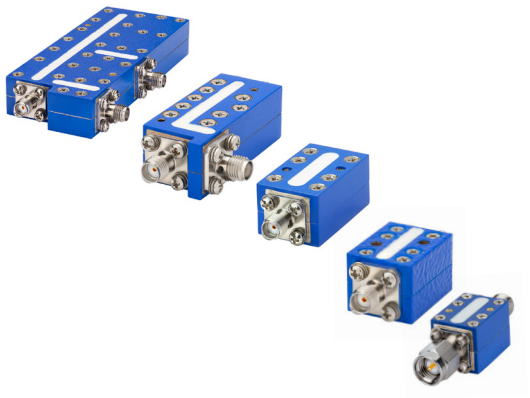
Suspended Substrate Stripline Filters and Multiplexers

50Ω DC to 40 GHz



The Big Deal

- Low insertion loss
- Ultra-wide passband width
- Fast roll-off with wide stopband
- Good power handling and temperature stability
- Passband up to 40 GHz
- Stopband up to 40 GHz

Product Overview

Mini-Circuits' Suspended Substrate Stripline filters offer low insertion loss by implementing printed circuit board suspended between two parallel ground planes, providing high Q. Low insertion loss combined with wide stopband makes them an excellent choice for wideband instruments and systems like ECM, ECCM, ELINT and ultra-broadband receivers.

Low pass, high pass, band pass, band stop, diplexer and multiplexer designs can be realized with this technology. Advanced filter design and construction can achieve stopband width greater than 6x the center frequency, and temperature stability will be better than other printed circuit realizations because the fields are mainly in the air rather than in a dielectric. The inside walls of the housing hold the circuit and prevent movement that could be caused by vibration or mechanical shock, making these designs excellent candidates for harsh operating environments.

Suspended substrate stripline filters can be realized in small form factors with high-quality, precise machining for applications where size is critical. 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 receiver front end and better power delivery to antenna in transmitters
Fast roll-off	Higher selectivity results in better adjacent channel rejection and dynamic range
Wide stopband	Wide, spur-free stop band results in better receiver sensitivity
High power handling	Well suited for transmitter applications
Excellent temperature stability	Ensures minimal variation in electrical performance across temperature

Suspended substrate stripline

Band Pass Filter

ZBSS-7975-S+

50Ω 7825 to 8125 MHz

Generic photo used for illustration purposes only

CASE STYLE: QD2229

Connectors	Model
SMA-F	ZBSS-7975-S+

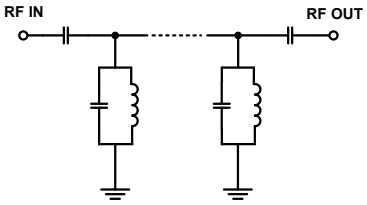
Features

- Sharp roll-off
- High rejection of 50 dB typ.
- Stop band up to 15 GHz
- Narrow bandwidth
- Connectorized package and small size

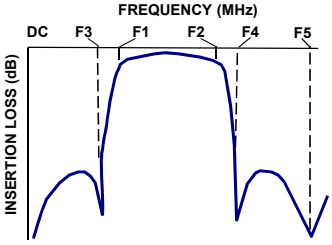
Applications

- Fixed Satellite
- Mobile communications
- C-band applications

Functional Schematic



Typical Frequency Response



+RoHS Compliant

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

Electrical Specifications at 25°C

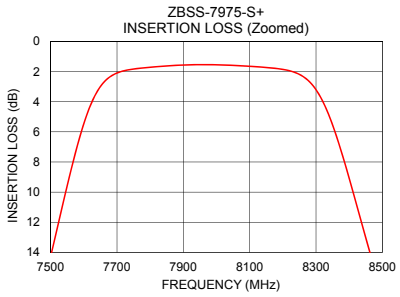
Parameter		F#	Frequency (MHz)	Min.	Typ.	Max.	Unit
Pass Band	Center Frequency	Fc	7975	-	2.0	-	dB
	Insertion Loss	F1-F2	7825-8125	-	2.5	3.5	dB
	VSWR	F1-F2	7825-8125	-	2.1	-	:1
Stop Band, Lower	Insertion Loss	DC-F3	DC-6900	40	50	-	dB
	VSWR	DC-F3	DC-6900	-	20	-	:1
Stop Band, Upper	Insertion Loss	F4-F5	9350-15000	40	50	-	dB
	VSWR	F4-F5	9350-15000	-	20	-	:1

