NCM12-FF-90A is a color camera module with a waterproof housing and a built-in ISP that complies with NTSC standards. It has 1280 horizontal pixels and 960 vertical pixels and conforms to the 1/3.8" optical format. The compact, waterproof housing makes this camera module ideal for rear-view monitors. It can easily replace existing rearview cameras.

1. Features

- NTSC
- HDR
- High sensitivity
- Wide-Angle Lens
- Self-starting
- Waterproof (IP67)

2. Specification

● Image Sensor	1/3.8inch CMOS color image sensor
● Shutter Type	Rolling shutter (interrace)
● Dimension(mm)	23 × 23 × 28[mm] ※1
● Effective Pixels	1280(H) × 960(V)
● Output Pixels	720(H) × 486(V)
● Pixel Size	2.9μm(H) × 2.9μm(V)
● Output Interface	Analog
● Output Signal Format	NTCS
● Frame Rate(Max.)	29.97fps
● Functions	Auto Exposure Control, Auto White Balance, Auto Gain Control, Flicker correction, HDR, Waterproof & Dustproof Performance (IP67), etc.
● Angle of View (Typ.)	(H)104°/(V)84°/(D)122°
● Optical Filter	IRCF
● F Number	F2.1
● Connection type	Relay connector
● Power consumption (Typ.)	960[mW]

※1 : Relay connector and Cable part is not included

3. Recommended Operating Conditions

● Recommended supply voltage	8.0	[V]	
● Power Supply Voltage	6.0 ～ 12.0	[V]	
● Operating Temperature	-30 ～ +80	[℃]	※2
● Storage Temperature	-40 ～ +85	[℃]	※2

※2 : No condensation.

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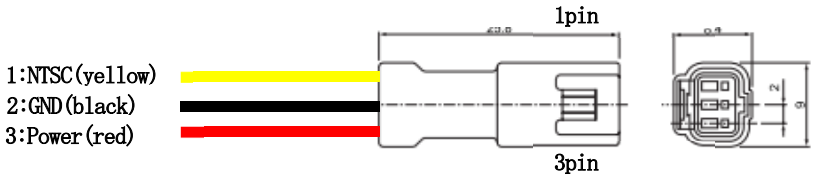
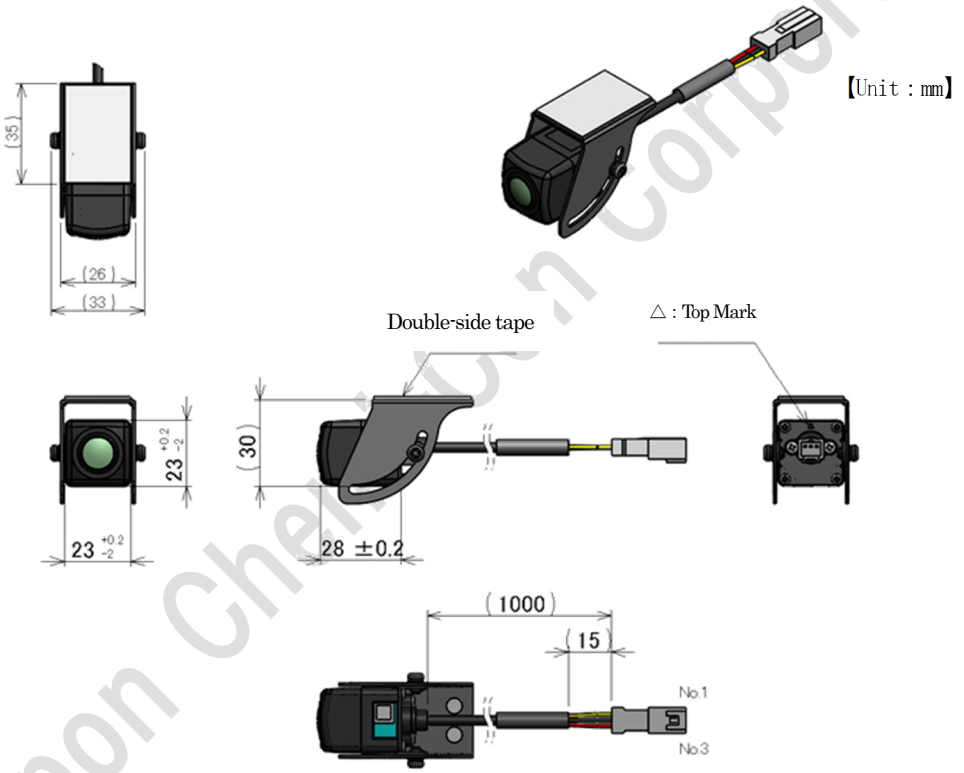
4. Terminal Description



