



4.1 PCB的一般檢查	4
4.1.1 PCB底板平坦要求	4
4.1.2 起泡 (Blistering) 或劣質	4
4.1.3 金手指標準	5
4.1.4 底板的綠油對岸的覆蓋	5
4.1.5 底板絲印標記、章印標記	6
4.2 元件安裝的一般標準	6
A: PTH元件	6
4.2.1 零件安裝的位置、方向	6
4.2.2 軸向腳元件	7
4.2.3 徑向腳元件安裝	8
4.2.4 腳形與釋壓	8
4.2.5 雙列元件(DIP 'S)	9
4.2.6 雙列元件 (DIP' S) 和單孔插座 (Socket)	9
4.2.7 板卡連接器 (Connector)	10
4.2.8 連接插針 (Connector Pins)	11
4.2.9 功率器件的安裝	14
B: 表面安裝件(SMT)要求	15
4.2.10 只有底部端子的片裝件	15
4.2.11 方形端子片裝件	16
4.2.12 圓形端子片裝件	18
4.2.13 PLCC件 (無腳芯片)	20
4.2.14 "L" 形腳和海歐翼形腳IC位置	21
4.2.15 圓形或扁橢形腳	24
4.2.16 "J" 形腳元件	26
4.3 焊點的要求	27
4.3.1 錫點的一般要求	27
4.3.2 不可接受的焊接狀況	27

PREPARED BY (NAME)	SIGNATURE	DATE:	DOCUMENT NO.: SYST-DCWS-01	REV: 1
			TITLE: THE VISUAL INSPECTION CRITERIA FOR PCBA	
REVIEWEDED BY (NAME)	SIGNATURE	DATE:		
				PAGE: 2 OF 39

4.3.3 元件腳的穿孔 ---SMT通道的上錫性	29
4.4 飛線	30
4.4.1 飛線之中路線或預留段.	30
4.4.2 雙面連接孔之聯	31
4.4.3 飛線在焊錫面之線路及預段	31
4.4.4 飛線---表面安裝	32
4.5 散熱片, 螺絲, 螺母, 墊圈.	33
4.5.1 硬件安裝 --- 電氣間隙	33
4.5.2 穿過緊固件	34
4.5.3 散熱片的安裝	35
4.6 元件破損及缺陷	36
4.6.1 元件腳	36
4.6.2 DIPS 和 SOIC	37
4.6.3 軸向腳元件.	37
4.6.4 徑向腳元件	37
4.6.5 SMD元件.	37
4.6.5.1 晶片電阻	38
4.6.5.2 晶片電容	38
4.6.5.3 圓形部件	39

PREPARED BY (NAME)	SIGNATURE	DATE:	DOCUMENT NO.: SYST-DCWS-01	REV: 1
			TITLE: THE VISUAL INSPECTION CRITERIA FOR PCBA	
REVIEWEDED BY (NAME)	SIGNATURE	DATE:		
				PAGE: 3 OF 39

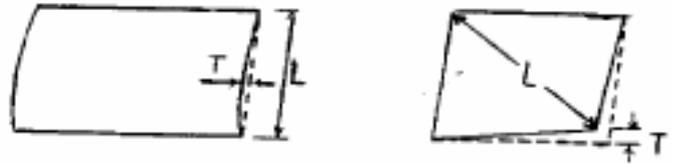
- 1.0 目的
 闡述QA對PCBA的一般外觀檢查標準, 以指導QA及相關部門的工作.
- 2.0 適用範圍
 本標準適用於百富電子有限公司DC-DC產品的PCBA檢查.
- 3.0 參考文件
 - 3.1 IPC-A-610B 電路安裝接收標準class2
 - 3.2 IPC-A-600
- 4.0 應用範圍
 - 4.1 PCB的一般檢查(包括金手指)
 - 4.2 元件安裝的一般檢查
 - 4.3 錫點的要求(PTH / SMT)
 - 4.4 飛線
 - 4.5 散熱片、螺絲、螺母、墊圈
 - 4.6 元件缺陷、損傷

4.1 PCB的一般檢查

4.1.1 PCB底板平坦要求

PCB扭曲及彎曲變形容許誤差:

$$T/L \leq 1\%$$



4.1.2 起泡 (Blistering) 或劣質

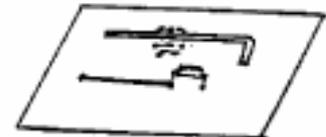
可接受:

有局部起泡, 但未靠近線路和焊接點.

(若嚴重影響焊接, 受熱會惡化時, 可拒收)

不可接受:

在銅片處有起泡的痕跡.

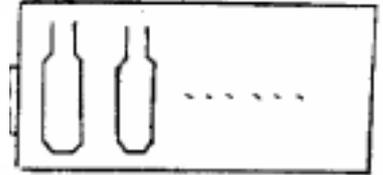


PREPARED BY (NAME)	SIGNATURE	DATE:	DOCUMENT NO.: SYST-DCWS-01	REV: 1
			TITLE: THE VISUAL INSPECTION CRITERIA FOR PCBA	
REVIEWEDED BY (NAME)	SIGNATURE	DATE:		
				PAGE: 4 OF 39

4.1.3 金手指標準

不可接受:

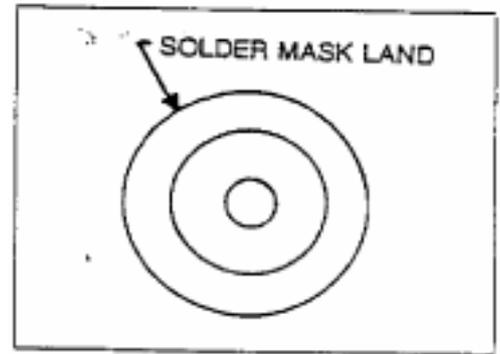
- (1) 在接觸面內有過多坑紋、針孔、小瘤或凹痕直徑大于0.13mm.
- (2) 在接觸面上出現小泡, 生鏽及變色或露銅時.
- (3) 有空洞從而減少了接觸面積.
- (4) 劃痕寬度大于0.1mm, 在一個金手指上有兩條或有兩個以上手指有劃痕或劃傷深度較大時.
- (5) 金手指氧化, 嚴重發黃或有污漬.



4.1.4 底板的綠油對岸的覆蓋

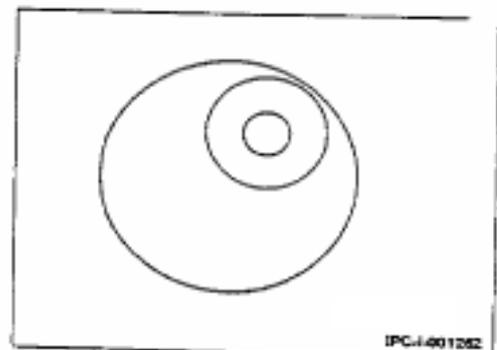
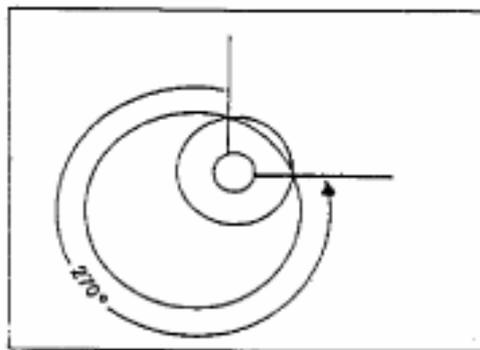
理想狀態:

綠油空位在正中



可接受:

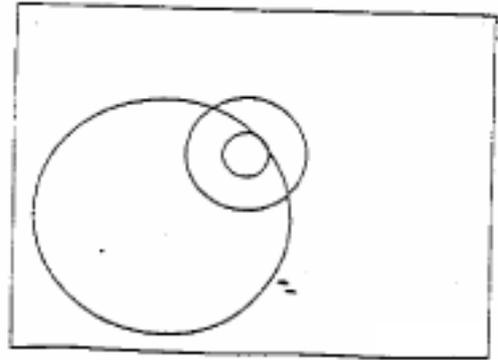
- (1) 綠油沒有蓋着岸.
- (2) 外環有270°不被綠油覆蓋.



PREPARED BY (NAME)	SIGNATURE	DATE:	DOCUMENT NO.: SYST-DCWS-01	REV: 1
			TITLE: THE VISUAL INSPECTION CRITERIA FOR PCBA	
REVIEWEDED BY (NAME)	SIGNATURE	DATE:		
				PAGE: 5 OF 39

不可接受:

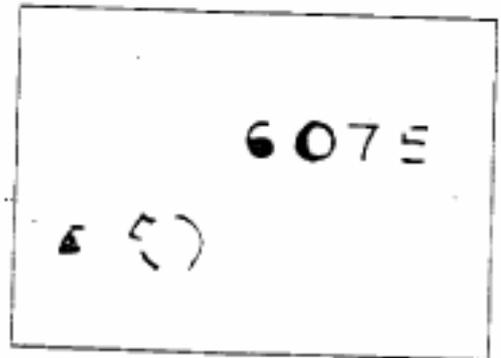
外環被綠油覆蓋處大于90°.



4.1.5 底板絲印標記、章印標記

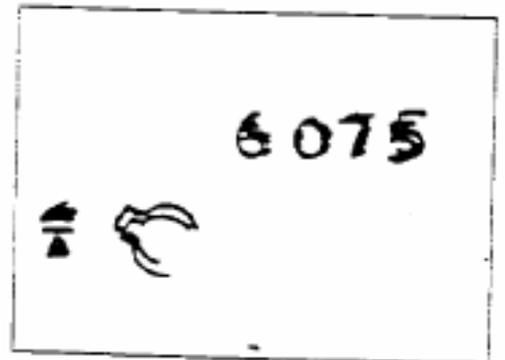
可接受:

- (1) 數字或字母雖少墨或撕開或中空部分被裝滿,但不會讓符號難以辯認.
- (2) 零件外形標示符可損失,但遺留符號要清楚示明組體外形.
- (3) 標記墨水可到岸但不可伸展到孔內.



不可接受:

- (1) 標記弄臟或有污漬.
- (2) 雙重印跡.
- (3) 符號或零件位置參考標記或零件輪廓標示損失超過10%.
- (4) 任何遵至符號難以辨認的缺陷(如斷折、少絲巾、中空裝滿等).



4.2 元件安裝的一般標準

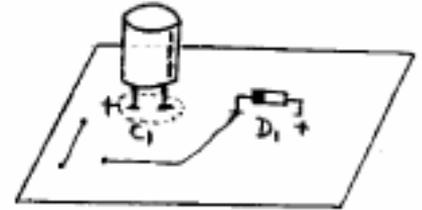
A: PTH元件

4.2.1 零件安裝的位置、方向

PREPARED BY (NAME)	SIGNATURE	DATE:	DOCUMENT NO.: SYST-DCWS-01	REV: 1
			TITLE: THE VISUAL INSPECTION CRITERIA FOR PCBA	
REVIEWEDED BY (NAME)	SIGNATURE	DATE:		
				PAGE: 6 OF 39

可接受:

- (1) 方向正確.
- (2) 方向符號可見.
- (3) 無方向元件(如電阻)排列方向不一致.
- (4) 元件規格正確且安裝在正確位置上.



不可接受:

- (1) 零件不合規格.
- (2) 安裝位置錯.
- (3) 有向元件方向反
- (4) 多腳元件、方向錯、腳位錯.

4.2.2 軸向腳元件

水平安裝

理想狀態:

- (1) 若元件重量小于28克,功率小于1W,則元件貼面平行安裝.
- (2) 若元件功率大于1W, 則元件體與PCB間距(D)大于1.5mm.



不可接受:

- (1) 元件體與PCB最大間距D大于3mm.
- (2) 元件功率大于1W, 而元件體與PCB間距大于1.5mm.



垂直安裝

元件體高于基盤 “H” 在0.4~3.0mm範圍內, 且傾角合乎電氣間隙要求, 則可接受, 否則不可接受.



PREPARED BY (NAME)	SIGNATURE	DATE:	DOCUMENT NO.: SYST-DCWS-01	REV: 1
			TITLE: THE VISUAL INSPECTION CRITERIA FOR PCBA	
REVIEWEDED BY (NAME)	SIGNATURE	DATE:		
				PAGE: 7 OF 39

4.2.3 徑向腳元件安裝

水平安裝

可接受:

元件至少有一側與安裝板接觸, 且元件體被粘牢或卡住以防震動.



不可接受:

元件體不與安裝面接觸.

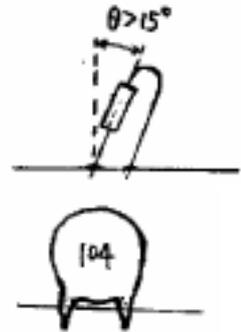
垂直安裝

可接受:

(1). 元件傾斜不超過 15°

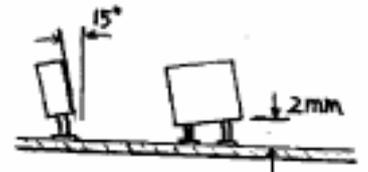
元件面與焊盤間距H可見.

(2) 有彎月面 (如電容) 的元件若無發熱的可能, 重量小於10克, 電壓小於240V則彎月面落入孔中也接受.



不可接受:

元件面與板面間距超出0.25~2.0mm範圍, 或傾角大於 15° .

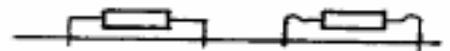


4.2.4 腳形與釋壓

釋壓可接受:

(1). 元件腳出體時平行元件軸.

(2). 元件腳入孔大約為 90° (正板面).

