



**THE DATASHEET OF  
NCS1-112+**





## CERAMIC BALUN

# RF Transformer

## NCS1-112+

Mini-Circuits

50Ω    700 to 1100 MHz    1:1 Ratio

### FEATURES

- Wideband, 700 to 1100 MHz
- Low phase unbalance, 2 deg. and amplitude unbalance, 0.3 dB typ.
- Miniature size, 0.079"x0.049"x0.028"
- LTCC construction
- Low cost
- Aqueous washable

### APPLICATIONS

- WCDMA
- PCS
- GPS



Generic photo used for illustration purposes only

CASE STYLE: GE0805C-1AP

#### +RoHS Compliant

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

### PRODUCT OVERVIEW

Mini-Circuits new RF Transformer, NCS1-112+ converts single ended, unbalanced RF signals, that propagate through systems, to balanced signals that are required for many semiconductor devices. The NCS series offers a low cost small size alternative for matching, A/D converters, System on Chips, and up/down converters. The outstanding phase and amplitude unbalance make this component a versatile building block for use in a variety of systems and sub-system designs. package with low inductance, excellent thermal efficiency, and high ESD rating.

### KEY FEATURES

Feature	Advantages
Small Size	Offered in the EIA-0805 package size, the NCS1-112+ offers an industry leading combination of size and performance. The small footprint (2.0 mm x 1.25 mm) allows for reduced parasitics in systems with improved performance and simplified layout.
Low Phase and Amplitude Unbalance	Supporting 8 deg. and 0.8 dB unbalance make this RF Transformer applicable for use in higher level integrated components such as A/D converters and system on a chip.





### ELECTRICAL SPECIFICATIONS AT 25°C

Parameter	Frequency (MHz)	Min.	Typ.	Max.	Units
Impedance Ratio		1			
Frequency Range		700		1100	MHz
Insertion Loss <sup>1</sup>	700 - 730	—	1.1	—	dB
	730 - 950	—	0.75	1.2	
	950 - 1000	—	0.8	1.2	
	1000 - 1100	—	1.1	—	
Amplitude Unbalance	700 - 730	—	0.85	—	dB
	730 - 950	—	0.75	0.95	
	950 - 1000	—	0.65	0.95	
	1000 - 1100	—	0.87	—	
Phase Unbalance <sup>2</sup>	700 - 730	—	0.85	—	Degree
	730 - 950	—	4.5	9	
	950 - 1000	—	8	12	
	1000 - 1100	—	13	—	

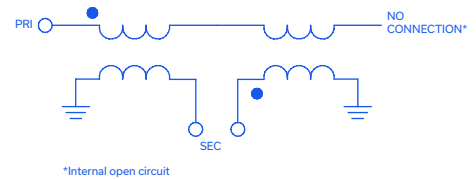
1. Insertion Loss is referenced to mid-band loss, 0.7 dB. Reference Demo Board TB-419+  
 2. Relative to 180°

### MAXIMUM RATINGS

Parameter	Ratings
Operating Temperature	-40°C to 85°C
Storage Temperature	-55°C to 100°C
RF Power	3W

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

### CONFIGURATION J





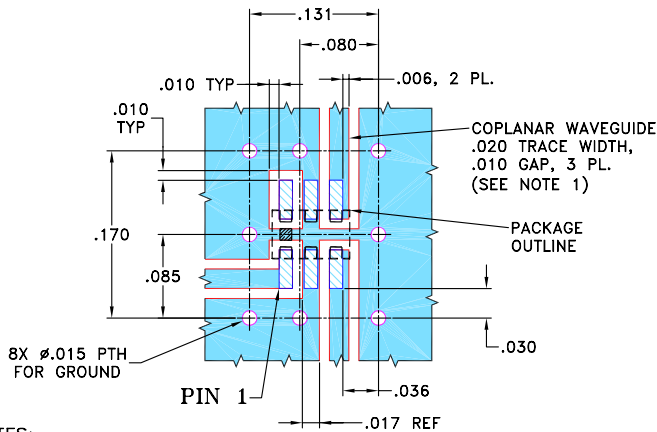
### PAD CONNECTIONS

PRIMARY DOT (Unbalanced Port)	1
PRIMARY (GND)	2
SECONDARY DOT (Balanced)	4
SECONDARY (Balanced)	3
NO CONNECTION	6
NOT USED (GND Externally)	5

