ZWO ASI183MC-P

ZWO ASI183MC Pro Astronomy Camera User Manual

Model: ASI183MC-P

1. Introduction

The ZWO ASI183MC Pro is a high-performance color astronomy camera designed for capturing detailed images of celestial objects. It features a 20.18 megapixel CMOS sensor, high quantum efficiency, and integrated TEC cooling for optimal performance in various astronomical imaging applications, including deep-sky, lunar, and solar photography, as well as electronically-assisted astronomy (EAA).
This manual provides essential information for the proper setup, operation, and maintenance of your ASI183MC Pro camera.

2. Product Features

- **High-Resolution Sensor:** Equipped with an advanced 5496x3672 (20.1 megapixel) CMOS sensor with 2.4-micron pixels for capturing fine details.
- **High Quantum Efficiency:** Designed for efficient light capture, reducing exposure times.
- **TEC Cooling:** Integrated Two-Stage TEC cooling reduces sensor temperature by 40°C-45°C below ambient, minimizing thermal noise for faint deep-sky objects.
- **Fast Data Transfer:** USB 3.0 interface provides transfer speeds up to 19 frames per second at maximum resolution.
- **DDR3 Buffer:** A 256MB DDR3 buffer ensures quick and stable data transfer and helps reduce amp glow.
- **Integrated USB 2.0 Hub:** Includes a separate USB 2.0 hub for powering accessories such as autoguiding cameras or electronic focusers.
- **Durable Construction:** Compact, lightweight, and features a red anodized CNC aluminum body for robust field use.
- **Versatile Connectivity:** Connects to 1.25-inch and 2-inch telescope focusers using the included T-threaded 1.25-inch nosepiece and 2-inch adapter.
- **Broad Compatibility:** Compatible with Mac OS X and Windows (32-bit and 64-bit) XP and later operating systems.

3. Package Contents

The ZWO ASI183MC Pro camera package typically includes the following items:

Image: Contents of the ZWO ASI183MC Pro camera package, including the camera body, cables, adapters, and accessories.

- ASI183MC Pro Camera Body
- Camera Bag
- USB 3.0 Cable
- Quick Guide
- 21mm Extender
- T2-M48 16.5mm Extender
- 1.25-inch Nose Piece
- 1.25-inch Cover
- M42-M48 Adapter
- 0.5m USB 2.0 Cable (x2)
- T2-1.25-inch Adapter
- Spacer (x2)

4. Setup

4.1 Driver and Software Installation

Before connecting the camera, download and install the latest drivers and imaging software from the official ZWO website. This ensures proper functionality and compatibility with your operating system.

4.2 Powering the Camera

The camera electronics draw power from your computer's USB 3.0 interface. However, the TEC cooler

requires a separate 12V@3A power supply (not included) for operation. Connect the USB 3.0 cable to your computer and the camera. If using the TEC cooling, connect the 12V power supply to the camera's DC 12V input port.

