DLP® Automotive
An Introduction to interior Display

Feb 2022

TI DLP products: a history of innovation

1987

Dr. Larry Hornbeck invents digital micromirror device (DMD), known as the DLP® chip

1996

First commercial DLP system ships; enables **first ultra portable projector**

1998

DLP Products receives first **Emmy® Award** for Outstanding Achievement In Engineering Development

1999

Star Wars: Episode 1 – The Phantom Menace shown on DLP Digital Cinema

2009

Consumer devices begin to ship worldwide featuring **DLP Pico™ technology based projectors**

2012

New DLP development kit launches allowing developers to use DLP technology in **new markets**

2015

Dr. Hornbeck receives the **2014 Scientific and Technical Academy Award® of Merit (Oscar® statuette)** for the invention of DMD technology as used in DLP Cinema® projection

Photo credit: Michael Yada / ©A.M.P.A.S.

2017

Lincoln Continental, **first automobile with DLP technology-based HUD, comes to market**

2020

Daimler introduces the worlds first augmented reality head-up display in the 2021 S-Class

2019

Audi introduced Digital Matrix Headlight in the etron sportsback

First **automotive**-qualified DLP chipset for head-up display (HUD) applications

- ❑ Automotive qualified using industry standard testing
- ❑ Constant performance over -40 to 105 °C
- ❑ In production and shipping in volume since 2017

