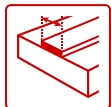




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## PCB Trace Width Calculator

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)

1

A

## Thickness (t)

12

Temperature Rise ( $T_{Rise}$ )

25

## Ambient Temperature

25

## Trace Length

60

## FORMULA

First, calculate the Area:

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

Then, calculate the Width:

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

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.

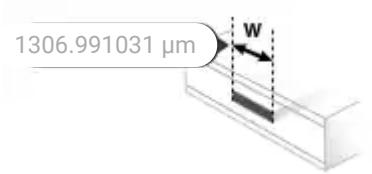
## Common values:

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
---------------	---

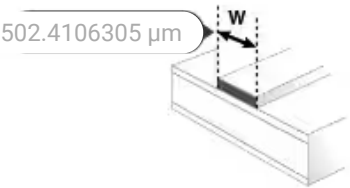
Voltage Drop

0,07137577674	V
---------------	---

Power Loss

0,07137577674	W
---------------	---

Minimum Trace Width



External Layers in Air

Required Trace Width (W)

502,4106305
-------------

Resistance

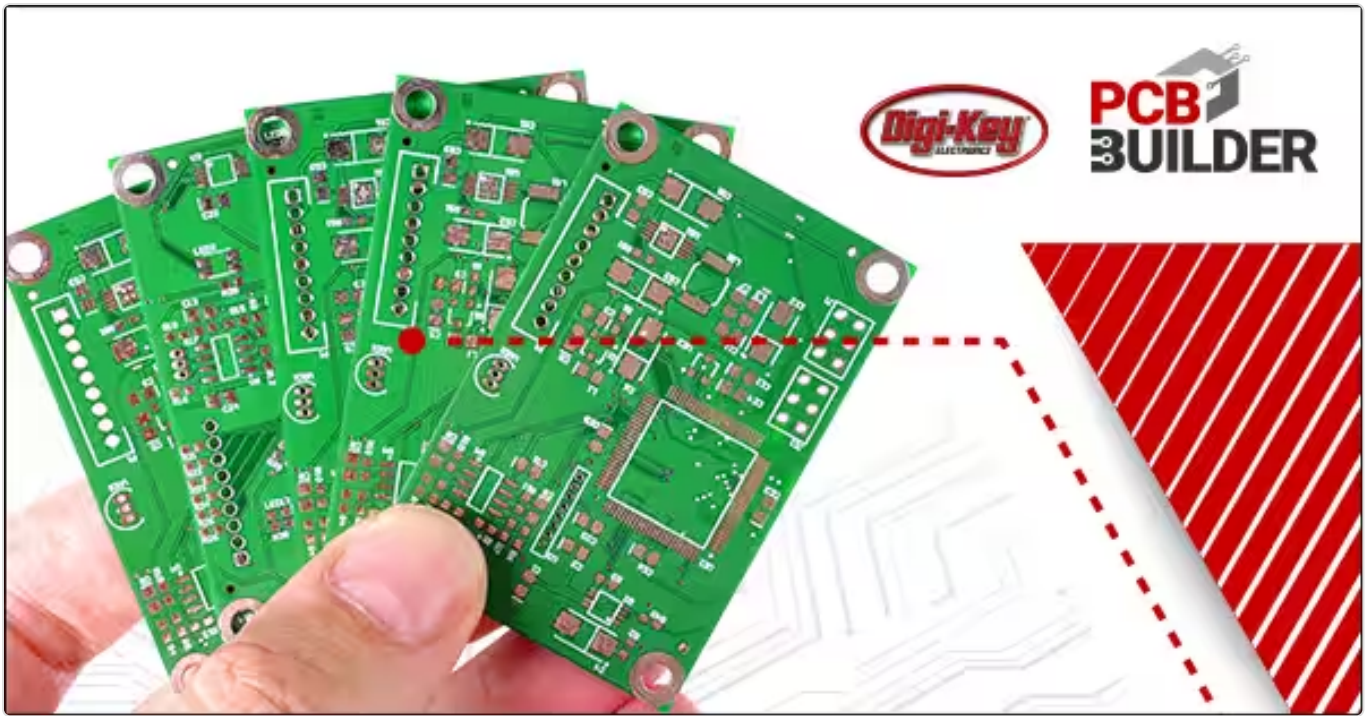
0,1856797893	Ω
--------------	---

Voltage Drop

0,1856797893	V
--------------	---

Power Loss

0,1856797893	W
--------------	---



## Related Tools



[Trace Impedance Calculator](#)



[Length Conversion](#)



[Wire Size Conversion Calculator](#)



[Inductance Conversion](#)

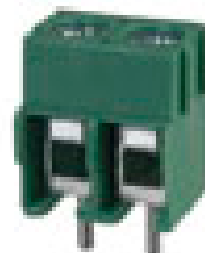


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