

# Ceramic Balun RF Transformer

50Ω 223 to 520 MHz 1:1 Ratio

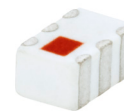
## NCS1-521+

### Features

- wideband, 223 to 520 MHz
- low phase unbalance, 5 deg. and amplitude unbalance, 0.7 dB typ.
- miniature size, 0.079"x0.049"x0.033"
- LTCC construction
- low cost
- aqueous washable

### Applications

- WLAN
- GSM
- two way trunked radio



Generic photo used for illustration purposes only

CASE STYLE: GE0805C-9

**+RoHS Compliant**

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

**Available Tape and Reel at no extra cost**

Reel Size	Devices/Reel
7"	20, 50, 100, 200, 500, 1000, 4000

### Electrical Specifications at 25°C

Parameter	Frequency (MHz)	Min.	Typ.	Max.	Unit
Impedance Ratio			1		Ohm
Frequency Range		223		520	MHz
Insertion Loss <sup>1</sup>	223-520	—	—	1.50	dB
Amplitude Unbalance	223-520	—	—	1.5	dB
Phase Unbalance <sup>2</sup>	223-520	—	—	10	Degree

1. Reference Demo Board TB-419+

2. Relative to 180°

### Maximum Ratings

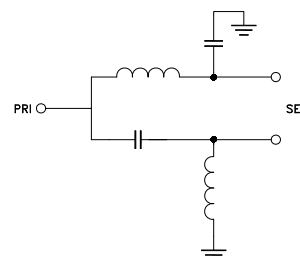
Parameter	Ratings
Operating Temperature	-40°C to 85°C
Storage Temperature	-55°C to 100°C
RF Power	2W

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

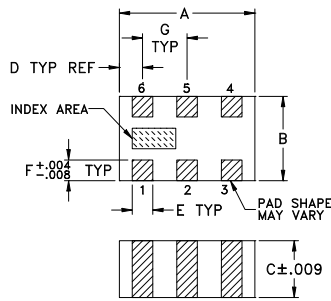
### Pad Connections

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

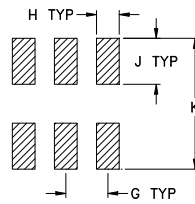
### Configuration S



## Outline Drawing



## PCB Land Pattern

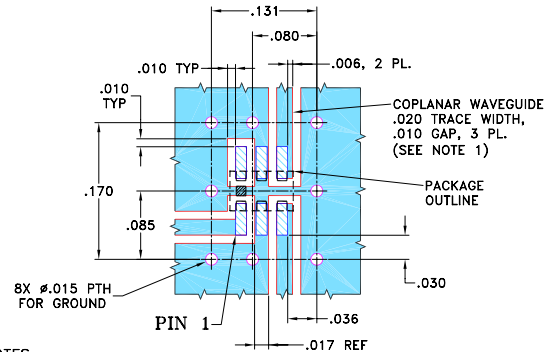


Suggested Layout,  
Tolerance to be within ±.002

## Outline Dimensions (inch/mm)

A	B	C	D	E	F
.079	.049	.033	.014	.012	.012
2.0	1.24	0.84	0.36	0.30	0.30
G	H	J	K	wt	
.026	.014	.039	.110	grams	
0.66	0.36	1.00	2.80	.008	

## Demo Board MCL P/N: TB-419+ Suggested PCB Layout (PL-264)



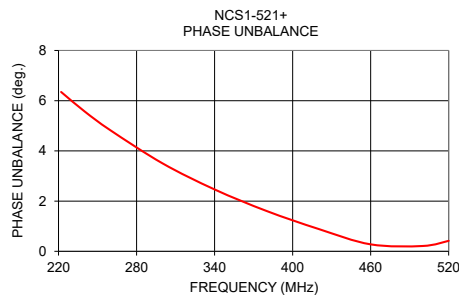
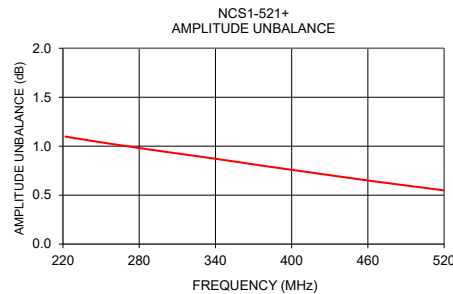
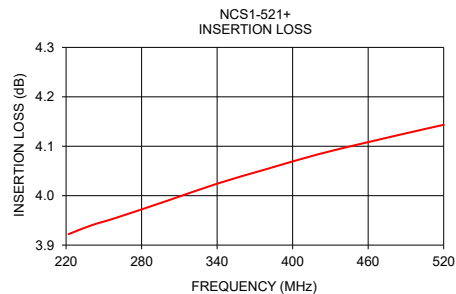
## NOTES:

- COPLANAR WAVEGUIDE PARAMETERS ARE SHOWN FOR ROGERS R04350B WITH DIELECTRIC THICKNESS .010" ± .001". COPPER: 1/2 OZ. EACH SIDE. FOR OTHER MATERIALS TRACE WIDTH AND 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

## Typical Performance Data at 25°C<sup>3</sup>

FREQUENCY (MHz)	INSERTION LOSS (dB)	INPUT R. LOSS (dB)	AMPLITUDE UNBALANCE (dB)	PHASE UNBALANCE (Deg.)
222.0	3.92	15.51	1.10	6.35
240.0	3.94	15.25	1.06	5.57
260.0	3.96	14.97	1.02	4.82
300.0	3.99	14.46	0.94	3.50
340.0	4.02	14.00	0.87	2.47
380.0	4.05	13.63	0.80	1.61
420.0	4.08	13.31	0.72	0.89
460.0	4.11	13.05	0.65	0.28
500.0	4.13	12.89	0.58	0.21
520.0	4.14	12.82	0.55	0.42

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



## Additional 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/MCLStore/terms.jsp](http://www.minicircuits.com/MCLStore/terms.jsp)