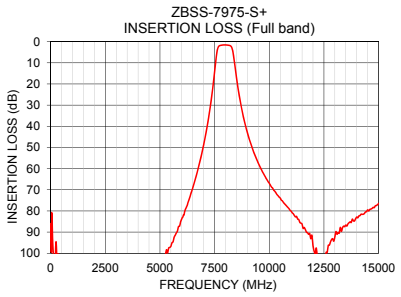
Maximum Ratings	
Operating Temperature	-40°C to 85°C
Storage Temperature	-55°C to 100°C
RF Power Input	3W max.

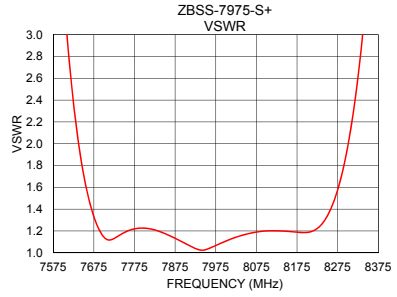
Permanent damage may occur if any of these limits are exceeded.

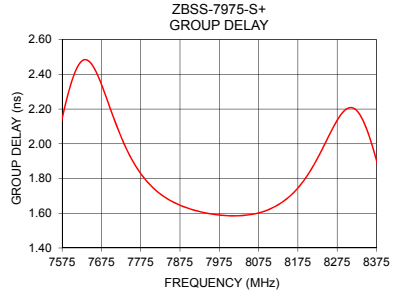
Typical Performance Data at 25°C

Frequency (MHz)	Insertion Loss (dB)	VSWR (:1)	Frequency (MHz)	Group Delay (nsec)
10	85.98	34324.80	7825	1.71
100	95.68	30921.64	7840	1.69
1000	120.56	832.33	7855	1.67
5000	106.04	118.10	7870	1.65
6900	53.51	79.75	7885	1.64
7300	30.91	35.71	7900	1.63
7430	20.66	20.47	7915	1.62
7500	14.28	12.22	7930	1.61
7650	2.99	1.71	7945	1.60
7825	1.67	1.21	7960	1.59
7975	1.54	1.07	7975	1.59
8125	1.69	1.20	7990	1.59
8300	3.21	1.98	8005	1.59
8500	16.90	14.38	8020	1.59
8550	20.50	18.96	8035	1.59
8720	30.77	36.32	8050	1.59
9000	43.05	72.80	8065	1.60
9350	53.79	120.35	8080	1.60
10000	66.92	136.81	8100	1.62
15000	76.52	57.51	8125	1.65









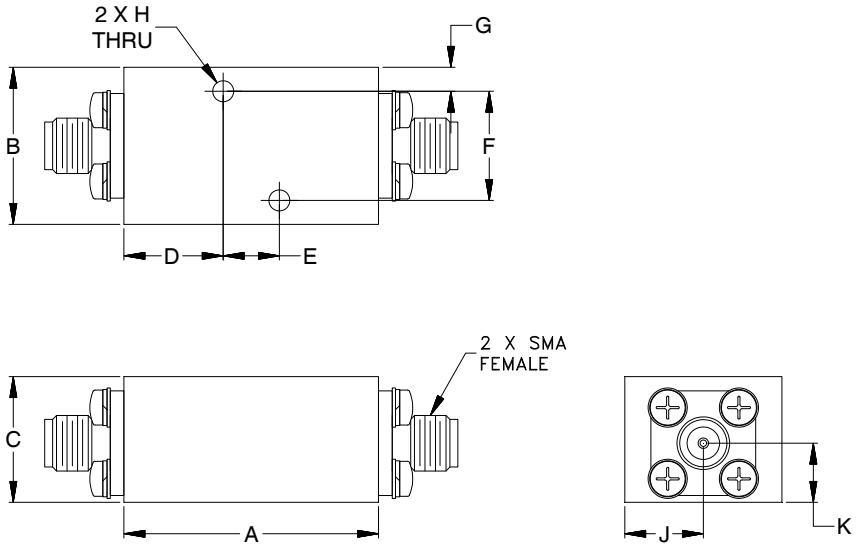
Notes

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 FEMALE
PORT - 2	SMA FEMALE

Outline Drawing



Outline Dimensions (inch / mm)

