

Surface Mount

Diplexer

DPLB-8510A01+

75 Ω DC to 1220 MHz
(DC-85, 102-1220 MHz)



CASE STYLE: NU1620

The Big Deal

- Low insertion loss
- High rejection, 50dB typ.
- 75 Ω Impedance
- Used in DOCSIS 3.1 standard

Product Overview

DPLB-8510A01+ has lowpass port at DC-85 MHz and highpass port at 102-1220 MHz. Good return loss combined with high out of channel rejection makes it a ideal part in cable TV and multiband radio systems.

Key Features

Feature	Advantages
Low passband insertion loss	Low passband insertion loss ensures low signal loss through both the channels.
Good stopband rejection	Co-channel rejection of 50dB ensures unwanted spurious are eliminated.
Excellent return loss at DC-85 and 102-1220 MHz	This makes signal transmission with very less reflection and well-matched with the adjacent component used in the system.

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



Surface Mount Diplexer

75Ω DC to 1220 MHz (DC-85, 102-1220 MHz)

Maximum Ratings

Operating Temperature -40° to 85°C

Storage Temperature -55°C to 100°C

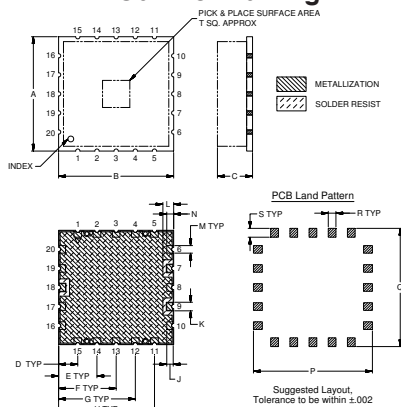
RF Power Input 30dBm Max.

Permanent damage may occur if any of these limits are exceeded. These ratings are not intended for continuous normal operation

Pin Connections

HIGH PASS PORT	7
LOW PASS PORT	9
COMMON PORT	18
GROUND	1-6,8,10-17,19,20

Outline Drawing

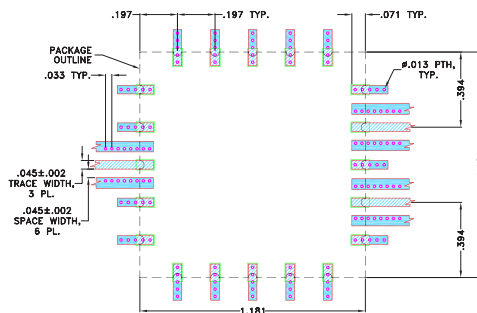


Outline Dimensions (inches)

A	B	C	D	E	F	G	H	J	K	
-	-	Max	Min	.197	.394	.591	.787	.984	.066	.089
1.181	1.181	.280	.205	5.00	10.00	15.00	20.00	25.00	1.68	2.26
30.00	30.00	7.11	5.21							
L	M	N	P	Q	R	S	T			Wt.
-	-	.071	1.221	1.221	.079	.091	.280			grams
.111	.079									3.6
2.82	2.01	1.80	31.01	31.01	2.01	2.31	7.11			

Demo Board MCL P/N: TB-786+ Suggested PCB Layout (PL-435)

SUGGESTED MOUNTING CONFIGURATION FOR NU1620,
NV1988, NZ2001, PA2002 CASE STYLE "20DP01" PIN CODE



NOTES:

- TRACE WIDTH IS SHOWN FOR OAK-602 WITH DIELECTRIC THICKNESS .031±.002". COPPER: 1/2 OZ. EACH SIDE. FOR OTHER MATERIALS TRACE WIDTH MAY NEED TO BE MODIFIED.
- 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

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www.minicircuits.com P.O. Box 350166, Brooklyn, NY 11235-0003 (718) 934-4500 sales@minicircuits.com

DPLB-8510A01+



CASE STYLE: NU1620

+RoHS Compliant

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

Features

- Low insertion loss
- 75Ω Impedance
- Good return loss
- High rejection

Applications

- Cable TV systems (DOCSIS 3.1 standard)
- Multiband radio systems



CAUTION NOTE: Open units are not recommended for use with Aqueous wash systems. Please evaluate your wash process before use.

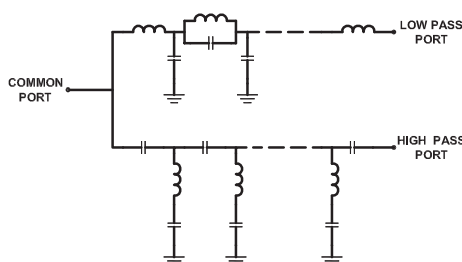
Electrical Specifications at 25°C

Parameter	Port	Frequency (MHz)	Min.	Typ.	Max.	Unit
Pass Band	Insertion Loss	Low Pass	DC-85	-	1.4	1.7
		High Pass	102-1220	-	1.4	1.7
	Return Loss	Low Pass	DC-85	14	18	-
		High Pass	102-1220	14	16	-
		Common	102-1220	14	16	-
Stop Band Isolation	Low Pass	102-1220	42	50	-	dB
	High Pass	DC-85	42	50	-	
Group Delay Variation	Low Pass	83-84	-	3	7	ns
		84-85	-	3	8	
	High Pass	102.25-106.83	-	10	18	
		109.25-112.83	-	4	8	

