



Mini-Circuits

BALANCED TO UNBALANCED

# RF Transformer

TC1.33-282+

100 to 75Ω 5 to 2800 MHz

## THE BIG DEAL

- Suitable for Tin/Lead and RoHS Solder Systems
- Wideband, 5 to 2800 MHz
- Balanced Transmission Line
- Good Return Loss, 20 dB Typ. at 1 dB Band
- Excellent Amplitude Unbalance, 0.3 dB Typ.
- Aqueous Washable



Generic photo used for illustration purposes only

CASE STYLE: AT224-1A

### +RoHS Compliant

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

## APPLICATIONS

- Balanced to Unbalanced Transformation
- Push-Pull Amplifiers
- PCS/DCS
- Cable TV
- Cellular

## PRODUCT OVERVIEW

The TC1.33-282+ is a mini wideband tri-filar transformer, measuring approximately 4 mm on all sides. The plastic substrate, 5-pad design is aqueous washable and RoHS compliant, featuring a square core and all welded wire construction for repeatability and reliability in balanced-to-unbalanced 100/75Ω implementations.

## KEY FEATURES

Feature	Advantages
Very Wide Bandwidth	5-2800 MHz bandwidth useful for CATV (forward & return), medical wireless and D2A/A2D, and communications applications
Excellent Amplitude and Phase Unbalance	0.3 dB amplitude and 6° phase unbalance aid rejection of even harmonics (in push-pull amplifiers) and common mode signals (when used as a balun)
Good Return Loss	Efficient signal path across 100/75Ω transitions
Low and Flat Insertion Loss	Flatness ±0.1 dB across 50-1000 MHz CATV bands preserves gain flatness after impedance transformation.



ELECTRICAL SPECIFICATIONS AT +25°C, 75 $\Omega$ 

Parameter	Frequency (MHz)	Min.	Typ.	Max.	Unit
Impedance Ratio (Secondary/Primary)			1.33		
Frequency Range		5		2800	MHz
Insertion Loss <sup>1</sup>	5 - 2800			3	dB
	30 - 2000			2	
	50 - 1500			1	
Phase Unbalance	50 - 1500			6	Deg.
	30 - 2000			6	
Amplitude Unbalance	50 - 1500			0.3	dB
	30 - 2000			1.0	

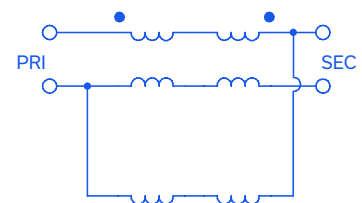
1. Insertion Loss is referenced to mid-band loss, 1.0 dB typ. Measured in 75 $\Omega$  system.

## ABSOLUTE MAXIMUM RATINGS

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

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

## CONFIG. K





BALANCED TO UNBALANCED

# RF Transformer

**TC1.33-282+**

Mini-Circuits

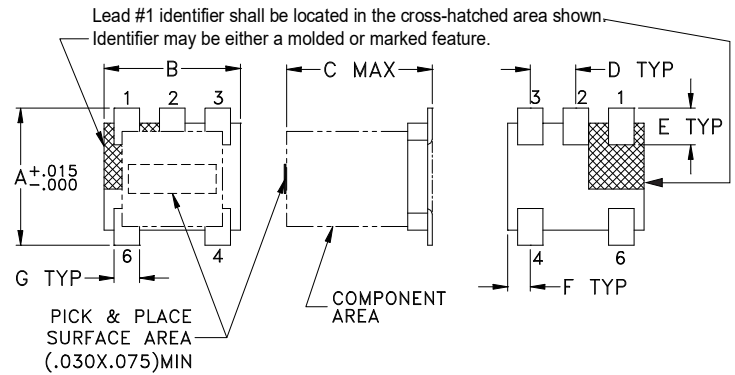
100 to 75Ω 5 to 2800 MHz

## PIN CONNECTIONS

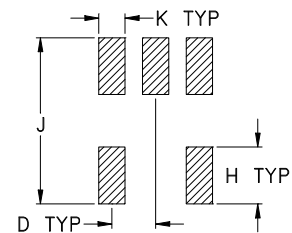
Function	Pin Number
PRIMARY DOT	6
PRIMARY	4
SECONDARY DOT	1
SECONDARY	3
NOT USED	2

**PRODUCT MARKING:** N/A

## OUTLINE DRAWING



## PCB Land Pattern



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

## OUTLINE DIMENSIONS (Inch/mm)

A	B	C	D	E	F
.150	.150	.160	.050	.040	.025
3.81	3.81	4.06	1.27	1.02	0.64
G	H	J	K	wt	
.028	.065	.190	.030	grams	
0.71	1.65	4.83	0.76	0.15	

**TAPE & REEL INFORMATION: F17**



Mini-Circuits

BALANCED TO UNBALANCED

# RF Transformer

TC1.33-282+

100 to 75Ω 5 to 2800 MHz

## TYPICAL PERFORMANCE DATA

FREQUENCY (MHz)	INSERTION LOSS (dB)	INPUT R. LOSS (dB)	AMPLITUDE UNBALANCE (dB)	PHASE UNBALANCE (Deg.)
5.00	1.48	17.72	0.38	3.28
10.00	1.20	21.95	0.21	2.17
30.00	1.08	27.05	0.11	0.55
50.00	1.08	28.04	0.09	0.06
100.00	1.09	28.09	0.08	1.09
500.00	0.99	24.29	0.21	5.00
1000.00	0.97	22.66	0.07	6.34
1500.00	1.20	22.41	0.71	5.18
2000.00	1.64	21.22	1.49	1.64
2400.00	2.13	17.79	2.00	3.40
2800.00	2.76	13.83	2.31	10.70



## 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/terms/viewterm.html](http://www.minicircuits.com/terms/viewterm.html)