A	B	C	D	E	F
1.22	**.75**	**.60**	**.47**	**.268**	**.521**
30.86	19.05	15.24	12.03	6.81	13.23

G	H	J	K		Wt.
.11	**.100**	**.38**	**.28**		grams
2.91	2.54	9.53	7.18		70

Note: Please refer to case style drawing for details

Suspended substrate stripline

Band Pass Filter ZBSS-7975-S+

Typical Performance Data

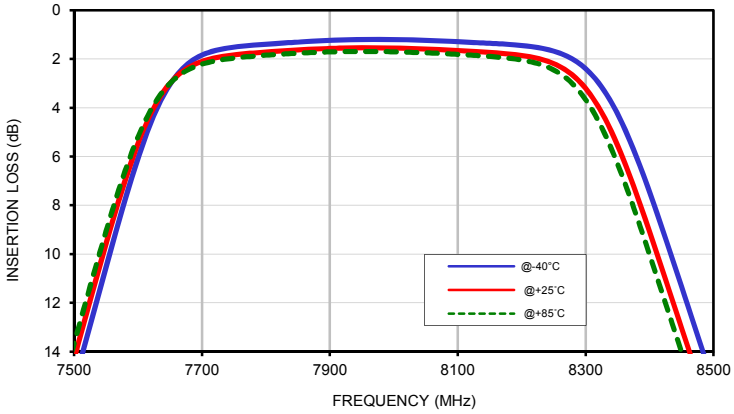
FREQ.	INSERTION LOSS			INPUT RETURN LOSS			OUTPUT RETURN LOSS		
(MHz)	(dB)			(dB)			(dB)		
	@-40°C	@+25°C	@+85°C	@-40°C	@+25°C	@+85°C	@-40°C	@+25°C	@+85°C
10	90.01	85.98	87.85	0.01	0.00	0.00	0.00	0.00	0.00
50	80.50	80.78	80.60	0.01	0.00	0.00	0.00	0.00	0.00
100	96.25	95.68	93.80	0.00	0.00	0.00	0.00	0.00	0.00
500	118.19	108.51	113.68	0.02	0.01	0.01	0.02	0.01	0.01
1000	112.85	120.56	113.82	0.02	0.02	0.04	0.03	0.03	0.04
2000	113.03	112.72	115.79	0.02	0.06	0.10	0.03	0.06	0.09
3000	121.51	115.41	113.24	0.00	0.10	0.16	0.02	0.10	0.13
4000	115.98	111.26	117.48	0.03	0.14	0.19	0.02	0.13	0.15
5000	103.60	106.04	103.85	0.05	0.15	0.18	0.01	0.13	0.12
6000	84.33	83.76	84.15	0.03	0.14	0.17	0.02	0.14	0.11
6900	53.85	53.51	53.24	0.06	0.22	0.27	0.09	0.26	0.25
7000	49.16	48.75	48.40	0.09	0.25	0.31	0.11	0.30	0.31
7250	35.03	34.36	33.87	0.20	0.42	0.53	0.26	0.52	0.60
7300	31.65	30.91	30.39	0.25	0.49	0.62	0.32	0.61	0.71
7430	21.62	20.66	20.05	0.51	0.85	1.08	0.62	1.02	1.21
7500	15.32	14.28	13.67	0.93	1.42	1.78	1.05	1.59	1.89
7600	6.06	5.46	5.19	3.76	5.24	6.19	3.69	5.02	5.70
7640	3.49	3.33	3.29	7.56	9.94	11.23	7.02	8.90	9.68
7800	1.40	1.71	1.85	18.64	19.87	21.34	18.18	18.80	18.96
7825	1.35	1.67	1.80	18.71	20.46	22.53	18.53	19.27	19.37
7850	1.31	1.63	1.76	19.51	21.85	24.65	19.39	20.16	20.10
7900	1.24	1.57	1.71	23.49	27.75	31.45	22.77	23.15	22.13
7975	1.20	1.54	1.70	38.02	29.86	25.32	28.98	25.18	22.70
8000	1.20	1.55	1.71	28.37	25.84	23.55	25.73	23.45	21.80
8100	1.29	1.65	1.81	19.74	20.81	22.14	18.85	18.99	19.05
