UL Approval: E214381
Version : Rev. 5

# VT-901

## Datasheets & Process Guideline

***VT-901TC /Laminate  VT-901PP/Prepreg***

***High Tg &***

***High Reliability***

***Material***

## General Information

- ***High Tg (Tg 250℃) and Extreme Operating Temperature***
- High Thermal Resistance(Td 390℃) and Several Assembly Processing
- Improved Fracture Toughness
- Low Z-axis CTE for Through Hole Reliability

## Application

- Chip Manufacturers
- Engine/Flight Controls
- Down Hole
- Power Supply /Backplane
- Military and Burn-in Board

## Availability

VT-901TC Laminates are available in thickness from .004" to .125" and with the copper foil from 1/2oz to 3oz; Ventec can supply double side treated copper foil and single side treated copper foil, but double side treated copper foil and reverse copper foil are not suggested using on VT-901 laminates because the peel strength would not be as good as conventional material's.

VT-901PP pre-pregs are available in many E-Glass styles, such as 7628, 7629, 1506, 1500, 2113, 2313, 3313, 2116.

## Storage Condition & Shelf Life

| | | Prepreg | Laminate |
|---|---|---|---|
| Storage Condition | Temperature | Below 20℃(68℉) | Room |
| | Relative Humidity | Below 50% RH | / |
| Shelf Life | | 3 Months | 5 Months(airproof) |

** The pre-preg exceeding shelf time should be retested.*

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# VT-901

## Properties Sheet: *IPC-4101B Specification Sheet(s)/41、42*

(Test Sample: .061"1/1)

| Test Item | | Test Condition (IPC-TM-650 or As Noted) | Unit | Specification (IPC-4101 B) | Typical Value | |
|---|---|---|---|---|---|---|
| | | | | | VT-901 | Normal FR-4 |
| **Flexural Strength** | Warp | 2.4.4 | MPa | >415 | 500 | 600 |
| | Fill | | | >345 | 380 | 500 |
| **Peel Strength (1 oz)** | As Received | 2.4.8 | Lb/in | 6.0 min | 6~9 | 10~12 |
| | After Thermal stress | | | | 6~9 | 9~12 |
| **Glass Transition Temp.(Tg),DSC** | | 2.4.25 | ℃ | - | 250 | 136~140 |
| **Decomposition Temp. (Td), By TGA (@5% weight loss)** | | ASTM D3850 | ℃ | - | 390 | 290~310 |
| **X.Y-axis C.T.E.** | | TMA | ppm/℃ | - | 13~14 | 12~15 |
| **Z-axis C.T.E.** | Before Tg | TMA | ppm/℃ | - | 50 | 50 |
| | After Tg | | | - | 250 | 250 |
| **Z-axis Total Expansion** | 50→260℃ | TMA | % | - | 1.5% | 3.5~4.0% |
| | 50→288℃ | TMA | % | - | 2.0% | 4.0~5.0% |
| **Moisture Absorption** | D-24/23 | 2.6.21 | % | 0.35 max | 0.10~0.16 | 0.25 |
| | After PCT | 1atm.,121℃,1hour | % | - | 0.20 | 0.28 |
| **Volume Resistance** | After Moisture | 2.5.17.1 | MΩ-㎝ | $\geq 10^6$ | $5\times10^8$ | $5\times10^8$ |
| | E-24/125 | | | $\geq 10^3$ | $5\times10^6$ | $5\times10^6$ |
| **Surface Resistance** | After Moisture | 2.5.17.1 | MΩ | $\geq 10^4$ | $5\times10^7$ | $5\times10^7$ |
| | E-24/125 | | | $\geq 10^3$ | $5\times10^6$ | $5\times10^6$ |
| **Electric Strength** | | 2.5.6.2 | KV/mm | ≥30 | 54 | 54 |
| **Dielectric Breakdown** | | 2.5.6 | KV | ≥40 | >50 | >50 |
| **Arc Resistance** | | 2.5.1 | Second | ≥120 | 135 | 65 |
| **Dielectric Constant (Dk)** | 1.0 MHz | 2.5.5.3, 2.5.5.9, 2.5.5.5 | - | 5.4 max. | 4.2~4.5 | 4.42 |
| | 1.0 GHz | | | | 4.0~4.3 | 4.39 |
| | 2.0 GHz | | | | 3.9~4.2 | 4.38 |
| **Dispassion Factor(Df)** | 1.0 MHz | 2.5.5.3, 2.5.5.9, 2.5.5.5 | - | 0.035 max. | 0.016~0.018 | 0.022 |
| | 1.0 GHz | | | | 0.016~0.018 | 0.022 |
| | 2.0 GHz | | | | 0.018~0.020 | 0.021 |
| **Thermal Stress** | 288℃,Solder Dip | 2.4.13.1 | Second | 60 | >1200 | 90~120 |
| **Pressure Cook Test** | | Pre-treat15psi/30m 288℃,10Sec/cycle | Cycle | 2 Cycles Min. | >18 | 6~8 |
| **Time to Delamination---T288** | | 2.4.24.1 | Minute | - | >60 | 3 |
| **Time to Delamination---T300** | | 2.4.24.1 | Minute | - | >30 | - |
| **Flammability** | | UL94 | - | V1 | V0 | V0 |

※ *All test data provided are typical values and are not intended to be specification values.*

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## Process Guideline

### ● Press Condition

| |
|---|
| 1. Heating rate (Rise of Rate) of material:<br>Programmable Press: 1.5-3.0℃/min(3~5℉/min) Manual Press:3~6℃/min(5~10℉/min) |
| 2. Curing Temperature & Time: >200min at more than 220℃ (428℉) [Material Temperature] |
| 3. Full Pressure: ≥450psi |
| 4. Vacuuming should be continued until over 200℃ (392℉) [Material Temperature] |
| 5. Cold Press condition: Keep Plate @ Room Temperature by water; Pressure:100psi; Keep Time:60minutes |

### ● Typical Drilling Parameters (φ0.3-1.0 mm) [Recommended]

| | | |
|---|---|---|
| 1. Spindle Speed: | 120-180 | KRPM |
| 2. Feed Rate: | 100-200 | Inch / min |
| 3. Retract Rate: | 550-1000 | Inch / min |
| 4. Chip Load: | 0.6~1.8 | mil / Rev. |
| 5. Entry board: | t0.15mm Al | |
| 6. Stacked number (t1.6mm): | 1-3 stacks | |

The use of undercut drill bits has yielded better quality on smaller holes. Check with your drill supplier for more information.

### ● Desmearing Process

Desmear rate of **VT-901** is less than that of the conventional FR-4;

Adjustments to the desmear process is necessary for the polyimide materials;

Check with your chemical supplier for recommendations.

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