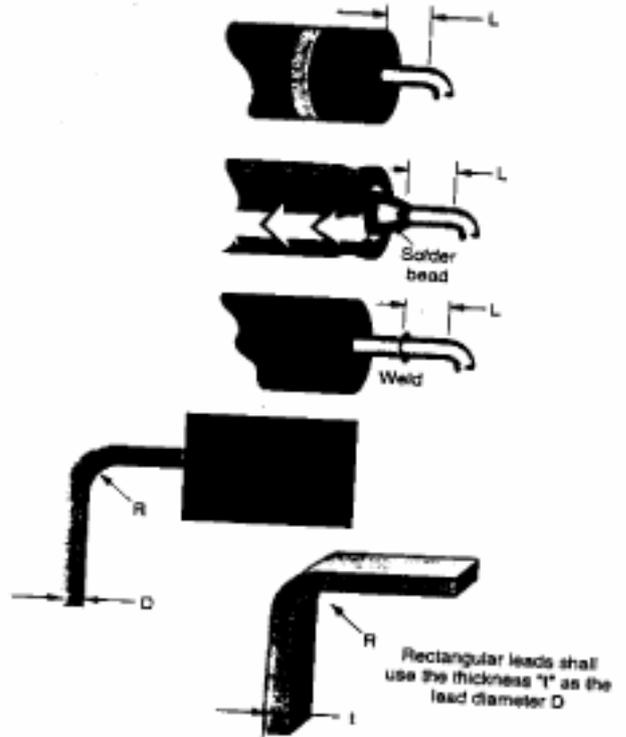


PREPARED BY (NAME)	SIGNATURE	DATE:	DOCUMENT NO.: SYST-DCWS-01	REV: 1
			TITLE: THE VISUAL INSPECTION CRITERIA FOR PCBA	
REVIEWEDED BY (NAME)	SIGNATURE	DATE:		
				PAGE: 8 OF 39

腳形合格:

- (1) 腳寬 $L \geq 0.8\text{mm}$
- (2) 腳未多次扭或開裂.
- (3) 腳彎角半徑滿足以下要求:

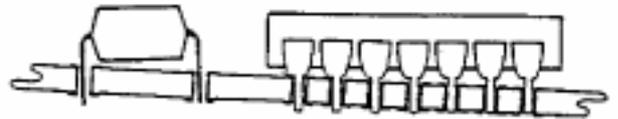
腳直徑(D)	彎弧半徑
$D \leq 0.8\text{mm}$	$\geq D$
$0.8 < D < 1.2$	$\geq 1.5D$
$D \geq 1.2\text{mm}$	$\geq 2D$



4.2.5 雙列元件(DIP 'S)

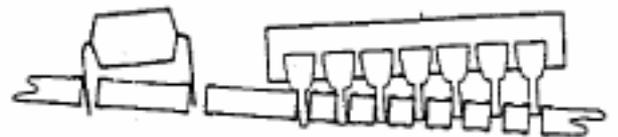
可接受:

元件腳有少量傾斜但出現腳長度和元件高度滿足要求



不可接受:

元件傾斜使元件超高或出腳不滿足要求.



4.2.6 雙列元件 (DIP' S) 和單孔插座 (Socket)

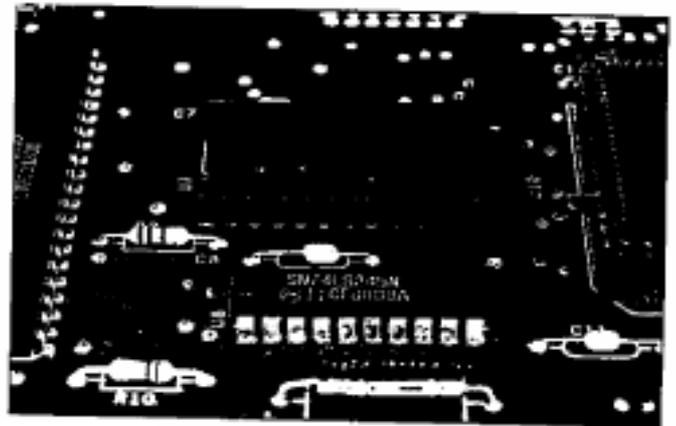
可接受:

PREPARED BY (NAME)	SIGNATURE	DATE:	DOCUMENT NO.: SYST-DCWS-01	REV: 1
			TITLE: THE VISUAL INSPECTION CRITERIA FOR PCBA	
REVIEWEDED BY (NAME)	SIGNATURE	DATE:		
				PAGE: 9 OF 39

(1) 單孔座不超過1mm, 元件高度和出腳不超過最大值.



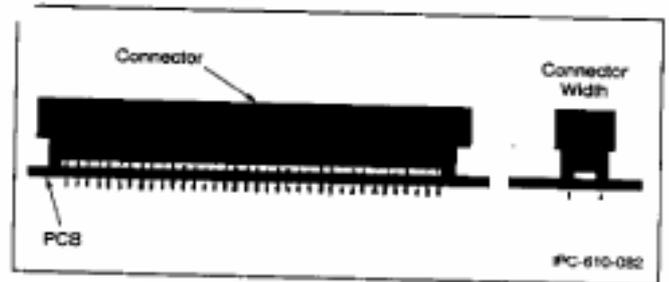
(2) 多腳座 (IC座) 最大高度不超過4.5mm, 元件高度和出腳滿足要求.



4.2.7 板卡連接器 (Connector)

理想狀況:

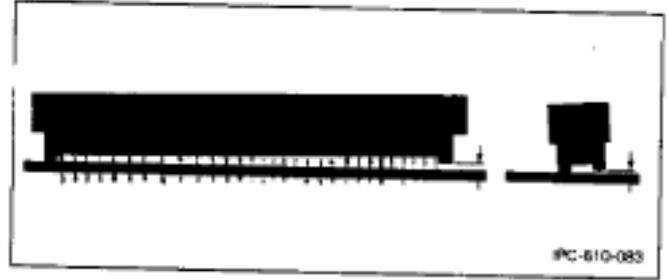
連接器齊平嵌入板內, 插腳全部貼板, 腳出合要求.



PREPARED BY (NAME)	SIGNATURE	DATE:	DOCUMENT NO.: SYST-DCWS-01	REV: 1
			TITLE: THE VISUAL INSPECTION CRITERIA FOR PCBA	
REVIEWEDED BY (NAME)	SIGNATURE	DATE:		
				PAGE: 10 OF 39

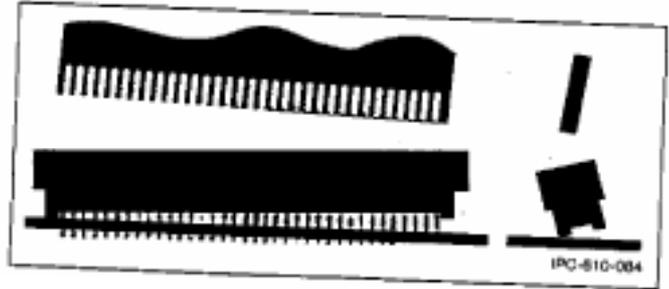
可接受:

Connector插腳一側觸板, 另一側離板縫隙不超過0.5mm, (在滿足腳出和高度的情況下) 有少許傾斜.



不可接受:

離板縫隙大于0.5mm.



4.2.8 連接插針 (Connector Pins)

不可接受:

- (1) 一排插針長短不齊在0.5mm以上. (圖2-69)
- (2) 插針鈕曲. (圖2-68)
- (3) 插針偏斜超過1/2針厚度. (圖2-67)
- (4) 因插針插入而損傷. (圖2-70)
- (5) 針有破損. (圖2-71)

PREPARED BY (NAME)	SIGNATURE	DATE:	DOCUMENT NO.: SYST-DCWS-01	REV: 1
			TITLE: THE VISUAL INSPECTION CRITERIA FOR PCBA	
REVIEWEDED BY (NAME)	SIGNATURE	DATE:		
				PAGE: 11 OF 39

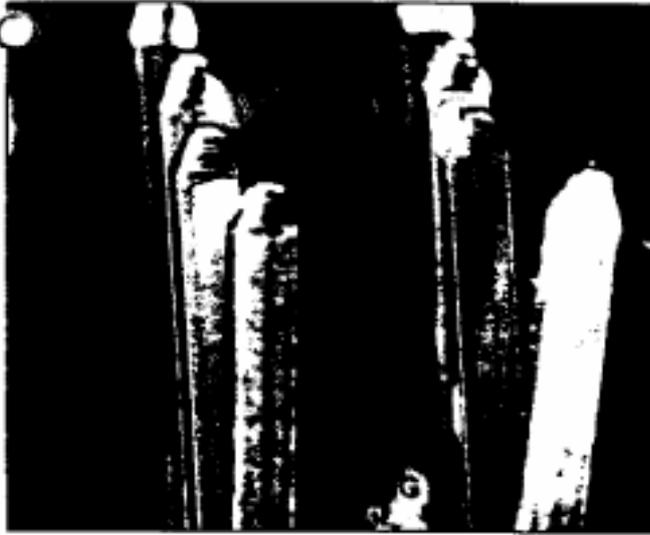


Figure 2-67

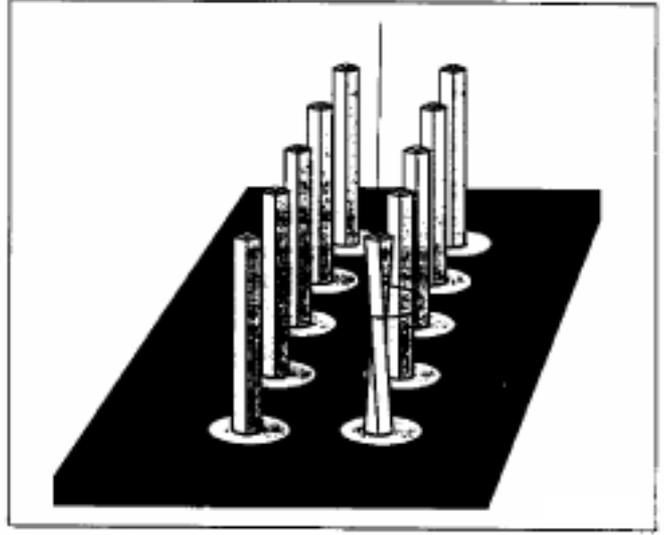


Figure 2-68

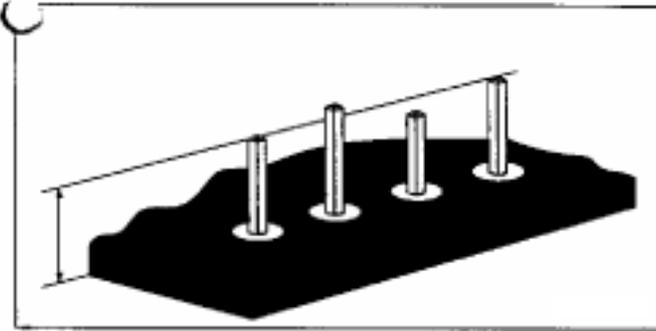


Figure 2-69

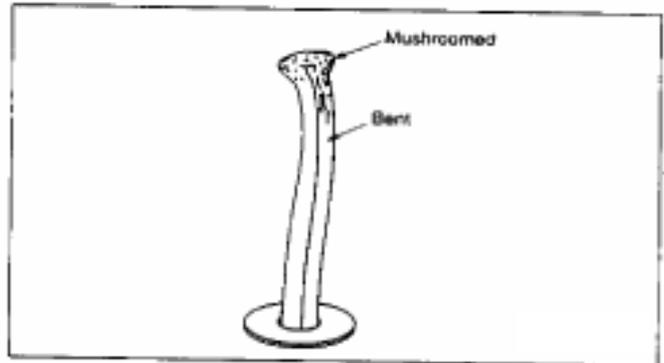


Figure 2-70

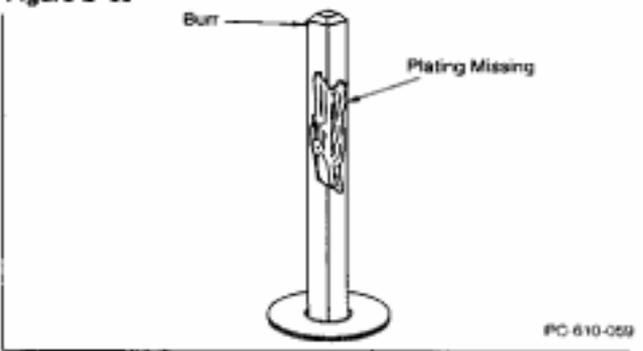
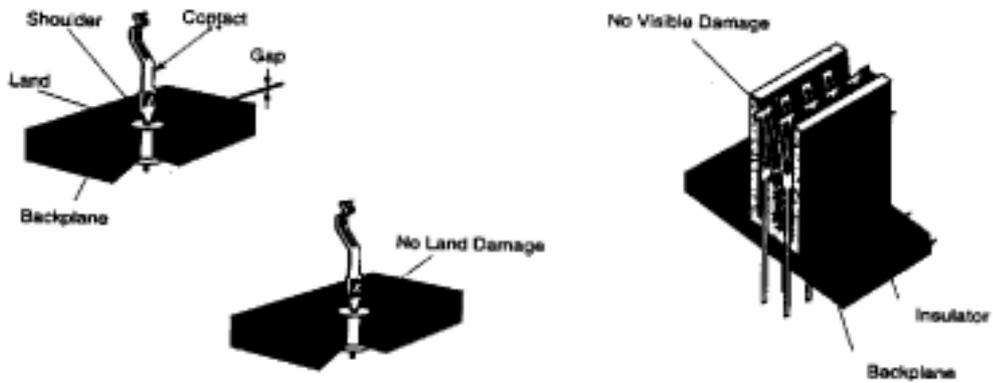


Figure 2-71

PREPARED BY (NAME)	SIGNATURE	DATE:	DOCUMENT NO.: SYST-DCWS-01	REV: 1
			TITLE: THE VISUAL INSPECTION CRITERIA FOR PCBA	
REVIEWEDED BY (NAME)	SIGNATURE	DATE:		
				PAGE: 12 OF 39

可接受:



不可接受:

- (1) 接觸彈片高出絕緣體.
- (2) 彈片扭曲.
- (3) 焊盤損壞.
- (4) 彈片斷.
- (5) 彈片與焊盤間隙太高, 未插到位.

