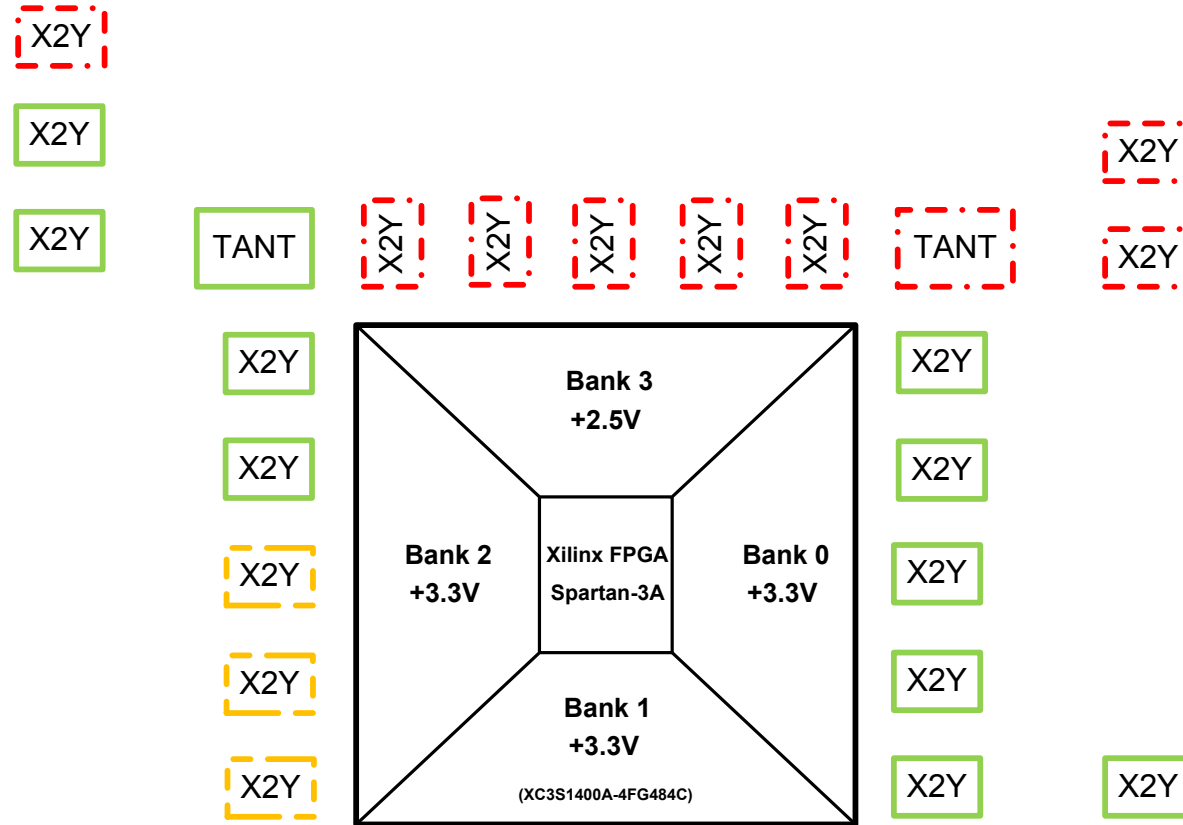


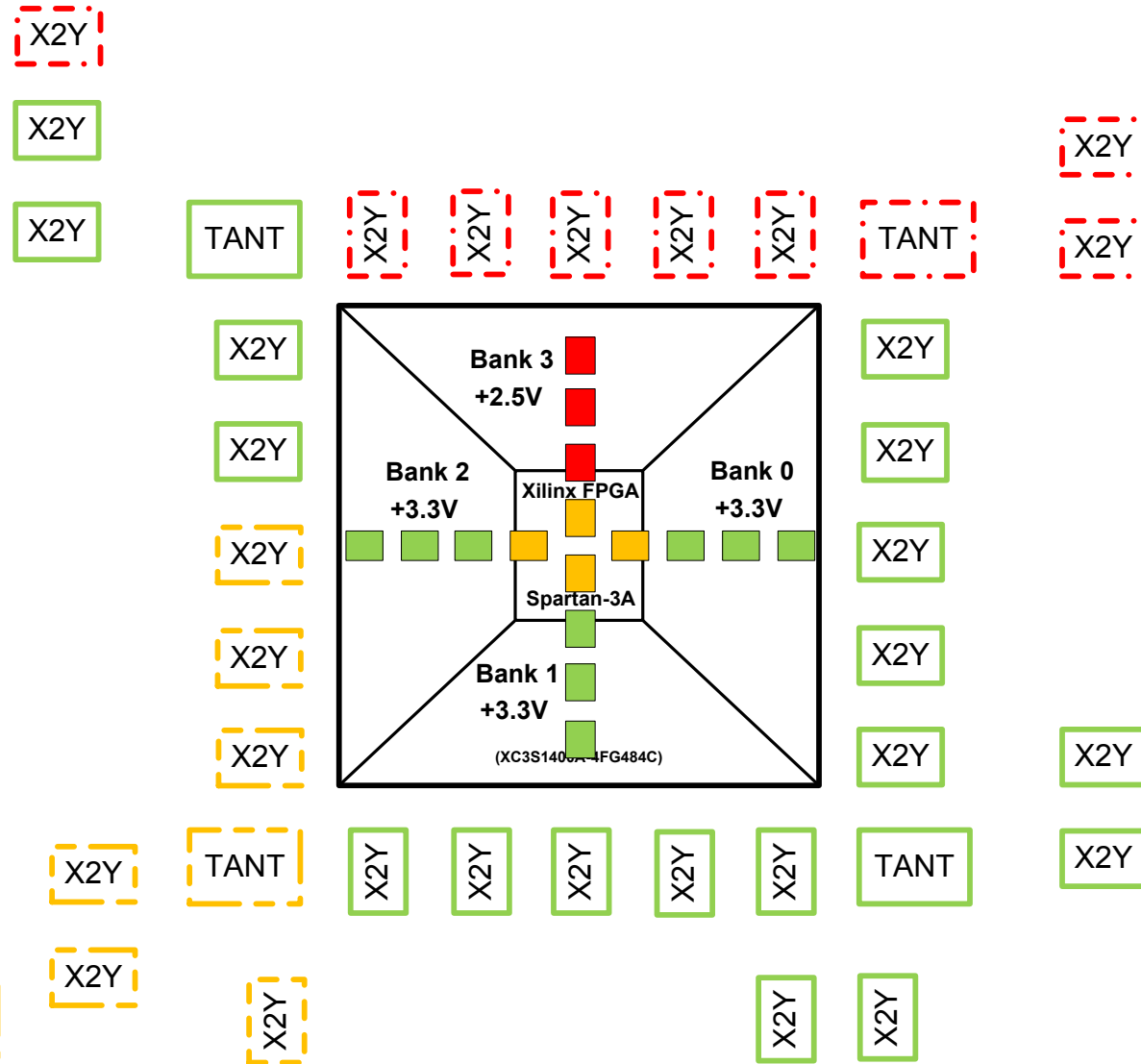
# Spartan-3A Top Side Decoupling Capacitor Placement



