

Low Pass Filter

SCLF-190+

50Ω DC to 190 MHz

Maximum Ratings

Operating Temperature -40°C to 85°C

Storage Temperature	-55°C to 100°C
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Power Input	0.5W max.
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Permanent damage may occur if any of these limits are exceeded.

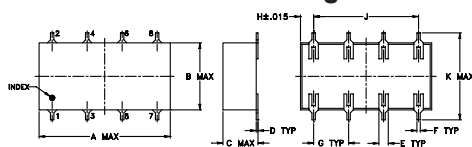
Pin Connections

INPUT	1
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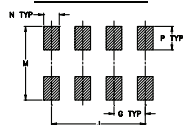
OUTPUT 8

GROUND	2.3.4.5.6.7
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Outline Drawing



PCB Land Pattern



Suggested Layout,
Tolerance to be within ± 002

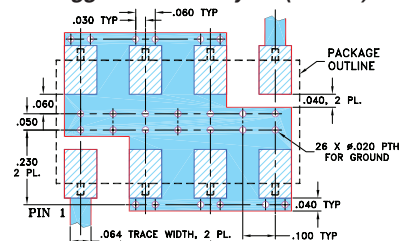
Outline Dimensions (inch)

A	B	C	D	E	F	G
0.75	0.38	0.28	0.01	0.05	0.02	0.2
19.05	9.65	7.11	0.25	1.27	0.51	5.08

H	J	K	M	N	P	wt
0.075	0.6	0.45	0.47	0.1	0.15	grams
1.91	15.24	11.43	11.94	2.54	3.81	1.60

Demo Board MCL P/N: TB-187+

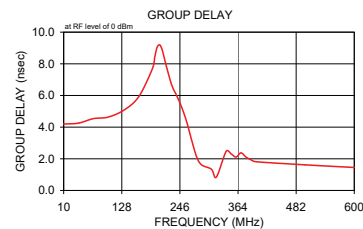
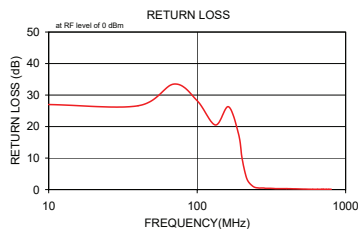
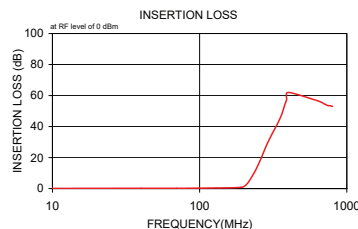
Suggested PCB Layout (PL-049)



NOTES: 1. TRACE WIDTH IS SHOWN FOR ROGERS RO4350B WITH DIELECTRIC THICKNESS .030" $\pm$.002"; 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.

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 SOLDER MASK

Notes

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/MC_Store/terms.is

Features

- wide selection of cut-off frequencies
- excellent rejection
- custom models available

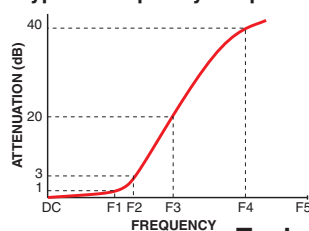
Applications

- defense communications
- receivers/transmitters
- harmonic rejection of VCOs

Electrical Specifications

Parameter	F#	Frequency (MHz)	Min.	Typ.	Max.	Unit	
Pass Band	Insertion Loss	DC-F1	DC-190	—	—	1.0	dB
	Freq. Cut-Off	F2	210	—	3.0	—	dB
	VSWR	DC-F1	DC-190	—	1.7	—	:1
Stop Band	Rejection Loss	F3-F4	290-390	20	—	—	dB
		F4-F5	390-800	40	—	—	dB
	VSWR	F3-F5	290-800	—	18	—	:1

