Cheatography

PCB Layout Notes Cheat Sheet

by sean via cheatography.com/22969/cs/6138/

Grids

Visible Grid	100 thou *typical for through-hole work*
Snap Grid	50/25/10 thou *typically used for track layout*

Tracks

Signal	25 thou
Ground	50 thou
"neck down"	10-15 thou

> *neck down to pass between component pads*
> *keep track widths as large as possible to minimize resistance, inductance, etc.*

See track width chart to the right for track width recommendations based on current flow, for a 10 deg C temperature rise within the track.

Spacing

10 thou	typical amount
8 thou	achievable with homemade PCBs

See minimum spacing chart to right for track spacing based on voltages.

Pads

Through hole, leaded components *(resistors, capacitors, etc.)*	Round 70 thou
Dual In-Line *(eg. IC's)*	Oval 60 thou ↕, 90-100 thou ↔
SMT packages	Rectangular *for most* Oval *for SO packages*

> *pin 1 is in a rectangular shape*
> *keep track widths as large as possible to minimize resistance, inductance, etc.*

Vias

Round	0.5mm-0.7mm

Holes (eg. through-hole components)

Round	1mm (39 thou)

NOTES

Board Dimensions

> Measured in mm

Copper Weight/Thickness Guildelines

> General Purpose: 1oz copper
> High Current: 2oz - 4oz copper

Design and Layout (eg. grids, pads, tracks, spacing)

> use thou

Mechanical and Manufacturing (eg. hole sizes, board dimensions)

> use mm

Minimum Track Width for 10 deg C rise

Current *Amps*	**Width** *1oz* *thou*	**Width** *2oz* *thou*	**milliOhms** *per inch*
1	10	5	52
2	30	15	17.2
3	50	25	10.3
4	80	40	6.4
5	110	55	4.7
6	150	75	3.4
7	180	90	2.9
8	220	110	2.3
9	260	130	2.0
10	300	150	1.7

Minimum Spacing (based on voltage)

Voltage *(DC/Peak AC)*	**Internal** *mm / thou*	**External** *mm / thou*
0-15V	0.05mm/2 thou	0.1mm/4 thou
16-30V	0.05mm/2 thou	0.1mm/4 thou
31-50V	0.1mm/4 thou	0.6mm/23.6 thou
51-100V	0.1mm/4 thou	0.6mm/23.6 thou
101-150V	0.2mm/8 thou	0.6mm/23.6 thou
151-170V	0.2mm/8 thou	1.25mm/49 thou
171-250V	0.2mm/8 thou	1.25mm/49 thou
251-300V	0.2mm/8 thou	1.25mm/49 thou
301-500V	0.25mm/98.5 thou	2.5mm/98.5 thou

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Best Practices

Best Practices

> **Track Size:** Keep track size as large as you can get away with, necking down as needed when things get crowded.

> **Track Size:** Design track size for a 10deg C temp rise within the tracks (see table, pg.7, in PCB design tutorial article by Dave Jones)

> **Professional Manufacture:** When having your board professionally manufactured, consult their design guides to see what their minimum track size/spacing is.

> **Pad/hole ratio:** the ratio of pad size to hole diameter. Rule of thumb is to aim for the pad to be 1.8 times larger than the diameter of the hole (allows for alignment tolerances between drill and artwork).

PCB design tutorial article by Dave Jones
http://alternatezone.com/electronics/files/PCBDesignTutorialRevA.pdf

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