

Coaxial-Ceramic Resonator Filters and Multiplexers

50Ω

DC to 6 GHz



The Big Deal

- Low insertion loss with excellent power handling
- Passbands up to 6 GHz
- Fractional bandwidth from <1 to 25%
- Excellent temperature stability
- Rugged construction to handle demanding environmental conditions

Product Overview

Mini-Circuits' *Coaxial-Ceramic Resonator filters* offer low insertion loss in very small form factors, using ceramic material with high dielectric constant and superior Q factor. Bandpass and bandstop filters, diplexer and multiplexer designs can be constructed using this technology. Low insertion loss combined with excellent power handling makes these filters well suited for transmitter and receiver signal chains. Advanced filter design and construction can achieve stopband width greater than 3x the center frequency

All our coaxial-ceramic resonator filters are built with rugged construction. Excellent repeatability across units is achieved through precise tuning and process control.

Key Features

Feature	Advantages
Low insertion loss	Low signal loss results in better SNR in signal chain
Fast roll-off	Higher selectivity results in better adjacent channel rejection and dynamic range
Wide stop band	Wide spur-free stopband results in better receiver sensitivity
Excellent power handling	Well suited for transmitter applications
Rugged Construction	These filter assemblies have been qualified over a wide range of thermal, mechanical and environmental conditions including withstanding the stress of extensive solder reflow cycles
Small Size	Very well suited for high performance applications where size is a constraint.
Temperature stability	Very minimal change in electrical performance across temperature makes these filters suitable for a wide range of operating conditions.

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



Band Stop Filter

50Ω 1080 to 1100 MHz

ZCBS4-1090-S+



Generic photo used for illustration purposes only

CASE STYLE: VQ2072

Connectors	Model
SMA-F/F	ZCBS4-1090-S+

Features

- Low insertion loss, 1.1 dB typ.
- Fast roll-off
- Connectorized package

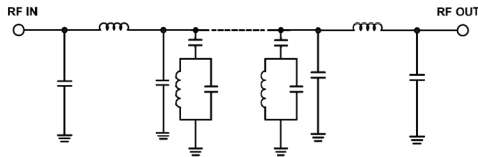
Applications

- Military IFF
- Test and measurement

Electrical Specifications at 25°C

Parameter	F#	Frequency (MHz)	Min.	Typ.	Max.	Unit
Pass Band, Lower	Insertion Loss	DC-F1	DC - 1040	-	1.1	dB
	VSWR	DC-F1	DC - 1040	-	1.33	:1
Stop Band	Rejection	F4-F5	1080 - 1100	38	45	dB
Pass Band, Upper	Insertion Loss	F2-F3	1140 - 1300	-	1.0	dB
	VSWR	F2-F3	1140 - 1300	-	1.29	:1

Functional Schematic



Maximum Ratings

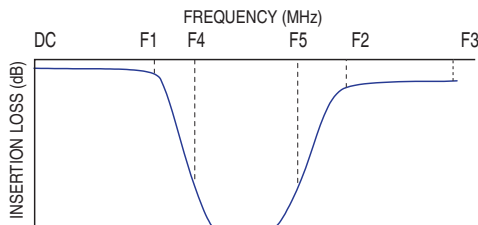
Operating Temperature	-40°C to 85°C
Storage Temperature	-55°C to 100°C
RF Power Input	6W max. @ 25°C

