DLP4710 .47” 1080p LED-Illuminated Reference Design: TRP In-line Bottom Illumination Architecture

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Specifications & Geometric Efficiency

- Choice of LED size: 1.5*2.6mm, for compactness and efficiency
- Assumed projection pupil: F/1.7
- Geometric efficiency (ray tracing without considering coating, absorption, DMD efficiency)
  - R: 62.699%
  - G: 65.179%
  - B: 63.624%
- Careful optimization with size trade-off can increase the optical efficiency

Bottom Illumination Example

Digital Micromirror Device (DMD)

Can add fold optics here if an
“L” shaped engine is desirable

Customer projection lens

2D Views

- Very compact size
- Increasing size can improve efficiency – an optional trade-off

Additional Comments

- This optical reference design helps customers understand bottom illumination and in-line architectures and also learn how compact a DLP4710 optical engine can be.
- The optical engine designer will need to carefully make trade-offs on LED, size, fly's eye or light tunnel, projection lens, etc., in order to achieve their own target specifications.
- The optical engine designer will need to add their own projection lens for image quality evaluation, and to optimize R,G,B efficiency more precisely.
- Attention should be paid to stray light control for better contrast.