Surface Mount

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%
- Low profile designs with min. height of 0.120”
- 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 as high as 20 GHz.

All our coaxial-ceramic resonator filters are built with rugged construction, qualified to withstand multiple demanding reflow cycles. 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
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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

Surface Mount

Bandpass Filter

CBP-1905AN+

50Ω 1785 to 2025 MHz

Generic photo used for illustration purposes only
CASE STYLE: TJ2826-1

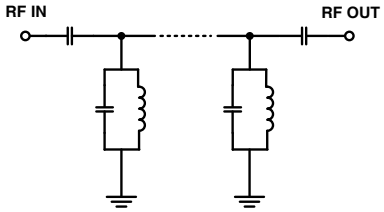
Features

- Low Insertion loss
- Minimal Insertion loss variation over operating temperature
- Low-profile shielded package

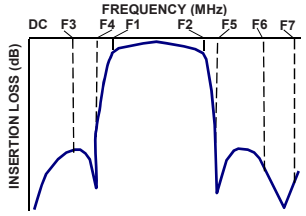
Applications

- Cordless telephony system
- Wireless audio applications
- Fixed mobile

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

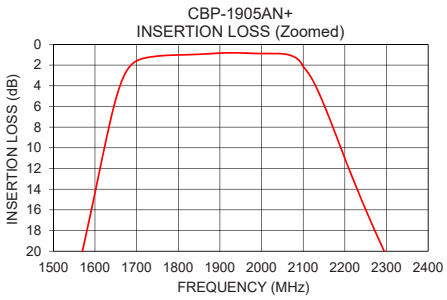
Parameter		F#	Frequency (MHz)	Min.	Typ.	Max.	Unit
Pass Band	Center Frequency	-	-	-	1905	-	MHz
	Insertion Loss	F1-F2	1785 - 2025	-	1.1	1.8	dB
	VSWR	F1-F2	1785 - 2025	-	1.36	1.7	:1
Stop Band, Lower	Insertion Loss	DC-F3	DC - 1300	50	60	-	dB
		F3-F4	1300 - 1525	20	27	-	dB
Stop Band, Upper	Insertion Loss	F5-F6	2365 - 2650	20	26	-	dB
		F6-F7	2650 - 3200	35	40	-	dB

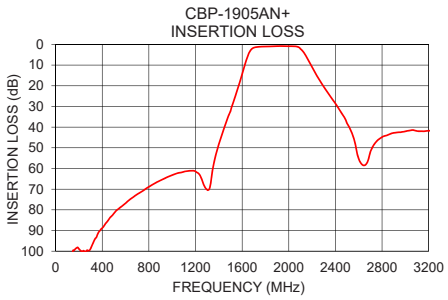
Maximum Ratings	
Operating Temperature	-40°C to 85°C
Storage Temperature	-55°C to 100°C
RF Power Input	10 W at 25°C

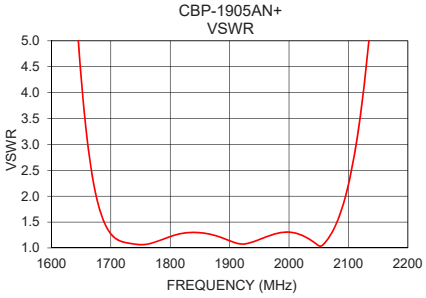
Permanent damage may occur if any of these limits are exceeded.

