Surface Mount

Diplexer

SDP-1R3G+

50Ω DC to 1300 MHz (DC-600, 710-1300 MHz)



Generic photo used for illustration purposes only

CASE STYLE: HU1186

The Big Deal

- Low insertion loss
- High Rejection
- Miniature shielded package

Product Overview

SDP-1R3G+ is a low-pass + high-pass combination device. Low pass port is designed for DC to 600 MHz and high pass port is designed for 710 to 1300 MHz. This shielded case package provides very low pass-band insertion loss and excellent co-channel rejection which makes this suitable for high performance applications like defense and other wireless communication systems.

Key Features

Feature	Advantages
Low passband insertion loss	Suitable for high performance application.
Excellent rejection	Helps in reducing co-channel interference.
Shielded case	Reduced interference with the surrounding components.

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

SDP-1R3G+

50Ω DC to 1300 MHz (DC-600, 710-1300 MHz)



Generic photo used for illustration purposes only

CASE STYLE: HU1186

+RoHS Compliant

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

Maximum Ratings

Operating Temperature	-40°C to 85°C
Storage Temperature	-55°C to 100°C
Max. RF Power Input	6 W at 25°C

1. Exceeding any one or combination of these limits may cause permanent damage.
2. Sustained operation near these survivability limits is not recommended.
3. Max RF power input derate to 3W at 85°C

Pin Connections

HIGH PASS PORT	13
LOW PASS PORT	9
COMMON PORT	2
GROUND	1,3-5,7,8,10-12,14
NON CONNECTED	6

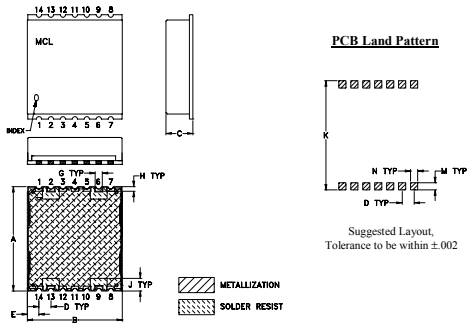
Features

- Low insertion loss
- 50Ω Impedance
- Combination of Low pass and High pass filters
- Miniature shielded package

Applications

- Defense
- Transmitter / Receiver

Outline Drawing



Outline Dimensions (inch / mm)

A	B	C	D	E	F	G	H
.870	.800	.25	.100	.097	--	.060	.040
22.10	20.32	6.35	2.54	2.46	--	1.52	1.02

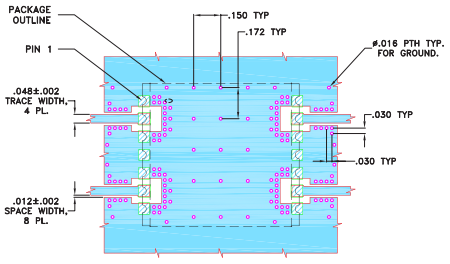
J	K	L	M	N	P		wt
.105	.910	--	.060	.060	--		grams
2.67	23.11	--	1.52	1.52	--		2.85

Note: Please refer to case style drawing for details

Demo Board MCL P/N: TB-833+

Suggested PCB Layout (PL-450)

SUGGESTED MOUNTING CONFIGURATION FOR HU1186 CASE STYLE "14FL03" PIN CODE



NOTES:

1. TRACE WIDTH IS SHOWN FOR ROGERS(RO4350B) WITH DIELECTRIC THICKNESS .030"±.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

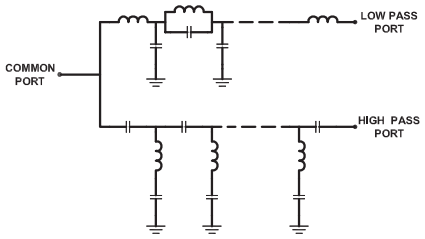
Electrical Specifications at 25°C

Parameter		Port	Frequency (MHz)	Min.	Typ.	Max.	Unit
Pass Band	Insertion Loss	Low Pass	DC-600	-	0.8	1.2	dB
		High Pass	710-1300	-	0.8	1.2	
	Return Loss	Low Pass	DC-600	12	15	-	dB
		High Pass	710-1300	12	15	-	
		Common	DC-600	12	15	-	
			710-1300	12	15	-	
Stop Band Isolation		Low Pass	710-1300	33	40	-	dB
		High Pass	DC-600	33	40	-	