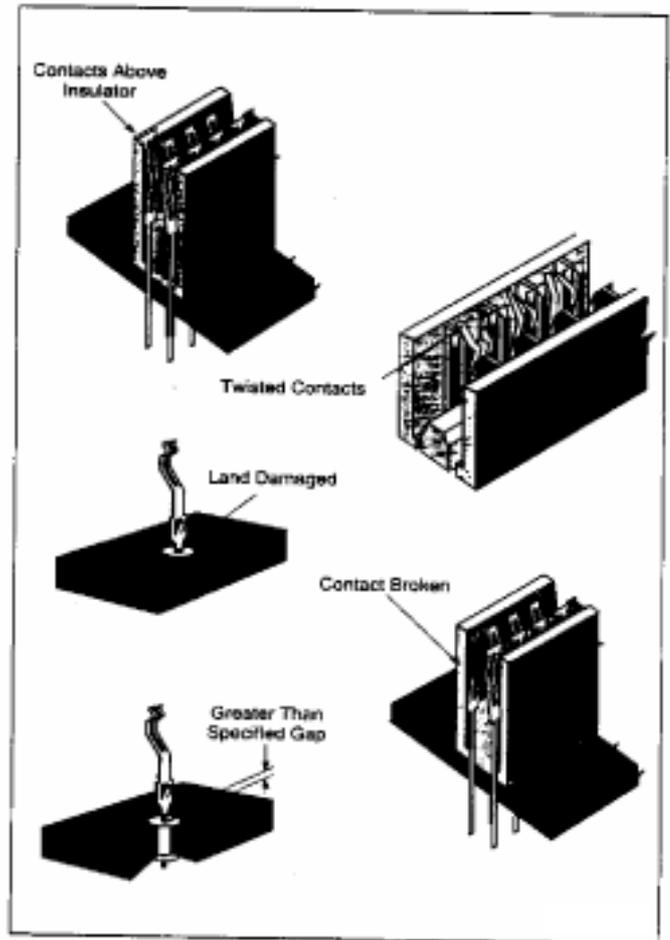
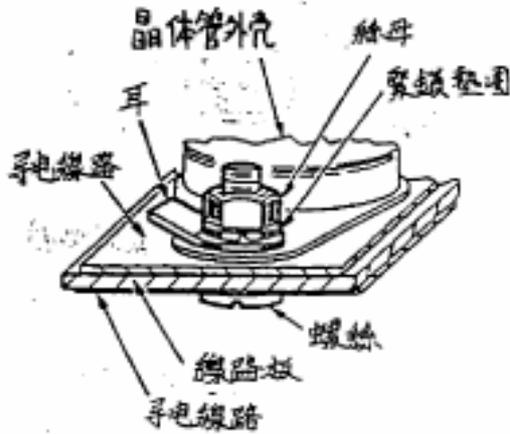


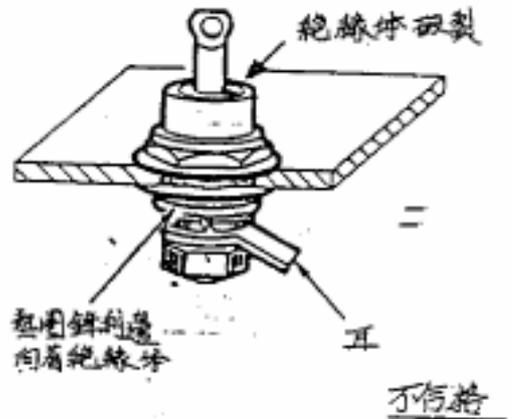
Figure 2-62

PREPARED BY (NAME)	SIGNATURE	DATE:	DOCUMENT NO.: SYST-DCWS-01	REV: 1
			TITLE: THE VISUAL INSPECTION CRITERIA FOR PCBA	
REVIEWEDED BY (NAME)	SIGNATURE	DATE:		
				PAGE: 13 OF 39

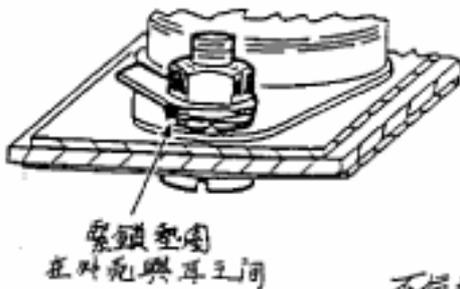
4.2.9 功率器件的安裝



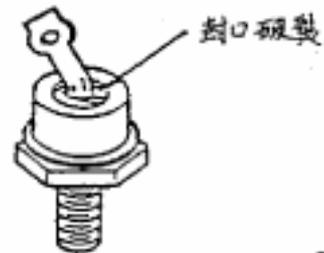
理想



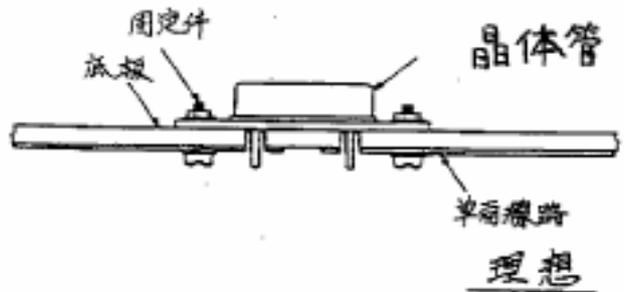
不合格



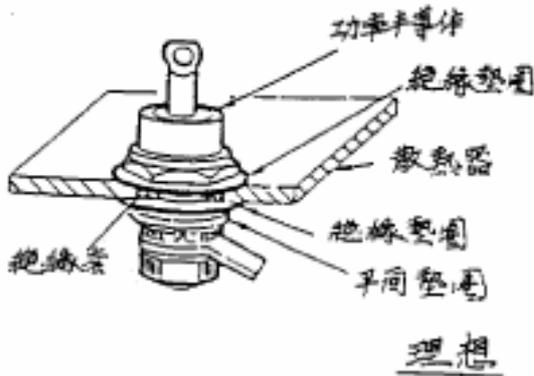
不合格



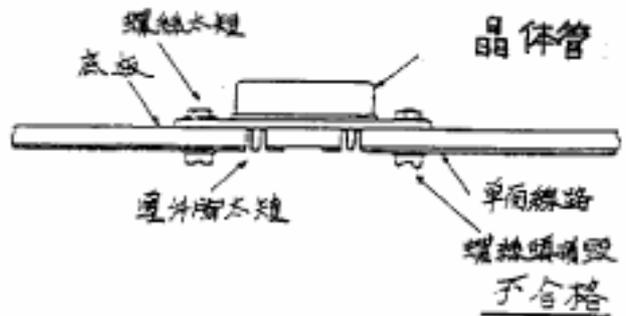
不合格



理想



理想



不合格

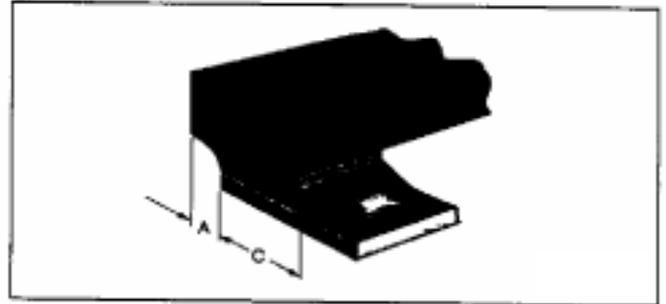
PREPARED BY (NAME)	SIGNATURE	DATE:	DOCUMENT NO.: SYST-DCWS-01	REV: 1
REVIEWED BY (NAME)	SIGNATURE	DATE:	TITLE: THE VISUAL INSPECTION CRITERIA FOR PCBA	
				PAGE: 14 OF 39

B: 表面安裝件(SMT)要求

4.2.10 只有底部端子的片裝件

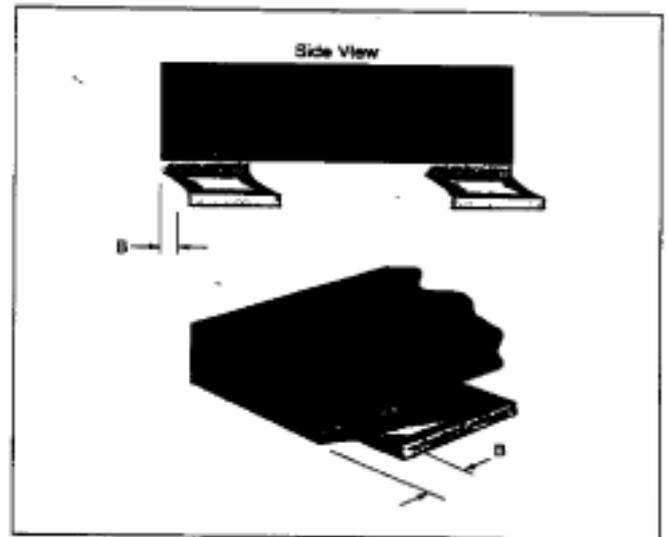
1. 側面懸空 (A)

如果最小尾端焊接寬度(C)滿足要求, 則允許有側面是空.



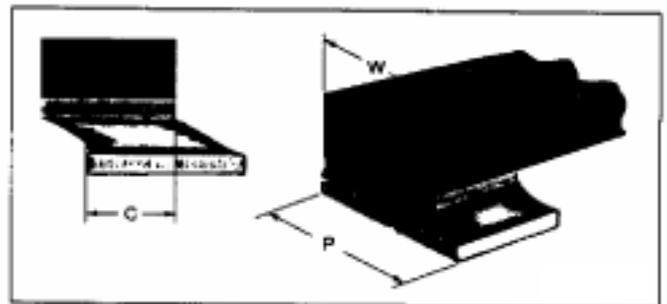
2. 尾端懸空 (B)

不允許有尾端懸空.



3. 尾端焊接寬度 (C)

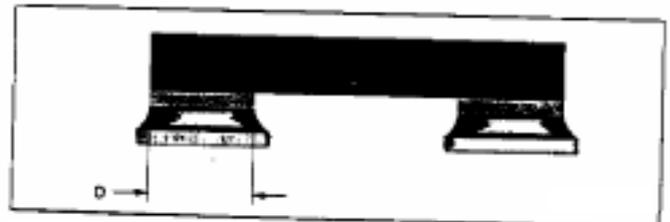
C大於或等於50%元件端子寬(W)或50%焊盤寬(P), (取W與P中較小者).



4. 側面焊接長度 (D)

只要其它條件滿足D則無

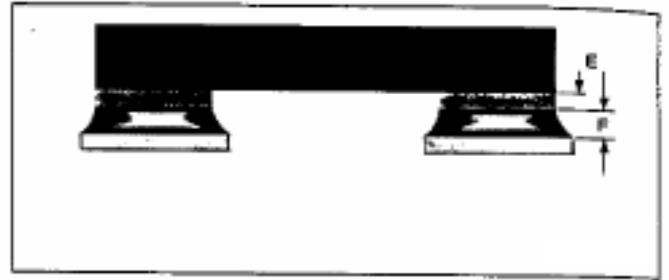
特別要求. 特別要求.



PREPARED BY (NAME)	SIGNATURE	DATE:	DOCUMENT NO.: SYST-DCWS-01	REV: 1
			TITLE: THE VISUAL INSPECTION CRITERIA FOR PCBA	
REVIEWEDED BY (NAME)	SIGNATURE	DATE:		
				PAGE: 15 OF 39

5. 最大錫流高度 (E)

無特別要求.

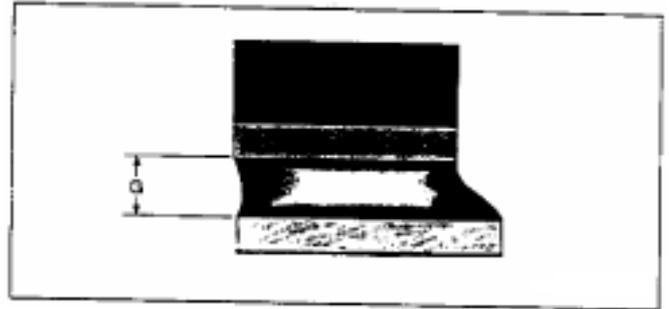


6. 最小錫流高度 (F)

只要上錫良好, 則F無特別要求.

7. 最小錫厚 (G)

上錫良好即可.

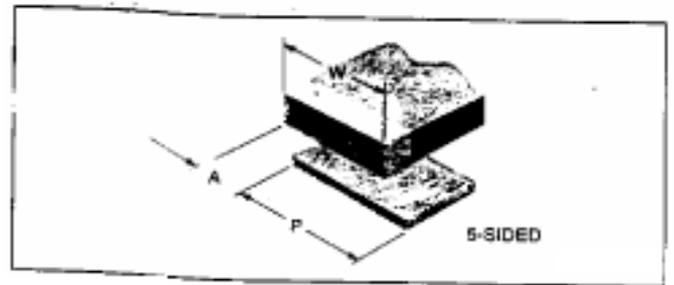


4. 2. 11 方形端子片裝件

W---元件端子寬 P---焊盤寬 T---元件端子長 H---元件端子高

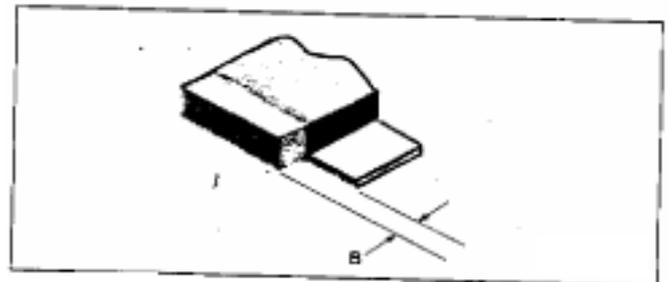
1. 側面懸空 (A)

A應小于或等于50%W或50%P, 否則為不合格.



2. 尾端懸空 (B)

不允許有尾端懸空.