## Legend:

- +1.2V 
  - X2Y
  - TANT
- +2.5V 
  - X2Y
  - TANT
- +3.3V 
  - X2Y
  - TANT

# Spartan-3A Bottom Side Decoupling Capacitor Placement



## Legend:




- +1.2V  X2Y TANT
- +2.5V  X2Y TANT
- +3.3V  X2Y TANT

# Spartan-3A Shared Layers: +1.2V and +2.5V



## Legend:

+1.2V   









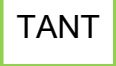
+2.5V   

+3.3V   

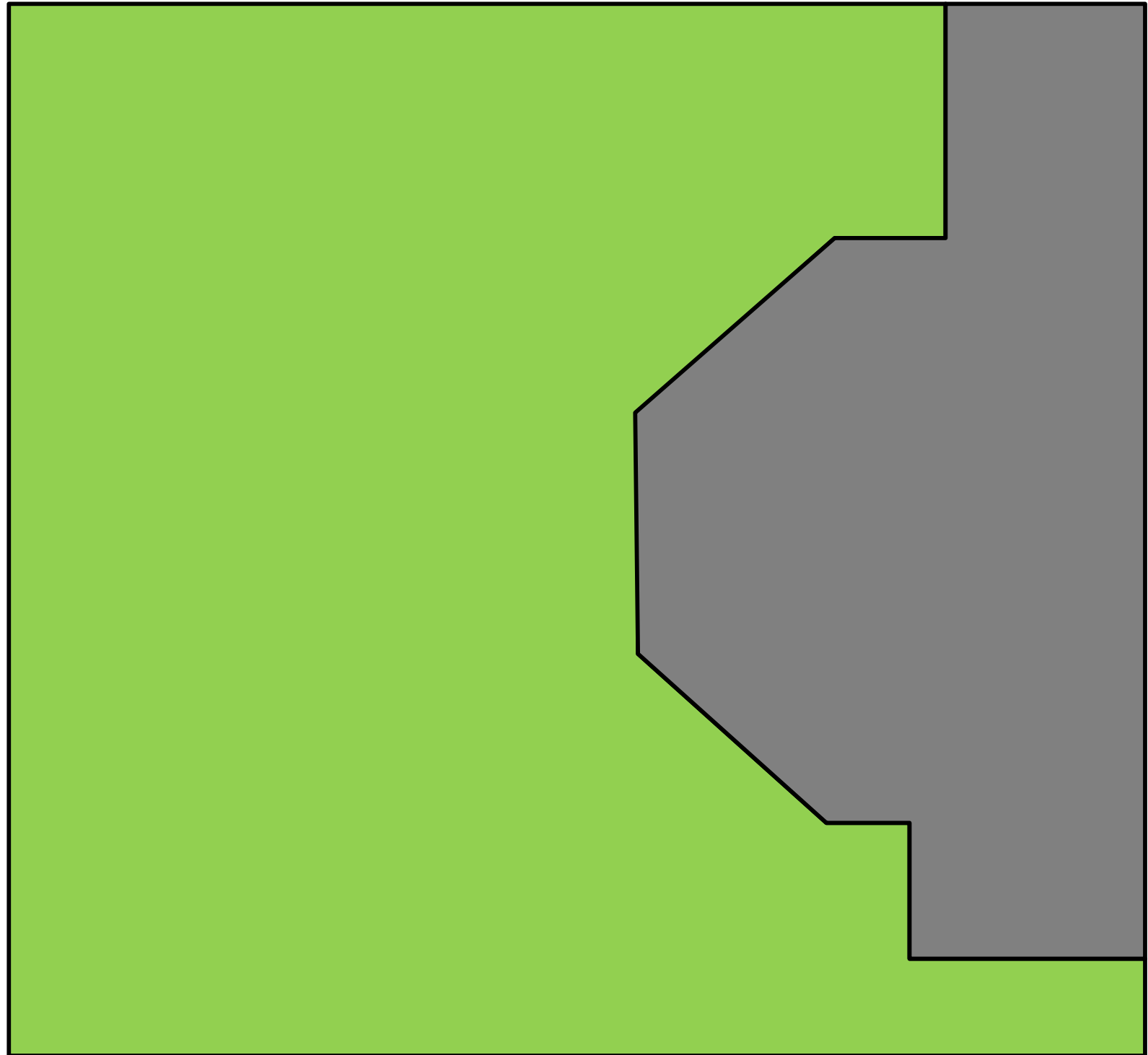
# Spartan-3A Shared Layers: +3.3V








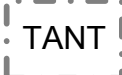






## Legend:

+1.2V			
+2.5V			
+3.3V			

# Shared Layer: +1.8V, +3.3V















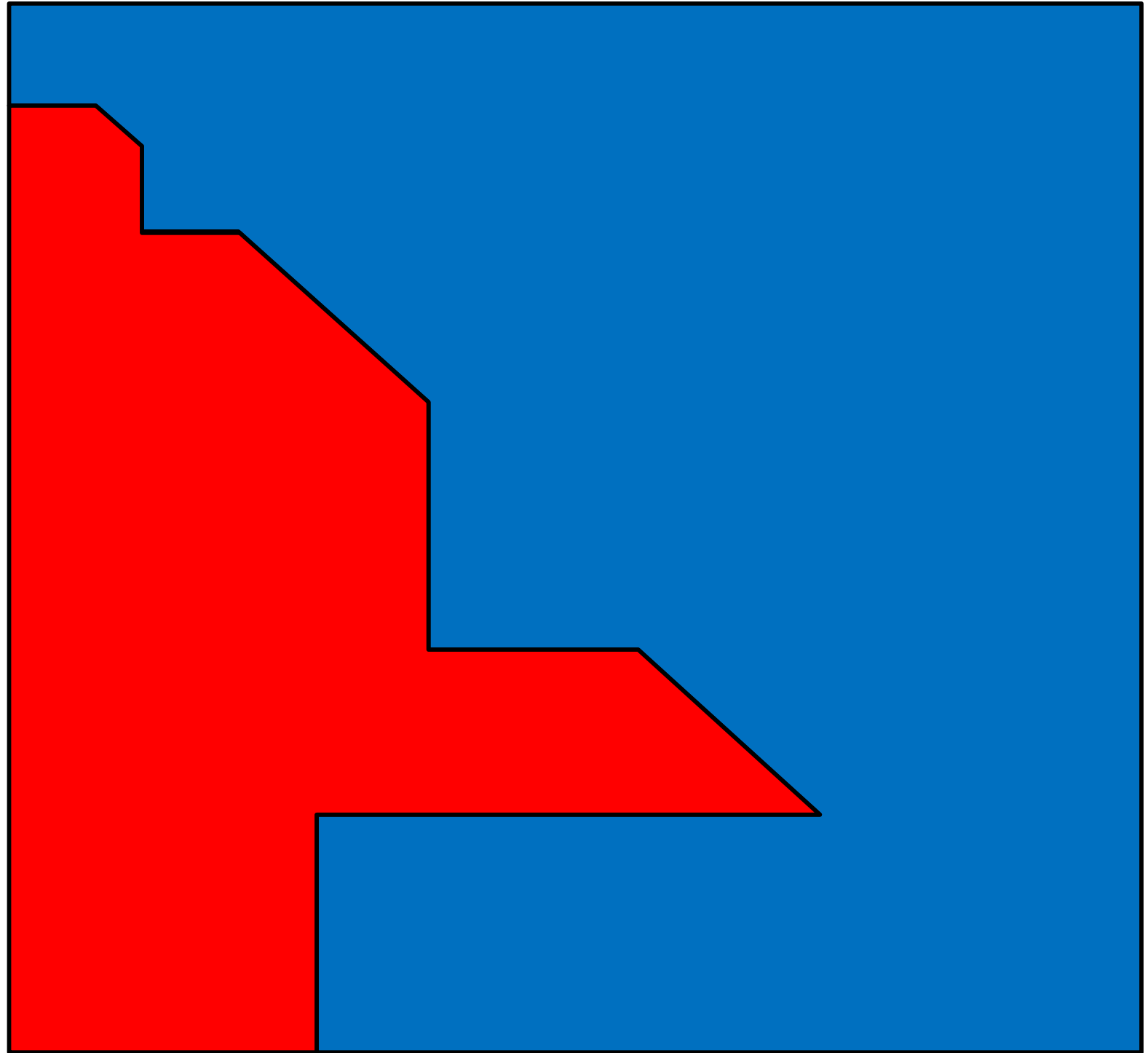
## Legend:

+1V			
+1.8V			
+2.5V			
+3.3V			

# Shared Layer: +1V, +2.5V

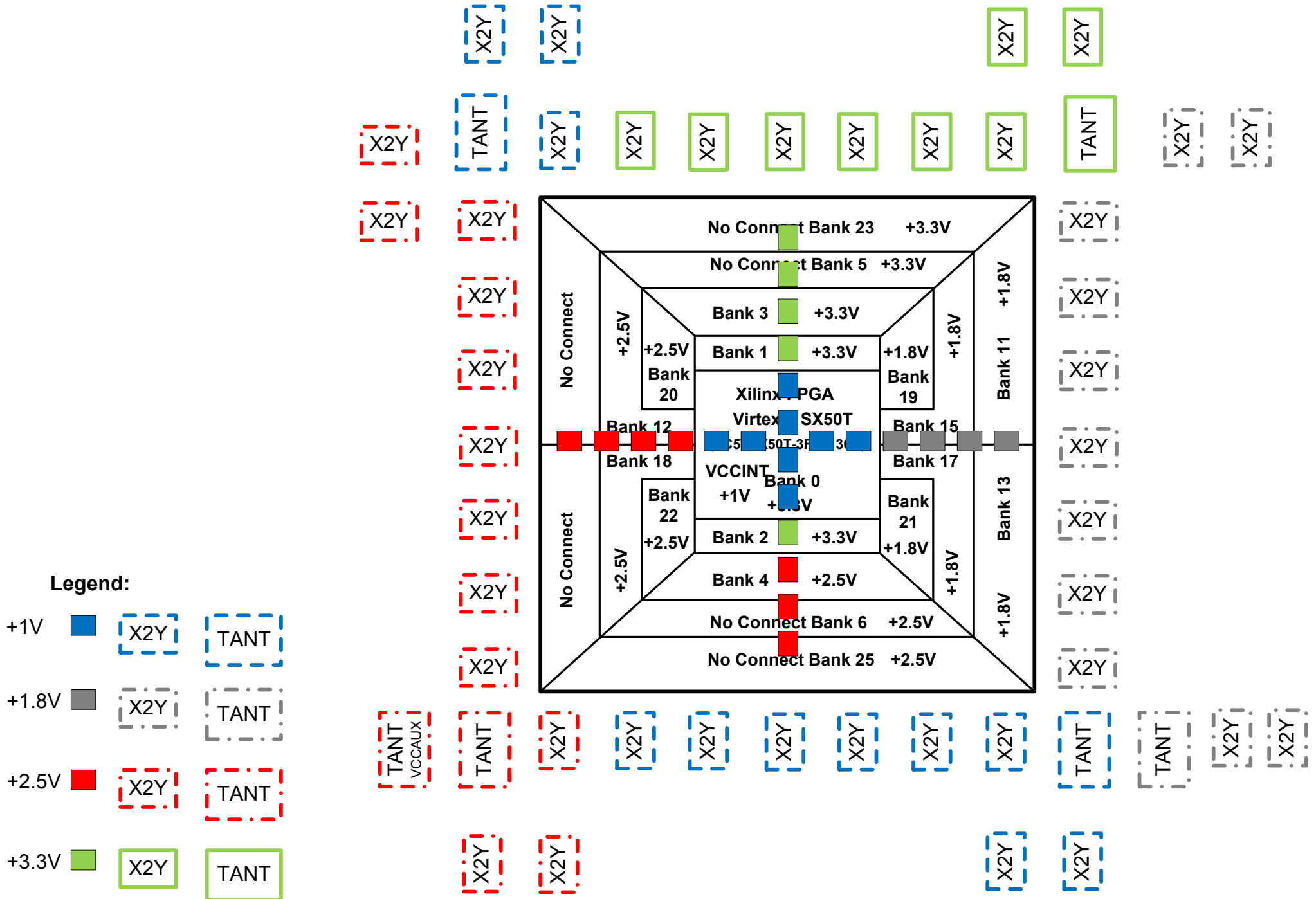
## Legend:

+1V			
