



LTCC SURFACE MOUNT

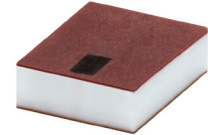
Thru-Line

TPCV-333+

50Ω DC to 33 GHz

THE BIG DEAL

- Low Insertion Loss, 0.4 dB Typ.
- Return Loss, 13 dB Typ.
- 1210 Surface Mount Footprint
- Versatile "Place Holder" for Mini-Circuits LTCC Filters
- Power Handling: 6 W



Generic photo used for illustration purposes only

APPLICATIONS

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

FUNCTIONAL DIAGRAM



PRODUCT OVERVIEW

TPCV-333+ is a miniature low temperature co-fired ceramic (LTCC) 50 Ohm transmission line, with low insertion loss through 33 GHz that supports a variety of applications. This model provides 0.4 dB typical insertion loss over a wide band due to its rugged monolithic construction. Housed in a 1210 ceramic form factor which is ideal for dense signal chain PCB layouts, where it complements MMIC size and performance. The LTCC fabrication process assures minimal RF performance variation while delivering a product that is well suited for environmental extremes of high humidity and temperature.

KEY FEATURES

Features	Advantages
Footprint Compatible "Thru-Line"	Enables system designers the flexibility to plan to add LTCC filters to the PCB layout at a later stage in the design process, after system test results are available. Compatible with Mini-Circuits low pass filters (LFCV series), with identical case style and pad connections.
LTCC Construction	The use of LTCC technology allows for repeatable performance in a rugged ceramic package, well suited for tough environments such as high humidity and temperature extremes. See Mini-Circuits Environmental Rating ENV06T10 for more information.
Small Size, 1210	1210 package allows for space to be saved in dense circuit board layouts, while also minimizing the effects of parasitics.
Rugged Power Handling, 6 W	Handles up to 6 Watts in a small 1210 package.





ELECTRICAL SPECIFICATIONS^{1,2} AT +25°C

Parameter		F#	Frequency (GHz)	Min.	Typ.	Max.	Units
Passband	Insertion Loss	DC-F1	DC - 19	—	0.3	0.7	dB
		F1-F2	19 - 28	—	0.4	0.9	
		F2-F3	28 - 33	—	0.8	—	
	Return Loss	DC-F1	DC - 19	—	16	—	dB
		F1-F2	19 - 28	—	13	—	
		F2-F3	28 - 33	—	13	—	
Group Delay	DC-F3	DC - 33	—	25	—	psec	

1. Tested on Evaluation Board P/N TB-TPCV-333+

2. Bi-directional RF1 and RF2 ports can be interchanged.

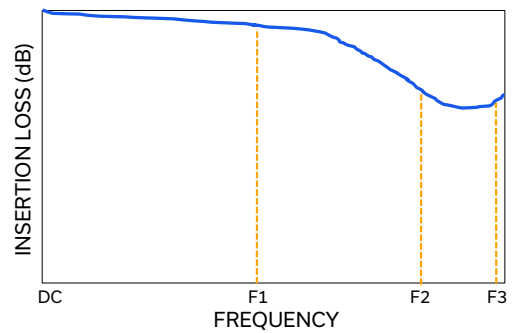
ABSOLUTE MAXIMUM RATINGS³

Parameter	Ratings
Operating Temperature	-55°C to +125°C
Storage Temperature	-55°C to +125°C
Input Power ⁴	6 W @ +25°C

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

4. Power rating applies only to signals within the passband. Power rating above +25°C operating temperature decreases linearly to 1.5 W at +125°C.