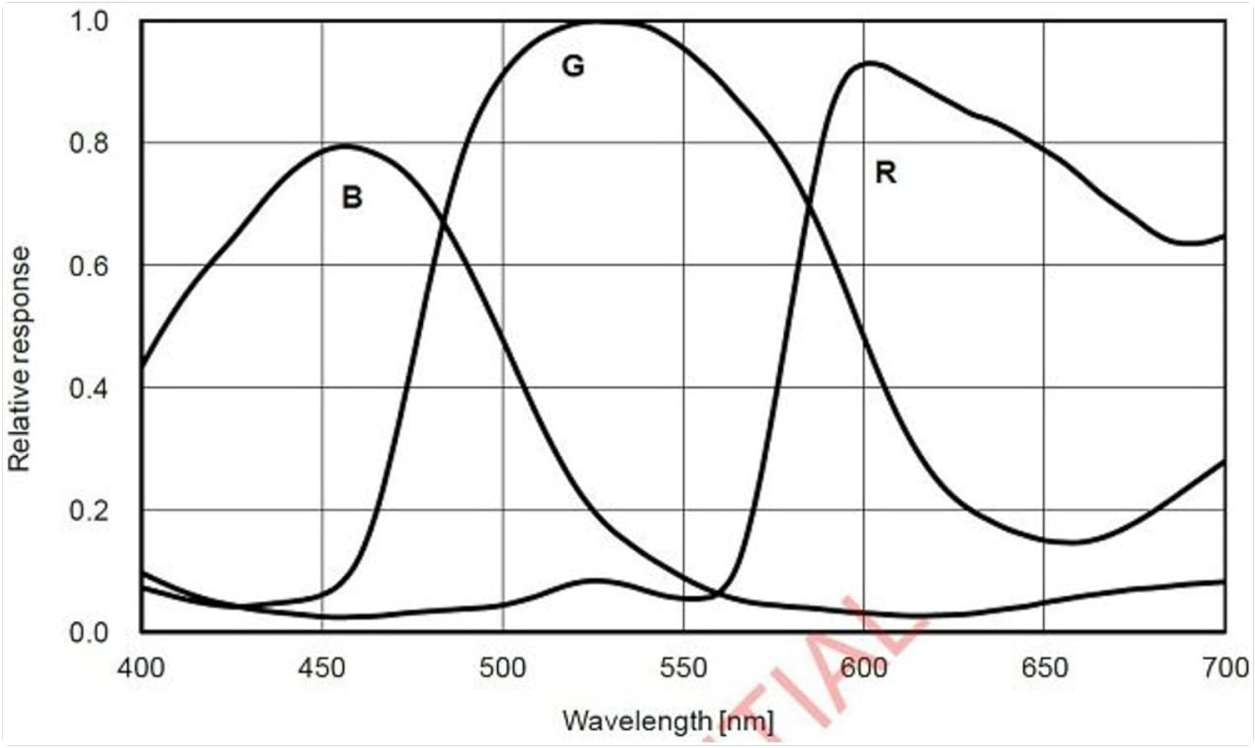


Image: Rear panel of the ZWO ASI183MC Pro camera showing USB 2.0, USB 3.0, and DC 12V power input ports.

4.3 Connecting to a Telescope

The ASI183MC Pro can be connected to a telescope using the appropriate adapter:

1. **1.25-inch Focuser:** Attach the 1.25-inch nosepiece to the camera's T-thread, then insert it into your telescope's 1.25-inch focuser.
2. **2-inch Focuser:** Use the 2-inch adapter to connect the camera to a 2-inch focuser.

Ensure all connections are secure to prevent light leaks and maintain stability.

4.4 Accessory Connection

The integrated USB 2.0 hub allows connection of accessories such as an autoguiding camera or an electronic focuser. Connect these devices to the USB 2.0 OUT ports on the camera.

5. Operating Instructions

5.1 Imaging Modes

The ASI183MC Pro is suitable for various imaging tasks:

- **Deep-Sky Imaging:** Utilize the TEC cooling for longer exposures to capture faint nebulae, galaxies, and star clusters.
- **Lunar and Solar Imaging:** The high frame rate (up to 19 fps) is ideal for capturing planetary, lunar, and solar details (a certified solar filter is required for solar observation).
- **Electronically-Assisted Astronomy (EAA):** The fast data rates allow for real-time focusing and live stacking for EAA applications.

5.2 TEC Cooling Operation

To activate the TEC cooling, ensure the 12V power supply is connected. Control the cooling temperature through your imaging software. The TEC cooler can reduce the sensor temperature significantly, which helps in reducing thermal noise during long exposures. It is recommended to set the cooling target temperature to a stable value appropriate for your imaging session.

5.3 Focusing

Achieving precise focus is crucial for sharp astronomical images. Use your telescope's focuser in conjunction with live view features in your imaging software. The high frame rate of the ASI183MC Pro can assist in real-time focusing.

6. Maintenance

6.1 Cleaning the Camera Body

Wipe the exterior of the camera with a soft, dry cloth. Avoid using harsh chemicals or abrasive materials that could damage the anodized finish.

6.2 Sensor Cleaning

Dust particles on the sensor window can appear in your images. If cleaning is necessary, use specialized sensor cleaning tools (e.g., blower, sensor brush, or cleaning swabs with appropriate solution) designed for delicate optical surfaces. Exercise extreme caution to avoid scratching the sensor window. If unsure, consult a professional.

6.3 Storage

When not in use, store the camera in its protective bag in a dry, dust-free environment. Avoid extreme temperatures and humidity.

