Surface Mount

RF Transformer

ADT3-1T-75+

75Ω 1 to 500 MHz

The Big Deal

- Low insertion loss, 1.2 dB
- Excellent return loss, 25 dB in 1 dB bandwidth
- Low unbalance, 0.2 dB, 1˚
- Small size, 0.27 x 0.31 x 0.22”

CASE STYLE: CD542

Product Overview

Mini-Circuits’ ADT3-1T-75+ is a 75Ω DC isolated surface-mount transformer with a secondary/primary impedance ratio of 3:1 and a center tap on the secondary winding. This model covers the 1 to 500 MHz band with low insertion loss (1.2 dB), excellent return loss (25 dB within the 1 dB bandwidth, low phase unbalance (1˚) and low amplitude unbalance (0.2 dB). The unit comes enclosed in a miniature, 6-lead plastic package measuring just 0.27 x 0.31 x 0.22”, ideal for dense circuit board layouts.

Key Features

Feature	Advantages
DC Isolation	Provides DC isolation between circuits and efficient AC transmission, eliminating the need for external DC biasing components.
Secondary center tap	Allows DC feed up to 30 mA and DC bias without adding bias tees into the signal chain.
Low insertion loss, 1.2 dB	Excellent transmission of signal power from input to output.
Excellent return loss, 25 dB within 1 dB bandwidth.	Provides excellent matching for 75Ω systems with low signal reflection.
Low phase and amplitude unbalance, 1˚, 0.2 dB	Low phase and amplitude unbalance can improve a system’s electromagnetic compatibility by rejecting unwanted common-mode noise.
Small footprint, 0.27 x 0.31 x 0.22”	Accommodates tight space requirements for dense PCB layouts.

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Generic photo used for illustration purposes only

CASE STYLE: CD542

+RoHS Compliant

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

Features

- excellent return loss, 25 dB typ. in 1 dB bandwidth
- excellent amplitude unbalance, 0.2 dB typ. and phase unbalance, 1 deg. typ. in 1dB bandwidth
- aqueous washable
- protected under US patent 6,133,525

Applications

- balun
- impedance matching
- DOCSIS 3.1

Available Tape and Reel at no extra cost

Reel Size	Devices/Reel
7"	10, 20, 50, 100, 200
13"	500,1000

Electrical Specifications at 25°C

Parameter	Frequency (MHz)	Min.	Typ.	Max.	Unit
Impedance Ratio (secondary/ primary)			3		Ohm
Frequency Range		1	—	500	MHz
Insertion Loss*	2-300 1-500	— —	— —	0.8 1.2	dB
Amplitude Unbalance	1-300 300-500	— —	0.2 0.4	0.6 1.20	dB
Phase Unbalance	1-300 300-500	— —	1 4	4 8	Degree
Return Loss	1-2 2-300 300-500	13 17 14	19 25 22	— — —	dB

* Insertion Loss is referenced to mid-band loss, 0.5 dB typ.

Maximum Ratings

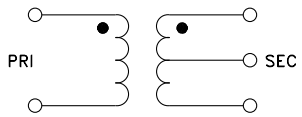
Parameter	Ratings
Operating Temperature	-40°C to 85°C
Storage Temperature	-55°C to 100°C
RF Power	0.25W
DC Current	30mA

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

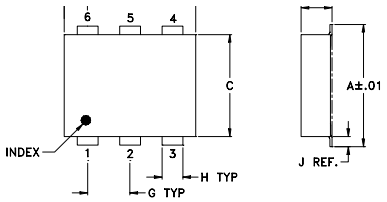
Pin Connections

Function	Pin Number
PRIMARY DOT	3
PRIMARY	1
SECONDARY DOT	6
SECONDARY	4
SECONDARY CT	5
NOT USED	2

Config. A



Outline Drawing

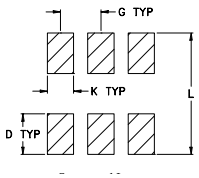


Outline Dimensions (inch / mm)

