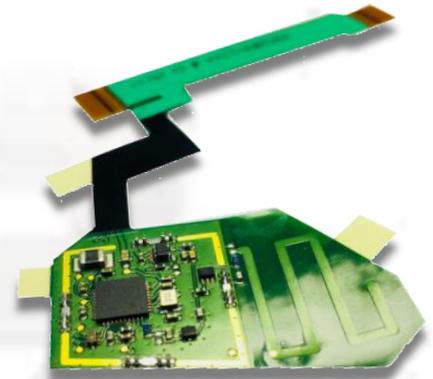


Johnson Electric

Johnson Electric, a \$3.2 billion company, is the leader in motion subsystems. Our technology leadership, application expertise and global footprint make Johnson Electric the ideal partner for custom product development projects.

Johnson Electric is committed to making our customers successful by providing product differentiation and supply chain excellence. Over 75% of our sales are realized in the automotive industry.



Flexible printed circuit and printed electronics

Over the past 40 years, Johnson Electric has developed and manufactured innovative flexible interconnections assemblies for the automotive industry.

Today we propose cost effective printed capacitive touch foil solutions which we have been successfully delivering in high volume mass production programs to automotive customers since 2014.

Automotive HMI challenges :

Due to the ubiquitous use of smart phones, drivers are now ready to welcome capacitive touch technology in their cars.

This technology allows OEM engineers and designers new design opportunities to integrate the switch below thin 3D smart surfaces.

There are numerous challenges to be solved with this technology:

- Styling: allowing OEM's the possibility to integrate the maximum of icon illuminated switches below a minimum of 3D seamless surface.
- Safety: reducing driver distraction, avoiding false switching and offering function validation feedback.
- Function integration: offering an automated and accurate positioning of the capacitive touch foil below a 3D 'A' surface without the hindrance of an adhesive.

Johnson Electric is working closely with its customers to undertake these challenges and bring to the market reliable cost effective solutions.



Switch technology

Johnson Electric offers a wide range of capacitive switch technologies, including self, mutual and diamond matrix, to address each customer application.

To overcome issues of driver switching error, Johnson Electric offers a multistage switch combining the preselection and validation of the switch function after a mechanical action by the user on the 'A' surface



IC and led integration

Johnson Electric has developed its own screenable conductive adhesive for component assembly. LED's and IC's can be assembled directly on our flexible printed circuit substrate offering the possibility to move the intelligence away from the module for more design flexibility and function cost reduction.



Foil integration

The integration of the foil below the 'A' surface can be done with adhesive or adhesiveless construction.

For automated assembly processes adhesiveless is more friendly but requires a support layer which could be integral to the light guide structure. For adhesive constructions the foil would be adhered to the back side of the 'A' surface

Jean-François Roy

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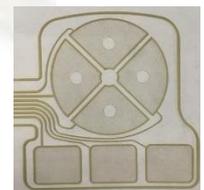


Switch illumination

Johnson Electric guarantees a minimum of 80% light transmission through the switch area. For cost optimization a fine line 'Nano Silver' printing has been developed giving the opportunity to print discrete honeycomb grid patterns in the switch area. By request, an additional diffusion layer can be printed on top of the switch.



Pedot



Nano Silver

Interconnection

Several interconnection methods are possible: ZIF connector, Zebra strip and anisotropic adhesive.

Interconnection pitches down to 0.5 mm are available to optimize the board interconnection footprint.

Johnson Electric is a safe choice

Johnson Electric is vertically integrated from ink manufacturing to component assembly. Our quality is guaranteed thanks to our one piece flow manufacturing concept and 100% analogue capacitance test of each individual electrodes of the circuit. All data is recorded and stored, piece traceability is maintained through a printed datamatrix



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