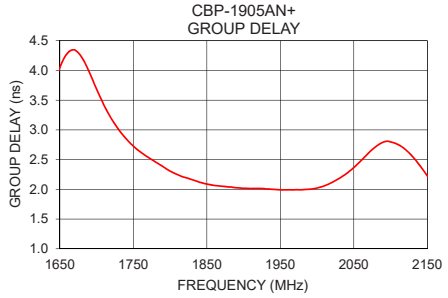
Typical Performance Data at 25°C

Frequency (MHz)	Insertion Loss (dB)	VSWR (:1)	Frequency (MHz)	Group Delay (ns)
1	103.06	331.71	1785	2.42
100	105.12	725.34	1795	2.34
1000	63.23	111.95	1805	2.27
1300	70.29	68.74	1815	2.22
1525	27.86	36.00	1825	2.18
1560	21.79	27.60	1835	2.14
1665	3.48	2.67	1845	2.10
1785	1.04	1.16	1855	2.08
1800	1.02	1.22	1865	2.06
1905	0.84	1.12	1875	2.05
2000	0.89	1.31	1885	2.03
2025	0.89	1.23	1895	2.02
2120	3.27	3.55	1905	2.02
2300	20.46	50.74	1915	2.01
2365	25.82	62.49	1925	2.01
2420	30.30	72.95	1935	2.01
2650	58.47	96.43	1945	2.00
2700	51.98	99.00	1955	1.99
3000	42.05	83.97	2000	2.02
3200	41.78	61.14	2025	2.15









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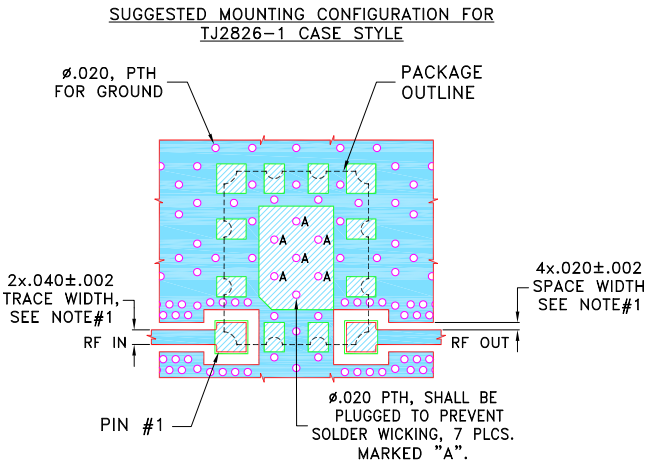
Pad Connections

INPUT	1
OUTPUT	4
GROUND	2,3,5,6,7,8,9,10,11,12

Demo Board MCL P/N: TB-1099+
Suggested PCB Layout (PL-630)



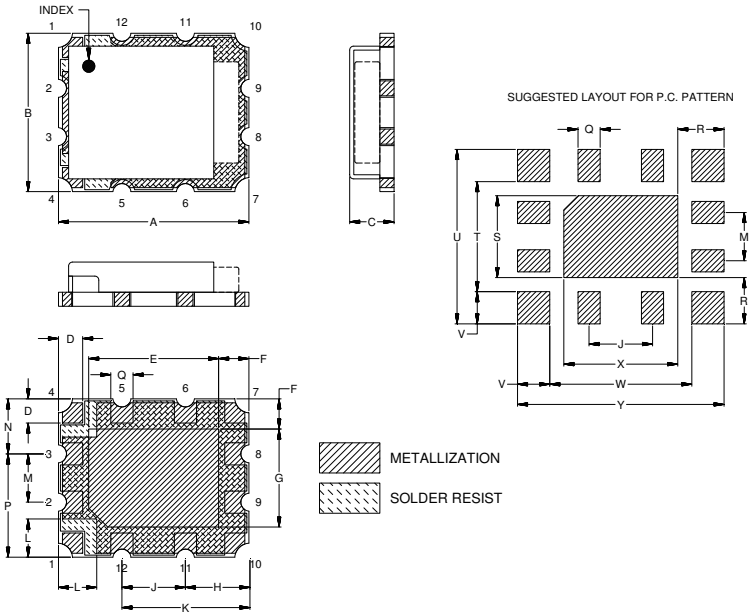
NOTES:

1. TRACE WIDTH IS SHOWN FOR ROGERS (RO4350B) WITH DIELECTRIC THICKNESS .020"±.0015". COPPER: 1/2 OZ. EACH SIDE. FOR OTHER MATERIALS TRACE WIDTH MAY NEED TO BE MODIFIED.
2. BOTTOM SIDE OF THE PCB IS CONTINUOUS GROUND PLANE.

