



Extended Common Mode LVDS Solutions

Volodymyr Burkhay

**TELEFUNKEN Semiconductors GmbH & Co. KG,
Germany**

volodymyr.burkhay@telefunkensemi.com

***19th SpaceWire
Working Group
meeting***

2012, October 3rd, 14:45 – 15:00

Outline

- Introduction
- Extended Common Mode LVDS
- Achievements
- Application Challenges
- Conclusion

Introduction

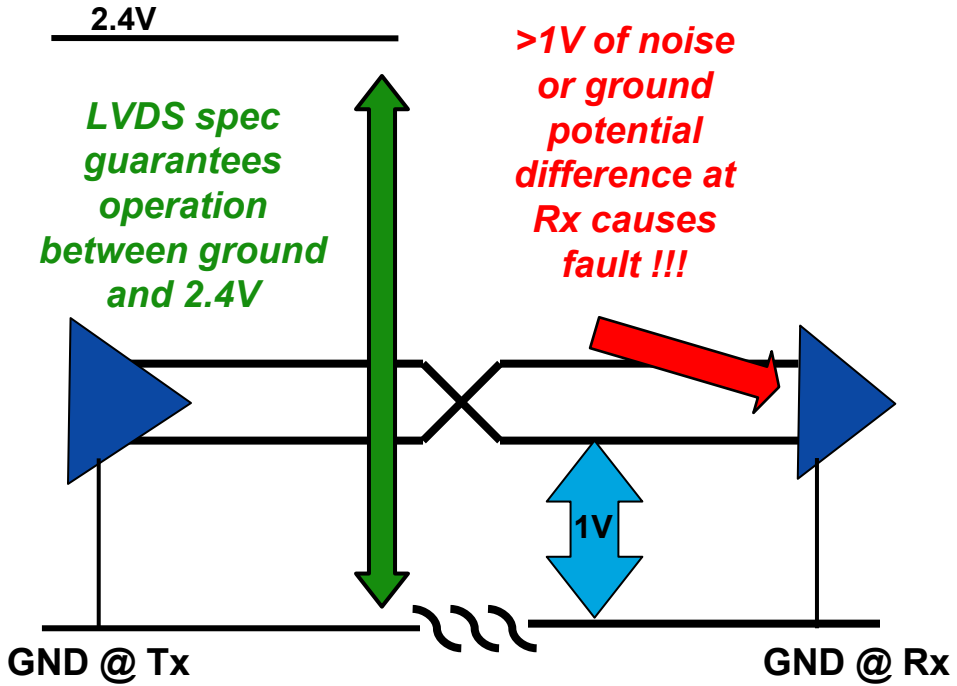
TELEFUNKEN Semiconductors

- Extend customer base towards high quality niche markets
- SOI technologies: 0.35 μm , 0.8 μm
 - robustness: $\leq 200\text{V}$, no Latch-Up
 - efficiency: LV & HV on die, 0.8 μm isolation $\leq 100\text{V}$
 - low power: low leakage, precise currents
 - suitable for harsh and radiation environments
- ITAR free, high quality components & technologies from Germany