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

Typical Performance Data at 25°C

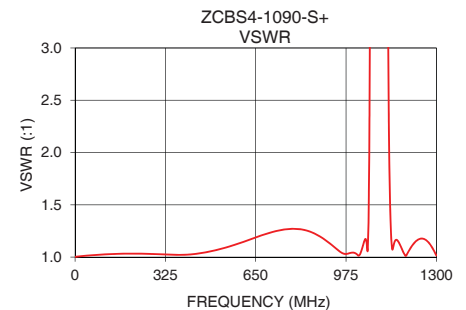
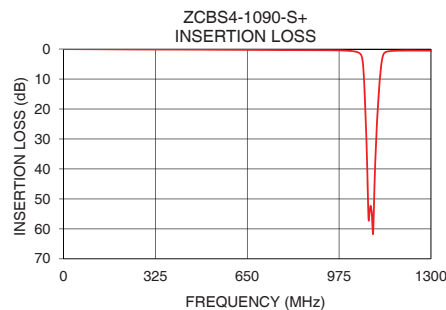
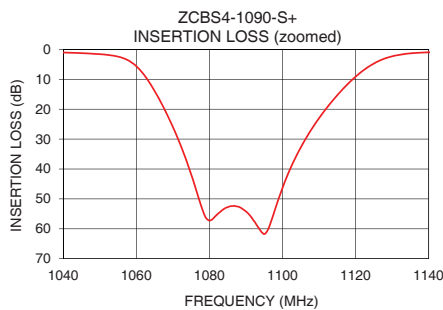
Frequency (MHz)	Insertion Loss (dB)	VSWR (:1)
1	0.00	1.00
10	0.02	1.01
100	0.07	1.03
500	0.21	1.06
1040	1.05	1.15
1057	3.20	1.56
1068	20.75	9.47
1070	25.94	11.25
1080	57.26	18.19
1090	54.20	22.00
1095	61.77	22.49
1100	46.28	21.99
1106	30.58	19.92
1112	19.71	15.83
1128	3.04	2.59
1140	0.97	1.10
1180	0.54	1.05
1200	0.50	1.06
1250	0.51	1.18
1300	0.53	1.02

Typical Frequency Response



+RoHS Compliant

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



Notes

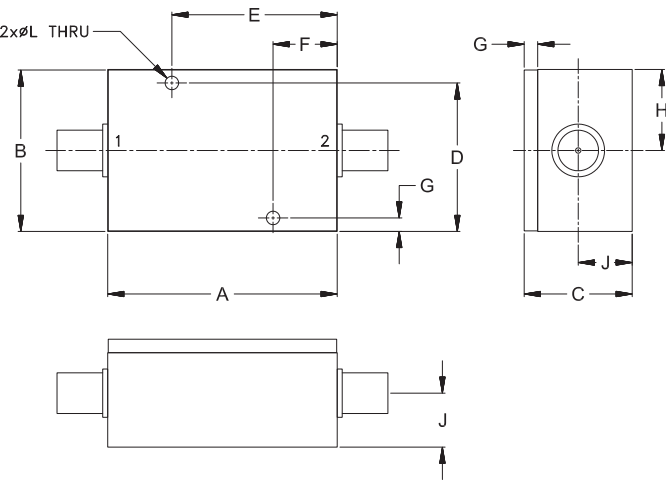
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Coaxial Connections

PORT - 1	SMA-Female
PORT - 2	SMA-Female

Outline Drawing



Outline Dimensions ($\frac{\text{inch}}{\text{mm}}$)

A	B	C	D	E	F	G	H	J	Wt.
2.125	1.500	1.000	1.375	1.531	.594	.125	.750	.500	grams
53.98	38.10	25.40	34.93	38.89	15.09	3.18	19.05	12.70	130

