

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

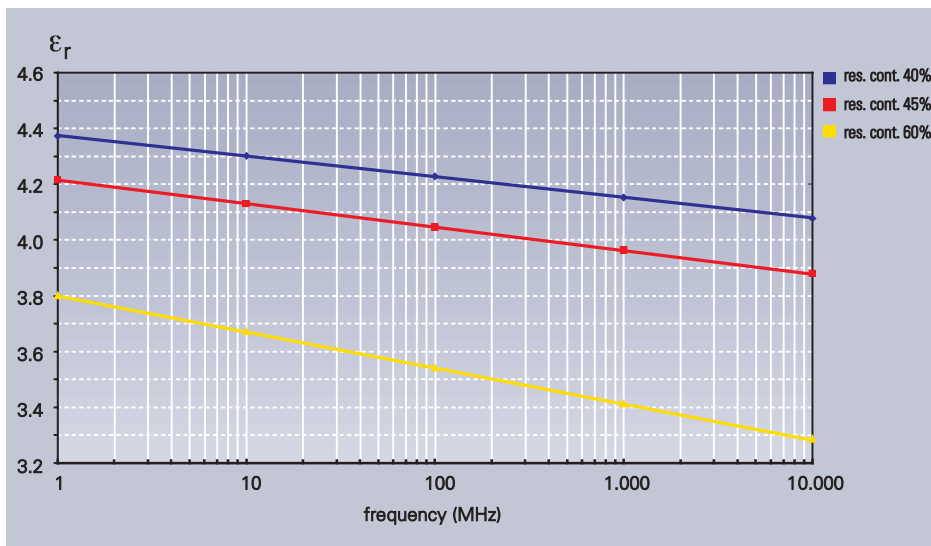
IS410 is based on a high- T_g epoxy system with a nominal glass transition temperature of 170 - 180 °C (DSC). This quality offers very high resistance to heat and chemical attack.

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

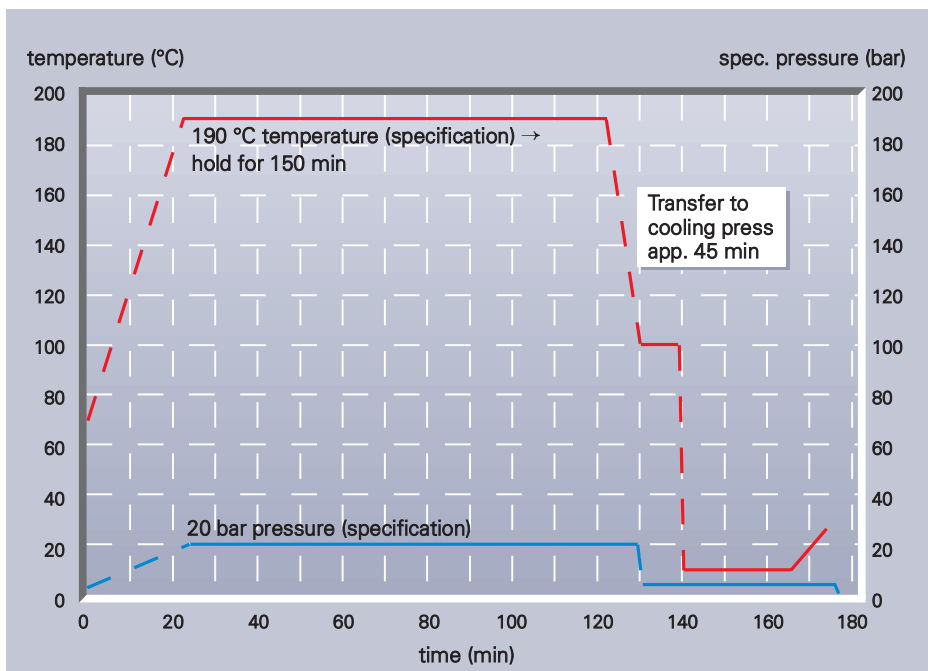
Dielectric constant depending on frequency and resin content

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. Standard HTE copper foils (18, 35, 70 μ m) are used according to IPC-4562, grade 3. 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.
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 s	Viscosity Pa · s	Scaled flow		Theor. thick mm
		mm	inch				mil/Prepreg	mm/Prepreg	
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		
0.050	0.002	± 0.018	± 0.013	1 x 106	63
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

Typical drilling parameters to 4-layer Multilayer 1.6 mm

Diameter mm	Feed rate mm/s	RPU rpm/1000	Discharge 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.isolaAG.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	Specification	Isola-Value	Specification	Isola-Value
		Laminate thickness < 0.50 mm		Laminate thickness ≥ 0.50 mm	
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

All of this Technical Information has been determined with due care and thoroughness. However, because the conditions of use and the process and application technology employed can vary so greatly, the provided data and figures can only serve as nonbinding guidelines. They do not constitute a guarantee that the purchased item will possess certain attributes. For this reason, no liability whatsoever can be assumed for them. The buyer is obliged to check the suitability of all supplied products.

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