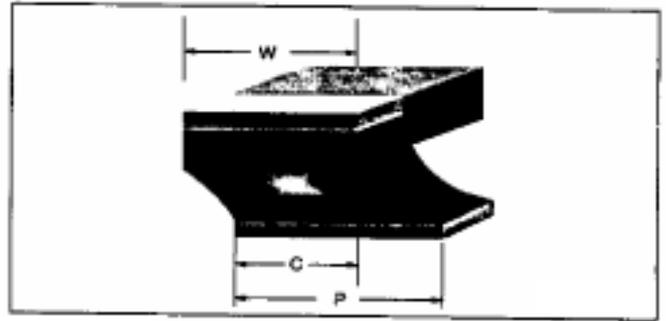


PREPARED BY (NAME)	SIGNATURE	DATE:	DOCUMENT NO.: SYST-DCWS-01	REV: 1
			TITLE: THE VISUAL INSPECTION CRITERIA FOR PCBA	
REVIEWEDED BY (NAME)	SIGNATURE	DATE:		
				PAGE: 16 OF 39

3. 尾端焊接寬度 (C)

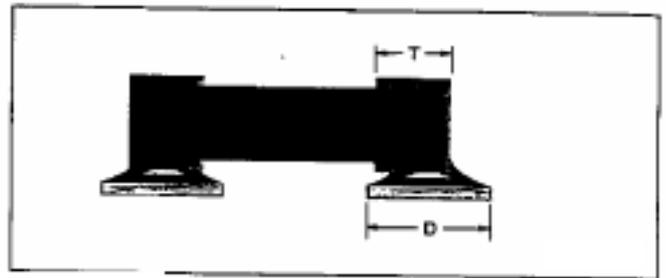
C應大于或等于50%W

或50%P, (取二者中較小者).



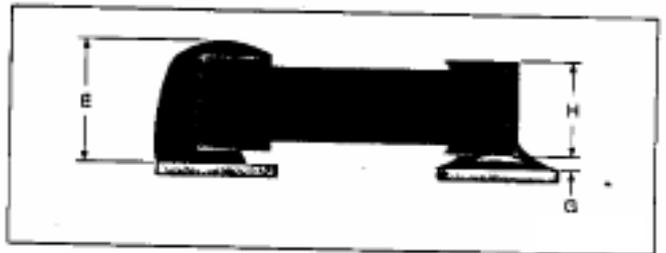
4. 側面焊接長度 (D)

只要上錫良好, D無特別要求.



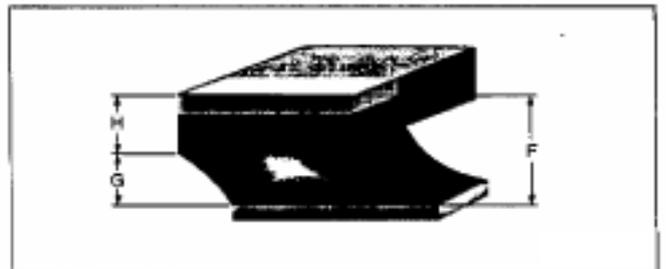
5. 最大錫流高度 (E)

錫流可到元件端子頂, 但不可碰到元件體.



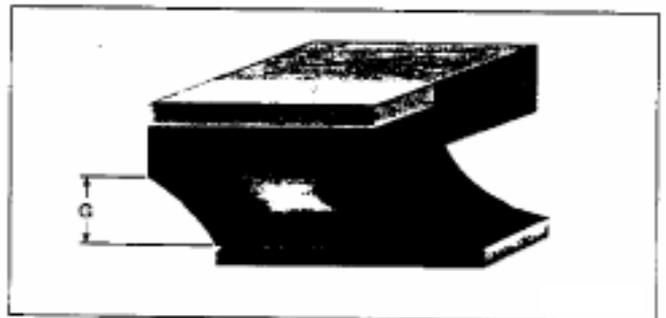
6. 最小錫流高 (F)

$F \geq G + 25\%H$, 否則為不合格.



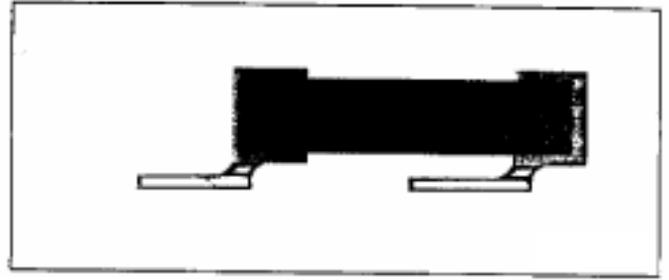
7. 最小錫厚 (G)

上錫良好即可.



PREPARED BY (NAME)	SIGNATURE	DATE:	DOCUMENT NO.: SYST-DCWS-01	REV: 1
			TITLE: THE VISUAL INSPECTION CRITERIA FOR PCBA	
REVIEWEDED BY (NAME)	SIGNATURE	DATE:		
				PAGE: 17 OF 39

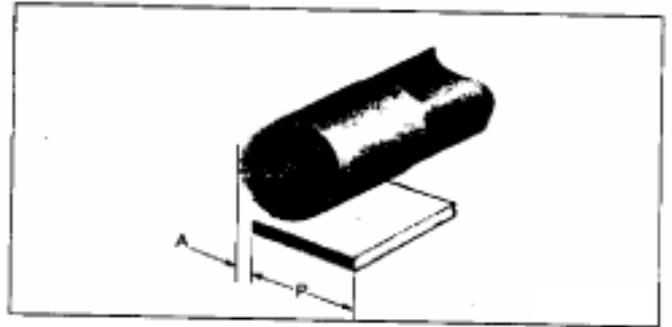
8. 端子與焊盤搭接 (J)
 有明顯搭接即可.



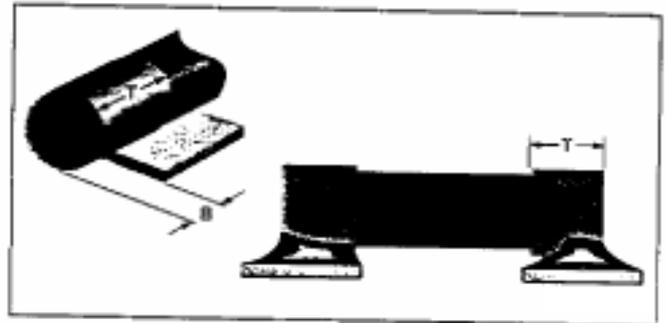
4.2.12 圓形端子片裝件

W: ---端子寬(直徑) T---端子長 P---焊盤寬

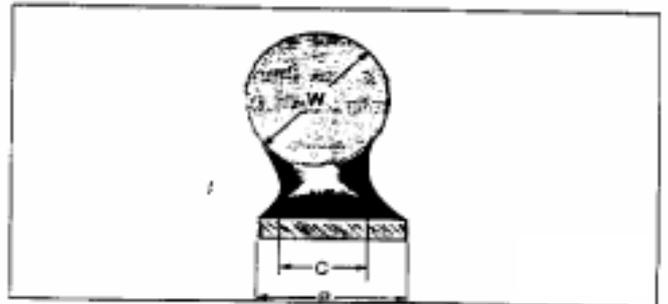
1. 側面懸空 (A)
 A不超過25%W或25%P



2. 尾端懸空 (B)
 不允許有尾端懸空.



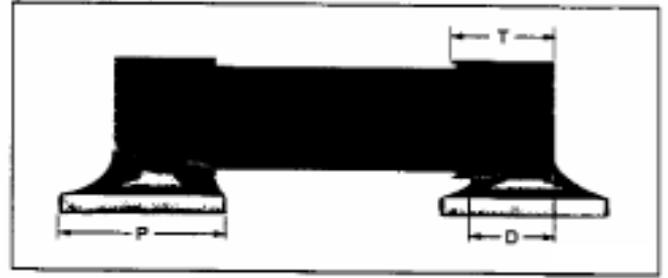
3. 尾端焊接寬度 (C)
 $C \geq 50\%W$ 或 $50\%P$, 否則
 為不合格.



PREPARED BY (NAME)	SIGNATURE	DATE:	DOCUMENT NO.: SYST-DCWS-01	REV: 1
			TITLE: THE VISUAL INSPECTION CRITERIA FOR PCBA	
REVIEWEDED BY (NAME)	SIGNATURE	DATE:		
				PAGE: 18 OF 39

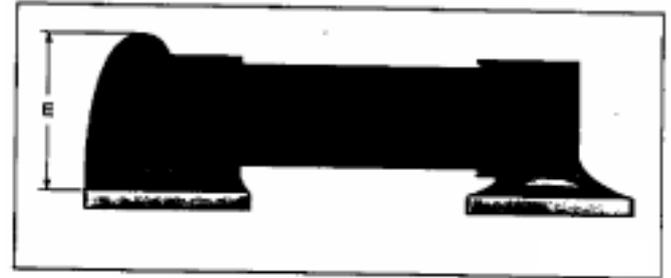
4. 側面焊接長度 (D)

$D \geq 50\%T$ 或 $50\%P$ 否則為不合格.



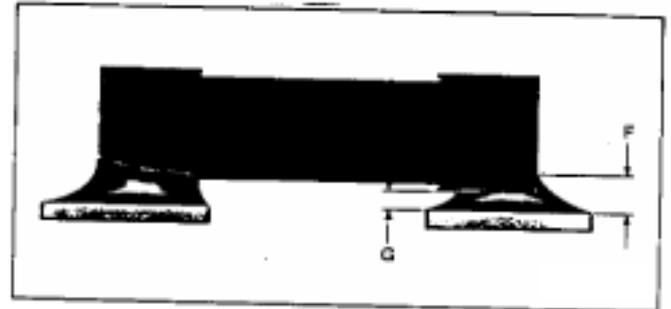
5. 最大錫流高 (E)

錫流到金屬端子頂, 但不
 可碰到元件體



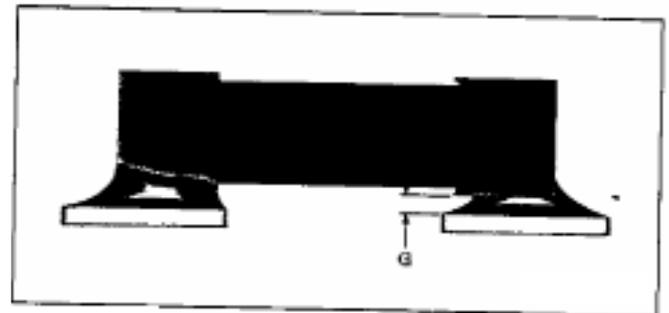
6. 最小錫流高 (F)

上錫良好即可.



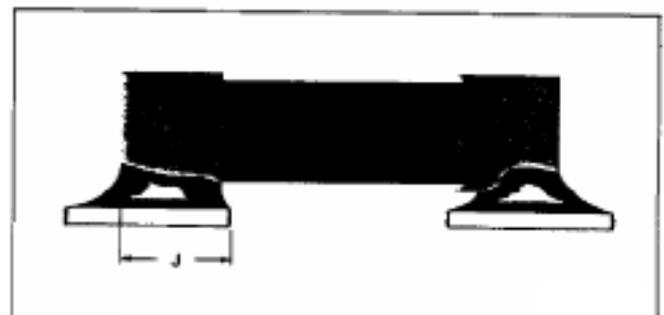
7. 最小錫度 (G)

上錫良好即可.



8. 端子與焊盤搭接 (J)

有明顯搭接即可.



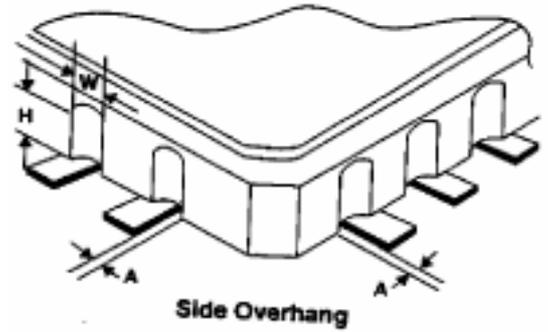
PREPARED BY (NAME)	SIGNATURE	DATE:	DOCUMENT NO.: SYST-DCWS-01	REV: 1
			TITLE: THE VISUAL INSPECTION CRITERIA FOR PCBA	
REVIEWEDED BY (NAME)	SIGNATURE	DATE:		
				PAGE: 19 OF 39

4.2.13 PLCC件 (無腳芯片)

W---城堡寬 H---城堡高 P--- 焊接寬

1. 最大側面懸空 (A)

側面懸空應不大于50%W否則為不合格.



2. 最大尾端懸空 (B)

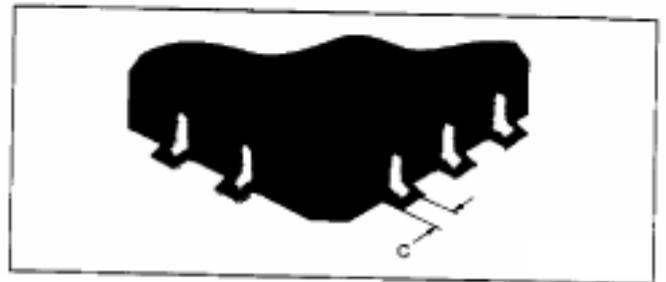
不允許有尾端懸空.



3. 最小尾端焊接寬度 (C)

$D \geq 50\%W$

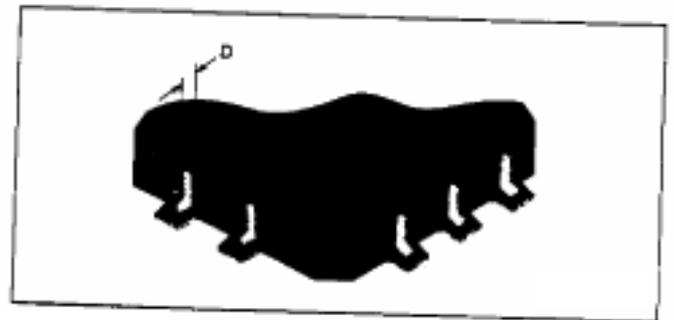
否則為不合格.