+1.8V			
+2.5V			
+3.3V			



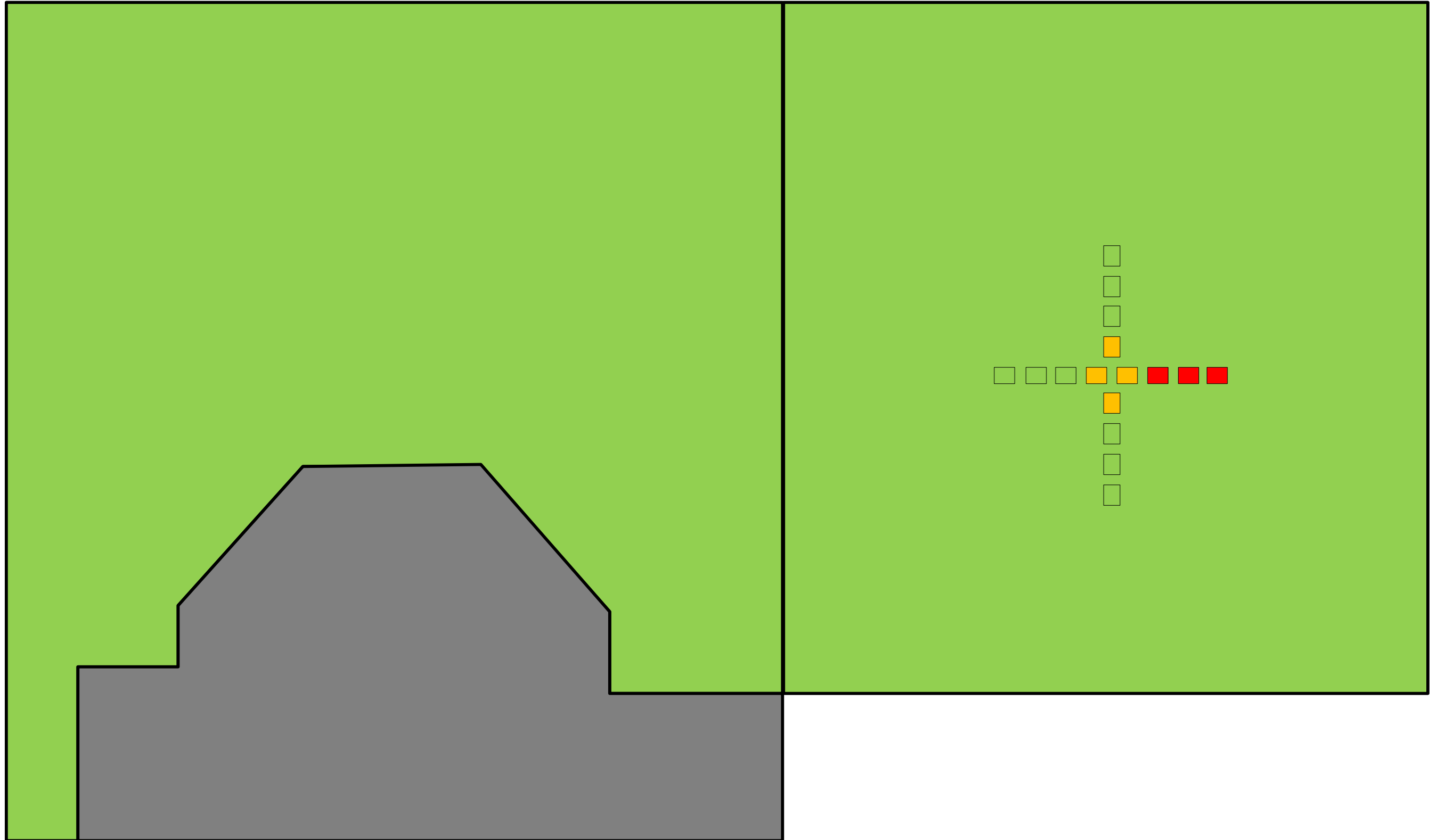
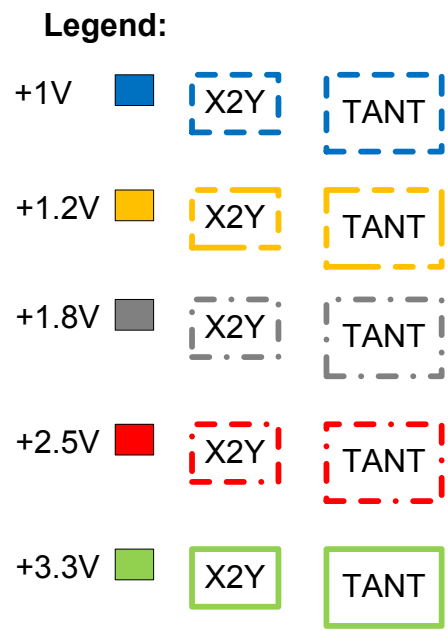