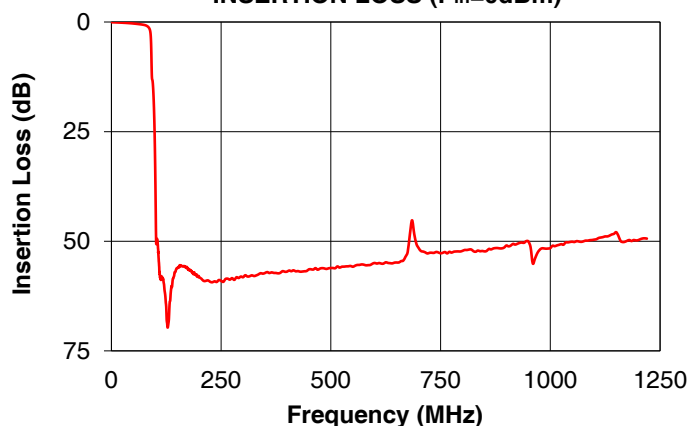
Typical Performance Data at 25°C

FREQUENCY (MHz)	INSERTION LOSS (dB)		RETURN LOSS (dB)	
	Low Pass Port	High Pass Port	Common Port	Low Pass Port
1.00	0.04	83.22	45.42	45.76
50.00	0.33	55.81	17.42	17.13
83.00	1.03	65.73	23.88	25.72
84.00	1.12	70.08	24.17	24.58
85.00	1.24	52.96	25.07	23.72
87.75	1.78	29.92	33.60	21.55
89.25	2.66	19.24	17.49	15.32
89.75	3.30	15.77	14.43	12.57
92.00	11.66	5.10	9.64	4.31
94.00	13.56	2.81	15.51	3.46
97.50	21.20	1.55	21.99	6.74
99.50	31.03	1.25	20.51	6.66
100.00	34.46	1.20	20.35	5.56
102.00	50.21	1.04	20.27	2.66
106.00	51.12	0.83	21.65	1.09
109.00	55.90	0.72	23.29	0.77
112.00	58.53	0.64	25.33	0.61
500.00	56.11	0.26	23.85	0.08
750.00	52.74	0.38	17.41	0.04
950.00	50.04	0.45	16.37	0.14
1000.00	51.56	0.45	16.62	0.16
1220.00	49.40	0.42	21.01	0.31

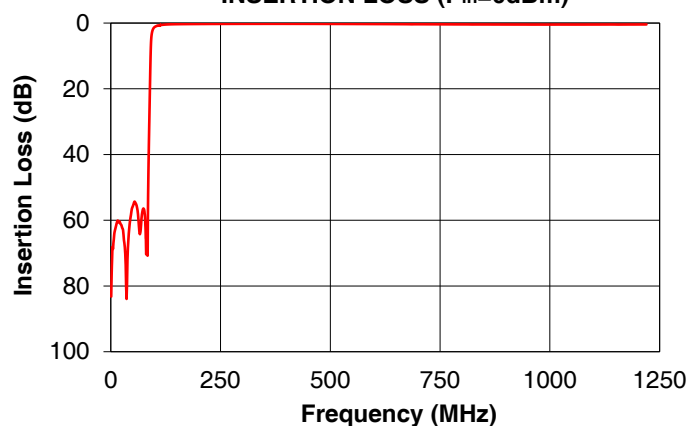
Functional Schematic



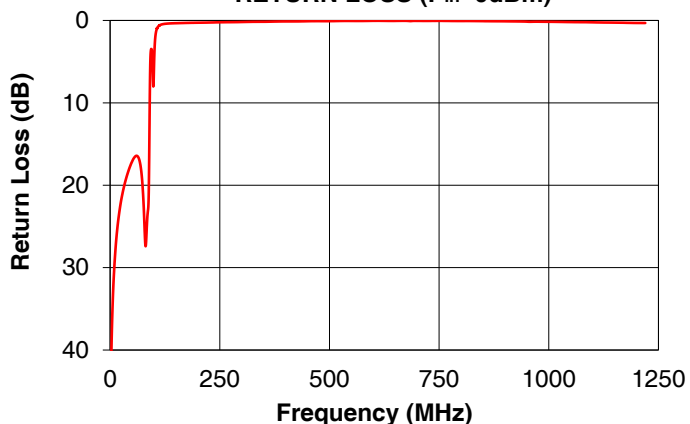
**DPLB-8510A01+ LOW PASS PORT
INSERTION LOSS ($P_{in}=0dBm$)**



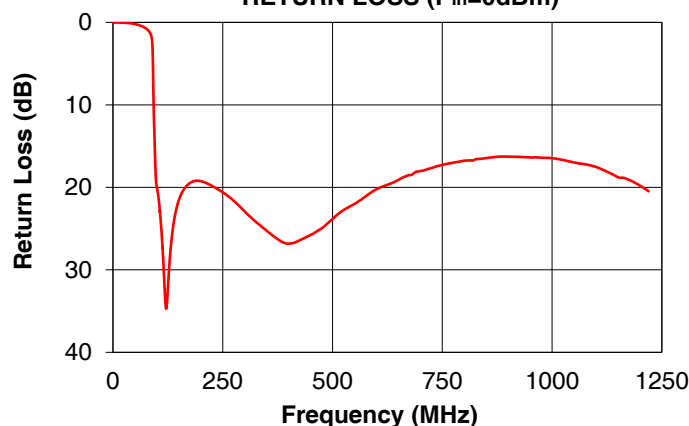
**DPLB-8510A01+ HIGH PASS PORT
INSERTION LOSS ($P_{in}=0dBm$)**