4. 最小側面焊接長度 (D)

$D \geq 50\%F$ 或 $50\%P$

(F為最小錫流高)



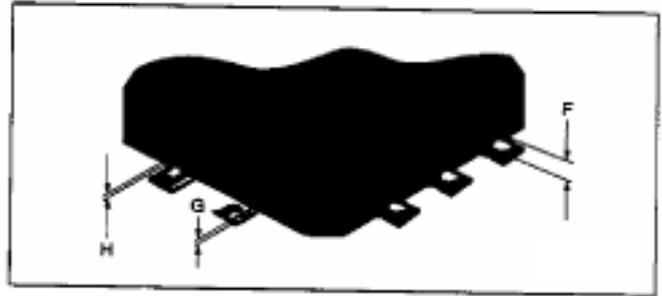
PREPARED BY (NAME)	SIGNATURE	DATE:	DOCUMENT NO.: SYST-DCWS-01	REV: 1
			TITLE: THE VISUAL INSPECTION CRITERIA FOR PCBA	
REVIEWEDED BY (NAME)	SIGNATURE	DATE:		
				PAGE: 20 OF 39

5. 最大錫流高 (E)

E無特別要求.

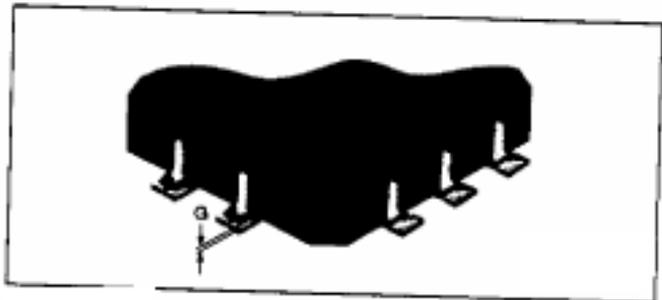
6. 最小錫流高 (F)

$F \geq G + 25\%H$, 否則為不合格.



7. 最小錫厚 (G)

上錫良好即可.

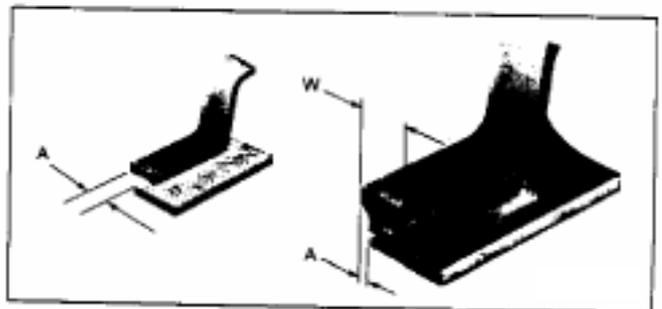


4.2.14 “L”形腳和海歐翼形腳IC位置

定義: W為IC腳寬

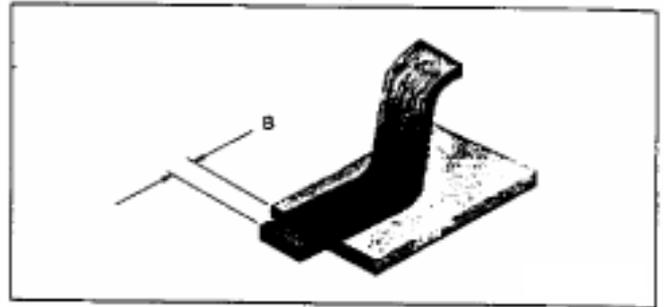
1. 側面懸空 (A)

側面位移, 使元件腳懸空 (A) 最大為 $0.5W$ 或 0.5mm 中之最小者. 否則為不合格.

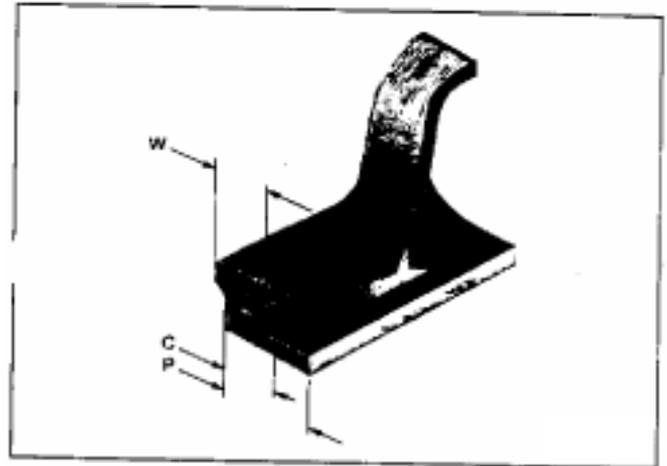


PREPARED BY (NAME)	SIGNATURE	DATE:	DOCUMENT NO.: SYST-DCWS-01	REV: 1
			TITLE: THE VISUAL INSPECTION CRITERIA FOR PCBA	
REVIEWEDED BY (NAME)	SIGNATURE	DATE:		
				PAGE: 21 OF 39

2. 前后移动 (B)
 不允许有前后悬空.



3. 最小尾端连接宽度 (C)
 最小焊接宽度为50%W, 小于此数为不合格.

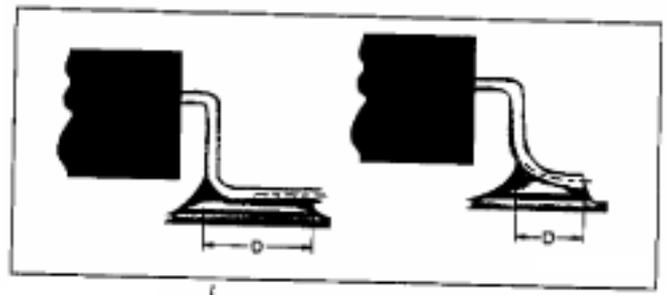


可接受:

最小侧面连接长度D等于元件脚宽W加上根部锡流高.

不可接受:

最小侧面连接长度D小于W.



PREPARED BY (NAME)	SIGNATURE	DATE:	DOCUMENT NO.: SYST-DCWS-01	REV: 1
			TITLE: THE VISUAL INSPECTION CRITERIA FOR PCBA	
REVIEWEDED BY (NAME)	SIGNATURE	DATE:		
				PAGE: 22 OF 39

5. 最大錫流高長 (E)

可接受:

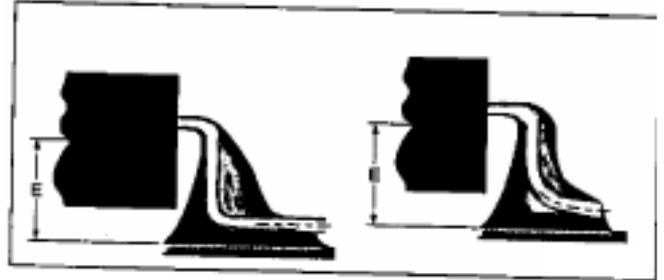
高外形元件 (如QFPS, SOLS): 錫流可靠近但不可接觸元件體或尾封.

低外形元件 (如QFPS, SOLS): 錫流可到元件包裝.

不可接受:

高外形元件: 錫流接觸到元件包裝和尾封

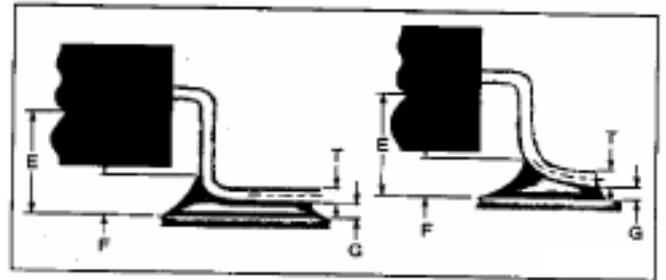
低外形元件: 錫流多到達背了導體間最小縫隙要求.



6. 最小錫流高度 (F)

可接受:

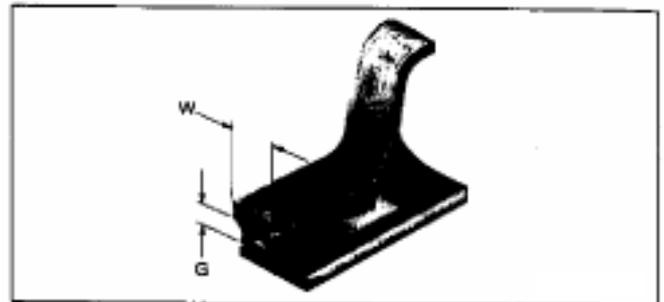
最小尾錫流高度F等于最小厚度G加上50%的腳厚(T), 小于此值則不可接受.



7. 最小錫厚 (G)

可接受:

有充分的錫形成合適的焊縫.

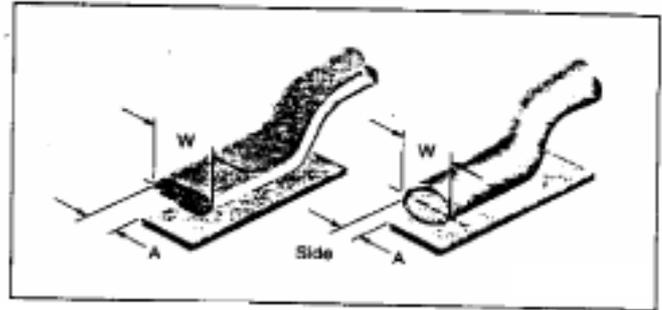


PREPARED BY (NAME)	SIGNATURE	DATE:	DOCUMENT NO.: SYST-DCWS-01	REV: 1
			TITLE: THE VISUAL INSPECTION CRITERIA FOR PCBA	
REVIEWEDED BY (NAME)	SIGNATURE	DATE:		
				PAGE: 23 OF 39

4.2.15 圓形或扁橢形腳

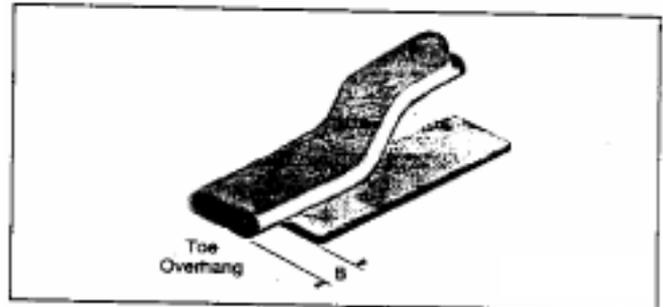
1. 側面懸空 (A)

$$A \cong 50\%W \text{ 或 } 50\%P$$



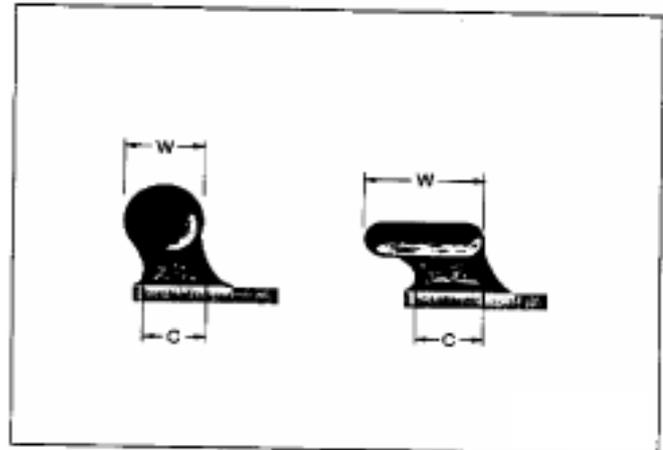
2. 前后移動 (B)

不允許有前后懸空.



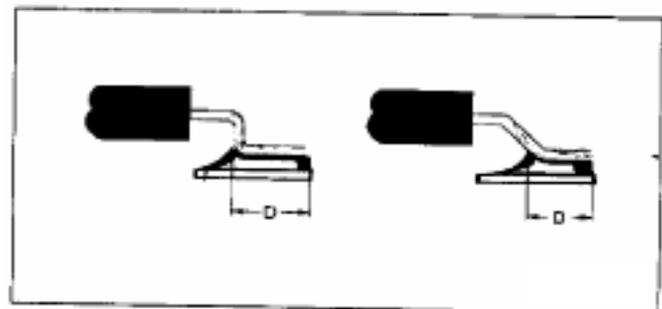
3. 最小尾端焊接寬度 (C)

有明顯合適的焊錫即可.



4. 最小側面焊接長度 (D)

$$D \cong W$$



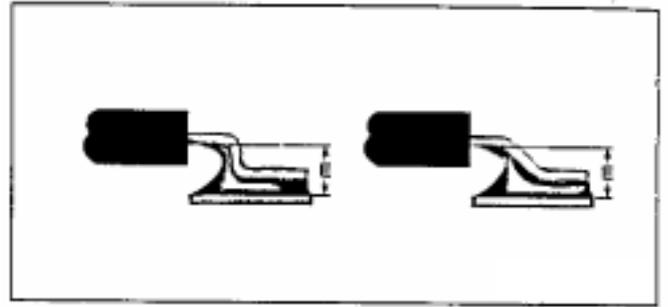
PREPARED BY (NAME)	SIGNATURE	DATE:	DOCUMENT NO.: SYST-DCWS-01	REV: 1
			TITLE: THE VISUAL INSPECTION CRITERIA FOR PCBA	
REVIEWEDED BY (NAME)	SIGNATURE	DATE:		
				PAGE: 24 OF 39

5. 最大跟部錫流, 高度 (E)

可接受:

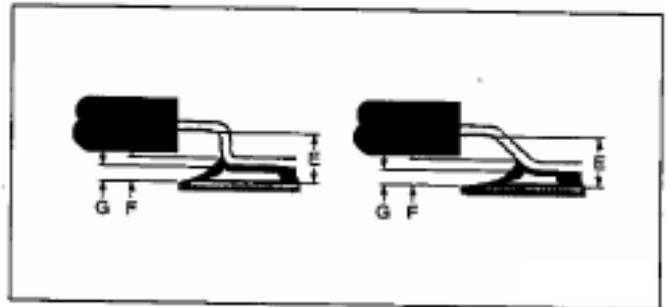
高外形元件 (如QFPS, SOLS):
 錫流可靠近但不可接觸元件
 體或尾封.

