

UPISEL-N

**UPILEX-RN**

- High elongation polyimide film

UPILEX-S

- High temperature polyimide film

UPISEL-N

- Polyimide Copper Clad Laminate

UBE's UPISEL-N film offers unique properties for many applications like:

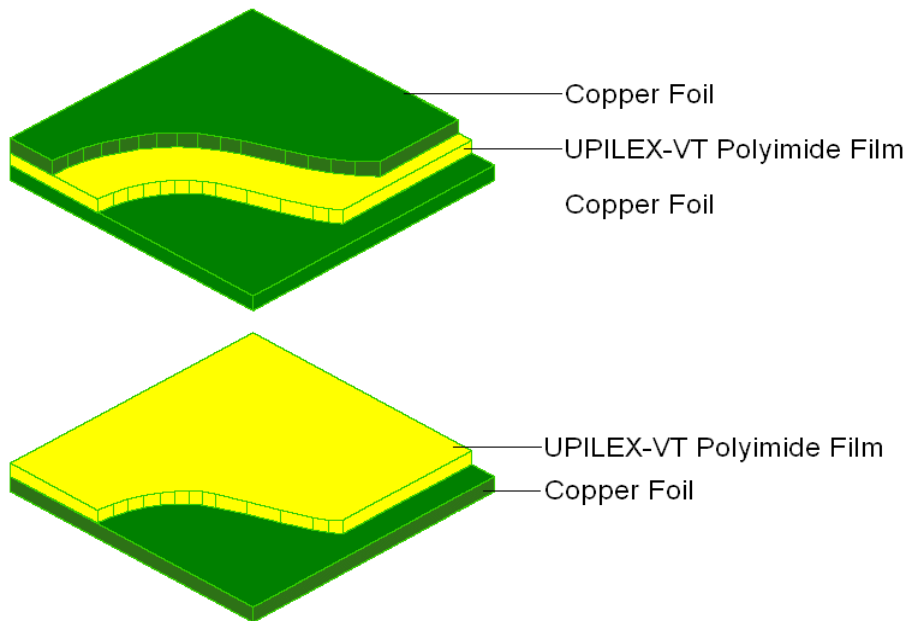
Metal substrates
Flexible printed circuits

Summary

UPISEL-N is a full polyimide copper clad laminate. Since it is based on our UPILEX-VT heat bonding type polyimide film, no adhesive is necessary to achieve very high peel strength. The very good physical, mechanical, electrical and chemical resistance properties of UPISEL-N make it the ideal choice if high thermal and hygroscopic dimensional stability is required.

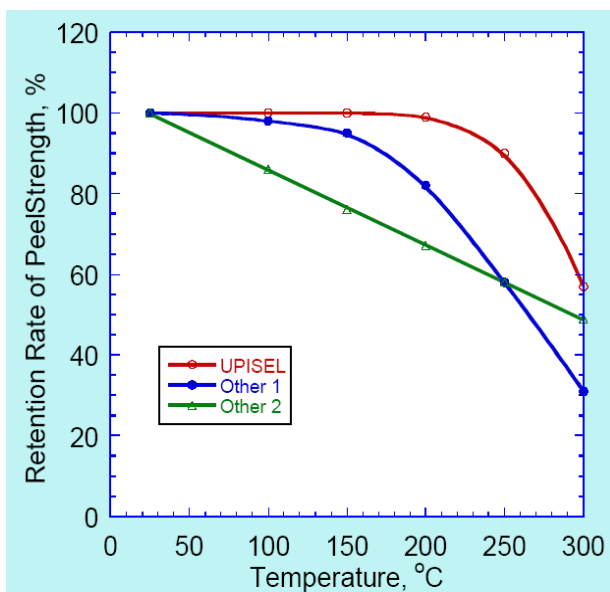
UPISEL-N

SPECIALTY PRODUCTS



Characteristics

UPISEL-N is a copper clad laminate, based on our UPILEX-VT film material. This UPILEX-VT polyimide film material offers high bonding ability without any use of adhesive. The copper foil is heat laminated to the polyimide film. No adhesive is necessary to reach very good peeling properties. The high peel strength remains over a wide temperature range.



