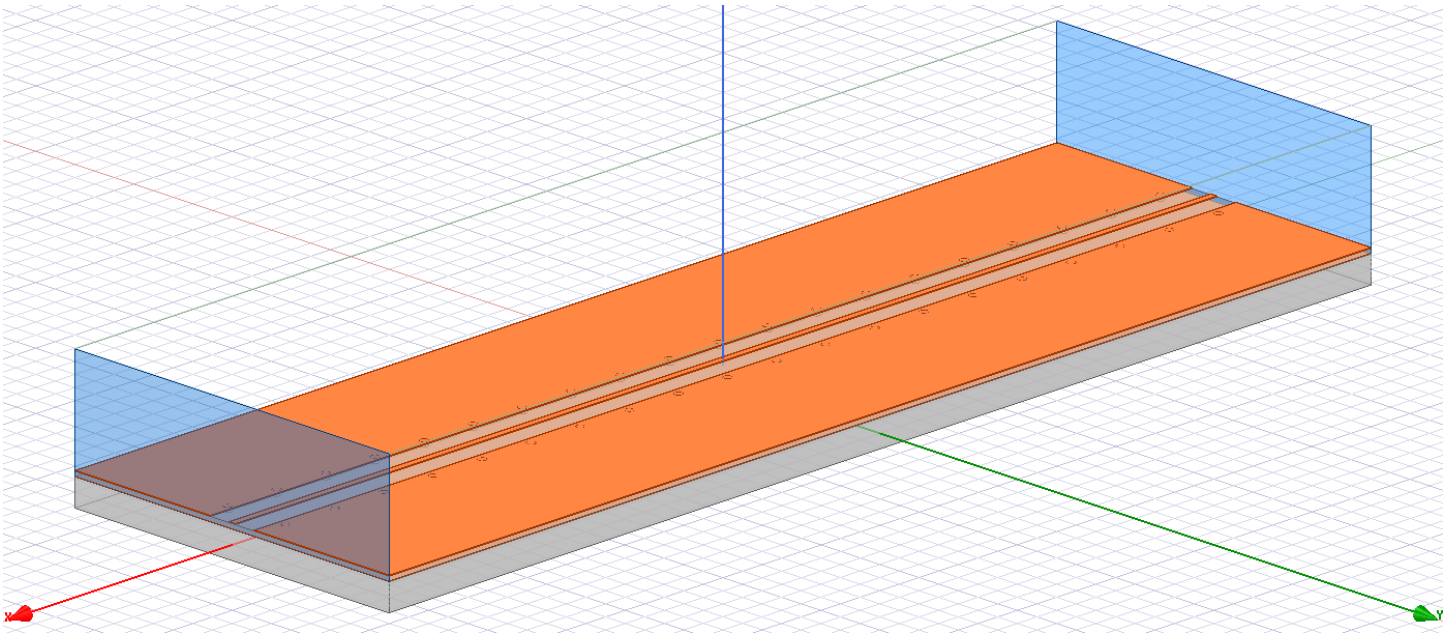


Microstrip Analysis on OSH Park's 4-Layer Stackup using HFSS

Comparing unmasked and masked microstrip analysis given by OSH Park's specifications and FR408 datasheet, and by Harmon Instruments' measurements. Ansys Electromagnetics Suite v19.1 was used.

OSH Park 4 Layer Stackup (layers 1 & 2):

1 mil (0.0254 mm)	Solder mask
1.4 mil (0.0356 mm)	1 oz copper
6.7 mil (0.1702 mm)	FR408 prepreg (Er = 3.66, Loss Tan. = 0.012 @ 1GHz)
0.7 mil (0.0178 mm)	0.5 oz copper
47 mil (1.1938 mm)	FR408 core