Typical Frequency Response



Electrical Schematic



Typical Performance Data

Frequency (MHz)	Insertion Loss (dB)		Return Loss (dB)	Frequency (MHz)	Group Delay (nsec)
	$\bar{x}$	σ			
10.00	0.12	0.10	27.00	10.00	4.20
40.00	0.19	0.10	26.60	40.00	4.25
70.00	0.21	0.10	33.50	70.00	4.54
100.00	0.27	0.10	28.20	100.00	4.63
132.50	0.41	0.10	20.50	132.50	5.08
162.50	0.49	0.10	26.30	162.50	5.93
190.00	0.77	0.10	17.60	190.00	7.69
200.00	1.38	0.10	10.40	195.00	8.44
210.00	3.05	0.10	5.40	200.00	9.07
220.00	5.72	0.10	2.70	205.00	9.20
240.00	11.88	0.10	0.90	210.00	8.88
260.00	18.95	0.30	0.50	220.00	7.66
270.00	22.68	0.40	0.50	230.00	6.61
280.00	26.25	0.50	0.50	240.00	5.96
290.00	29.54	0.60	0.40	250.00	5.22
310.00	35.11	0.80	0.40	260.00	4.32
340.00	42.33	1.20	0.30	270.00	3.16
360.00	47.49	1.60	0.30	280.00	2.12
370.00	50.87	2.40	0.30	290.00	1.62
380.00	54.42	3.60	0.30	310.00	1.34
390.00	57.49	3.20	0.30	320.00	0.85
400.00	62.02	5.20	0.30	340.00	2.48
600.00	57.37	2.30	0.10	350.00	2.31
647.50	56.32	1.40	0.10	360.00	2.11
687.50	55.21	1.80	0.10	370.00	2.38
702.50	54.51	0.90	0.10	380.00	2.11
710.00	54.45	1.30	0.10	390.00	1.94
740.00	53.58	1.30	0.10	400.00	1.82
770.00	53.44	1.40	0.10	500.00	1.62
800.00	53.04	1.10	0.10	600.00	1.45

