封装信息

元器件引脚焊盘网板的设计方针与示例

为了提高表面贴装型元器件的散热效率，通常会在封装背面设有元器件引脚焊盘（Extended pad），以向 PCB 散热。此时通常会通过回流焊连接元器件引脚焊盘与 PCB 的铜箔面，但若不合理地设计所使用网板（Stencil）的尺寸，则可能会发生贴装故障。本应用笔记记述了元器件引脚焊盘网板的设计方针和示例。

罗姆通过设计资源“封装信息”及“CAD 数据”提供封装的参考焊盘尺寸。但现阶段（2021.10）由于需要分别配合各制造环境进行调整，因此暂时无法提供网板 （又称“钢板”）的信息。元器件引脚焊盘的焊盘面积一般比较大，因此如果按照相同的尺寸去设计网板，印刷焊锡膏的话则可能会发生贴装故障。

鸥翼式封装用网板
SOP、QFP 等

网板的开口部基本上是按照与元器件引脚焊盘相同尺寸来设计的，但有时为了提高回流焊接时产生气体的逸出性，抑制焊锡气泡的产生，会设置阻焊层分割网板的开口部位（例 1、例 2）。SOP 与 QFP 从封装的 2 个或 4 个侧面引出引线，由于其形状为鸥翼型，所以在基板贴装面和封装下表面间会存在间距（Standoff）（Figure1）。因此，即使选择比此间距厚的网板，涂敷很多的焊料也不容易引起连焊等贴装不良。另外，在元器件引脚焊盘下面设散热孔（Through hole）时，需要注意焊锡的吸附。许多焊锡被散热孔吸附后，会导致接合强度和焊锡熔敷率下降，可能会导致热阻恶化。

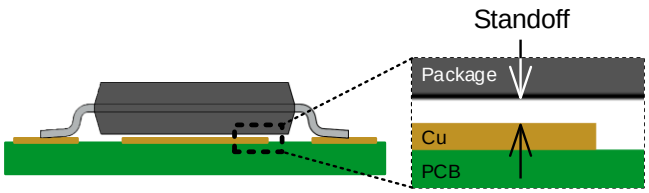


Figure 1. 鸥翼式封装基板贴装面和封装下表面间存在间距

扁平引脚型封装用网板
QFN、SON、SOF 等

QFN 封装作为扁平引脚型封装的代表性封装，由于基板贴装面和封装下表面间没有间距，需要注意以下贴装故障。

1. 焊锡膏过量时，焊锡桥及器件整体上浮，产生焊锡气泡
2. 焊锡膏量不足时，可能会导致焊锡接合不良或可靠性下降
3. 焊锡膏的不均匀涂敷会导致间距不一致性的增加，从而导致引脚虚焊
4. 回流焊接时放出的气体导致较大的焊锡气泡产生

网板的开口部尺寸的设计一般与元器件引脚焊盘的尺寸相同，但我们不推荐开设一个大的开口，而建议使用有多个小开口的网板（例 3、例 4）。这样就可以控制焊锡膏的印刷范围，从而控制焊锡的厚度。另外，气体的逸出性也会提高，能够有效控制气泡的产生。焊锡膏的印刷范围一般设置为元器件引脚焊盘面积的 50％～80％。

由于结果会因为贴装设备与条件、网板的厚度与剖面形状、材质等而发生变化，因此请设计最适合客户生产线的网板。

网板示例

例 1. HTSOP-J8

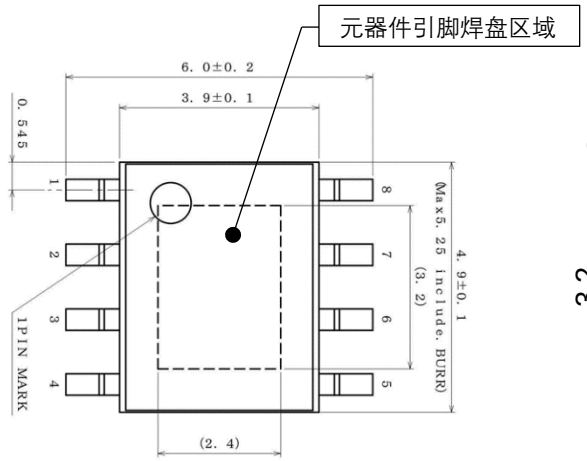
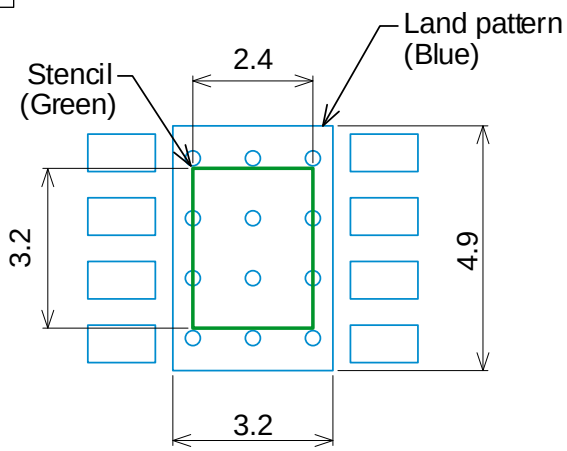