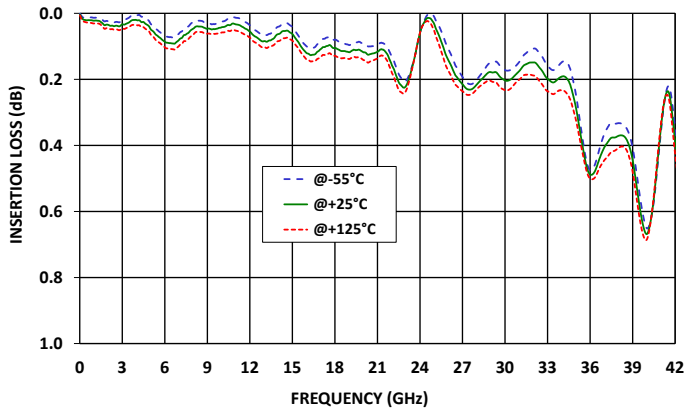
TYPICAL FREQUENCY RESPONSE AT +25°C



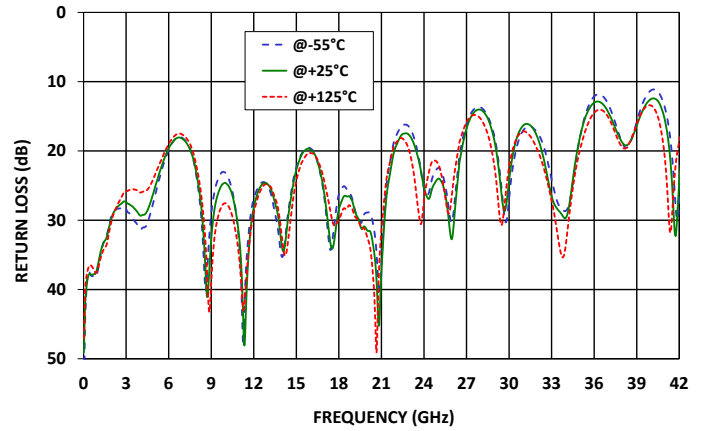


TYPICAL PERFORMANCE GRAPHS

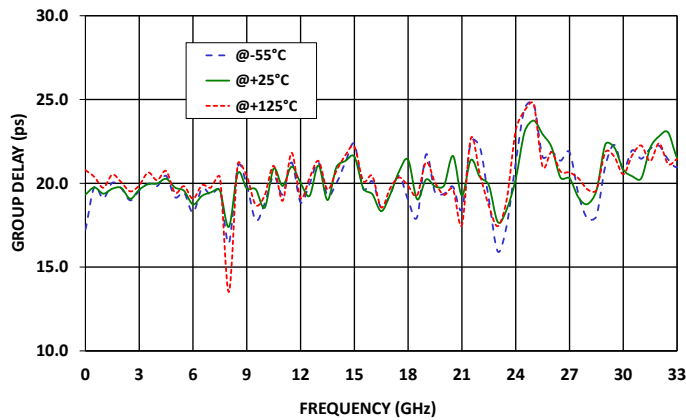
TPCV-333+
INSERTION LOSS



TPCV-333+
RETURN LOSS



TPCV-333+
GROUP DELAY





FUNCTIONAL DIAGRAM

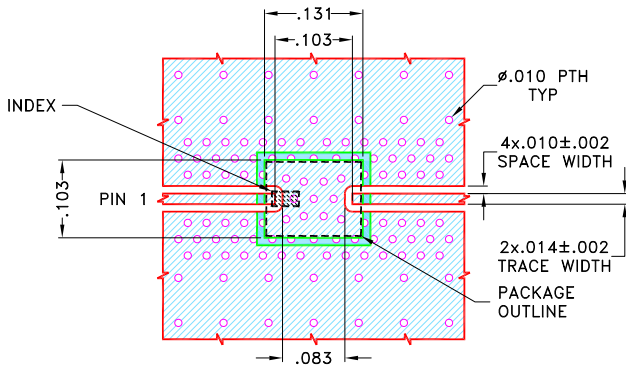


Figure 1. TPCV-333+ Functional Diagram

PAD DESCRIPTION

Function	Pad Number	Description
RF1 ²	1	Connects to RF Input Port
RF2 ²	2	Connects to RF Output Port
GROUND	3	Connects to Ground on PCB, (See drawing PL-679)

SUGGESTED PCB LAYOUT (PL-679)

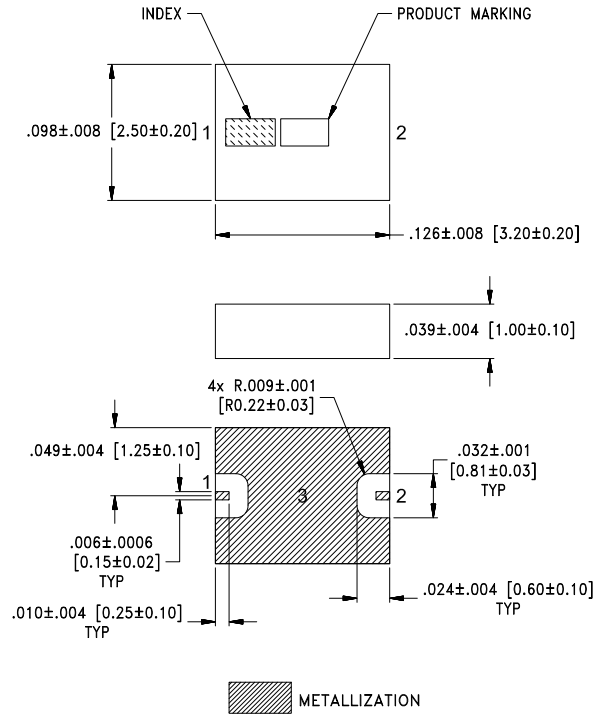


NOTES:

1. COPLANAR WAVEGUIDE PARAMETERS ARE SHOWN FOR ROGERS (R04835 Lo Pro) WITH DIELECTRIC THICKNESS .0073±.0007. 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 PATTERN WITH SMOBC (SOLDER MASK OVER BARE COPPER)
 - DENOTES PCB COPPER PATTERN FREE OF SOLDERMASK

Figure 2. Suggested PCB Layout PL-679

CASE STYLE DRAWING



Weight: .03 grams
Dimensions are in inches (mm). Tolerances: 2 Pl.±.01; 3 Pl. ±.005

PRODUCT MARKING*: WN

*Marking may contain other features or characters for internal lot control.



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Thru-Line

TPCV-333+

Mini-Circuits

50Ω DC to 33 GHz

ADDITIONAL DETAILED INFORMATION IS AVAILABLE ON OUR DASH BOARD. [CLICK HERE](#)

Performance Data and Graphs	Data
	Graphs
	S-Parameter (S2P Files) Data Set (.zip file) De-embedded to device pads
Case Style	JV1210C-7 Lead Finish: Gold over Nickel Plating.
RoHS Status	Compliant
Tape and Reel	F74
Suggested Layout for PCB Design	PL-679
Evaluation Board	TB-TPCV-333+
	Gerber File
Environmental Rating	ENV06T10

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-Circuits' 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

