Coaxial

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.

Coaxial

Band Stop Filter

ZCBS4-738-S+

50Ω 718 to 758 MHz

Generic photo used for illustration purposes only

CASE STYLE: FM587-1

Connectors	Model
SMA-M\F	ZCBS4-738-S+

Features

- Low insertion loss, 1.7 dB typ.
- Fast roll-off
- Connectorized package

Applications

- Satellite communication

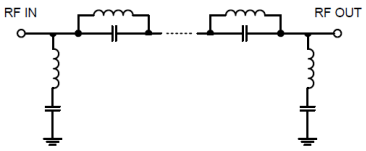
Electrical Specifications at 25°C

Parameter		F#	Frequency (MHz)	Min.	Typ.	Max.	Unit
Pass Band, Lower	Insertion Loss	DC-F1	DC - 704	-	1.7	2.4	dB
	VSWR	DC-F1	DC - 704	-	1.35	1.9	:1
Stop Band	Rejection	F4-F5	718 - 758	12	17	-	dB
Pass Band, Upper	Insertion Loss	F2-F3	770 - 850	-	1.7	2.4	dB
	VSWR	F2-F3	770 - 850	-	1.3	1.9	:1

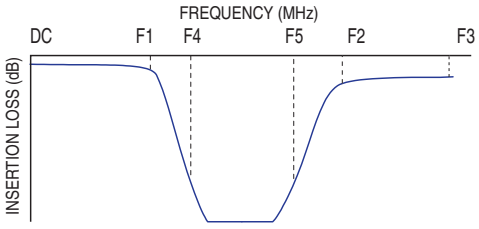
Maximum Ratings	
Operating Temperature	-40°C to 85°C
Storage Temperature	-55°C to 100°C
RF Power Input	5W max. @ 25°C

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

Functional Schematic



Typical Frequency Response

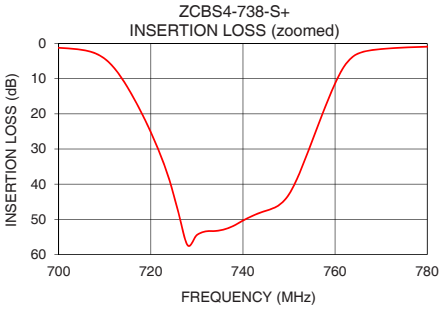


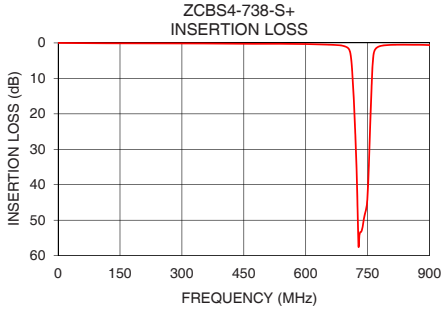
+RoHS Compliant

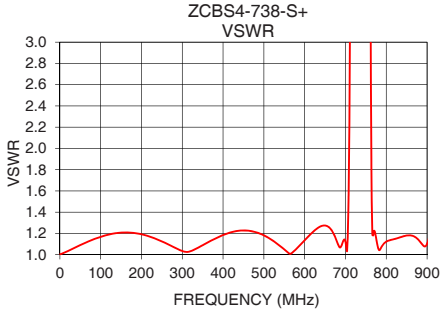
The +Suffix identifies RoHS Compliance. See our web site for RoHS Compliance methodologies and qualifications

Typical Performance Data at 25°C

Frequency (MHz)	Insertion Loss (dB)	VSWR (:1)
1	0.00	1.01
10	0.01	1.02
50	0.04	1.09
100	0.08	1.17
500	0.25	1.18
704	1.63	1.04
708	2.82	1.65
718	19.77	11.61
720	25.23	13.83
724	38.66	17.04
738	51.81	20.32
740	50.34	20.15
758	17.58	8.72
760	11.38	5.58
764	3.61	1.66
770	1.59	1.22
800	0.59	1.12
820	0.52	1.15
830	0.50	1.16
850	0.51	1.18







