

# Surface Mount RF Transformer

## TRS1-23-75+

75Ω      10 to 2200 MHz

### The Big Deal

- Very wide band balun, with excellent performance from 10 MHz to 2.2 GHz
- Excellent amplitude unbalance, 0.3 dB typ
- Good return loss, 20 dB typ



CASE STYLE: AT577-1

### Product Overview

The TRS1-23-75+ is a balanced-to-unbalanced 75Ω transmission line transformer, 0.2" x 0.2" x 0.2" in size. This rugged, wire welded, rectangular core design is rated for up to 0.5W maximum power, in an aqueous washable case suitable for both RoHS and tin/lead solder systems.

Feature	Advantages
Very wide bandwidth	10-2200 MHz bandwidth covers CATV (forward & return), medical wireless and D2A/A2D, and other communications applications
Excellent amplitude and phase unbalance	0.4 dB amplitude and 3° phase unbalance aid rejection of even harmonics (in push-pull amplifiers) and common mode signals (when used as a balun)
Good return loss	Provides excellent matching for 75Ω circuitry
Low and flat insertion loss	Consistently low signal loss, ±0.2dB across all 50-1000 MHz CATV bands

#### 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](http://www.minicircuits.com/MCLStore/terms.jsp)



# Balanced RF Transformer

75Ω 10 to 2200 MHz

## TRS1-23-75+



Generic photo used for illustration purposes only

CASE STYLE: AT577-1

**+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"	500
13"	2000

### Maximum Ratings

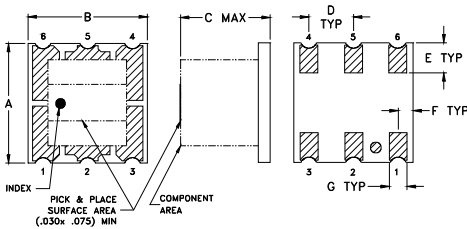
Operating Temperature	-40°C to 85°C
Storage Temperature	-55°C to 100°C
RF Power	0.5W
DC Current	300mA

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

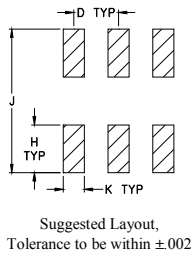
### Pin Connections

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

### Outline Drawing



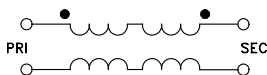
### PCB Land Pattern



### Outline Dimensions (inch/mm)

A	B	C	D	E	F	
.200	.200	.15	.075	.050	.025	
5.08	5.08	3.81	1.91	1.27	0.64	
G	H	J	K			wt
.030	.080	.240	.035			grams
0.76	2.03	6.10	0.89			0.15

### Config. G



### Features

- suitable for tin/lead and RoHS solder systems
- wideband, 10 to 2200 MHz
- balanced transmission line
- good return loss, 20 dB typ. at 1 dB band
- excellent amplitude unbalance, 0.3 dB typ.
- aqueous washable

### Applications

- balanced to unbalanced transformation
- push-pull amplifiers
- PCS/DCS
- cable TV
- cellular

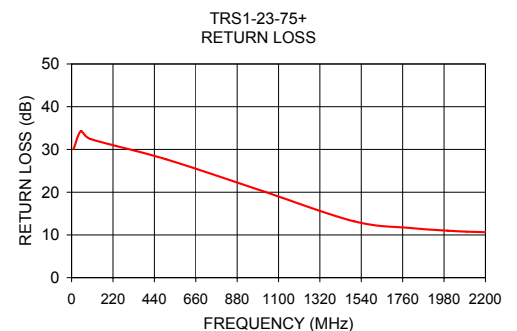
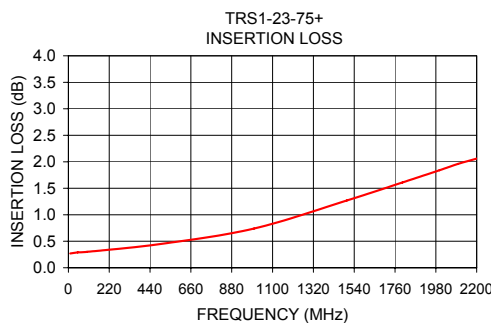
### Transformer Electrical Specifications at 25°C

Ω RATIO	FREQUENCY (MHz)	INSERTION LOSS*			PHASE UNBALANCE (Deg.) Typ.		AMPLITUDE UNBALANCE (dB) Typ.	
		3 dB MHz	2 dB MHz	1 dB MHz	1 dB bandwidth	2 dB bandwidth	1 dB bandwidth	2 dB bandwidth
1	10-2200	10-2200	30-1500	50-1000	3	5	0.4	0.6

\*Insertion Loss is referenced to mid-band loss, 0.2 dB typ.