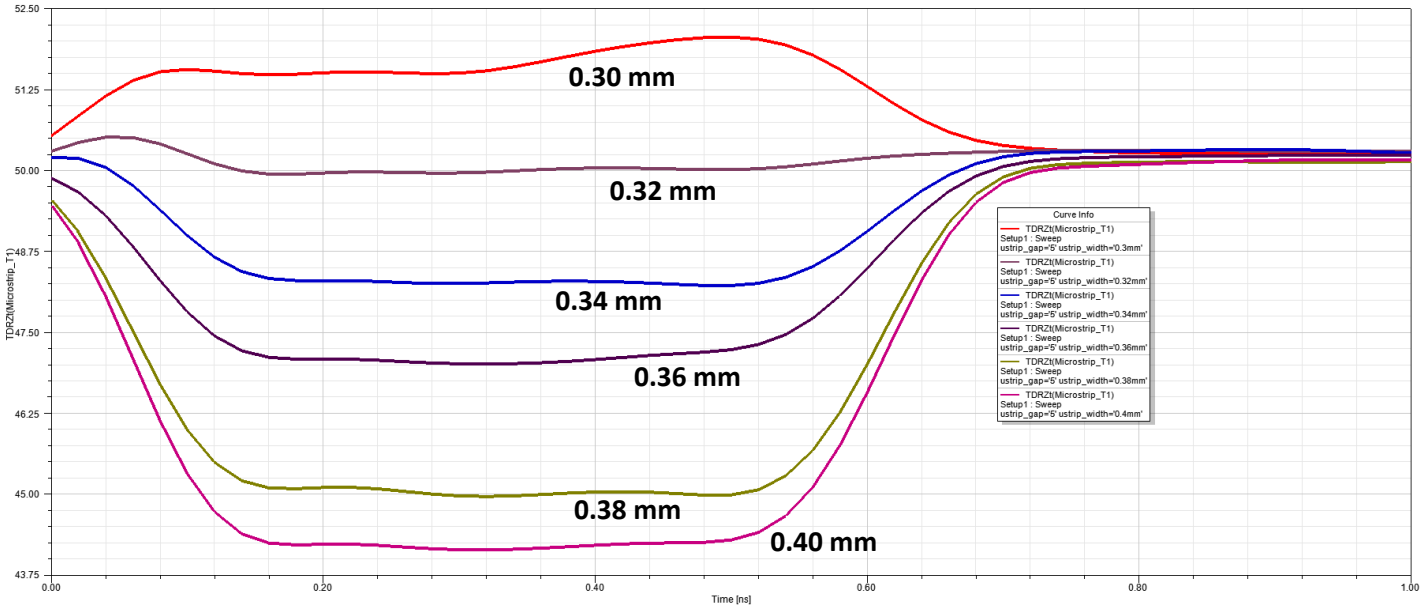
Microstrip Board Dimensions:

50 mm	PCB Length
16 mm	PCB Width
5x prepreg	Microstrip Gap
0.35 mm / 5 mm x 10	Via Diameter / Spacing

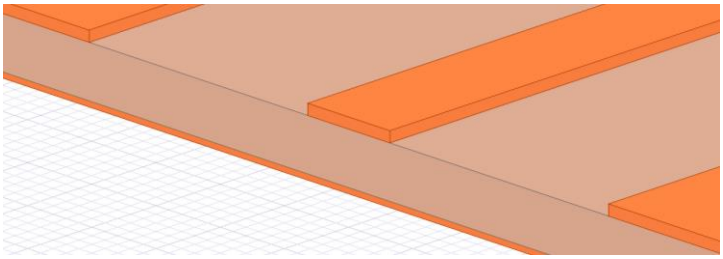
HFSS Solution and Sweep Setup (default except for below):

Terminal with Wave Ports	Solution Type
1.265 GHz	Solution Frequency
40	Max # of Passes
0.01	Maximum Delta S
1%	Maximum Delta Zo
Interpolating Linear Step	Sweep Type
100 MHz / 10 GHz / 25 MHz	Sweep Start, End, Step
1000	Sweep Max Solutions

