

# FSR™ Technical Specifications

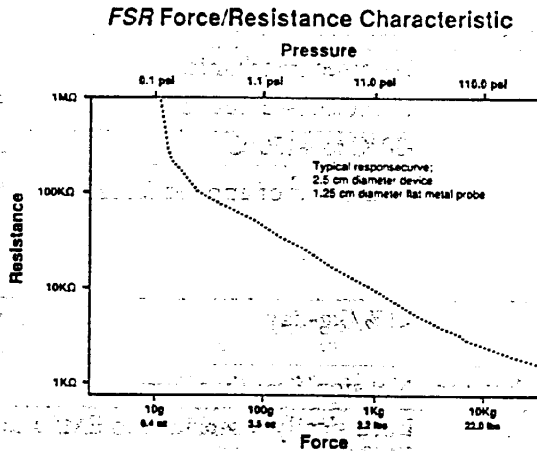
INTERLINK  
ELECTRONICS  
EUROPE

What is and  
is not  
an FSR™

The Force Sensing Resistor™ is a polymer thick film device which exhibits a decreasing resistance with increasing force applied normal to the device surface. Its force sensitivity is optimized for use in human touch control of electronic and mechanical devices. The FSR™ is not a load cell or strain gauge. Though it has comparable measuring properties, the FSR™ is not suited for exact force measurement.

The FSR's™  
Force Versus  
Resistance  
Curve

The FSR™ force versus resistance curve shown below provides an overview of its characteristic behavior. As you can see, it is approximately linear in a log F vs log R plot.



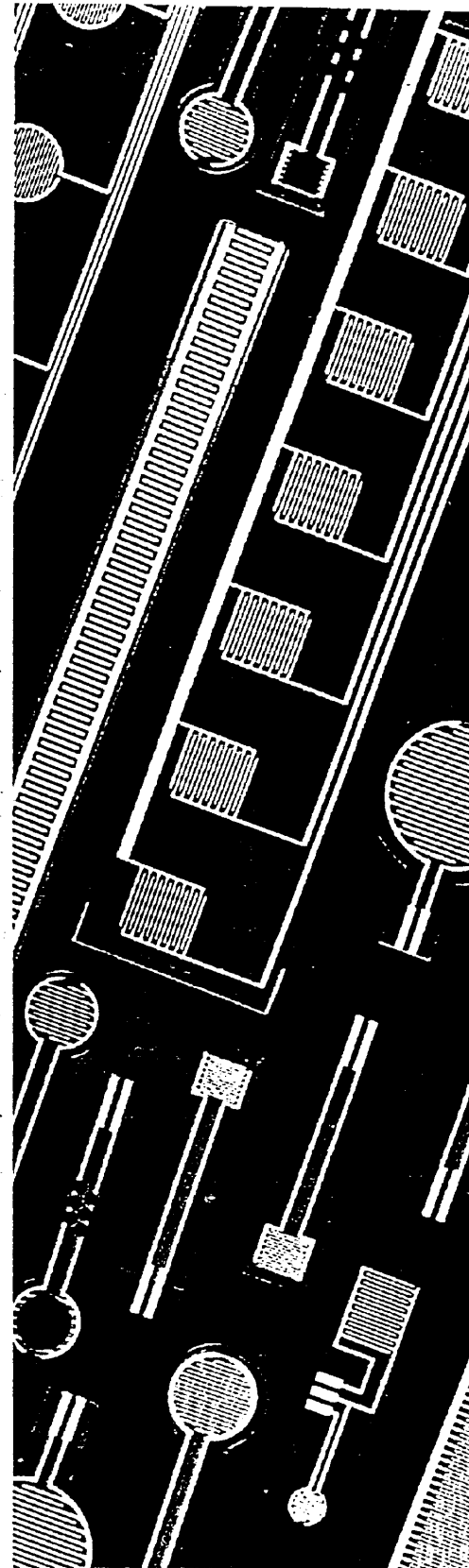
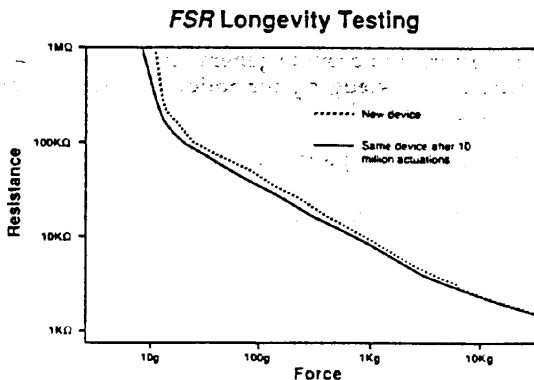
Representative  
Resistance  
Values

The following results demonstrate standard resistance for a standard 1" circular FSR™ actuated by a 1/2" diameter flat metal circular probe. These results are intended to be representative of typical FSR™ behavior and are not absolute specifications.