Note: Please refer to case style drawing for details

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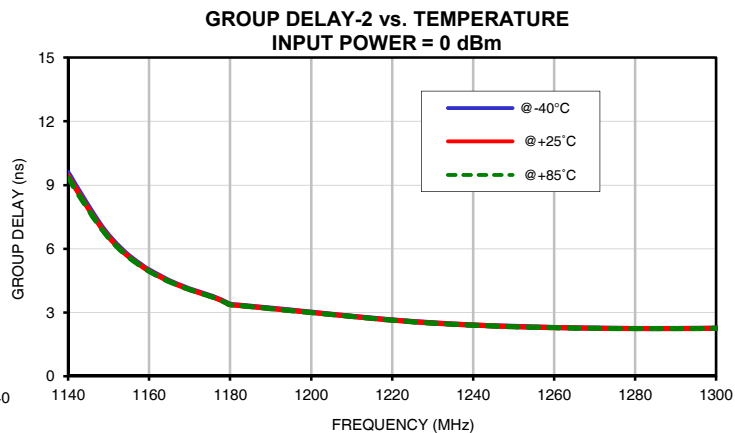
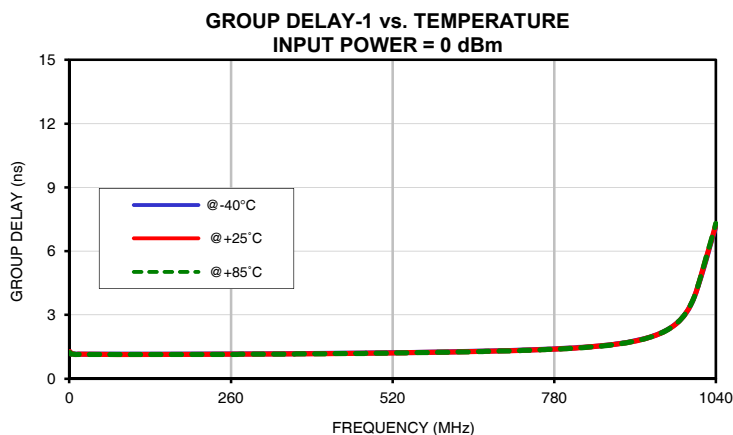