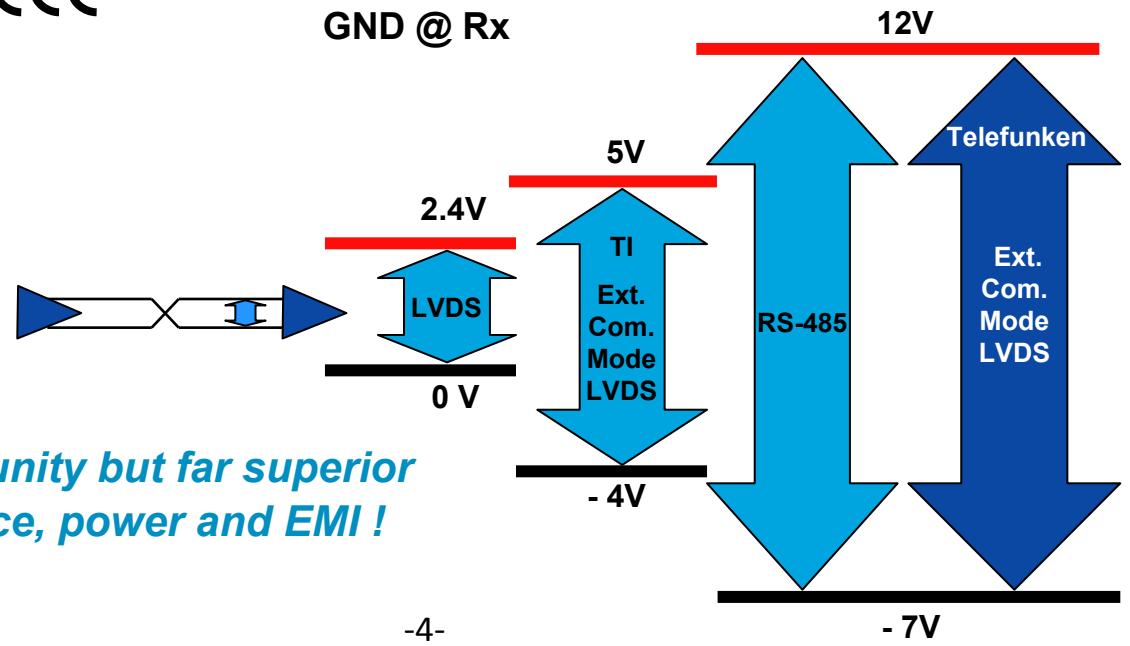
Extended Common Mode LVDS

- Competitive high-speed performance and efficiency of LVDS
- Robustness of RS-485/422

Extended Common Mode LVDS



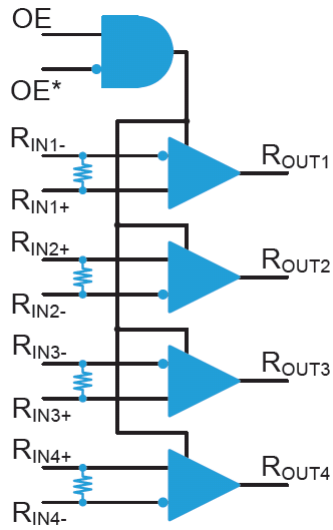
Ideal for box-to-box communication or noisy industrial, aerospace, signage & automotive applications



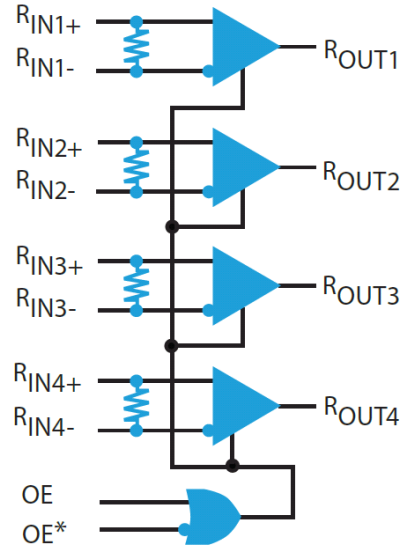
RS-485 noise immunity but far superior LVDS performance, power and EMI !