8125	1.32	1.69	1.85	19.34	20.76	22.51	18.62	18.97	19.12
8200	1.45	1.86	2.04	19.73	21.37	23.72	22.18	24.55	25.87
8300	2.40	3.21	3.67	10.71	9.68	9.28	11.49	10.13	9.44
8400	7.46	9.08	10.03	2.92	2.77	2.75	2.61	2.44	2.31
8500	15.28	16.90	17.85	1.05	1.21	1.30	0.78	0.93	0.92
8550	19.01	20.50	21.39	0.73	0.92	1.00	0.50	0.67	0.66
8700	28.61	29.70	30.39	0.31	0.51	0.58	0.18	0.35	0.32
8750	31.33	32.32	32.95	0.24	0.44	0.50	0.13	0.30	0.27
8800	33.86	34.75	35.33	0.19	0.38	0.44	0.09	0.25	0.22
9000	42.47	43.05	43.43	0.06	0.24	0.29	0.01	0.17	0.12
9350	53.57	53.79	53.94	0.02	0.14	0.20	0.05	0.11	0.06
9500	57.37	57.44	57.51	0.03	0.13	0.19	0.05	0.10	0.05
9750	62.66	62.63	62.62	0.04	0.12	0.19	0.06	0.10	0.05
10000	67.17	66.92	66.78	0.04	0.13	0.21	0.06	0.11	0.07
10250	70.90	70.64	70.62	0.02	0.15	0.24	0.05	0.13	0.10
10500	74.15	73.89	73.95	0.00	0.17	0.28	0.04	0.15	0.15
10750	77.05	77.17	77.03	0.01	0.20	0.33	0.02	0.18	0.20
11000	80.03	80.10	80.07	0.03	0.24	0.38	0.00	0.22	0.26
11250	82.94	82.61	83.34	0.04	0.27	0.44	0.00	0.26	0.32
11500	85.78	86.21	86.15	0.06	0.31	0.49	0.00	0.28	0.37
11750	90.49	90.28	91.86	0.05	0.33	0.53	0.01	0.30	0.41
12000	95.05	96.43	97.87	0.05	0.36	0.57	0.04	0.31	0.45
12250	107.08	107.67	105.63	0.05	0.39	0.61	0.04	0.31	0.46
12500	103.51	101.43	104.71	0.03	0.40	0.64	0.09	0.31	0.46
12750	94.18	96.16	97.90	0.02	0.41	0.65	0.09	0.28	0.44
13000	91.04	92.28	91.52	0.00	0.41	0.67	0.12	0.26	0.43
13250	89.23	87.80	89.61	0.02	0.41	0.68	0.12	0.24	0.40
13500	87.25	86.70	86.02	0.04	0.40	0.68	0.13	0.21	0.37
13750	85.60	85.45	85.30	0.05	0.39	0.68	0.13	0.19	0.32
14000	83.32	82.91	83.49	0.07	0.37	0.67	0.10	0.19	0.31
14200	82.70	81.55	82.00	0.08	0.36	0.67	0.09	0.19	0.30
14400	80.94	80.49	80.24	0.09	0.35	0.65	0.08	0.19	0.29
14600	79.78	79.30	79.12	0.11	0.33	0.63	0.08	0.17	0.27
14800	77.86	78.45	77.66	0.12	0.31	0.60	0.07	0.18	0.26
15000	76.81	76.52	76.06	0.14	0.30	0.58	0.07	0.18	0.25

