**THE BIG DEAL**

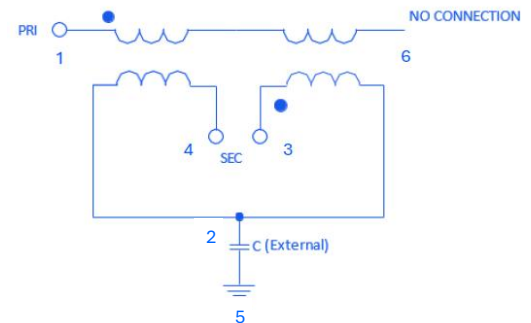
- Tiny Size, 0603
- Low Cost
- DC feeding capability for Secondary
- Rugged LTCC construction



Generic photo used for illustration purposes only

APPLICATIONS

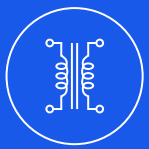
- Wireless Infrastructure 5G, sub-6 GHz bands
- Small cells, repeaters and base station modules
- Satellite and Aerospace

CONFIGURATION R**PRODUCT OVERVIEW**

Mini-Circuits' TCW-4300+ is a high-performance ceramic RF balun transformer with a 1:2 impedance ratio, optimized for 2.15 to 4.3 GHz – a critical range for wireless infrastructure, SATCOM uplinks and 5G sub-6 GHz systems. Engineered for precision, it delivers low insertion loss, excellent phase balance and minimal amplitude variation, ensuring superior signal integrity in demanding RF chains. With 4W RF power handling and DC isolation between the input and output, it supports biasing flexibility for active components. Built on LTCC technology and housed in a rugged 0603 ceramic package, TCW2-4300+ combines compact size with exceptional reliability for harsh environments. .

KEY FEATURES

Feature	Advantages
4W power handling	Supports a wide range of power requirements.
DC Isolated from input to output	Can be used to DC bias external circuits at the output.
Tiny size, 0603	Accommodates tight space requirements for dense PCB layouts.
LTCC construction	LTCC combines compact size with exceptional reliability for harsh environments.

ELECTRICAL SPECIFICATIONS¹ AT +25°C, Z₀=50Ω

Parameter	Frequency (MHz)	Min.	Typ.	Max.	Units
Impedance Ratio (Secondary/Primary)	-	2			-
Frequency Range	-	2150	-	4300	MHz
Average Insertion Loss ²	2150 - 4300	-	0.8	1.2	dB
Return Loss (Unbalanced port)	2150 - 4300	10	15	-	dB
Return Loss (Balanced port) ²	2150 - 4300	10	15	-	dB
CMRR	2150 - 4300	20	22	-	dB
Amplitude Unbalance	2150 - 4300	-	-	1.3	dB
Phase Unbalance ³	2150 - 4300	-	-	11	Degrees

1. Tested in Evaluation Board P/N TB-TCW2-4300C+

2. Based on mixed-mode parameters

3. Relative to 180°

ABSOLUTE MAXIMUM RATINGS⁴

Parameter	Ratings
Operating Temperature	-55°C to +125°C
Storage Temperature	-55°C to +125°C
RF Power Input ⁵	4 W