Introduced Components

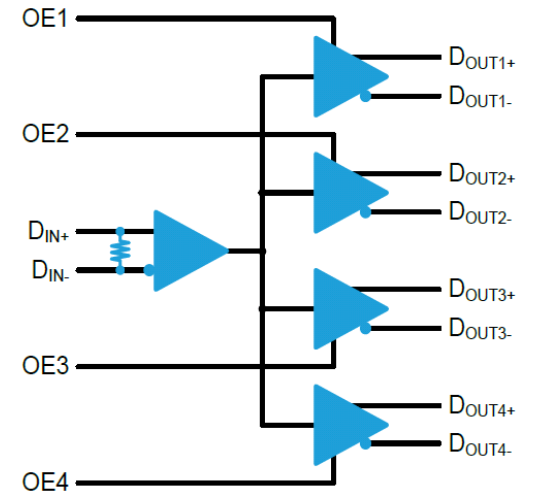
TF90LVDS048



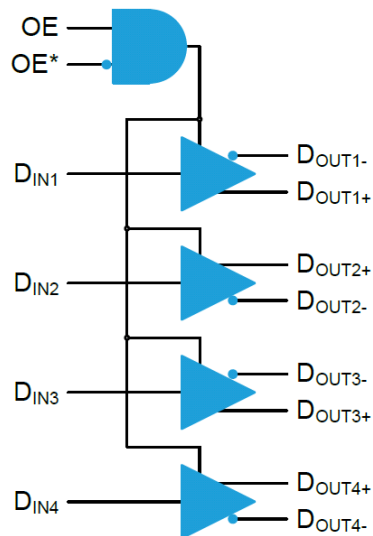
TF90LVDS032



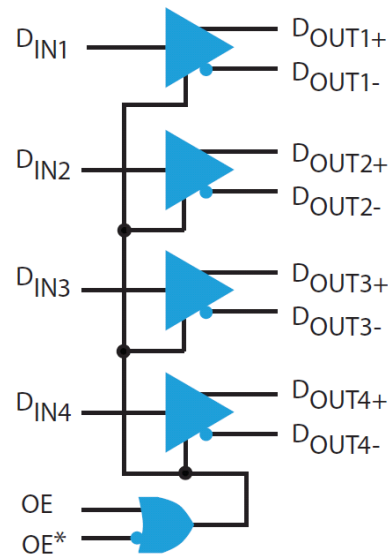
TF90LVDS104



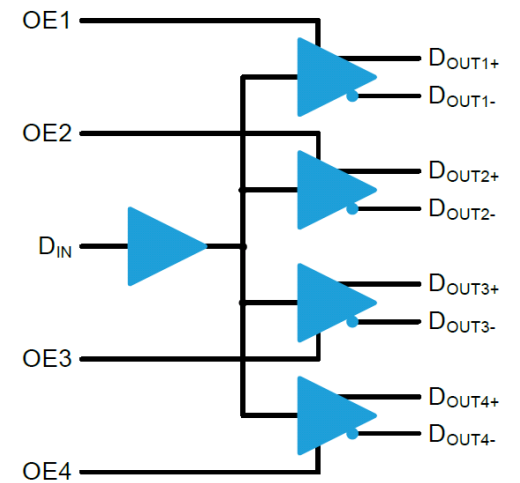
TF90LVDS047



TF90LVDS031

