

文件名称(Title): **PCB Layout**

文件编号 (Doc. No.)

:

版本 (Revision):

编订者 (Author):

审查(Checked by)

版本 (Revision)	变更日期 (Date)	变更说明 (Description)
01-	09.04.	增加 0201

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1.0 目的

为确保机型 PCA 局部各组件 PCB PAD Layout 的正确性及标准的统一性，故编订此Guide。

2.0 范围

适用手机事业部。

3.0 定义

3.1 为了便于设计端与制程端便利阅读此份文件，文件所涉及的全部尺寸将同时使用公制〔mm〕与英制〔mil〕两种制式单位。

3.2 本份 Guide 后续假设有变更时，其尺寸修改的原则为：整个中心位置不变，只是在原有尺寸的根底上进展增大或缩小。

3.3 DFM: Design For Manufacture。

3.4 如因电气特性〔ESD、EMI、EMC ……〕的关系，无法依据 Layout Guide进展 Layout时，将由PE、PED、R&D 共同争论 Layout方式。

3.5 如因客户的需求无法依此 Layout Guide 方式 Layout 时，将以客户的方式为主。

3.6 如因 PCB 厂商制程无法制做时，将由 PE、PED、R&D 共同打算 Layout方式。

4.0 权责

4.1 设计端(R&D):

R&D 在设计机型时,请依据此 Guide进展 Layout,以确保所设计的机型能满足各制程的作业要求

4.2 制程端(PE):

在机型导入时, PE 依此Guide确认各种类型组件的 Layout 是否符合标准,假设不符合则须提出相关的问题点.(DFM)

5.0 内容

5.1 作业流程

无

5.2 SMT 各类型组件 Layout Guide

R&D 单位按 4.1 规定之权责进展相关的 PCB Layout。

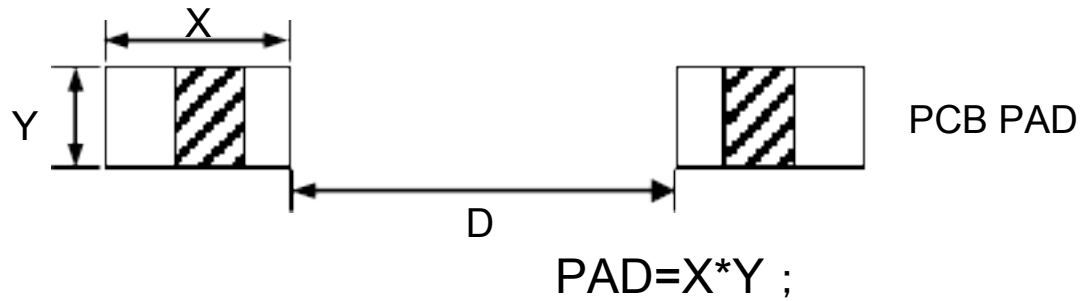
5.2.1 Chip component

A SMT 电阻、电容

a 零件外形



b PAD Layout

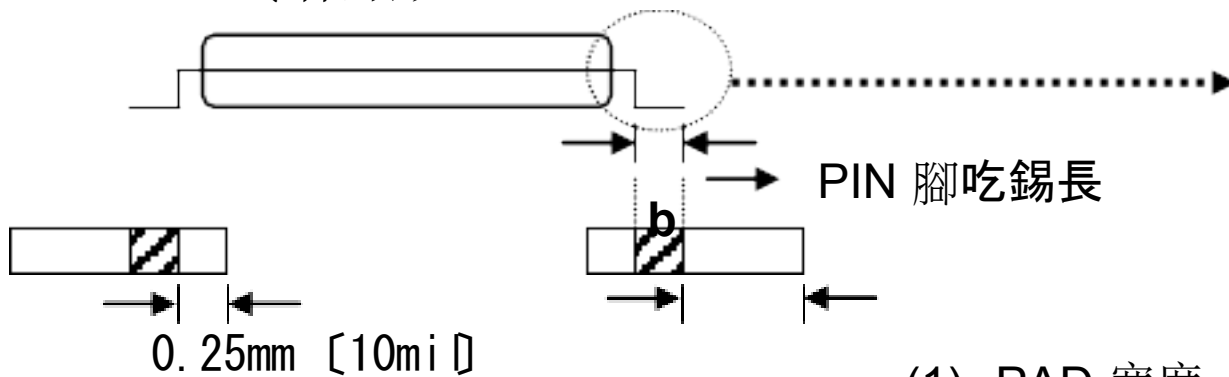


一般 CHIP 电阻与电容对应 LAYOUT 如下表:

NO	TYPE	L	W	X	Y	D
1	0201	0.6	0.3	(11.8mil) 0.3mm	(13.78mil) 0.35mm	(9.84mil) 0.25mm
1	0402	1.0	0.5	(19.69mil) 0.4922mm 0.2925mm	(23.62mil) 0.5905mm	(11.7mil)
2	0603	1.6	0.8	(33.86mil) 0.8465mm	(29.53 mil) 0.7382mm	(15.7mil) 0.3925mm
3	0805	2.0	1.2 5	(60mil) 1.5mm	(56mil) 1.4mm	(30mil) 0.75mm
4	1206	3.2	1.6	(60mil) 1.5mm	(60mil) 1.6mm	(80mil) 2.0mm
5	1210	3.0 5	2.5 5	(63mil) 1.575mm	(106mil) 2.65mm	(48mil) 1.20mm
6	2023	5.0	2.5	(65mil) 1.625mm	(110mil) 2.75mm	(119.7mil) 2.9925mm
7	2512	6.3	3.2	(79mil) 1.975mm	(118mil) 2.95mm	(176.8mil) 4.42mm

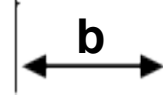
A SMT QFP、SOP、TSOP、TSSOP IC

a 零件外形

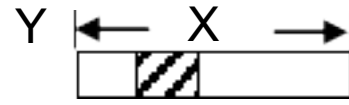


b Layout 方式

PAD Layout



0.5mm [20mil]



1> Pitch 0.5mm PAD 宽度为PITCH 1/2

2> Pitch 0.5mm 时 PAD 宽度为PIN脚宽度;

(1) PAD 宽度 (X)

1> IC PIN脚吃锡长度 (b 内加 0.25mm (10 mil)、外加 0.5mm (20mil) 即 $X=b+0.75mm$;

