



SURFACE MOUNT

RF Transformer

NCS2-2702+

50Ω 9000 to 27000 MHz Ratio 1:2

KEY FEATURES

- 9000 to 27000 MHz coverage in a single 1:2 transformer
- Patent-pending technology
- Low insertion loss of 1.4 dB typical
- Compact 0805 footprint
- Low phase unbalance of 10 deg. typical
- Low amplitude unbalance of 1.3 dB

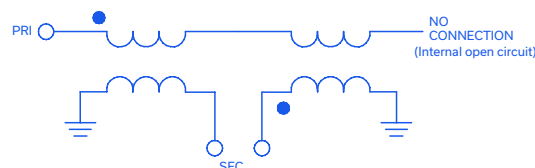


Generic photo used for illustration purposes only

APPLICATIONS

- X-Band, Ku-Band and K-Band RF Sampling ADCs/DACs
- Ku/Ka SATCOM Ground Terminals
- X-Band Radar
- Test & Measurement Equipment
- Emerging 6G cmWave Infrastructure

FUNCTIONAL DIAGRAM



PRODUCT OVERVIEW

The Mini-Circuits NCS2-2702+ 1:2 transformer covers frequencies from 9000 to 27000 MHz in a compact 0805 package. Patent-pending technology enables ultra-wideband coverage to support applications in the X-band, Ku-Band and K-Band. Manufactured with LTCC technology, this component provides high reliability, performance and repeatability across the full operating frequency band. The low insertion loss, amplitude and phase unbalance make this component ideal for wideband applications that require balanced to unbalanced conversion.

ELECTRICAL SPECIFICATIONS^{1,2} AT +25 °C, Z₀=50Ω

Parameter	Frequency (MHz)	Min.	Typ.	Max.	Units
Impedance Ratio		2			
Frequency Range		9000		27000	MHz
Average Insertion Loss (above 3 dB)	9000-10000	-	1.4	1.5	dB
	10000-12000	-	0.9	1	
	12000-20000	-	0.8	1	
	20000-25000	-	1.5	1.7	
	25000-27000	-	2	2.5	
Return Loss - Unbalanced Port	9000-10000	-	7.8	-	dB
	10000-12000	-	11	-	
	12000-20000	13	16	-	
	20000-25000	-	9.3	-	
	25000-27000	-	9.3	-	
Amplitude Unbalance (±)	9000-10000	-	1.1	1.7	dB
	10000-12000	-	1	1.5	
	12000-20000	-	1.3	1.5	
	20000-25000	-	1.4	1.5	
	25000-27000	-	0.9	1.5	



ELECTRICAL SPECIFICATIONS¹ AT +25 °C, $Z_0=50\Omega$

Parameter	Frequency (MHz)	Min.	Typ.	Max.	Units
Phase Unbalance (Relative to 180°)	9000–10000	-	8	13	Deg.
	10000–12000	-	8	13	
	12000–20000	-	10	13	
	20000–25000	-	10	13	
	25000–27000	-	8.5	15	
CMRR	9000–27000	18	20	-	dB

1. Tested in Evaluation Board P/N TB-NCS2-2702C+ with the connector and feedline effects de-embedded using the TRL method.

2. Typical variation: $\pm 3\%$

ABSOLUTE MAXIMUM RATINGS³

Operating Temperature	-55 °C to +125 °C
Storage Temperature	-55 °C to +125 °C
Input Power ⁴	10 W

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

4. Power rating applies only to signals within the passband. Power rating above +25 °C operating temperature decreases linearly to 1.97 W at +125 °C.



