



isola

B-IS410/2

IS410

High- T_g and high-
temperature-resistant
base material

**CAF
RESISTANT**

High- T_g and high temperature-resistant base material

IS410

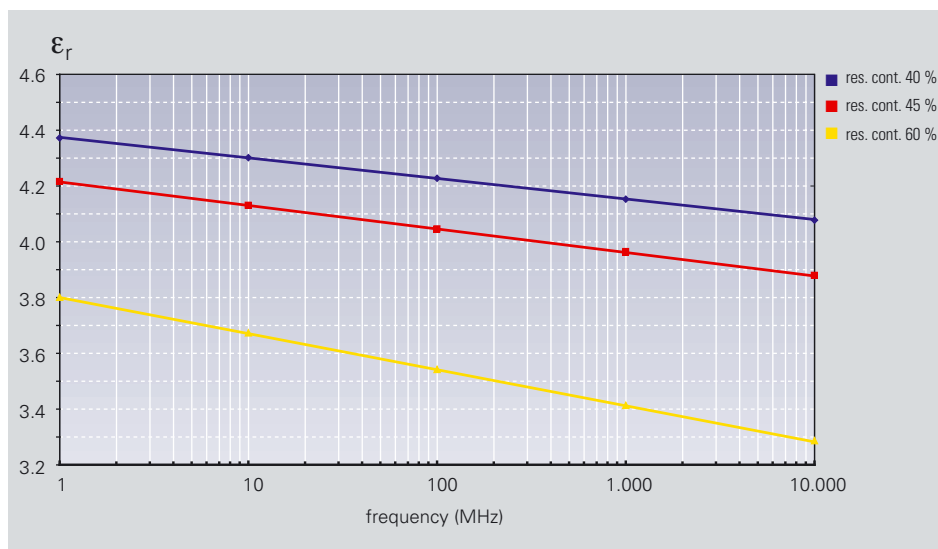
IS410 is based on a high- T_g epoxy system with a nominal glass transition temperature of 170 - 180 °C (DSC). This quality offers very high resistance to heat and chemical attack.

IS410 is particularly well-suited for lead-free soldering processes, which subject materials to increasingly greater thermal stresses.

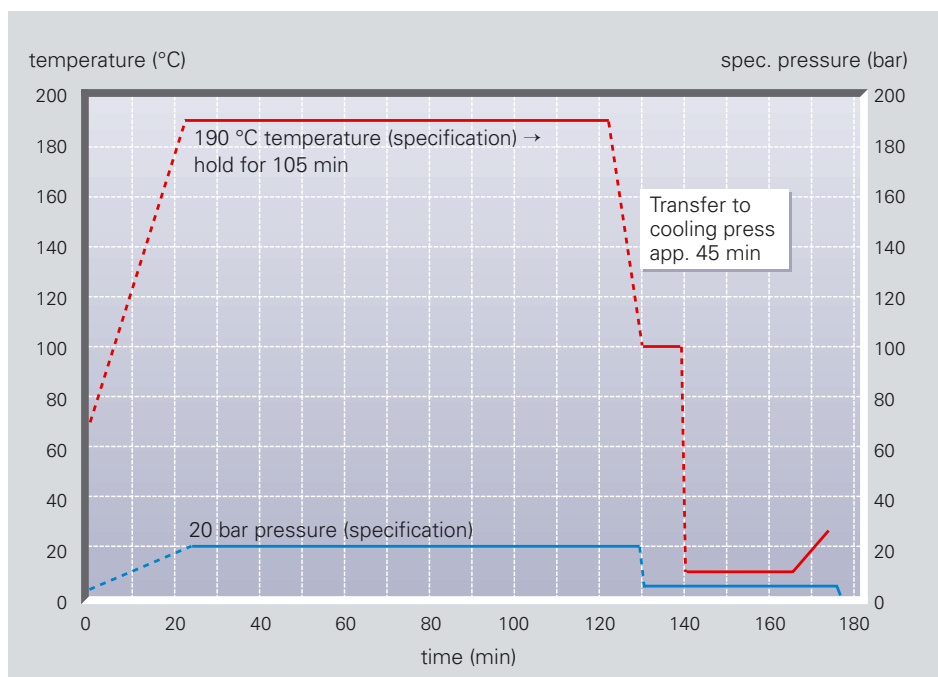
Dielectric constant depending on frequency and resin content

parameter: resin content

Loss factor from 1 MHz to 10 GHz = $0,02 \pm 0,005$



Recommended Pressing Parameters



Special properties

- High T_g value (DSC) of 170 - 180 °C
- High temperature resistance; $T_{260} > 60$ min, $T_{288} = 30$ min (time to delamination)
- High resistance to chemical attack
- CAF-resistant*
- Excellent resistance to heat shock (withstands six solder test repetitions 10 s at 288°C)
- Completely cures without follow-up tempering

* *Conductive Anodic Filament*

Testing conditions:

1000 hours at

- 85 °C,
- 85% r.h.,
- 100 V

Approval

Underwriters' Laboratories Inc.
File-No. E41625

Typical Applications

Circuit boards subjected to high thermal stresses in the form of process, dissipation and ambient heat, as well as printed circuits requiring highly migration-resistant substrates.

