

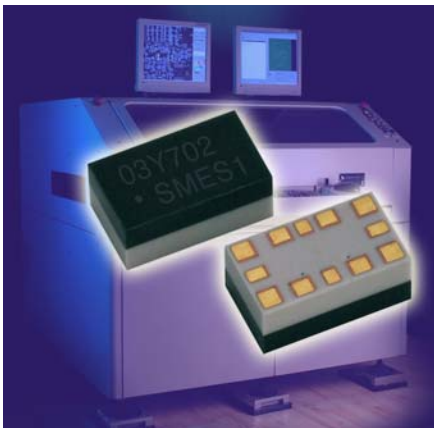
MarketEye Submission for April 2009

New Hi-Tech Relays and Switches

The New Year brought new technology to relays and switches. Omron introduced a new MEMS (Micro Electro Mechanical Systems) relay and NKK Switches a new Smart Switch with OLED (Organic Light Emitting Diode) display technology. These new products, their technological benefits, and the markets they are intended to serve are the topics of this article.

Hot Switchable MEMS Relay

Omron introduces a “hot switchable” (the ability open or close on a live circuit) micro electro mechanical systems (MEMS) relay that was 10 years in the making. Other MEMS relays have been introduced by other manufacturers that are NOT “hot switchable” or their claims of being “hot switchable” were found not to true.



Omron’s 2SMES relay is comprised of two, SPST-NO silicon chips, packaged together for SPDT or DPST-NO operation in a compact enclosure measuring only 5.2 x 3.0 x 1.8mm. Driven by an electrostatic drive system, it is rated for 100 Million operations at 0.5 mA at 0.5VDC resistive load, and has been tested over 1 Billion cycles. Additionally its power consumption is extremely low at 10 μ W max.

Contact sticking during “hot switching” was the major design issue that needed to be resolved. Contact geometry and a proprietary metallurgical alloy were the keys to success. The movable contact assembly made of this proprietary material is sandwiched between two layers of glass. The bottom layer of glass has the traces for the stationary contacts and the electrostatic drive that pulls in the moveable contact. The top layer of glass caps off the die then two of these die are wire bonded and package together to form the finished product.

Developed to meet the needs of the automated test equipment (ATE) market for chips and equipment, this product has exceptional high frequency characteristics at 10GHz and 50 Ω are isolation of 30 dB, insertion loss of 1 dB, and return loss of 10 dB. It has a maximum

carry of 30 dBm and peak carry of 36 dBm at 2 GHz. This along with its' small size and 10 μ W of power consumption target it to replace some of the reed relays, Gas FET's, and pin diode switches used in ATE equipment.

ESD sensitivity, control voltage, and price are things to keep in mind when considering this new MEMS relay. The product is very ESD sensitive and carries a 100 V Human Body Model (HBM) rating. Exposure to static discharge will cause the contacts to pit. The electrostatic drive that draws the movable contacts into the stationary ones requires 34 V DC. These very small relays carry a big price compared to other relay types. In moderate production volume expect a price of \$70.00 to \$80.00 each. High volume production will bring the price down to \$50.00 each.

Omron's 2SMES relays are available in 3 weeks for prototype quantities and production quantities in 6 to 8 weeks.

Big Screen Technology Brought Down In Size

Organic light emitting diode (OLED) technology is the latest display technology being used to produce large flat panel monitors and televisions. NKK Switches has scaled down this technology to a 13 X 10 mm display in their Smart Switch programmable switch product line.

Programmable switches are a user interface device that integrates a display with a push button. The information presented on the display can be the result of operator input or the input of another device. This allows designers the ability to control more devices with fewer switches and provide operators with specific choices for a given circumstance, such as opening and closing specific valves to bring a section of a wastewater treatment plant on or off line.

The first generations of programmable switches used liquid crystal displays (LCD) to provide a monochromatic display that was backlight with LED's to provide color and readability in low light conditions. But there are limitations to the LCD technology.

The LCD displays form graphics in a dot matrix. This is quite acceptable for alphanumeric characters, but icons need to be basic and a photo-quality image is impossible. The display can only be one color since its color comes from backlighting. The viewing angle of the display is limited to 60 to 80 degrees. The use of an OLED display addresses these limitations and more.

A full color OLED display has more than 65,000 colors in its palette. It has four times the resolution of LCD displays and a fifty times great contrast ratio. Photo quality graphics can be viewed from a full 180 degree viewing angle. It is also capable of 16-bit video with response times up to 100 frames per second. This is a great feature for one the primary users of the Smart Switch.



For the manufacturers of audio/video broadcast equipment the ability to feed video or images directly to switch that controls the source to be used or aired opens up many new design possibilities. The OLED display only requires one-fourth the power of a full color LCD version. This enables improved life in battery-powered applications and the possibility of a handheld device to control camera or source selection.

Theatrical lighting control is another major user of the Smart Switch. As are equipment manufactures in aerospace, commercial lighting, food preparation, industrial controls, medical, and military applications.

The OLED technology is not for everybody and the LCD display will continue to be available in the Smart Switch line-up. The current OLED display has an expected life that is 25% of its LCD counterpart. A screen saver may be necessary to prevent burn-in of prolonged images and OLED Smart Switches carry a 30% price premium.

The OLED Smart Switches are available in stock or with a 12 week lead-time.