A	B	C	D	E	F	G
.272	.310	.220	.100	.112	.055	.100
6.91	7.87	5.59	2.54	2.84	1.40	2.54

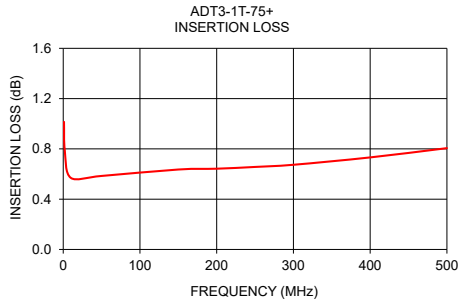
H	J	K	L	wt
.030	.026	.065	.300	grams
0.76	0.66	1.65	7.62	0.20

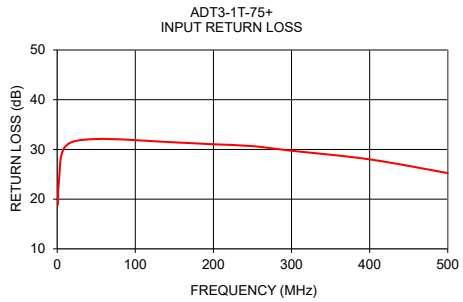
PCB Land Pattern

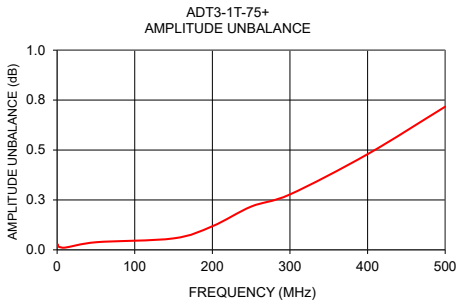


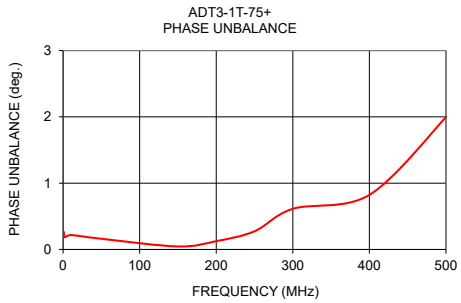
Typical Performance Data

FREQUENCY (MHz)	INSERTION LOSS (dB)	INPUT R. LOSS (dB)	AMPLITUDE UNBALANCE (dB)	PHASE UNBALANCE (Deg.)
1.0	1.02	18.88	0.03	0.26
2.0	0.79	23.05	0.02	0.18
10.0	0.57	30.52	0.01	0.22
50.0	0.58	32.09	0.04	0.16
150.0	0.64	31.42	0.06	0.04
200.0	0.64	31.03	0.12	0.13
250.0	0.66	30.66	0.22	0.27
300.0	0.67	29.74	0.28	0.61
400.0	0.73	28.00	0.48	0.82
500.0	0.81	25.24	0.72	2.00