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
10	0.07	69.71	49.89	50.28	0.05
50	0.09	55.86	37.51	40.92	0.04
100	0.10	50.37	32.38	36.77	0.03
150	0.12	47.99	28.68	31.30	0.03
200	0.14	47.67	25.92	26.19	0.03
250	0.16	49.44	23.60	23.03	0.04
300	0.19	55.50	21.87	21.02	0.06
350	0.21	59.22	20.86	20.24	0.09
600	0.67	44.64	25.92	22.77	0.44
625	1.52	31.79	12.12	11.01	0.60
635	3.19	20.46	6.68	5.68	0.79
665	22.63	3.48	5.92	0.65	5.20
685	34.25	1.16	14.14	0.41	14.10
650	10.26	8.92	3.59	1.55	1.87
700	45.46	0.74	23.51	0.32	25.74
710	46.65	0.63	30.83	0.28	43.94
800	41.07	0.36	22.56	0.11	22.01
850	44.02	0.31	23.03	0.07	23.03
900	45.58	0.27	23.59	0.05	24.42
1000	45.30	0.23	25.84	0.02	27.58
1200	45.44	0.20	37.94	0.03	50.01
1300	46.35	0.19	30.69	0.03	32.14

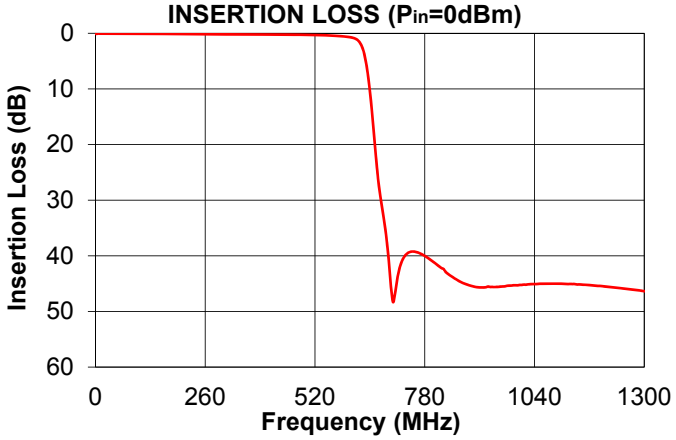
Functional Schematic



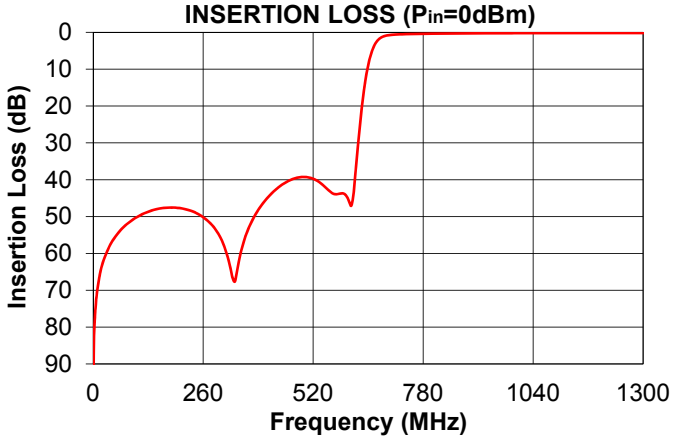
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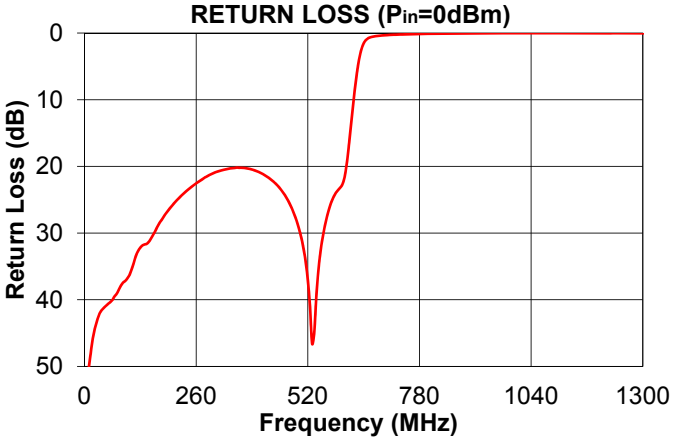
SDP-1R3G+ LOW PASS PORT
INSERTION LOSS (P_{in}=0dBm)



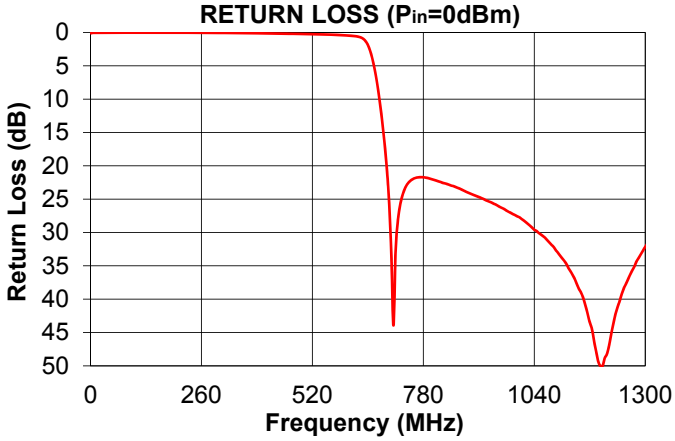
SDP-1R3G+ HIGH PASS PORT
INSERTION LOSS (P_{in}=0dBm)