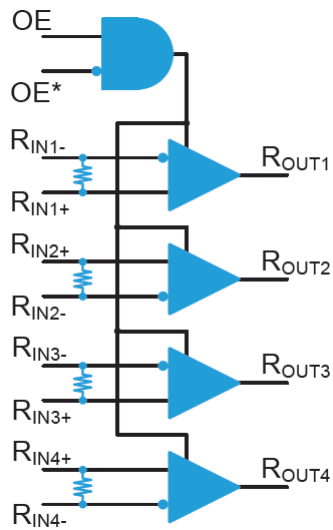


TF90LVDS105

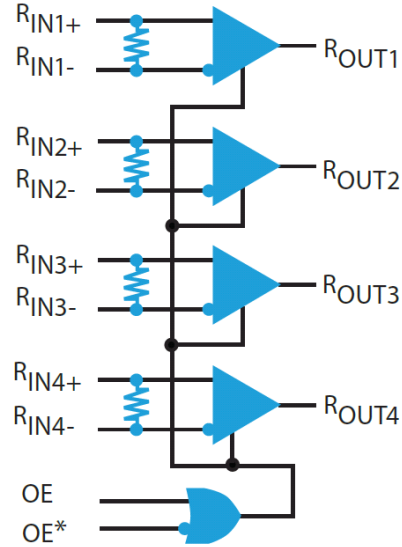


Introduced Components

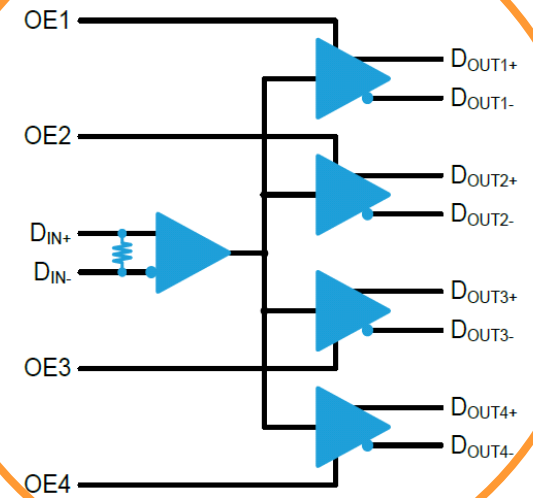
TF90LVDS048



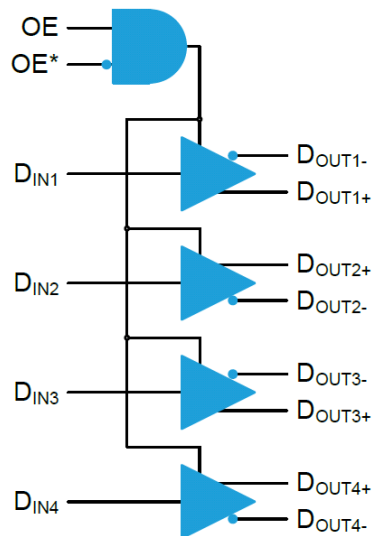
TF90LVDS032