Typical Performance Data

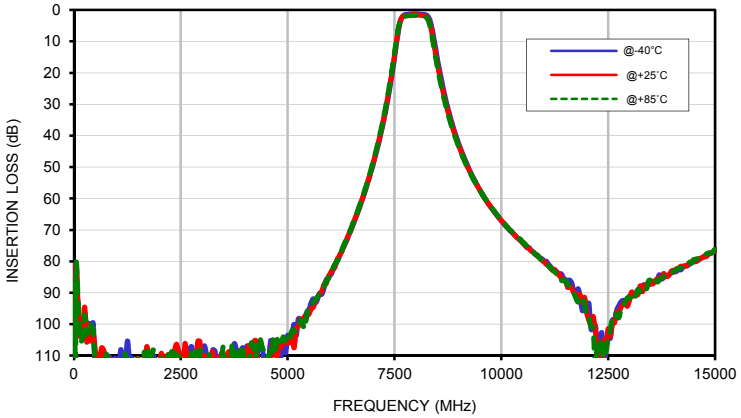
FREQ.	GROUP DELAY		
(MHz)	(nsec)		
	@-40°C	@+25°C	@+85°C
7825	1.75	1.71	1.69
7830	1.74	1.70	1.69
7835	1.73	1.69	1.68
7840	1.72	1.69	1.67
7845	1.71	1.68	1.67
7850	1.70	1.67	1.66
7855	1.70	1.67	1.65
7860	1.69	1.66	1.65
7865	1.68	1.66	1.64
7870	1.68	1.65	1.64
7875	1.67	1.65	1.63
7880	1.67	1.64	1.63
7885	1.66	1.64	1.63
7890	1.66	1.63	1.62
7895	1.65	1.63	1.62
7900	1.65	1.63	1.61
7905	1.65	1.62	1.61
7910	1.64	1.62	1.61
7915	1.64	1.62	1.60
7920	1.63	1.61	1.60
7925	1.63	1.61	1.60
7930	1.63	1.61	1.60
7935	1.63	1.60	1.59
7940	1.62	1.60	1.59
7945	1.62	1.60	1.59
7950	1.62	1.60	1.59
7955	1.62	1.60	1.59
7960	1.61	1.59	1.59
7965	1.61	1.59	1.58
7970	1.61	1.59	1.58
7975	1.61	1.59	1.58
7980	1.61	1.59	1.58
7985	1.60	1.59	1.58
7990	1.60	1.59	1.58
7995	1.60	1.59	1.58
8000	1.60	1.59	1.58
8005	1.60	1.59	1.58
8010	1.60	1.58	1.58
8020	1.60	1.59	1.58
8030	1.60	1.59	1.58
8040	1.60	1.59	1.59
8050	1.60	1.59	1.59
8060	1.60	1.59	1.59
8070	1.60	1.60	1.60
8080	1.61	1.60	1.61
8090	1.61	1.61	1.62
8100	1.62	1.62	1.63
8110	1.63	1.63	1.64
8125	1.64	1.65	1.66

Typical Performance Curves

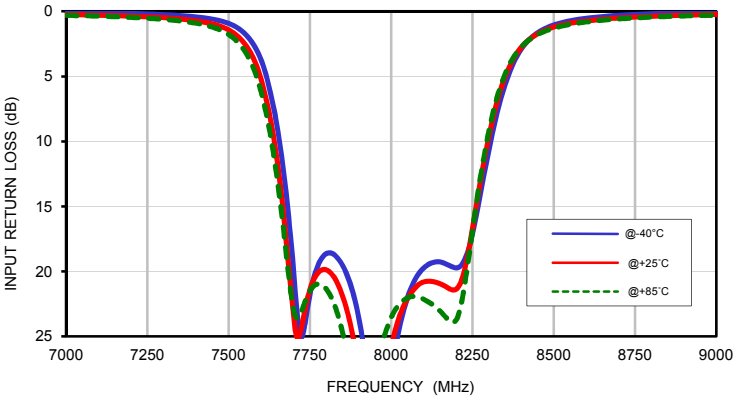
INSERTION LOSS vs. TEMPERATURE (Zoomed)
INPUT POWER = 0 dBm



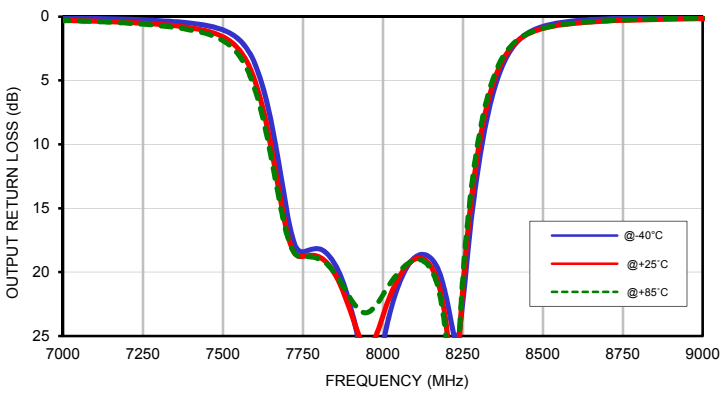
INSERTION LOSS vs. TEMPERATURE
INPUT POWER = 0 dBm