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

5. At +25°C, derate linearly to 1.4 W at +125°C.



CERAMIC BALUN

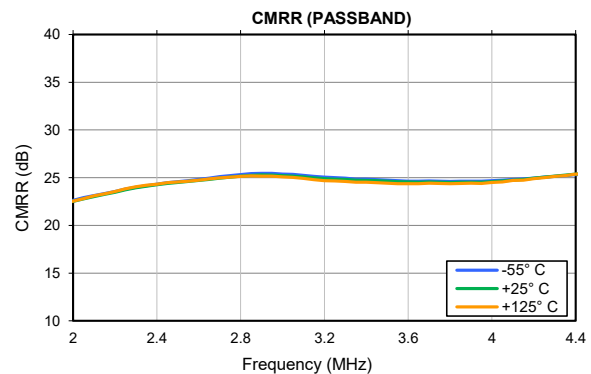
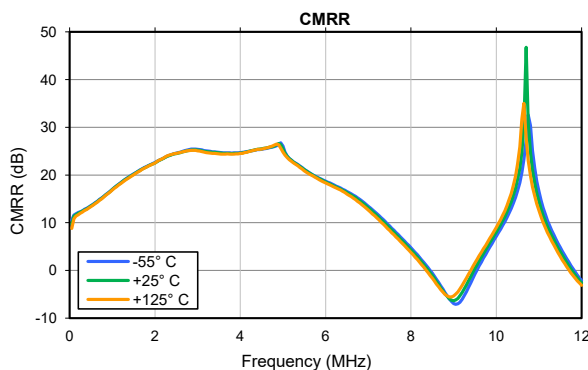
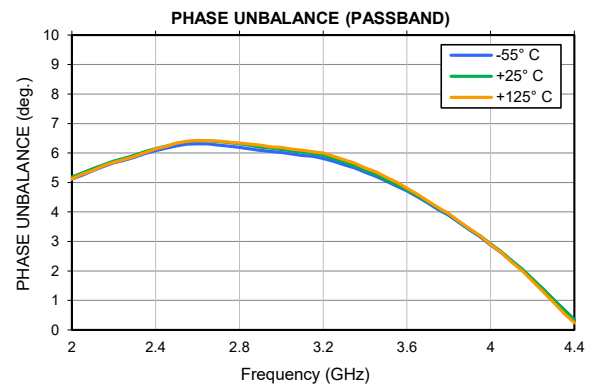
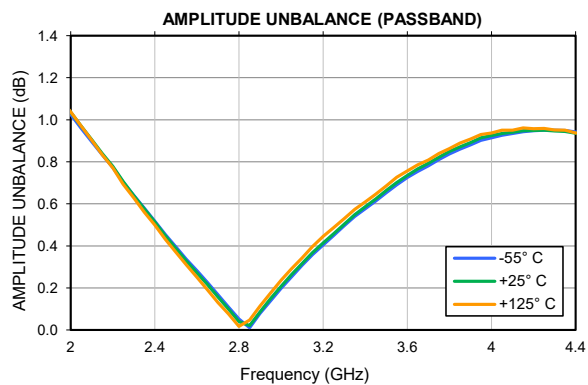
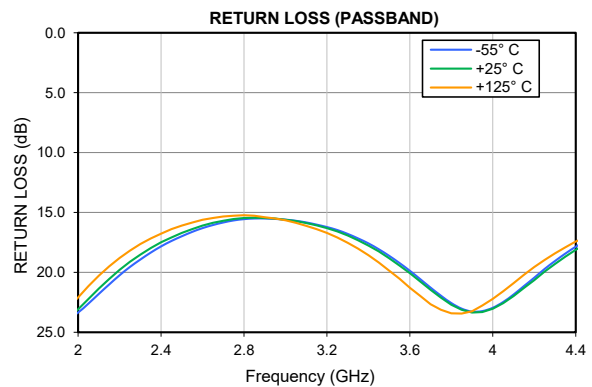
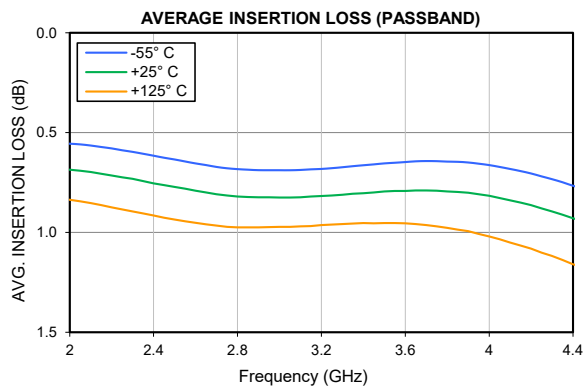
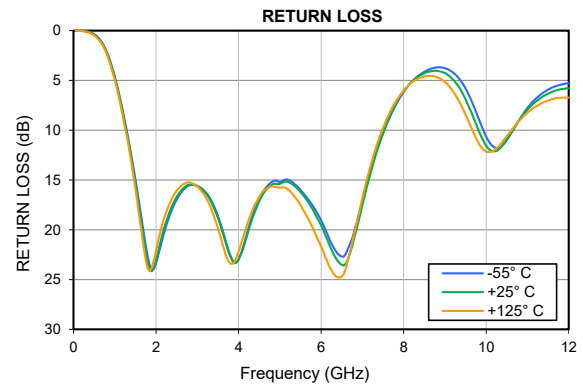
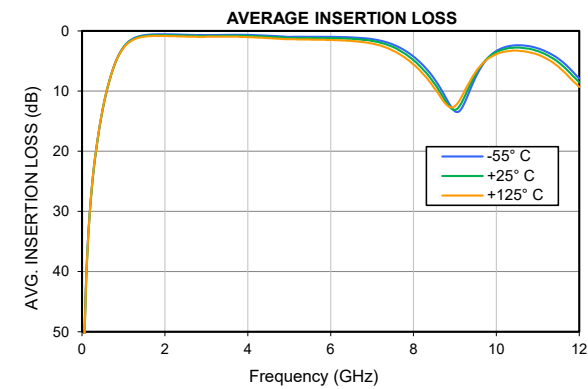
RF Transformer

