

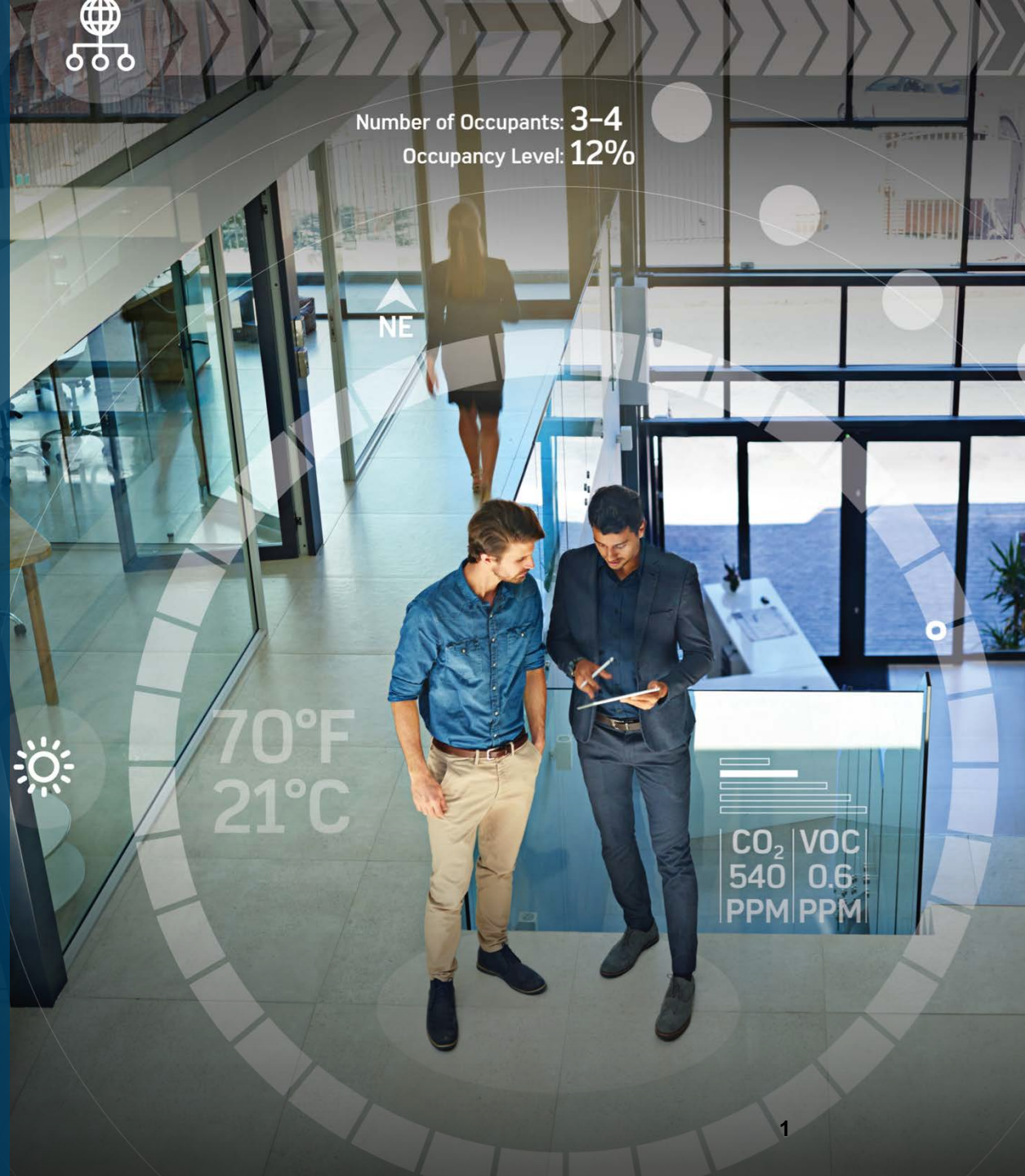


AHEAD OF WHAT'S POSSIBLE™

PoDL Power Coupling Network Performance

GITESH BHAGWAT

SANTA BARBARA DESIGN CENTER