# Virtex-5 Bottom Side Decoupling Capacitor Placement




















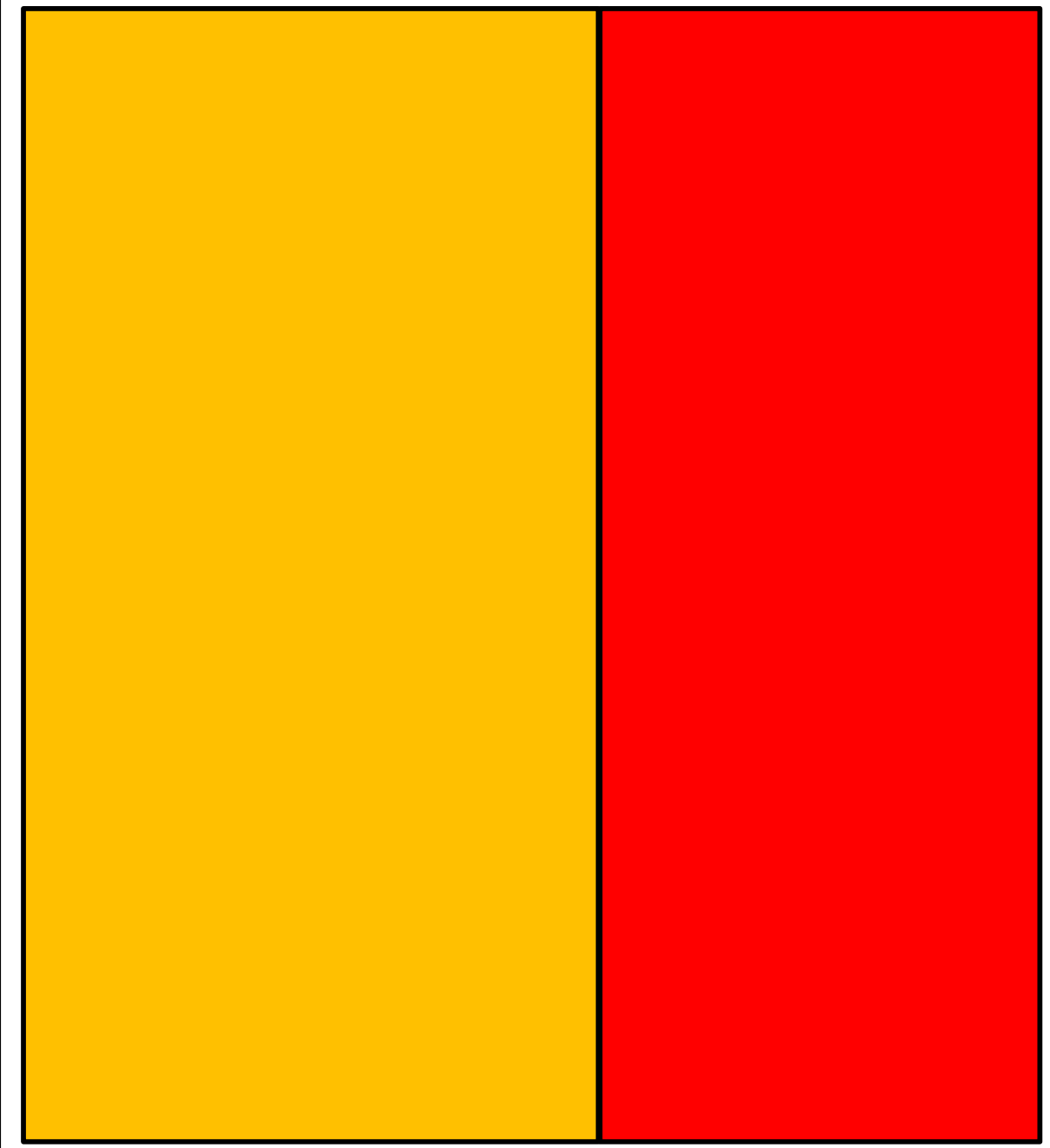
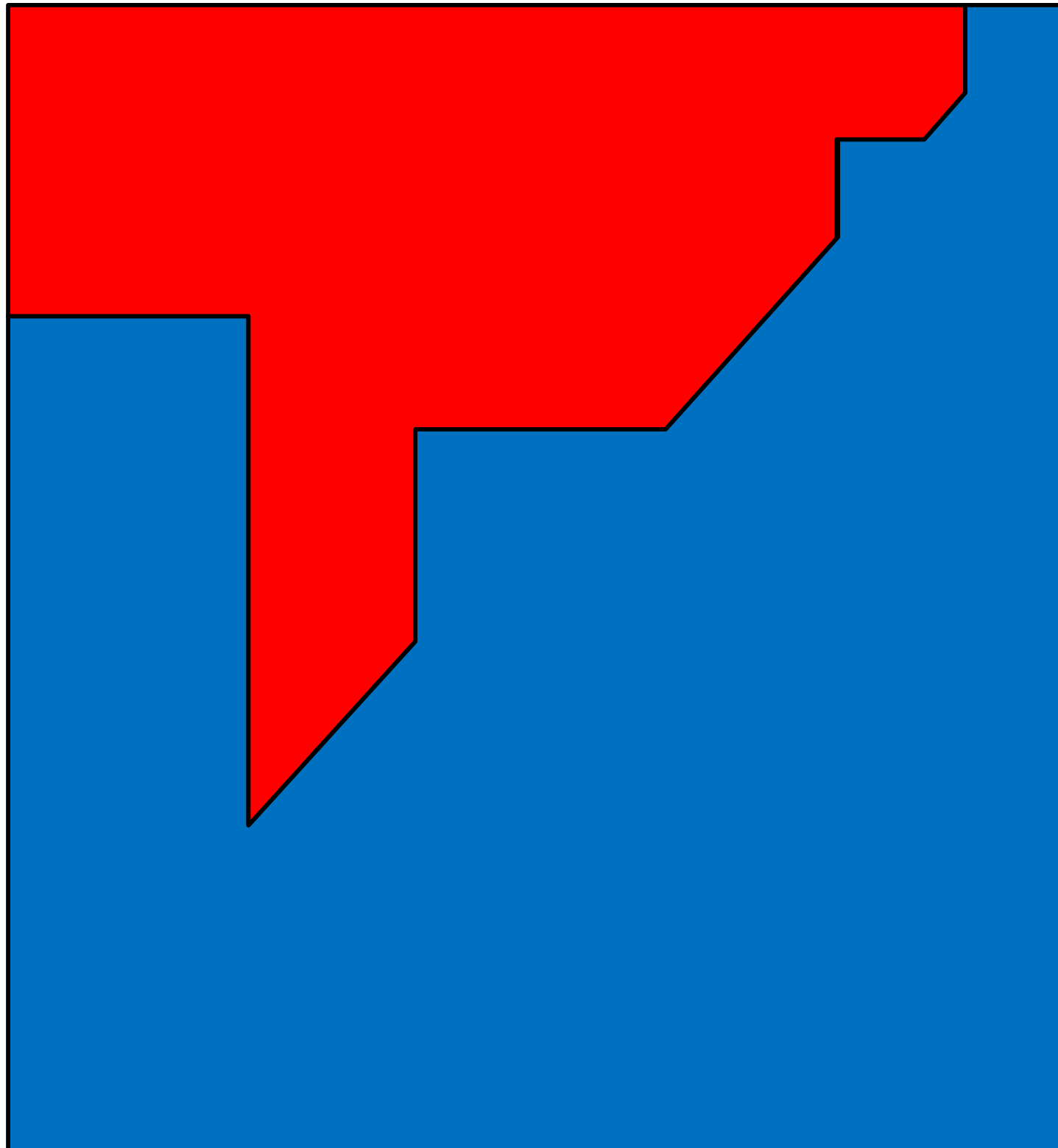
# Shared Layer: +1.8V, +3.3V