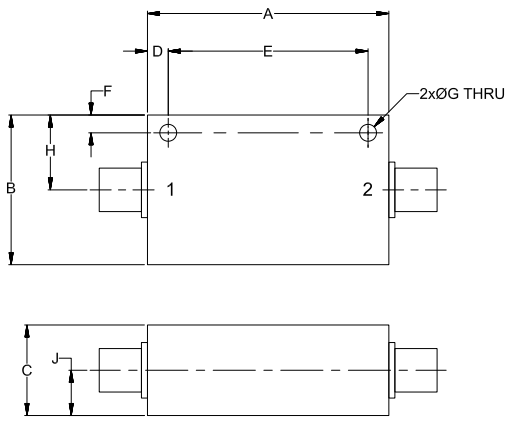
Notes

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

Coaxial Connections

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

Outline Drawing



Outline Dimensions (inch / mm)

A	B	C	D	E	F	G	H	J	Wt.
2.00	**1.24**	**.75**	**.17**	**1.656**	**.15**	**.140**	**.62**	**.38**	grams
50.80	31.50	19.05	4.32	42.06	3.81	3.56	15.75	9.65	57

Note: Please refer to case style drawing for details

Coaxial Band Stop Filter ZCBS4-738-S+

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	0.00	58.51	60.85	62.80	51.69	51.17	50.85
10	0.01	0.01	0.01	40.01	41.66	42.91	39.74	41.13	42.10
20	0.02	0.02	0.02	33.91	35.24	36.33	33.91	35.22	36.24
30	0.02	0.03	0.03	30.59	31.66	32.64	30.56	31.66	32.61
40	0.03	0.03	0.04	28.36	29.19	30.04	28.32	29.17	30.02
50	0.04	0.04	0.04	26.74	27.31	28.02	26.68	27.28	28.01
60	0.04	0.05	0.05	25.50	25.83	26.39	25.46	25.82	26.39
70	0.05	0.06	0.06	24.51	24.63	25.00	24.49	24.62	25.03
80	0.06	0.07	0.07	23.76	23.66	23.86	23.72	23.65	23.88
90	0.06	0.07	0.08	23.16	22.87	22.89	23.11	22.85	22.90
100	0.07	0.08	0.09	22.69	22.22	22.06	22.64	22.20	22.07
110	0.08	0.09	0.09	22.34	21.69	21.36	22.28	21.66	21.37
120	0.08	0.10	0.10	22.08	21.25	20.77	22.03	21.24	20.79
130	0.09	0.10	0.11	21.92	20.93	20.30	21.86	20.91	20.32
140	0.09	0.11	0.12	21.80	20.68	19.92	21.76	20.68	19.96
150	0.10	0.11	0.13	21.76	20.53	19.66	21.71	20.53	19.69
160	0.10	0.12	0.14	21.76	20.46	19.49	21.72	20.47	19.54
170	0.10	0.12	0.14	21.80	20.47	19.43	21.79	20.50	19.49
180	0.11	0.13	0.14	21.90	20.58	19.48	21.89	20.61	19.56
190	0.11	0.13	0.15	22.05	20.79	19.65	22.05	20.83	19.74
200	0.11	0.13	0.15	22.24	21.07	19.92	22.24	21.12	20.01
210	0.11	0.13	0.15	22.50	21.48	20.33	22.50	21.54	20.43
220	0.11	0.13	0.15	22.84	21.99	20.86	22.85	22.08	20.99
230	0.11	0.13	0.15	23.27	22.64	21.56	23.29	22.75	21.70
240	0.12	0.13	0.15	23.83	23.46	22.45	23.84	23.56	22.59
