Surface Mount

Diplexer

DPLB-8510A05+

75Ω 5 to 1220 MHz (5-85, 102-1220 MHz)

CASE STYLE: NU1620

The Big Deal

- High crossover isolation
- Excellent return loss, 24dB Typ.
- 75Ω Impedance
- Used for DOCSIS 3.1 standard

Product Overview

DPLB-8510A05+ is a low cost high performance diplexer with the lowpass port at 5-85 MHz and highpass port at 102-1220 MHz. Excellent return loss combined with high out of channel rejection makes it an ideal component in cable TV and multiband radio systems.

Key Features

Feature	Advantages
Low passband insertion loss	Passband insertion loss 1.2 dB Typ. ensures low signal loss through both the channels.
Excellent stopband rejection	Co-channel rejection of 50dB Typ. ensures unwanted spurious are eliminated.
Excellent return loss at 5-85 and 102-1220 MHz	This makes signal transmission with very less reflection and well-matched with the adjacent component used in the system.

Notes
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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

Diplexer

DPLB-8510A05+

75Ω 5 to 1220 MHz (5-85, 102-1220 MHz)

Maximum Ratings

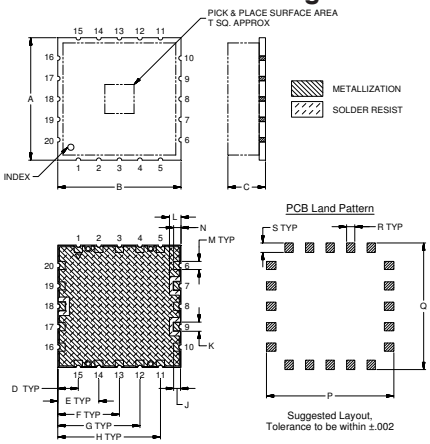
Operating Temperature	-40° to 85°C
Storage Temperature	-55°C to 100°C
RF Power Input	30dBm Max.

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

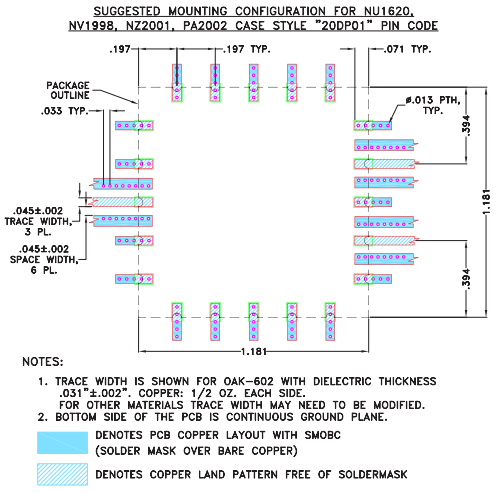


Outline Dimensions (inch / mm)

A	B	C		D	E	F	G	H	J	K
-	-	Max	Min	-	-	-	-	-	-	-
1.181	1.181	.280	.205	.197	.394	.591	.787	.984	.066	.089
30.00	30.00	7.11	5.21	5.00	10.00	15.00	20.00	25.00	1.68	2.26

L	M	N	P	Q	R	S	T	Wt. grams
-	-	-	-	-	-	-	-	
.111	.079	.071	1.221	1.221	.079	.091	.280	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)



NOTES:
1. 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.
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

Features

- Excellent return loss
- High crossover isolation
- Insertion loss 1.2 dB Typ.
- 75Ω Impedance

Applications

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

CASE STYLE: NU1620

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

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

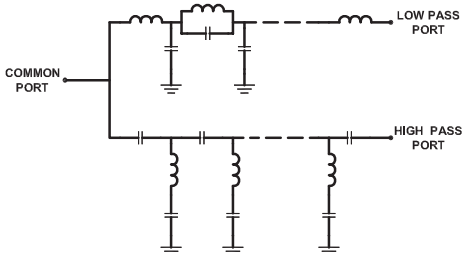
Electrical Specifications at 25°C

Parameter		Port	Frequency (MHz)	Min.	Typ.	Max.	Unit
Pass Band	Insertion Loss	Low Pass	5-85	-	1.2	1.6	dB
		High Pass	102-1220	-	1.3	1.6	
	Return Loss	Low Pass	5-85	20	24	-	dB
		High Pass	102-250	20	24	-	
			250-1220	20	24	-	
		Common	5-85	20	24	-	
			102-250	20	24	-	
			250-1220	20	24	-	
	Group delay Variation	Low Pass	79-85	-	25	35	ns
		High Pass	102-108	-	18	23	
	Absolute Group Delay	Low Pass	85	-	55	65	
		High Pass	102	-	45	55	
Stop Band Isolation		Low Pass	102-1220	43	45	-	dB
		High Pass	5-85	48	55	-	
Cross Over Isolation		LP-HP	85-102	38	41	-	

