



Wearable Devices Are On Their Way — What will be the fate of Japanese electronic parts?

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Over half of a smartphone's internal parts are made in Japan. With Chinese and ROKn smartphone makers expanding their share, will Japanese parts maintain their strength?

Open it up, and it's made in Japan – this is something we often find. While Japanese smartphone manufacturers have a very low presence, the ratio of that which is made in Japan rises when it comes to parts. Capable of Internet access, calling and multiple other functions, all in a handheld size, smartphones consist of numerous Japanese electronic parts and materials that are small and provide high-performance quality.

Republic of Korea's Semco on the rise, yet Japanese makers maintain their presence in ultra-small products

The small parts field is one where Japanese manufacturers excel. Multilayer ceramic capacitors (MLCCs) are parts that store electricity and are indispensable to a great many electronic products. They assist power supply and sustain normal operation while reducing noise.

They are also one of the most used parts in a smartphone. Conventional cell phones only use 150–200 MLCCs per device, but high-specification smartphones like the iPhone carry 500–600.

MLCC models often used in smartphones are the 0603 and 0402. The smallest of the currently mass-produced MLCCs, the 0402, is ultra-small, measuring 0.4 mm x 0.2 mm x 0.2 mm. One can view it with a magnifying glass and still not notice that it is a rectangular parallelepiped.

Murata Manufacturing maintains the top share in MLCCs, followed by Semco, a group company of Samsung in Republic of Korea (ROK). Semco has expanded its share in the last several years and surpassed Taiyo Yuden.

Solely in terms of the ultra-small 0402, Murata's share has reached about half, followed by Taiyo Yuden and Semco. The smaller it gets, "development of materials such as synthesized powder becomes the key," says Masuyama Shinji, director of the Electronic Parts Business Group at Taiyo Yuden. The two Japanese companies are overwhelmingly strong in ultra-small MLCCs.

Semco is known to have hired numerous technicians away from Japanese companies such as TDK and Murata in the mid-2000s to heighten its presence. While Semco mainly supplies for the Galaxy smartphones of its parent company Samsung, executives of Murata and Taiyo Yuden both agree that the company is a technological heavy hitter in terms of its frontier fields.



As of the early 2000s, TDK placed second only after Murata, but factors including delays in material development caused the company to rapidly lose its share in the last several years and it fell to fourth. It aims to survive in industrial use such as automobiles. Ranking fifth is Kyocera, but not with a particularly high share.

With Taiwan's Yageo and other newcomers gradually gaining strength, "pressure for price is heightening in versatile fields," Masuyama says. MLCC investments amount to a staggering sum of several to 10 billion yen. Sustaining presence in the highly profitable frontier field will be requisite to survival for Japanese manufacturers.

Weak companies drop out. Players have likewise lessened in the surface acoustic wave (SAW) filter field as well. Currently competing with leader Murata is TDK-EPC (EPCOS: TDK acquired German EPCOS in 2008), Taiyo Yuden and a number of others.

SAW filters extract necessary wavelength signals to reduce noise during calls. Whereas conventional phones were only equipped with five or six such filters, smartphones use ten to fifteen.

Murata enhanced its production line this spring and orders are pouring in from Apple and smartphone manufacturers in China and ROK. Among all parts for smartphones, SAW filters are the ones in tightest supply according to an executive of a parts manufacturer.

Having likely failed in the iPhone 5 bid, EPCOS had significantly low plant operation rate last year. It is still struggling given its slowness to win large-lot orders. How TDK goes about leveraging EPCOS's advantages in automotive and industrial equipment fields to smartphones and other civilian areas will, once again, define the fortunes of TDK's small parts business.

ROK and U.S. competitors vigorously chase leading-edge Sony

Image sensors are digital cameras that are essential for smartphones. Two are installed in a single smartphone – one on the backside for taking photos (rear camera), and the other on the front surface for self-photos (front camera).

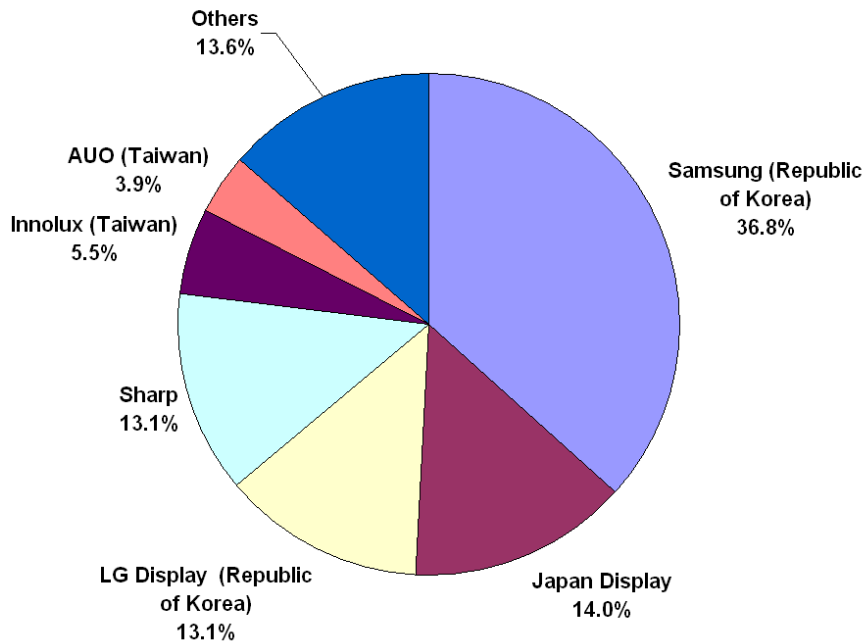
Sony is particularly strong in CMOS image sensors for rear cameras on high-end smartphones such as the iPhone 5 and Galaxy S4. For the iPhone 5, Sharp and ROK's LG Innotek install Sony image sensors into the camera modules they supply to Apple.

