ROGERS CORPORATION

Advanced Circuit Materials

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Preliminary Data Sheet
R/flex JADE® A Laminate

R/flex JADE® A Series

Halogen-Free Adhesive System
Flexible Copper Clad Laminate Materials

R/flex JADE ® A series flexible circuit materials are the next generation of the industry-leading R/flex CRYSTAL® epoxy adhesive system. Environmentally friendly, these materials are halogen-free, lead-free, and flame retardant. They allow our customers to meet the increasing environmental requirements imposed upon commercial applications worldwide without compromising the performance required in today's demanding flexible circuit designs.

Product Features & Benefits:

- Green and halogen-free epoxy system
- Superior thermal stability allows R/flex JADE A series material to withstand multiple passes through lead-free soldering
- Excellent dimensional stability and superb peel strength improve process yields and reduce fabrication costs
- Inherent flame retardant performance - passes UL 94 V-0 flame testing
- Transparent adhesive system facilitates optical inspection

Applications:

R/flex JADE A flexible copper clad laminate Materials is formulated to accommodate the most technically demanding circuit applications: hard disk drives, cellular phones, laptop computers, personal digital assistants, semiconductor packages, and many others.

Typical Values (1)

R/flex JADE® A - Flexible Copper Clad Laminates

Property		Test	Details		Units	Copper Clad Laminates			
						Single Sided	Double Sided	Single Sided	Double Sided
						A590L8H0	A590L8H8	A590L110	A590L111
Mechanical Properties									
Peel Strength		IPC-TM-650 method 2.4.9	Method A (as received)		kN/m	1.37	1.29/1.25	1.96	1.80/1.78
			After Solder Float			1.32	1.25/1.27	1.87	1.82/1.80
Solder Resistance		IPC-TM-650 method 2.4.13	288°C, 10 sec.			PASS	PASS	PASS	PASS
Dimensional Stability		IPC-TM-650 method 2.2.4	Method B	MD	%	0.016	-0.012	0.025	0.008
				CMD	%	0.116	0.091	0.050	0.080
			Method C	MD	%	0.006	-0.028	0.015	-0.034
				CMD	%	0.120	0.086	0.043	0.045
Electrical Properties									
Insulation Resistance		IPC-TM-650 method 2.6.3	500V, 60 sec		Ohms	$1.65*10^{12}$	$1.65*10^{12}$	$1.65*10^{12}$	$1.65*10^{12}$
Dielectric Constant		IPC-TM-650 method 2.5.5.3	@1MHz		-	3.63	3.63	3.63	3.63
			@1GHz		-	3.85	3.85	3.85	3.85
Dissipation Factor		IPC-TM-650 method 2.5.5.3	@1MHz		-	0.02	0.02	0.02	0.02
Surface Resistance		IPC-TM-650 method 2.5.17	-		Ohms	$2.8*10^{15}$	$2.8*10^{15}$	$2.8*10^{15}$	$2.8*10^{15}$
Volume Resistivity			-		Ohms cm	$2.1*10^{15}$	$2.1*10^{15}$	$2.1*10^{15}$	$2.1*10^{15}$
Dielectric Strength		ASTM D-149			V/mil	4700	4700	4700	4700
Physical Properties									
Polyimide Performance	Tensile Modulus	ASTM D-882	@20°C		GPa	4.1	4.1	4.1	4.1
	Tensile Strength				MPa	303	303	303	303
	Elongation				%	90	90	90	90
	CTE	TMA	100 to 200°C		ppm/°C	16	16	16	16
	CHE	HMA	@50°C		ppm%RH	13	13	13	13
	Humidity Absorption	ASTM D-570	D-24/20		%	2.5	2.5	2.5	2.5
Tg		TMA			°C	51	51	51	51
Chemical Resistance		2N NaOH	immersed peel strength/ (non-immersed peel strength)		*%	PASS	PASS	PASS	PASS
MEK Resistance		IPC-TM-650 method 2.3.2			%/wt loss	PASS	PASS	PASS	PASS
Flammability		UL94	File#E122972			VTM-0	VTM-0	VTM-0	VTM-0

(1) Typical values are a representation of an average value for the population of the property. For specification values contact Rogers Corporation.

Environmental Standards:
R/flex JADE® A series products contain no cadmium, lead, mercury, hexavalent chromium compounds, PBBs, PBDEs and meet or exceed the following industry standards:

- IEC and JPCA halogen-free requirements
- RoHS directives

RoHS Compliant

Part Number Description:

Laminate (L) Designations **R/flex A5X0-L-XXX**

Copper Type
6=ED, 9=RA
Side 1 copper thickness *in oz./ft²*
8=0.5 (18µm) 1=(35µm)
Polyimide film thickness in mils
H=0.5 (12.5µm), 1= (25µm)
Side 2 copper thickness *in oz./ft²*
*8=0.5 (18*µm), 1=(35µm)

Laminate Type	Rogers Part Number	Copper Thickness		Polyimide Thickness	
		mil	µm	mil	µm
Single Sided	A590L810	½	18	1	25
Single Sided	A590L110	1	35	1	25
Single Sided	A590L8H0	½	18	½	12
Single Sided	A560LT10	⅓	12	1	25
Single Sided	A560L810	½	18	1	25
Single Sided	A560L110	1	35	1	25
Single Sided	A560LTH0	⅓	12	½	12
Single Sided	A560L8H0	½	18	1	12
Double Sided	A590L818	½	18	1	25
Double Sided	A590L111	1	35	1	25
Double Sided	A590L8H8	½	18	½	12
Double Sided	A560LT1T	⅓	12	1	25
Double Sided	A560L818	½	18	1	25
Double Sided	A560L111	1	35	1	25
Double Sided	A560LTHT	⅓	12	½	12
Double Sided	A560L8H8	½	18	½	12

Available Configurations:
Many additional configurations are available as non-standards. Please check with your Rogers representative.

Material Construction Information:
R/flex JADE® A products are constructed with a base dielectric polyimide of Kaneka APICAL® NP film and a standard release sheet of opaque polypropylene encapsulated white paper carrier. Bonding films are manufactured with polypropylene encapsulated paper and a polyester release sheet.

All R/flex® flexible circuit materials are manufactured under rigorous process control where process capabilities are continuously monitored for all critical properties such as peel strength and dimensional stability.

Storage Conditions:

Copper clad laminates do not change physical properties during storage and therefore do not have a shelf life. Long exposure to moisture and elevated temperatures may cause copper surface oxidation. Storage in original packaging, located in a dry, cool environment is recommended.

Applicable Specifications:

Copper Clad Laminates: IPC 4204/4

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