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	High Pass Port
1.0	0.01	78.50	48.44	48.60	0.00
5.0	0.04	68.33	41.24	42.18	0.00
79.0	0.69	60.77	30.44	29.30	0.44
85.0	1.19	55.01	34.05	32.97	0.67
89.0	3.14	50.30	12.09	10.29	0.95
91.6	12.59	30.12	4.74	2.18	1.30
92.6	19.47	23.04	3.93	1.41	1.54
93.0	22.75	20.55	3.76	1.24	1.67
93.8	30.59	16.01	3.64	1.02	2.04
97.2	44.14	3.82	8.88	0.65	8.88
102.0	52.29	1.35	37.73	0.50	29.34
108.0	56.02	0.89	38.70	0.42	28.86
250.0	52.92	0.25	36.13	0.12	32.34
300.0	51.23	0.24	47.92	0.09	44.68
500.0	50.13	0.26	41.70	0.02	29.69
600.0	49.71	0.28	36.91	0.03	29.86
750.0	50.04	0.32	31.47	0.01	32.39
800.0	49.98	0.33	30.55	0.03	32.94
850.0	49.98	0.35	30.03	0.06	33.13
900.0	49.91	0.36	29.98	0.10	32.58
1000.0	50.12	0.39	30.78	0.19	30.92
1220.0	50.11	0.46	31.08	0.42	29.66

Functional Schematic



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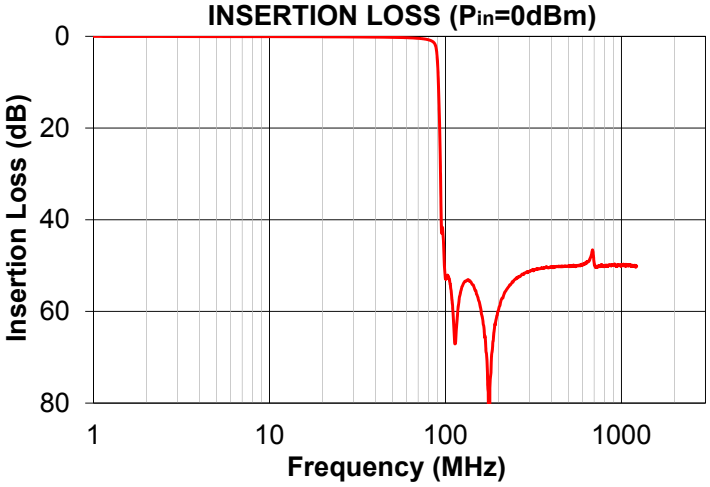
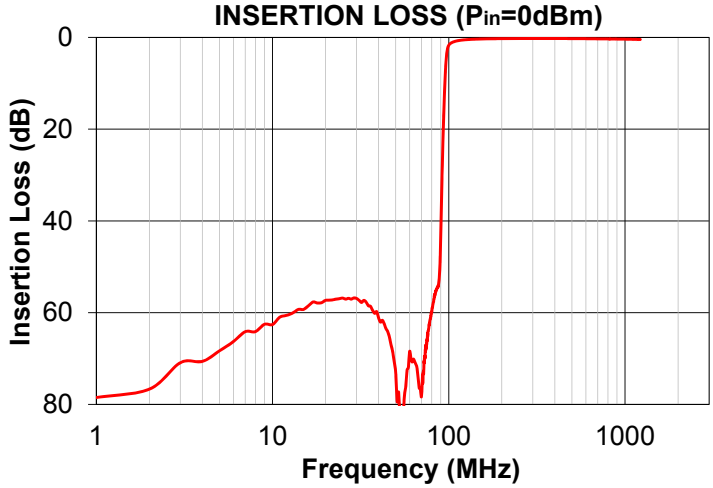
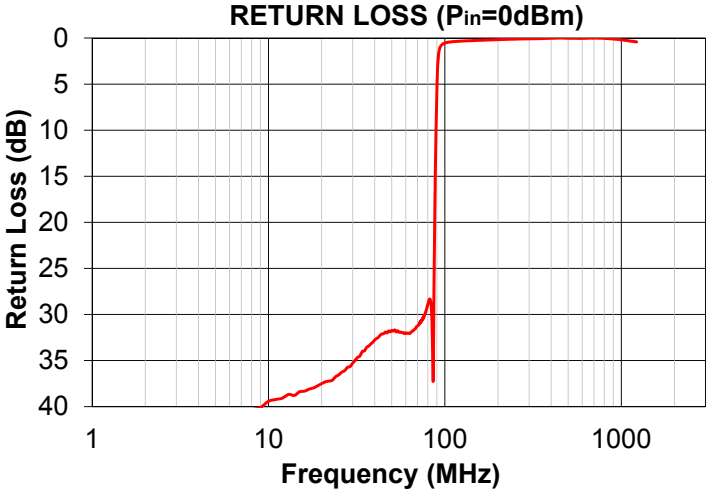
DPLB-8510A05+ LOW PASS PORT
INSERTION LOSS (Pin=0dBm)