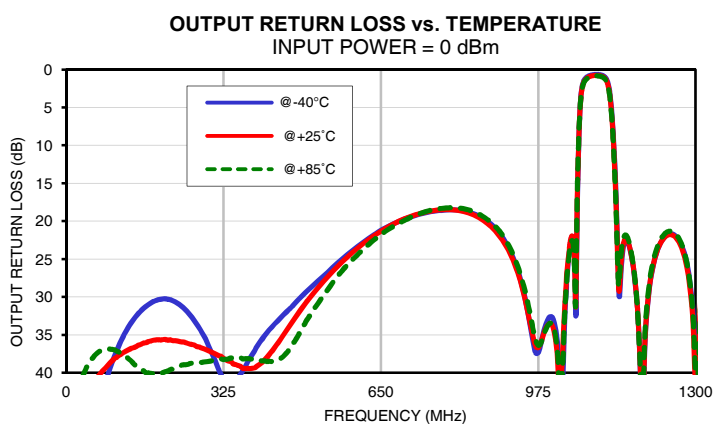
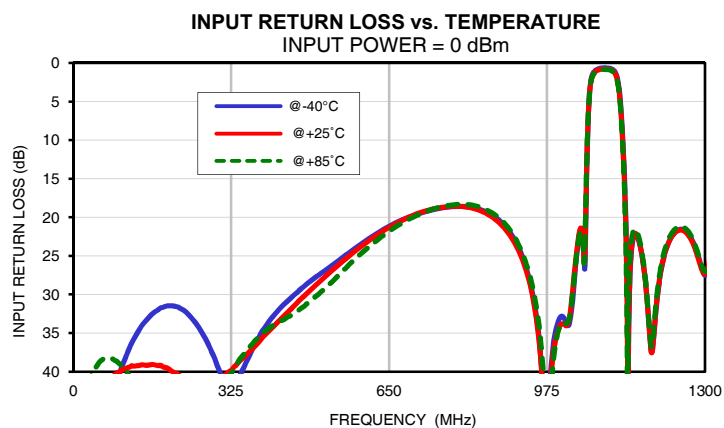
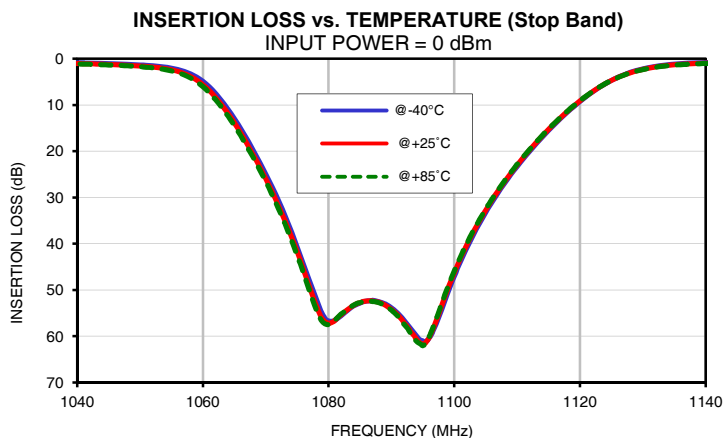
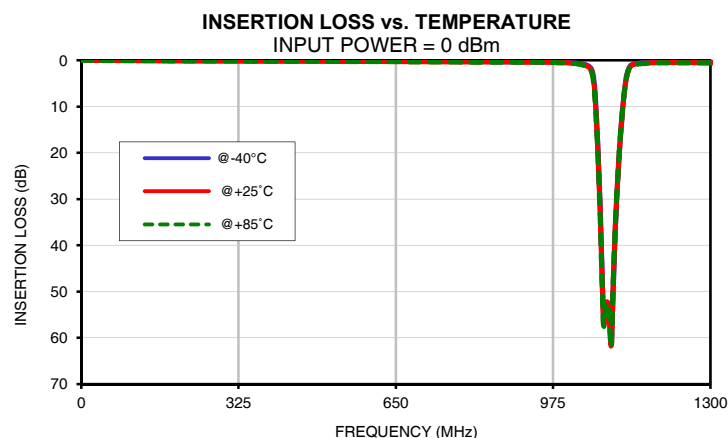
Typical Performance Data

