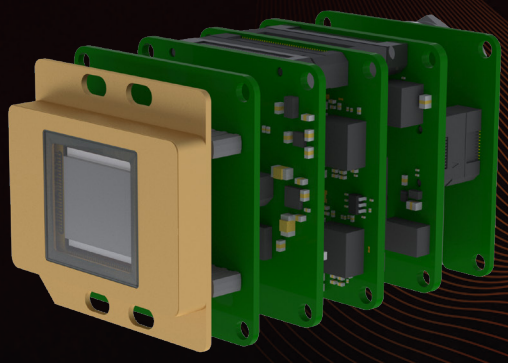
EMBERION



# Emberion VS20 Core

# Data Sheet

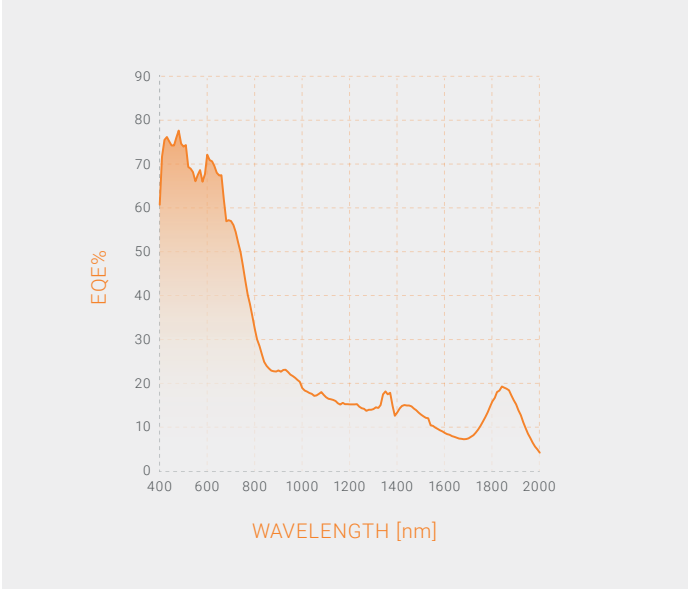
## Broaden your vision

- Wide spectral range from VIS to SWIR up to 2000 nm with one image sensor from Emberion
- Complete camera core system to provide optimal imaging solutions and ready-made for system integration
- High Dynamic Range (HDR) without saturation and capability for linear output for optical measurement are targeted for a variety of imaging application needs
- Scalability, affordability and customizability is enabled by monolithic integration of colloidal quantum dots (CQD) using in-house designed CMOS readout IC

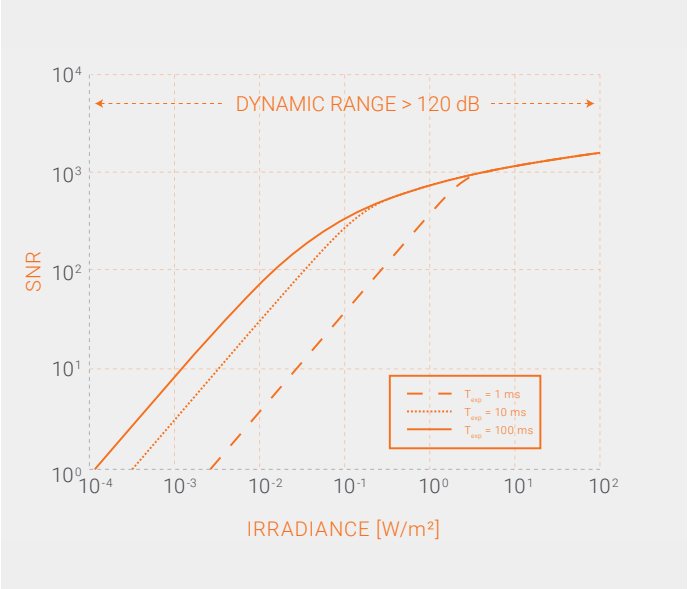
| Image sensor specifications | |
|---|---|
| Image sensor type | Emberion colloidal quantum dot (CQD) photodiode |
| Spectral range | 400 to 2000 nm |
| Pixel pitch | 20.0 µm x 20.0 µm |
| Resolution in pixels | 640 x 512 |
| Image size | 12.80 mm x 10.24 mm |
| Image diameter | 16.39 mm |
| Fill factor | 90 % |
| Operable pixels | > 99.9% |
| Shutter | Global, built-in electronic |
| Cooling | Built-in thermoelectric cooler (TEC) |
| **Camera specifications** | |
| A/D conversion | 14 bits |
| Image processing | Non-uniformity correction, linearisation, defect pixel correction |
| Exposure time | Min 0.1 ms, adjustable with 1 µs resolution |
| Ambient operating temperature | -20 to +40 °C |
| Power consumption | 14 W at 400 fps |
| **Mechanics** | |
| Dimensions (L x W x H) | 82.8 mm x 40.0 mm x 40.0 mm |
| Lens mount / heat sink (C-mount) | Optional |
| Weight | 102 g for sensor and PCBA only, 251 g including lens mount / heat sink |

## Interfaces

| | |
|---|---|
| Image data | GigE Vision, RJ45 connector |
| Communications | GenICam compatible |
| Firmware update | through GigE interface |
| Max frame rate (full VGA) | 400 fps |
| Trigger | 2 HW triggers (Opto-isolated and non-isolated), Trigger over Ethernet (IEEE 1588 PTP) |
| Power input | 12 VDC |




Camera external quantum efficiency (EQE) vs. wavelength at 0°C sensor temperature




Camera signal-to-noise (SNR) ratio vs. irradiance at 1850 nm wavelength and F#=1

## Image sensor performance at sensor temperature 0°C

| | |
|---|---|
| Dynamic range (optical input) | 120 dB |
| Responsivity | 1.5 x $10^9$ V/W at 10 ms exposure time and 1850 nm wavelength |
| Input refered voltage noise | 200 µV |
| Saturation current density | 1 x $10^{-4}$ mA/cm$^2$ |
| Noise equivalent irradiance (NEI) | 3 x $10^{-4}$ W/m$^2$ at 10 ms exposure time and 1850 nm wavelength |

## Mechanics design, dimensions and connectors