低外形元件 (如QFPS, SOLS):
 錫流可到元件包裝.



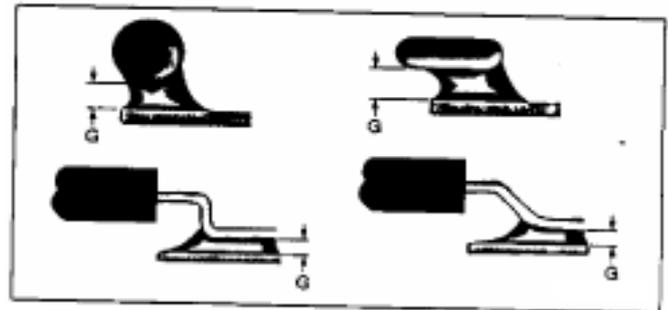
6. 最小錫流高度 (F)

$F \geq G + 50\%T$ T為腳厚.



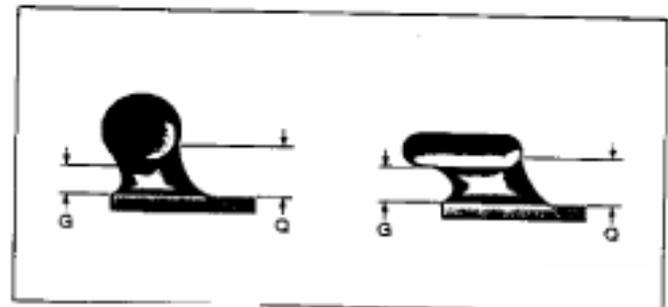
7. 最小錫厚 (G)

有充分的錫流即可.



8. 最小側面焊接高度 (Q)

Q大于或等于G+25%T, (T為
 焊接側腳厚), 否則為不可接受.

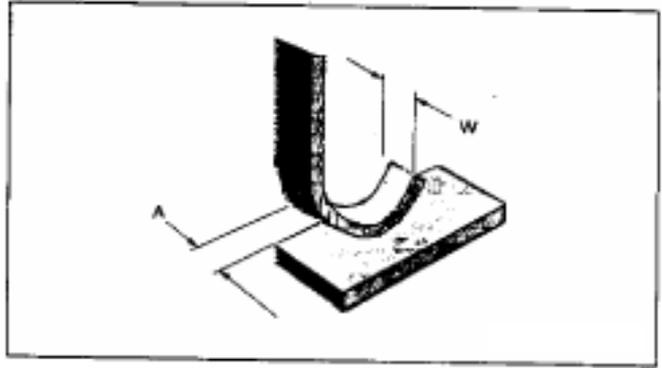


PREPARED BY (NAME)	SIGNATURE	DATE:	DOCUMENT NO.: SYST-DCWS-01	REV: 1
			TITLE: THE VISUAL INSPECTION CRITERIA FOR PCBA	
REVIEWEDED BY (NAME)	SIGNATURE	DATE:		
				PAGE: 25 OF 39

4.2.16 “J”形腳元件

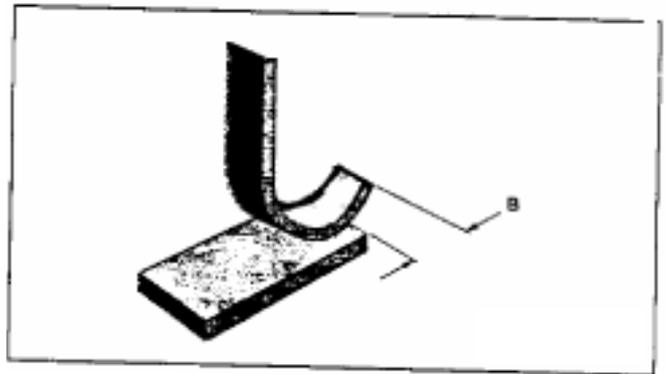
1. 側面懸空 (A)

側向懸空A應小于或等于
 50%W否則為不合格.



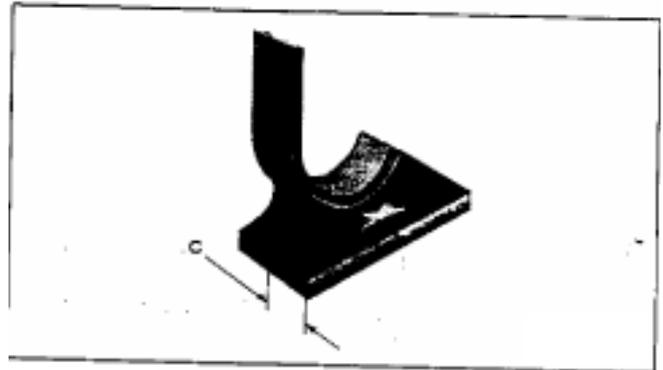
2. 腳尖懸空 (B)

對於腳尖懸空無特別要求.



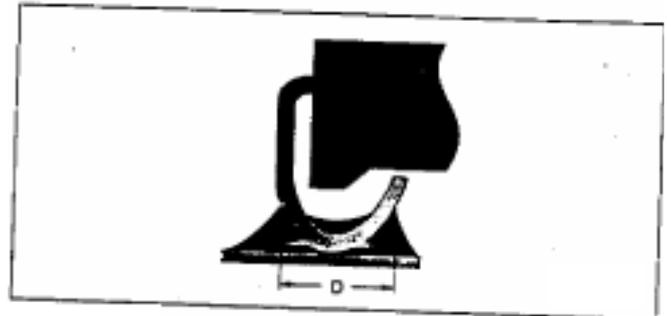
3. 尾端焊接寬度 (C)

C最小為50%W, 否則為不合格.



4. 側向焊接長度 (D)

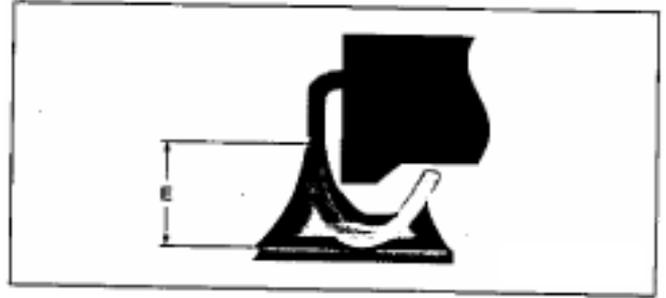
D應大于150%W, 否則為不合格.



PREPARED BY (NAME)	SIGNATURE	DATE:	DOCUMENT NO.: SYST-DCWS-01	REV: 1
			TITLE: THE VISUAL INSPECTION CRITERIA FOR PCBA	
REVIEWEDED BY (NAME)	SIGNATURE	DATE:		
				PAGE: 26 OF 39

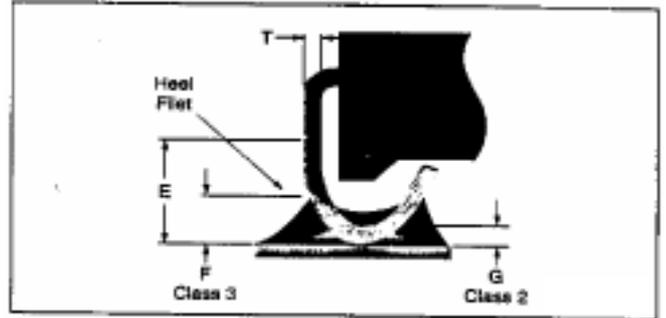
5. 最大錫流高度 (E)

錫流最高不得碰及元件包裝體，否則為不合格。



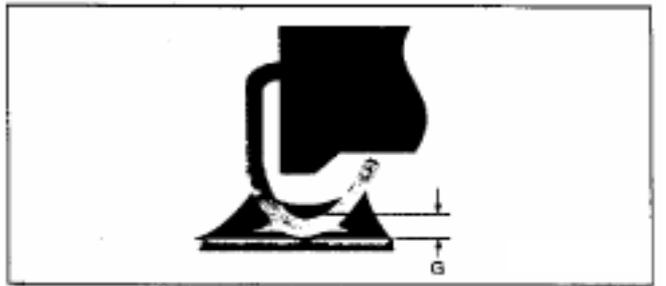
6. 最小后跟錫流高 (F)

$F \geq G + 50\%T$ (T為腳厚, G為錫厚) 否則為不合格。



7. 最小錫厚 (G)

上錫應充分良好，錫膏熔化不完全則為不合格。



4.3 焊點的要求

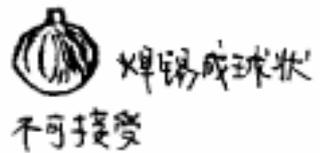
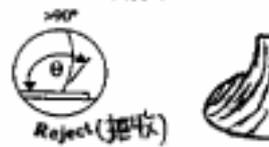
4.3.1 錫點的一般要求

焊點外觀光亮平滑並呈現良好的上錫，輪廓分明，與元件連接處有一羽毛狀薄邊，錫點與焊盤接觸角小於或等於90°(如右圖)

4.3.2 不可接受的焊接狀況

1. 因未浸潤(助焊劑不夠)導致焊錫成球狀蓋于表面，與元件接合處無薄邊，或錫量過多以至錫伸到焊盤線外。

Good Wetting of Land



PREPARED BY (NAME)	SIGNATURE	DATE:	DOCUMENT NO.: SYST-DCWS-01	REV: 1
			TITLE: THE VISUAL INSPECTION CRITERIA FOR PCBA	
REVIEWEDED BY (NAME)	SIGNATURE	DATE:		
				PAGE: 27 OF 39

2. 導體間錫搭橋(短路)



3. 錫珠或錫碎與導體間距離小於電氣要求或錫珠或錫碎未完全嵌牢.

4. 錫珠或錫碎與導體間距離小於0.13mm
 或者錫珠或錫碎的直徑大於0.13mm.



5. 每600mm²的板上超過5個以上的錫碎或錫珠.

6. 有錫絲網.

7. 焊接處呈現不良外觀，灰暗，起粒狀或結霜狀
 (往往是因為錫在太臟或焊點臟功加熱溫度不夠).

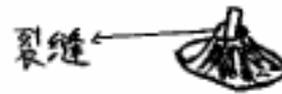


8. 絕緣體被上錫或線的輪廓不可辨出.



PREPARED BY (NAME)	SIGNATURE	DATE:	DOCUMENT NO.: SYST-DCWS-01	REV: 1
			TITLE: THE VISUAL INSPECTION CRITERIA FOR PCBA	
REVIEWEDED BY (NAME)	SIGNATURE	DATE:		
				PAGE: 28 OF 39

9. 裂錫.



10. 錫尖



11. 少錫

- (1) 孔中錫量不足, 岸面沒有錫.
- (2) 不充分的錫 (在元件周圍少于270°)
- (3) 在焊盤的表面沒有錫 (或极少)



12. 錫洞或針孔.



13. 不出腳.

因錫量過多, 致使元件腳看不到.

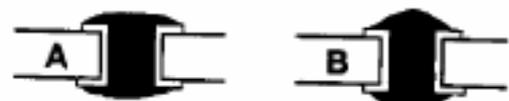


14. 焊錫觸及元件體.



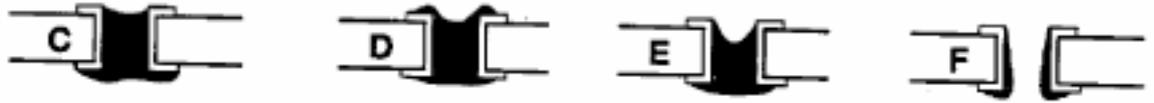
4.3.3 元件腳的穿孔 ---SMT通道的上錫性

A, B為理想狀態: 洞充滿錫, 焊盤頂呈現良好上錫.

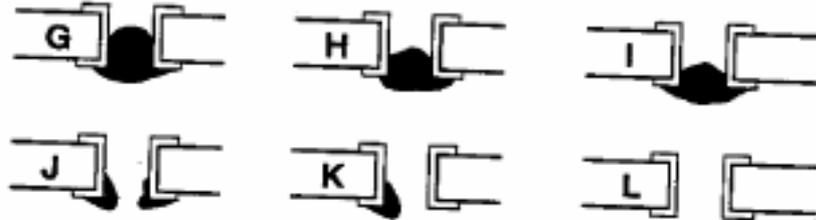


PREPARED BY (NAME)	SIGNATURE	DATE:	DOCUMENT NO.: SYST-DCWS-01	REV: 1
			TITLE: THE VISUAL INSPECTION CRITERIA FOR PCBA	
REVIEWEDED BY (NAME)	SIGNATURE	DATE:		
				PAGE: 29 OF 39

C、D、E、F 為可接受狀態: 洞邊是錫良好.



G、H、I、J、K、L 不合格: 洞邊未上滿錫.



4.4 飛線

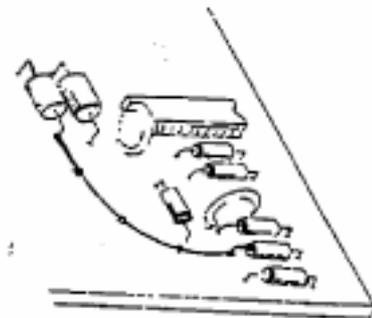
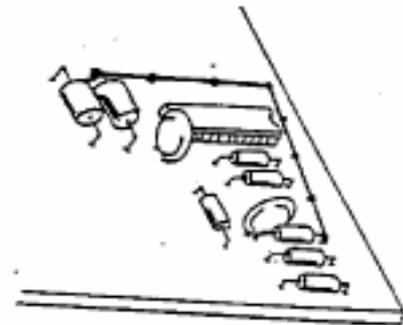
4.4.1 飛線之中路線或預留段.

