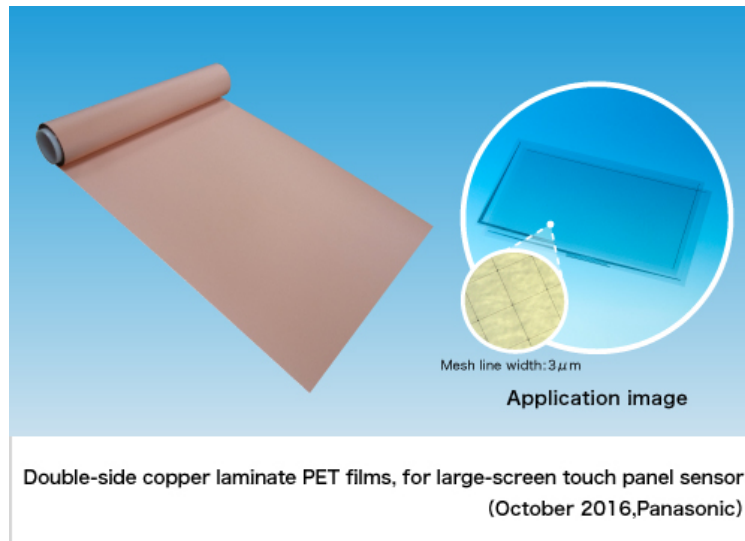


Oct 18, 2016

Panasonic Commercializes "Double-side Copper Laminate Polyethylene Terephthalate (PET) Films" for Large-screen Touch Panel Sensor



Panasonic's new product, which exhibits exceptional bending resistance as well as improved input sensitivity and display visibility, will be available in commercial quantities beginning December 2016.

Osaka, Japan - Panasonic Corporation announced today that it has launched "[Double-side copper laminate polyethylene terephthalate \(PET\) films\[1\]](#)" suitable for large-screen [touch panel sensor\[2\]](#) (Product Number: R-H825). This product is designed for large-format touch panel sensors used in many electronic products like electronic blackboards, digital signage, and amusement devices.

Touch panel display manufacturers are striving to improve qualities of large format touch panels. One approach is to increase the sensor performance to help maximize the viewing area, enhance the ease of use for both pen and multi-touch inputs, and improve outdoor and indoor visibility even as display resolution increases to 4K and beyond. During the manufacturing process, large touch panel sensors may experience bending due to their size and weight. The resultant stresses on the conductors increase the risk of cracks or breaks in the sensor's copper wires that can result in an increase in electrical resistance or even complete failure of the wire. By combining a unique resin chemistry with proprietary thin-layer copper laminating technology, Panasonic has developed the new R-H825 "Double-side copper laminate polyethylene terephthalate (PET) films". This product exhibits excellent bending-resistance that reduces the risk of wire breakage, even in the largest displays. Additionally, low resistance copper ensures superior input sensitivity and a narrow mesh pattern enables high display visibility. Copper foil on both sides of the transparent PET improves mesh alignment and eliminates the need to use two separate single-sided conductive films.

Panasonic's new product has the following features:

1. Exceptional bending resistance reduces the risk of wire cracking and facilitates material handling, even during the manufacturing process of large displays
 - Panasonic bending evaluation results using a 10 mm diameter mandrel:
 - Panasonic New R-H825 - No cracks after 10 bend cycles
 - Conventional Cu laminate PET - Cracked after one bend cycle
2. Low resistance copper facilitates highly sensitive and easy-to-use touch panel designs. This feature also enables multi-point, high-speed finger and pen input capabilities.
 - Surface Resistance
 - $1.0 \Omega / \text{square}$ (Approximately 1/50 - 1/100 of electrode films using ITO or silver)
 - 2 μm -thick conductor
 - First in the industry* (Other common sensor film conductors are 0.2 - 0.5 μm thick)
3. The wiring created with the R-H825 aids the superior visibility demanded by high-definition displays because the copper mesh pattern does not obstruct the field of view. The R-H825 is manufactured into a functional sensor film (copper mesh film) by creating the conductor pattern and finely patterning the copper. Because copper is bonded to both sides of the PET, the alignment of X and Y is better than the traditional method of laminating two single-sided sensor films together.

* Panasonic data as of October 18, 2016 for double-sided copper (metal)-based mesh films.

Recommended applications for R-H825:

Touch panel sensors used in electronic blackboards, digital signage, amusement devices, etc.

