Ceramic

RF Transformer

TCO2-532+

50Ω 4600 to 5900 MHz 1:2 Ratio

The Big Deal

- Tiny size, 0402
- Good Power handling, 2W



CASE STYLE: NK0402C

Product Overview

Mini-Circuits' TCO2-532+ is a tiny ceramic RF balun transformer with an impedance ratio of 1:2, covering a variety of wireless communications applications from 4600 to 5900 MHz. This model provides low insertion loss, low phase unbalance (relative to 180°), low amplitude unbalance, and RF input power handling up to 2W. Fabricated using LTCC technology, the unit comes housed in a tiny, rugged ceramic package suitable for harsh operating environments.

Key Features

Feature	Advantages
2W power handling	Supports a wide range of power requirements
Tiny size, 0402	Accommodates tight space requirements for dense PCB layouts.
LTCC construction	LTCC process enables tiny size and low cost, suitable for high-volume production. Rugged ceramic package provides excellent reliability in harsh operating environments.

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Generic photo used for illustration purposes only

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+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

Features

- miniature size 0402 (0.039"[1.0mm] x 0.020"[0.5mm] x 0.015"[0.37mm
- LTCC construction
- aqueous washable

Applications

- WLAN/Wi-Fi
- 5G sub 6 GHz

Electrical Specifications at 25°C

Parameter	Frequency (MHz)	Min.	Typ.	Max.	Unit
Impedance Ratio			2		
Frequency Range		4600	—	5900	MHz
Insertion Loss[1]	4600 - 5900	—	0.8	1.2	dB
Amplitude Unbalance	4600 - 5900	—	1.0	2.0	dB
Phase Unbalance[2]	4600 - 5900	—	10	—	Degree
Unbalance Return Loss	4600 - 5900	9	13	—	dB

1. Tested on Evaluation Board TB-TCO2-532+
2. Relative to 180°

Maximum Ratings

Parameter	Ratings
Operating Temperature	-55°C to 125°C
Storage Temperature*	-55°C to 125°C
RF Power**	2W at 25°C

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

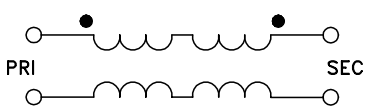
* Refer to product storage temperature after installation.
Suggestion for T&R unused product storage condition: +5~+35°C, Humidity 45~75%RH, 12 Month max.

** Derate linearly to 0.5W at 125°C.

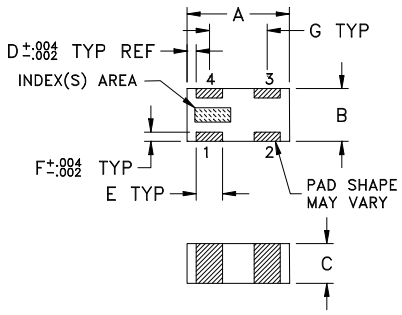
Pad Connections

Function	Pad Number
PRIMARY DOT (Unbalanced Port)	1
PRIMARY (GND)	4
SECONDARY DOT (Balanced)	2
SECONDARY (Balanced)	3

Configuration G



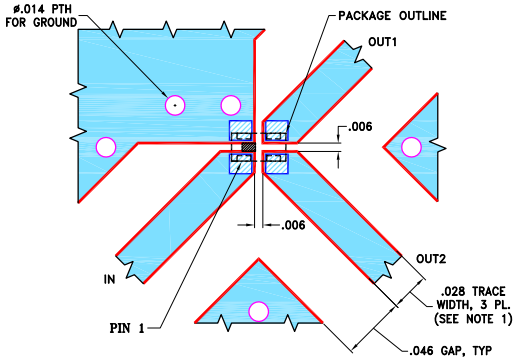
Outline Drawing



Outline Dimensions (inch / mm)

A	B	C	D	E	F	G	wt
.039	.020	.015	.004	.010	.004	.022	grams
1.0	0.51	0.38	0.10	0.25	0.10	0.56	.0007

Evaluation Board MCL P/N: TB-TCO2-532+
Suggested PCB Layout (PL-624)



NOTES:
1. TRACE WIDTH & GAP ARE SHOWN FOR FR4, GRADE IT-180TC (ITEQ CORP.) WITH DIELECTRIC THICKNESS .016±.0015. COPPER: 1/2 OZ. EACH SIDE. FOR OTHER MATERIALS TRACE WIDTH & GAP MAY NEED TO BE MODIFIED.
2. BOTTOM SIDE OF THE PCB IS CONTINUOUS GROUND PLANE.

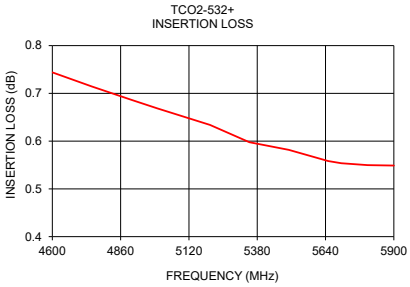
DENOTES PCB COPPER LAYOUT WITH SMOBC (SOLDER MASK OVER BARE COPPER).

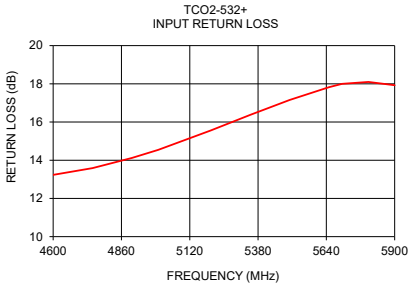
DENOTES COPPER LAND PATTERN FREE OF SOLDER MASK.

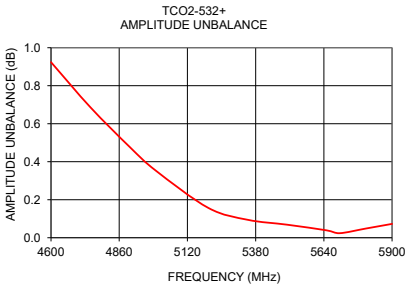
Typical Performance Data[3]

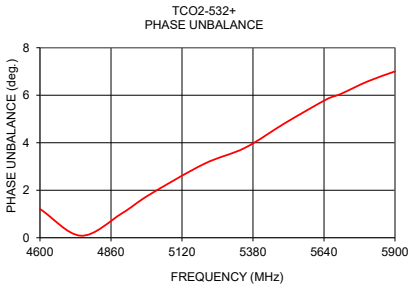
Frequency (MHz)	Insertion Loss (dB)	Input R. Loss (dB)	Amplitude Unbalance (dB)	Phase Unbalance (Deg.)
4600	0.74	13.23	0.92	1.21
4750	0.71	13.59	0.69	0.09
4900	0.69	14.12	0.48	1.03
5000	0.67	14.54	0.35	1.81
5200	0.63	15.56	0.16	3.10
5350	0.60	16.37	0.09	3.78
5500	0.58	17.15	0.07	4.85
5650	0.56	17.83	0.04	5.83
5700	0.55	18.00	0.02	6.05
5800	0.55	18.10	0.05	6.58
5900	0.55	17.93	0.07	7.00

3. Measured with Agilent N5242A network analyzer using impedance conversion and port extension.









Additional 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