DENOTES PCB COPPER LAYOUT WITH SMOBC (SOLDER MASK OVER BARE COPPER)

DENOTES COPPER LAND PATTERN FREE OF SOLDERMASK

Outline Drawing



Outline Dimensions (inch / mm)

A	B	C	D	E	F	G	H	J	K	L	M
.472	**.394**	**.110**	**.060**	**.322**	**.075**	**.244**	**.160**	**.157**	**.317**	**.095**	**.120**
12.00	10.00	2.79	1.52	8.19	1.91	6.19	4.06	4.00	8.06	2.41	3.05

N	P	Q	R	S	T	U	V	W	X	Y	Wt.
.137	**.257**	**.055**	**.115**	**.204**	**.274**	**.434**	**.080**	**.352**	**.282**	**.512**	grams
3.48	6.52	1.40	2.92	5.17	6.95	11.02	2.03	8.95	7.17	13.01	6

Note: Please refer to case style drawing for details

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Surface mount Band Pass Filter CBP-1905AN+

Typical Performance Data

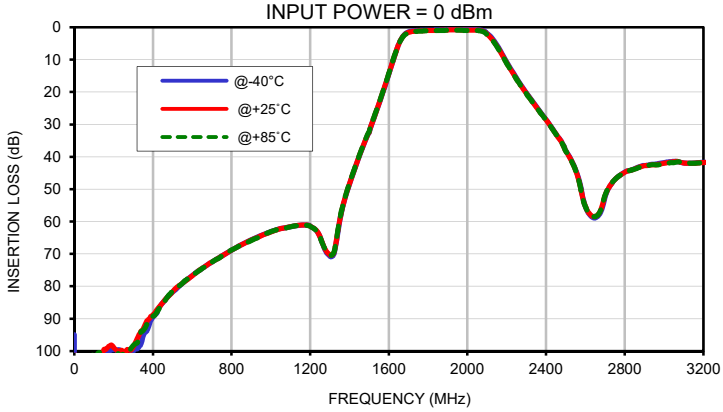
FREQ. (MHz)	INSERTION LOSS (dB)			INPUT RETURN LOSS (dB)			OUTPUT RETURN LOSS (dB)		
	@-40°C	@+25°C	@+85°C	@-40°C	@+25°C	@+85°C	@-40°C	@+25°C	@+85°C
1	102.12	103.06	109.62	0.05	0.05	0.06	0.05	0.05	0.05
5	103.25	102.89	102.18	0.05	0.05	0.05	0.05	0.05	0.05
50	102.74	107.26	101.66	0.03	0.03	0.03	0.03	0.03	0.03
100	104.13	105.12	101.49	0.02	0.02	0.03	0.02	0.03	0.03
200	99.59	98.88	101.54	0.00	0.02	0.02	0.01	0.02	0.02
250	101.34	100.18	100.73	0.00	0.02	0.02	0.01	0.02	0.03
500	81.82	81.73	81.45	0.01	0.04	0.05	0.02	0.05	0.06
600	76.65	76.84	76.68	0.02	0.06	0.07	0.02	0.06	0.07
700	72.52	72.49	72.53	0.04	0.08	0.09	0.04	0.08	0.10
800	68.88	68.88	68.79	0.05	0.10	0.11	0.07	0.11	0.13
900	65.65	65.76	65.88	0.08	0.13	0.14	0.09	0.13	0.15
1000	63.12	63.23	63.15	0.10	0.16	0.18	0.11	0.16	0.18
1100	61.61	61.57	61.64	0.14	0.19	0.21	0.15	0.19	0.22
1200	61.39	61.42	61.46	0.15	0.21	0.24	0.17	0.22	0.25
1300	70.69	70.29	70.25	0.19	0.25	0.28	0.20	0.26	0.29
1400	48.41	48.28	48.12	0.25	0.32	0.35	0.25	0.32	0.35
1500	32.50	32.35	32.13	0.35	0.43	0.47	0.36	0.44	0.48
1525	27.98	27.86	27.69	0.39	0.48	0.53	0.40	0.50	0.55
1560	21.95	21.79	21.63	0.51	0.63	0.69	0.53	0.64	0.71
1600	14.54	14.37	14.22	0.90	1.07	1.17	0.93	1.10	1.20
1650	5.35	5.32	5.31	3.68	4.12	4.34	3.84	4.31	4.56
1665	3.42	3.48	3.53	6.25	6.83	7.10	6.54	7.18	7.49
