Surface Mount

RF Transformer

ADT2-162T+

50Ω 20 to 1600 MHz

The Big Deal

- 1W RF power handling
- Low unbalance, 0.4 dB, 3˚
- Small size, 0.27 x 0.31 x 0.22”



CASE STYLE: CD636

Product Overview

Mini-Circuits’ ADT2-162T+ is a surface-mount balanced-to-balanced transformer with a secondary/primary impedance ratio of 2:1. This model covers the 20 to 1600 MHz band with low insertion loss (1.2 dB typ.) as well as low phase unbalance (3˚) and amplitude unbalance (0.4 dB). The unit comes enclosed in a miniature, leadless plastic package measuring just 0.27 x 0.31 x 0.22”, ideal for dense circuit board layouts.

Key Features

Feature	Advantages
Wideband, 20 to 1600 MHz	Supports a wide range of applications including VHF/UHF, cellular, PCS and more.
Low insertion loss, 1.2 dB typ.	Good transmission of signal power from input to output.
1W RF power handling	Supports a wide range of power requirements.
Low phase and amplitude unbalance, 3˚, 0.4 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.

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

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Generic photo used for illustration purposes only

CASE STYLE: CD636

+RoHS Compliant

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

Available Tape and Reel at no extra cost

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

Maximum Ratings

Operating Temperature	-40°C to 85°C
Storage Temperature	-55°C to 100°C
RF Power	1.0W

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

Pin Connections

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

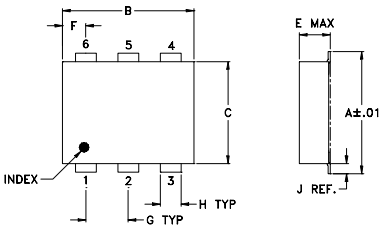
Features

- leaded surface mount
- wideband frequency 20-1600 MHz
- excellent amplitude balance, 0.4 dB typ. and phase unbalance, 3 deg. typ.

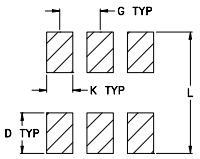
Applications

- VHF/UHF
- balanced amplifiers
- info structure
- A/D and D/A converter
- cellular

Outline Drawing



PCB Land Pattern



Suggested Layout,
Tolerance to be within ±.002

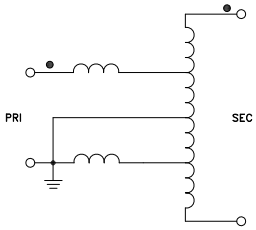
Outline Dimensions (inch / mm)

A	B	C	D	E	F	G
.272	.310	.220	.100	.162	.055	.100
6.91	7.87	5.59	2.54	4.11	1.40	2.54

H	J	K	L	wt
.030	.026	.065	.300	grams
0.76	0.66	1.65	7.62	0.25

Demo Board MCL P/N: TB-430+

Config. P1



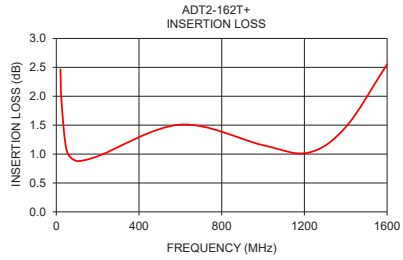
Transformer Electrical Specifications@25°C

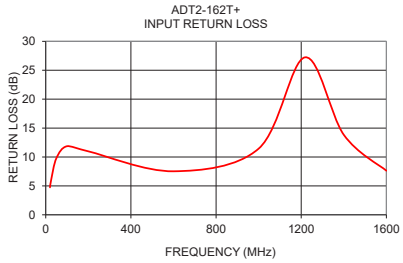
Parameter	Frequency (MHz)	Min.	Typ.	Max.	Unit
Impedance Ratio (secondary / primary)			2		
Frequency Range		20		1600	MHz
Insertion Loss* (average)	50 - 1250 25 - 1400 20 - 1600	— — —	0.5 1.2 2.0	1.0 2.0 3.0	dB
Amplitude Unbalance ±	50 - 1250 25 - 1400 20 - 1600	— — —	0.4 0.5 0.6	0.75 0.85 0.95	dB
Phase Unbalance ±	50 - 1250 25 - 1400 20 - 1600	— — —	2 2.5 3.0	4 5 7	Degree
Input Return Loss	20-1600	—	12	—	dB
Common mode rejection	20-1250 1250-1600	20 18	25 22	— —	dB

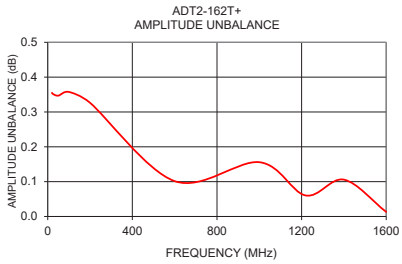
* Insertion Loss is referenced to mid-band loss, 1.0 dB typ.

