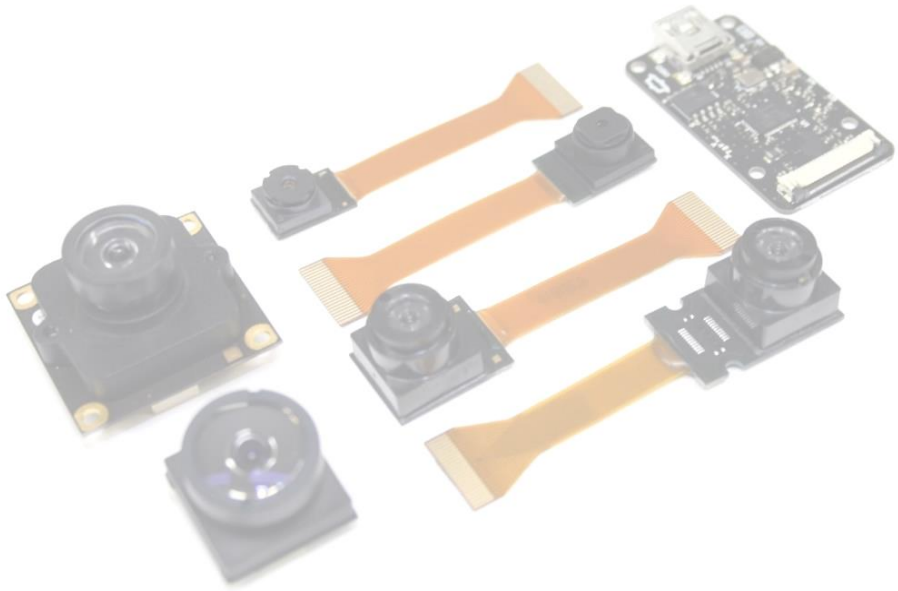
NIPPON CHEMI-CON

CMOS CAMERA MODULES

2019



CMOS CAMERA MODULES

Page No.	Part Number	Active Pixels	HFOV	Optical Format	Frame Cycle
2	NCM03-V	VGA (640H×480V)	55°	1/4	Max30fps
8	NCM03-S		105°		
14	NCM03-W2		135°		
19	NCM03-ZB	VGA (640H×480V) NTSC Output	132°	1/4	
25	NCM03-CB	WVGA (752H×480V)	86°	1/3	Max60fps
30	NCM10-B	WXGA(HD) (1280Hx800V)	110°	1/3	Max30fps
34	NCM13-M	SXGA (1280H×1024V)	55°	1/4	Max15fps
40	NCM13-K		135°		
46	NCM13-K2		190°		
52	NCM-USB-03D(55)	VGA(640H×480V) USB Camera Module USB2.0	55°	1/4	Max30fps
56	NCM-USB-03D(105)		105°		
60	NCM-USB-C	USB Output Interface Board USB2.0			
65	NCM-USB-E				

Part Number

NCM 03 - A*
NCM:Series
03=0.3Mega Pixels
10=1Mega Pixels
13=1.3Mega Pixels
A*～Z*:Serial number
(* : an alphanumeric character)

NCM - USB - 03A (**)
NCM:Series
USB:Output=USB Interface
03=0.3Mega Pixels
A～Z : Serial number (an alphabet)
** : Number = Horizontal field of view[°]

VGA (DSP Built-in) Camera Module NCM03-V

NCM03-V is a VGA color camera module with built-in DSP.
It has vertical 480 pixels, horizontal 640 pixels via 1/4 inch sensor.
Advantages: Low power consumption, good color reproducibility by primary color filter, downsizing by built-in DSP.
Suitable for image input device such as PC camera and network camera.

1. Features

1-1. Outline

- Compact all-in-one package
- Small plastic lens
- Standby-mode available
- Serial bus control
- Power consumption(TYP): 110[mW]
- Slave address: Write address = 0xDC
  Read address = 0xDD

1-2. Sensor

- Optical format 1/4 inch optical format
- Active pixels 640(H) x 480(V)
- On chip color filter Primary color filter
- Image transfer rate Max 30fps

1-3. Signal processing

- Digital output YUV422, RGB565(8bit)
- Image format VGA, QVGA, QQVGA, CIF, QCIF
- Automatic control Auto Exposure Control(AEC), Auto White Balance(AWB), 50/60Hz flicker cancellation
- Image mirroring (flipping up/down, left/right)

1-4. Lens

- Structure 3Plastic
- F number 2.8
- Angle of view 65(D) / 55(H) / 42(V)
- Imaging range 40cm～∞
- OLPF None
- IRCF Built-in
- TV distortion <=-0.14%

2. Recommended operating conditions

	MIN	TYP	MAX	Unit
Power supply voltage(DVDD)	1.43	1.8	1.89	V
Power supply voltage(AVDD)	2.66	2.8	2.94	V
Power supply voltage (HVDD)	2.66	2.8	2.94	V
Operating temperature	-20		60	℃
Storage temperature	-30		70	℃
Input high voltage	0.8*HVDD			V
Input low voltage			0.2*HVDD	V
MCLK			27	MHz

※Operation/storage should be under humidity 85%RH and at no dew condensation nor freezing environment.

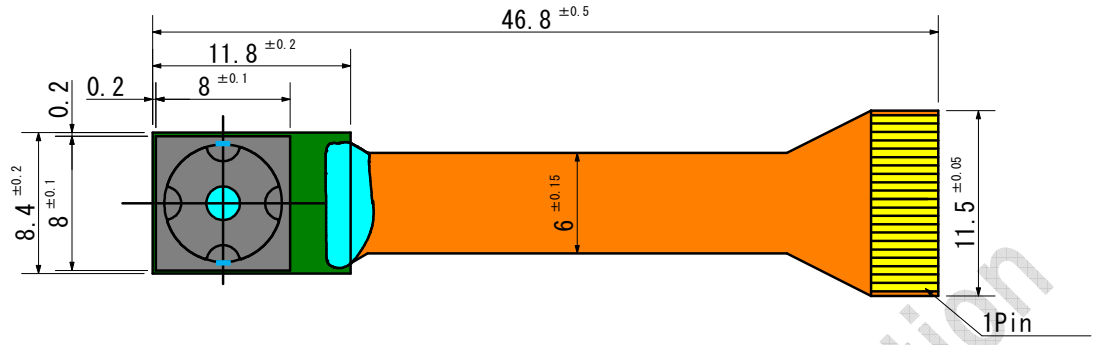
3. Maximum ratings

	MIN	MAX	Unit
DVDD(Digital Core)	-0.3	2.5	V
AVDD(Analog)	-0.3	4.5	V
HVDD(Digital I/O)	-0.3	4.5	V
Vin(DC input voltage)	-0.3	HVDD+0.3	V