Number of Occupants: 3-4
Occupancy Level: 12%



70°F
21°C

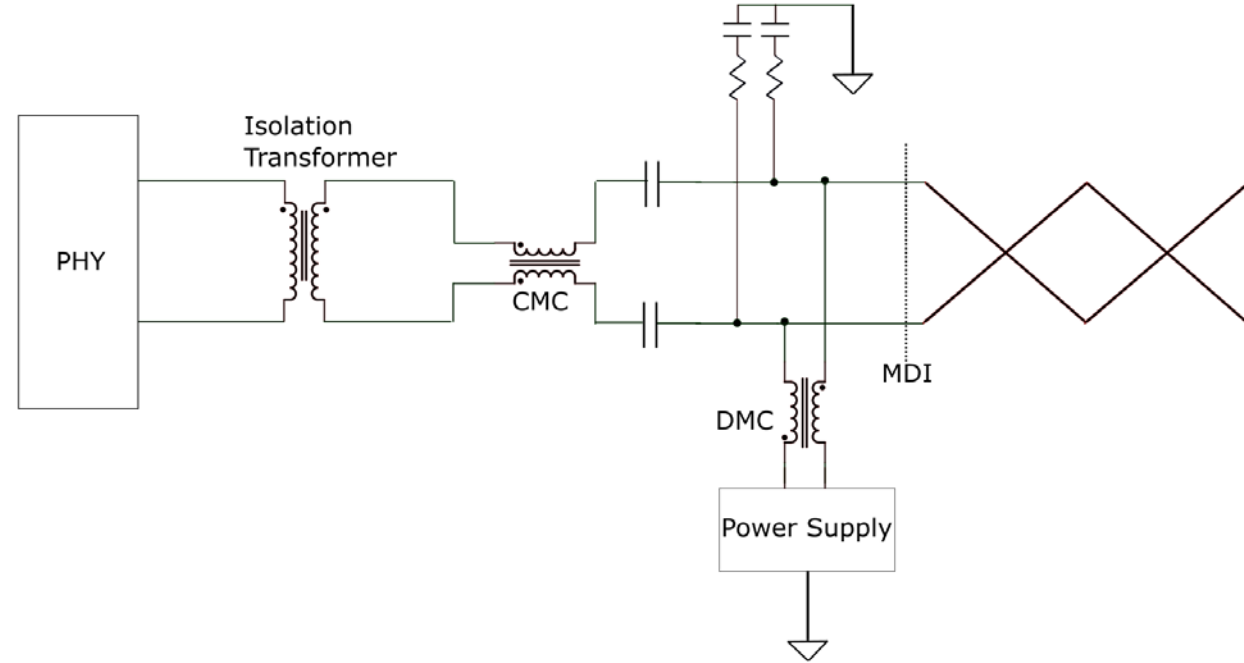
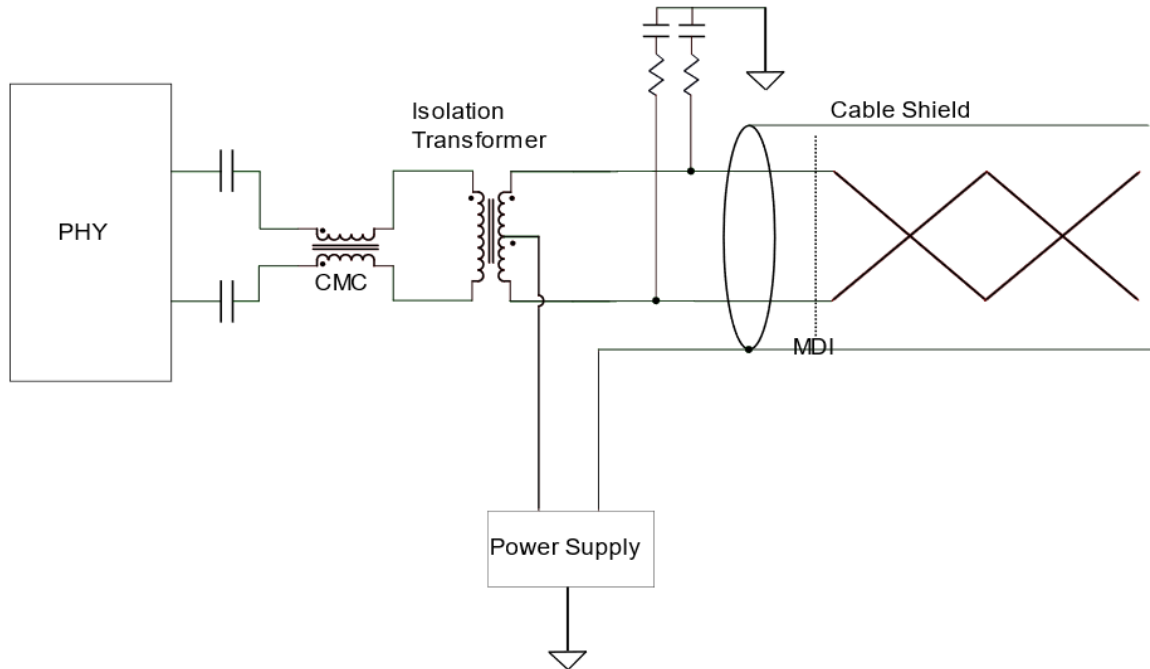
CO ₂	VOC
540	0.6
PPM	PPM