250	0.12	0.13	0.14	24.53	24.46	23.57	24.54	24.58	23.73
260	0.12	0.13	0.14	25.41	25.70	24.99	25.42	25.84	25.19
270	0.11	0.13	0.14	26.52	27.27	26.81	26.51	27.43	27.06
280	0.11	0.13	0.14	27.91	29.28	29.21	27.84	29.43	29.53
300	0.12	0.14	0.15	31.99	35.53	37.13	31.51	35.41	38.04
400	0.17	0.20	0.23	22.18	21.52	20.53	22.03	21.44	20.52
500	0.22	0.25	0.28	20.82	21.53	21.55	20.83	21.56	21.58
700	1.06	1.23	1.35	21.87	22.15	21.59	23.97	24.73	24.26
704	1.39	1.63	1.79	21.30	20.67	19.98	47.84	35.03	34.43
710	3.71	4.34	4.69	7.38	6.92	6.78	8.00	7.49	7.39
714	9.52	10.49	10.95	2.61	2.62	2.67	2.81	2.81	2.87
718	18.69	19.77	20.21	1.30	1.41	1.49	1.39	1.50	1.58
720	24.10	25.23	25.65	1.08	1.19	1.26	1.14	1.26	1.33
724	37.24	38.66	39.03	0.88	0.98	1.05	0.91	1.02	1.08
730	55.02	54.45	54.46	0.77	0.87	0.93	0.79	0.89	0.94
738	51.90	51.81	51.73	0.75	0.85	0.92	0.75	0.86	0.91
740	50.52	50.34	50.43	0.76	0.87	0.93	0.76	0.86	0.92
742	49.13	49.06	49.11	0.78	0.88	0.96	0.77	0.88	0.94
748	45.88	45.80	45.83	0.87	1.00	1.09	0.85	0.98	1.06
750	43.33	42.89	42.92	0.93	1.07	1.17	0.90	1.04	1.13
754	32.18	31.20	31.22	1.13	1.32	1.44	1.09	1.27	1.38
758	18.50	17.58	17.66	1.72	2.07	2.25	1.67	2.00	2.17
760	12.11	11.38	11.53	2.66	3.24	3.46	2.60	3.15	3.38
770	1.43	1.59	1.71	20.12	20.28	20.50	19.88	19.93	20.21
800	0.50	0.59	0.65	25.56	25.53	26.53	24.82	24.76	25.90
806	0.47	0.56	0.61	24.70	24.76	25.55	24.10	24.11	25.01
810	0.45	0.54	0.59	24.35	24.44	25.09	23.79	23.83	24.57
816	0.44	0.52	0.58	23.92	24.03	24.48	23.45	23.49	24.00
820	0.43	0.52	0.57	23.64	23.75	24.06	23.23	23.27	23.62
824	0.43	0.51	0.56	23.37	23.48	23.67	23.02	23.04	23.26
826	0.42	0.51	0.56	23.24	23.33	23.46	22.90	22.92	23.07
830	0.42	0.50	0.56	22.95	23.03	23.06	22.68	22.67	22.71
836	0.42	0.51	0.56	22.56	22.61	22.50	22.35	22.31	22.19
840	0.42	0.50	0.56	22.31	22.34	22.15	22.13	22.08	21.88
850	0.43	0.51	0.57	21.85	21.85	21.50	21.72	21.64	21.27