Figure 2. 外形顶视图
顶视图



*阻焊层开口部位与元器件引脚焊盘区域相同（2.4mm×3.2mm）

Figure 3. 网板示例

例 2. HTSSOP-C48

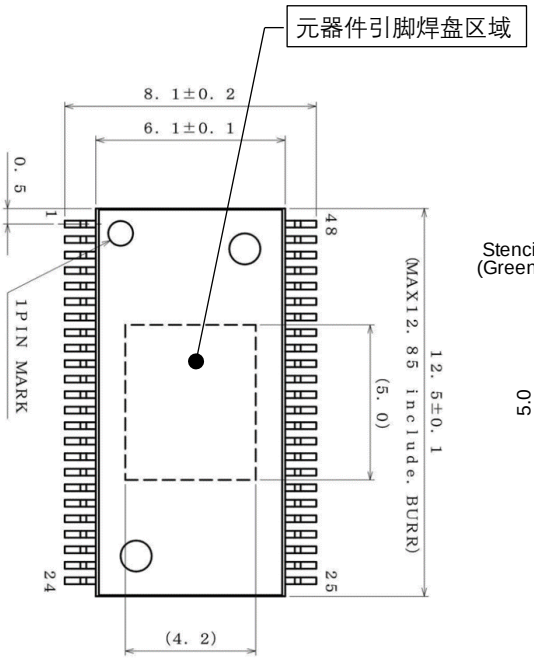


Figure 4. 外形顶视图
顶视图

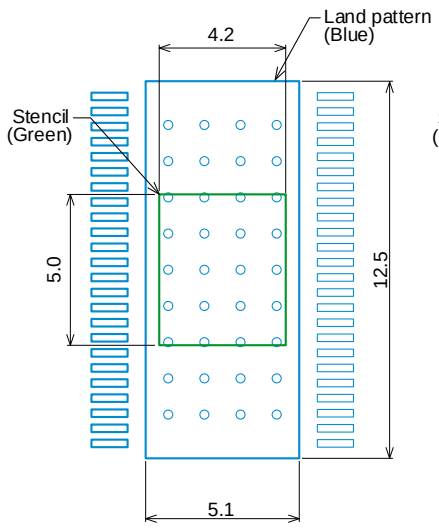
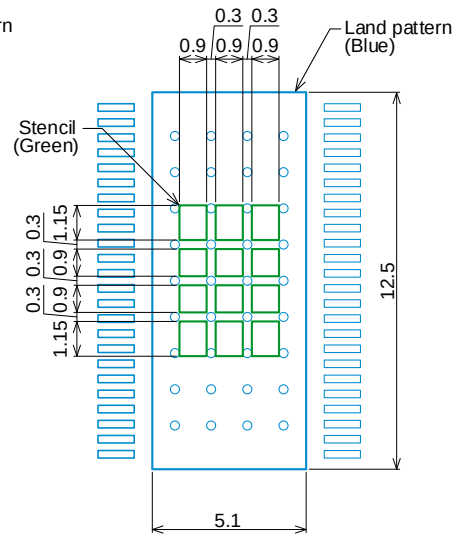