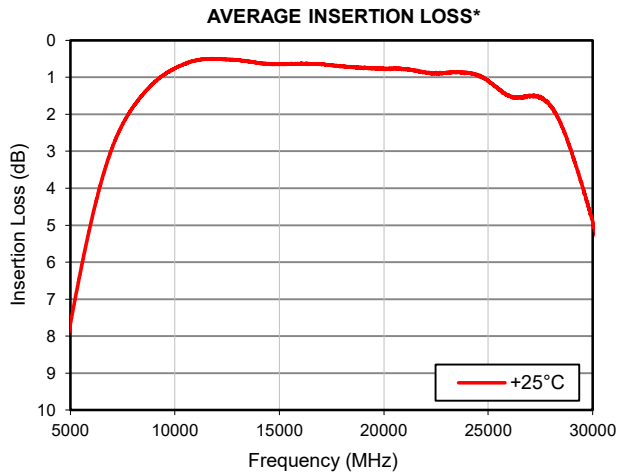
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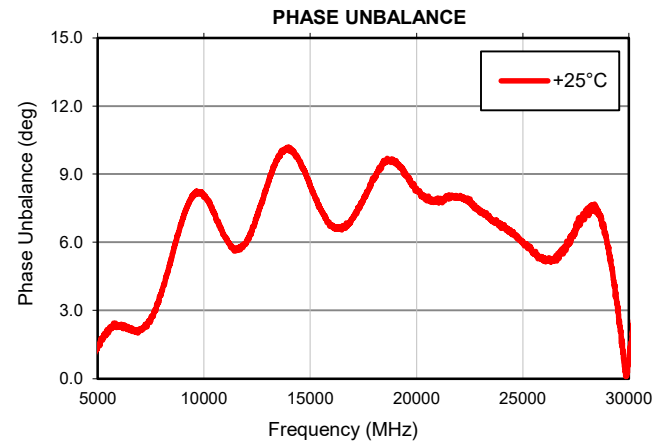
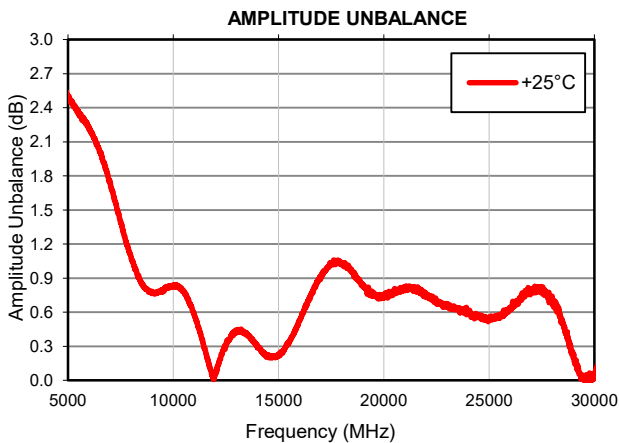
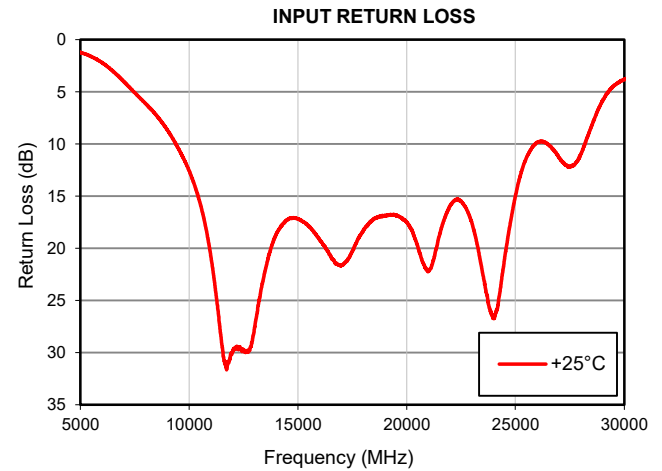
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TYPICAL PERFORMANCE GRAPHS



