

BALANCED <sup>top hat</sup>  
RF Transformer

TRS2-1T-1+

Mini-Circuits

75Ω 5 to 1200 MHz 1:2 Ratio

FEATURES

- Suitable for Tin/Lead and RoHS Solder Systems
- Wideband, 5 to 1200 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: TT1618

**+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

ELECTRICAL SPECIFICATIONS AT +25°C

Parameter	Frequency (MHz)	Min.	Typ.	Max.	Unit
Impedance Ratio (Secondary/Primary)			2		
Frequency Range		5		1200	MHz
Insertion Loss (Avg.) <sup>1</sup>	5-600		0.5	1.0	dB
	600-1000		1.0	1.9	
	1000-1200		1.7	2.3	
Amplitude Unbalance	5-600		0.3	1.0	dB
	600-1000		0.6	1.6	
	1000-1200		0.6	1.9	
Phase Unbalance	5-50		0.2	3	Degree
	50-1200		3	9	
Input Return Loss Single Ended	5-50	17	22		dB
	50-1000	14	22		
	1000-1200	9	17		

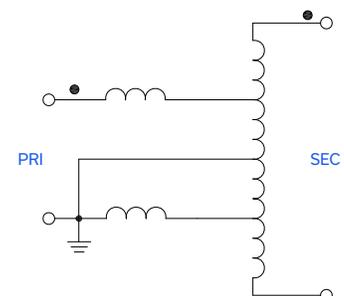
1. Insertion Loss is referenced to mid-band loss, 0.6 dB typ.

