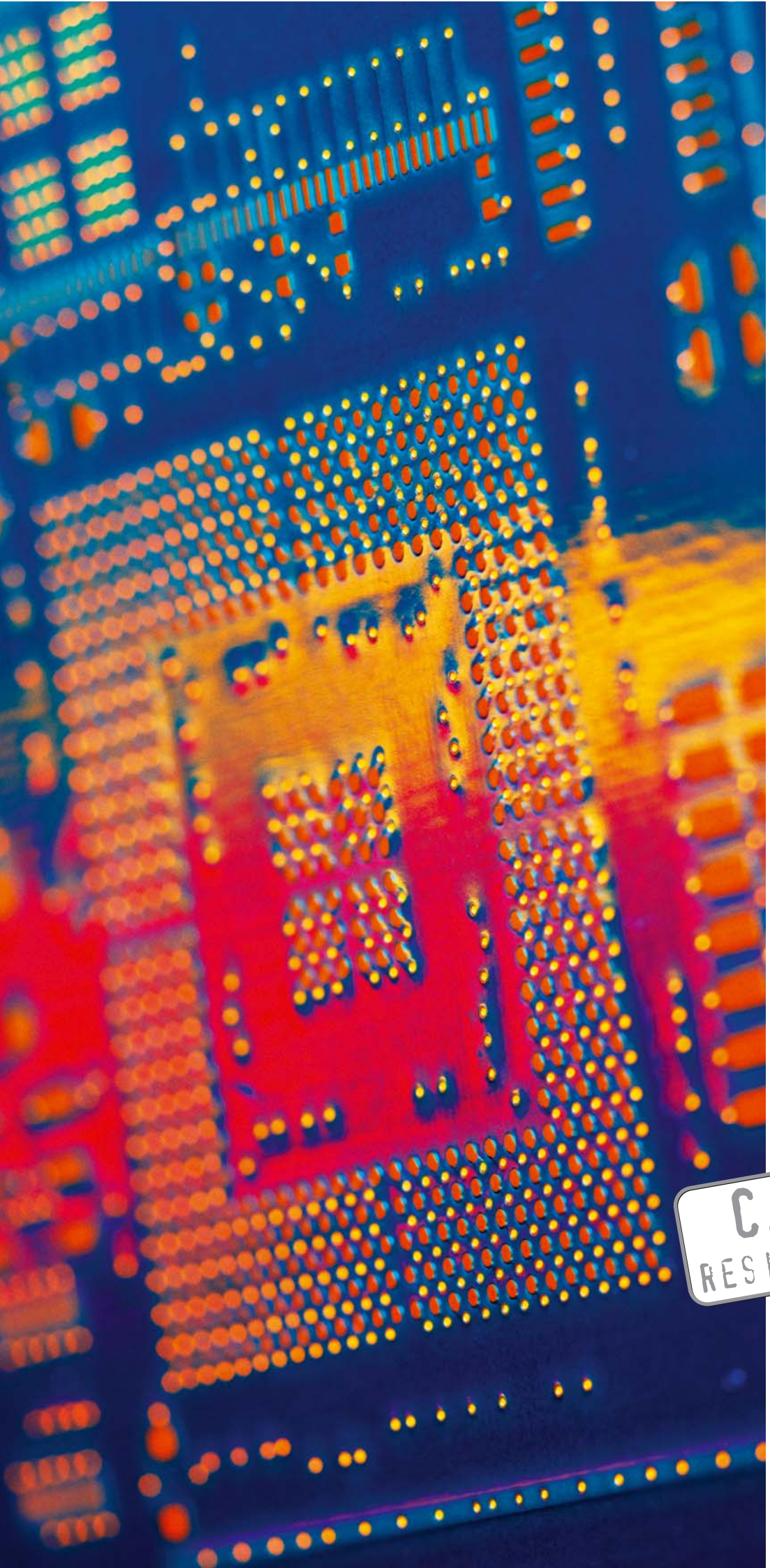


isola

B-IS410/3

IS410

High-T_g and high-temperature-resistant base material

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.

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 Filement*
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-FR-4-quality DURAVER®-E-CU quality 104.
Typical copper foil thicknesses (18, 35, 70 µm) correspond to IPC-4562, grade 3 (HTE-quality). For laminates with a substrate ≤ 0.1 mm VLP foils with HTE properties are used. Laminates are only available with double sided copper claddings.