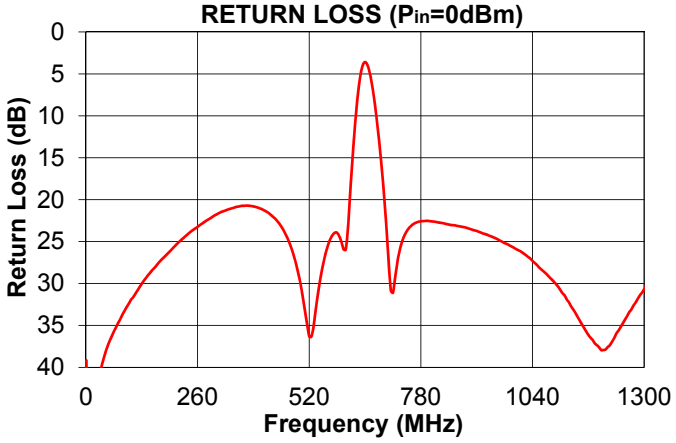
SDP-1R3G+ LOW PASS PORT
RETURN LOSS (P_{in}=0dBm)



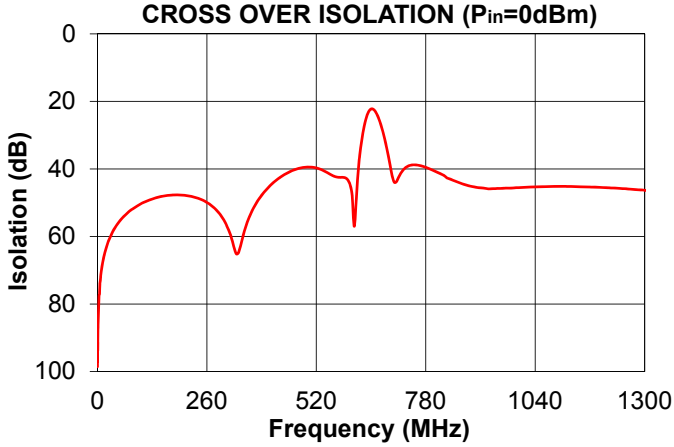
SDP-1R3G+ HIGH PASS PORT
RETURN LOSS (P_{in}=0dBm)



SDP-1R3G+ COMMON PORT
RETURN LOSS (P_{in}=0dBm)



SDP-1R3G+
CROSS OVER ISOLATION (P_{in}=0dBm)



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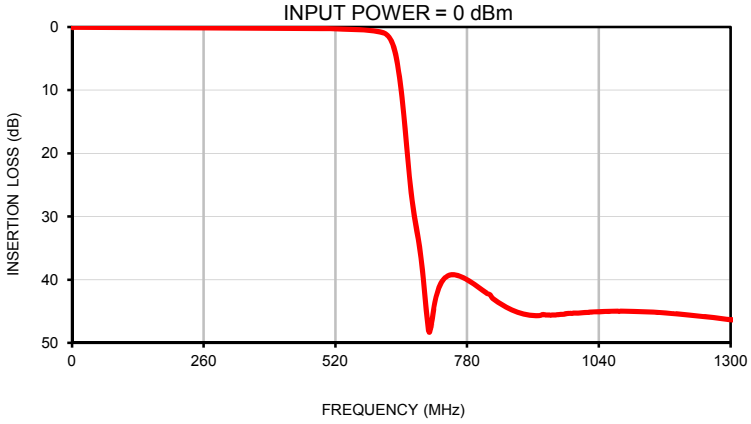
Surface Mount Diplexer SDP-1R3G+

