



Mini-Circuits

BALANCED TO UNBALANCED



# RF Transformer

TC1-182T-75X+

75Ω 5 to 1800 MHz

## THE BIG DEAL

- Very wide band balun, with excellent performance from 5 MHz to 1800 MHz
- Excellent amplitude unbalance, 0.4 dB typ and phase unbalance, 5°typ.
- Good return loss, 20 dB typ.



Generic photo used for illustration purposes only

CASE STYLE: AT1521

## APPLICATIONS

- Balanced to unbalanced transmission
- Push-pull amplifiers
- PCS/DCS
- Cable TV
- Cellular
- Docsis 3.1

### +RoHS Compliant

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

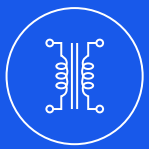
## PRODUCT OVERVIEW

The TC1-182T-75X+ is a balanced-to-unbalanced 75Ω transmission line transformer. This rugged, wire welded, rectangular core with top hat design is rated for up to 0.25W maximum power, in an aqueous washable case suitable for both RoHS and tin/lead solder systems.

## KEY FEATURES

Feature	Advantages
Very wide bandwidth	5-1800 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 5° 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 100-1218 MHz CATV bands
Top Hat® feature	Improves speed and accuracy of pick and place assembly and provides clear device marking for visual inspection.





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## ELECTRICAL SPECIFICATIONS AT +25°C

Parameter	Frequency (MHz)	Min.	Typ.	Max.	Unit
Impedance Ratio			1		
Frequency Range		5	—	1800	MHz
Insertion Loss <sup>1</sup>	5 - 1800	—	1.2	2.5	dB
Amplitude Unbalance	5 - 1200	—	0.4	1.0	dB
	1200 - 1800	—	1.3	2.1	
Phase Unbalance	5 - 1800	—	5	10	Degree

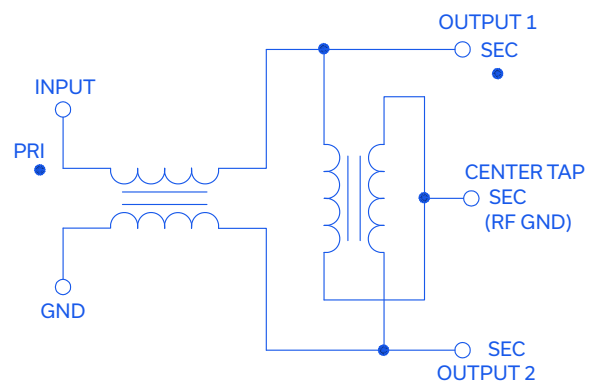
1. Insertion Loss is referenced to mid-band loss, 1.0 dB typ. Measured in 75Ω system.

## 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.

## CONFIGURATION M1





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## OUTLINE DRAWING

ORIENTATION DOT ON TOP HAT

A  $+.015$   
 $-.000$

B

1 2 3

4 5 6

G TYP

MODEL MARKING (ORIENTATION)

C MAX

AREA COMPONENT

D TYP

E TYP

F TYP

3 2 1

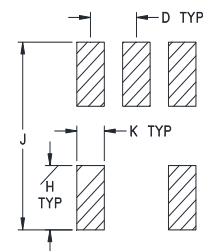
4 5 6

Orientation Dot on Top Hat & Marking on the Substrate both refers to Pin#1 of the Unit.

TOP HAT/  
PICK & PLACE SURFACE  
AREA (.10x.10) MIN

Top-hat total thickness: .013 inches MAX.

## PCB Land Pattern





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

## OUTLINE DIMENSIONS (Inch/mm)

A	B	C	D	E	F	G	H	J	K
.150	.150	.160	.050	.040	.025	.028	.065	.190	.030
3.81	3.81	4.06	1.27	1.02	0.64	0.71	1.65	4.83	0.76

Weight: 0.15 grams

Figure 1 is a detailed cross-sectional view of the package base. It shows a central vertical structure with a top section of .050, 2 PL. and a bottom section of .040. A central vertical channel is .015 PTH, 6 PL. FOR GROUND. The overall width is .113. The base has a .015 TYP. thickness. The bottom section has a .033 thickness. The base material has a .044 TRACE WIDTH, 3 PL. (SEE NOTE 1). A 45° TYP. angle is shown at the bottom left. The package outline is indicated by a dashed line. PIN 6 is labeled on the left side. SEE NOTE 3 is indicated on the right side.

