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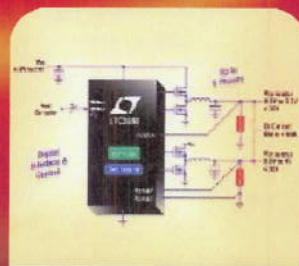
Japan's massive quake rattles supply chain



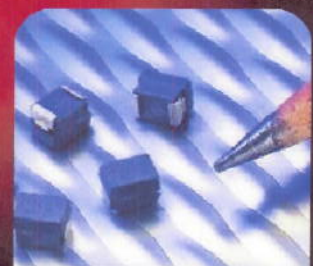
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JAPAN DISASTER IMPACTS SUPPLY CHAIN

The aftermath of Japan's earthquake last month has left the electronics supply chain struggling with production stoppages and shipment delays of electronic components and raw materials supply

By Gina Roos

While the devastation from the earthquake and tsunami in northeastern Japan on March 11 is immeasurable in terms of its impact on the country's people and psyche, Japan also faces a nuclear power plant crisis, rolling power outages, and a crippled transportation system, all of which are having a devastating impact on Japan's people and economy. The aftershock can be felt throughout the electronics industry supply chain as manufacturers try to assess the full extent of the damage.

Delays or complete stoppages in the production of electronic components are due to several reasons ranging from building and/or equipment damage to power outages and logistics issues. Components affected include memory devices, in particular DRAMs and flash memory, logic ICs, capacitors and inductors.

Initial reports from market research firm TrendForce indicated that a power outage caused production to shutdown silicon wafer fabs at Shin-Etsu Semiconductor and SUMCO. Both companies also suffered damage to their production lines.

Shin-Etsu is a major wafer silicon supplier to DRAM suppliers Hynix, Elpida and Rexchip. However, DRAMeXchange reported that Hynix's demand can be met by other plants and suppliers, and both Elpida and Rexchip, which get a large share of supply from the impacted plants, have started to negotiate raw wafer purchases from other vendors. Both have one month of inventory level.

Samsung and Micron will not be impacted by the potential wafer shortage. According to DRAMeXchange, Samsung has five other wafer suppliers in the U.S., Japan and Korea, while Micron's supply comes primarily from the U.S.

Overall, Taiwanese DRAM suppliers are not impacted by the raw wafer shortage.

The latest reports from IHS iSuppli reveals the shutdown of operations at Shin-Etsu Chemical Co. Ltd.'s Shirakawa facility and MEMC Electronic Materials Inc.'s Utsunomiya plant, together, has

impacted 25 percent of the global production of silicon wafers used to make semiconductors. This could have a major impact on the industry since both companies supply domestic Japanese demand and global semiconductor manufacturers, said IHS.

The Shirakawa facility produces large 300-mm wafers, which are used in more advanced semiconductors that have high transistor counts, and are mainly used in manufacturing flash memory and DRAMs, said IHS. As a result, the global supply of memory semiconductors will be impacted the most severely of any segment of the chip industry. Logic devices represent the next largest use of these wafers, according to IHS.

Shin-Etsu's Shirakawa plant, which is responsible for 20 percent of global silicon semiconductor wafer supply, told IHS it would set up production systems at other facilities but did not know how long it would take to restore the damaged facilities and equipment.

MEMC's Utsunomiya facility, which accounts for 5 percent of worldwide semiconductor wafer supply, evacuated employees and suspended operations at the plant after the earthquake, and expects that shipments from this facility will be delayed in the near term, said IHS.

As a result of the potential raw wafer shortage, PC OEMs have increased their DRAM inventory level for future demand, according to DRAMeXchange. This led to higher contract prices in March. The DDR3 2-GB contract price increased by 3.03 percent from \$16.50 to \$17 (\$0.91/Gb) while DDR3 4-GB increased by 3.13 percent from \$32 to \$33.

Raw materials production suspended

More bad news for the supply chain includes the shutdown of raw materials production at two Japanese companies – Mitsubishi Gas Chemical Company Inc. and Hitachi Kasei Polymer Co. Ltd. – which account for 70 percent of the worldwide supply of the main raw material used to make printed circuit boards (PCBs), reported 

Supply Chain

IHS iSuppli. Both companies told IHS they will resume production of the raw material, copper-clad laminate (CCL), within two weeks.

