

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

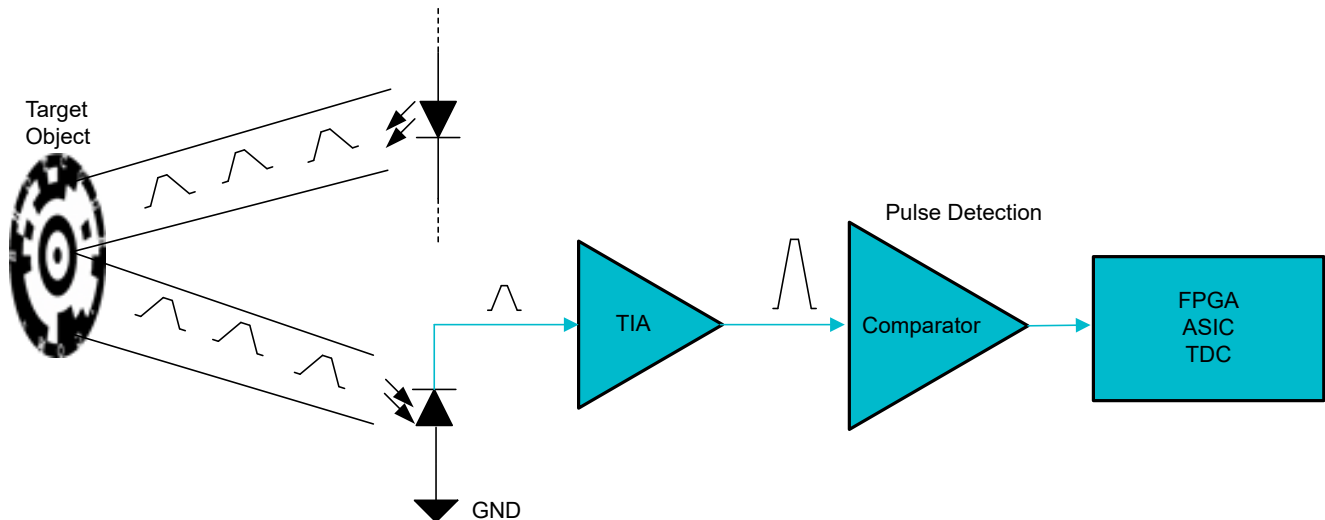


Figure 1. Concept Diagram for Time-of-Flight Pulse Detection with Comparator

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 can be reduced.
- 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 possible detecting 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)
TLV3801/11 , TLV3801-Q1	LVDS	240ps	225ps	5ps	2.7 to 5.25
TLV3601/2/3 , TLV3601/2/3-Q1	Push-Pull	1.25ns	2.5ns	600ps	2.4 to 5.5
TLV3604 , TLV3605	LVDS	600ps	800ps	350ps	2.4 to 5.5
TLV3901	CML	60ps	125ps	5ps	3.1 to 5.25

If you have more questions please ask them on [TI's E2E forum](#).

IMPORTANT NOTICE AND DISCLAIMER

TI PROVIDES TECHNICAL AND RELIABILITY DATA (INCLUDING DATASHEETS), DESIGN RESOURCES (INCLUDING REFERENCE DESIGNS), APPLICATION OR OTHER DESIGN ADVICE, WEB TOOLS, SAFETY INFORMATION, AND OTHER RESOURCES "AS IS" AND WITH ALL FAULTS, AND DISCLAIMS ALL WARRANTIES, EXPRESS AND IMPLIED, INCLUDING WITHOUT LIMITATION ANY IMPLIED WARRANTIES OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE OR NON-INFRINGEMENT OF THIRD PARTY INTELLECTUAL PROPERTY RIGHTS.

These resources are intended for skilled developers designing with TI products. You are solely responsible for (1) selecting the appropriate TI products for your application, (2) designing, validating and testing your application, and (3) ensuring your application meets applicable standards, and any other safety, security, regulatory or other requirements.

These resources are subject to change without notice. TI grants you permission to use these resources only for development of an application that uses the TI products described in the resource. Other reproduction and display of these resources is prohibited. No license is granted to any other TI intellectual property right or to any third party intellectual property right. TI disclaims responsibility for, and you fully indemnify TI and its representatives against any claims, damages, costs, losses, and liabilities arising out of your use of these resources.

TI's products are provided subject to [TI's Terms of Sale](#), [TI's General Quality Guidelines](#), or other applicable terms available either on [ti.com](https://www.ti.com) or provided in conjunction with such TI products. TI's provision of these resources does not expand or otherwise alter TI's applicable warranties or warranty disclaimers for TI products. Unless TI explicitly designates a product as custom or customer-specified, TI products are standard, catalog, general purpose devices.

TI objects to and rejects any additional or different terms you may propose.

Copyright © 2026, Texas Instruments Incorporated

Last updated 10/2025