Surface Mount Low Pass Filter

SCLF-190+

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
10	0.06	0.07	0.08	31.48	30.70	30.27	31.63	30.85	30.32
20	0.07	0.08	0.10	26.50	25.85	25.51	26.63	25.97	25.47
30	0.09	0.11	0.12	24.01	23.57	23.34	24.15	23.75	23.39
40	0.12	0.14	0.15	22.90	22.72	22.69	23.04	22.90	22.73
50	0.12	0.14	0.16	22.90	23.06	23.28	23.05	23.24	23.30
60	0.12	0.14	0.16	24.07	24.79	25.46	24.26	25.04	25.52
70	0.11	0.15	0.15	27.06	28.82	30.72	27.29	29.25	30.95
80	0.12	0.15	0.17	34.87	41.72	45.23	35.30	43.99	48.28
90	0.12	0.17	0.18	36.69	31.40	28.71	36.25	31.06	28.65
100	0.15	0.20	0.22	26.40	24.51	23.18	26.31	24.40	23.18
140	0.25	0.30	0.32	18.52	19.32	19.73	18.60	19.38	19.78
150	0.26	0.30	0.32	19.42	20.84	21.89	19.51	20.95	21.91
160	0.27	0.32	0.33	21.09	23.21	25.04	21.17	23.31	25.05
170	0.28	0.34	0.37	22.52	24.70	26.78	22.59	24.97	27.07
180	0.34	0.41	0.43	21.04	22.22	23.17	21.32	22.69	23.84
190	0.49	0.57	0.62	15.84	15.84	15.88	16.08	16.19	16.25
200	0.99	1.15	1.26	9.55	9.24	9.01	9.71	9.41	9.17
210	2.48	2.78	2.98	4.70	4.51	4.32	4.78	4.55	4.39
220	5.57	5.92	6.22	2.06	2.03	1.95	2.10	2.04	1.97
240	13.83	14.12	14.41	0.56	0.61	0.62	0.54	0.60	0.60
260	21.50	21.65	21.88	0.30	0.37	0.37	0.29	0.34	0.34
270	25.00	25.12	25.27	0.25	0.32	0.32	0.25	0.29	0.28
280	28.38	28.46	28.60	0.21	0.28	0.30	0.21	0.25	0.25
290	31.66	31.73	31.82	0.19	0.25	0.27	0.18	0.23	0.23
310	37.85	37.92	37.93	0.16	0.23	0.22	0.15	0.21	0.20
340	46.72	46.61	46.85	0.12	0.18	0.19	0.11	0.17	0.18
360	52.89	52.91	52.88	0.11	0.18	0.17	0.09	0.16	0.17
370	56.29	56.10	56.22	0.10	0.17	0.17	0.09	0.16	0.16
380	60.09	59.87	61.09	0.10	0.16	0.16	0.08	0.14	0.16
390	63.89	64.17	63.91	0.09	0.16	0.16	0.08	0.15	0.14
400	69.30	70.08	71.74	0.08	0.16	0.16	0.06	0.14	0.14
500	67.49	66.65	66.87	0.04	0.12	0.14	0.04	0.12	0.13
600	67.06	65.46	65.83	0.05	0.12	0.13	0.03	0.10	0.15
710	68.71	66.42	67.63	0.04	0.13	0.15	0.03	0.11	0.16
740	58.75	65.52	58.50	0.05	0.13	0.14	0.04	0.12	0.17
770	61.39	65.09	61.49	0.04	0.13	0.15	0.04	0.12	0.16
800	57.06	61.84	54.19	0.05	0.14	0.16	0.06	0.13	0.19
900	53.18	56.50	55.10	0.03	0.14	0.17	0.06	0.14	0.20
1000	55.25	54.98	54.73	0.03	0.14	0.18	0.05	0.15	0.21
1100	54.97	54.78	54.47	0.04	0.15	0.19	0.06	0.16	0.23
1200	54.29	54.53	53.32	0.05	0.16	0.21	0.08	0.18	0.23
1300	53.46	53.45	53.48	0.06	0.17	0.23	0.08	0.19	0.25
1400	51.99	51.81	50.92	0.07	0.19	0.25	0.09	0.19	0.25
1500	50.72	50.60	49.33	0.07	0.19	0.27	0.09	0.20	0.26
1600	50.60	49.80	49.81	0.09	0.20	0.27	0.09	0.20	0.23
1700	49.99	49.16	48.28	0.11	0.22	0.28	0.12	0.22	0.24
1900	49.93	49.18	47.97	0.12	0.23	0.30	0.13	0.21	0.24
2000	50.08	48.32	48.11	0.13	0.23	0.30	0.14	0.23	0.23
2100	47.07	47.02	46.80	0.12	0.24	0.31	0.12	0.22	0.24
2200	48.74	46.79	48.00	0.14	0.25	0.32	0.15	0.24	0.24
2300	46.72	46.93	46.38	0.14	0.25	0.31	0.14	0.25	0.24
2400	46.50	45.21	47.07	0.15	0.27	0.34	0.17	0.26	0.26
2500	47.77	48.00	46.10	0.15	0.26	0.35	0.14	0.24	0.26
2600	46.76	47.88	47.82	0.16	0.28	0.38	0.16	0.26	0.29

REV. X2

SCLF-190+

101115

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Surface Mount Low Pass Filter