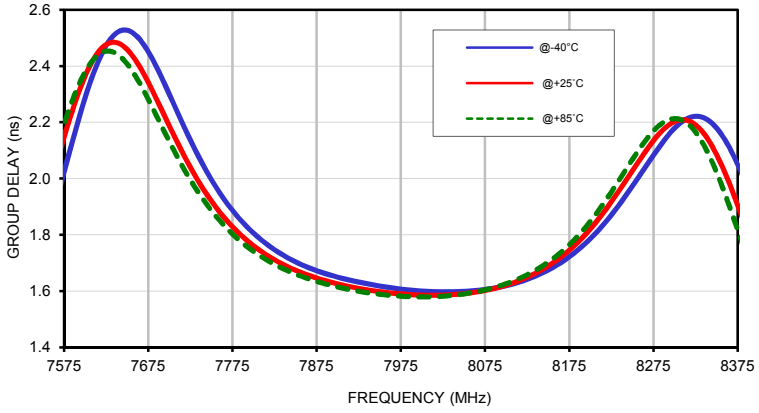
INPUT RETURN LOSS vs. TEMPERATURE
INPUT POWER = 0 dBm



OUTPUT RETURN LOSS vs. TEMPERATURE
INPUT POWER = 0 dBm



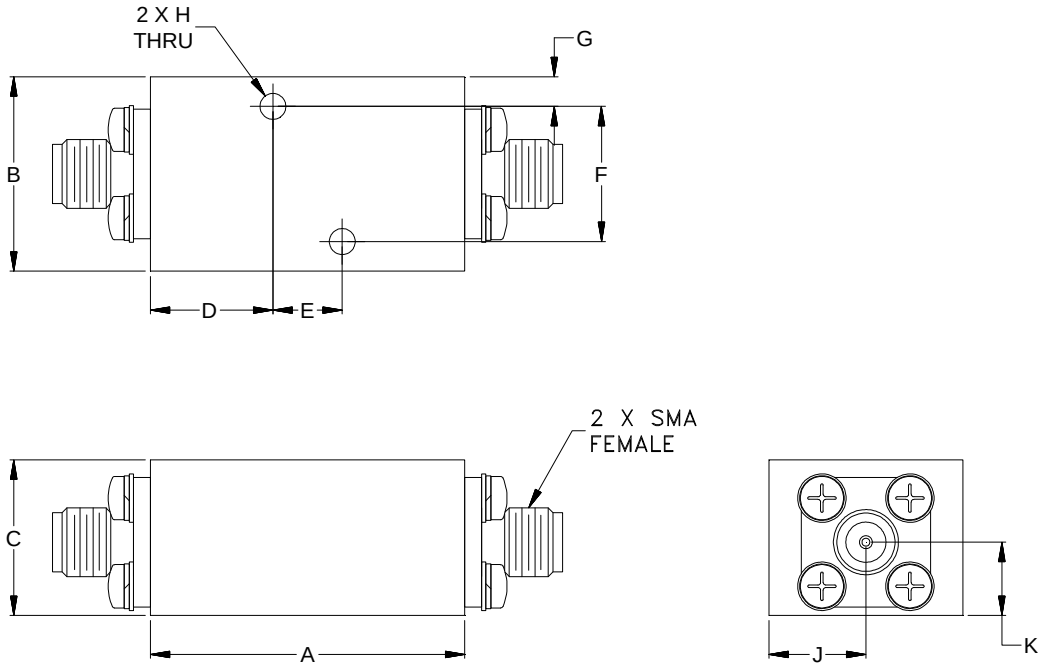
GROUP DELAY vs. TEMPERATURE
INPUT POWER = 0 dBm



Case Style QD

Outline Dimensions

QD2229



CASE#	A	B	C	D	E	F	G	H
QD2229	1.22 (30.86)	.75 (19.05)	.60 (15.24)	.47 (12.03)	.268 (6.81)	.521 (13.23)	.11 (2.91)	.100 (2.54)

CASE#	J	K	WT. GRAMS
QD2229	.38 (9.53)	.28 (7.18)	70

Dimensions are in inches (mm). Tolerances: 2 Pl. ± .10; 3 Pl. ± .015

Notes:

1. Case material: Brass.
2. Case finish: Powder coated over silver plating.
3. Refer to the individual model data sheet 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