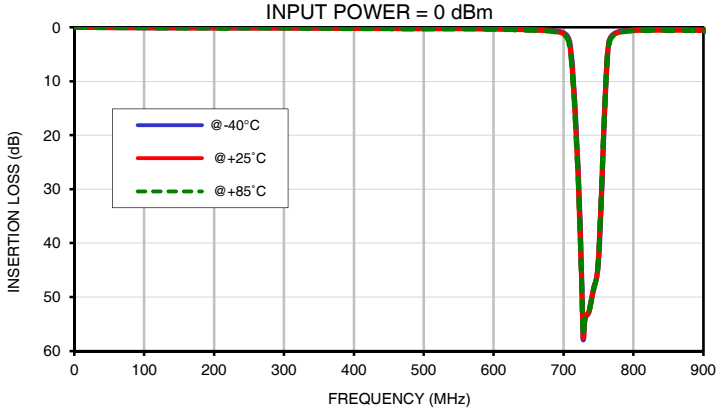
Typical Performance Data

FREQ. (MHz)	GROUP DELAY-1 (ns)		
	@-40°C	@+25°C	@+85°C
1	1.50	1.49	1.53
2	1.53	1.52	1.55
4	1.53	1.52	1.54
10	1.54	1.53	1.53
20	1.53	1.52	1.52
40	1.53	1.52	1.52
60	1.52	1.52	1.51
80	1.52	1.52	1.51
100	1.52	1.52	1.51
120	1.53	1.52	1.51
140	1.53	1.52	1.52
160	1.54	1.53	1.52
180	1.54	1.53	1.53
200	1.55	1.54	1.54
220	1.56	1.55	1.55
240	1.58	1.57	1.56
260	1.59	1.58	1.58
280	1.61	1.60	1.60
300	1.63	1.62	1.62
320	1.64	1.64	1.64
340	1.66	1.65	1.65
360	1.68	1.67	1.67
380	1.70	1.69	1.69
400	1.73	1.72	1.71
420	1.75	1.74	1.74
440	1.78	1.78	1.77
460	1.83	1.82	1.81
480	1.87	1.87	1.86
500	1.94	1.93	1.93
520	2.01	2.01	2.01
540	2.11	2.10	2.10
560	2.23	2.23	2.22
580	2.39	2.38	2.38
600	2.60	2.59	2.59
620	2.90	2.90	2.90
640	3.41	3.41	3.41
660	4.38	4.40	4.41
680	6.72	6.78	6.81
700	16.17	16.53	16.64
702	18.73	19.09	19.17
704	21.46	21.72	21.71

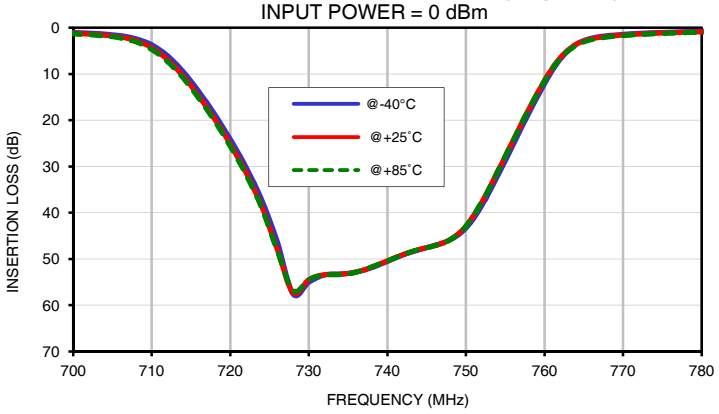
FREQ. (MHz)	GROUP DELAY-2 (ns)		
	@-40°C	@+25°C	@+85°C
770	31.12	30.30	30.03
772	27.46	26.50	26.30
774	23.05	22.23	22.13
776	19.30	18.73	18.68
778	16.58	16.18	16.16
780	14.60	14.30	14.29
782	13.08	12.84	12.84
784	11.86	11.67	11.66
786	10.86	10.70	10.70
788	10.02	9.88	9.88
790	9.31	9.19	9.19
792	8.70	8.59	8.60
794	8.17	8.08	8.09
796	7.71	7.63	7.64
798	7.32	7.25	7.25
800	6.96	6.90	6.91
802	6.65	6.60	6.61
804	6.38	6.33	6.34
806	6.13	6.09	6.10
808	5.91	5.87	5.88
810	5.71	5.68	5.69
812	5.54	5.51	5.51
814	5.38	5.35	5.36
816	5.23	5.21	5.21
818	5.10	5.08	5.08
820	4.98	4.96	4.96
822	4.87	4.85	4.85
824	4.77	4.75	4.76
826	4.68	4.66	4.67
828	4.60	4.58	4.58
830	4.52	4.51	4.51
832	4.45	4.44	4.44
834	4.39	4.37	4.38
836	4.33	4.32	4.32
838	4.27	4.26	4.27
840	4.23	4.22	4.22
842	4.18	4.18	4.18
844	4.14	4.14	4.14
846	4.11	4.10	4.11
848	4.07	4.07	4.07
850	4.05	4.04	4.04