1700	1.43	1.60	1.69	17.85	18.41	18.53	20.35	21.34	21.47
1750	0.97	1.13	1.22	29.35	30.21	30.83	28.57	28.14	28.21
1785	0.88	1.04	1.11	23.55	22.78	23.00	22.45	21.75	21.95
1800	0.87	1.02	1.10	20.56	20.12	20.38	20.06	19.62	19.85
1850	0.81	0.95	1.02	17.75	17.83	18.35	17.60	17.76	18.30
1905	0.70	0.84	0.91	24.64	25.10	25.63	25.24	26.70	28.15
1950	0.68	0.83	0.90	23.97	22.45	22.01	24.72	23.29	22.91
1975	0.71	0.86	0.94	19.29	18.58	18.52	19.54	18.85	18.83
2000	0.73	0.89	0.96	17.93	17.56	17.76	17.98	17.61	17.80
2025	0.73	0.89	0.96	19.82	19.80	20.40	19.55	19.46	19.89
2050	0.74	0.91	1.00	32.34	33.38	35.13	26.36	25.83	25.51
2100	1.88	2.16	2.31	8.66	8.40	8.23	8.63	8.35	8.18
2120	2.95	3.27	3.43	5.13	5.03	4.98	5.12	5.01	4.97
2200	10.70	11.02	11.13	0.82	0.91	0.95	0.82	0.91	0.96
2250	15.72	15.98	16.06	0.40	0.49	0.53	0.41	0.49	0.53
2300	20.25	20.46	20.52	0.25	0.34	0.38	0.27	0.35	0.39
2350	24.42	24.58	24.65	0.20	0.30	0.33	0.21	0.29	0.33
2365	25.67	25.82	25.86	0.19	0.28	0.31	0.20	0.28	0.31
2400	28.43	28.57	28.65	0.14	0.23	0.27	0.16	0.24	0.28
2420	30.20	30.30	30.35	0.15	0.24	0.27	0.15	0.24	0.27
2450	32.85	32.94	32.98	0.14	0.23	0.27	0.14	0.23	0.26
2500	38.08	38.21	38.25	0.12	0.21	0.25	0.13	0.22	0.26
2550	43.93	44.14	44.16	0.11	0.21	0.25	0.11	0.20	0.24
2600	55.38	55.33	55.44	0.09	0.19	0.23	0.09	0.19	0.23
2650	58.89	58.47	58.49	0.08	0.18	0.23	0.09	0.18	0.23
2700	52.33	51.98	51.90	0.08	0.18	0.23	0.09	0.19	0.24
2750	47.04	47.06	47.02	0.07	0.17	0.22	0.07	0.17	0.22
2800	44.75	44.82	44.91	0.07	0.18	0.24	0.08	0.18	0.24
2850	43.69	43.77	43.82	0.07	0.19	0.25	0.08	0.19	0.25
2900	42.66	42.76	42.82	0.06	0.18	0.24	0.08	0.19	0.25
2950	42.26	42.49	42.45	0.08	0.19	0.27	0.08	0.19	0.26
3000	41.84	42.05	42.16	0.10	0.21	0.27	0.10	0.21	0.28
3050	41.38	41.51	41.79	0.09	0.21	0.28	0.10	0.21	0.29
3100	41.91	41.90	41.87	0.12	0.24	0.31	0.12	0.24	0.31
3130	41.97	41.99	41.99	0.12	0.24	0.32	0.14	0.26	0.35
3150	41.97	42.01	41.98	0.12	0.25	0.33	0.14	0.26	0.35
3180	41.77	41.88	41.90	0.13	0.25	0.33	0.15	0.27	0.35
3200	41.72	41.78	41.81	0.16	0.28	0.36	0.16	0.29	0.37

