CERAMIC

Thru-Line

50Ω DC to 30 GHz

TPHK-3002+

THE BIG DEAL

- Low loss, less than 1 dB max at 20 GHz
- Return Loss, 14 dB typical below 20 GHz
- Standard 1812 (4.5mm x 3.2mm) case style
- Suited for very high-volume production

Generic photo used for illustration purposes only

CASE STYLE: NM1812C-3

+RoHS Compliant
The +Suffix identifies RoHS Compliance.
See our website for methodologies and qualifications

APPLICATIONS

- Test and Measurement
- EW, Radar and ECM Defense Systems
- 5G MIMO and Back Haul Radio
- Satellite Communications

PRODUCT OVERVIEW

The TPHK-3002+ is a 50 Ohm transmission line which can pass signals with low insertion loss typ 1.3 dB up to 30 GHz. This can be used as a place holder in system boards in the absence of LTCC filters. In addition, this low loss device provides excellent matching between devices.

KEY FEATURES

Feature	Advantages
Cost effective	LTCC is scalable technology that is cost effective due to ease of production in high quantities.
Small size (4.5mm x 3.2mm)	Allows for high layout density of circuit boards, while minimizing effects of parasitics.
Surface Mountable	Suitable for very high volume automated assembly process.

REV. A
ECO-022343
TPHK-3002+
MCL NY
240808

ELECTRICAL SPECIFICATIONS[1] AT 25°C

Parameter	F#	Frequency (GHz)	Min.	Typ.	Max.	Units
Passband Insertion Loss	DC-F1	0.1-10	—	0.2	0.5	dB
	F1-F2	10-20	—	0.6	1	
	F2-F3	20-30	—	1.3	2.0	
Passband Return Loss	DC-F1	0.1-10	—	20	—	dB
	F1-F2	10-20	—	14	—	
	F2-F3	20-30	—	7	—	

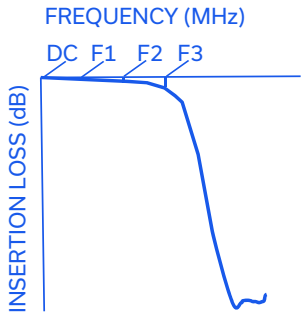
1. Measured on Mini-Circuits Test Board TB-TPHK-3002C+ with connectors and feed lines de-embedded.

MAXIMUM RATINGS

Parameter	Ratings
Operating Temperature	-55°C to 125°C
Storage Temperature	-55°C to 125°C
RF Power Input	1 W max.

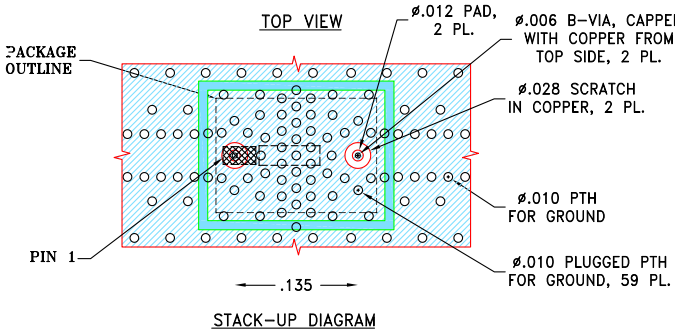
Permanent damage may occur if any of these limits are exceeded

TYPICAL FREQUENCY RESPONSE

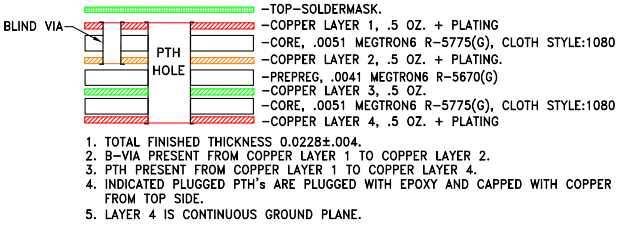


FUNCTIONAL SCHEMATIC

DEMO BOARD MCL P/N: TB-TPHK-3002C+
SUGGESTED PCB LAYOUT (PL-730)



STACK-UP DIAGRAM



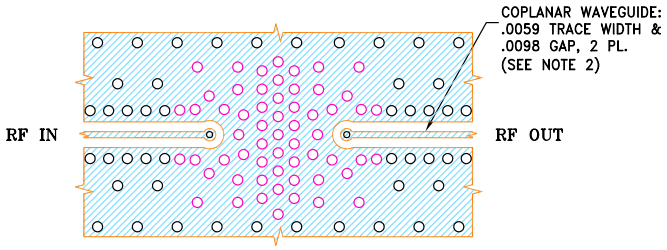
1. TOTAL FINISHED THICKNESS 0.0228±.004.
2. B-VIA PRESENT FROM COPPER LAYER 1 TO COPPER LAYER 2.
3. PTH PRESENT FROM COPPER LAYER 1 TO COPPER LAYER 4.
4. INDICATED PLUGGED PTH's ARE PLUGGED WITH EPOXY AND CAPPED WITH COPPER FROM TOP SIDE.
5. LAYER 4 IS CONTINUOUS GROUND PLANE.