Presentation Outline

- ▶ Traditional PoDL Coupling Network
 - With Isolation
- ▶ GBC PoDL Coupling Network
 - Galvanic Barrier Coupler
- ▶ Derived Schemes – GB Coupling Networks
- ▶ Other Benefits of the GBC
- ▶ 100BASE-T1 GBCs
 - Specs and Measurements- Version A
 - Specs and Measurements- Version B

Traditional PoDL Coupling Networks

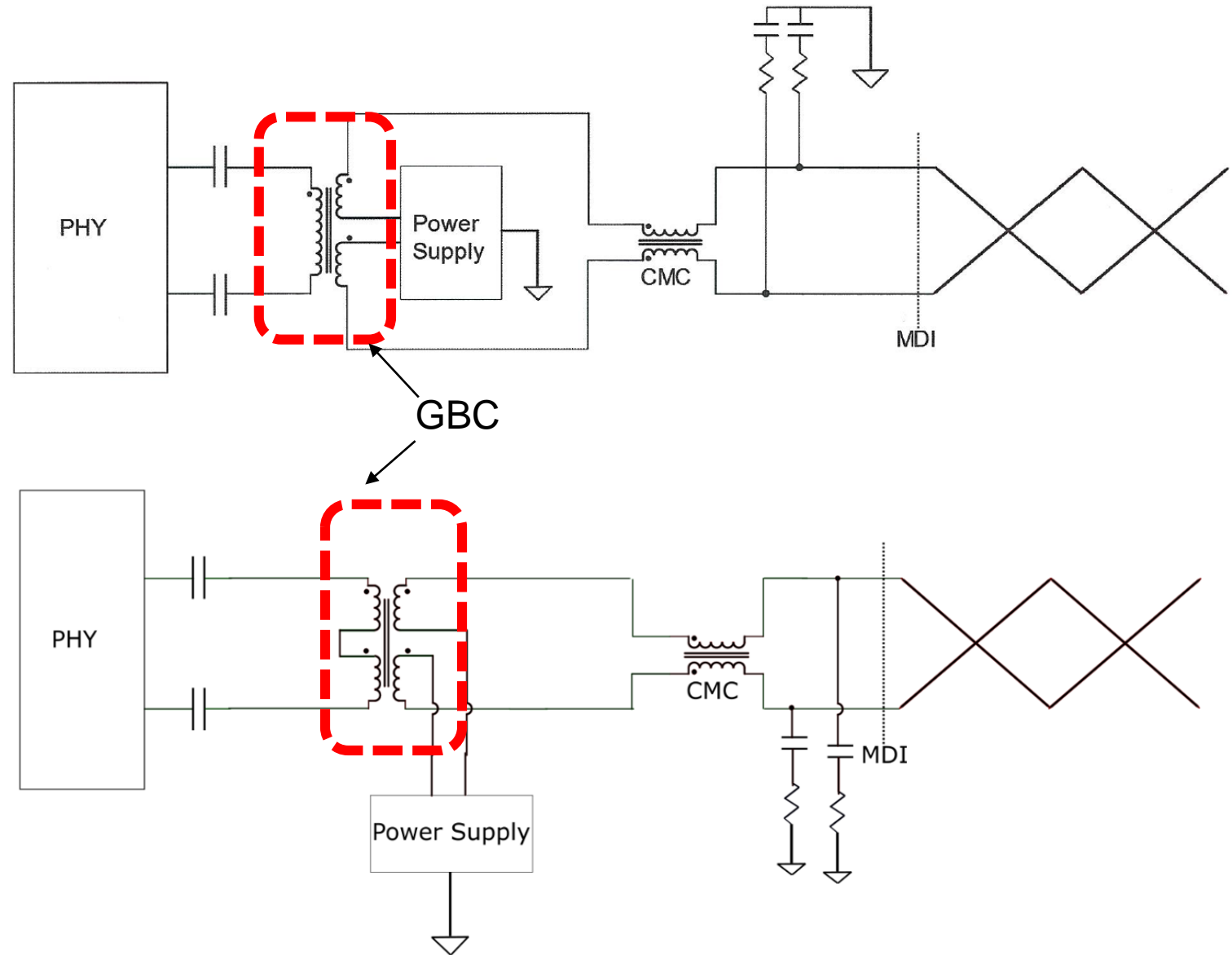
- Separate Transformer for Isolation



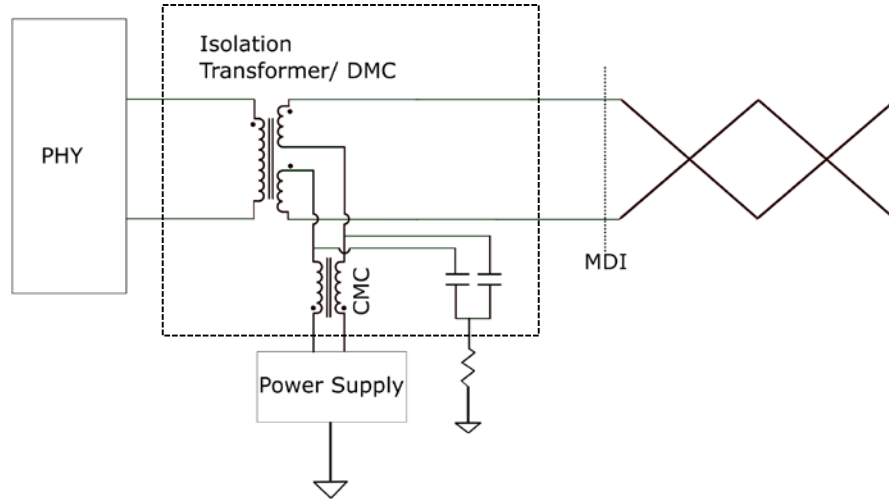
- Using Shield for Return Current ([stewart_01_0917.pdf](#))

