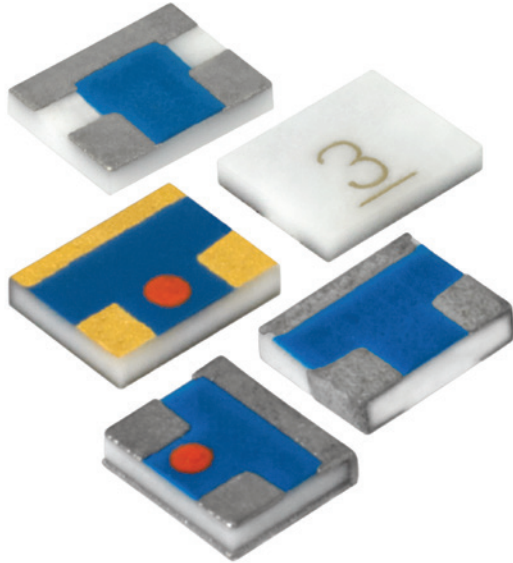


# TS05 Series

ATTENUATOR CHIP DC-18 GHZ



Smiths Interconnect is the world leader in chip attenuators offering the widest selection of products from DC through Q band. Chip components are offered on Alumina, Aluminum Nitride, Beryllium Oxide, and CVD Diamond for a wide range of applications. Backed by proven performance and significant heritage, Smiths Interconnect is the leader in high reliability components.

The TS05 platform offers significant heritage and proven performance in a cost effective commercial grade product. High reliability tested options are also available to ensure mission success in demanding high reliability applications. Rated for DC-18 GHz with excellent broadband response, the TS05 series of products has a wide range of applications. It is constructed on an Alumina substrate with rugged thick film terminations and passivated Tantalum Nitride resistive elements. The product also includes a protective coating for added protection from various environmental conditions. Multiple attenuation values and mounting configuration are available to support both surface mount and wire bond applications. Various finish options are also available including RoHS compliance.

TS05 Series Chip Attenuators offer proven performance and significant high reliability heritage in a commercial grade product.

## Features and Benefits

- Small Footprint
- Multiple Mounting Configurations
- Broad Frequency Range
- Low VSWR
- Wide Range of Attenuation Values
- Tight Attenuation Tolerance
- High Reliability Options Available

## Applications

- Amplifier Circuits
- Transmit/Receive Modules
- Up/Down Converters
- Instrumentation
- Radar
- Broadcast

# Technical Characteristics

Mounting Configuration Options	Planar	Single Wrap (W1)	Triple Wrap (W3)	Wire Bondable Gold (WB1)
--------------------------------	--------	------------------	------------------	--------------------------

## Electrical

<b>Nominal Impedance</b>	50 ohms								
<b>Frequency Range</b>	DC -12.4 GHz (*18 GHz for planar option)								
<b>Attenuation Values Available</b>	0-20 in 1 dB Increments								
<b>Attenuation Accuracy</b>	<b>ATTENUATION ACCURACY</b>								
	<b>Attenuation Value (dB)</b>	<b>DC-4 GHz</b>		<b>4-8 GHz</b>		<b>8-12.4 GHz</b>		<b>12.4-18 GHz*</b>	
	0	-0, +0.3		-0, +0.5		-0, +0.5		-0, +0.5	
	1-3	± 0.3		± 0.5		± 0.5		± 0.5	
	4-6	± 0.4		± 0.5		± 0.5		± 0.75	
	7-10	± 0.5		± 0.5		± 0.75		± 1.0	
	11-15	± 0.75		-3.0, +0.5		-3.5, +0.5		-	
	16-20	± 1.0		-4.0, +0.5		-6.0, +1.0		-	
<b>Power Rating</b>	<b>POWER RATING</b>								
	<b>dB Values</b>	<b>Watts</b>	<b>dB Values</b>	<b>Watts</b>	<b>dB Values</b>	<b>Watts</b>	<b>dB Values</b>	<b>Watts</b>	
	0-1	5	2-3	2	4-10	1	11-20	0.75	
		25		10		5		3.75	
<b>Peak Power</b> Based on 10 µs pulse width @ 1% Duty Cycle	<b>VSWR</b>								
		<b>DC-4 GHz</b>		<b>4-8 GHz</b>		<b>8-12.4 GHz</b>		<b>12.4-18 GHz*</b>	
<b>VSWR</b>		1.25:1 Max		1.35:1 Max		1.50:1 Max		1.50:1 Max	

## Environmental

<b>Operating Temperature</b>	-55°C to +150°C
<b>Storage Temperature</b>	-65°C to +150°C
<b>Moisture Sensitivity Level</b>	MSL 1 - Unlimited