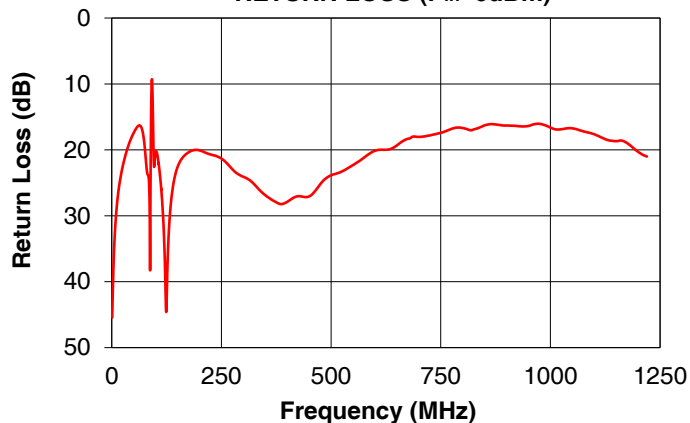
**DPLB-8510A01+ LOW PASS PORT
RETURN LOSS ($P_{in}=0dBm$)**



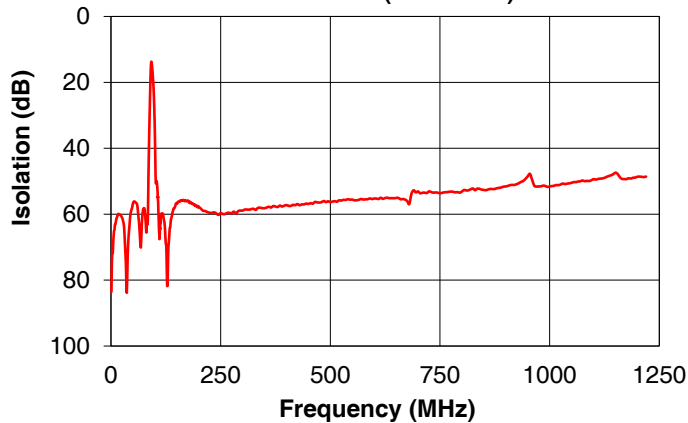
**DPLB-8510A01+ HIGH PASS PORT
RETURN LOSS ($P_{in}=0dBm$)**