理想:

- (1) 飛線直連路線, 有預留段.
- (2) 在板上每隔25mm用膠粘固定飛線.

可接受:

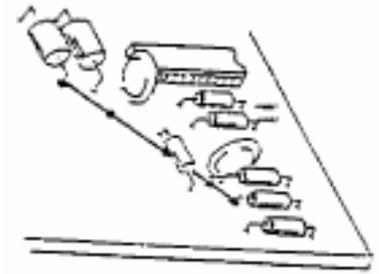
- (1) 飛線之路線並非直接, 但應避免損壞飛線.
- (2) 在底板上每隔25mm用膠固定飛線.



PREPARED BY (NAME)	SIGNATURE	DATE:	DOCUMENT NO.: SYST-DCWS-01	REV: 1
			TITLE: THE VISUAL INSPECTION CRITERIA FOR PCBA	
REVIEWEDED BY (NAME)	SIGNATURE	DATE:		
				PAGE: 30 OF 39

不可接受:

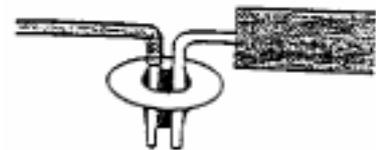
- (1) 飛線之路線在零件底部, 或飛線跨在元件上.
- (2) 飛線拉緊, 沒有預留段.



4. 4. 2 雙面連接孔之聯

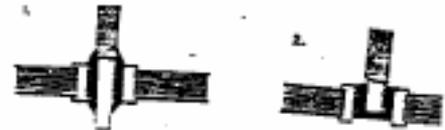
可接受:

- (1) 飛線與元件腳接在同一孔中或線頭焊在元件腳上.
- (2) 電線焊進 (SMT) 通道孔中或孔面.



不可接受:

- (1) 絕緣體嵌入錫中.
- (2) 電線未通過孔洞到另一邊.



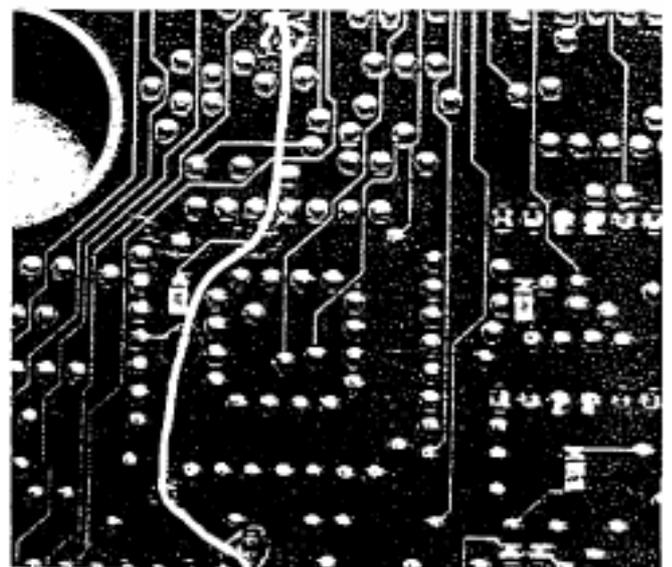
4. 4. 3 飛線在焊錫面之線路及預段

理想:

- (1) 飛線沒有橫過焊盤, 腳印地帶及測試點.
- (2) 在板上每25mm用膠固定.
- (3) 在飛線轉角處用膠固定.

可接受:

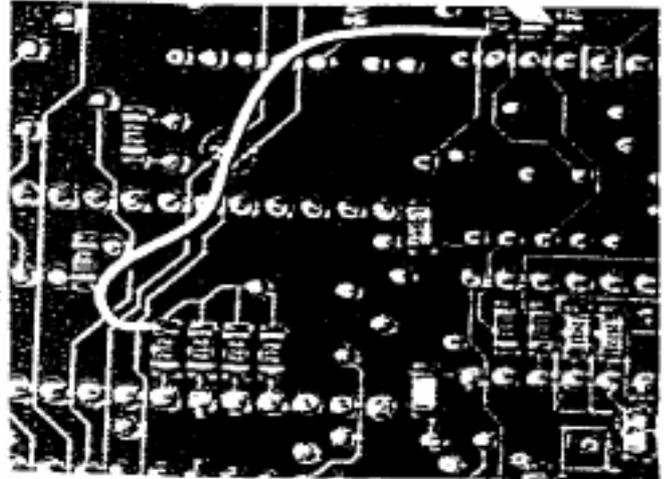
在不能避免時, 飛線橫過腳印地帶, 但不能橫過焊盤及測試點.



PREPARED BY (NAME)	SIGNATURE	DATE:	DOCUMENT NO.: SYST-DCWS-01	REV: 1
			TITLE: THE VISUAL INSPECTION CRITERIA FOR PCBA	
REVIEWEDED BY (NAME)	SIGNATURE	DATE:		
				PAGE: 31 OF 39

不可接受:

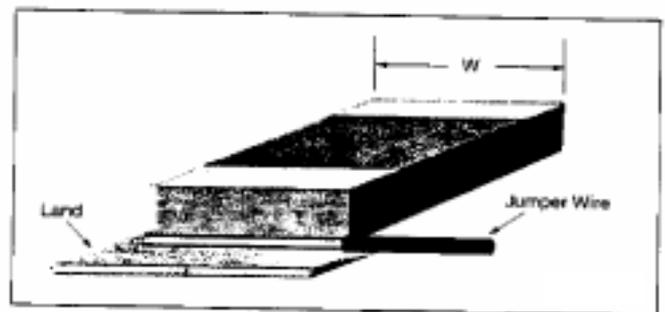
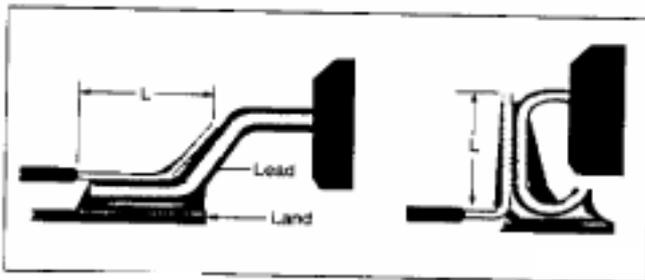
- (1) 飛線橫過焊盤及腳印地帶.
- (2) 飛線懸挂于板邊.
- (3) 飛線被粘到可動部件或部件的轉範圍內.
- (4) 膠粘固定距離不滿足工程文件要求.(一般小於或等於25mm)
- (5) 拐角處無膠粘牢.
- (6) 膠水點到可動元件或插座上.



4.4.4 飛線——表面安裝

要求:

- (1) 元件體, 腳和焊盤上不得有膠.
- (2) 飛線, 腳, 焊盤需有合適的浸錫.
- (3) 飛線焊接頭最小長度為: 有腳元件為 L
無腳元件為 W
- (4) 飛線不能太松以致可拉到元件頂.
- (5) 飛線需用膠粘固, 並合4.1.3 要求.
- (6) 焊接頭處無裂縫.



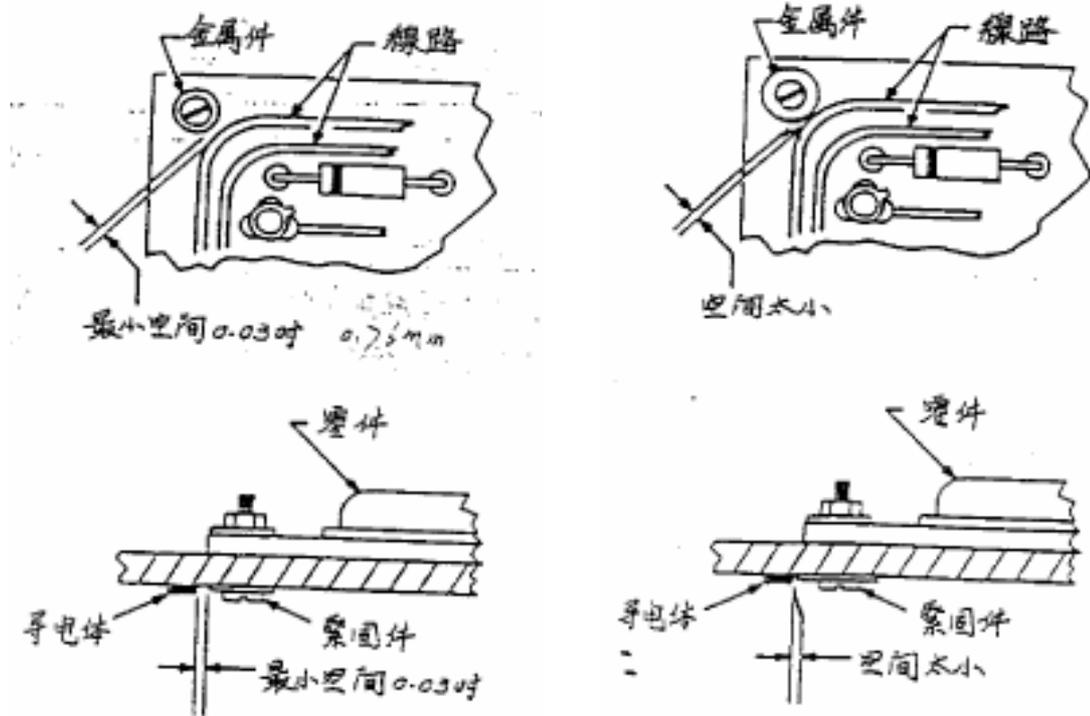
PREPARED BY (NAME)	SIGNATURE	DATE:	DOCUMENT NO.: SYST-DCWS-01	REV: 1
			TITLE: THE VISUAL INSPECTION CRITERIA FOR PCBA	
REVIEWEDED BY (NAME)	SIGNATURE	DATE:		
				PAGE: 32 OF 39

4.5 散熱片, 螺絲, 螺母, 墊圈.

4.5.1 硬件安裝 --- 電氣間隙

最小電氣間隙為0.76mm

小于此數則不合格



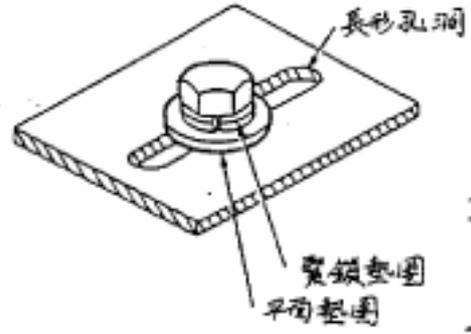
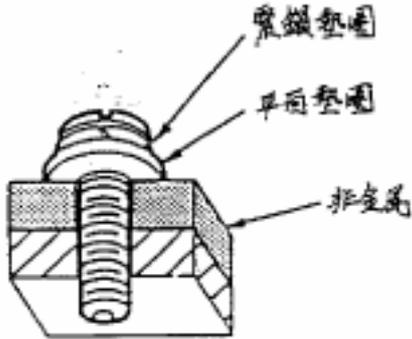
PREPARED BY (NAME)	SIGNATURE	DATE:	DOCUMENT NO.: SYST-DCWS-01	REV: 1
			TITLE: THE VISUAL INSPECTION CRITERIA FOR PCBA	
REVIEWEDED BY (NAME)	SIGNATURE	DATE:		
				PAGE: 33 OF 39

4.5.2 穿過緊固件

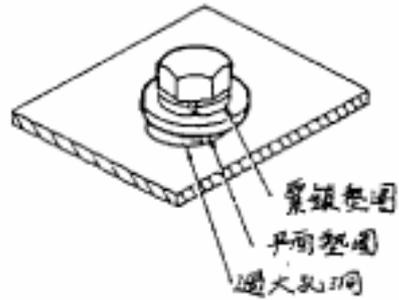
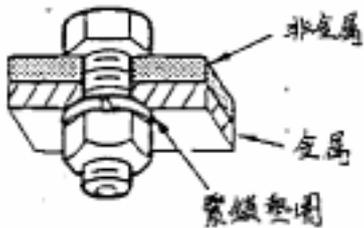
要求：(1) 正確的硬件順序。(如右圖)

(2) 正確的硬件

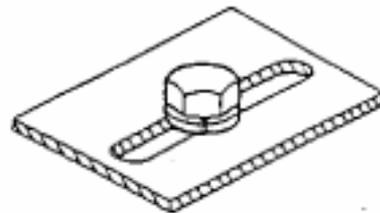
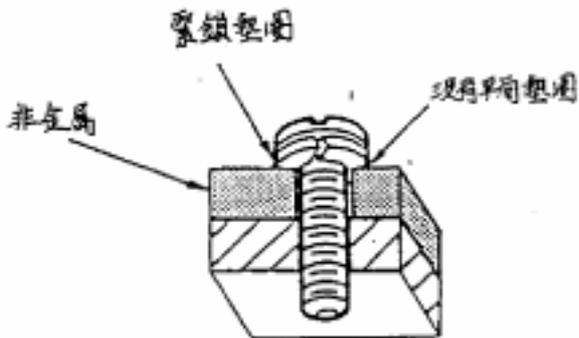
無平面墊圈則不合格。



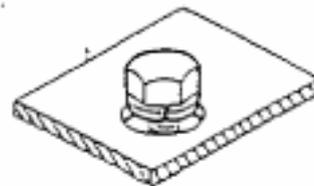
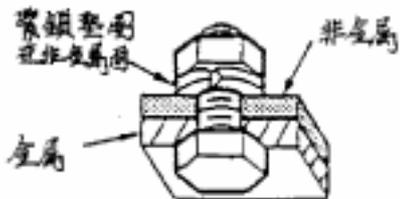
合格



合格



不合格



不合格

不合格

PREPARED BY (NAME)	SIGNATURE	DATE:	DOCUMENT NO.: SYST-DCWS-01	REV: 1
			TITLE: THE VISUAL INSPECTION CRITERIA FOR PCBA	
REVIEWEDED BY (NAME)	SIGNATURE	DATE:		
				PAGE: 34 OF 39

4.5.3 散熱片的安裝

檢查項目：

- (1) 元件是否與散熱片接觸良好.
- (2) 安裝是否牢固.
- (3) 元件與散熱片平面是否平行.
- (4) 熱隔離物是否恰當.