## Mechanical

<b>Substrate Material</b>	Alumina (Al <sub>2</sub> O <sub>3</sub> ) 96%		
<b>Resistive Film</b>	Thin Film, Tantalum Nitride		
<b>Terminal Material</b>	Thick Film	Thick Film Bondable Gold Input/Output Pads, Solderable Platinum Silver Ground	
<b>Protective Coating</b>	Polymer		
<b>Finish Options</b>	<b>Blank</b>	Solder Plated (Sn60/Pb40)	N/A
	<b>-F</b>	Silver Plated (RoHS Compliant)	
	<b>-S</b>	Pretinned (Sn60/Pb40)	
	<b>-G</b>	Gold (Thick Film) *Available Planar Only	

## Marking

<b>Unit Marking</b>	dB Value	Colored Dot Marking	dB Value	Colored Dot Marking
---------------------	----------	---------------------	----------	---------------------

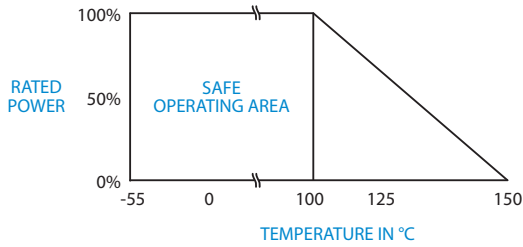
## Quality Assurance

	Sample visual and mechanical inspection - 1.0 AQL per mechanical drawing requirements. Periodic electrical inspection performed for commercial grade products. High reliability tested products are available per MIL-PRF-55342.
--	--

## Packaging

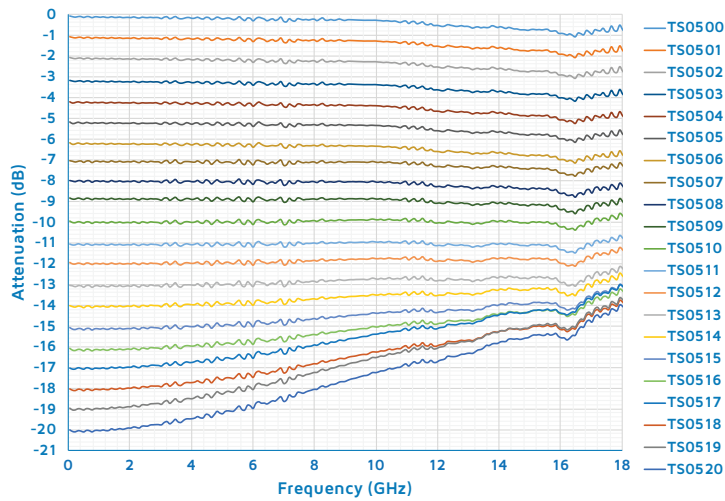
<b>Standard Packaging</b>	Tape and Reel or Waffle Pack
---------------------------	------------------------------

