

IPC-4101 /21 /24 /26 /121 /124 /129    UL - File Number E41625

IS410 is a high-performance FR-4 epoxy laminate and prepreg system designed to support the printed circuit board industry's requirements for higher levels of reliability and the trend to use lead-free solder.

#### PRODUCT FEATURES

##### Industry Recognition

- UL File Number: E41625
- RoHS Compliant

##### Performance Attributes

- Lead-free assembly compatible
- 6x 288°C solder float capable

##### Processing Advantages

- FR-4 process compatible

#### PRODUCT AVAILABILITY

##### Standard Material Offering: Laminate

- 2 to 125 mil (0.05 to 3.2 mm)

##### Copper Foil Type

- HTE Grade 3
- RTF (Reverse Treat Foil)

##### Copper Weight

- ½, 1 and 2 oz (18, 35 and 70 µm) available
- Thinner copper foil available

##### Standard Material Offering: Prepreg

- Tooling of prepreg panels

##### Glass Fabric Availability

- E-glass
- Square weave glass
- Mechanically spread glass

Isola's IS410 has a glass transition temperature (Tg) of 180°C and is specially formulated for superior performance through multiple thermal excursions, passing 6X solder tests at 288°C. IS410 is optimized for enhanced drilling performance allowing high aspect ratio holes of ≤10 mils. Its unique resin chemistry provides CAF resistance with the benefit of long-term reliability of boards built with small feature designs.

#### PRODUCT ATTRIBUTES



#### TYPICAL MARKET APPLICATIONS



#### ORDERING INFORMATION:

Contact your local sales representative or contact [info@isola-group.com](mailto:info@isola-group.com) for further information.

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# Typical Values Table

| Property                                               |                                                                                                | Typical Value                                  | Units            | Test Method              |
|--------------------------------------------------------|------------------------------------------------------------------------------------------------|------------------------------------------------|------------------|--------------------------|
|                                                        |                                                                                                |                                                | Metric (English) | IPC-TM-650 (or as noted) |
| Glass Transition Temperature (Tg) by DSC               |                                                                                                | 180                                            | °C               | 2.4.25C                  |
| Decomposition Temperature (Td) by TGA @ 5% weight loss |                                                                                                | 350                                            | °C               | 2.4.24.6                 |
| Time to Delaminate by TMA<br>(Copper removed)          | A. T260                                                                                        | 50                                             | Minutes          | 2.4.24.1                 |
|                                                        | B. T288                                                                                        | 10                                             |                  |                          |
| Z-Axis CTE                                             | A. Pre-Tg                                                                                      | 55                                             | ppm/°C           | 2.4.24C                  |
|                                                        | B. Post-Tg                                                                                     | 250                                            | ppm/°C           | 2.4.24C                  |
|                                                        | C. 50 to 260°C, (Total Expansion)                                                              | 3.5                                            | %                |                          |
| X/Y-Axis CTE                                           | Pre-Tg                                                                                         | 11                                             | ppm/°C           | 2.4.24C                  |
| Thermal Conductivity                                   |                                                                                                | 0.5                                            | W/m·K            | ASTM E1952               |
| Thermal Stress 10 sec @<br>288°C (550.4°F)             | A. Unetched<br>B. Etched                                                                       | Pass                                           | Pass Visual      | 2.4.13.1                 |
| Dk, Permittivity                                       | A. @ 100 MHz                                                                                   | 3.96                                           | —                | 2.5.5.3                  |
|                                                        | B. @ 1 GHz                                                                                     | 3.90                                           |                  | 2.5.5.9                  |
|                                                        | C. @ 2 GHz                                                                                     | 3.97                                           |                  | Bereskin Stripline       |
|                                                        | D. @ 5 GHz                                                                                     | 3.87                                           |                  | Bereskin Stripline       |
|                                                        | E. @ 10 GHz                                                                                    | 3.87                                           |                  | Bereskin Stripline       |
| Df, Loss Tangent                                       | A. @ 100 MHz                                                                                   | 0.0149                                         | —                | 2.5.5.3                  |
|                                                        | B. @ 1 GHz                                                                                     | 0.0189                                         |                  | 2.5.5.9                  |
|                                                        | C. @ 2 GHz                                                                                     | 0.0200                                         |                  | Bereskin Stripline       |
|                                                        | D. @ 5 GHz                                                                                     | 0.0230                                         |                  | Bereskin Stripline       |
|                                                        | E. @ 10 GHz                                                                                    | 0.0230                                         |                  | Bereskin Stripline       |
| Volume Resistivity                                     | A. After moisture resistance<br>B. At elevated temperature                                     | 8.0 x 10 <sup>8</sup><br>3.6 x 10 <sup>8</sup> | MΩ-cm            | 2.5.17.1                 |
| Surface Resistivity                                    | A. After moisture resistance<br>B. At elevated temperature                                     | 8.0 x 10 <sup>6</sup><br>4.5 x 10(8)           | MΩ               | 2.5.17.1                 |
| Dielectric Breakdown                                   |                                                                                                | >50                                            | kV               | —                        |
| Arc Resistance                                         |                                                                                                | 129                                            | Seconds          | —                        |
| Electric Strength (Laminate & laminated prepreg)       |                                                                                                | 44 (1100)                                      | kV/mm (V/mil)    | —                        |
| Comparative Tracking Index (CTI)                       |                                                                                                | 3 (175-249)                                    | Class (Volts)    | UL 746A<br>ASTM D3638    |
| Peel Strength                                          | A. Low profile copper foil and very low profile copper foil all copper foil >17 µm [0.669 mil] | 1.14 (6.5)                                     | N/mm (lb/inch)   | 2.4.8C                   |
|                                                        | B. Standard profile copper                                                                     | 1.225 (7.0)                                    |                  | 2.4.8.2A                 |
|                                                        | 1. After thermal stress                                                                        | 1.14 (6.5)                                     |                  | 2.4.8.3                  |
|                                                        | 2. At 125°C (257°F)                                                                            | 0.90 (5.1)                                     |                  | 2.4.8.3                  |
| Flexural Strength                                      | A. Length direction                                                                            | 570 (82.6)                                     | MPa (kpsi)       | 2.4.4B                   |
|                                                        | B. Cross direction                                                                             | 458 (66.4)                                     |                  |                          |
| Tensile Strength                                       | A. Length direction                                                                            | 420 (60.9)                                     | MPa (kpsi)       | ASTM D3039               |
|                                                        | B. Cross direction                                                                             | 316 (45.8)                                     |                  |                          |
| Poisson's Ratio                                        | A. Length direction                                                                            | 0.175                                          | —                | ASTM D3039               |
|                                                        | B. Cross direction                                                                             | 0.143                                          |                  |                          |
| Moisture Absorption                                    |                                                                                                | 0.20                                           | %                | 2.6.2.1A                 |
| Flammability (Laminate & laminated prepreg)            |                                                                                                | V-0                                            | Rating           | UL 94                    |
| Relative Thermal Index (RTI)                           |                                                                                                | 130                                            | °C               | UL 796                   |

## NOTES

Visit our site <http://www.isola-group.com> for more details.

Revisions:

A: Initial release - 4/17

B: Corrected units for Flexural and Tensile Strength - 8/18

C: Change MOT to RTI 5/19

D: Removed Asia as Production site 9/24

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