

Simultaneous Bidirectional Data-Transmitter for Future HEP Experiments

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This work presents a design and implementation of an I/O circuit block capable of simultaneous bidirectional transmission in CMOS integrated circuits. In High Energy Experiments at high luminosity, reducing material of silicon trackers in the inner vertex layers is of major importance to suppress multiple-scattering and to achieve good overall detector performance. Merging data-transmitter and receiver into common bonding pad is feasible not only to reduce the number of transmission lines from a considerable number of chips. The circuit block presented here is designed on the basis of current subtractor and conventional current-mode logic (CML) drivers. Its principle is also applicable to widely-used low-voltage differential signal (LVDS) drivers. The prototype chip was fabricated in TSMC 65-nm CMOS technology. Working principle has been demonstrated in preliminary laboratory testing.

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