1. TRACE WIDTH IS SHOWN FOR ROGERS RO4350B WITH DIELECTRIC THICKNESS .020" ± .0015"; COPPER: 1/2 OZ. ON EACH SIDE. FOR OTHER MATERIALS TRACE WIDTH MAY NEED TO BE MODIFIED.
  2. BOTTOM SIDE OF THE PCB IS CONTINUOUS GROUND PLANE.
  3. THIS PAD IS NOT REQUIRED FOR AT224 CASE STYLE.
-  DENOTES PCB COPPER LAYOUT WITH SMOBC (SOLDER MASK OVER BARE COPPER)
-  DENOTES COPPER LAND PATTERN FREE OF SOLDER MASK

### TAPE & REEL INFORMATION: F17



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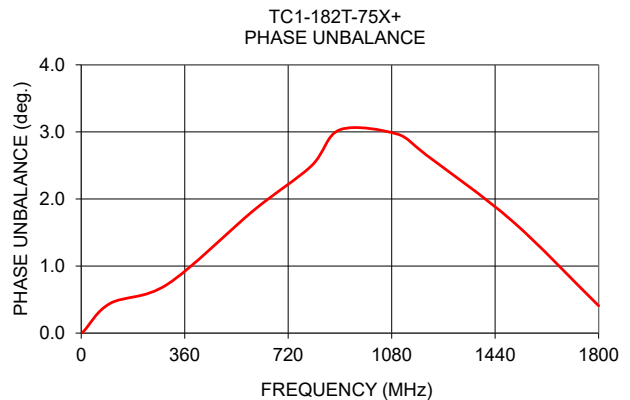
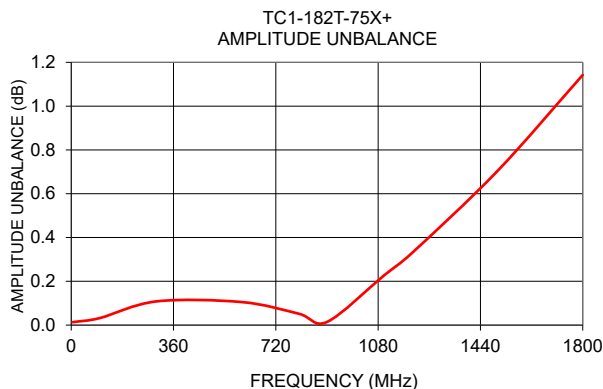
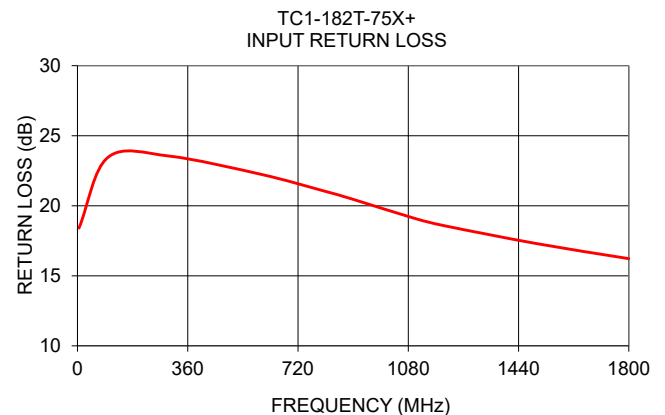
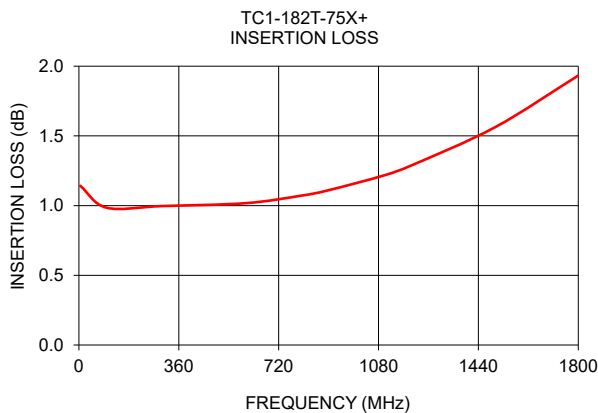
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## TYPICAL PERFORMANCE DATA

Frequency (MHz)	Insertion Loss (dB)	Input Return Loss (dB)	Amplitude Unbalance (dB)	Phase Unbalance (Deg.)
5	1.14	18.41	0.01	0.01
60	0.98	23.25	0.02	0.44
100	0.98	23.46	0.03	0.73
300	1.00	23.54	0.11	1.83
500	1.00	22.81	0.13	2.49
700	1.04	21.67	0.08	3.03
1000	1.16	19.76	0.11	2.97
1200	1.29	18.56	0.33	2.66
1500	1.56	17.29	0.70	1.67
1800	1.93	16.22	1.14	0.41



- NOTES**
- 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.
  - Electrical specifications and performance data contained in this specification document are based on Mini-Circuit's applicable established test performance criteria and measurement instructions.
  - 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)