Typical Performance Data

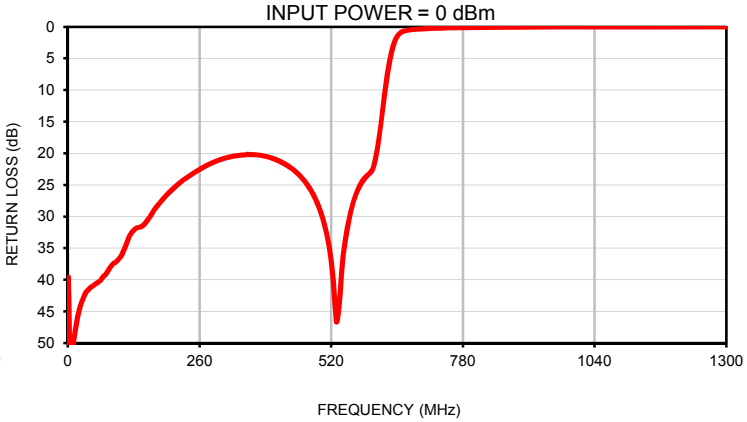
FREQUENCY (MHz)	INSERTION LOSS (dB)		Cross over isolation (dB) (between LPF and HPF)	RETURN LOSS (dB)		
	Lowpass port	Highpass port		Common port	Lowpass port	Highpass port
10	0.07	69.71	69.55	49.89	50.28	0.05
20	0.08	63.55	63.78	45.13	45.55	0.05
40	0.09	57.69	57.74	39.16	41.57	0.04
50	0.09	55.86	55.92	37.51	40.92	0.04
80	0.10	52.03	52.13	34.24	38.50	0.03
100	0.10	50.37	50.59	32.38	36.77	0.03
120	0.11	49.13	49.38	30.81	33.36	0.02
140	0.12	48.31	48.55	29.32	31.71	0.02
160	0.12	47.76	47.96	28.10	30.24	0.03
180	0.13	47.56	47.70	26.96	27.99	0.03
200	0.14	47.67	47.72	25.92	26.19	0.03
220	0.15	48.06	48.07	24.88	24.75	0.03
240	0.16	48.82	48.72	23.99	23.55	0.04
260	0.17	50.17	49.93	23.25	22.54	0.05
280	0.18	52.17	51.84	22.52	21.68	0.06
300	0.19	55.50	55.06	21.87	21.02	0.06
320	0.20	61.81	61.13	21.38	20.59	0.07
340	0.21	64.86	62.80	21.02	20.30	0.08
360	0.22	55.33	54.49	20.76	20.21	0.10
380	0.23	50.19	49.58	20.73	20.32	0.11
400	0.23	46.59	46.30	20.94	20.70	0.13
420	0.24	43.93	43.84	21.41	21.33	0.15
440	0.25	41.89	42.01	22.23	22.29	0.16
460	0.25	40.42	40.66	23.62	23.69	0.18
480	0.27	39.51	39.78	26.02	25.89	0.20
500	0.29	39.24	39.43	30.16	29.47	0.23
520	0.32	39.74	39.71	36.30	37.05	0.25
540	0.36	41.14	40.69	31.32	39.28	0.28
560	0.42	43.19	42.04	26.05	28.80	0.32
600	0.67	44.64	44.58	25.92	22.77	0.44
610	0.82	47.05	56.97	23.49	19.90	0.48
625	1.52	31.79	34.09	12.12	11.01	0.60
635	3.19	20.46	26.65	6.68	5.68	0.79
665	22.63	3.48	24.09	5.92	0.65	5.20
685	34.25	1.16	32.52	14.14	0.41	14.10
700	45.46	0.74	41.94	23.51	0.32	25.74
710	46.65	0.63	43.82	30.83	0.28	43.94
740	39.49	0.49	39.05	24.47	0.20	22.99
760	39.31	0.44	38.85	23.01	0.17	21.84
780	40.01	0.40	39.52	22.57	0.14	21.71
800	41.07	0.36	40.57	22.56	0.11	22.01
820	42.21	0.34	41.72	22.71	0.09	22.42
840	43.51	0.32	43.11	22.91	0.08	22.83
860	44.48	0.30	44.12	23.07	0.06	23.29
880	45.15	0.29	44.92	23.28	0.05	23.89
900	45.58	0.27	45.44	23.59	0.05	24.42
920	45.68	0.26	45.74	23.93	0.04	24.94
940	45.59	0.25	45.84	24.32	0.03	25.51
960	45.52	0.24	45.76	24.76	0.03	26.20
980	45.35	0.23	45.68	25.28	0.02	26.91
1000	45.30	0.23	45.54	25.84	0.02	27.58
1020	45.18	0.22	45.43	26.45	0.02	28.43
1040	45.07	0.21	45.33	27.30	0.02	29.59
1060	45.02	0.21	45.26	28.30	0.02	30.52
1080	45.02	0.21	45.18	29.29	0.02	31.83
1100	45.01	0.20	45.17	30.40	0.01	33.44
1120	45.07	0.20	45.21	31.92	0.02	35.34
1200	45.44	0.20	45.53	37.94	0.03	50.01
1250	45.87	0.20	45.86	34.78	0.02	38.34
1300	46.35	0.19	46.32	30.69	0.03	32.14

Typical Performance Curves

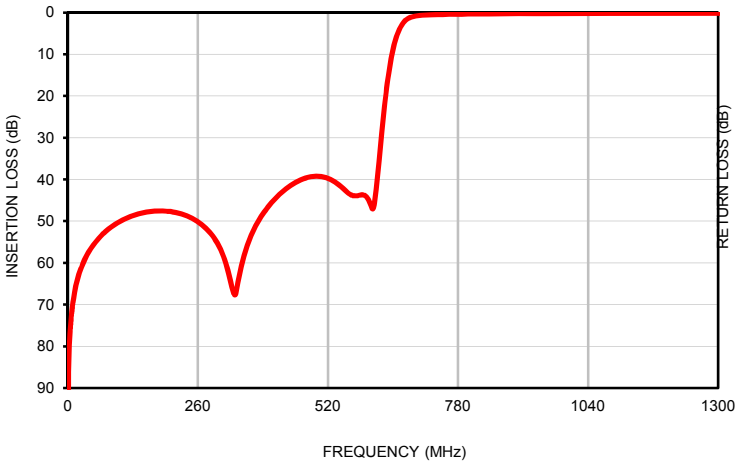
LOW PASS INSERTION LOSS
INPUT POWER = 0 dBm