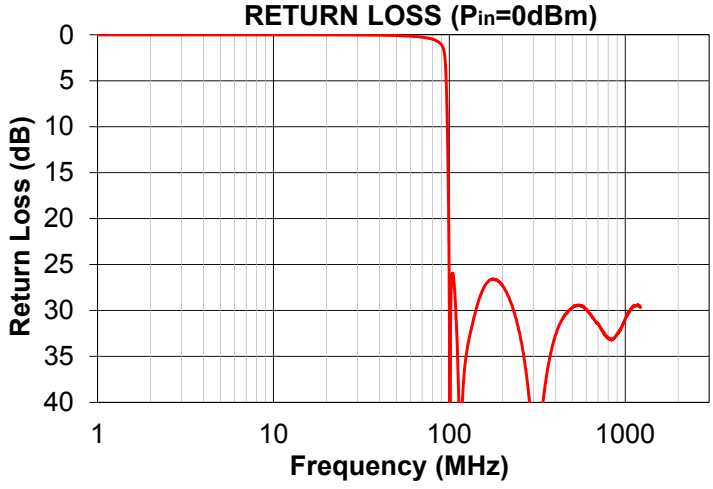
DPLB-8510A05+ HIGH PASS PORT
INSERTION LOSS (Pin=0dBm)



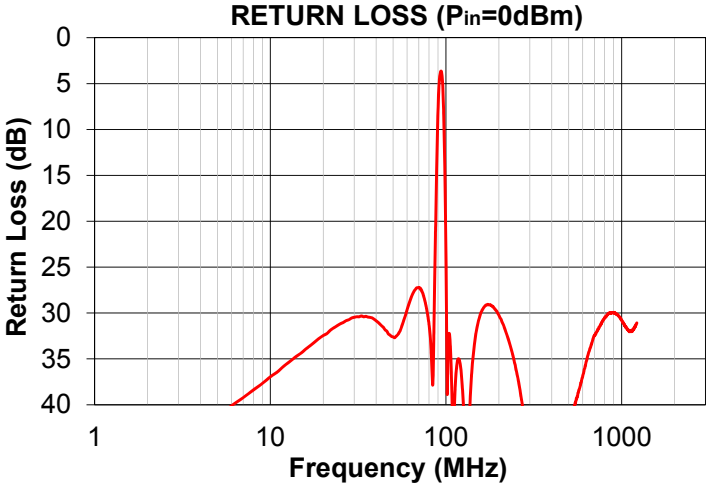
DPLB-8510A05+ LOW PASS PORT
RETURN LOSS (Pin=0dBm)



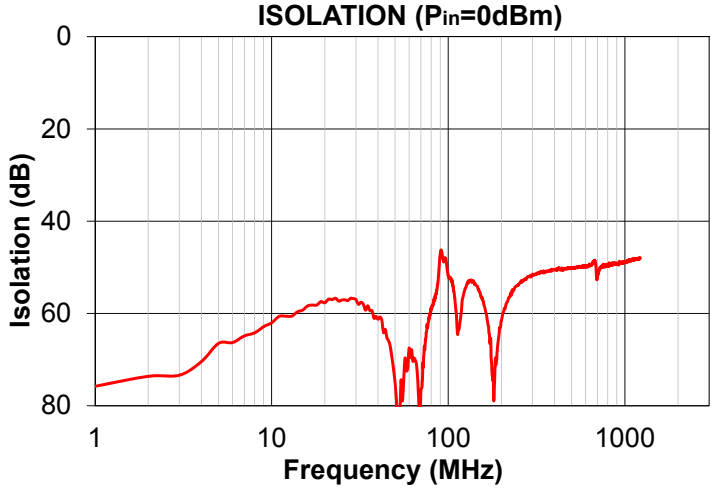
DPLB-8510A05+ HIGH PASS PORT
RETURN LOSS (Pin=0dBm)



DPLB-8510A05+ COMMON PORT
RETURN LOSS (Pin=0dBm)



DPLB-8510A05+ CROSS OVER
ISOLATION (Pin=0dBm)



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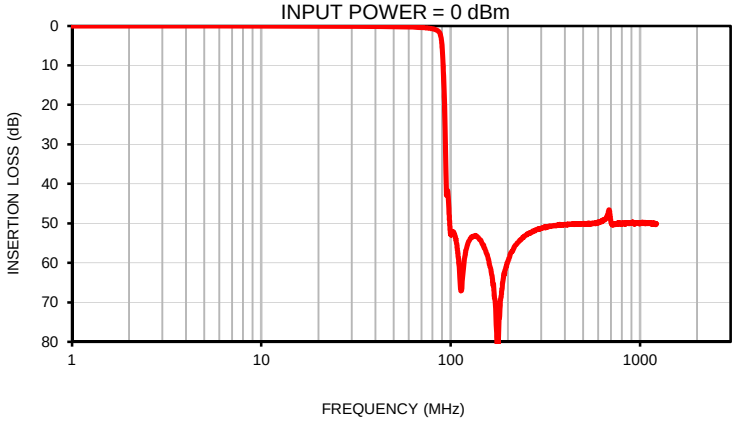
Surface Mount Diplexer DPLB-8510A05+