# Shared Layer: +1, +1.2V, +2.5V

Legend:

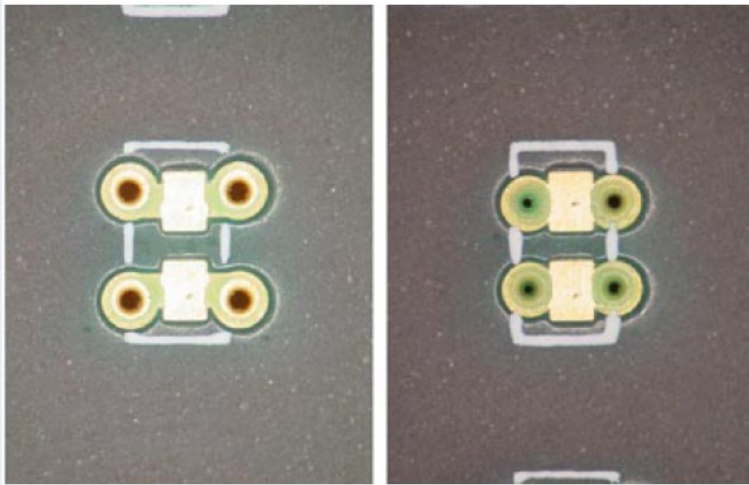
- +1V   
- +1.2V   
- +1.8V   
- +2.5V   
- +3.3V   



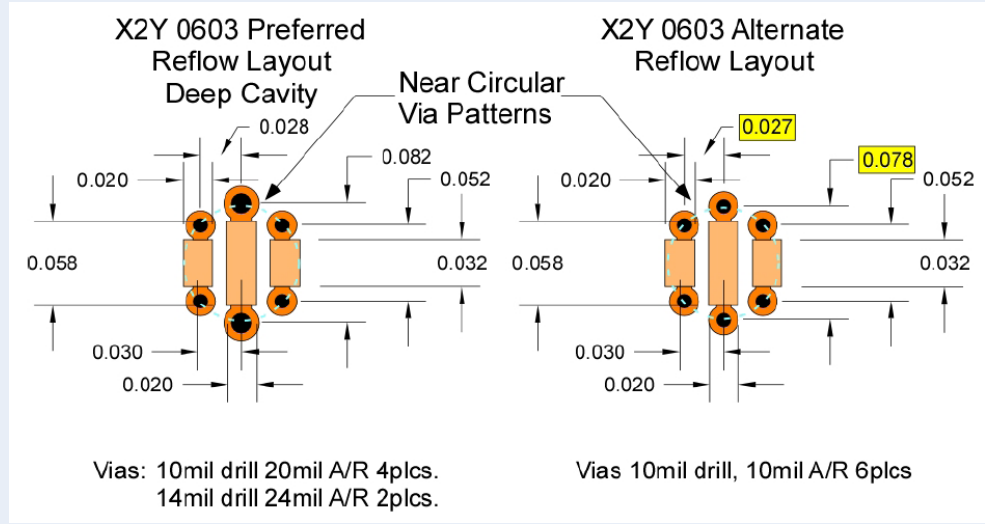
# Via Placement for 0402, Tantalum, and X2Y Capacitors

