

PV4003_237 Data Sheet

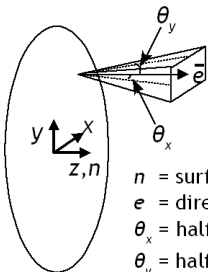
Technology Overview

PhotonVacuum™ technology is an advanced optical illumination technology for LED based projection displays. It makes it possible to collect all the light from the LED die, which leads to the best possible lm/W ratio. By integrating several optical functions into one etendue preserving component the technology enables the superior performance in the smallest size.

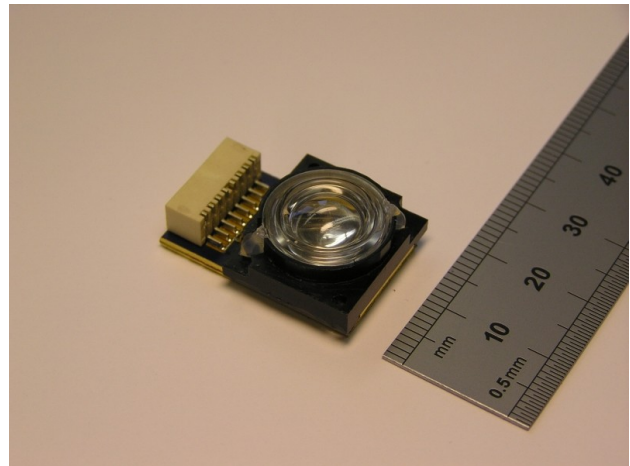
The technology provides all-in-one illuminator including light collection, beam forming and homogenization functions, and resulting uniform and rectangular illumination. Each point at the output of the PhotonVacuum™ component emits light with a rectangular cone. The output is telecentric with solid beam in both spatial and angular space.

Applications

- Ultra small front projectors, 100-250 lumens
- Head-up displays
- Military displays
- Suitable for DMD, LCoS and LCD projectors
- Suitable microdisplay sizes from 0.4" to 0.7"



n = surface normal vector of PV output
 e = direction vector of rectangular cone of light
 θ_x = half angle in x-direction
 θ_y = half angle in y-direction



Features

Compatible with the most common HB LED chips

- LED chip sizes from 4mm² to 6 mm²
- Optimized for Luminus Device's PT54 LEDs

Superior lm/W Ratio: Collects All the Light

- Collects the light emitted from the LED die to the whole hemisphere ($\pm 83^\circ$)

Ultra Small Size: All-in-One Illuminator

- Integrates light collection, beam forming and homogenization functions into one component (Size 8x15x15mm³)

Preserved Etendue

- The etendue of the output beam is equal to the etendue of the source
- The output beam is spatially and angularly solid

High Collection and Guiding Efficiency

- Provides up to 80% efficiency from the LED die to the microdisplay imager

Good Uniformity

- Provides uniformity better than 85% inside the illuminated rectangular

Output Beam

- Diameter 13.2mm
- Half angle with PT54 LEDs
 $\Theta_x = 11.7^\circ$, $\Theta_y = 8.7^\circ$