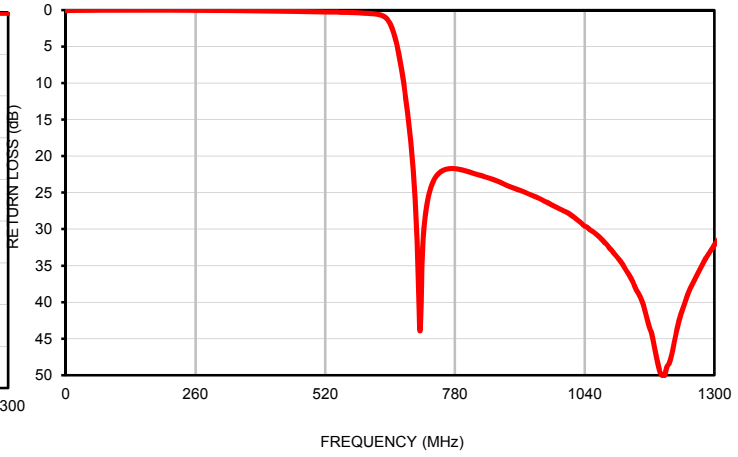
LOW PASS RETURN LOSS
INPUT POWER = 0 dBm



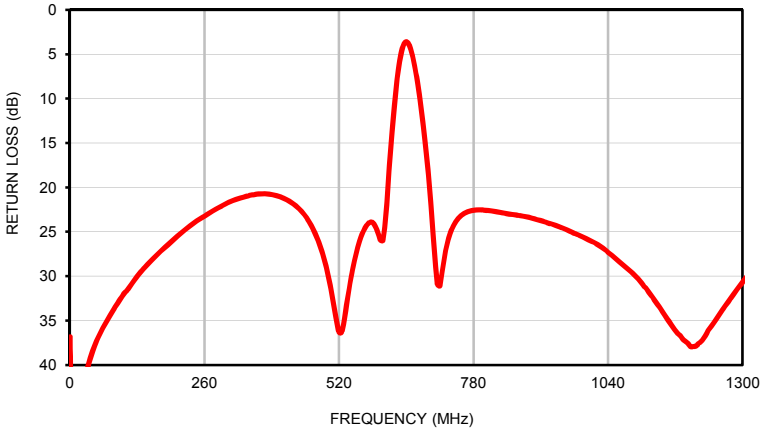
HIGH PASS INSERTION LOSS
INPUT POWER = 0 dBm



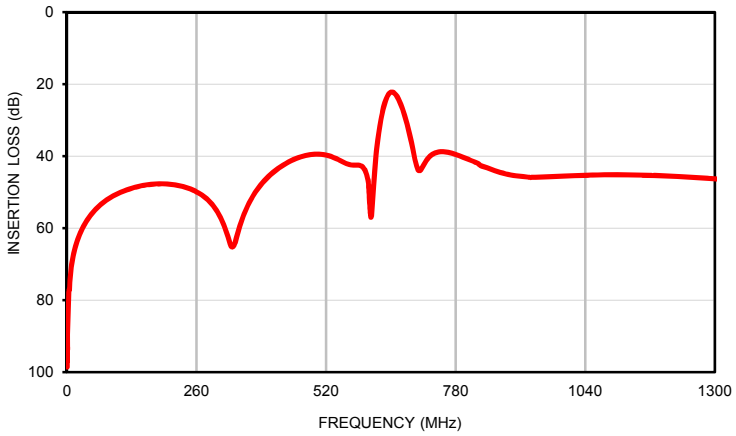
HIGH PASS RETURN LOSS
INPUT POWER = 0 dBm



