



## ETL-XPC-204

## (T TYPE)

## (For FR-1 High Tracking Laminate)

## ■特性

- 優越的低溫打孔性
- 尺寸變化、彎曲度小
- 優越之電氣火災安全性 & 優越之耐熱性
- 符合 UL746E DSR (▲ 標誌)
- 符合 RoHS 法規要求

## ■用途 APPLICATIONS

- 彩色電視機、CD 音響、監視器、VTR、汽車音響、洗衣機、電毯、家庭音響、LED 及傳統照明等驅動電源板。

## ■CHARACTERS

- Excellent low temperature punchability.
- Dimensional change and warpage are small.
- Electrical fire safety is excellent & Excellent heat resistance.
- Meet UL746E Direct Support Requirement (▲ MARK).
- Conform to the claim of RoHS.

## ■APPLICATIONS

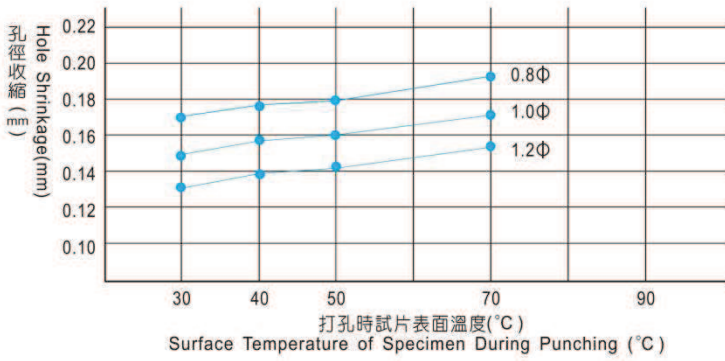
- Color TV, CD Player, Monitor, VTR, Car Stereo Equipment, Washing Machine, Electric Blanket, Home Stereo Equipment, and power drive board of LED and traditional lighting ...etc.

