Ultra Wideband

RF Transformer

NCR2-Series

50Ω 3W Up to 18 GHz

The Big Deal

- Microwave Frequency Balun
- Ultra-Wideband Frequency Coverage, from 3.5 up to 18 GHz
- Miniature Size LTCC Package

Generic photo used for illustration purposes only

CASE STYLE: NF1846-1

Product Overview

The Mini-Circuits NCR2 family of ultra-wideband balun transformers covers a frequency range spanning 3.5 to 18 GHz with an impedance ratio of 1:2. They are commonly used for unbalanced to balanced applications. LTCC construction provides exceptional reliability, thermal stability, and a high degree of repeatability. A small footprint (0.08 x 0.10") offers flexibility of integration with RF integrated circuits.

Key Features

Feature	Advantages
Ultra-wide bandwidth	The NCR2 family of LTCC baluns covers many popular microwave frequency bands and is ideal for applications such as satellite communications, point to point radio, and electronic surveillance.
LTCC construction	Low Temperature Ceramic Co-fired construction offers a high degree of repeatability, temperature stability, and high power handling capabilities.
Miniature footprint, 0.079"x0.098"x0.035"	The miniature footprint of these LTCC baluns makes them easy to integrate with RF integrated circuits.

Ceramic Balun

RF Transformer

50Ω 3500 to 11000 MHz

NCR2-113+

Generic photo used for illustration purposes only

CASE STYLE: NF1846-1

+RoHS Compliant

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

Maximum Ratings

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

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

Pad Connections

PRIMARY DOT (Unbalanced Port)	2
SECONDARY DOT (Balanced)	6
SECONDARY (Balanced)	4
GND Externally	1,3,5

Features

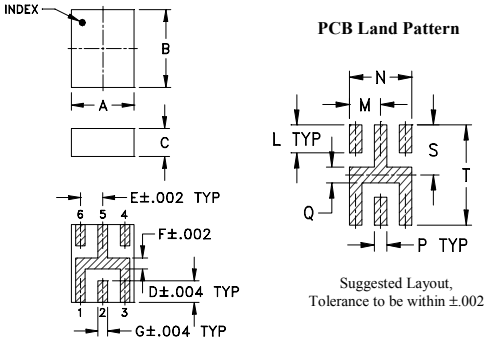
- wideband, 3500 to 11000 MHz
- miniature size, 0.079”x0.098”x0.035”
- LTCC construction
- low cost
- aqueous washable

Applications

- Point to Point
- ISM
- Radio navigation
- SATCOM

Product Marking: TB

Outline Drawing

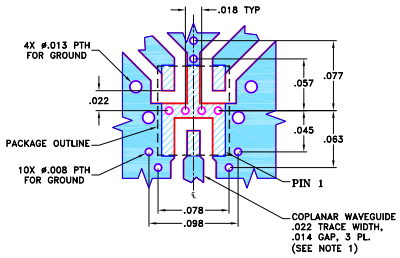


Outline Dimensions (inch / mm)

A	B	C	D	E	F	G	L
.079	.098	.035	.027	.028	.014	.014	.028
2.01	2.49	0.89	0.69	0.71	0.36	0.36	0.71

M	N	P	Q	R	S	T	wt
.035	.07	.014	.016	--	.050	.100	grams
0.89	1.78	0.36	0.41	--	1.27	0.03	0.020

Demo Board MCL P/N: TB-745+
Suggested PCB Layout (PL-425)



NOTES:
1. COPLANAR WAVEGUIDE PARAMETERS ARE SHOWN FOR ROGERS RO4350B WITH DIELECTRIC THICKNESS .010"±.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

Electrical Specifications at 25°C

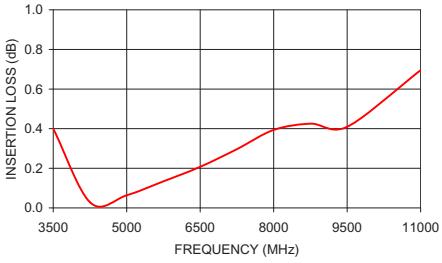
Parameter	Frequency (MHz)	Min.	Typ.	Max.	Unit
Impedance Ratio (secondary/primary)			2		
Frequency Range		3500	—	11000	MHz
Insertion Loss*	3500 - 11000	—	0.5	2.7	dB
Amplitude Unbalance	3500 - 11000	—	1.0	3.5	dB
Phase Unbalance†	3500 - 11000	—	9	19	Degree

* Insertion Loss is referenced to mid-band loss, 0.60 dB. Reference Demo Board TB-745+.
† Relative to 180°

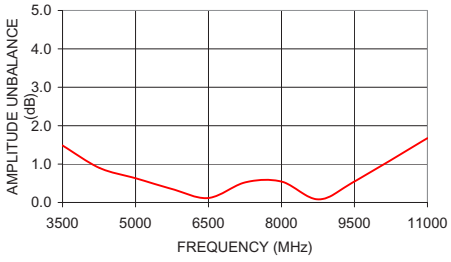
Typical Performance Data at 25°C

FREQUENCY (MHz)	INSERTION LOSS (dB)	INPUT R. LOSS (dB)	AMPLITUDE UNBALANCE (dB)	PHASE UNBALANCE (Deg.)
3500.0	0.40	9.66	1.48	8.68
4260.0	0.03	13.51	0.90	11.83
5000.0	0.06	12.80	0.63	11.92
5760.0	0.13	12.06	0.35	8.73
6500.0	0.21	11.60	0.12	4.61
7260.0	0.30	11.13	0.53	1.54
8000.0	0.39	10.68	0.55	0.46
8760.0	0.43	10.82	0.08	3.02
9500.0	0.41	11.69	0.55	6.73
11000.0	0.70	12.34	1.68	6.60

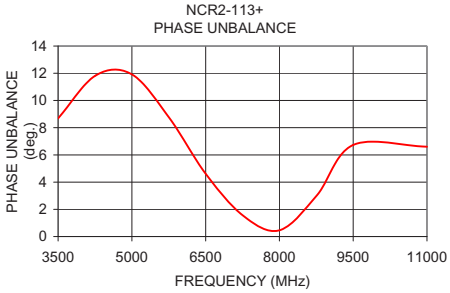
NCR2-113+
INSERTION LOSS



NCR2-113+
AMPLITUDE UNBALANCE



NCR2-113+
PHASE UNBALANCE



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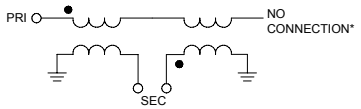

Notes
A. Performance and quality attributes and conditions not expressly stated in this specification document are intended to be excluded and do not form a part of this specification document.
B. Electrical specifications and performance data contained in this specification document are based on Mini-Circuit's 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/MCLStore/terms.jsp