Typical Performance Curves

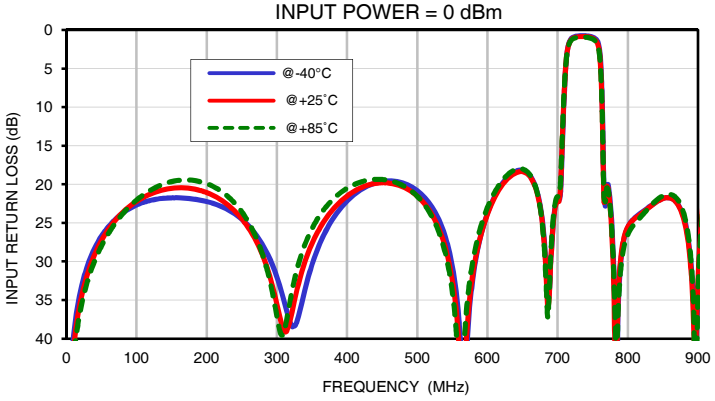
INSERTION LOSS vs. TEMPERATURE
INPUT POWER = 0 dBm



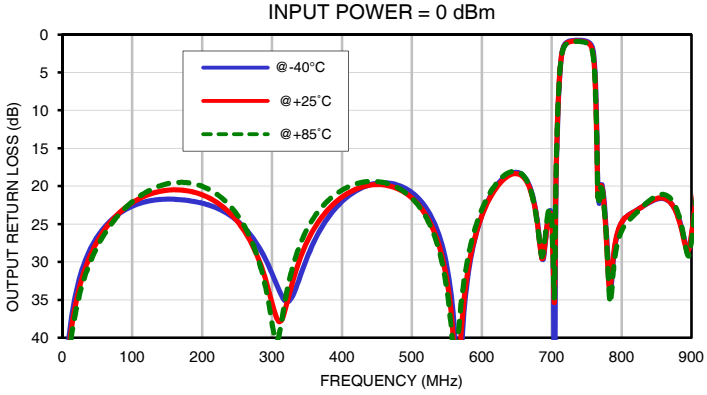
INSERTION LOSS vs. TEMPERATURE (Stop Band)
INPUT POWER = 0 dBm



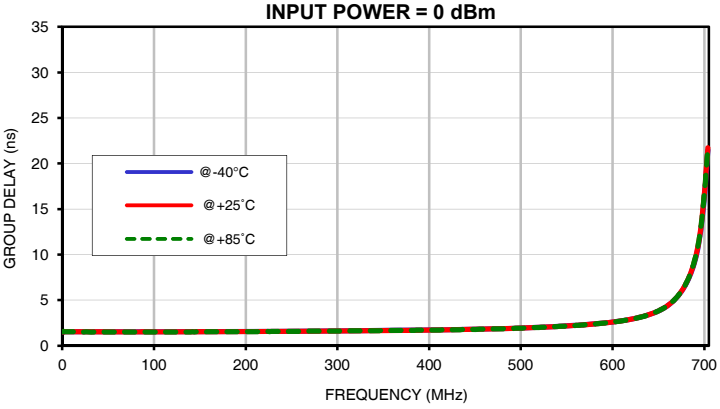
INPUT RETURN LOSS vs. TEMPERATURE
INPUT POWER = 0 dBm