**DPLB-8510A01+ COMMON PORT
RETURN LOSS ($P_{in}=0dBm$)**



**DPLB-8510A01+ CROSS OVER
ISOLATION ($P_{in}=0dBm$)**



Notes

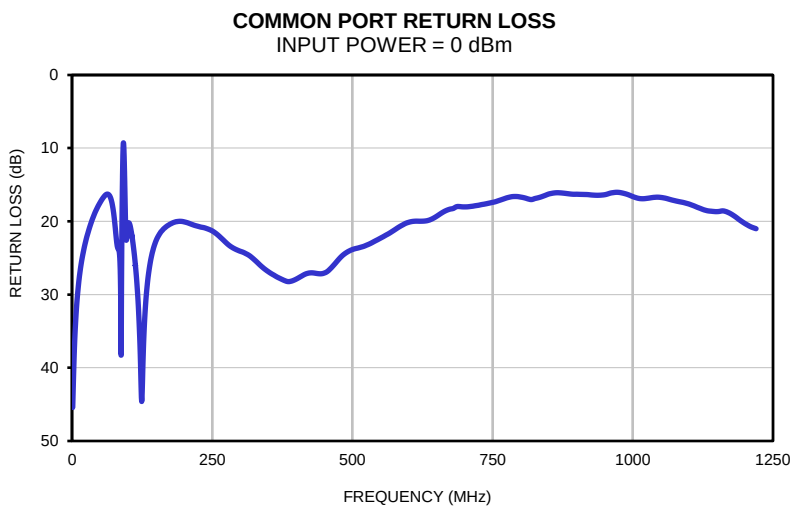
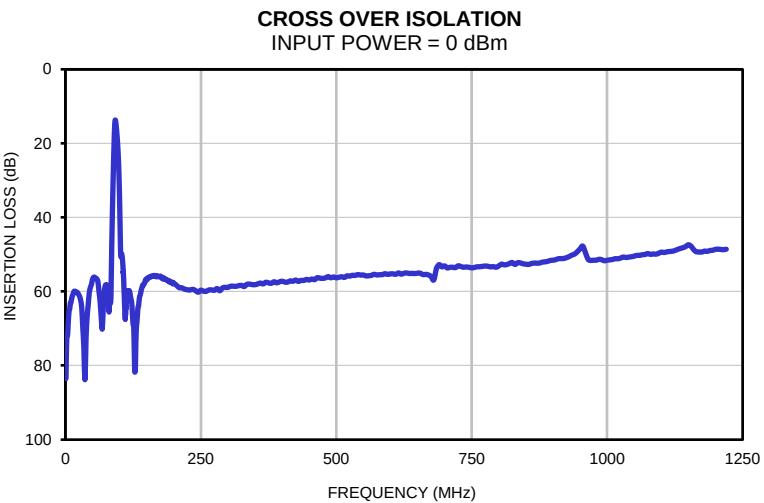
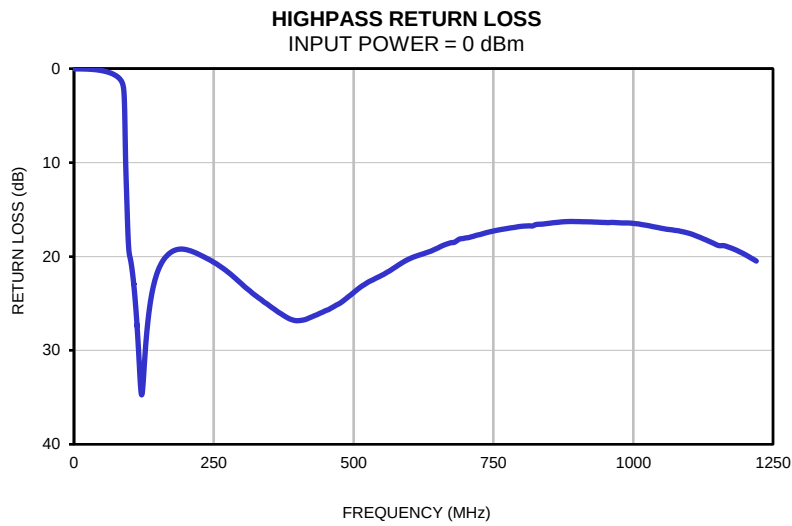
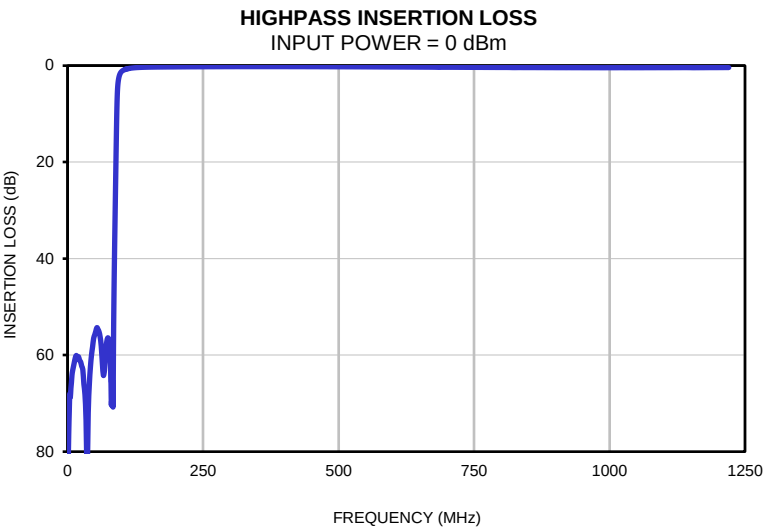
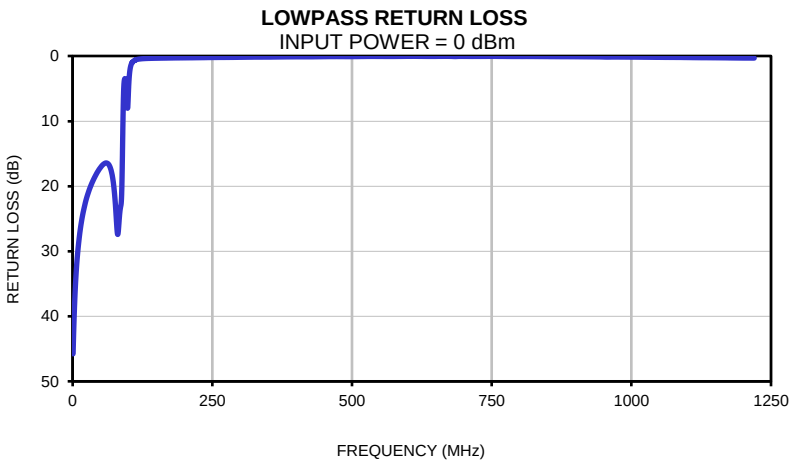
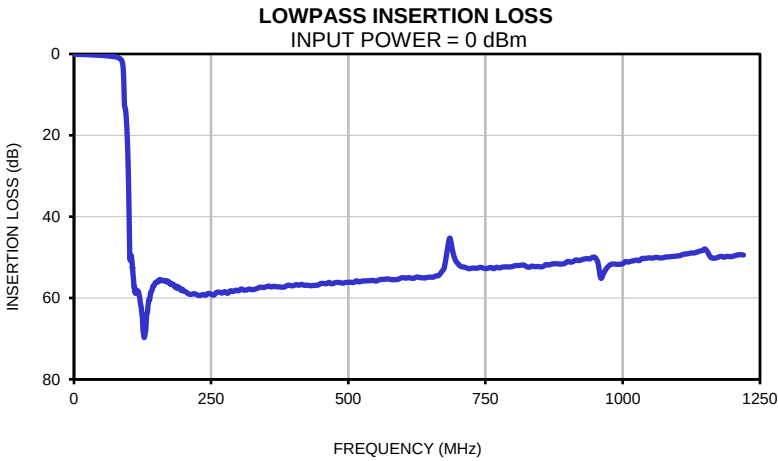
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Typical Performance Data