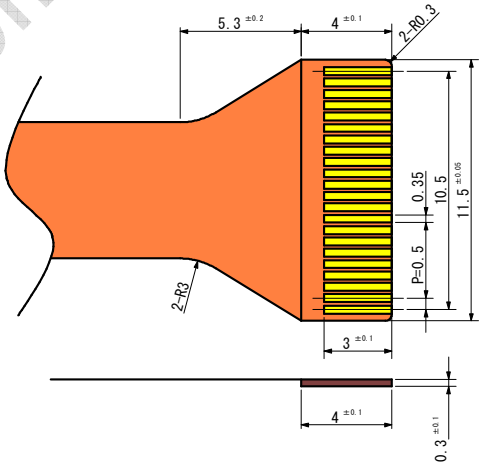
4. Output terminal

Terminal#	Symbol	I/O	Description
1	DVDD	—	Supply (digital) for Core
2	DGND	—	GND(Digital)
3	PCLK	O	Data clock
4	DGND	—	GND(Digital)
5	HSYNC	O	Horizontal sync pulse out
6	VSYNC	O	Vertical sync pulse
7	HVDD	—	Supply (digital) for IO
8	SDA	I/O	I2C bus I / F data
9	SCL	I	I2C bus I / F clock
10	RSTB	I	System input reset (Low active)
11	DATA7	O	Digital data output
12	DATA6	O	Digital data output
13	DATA5	O	Digital data output
14	DATA4	O	Digital data output
15	DATA3	O	Digital data output
16	DATA2	O	Digital data output
17	DATA1	O	Digital data output
18	DATA0	O	Digital data output
19	STDBY	I	Standby mode (Hi active)
20	MCLK	I	System clock
21	AGND	—	GND(Analog)
22	AVDD	—	Supply(Analog)

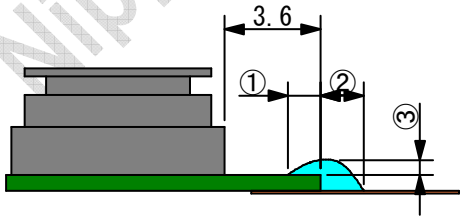
5. Dimensions



<FPC specification>
Number of terminals: 22
Thickness: 0.3mm
Terminal : 0.5mm pitch
Gold(Au) plating

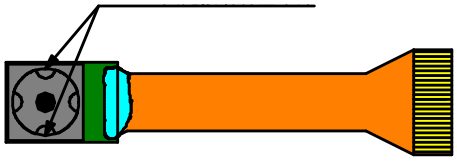


Adhesive to fix the FPC

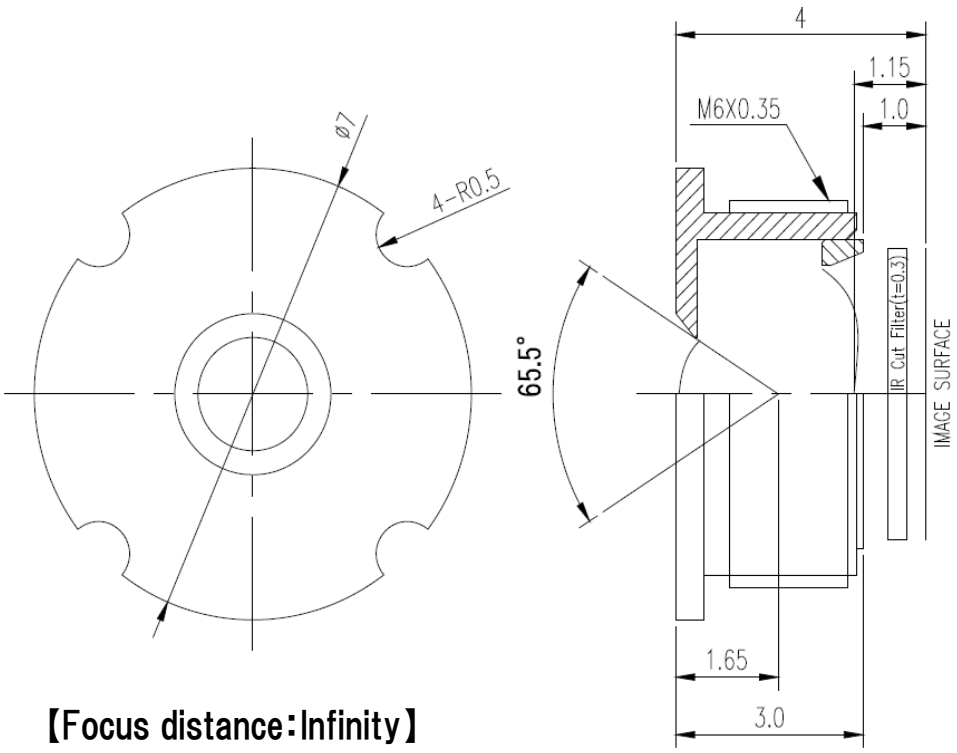


No.	Standard Value
①	0.5～1.8mm
②	2.0±1.0mm
③	0.05～0.5mm

Adhesive to fix the lens

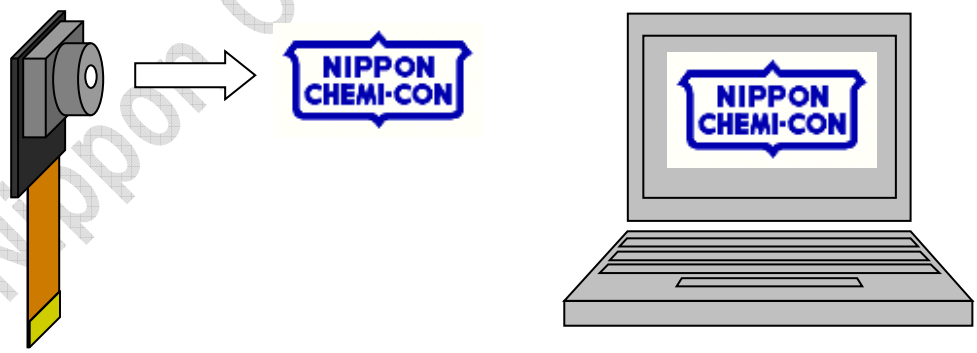


6. Lens outline



【Focus distance:Infinity】

7. Imaging Direction



8. Handling precautions

This camera module is designed to be incorporated into electronic equipment. Please note the following precautions to ensure safety design.

1) Operating temperature
Please make sure that the inside temperature of the equipment does not exceed the operating temperature.

2) Durability of CMOS imaging device against sunlight
If the device will be used under sunlight for long duration, the optical performance may be affected by deterioration of lens and sensor. Please confirm the application environment in advance.

3) Installation method
This camera module is not a dust or drip-proof. Please prevent water/dust to come inside when installing on equipment.

4) Electrostatic countermeasure
Please handle this camera module in the same way as semiconductor devices, avoiding electrostatic.
Recommended environment
① Use an electrically conductive mat on the workbench and the floor in the work area to remove static electricity.
② Workers should use antistatic clothing, wrist strap, etc.
③ Use electrostatically discharged jigs, boxes, bags, etc..
④ When handling, remove static electricity with an ionizer or the like.

5) Mechanical strength
This camera module is a precision optical component. Please handle with care so as not to give excessive mechanical shock.
Especially stress on the FPC crimping part should not be applied during and/or after the installation.
Please prevent dust and dirt from adhering to the surface of the lens, and be careful not to scratch the lens while handling or when removing foreign matter on the lens surface.

6) Disassembly/Modification
Please do not disassemble or modify this module. The warranty does not cover the product if it is disassembled or modified.

