

Data Sheet and Design Guideline

DUREL® Screen Printed Electronic Manufacturing Solutions

PRODUCTS AND APPLICATIONS:

- | | |
|--------------------------|----------------------------------|
| Electroluminescent lamps | Polymer Dispersed Liquid Crystal |
| Sensors | Conductive Adhesives |
| Capacitive Sensors | Antenna |
| Medical Electrodes | Light Guide Film Backlights |

Printed Electronic Manufacturing Capabilities:

Ultra Fine Screen Printing

In-house screen making expertise combined with highly skilled operators enables 0.1mm trace widths and spaces for fine line print project requirements. Panel sizes to 425 x 275 mm. In addition, Rogers has significant practical experience printing and etch patterning transparent conductive coatings.

Design and Materials Expertise

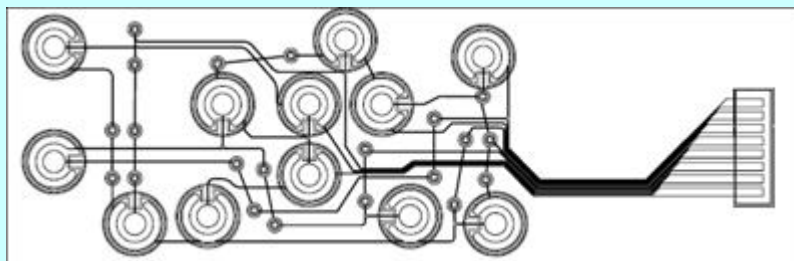
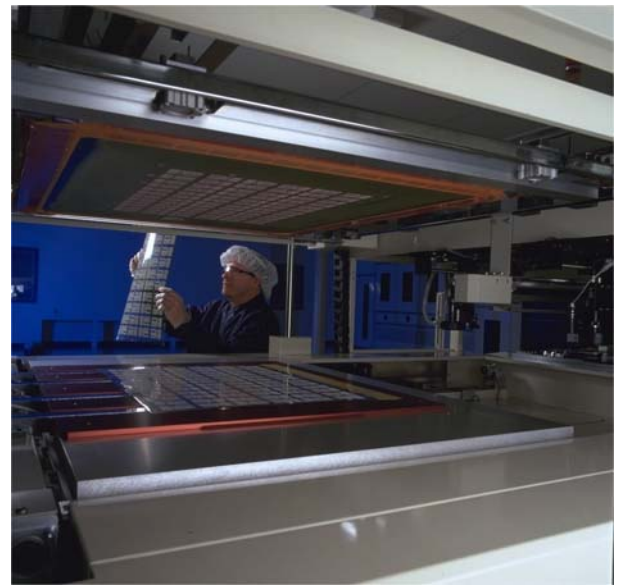
Internal highly experienced product design teams are available to support customer design engineers. Rogers' engineers have extensive experience with printing conductive, dielectric and specialty inks on flexible and rigid substrates including PET, polycarbonate, polyimide, ceramic, composite, paper and bi-layer.

Precision Registration

Camera registration aligns every panel with layer to layer registration of 0.20mm and feature to feature registration same layer of 0.10mm. This allows multi-layer double-sided capability. Rogers' 20+ years of manufacturing multiple layer products, including two-sided printing, enables unique concepts and highly complex product designs. In-house converting includes assembly, die and laser cutting, lamination, singulation, LIF and ZIF interconnects, and application of adhesives. This allows for complete product fabrication in numerous custom configurations.

Global High Volume Manufacturing

Rogers Durel Division has multiple screen print manufacturing lines in Chandler, AZ and Suzhou, China. All print lines incorporate automated processing ensuring maximum reproducibility, reliability, and cost effective production.



Bring your printed electronic products to market using Rogers' 20+ years of Design and Manufacturing Expertise.

**Your
 HIGH VOLUME, HIGH PERFORMANCE
 PARTNER**

Substrate Properties

Physical Properties	Units	Polyester (Mylar®)	PEN	Polycarbonate	Polyimide
Thickness range	microns	12 - 188	25 - 75	25 - 500	12 - 125
Tensile strength (@25°C)	kpsi	8 to 11	29	8 to 11	25
Break elongation	%	60 to 165	60 to 118	80 to 150	70
Tensile modulus (@25oC)	100,000 psi	5	7.2 to 8	3	4.3
Tear initiation strength	lb/in	1000 to 1500		1400 to 1800	1000
Tear propagation strength	g/mil	12 to 25		30 to 55	8
Refractive Index		1.575	1.65 to 1.90 (orientation dependent)	1.585	na
Density	g/cm3	1.455	1.36	1.20 to 1.22	1.43

Chemical Resistance					
Acids - concentrated		Good	Good - Poor	Poor	Fair
Acids - dilute		Good	Good	Good	Good
Alcohols		Good	Good	Good	Good
Alkalis		Poor	Good	Good - Poor	Poor
Organic Solvents		Good	Good	Poor	Good
Greases and oils		Good	Good	Good - Fair	Good
Halogenated hydrocarbons		Good	Good	Good - Poor	
Ketones		Good	Good	Poor	Good
Water		Good	Good	Good	Good
Water absorption (ASTM D570)	% 24 hours	< 0.8	<0.8	0.1	2.9
Radiation resistance			better than PET	Fair	
UV resistance				Fair	

Thermal Properties					
Service Temperature	°C	-60 to 105	to 155	-135 to 115	-125 to 200
Glass transition temperature (T _g)	°C	75	121	150	>400
Coefficient of thermal expansion	ppm/°C	27	20	58	20
Change in linear dimensions (100°C, 30 min)	%	<0.5	<0.3		<0.3

Electrical Properties					
Dielectric constant (ASTM D150) 1 MHz		3	3.2	2.9	3.5
Dissipation factor (ASTM D150) 1 MHz		0.018	0.0048	0.01	0.01
Dielectric strength (ASTM D149) @ 1-mil thickness	V/mil	3400	4060	300 to 1700	6000
Volume resistivity	ohms-cm	1E+16	1E+15	1E+14 to 1E+16	1E+16

Conductive Ink Properties

Ink	Thickness (mil)	Resistivity (Ωm)	Hardness
Ag	0.3	1.5 x 10 ⁻⁸	1H-3H
Carbon	0.4	2.5 x 10 ⁻⁶	1H-3H
PEDOT:PSS	<0.1	5 x 10 ⁻³	1H

The information contained in this data sheet/design guide is intended to assist you in designing your screen printed electronics. 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 the results shown on the data sheet/design guide will be achieved by a user for a particular purpose. The user must develop its own design and should determine the suitability of that design and of Rogers screen printing capabilities for each application.

DUREL, The world runs better with Rogers, and the Rogers' logo are licensed trademarks of Rogers Corporation.

Mylar is a registered trademark of E.I. du Pont de Nemours and Company.

©2008 Rogers Corporation, Printed in U.S.A. All Rights Reserved

Publication # LIT-E9001 A03