Typical Performance Data

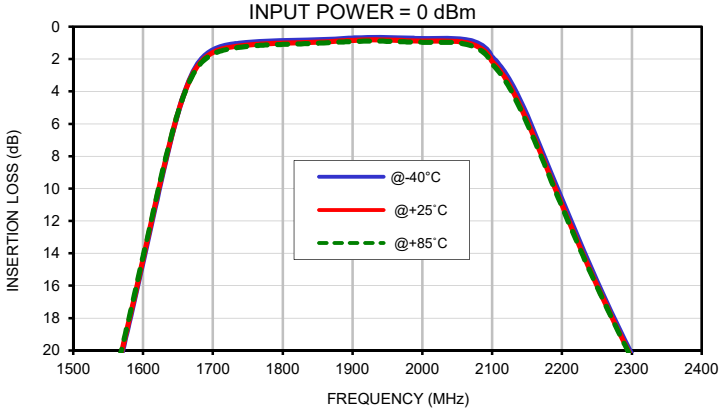
FREQ. (MHz)	GROUP DELAY (nsec)		
	@-40°C	@+25°C	@+85°C
1785.0	2.45	2.42	2.41
1790.0	2.40	2.39	2.37
1795.0	2.36	2.34	2.34
1800.0	2.33	2.31	2.30
1805.0	2.30	2.27	2.26
1810.0	2.27	2.25	2.24
1815.0	2.24	2.22	2.21
1820.0	2.22	2.20	2.19
1825.0	2.20	2.18	2.17
1830.0	2.18	2.16	2.15
1835.0	2.16	2.14	2.13
1840.0	2.13	2.12	2.11
1845.0	2.12	2.10	2.10
1850.0	2.10	2.09	2.08
1855.0	2.09	2.08	2.07
1860.0	2.08	2.07	2.06
1865.0	2.07	2.06	2.05
1870.0	2.06	2.05	2.04
1875.0	2.06	2.05	2.04
1880.0	2.05	2.04	2.03
1885.0	2.04	2.03	2.03
1890.0	2.04	2.03	2.02
1895.0	2.03	2.02	2.01
1900.0	2.03	2.02	2.01
1905.0	2.03	2.02	2.01
1910.0	2.02	2.01	2.01
1915.0	2.02	2.01	2.01
1920.0	2.03	2.02	2.01
1925.0	2.02	2.01	2.00
1930.0	2.02	2.01	2.00
1935.0	2.02	2.01	1.99
1940.0	2.01	2.00	1.99
1945.0	2.01	2.00	1.99
1950.0	2.01	1.99	1.99
1955.0	2.01	1.99	1.98
1960.0	2.00	1.99	1.98
1965.0	2.00	1.99	1.98
1970.0	2.01	1.99	1.98
1975.0	2.01	1.99	1.99
1980.0	2.01	1.99	1.99
1985.0	2.01	2.00	1.99
1990.0	2.01	2.00	2.00
1995.0	2.02	2.01	2.00
2000.0	2.03	2.02	2.02
2002.5	2.04	2.03	2.03
2005.0	2.05	2.04	2.04
2007.5	2.05	2.05	2.04
2010.0	2.06	2.06	2.06
2012.5	2.07	2.07	2.07
2020.0	2.11	2.12	2.11
2025.0	2.15	2.15	2.15