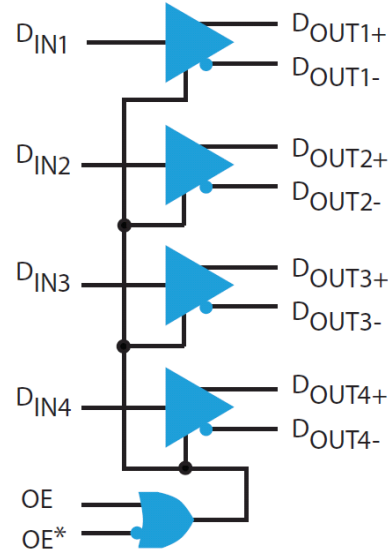
TF90LVDS104



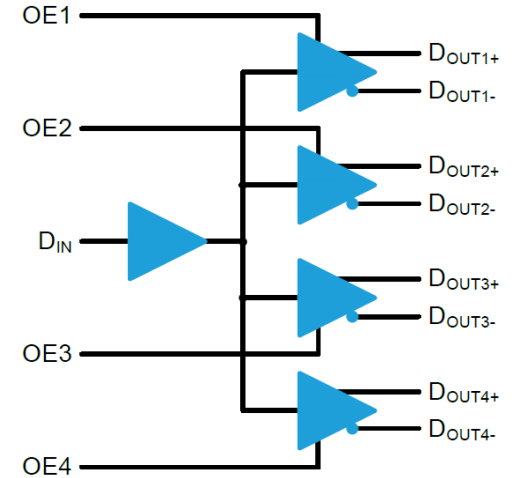
TF90LVDS047



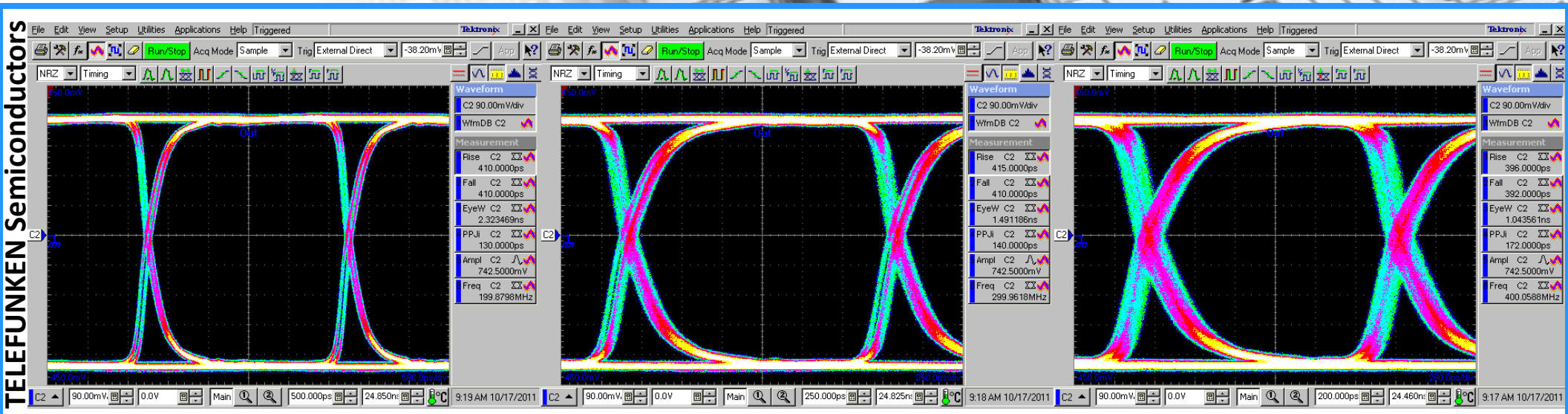
TF90LVDS031



TF90LVDS105



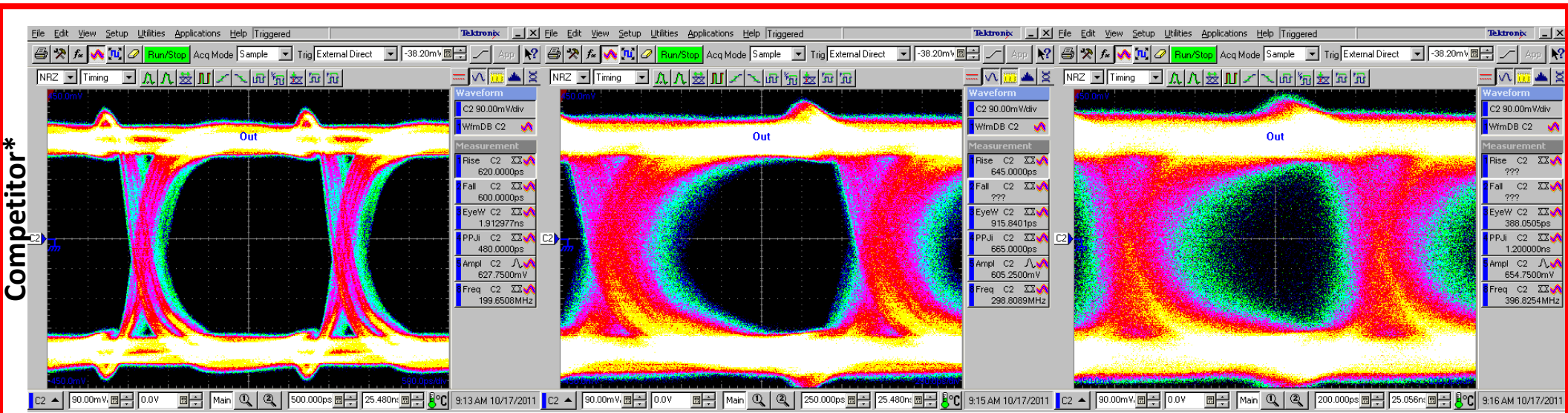
Speed Performance Comparison (TF90LVDS104)