Typical Performance Data

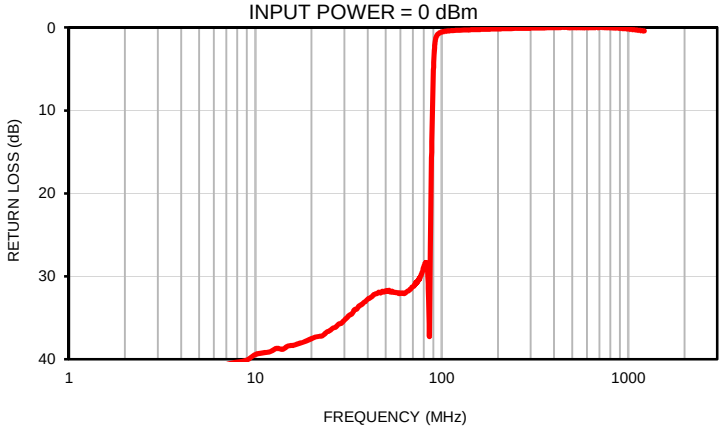
FREQUENCY (MHz)	INSERTION LOSS (dB)		Cross over isolation (dB) (between LPF and HPF)	RETURN LOSS (dB)		
	Lowpass port	Highpass port		Common port	Lowpass port	Highpass port
1.0	0.01	78.50	75.78	48.44	48.60	0.00
3.0	0.03	70.91	73.38	44.16	44.11	0.00
5.0	0.04	68.33	66.48	41.24	42.18	0.00
6.0	0.05	66.31	66.31	40.12	41.28	0.00
7.0	0.05	64.15	64.87	39.23	40.62	0.00
8.0	0.06	64.13	64.22	38.39	40.34	0.00
10.0	0.06	62.59	62.04	36.95	39.42	0.00
12.0	0.07	60.60	60.59	35.75	39.08	0.01
15.0	0.08	59.29	59.26	34.35	38.39	0.00
20.0	0.09	57.31	57.68	32.46	37.51	0.01
25.0	0.11	56.82	57.09	31.18	36.55	0.01
30.0	0.12	56.90	57.00	30.47	35.28	0.02
35.0	0.14	58.49	58.34	30.37	33.94	0.03
40.0	0.16	61.16	61.24	30.85	32.76	0.04
45.0	0.19	64.07	65.33	31.83	32.07	0.06
50.0	0.21	73.04	75.18	32.61	31.73	0.08
55.0	0.25	83.94	78.96	31.88	31.93	0.11
60.0	0.29	68.44	67.53	29.67	32.00	0.14
65.0	0.35	71.19	70.10	27.82	31.84	0.19
70.0	0.42	78.28	76.75	27.22	31.25	0.26
75.0	0.54	66.89	64.14	28.31	30.43	0.34
79.0	0.69	60.77	59.81	30.44	29.30	0.44
85.0	1.19	55.01	55.83	34.05	32.97	0.67
90.0	5.30	44.00	47.20	8.18	5.79	1.06
91.0	9.28	35.09	46.25	5.63	3.08	1.19
92.0	15.14	27.13	46.76	4.33	1.79	1.38
93.0	22.75	20.55	47.88	3.76	1.24	1.67
94.0	32.90	14.96	48.64	3.66	0.98	2.17
95.0	42.91	10.26	48.56	4.14	0.83	3.13
96.0	41.66	6.60	48.02	5.53	0.73	4.97
97.0	43.45	4.16	48.45	8.19	0.66	8.09
98.0	47.28	2.79	49.50	12.16	0.61	12.65
99.0	51.10	2.09	50.86	17.33	0.57	18.90
100.0	52.75	1.72	51.77	24.03	0.54	28.71
101.0	52.85	1.50	52.18	33.52	0.51	40.14
102.0	52.29	1.35	52.41	37.73	0.50	29.34
103.0	52.28	1.24	52.29	33.44	0.48	26.73
104.0	52.51	1.14	53.04	32.24	0.46	25.95
105.0	53.02	1.07	52.78	32.57	0.45	26.03
106.0	53.72	1.00	53.69	33.86	0.44	26.67
107.0	54.83	0.94	54.48	35.88	0.42	27.65
108.0	56.02	0.89	55.60	38.70	0.42	28.86
109.0	57.52	0.85	56.77	41.69	0.41	30.32
110.0	59.50	0.80	58.63	42.92	0.40	32.04
150.0	56.20	0.35	55.34	31.60	0.26	28.38
250.0	52.92	0.25	53.83	36.13	0.12	32.34
300.0	51.23	0.24	51.47	47.92	0.09	44.68
400.0	50.24	0.25	50.47	43.01	0.02	32.74
500.0	50.13	0.26	50.26	41.70	0.02	29.69
600.0	49.71	0.28	49.75	36.91	0.03	29.86
700.0	49.51	0.31	52.19	32.46	0.01	31.45
800.0	49.98	0.33	49.64	30.55	0.03	32.94
900.0	49.91	0.36	49.32	29.98	0.10	32.58
1000.0	50.12	0.39	48.77	30.78	0.19	30.92
1050.0	49.99	0.40	48.42	31.49	0.24	30.19
1100.0	50.06	0.41	48.38	31.94	0.30	29.62
1150.0	50.00	0.43	48.17	32.00	0.35	29.48
1180.0	50.02	0.44	48.22	31.61	0.38	29.42
1200.0	50.14	0.45	48.19	31.41	0.40	29.46
1220.0	50.11	0.46	47.94	31.08	0.42	29.66