Additional 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

RF Transformer ADT3-1T-75+

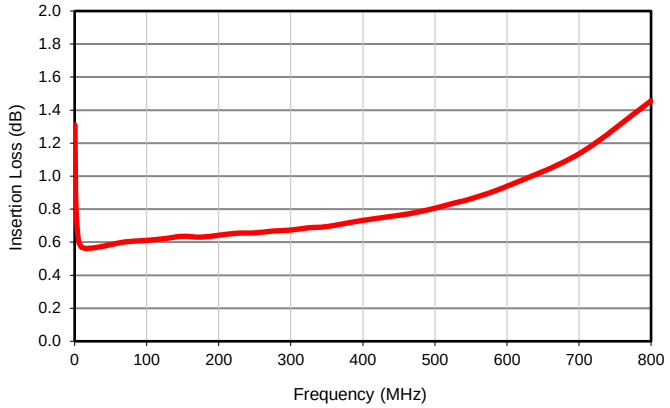
Typical Performance Data

FREQUENCY (MHz)	AVERAGE INSERTION LOSS (dB)	INPUT RETURN LOSS (dB)	AMPLITUDE UNBALANCE (dB)	PHASE UNBALANCE (deg.)
0.5	1.31	14.79	0.03	0.48
1.0	1.02	18.88	0.03	0.26
2.0	0.79	23.05	0.02	0.18
5.0	0.62	28.15	0.02	0.16
8.0	0.58	29.96	0.02	0.18
10	0.57	30.52	0.01	0.22
15	0.56	31.46	0.01	0.12
20	0.56	31.35	0.01	0.04
30	0.57	31.29	0.01	0.07
50	0.58	32.09	0.04	0.16
70	0.60	32.38	0.05	0.10
100	0.61	30.99	0.03	0.21
125	0.62	32.06	0.09	0.06
150	0.64	31.42	0.06	0.04
175	0.63	31.21	0.11	0.16
200	0.64	31.03	0.12	0.13
225	0.65	31.04	0.14	0.10
250	0.66	30.66	0.22	0.27
275	0.67	30.19	0.25	0.50
300	0.67	29.74	0.28	0.61
325	0.69	29.31	0.30	0.64
350	0.69	28.89	0.34	0.62
400	0.73	28.00	0.48	0.82
450	0.76	26.33	0.61	1.35
475	0.78	25.69	0.67	1.69
500	0.81	25.24	0.72	2.00
525	0.84	24.66	0.77	2.32
550	0.86	24.15	0.84	2.60
600	0.94	23.27	1.04	3.28
700	1.14	21.60	1.44	5.68
800	1.46	21.13	1.96	8.94

