

What is a copper coin?

The copper coin PCB is a piece of solid copper inserted onto or into the PCB, typically under the component(s) which need cooling. Copper coin can provide up to 10 times the cooling compared to a via farm of same size. And instead of using thermally conductive material, the copper coin can provide direct contact between the heat-generating component pad to the heat sink. Copper's thermal conduciveness is on average 30-200 times better than any conductive dielectric prepreg available.

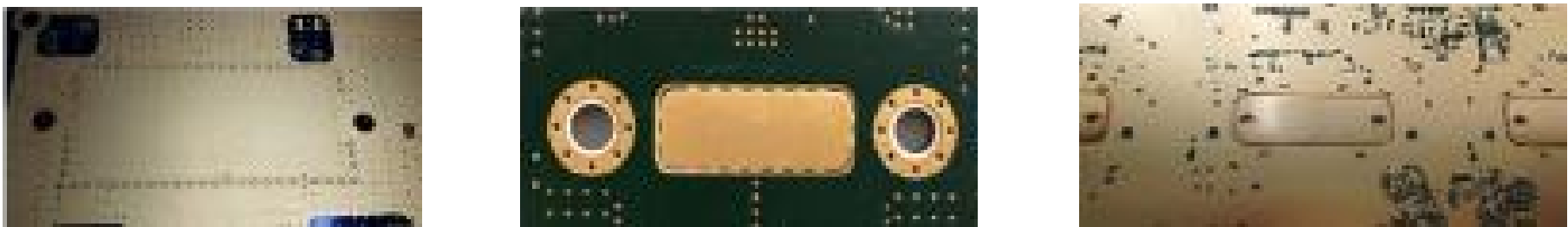
Copper Coins can reduce weight and cost compared to a conventional attached heat sink and allows assembly of components on both sides of the PCB.

Technical tips

- Mechanical advice**
- 1 It is recommended to have the same hole size for all holes in the coin.
 - 2 When different size coins are used on the same unit, the size difference should be ≥1mm. If the difference is <1mm, we suggest to use same size.
 - 3 Minimum difference of long size and short size of the coin preferred to be ≥= 1.0mm. A difference <0.3mm will be taken as same size.
 - 4 Number of coins per unit may be up to 32 pcs, but this also depends on the the coin sizes, PCB size and customer panel. Please ask PCBX before you start design.

Design guide

- 1 Connections V5 is done by laser milling and copper filling. Preferred maximum size of the opening to be filled is 4×4 mm. If a larger area needs to be connected, please contact your local FAE.
- 2 Copper coin can be embedded, press fit or be bonded by conductive adhesive film.