7. Troubleshooting

7.1 Camera Not Detected

- Ensure USB 3.0 cable is securely connected to both the camera and the computer.
- Verify that the correct drivers are installed. Reinstall if necessary.
- Try a different USB 3.0 port or cable.
- Check your computer's device manager to see if the camera is recognized.

7.2 Focusing Difficulties

- Ensure your telescope's focuser is functioning correctly.
- Use a Bahtinov mask or similar focusing aid for precise focus.
- Increase gain or exposure time temporarily in live view to make stars more visible for focusing.

7.3 Excessive Noise or Amp Glow

- Ensure the TEC cooling is active and set to an appropriate temperature.
- Perform proper calibration frames (darks, flats, bias) during post-processing to reduce noise and amp glow.
- Verify that the 12V power supply for the TEC cooler is connected and functioning.

7.4 TEC Cooler Not Functioning

- Confirm that a separate 12V@3A power supply is connected to the camera's DC 12V input.
- Check the power supply for proper operation.
- Ensure the cooling function is enabled in your imaging software.

8. Specifications

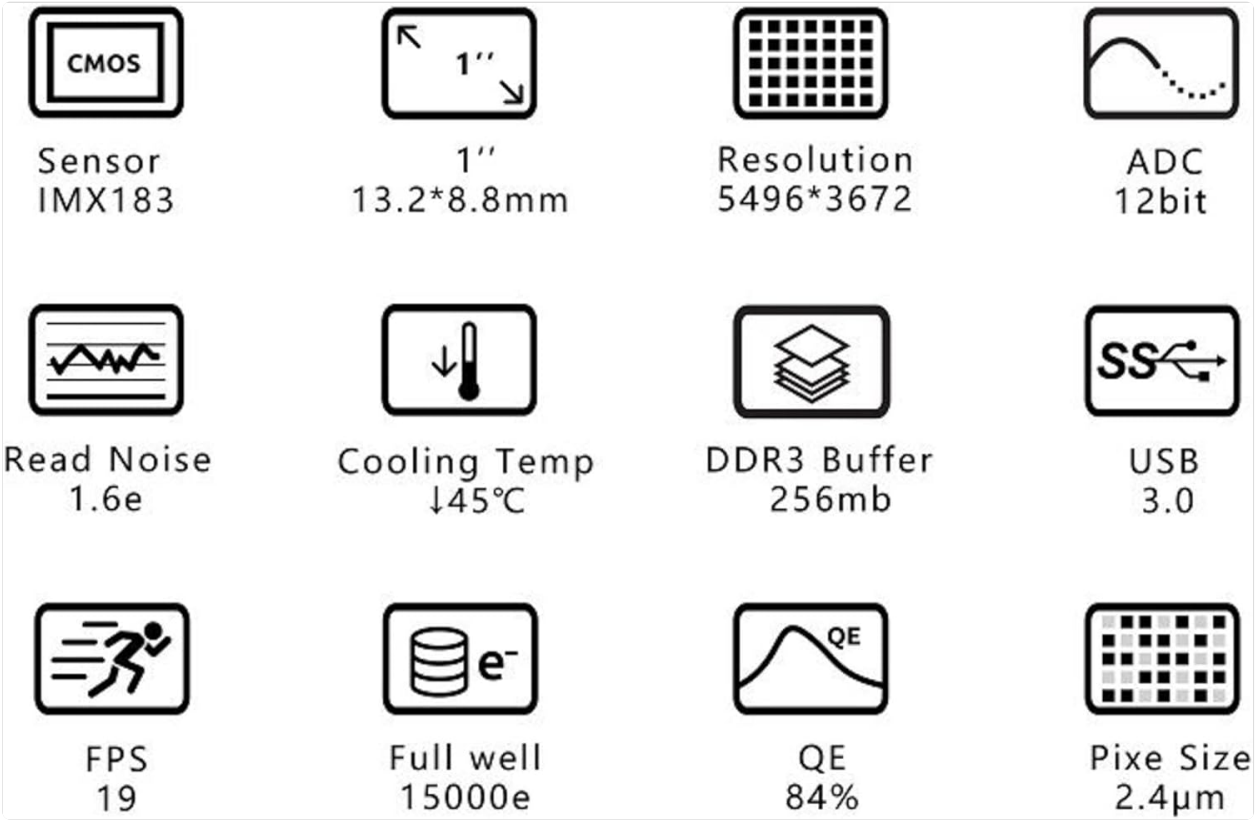


Image: Visual representation of key technical specifications for the ZWO ASI183MC Pro camera.