2>任一边外侧PIN PAD宽度需外加0.1mm (4mil)、PAD 与PAD 间须加防焊。

※ 防焊: 防焊与 PAD 间距取 0.125mm (5mil) TOLERANCE。

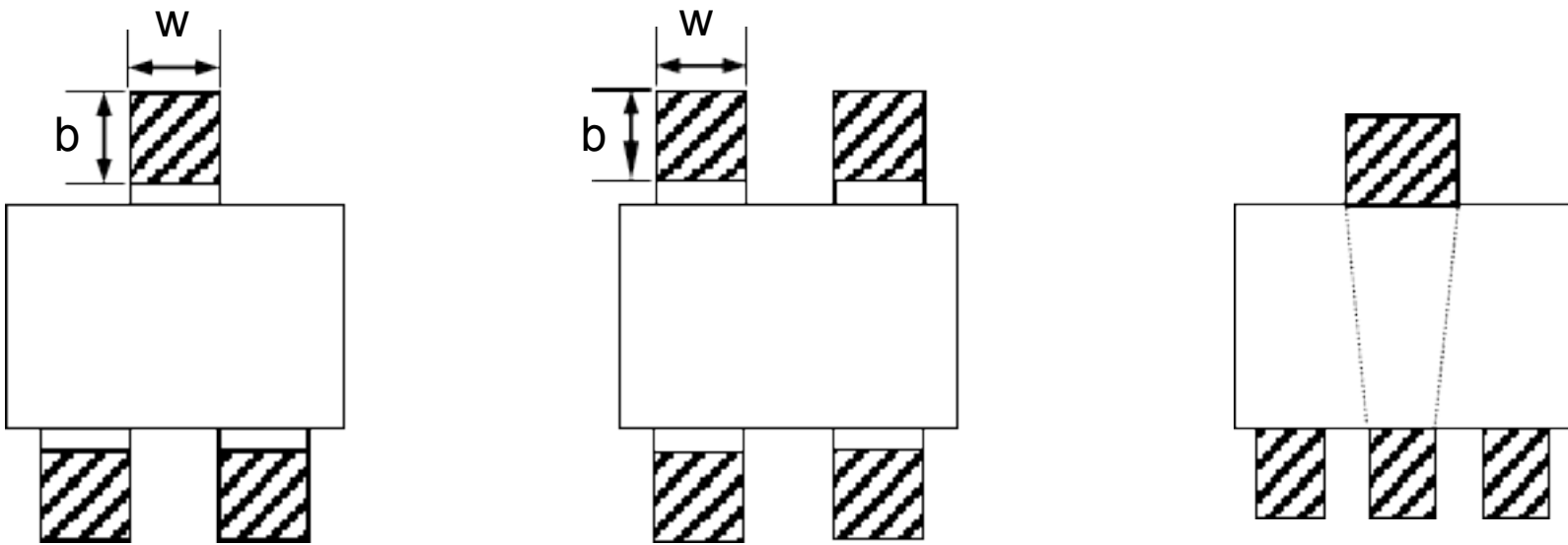
b 以下是常用 IC 最正确 Layout 方式

Item	组件类型	PAD 图片	PAD Layout size
1	QFP (ERIDANI、DEL SOL)		$X=0.25mm$ (10 mil) $Y=1.50mm$ (60mil) $P1=0.50mm$ (20 mil) $P2=10.20mm$ (408 mil)
2	QFP (BARRACU)		$X=0.25mm$ (10 mil) $Y=1.747mm$ (69.88mil) $P1=0.50mm$ (20 mil) $P2=13.535mm$ (541.4mil)
Item	组件类型	PAD 图片	PAD Layout size

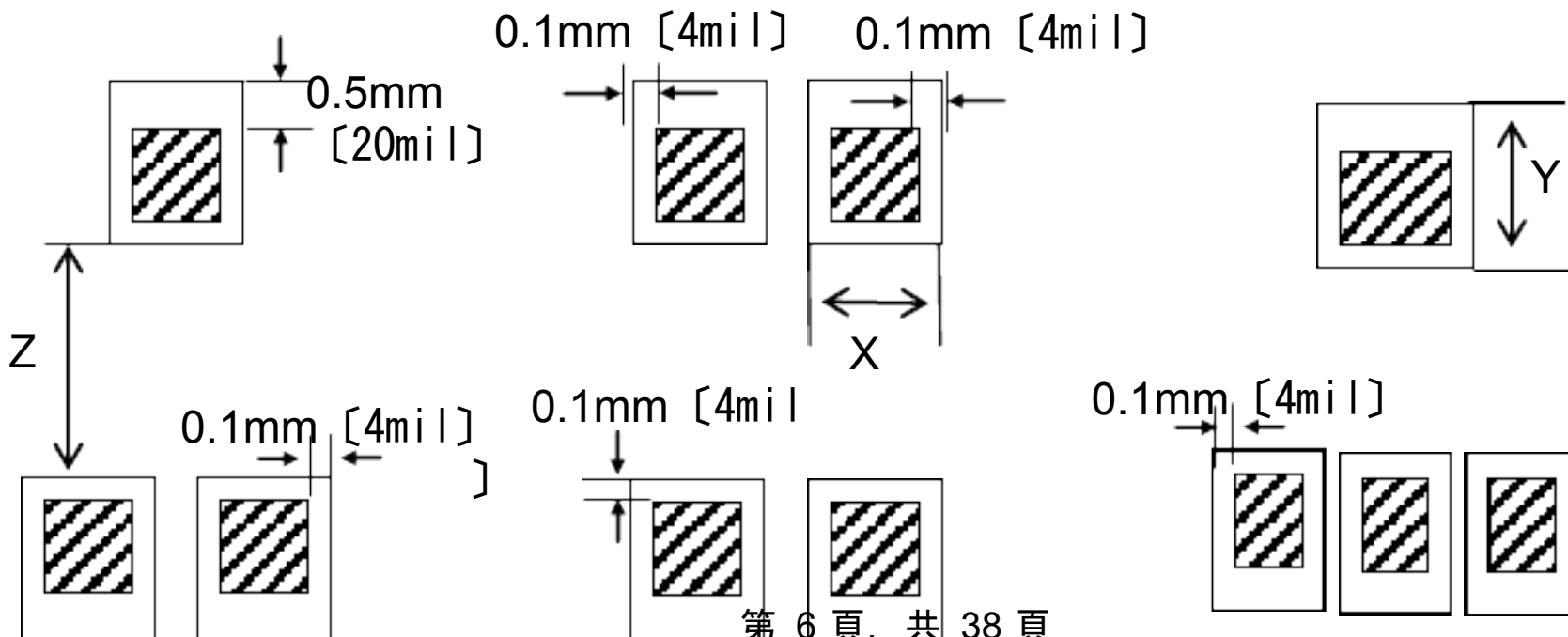
<p>3</p>	<p>QF (VV5351AT00 1</p>		<p>$X=0.38\text{mm}$ (15mil) $Y=1.55\text{ mm}$ (10 mil) $W1=0.80\text{mm}$ (62 mil))</p>
<p>4</p>	<p>QF P (IC(ASIC) UAB-M9658-</p>		<p>$X=0.40\text{mm}$ (16mil) $Y=1.15\text{ mm}$ (46mil) $W1=0.65\text{ mm}$ (26mil)</p>

A SMT 晶体

a 零件外形



b PCB PAD (阴影局部为零件的焊盘)