However, with current inventory levels, IHS believes there is sufficient supply of finished PCBs and raw CCL material to keep electronics production lines running at global electronics manufacturers, as long as the interruption doesn't last significantly longer than two weeks.

Plant assessments underway

Most Japanese semiconductor companies are still evaluating the damage caused by the earthquake. Panasonic has reported some minor injuries to employees at several of its companies including Panasonic Electric Works Co., Ltd. Koriyama Factory, which manufactures electronic materials. The company also reported damage to equipment, buildings and production. No further details were provided at that time.

Texas Instruments (TI) reported that its Miho and Aizu sites and its Tokyo offices were impacted by the initial earthquake. The chip maker reports no injuries to employees at these sites. The company estimates it will reinstate production at Miho in stages, beginning with several lines in May and returning the factory to full production in mid-July, which means full shipment capability in September.

TI's fab in Aizu-wakamatsu estimates it will have full production by mid-April. A fourth TI site in Hiji was not impacted. (See news story on page 12.)

Toshiba's NAND production line only experienced a minor setback; however, the chip maker is evaluating the impact that materials supply, traffic and infrastructure challenges will have on the company, reported DRAMeXchange. Toshiba's 12-inch plant in Iwate Prefecture primarily produces logic and consumer ICs.

IHS iSuppli reported that Elpida Memory said its semiconductor assembly facility in Yamagata has been damaged and a lack of electricity is impacting production. The Yamagata facility's utilization rate now is at less than 50 percent.

The earthquake also has damaged about 40 percent of the total wafer capacity of Renesas Electronics Corp., reported IHS iSuppli. The company has stopped production at its Tsugaru fabs producing analog and discrete devices, the Naka facility making system-on-chip and microcontroller devices, and the Takasaki and Kofu fabs making analog and discrete parts.

In addition, half of the total wafer capacity at Fujitsu has been damaged. While the company's fabs and wafer equipment are

intact, the shortage of electricity, gas and wafers means it will take three or four weeks for the company to recover production, said IHS.

IHS iSuppli reports no damage at AKM Semiconductor's fab producing electronics compasses for the Apple iPad 2.

To keep ahead of the changes in the supply chain as a result of the Japan earthquake, several companies and organizations have launched websites to aggregate supplier updates. These include websites created by the Electronic Components Industry Association (ECIA) (www.eciaonline.org/japan.html) and the element14 engineering community (www.element14.com/japanemergency).

Panic or measured buying?

Many electronic OEMs worldwide may be engaging in panic or speculative buying of semiconductors and other electronic components, spurred by fears of supply

disruptions from Japan, said market research analysts. Electronic distributors are reporting a surge in orders from OEM customers, trying to ensure they have sufficient inventory on hand to ride out any interruption in supply, said IHS iSuppli.