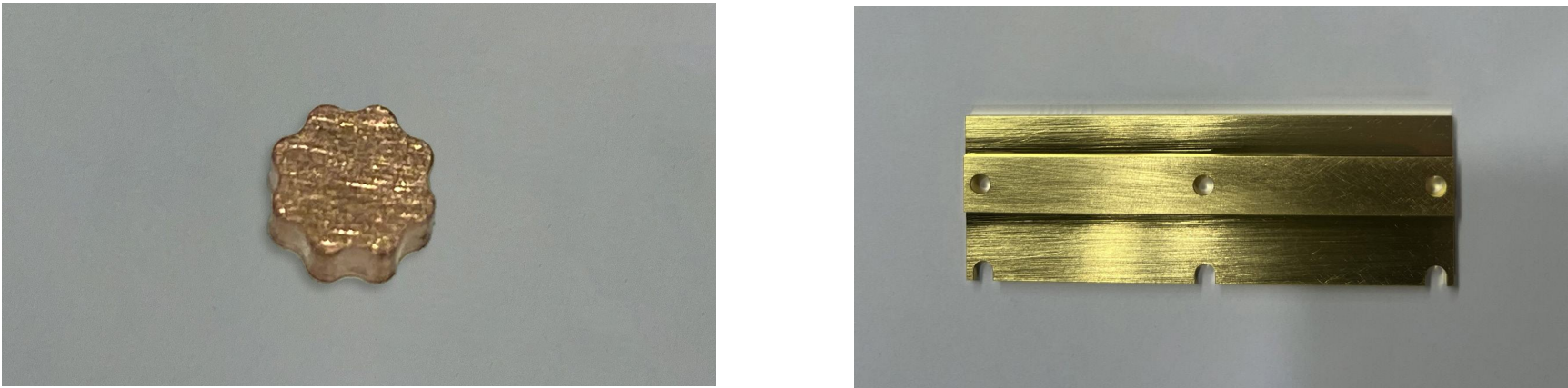


- 3 Copper coin can be used in normal high layer count, IPC 4761 type VII plugging, HDI or Rigid-flex constructions, but each factory has individual limitations. It is recommended to ask PCBX before starting a new design.
- 4 Different types of coins can be in one unit, but we recommend less than 3 different types or sizes.
- 5 The Aspect ratio limitation of blind via in a coin is <1:1, but for optimal production the preferred is 0.8:1.
- 6 Any construction with coins must have a symmetric build, which means same core and prepreg each side of the centre core.
- 7 The Shape of T coin should be symmetrical in both X and Y direction, which means the size Q shall be the same on both sides, but Qx and Qy can be different. If you need an asymmetric shape please contact your local PCBX FAE.
- 8 Coin attachment by conductive adhesive can be available depending on design and factory capability. Please check with the local PCBX FAE before you start design.
- 9 Coin by press fit attachment has limitations. When press fit is used, the push/pull strength might be limited. Please contact your local PCBX FAE for further checking.