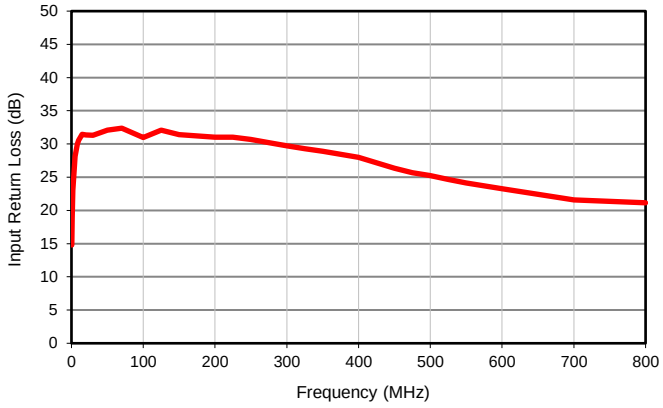
RF Transformer ADT3-1T-75+

Typical Performance Data

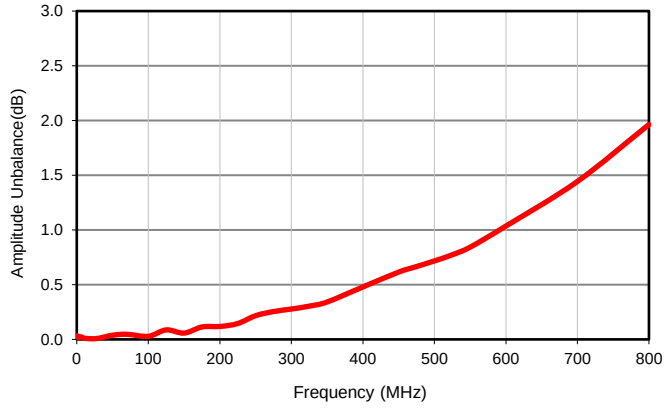
Average Insertion Loss



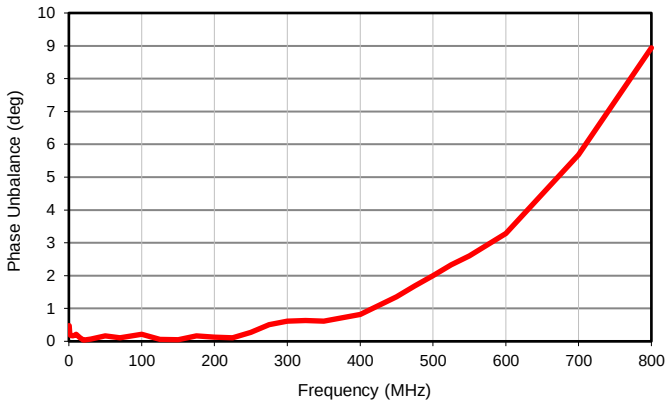
Input Return Loss



Amplitude Unbalance



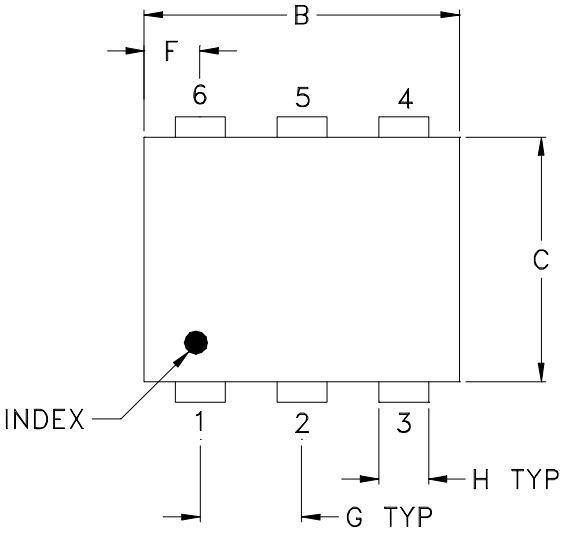
Phase Unbalance

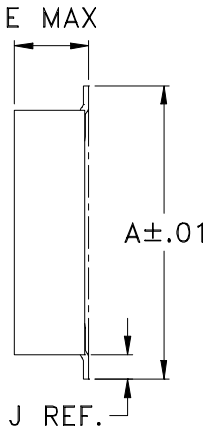


Case Style CD

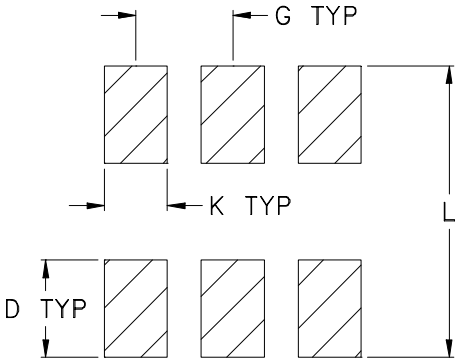
CD541
CD542
CD636
CD637

Outline Dimensions





PCB Land Pattern



Suggested Layout,
Tolerance to be within ±.002

CASE#	A	B	C	D	E	F	G	H	J	K	L	WT, GRAM
CD541	.272 (6.91)	.310 (7.87)	.220 (5.58)	.100 (2.54)	.082 (2.08)	.055 (1.40)	.100 (2.54)	.030 (0.76)	.026 (0.66)	.065 (1.65)	.300 (7.62)	.15
CD542					.112 (2.84)							.20
CD636					.162 (4.11)							.25
CD637					.206 (5.23)							.40

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

Notes:

1. Case material: Plastic.
2. Termination finish:
   For RoHS Case Styles: Tin plate over Nickel plate. All models, (+) suffix.
   For RoHS-5 Case Styles: Tin-Lead plate. All models, no (+) suffix.

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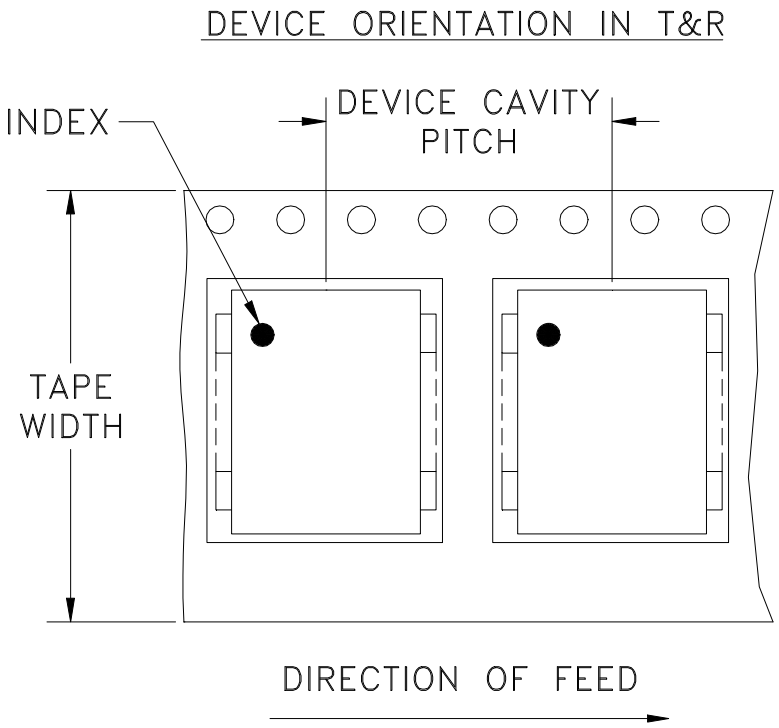
Tape & Reel Packaging TR-F34



Tape Width, mm	Device Cavity Pitch, mm	Reel Size, inches	Devices per Reel see note	
16	12	7	Small quantity standard (see note)	20
				50
				100
				200
		13	Standard	500
				1000

Note: Availability of small reel quantity varies by model.
Refer to pricing and availability on individual model dashboard.