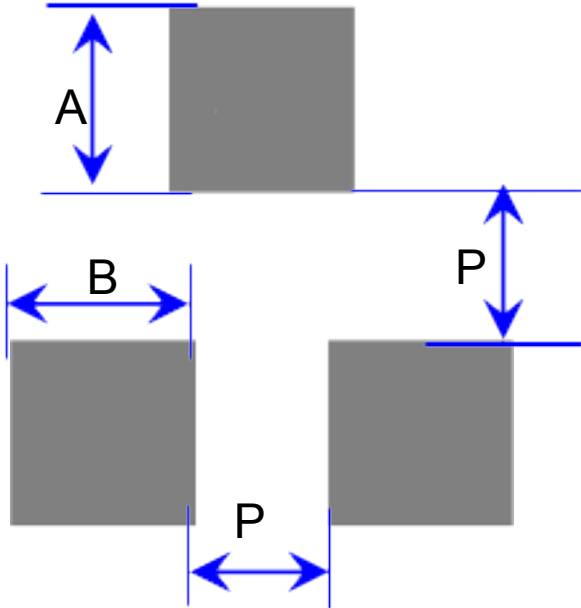
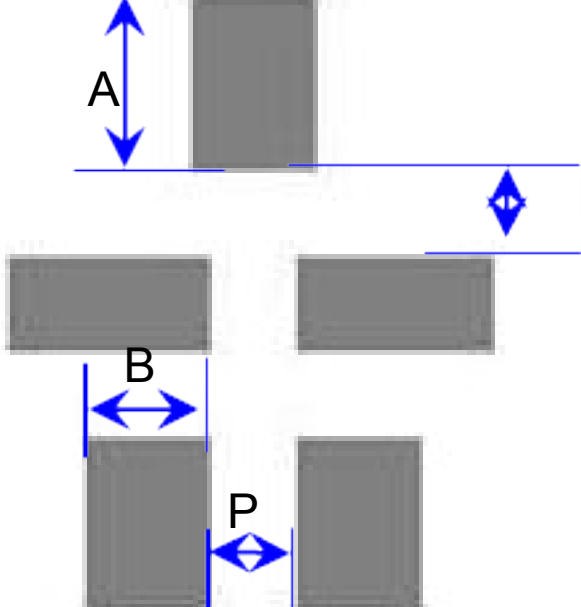
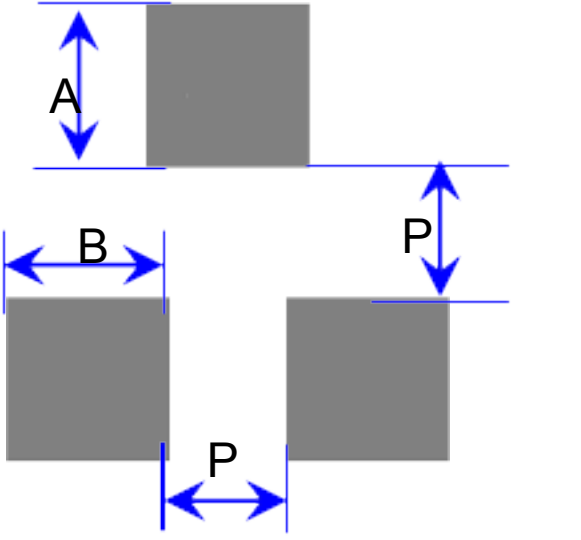
c Layout 公式

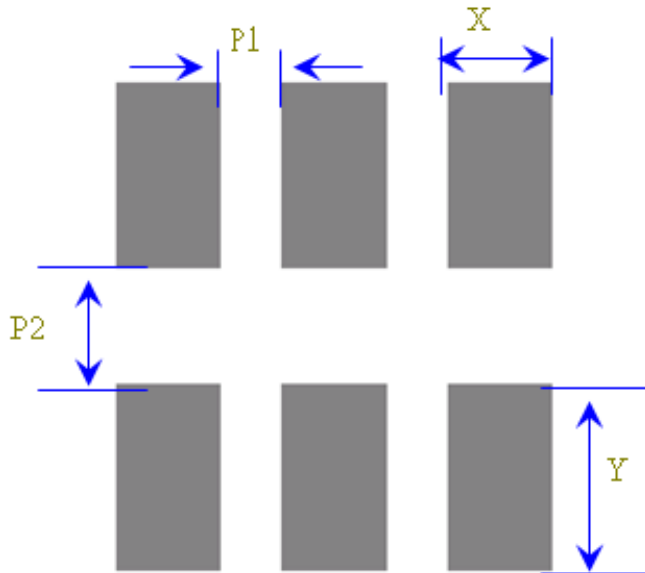
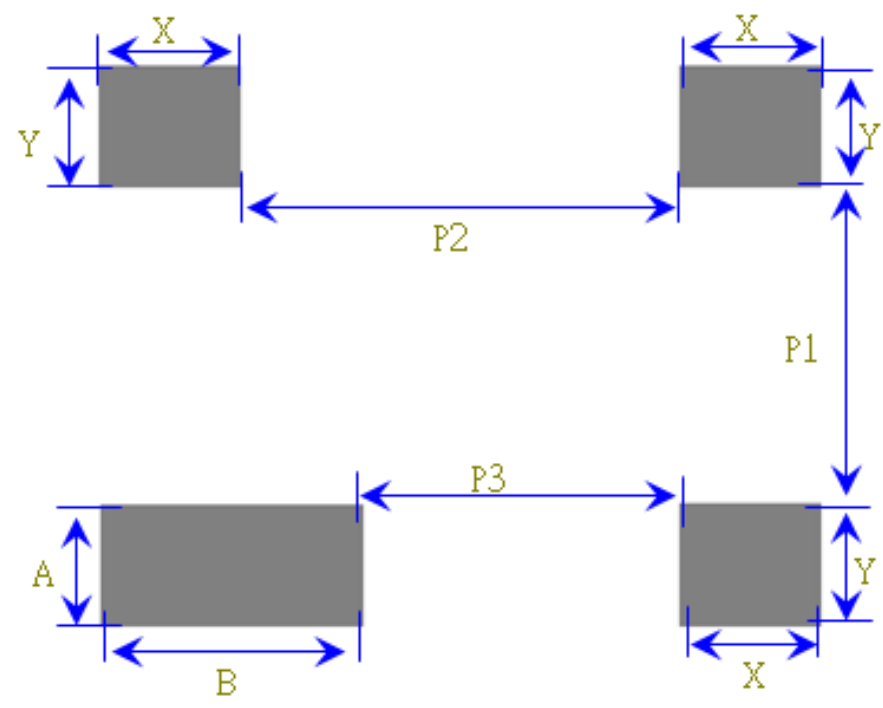
(1) PAD X 长度为零件 PIN w 两侧各加 0.1mm (4mil) ;

(2) PAD Y 长度为零件 PIN b 值内侧加 0.1mm (4mil) 。外侧加 0.5mm (20mil) ;

(3) 如零件本身 PIN 不同(4) 、则依各 PIN 差异设计 PAD 尺寸、PAD 间皆需防焊;

(4) 其中局部组件的最正确 Layout 方式

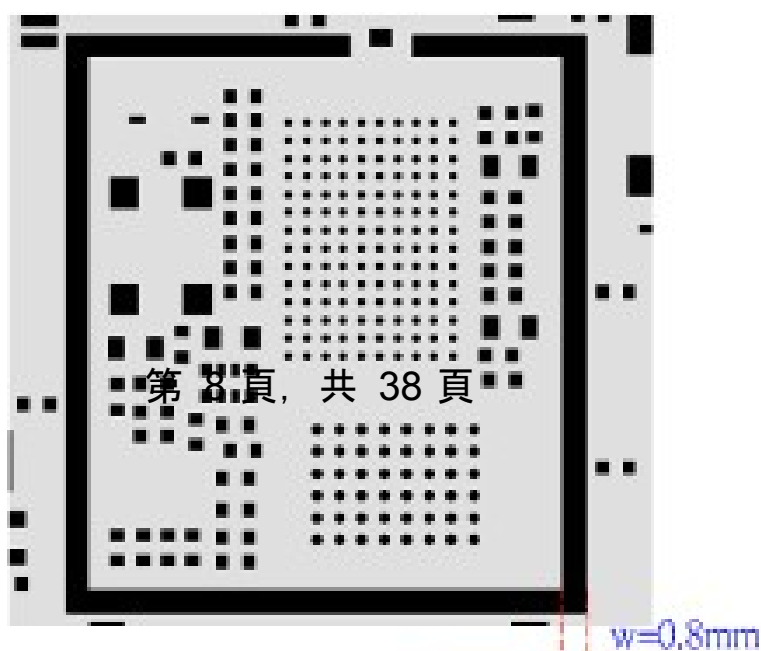
Ite	组件类型	PAD 图	PAD Layout
1	SOT-23		<p>A=1.28mm (51mil B=0.90mm (36mil) P1=P2=1.00mm</p>
2	SAW		<p>A=0.32mm (12.8mi B=0.45mm (18mil)</p>
3	SOT-416		<p>A=0.80mm (32mil) B=0.50mm (20mil) P1=0.50mm (</p>