FREQ.	INSERTION LOSS			INPUT RETURN LOSS			OUTPUT RETURN LOSS		
(MHz)	(dB)			(dB)			(dB)		
	@-40°C	@+25°C	@+85°C	@-40°C	@+25°C	@+85°C	@-40°C	@+25°C	@+85°C
1	0.00	0.00	0.01	61.33	58.80	57.57	59.50	57.41	56.43
10	0.01	0.02	0.02	57.18	51.07	48.24	56.96	50.85	48.09
20	0.02	0.02	0.03	54.23	47.68	44.23	53.82	47.13	43.83
30	0.02	0.03	0.03	51.88	45.47	41.71	52.12	44.94	41.29
40	0.03	0.03	0.04	50.07	43.89	40.04	49.96	43.32	39.59
50	0.03	0.04	0.04	48.33	42.94	39.12	47.90	42.03	38.36
60	0.04	0.05	0.05	46.32	41.94	38.44	45.65	41.06	37.62
70	0.04	0.05	0.05	44.73	41.36	38.33	43.42	40.14	37.13
80	0.05	0.06	0.06	42.84	40.67	38.33	41.48	39.46	36.95
100	0.06	0.07	0.07	39.35	39.80	39.25	37.71	38.10	36.96
200	0.09	0.11	0.12	31.47	39.83	47.67	30.24	35.62	39.96
300	0.12	0.15	0.16	39.76	40.96	43.03	37.29	37.29	38.43
400	0.14	0.18	0.19	33.74	34.91	34.51	35.96	38.86	38.38
500	0.17	0.21	0.22	27.69	28.72	30.19	29.04	30.35	32.76
600	0.20	0.25	0.27	23.13	23.40	24.28	23.44	23.66	24.53
700	0.25	0.30	0.33	19.76	19.74	19.98	19.70	19.65	19.85
800	0.30	0.36	0.39	18.59	18.60	18.31	18.51	18.52	18.22
900	0.32	0.38	0.42	22.07	22.46	21.77	22.01	22.39	21.75
1000	0.44	0.53	0.58	33.18	34.24	34.35	32.58	33.51	33.45
1040	0.89	1.05	1.13	22.81	22.42	22.89	23.62	23.24	23.80
1057	2.73	3.20	3.51	13.23	12.46	12.03	13.94	13.16	12.72
1063	9.13	10.00	10.54	3.47	3.52	3.56	3.69	3.74	3.79
1068	19.80	20.75	21.34	1.56	1.72	1.81	1.68	1.84	1.94
1070	24.96	25.94	26.55	1.29	1.45	1.54	1.39	1.55	1.64
1071	27.74	28.74	29.37	1.19	1.35	1.44	1.29	1.44	1.53
1080	56.72	57.26	57.52	0.78	0.92	0.99	0.83	0.96	1.03
1085	52.83	52.77	52.75	0.69	0.82	0.89	0.72	0.85	0.91
1088	52.55	52.63	52.76	0.66	0.79	0.85	0.69	0.81	0.87
1090	53.88	54.20	54.33	0.65	0.78	0.84	0.67	0.79	0.85
1092	56.50	57.09	57.44	0.64	0.77	0.83	0.66	0.78	0.84
1095	61.03	61.77	62.04	0.63	0.76	0.83	0.66	0.77	0.83
1098	54.20	53.35	52.91	0.64	0.77	0.84	0.66	0.78	0.84
1100	47.02	46.28	45.88	0.66	0.79	0.85	0.67	0.79	0.86
1106	31.00	30.58	30.38	0.73	0.88	0.95	0.74	0.87	0.94
1112	19.98	19.71	19.61	0.94	1.11	1.19	0.94	1.10	1.19
1119	10.36	10.23	10.18	1.80	2.05	2.19	1.78	2.02	2.16
1128	2.97	3.04	3.08	6.69	7.23	7.57	6.58	7.08	7.41
1130	2.20	2.31	2.36	8.79	9.41	9.83	8.64	9.20	9.60
1135	1.19	1.33	1.40	16.02	16.97	17.83	15.55	16.32	17.00
1140	0.84	0.97	1.04	29.42	32.59	38.02	26.01	26.73	27.37
1150	0.63	0.75	0.82	23.63	23.25	22.49	23.71	23.25	22.51
1155	0.59	0.69	0.76	22.33	22.13	21.58	22.60	22.34	21.82
1160	0.55	0.65	0.71	22.43	22.30	21.87	22.79	22.62	22.22
1165	0.51	0.61	0.67	23.30	23.23	22.86	23.79	23.67	23.35
1170	0.49	0.58	0.64	24.81	24.77	24.45	25.48	25.39	25.15
1175	0.46	0.56	0.61	26.95	26.95	26.67	27.92	27.84	27.70
1180	0.45	0.54	0.59	29.90	29.95	29.72	31.59	31.52	31.54
1185	0.43	0.52	0.57	33.93	34.04	33.75	37.76	37.58	38.01
1190	0.42	0.51	0.56	37.49	37.55	36.81	47.17	44.94	44.47
1200	0.41	0.50	0.55	31.52	31.38	30.71	31.66	31.43	30.79
1210	0.41	0.50	0.55	26.78	26.70	26.18	26.66	26.56	26.05
1220	0.41	0.50	0.55	24.16	24.12	23.66	24.06	24.03	23.56
1230	0.42	0.51	0.55	22.65	22.66	22.21	22.59	22.62	22.16
1240	0.42	0.51	0.56	21.83	21.89	21.44	21.84	21.92	21.47
1250	0.43	0.51	0.57	21.54	21.65	21.20	21.66	21.79	21.34
1260	0.43	0.52	0.57	21.77	21.92	21.46	22.03	22.24	21.77
1270	0.43	0.52	0.57	22.51	22.71	22.24	23.02	23.32	22.84
1280	0.43	0.52	0.57	23.87	24.13	23.63	24.97	25.45	24.90
1290	0.43	0.52	0.58	25.85	26.10	25.57	28.71	29.64	28.91
1300	0.44	0.53	0.59	27.53	27.38	27.04	38.40	41.50	40.11