GBC PoDL Coupling Network

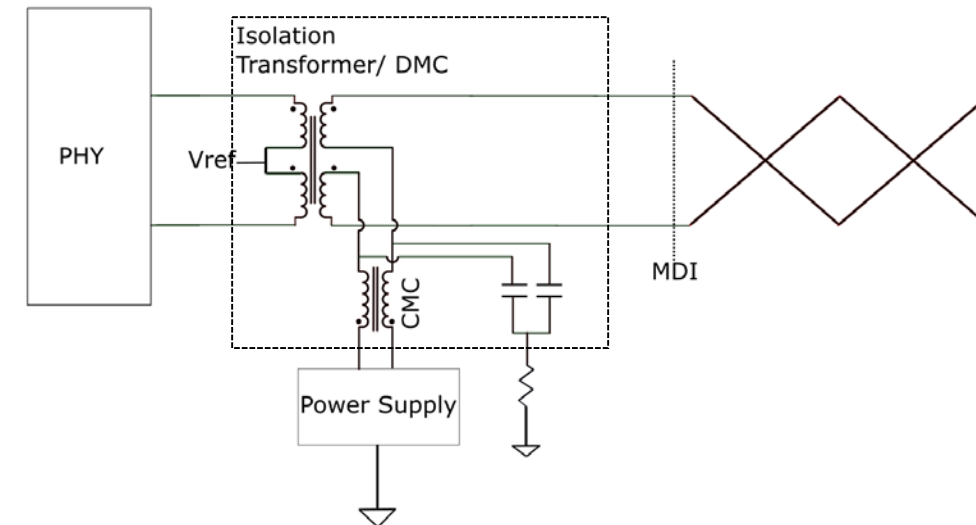
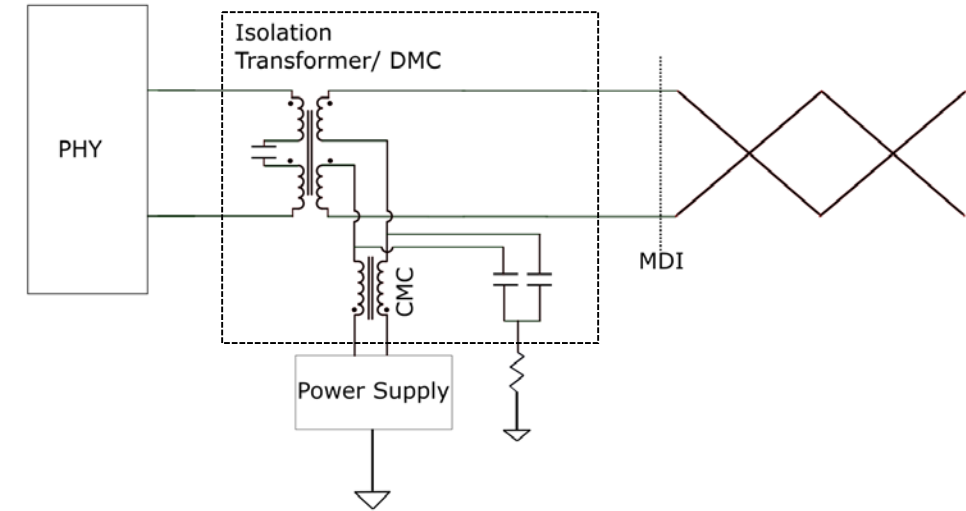
- ▶ Two variations of the GBC shown
- ▶ Integrates the functionality of Power Coupling Inductors and Isolation Transformer into one device
- ▶ GBC ensures Lossless coupling of data from PHY to the Line
- ▶ 100BASE-T1 GBC successfully made
- ▶ 10BASE-T1 GBC in design



Derived schemes- GB Coupling Networks



- ▶ Unified CM terminations improve MDI mode conversion
- ▶ DC blocking capacitors can be eliminated or reduced
- ▶ Possible Modularization or Integration with Connector