Figure 5. 网板示例
一个开口部位



*阻焊层开口部位与元器件引脚焊盘区域相同（4.2mm×5.0mm）

Figure 6. 网板示例
分割开口部位
焊锡膏印刷范围：52.7%

例 3. VQFN028V5050

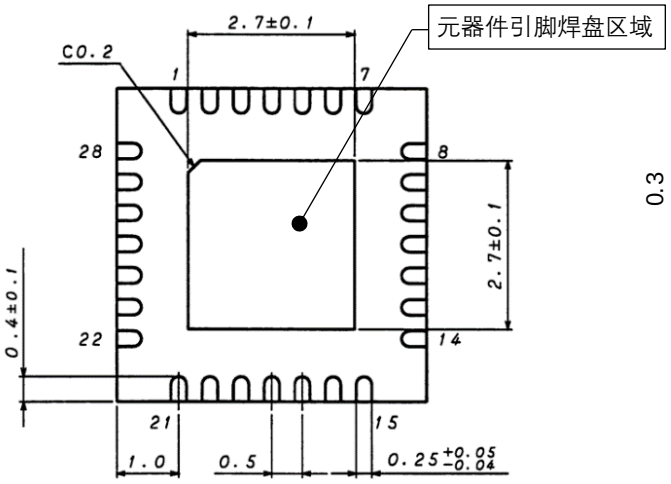
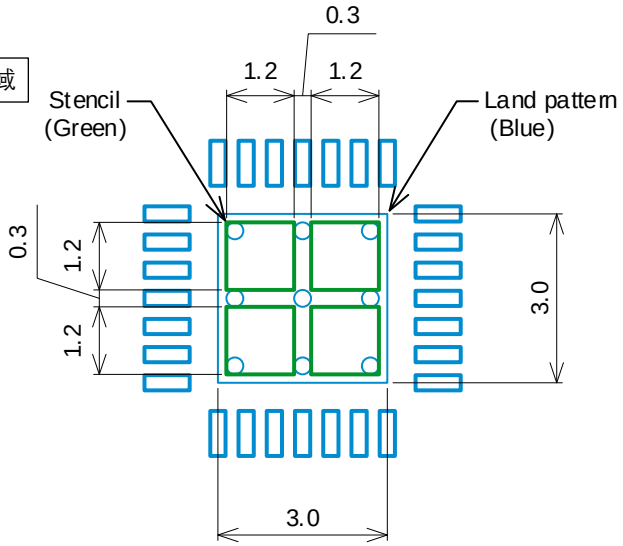


Figure 7.外形底视图

底视图



＊ 阻焊层开口部位与元器件引脚焊盘区域相同

(2.7mm×2.7mm)

Figure 8. 网板示例

焊锡膏印刷范围：79%

例 4. HSON8

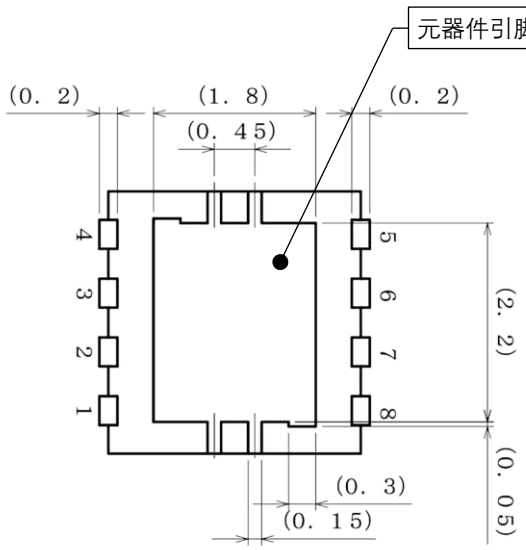
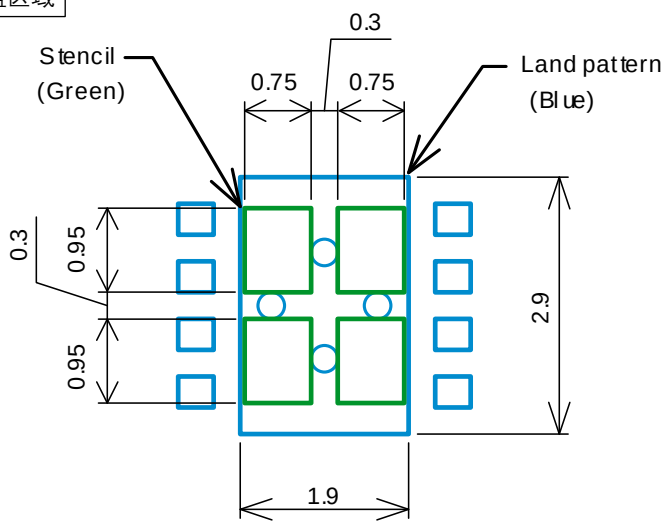


Figure 9. 外形底视图

底视图



＊ 阻焊层开口部位与元器件引脚焊盘区域相同 (1.8mm×2.2mm)

Figure 10. 网板示例

焊锡膏印刷范围：72%

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