ABSOLUTE MAXIMUM RATINGS

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

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

CONFIG. P1



REV. B  
ECO-028366  
TRS2-1T-1+  
MCL NY  
260206



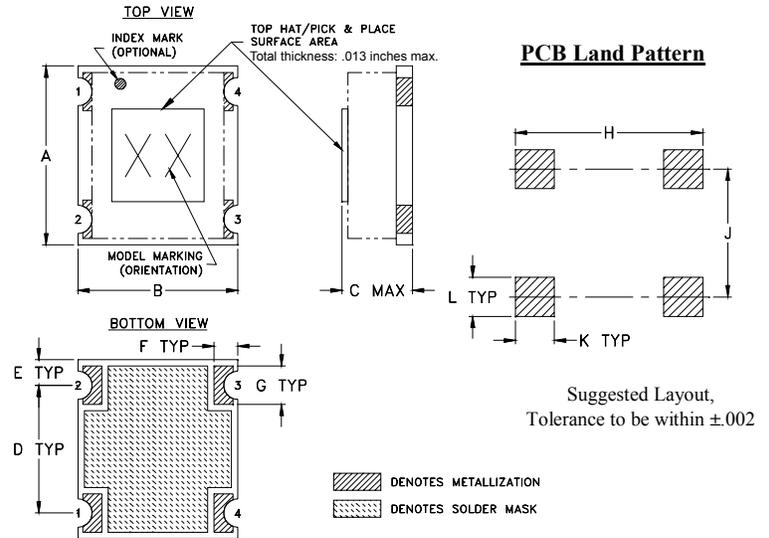


### PIN CONNECTIONS

PRIMARY DOT	1
PRIMARY	4
SECONDARY DOT	3
SECONDARY	2

PRODUCT MARKING: GC

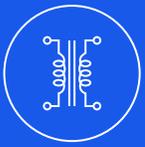
### OUTLINE DRAWING



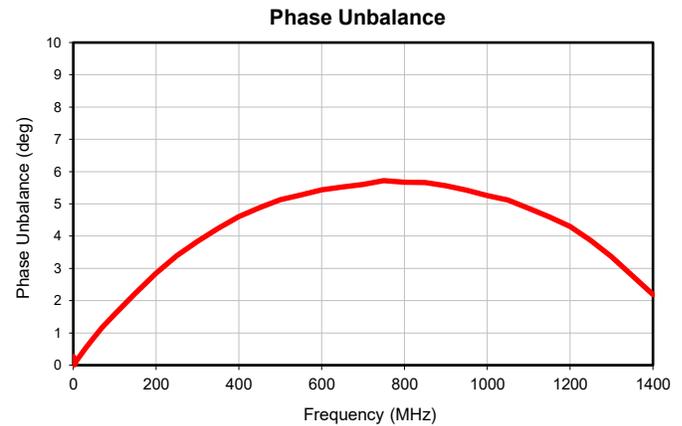
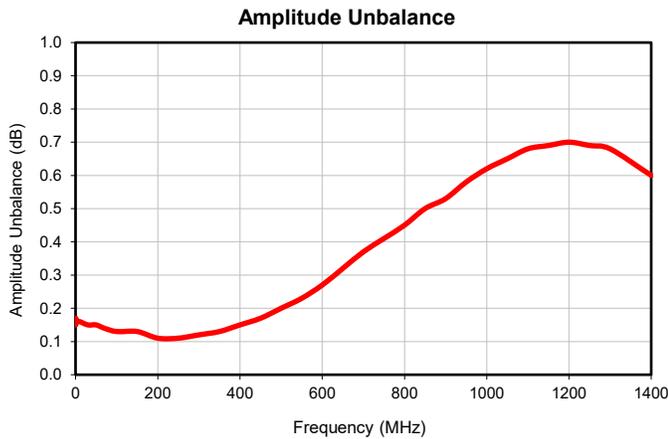
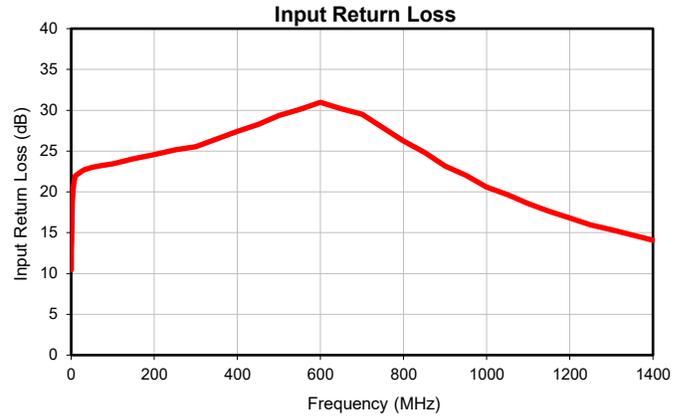
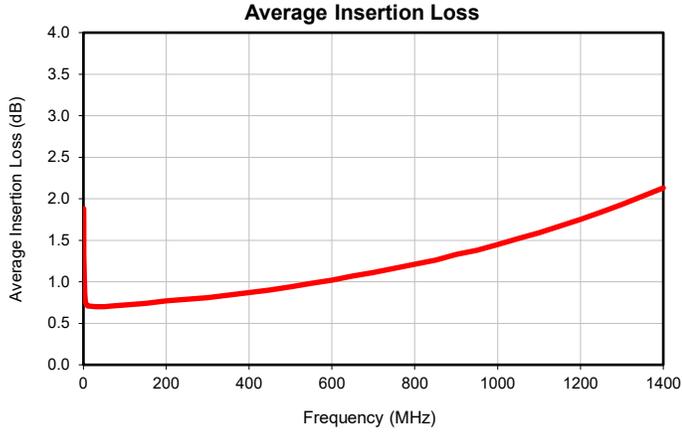
### OUTLINE DIMENSIONS (Inch mm)

A	B	C	D	E	F
.280	.250	.12	.200	.040	.037
7.11	6.35	3.05	5.08	1.02	0.94
G	H	J	K	L	wt.
.060	.293	.200	.061	.061	grams
1.52	7.44	5.08	1.55	1.55	2.8

