

## 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.

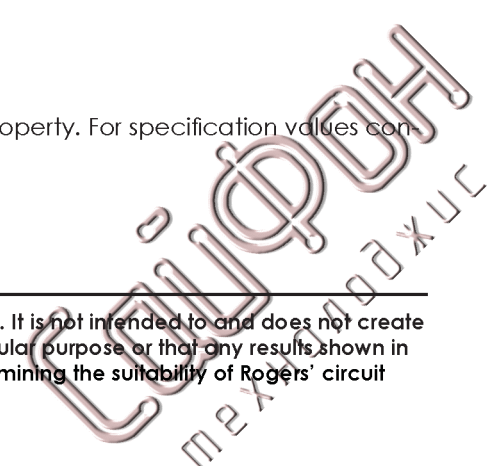
Typical Values (1)

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	
<b>Mechanical Properties</b>								
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
<b>Electrical Properties</b>								
Insulation Resistance	IPC-TM-650 method 2.6.3	500V, 60 sec	Ohms	1.65*10 <sup>12</sup>	1.65*10 <sup>12</sup>	1.65*10 <sup>12</sup>	1.65*10 <sup>12</sup>	
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 <sup>15</sup>	2.8*10 <sup>15</sup>	2.8*10 <sup>15</sup>	2.8*10 <sup>15</sup>	
Volume Resistivity		-	Ohms cm	2.1*10 <sup>15</sup>	2.1*10 <sup>15</sup>	2.1*10 <sup>15</sup>	2.1*10 <sup>15</sup>	
Dielectric Strength	ASTM D-149		V/mil	4700	4700	4700	4700	
<b>Physical Properties</b>								
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#E1 22972		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.

The information in this data sheet is intended to assist you in designing with Rogers' circuit materials. It is not intended to and does not create any warranties, express or implied, including any warranty of merchantability or fitness for a particular purpose or that any results shown in this data sheet will be achieved by a user for a particular purpose. The user is responsible for determining the suitability of Rogers' circuit materials for each application.



**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



**Part Number Description:**

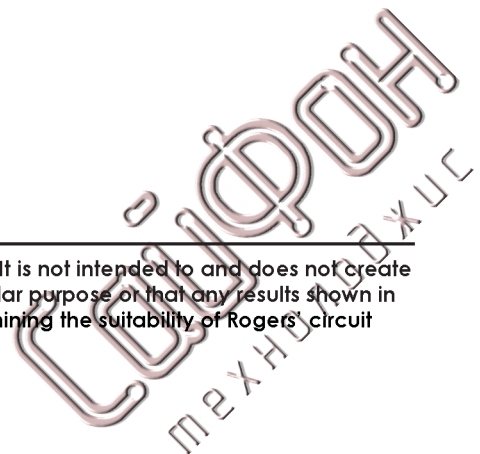
Laminate (L) Designations	R/flex A5X0-L-XXX
Copper Type 6=ED, 9=RA	
Side 1 copper thickness in oz./ft <sup>2</sup> 8=0.5 (18µm), 1=(35µm)	
Polyimide film thickness in mils H=0.5 (12.5µm), 1= (25µm)	
Side 2 copper thickness in oz./ft <sup>2</sup> 8=0.5 (18µm), 1=(35µm)	

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.

The information in this data sheet is intended to assist you in designing with Rogers' circuit materials. It is not intended to and does not create any warranties, express or implied, including any warranty of merchantability or fitness for a particular purpose or that any results shown in this data sheet will be achieved by a user for a particular purpose. The user is responsible for determining the suitability of Rogers' circuit materials for each application.



**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

**CONTACT INFORMATION:**

USA:	Rogers Advanced Circuit Materials, ISO 9002 Certified	Tel: 480-961-1382	Fax: 480-917-5256
Belgium:	Rogers N.V. - Gent	Tel: +32-9-2353611	Fax: +32-9-2353658
Japan:	Rogers Japan Inc.	Tel: 81-3-5200-2700	Fax: 81-3-5200-0571
Taiwan:	Rogers Taiwan Inc.	Tel: 886-2-86609056	Fax: 886-2-86609057
Korea:	Rogers Korea Inc.	Tel: 82-31-716-6112	Fax: 82-31-716-6208
Singapore:	Rogers Technologies Singapore Inc.	Tel: 65-747-3521	Fax: 65-747-7425
China:	Rogers (Shanghai)	Tel: 86-21-63916088	Fax: 86-21-63915060
China:	Rogers (Shenzhen)	Tel: 86-755-8236 6060	Fax: 86-755-8236 6123

**The information in this data sheet is intended to assist you in designing with Rogers' circuit materials. It is not intended to and does not create any warranties, express or implied, including any warranty of merchantability or fitness for a particular purpose or that any results shown in this data sheet will be achieved by a user for a particular purpose. The user is responsible for determining the suitability of Rogers' circuit materials for each application.**

R/flex, R/flex CRYSTAL and R/flex JADE are licensed trademarks of Rogers Corporation  
APICAL is a registered trademark of Kanega Fuchi.

©2007, 2008 Rogers Corporation, Printed in U.S.A., All rights reserved.  
Revised 05/2008 -0508-0.5CC **Publication#:14-037**