Ite	组件类型	PAD 图	PAD Layout
4	SOT23	 <p>The diagram shows a 2x3 grid of rectangular pads. The horizontal spacing between pads is labeled P1, and the horizontal width of each pad is labeled X. The vertical spacing between pads is labeled P2, and the vertical height of each pad is labeled Y.</p>	<p>X=0.60mm (24mil) Y=1.20mm (20mil) P1=0.35mm ()</p>
5	SOT143	 <p>The diagram shows three pads: two small rectangular pads at the top and one larger rectangular pad at the bottom. The top pads have width X and height Y, with a center-to-center distance P2. The bottom pad has width B and height A. The center-to-center distance between the bottom pad and the top pads is P1. The horizontal distance between the center of the bottom pad and the center of the right top pad is P3.</p>	<p>X=0.70mm (28mil) Y=0.75mm (30mil) P1=1.20mm (48mil) P2=1.22mm (49mil) P3=0.82mm (33mil)</p>

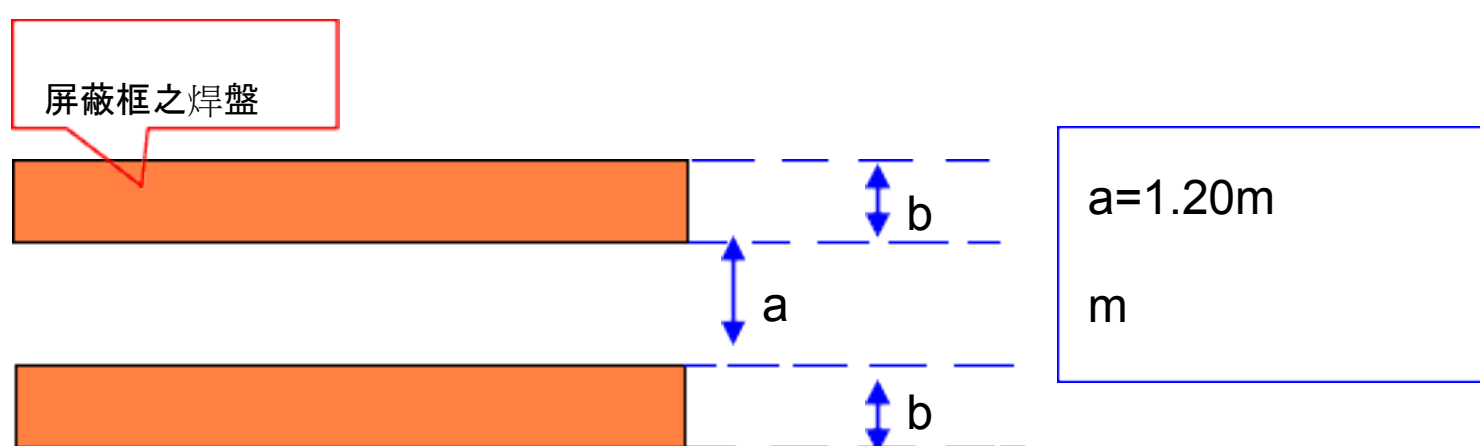
(5) 如零件本身 PIN 不同、则依各 PIN 差异设计 PAD 尺寸、PAD 间皆需防焊。

B 屏蔽框焊盘 PCB LAYOUT

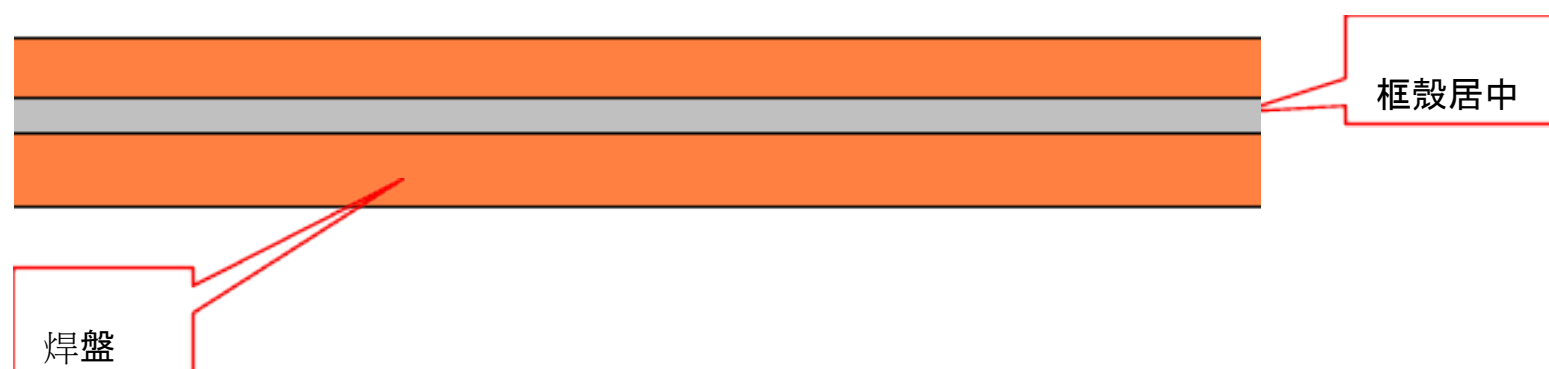
1) 屏蔽框焊盘宽度 w=0.8mm(主要考虑组件公差 0.1mm,机台贴装精准度 0.05mm)



- 2) 屏蔽框焊盘与周边组件焊盘距离不小于 1mm
- 3) 屏蔽框焊盘两侧要各保存有 1mm 基板宽度
- 4) 并排 layout 在一起的屏蔽框之焊盘，建议间隔 1.2mm,且中间用宽 0.4mm 防焊漆隔离



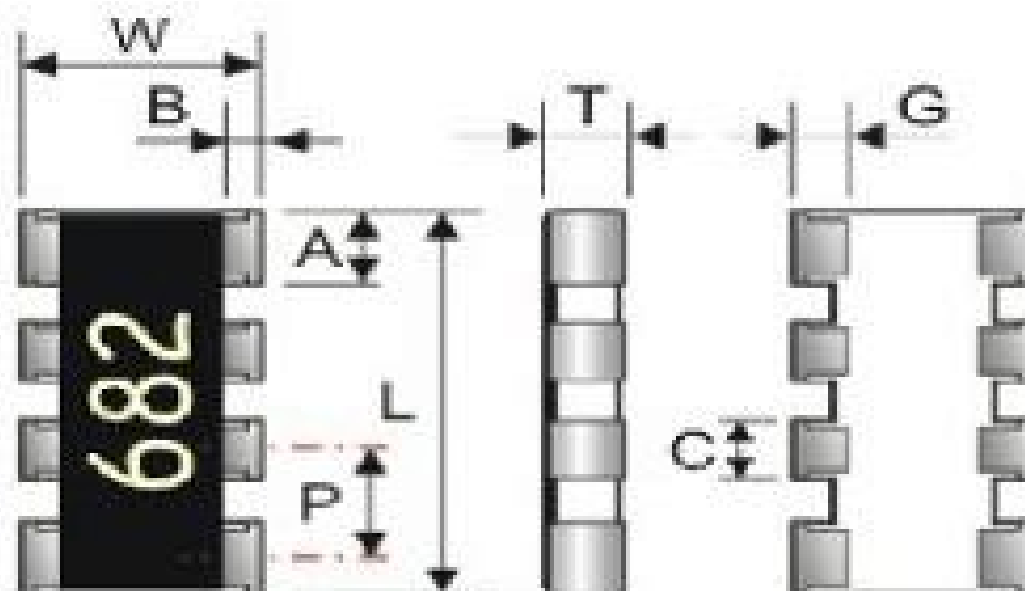
- 5) 屏蔽框焊盘外形尺寸的设计，应以屏蔽框组件为依据，将屏蔽框铁壳的中心位置设计在 PAD 的中心,两边外露的 PAD 是平均的;