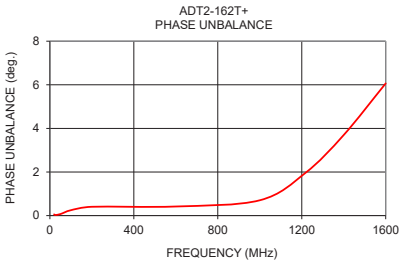
Typical Performance Data

FREQUENCY (MHz)	INSERTION LOSS (dB)	INPUT R. LOSS (dB)	AMPLITUDE UNBALANCE (dB)	PHASE UNBALANCE (Deg.)
20	2.47	4.74	0.35	0.06
25	1.92	5.94	0.35	0.03
50	1.07	9.79	0.35	0.07
100	0.88	11.86	0.36	0.25
200	0.96	10.98	0.33	0.41
600	1.51	7.53	0.10	0.42
1000	1.15	11.44	0.16	0.70
1218	1.02	27.23	0.06	1.96
1400	1.47	13.83	0.11	3.70
1600	2.55	7.63	0.01	6.06









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REV. OR
M169322
ADT2-162T+
WZ/CP/AM
190116

RF Transformer ADT2-162T+

Typical Performance Data

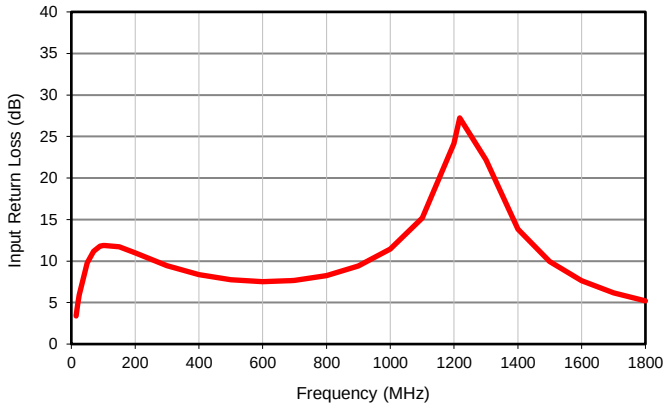
FREQUENCY (MHz)	AVERAGE INSERTION LOSS (dB)	INPUT RETURN LOSS (dB)	AMPLITUDE UNBALANCE (dB)	PHASE UNBALANCE (deg.)
15	3.45	3.39	0.36	0.16
20	2.47	4.74	0.35	0.12
25	1.92	5.94	0.35	0.06
50	1.07	9.79	0.35	0.14
70	0.93	11.17	0.35	0.22
90	0.89	11.77	0.34	0.39
95	0.88	11.83	0.35	0.44
100	0.88	11.86	0.36	0.50
105	0.88	11.89	0.36	0.54
150	0.89	11.72	0.33	0.66
200	0.96	10.98	0.33	0.81
300	1.14	9.44	0.30	1.09
400	1.31	8.37	0.26	1.13
500	1.44	7.75	0.19	1.10
600	1.51	7.53	0.10	0.84
680	1.52	7.61	0.03	0.65
684	1.51	7.63	0.03	0.63
700	1.51	7.67	0.01	0.56
800	1.43	8.25	0.06	0.06
900	1.31	9.40	0.13	0.60
1000	1.15	11.44	0.16	1.41
1100	1.03	15.18	0.14	2.39
1200	1.01	24.18	0.08	3.65
1218	1.02	27.23	0.06	3.93
1300	1.14	22.21	0.01	5.32
1400	1.47	13.83	0.11	7.40
1500	1.96	9.93	0.12	9.85
1600	2.55	7.63	0.01	12.13
1700	3.19	6.16	0.21	13.60
1800	3.81	5.20	0.47	13.84