Typical Performance Curves

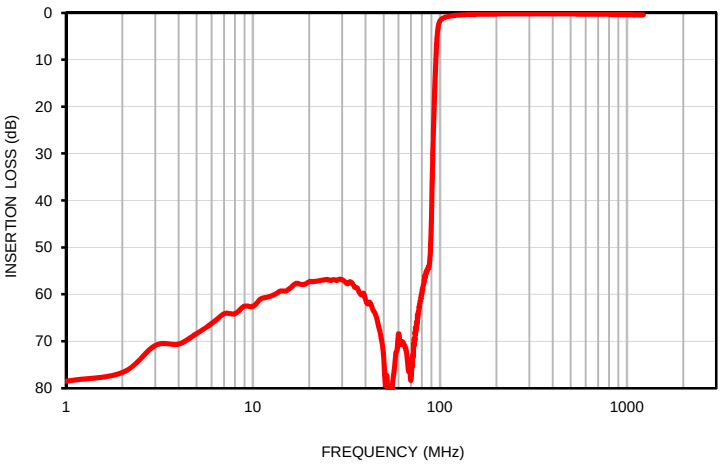
LOWPASS INSERTION LOSS
INPUT POWER = 0 dBm



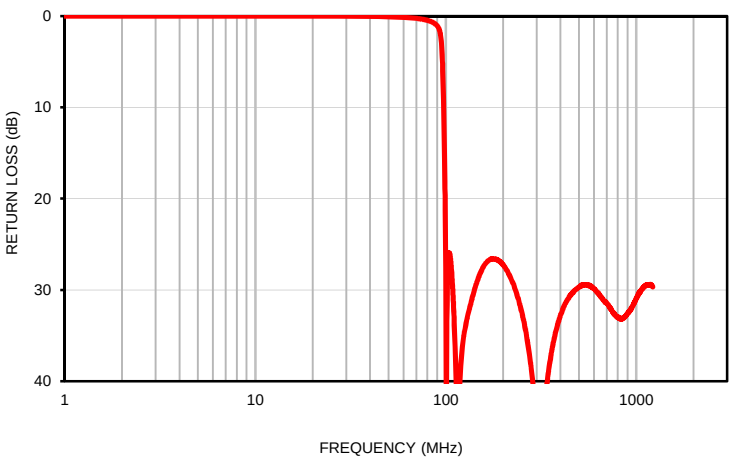
LOWPASS RETURN LOSS
INPUT POWER = 0 dBm



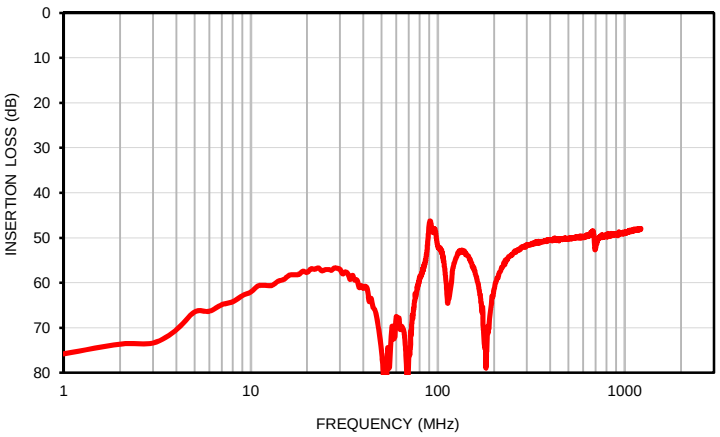
HIGHPASS INSERTION LOSS
INPUT POWER = 0 dBm



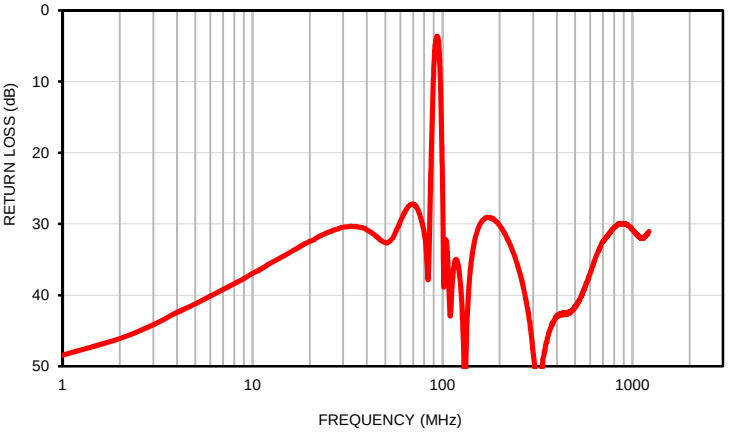
HIGHPASS RETURN LOSS
INPUT POWER = 0 dBm



CROSS OVER ISOLATION
INPUT POWER = 0 dBm



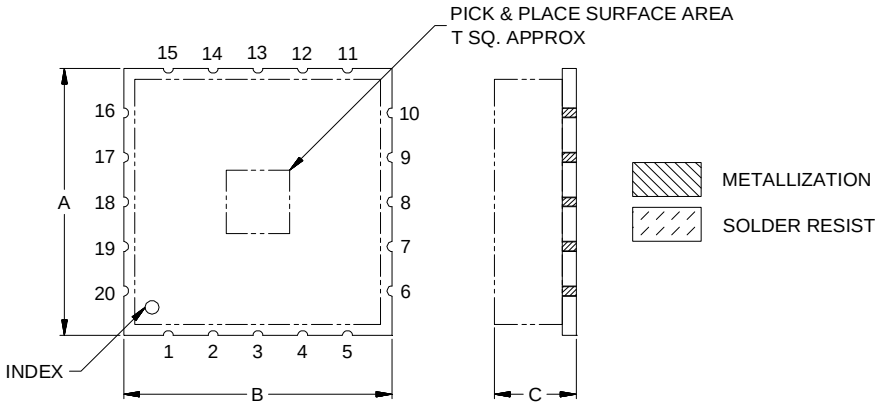
COMMON PORT RETURN LOSS
INPUT POWER = 0 dBm

