



isola

B-IS410/4

IS410

High T_g and high
temperature resistant
base material

CAF
ENHANCED

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 material offers very high resistance to thermal and chemical attack.

Specifically IS410 meets the increasing thermal stress associated with lead-free interconnection technology to an extremely high degree. IS410 is particularly well-suited for lead-free soldering processes, which subject materials to increasingly greater thermal stresses.

Special Properties

- High T_g value (DSC) of 170 - 180 °C
 - High thermal resistance;
 $T_{260} > 60$ min, $T_{288} = 30$ min
 - T_D : 360 °C
 - High resistance to chemical attack
 - CAF-enhanced*
 - Excellent resistance to heat shock (withstands six solder test repetitions 10 s at 288 °C)
 - Completely cures without follow-up post baking
- * *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 high migration-resistance.

Raw Materials

The same types of E-glass-fabric are used as for our standard-FR-4-quality DURAVER®-E-CU quality 104. The used copper foils meet the demands of IPC-4562, grade 1 for thicknesses $\geq 105 \mu$ and grade 3 for thicknesses $< 105 \mu$ (HTE-quality).

Laminates are only available with double sided copper cladding.

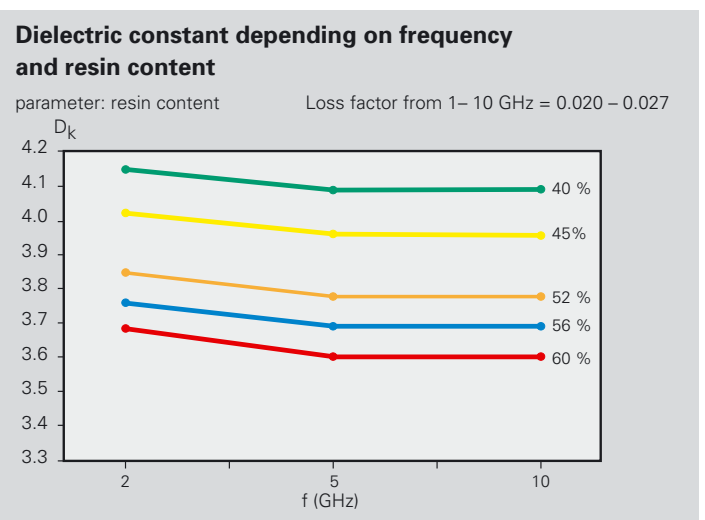
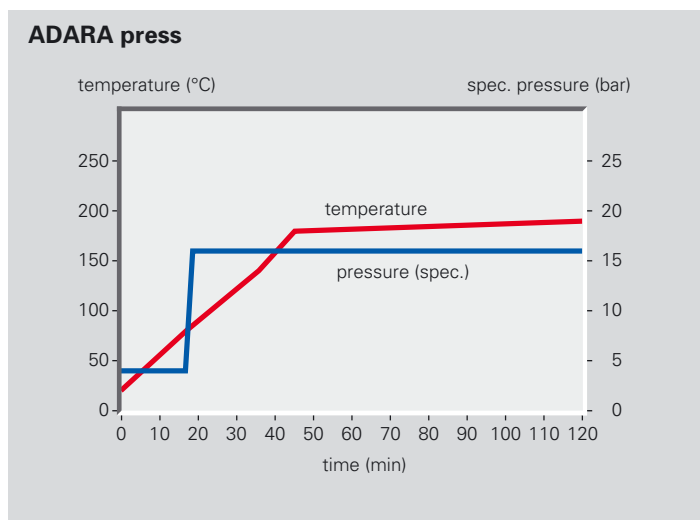
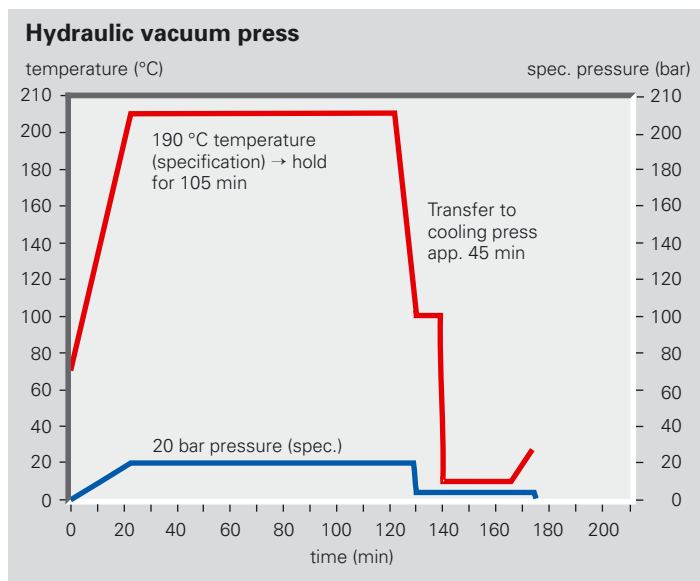
Supply forms and storage

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

Prepregs are available with a standard width of approx. 1250 mm (location oriented).