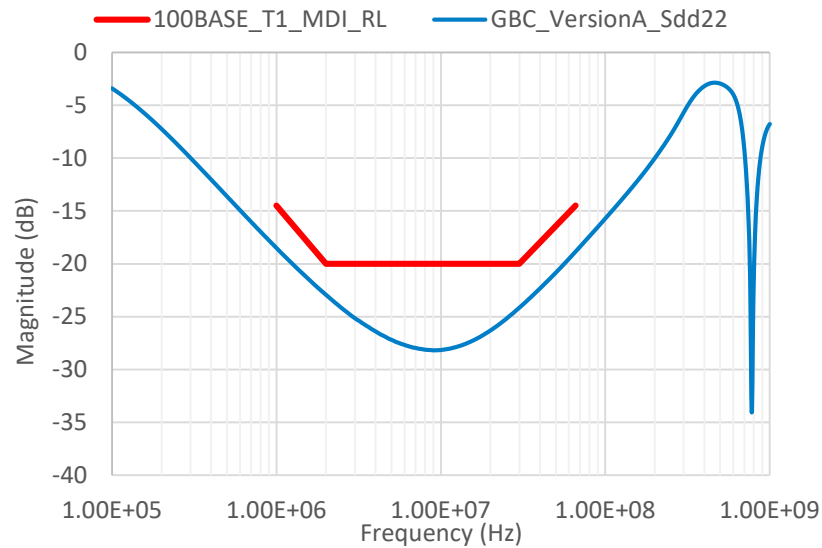
Other Benefits of the GBC

- ▶ Several other advantages offered by the GBC and GB Coupling Networks:
 - Galvanic isolation of the PHY
 - CM Noise rejection
 - Due to tightly coupled windings
 - And inter-winding isolation
 - Possible elimination of CMC
 - Reduced number of devices compared with tradition PCN schemes
 - Improved CM Termination
 - DC blocking effect using isolation or primary side center-tap

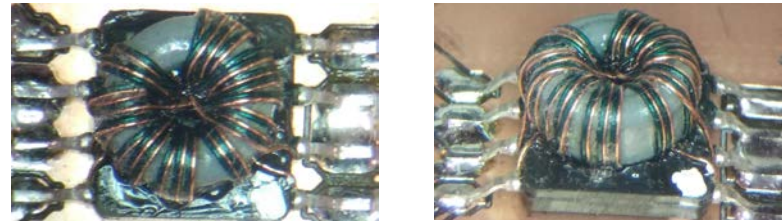
100BASE-T1 GBC Specs and Measurements

Version A

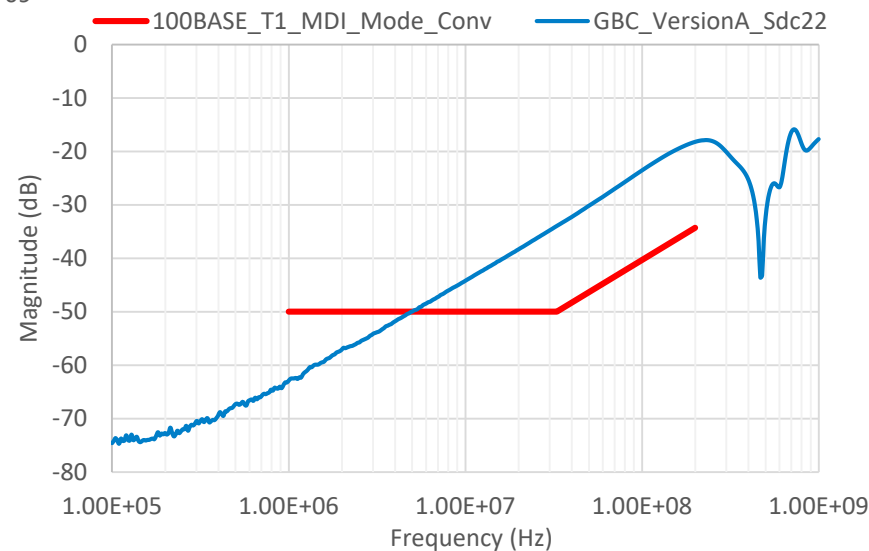
DM Return Loss Sdd22(DB)