可接受：

- (1) 散熱片緊貼安裝.
- (2) 元件無損壞, 未受壓.
- (3) 元件邊有明顯的熱隔離物,
(雖然不均勻) (圖2-53)
- (4) 元件不平, 但與安裝表面接
觸大於75%, 其它合要求.(圖2-56)

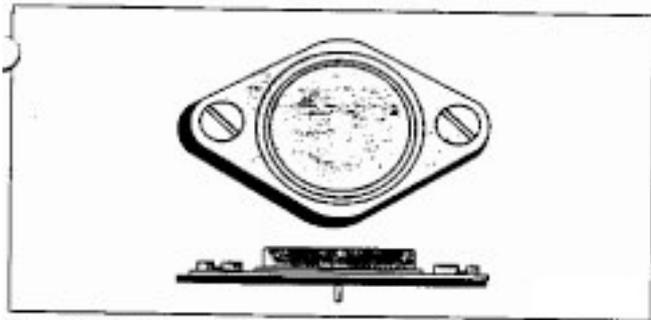
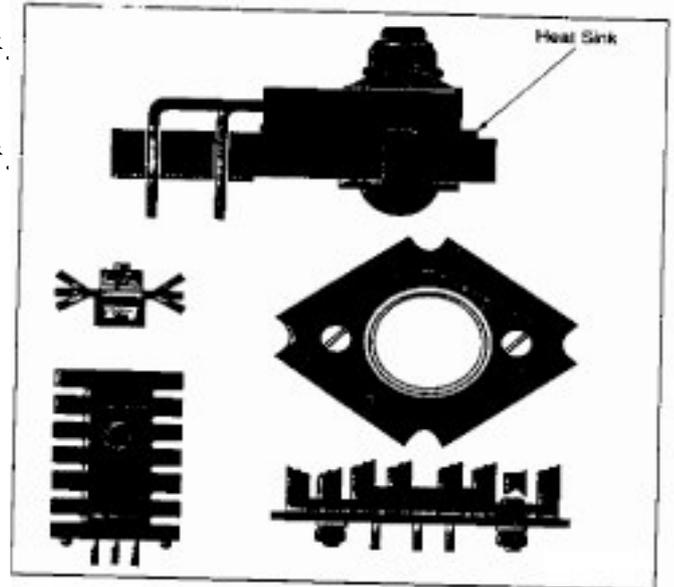


Figure 2-53

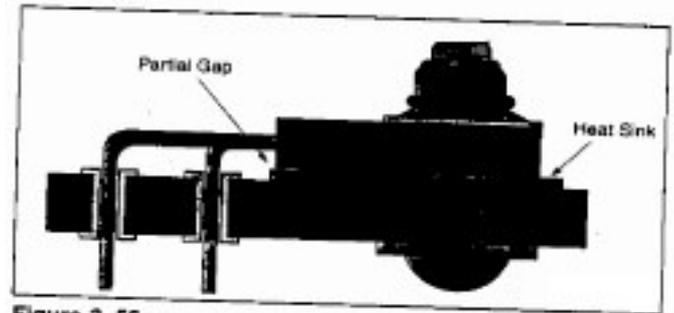


Figure 2-56

PREPARED BY (NAME)	SIGNATURE	DATE:	DOCUMENT NO.: SYST-DCWS-01	REV: 1
			TITLE: THE VISUAL INSPECTION CRITERIA FOR PCBA	
REVIEWEDED BY (NAME)	SIGNATURE	DATE:		
				PAGE: 35 OF 39

不可接受:

(1) 散熱片安裝在錯誤位置.

(圖2-57A)

(2) 散熱片彎曲變形. (圖2-57B)

(3) 元件開裂. (圖2-57C)

(4) 漏散熱片上毛邊. (圖2-57D)

(5) 無熱隔離物. (圖2-54)

(6) 元件與安裝表面未接觸, 硬件鬆動. (圖2-57)

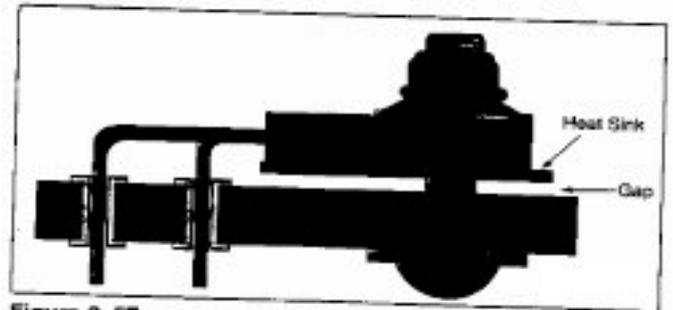
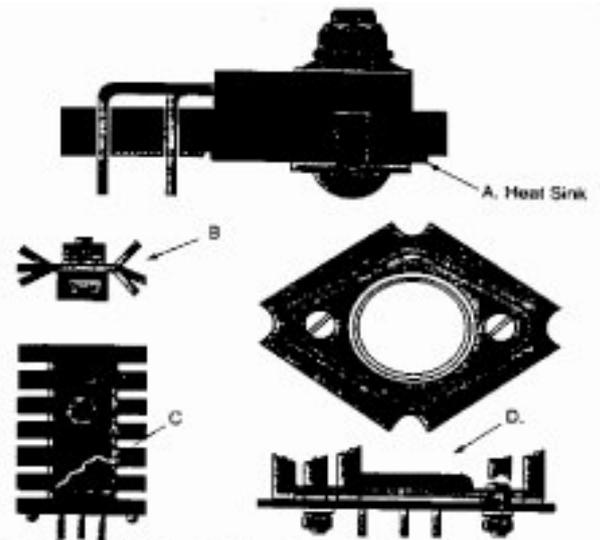


Figure 2-57

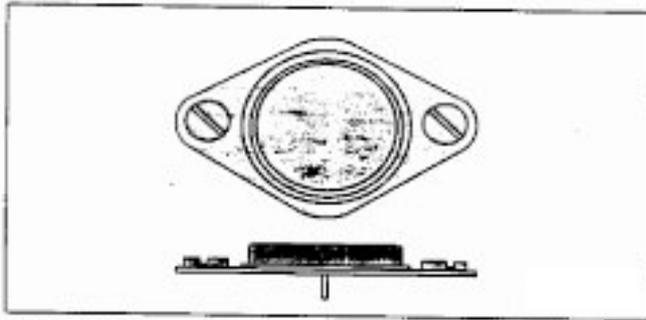


Figure 2-54

4.6 元件破損及缺陷

4.6.1 元件腳

可接受:

缺口或刻痕不超過元件腳直徑的1/10.



不可接受:

(1) 划痕或裂縫超過元件腳直徑的1/10

(2) 腳形多次扭曲.

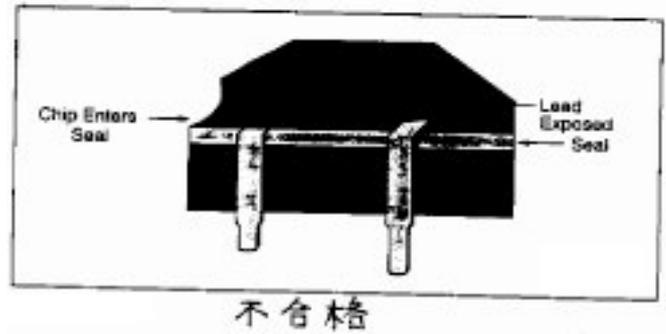


PREPARED BY (NAME)	SIGNATURE	DATE:	DOCUMENT NO.: SYST-DCWS-01	REV: 1
			TITLE: THE VISUAL INSPECTION CRITERIA FOR PCBA	
REVIEWEDED BY (NAME)	SIGNATURE	DATE:		
				PAGE: 36 OF 39

4.6.2 DIPS 和 SOIC

可接受:

- (1) 破口未損及密封處.
- (2) 沒有裂縫延伸到密封處.
- (3) 破口不影響元件標識, 否則為不合格.



4.6.3 軸向腳元件.

可接受:

- (1) 無可見的裂口, 內部金屬未暴露.
- (2) 元件密封未受影響.

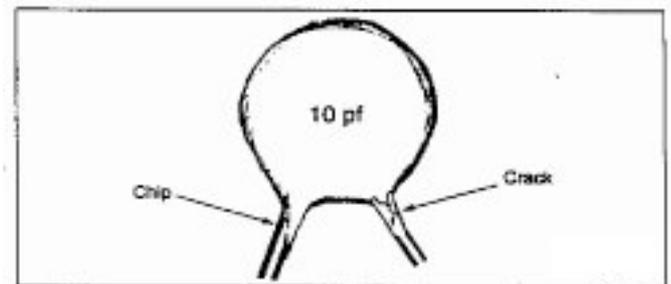
不可接受:

- (1) 外殼被損以至金屬暴露或外形受損.
- (2) 玻璃殼元件有開裂.

4.6.4 徑向腳元件

可接受:

表面輕微擦, 刮, 削傷, 但未暴露元件基質和有效區, 結構完整性未受破壞.



不可接受:

元件有效區被暴露或結構完整性受破壞.

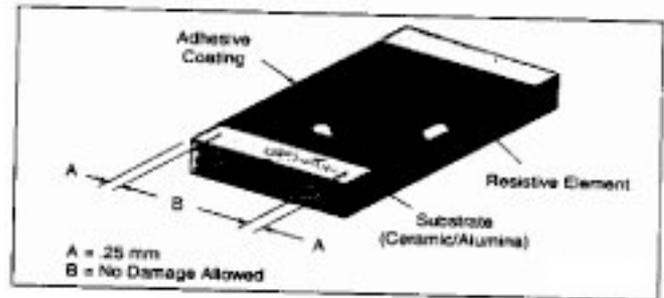
4.6.5 SMD元件.

PREPARED BY (NAME)	SIGNATURE	DATE:	DOCUMENT NO.: SYST-DCWS-01	REV: 1
			TITLE: THE VISUAL INSPECTION CRITERIA FOR PCBA	
REVIEWEDED BY (NAME)	SIGNATURE	DATE:		
				PAGE: 37 OF 39

4.6.5.1 晶片電阻

可接受:

- (1) 元件頂面破口從元件邊向內延伸的寬度小於0.25mm.
- (2) B區無破損.



不可接受:

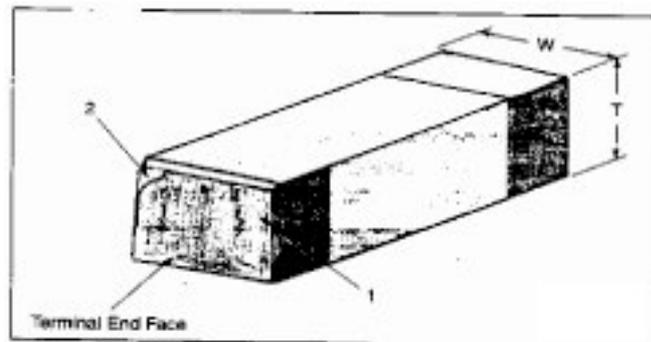
- (1) 電阻材料有缺口.
- (2) 任何開裂.
- (3) 尾端頂部金屬覆層少50%以上.
- (4) 不規則形狀超出此類型元件的最大或最小規定尺寸.

4.6.5.2 晶片電容

A 浸錫

可接受:

邊緣浸錫少於元件寬(W)和厚度(T)的1/4.



PREPARED BY (NAME)	SIGNATURE	DATE:	DOCUMENT NO.: SYST-DCWS-01	REV: 1
			TITLE: THE VISUAL INSPECTION CRITERIA FOR PCBA	
REVIEWEDED BY (NAME)	SIGNATURE	DATE:		
				PAGE: 38 OF 39

不可接受:

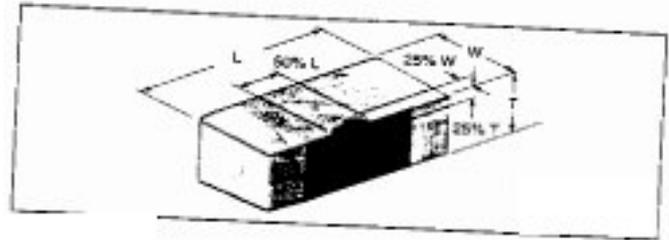
- (1) 波峰焊中使元件端子尾面浸錫.
- (2) 浸錫超過元件寬度或厚度有1/4.

B 缺口和開裂

可接受:

每個缺口大小不超過如下尺寸:

- 25%T (25%厚度)
- 25%W (25%寬度)
- 50%L (50%長度)



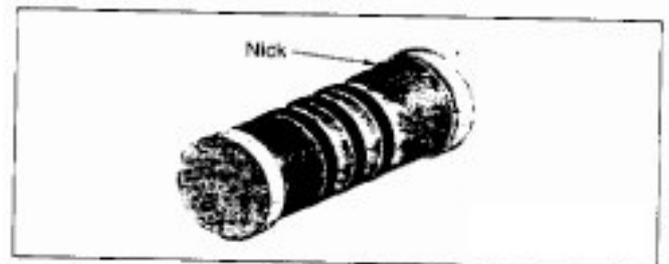
不可接受:

- (1) 任何暴露了電極的缺口.
- (2)任何開裂.

4.6.5.3 圓形部件

不可接受:

任何缺口, 開裂或其它損傷.



PREPARED BY (NAME)	SIGNATURE	DATE:	DOCUMENT NO.: SYST-DCWS-01	REV: 1
			TITLE: THE VISUAL INSPECTION CRITERIA FOR PCBA	
REVIEWEDED BY (NAME)	SIGNATURE	DATE:		
				PAGE: 39 OF 39