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PCB Trace Width Calculator

Presented By **samtec**

This tool uses formulas from IPC-2221 to calculate the width of a copper printed circuit board conductor or "trace" required to carry a given current while keeping the resulting increase in trace temperature below a specified limit. If the length of the trace is also provided, the total resistance, voltage drop, and power loss due to trace resistance are also calculated. The results are estimates; actual results may vary depending on application conditions. Note also that required widths are significantly higher for traces on internal layers of a circuit board compared to those on a board's outer surface; use whichever result is appropriate for your situation.

Current (I)

 A

Thickness (t)

Temperature Rise (T_{Rise})

Ambient Temperature

Trace Length

FORMULA

First, calculate the Area:

$$A = \left(\frac{I}{k \times T_{Rise}^b} \right)^{\frac{1}{c}}$$

For IPC-2221 internal layers: $k = 0.024$, $b = 0.44$, $c = 0.725$

For IPC-2221 external layers: $k = 0.048$, $b = 0.44$, $c = 0.725$

where k , b , and c are constants resulting from curve fitting to the IPC-2221 curves.

Then, calculate the Width:

$$W = \frac{A}{t \times 1.378}$$

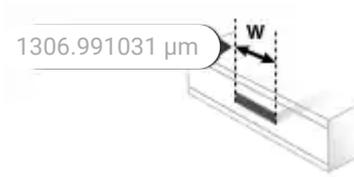
Common values:

Thickness: 1 oz

Ambient: 25 C

Temp rise: 10 C

Minimum Trace Width



Internal Layers

Required Trace Width (W)

1306,991031

Resistance

0,07137577674	Ω
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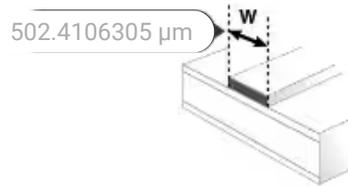
Voltage Drop

0,07137577674	V
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Power Loss

0,07137577674	W
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Minimum Trace Width



External Layers in Air

Required Trace Width (W)

502,4106305

Resistance

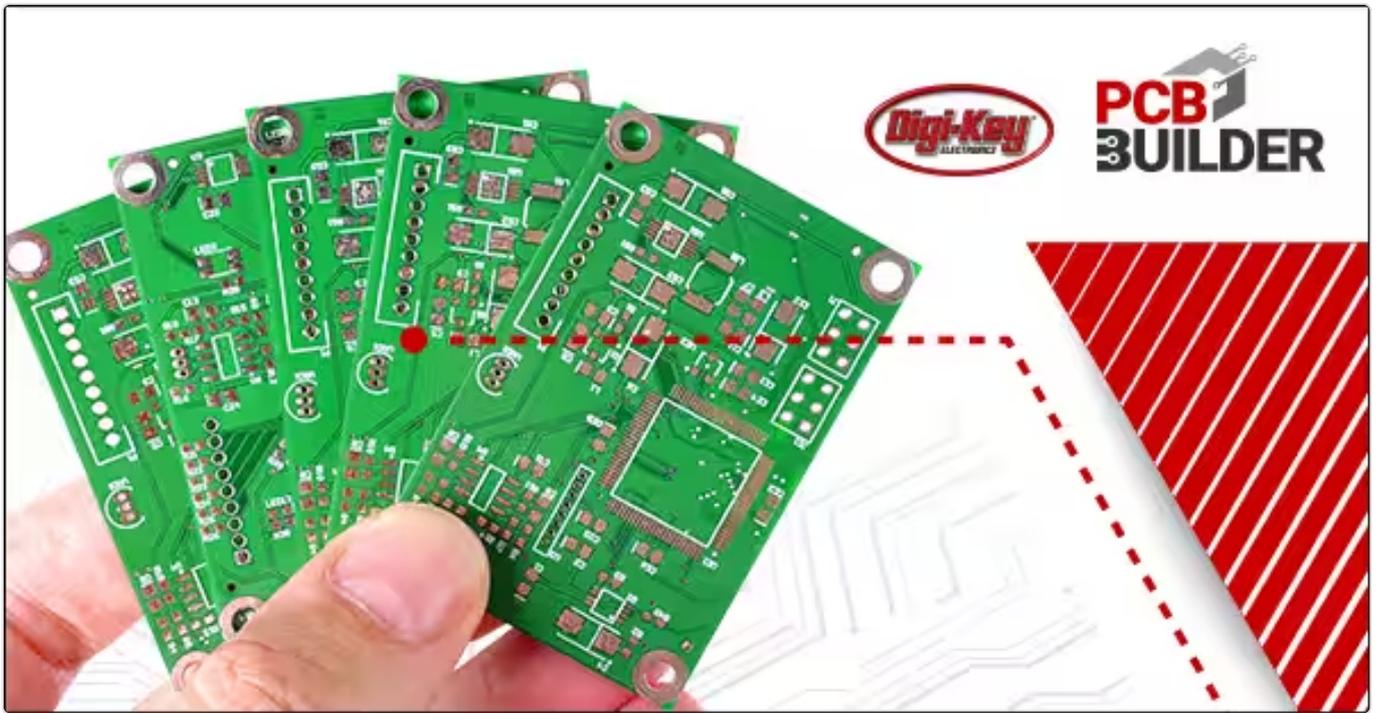
0,1856797893	Ω
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Voltage Drop

0,1856797893	V
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Power Loss

0,1856797893	W
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