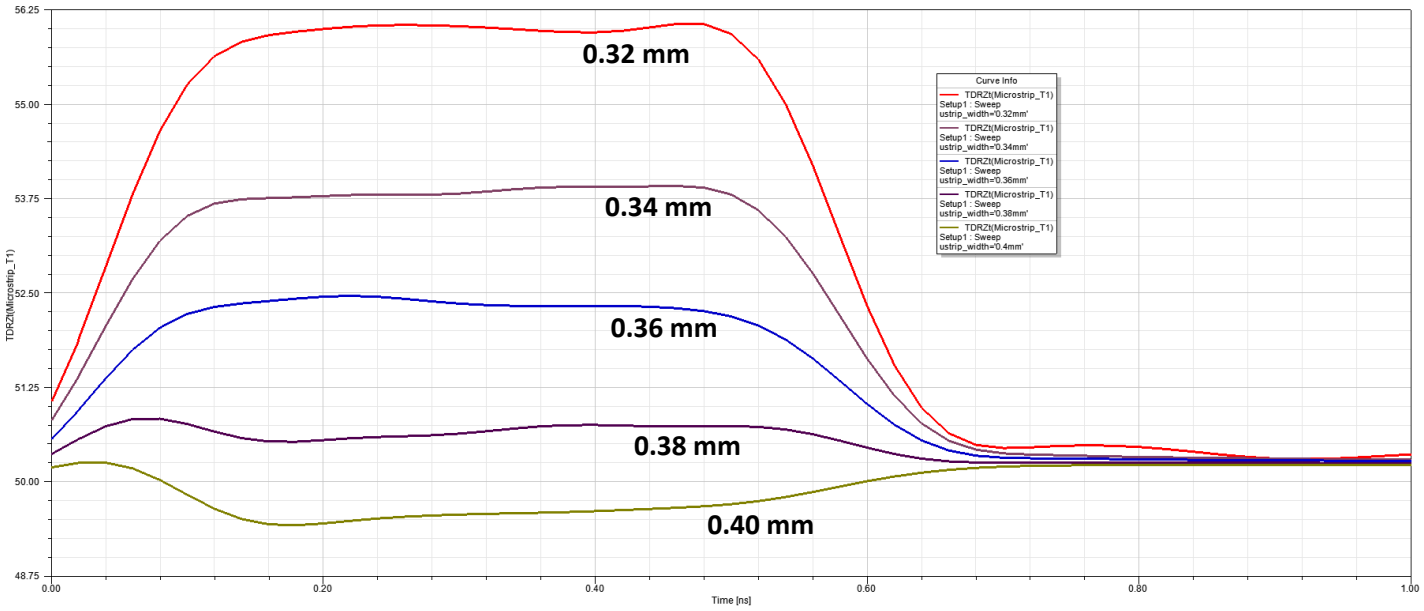
Unmasked Microstrip TDR Plot (parametric sweep of microstrip width w/ datasheet spec):



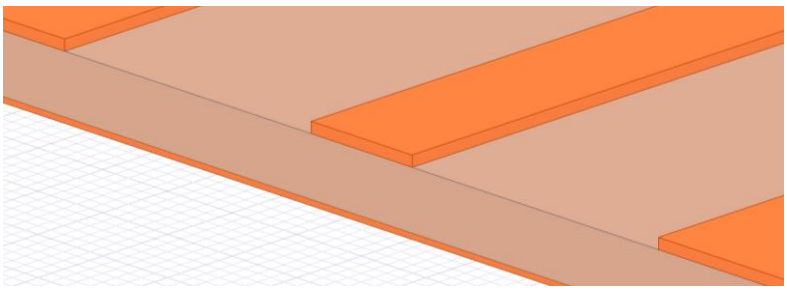
0.17 mm	FR408 prepreg (Er = 3.66)
0.32 mm	50Ω Microstrip width



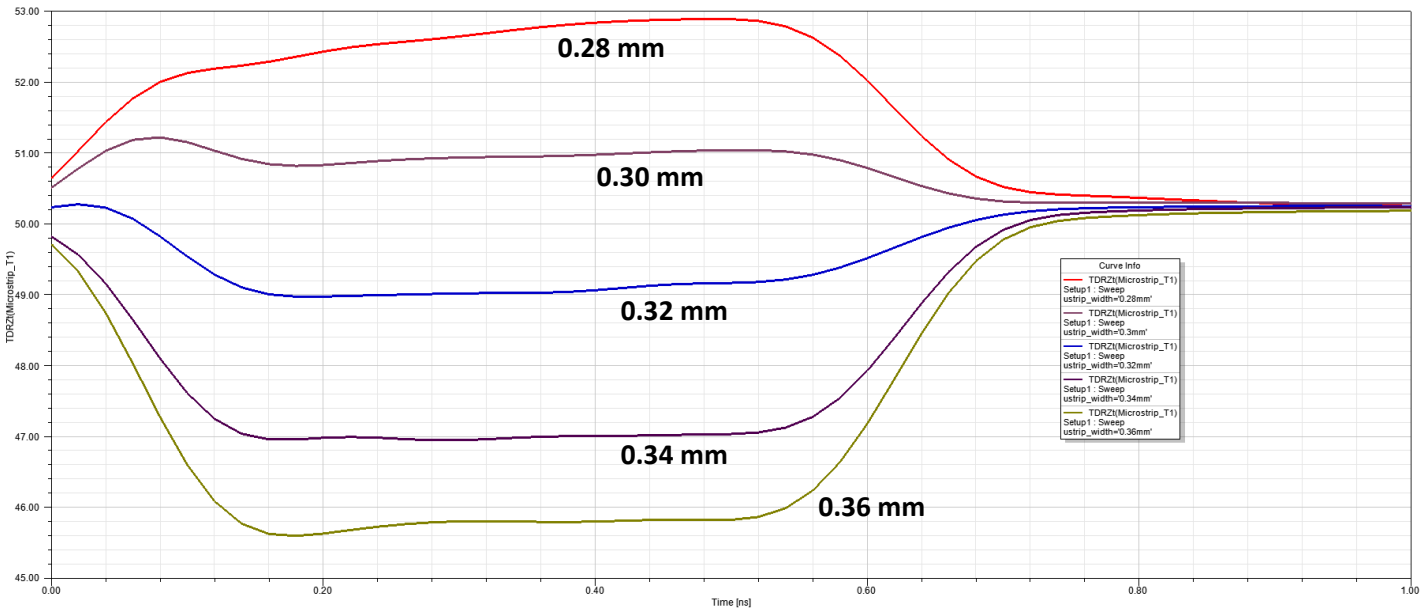
Unmasked Microstrip TDR Plot (parametric sweep of microstrip width w/ Harmon Instruments spec):