Typical Performance Data

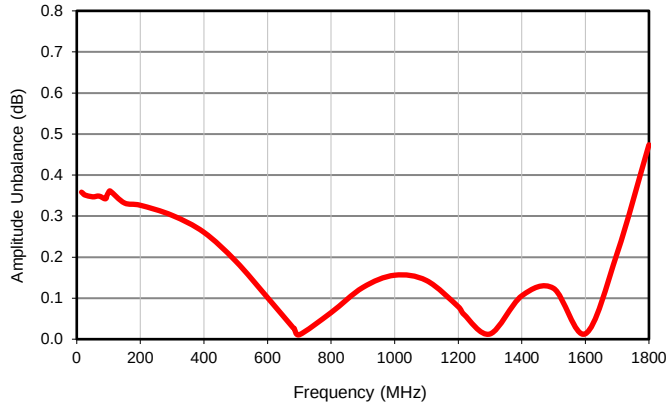
Average Insertion Loss



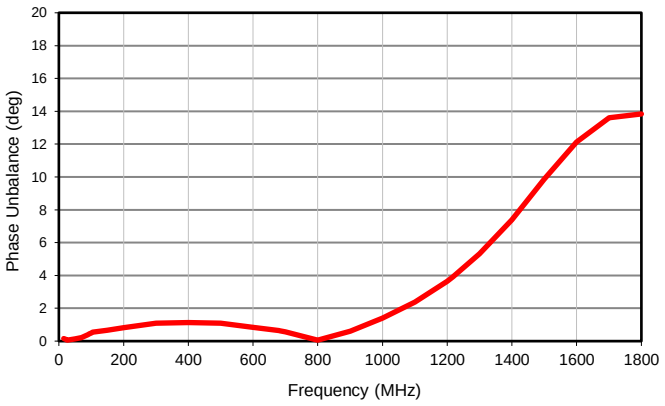
Input Return Loss



Amplitude Unbalance



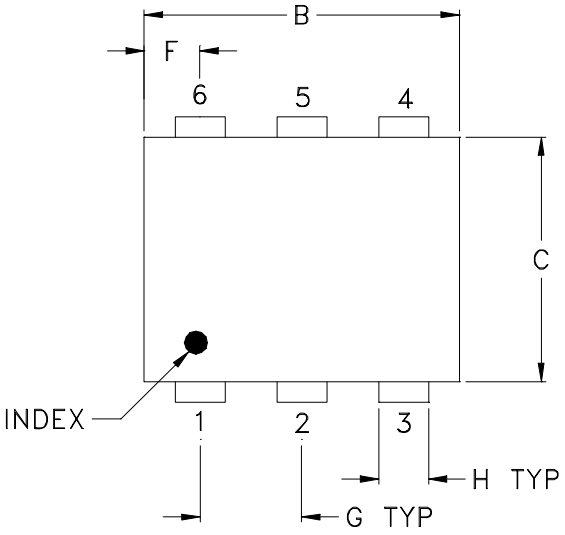
Phase Unbalance

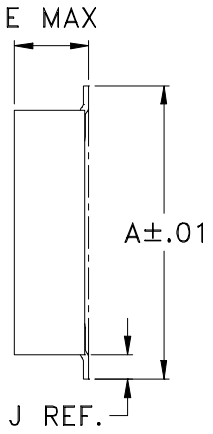


Case Style CD

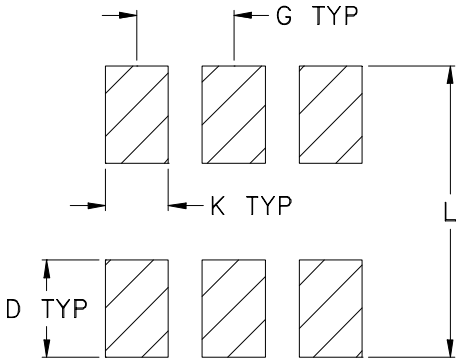
CD541
CD542
CD636
CD637

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:

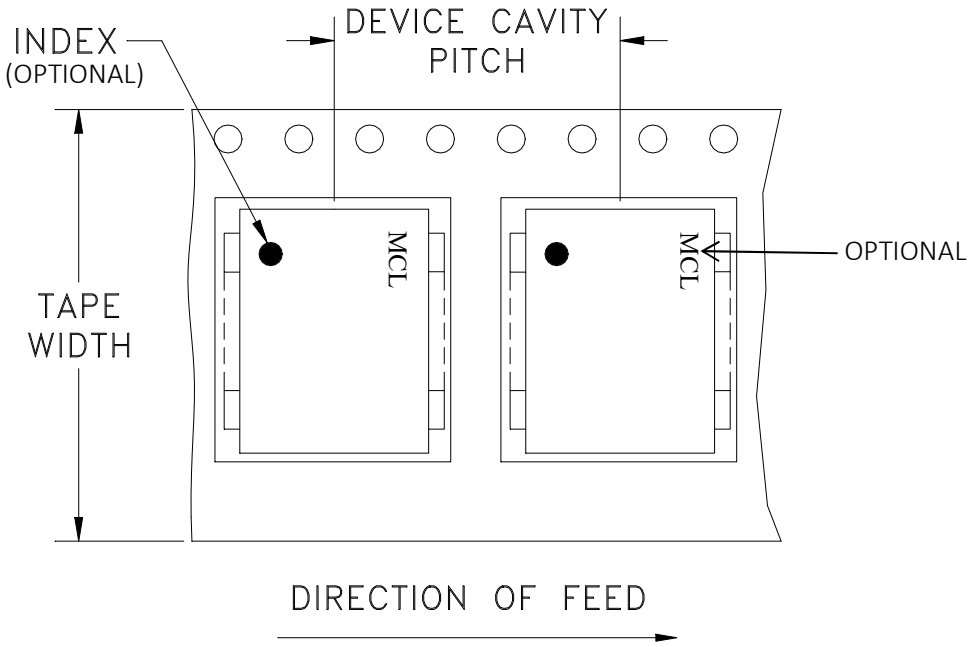
1. Case material: Plastic.
2. Termination finish:
   For RoHS Case Styles: Tin plate over Nickel plate. All models, (+) suffix.
   For RoHS-5 Case Styles: Tin-Lead plate. All models, no (+) suffix.

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Tape & Reel Packaging TR-F34

DEVICE ORIENTATION IN T&R



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.

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

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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

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