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FLIR GRASSHOPPER®3
USB3 VISION





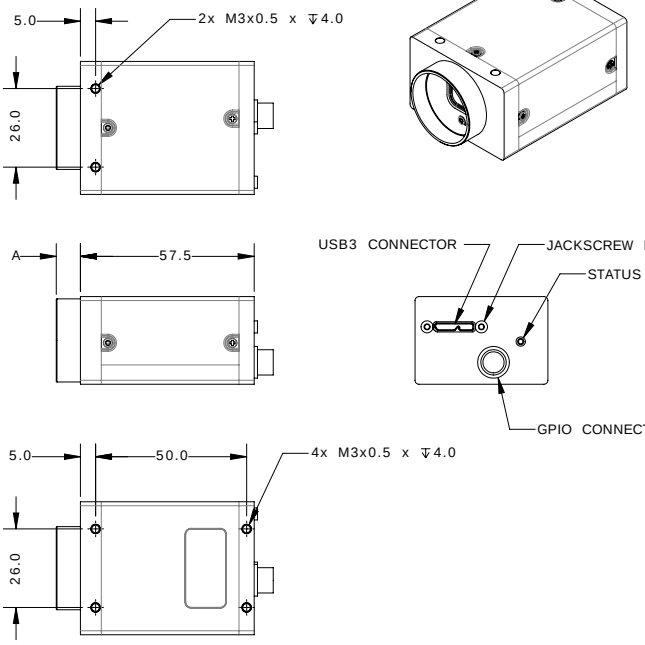
HIGH PERFORMANCE CCD + CMOS

The high performance Grasshopper3 camera line combines the benefits of CCD with the affordability and data throughput of USB 3.0. Its FPGA and frame buffer-based architecture provides optimal reliability, a rich set of features, and a full image processing pipeline including color interpolation, gamma, and lookup table functionality. The Grasshopper3 offers a powerful, easy-to-use, and cost-effective alternative to Camera Link and dual GigE LAG solutions.

KEY FEATURES

- USB 3.0 for bandwidth, ease of use, and cost effectiveness
- Variety of high-resolution large format CCD and CMOS sensors
- FPGA and frame buffer-based architecture for optimal reliability

USB3 VISION™



Specifications

Model	Version	MP	Imaging Sensor
GS3-U3-14S5C-C **GS3-U3-14S5M-C**	Color Mono	1.4 MP	• Sony ICX285, 2/3", 6.45 µm • Global shutter • 30 FPS at 1384 x 1036
GS3-U3-15S5C-C **GS3-U3-15S5M-C**	Color Mono	1.4 MP	• Sony ICX825, 2/3", 6.45 µm • Global shutter • 45 FPS at 1384 x 1032
GS3-U3-23S6C-C **GS3-U3-23S6M-C**	Color Mono	2.3 MP	• Sony IMX174, 1/1.2", 5.86 µm • Global shutter • 163 FPS at 1920 x 1200
GS3-U3-28S4C-C **GS3-U3-28S4M-C**	Color Mono	2.8 MP	• Sony ICX687, 1/1.8", 3.69 µm • Global shutter • 26 FPS at 1928 x 1448
GS3-U3-28S5C-C **GS3-U3-28S5M-C**	Color Mono	2.8 MP	• Sony ICX674, 2/3", 4.54 µm • Global shutter • 26 FPS at 1920 x 1440
GS3-U3-32S4C-C **GS3-U3-32S4M-C**	Color Mono	3.2 MP	• Sony IMX252, 1/1.8", 3.45 µm • Global shutter • 121 FPS at 2048 x 1536
GS3-U3-41C6C-C **GS3-U3-41C6M-C**	Color Mono	4.1 MP	• CMOSISCMV4000-3E5, 1", 5.5 µm • Global shutter • 90 FPS at 2048 x 2048
GS3-U3-41C6NIR	Mono NIR	4.1 MP	• CMOSISCMV4000-3E12, 1", 5.5 µm • Global shutter • 90 FPS at 2048 x 2048
GS3-U3-41S4C-C **GS3-U3-41S4M-C**	Color Mono	4.1 MP	• Sony ICX808, 1/1.8", 3.1 µm • Global shutter • 18 FPS at 2016 x 2016
GS3-U3-50S5C-C **GS3-U3-50S5M-C**	Color Mono	5.0 MP	• Sony ICX625, 2/3", 3.45 µm • Global shutter • 15 FPS at 2448 x 2048
GS3-U3-51S5C-C **GS3-U3-51S5M-C**	Color Mono	5.0 MP	• Sony IMX250, 2/3", 3.45 µm • Global shutter • 75 FPS at 2448 x 2048
GS3-U3-60S6C-C **GS3-U3-60S6M-C**	Color Mono	6.0 MP	• Sony ICX694, 1", 4.54 µm • Global shutter • 13 FPS at 2736 x 2192
GS3-U3-60QS6C-C **GS3-U3-60QS6M-C**	Color Mono	6.0 MP	• Sony ICX694, 1", 4.54 µm • Global shutter • 25 FPS at 2736 x 2192
GS3-U3-89S6C-C **GS3-U3-89S6M-C**	Color Mono	8.9 MP	• Sony IMX255, 1", 3.45 µm • Global shutter • 43 FPS at 4096 x 2160
GS3-U3-91S6C-C **GS3-U3-91S6M-C**	Color Mono	9.1 MP	• Sony ICX814, 1", 3.69 µm • Global shutter • 9 FPS at 3376 x 2704
GS3-U3-120S6C-C **GS3-U3-120S6M-C**	Color Mono	12 MP	• Sony ICX834, 1", 3.1 µm • Global shutter • 7 FPS at 4240 x 2824
GS3-U3-123S6C-C **GS3-U3-123S6M-C**	Color Mono	12.3 MP	• Sony IMX253, 1.1", 3.45 µm • Global shutter • 30 FPS at 4096 x 3000