Feature	Specification
Model Name	ASI183MC-P
Sensor	IMX183 CMOS
Resolution	5496 x 3672 (20.18 MP)
Pixel Size	2.4 µm
Sensor Size	13.2mm x 8.8mm (1-inch format)
ADC	12-bit
Read Noise	1.6e
Full Well Capacity	15000e
Cooling Temperature	ΔT=40°C-45°C below ambient
DDR3 Buffer	256MB
Interface	USB 3.0

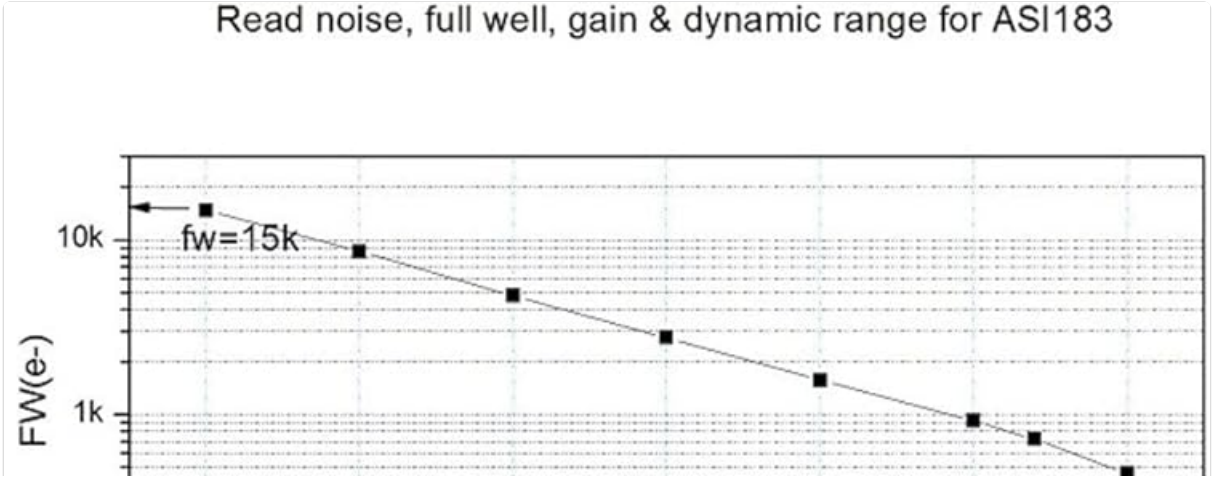
Feature	Specification
Max FPS (Full Resolution)	19 fps
Product Dimensions	6 x 6 x 6 inches (approximate)
Item Weight	2.94 pounds
Manufacturer	ZWO Optical
Date First Available	March 25, 2018

8.1 Mechanical Dimensions

Image: Diagram illustrating the mechanical dimensions of the ZWO ASI183MC Pro camera in millimeters.