### TAPE & REEL INFORMATION: F2



### TYPICAL PERFORMANCE CHARTS



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

# RF Transformer

# TRS2-1T-1+

## Typical Performance Data

FREQUENCY MHz	AVERAGE INSERTION LOSS (dB)	INPUT RETURN LOSS (dB)	AMPLITUDE UNBALANCE (dB)	PHASE UNBALANCE (deg.)
0.5	1.88	10.45	0.15	0.27
0.6	1.70	11.35	0.16	0.21
0.7	1.56	12.12	0.17	0.21
0.8	1.46	12.77	0.16	0.14
1.0	1.31	13.83	0.16	0.09
3.0	0.86	18.67	0.16	0.01
5.0	0.76	20.46	0.16	0.07
7.0	0.73	21.33	0.16	0.13
10	0.71	21.96	0.16	0.18
30	0.70	22.69	0.15	0.53
50	0.70	22.99	0.15	0.86
70	0.71	23.20	0.14	1.17
100	0.72	23.43	0.13	1.58
150	0.74	24.05	0.13	2.23
200	0.77	24.55	0.11	2.85
250	0.79	25.15	0.11	3.39
300	0.81	25.54	0.12	3.84
350	0.84	26.47	0.13	4.24
400	0.87	27.39	0.15	4.61
450	0.90	28.27	0.17	4.88
500	0.94	29.37	0.20	5.13
550	0.98	30.09	0.23	5.28
600	1.02	30.97	0.27	5.43
650	1.07	30.16	0.32	5.52
700	1.11	29.50	0.37	5.60
750	1.16	27.89	0.41	5.72
800	1.21	26.22	0.45	5.67
850	1.26	24.85	0.50	5.66
900	1.33	23.16	0.53	5.56
950	1.38	22.01	0.58	5.42
1000	1.45	20.59	0.62	5.26
1050	1.52	19.63	0.65	5.12
1100	1.59	18.54	0.68	4.86
1150	1.67	17.62	0.69	4.60
1200	1.75	16.81	0.70	4.30
1250	1.84	15.96	0.69	3.87
1300	1.93	15.37	0.68	3.36
1400	2.13	14.08	0.60	2.19

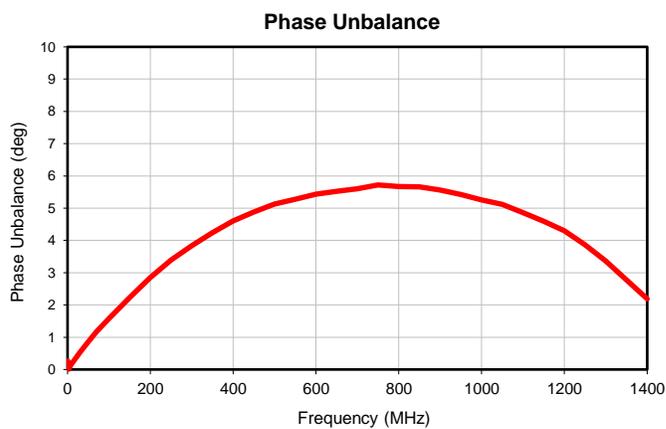
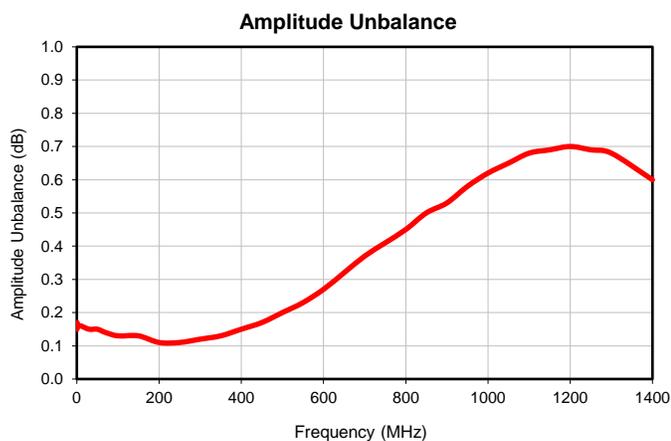
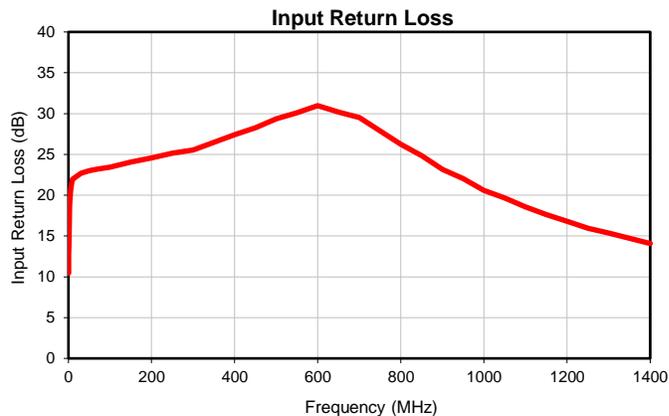
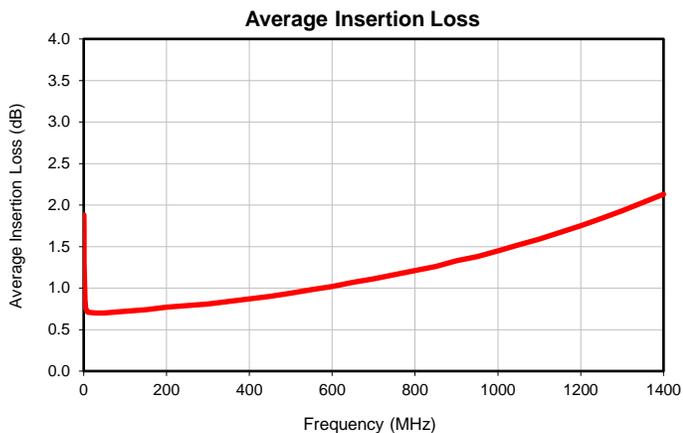