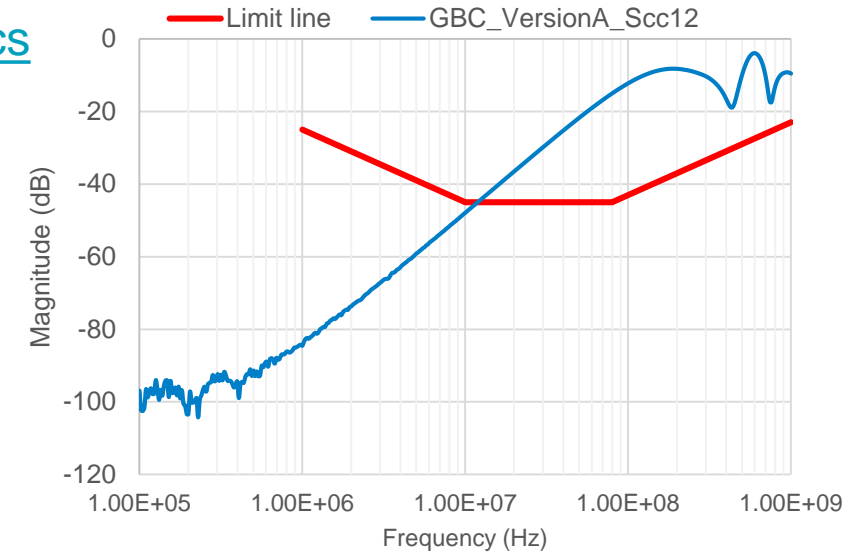
- EPA4466AG-LF by [PCA Electronics](#)



Mode Conversion Sdc22(DB)



CM Insertion Loss (Scc12)



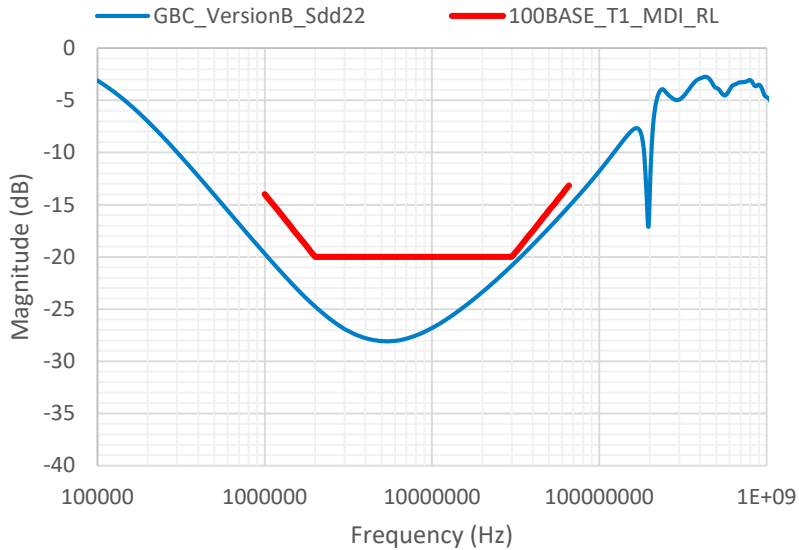
- Core Dimensions: Approx. 9.5 X 9.5 X 5 mm
- Current Capacity: 1000mA
- Isolation Rating: 1500Vrms
- Winding: hand wound

- Return Loss meets the 100BASE-T1 MDI limit line
- Significant CM Insertion Loss
- Mode Conversion Loss may be sufficient for some applications or can be augmented by a small CMC

100BASE-T1 GBC Specs and Measurements

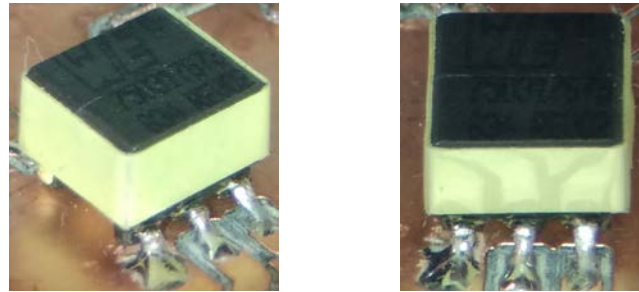
Version B

Return Loss (dB)