7) Safety standard
This camera module is a semi-finished product (module part), and we do not guarantee compliance to any safety standards by itself. Please obtain the safety standard with your finished product.

8) Safety design
Although we strive to improve the quality and reliability, there is always a risk of malfunctioning generally with semiconductor products. Please design the safety function in your equipment to prevent a harm to human life/health or property in case of potential malfunction of this camera module.

9) Storage
This camera module is a precision optical component. Avoid storing in high temperature/humidity/dust/environment and/or direct sunlight.

10) Use for specific applications
This camera module is intended to be used for commonly used electronic equipment (such as computer, office equipment, measuring equipment, industrial robot, home appliances, etc.). It is not intended to be used for equipment which requires extremely high quality and reliability, where its malfunction may directly affect human life or health, including but not limited to, nuclear power control equipment, aerospace equipment, transportation equipment, traffic signal equipment, combustion control, medical equipment, life support system, various safety devices, etc. (hereinafter referred to as specific applications).
If you are planning to use this module for applications other than those for general, commonly used electronic equipment, please contact us in advance.
We will not be responsible for any damage caused by this camera module if it is used for those specific applications without prior consultation.

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

12) Handling of export restricted cargo
Please follow the local laws/regulations of your country/region for exporting technical information of this product or the product itself.

13) Laws and Regulations
You cannot use this camera module for the products that are prohibited to manufacture or sell according to applicable laws and regulations.

VGA (DSP Built-in) Camera Module NCM03-S

NCM03-S is a VGA color camera module with built-in DSP.
It has vertical 480 pixels, horizontal 640 pixels via 1/4 inch sensor.
Advantages: Low power consumption, good color reproducibility by primary color filter, downsizing by built-in DSP.
Suitable for image input device such as PC camera and network camera.

1. Features

1-1. Outline

- Compact all-in-one package
- Small and wide angle plastic lens
- Standby-mode available
- Serial bus control
- Power consumption (TYP): 100[mW]
- Slave address: Write address = 0xB8
  Read address = 0xB9

1-2. Sensor

- Optical format 1/4 inch optical format
- Active pixels 640(H) x 480(V)
- On chip color filter Primary color filter
- Image transfer rate Max 30fps

1-3. Signal processing

- Digital output YCbCr, YUV, RGB565, RGB555, RGB444
- Image format VGA, QVGA, QQVGA, CIF, QCIF
- Automatic control Auto Exposure Control(AEC), Auto White Balance(AWB), 50/60Hz flicker cancellation
- Image mirroring (flipping up/down, left/right)

1-4. Lens

- Structure 2Plastic
- F number 2.8
- Angle of view 130(D) / 105(H) / 78(V)
- Imaging range 45cm～∞
- OLPF None
- IRCF Built-in
- TV distortion <=-23%(TYP)

2. Recommended operating conditions

	MIN	TYP	MAX	Unit
DVDD(Digital Core)	2.55	2.8	3.05	V
AVDD(Analog)	2.55	2.8	3.05	V
Operating temperature	-20	-	60	℃
Storage temperature	-30	-	70	℃
Input high voltage	DVDD-0.25	-	-	V
Input low voltage	-	-	0.8	V
MCLK	10	12	27	MHz

※Operation/storage should be under humidity 85%RH and at no dew condensation nor freezing environment.

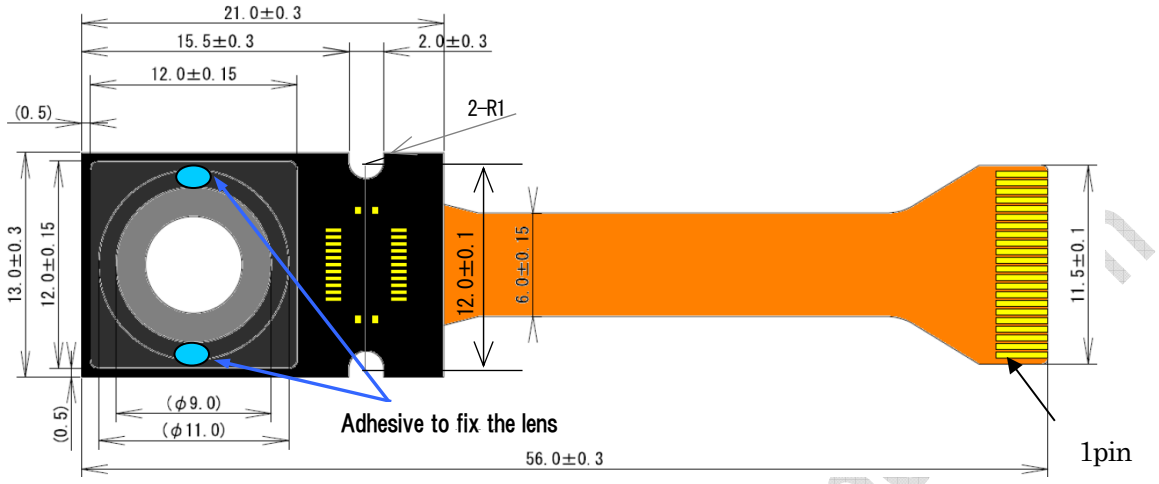
3. Maximum ratings

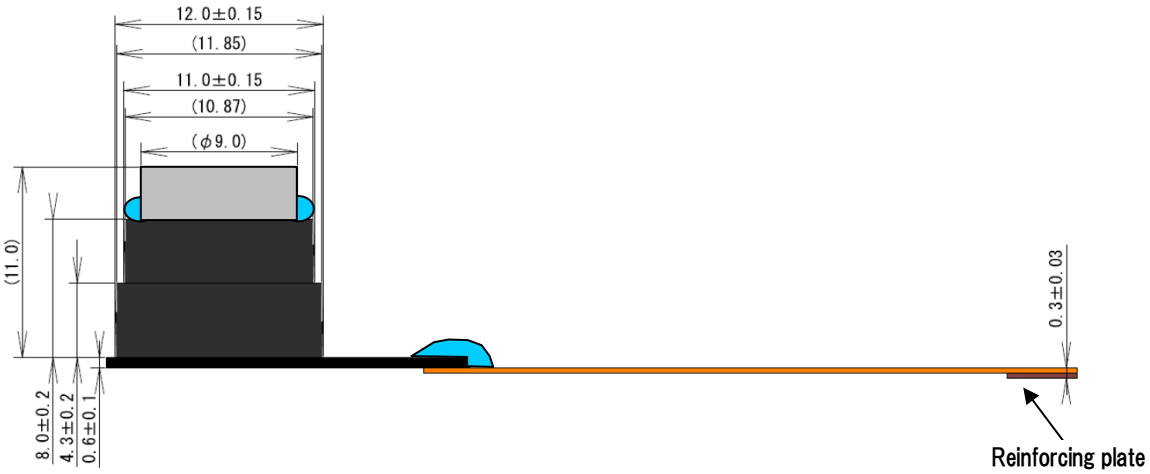
	MIN	MAX	Unit
DVDD(Digital Core)	-0.3	4.0	V
AVDD(Analog)	-0.3	4.0	V
Vin(DC input voltage)	-0.3	HVDD+0.3	V

