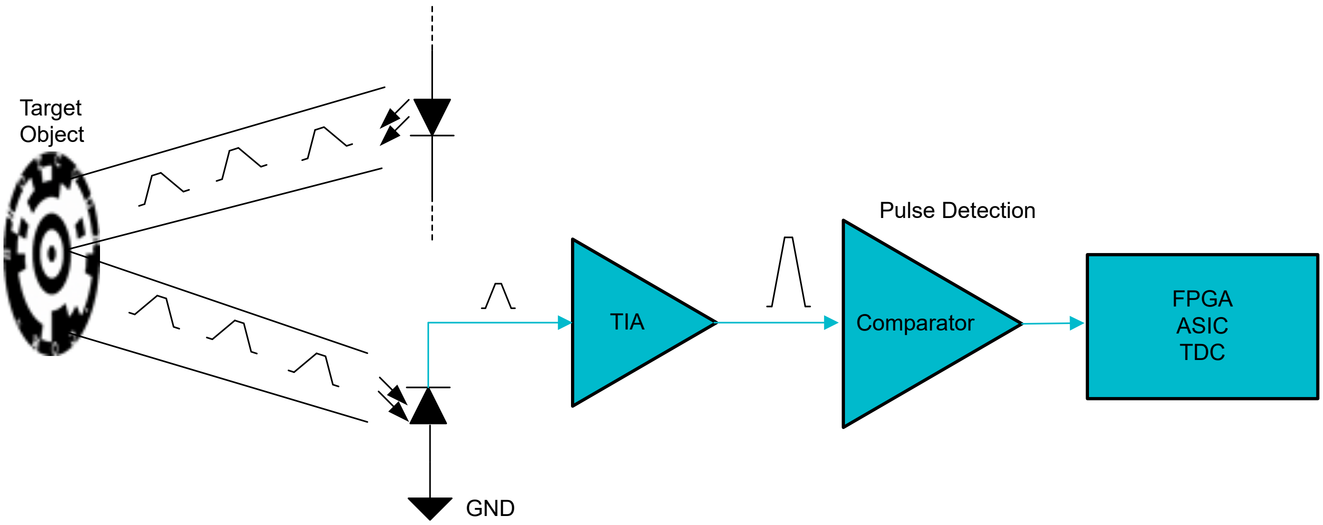
Product Overview

Enhancing Accuracy and Narrow Pulse Detection in Automotive and Industrial LiDAR with LVDS Comparators



Concept Diagram for Time-of-Flight Pulse Detection with Comparator

See more about this use case in How to design with high speed comparators in automotive and industrial systems and our Intro to high speed comparators: ToF distance measurements with LVDS comparator videos.

Design Challenges

- Depending on the reflectivity or distance of an object, the received pulse amplitude may be reduced.
- It is important to maintain consistent propagation delay regardless of pulse amplitude.
- Measuring distances from far away objects requires higher amplitudes and narrower pulses to maintain power, as described in When to Use High-Speed Comparators or ADCs for Distance Measurements in Optical Time-of-Flight Systems.

How High Speed Comparators Benefit the System

- Low overdrive dispersion contributes to consistent measurements by reducing pulse amplitude sensitivity.
- Super-fast propagation delay enables time sensitive measurements to occur.
- Narrow pulse width detection capability makes it possible to detect objects at farther distances.
- LVDS and single-ended comparator output options are available depending on downstream device requirements.

Part Number	Output Type	Min. Pulse Width	t_{PD}	$t_{OD\_DISPERSION}$	Supply Range (V)
TLV3801 and TLV3811	LVDS	240 ps	225 ps	5 ps	2.7 to 5.25
TLV3601and TLV3603	Push-Pull	1.25 ns	2.5 ns	600 ps	2.4 to 5.5
TLV3604 and TLV3605	LVDS	600 ps	800 ps	350 ps	2.4 to 5.5

If you have more questions please ask them on TI's E2E forum.

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Mailing Address: Texas Instruments, Post Office Box 655303, Dallas, Texas 75265