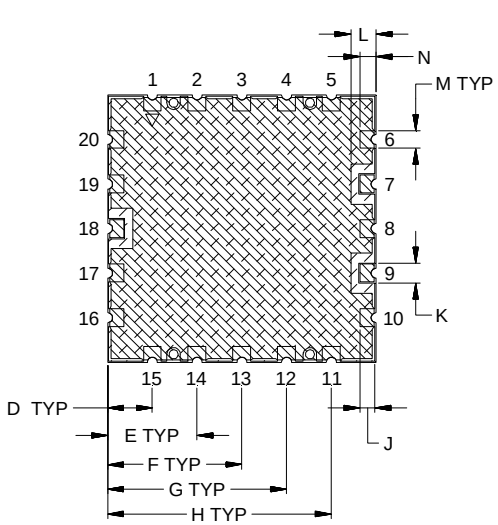


Case Style NU

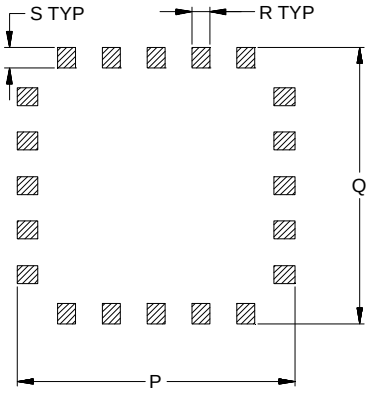
Outline Dimensions

NU1620





PCB Land Pattern



Suggested Layout,
Tolerance to be within ±.002

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. ± .03; 3Pl. ± .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.

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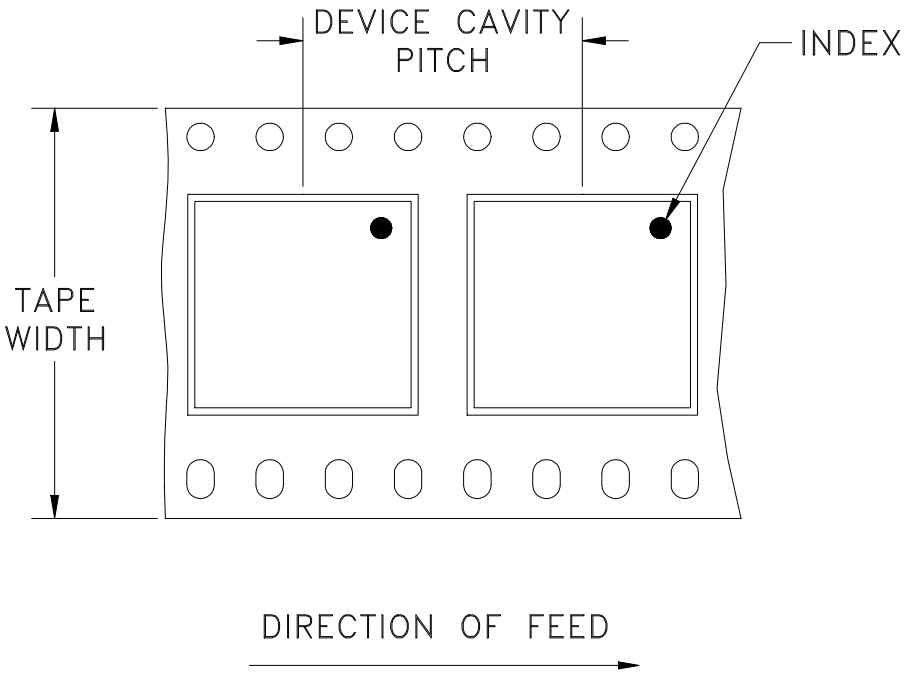
Tape & Reel Packaging TR-F80