Peel Strength-Temperature Curves

The high peel strength of UPISEL-N remains nearly unchanged up to 200°C. Even at very high temperatures the peel strength is above 0.7 N/mm.

Mechanical Properties

UPISEL-N offers:

- High bonding strength to copper foil
- High tensile modulus and strength

Table-1 Mechanical Properties, Typical values						
Properties		Unit		UPISEL-N BE1210		Test Method
				MD	TD	
Copper Foil Peel Strength	25°C	90° Peel	N/mm	1.5		IPCTM-650
	25°C	T-Peel	N/mm	1.4		IPCTM-650
	250°C	T-Peel	N/mm	1.3		IPCTM-650
	300°C	T-Peel	N/mm	0.7		IPCTM-650
	7 days 200°C	90° Peel	N/mm	1.1		IPCTM-650
	2N-HCl	90° Peel	Retained%	100%		IPCTM-650
	2N-NaOH	90° Peel	Retained%	100%		IPCTM-650
Tensile Strength Copper Foil		25°C	MPa	525	520	JIS C6515
Tensile Strength UPILEX-VT		25°C	MPa	314		ASTMD882
Elongation			%	54		ASTMD882
Tensile Modulus			MPa	7100		ASTMD882
Tear Strength Initiation [Graves]			N	157		ASTMD1004
Tear Strength [Elmendorf]			N	1.96		ASTMD1922
Flexural Endurance			cycle	>100000		IPC-FC-241B
Folding Endurance		R=0.4mm	cycle	48		IPC-FC-241B

Thermal and Chemical Properties

UPISEL-N offers:

- Excellent dimensional stability and heat resistance
- Very good match of CTE with Cu
- Very low hygroscopic expansion

Table-2 Thermal and Chemical Properties, Typical values					
Properties		Unit	UPISEL-N BE1210		Test Method
			MD	TD	
Hot solder resistance	1 min @ 300°C		No change		IPCTM-650
Dimensional stability	Cu etching	Change Ratio %	0.01	0.05	IPCTM-650
	30min @ 150°C	Change Ratio %	-0.01	0.04	IPCTM-650
CTE (UPILEX-VT)		ppm/°C	18.6	17.4	JIS C6481
CHE (UPILEX-VT)		ppm/%RH	8.6	8.1	ASTMD570
Water absorption rate		%	< 1.1		IPC-TM650
Flammability (UL94 file number E178453 V-0)			UL-94 VTM-0		UL94

Electrical properties

Table-3 Electrical Properties, Typical values			
Properties	Unit	UPISEL-N BE1210	Test Method
Volume Resistance	Ω cm	10 ¹⁷	ASTMD257
Surface Resistance	Ω	> 10 ¹⁷	ASTMD257
Dielectric Constant (1kHz)	-	3.2	ASTMD150
Dissipation Factor (1kHz)	-	0.004	ASTMD150
Dielectric Strength	kV / mil	6.9	ASTMD149

Available grades of UPISEL-N

Table-4 UPISEL-N Grades				
Type	Type	Copper Thickness	Polyimide Thickness	
			25µm	50µm
Electrolytic Copper Foil	Double	35µm	BE1110	BE1120
	Single		SE1110	SE1120
	Double	18µm	BE1210	BE1220
	Single		SE1210	SE1220
	Double	12µm	BE1310	BE1320
	Single		SE1310	SE1320
	Double	9µm	BE1410	BE1420
	Single		SE1410	SE1420
	Double	5µm	BE0510	BE0520
	Single		SE0510	SE0520
	Double	3µm	BE0310	BE0320
	Single		SE0310	SE0320
Rolled Copper Foil	Double	35µm	BR1110	BR1120
	Single		SR1110	SR1120
	Double	18µm	BR1210	BR1220
	Single		SR1210	SR1220

Note: Not all grades are already available as standard material

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