*Average Insertion loss above 3dB





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FUNCTIONAL DIAGRAM

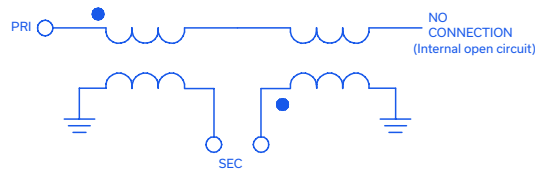
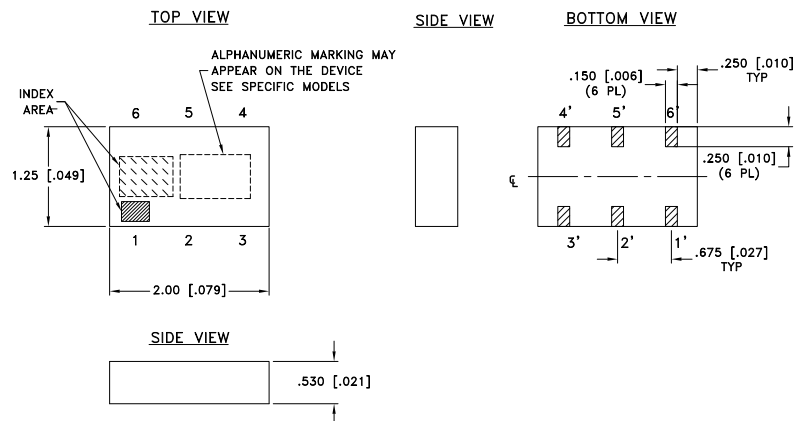


Figure 1. NCS2-2702+ Functional Diagram

PAD DESCRIPTION

Function	Pad Number	Description
Unbalanced Port	1	Unbalanced Input Port
Balanced Ports	3,4	Balanced Output Ports
Ground	2,5	Connects to Ground on PCB, (See drawing PL-860)
NC	6	No connection, not used internally. See drawing PL-860 for connection to PCB

CASE STYLE DRAWING



Weight: 0.005 grams
Dimensions are in inches [mm]. Tolerances: 2 Pl. ± 0.30 ; 3 Pl. ± 0.200

SUGGESTED PCB LAYOUT (PL-860)

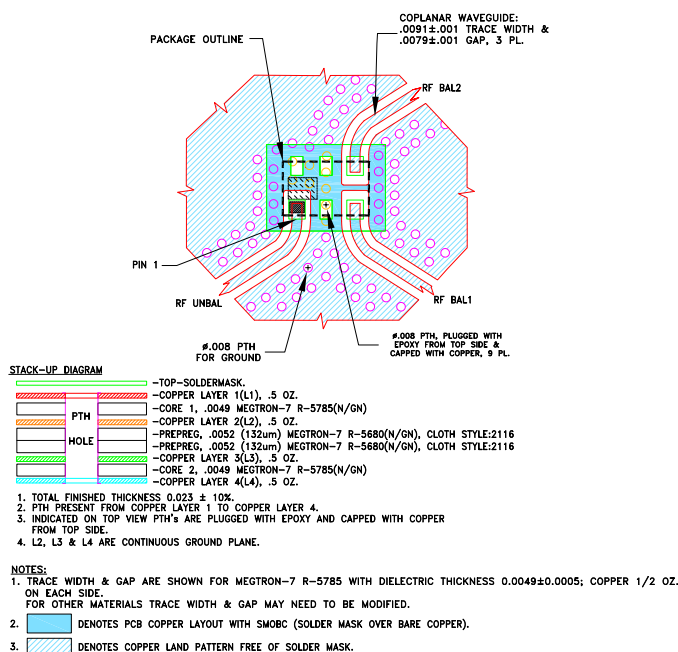
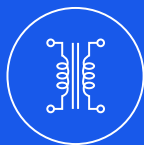


Figure 2. Suggested PCB Layout PL-860

PRODUCT MARKING*: T5

*Marking may contain other features or characters for internal lot control.



Mini-Circuits

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ADDITIONAL DETAILED INFORMATION IS AVAILABLE ON OUR DASH BOARD.

[CLICK HERE](#)

Performance Data & Graphs	Data Graphs S-Parameter (S3P Files) Data Set (.zip file) De-embedded to device pads
Case Style	GE0805C-21 Lead Finish: Tin plate over Nickel
RoHS Status	Compliant
Tape and Reel	TR-F114
Suggested Layout for PCB Design	PL-860
Evaluation Board	TB-NCS2-2702C+ Gerber File
Environmental Rating	ENV163

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-Circuits' 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