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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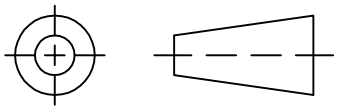
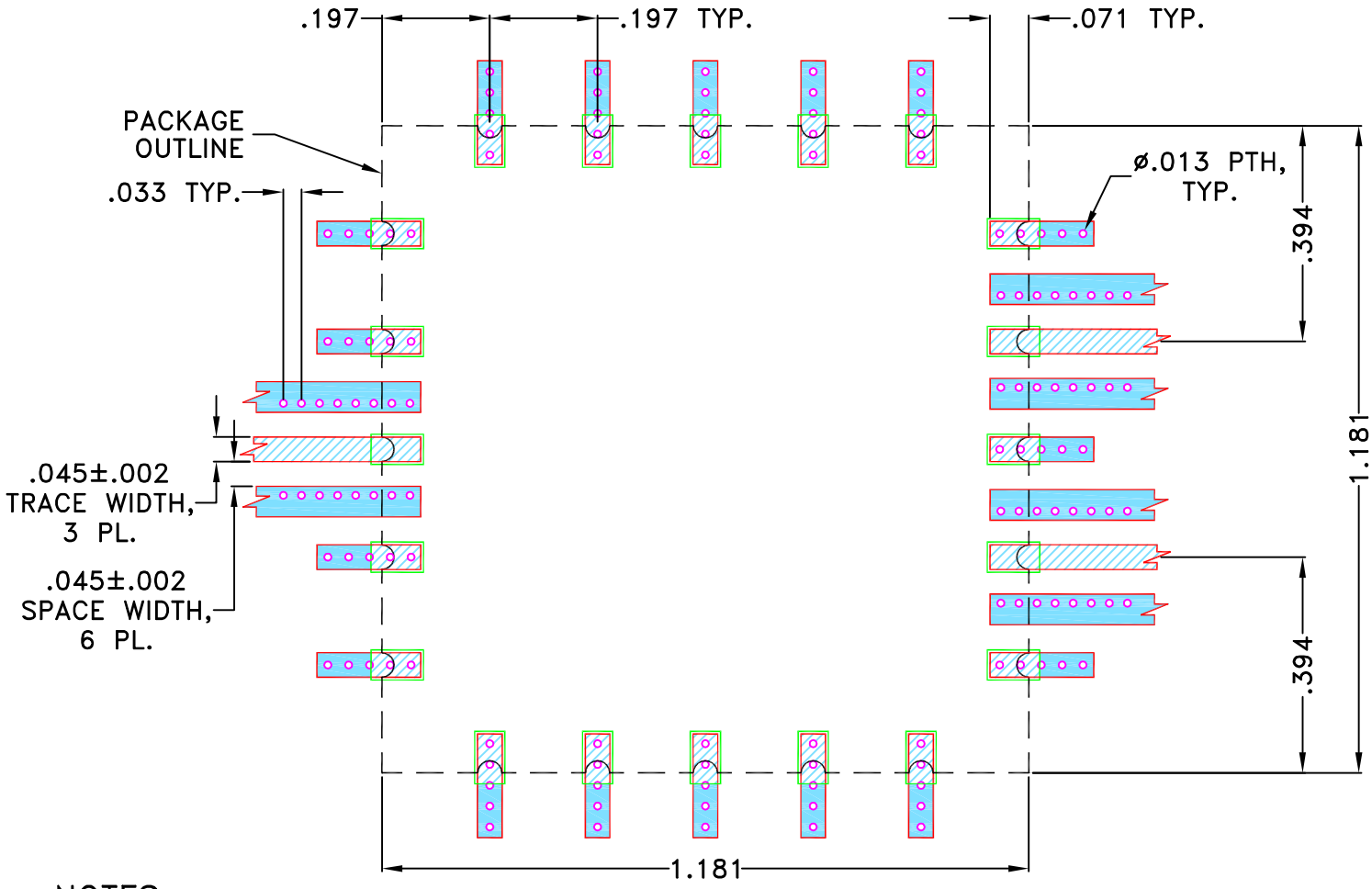
THIRD ANGLE PROJECTION



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

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



NOTES:

1. 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.
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

UNLESS OTHERWISE SPECIFIED		INITIALS	DATE
DIMENSIONS ARE IN INCHES	DRAWN	DDR	09 SEP 14
TOLERANCES ON:	CHECKED	MD	09 SEP 14
2 PL DECIMALS ±	APPROVED	KR	09 SEP 14
3 PL DECIMALS ± .005"			
ANGLES ±			
FRACTIONS ±			