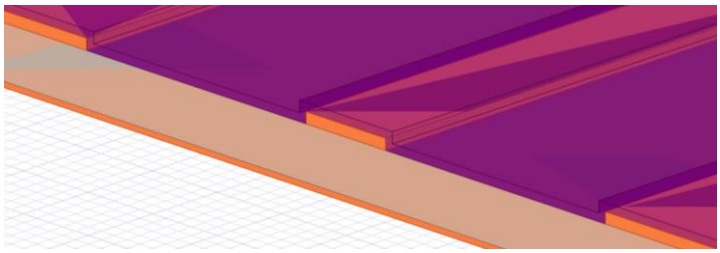
0.19 mm	FR408 prepreg (Er = 3.30)
0.39 mm	50Ω Microstrip width



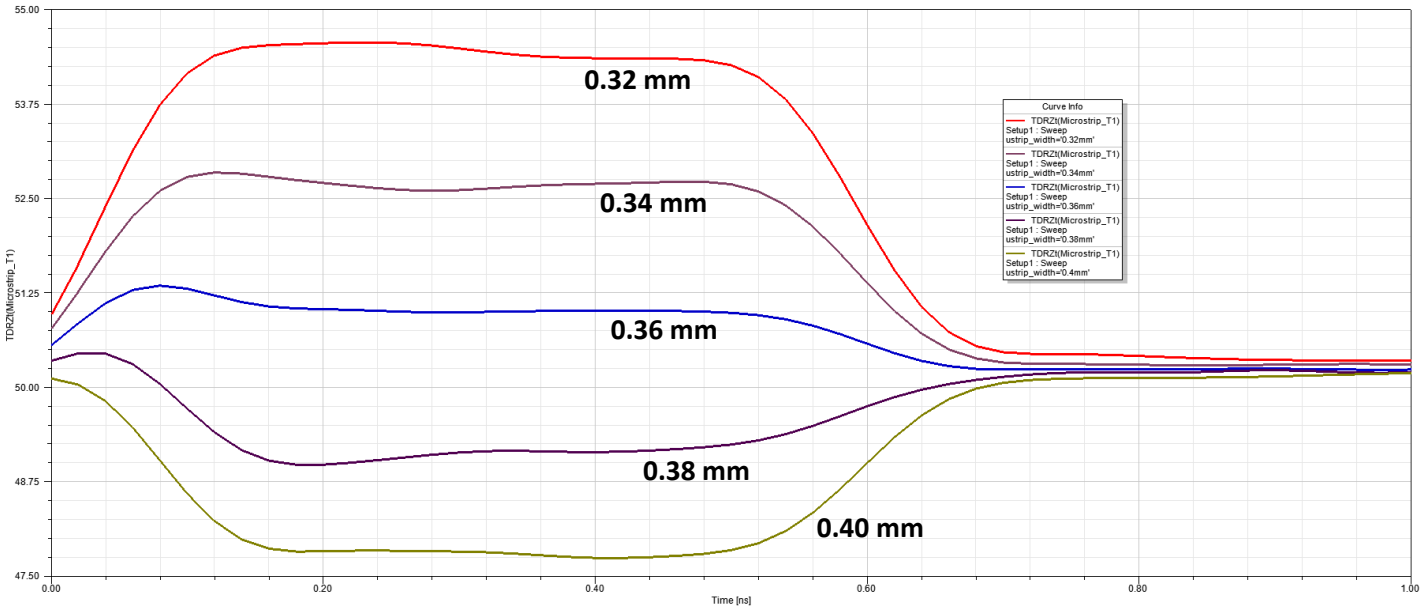
Masked Microstrip TDR Plot (parametric sweep of microstrip width w/ datasheet spec):