Resistance at	
100 g	80,000 ohm
500 g	25,000 ohm
1 kg	13,000 ohm
10 kg	2,200 ohm

Durability

FSRs™ have been shown to be extremely durable devices. The following graph profiles longevity performance. Test Conditions Displayed: 10,000,000 repetitions; 12 lbs force; 1cm diameter probe; 55 durometer rubber; 0.5 seconds on/0.5 seconds off.



# FSR™ Technical Specifications

## Simple FSRs™ and Arrays

Parameter	Value	Conditions
Size Range*	Max= 22" x 32" (56cm x 80 cm) Min= 0.2" x 0.2" (0.5cm x 0.5 cm)	any shape
Device Thickness*	0.008"-0.030" (0.2mm - 0.8 mm)	
Repeatability	Cycle-to-cycle ±2% Part-to-part ±15%	Above 100g
Optimum Pressure Range	0.01-100 psi	
Force Range	10g to 20kg	
Maximum Applied Pressure*	Approx. 500 psi	
Temperature Coefficient	1000 ppm/Measured at 1kg force	
Device Rise Time	1-2 msec (mechanical)	
Lifetime	10,000,000+ actuations	Shows <±5% change
Use Temperature	-30°C to +170°C	High temp. adhesives
Maximum Current**	1 mA/cm <sup>2</sup> of applied force	**Buffering devices can isolate the FSR™ from higher currents if the application requires
Creep	<1%/kg-day	With optimum mechanical arrangement
Sensitivity to Noise/Vibration	Not significantly affected	
EMI	Intrinsically insensitive to EMI and itself does not generate EMI	
Switch Characteristic	Essentially Zero Travel	
Lead Attachment	Flex Circuit techniques: Stitched Connectors (e.g. AMP™) Crimp Connectors (e.g. Berg™) Conductive Epoxy Solder Tabs or Eyelets	
Positional Resolution	0.003" (0.075 mm) typical	
Positional Accuracy	±2%	
* These are "normal" parameters. FSRs™ are custom devices and can be functional outside these ranges. Consult Design Services with your specific requirements.		

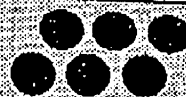
## Linear Potentiometers and XYZ Pads

The product information contained in this document is designed to provide general information and guidelines only and must not be used as an implied contract with Interlink Electronics. Acknowledging our policy of continual product development, we reserve the right to change without notice any detail in this publication.

Interlink Electronics holds international patents for its Force Sensing Resistor™ device technology.

FSR™ and Force Sensing Resistor™ are trademarks of Interlink Electronics. Interlink® and the six dot logotype are Registered Marks of Interlink Electronics.





## FORCE SENSING RESISTOR

SUBSTRATE

Page 2 of 2

Rev. 1

Date: 15.9.1992

*Da teublat en 182389*

PROPERTY	ULTEM	STABAR S100	MELINEX
Physical			
Colour	Amber transparent	Transparent	
Film Morphology	Amorphous	Amorphous	
Haze		Low at temp. < 143 °C (1%)	
Outgassing		ASTM E595 test passed	
Area Factor			
Rockwell Hardness	109 M		
Density	1,27 g/cm <sup>3</sup>	1,37 g/cm <sup>3</sup>	
Heat Shrinkage	0,135% (200°C)	< 0,1 % (150°C, 30 min)	
Water Absorption	0,25 %	1,8 % (24 hrs, 24°C)	
Mechanical			
TearStrength-initiation	132 kg/cm	470/480 kg/cm (23 °C)	
TearStrength-propagation	9,1 kg/cm	5,8 kg/cm	
Thermal			
Heat Distortion temperature	394 °F (@ 264 psi) 410 °F (@ 66 psi)		
Coeff. of Thermal Expansion (0-300 f)	3,1 10 <sup>-5</sup> in/in/°F (17,2 ppm/°C)		
Thermal Conductivity	1,5 BTU/hr/ft <sup>2</sup> /°F/in		
IEEE Thermal class	155 °C		
Fire properties		ATS 1000,001 test passed	
Flammability	UL94 VTM-0	UL94 VTM	
Tg	217 °C	223 °C	
Continuous Use Temperature	170 °C	180 °C (200 °C short time)	
Electrical			
Volume resistivity	10 <sup>17</sup> Ω-cm	10 <sup>16</sup> Ω-cm	
Surface resistivity	1,2 x 10 <sup>16</sup>		
Dielectric constant			
Dielectric Strength		119 kV/mm	
Resistant to:			
Aliphatic hydrocarbons	yes	yes	
Oils	yes	yes	
Greases	yes	yes	
Leaded / unleaded gasoline	yes	yes	
Hydrocarbons	yes		
Alcohols	yes		
Fully halogenated solvents	yes		
Mineral acids	yes		
Bases	Short-term exposure		
Organic solvents		yes	
Chlorinated / fluorinated reagents		yes	
Esters		no	
Ketones		no	
Methylene chloride		no	
polar aromatic solvents		no	
Food		complies with FDA regulations	
Blood	(yes)		
UV	yes	no	
Gamma radiation	yes		