400 Mbps PRBS23

600 Mbps PRBS23

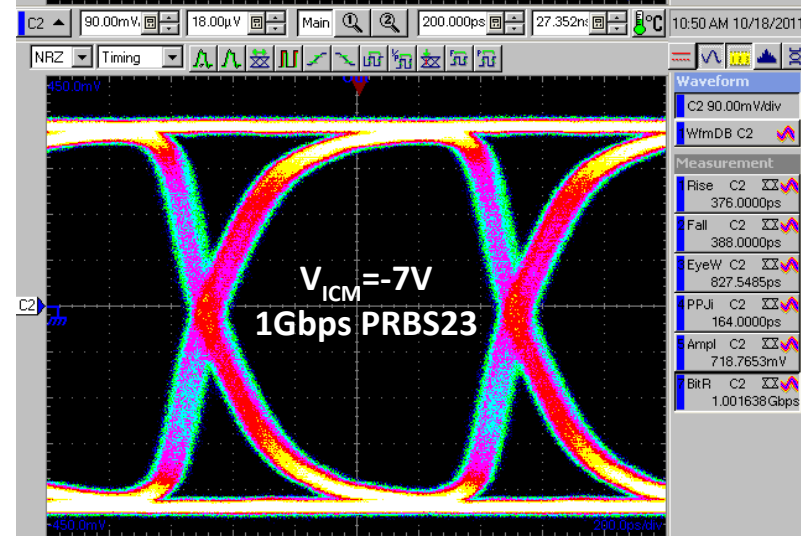
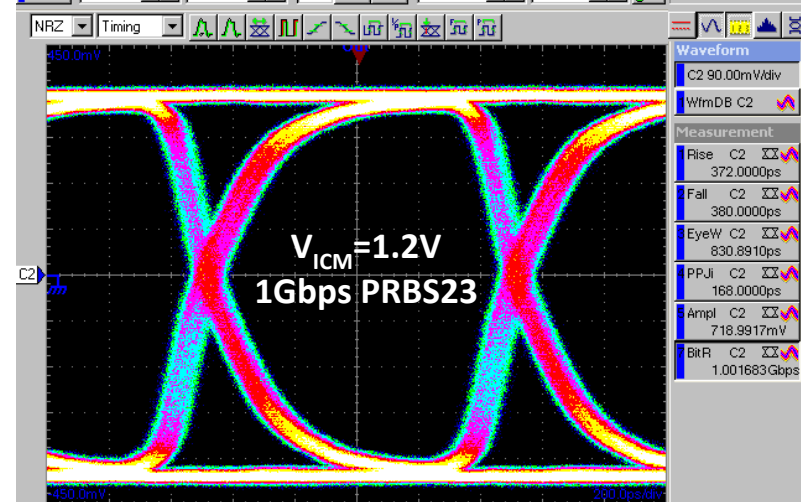
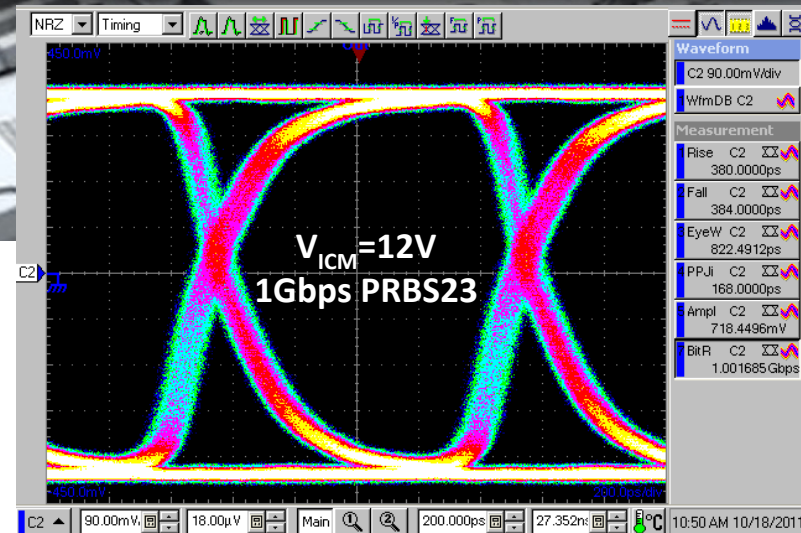
800 Mbps PRBS23



*Measured by TELEFUNKEN Semiconductors on the same bench

Achieved Specifications (TF90LVDS104)

- -7V to 12V extended common mode
- ESD min 8kV HBM
- 400MHz/800Mbps
- 300ps max pulse skew
- 100ps max channel-to-channel skew (same edge)
- -40°C to +85°C extended temperature range
- Low power
- Optimized for high-speed performance