Contact Information

Upstream Engineering Inc.
 Kiilakiventie 1
 FI-90250 Oulu, FINLAND

Tel: +358 40 768 7956

Fax: +358 8 311 5544

Email: sales@upstream.fi

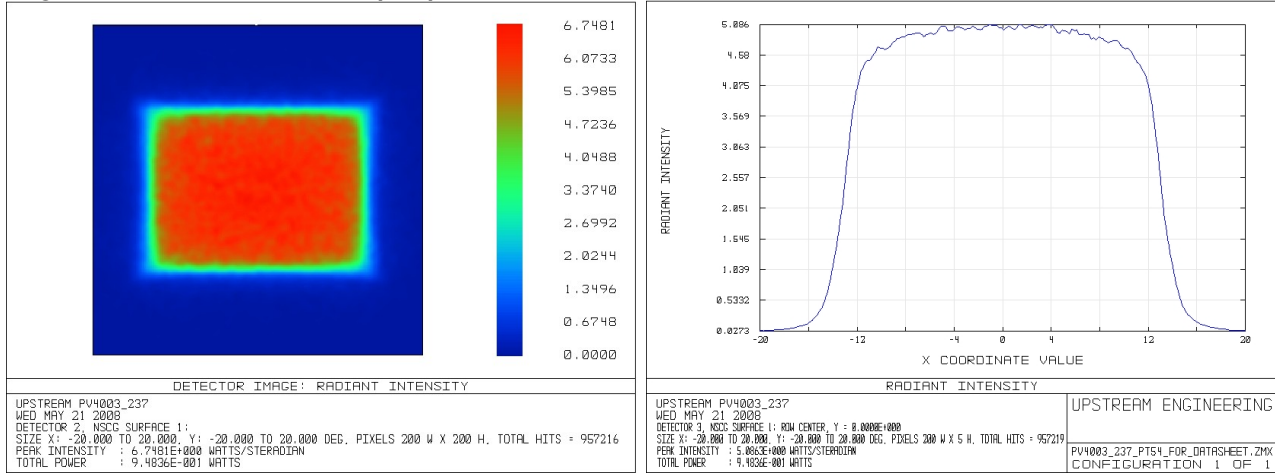
Web: www.upstream.fi

Important Notice

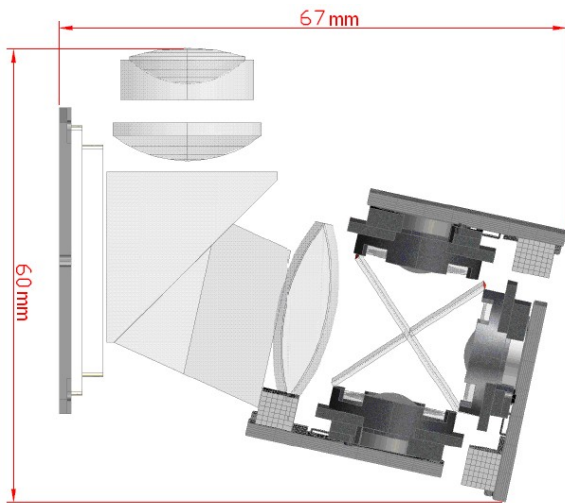
Performance figures, data and any illustrative material provided in this data sheet are typical and must be specifically confirmed by Upstream before they become applicable to any particular order or contract. In accordance with the Upstream policy of continuous improvement specifications may change without notice. The publication of information in this data sheet does not imply freedom from patent or other protective rights of Upstream or others.

Output Beam Characteristics

Angular distribution at PV output plane:

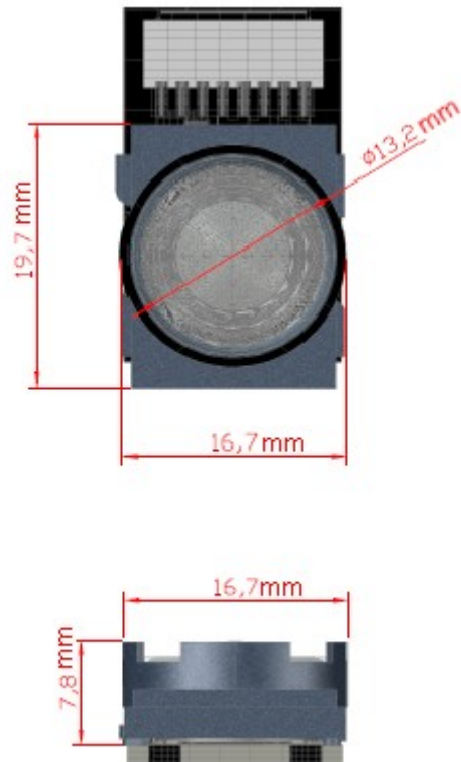


Illumination example



Optical engine with
PhotonVacuum™ RGB illuminator
(Scale 1:1)

Mechanical dimensions



Contact Information
Upstream Engineering Inc.
Kiilakiventie 1
FI-90250 Oulu, FINLAND

Tel: +358 40 768 7956
Fax: +358 8 311 5544
Email: sales@upstream.fi
Web: www.upstream.fi

Important Notice

Performance figures, data and any illustrative material provided in this data sheet are typical and must be specifically confirmed by Upstream before they become applicable to any particular order or contract. In accordance with the Upstream policy of continuous improvement specifications may change without notice. The publication of information in this data sheet does not imply freedom from patent or other protective rights of Upstream or others.