

Current Status and Future Trend of FPC

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SUMMARY

Introduction of Nippon Mektron

Nippon Mektron, Ltd., the first producer of FPC (Flexible Printed Circuits) in Japan, manufactures FLEXBOARD, Panel Keyboard, and Bus-Bar, to say nothing of many types of FPC. We fulfill technical requirements in electronic equipment ranging from computers to consumer products. As other products, Mektron manufactures Fine chemicals, Fluorinated org. compounds, and Polyurethanes molded products.

Nippon Mektron, Ltd. is the largest FPC manufacturer in the world by Printed Circuit Fabrication Magazine, March 1998.

Position of FPC at PCB industry (Current Status of Printed Circuit Board Industry (JPCA, 1998))

Change of PCB Production amount, Growth Rate, and Ratio of FPC in Japan are shown below. (Table 1, 2, and 3)

Table 1 Trend of FPC Production amount. Unit: Billion Yen

	1993	1994	1995	1996	1997	1998pr.
S/S FPC	67.8	73.9	85.9	91.6	96.3	102
D, M/S FPC	25.1	28	34.1	40.5	50.7	56.6
Total FPC	92.9	101.9	120	132.1	147	158.6

Table 2 Annual Growth Rate (comparing with the preceding year)

Yr. To Yr. Ratio	1994	1995	1996	1997	1998pr.
S/S FPC	109%	116%	107%	105%	106%
D, M/S FPC	112%	122%	119%	125%	112%
Total FPC	110%	118%	110%	111%	108%

Table 3 Ratio of FPC to Total PCB (Comparing with production amount)

	1993	1994	1995	1996	1997	1998pr.
Total FPC	92.9	101.9	120	132.1	147	158.6
Total PCB	802.9	830.8	875.9	908	1013.7	1085
Share FPC/PCB	11.6%	12.3%	13.7%	14.5%	14.5%	14.6%

Demand Forecast [Future Vision of Electronic Circuit Industry (1996)]

Demand forecast of Japan is shown below. (Table 4)

Table 4 Forecast of Demanded Surface Area (Km²)

	94	97	0	5
S/S FPC	3,176	3,192	3,166	3,456
D, M/S FPC	644	667	699	802
Total	3,820	3,859	3,865	4,258

FPC Market (Application)

Computer Hardware (PC, HDD, FDD, Printer, Display, Peripheral device) ,

For Automobiles (ECU, Sensor, Car media, etc.)

Displays (LC, Plasma, etc.)

Communication Devices (Mobile communication devices, Fax, etc.)

Precision Devices (Camera, Digital camera)

AV Devices (DVD, VCR, Audio)

Medical Instruments

OA Devices (Copier, etc.)

Others (Battery, etc.)

Trend of Customers' Requirement

High performance

Acceleration of miniaturizing and thin-lightweighting (Energy-saving, Multi-layer, Portable, etc.)

High Density Assembly (Trend of IC by Assembly method is the key point.)
(SMT, WB, CSP, COB etc.)

Fine Patterns and Small diameter of Through Holes

Advanced Dimension Accuracy Specification

Trend of Requirement to FPC Materials

Transfer from Three-layer Laminates to Adhesiveless Two-layers (Base material, Cover-lay material)

Trend of Cover-lay Material (varies with each industry)

Photo-sensitive cover-lay for High Accuracy Assembly

Dimensional Stability (Residual stress, Moisture proof, Heat proof, etc.)

PI Material as a Stiffener (Low stress at heating, Flatness, etc.)

Move to the Lower Price

CONCLUSION

Production amount will increase slowly; however, material consumption seems to have increasing tendency by decreasing of a price of product, yet it does not increase so much because of miniaturizing product. On the other hand, although the film thickness of 1mil is still the major volume of FPC for a while, I think that the transfer to the thinner film (1mil to 1/2mil) for some applied electric devices will make the ratio of 1mil and 1/2mil change gradually.