DLP automotive: applications

Augmented Reality Head-up

Transparent Window

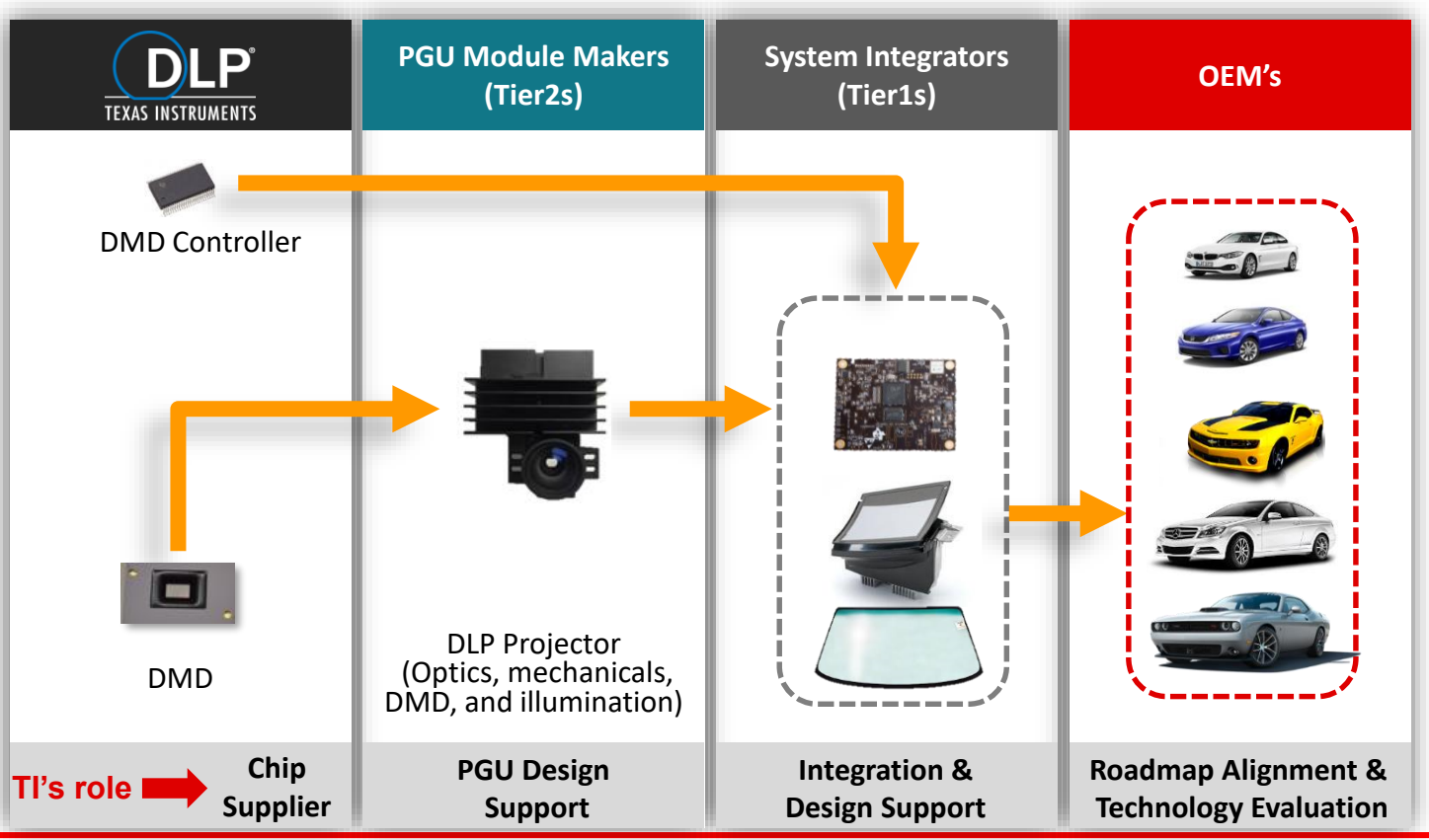
A-Pillar Blind Spot Display

High Resolution Headlight

Dynamic Ground Projection

Dynamic exterior lighting

DLP automotive: business model



DLP technology: advantages in display applications

Superior image quality

- ❑ 125% NTSC color-gamut
- ❑ High brightness, supports > 15K cd/m2
- ❑ Consistent image quality over temperature

True augmented reality

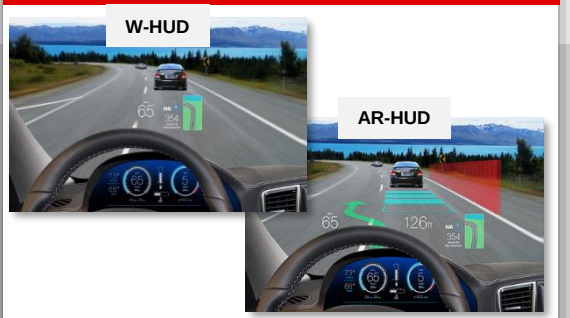
- ❑ Wide field of view (12 x 5° and greater)
- ❑ Supports long virtual image distances
- ❑ Supports waveguides and holographic HUD designs

Polarized sunglasses

- ❑ Does not require a polarized light source
- ❑ Display visible even when wearing sunglasses

DLP automotive: interior display applications

Head-up Display (HUD)



W-HUD

- ❑ Mid - Large FOV (> 7º wide)
- ❑ <5m virtual image distance

AR-HUD

- ❑ Large FOV (≥ 10º wide)
- ❑ >10m virtual image distance

Holographic Cluster Display

- ❑ Large FOV (> 15º wide) & Eyebox
- ❑ 0m virtual image distance
- ❑ Small package size
- ❑ Easier windshield integration

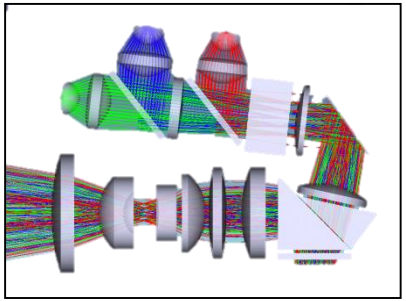
Transparent Window Display

- ❑ Scalable display portfolio
- ❑ Single and multi-color support
- ❑ Growing ecosystem
- ❑ High brightness @ low power

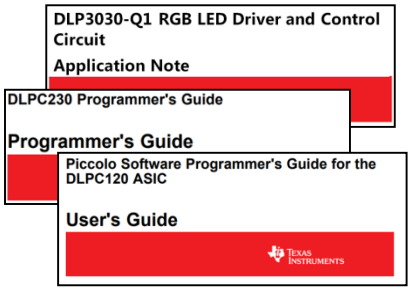
DLP technology: design-in support tools

E2E Support & Application Notes

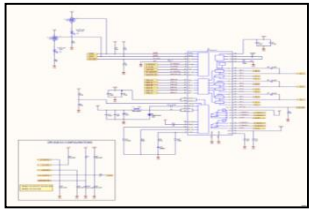
E2E Technical Support



Optical Reference Designs & Reviews



Application Notes & User Guides

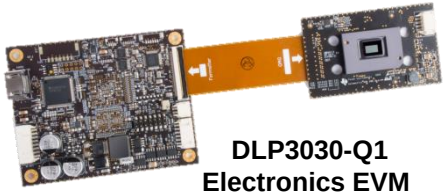


Design Reviews

Evaluation Modules

DLP3030-Q1
Optical Module (PGU)

DLP3030-Q1
Combiner HUD EVM



DLP3030-Q1
Electronics EVM

DLP technology: what are we looking for?

What we offer?

- The only automotive qualified projection display technology that can enable efficient, bright displays with saturated colors
- Light source and polarization agnostic displays that support next gen optical architectures like waveguides and HOEs
- DMD mirror performance is the same at –40°C as it is as 105°C; constant image performance over temperature.

Our Interests

- Automotive ready micro-optics technologies that enable reduction of AR-HUD volume in vehicles
- Automotive ready windshield/ window film technologies that enable transparent displays for drivers and passengers in the car
- Laser or other narrow spectral bandwidth illumination solutions that are automotive ready and cost optimized.

Thank you!