NOTES:

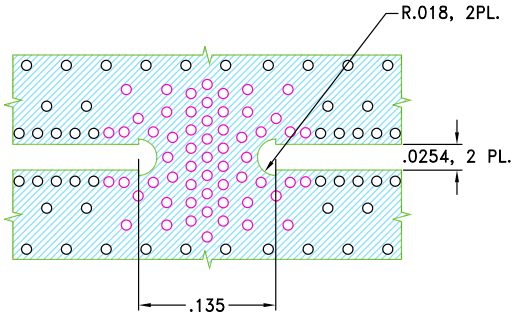
1. PCB IS MULTILAYER PCB, SEE STACK-UP DIAGRAM.
2. TRACE WIDTH & GAP PARAMETERS ARE SHOWN FOR MEGTRON6 R-5775(G), CLOTH STYLE:1080 WITH DIELECTRIC THICKNESS .0051; COPPER: 1/2 OZ.+PLATING. FOR OTHER MATERIALS TRACE WIDTH AND GAP MAY NEED TO BE MODIFIED.
3. COPPER LAYER 4 OF THE PCB ARE CONTINUOUS GROUND PLANE.

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

DENOTES COPPER LAND PATTERN FREE OF SOLDER MASK



LAYER 3 & PTH

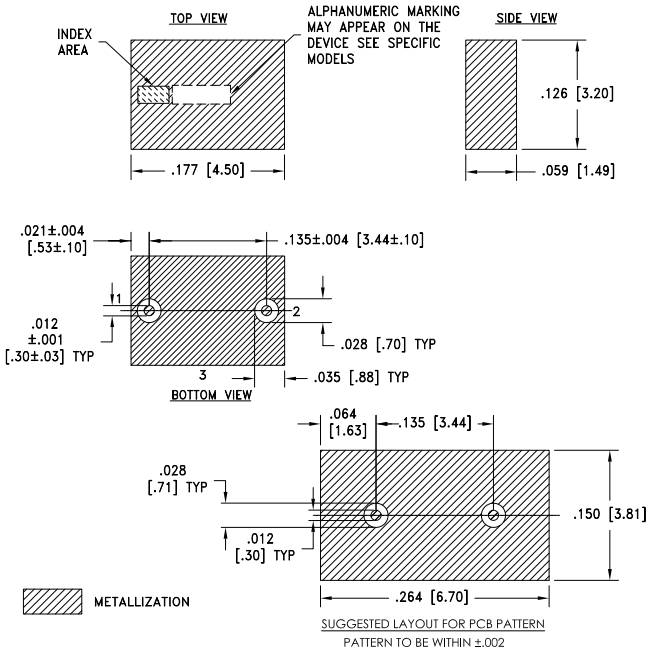


PAD CONNECTIONS

INPUT	1
OUTPUT	2
GROUND	3

PRODUCT MARKING: : F446

OUTLINE DRAWING

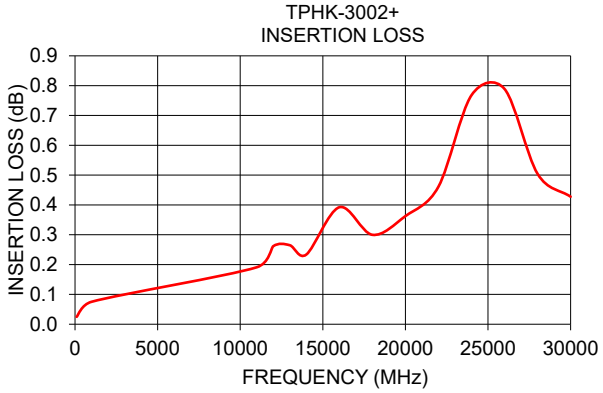


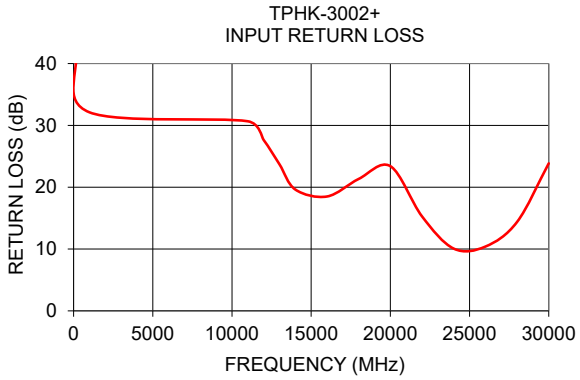
Weight: .126 grams.

Dimensions are in inches [mm]. Tolerances: 2Pl.±.01; 3Pl. ±.005

TYPICAL PERFORMANCE DATA AT 25°C

Frequency (MHz)	Insertion Loss (dB)	Return Loss (dB)
100	0.02	41.80
1000	0.08	32.12
11000	0.19	30.66
12000	0.26	27.64
13000	0.26	23.70
14000	0.23	19.62
16000	0.39	18.50
18000	0.30	21.34
20000	0.36	23.40
22000	0.46	15.27
24000	0.77	10.07
26000	0.79	10.40
28000	0.50	14.38
30000	0.43	23.85





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/terms/viewterm.html