Pads 2,3,4 are DC-connected internally

PRODUCT MARKING: N/A

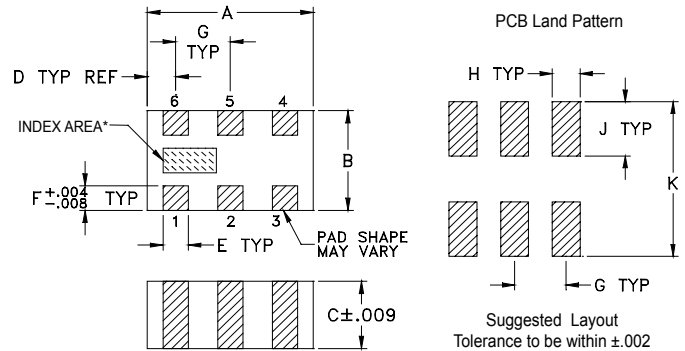
### DEMO BOARD MCL P/N: TB-419+ SUGGESTED PCB LAYOUT (PL-264)



**NOTES:**

1. COPLANAR WAVEGUIDE PARAMETERS ARE SHOWN FOR ROGERS R04350B WITH DIELECTRIC THICKNESS  $.010'' \pm .001''$ . COPPER: 1/2 OZ. EACH SIDE. FOR OTHER MATERIALS TRACE WIDTH AND GAP MAY NEED TO BE MODIFIED.
  2. 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



\*Shape of index marking may vary

### OUTLINE DIMENSIONS (Inches/mm)

A	B	C	D	E	F
.079	.049	.028	.014	.012	.012
2.00	1.25	0.70	0.35	0.30	0.30
G	H	J	K		wt
.026	.014	.039	.110		grams
0.65	0.35	1.00	2.80		.008

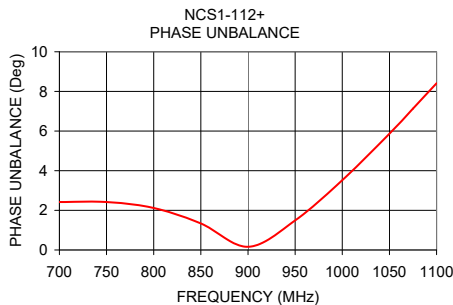
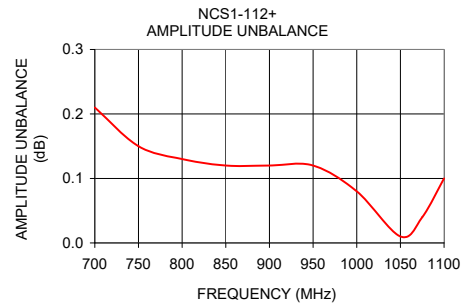
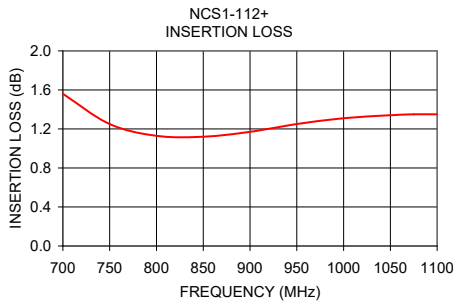
### TAPE & REEL INFORMATION: F74



### TYPICAL PERFORMANCE DATA<sup>3</sup>

Frequency (MHz)	Insertion Loss (dB)	Input Return Loss (dB)	Amplitude Unbalance (dB)	Phase Unbalance (deg)
700	1.56	10.10	0.21	2.42
750	1.25	13.51	0.15	2.42
800	1.13	16.24	0.13	2.12
850	1.12	16.12	0.12	1.34
900	1.17	14.60	0.12	0.16
950	1.25	13.37	0.12	1.49
1000	1.31	12.75	0.08	3.52
1050	1.34	12.64	0.01	5.87
1075	1.35	12.79	0.04	7.13
1100	1.35	13.09	0.10	8.41

3. Measured with Agilent E5071B network analyzer using impedance conversion and port extension.




#### 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.
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