C 排阻、排容

a 0402x4 (1005x4)排阻

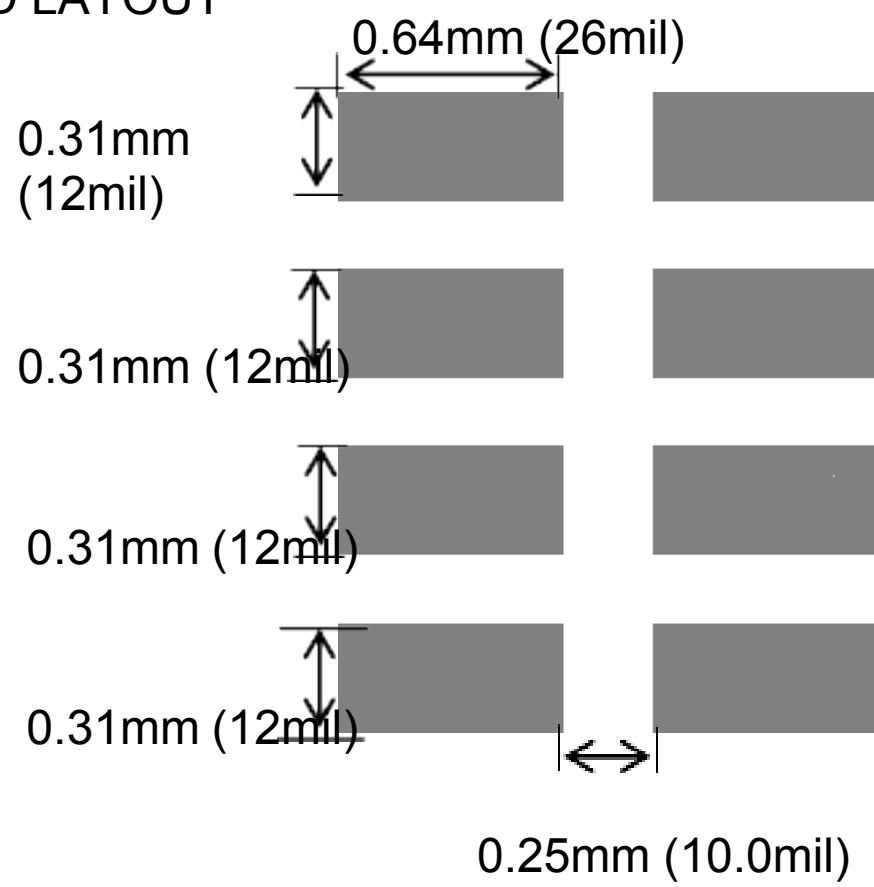
(1) 零件外形



(2) 零件 Size---0402x4 (1005x4)

	L	W	T	P	A	B	C	G
组件尺寸 (mm)	2.00 ± 0.10	1.00 ±0.10	0.45 ±0.10	0.50 ±0.05	0.40 ±0.10	0.20 ±0.10	0.30 ±0.05	0.25 ±0.10

(3) PAD LAYOUT

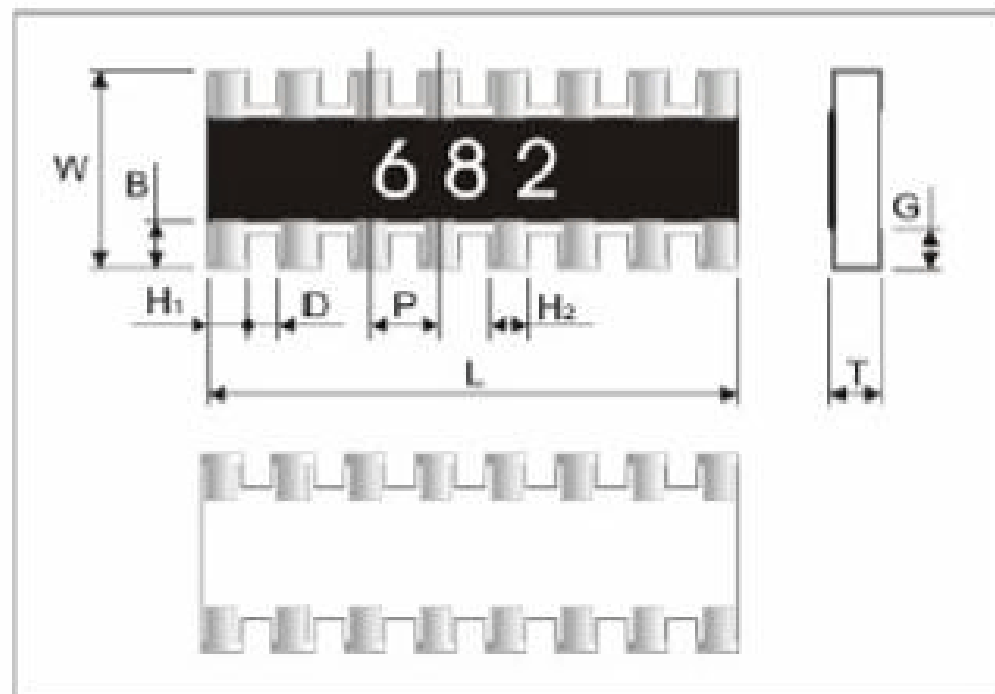


(4) PAD 与 PAD 间需盖防焊。

b 0402x4 (1005x8)排阻

(1) 零件外形

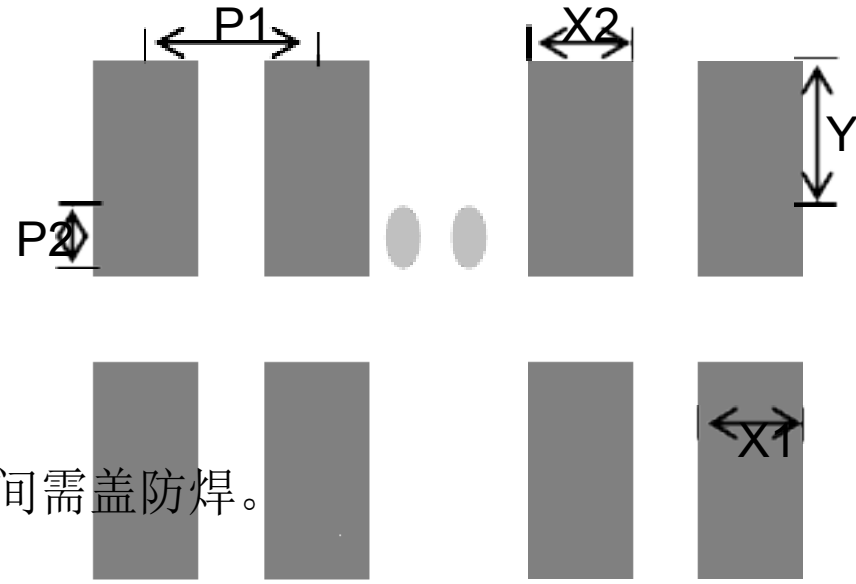
	WA06W
L	4.00 ± 0.20
W	1.60 ± 0.15
T	0.45 ± 0.10
B	0.30 ± 0.20
G	0.30 ± 0.20
D	0.20 ± 0.10
P	0.50 ± 0.20
H1	0.40 ± 0.20
H2	0.30 ± 0.10



