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Use of IHP's 0.25 μm BiCMOS Process in the Development of European LVDS Devices

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Transmission of large amount of data is extensively used in communication among spacecraft and satellite onboard systems during a mission. LVDS (Low-Voltage Differential Signaling) Drivers and Receivers are key to provide means of sending/receiving data along twisted pair cable at very high data-rates with low power and excellent EMI performance. Rad-tolerant and Rad-hard ANSI EIA/TIA 644A complaint LVDS Drivers and Receivers products are essential in an extensive range of space applications. Typical applications with such needs are SpaceWire and clock distribution networks.

The purpose of this activity is the development of an LVDS Octal repeater in the frame of ESA's and ECI's European LVDS Driver Development intended to be used in space applications and built in IHP's 0.25- μm BiCMOS process technology which has a good performance in terms of radiation, for both total dose and single event effects. Previous tests on this technology show no degradation up to 300Krad of total ionization dose (TID) and a single event latch-up (SEL) immunity up to 84MeV $\text{cm}^2 \text{mg}^{-1}$ at least.

The key features of the octal LVDS repeater include cold sparing (essential for redundant systems architecture), up to 250MHz signaling rate per channel allowing for 500Mbps transfer rates over SpiceWire, 3.3V single power supply, fast propagation delay, low channel to channel skew, TRI-state output control, extended common mode on LVDS receivers and the minimum ESD tolerant rating of 8kV for human body model (HBM), 250V for machine model and +/- 500V for field induced charge device model.

In order to validate and characterize the technology for the extended ESD tolerance an additional test vehicle chip has been built in the frame of the activity, with a set of ESD test vehicles that include NMOS clamps, PMOS clams, and diodes.

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