



- **Power consumption 1.0 W**
- **Operating temperatures  $-40^{\circ}\text{C}$  ...  $+55^{\circ}\text{C}$**
- **TEC-less & Shutter-less**

The infrared camera S5IR is intended for the equipment of the LWIR (8-14  $\mu\text{m}$ ) spectral range imaging systems.

The camera employs the operational algorithms without sensor temperature stabilization and without electromechanical shutter (TEC-less & Shutter-less).

In the majority of the IR cameras performance of the non-uniformity correction requires periodical input and recording of the dark frame. For this purpose the electromechanical shutter that shuts the camera input window for several seconds is used, interrupting image acquisition and making the camera "blind". Image sensor precise temperature stabilization is also necessary for the effective calibration. In some critical applications (moving objects detection, machine vision systems operating in a real time and in other situations where uninterrupted image acquisition is important) the use of the cameras with shutters may lead to very grave consequences.

Unlike in the majority of IR cameras, in the S5IR camera the image is formed continuously – non-uniformity correction in each frame is performed with the help of the built-in software tools, where neither electromechanical shutter nor thermoelectric cooler are necessary. The absence of the electromechanical shutter (and, thus, moving mechanical parts) and the thermoelectric cooler in the camera design stipulate such S5IR camera advantages as enhanced reliability and environmental resistance, absence of the acoustic noises, ultimately low power consumption, small size and weight.

The S5IR camera forms both digital and analog CCIR signals and, thus, may be connected either to computer (via serial LVDS interface and PCI-adaptor or via small-size converter to USB2.0 port, interface cable length up to 15 m), or to TV monitor. Either raw images from the S5IR or after image pre-processing can be transferred into computer.

The S5IR can be used either as a stand-alone unit or as the module embedded into various electro-optical systems, designed by an end-user. The camera can be controlled from either from computer or from 3-button remote console. As an option, the OLED display EMA100100 (eMagin, USA) can be connected to the camera.

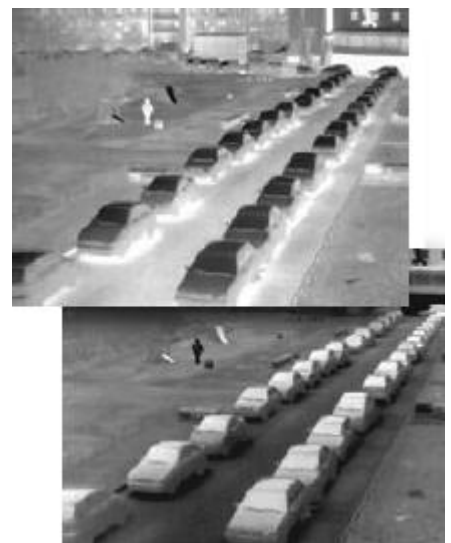
The S5IR is a smart camera, and it implements a number of the built-in image pre-processing functions, such as spatial filtering (contrasting, smoothing, median filtering) and temporal filtering (digital integration, recursive filtering, noise reduction). The image on a TV monitor and OLED display can be displayed in different modes (brightness and contrast adjustment, negative/positive switching, 2<sup>x</sup> zoom, ABC).

Image processing functions, built into the S5IR, provide the user with the possibility of the obtaining of optimal images for a different operation conditions of the camera or of the electro-optical systems with the embedded camera.

In specific cases the sets of the image processing functions, image displaying modes, on-screen menu, reticles and markers can be developed or customized for the specific user while in the camera manufacturing.

S5IR supports several image sensor readout modes with different frame rate. In the basic version, frame rate is up to 71 Hz for 384 $\times$ 288 image sensor and up to 25 Hz for 640 $\times$ 480 image sensor.

S5IR camera can be supplied with lenses from different manufacturers. For specific applications, delivery of the S5IR without lens may be performed (adjusted for the customer's lens).



Due to the TEC-less & Shutter-less algorithms of operation, design solutions and adjustable set of control and processing functions, the S5IR camera possesses a number of significant advantages over majority of IR cameras for critical applications and for applications with rigid restrictions for weight and size.

Image sensors parameters in the module		
Spectral range, $\mu\text{m}$	8-14 (LWIR)	
Resolution	384×288	640×480
Pixel pitch, $\mu\text{m}$	25	
NETD (@ F/1, 300K)	< 60 mK (50 Hz frame rate)	< 100 mK (25Hz frame rate)
Control parameters		
ADC resolution, bits	14	
Frame rate options, Hz	50 / 55 / 71	17.5 / 19 / 25
Operation mode	TEC-less & Shutter-less	
Image processing	Spatial filtering: <ul style="list-style-type: none"> <li>- contrasting,</li> <li>- smoothing,</li> <li>- median filtering.</li> </ul> Temporal filtering: <ul style="list-style-type: none"> <li>- digital integration,</li> <li>- recursive filtering,</li> <li>- filtering «25 Hz».</li> </ul> Defects correction.	
Interface to PC	Serial, LVDS, 4 shielded twisted pairs. Interface cable length up to 15 m. Optionally may be controlled via RS232 LVDS. Connection to PC via PCI-adapter or via external USB2.0 converter.	
Remote 3-button console	Optionally	
OLED display (optionally)	EMA100100, 640×480, frame rate 30 Hz.	
TV output	Analog monochrome CCIR. Image displaying functions: <ul style="list-style-type: none"> <li>- negative/positive,</li> <li>- 2<sup>x</sup> zoom,</li> <li>- brightness/contrast adjustment,</li> <li>- reticle and menu displaying with remote console,</li> <li>- ABC.</li> </ul>	
Power supply, V	+3 ... +5.5	
Power consumption, W	1.0 without OLED display 1.3 with OLED display	1.2 without OLED display 1.5 with OLED display
Embodiment	Non-hermetic metal housing. External OLED display and remote console are connected via auxiliary connector. <b>Package-less embodiment is available.</b>	
Outline dimensions (w/o lens and mates), mm	Ø50×50	Ø50×56
Ambient temperature, °C	Operating: -40* ... +60 Storage: -40* ... +60 *) subject to external control of the condensate formation	

**Joint Stock Company «Research and Production Enterprise «SILAR»**

68, prospect Toreza, St.-Petersburg, Russia, 194223

phone: +7 (812) 552-20-69

fax: +7 (812) 552-28-76

web: <http://www.npp.silar.ru>

email: [marketing@silar.ru](mailto:marketing@silar.ru)