Raw Materials

The same types of E-glass-fabric are used as for our standard-FR4-quality DURAVER®-E-CU quality 104. Typical copper foil thicknesses (18, 35, 70 μ m) correspond to IPC-4562, grade 3 (HTE-quality). For laminates with a substrate ≤ 0.1 mm VLP foil with HTE properties is used. Laminates are only available with double sided copper claddings.

Supply forms and storage

The laminates are produced in standard sheet size: 1225 x 1070 mm (warp)

Prepregs are available with a standard roll width of approx. 1255 mm (location oriented).

Other sheet sizes and roll widths available on request. Laminate and prepreg panels are cut to specification.

For pin-lam technology, required holes are punched in the prepreg panels as specified.

The prepregs can be stored for six months at < 5 °C or for three months at < 20 °C and relative humidity of < 50 %. When removing chilled product from storage, take appropriate steps to prevent condensation.

Processing

IS410 should be pressed for two hours at 190 °C to ensure complete curing of the resin matrix. Post-baking is not required.

As used for all High-T_g base materials, adapted drilling parameters are necessary.

IS410 Standard Prepregs

| Prepreg type | | Nominal thickness | | Resin cont. | Res. gel-time | Viscosity | Scaled flow | | Theor. thickn. |
|--------------|------|-------------------|--------|-------------|---------------|-----------|-------------|---------------|----------------|
| | | mm | inch | % | s | Pa · s | mil/Prepreg | mm/Prepreg | mm |
| 106 | MD02 | 0.060 | 0.0024 | 73 ± 3 | 65 ± 15 | 28 ± 7 | 1.8 ± 0.25 | 0.046 ± 0.006 | 0.060 |
| 1080 | MD01 | 0.063 | 0.0025 | 61 ± 3 | 65 ± 15 | 28 ± 7 | 2.3 ± 0.30 | 0.058 ± 0.007 | 0.075 |
| 2116 | MD02 | 0.120 | 0.0047 | 50 ± 3 | 65 ± 15 | 28 ± 7 | 3.8 ± 0.30 | 0.097 ± 0.008 | 0.120 |
| 7628 | MD03 | 0.190 | 0.0075 | 45 ± 3 | 65 ± 15 | 28 ± 7 | 6.6 ± 0.30 | 0.167 ± 0.008 | 0.200 |

IS410 Standard laminate constructions

| Nominal thickness | | Thickness tolerance | | Construction | Mean resin content |
|-------------------|-------|-----------------------|-----------------------|--------------|--------------------|
| mm | inch | IPC-4101A cl. B mm | IPC-4101A cl. C mm | | |
| 0.075 | 0.003 | ± 0.018 | ± 0.013 | 1 x 1080 | 61 |
| 0.100 | 0.004 | ± 0.018 | ± 0.013 | 1 x 2116 | 42 |
| 0.125 | 0.005 | ± 0.025 | ± 0.018 | 1 x 2165 | 45 |
| 0.150 | 0.006 | ± 0.025 | ± 0.018 | 1 x 2157 | 44 |
| 0.200 | 0.008 | ± 0.038 | ± 0.025 | 1 x 7628M | 42 |
| 0.250 | 0.010 | ± 0.038 | ± 0.025 | 2 x 2165 | 45 |
| 0.300 | 0.012 | ± 0.050 | ± 0.038 | 2 x 2157 | 44 |
| 0.360 | 0.014 | ± 0.050 | ± 0.038 | 2 x 7628M | 39 |
| 0.410 | 0.016 | ± 0.050 | ± 0.038 | 2 x 7628M | 43 |
| 0.560 | 0.021 | ± 0.064 | ± 0.050 | 3 x 7628M | 39 |
| 0.760 | 0.028 | ± 0.064 | ± 0.050 | 4 x 7628M | 39 |
| 0.960 | 0.035 | ± 0.100 | ± 0.075 | 5 x 7628M | 39 |

Other thicknesses on request.

Typical drilling parameters to 4-layer Multilayer 1.6 mm

| Diameter | Feed rate | RPU | Discharge |
|----------|-----------|----------|-----------|
| mm | mm/s | rpm/1000 | mm/s |
| 0.30 | 42 | 110 | 163 |
| 0.60 | 92 | 80 | 200 |
| 0.90 | 70 | 53 | 200 |
| 1.20 | 53 | 40 | 200 |
| 1.50 | 43 | 32 | 200 |
| 1.80 | 37 | 27 | 200 |
| 2.20 | 25 | 22 | 200 |
| 2.40 | 20 | 20 | 200 |

Current product information can also be obtained from our website www.isola-group.com