## ■一般物性 GENERAL PROPERTIES

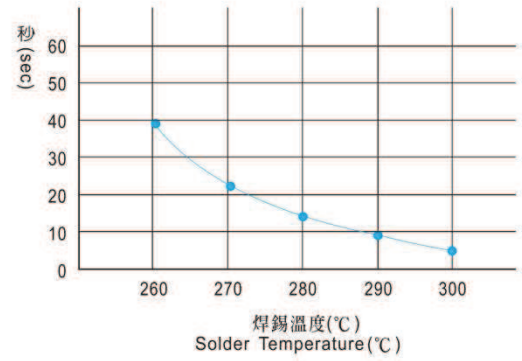
| 試驗項目 Test Item                         |                          | 單位 Unit             | 處理條件 Condition                        | 品管規格值 Guarantee Value         | 實測標準值 Standard Value                     |
|--|--------------------------|---------------------|---------------------------------------|-------------------------------|--|
| 體積阻抗 Volume Resistivity                |                          | Ω-cm                | C-96/20/65                            | Above $5 \times 10^{12}$      | $1 \times 10^{13} \sim 1 \times 10^{14}$ |
|  |                          |                     | C-96/20/65+C-96/40/90                 | Above $5 \times 10^{11}$      | $1 \times 10^{12} \sim 5 \times 10^{13}$ |
| 表面阻抗<br>Surface Resistance             | 接著劑面<br>Adhesive Surface | Ω                   | C-96/20/65                            | Above $1 \times 10^{11}$      | $5 \times 10^{11} \sim 5 \times 10^{12}$ |
|  | 積層板面<br>Laminate Surface |                     | C-96/20/65+C-96/40/90                 | Above $1 \times 10^{10}$      | $1 \times 10^{11} \sim 1 \times 10^{12}$ |
|  |                          |                     | C-96/20/65                            | Above $1 \times 10^{10}$      | $5 \times 10^{10} \sim 1 \times 10^{12}$ |
|  |                          |                     | C-96/20/65+C-96/40/90                 | Above $1 \times 10^8$         | $5 \times 10^8 \sim 5 \times 10^9$       |
| 絕緣阻抗<br>Insulation Resistance          |                          | Ω                   | C-96/20/65                            | Above $1 \times 10^{11}$      | $5 \times 10^{11} \sim 5 \times 10^{12}$ |
|  |                          |                     | C-96/20/65+D-2/100                    | Above $1 \times 10^8$         | $5 \times 10^8 \sim 5 \times 10^9$       |
| 介電常數(1 MHz)<br>Dielectric Constant     |                          | —                   | C-96/20/65                            | Less than 5.3                 | 4.1~4.6                                  |
|  |                          |                     | C-96/20/65 +D-24/23                   | Less than 5.6                 | 4.8~5.2                                  |
| 散發因子(1 MHz)<br>Dissipation Factor      |                          | —                   | C-96/20/65                            | Less than 0.045               | 0.030~0.040                              |
|  |                          |                     | C-96/20/65 + D-24/23                  | Less than 0.055               | 0.046~0.052                              |
| 焊錫耐熱性(260°C)<br>Solder Heat Resistance |                          | sec                 | A                                     | Above 10                      | 20~40                                    |
| 銅箔剝離強度<br>Peel Strength                | 銅箔(35μm)<br>Copper Foil  | kgf/cm              | A                                     | Above 1.5                     | 1.90~2.40                                |
|  |                          |                     | S<br>(260°C, 10 sec)                  | Above 1.5                     | 1.90~2.40                                |
| 彎曲強度 Flexural Strength                 |                          | kgf/mm <sup>2</sup> | A                                     | Above 10                      | 13~16                                    |
| 吸水率 Water Absorption                   |                          | %                   | E-24/50+D-24/23                       | Less than 1.2                 | 0.60~0.80                                |
| 耐熱性 Heat Resistance                    |                          | —                   | A                                     | 190°C 30 min<br>no blistering | 200~205°C 30 min<br>no blistering        |
| 難燃性 Flame Resistance<br>(UL 94 method) |                          | sec                 | A& E-168/70                           | Less than π=5<br>Max=10       | 94 V-0                                   |
| 耐藥品性 Alkali Resistance                 |                          | —                   | Immersion in 3% NaOH<br>40°C (3 mins) | 無異常<br>No abnormality         | 無異常<br>No abnormality                    |
| 加工沖孔性 Punchability                     |                          | —                   | A                                     | Suitable temp.<br>50~70 °C    | GOOD                                     |
| 耐漏電破壞性 CTI (IEC 60112)                 |                          | Volt                | A                                     | ≥600                          | ≥600                                     |

◎以上數據試片厚度 1.6mm (Note : Test specimen thickness is 1.6mm)

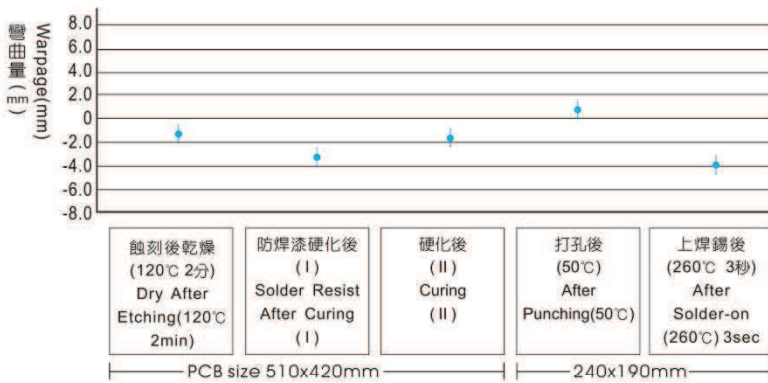
■ 打孔後孔徑收縮  
Hole Shrinkage after Punching