P.O. Box 350166, Brooklyn, New York 11235-0003 (718) 934-4500 • Fax (718) 332-4661 For detailed performance specs & shopping online see Mini-Circuits web site  
 The Design Engineers Search Engine Provides ACTUAL Data Instantly From MINI-CIRCUITS At: [www.minicircuits.com](http://www.minicircuits.com)

IF/RF MICROWAVE COMPONENTS

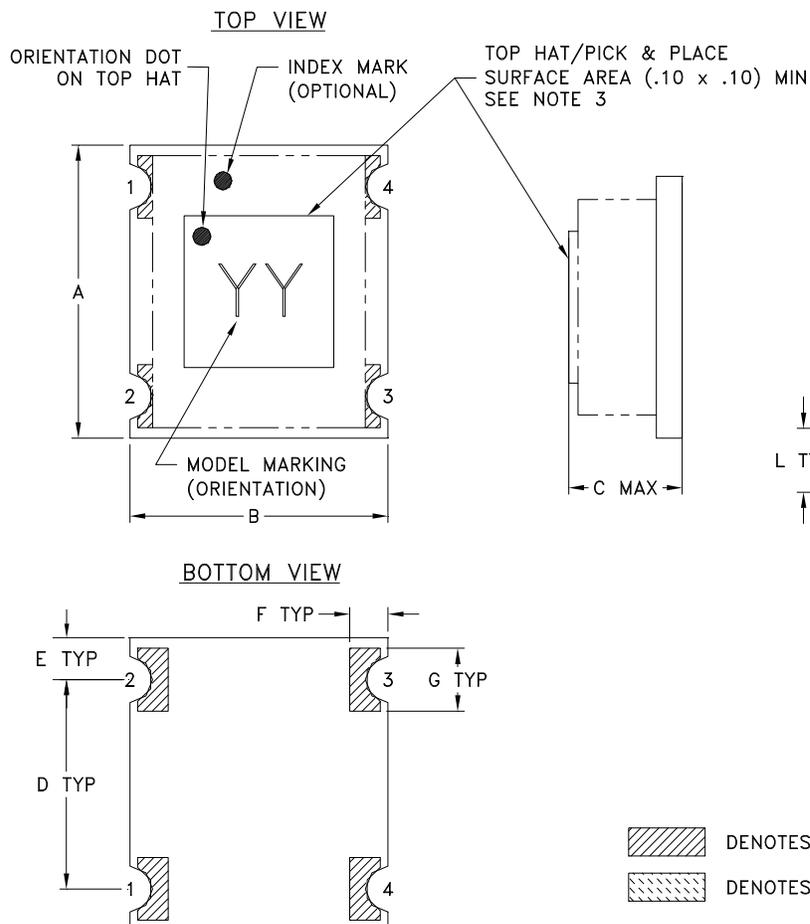
REV. OR  
TRS2-1T-1+  
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Page 1 of 1