Typical Performance Curves

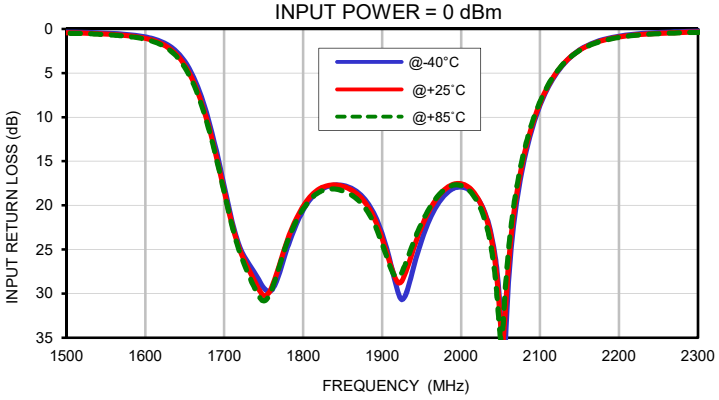
INSERTION LOSS vs. TEMPERATURE
INPUT POWER = 0 dBm



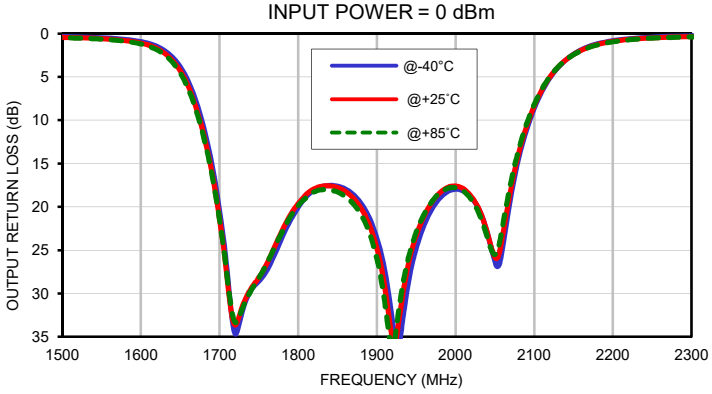
INSERTION LOSS vs. TEMPERATURE (Zoomed)
INPUT POWER = 0 dBm



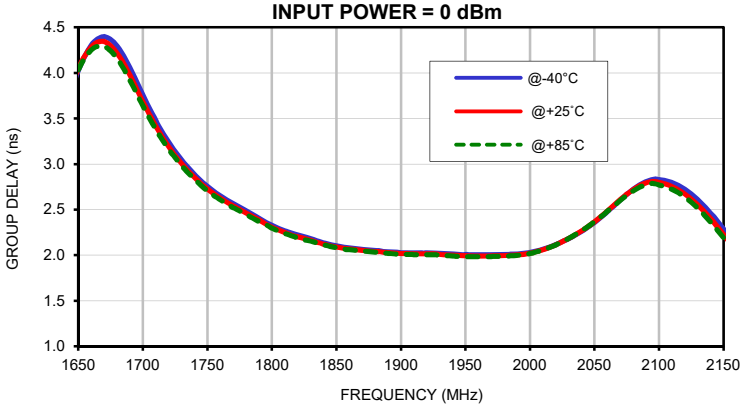
INPUT RETURN LOSS vs. TEMPERATURE
INPUT POWER = 0 dBm



OUTPUT RETURN LOSS vs. TEMPERATURE
INPUT POWER = 0 dBm



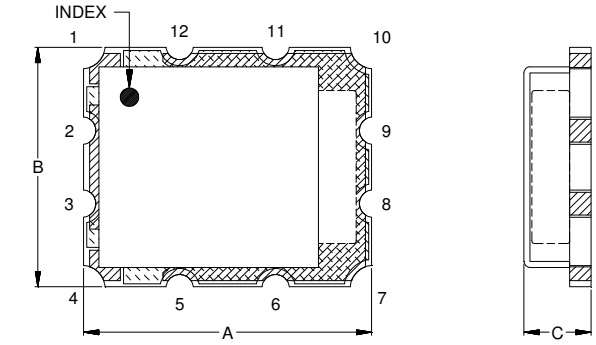
GROUP DELAY vs. TEMPERATURE
INPUT POWER = 0 dBm