0402 Capacitor  
1.27mm Via Grid

0402 Capacitor  
1.00mm Via Grid



## X2Y Capacitor



## Tantalum Capacitor Via Placement

Option 1

Option 2  
(via-in-pad)

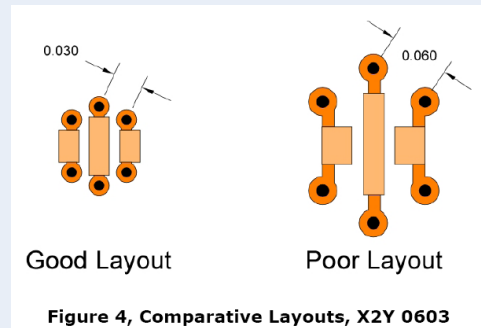
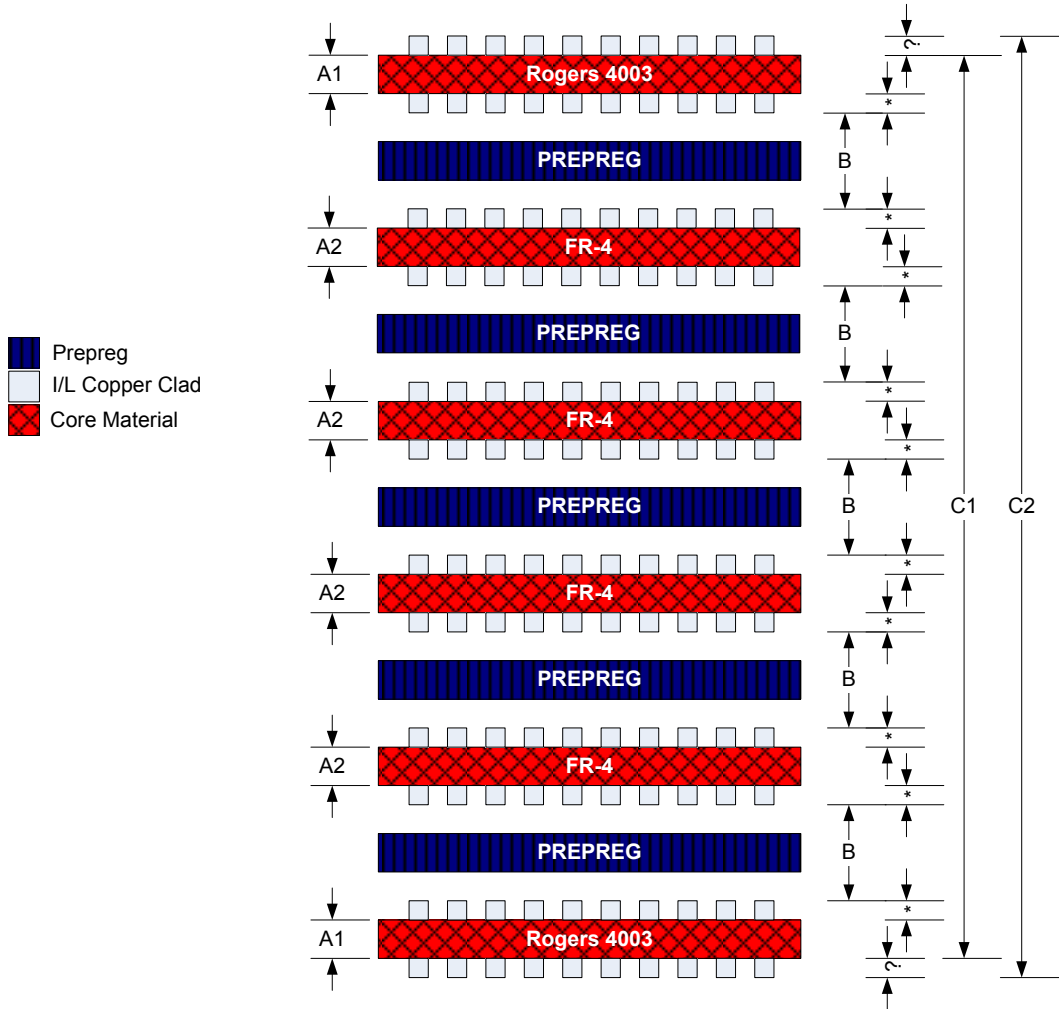


Figure 4, Comparative Layouts, X2Y 0603

# 12-Layer Mixed-Dielectric Core Construction



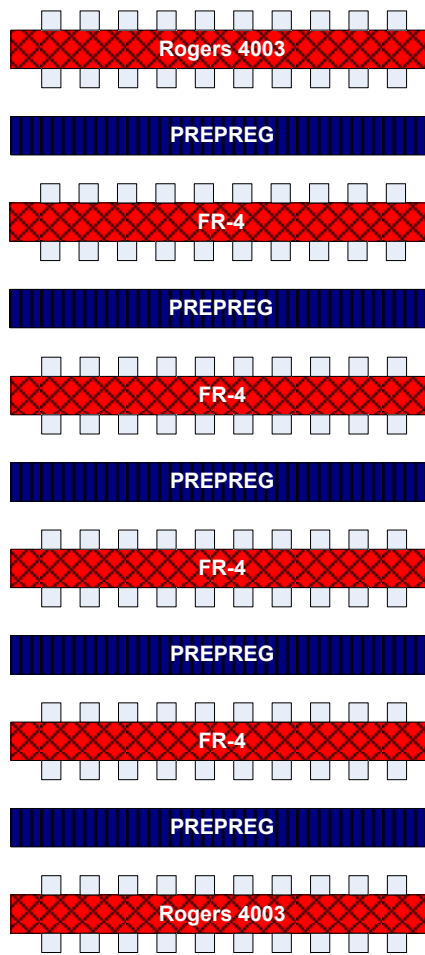
Construction Type	A1 (Inches)	A2 (Inches)	B (Inches)	C1 (Inches)	C2 (Inches)
Rogers/FR-4 Mix	.008 ± .001	.008 ± .001	.0045 ± .0007	0.068 - 0.087	0.0694 - 0.0884




