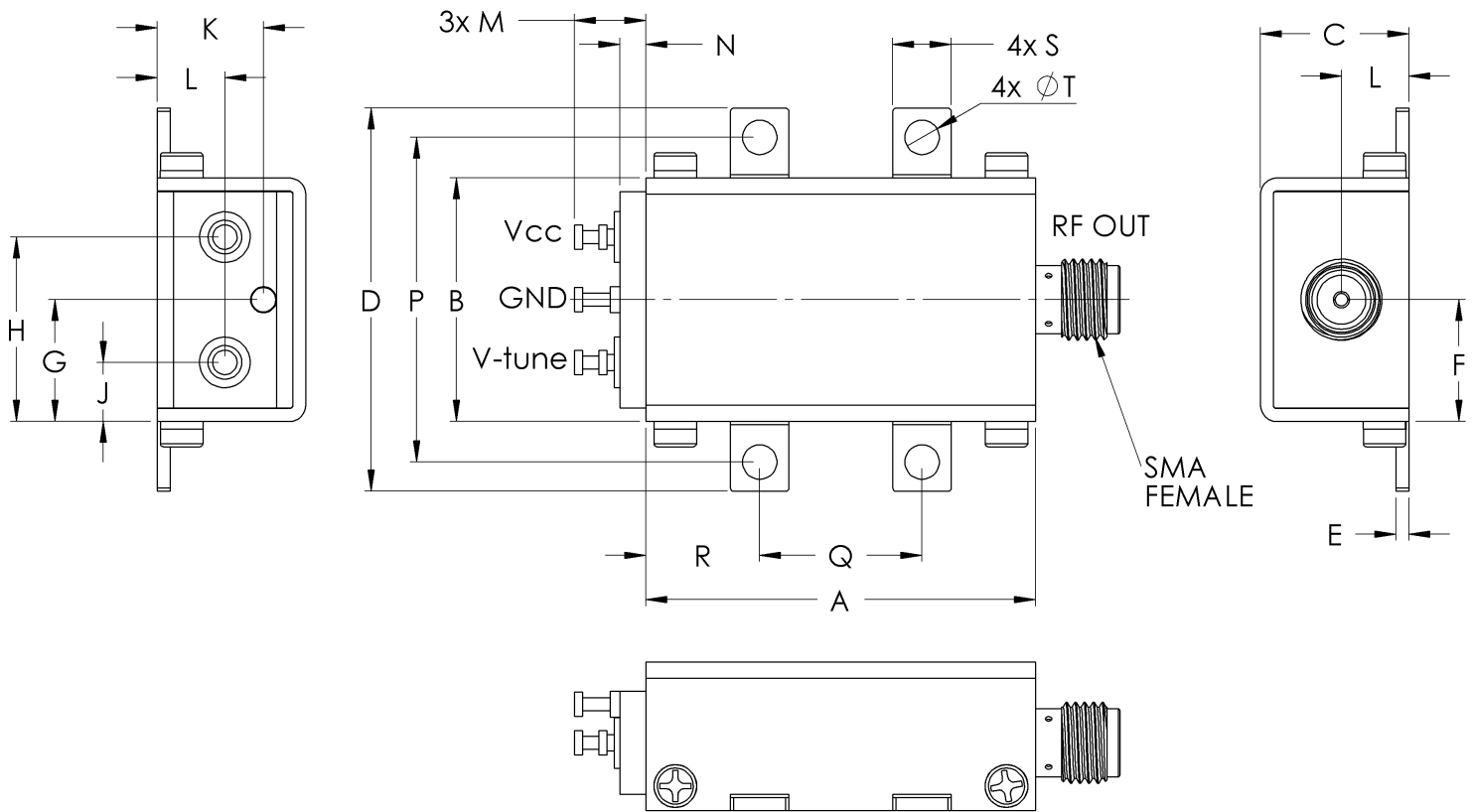
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# Case Style

# GB

## Outline Dimensions

## GB956



CASE #.	A	B	C	D	E	F	G	H	J	K	L	M	N
GB956	1.20 (30.48)	.75 (19.15)	.46 (11.61)	1.18 (30.07)	.04 (1.02)	.38 (9.53)	.38 (9.53)	.57 (14.43)	.18 (4.62)	.33 (8.31)	.21 (5.28)	.22 (5.59)	.08 (2.03)

CASE #.	P	Q	R	S	T	WT GRAMS
GB956	1.00 (25.4)	.50 (12.7)	.35 (8.89)	.18 (4.57)	.106 (2.69)	35

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

### Note:

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 85°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