Types of coins



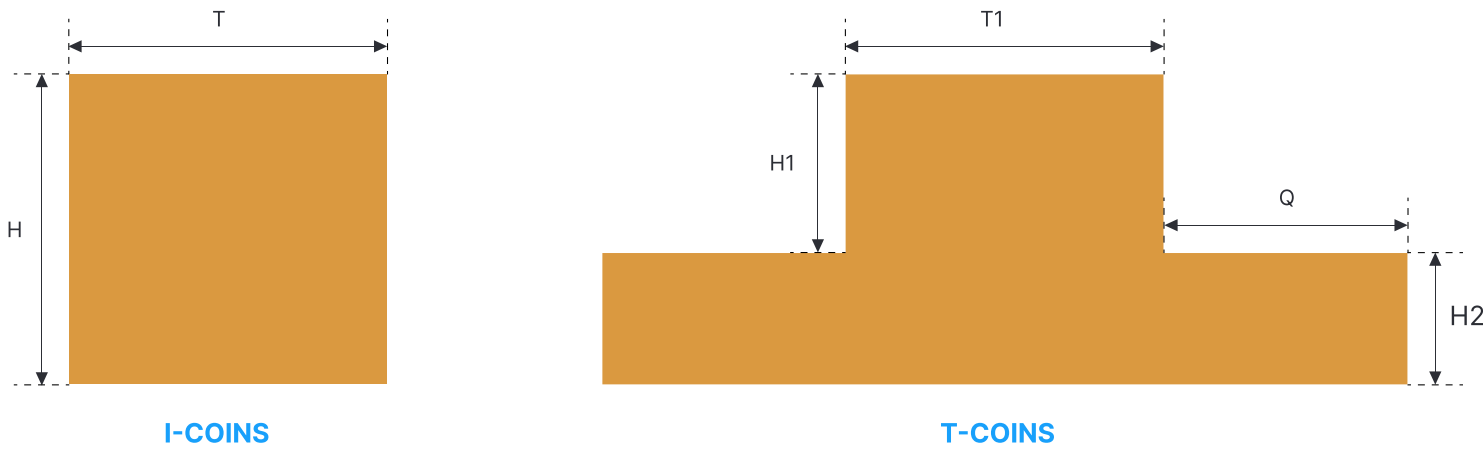
I OR U COINS



PRESS FIT I COINS

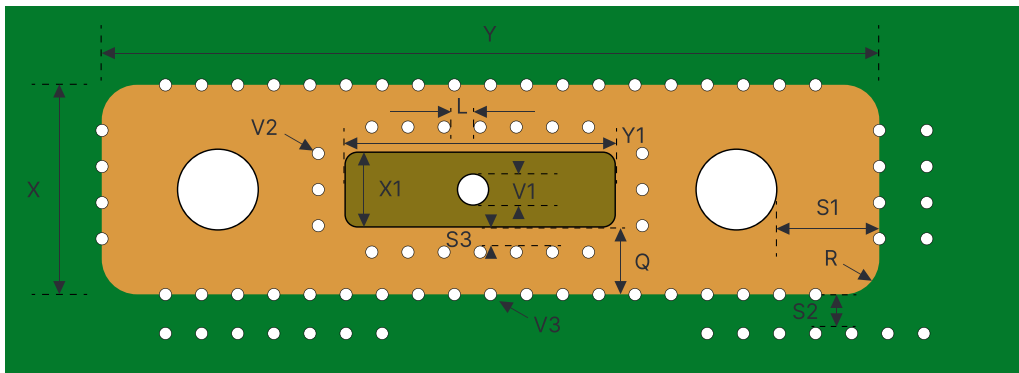
T COINS

Copper coin mechanical manufacture



I-COINS

T-COINS

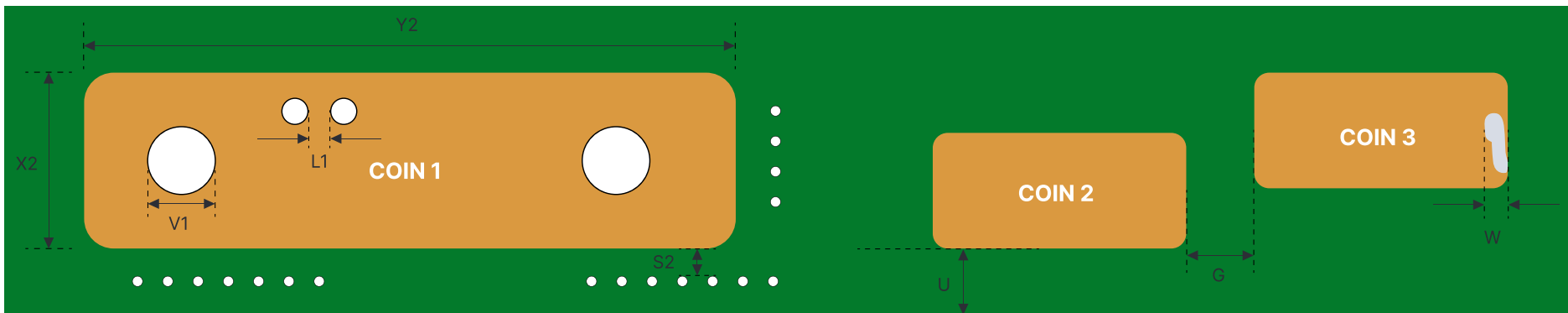
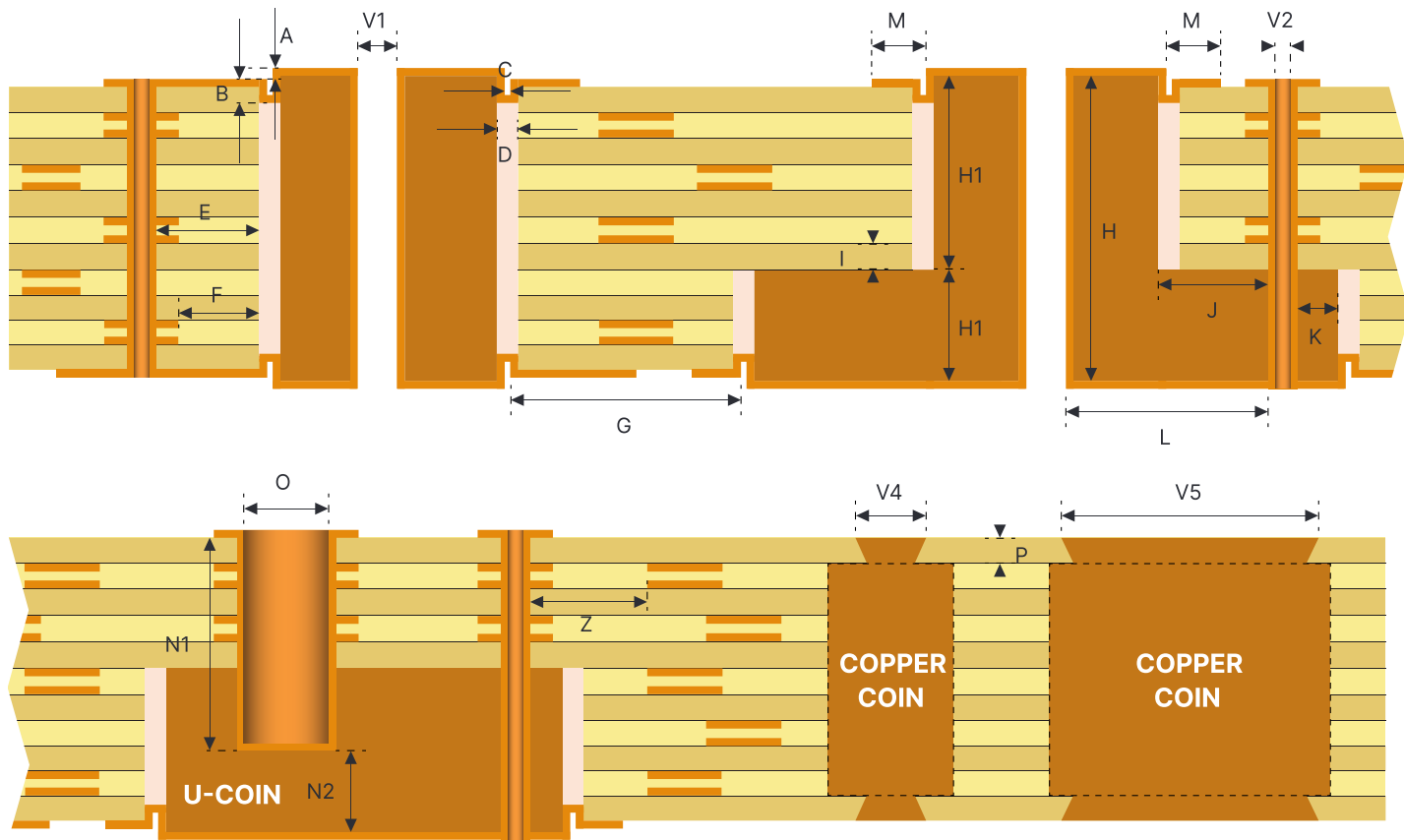