SCLF-190+

Typical Performance Data

FREQ. (MHz)	GROUP DELAY (nsec)		
	@ -40° C	@ +25° C	@ +85° C
0.1	6.29	4.77	7.44
1	3.87	3.87	3.94
10	3.42	3.56	3.60
20	3.71	3.70	3.67
30	3.70	3.65	3.57
40	3.57	3.67	3.68
42	3.56	3.63	3.49
44	3.62	3.65	3.58
45	3.75	3.72	3.80
46	3.61	3.60	3.54
48	3.60	3.74	3.60
50	3.67	3.67	3.66
52	3.66	3.77	3.61
54	3.67	3.72	3.74
55	3.68	3.62	3.69
56	3.69	3.73	3.74
58	3.70	3.66	3.71
60	3.68	3.64	3.78
62	3.64	3.66	3.69
64	3.78	3.82	3.98
65	3.77	3.76	3.68
66	3.82	3.61	3.72
68	3.70	3.70	3.76
70	3.85	3.82	3.77
72	3.75	3.79	3.95
74	3.73	3.87	3.78
75	3.81	3.68	3.71
76	3.83	3.75	3.80
78	3.89	3.90	3.94
80	3.86	3.86	3.98
82	3.94	3.95	3.93
84	3.85	3.86	3.93
85	3.86	3.88	3.83
86	3.93	3.88	3.95
88	3.91	3.93	3.92
90	4.15	4.13	4.01
92	4.00	3.88	3.97
94	4.04	4.09	4.06
95	4.14	4.18	4.15
96	4.12	4.08	4.12
98	4.00	3.98	4.00
100	4.09	4.11	4.06
110	4.20	4.17	4.09
120	4.24	4.21	4.16
130	4.40	4.39	4.48
140	4.52	4.60	4.57
150	5.01	4.83	4.95
160	5.24	5.20	5.30
170	5.70	5.79	5.79
180	6.46	6.53	6.58
190	7.37	7.60	7.62
200	8.69	8.75	8.73
300	0.54	0.74	1.02

REV. X2
SCLF-190+
101115
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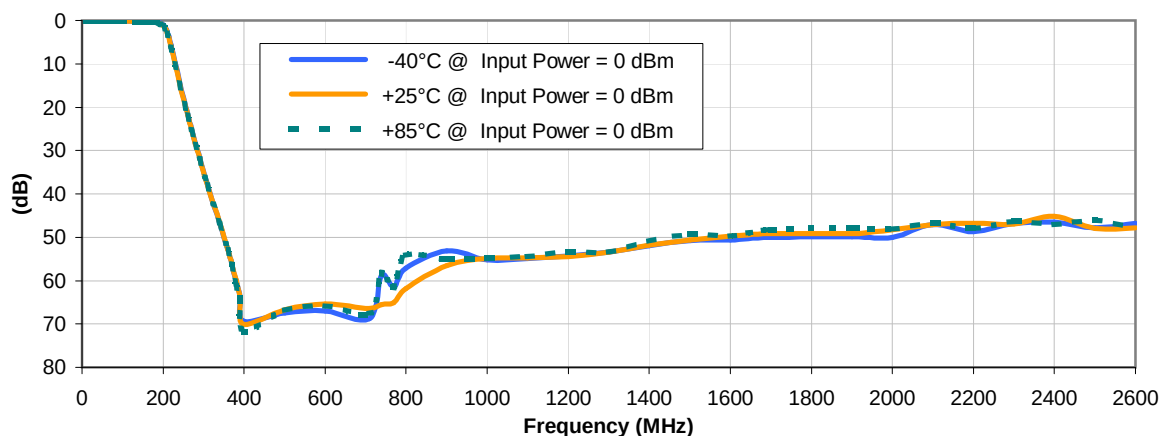