(2) PAD LAYOUT

	Y	X	X	P1	P2
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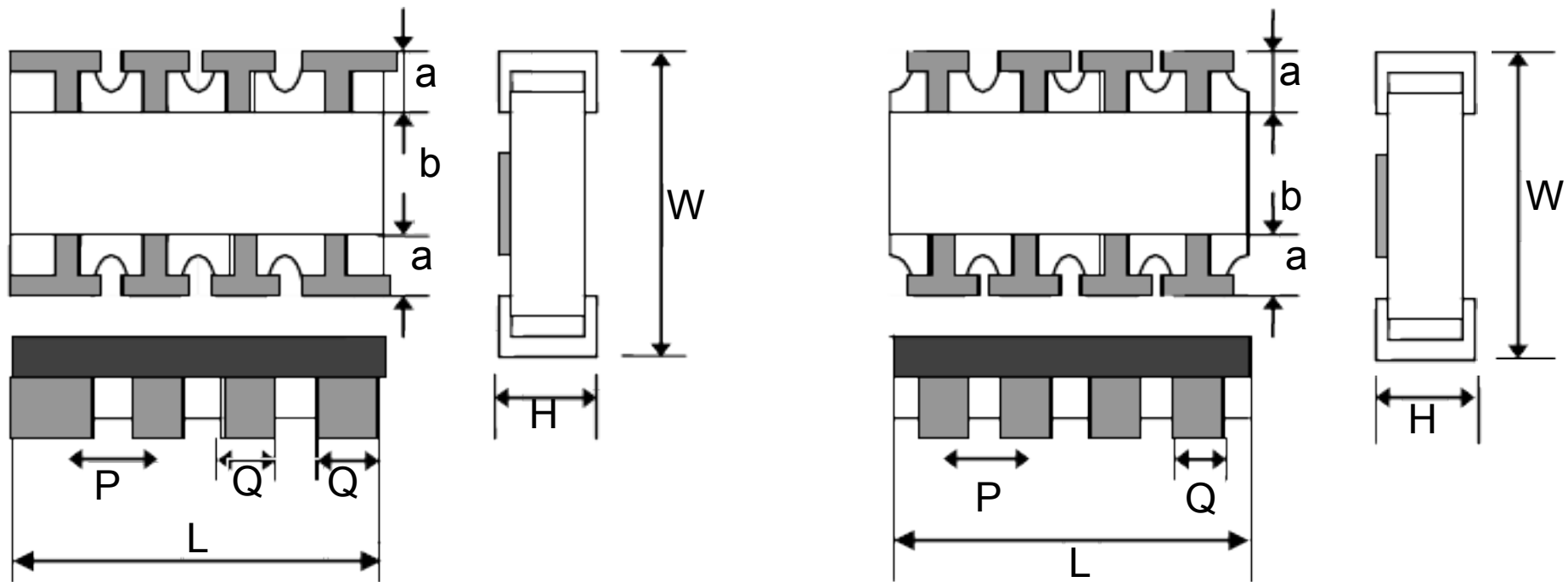
PAD 尺寸	1.0mm(40)	0.3mm(12)	0.2mm(8)	0.5mm(20mil)	0.25mm
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(3) PAD 与 PAD 间需盖防焊。

c 0603x4 (1608x4)排阻零件外形

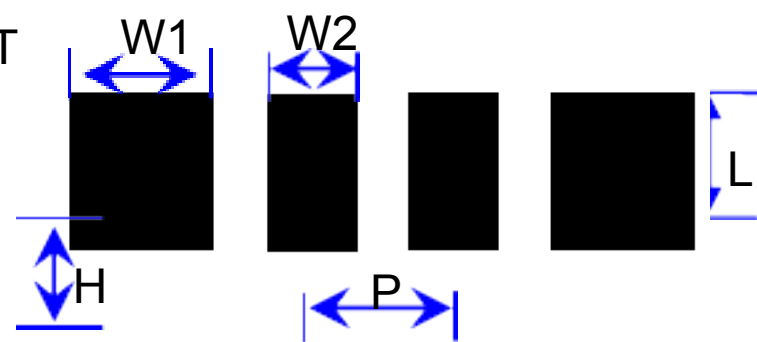
(1) 零件规格:Tolerances $\pm 0.1\text{mm}$ (4mil)



外形	L	W	H	Q1	外形	L	W	H	Q
Rac 16	3.2m m	1.6m m	0.5m m	0.5m m	Rac 16	3.2m m	1.6m m	0.5m m	0.5m m

外形	b	a	Q2	*P	外形	b	a	*P
RAC 16	0.2m m	0.35m m	0.65m m	0.8m m	RAC 16	0.2m m	0.35m m	0.8m m