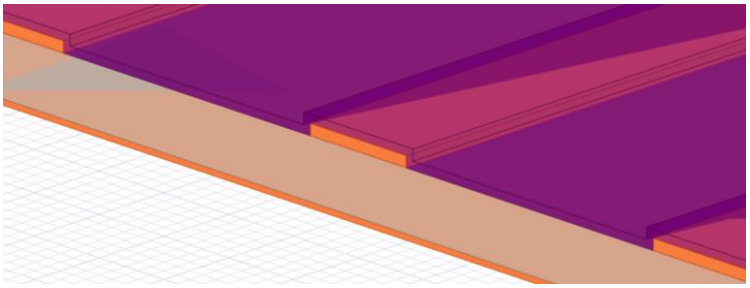
0.17 mm	FR408 prepreg (Er = 3.66)
0.31 mm	50Ω Microstrip width



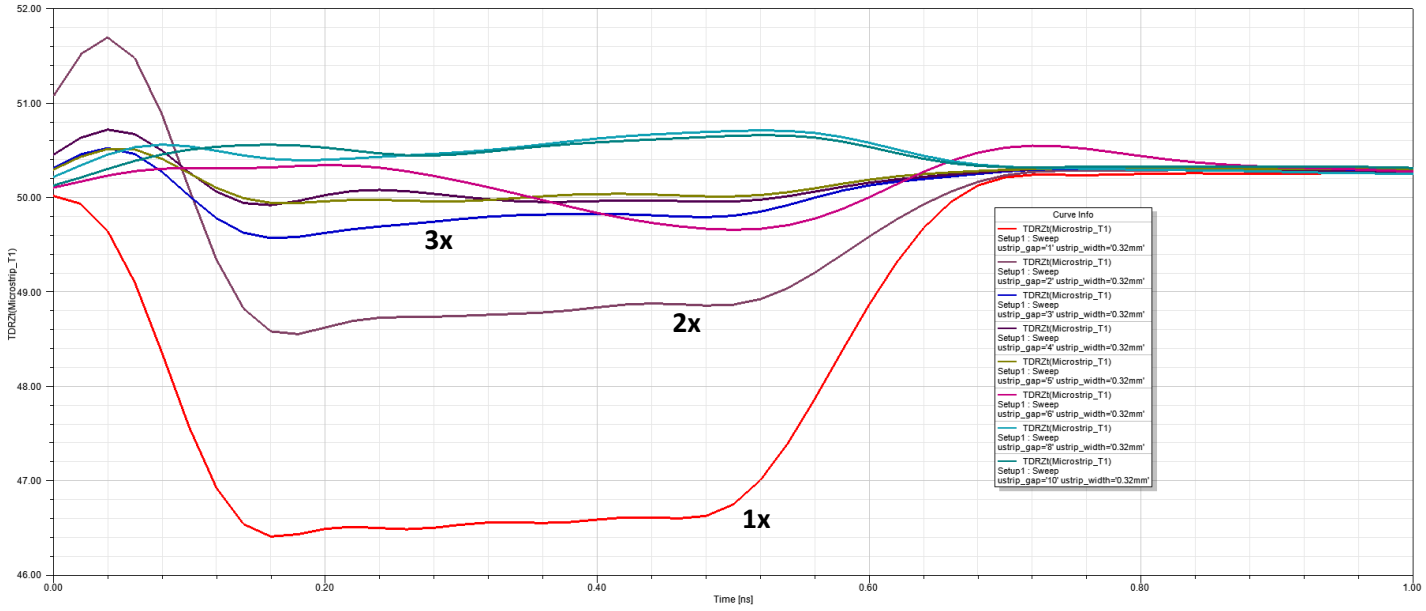
Masked Microstrip TDR Plot (parametric sweep of microstrip width w/ Harmon Instruments spec):



0.19 mm	FR408 prepreg (Er = 3.30)
0.37 mm	50Ω Microstrip width



Unmasked Microstrip TDR Plot (parametric sweep of microstrip gap – multiple of prepreg height):



0.17 mm	FR408 prepreg (Er = 3.66)
0.32 mm	50Ω Microstrip width
≥ 4x prepreg	**Microstrip Gap**