### Typical Performance Data

FREQUENCY (MHz)	INSERTION LOSS (dB)	INPUT R. LOSS (dB)	AMPLITUDE UNBALANCE (dB)	PHASE UNBALANCE (Deg.)
10.00	0.27	30.06	0.58	6.13
30.00	0.29	34.11	0.58	2.24
50.00	0.29	34.32	0.55	1.33
100.00	0.30	32.46	0.51	0.30
500.00	0.45	27.73	0.33	2.61
1000.00	0.74	20.49	0.10	2.40
1500.00	1.27	13.21	0.27	1.23
1800.00	1.61	11.64	0.18	3.21
2000.00	1.84	10.99	0.05	4.05
2200.00	2.06	10.63	0.14	4.39



### Notes

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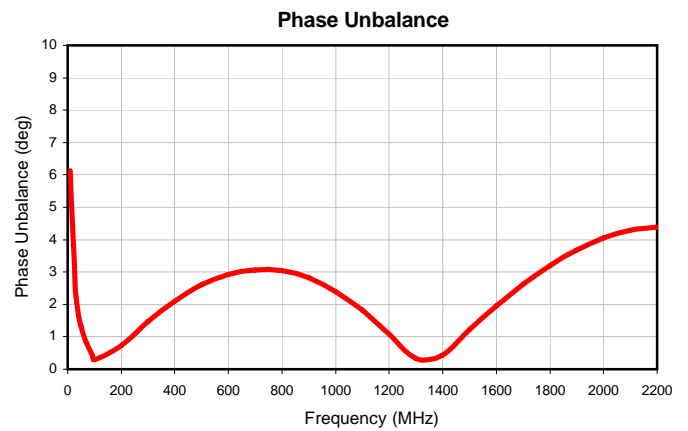
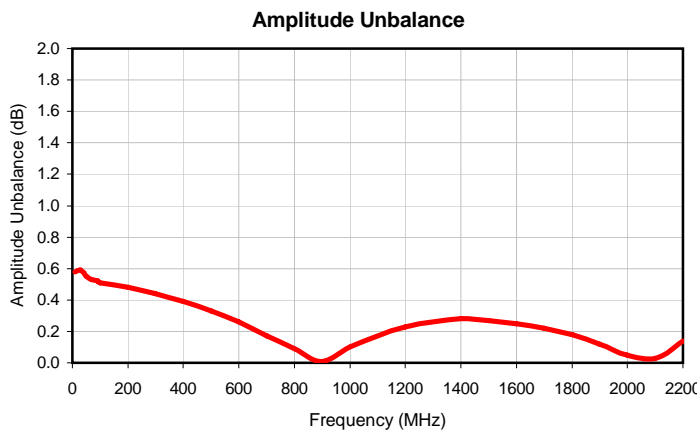
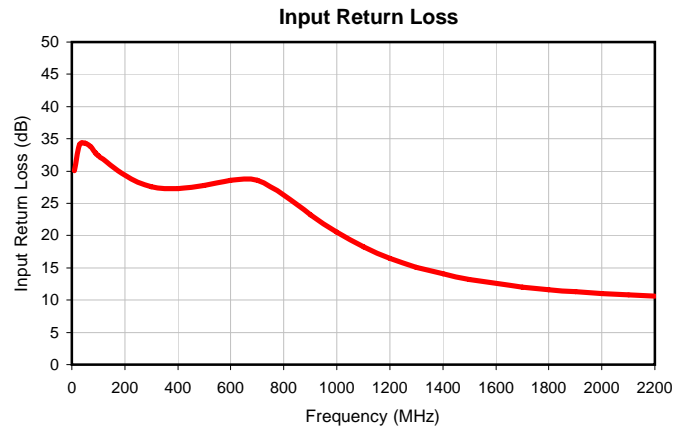
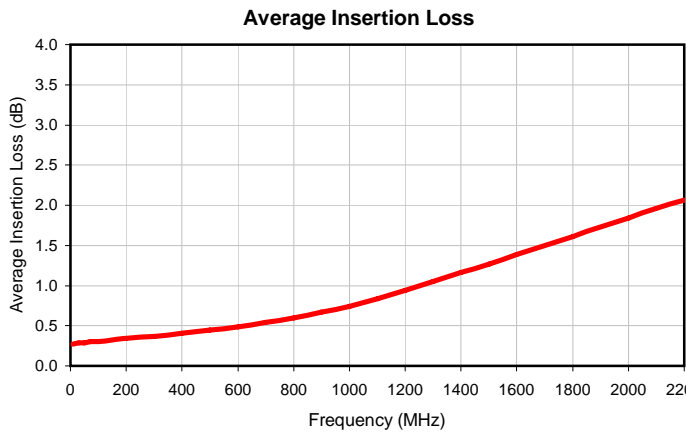
# RF Transformer