Preliminary Radiation Test

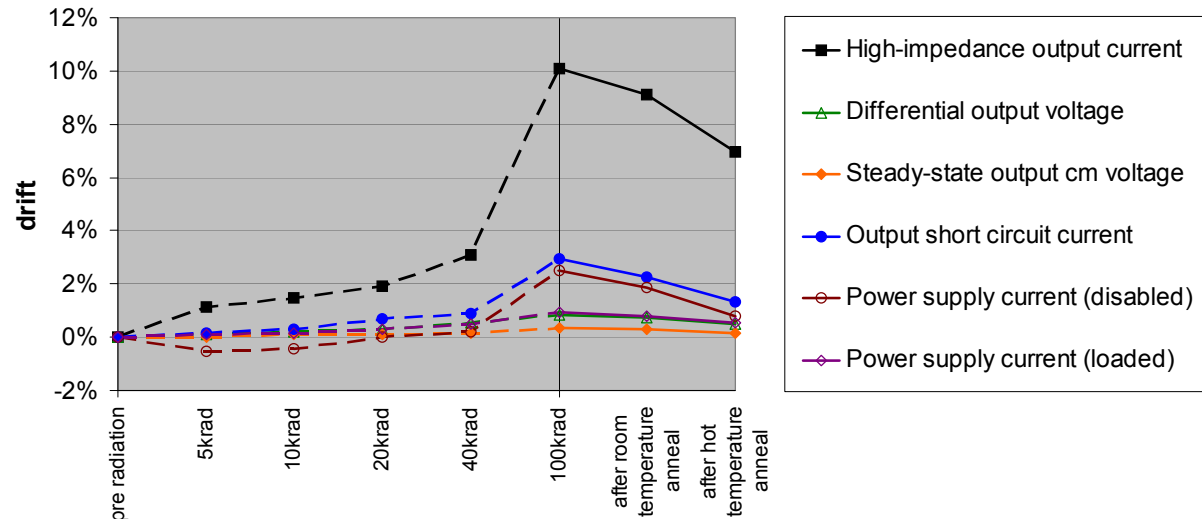
Conditions

- TID without applied bias
- 5 TID groups
- Dose rate: 75 rad/min (^{60}Co source)
- Room temperature annealing
- Hot temperature annealing 100°C for 5 h

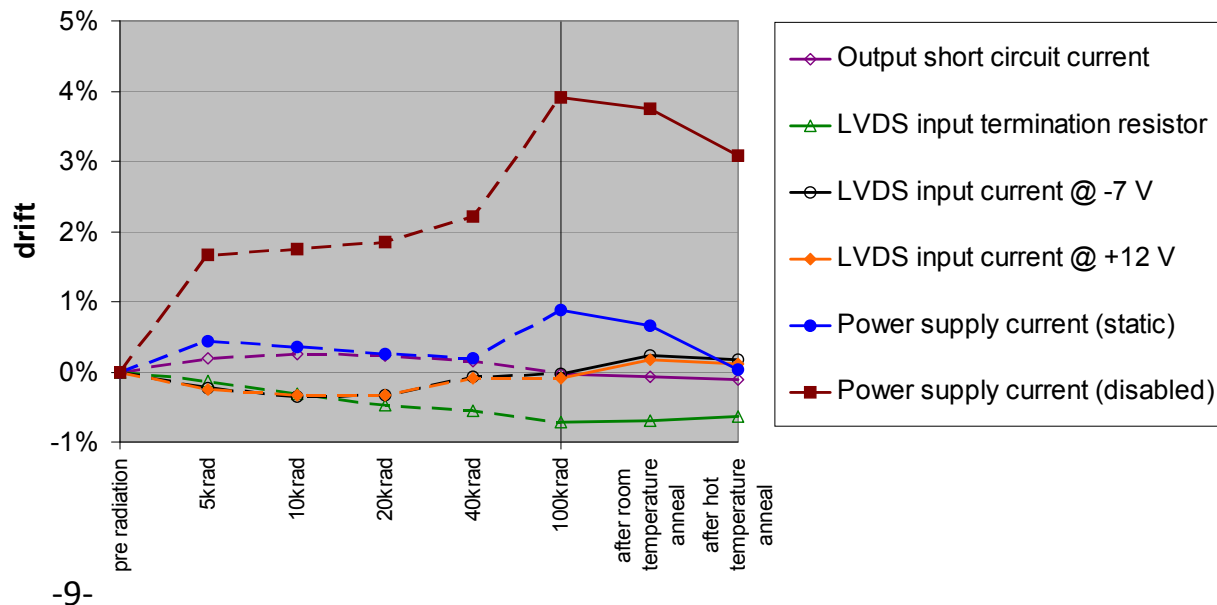
Results

- Minor shifts in key data sheet parameters after TID irradiation up to 100krad
- None of the component specifications are violated
 - all tested parts keep their complete functionality