Surface Mount Low Pass Filter

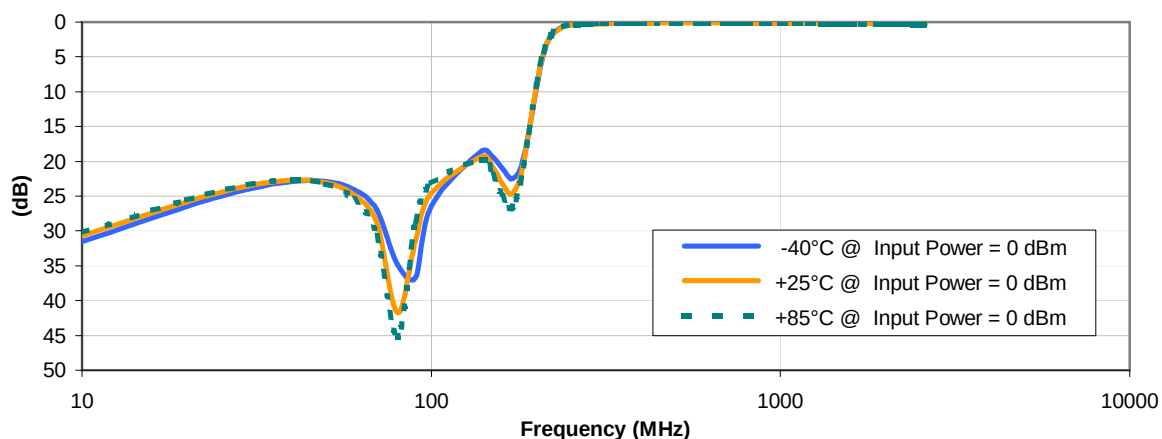
Typical Performance Curves

SCLF-190+

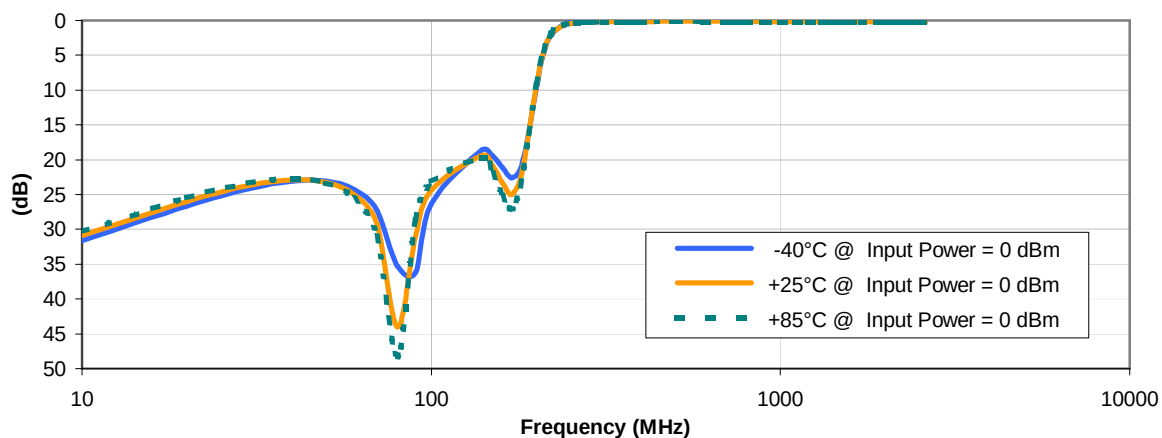
INSERTION LOSS vs. TEMPERATURE



INPUT RETURN LOSS vs. TEMPERATURE

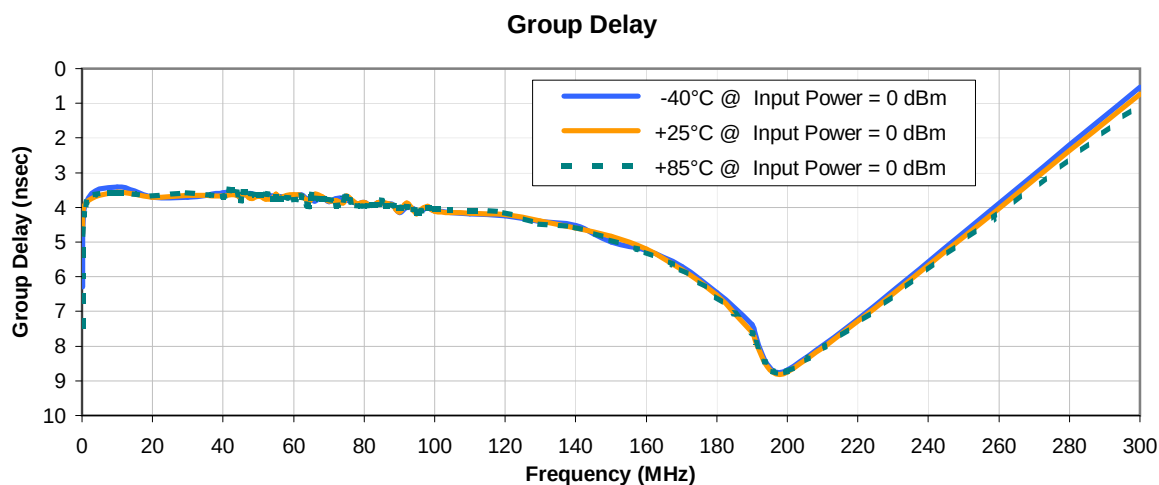


OUTPUT RETURN LOSS vs. TEMPERATURE



REV. X2
SCLF-190+
101115
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Typical Performance Curves