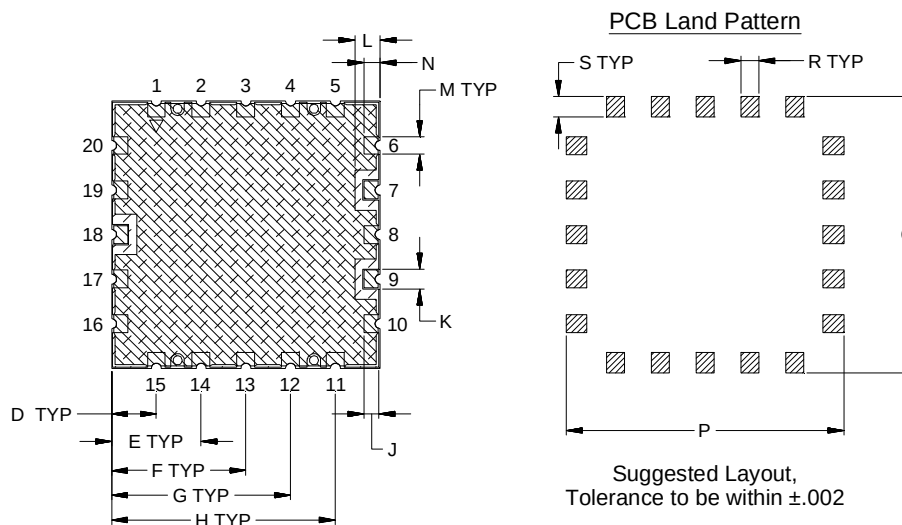
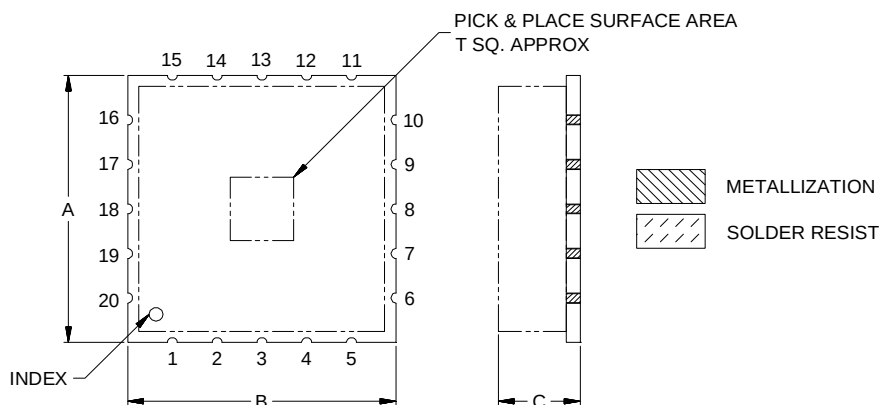
FREQUENCY (MHz)	INSERTION LOSS (dB)		Cross over isolation (dB) (between LPF and HPF)	RETURN LOSS (dB)		
	Lowpass port	Highpass port		Common port	Lowpass port	Highpass port
1.0	0.04	83.22	83.52	45.42	45.76	0.02
5.0	0.07	68.71	68.88	35.51	35.55	0.01
10.0	0.08	62.80	63.09	29.69	29.47	0.01
20.0	0.13	60.33	60.13	24.17	23.62	0.03
60.0	0.44	56.27	57.36	16.37	16.42	0.34
80.0	0.84	65.68	64.53	23.16	27.06	0.96
83.0	1.03	65.73	62.66	23.88	25.72	1.15
84.0	1.12	70.08	61.48	24.17	24.58	1.23
85.0	1.24	52.96	52.28	25.07	23.72	1.32
88.0	1.87	28.13	30.02	29.46	20.90	1.81
89.0	2.44	21.01	24.11	19.28	16.66	2.21
89.5	2.94	17.49	21.33	15.87	13.95	2.55
90.0	3.75	14.09	18.77	13.13	11.21	3.09
90.5	5.03	10.99	16.57	11.04	8.69	3.95
91.0	6.96	8.38	14.93	9.72	6.63	5.23
92.0	11.66	5.10	13.70	9.64	4.31	8.54
93.0	13.10	3.61	14.35	11.98	3.59	11.08
93.5	13.25	3.16	14.99	13.64	3.48	12.03
94.0	13.56	2.81	15.73	15.51	3.46	12.94
95.0	14.84	2.28	17.41	19.44	3.68	14.80
97.0	19.54	1.65	21.82	22.42	5.80	18.14
97.5	21.20	1.55	23.30	21.99	6.74	18.72
98.0	23.14	1.46	25.05	21.51	7.62	19.15
99.0	28.03	1.31	29.56	20.76	7.62	19.70
99.5	31.03	1.25	32.39	20.51	6.66	19.87
100.0	34.46	1.20	35.64	20.35	5.56	20.01
101.0	42.64	1.11	43.36	20.21	3.77	20.27
102.0	50.21	1.04	50.02	20.27	2.66	20.60
105.0	49.92	0.87	51.02	21.20	1.28	21.88
106.0	51.12	0.83	52.88	21.65	1.09	22.40
109.0	55.90	0.72	62.71	23.29	0.77	24.27
110.0	57.53	0.69	66.01	23.93	0.70	25.00
111.0	58.32	0.66	65.96	24.60	0.65	25.75
112.0	58.53	0.64	64.55	25.33	0.61	26.57
112.5	58.36	0.63	62.77	25.72	0.60	27.03
113.0	58.73	0.62	61.78	26.13	0.58	27.47
115.0	58.05	0.58	59.77	27.92	0.53	29.44
120.0	59.88	0.50	61.30	34.81	0.45	34.39
125.0	64.97	0.45	69.06	43.08	0.40	32.33
150.0	56.17	0.34	56.68	22.59	0.33	21.55
175.0	56.51	0.31	55.84	20.37	0.29	19.48
200.0	58.19	0.29	57.75	20.08	0.27	19.25
250.0	59.03	0.26	59.67	21.32	0.22	20.61
300.0	58.21	0.23	58.91	24.09	0.18	22.92
350.0	57.24	0.23	58.18	26.88	0.15	25.26
400.0	56.93	0.23	57.23	27.88	0.11	26.83
450.0	56.41	0.24	56.92	27.06	0.09	25.75
500.0	56.11	0.26	56.32	23.85	0.08	23.84
550.0	55.82	0.28	55.56	22.30	0.06	22.00
600.0	54.95	0.30	55.26	20.14	0.04	20.23
650.0	54.85	0.33	55.07	19.32	0.05	19.10
700.0	51.54	0.36	53.10	18.03	0.05	18.02
750.0	52.74	0.38	53.63	17.41	0.04	17.28
800.0	52.19	0.40	53.12	16.69	0.06	16.78
850.0	52.31	0.42	52.64	16.27	0.08	16.45
900.0	50.97	0.44	51.57	16.30	0.10	16.27
950.0	50.04	0.45	48.52	16.37	0.14	16.37
1000.0	51.56	0.45	51.58	16.62	0.16	16.46
1200.0	49.75	0.43	48.64	20.29	0.30	19.79
1220.0	49.40	0.42	48.60	21.01	0.31	20.48