# Power Derating Curve

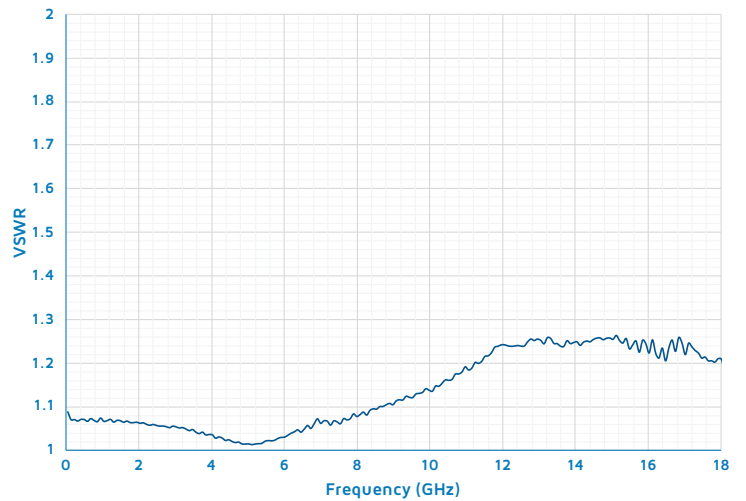


# Typical Data

TS05XX Series Attenuation



TS05XX Series VSWR

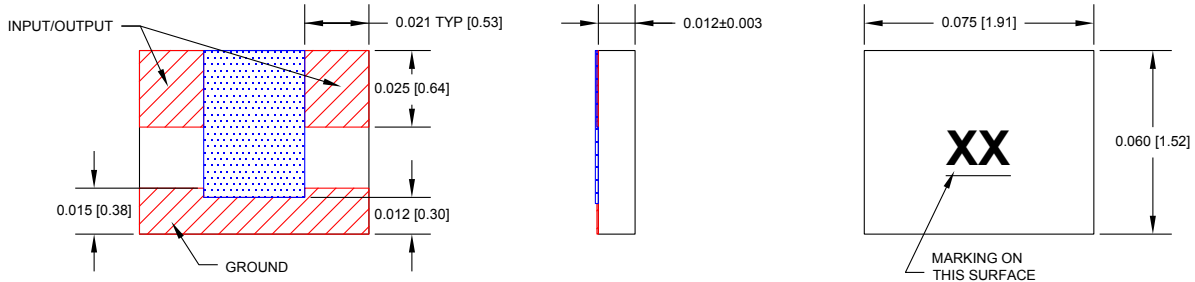


# Dot Marking Reference

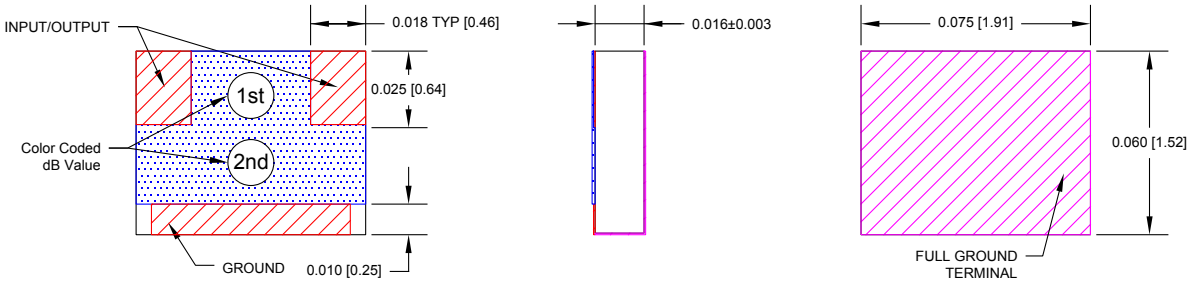
dB Value	DOT Color		dB Value	DOT Color	
	1st Dot	2nd Dot		1st Dot	2nd Dot
0	Black	-	11	Brown	Brown
1	Brown	-	12	Brown	Red
2	Red	-	13	Brown	Orange
3	Orange	-	14	Brown	Yellow
4	Yellow	-	15	Brown	Green
5	Green	-	16	Brown	Blue
6	Blue	-	17	Brown	Violet
7	Violet	-	18	Brown	Gray
8	Gray	-	19	Brown	White
9	White	-	20	Red	Black
10	Brown	Black			