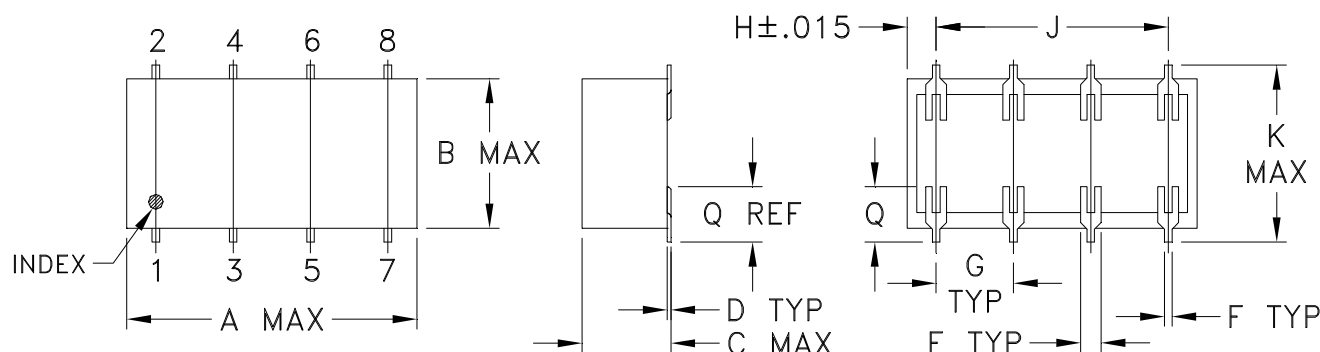


Case Style

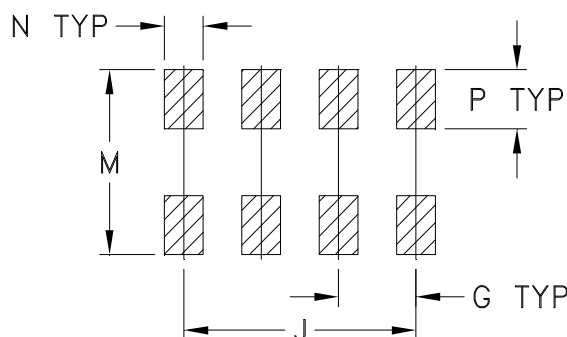
YY

Outline Dimensions

YY101
YY109
YY161



PCB Land Pattern



Suggested Layout
Tolerance to be within $\pm.002$

CASE#	A	B	C	D	E	F	G	H	J	K	L	M	N	P	Q	WT. GRAM S
YY101*			.20 (5.08)							.450 (11.43)	--	.470 (11.94)				1.6
YY109*	.75 (19.05)	.38 (9.65)	.20 (5.08)	.010 (0.25)	.050 (1.27)	.020 (0.51)	.200 (5.08)	.075 (1.91)	.600 (15.24)	.720 (18.29)	--	.740 (18.80)	.100 (2.54)	.150 (3.81)	.148 (3.76)	1.6
YY161			.28 (7.11)							.450 (11.43)	--	.470 (11.94)				1.6

Dimensions are in inches (mm). Tolerances: 2 Pl. $\pm .01$; 3 Pl. $\pm .005$

Notes:

- Case material: Plastic.
- Termination finish:
For RoHS Case Styles: Tin plate over Nickel plate.
For RoHS-5 Case Styles: Tin-Lead plate.
- Special Tolerances: Termination thickness $\pm .003$ inch.
- * Denotes: For SCM mixers, long termination version (case YY109) is available upon request, consult factory. To order short termination version (case YY101) add -NL suffix.