Typical Performance Curves



Outline Dimensions

NU1620



CASE#	A	B	C		D	E	F	G	H	J	K	L	M
			Max	Min									
NU1620	1.181 (30.00)	1.181 (30.00)	.280 (7.11)	.205 (5.21)	.197 (5.00)	.394 (10.00)	.591 (15.00)	.787 (20.00)	.984 (25.00)	.066 (1.68)	.089 (2.26)	.111 (2.82)	.079 (2.01)

CASE#	N	P	Q	R	S	T	WT.GRAMS
NU1620	.071 (1.80)	1.221 (31.01)	1.221 (31.01)	.079 (2.01)	.091 (2.31)	.280 (7.11)	3.6

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

Notes:

1. Base: Printed wiring laminate.
2. Termination finish:
 - For RoHS Case Styles: 3-5 μ inch Gold over 120-240 μ inch Nickel plate.
 - For RoHS-5 Case Styles: Tin-Lead plate.



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

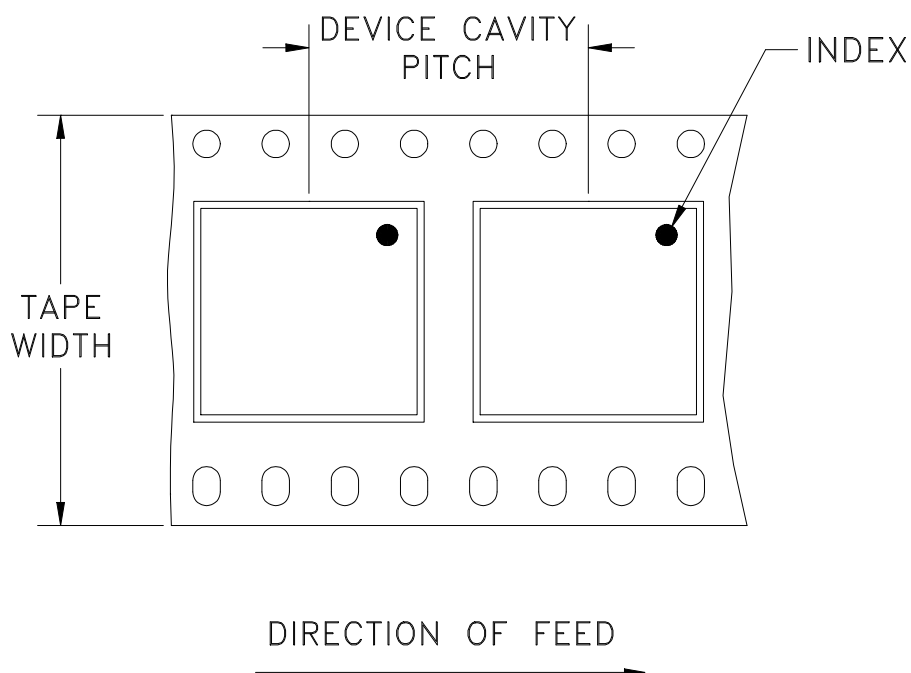


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RF/IF MICROWAVE COMPONENTS

Tape & Reel Packaging TR-F80

DEVICE ORIENTATION IN T&R



Tape Width, mm	Device Cavity Pitch, mm	Reel Size, inches	Devices per Reel
44	40	13	100

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.