Other sheet sizes and roll widths available on request.

Recommended Pressing Parameters



Laminate and prepreg panels are cut to specification.

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

A variety of punch tools are available for this purpose.

The prepregs can be stored for six months at < 5 °C or for three months at < 23 °C and relative humidity of < 50 %.

When removing chilled product from storage, take appropriate steps to prevent condensation.

Processing

IS410 should be pressed for 105 min at 205 °C to ensure a complete curing of the resin matrix. Post-baking is not required.

We recommend to use copperfoil type HTG for the production of multilayers.

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

IS410 Standard prepregs

Prepreg type	Nominal thickness		Resin content %	Res. gel-time s	Viscosity Pa · s	Scaled flow	
	mm	inch				mil/Prepreg	mm/Prepreg
106 MD02	0.064	0.0024	73 ± 3	65 ± 15	28 ± 7	1.5	0.046
1080 MD01	0.079	0.0030	61 ± 3	65 ± 15	28 ± 7	2.3	0.058
2116 MD02	0.126	0.0047	50 ± 3	65 ± 15	28 ± 7	3.7	0.097
7628 MD02	0.201	0.0077	44 ± 3	65 ± 15	28 ± 7	6.7	0.167

IS410 Standard laminate constructions

Nominal thickness		Thickness tolerance		Construction	Mean resin content %
mm	inch	IPC-4101B cl. B mm	IPC-4101B 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 7628	41
0.410	0.016	± 0.050	± 0.038	2 x 7628M	42
0.540	0.021	± 0.064	± 0.050	3 x 7628	41
0.760	0.028	± 0.064	± 0.050	4 x 7628	41
0.960	0.035	± 0.100	± 0.075	5 x 7628	41

Other thicknesses on request.

The specific drilling parameters for this grade are available on request.

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

Technical Values

IS410

Specification Sheet #:	IPC-4101B/26
Reinforcement:	woven E-glass
Resin system:	primary: epoxy • secondary: multifunctional epoxy
Flame Retardant Mechanism:	brominated epoxy resin • minimum UL requirement: V-0
Fillers:	none
ID Reference:	UL/ANSI: FR-4 • ANSI: FR-4/24 • RoHS-compliant
Glass Transition Temperature (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	6.0 · 10 ⁷	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	4.0 · 10 ⁷	1.0 · 10 ³	3.8 · 10 ⁷
3. Surface Resistivity , minimum					
A. C-96/35/90	MΩ	1.0 · 10 ⁴	9.0 · 10 ⁷	n/a*	n/a*
B. After moisture resistance	MΩ	n/a*	n/a*	1.0 · 10 ⁴	2.0 · 10 ⁷
C. At elevated temperature E-24/125	MΩ	1.0 · 10 ³	6.0 · 10 ⁷	1.0 · 10 ³	3.8 · 10 ⁷
4. Moisture Absorption , maximum	%	n/a*	n/a*	0.80	0.20**
5. Dielectric Breakdown , minimum	kV	n/a*	n/a*	40	46
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-0	V-0	V-0	V-0
13. Glass Transition Temperature (T_g) DSC	°C	170 - 200	170 - 180	170 - 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

Tests are carried out in accordance with IPC-650 test methods.

*not applicable **measured at 1.55 mm laminate

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USA

Isola USA S.a.r.l.
(Headquarters)
3100 W. Ray Road, Suite 301
Chandler, AZ 85226, USA
Phone: +1/4 80 / 8 93 65 27
Fax: +1/4 80 / 8 93 14 09
E-mail: info@isola-usa.com

EUROPE

Isola GmbH
52353 Düren
Germany
Phone: +49 (0) 24 21/ 80 80
Fax: +49 (0) 24 21/ 8 08 80
E-mail: info-dur@isola-group.com

MAS Italia s.r.l.
Via S. Sebastiano 21
I-51032 Bottegone (PT)
Phone: +39 / 05 73 / 92 22 31
Fax: +39 / 05 73 / 92 22 65
E-mail: info-bot@isola-group.com

Isola Fabrics s.r.l.
Via Matteotti, 120
I-20047 Brugherio (MI)
Phone: +39 / 039 / 2 89 16 47
Fax: +39 / 0 39 / 2 89 16 90
E-mail: info@isola-fabrics.com

ASIA

Isola Asia Pacific (Hong Kong) Ltd.
Unit 3512 - 3522, 35/F
No. 1 Hung To Road, Kwun Tong,
Kowloon, Hong Kong
Phone: +8 52 / 24 18 - 13 18
Fax: +8 52 / 24 18 - 15 33
E-mail: asia@isola-group.com