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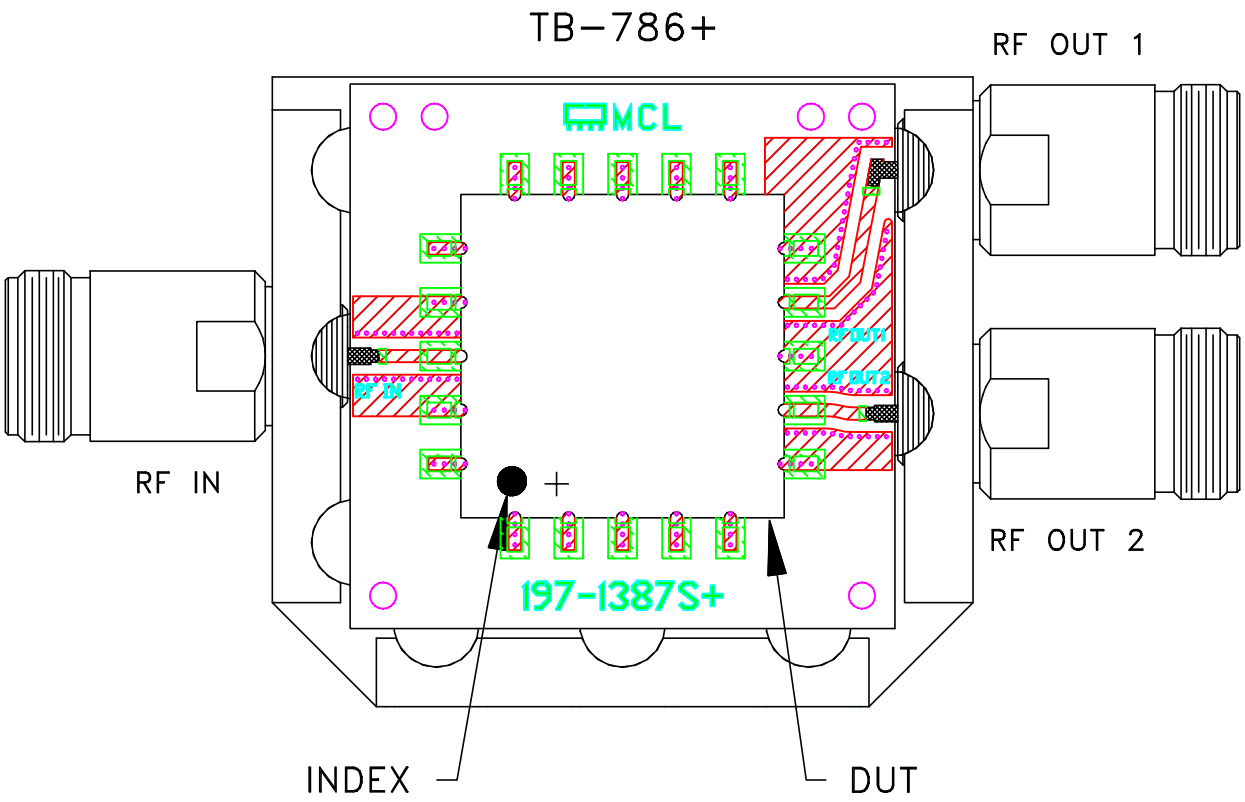
ASHEETA1.DWG REV:A DATE:01/12/95

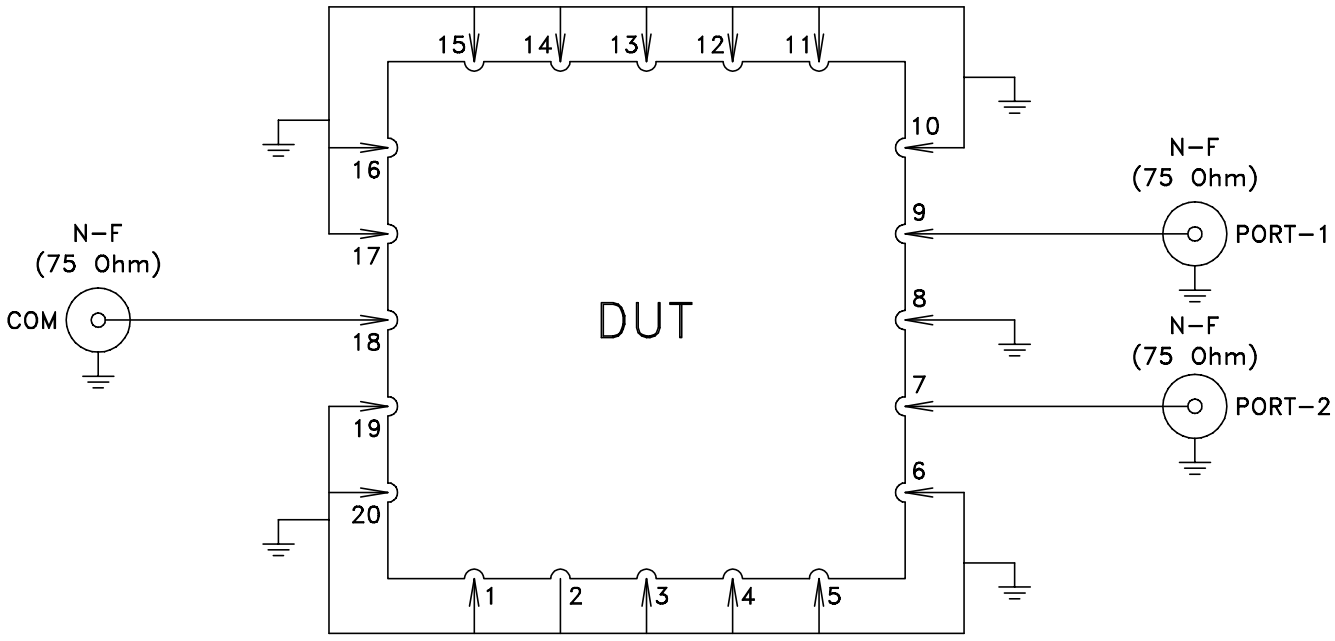
Mini-Circuits® 13 Neptune Avenue Brooklyn NY 11235

PL, 20DP01, NU1620, NV1998, NZ2001, PA2002, TB-786+, 75 OHM

SIZE	CODE IDENT	DRAWING NO:	REV:
A	15542	98-PL-435	OR
FILE: 98PL435		SCALE: 3:1	SHEET: 1 OF 1

Evaluation Board and Circuit





Schematic Diagram

Notes:
1. 75 Ohm N Female connectors.
2. PCB Material: OAK-602 OR Equivalent
   Dielectric Constant=2.50±.04, Thickness=.031 inch.

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Environmental Specifications ENV03

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

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