# Actividad 9.1

1) A continuación se describen las características provistar por tres fabricantes locales
- MAYER
  - Material: PTH
- SEI
  - Material: FR2, FR4 (0.6, 0.8, 1.0, 1.2, 1.6, 2.0, 2.4 y 3.2 mm)
- INERCI
  - Material: 4PCB

(Como nunca me respondieron los mails busqué proveedores de afuera)

# 4PCB ([www.4pcb.com](www.4pcb.com))

| Specifications | Standard | Custom |
|---|---|---|
| Layer Count | 0 - 10 Layers | 0 - 40 Layers |
| Turn Time | Same Day - 5 Day | Same Day - 4 Weeks |
| Quantity Req. | 1 - 10000+ | 1 - 10000+ |
| Materials | FR-4 | FR-4/Rogers/Polyimide/Aluminum Clad/High-Temp. FR4/*Others* » |
| Plating Finish | Lead-Free HAL* | Electrolytic Hard Gold/Soft Gold/ENIG/Nickel/Immersion Silver OSP/Leaded & Lead-Free HAL |
| Cert. / Qualifications | IPC Class 2 - A600 | IPC6012 Class 2-3A / IPC6018 Class 3 MIL-PRF-31032 / MIL-PRF-55110 / ISO 9001:2008 / AS9100C / *More* » |
| Board Thickness | .031" / .062" / .093" / .125" | Full Range Available |
| Copper Weight | 1 oz. Inner / Up to 2 oz. Outer | 0.5 - 4 oz. Inner / 1 - 20 oz. Outer |
| Trace/Space | 5 / 5 Mils | Down to 2.75 / 3 Mils |

Descripción de materiales

[http://www.4pcb.com/laminate-material-vendors.html](http://www.4pcb.com/laminate-material-vendors.html)

# PCBCHART([www.pcbcart.com](www.pcbcart.com))

Solo FR4

| Feature | Capability |
|---|---|
| Quality Grade | Standard IPC 2 |
| Number of Layers | 1 - 32layers |
| Order Quantity | 1pc - 10,000,000 pcs |
| Build Time | 2days - 5weeks (Expedited Service) |
| Material | FR-4 Standard Tg 140°C, FR4-High Tg 170°C, FR4-Sigh-Tg 180°C, FR4-Halogen-free, FR4-Halogen-free & High-Tg |
| Surface Finish | HASL - Hot Air Solder Leveling<br>Lead Free HASL - RoHS<br>ENIG - Electroless Nickle/Immersion Gold - RoHS<br>ENEPIG - Electroless Nickel Electroless Palladium<br>Immersion Gold - RoHS<br>Immersion Silver - RoHS<br>Immersion Tin - RoHS<br>OSP -Organic Solderability Preservatives - RoHS |
| Impedance tolerance | ±5% - ±10% |
| SMD Pitch | 0.2mm(8mil) |
| BGA Pitch | 0.2mm(8mil) |
| Chamfer of Gold Fingers | 20, 30, 45, 60 |
|  | Gold fingers<br>Blind and Buried Holes<br>peelable solder mask<br>Edge plating<br>Carbon Mask<br>Kapton tape |

# 3PCB (www.3PCB.com)

| Items | Manufacturing Capabilities | Remarks |
|---|---|---|
| Number of Layers | 1-10 layers | For orders above 10 layers, please contact our sales rep. |
| Material | FR-4 (King Board) | For Flex, Rigid-flex, Metal-based (Aluminum etc.,), HDI, Halogen-free, High Tg, etc., please contact sales rep. |
| Maximum PCB Size(Dimension) | 500x1100 mm | Any sizes beyond this dimension, please contact us. |
| Board Size Tolerance(Outline) | ±0.2mm/±0.5mm | ±0.2mm for CNC routing, and ±0.5mm for V-scoring. |
| Board Thickness | 0.4-2.4mm | 0.4, 0.6, 0.8, 1.0, 1.2, 1.6, 2.0, 2.4mm. Please contact us if your board exceeds these. |
| Board Thickness Tolerance(t≥1.0mm) | ±10% | Normally "+ Tolerance" will occur due to PCB processing steps such as electroless copper, solder mask and other types of finish on the surface. |
| Board Thickness Tolerance(t<1.0mm) | ±0.1mm | |
| Min Trace | 0.1mm/4mil | Min manufacturable trace is 4mil(0.1mm), strongly suggest to design trace above 6mil(0.15mm) to save cost. |
| Min Spacing | | Min manufacturable spacing is 4mil(0.1mm), strongly suggest to design spacing above 6mil(0.15mm) to save cost. |
| Outer Layer Copper Thickness | 1oz/2oz/3oz(35μm/70μm/105μm) | Also known as copper weight. 35μm=1oz, 70μm=2oz, 105μm=3oz. Please contact us if you need copper weight greater than 3oz. |
| Inner Layer Copper Thickness | 1oz/1.5oz(35μm/50μm) | Inner copper weight as per customer's request for 4 and 6 layers. Please contact us if you need copper weight greater than 1.5oz. |
| Drill Sizes (CNC) | 0.2-6.3mm | Min drill size is 0.2mm, max drill is 6.3mm. Any holes greater than 6.3mm or smaller than 0.3mm will be subject to extra charges. |
| Min Width of Annular Ring | 0.15mm(6mil) | For pads with vias in the middle, Min width for Annular Ring is 0.15mm(6mil). |
| Finished Hole Diameter (CNC) | 0.2mm-6.2mm | The finished hole diameter will be smaller than size of drill bits because of copper plating in the hole barrels |
| Finished Hole Size Tolerance(CNC) | ±0.08mm | For example, if the drill size is 0.6mm, the finished hole diameter ranges from 0.52mm to 0.68mm will be considered acceptable. |
| Solder Mask | LPI | Liquid Photo-Imageable is the mostly adopted. Thermosetting Ink is used in the inexpensive paper-based boards. |
| Minimum Character Width(Legend) | 0.15mm | Characters of less than 0.15mm wide will be too narrow to be identifiable. |

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|---|---|---|
| Minimum Character Height (Legend) | 0.8mm | Characters of less than 0.8mm high will be too small to be recognizable. |
| Character Width to Height Ratio (Legend) | 1:5 | In PCB silkscreen legends processing, 1:5 is the most suitable ratio |
| Minimum Diameter of Plated Half Holes | 0.6mm | Design Half-Holes greater than 0.6mm to ensure better connection between boards. |
| Surface Finishing | HASL with lead<br>HASL lead free<br>Immersion gold | The most popular three types of PCB surface finish. Please contact us for other finishes. |
| Solder Mask | Green ,Red, Yellow, Blue, White ,Black | No extra charge (Green, Red, Yellow, Blue) |
| Silkscreen | White, Black, None | No extra charge. |
| Panelization | V-scoring,<br>Tab-routing,<br>Tab-routing with Perforation (Stamp Holes) | Leave min clearance of 1.6mm between boards for break-routing. For V-score panelization, set the space between boards to be zero. |