4. Output terminal

Terminal#	Symbol	I/O	Description
1	NC	—	—
2	DGND	—	GND(Digital)
3	PCLK	O	Data clock
4	DGND	—	GND(Digital)
5	HSYNC	O	Horizontal sync pulse out
6	VSYNC	O	Vertical sync pulse
7	HVDD	—	Supply (digital) for IO
8	SDA	I/O	I2C bus I / F data
9	SCL	I	I2C bus I / F clock
10	RSTB	I	System input reset (Low active)
11	DATA7	O	Digital data output
12	DATA6	O	Digital data output
13	DATA5	O	Digital data output
14	DATA4	O	Digital data output
15	DATA3	O	Digital data output
16	DATA2	O	Digital data output
17	DATA1	O	Digital data output
18	DATA0	O	Digital data output
19	STDBY	I	Standby mode (Hi active)
20	MCLK	I	System clock
21	AGND	—	GND(Analog)
22	AVDD	—	Supply(Analog)

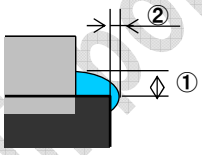
5. Dimensions



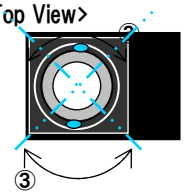


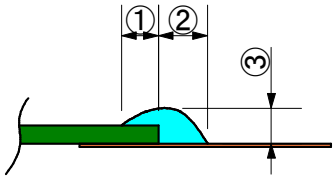
Adhesive to fix the lens

<Side View>



<Top View>

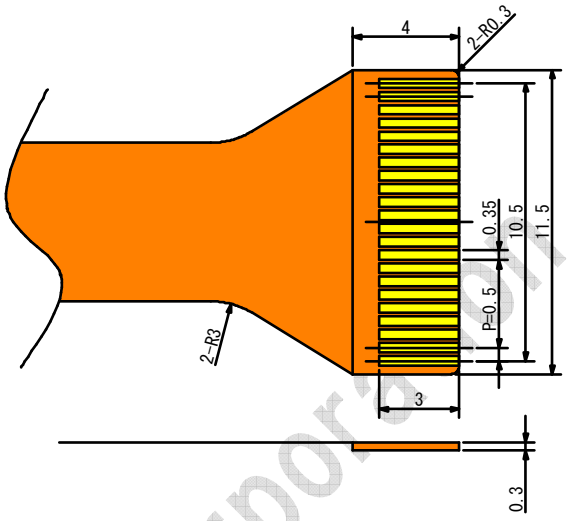




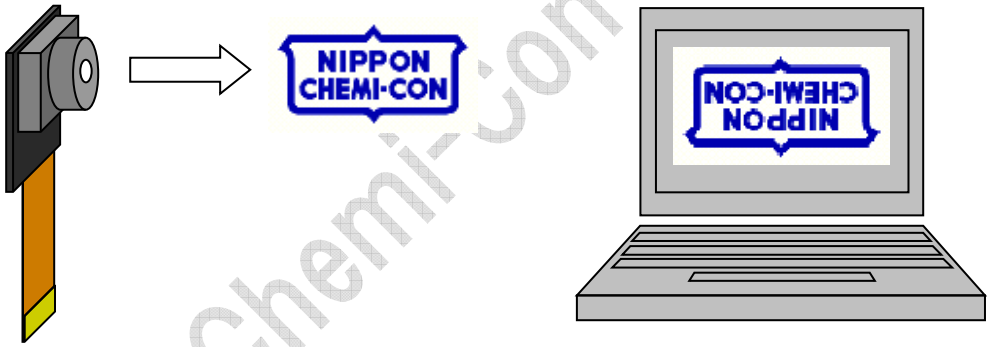
①Should not surpass lens top.
②0.2mmMAX
③Should be within the angle shown in above.

No.	Standard Value
①	0.5～1.8mm
②	2.0±1.0mm
③	0.05～0.5mm

<FPC specification>
Number of terminals: 22
Thickness: 0.3mm
Terminal : 0.5mm pitch
Gold(Au) plating



6. Imaging Direction



7. Handling precautions

This camera module is designed to be incorporated into electronic equipment. Please note the following precautions to ensure safety design.

1) Operating temperature
Please make sure that the inside temperature of the equipment does not exceed the operating temperature.

2) Durability of CMOS imaging device against sunlight
If the device will be used under sunlight for long duration, the optical performance may be affected by deterioration of lens and sensor. Please confirm the application environment in advance.

3) Installation method
This camera module is not a dust or drip-proof. Please prevent water/dust to come inside when installing on equipment.

4) Electrostatic countermeasure
Please handle this camera module in the same way as semiconductor devices, avoiding electrostatic.
Recommended environment
① Use an electrically conductive mat on the workbench and the floor in the work area to remove static electricity.
② Workers should use antistatic clothing, wrist strap, etc.
③ Use electrostatically discharged jigs, boxes, bags, etc..
④ When handling, remove static electricity with an ionizer or the like.

5) Mechanical strength
This camera module is a precision optical component. Please handle with care so as not to give excessive mechanical shock.
Especially stress on the FPC crimping part should not be applied during and/or after the installation.
Please prevent dust and dirt from adhering to the surface of the lens, and be careful not to scratch the lens while handling or when removing foreign matter on the lens surface.

6) Disassembly/Modification
Please do not disassemble or modify this module. The warranty does not cover the product if it is disassembled or modified.

7) Safety standard
This camera module is a semi-finished product (module part), and we do not guarantee compliance to any safety standards by itself. Please obtain the safety standard with your finished product.

8) Safety design
Although we strive to improve the quality and reliability, there is always a risk of malfunctioning generally with semiconductor products. Please design the safety function in your equipment to prevent a harm to human life/health or property in case of potential malfunction of this camera module.

9) Storage
This camera module is a precision optical component. Avoid storing in high temperature/humidity/dust/environment and/or direct sunlight.

10) Use for specific applications
This camera module is intended to be used for commonly used electronic equipment (such as computer, office equipment, measuring equipment, industrial robot, home appliances, etc.). It is not intended to be used for equipment which requires extremely high quality and reliability, where its malfunction may directly affect human life or health, including but not limited to, nuclear power control equipment, aerospace equipment, transportation equipment, traffic signal equipment, combustion control, medical equipment, life support system, various safety devices, etc. (hereinafter referred to as specific applications).
If you are planning to use this module for applications other than those for general, commonly used electronic equipment, please contact us in advance.
We will not be responsible for any damage caused by this camera module if it is used for those specific applications without prior consultation.

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

12) Handling of export restricted cargo
Please follow the local laws/regulations of your country/region for exporting technical information of this product or the product itself.

13) Laws and Regulations
You cannot use this camera module for the products that are prohibited to manufacture or sell according to applicable laws and regulations.

VGA (DSP Built-in) Camera Module NCM03-W2

NCM03-W2 is a VGA color camera module with built-in DSP.
It has vertical 480 pixels, horizontal 640 pixels via 1/4 inch sensor.
Advantages: Low power consumption, good color reproducibility by primary color filter, downsizing by built-in DSP.
Suitable for image input device such as event data recorder and surveillance camera.