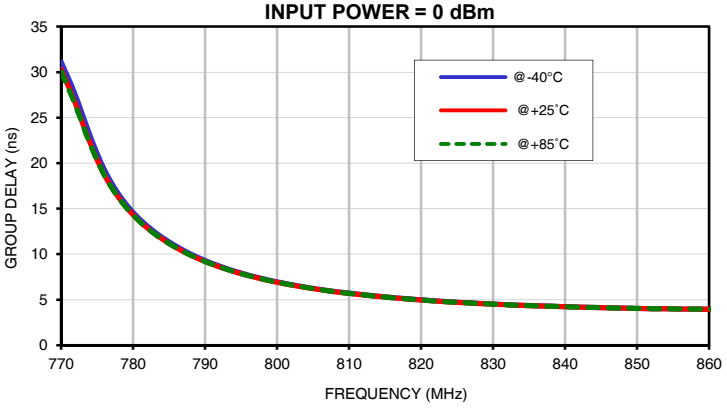
OUTPUT RETURN LOSS vs. TEMPERATURE
INPUT POWER = 0 dBm



GROUP DELAY-1 vs. TEMPERATURE
INPUT POWER = 0 dBm



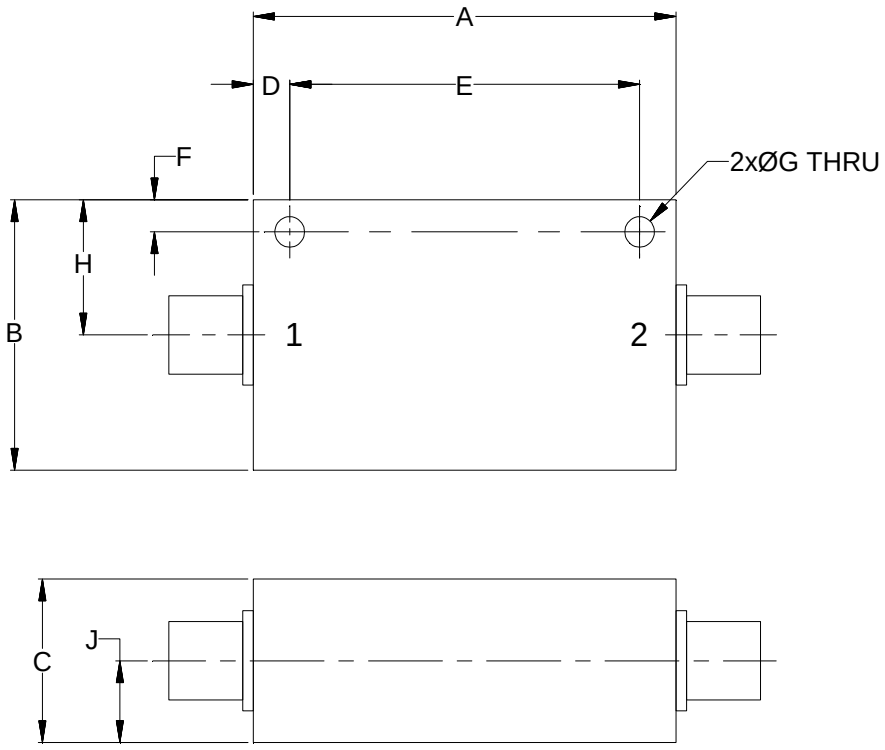
GROUP DELAY-2 vs. TEMPERATURE
INPUT POWER = 0 dBm



Case Style FM

Outline Dimensions

FM587-1



CASE #.	A	B	C	D	E	F	G	H	J	WT, GRAM
FM587-1	2.00 (50.80)	1.24 (31.50)	.75 (19.05)	.17 (4.32)	1.656 (42.06)	.15 (3.81)	.140 (3.56)	.62 (15.75)	.38 (9.65)	57

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

Notes:

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

Mini-Circuits

Environmental Specifications ENV46

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