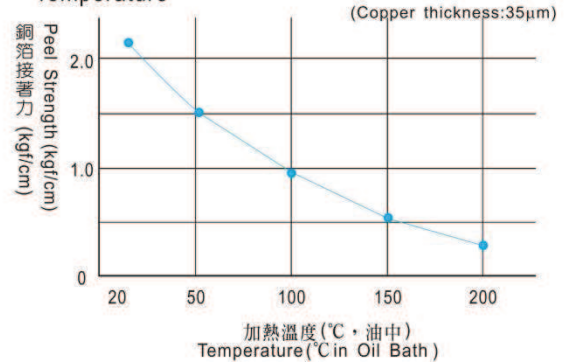
■ 焊錫中的耐熱之溫度特性  
Characteristics of Solder Heat Resistance



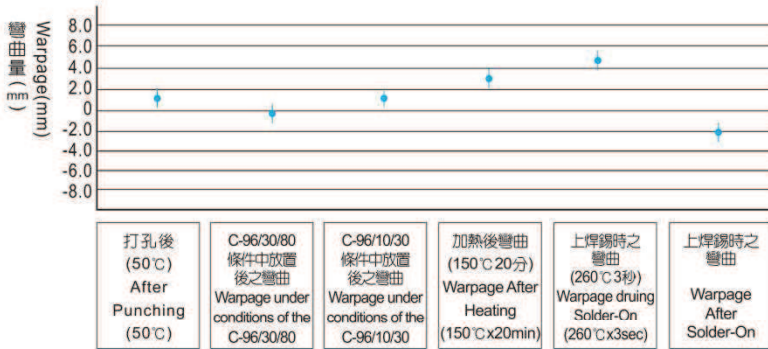
■ 印刷電路板加工時之彎曲(板厚1.6mm單面銅箔)  
Warpage During Process(thickness 1.6mm, single side)



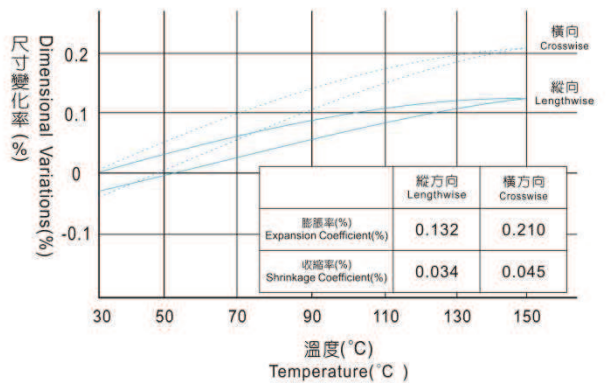
■ 銅箔接著力之溫度特性  
Characteristics of Peel Strength vs. Temperature



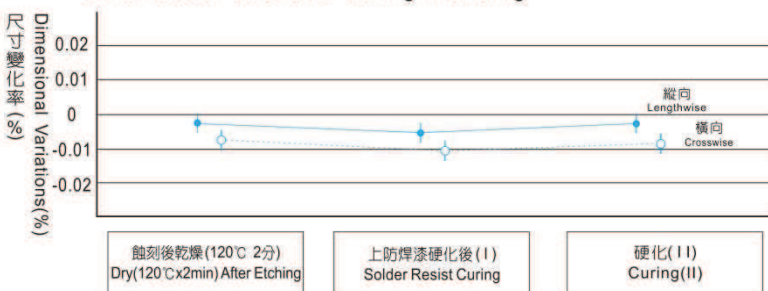
■ 彎曲隨時間之變化，加熱後及上焊錫後之彎曲  
Warpage vs. Time and Warpage after Heating and Solder-On



■ 熱脹冷縮特性  
Heat Expansion and Cooling Shrinkage



■ 在印刷工程中之尺寸變化  
Dimensional Variations During Punching



■ 打孔特性(打孔溫度25°C)  
Punch Character(Punching Temperature 25°C)

| 最大剪斷應力<br>Max. Shearing Resistance (kgf/mm <sup>2</sup> ) | 最大拔起應力<br>Max. Plucking Resistance (kgf/mm <sup>2</sup> ) |
|---|---|
| 8.6   | 2.5   |