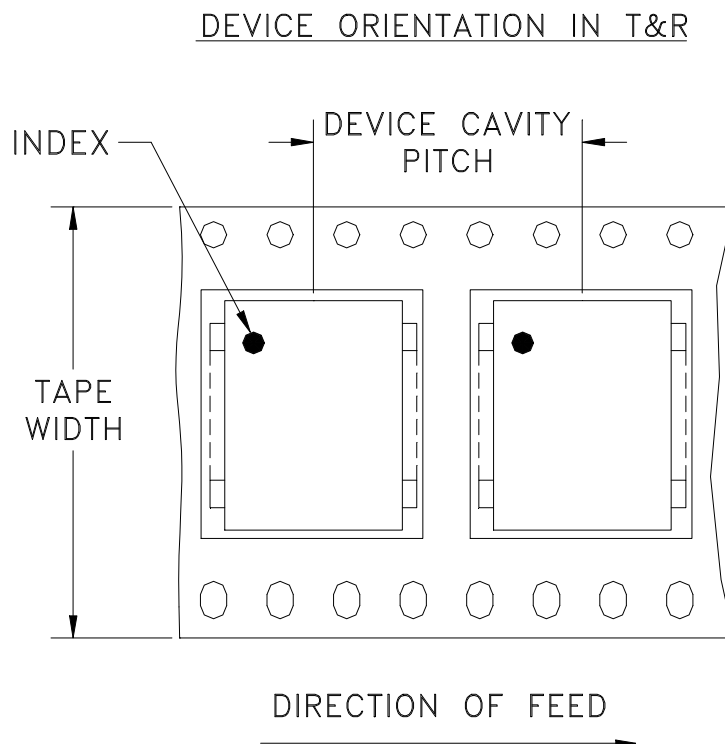
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Mini-Circuits ISO 9001 & ISO 14001 Certified

Tape & Reel Packaging TR-F5



Tape Width, mm	Device Cavity Pitch, mm	Reel Size, inches	Devices per Reel
32	16	13	500

Mini-Circuits carrier tape materials provide protection from ESD (Electro-Static Discharge) during handling and transportation. Tapes are static dissipative and comply with industry standards EIA-481/EIA-541.

Go to: www.minicircuits.com/pages/pdfs/tape.pdf



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A diagram of a tapered shaft with a central hole. The shaft is represented by a trapezoid with a horizontal centerline passing through its middle. The left end of the shaft is narrower than the right end, indicating a taper. The central hole is represented by a smaller trapezoid inside the shaft, also with a horizontal centerline.

REV	ECN No.	DESCRIPTION	DATE	DR	AUTH
OR	M81561	NEW RELEASE	09/11/02	GF	ABD
A	M101145	ADDED YY101 CASE STYLE & NOTE 2	10/07/05	MMG	ABD
B	M102713	ADDED "...WITH SMOBC"	01/16/06	GT	IL
C	M165986	TB-187+ (WAS TB-187)	02/01/18	ITG	IL

.030 TYP
 .060 TYP
 .060
 .050
 .230
 2 PL.
 PIN 1
 .064 TRACE WIDTH, 2 PL.
 (SEE NOTE BELOW)
 .100 TYP
 .040 TYP
 .040, 2 PL.
 PACKAGE OUTLINE
 26 X ϕ .020 PTH FOR GROUND



DENOTES COPPER LAND PATTERN FREE OF SOLDER MASK

UNLESS OTHERWISE SPECIFIED		INITIALS	DATE
DIMENSIONS ARE IN INCHES TOLERANCES ON: 2 PL DECIMALS ± 3 PL DECIMALS ± .005 ANGLES ± FRACTIONS ±	DRAWN	GF	08/12/02
	CHECKED	AV	09/11/02
	APPROVED	ABD	09/11/02

11

Mini-Circuits®

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PL, cr, YY101/YY161, SCLF, TB-187+

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ASHEETA1.DWG REV:A DATE:01/12/95