COMMON PORT RETURN LOSS
INPUT POWER = 0 dBm



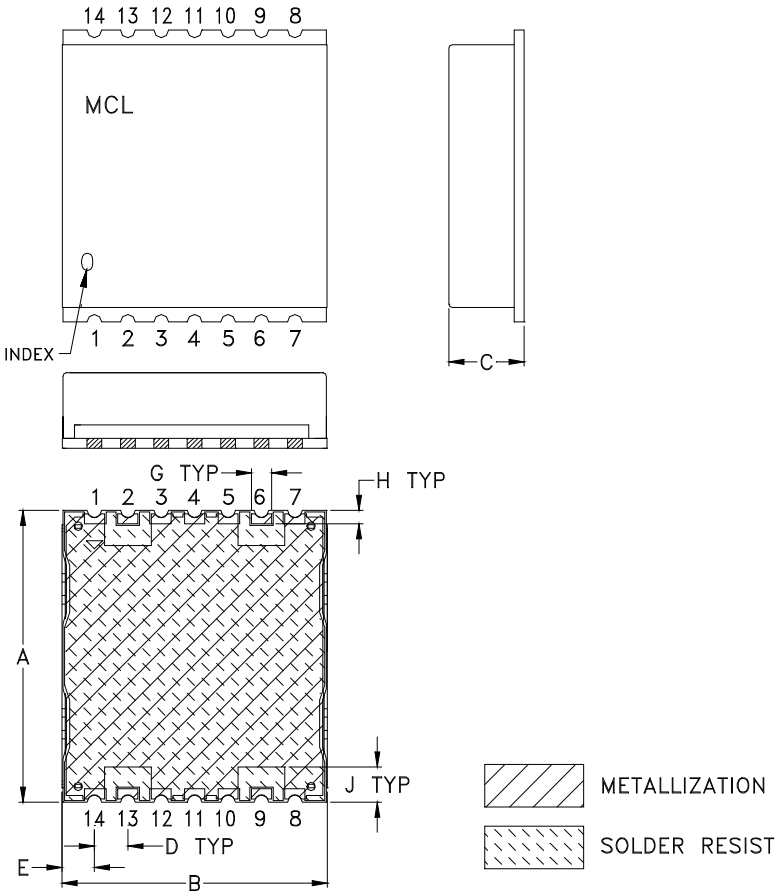
CROSS OVER ISOLATION
INPUT POWER = 0 dBm



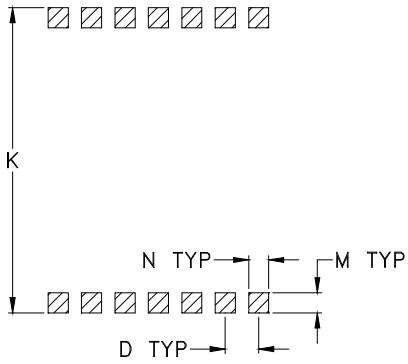
Case Style HU

Outline Dimensions

HU1186



PCB Land Pattern



Suggested Layout,
Tolerance to be within ±.002

CASE#	A	B	C	D	E	F	G	H	J	K	L	M	N	P	WT, GRAM
HU1186	.870 (22.10)	.800 (20.32)	.25 (6.35)	.100 (2.54)	.097 (2.46)	- -	.060 (1.52)	.040 (1.02)	.105 (2.67)	.910 (23.11)	- -	.060 (1.52)	.060 (1.52)	- -	2.85

Dimensions are in inches (mm). Tolerances: 2PL. +/- .03; 3PL. +/- .015

Notes:

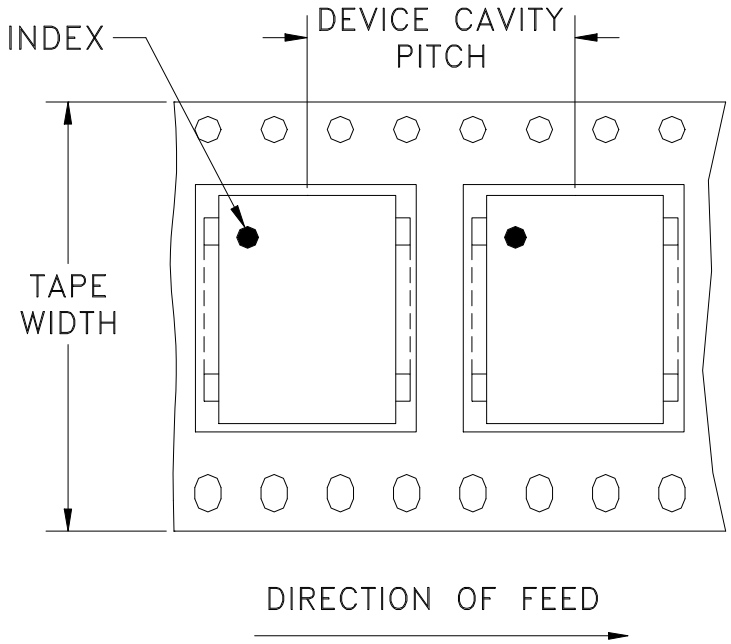
1. Case material: Nickel-Silver alloy.
2. Base: Printed wiring laminate.
3. Termination finish:
   For RoHS Case Styles: 2-5 µ inch (.05-.13 microns) Gold over 120-240 µ inch (3.05-6.10 microns) Nickel plate.
   For RoHS-5 Case Styles: Tin-Lead plate.

