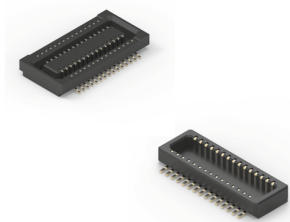


WR-BTB Board-to-Board 0.5 mm

0.5 mm pitch High-Speed Board-to-Board Connectors



Overview



Characteristics

- Board-to-board distance: 1.5 mm
- Dual row
- Polarities: 20 to 50 pins
- Compatible with PCIe 4.0 and equivalent standards

Applications

- Wearables
- Computing
- Internet-of-Things
- Displays and Cameras

General Information

Kind Properties:

Properties		Value	Unit
Pitch	P	0.5	mm
Durability		30 Mating cycles	
Application		PCI Express 4.0	
Gender		Plug	
Type		Vertical	

Material Properties:

Insulator Material	LCP
Insulator Flammability Rating	UL94 V-0
Insulator Color	Black
Pin Material	Phosphor Bronze
Pin Plating	Selective Gold

General Information:

Operating Temperature	-40 °C up to +85 °C
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Electrical Properties:

Properties		Test conditions	Value	Unit
Rated Current	I _R		300	mA
Working Voltage			50	V (AC)
Withstanding Voltage		1 min.	500	V (AC)
Contact Resistance	R		60	mΩ
Insulation Resistance	R _{ISO}		500	MΩ

Certification:

RoHS Approval	Compliant [2011/65/EU&2015/863]
REACH Approval	Conform or declared [(EC)1907/2006]
Halogen Free	Conform [IEC 61249-2-21]

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Specific Information

Signal Integrity

More detailed information to signal integrity on WR-BTB series is available with the Application Note ANE025:

we-online.com/ANE025

Single-ended Signaling

The impedance in GSG configuration is 50 ± 10 Ohm (48 Ohm simulated). When tested with a 50 Ohm transmission line in a GSG test fixture, the experimental Insertion Loss profile can be modeled with a safety margin using the following equation:

$$IL(f) = Af^2 + Bf + C$$

The equation states that the insertion loss (IL) of the interconnect, when measured in a 50 Ohm GSG test fixture, can be approximated by a second-order polynomial function of frequency f . This model includes a safety margin, meaning it intentionally overestimates the loss slightly to stay on the safe side when predicting performance. Using the following parameters with f in GHz with the WR-BTB 0.5 mm High-Speed Low-Profile series shows following results:

- $A = 3.12 \cdot 10^{-2}$
- $B = 4.61 \cdot 10^{-1}$
- $C = 1.0 \cdot 10^{-1}$

The parameters with the formula mentioned above result in the following diagram:

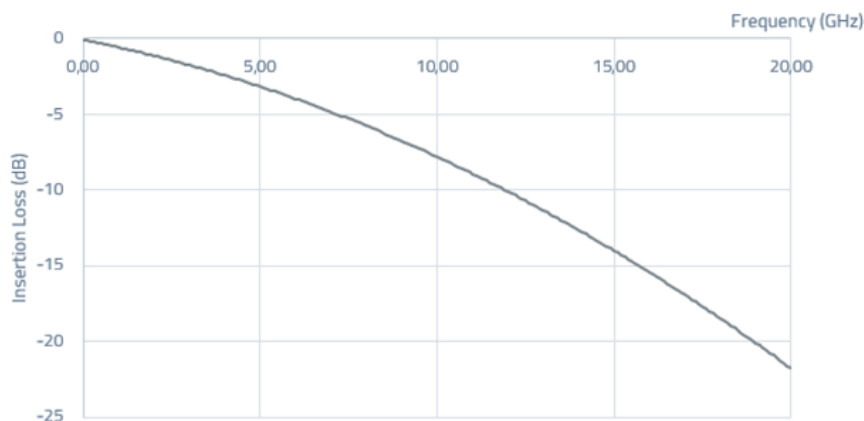


Figure 1: WR-BTB 0.5 mm High-Speed Low-Profile GSG 50 Ohm Insertion loss profile

The safety margin of this loss profile is about 0.2 dB at 500 MHz and 1 dB at 18 GHz. It overstates the Insertion Loss by about 5 dB between 10 GHz and 17 GHz.

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Specific Information

Differential Signaling

The differential impedance in GSSG configuration of this connector is 100 ± 10 Ohm (96 Ohm simulated). When tested with a 100 Ohm reference differential transmission line in a GSSG test fixture, the experimental Insertion Loss profile (in dB) can be modeled with a safety margin using the following equation:

$$IL(f) = Af^2 + Bf + C$$

Using the following parameters with f in GHz:

- $A = 8.95 \cdot 10^{-3}$
- $B = 0$
- $C = 1.84 \cdot 10^{-4}$

The parameters with the formula mentioned above result in the following diagram:

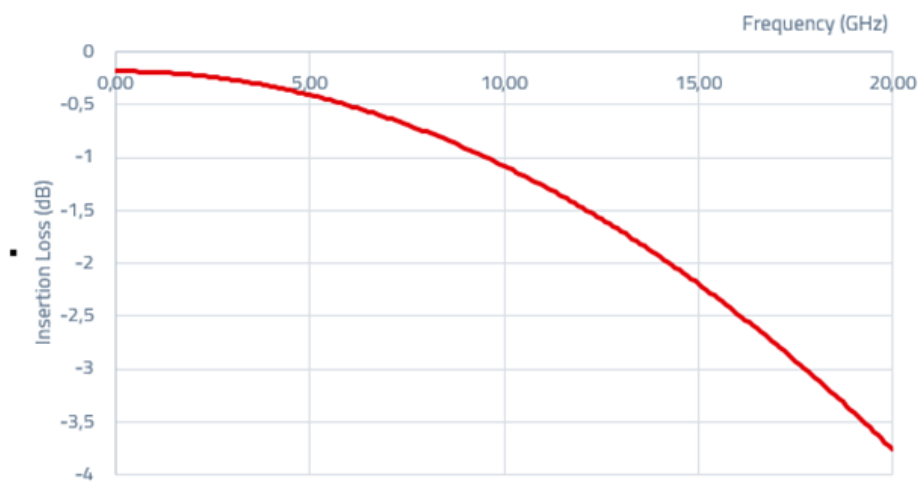


Figure 2: WR-BTB 0.4mm High-Speed Low-Profile GSSG 100 Ohm differential Insertion loss profile

The safety margin of this loss profile is about 0.18 dB at 500 MHz and 1 dB at 20 GHz.

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