? = Copper thickness unless otherwise specified on outer layers is ½ oz Cu (0.0007" before plating)

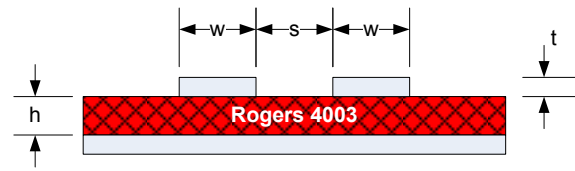
\* = Copper thickness unless otherwise specified on inner layers: ½ oz Cu (0.0007")

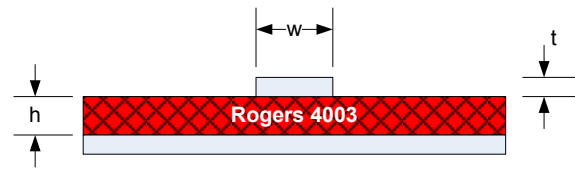
# 12-Layer Mixed-Dielectric Core Construction Stack-Up

Layer Name	Signal/Plane
Top	Signal
Side2	Plane (GND)
Side3	Plane (PWR)
Side4	Signal
Side5	Plane (GND)
Side6	Signal
Side7	Signal
Side8	Plane (GND)
Side9	Signal
Side10	Plane (PWR)
Side11	Plane (GND)
Bottom	Signal



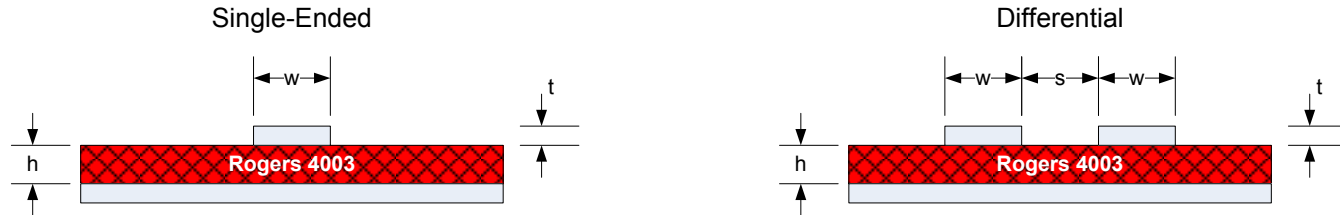
-  Prepreg
-  I/L Copper Clad
-  Core Material





# 10-Layer Mixed-Dielectric Core Construction Transmission Lines

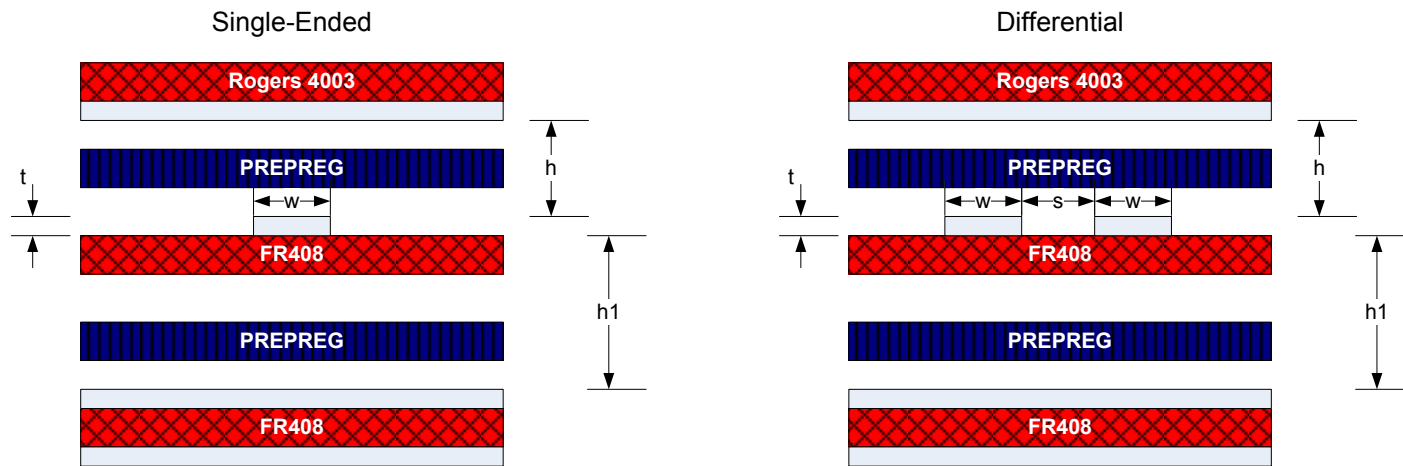
Microstrip:



T-line	h (Inches)	w (Inches)	s (Inches)	t (oz) [Inches]	Z <sub>o</sub> (Ohms)	ε <sub>r</sub>
Single-Ended	.008 ± .001	0.016	N/A	½ [0.0007]	50.37	3.38
Differential	.008 ± .001	0.012	0.008	½ [0.0007]	100.96	3.38

Microstrip allowed on Top and Bottom Layers.

Asymmetric (Offset) Stripline:



T-line	h1 (Inches)	h (Inches)	w (Inches)	s (Inches)	t (oz) [Inches]	Z <sub>o</sub> (Ohms)	ε <sub>r</sub>
Single-Ended	.00149 ± .001	.0062 ± .0007	0.004	N/A	½ [0.0007]	50	3.65
Differential	.00149 ± .001	.0062 ± .0007	0.004	0.004	½ [0.0007]	100	3.65