The Galaxy S4 uses a 13-megapixel high-resolution sensor. "What other companies manufacture in a process for 1.4 μm Sony can manufacture for 1.1 μm . They also have a line for 16 and 20 MP, and in terms of the highest-end technology, competitors don't even come close," says Miwa Hideaki, marketing analyst at Techno Systems Research. With the increase in high-end smartphones, Sony expects to this year raise its share to 18.4% from last year's 15.4%.

But the share is expected to fall next year. One reason is that Samsung Electronics and U.S. company OmniVision are about to catch up on high-end products of 13 MP and above. Since Samsung plans to boost its in-house production ratio, Sony will lose a purchaser. And rising Chinese manufacturers with smartphones equipped with CMOS sensors of 8 MP or below are mostly using OmniVision. ROK's SK Hynix and China's Galaxy Core are also rapidly expanding their shares in this volume sector.



Japan and Republic of Korea Sustaining Presence in Panels — Monetary shares in smartphone panels (2012)



Note: Innolux is an LCD panel manufacturer of the Taiwan Foxconn Group.

Source: NPD DisplaySearch

The key for Sony to stretch its share will be to venture into these low-priced devices, which will prove quite challenging price-wise. It would be better off seeking a way of developing uses in areas other than smartphones.

The panel is the most costly of all parts in a smartphone. For the iPhone 5, the cost for the panel on a unit priced at \$649 was said to be around \$44 (according to an IHS iSuppli study).

Japanese and ROKn manufacturers are the overwhelming leaders in high-resolution panels (see figure). The companies that supply LCD panels for the iPhone 5S and 5C are Japan Display, Sharp and ROK's LG Display – unchanged from those for the iPhone 5. Plants of these companies have been running at full operation from this summer, and supply/demand expects to be tight until at least around fall. In the shift from the iPhone 4S to the 5, the three companies all had poor yield due to the shift to touch-panel-embedded production, but this trouble should lessen with the 5S and 5C.

Samsung Electronics does hold a high share in smartphone panels, which are not LCDs but rather are organic electroluminescent (EL) panels that go in its Galaxy series smartphones and comprise a high ratio. These panels are made almost entirely in-house.

Samsung has considered the bright organic EL panel a characteristic feature of the Galaxy. But in the last year or so, the company is reconsidering LCD, which is technologically superior to



organic EL. Since its in-house supply is still limited, it would have to rely more on outsourcing LCD production. Japan Display already provides mass supply for the six-inch, almost tablet-sized, Galaxy Mega. Samsung's upcoming strategies may affect production at Sharp and LG.

Circumstances greatly differ when it comes to low-end smartphones priced under \$300. Some Japanese manufacturers seem to be supplying panels to China's Huawei and ZTE. Yet for smartphones around the \$100 range, new panel manufacturers such as Taiwan's CPT and HannStar are wholesaling to Chinese agents in bulk, which does not leave great room for Japanese companies to attempt entry.

As of now, Taiwanese and Chinese manufacturers still trail in mass-production technology of high-resolution panels, yet they too are installing the latest facilities and urgently trying to catch up. Sharp and Japan Display cannot rest on their laurels.

Using smartphone technology on next-generation wearables

Can Japanese manufacturers continue profiting from smartphone parts? Murata Tomohiro, author of *Denshi buhin dakega naze tsuyoi* (Why are electronic parts the only strong field?), suggests that they "will sustain their lead in MLCC and other upstream fields that develop from the material up."

The parts industry is always prone to price reductions. Until just a while ago, prices were revised once each year, but these days the span has shortened considerably to once every quarter, according to an executive of a parts major. "Companies need to find ways not to compete directly with new and rising manufacturers that have price competitiveness," Murata says.

While the growth of Apple and Samsung slows in the smartphone market, new power from China and other economies is on the rise. Japanese companies will want to compete against these new and rising powers from the upstream down.

There is concern that prices for parts heading to China will drop, but experts say it is not as bad as people think. According to one security analyst, "Parts manufacturers have the leisure to negotiate prices on parts with high features that even the inexpensive smartphones will need. It's Apple, in fact, that is likely asking for lower prices in exchange for mass-lot orders."

Deliveries have begun on samples geared for next-generation wearable devices, which are expected to proliferate following smartphones. Whether Japanese parts manufacturers can take their technological advantages developed through smartphones to this next stage will be a test of their capabilities.

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