9. Performance Graphs

9.1 Read Noise, Full Well, Gain & Dynamic Range



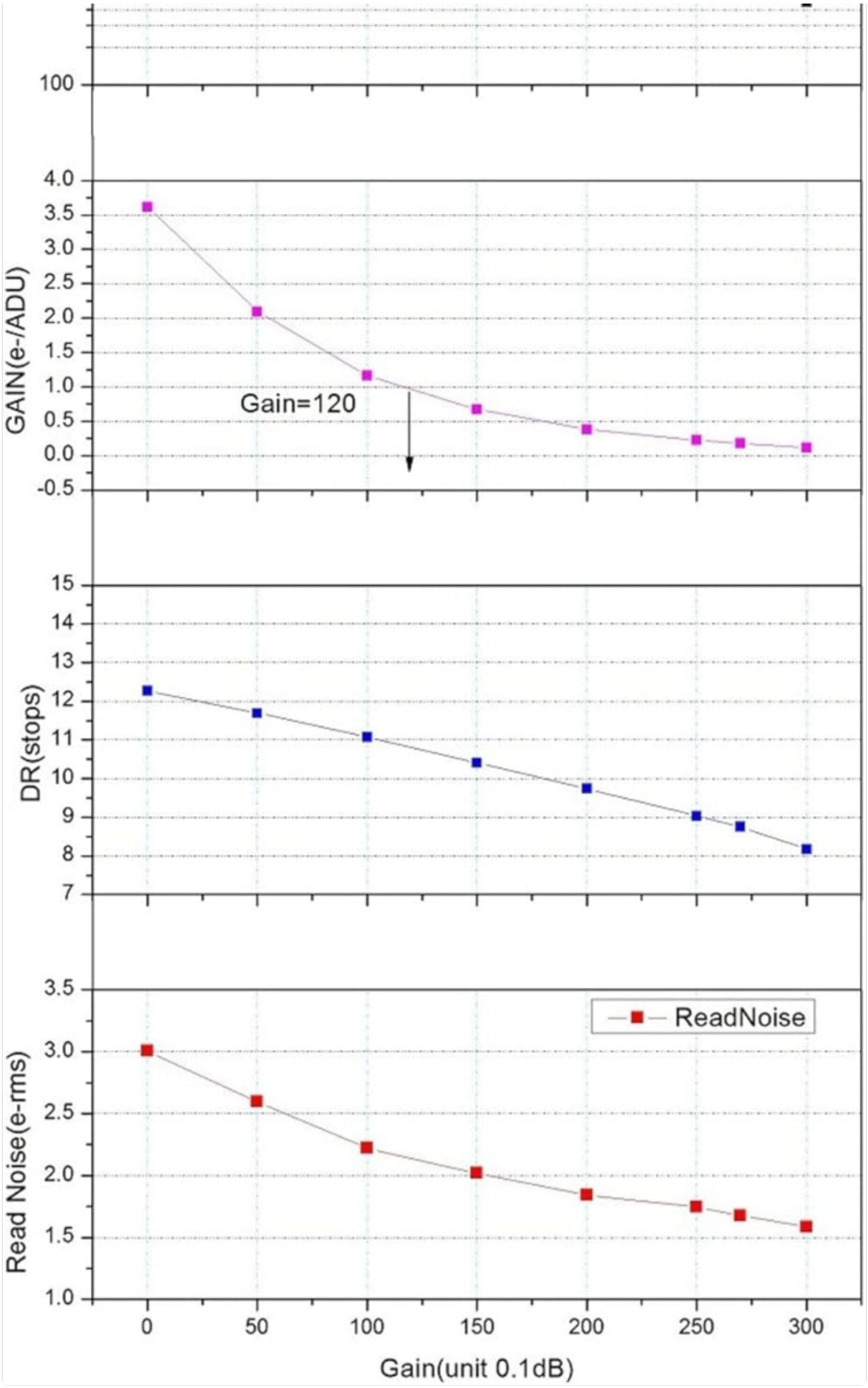


Image: Graph showing the relationship between read noise, full well capacity, gain, and dynamic range for the ASI183 sensor.

