

DKN Research Newsletter

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(Micro Electronics & Packaging)

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JPCA SHOW 2019 (Part 3)

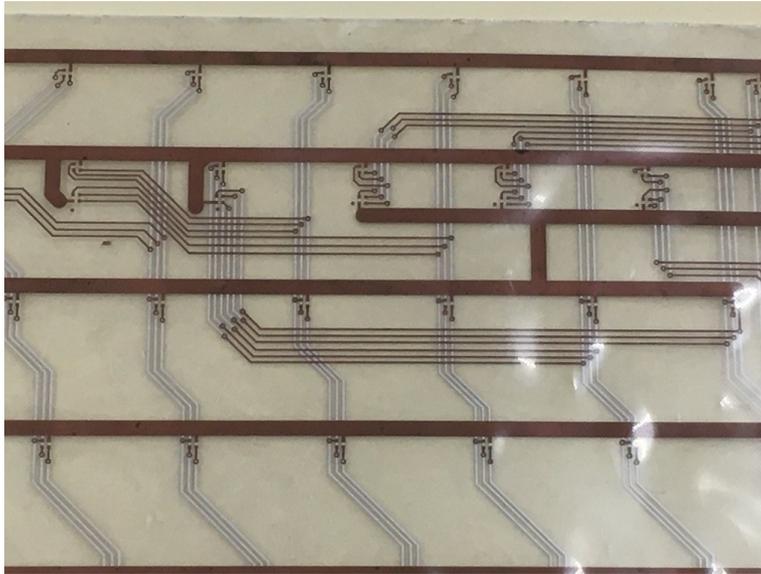
This is part three of my observations from the JPCA Show.

There were many new products related to thick film base flexible circuits introduced at the show. Specifically, these products were screen-printed conductive inks featured by some Taiwanese companies as well as other mid-sized manufactures. P-ban.com, an online circuit distributor displayed several advanced technologies. Their basic concepts are not new, but their technology bundles are very practical, and are currently in the market.

Progress continues with reducing the density of thick film flexible circuits. Flex circuit manufacturers have volume production with 50 micron fine lines and spaces, and soon will be giving way to 30 micron lines and spaces or less. Conductive ink suppliers and screen mask manufacturers claim that 10 micron lines are possible, while double sided and multi-layer circuits with small via holes on flexible substrates are becoming main stream.

Thick film circuit metallization is a hot topic for the industry. The idea was bounced around many years ago; but manufactures were not successful in delivering a viable product. Fast forward to today and two companies displayed actual samples of metallized thick film circuits at the show. Representatives who were manning the trade show booths claim the flexible circuits have significant conductor resistance compared with traditional thick film circuits. The low conductivities from thick film circuits were a considerable disadvantage and limited their applications. However, supplemental surface metallization of thick film traces will significantly increase the conductivities. To put a number on it, conductivities can be ten times higher and even more depending on the metallization thickness.

Manufacturers did not point out a second advantage from metallization – the significant reduction of silver migration. Migration from silver conductors is always a problem for circuit designers. Metallization of silver conductors reduces the migration complications from thick film conductors. The screenshot below shows the copper metallization of silver thick film circuits:



Another advantage from the thick film technology is the ability to generate conductive printed circuits on non-standard substrates such as polyimide films and PET films. The physical properties from traditional plastic films are adequate for electrical insulation materials. One disadvantage is the low moisture permeability from plastic films used with wearable devices. Everyday materials such as cloths and papers could be suitable for wearable devices; however, it is not easy to generate copper foil circuits if used as conductors. The thick film circuit designed for two dimensional pressure sensor arrays is a good example. The screenshot below shows a wheelchair with a large sized sensor module built into a square fabric sheet:



The manufacturer of the sensor device confirmed that all of the construction was created using a screen-printing process.

(to be continued)

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Headlines of the week

(Please contact haverhill@dknresearch.com for further information and news.)

1. **Toshiba (Major electric & electronic company in Japan) 6/25**
Has successfully achieved 23.5% conversion rate with the next generation photovoltaic cells of transparent copper oxide with tandem constructions.
2. **AIST (Major R&D organization in Japan) 7/8**
Has co-developed a new electrolyte for zinc/air secondary battery. It is capable to extend the life significantly.
3. **Faurecia Clarion (Major car module manufacturer in Japan) 7/12**
Has been developing new car audio systems with attractive interiors that reduce the size and weight to one fifth.
4. **JAE (Major connector manufacturer in Japan) 7/16**
Has rolled out a new SMT type board-to-board connector series “AC01 Series” for industrial uses. 0.5 mm pitch, 2.5 mm high, 50, 60, 80 and 100 pins
5. **Sony (Major electronics company in Japan) 7/18**
Has released new small size CMOS image sensors, “IMX415” and “IMX485” with LGA ceramic package (12.0 x 9.3 mm) for security camera systems. They are compatible for 4K displays of the security systems.
6. **JR East Japan (Major railway company in Japan) 7/12**
Has successfully completed the trial runs of auto drive bus. The new bus service system will be valuable as the transportation network in rural areas.
7. **Fujikura (Major cable company in Japan) 7/17**

Has developed a new super conductor wires and started volume production as the magnet wire for the MRI equipment. 400A/mm² current density was achieved at 30K.

8. Denso (Major automobile device manufacturer in Japan) 7/16

Has agreed to build a new JV with Toyota to develop semiconductor devices for automobiles. The new company will start the operation in April, 2020 with 500 employees.

9. Murata (Major component supplier in Japan) 7/17

Has commercialized the world smallest SAW (Surface Acoustic Wave) device for smart phones. Size: 0.9 x 0.7 mm

10. Kyocera (Major electronics company in Japan) 7/18

Has opened a new R&D Center in Minato-Mirai of Yokohama with 7800 sq. meter floor space to develop the technologies of IoT, AI, robotics and auto driving. 200 sq. meter Creative Fab will be attached for trials and tests.

11. IMV (MEMS device manufacturer in Japan) 7/18

Has unveiled a new vibration sensor “VP-8021A” produced by MEMS process. It is less expensive compared to the traditional piezo type sensors.

12. Tokin (Major device manufacturer in Japan) 7/18

Has rolled out a new polymer tantalum capacitor series “T598” for the super computing of automobile applications. Higher volume efficiencies, longer life.

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