Technical Values

IS410

| | |
|-------------------------------------|---|
| Specification Sheet #: | IPC-4101A/24 |
| Reinforcement: | woven E-glass |
| Resin system: | primary: epoxy • secondary: multifunctional epoxy |
| Flame Retardant Mechanism: | bromine • minimum UL 94 requirement: V-1 |
| Fillers: | n/a |
| ID Reference: | UL/ANSI: FR-4 • ANSI: FR-4/24 |
| Glass Transition (T _g): | 150 °C - 200 °C |

Explanations:

C = preconditioning in humidity chamber
E = preconditioning at temperature

The figures following the letter symbols indicate with the first digit the duration of the preconditioning in hours, with the second digit the preconditioning temperature in °C and with the third digit the relative humidity.

| Properties | Units | Laminate thickness < 0.50 mm | | Laminate thickness ≥ 0.50 mm | |
|---|-------------------|------------------------------|-----------------------|------------------------------|-----------------------|
| | | Specification | Isola-Value | Specification | Isola-Value |
| 1. Peel Strength , minimum | | | | | |
| A. Low profile copper foil and profile copper foil – all copper weights > 17 µm | N/mm | 0.70 | n/a* | 0.70 | n/a |
| B. Standard profile copper foil (35 µm) | | | | | |
| 1. After thermal stress | N/mm | 0.80 | 1.07 | 1.05 | 1.51 |
| 2. At 125 °C | N/mm | 0.70 | 0.87 | 0.70 | 1.36 |
| 3. After process solutions | N/mm | 0.55 | 1.10 | 0.80 | 1.68 |
| C. All other foil composite | N/mm | n/a | n/a | n/a | n/a |
| 2. Volume Resistivity , minimum | | | | | |
| A. C-96/35/90 | MΩ · cm | 1.0 · 10 ⁶ | 1.8 · 10 ⁵ | n/a | n/a |
| B. After moisture resistance | MΩ · cm | n/a | n/a | 1.0 · 10 ⁴ | 3.4 · 10 ⁷ |
| C. At elevated temperature E 24/125 | MΩ · cm | 1.0 · 10 ³ | 1.8 · 10 ⁷ | 1.0 · 10 ³ | 2.7 · 10 ⁷ |
| 3. Surface Resistivity , minimum | | | | | |
| A. C-96/35/90 | MΩ | 1.0 · 10 ⁴ | 1.5 · 10 ⁵ | n/a | n/a |
| B. After moisture resistance | MΩ | n/a | n/a | 1.0 · 10 ⁴ | 1.1 · 10 ⁵ |
| C. At elevated temperature E 24/125 | MΩ | 1.0 · 10 ³ | 3.5 · 10 ⁷ | 1.0 · 10 ³ | 3.7 · 10 ⁶ |
| 4. Moisture Absorption , maximum | % | n/a | n/a | 0.80 | 0.20** |
| 5. Dielectric Breakdown , maximum | kV | n/a | n/a | 40 | 54 |
| 6. Permittivity @ 1 MHz , maximum (Laminate or prepreg as laminated) | | 5.4 | 4.5 - 4.9 | 5.4 | 4.8 |
| 7. Loss Tangent @ 1MHz , maximum (Laminate or prepreg as laminated) | | 0.035 | 0.020 | 0.035 | 0.018 |
| 8. Flexural Strength , minimum | | | | | |
| A. Length direction | N/mm ² | n/a | n/a | 415 | 592 |
| B. Cross direction | N/mm ² | n/a | n/a | 345 | 534 |
| 9. Flexural Strength @ Elevated Temperature , length direction, minimum | N/mm ² | n/a | n/a | n/a | n/a |
| 10. Thermal Stress at 288 °C , minimum | | | | | |
| A. Unetched | s | ≥ 10 | ≥ 10 | ≥ 10 | ≥ 10 |
| B. Etched | s | ≥ 10 | ≥ 10 | ≥ 10 | ≥ 10 |
| 11. Electric Strength , minimum (Laminate or prepreg as laminated) | kV/mm | 30 | 36 | n/a | n/a |
| 12. Flammability | class | V-1 | V-0 | V-1 | V-0 |
| 13. Glass Transition Temperature (T_g) DSC , nominal | °C | 150 - 200 | 170 - 180 | 150 - 200 | 170 - 180 |
| 14. Coefficient of Thermal Expansion (CTE) TMA | | | | | |
| Fill direction (below T _g / above T _g) | ppm/K | – | – | – | 17/15 |
| Warp direction (below T _g / above T _g) | ppm/K | – | – | – | 13/6 |
| Vertical (below T _g / above T _g) | ppm/K | – | – | – | 55/217 |

*not applicable **measured at 1.55 mm laminate

Our information and our eventual advice for the application of our products in any form (for instance oral, written or by tests) is given carefully and by the best of our knowledge but is not binding and is provided without making any representation or warranty, expressed or implied, and without any liability. The user is not released also in the case of our prior testing or if the use is based on our practical application advice from its sole responsibility to use our product and to insure the correct application, the condition and fitness of our product for this application as well as the condition and fitness of the product itself.

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