1. Features

1-1. Outline

- Compact all-in-one package
- Small and wide angle plastic lens(H135°)
- Standby-mode available
- Serial bus control
- Power consumption (TYP): 180[mW]
- Slave address: Write address = 0xB8
  Read address = 0xB9

1-2. Sensor

- Optical format 1/4 inch optical format
- Active pixels 640(H) x 480(V)
- On chip color filter Primary color filter
- Image transfer rate Max 30fps

1-3. Signal processing

- Digital output YUV, RGB565, RGB555, RGB444
- Image format VGA, QVGA, QQVGA, CIF, QCIF, QQCIF
- Automatic control Auto Exposure Control(AEC), Auto White Balance(AWB), 50/60Hz flicker cancellation
- Image mirroring (flipping up/down, left/right)

1-4. Lens

- Structure 4Plastic
- F number 2.6
- Angle of view 165(D) / 135(H) / 107(V)
- Imaging range 40cm～∞
- OLPF None
- IRCF Built-in
- TV distortion <=-28%

2. Recommended operating conditions

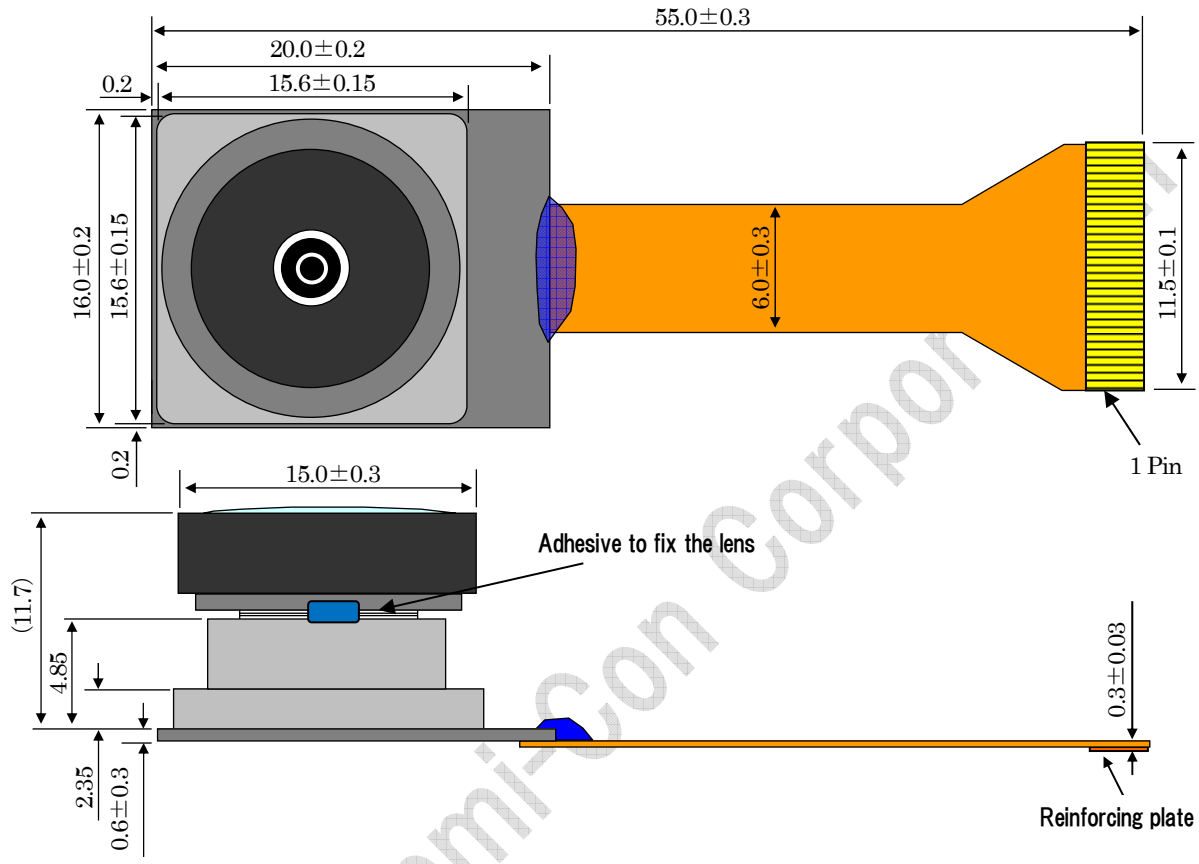
	MIN	TYP	MAX	Unit
DVDD(Digital Core)	2.55	2.8	3.05	V
AVDD(Analog)	2.55	2.8	3.05	V
Operating temperature	-20	-	60	℃
Storage temperature	-30	-	70	℃
Input high voltage	DVDD-0.25	-	-	V
Input low voltage	-	-	0.8	V
MCLK	10	12	27	MHz

※Operation/storage should be under humidity 85%RH and at no dew condensation nor freezing environment.
※The operating temperature includes a temperature rise.

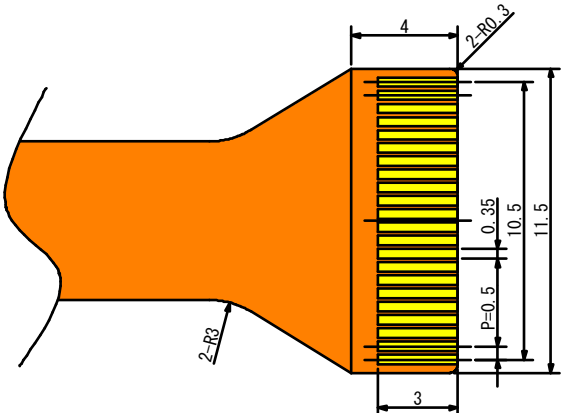
3. Output terminal

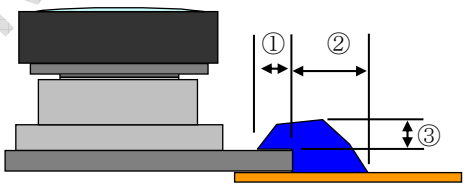
Terminal#	Symbol	I/O	Description
1	NC	—	—
2	DGND	—	GND(Digital)
3	PCLK	O	Data clock
4	DGND	—	GND(Digital)
5	HSYNC	O	Horizontal sync pulse out
6	VSYNC	O	Vertical sync pulse
7	HVDD	—	Supply (digital) for IO
8	SDA	I/O	I2C bus I / F data
9	SCL	I	I2C bus I / F clock
10	RSTB	I	System input reset (Low active)
11	DATA7	O	Digital data output
12	DATA6	O	Digital data output
13	DATA5	O	Digital data output
14	DATA4	O	Digital data output
15	DATA3	O	Digital data output
16	DATA2	O	Digital data output
17	DATA1	O	Digital data output
18	DATA0	O	Digital data output
19	STDBY	I	Standby mode (Hi active)
20	MCLK	I	System clock
21	AGND	—	GND(Analog)
22	AVDD	—	Supply(Analog)