Typical Performance Data

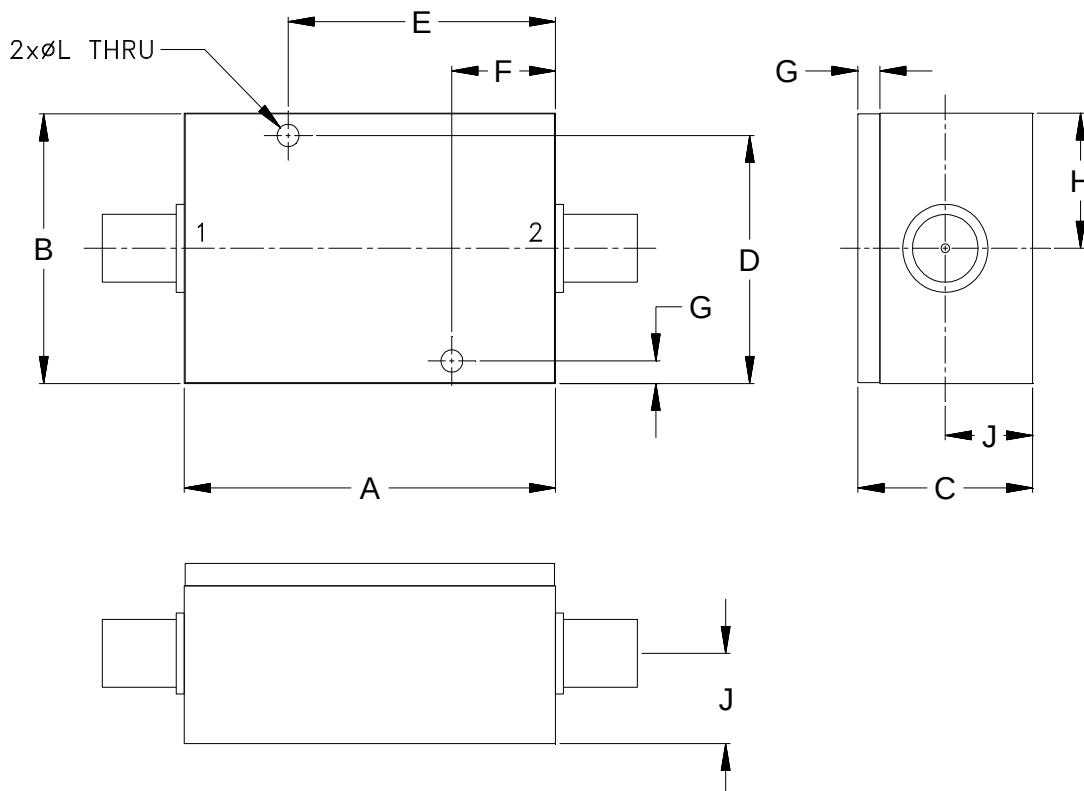
FREQ.	GROUP DELAY-1			FREQ.	GROUP DELAY-2		
(MHz)	(ns)			(MHz)	(ns)		
	@-40°C	@+25°C	@+85°C		@-40°C	@+25°C	@+85°C
1	1.26	1.27	1.23	1140	9.58	9.42	9.34
2	1.20	1.21	1.18	1141	9.26	9.11	9.03
4	1.17	1.17	1.16	1142	8.94	8.79	8.73
10	1.15	1.15	1.15	1143	8.63	8.49	8.43
20	1.16	1.15	1.14	1144	8.32	8.19	8.13
40	1.15	1.15	1.14	1145	8.01	7.89	7.83
60	1.15	1.14	1.14	1146	7.70	7.60	7.54
80	1.15	1.14	1.14	1147	7.41	7.31	7.26
100	1.15	1.14	1.14	1148	7.13	7.04	6.99
120	1.15	1.14	1.14	1149	6.87	6.79	6.75
140	1.15	1.14	1.14	1150	6.63	6.55	6.51
160	1.15	1.14	1.14	1155	5.67	5.62	5.59
180	1.15	1.14	1.14	1160	5.00	4.96	4.94
200	1.15	1.14	1.14	1165	4.49	4.46	4.45
220	1.15	1.15	1.14	1170	4.11	4.09	4.07
240	1.16	1.15	1.14	1175	3.80	3.77	3.76
260	1.16	1.15	1.15	1180	3.39	3.37	3.36
280	1.16	1.15	1.15	1185	3.30	3.28	3.27
300	1.17	1.16	1.15	1190	3.20	3.19	3.18
320	1.17	1.16	1.15	1195	3.11	3.09	3.09
340	1.17	1.16	1.16	1200	3.01	3.00	2.99
360	1.18	1.17	1.16	1205	2.92	2.90	2.90
380	1.18	1.17	1.17	1210	2.83	2.81	2.81
400	1.19	1.18	1.17	1215	2.73	2.72	2.72
420	1.19	1.18	1.18	1220	2.65	2.64	2.63
440	1.20	1.19	1.18	1225	2.57	2.56	2.56
460	1.20	1.19	1.19	1230	2.51	2.50	2.50
480	1.21	1.20	1.19	1235	2.46	2.45	2.44
500	1.22	1.21	1.20	1240	2.41	2.40	2.40
520	1.22	1.21	1.21	1245	2.37	2.36	2.36
540	1.23	1.22	1.22	1250	2.34	2.33	2.33
560	1.24	1.23	1.22	1255	2.31	2.31	2.30
580	1.25	1.24	1.23	1260	2.29	2.28	2.28
600	1.26	1.25	1.24	1265	2.27	2.27	2.26