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Tape & Reel Packaging TR-F21

DEVICE ORIENTATION IN T&R



Tape Width, mm	Device Cavity Pitch, mm	Reel Size, inches	Devices per Reel
32	32	13	200

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

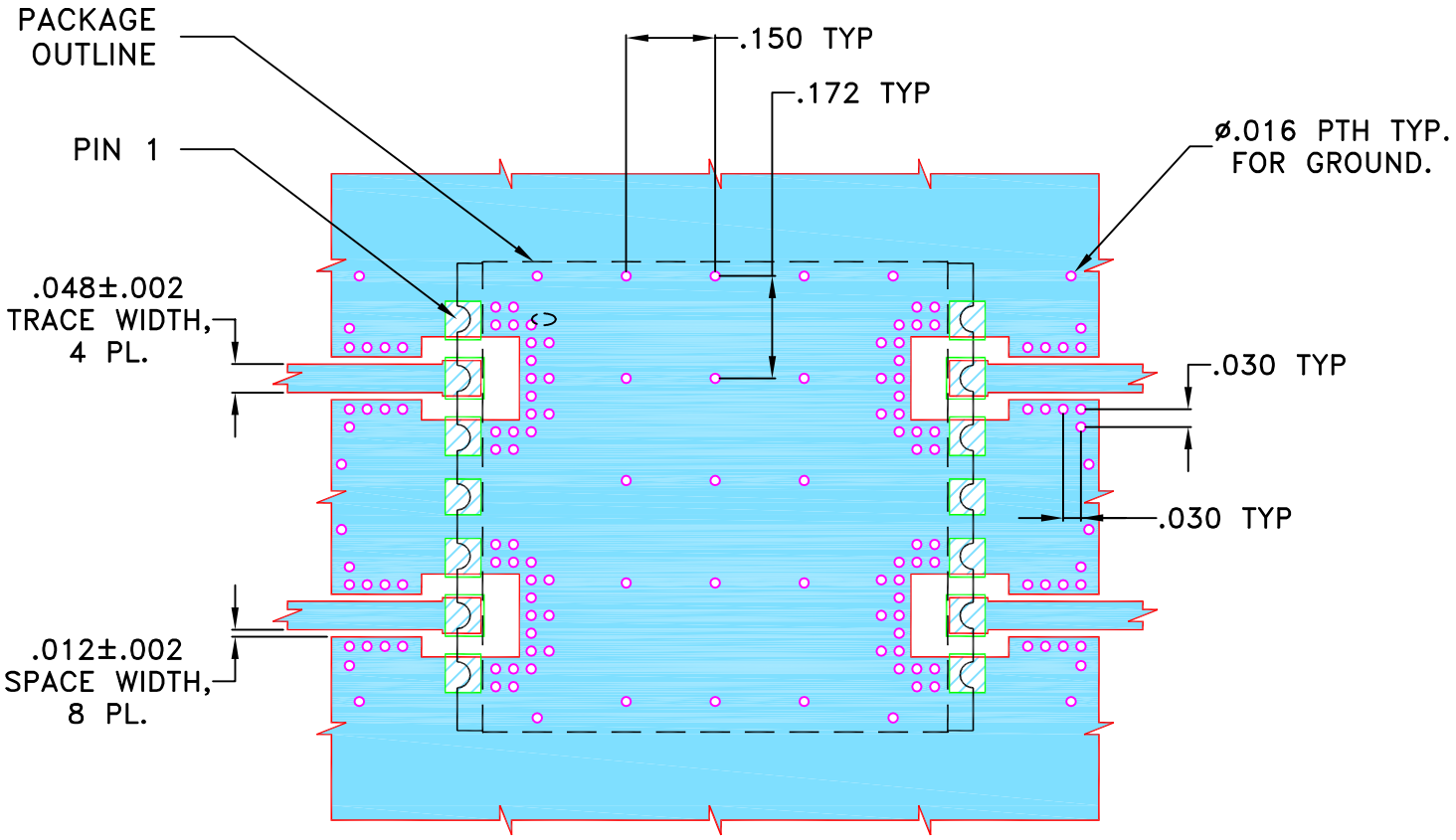
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THIRD ANGLE PROJECTION

REVISIONS					
REV	ECN No.	DESCRIPTION	DATE	DR	AUTH
OR	M150738	NEW RELEASE	APR 15	TM	MD
A	M174984	DIM UPDATED AND PIN 1 ADDED	JUN 19	TM	VC

SUGGESTED MOUNTING CONFIGURATION FOR HU1186 CASE STYLE "14FL03" PIN CODE



NOTES:

1. TRACE WIDTH IS SHOWN FOR ROGERS(RO4350B) WITH DIELECTRIC THICKNESS .030"±.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	TM	22 APR 15
TOLERANCES ON:	CHECKED	MD	22 APR 15
2 PL DECIMALS ±	APPROVED	MD	22 APR 15
3 PL DECIMALS ± .005"			
ANGLES ±			
FRACTIONS ±			