## Typical Performance Data

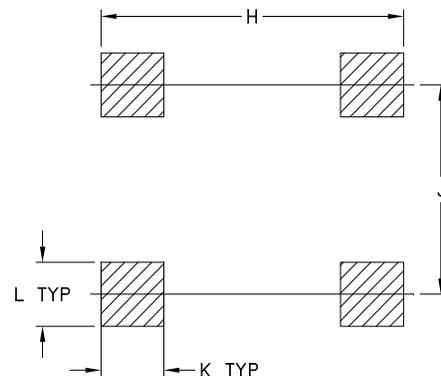


## Outline Dimensions

TT1618



## PCB Land Pattern



SUGGESTED LAYOUT  
TOLERANCE TO BE WITHIN  $\pm 0.02$

 DENOTES METALLIZATION  
 DENOTES SOLDER RESIST

CASE #	A	B	C	D	E	F	G	H	J	K	L	WT GRAMS
TT1618	.280 (7.11)	.250 (6.35)	.12 (3.05)	.200 (5.08)	.040 (1.02)	.037 (.94)	.060 (1.52)	.293 (7.44)	.200 (5.08)	.061 (1.55)	.061 (1.55)	2.80

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

### Notes:

- Open style, Base material: Printed wiring laminate.
- Termination finish: 3-5  $\mu$  inch (.08-.13 microns) Gold over 120-240  $\mu$  inch (3.05-6.10 microns) Nickel plate.  
All models, (+) suffix.
- Top-Hat total thickness: .013 inches MAX.
- Orientation Dot on Top Hat & PCB corresponds to Pin #1.

  
ISO 9001 ISO 14001 CERTIFIED

ALL NEW  

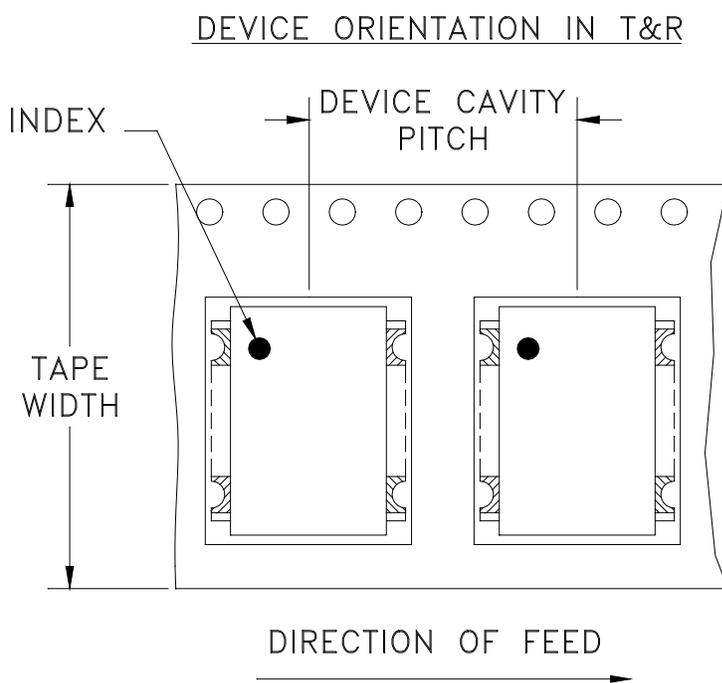

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RF/IF MICROWAVE COMPONENTS

# Tape & Reel Packaging TR-F2



Tape Width, mm	Device Cavity Pitch, mm	Reel Size, inches	Devices per Reel See note
16	12	7	10
			20
			50
			100
			200
		13	500
			1000

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](http://www.minicircuits.com/pages/pdfs/tape.pdf)



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Mini-Circuits ISO 9001 & ISO 14001 Certified

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