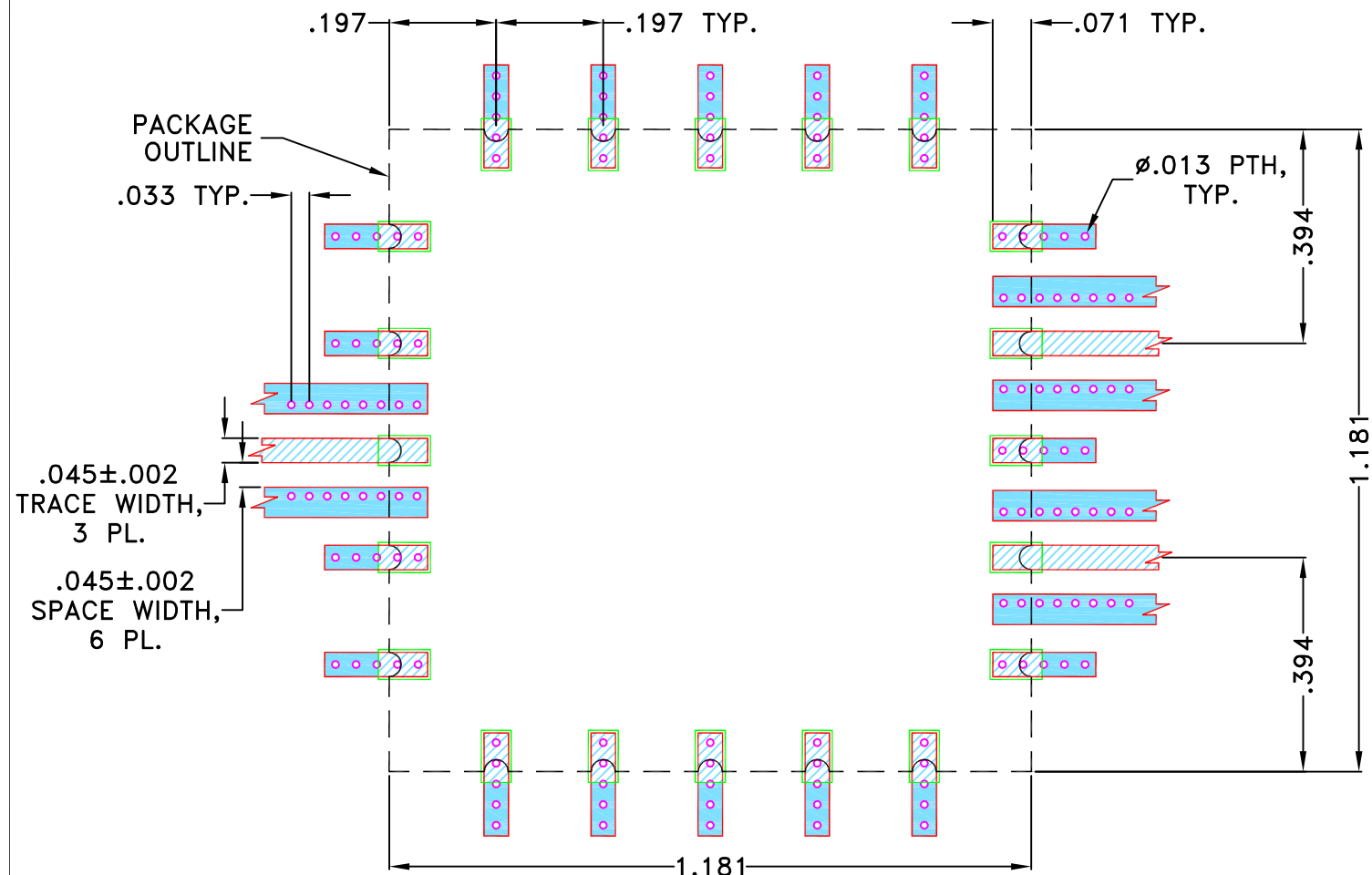
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THIRD ANGLE PROJECTION		REVISIONS				
		REV OR	ECN No. M147697	DESCRIPTION NEW RELEASE	DATE SEP 14	DR DDR
						AUTH MD

SUGGESTED MOUNTING CONFIGURATION FOR NU1620,
NV1998, NZ2001, PA2002 CASE STYLE "20DP01" PIN CODE



NOTES:

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FOR OTHER MATERIALS TRACE WIDTH MAY NEED TO BE MODIFIED.
- BOTTOM SIDE OF THE PCB IS CONTINUOUS GROUND PLANE.