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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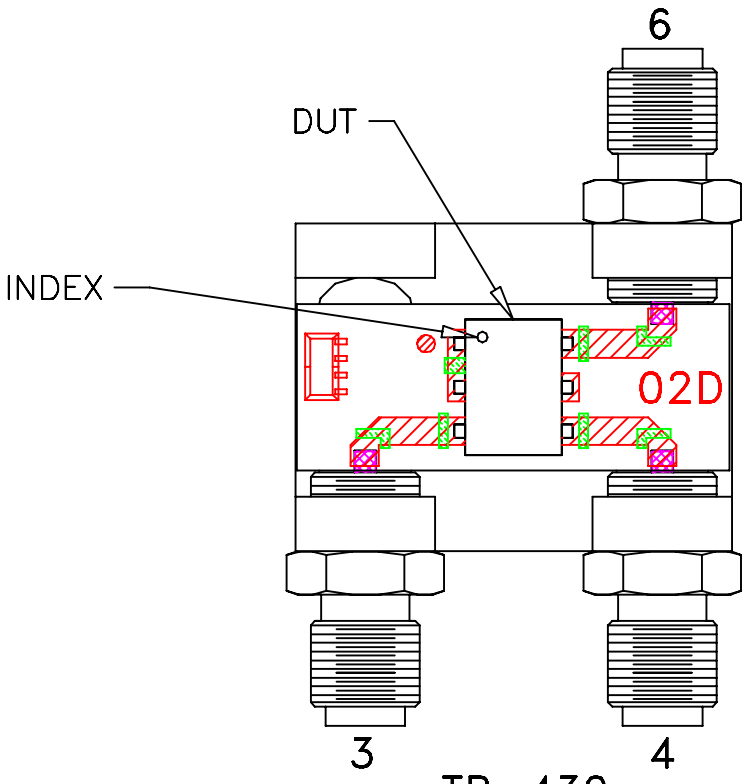
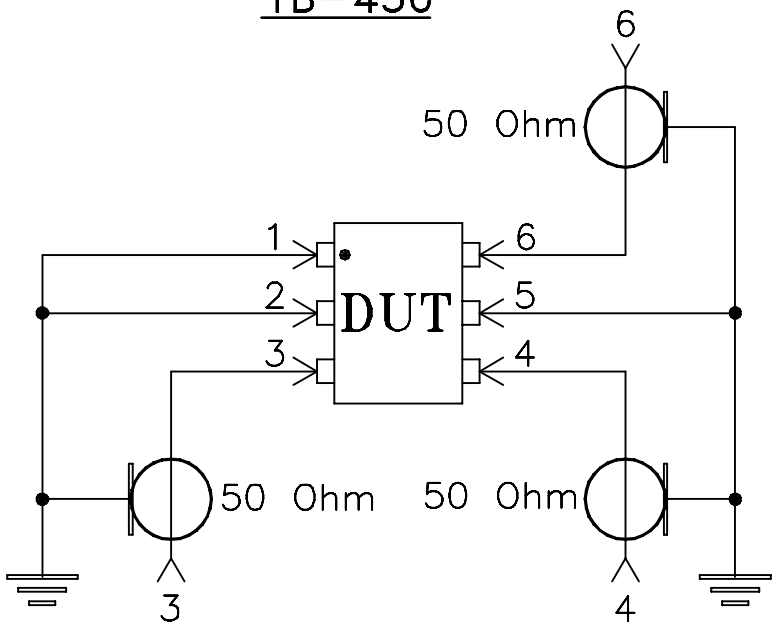
Evaluation Board and Circuit

For Pin Connections refer to Data Sheet of the DUT



TB-430



Schematic Diagram

Notes:

1. SMA Female connectors.
2. PCB Material: Rogers RO4350 or equivalent, Dielectric Constant=3.5, Thickness=.030 inch.
3. Must use ENA/PNA type agilent's network analyzers with impedance conversion option to convert ports to appropriate impedances.

Mini-Circuits®

Mini-Circuits

Environmental Specifications ENV02T1

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