[Panasonic Technology]

1. Exceptional bending resistance reduces the risk of wire cracking and facilitates handling, even during the manufacturing process of large displays

During the manufacturing process, large touch panel sensors may experience bending due to their size and weight. The stress from bending increases the risk of cracks or breaks in touch sensor's copper wires that can result in an increase in electrical resistance or the complete failure of the wire. By combining a unique resin chemistry with proprietary thin-layer copper bonding technology, Panasonic has developed the new R-H825 "Double-side copper laminate polyethylene terephthalate (PET) films". This product exhibits excellent bending-resistance that reduces the risk of circuit breakage and high resistance failures, even in large displays

2. Low resistance copper enables highly sensitive and easy-to-use touch panel designs. This feature facilitates multi-point, high-speed finger and pen input capabilities.

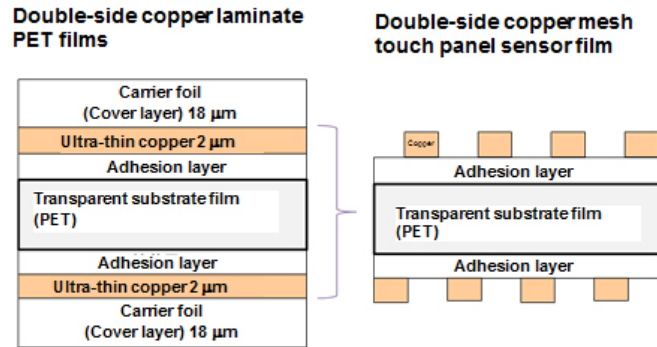
There is an increasing demand for multi-touch finger and pen touch inputs for large-format panels. The Panasonic R-H825 enables high input sensitivity by adopting low-resistance copper foil as the conductor. The surface resistance of this product is approximately 1/50 to 1/100th that of sensor film materials using ITO (indium tin oxide) or silver conductors. This extremely low resistance enables high-speed multi-point input and ensures smooth pen operation.

3. The wiring created with the R-H825 aids the superior visibility demanded by high-definition displays because the mesh pattern does not obstruct the field of view. This product is made into a functional copper mesh sensor film by creating the conductor pattern and subsequently thinning the copper. Additionally, double-sided copper improves positional accuracy.

As displays adopt higher definition, sensor films with thinner wiring are required. Until now, low adhesion between PET film and the copper pattern of conventional sensor films has severely limited the thinness of the conductor layer. The R-H825 enables low fine patterning by using Panasonic's unique composite material development technology to significantly increase the bond strength between the PET and the copper pattern. This increased adhesion enables dramatically finer

wiring patterns, which in turn improve display visibility. (Panasonic can also provide this material as a copper mesh sensor film.) The manufacturing of traditional touch panels requires the highly accurate positioning of two single-sided sensor films prior to bonding them together. Precise positioning becomes increasingly difficult as larger screen sizes are designed. The Panasonic R-H825 has a conductive copper foil layer on both sides which eliminates the need to bond two films and achieves high positional accuracy of the X and Y layers and simplifying the manufacturing process.

[Panasonic R-H825 Structure]



[Descriptions]

[1] Double-side copper laminate polyethylene terephthalate (PET) films

A key material that significantly affects usability of touch panel sensors is the PET film on which a copper-based electrically conductive layer is applied. The conductive layer detects capacitance changes where fingers or pens contact it. A touch panel sensor is usually constructed by forming an electrode film composed of two layers with X- and Y-axes, respectively, on a glass substrate. The Panasonic R-H825 has a conductive copper foil layer on both sides, thus eliminating the need to bond the X- and Y-layer films.

[2] Touch panel sensor

Film sensor for capacitive touch panels. It detects contact positions by capturing capacitance changes between the fingertip and the conductive layer and is commonly used in smartphones and tablet devices.

About Panasonic

Panasonic Corporation is a worldwide leader in the development of diverse electronics technologies and solutions for customers in the consumer electronics, housing, automotive, enterprise solutions and device industries. Since its founding in 1918, the company has expanded globally and now operates 474 subsidiaries and 94 associated companies worldwide, recording consolidated net sales of 7.553 trillion yen for the year ended March 31, 2016. Committed to pursuing new value through innovation across divisional lines, the company uses its technologies to create a better life and a better world for its customers. To learn more about Panasonic:

<http://www.panasonic.com/global>.

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