650	1.28	1.27	1.27	1270	2.26	2.26	2.25
700	1.32	1.31	1.30	1275	2.25	2.25	2.25
750	1.36	1.35	1.35	1280	2.25	2.24	2.24
800	1.43	1.42	1.42	1285	2.24	2.24	2.24
900	1.72	1.72	1.71	1290	2.25	2.24	2.24
1000	3.48	3.49	3.50	1295	2.25	2.25	2.25
1040	7.18	7.25	7.30	1300	2.26	2.25	2.26

Typical Performance Curves



Outline Dimensions

VQ2072



CASE#	A	B	C	D	E	F	G	H	J	WT. GRAMS
VQ2072	2.125 (53.98)	1.500 (38.10)	1.000 (25.40)	1.375 (34.93)	1.531 (38.89)	0.594 (15.09)	0.125 (3.18)	0.750 (19.05)	0.500 (12.70)	130

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

Notes:

- Case material: Aluminum alloy.
- Case finish:
For RoHS Case Styles: Clear chemical conversion coating, non-chrome or trivalent chrome based.
- Refer to the individual model data sheet for the type of connectors available.



P.O. Box 350166, Brooklyn, New York 11235-0003 (718) 934-4500 Fax (718) 332-4661 For detailed performance specs & shopping online see Mini-Circuits web site



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

RF/IF MICROWAVE COMPONENTS



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
Humidity	90 to 95% RH, 40°C, 96 hours; Units may require bake-out after humidity to restore full performance.	MIL-STD-202, Method 103, Condintion B
Thermal Shock	-55° to 100°C, 100 cycles	MIL-STD-202, Method 107, Condition A-3, except +100°C
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	50g, 11ms half-sine, 3 shocks each direction 3 axes (total 18)	MIL-STD-202, Method 213, Condition A