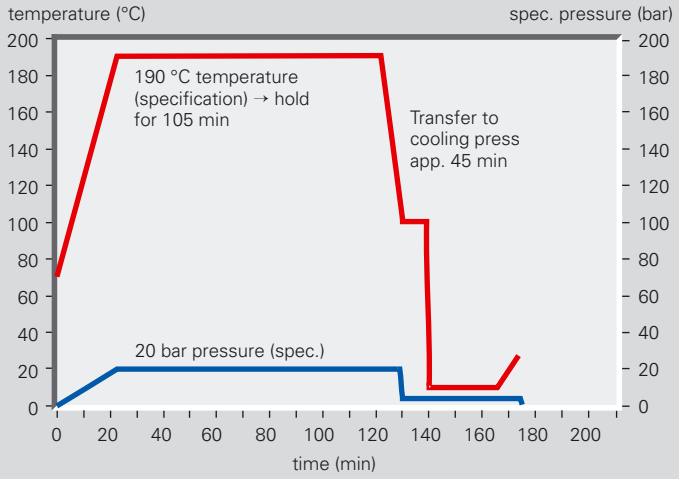
Supply forms and storage

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

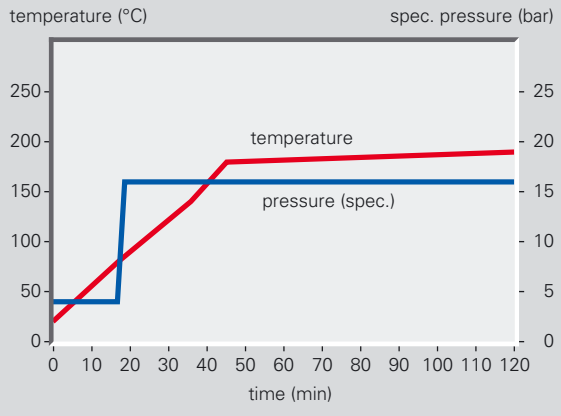
Prepregs are available with a standard width of approx. 1250 mm (location oriented).
Other sheet sizes and roll widths available on request.

Recommended Pressing Parameters

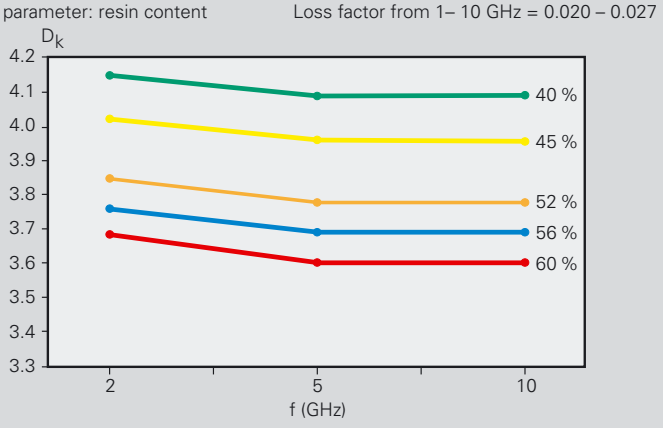
Hydraulic press



ADARA press



Dielectric constant depending on frequency and resin content



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 is available for this purpose.
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 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	Viscosity	Scaled flow	
	mm	inch	%	s	Pa · s	mil/Prepreg	mm/Prepreg
106 MD02	0.060	0.0024	73 ± 3	65 ± 15	28 ± 7	1.8 ± 0.25	0.046 ± 0.006
1080 MD01	0.075	0.0030	61 ± 3	65 ± 15	28 ± 7	2.3 ± 0.30	0.058 ± 0.007
2116 MD02	0.120	0.0047	50 ± 3	65 ± 15	28 ± 7	3.8 ± 0.30	0.097 ± 0.008
7628 MD01	0.200	0.0079	45 ± 3	65 ± 15	28 ± 7	6.6 ± 0.30	0.167 ± 0.008

IS410 Standard laminate constructions

Nominal thickness		Thickness tolerance		Construction	Mean resin content
		IPC-4101A cl. B	IPC-4101A cl. C		
mm	inch	mm	mm		%
0.075	0.003	± 0.018	± 0.013	1 x 1080	61 ± 3
0.100	0.004	± 0.018	± 0.013	1 x 2116	42 ± 3
0.125	0.005	± 0.025	± 0.018	1 x 2165	45 ± 3
0.150	0.006	± 0.025	± 0.018	1 x 2157	44 ± 3
0.200	0.008	± 0.038	± 0.025	1 x 7628M	42 ± 3
0.250	0.010	± 0.038	± 0.025	2 x 2165	45 ± 3
0.300	0.012	± 0.050	± 0.038	2 x 2157	44 ± 3
0.360	0.014	± 0.050	± 0.038	2 x 7628	41 ± 3
0.410	0.016	± 0.050	± 0.038	2 x 7628M	43 ± 3
0.540	0.021	± 0.064	± 0.050	3 x 7628	41 ± 3
0.760	0.028	± 0.064	± 0.050	4 x 7628	41 ± 3
0.960	0.035	± 0.100	± 0.075	5 x 7628	41 ± 3

Other thicknesses on request.

The specific drilling parameters for this grade are available on our Homepage www.isola-group.com

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:	brominated epoxy resin • minimum UL requirement: V-1
Fillers:	none
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	$1.0 \cdot 10^6$	$6.0 \cdot 10^7$	n/a*	n/a*
B. After moisture resistance	MΩ · cm	n/a*	n/a*	$1.0 \cdot 10^4$	$3.4 \cdot 10^7$
C. At elevated temperature E-24/125	MΩ · cm	$1.0 \cdot 10^3$	$4.0 \cdot 10^7$	$1.0 \cdot 10^3$	$3.8 \cdot 10^7$
3. Surface Resistivity, minimum					
A. C-96/35/90	MΩ	$1.0 \cdot 10^4$	$9.0 \cdot 10^7$	n/a*	n/a*
B. After moisture resistance	MΩ	n/a*	n/a*	$1.0 \cdot 10^4$	$2.0 \cdot 10^7$
C. At elevated temperature E-24/125	MΩ	$1.0 \cdot 10^3$	$6.0 \cdot 10^7$	$1.0 \cdot 10^3$	$3.8 \cdot 10^7$
4. Moisture Absorption, maximum	%	n/a*	n/a*	0.80	0.20**
5. Dielectric Breakdown, minimum	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/mm²	n/a*	n/a*	415	592
B. Cross direction	N/mm²	n/a*	n/a*	345	534
9. Flexural Strength @ Elevated Temperature, length direction, minimum	N/mm²	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	°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

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

*not applicable **measured at 1.55 mm laminate

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