# TRS1-23-75+

## Typical Performance Data

FREQUENCY MHz	AVERAGE INSERTION LOSS (dB)	INPUT RETURN LOSS (dB)	AMPLITUDE UNBALANCE (dB)	PHASE UNBALANCE (deg.)
10.0	0.27	30.06	0.58	6.13
30.0	0.29	34.11	0.59	2.24
50.0	0.29	34.32	0.55	1.33
70.0	0.30	33.79	0.53	0.83
90.0	0.30	32.87	0.52	0.45
100.0	0.30	32.46	0.51	0.30
200.0	0.34	29.38	0.48	0.74
300.0	0.37	27.62	0.44	1.49
400.0	0.41	27.27	0.39	2.09
500.0	0.45	27.73	0.33	2.61
600.0	0.49	28.55	0.26	2.92
700.0	0.54	28.58	0.17	3.07
800.0	0.60	26.33	0.09	3.04
900.0	0.67	23.24	0.01	2.82
1000.0	0.74	20.49	0.10	2.40
1100.0	0.84	18.26	0.17	1.81
1200.0	0.94	16.51	0.23	1.09
1300.0	1.05	15.12	0.26	0.33
1400.0	1.16	14.04	0.28	0.43
1500.0	1.27	13.21	0.27	1.23
1600.0	1.39	12.57	0.25	1.95
1700.0	1.50	12.05	0.22	2.62
1800.0	1.61	11.64	0.18	3.21
1900.0	1.73	11.28	0.12	3.67
2000.0	1.84	10.99	0.05	4.05
2100.0	1.96	10.77	0.03	4.28
2200.0	2.06	10.63	0.14	4.39

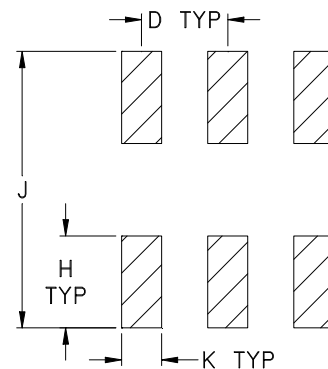
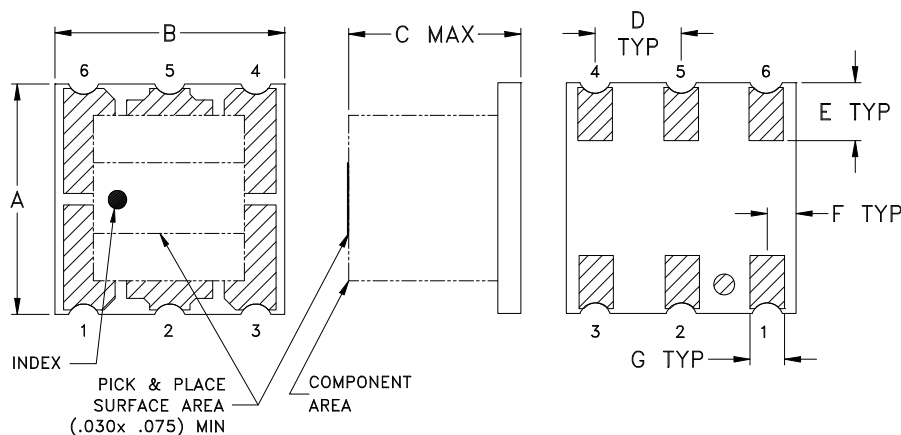
## Typical Performance Data



## Outline Dimensions

AT577-1

## PCB Land Pattern



Suggested Layout,  
Tolerance to be within  $\pm .002$

CASE #	A	B	C	D	E	F	G	H	J	K	L	WT. GRAMS
AT577-1	.200 (5.08)	.200 (5.08)	.15 (3.81)	.075 (1.91)	.050 (1.27)	.025 (0.64)	.030 (0.76)	.080 (2.03)	.240 (6.10)	.035 (0.89)	-- --	.15

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

### Notes:

1. Base material: Printed wiring laminate.
2. Termination finish:
  - For RoHS Case Style: 3-5  $\mu$  inch (.08-.13 microns) Gold over 120-240  $\mu$  inch (3.05-6.10 microns) Nickel plate.
  - For RoHS-5 Case Style: Tin-Lead plate. All models, no (+) suffix.



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



The Design Engineers Search Engine Provides ACTUAL Data Instantly From MINI-CIRCUITS At: [www.minicircuits.com](http://www.minicircuits.com)

RF/IF MICROWAVE COMPONENTS



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