

5.C.3 Design of Aging Aware 5 Gbps LVDS Transmitter for Automotive Applications

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This work describes the effect of circuit aging on 5 Gbps Low Voltage Differential Signaling (LVDS) Transmitter (TX) used in automotive high speed communication. Aging simulations are used to investigate the sensitivities of various sub-blocks of the TX designed in 16nm FinFet technology. Mitigation techniques using on-chip dynamic aging adaptive capability with jitter and duty-cycle correction circuitry is developed to recover critical TX performance within its specification limits. Measured Si results confirms the efficacy of the mitigation techniques, with TX capable of restoring its aging induced degradation in performance to <5% from its pre-aging values.

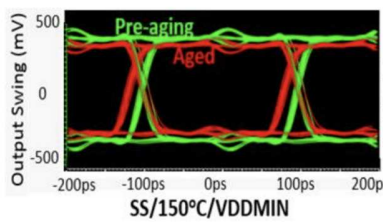


Fig 2a: Eye diagram comparing pre/post-aging degradation in swing, duty cycle and jitter

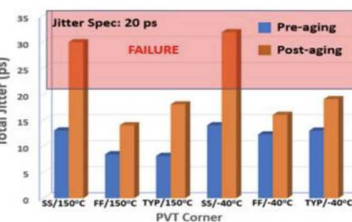


Fig 2b: Total jitter degradation with aging shows failures for 6 PVT corners

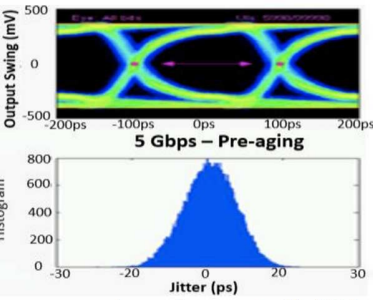
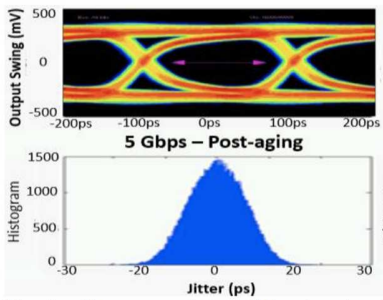


Fig 5a, 5b: comparison of Pre-/post aging measured eye diagrams with 10M samples of 5Gbps random data and total jitter at SS/VDDMIN/150 °C.