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

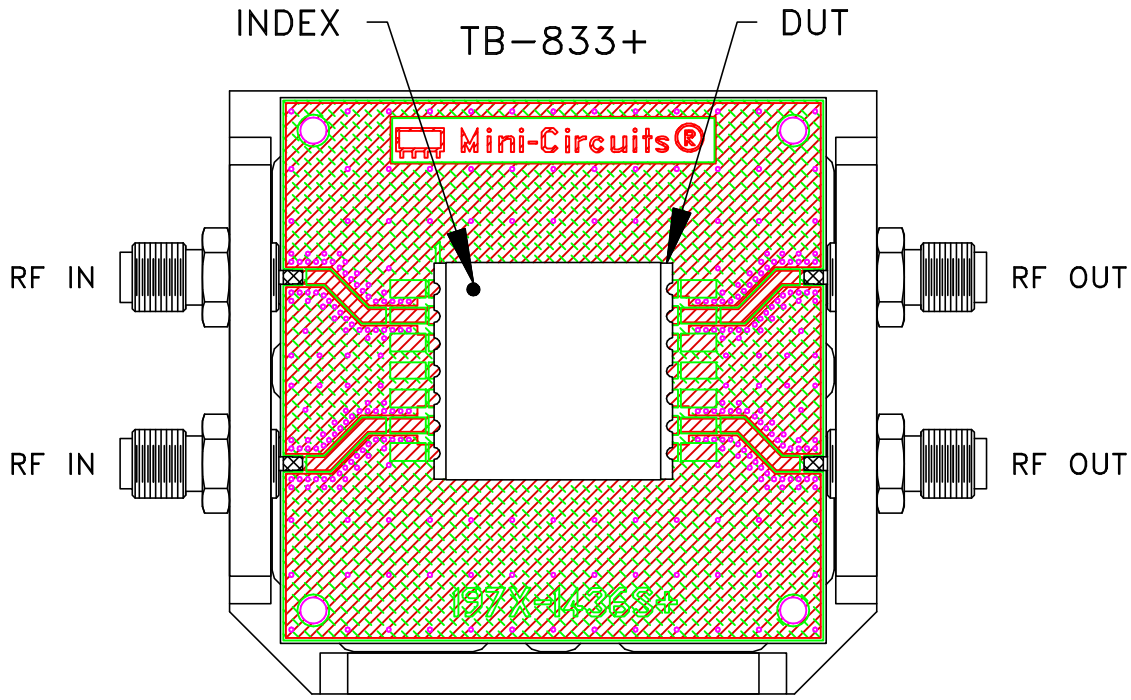
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13 Neptune Avenue
Brooklyn NY 11235

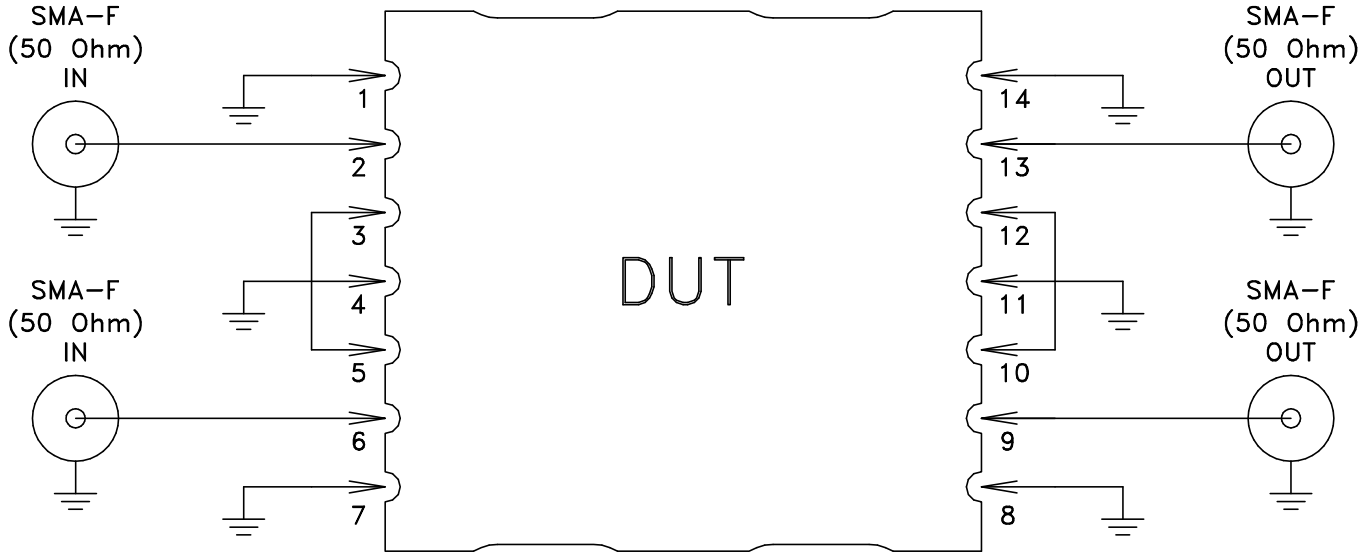
PL, 14FL03, HU1186
TB-833+, 50 Ohm

SIZE	CODE IDENT	DRAWING NO:	REV:
A	15542	98-PL-450	A

FILE:	SCALE:	SHEET:
98PL450	3:1	1 OF 1

Evaluation Board and Circuit





Notes:
1. 50 Ohm SMA Female connectors.
2. PCB Material: ROGERS (R04350) or Equivalent
   Dielectric Constant=3.48±.05, Thickness=.030 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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