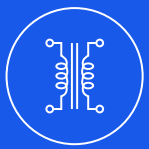
TCW2-4300+

Mini-Circuits

50Ω 2150 to 4300 MHz Ratio 1:2

TYPICAL PERFORMANCE GRAPHS





Mini-Circuits

CERAMIC BALUN

RF Transformer

TCW2-4300+

50Ω 2150 to 4300 MHz Ratio 1:2

CONFIGURATION R

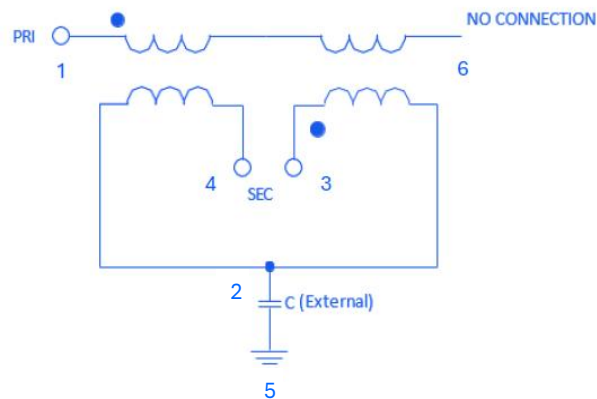
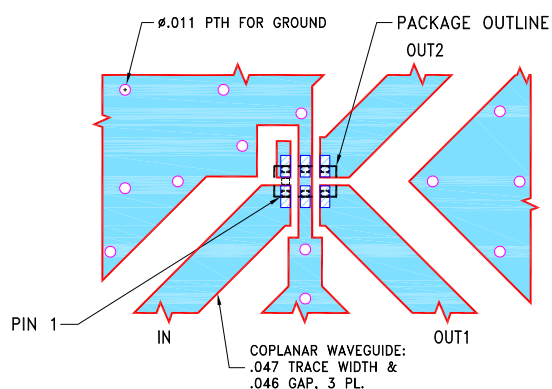


Figure 1. TCW2-4300+ Configuration

PAD DESCRIPTION

PRIMARY DOT (Unbalanced Port)	1
GND or DC FEED + RF	2
SECONDARY DOT (Balanced)	3
SECONDARY (Balanced)	4
GND	5
NO CONNECTION	6

DEMO BOARD MCL P/N: TB-TCW2-4300C+
SUGGESTED PCB LAYOUT (PL-574)

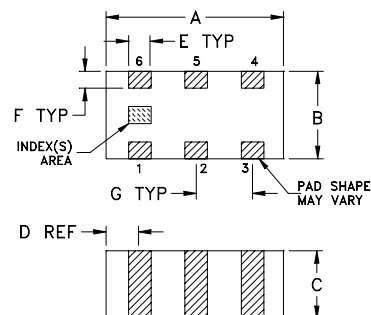
NOTES:

- TRACE WIDTH & GAP PARAMETERS ARE SHOWN FOR ROGERS RO4350B WITH DIELECTRIC THICKNESS .020±.0015. COPPER: 1/2 OZ. EACH SIDE. FOR OTHER MATERIALS TRACE WIDTH & GAP MAY NEED TO BE MODIFIED.
- BOTTOM SIDE OF THE PCB IS CONTINUOUS GROUND PLANE.

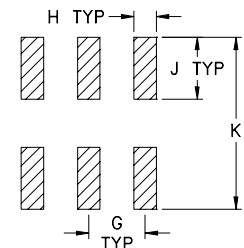
DENOTES PCB COPPER LAYOUT WITH SMOBC (SOLDER MASK OVER BARE COPPER).

DENOTES COPPER LAND PATTERN FREE OF SOLDER MASK.

OUTLINE DRAWING



PCB Land Pattern



Suggested Layout,
Tolerance to be within ±.002

OUTLINE DIMENSIONS (Inches
mm)

A	B	C	D	E	F
.063	.031	.024	.012	.008	.006
1.60	0.79	0.61	0.30	0.20	0.15
G	H	J	K		wt
.020	.010	.022	.053		grams
0.51	0.25	0.56	1.35		0.005

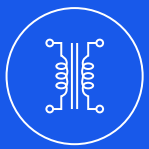
Dimensions are in Inches (mm). Tolerances: Pl.± .01; 3 Pl.± .005

PRODUCT MARKING: N/A

Mini-Circuits

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Mini-Circuits®

CERAMIC BALUN

RF Transformer

TCW2-4300+

50Ω 2150 to 4300 MHz Ratio 1:2

ADDITIONAL DETAILED INFORMATION IS AVAILABLE ON OUR DASHBOARD.

[CLICK HERE](#)

Performance Data & Graphs	Data
	Graphs
	S-Parameter (SXP Files) Data Set (.zip file) De-embedded to device pads
Case Style	JC0603C Lead Finish: Tin over Nickel Plating
RoHS Status	Compliant
Tape and Reel	TR-F114
Suggested Layout for PCB Design	PL-574
Evaluation Board	TB-TCW2-4300C+
	Gerber File
Environmental Rating	ENV06T10

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

