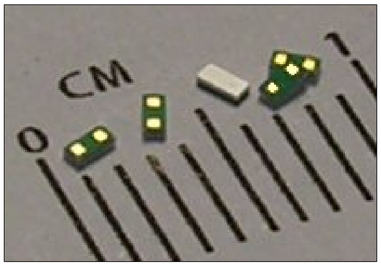
Thin Film Technology Equalizer Performance

Introduction

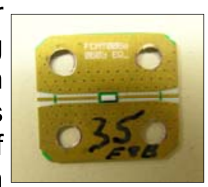
The Thin Film Technology (TFT) 0603 sized chip Equalizers are high frequency passive equalization modules that utilize a precision thin film resistor, inductor and HF monolithic capacitors to produce high pass filter functions for loss compensation purposes. The wide bandwidth of these components is derived from the integrated single sided, face down, thin film construction. These networks compensate for the loss in high-speed data transmission media. TFT offers these components in an 0603 package with a 0402 footprint for SMT assembly. This equalizer series covers application data rates of 2.5, 3.125, 5.0, 6.25, 10.0 and 12.5 Gb/s, for Bessel function losses of 3, 6, 9, 12 dB. Applications include high-speed cables, backplanes, test equipment, and optical modules.



Passive equalization has twofold benefits both in frequency and time domain. In the frequency domain, the equalized bandwidth of the signal path describes the flatness of the insertion loss response of the path in relation to the digital signal's spectral power density. The critical spectral power density of the digital stimulus resides at and below the fundamental frequency, which in NRZ schemes is one half of the data rate in Hertz. Whereas in time domain, passive equalization opens the eye and reduces time domain jitter.

Performance Characterization Setup

A full two-port SOLT calibration is performed on a Vector Network Analyzer, using Agilent's 3.5mm calibration kit. The calibration plane is up to the end of Phasephlex cables with 3.5mm SMA connectors. Measurements for the devices are taken with the equalizer component mounted on a 50 Ω trace Rogers's 4350B coupon. The footprint is considered part of the component in the S-parameter model. Figure 1 shows a typical mounted coupon clamped in the test fixture. This setup was used for the acquisition of the S-parameter data.



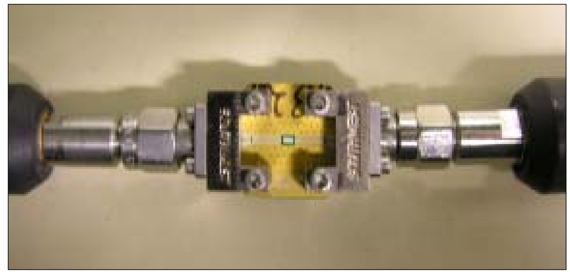


Fig 1: Assembled fixture with mounted coupon

De-embedded Performance Plots

De-embedding is performed to move the reference calibration plane from the end of the cable connector to the footprint of the device. This eliminates the influence and effects of the SMA connector, the SMA "launch", and the Rogers coupon trace on the measurement. This de-embedding is performed by Agilent's Advance Design Systems (ADS) de-embedding model. Figure 2 shows a performance comparison between de-embedded and non de-embedded S-parameter measurement results for 0603 equalizers.

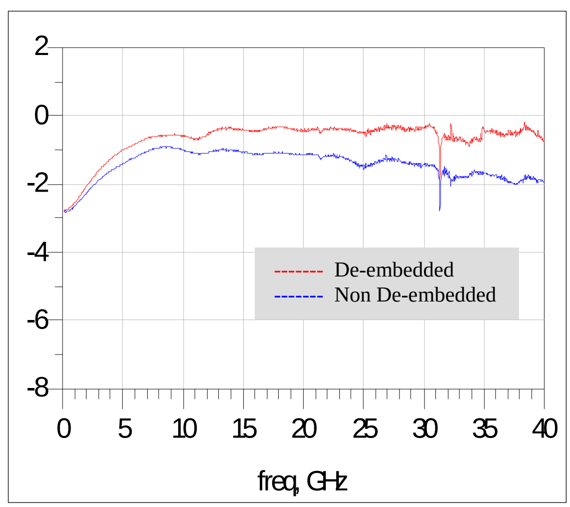


Fig 2: S21 plot for EF2A51A100E05A
(De-embedded vs. Non De-embedded)

Thin Film Technology Corp.
Thin Film Technology Corp.
1980 Commerce Drive
North Mankato, MN 56003
Phone: (507) 625-8445
Fax: (507) 625-3523

sales@thin-film.com
www.thin-film.com