# Mechanical

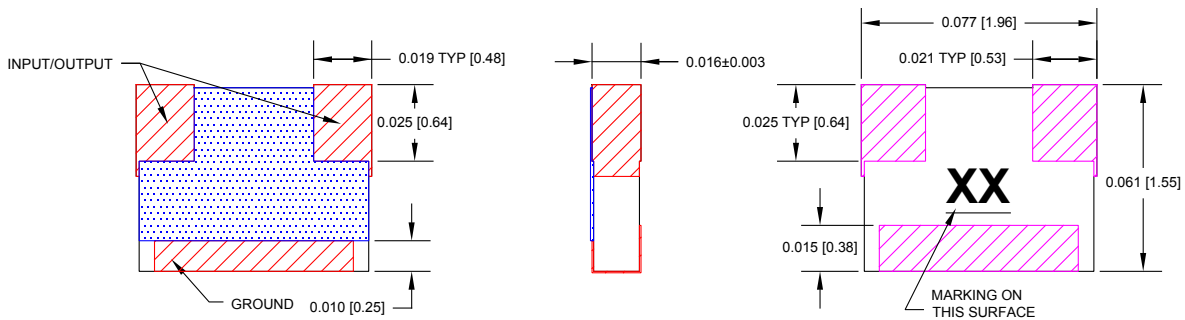
## TS05XX - Planar Option



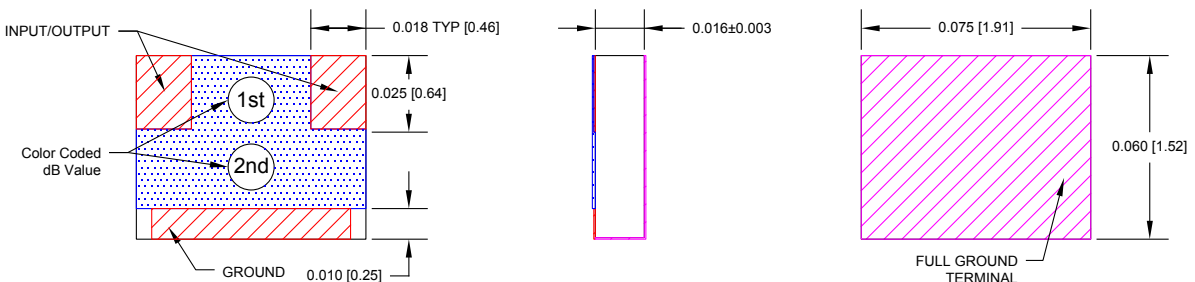
## TS05XXW1 - Single Wrap Option



## TS05XXW3 - Triple Wrap Option



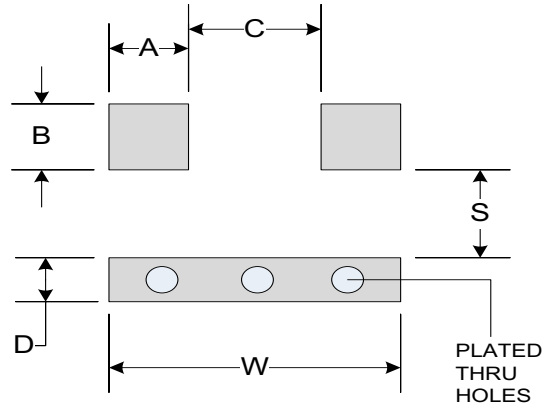
## TS05XXWB1 - Wire Bondable Option



\*Dimensions apply before solder, allow 0.015" max for all pretinned surfaces  
 Unless otherwise specified, tolerance: X.XXX = ±0.005"

# Suggested Mounting Footprint

Part Number	Inches						MM					
	A	B	C	D	S	W	A	B	C	D	S	W
TS05XX (Planar)	0.025	0.027	0.03	0.015	0.019	0.08	0.64	0.69	0.76	0.38	0.48	2.032
TS05XXW3 (Triple Wrap)	0.022	0.028	0.041	0.013	0.026	0.075	0.56	0.71	1.04	0.33	0.66	1.91



## How To Order

Specify Model Number: **TS05XXXXXX**

<b>TS05</b>	<b>00</b>	<b>W1</b>	<b>0</b>
<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>
<b>1 Series Name</b>	TS05 Series		
<b>2 Attenuation Value</b>	00 00 dB through 20 20 dB		
<b>3 Options</b>	<input type="checkbox"/> Planar <b>W1</b> Single Wrap Ground <input checked="" type="checkbox"/> <b>W3</b> Triple Wrap - All Ports <b>WB1</b> Wire Bondable		
<b>4 Terminal Finish</b>	<input checked="" type="checkbox"/> Standard <b>S</b> Pretinning <b>F</b> RoHS <b>G</b> Gold		

# Worldwide Support

## Connectors

### Americas

#### Sales

connectors.uscsr@smithsinterconnect.com

#### Technical Support

connectors.ustechsupport@smithsinterconnect.com

### Europe

#### Sales

connectors.emeacsr@smithsinterconnect.com

#### Technical Support

connectors.emeatechsupport@smithsinterconnect.com

### Asia

#### Sales

asiacsr@smithsinterconnect.com

#### Technical Support

asiatechsupport@smithsinterconnect.com

## Fibre Optics & RF Components

### Americas

#### Sales

focom.uscsr@smithsinterconnect.com

#### Technical Support

focom.techsupport@smithsinterconnect.com

### Europe

#### Sales

focom.emeacsr@smithsinterconnect.com

#### Technical Support

focom.techsupport@smithsinterconnect.com

### Asia

#### Sales

focom.asiacsr@smithsinterconnect.com

#### Technical Support

focom.techsupport@smithsinterconnect.com

## Semiconductor Test

### Americas

#### Sales

semi.uscsr@smithsinterconnect.com

#### Technical Support

semi.techsupport@smithsinterconnect.com

### Europe

#### Sales

semi.emeacsr@smithsinterconnect.com

#### Technical Support

semi.techsupport@smithsinterconnect.com

### Asia

#### Sales

semi.asiacsr@smithsinterconnect.com

#### Technical Support

semi.techsupport@smithsinterconnect.com

## RF/MW Subsystems

### Americas, Europe & Asia

#### Sales

subsystems.csr@smithsinterconnect.com

#### Technical Support

subsystems.techsupport@smithsinterconnect.com

## Connecting Global Markets

more > [smithsinterconnect.com](https://www.smithsinterconnect.com) | [in](#) [twitter](#) [youtube](#)