Imaging Performance (EMVA 1288)	See the Imaging Performance Specification, which includes quantum efficiency, saturation capacity (full well depth), read noise, dynamic range and signal to noise ratio.
A/D Converter	14-bit (10-bit GS3-U3-41C6, 10- and 12-bit GS3-U3-23S6, GS3-U3-32S4, GS3-U3-51S5, GS3-U3-89S6, GS3-U3-123S6)
Video Data Output	8, 12, 16 and 24-bit digital data
Image Data Formats	Mono8, Mono12, Mono16 (all models) RGB, YUV411, YUV422, YUV444, Raw8, Raw12, Raw16 (color models)
Partial Image Modes	Pixel binning and region of interest (ROI) modes
Image Processing	Gamma, lookup table, hue, saturation, and sharpness
Shutter	Global shutter; Automatic/manual/one- push/extended shutter modes Up to 32 seconds (GS3-U3-28S5, GS3-U3-41S4, GS3-U3-50S5, GS3-U3-60S6, GS3-U3-89S6, GS3-U3-91S6, GS3-U3-123S6); up to 30 seconds (GS3-U3-28S4); up to 4 seconds (GS3-U3-14S5, GS3-U3-15S5, GS3-U3-32S4, GS3-U3-41C6, GS3-U3-51S5, GS3-U3-120S6); up to 3.2 seconds (GS3-U3-23S6)
Gain	Automatic/manual/one- push modes -3.66 dB to 24 dB GS3-U3-14S5; -1.583 dB to 24 dB GS3-U3-15S5; 0 dB to 24 dB GS3-U3-23S6/GS3-U3-28S4/GS3-U3-28S5; 0 dB to 47.9 dB GS3-U3-32S4; 0 to 10.1 dB GS3-U3-41C6; -7.742 dB to 24 dB GS3-U3-41S4;-6.51 dB to 24 dB GS3-U3-50S5; 0 dB to 48 dB GS3-U3-51S5, GS3-U3-89S6, GS3-U3-123S6; -6.158 to 24 dB GS3-U3-60S6; -9 to 24 dB GS3-U3-91S6; -5.455 dB to 24 dB GS3-U3-120S6
Gamma	0.50 to 4.00, programmable lookup table
White Balance	Automatic/manual/one- push modes
High Dynamic Range	Cycle 4 gain and exposure presets
Color Processing	On-camera in YUV or RGB format, or on-PC in Raw format
Digital Interface	USB 3.0 interface with screw locks for camera control, data, and power
Transfer Rates	5 Gbit/s
GPIO	8-pin Hirose HR25 GPIO connector for power, trigger, strobe, PWM, and serial I/O, 1 opto-isolated input, 1 opto-isolated output, 2 bi-directional I/O pins
External Trigger Modes	Standard, bulb, low smear (CCD only), overlapped, and multi shot trigger modes
Image Buffer	128 MB frame buffer
Memory Channels	2 user configuration sets for custom camera settings
Flash Memory	2 MB non-volatile memory
Dimensions	44 mm x 29 mm x 58 mm excluding lens holder, without optics (metal case)
Mass	90 grams (without optics or tripod mounting bracket)
Power Consumption	5 V via USB 3.0 or 8-24 V via GPIO (external power is recommended)
Camera Control	Via FlyCapture SDK or third party software
Camera Updates	In-field firmware updates
Lens Mount	C-mount
Temperature	Operating: 0° to 50°C; Storage: -30° to 60°C
Humidity	Operating: 20 to 80% (no condensation); Storage: 20 to 95% (no condensation)
Compliance	CE, FCC, RoHS
Operating System	Windows, Linux (32- or 64-bit)
Warranty	3 years

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