(2) PAD LAYOUT

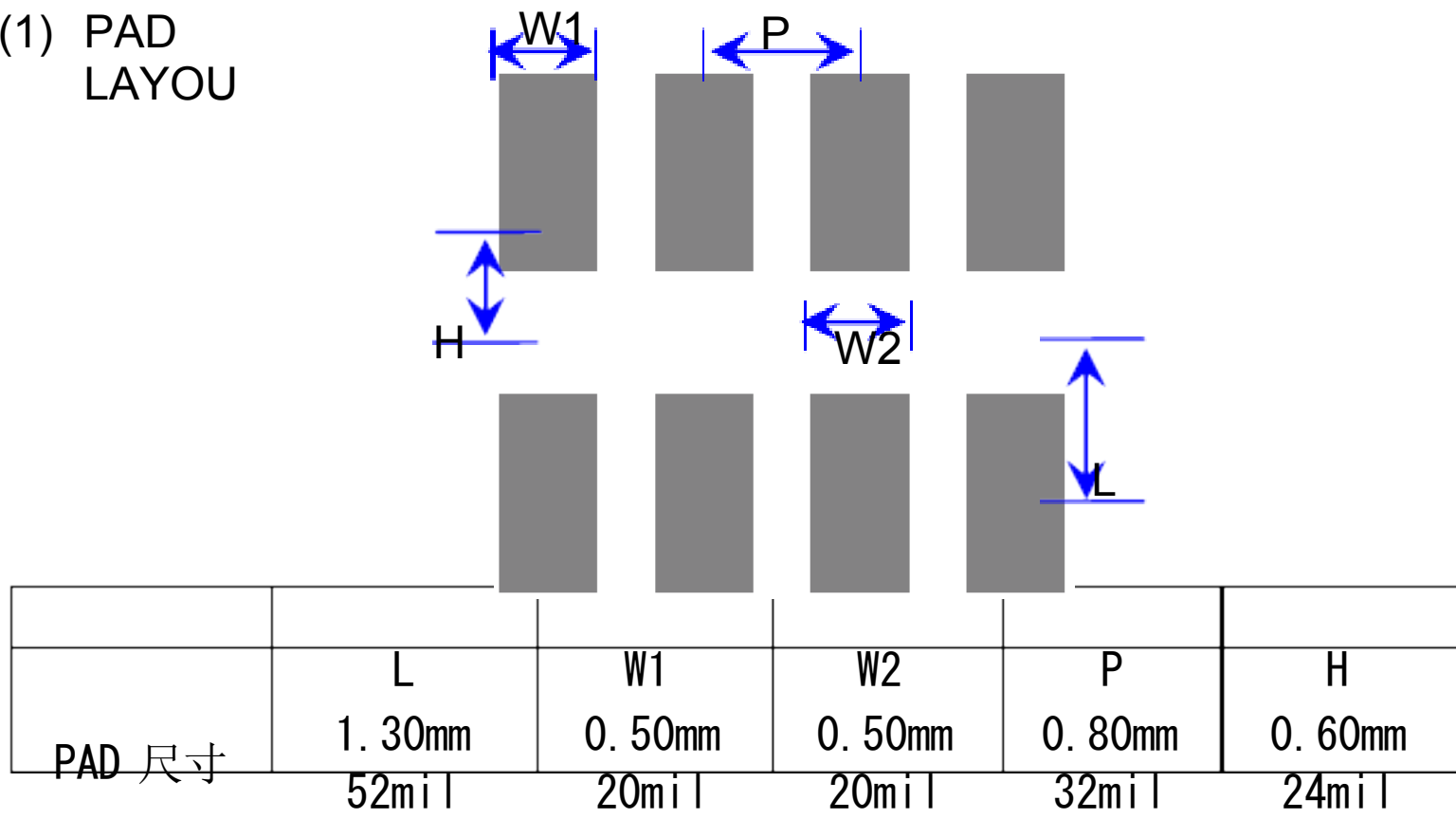


	L	W1	W2	P	H
PAD 尺寸	0.90mm 36mil	0.70mm 28mil	0.50mm 20mil	0.80mm 32mil	0.73mm 29.2mil

(3) PAD 与 PAD 间需盖防焊。

d 0603x4 (1608x4)排容零件

(1) PAD LAYOU



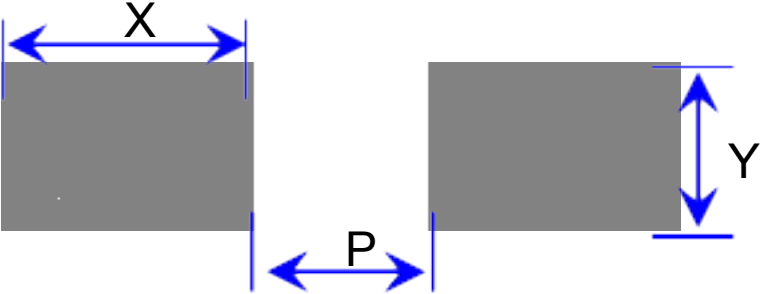
(2) PAD 与 PAD 间需盖防焊

D Diode LAYOUT 方式

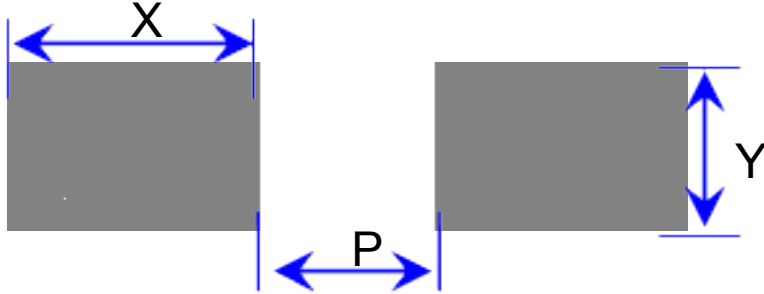
Ite	组件类型	PAD 图	PAD Layout size
1	SOD-		X=1.00mm(40 mil)
2	DO-		Y=1.00mm(40 mil)
3	SOD-		P=1.50mm(60 mil)
4	DO-		X=2.00mm(80 mil)
			Y=1.80mm(72 mil)
			P=2.50mm(100 ...)

E Chip LED LAYOUT 方式

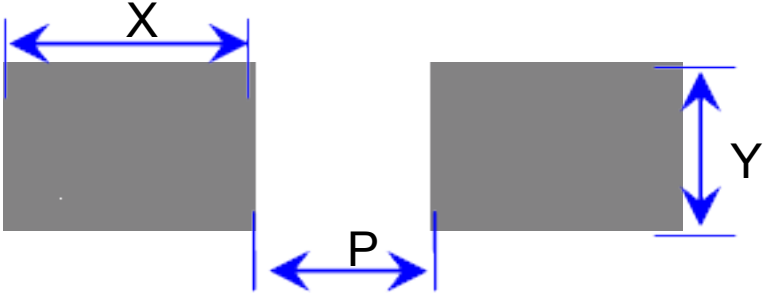
Ite	组件类型	PAD 图	PAD Layout

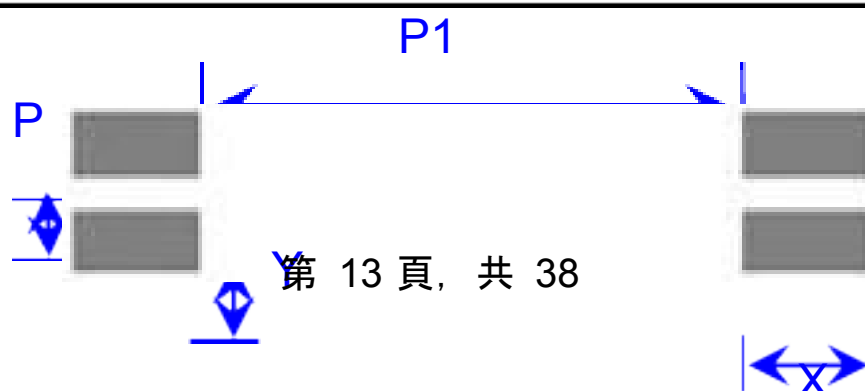
1	19-22SURSYG RED/GRE T		X=0.80mm(32 mil) Y=0.60mm(24 mil)
2	CHIP LED 12-21SYGC/S5 30-E1/TR8		X=1.50mm(40 mil) Y=1.20mm(48 mil)

A 电感 Layout 方式

Ite	组件类型	PAD 图	PAD Layout
1	CHIP DS5022P- 68UH +- 18.54*15.2*7		X=3.7mm(148mil) Y=2.70mm(108 mil)

B CHIP ELEC. CAP.与 CHIP TAN CAP. Layout 方式

Ite	组件类型	PAD 图	PAD Layout size
1	SMT CHIP ELEC.		X=3.50mm(140 mil)
2	CHIP TAN		Y=1.60mm(64 mil) P=2.10mm(84 mil)