4. Dimensions



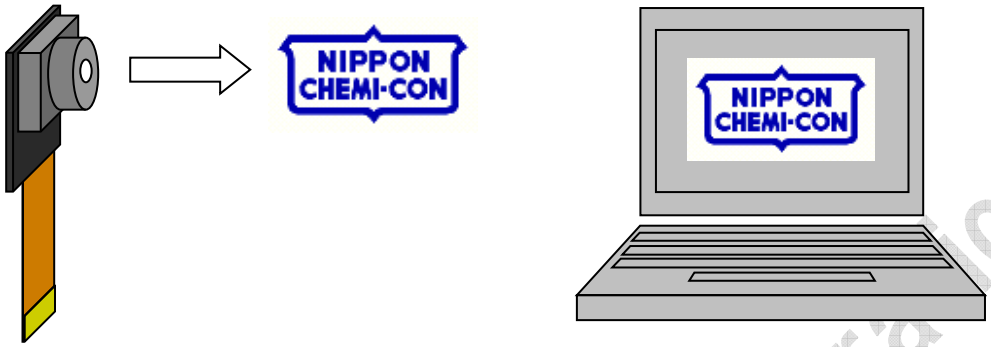
<FPC specification>
Number of terminals: 22
Thickness: 0.3mm
Terminal : 0.5mm pitch
Gold(Au) plating





No.	Standard Value
①	0.5～1.8mm
②	2.0±1.0mm
③	0.05～0.5mm

5. Imaging Direction



6. Handling precautions

This camera module is designed to be incorporated into electronic equipment. Please note the following precautions to ensure safety design.

1) Operating temperature
Please make sure that the inside temperature of the equipment does not exceed the operating temperature.

2) Durability of CMOS imaging device against sunlight
If the device will be used under sunlight for long duration, the optical performance may be affected by deterioration of lens and sensor. Please confirm the application environment in advance.

3) Installation method
This camera module is not a dust or drip-proof. Please prevent water/dust to come inside when installing on equipment.

4) Electrostatic countermeasure
Please handle this camera module in the same way as semiconductor devices, avoiding electrostatic.
Recommended environment
① Use an electrically conductive mat on the workbench and the floor in the work area to remove static electricity.
② Workers should use antistatic clothing, wrist strap, etc.
③ Use electrostatically discharged jigs, boxes, bags, etc..
④ When handling, remove static electricity with an ionizer or the like.

5) Mechanical strength
This camera module is a precision optical component. Please handle with care so as not to give excessive mechanical shock.
Especially stress on the FPC crimping part should not be applied during and/or after the installation.
Please prevent dust and dirt from adhering to the surface of the lens, and be careful not to scratch the lens while handling or when removing foreign matter on the lens surface.

6) Disassembly/Modification
Please do not disassemble or modify this module. The warranty does not cover the product if it is disassembled or modified.

7) Safety standard
This camera module is a semi-finished product (module part), and we do not guarantee compliance to any safety standards by itself. Please obtain the safety standard with your finished product.

8) Safety design
Although we strive to improve the quality and reliability, there is always a risk of malfunctioning generally with semiconductor products. Please design the safety function in your equipment to prevent a harm to human life/health or property in case of potential malfunction of this camera module.

9) Storage
This camera module is a precision optical component. Avoid storing in high temperature/humidity/dust/environment and/or direct sunlight.

10) Use for specific applications
This camera module is intended to be used for commonly used electronic equipment (such as computer, office equipment, measuring equipment, industrial robot, home appliances, etc.). It is not intended to be used for equipment which requires extremely high quality and reliability, where its malfunction may directly affect human life or health, including but not limited to, nuclear power control equipment, aerospace equipment, transportation equipment, traffic signal equipment, combustion control, medical equipment, life support system, various safety devices, etc. (hereinafter referred to as specific applications).
If you are planning to use this module for applications other than those for general, commonly used electronic equipment, please contact us in advance.
We will not be responsible for any damage caused by this camera module if it is used for those specific applications without prior consultation.

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

12) Handling of export restricted cargo
Please follow the local laws/regulations of your country/region for exporting technical information of this product or the product itself.

13) Laws and Regulations
You cannot use this camera module for the products that are prohibited to manufacture or sell according to applicable laws and regulations.

VGA NTSC Output Camera Module NCM03-ZB

NCM03-ZB is a NTSC output waterproof camera module adopting 1/4 VGA CMOS image sensor.
With HDR(High Dynamic Range) function, high quality imaging is made possible without reduction in frame rate and resolution even under environments with large contrast difference. Moreover, by adopting primary color filter, excellent color reproduction is realized.
Suitable for applications such as automotive view camera, security and industrial equipment.

1. Features

1-1. Outline

- Compact all-in-one package
- NTSC output
- High Dynamic Range
- Wide input voltage range(6～12V)
- Waterproof IP67 compatible

1-2. Ratings

● Optical format	1/4 inch optical format
● Active pixels	672(H)x506(V)
● NTSC output	648(H)x486(V)
● Aspect ratio	4:3
● Scan mode	interlaced
● Pixel size	5.6μm(H)x5.6μm(V)
● Color filter	RGB primary color filter, Bayer array
● Video output	1Vp-p (TYP) / termination 75Ω
● Signal	NTSC_J
● Resolution	Center 320TV or more, Peripheral 200TV or more
● Illuminance range	1～100KLux
● Dynamic range	108(dB)
● Current consumption	TYP 60【mA】, MAX 90【mA】 (Rating 8V)

1-3. Functions

- Lens shading correction
- Image mirroring (flipping left/light)
- Programmable gamma correction
- Auto white balance(AWB)
- Auto exposure control(ALC)
- Auto flicker detection
- On screen display(OSD)

1-4. Lens

● Structure	4pieces (1G3P L1:Glass)
● Focal length	1.19mm
● F number	2.0
● Angle of view	Horizontal 132° , Vertical 104° , Diagonal 164°
● Imaging range	40cm～∞
● TV distortion	< -17.8%

2. Operating conditions

	MIN	TYP	MAX	Unit
Power supply voltage	6.0	8.0	12.0	V
Operating temperature	-30	-	+80	℃
Storage temperature	-40	-	+85	℃

※ Operation/storage should be under humidity 85%RH and at no dew condensation nor freezing environment.