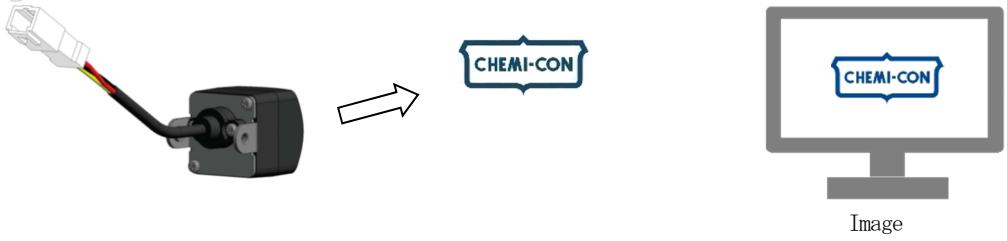
Connector : J. S. T. MFG. CO., LTD.
Model number: 03T-JWPF-VSLE-S

Terminal	Symbol	I/O	Description	Cable color
1	NTSC	O	NTSC	Yellow
2	GND	—	GROUND	Black
3	VCC	—	POWER	Red

5. External Dimensions



6. Image Capture Polarity



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7. Handling Precautions

This camera module is designed to be installed in electronic equipment. When using the product, please design for safety by paying close attention to the following precautions:

1) Operating temperature
Make sure that the internal temperature of the device does not exceed the operating temperature.

2) Light resistance of CMOS image sensor
If it is used under sunlight for a long period of time, optical performance may be affected due to deterioration of the lens and sensor.
Please check in advance in the operating environment.

3) Mounting method
This camera module is not designed to be dust-proof or drip-proof. When installing the camera module on a device,
Please pay attention to waterproofing and prevention of dust from entering the device.

4) Electrostatic protection
Please handle this camera module in the same way as semiconductor devices to prevent electrostatic breakdown.
Recommended Environment
(1) The worktable and the floor in the work area should be covered with a conductive mat to eliminate static electricity.
(2) Workers should wear antistatic clothing and grounding bands, and the like.
(3) Use non-charged jigs, boxes, bags, and the like.
(4) Use an ionizer or the like to eliminate static electricity when handling the product.

5) Mechanical strength
This camera module is a precision optical component. Please handle with care to avoid excessive mechanical shock.
In particular, please do not apply any stress such as load to the device during and after the installation of the FFC and connector.
In addition, please take care to prevent dust and dirt from adhering to the lens surface and take care not to scratch the lens when removing foreign objects from the lens surface or when handling the lens.

6) Disassembly and modification
Do not disassemble or modify the lens. The company does not provide any warranty if the lens is disassembled, modified, or otherwise altered.

7) Safety standards
This camera module is a semi-completed product (module parts) and safety standards are not guaranteed.
Customers are requested to obtain safety standards for their finished equipment.

8) Safety design
Although we strive to improve the quality and reliability of our products, semiconductor products in general may malfunction or fail. When using this camera module, the customer is responsible for the safety design of the equipment to ensure that life, human body, or property will not be infringed due to malfunction or failure of the camera module.

9) Storage
This camera module is a precision optical component. Avoid storing the camera module in an environment with high temperature, high humidity, dust, and direct sunlight.

10) Use for specific applications
This camera module is designed and manufactured for general electronic equipment (computers, personal devices, office equipment, measuring instruments, industrial robots, home appliances, etc.).
If the product is to be used in an application that requires a particularly high level of quality and reliability and where failure or malfunction of the product may cause damage to human life or property (Nuclear power control equipment, aerospace equipment, transportation equipment, traffic signal equipment, combustion control, medical equipment, life support systems, various safety devices, etc. (hereinafter referred to as Specific Applications)), please consult with our contact person in advance and discuss the matter with them before use.

This shall not apply in cases where the conditions of use, etc. are confirmed in writing upon consultation between the two parties.
If this camera module is used for Specific Application without prior consultation, we shall not be liable for any damage resulting from such use.

11) Radiation-proof design
This product is not designed to withstand radiation.

12) Handling of export-controlled cargo
When exporting or taking this product or its technical information out of Japan, please follow the proper export procedures in accordance with the latest laws and regulations stipulated in the relevant ministerial ordinances of the Foreign Exchange and Foreign Trade Law (Foreign Exchange and Foreign Trade Law).

13) Laws, regulations and rules
This camera module may not be used for applications for which the manufacture or sale of the camera module is prohibited by domestic

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