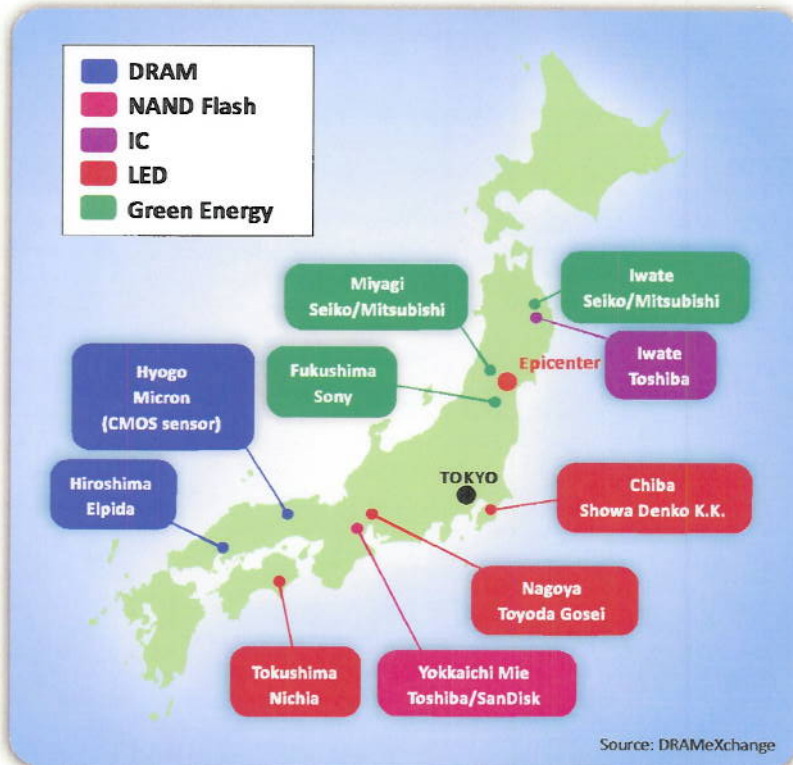
"Customers immediate needs are by and large covered, but in the absence of information everybody is panicking a little bit," said Michael Knight, vice president of product marketing and supplier marketing, TTI Inc, Ft. Worth, Tex. "There is a lot of panic activity where people are trying to figure what's made in Japan or what has some sort of raw material that is coming out of Japan, and then secondly, try to hoard some of that."

Knight says customers are requesting a six-month safety or buffer stock for components across the board, but he says this hasn't translated into higher prices. In addition, TTI's customers aren't facing any shortages because the distributor has product pipelines for them due to their long-term agreements.

Virtually all of TTI's suppliers were in central or south Japan so they weren't directly impacted by either the earthquake or the tsunami but what they are affected by is rolling blackouts, all the power problems and difficulty in moving parts, said Knight.

"Even if parts are getting out of the factory, getting them to where you can ship them has been tough, but those are near-term problems that will resolve themselves over the next few weeks," said Knight. "We are all in a kind of wait-and-see mode to see if product starts flowing out of Japan again."

However, DRAMeXchange says buyers who expect a potential



shortage of NAND Flash initiated speculative buying, which led to a panic surge in spot prices and about a 5 percent to 15 percent increase in contract average selling prices (ASPs) in the first half of March.

This also has impacted the independent distribution channel, which has started to see an uptick in orders. "We've seen a significant uptick in requirements and product transactions. It's a natural response to any kind of supply disruption," said Paul Romano, COO for Fusion Trade Inc., Andover, Mass. "This is a much more measured response to a disruption in the supply chain."

And it's not just for semiconductors. Romano says there has been an uptick in orders for lower cost devices such as inductors and capacitors. Many passive component plants were affected by the earthquake including one key supplier Murata, he said.

"We're seeing requirements across the board for passive parts from suppliers such as Taiyo Yuden, TDK, Nichicon, and United Chemi-con," Romano said.

Passive component manufacturers like TDK, which recently reported that some of its plants for electronic components including ferrite cores and capacitors were ready for production, stated that rolling blackouts will likely impact production.

This has also impacted component pricing in the independent distribution channel. "We have seen impacts on DRAM and NAND flash pricing and we've seen an uptick in demand for both," said Romano. Spot pricing for these devices has increased between 30 to 35 percent from pre-quake levels, he said.

"But a far larger issue lies with some of these other parts," Romano added. "Pricing on the spot market also has gone up for passives as a reaction to demand far outstripping supply right now."

Romano also warns buyers to watch for counterfeit parts. "Counterfeiters use these situations as opportunities. Everybody has to be careful especially when it comes to passive devices because it's much harder to vet out a passive device."

This means buyers have to make sure that they are partnering and buying from trusted sources and vendors, Romano said. They should have strong quality, inspection and vendor management systems, he added.

IHS says the recent buildup in global semiconductor inventory may mitigate the impact of reduced supply from Japan. The market research firm reported in February that global semiconductor inventory levels had risen to high levels, surging

to a two-and-a-half year high in the fourth quarter of 2010.