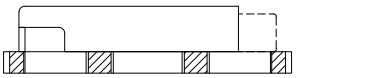


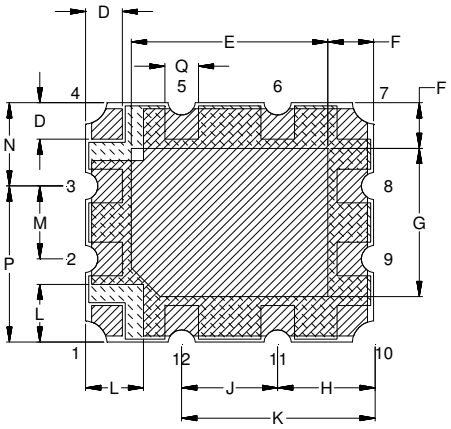
Case Style TJ

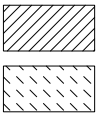
Outline Dimensions

TJ2826-1

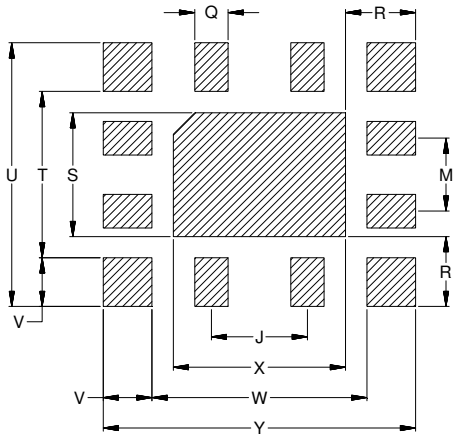








SUGGESTED LAYOUT FOR P.C. PATTERN



CASE#	A	B	C	D	E	F	G	H	J	K	L	M
TJ2826-1	.472 (12.00)	.394 (10.00)	.110 (2.79)	.060 (1.52)	.322 (8.19)	.075 (1.91)	.244 (6.19)	.160 (4.06)	.157 (4.00)	.317 (8.06)	.095 (2.41)	.120 (3.05)

CASE#	N	P	Q	R	S	T	U	V	W	X	Y	WT.GRAM
TJ2826-1	.137 (3.48)	.257 (6.52)	.055 (1.40)	.115 (2.92)	.204 (5.17)	.274 (6.95)	.434 (11.02)	.080 (2.03)	.352 (8.95)	.282 (7.17)	.512 (13.01)	6

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

Notes:

1. Case material: Nickel-Silver alloy.
2. Base: Printed wiring laminate.
3. Termination finish:
   For RoHS Case Styles: 3-5µinch (.08-.13microns) Gold over 120-240µinch (3.05-6.10microns) Nickel plate.
   For RoHS-5 Case Styles: Tin-Lead plate.

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Mini-Circuits

Environmental Specifications ENV54

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	-40° to 85°C Ambient Environment	Individual Model Data Sheet
Storage Temperature	-55° to 100° C Ambient Environment	Individual Model Data Sheet
Humidity	90 to 95% RH, 96 hours, 40°C	MIL-STD-202, Method 103B, Condition B, Except 50°C
Thermal Shock	-55° to 100°C, 100 cycles	MIL-STD-202, Method 107, Condition A-3, except +100°C
Solder Reflow Heat	Sn-Pb Eutectic Process: 225°C peak Pb-Free Process, 245°C peak	J-STD-020, Table 4-1, 4-2 and 5-2, Figure 5-1
Solderability	10X Magnification	J-STD-002, Para 4.2.5, Test S, 95% Coverage
Vibration (High Frequency)	20g peak, 10-2000 Hz, 4 times in each of three axes (total 12)	MIL-STD-202, Method 204, Condition D
Mechanical Shock	50g, 11 ms, 1/2-sine, 18 shocks: 3 each direction, each of 3 axes	MIL-STD-202, Method 213, Condition A

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