9.2 Dark Current vs. Temperature

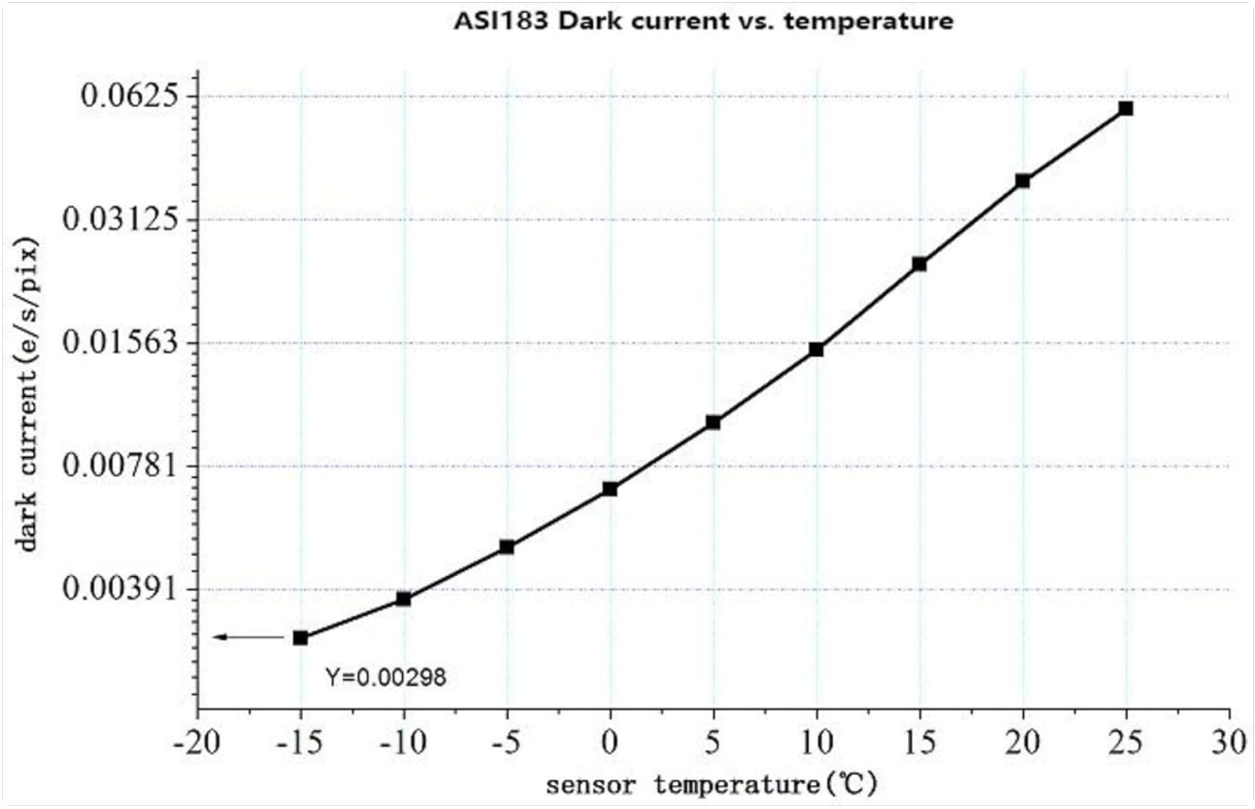


Image: Graph illustrating the dark current performance of the ASI183 sensor across various temperatures.

9.3 Relative Response (Quantum Efficiency)

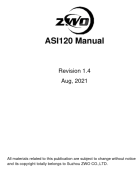
Image: Graph displaying the relative response (quantum efficiency) of the ASI183 sensor across different wavelengths (B, G, R channels).

10. Warranty and Support

For warranty information, technical support, and the latest software and driver downloads, please refer to the official ZWO website. It is recommended to regularly check the manufacturer's website for updates and additional resources.

Manufacturer: ZWO Optical

Related Documents - ASI183MC-P

	ZWO ASI585MC Pro DSO Camera Product Manual Comprehensive product manual for the ZWO ASI585MC Pro Deep Sky Object (DSO) camera. This guide details the camera's specifications, features like STARVIS 2 technology and TEC cooling, connection methods, what's included in the box, structural dimensions, warranty information, and servicing procedures. Ideal for astrophotographers seeking high sensitivity and resolution.
	ZWO ASI664MC Planetary Camera Product Manual This manual provides detailed information on the ZWO ASI664MC planetary CMOS camera, including its features, specifications, connection methods, and warranty information. Learn about its Sony IMX664 sensor, STARVIS 2 technology, and high-speed data transmission.
	ZWO ASI715MC Planetary Camera Product Manual Comprehensive product manual for the ZWO ASI715MC Planetary Camera. Learn about its 8.46MP Sony STARVIS sensor, low read noise, high QE, USB 3.0 connectivity, and specifications for astronomical imaging.
	ZWO ASI2600MC/MM DUO Camera Manual This manual provides a comprehensive guide to the ZWO ASI2600MC/MM DUO camera, covering product introduction, specifications, features, connection methods, warranty, and after-sales service.
	ZWO ASI120 Camera Manual - Guide to Astrophotography Comprehensive manual for the ZWO ASI120 camera, covering technical specifications, usage instructions, cleaning, and maintenance for astrophotography.
	ZWO ASI Camera Quick Guide: Setup and Troubleshooting A concise guide to installing and setting up your ZWO ASI camera, including software installation, connecting to telescopes, and common troubleshooting steps for Windows users.