DRAMeXchange expects the earthquake to reduce global NAND flash bit supply by less than four percent in the second quarter of 2011. Two major uncertainties in the supply chain are raw materials from IC upstream vendors and the condition of

Toshiba/SanDisk/Yokkaichi NAND Flash plants, said the market research firm.

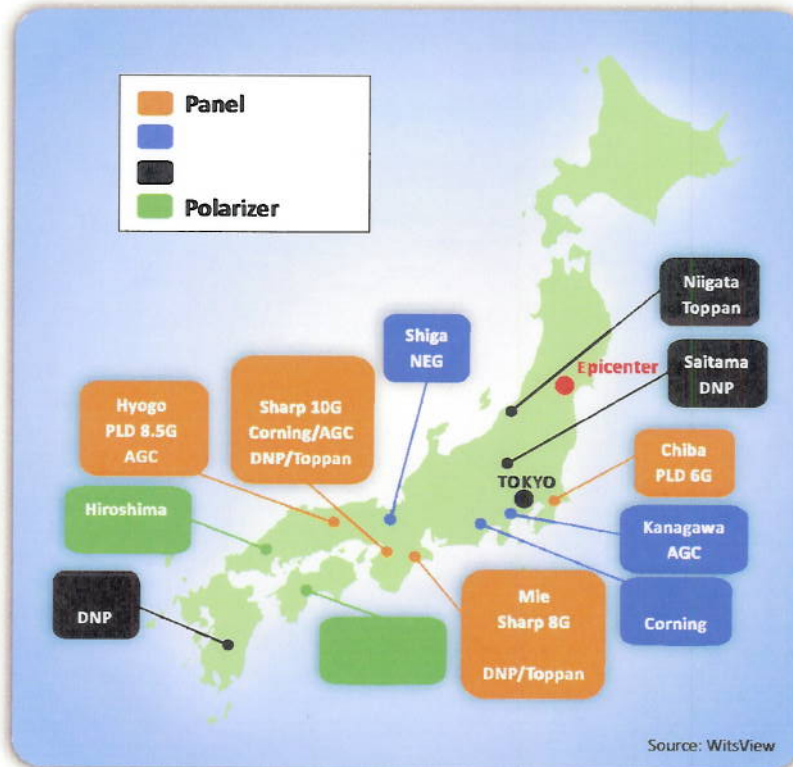
DRAMeXchange reports that there was no major damage to the Yokkaichi NAND Flash plants (Fab3 and Fab4), although some wafers were reportedly destroyed from the earthquake.

DRAMeXchange estimates the damage may reduce less than 10 percent of the total Toshiba/SanDisk output in the second quarter of 2011.

Although NAND flash spot pricing is expected to increase significantly due to uncertainty in supply, prices are expected to stabilize and return to a normal supply and demand situation in the second quarter.

DRAMeXchange also expects the decline in the

annual NAND flash contract ASPs to ease slightly in 2011.



No major impacts on LCD panel, LED Supply

As for LCD panel supply, Witsview, a research division of TrendForce, indicates that most major LCD panel manufacturers are in the Kansai region, Japan, which means they have not been significantly impacted by the earthquake.

The LED industry also shouldn't be impacted by the earthquake since the two leading LED manufacturers in Japan, Nichia and Toyoda Gosei, are far from the disaster area in northeast Japan, said LEDinside. However, it's not known at this time if SDK's LED production line, located in Chiba, has been impacted.

However, DisplaySearch is reporting tight supply of nitrogen trifluoride (NF3) gas, which is used in cleaning chemical vapor deposition (CVD) chambers in the production of TFT LCD, semiconductors, and amorphous silicon thin-film solar cells.

Some panel makers could also see supply constraints for indium tin oxide (ITO) target inventory (raw material for ITO disposition) as a result of the shutdown of JK Nikko's factory, reported DisplaySearch. JK Nikko is a leading supplier of ITO target, along with Mitsui, which was not impacted by the earthquake. Panel makers typically maintain one month of ITO target inventory.

There also may be a shortage of pigments from DIC used in color filters, connectors used in LCD modules from Hirose and JAE, and exposure equipment for Gen 4 and smaller fabs from Nikon, reported DisplaySearch.