T-COINS

SYMBOL	FEATURE	UNIT	PREFERRED	ADVANCED
H	Coin thickness	mm	1.0– 2.8	0.8-3.0
	Copper coin dimension tolerance	mm	±0.15	±0.03
H1	Top thickness / ladder of T coin	mm	0.5-1.8	≥0.35
H2	Base thickness of T coin	mm	≥0.5	0.5
	The depth routing tolerance on T coin	mm	±0.1	±0.075
Q	Minimum width of T coin based	mm	≥2	2
R	Minimum radius of corner chamfering	mm	1.0	0.5
S1=K	Hole edge to coin edge	mm	0.35	0.3
S2=E+D	Hole edge on PCB to bottom edge of T coin	mm	0.68 (PTH) 0.53 (NPTH)	0.53 (PTH) 0.48 (NPTH)
S3=J	Hole edge to top edge of T coin	mm	≥0.5	0.5
T	Diameter of top of the cylinder	mm	5	2
T1	Minimum width of T coin top	mm	5	2
X=X1+2Q	T coin short size	mm	20	2-30
Y=Y1+2Q	T coin length size	mm	30	8-30
L	Hole wall to hole wall on copper I coin	mm	0.5	0.4
V1	*Hole size on I coin	mm	≥0.9	0.9 (min.) 6.0 (Max.)
V2	*Hole size on Ladder of T coin	mm	H/3	0.3 (min) 6.0 (Max)
V3	Minimum diameter of half hole at Press fit coin edge	mm	≥0.8	0.6

Based on actual inventory, materials, and departmental constraints, conditions may change. If necessary, please contact our company for confirmation in advance.

Guidance for coin in designs



SYMBOL	FEATURE	UNIT	PREFERRED	ADVANCED
A	Coin flatness	mm	±0.075	+/-0.05
B	Dent of resin filled coin area	mm	0.076	0.05
C	Coin edge to cavity boundary after plating	mm	0.1	0
D	Coin edge to cavity boundary	mm	0.13	0.1
E	Cavity edge to hole wall	mm	0.55 (PTH) 0.5 (NPTH)	0.43 (PTH) 0.38 (NPTH)
F	Cavity edge to inner/outer circuit	mm	0.5 (Outer) 0.3 (Inner)	0.38 (Outer) 0.25 (Inner)
G	Cavity edge to cavity edge	mm	7	5
H	Coin thickness	mm	1.0-2.8	0.8-3.0
H1	Top thickness / ladder of T coin (min.)	mm	0.5-1.8	≥0.25
H2	Base thickness of T coin(min.)	mm	≥0.5	0.5
I	Dielectric thickness	mm	0.15	0.075
J	Top of T coin edge to hole wall	mm	≥0.5	0.5
K	Outline of T Coin edge to hole wall	mm	0.35	0.3
L1	Hole wall to hole wall on copper I coin	mm	1.0	0
M	Minimum Annular ring of copper coin	mm	0.5	0.3
N1	Milling depth	mm	≥0.5	0.5
N2	Min. remain thickness of U coin	mm	≥0.5	0.5
O	Min. milling slot size	mm	2.0	1.6
P	Maximum copper filling depth	mm	0.10	0.135
U	Coin to PCB Edge	mm	10	5.0
V4	Min. laser drilling size	mm	0.08-0.15	0.08
V5	Max. laser drilling size**	mm	4×4**	10×10**
W	Resin flow on to the coin surface	mm	≤0.25	≤0.25
X2	I coin short size	mm	20	2-50
Y2	I coin length size	mm	30	8-80
Z=D+E+K	Circuitry to thermal hole	mm	1.1	0.9
	Hole wall copper thickness	mm	0.025	0.05
	Maximum Board Layers	Layers	4-20	30

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