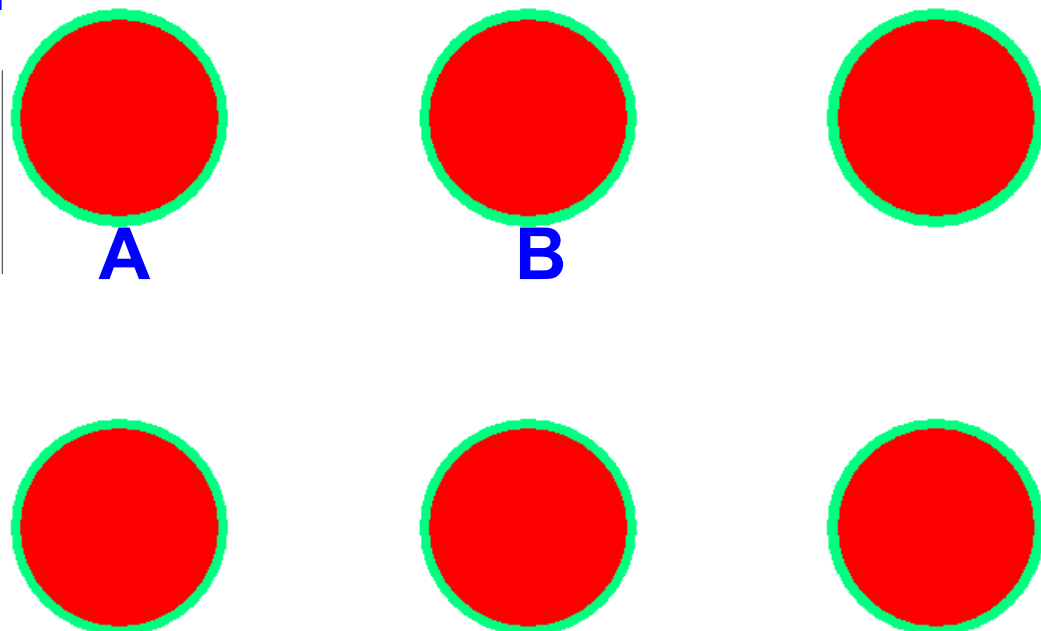
3	CRYSTAL 32.768KHZ +-20PPM 12.5PF 6.7X1.5X1.4 TP		X=1.20mm(48mil) Y=0.60mm(24mil)
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A BGA LAYOUT 方式

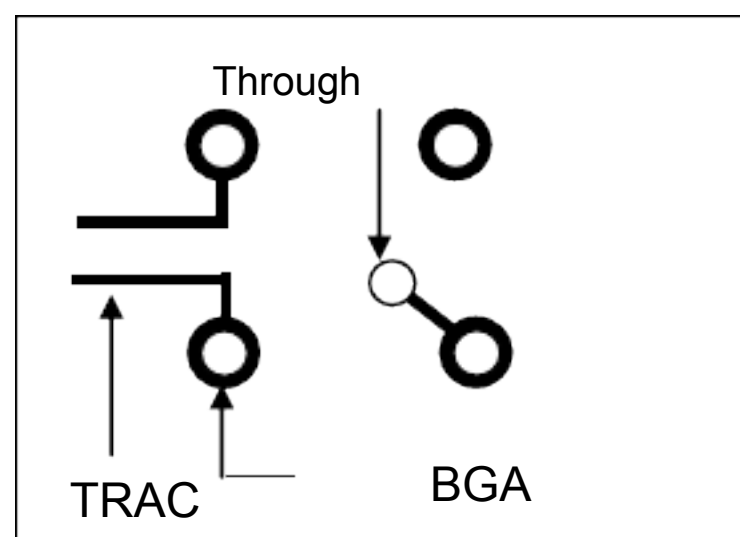
a BGA PAD LAYOUT (附图一)

零件	0.5mm(20mil)	0.65mm(26mil)	0.8mm(32mil)	
PITCH	ψ 11.2 \pm 1mil (0.28mm) (0.45mm)		ψ 14 \pm 1mil (0.35mm)	ψ 18 \pm 1mil
PCB				
PAD(B)	ψ 16mil (0.4mm)	ψ 20mil (0.5mm)	ψ 26mil (0.65mm)	
防焊(A)				

圖一



圖二



b PCB BGA 内部之贯穿孔与线路设计 (附图二):

- (1) BGA PAD 外四周需加防焊 (绿漆)
- (2) BGA PAD 底部有贯穿孔时 (Via) 需要求 PCB 厂商塞孔。

c BGA LAYOUT 位置

- (1) 多颗 BGA LAYOUT 时最好能在同一面 (因考虑制程的良率)。
- (2) 本体四周 3 mm 内不行有零件或高于 BGA 组件的本体高度 (Rework 时夹具才不会有损害组件及产生干预)。
- (3) BGA 本体反面尽可能不摆放零件 (因考虑制程修理的热效应)
- (4) BGA 每个 PAD 需有测试点, 测试点的大小请参照 5.17.2 项。
- (5) 测试点应分散放在反面。

(6) BGA LAYOUT 位置如有空间的话,应在非 PAD 位置多增加透气孔,以利 SMT 回焊空气流通,假设承受 WSM Process(波峰焊接制程)且 BGA 没有托盘进展屏蔽保护,则贯穿孔必需遮挡,避开影响 BGA 焊接。

K 无引脚 IC 类 LAYOUT 位置

Ite	组件类型	PAD 图	PAD Layout
1		<p>The diagram shows a central square pad with side length A and B. It is surrounded by a ring of smaller pads. The distance from the center of the central pad to the center of a surrounding pad is P. The width of the surrounding pads is X, and the height is Y.</p>	<p>X=0.50mm(20 mil) Y=0.35mm(14 mil) P1=0.95mm(38 mil)</p>

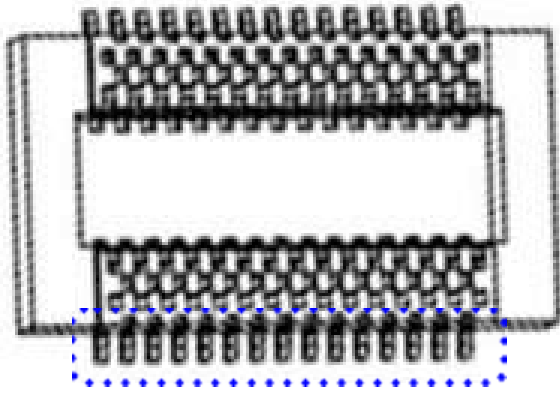
Item	组件类型	PAD 图片	PAD Layout size
2	IC 10/100 BASE	<p>The diagram shows a central square area with four circular pads. The distance between the centers of two adjacent circular pads is P. The diameter of each circular pad is P1. The distance from the center of a circular pad to the center of a square pad is P2. The distance between the centers of two square pads is psi. The width of the square pads is X, and the height is Y.</p>	<p>X=0.25mm(10 mil) Y=0.56mm(22 mil) P1=0.50mm(20mil) P2=4.20mm(168mil) psi=1.00mm(40mil) P4=1.00mm(40mil)</p>

3	IC (ANALOG) B	<p>The diagram shows a central rectangular pad with width A and height B. It is surrounded by a ring of smaller pads. The distance from the center of the central pad to the center of a surrounding pad is P1. The width of the surrounding pads is X, and the height is Y. The distance between the centers of two adjacent surrounding pads is P2.</p>	<p>X=1.27mm(51 mil) Y=0.64mm(20 mil) P1=0.62mm(26mil) P2=0.47mm(19 mil) A=3.50mm(140 mil) B=4.30mm(172 mil)</p>
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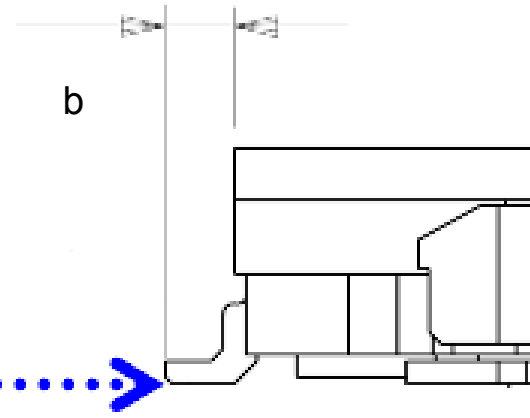
P2

L Connector LAYOUT 方式

a Fine Pitch Connector



第 15 頁, 共 38 頁



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