

# TDI Camera C10000-401

## Time Delay Integration Camera



The C10000-401 TDI camera is useful for a wide range of imaging applications requiring high speed operation with high sensitivity simultaneously. TDI is a special image acquisition method that has been used extensively in machine vision applications for industrial inspection. TDI imaging is appropriate for applications where it is desired to record a linear process over time, or where the aspect ratio of the subject being imaged is significantly asymmetric. TDI is particularly useful for low light level scanning applications for which a typical line scan camera can not make a useful image. Also, frame readout mode is available for easy focusing.

### FEATURES

- **High resolution / high sensitivity**  
(Horizontal spatial resolution with 128(V) TDI stages)  
- 2048(H) × 128 (V) , 4 TAP
- **Line rate up to 50 kHz**
- **High speed imaging combined with high sensitivity and low noise**
- **Great spectral response for UV-NIR with back thinned CCD**
- **100× anti-blooming with lateral overflow drain**
- **Dynamic range of 800 : 1**
- **12 bit / 8 bit selectable A/D converter**
- **Bi-directional scanning operation**
- **Frame readout mode for easy focusing**
- **Real time shading correction with internal DSP**

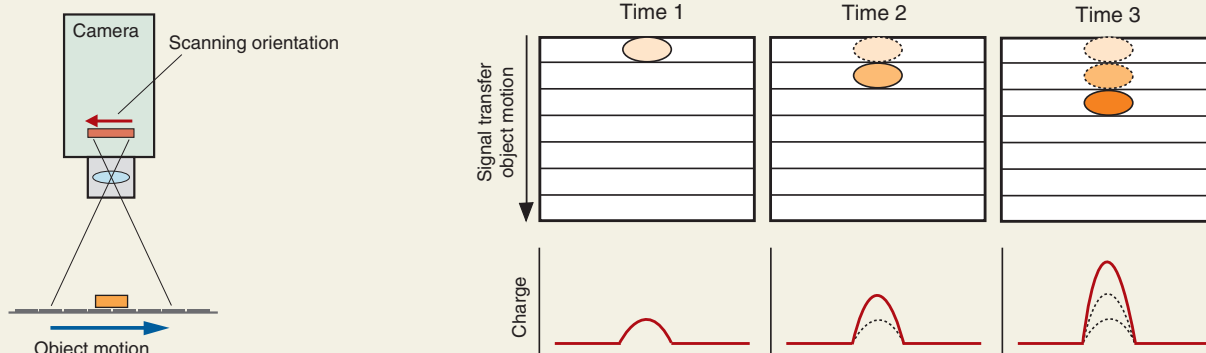
### APPLICATIONS

- **High speed imaging for low light applications**  
i.e. fluorescence imaging
- **Electronics manufacturing and inspection**
- **Semiconductor inspection**
- **High speed scanning for a large size sample**  
i.e. flat panel displays

### OPERATING PRINCIPLE OF TDI

#### TDI (Time Delay Integration):

Time Delay Integration is a technology of scanning in which a frame transfer device produces a continuous video image of a moving object by means of a stack of linear arrays aligned with and synchronized to the motion of the object to be imaged in such a way that, as the image moves from one line to the next, the integrated charge moves along with it, providing higher resolution at lower light levels than is possible with a line-scan camera.