SIZE
A

CODE IDENT
15542

DRAWING NO:
98-PL-049

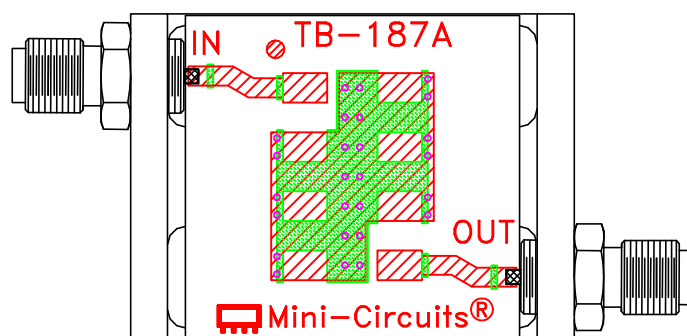
REV:	C
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FILE: 98PL049

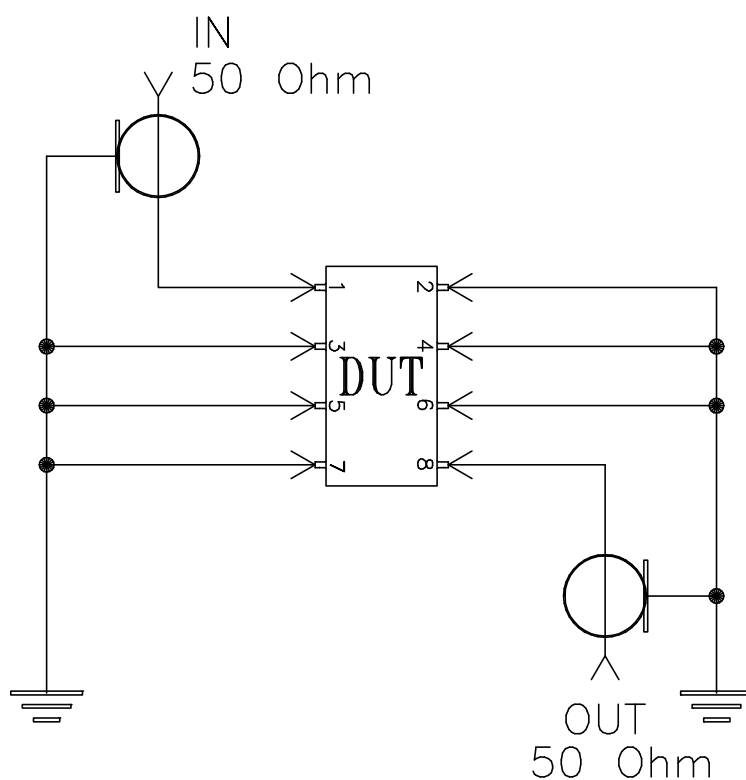
SCALE: 5:1

SHEET:	1 OF 1
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Evaluation Board and Circuit



TB-187+



Schematic Diagram

Notes:

1. SMA Female connectors.
2. PCB Material: Rogers R04350 or equivalent,
Dielectric Constant=3.5, Thickness=.030 inch.

 **Mini-Circuits®**



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, 240 hours, 50°C	MIL-STD-202, Method 103, Condition A, Except 50°C and end-point electrical test done within 12 hours
Thermal Shock	-55° to 100°C, 100 cycles	MIL-STD-202, Method 107, Condition A-3, except +100°C
Solder Reflow Heat	Sn-Pb Eutetic Process: 225°C peak Pb-Free Process 245° - 250°C peak	J-STD-020, Table 4-1, 4-2 and 5-2, Figure 5-1
Solderability	10X Magnification	J-STD-002, 95% Coverage
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, 11 ms, 1/2-sine, 18 shocks: 3 each direction, each of 3 axes	MIL-STD-202, Method 213, Condition A
Marking Resistance to Solvents	Isopropyl alcohol + mineral spirits at 25°C; terpene defluxer at 25°C; distilled water + proylene glycol monomethyl ether + monoethanolamine at 63°C to 70°C	MIL-STD-202, Method 215