3. Maximum ratings

	MIN	MAX	Unit
Power supply voltage	-	+12	V

4. Electrical characteristics

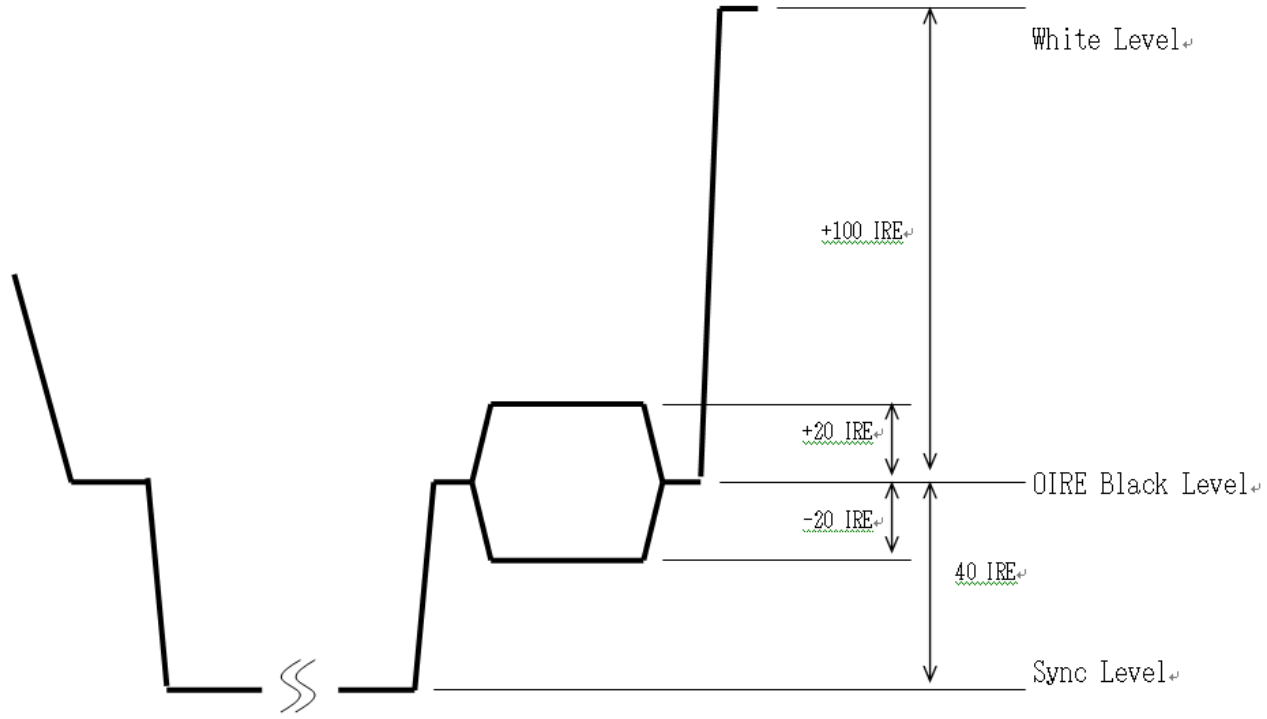
NTSC Signal Parameters

EXTCLK=24.9231MHz

AVDD33=3.3V; IOVDD33=3.3V; PVDD33=3.3V; DAVDD33=3.3V

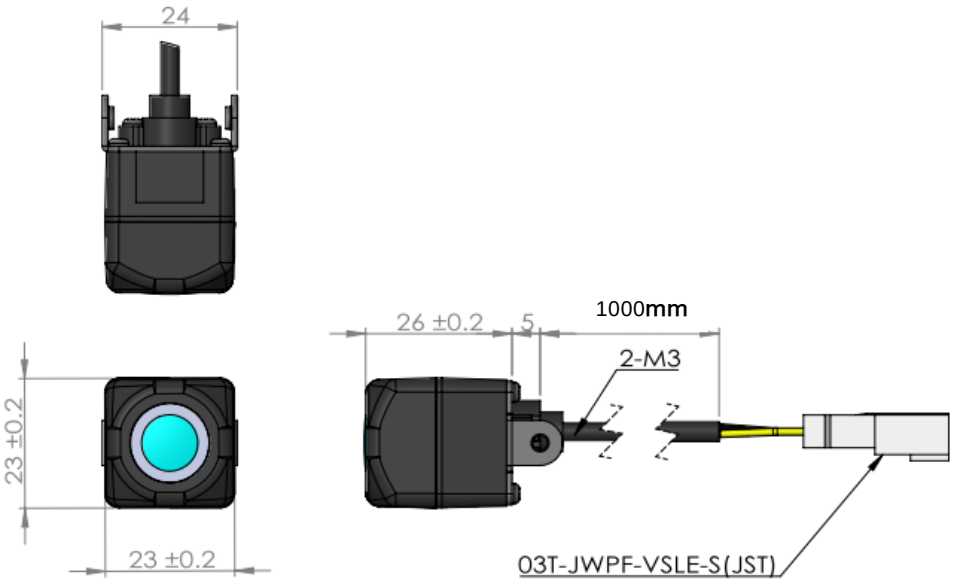
RVDD33=1.5V; DVDD15=1.5V

Specification	MIN	TYP	MAX	Unit
White Level	90	100	110	IRE
Black Level		0		IRE
Burst Level	36	40	44	IRE
Sync Level	36	40	44	IRE