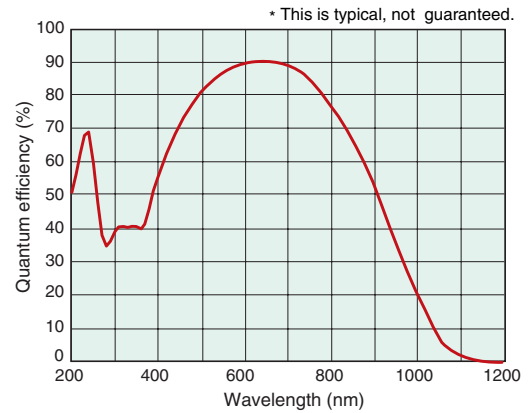


## SPECIFICATIONS

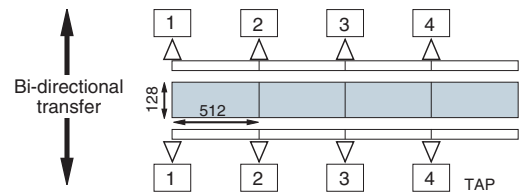
|                                      |   |
|--------------------------------------|---|
| Type number                          | <b>C10000-401</b>                                       |
| Pixel number                         | 2048 (H) × 128 (V)                                      |
| Device structure                     | Back thinned type                                       |
| Cell size                            | 12 μm(H) × 12 μm(V)                                     |
| Effective area                       | 24.58 mm(H) × 1.536 mm(V)                               |
| Readout mode                         | TDI readout mode or frame readout mode*1                |
| TDI transfer direction               | Bi direction  |
| TDI output channel                   | 4 TAP (512 × 4)   |
| Anti-blooming                        | Lateral overflow drain (100×)                           |
| TDI pixel clock rate                 | 30 MHz  |
| TDI line rate                        | 0.45 kHz to 50 kHz                                      |
| TDI line rate control                | Internal setting by serial command*2 / External trigger |
| Full-well capacity (typ.)            | 80 000 electrons  |
| Readout noise (typ.)                 | 100 electrons r.m.s.                                    |
| Dynamic range (typ.)                 | 800 : 1   |
| Binning                              | 2 × 2   |
| Analog enhancement gain              | 1 time to 5 times (16 steps)                            |
| A/D converter                        | 12 bit / 8 bit *3                                       |
| Image processing                     | Real-time shading correction                            |
| Interface                            | Base Configuration                                      |
| Camera control                       | Serial control in Camera Link                           |
| Camera output clock                  | 60 MHz  |
| Camera output channel                | 2 TAP (1024 × 2)  |
| Camera Link connector                | Mini-Camera Link (SDR) × 1                              |
| Lens mount                           | F-mount   |
| Power / Power consumption            | DC +12 V / 20 W   |
| Ambient storage temperature          | -10 °C to +50 °C  |
| Ambient operating temperature        | 0 °C to +40 °C  |
| Ambient operating / storage humidity | 70 % max. (with no condensation)                        |

- \*1 Frame readout mode is useful for easy focusing, but it is not suitable for measurement. Please consult with our sales office for details
- \*2 Internal TDI line rate is set by 33 ns step.
- \*3 Selectable by serial command.

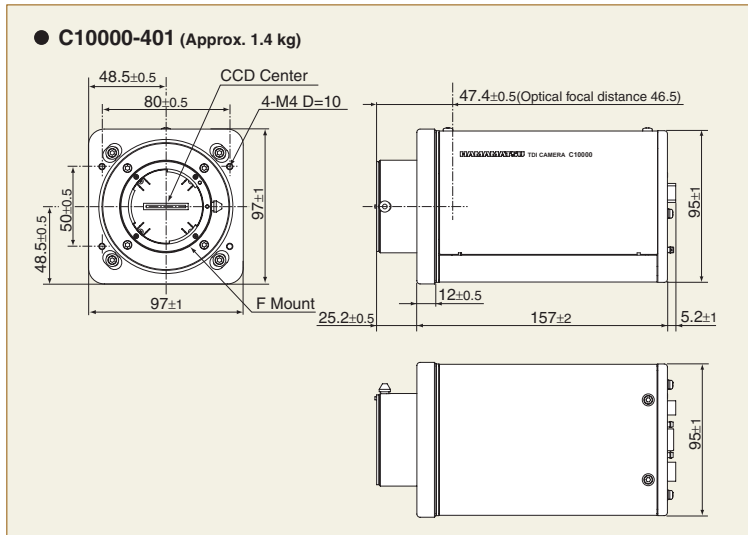
## SPECTRAL RESPONSE



## TDI SENSOR STRUCTURE



## DIMENSIONAL OUTLINES (Unit : mm)



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