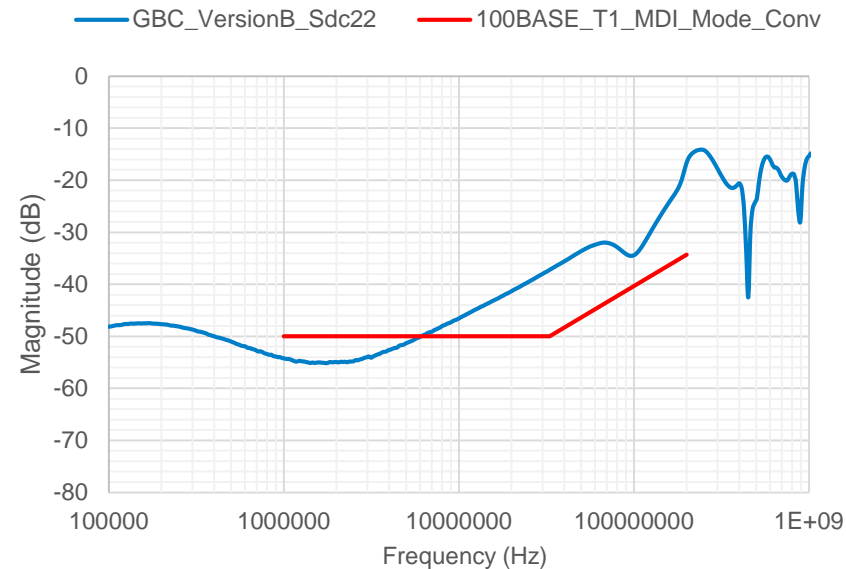


- Core Dimensions: Approx. 6.3 X 6 X 4.5 mm
- Current Capacity: 400mA
- Isolation Rating: 200Vrms
- Winding: automated machine wound

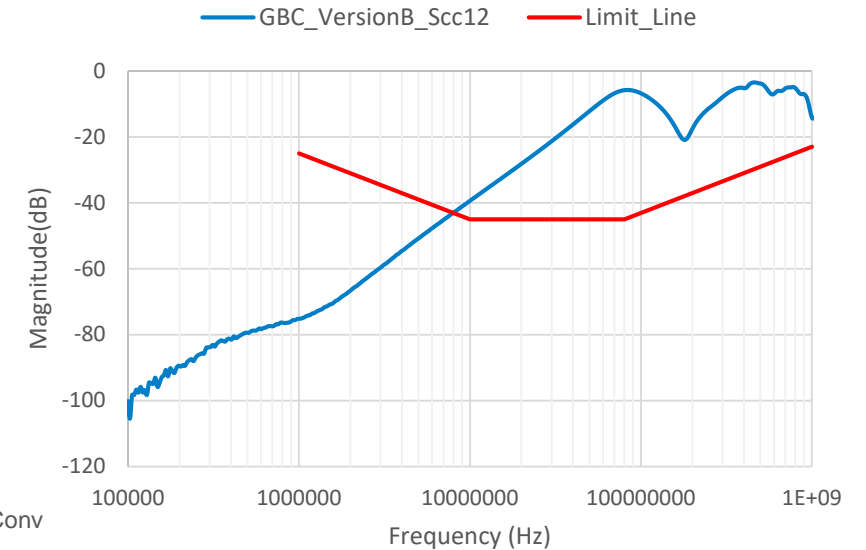
- 750317673 by [Wurth Electronics](#)



Mode Conversion



CM Insertion Loss (Scc12)



- Return Loss meets the 100BASE-T1 MDI limit line
- Significant CM Insertion Loss
- Mode Conversion Loss may be sufficient for some applications or can be augmented by a small CMC

Thank You!

QUESTIONS? FEEDBACK?