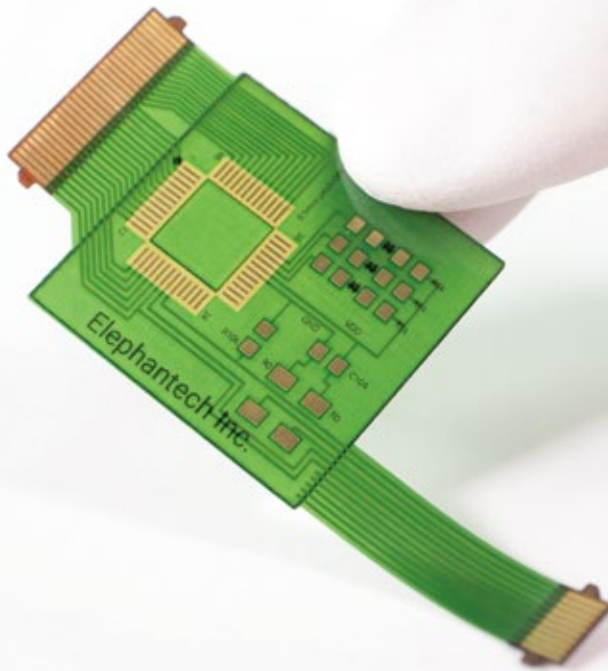




# P-Flex™ PI

## Single-sided Polyimide FPC



## Features of the Polyimide FPC P-Flex™

The Polyimide-base P-Flex™ (hereinafter P-Flex™ PI) is an FPC (Flexible Printed Circuit) where our very own Pure Additive method(\*1) is adapted to polyimides.

The PET based P-Flex™ (hereinafter P-Flex™ PET) we had developed and sold until now had issues with its range of use limited by the low heat resistance of PET (roughly 150°C) and having to use low temperature solder for mounting.

This P-Flex™ PI uses polyimides with high heat resistance (roughly 300°C) as its base material, allowing it to overcome the shortcomings of P-Flex™ PET and improving heat resistance and flame retardancy. Regarding the mounting of parts, the ability to use normal solder has not only expanded the applications but also greatly improved the mountability, and it can now be used just as if it was any normal FPC.

(\* 1) Technology to layer copper plating only on silver nanoink

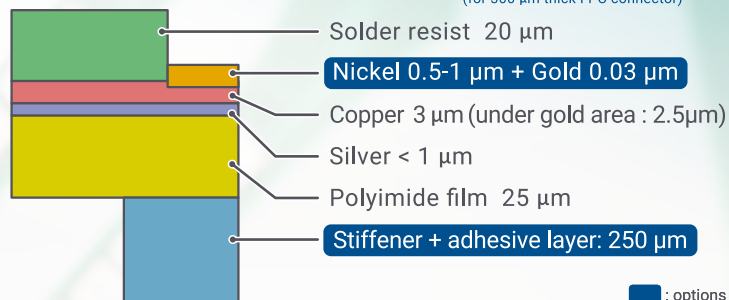
## Standard layer composition



Total theoretical thickness: 48 μm

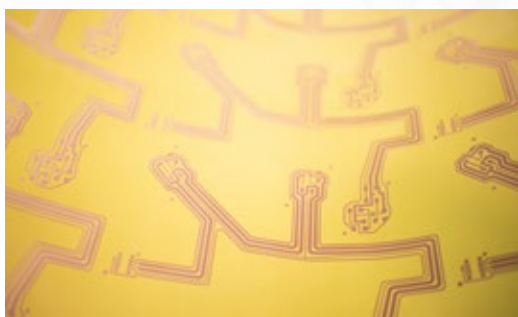
## Layer composition including options

(for 300 μm thick FPC connector)



Total theoretical thickness: 298 μm  
(The thickness from the conductor surface to the stiffener is 281 μm.)

## Single-sided Polyimide FPC



### Applications

Wiring replacement, FFC replacement, sensor module FPC, touch sensors, antennas such as Bluetooth

### Industries

consumer electronics, toys, industrial machinery

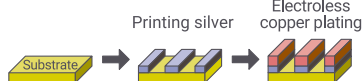
## About P-Flex™

### About Elephantech's manufacturing method (Pure Additive™ processing)

This manufacturing method consists of inkjet-printing silver nano-ink onto the substrate before electroless copper plating is applied to form the circuit. By reducing the amount of metal, liquid waste and man-hours, we can lessen manufacturing costs and shorten the lead time.

(\* Patent No. 6300213 acquired)

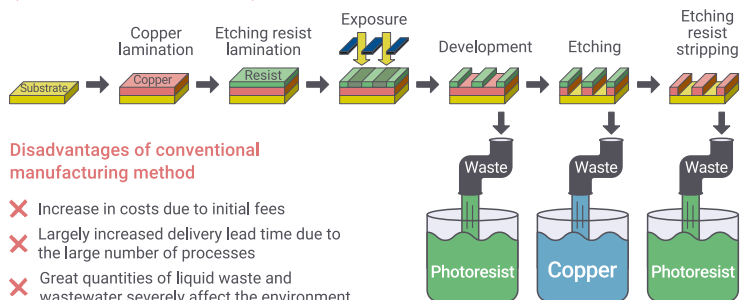
### Elephantech's manufacturing method (Pure Additive™ processing)



#### Advantages of Elephantech's manufacturing method

- ✓ Forming the circuit only where needed allows for a reduction in manufacturing cost and environmental footprint.
- ✓ A simple manufacturing process allowing for a shorter lead time.

### Conventional manufacturing method (subtractive method)



#### Disadvantages of conventional manufacturing method

- ✗ Increase in costs due to initial fees
- ✗ Largely increased delivery lead time due to the large number of processes
- ✗ Great quantities of liquid waste and wastewater severely affect the environment

## P-Flex™ manufacturing specifications

Substrate	Transparent heat-resistant PET film: 50 μm thick, 125 μm thick PI (Polyimide) film: 25 μm thick
Line width / interval	200/200 μm min., 200/150 μm min. (option)
Outline-pattern interval	Standard : 0.5 mm min. High : 0.3 mm min.
Temperature during continuous use	Between -20°C and +105°C
Copper foil thickness	3μm / 6μm (option)
Panel size	180 × 270 mm max.
Wiring layer	Single-sided
Soldermask application	UV inkjet printing (green)
Legend printing	Black UV inkjet (we plan on switching to a white color from May 2019)
Surface treatment	Oxidation prevention treatment, Electroless nickel gold plating (option)
Outline trimming / Hole processing	Laser cutting
SMT process	Subject to negotiation
Stiffeners alignment	Available (Connector part thickness alignment, mount part stiffener)
Inspection	Optical inspection + opens/shorts test

## Company Overview



# Elephantech

Elephantech Inc. (Formerly AgIC Inc.\*)

\*Changed corporate name on September 4, 2017

Establishment	January 2014
Address	4-3-8 Hatchobori, Chuo-ku, Tokyo 104-0032, Japan
Capital	JPY 381,050,000
Representative	Shinya Shimizu, CEO
Business description	Development of printed electronics manufacturing technology and provision of related services
URL	<a href="https://www.elephantech.co.jp/en/">https://www.elephantech.co.jp/en/</a>
Email	<a href="mailto:hello_en@elephantech.co.jp">hello_en@elephantech.co.jp</a>