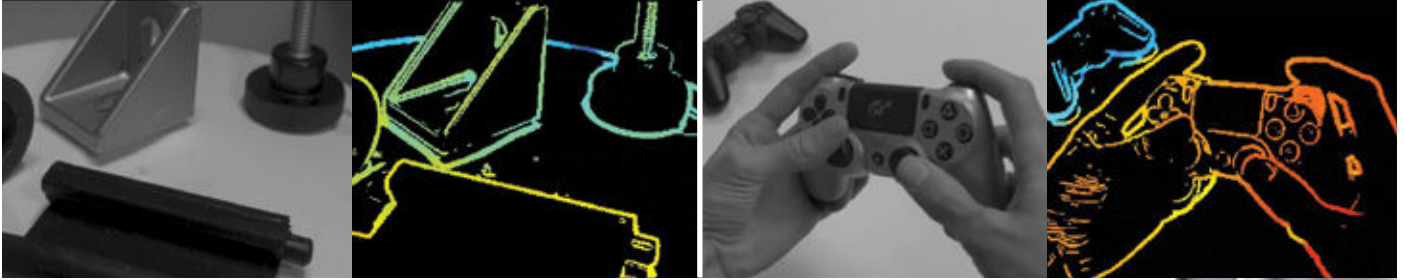# Topaz5D FAMILY
A UNIQUE COMBINATION OF REAL-TIME 3D DEPTH MAPS AND 2D VISION WITHIN A SINGLE SENSOR

Topaz5D™ is a 1,920 x 1,080 resolution, low noise global shutter 2D and 3D image sensor, designed with Teledyne e2v's proprietary CMOS technology and specific 3D post-processing optical layers. This delivers uncompromised 2D and 3D data in parallel, ideal for multiple logistics, robotic guidance, AR/VR tracking and anti-spoofing applications.

Topaz5D has 2.5 µm pixels and is housed in a tiny Chip Scale Packaging (CSP) which makes it ideal for space limited mobile applications. This sensor includes a truly innovative 'angular sensitive pixel' technology, so it can generate RAW 3D data, for real-time software processing of 3D depth maps. Indoor or outdoor and whatever the colors involved, all contrast differences and object edges are delineated with clarity in 3D vision. 2D images and 3D depth maps are delivered at very fast video frame rates with low power consumption and no additional specific lighting is required, keeping systems costs to a minimum.
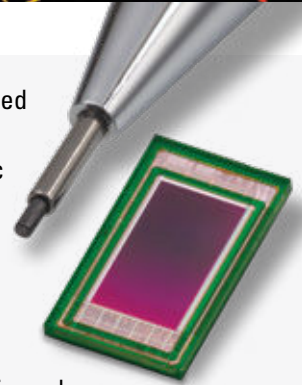
SENSOR FEATURES

Low-cost 3D vision technology combined with standard full-HD 2D images
3D depth maps from a single sensor, using normal indoor/outdoor lighting
5D processing Software Development Kit (SDK) runs on back-end SoC GPU or multi-core CPUs
2M with small ⅓ inch optical format 7.65 mm x 4.45 mm mechanical outline with array centred in a CSP package
Low power consumption sensor: <200 mW
Requires no specific lighting

APPLICATION BENEFITS

A simple 3D vision solution for typical working ranges from 4 cm-150 cm and further
Easy integration into multiple applications; logistics, robotics, industrial and consumer markets
Up to 30 fps 3D depth maps achievable with an adequate processing unit/OpenCL or CUDA compatible SDK
Compatible with slim scan engine designs, headsets, and handheld devices or for very compact 3D modules
Extended system battery life and low heat generation for space-constrained integration (modules/scan engines)
Compatible with room lighting, simplyfing BoM and reducing the impact on power supplies. No eye-safety concerns

FIND OUT MORE!

Sensor Characteristics

PARAMETERS	Topaz5D
Resolution – pixels	1,920 (H) x 1,080 (V)
Color Filter Array	Mono or color
3D detection direction	Horizontal & Vertical (mono) / Vertical (color)
Pixel size – square	2.5 µm global shutter
Optical format – inch	1/3.2
Aspect ratio	16:9
Max frame rate @ 10 bits – FPS	65 [2D stream] / 3D data stream rate depends on processor
Diagonal CRA°	14° (for Mono and Color)
Bit depth	10
Read out noise – e- @ 25°C, 10 bits	3.5
DSNU – e-	3.5
SNR max – dB	36.5
MTF @ Nyquist, 550 nm - %	>60
Dynamic range – dB	60.5
Power Consumption – mW	< 200 (for 10-bit @ max fps)

APPLICATIONS

- Consumer household cleaning robots
- Autonomous Mobile Robot (AMR)
- AR/VR headsets for hand/eye tracking
- 3D assisted access control and anti-spoofing
- Logistics; box dimensioning (fixed or handheld), label placement, tote filling and pallet inspection, pick & place stations, etc.

SOFTWARE REQUIREMENTS

- 480 x 270 pixel 3D depth maps, based on contrast detection, generated by 5D SDK, up to 30 fps
- Minimal latency between 2D and 3D data
- 5D Software Development Kit runs in OpenCL or CUDA GPU environments
- Pure CPU processing also supported (at lower frame rate)
- Same register settings and driver as Topaz 2M

HARDWARE CHARACTERISTICS

- Optical & mechanical matching centers
- Package: 7.65 mm x 4.45 mm CSP
- Pin-to-pin compatible with Topaz 2M & 1.5M sensors
- Operating temperature: -40°C to 85°C
- MIPI CSI-2 outputs: 1 or 2 lanes
- I²C control (Fast + compatible 1 MHz clock rate max)

EMBEDDED FEATURES

- 1,920 x 1,080, full-HD, 2D images without loss of MTF
- Image statistics and histogram in image footer
- Up to 16x analog gain steps, with high granularity
- Fast wake up; 1st good frame in < 10 ms
- No occlusion because of the single sensor concept
- Various possible working ranges depending on lens optical parameters (please contact our Sales and Support teams)

ORDER CODES	Topaz5D™ (CRA 14°, NO FOIL)	Topaz5D™ (CRA 14°, WITH FOIL)
MONO SENSOR	EV2S02MB-PM26200-T	EV2S02MB-PM26201-T
COLOR SENSOR	EV2S02MC-PM26100-T	EV2S02MC-PM26101-T
	Eval Kit Topaz5D™ Mono	**Eval Kit Topaz5D™ Color**
EVAL KIT + PC SOFTWARE	EV2E02MB-PU6T200-U	EV2E02MC-PU6T100-U