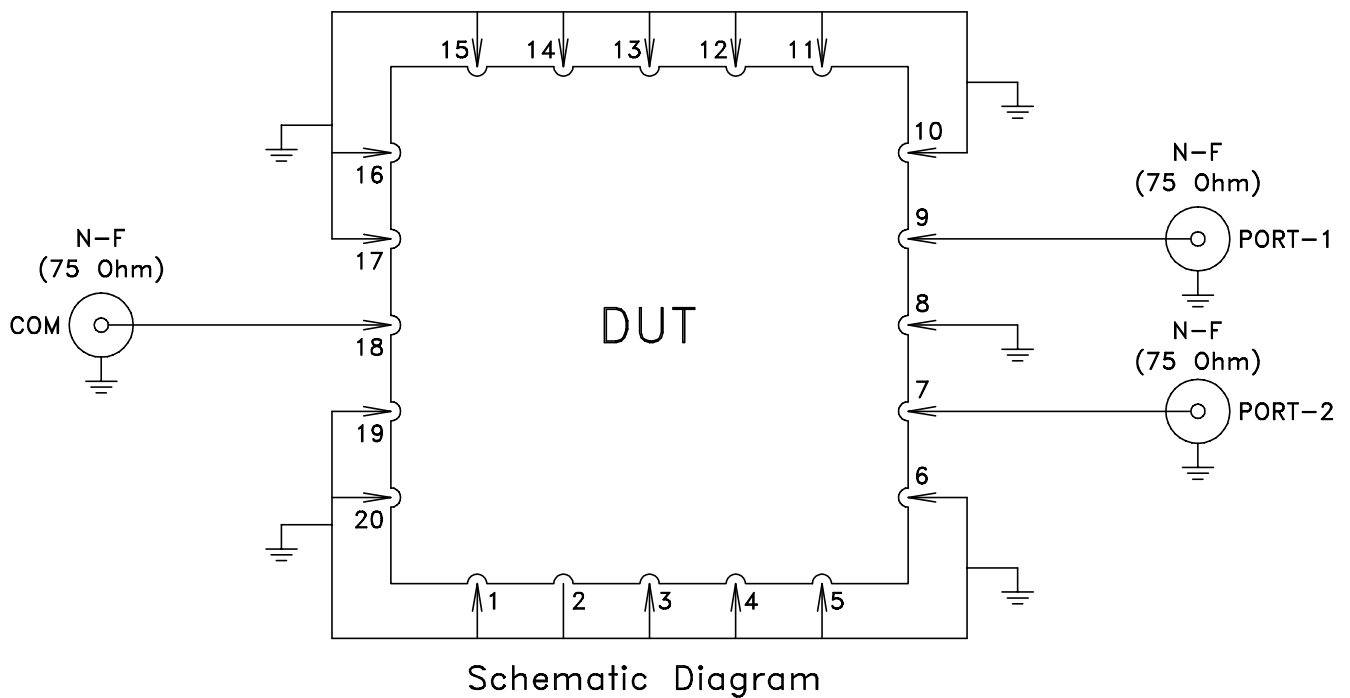
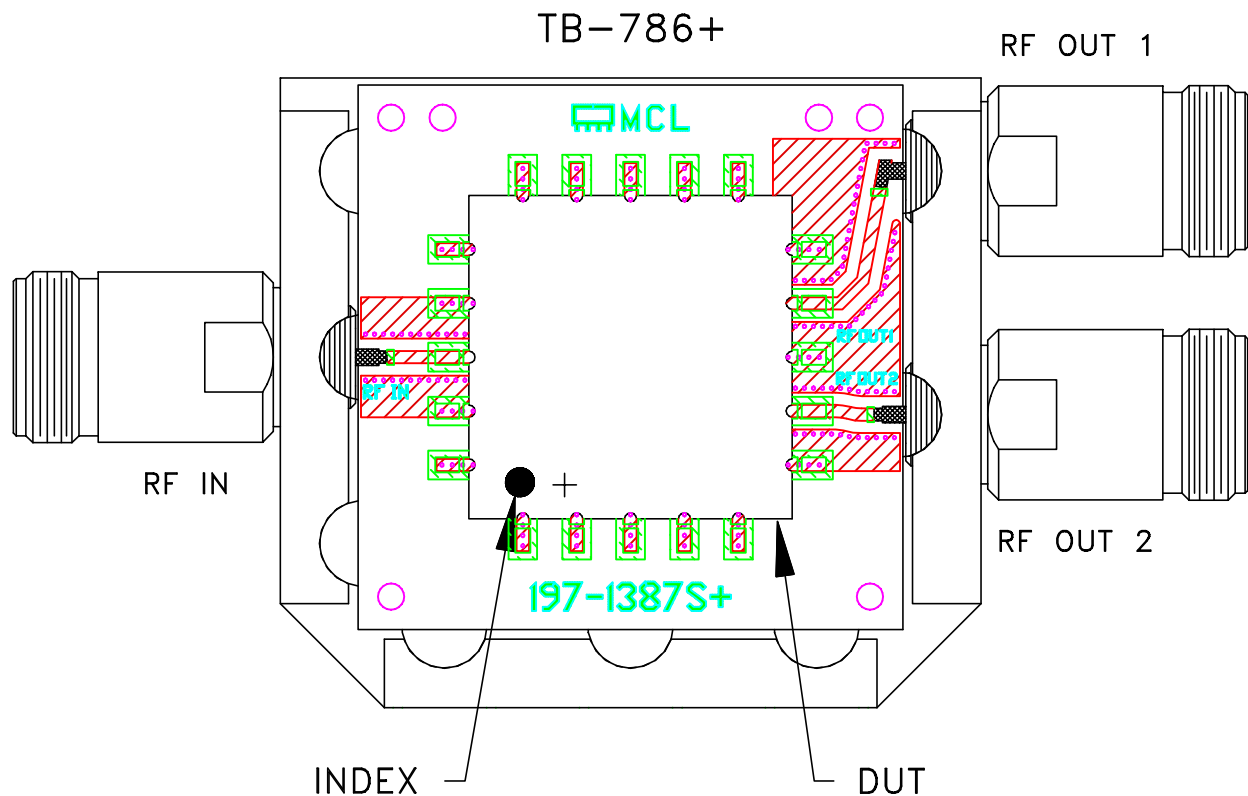
DENOTES PCB COPPER LAYOUT WITH SMOBC
(SOLDER MASK OVER BARE COPPER)



DENOTES COPPER LAND PATTERN FREE OF SOLDERMASK

UNLESS OTHERWISE SPECIFIED		INITIALS	DATE	 Mini-Circuits® 13 Neptune Avenue Brooklyn NY 11235		
DIMENSIONS ARE IN INCHES TOLERANCES ON: 2 PL DECIMALS ± 3 PL DECIMALS ± .005" ANGLES ± FRACTIONS ±	DRAWN	DDR	09 SEP 14			
	CHECKED	MD	09 SEP 14			
	APPROVED	KR	09 SEP 14			
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		SIZE	CODE IDENT	DRAWING NO:	REV:	
		A	15542	98-PL-435	OR	
		FILE:	98PL435	SCALE:	3:1	SHEET: 1 OF 1
ASHEETA1.DWG REV:A DATE:01/12/95						

Evaluation Board and Circuit



Notes:

1. 75 Ohm N Female connectors.
2. PCB Material: OAK-602 OR Equivalent
Dielectric Constant=2.50±.04, Thickness=.031 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	-55° to 85°C Ambient Environment	Individual Model Data Sheet
Storage Temperature	-55° to 100° C Ambient Environment	Individual Model Data Sheet
HAST	130°C, 85% RH, 96 hours	JESD22-A110
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 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, 20-2000 Hz, 4 times in each of three axes (total 12)	MIL-STD-883, Method 2007.3, Condition A
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