TF90LVDS031

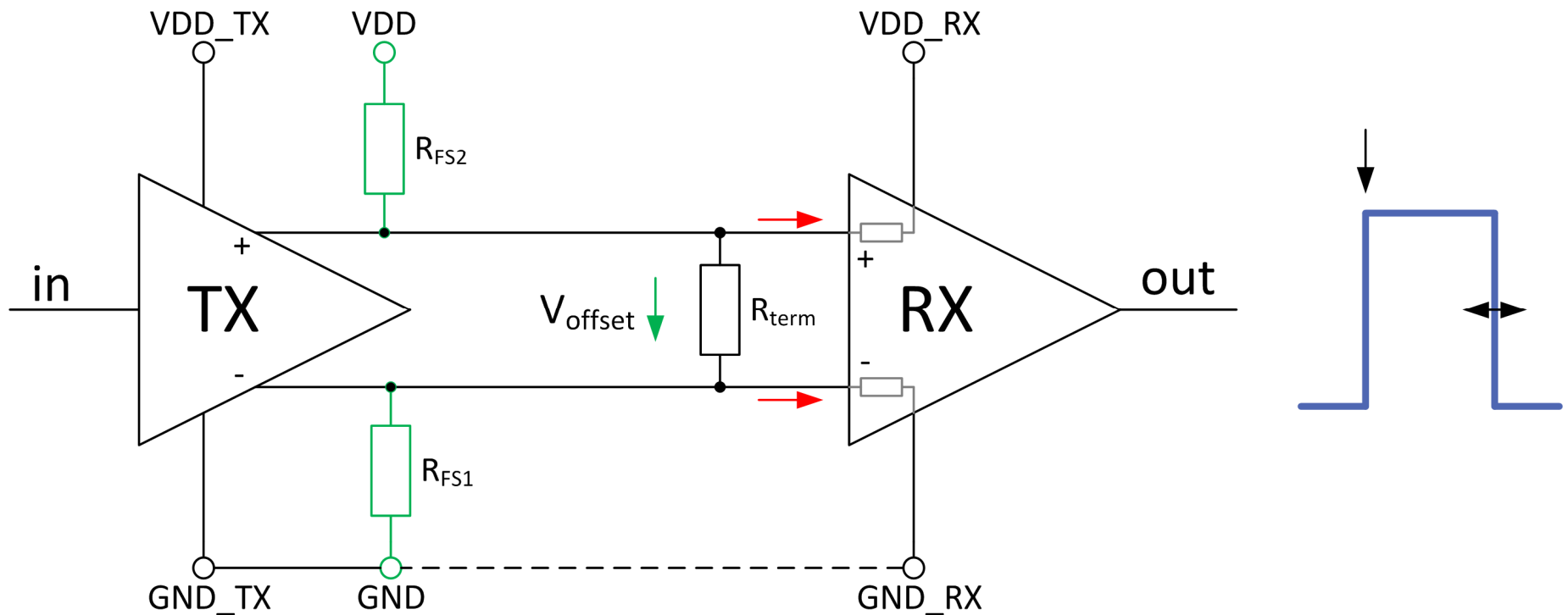


TF90LVDT032



Application Challenges

- Input Current
- Pulse Skew
- Fail Safe



Conclusion

- Extended Common Mode LVDS is a challenging application
- The components from TELEFUNKEN Semiconductors are showing good performance and solving a lot of issues
 - Improved Fail Safe will follow
- Further radiation tests will follow
 - TID test with applied bias
 - Heavy ions test



***Thank you for your
attention!***