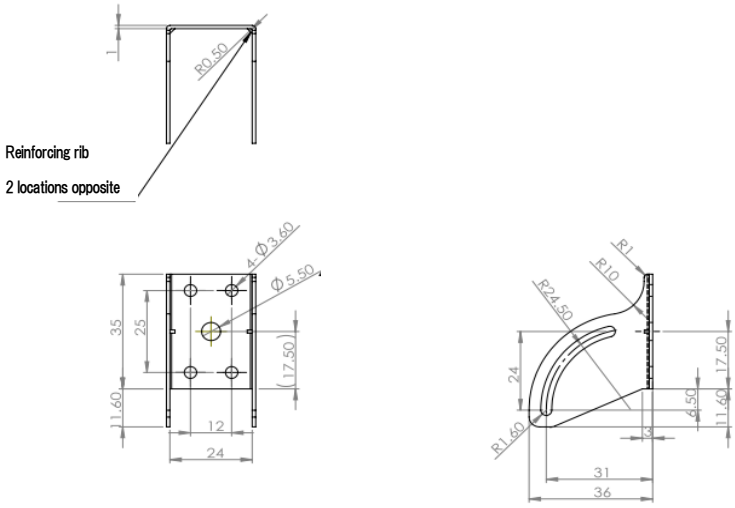


5. Dimensions (Tentative)

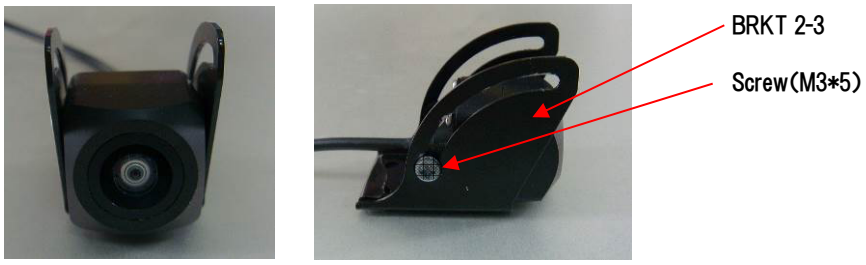
5-1. Camera module body



5-2. BRKT 2-3

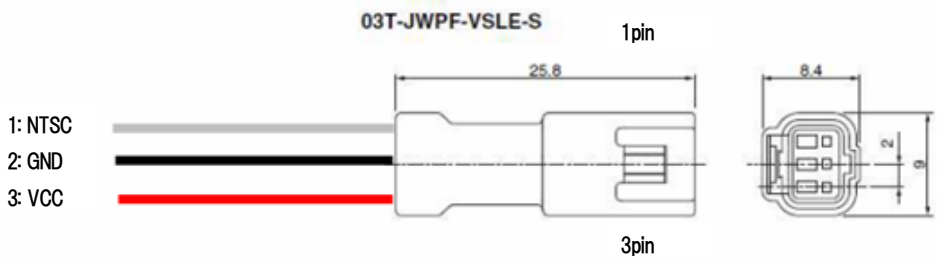


5-3. Assembled product



Front　　Side

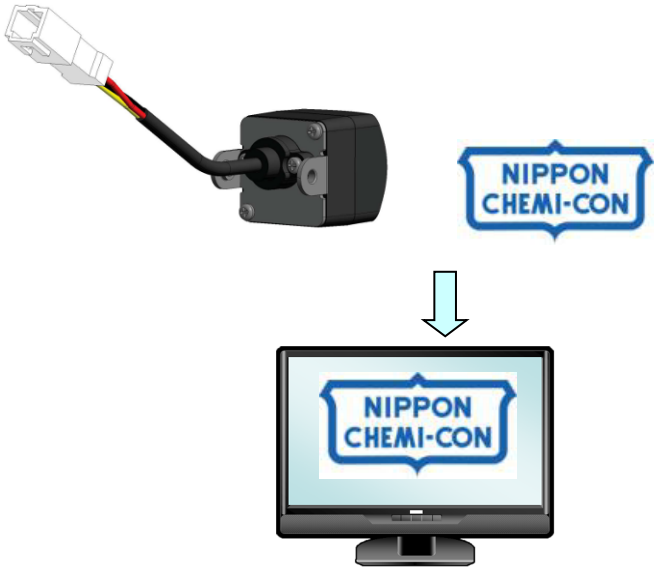
6. Output terminal



Connector： 03T-JWPF-VSLE-S (JST)

Terminal#	Symbol	I/O	Description
1	NTSC	O	NTSC
2	GND	I	GND
3	VCC	I	6V～12V

7. Imaging direction



8. Handling precautions

This camera module is designed to be incorporated into electronic equipment. Please note the following precautions to ensure safety design.

1) Operating temperature

Please make sure that the inside temperature of the equipment does not exceed the operating temperature.

2) Durability of CMOS imaging device against sunlight

If the device will be used under sunlight for long duration, the optical performance may be affected by deterioration of lens and sensor. Please confirm the application environment in advance.

3) Installation method

This camera module is not a dust or drip-proof. Please prevent water/dust to come inside when installing on equipment.

4) Electrostatic countermeasure

Please handle this camera module in the same way as semiconductor devices, avoiding electrostatic.

Recommended environment

① Use an electrically conductive mat on the workbench and the floor in the work area to remove static electricity.
② Workers should use antistatic clothing, wrist strap, etc.
③ Use electrostatically discharged jigs, boxes, bags, etc..
④ When handling, remove static electricity with an ionizer or the like.

5) Mechanical strength

This camera module is a precision optical component. Please handle with care so as not to give excessive mechanical shock.
Especially stress on the FPC crimping part should not be applied during and/or after the installation.
Please prevent dust and dirt from adhering to the surface of the lens, and be careful not to scratch the lens while handling or when removing foreign matter on the lens surface.

6) Disassembly/Modification

Please do not disassemble or modify this module. The warranty does not cover the product if it is disassembled or modified.

7) Safety standard

This camera module is a semi-finished product (module part), and we do not guarantee compliance to any safety standards by itself. Please obtain the safety standard with your finished product.

8) Safety design

Although we strive to improve the quality and reliability, there is always a risk of malfunctioning generally with semiconductor products. Please design the safety function in your equipment to prevent a harm to human life/health or property in case of potential malfunction of this camera module.

9) Storage

This camera module is a precision optical component. Avoid storing in high temperature/humidity/dust/environment and/or direct sunlight.

10) Use for specific applications

This camera module is intended to be used for commonly used electronic equipment (such as computer, office equipment, measuring equipment, industrial robot, home appliances, etc.). It is not intended to be used for equipment which requires extremely high quality and reliability, where its malfunction may directly affect human life or health, including but not limited to, nuclear power control equipment, aerospace equipment, transportation equipment, traffic signal equipment, combustion control, medical equipment, life support system, various safety devices, etc. (hereinafter referred to as specific applications).
If you are planning to use this module for applications other than those for general, commonly used electronic equipment, please contact us in advance.
We will not be responsible for any damage caused by this camera module if it is used for those specific applications without prior consultation.

11) Radiation resistance design

This product is not designed to withstand radiation.

12) Handling of export restricted cargo

Please follow the local laws/regulations of your country/region for exporting technical information of this product or the product itself.

13) Laws and Regulations

You cannot use this camera module for the products that are prohibited to manufacture or sell according to applicable laws and regulations.

360Kpixels (HDR) Global Shutter Camera Module

NCM03-CB is a global shutter type color camera module.
It has vertical 480 pixels, horizontal 752 pixels via 1/3 inch sensor.
Suitable for machine vision applications such as factory automation and industrial robots.

1. Features

1-1. Outline

- Compact all-in-one package
- 360K pixels digital output, 60fps at full resolution
- Global shutter
- HDR(High Dynamic Range) provides excellent imaging performance under various illumination environments
- Standby-mode available
- Serial bus control
- Power consumption current(TYP): 50[mA]
- Slave address Write address = 0xB8
  Read address = 0xB9

1-2. Sensor

- Optical format 1/3 inch optical format
- Active pixels 752(H) x 480(V)
- Image transfer rate Max 60fps (Full resolution)
- Scan mode Progressive or interlaced
- Shutter Global shutter
- Sensitivity 4.8V/Lux-Sec(550nm)
- Dynamic range >55dB: linear mode
  >100dB: HDR mode

1-3. Signal processing

- Digital output RAW 10bit Parallel
- Image format WVGA(752x480), QVGA(320x240), CIF(352x288), QCIF(176x144)
- Automatic control Auto Exposure Control(AEC),
  Auto Gain Control(AGC), 50/60Hz flicker cancellation
- Image mirroring (flipping up/down, left/right)

1-4. Lens

- Structure 2Glass 3Plastic
- F number 2.4
- Angle of view 98.2(D) / 86.6(H) / 64.0(V) (Image size: 640x480, Actual measurement value)
- Imaging range 40cm～∞
- IRCF Cut-off 650nm(50%)
- TV distortion -10.8%

2. Maximum ratings

	MIN	MAX	Unit
Power supply voltage	-0.3	4.5	V
Total power supply current	—	200	mA
Total ground current	—	200	mA
DC input voltage	-0.3	VDD + 0.3	V
DC output voltage	-0.3	VDD + 0.3	V
Storage temperature	-50	+150	℃

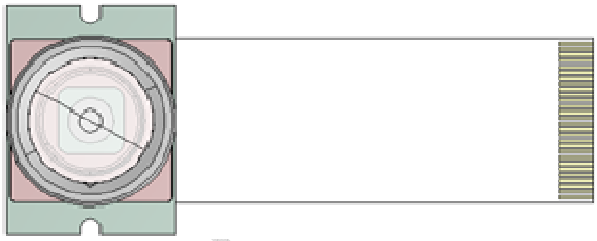
3. Recommended operating conditions

	MIN	TYP	MAX	Unit
DVDD(Digital Core)	3	3.3	3.6	V
AVDD(Analog)	3	3.3	3.6	V
Operating temperature	-20	-	60	℃
Storage temperature	-30	-	70	℃

※ Operation/storage should be under humidity 85%RH and at no dew condensation nor freezing environment.

4. Output terminal

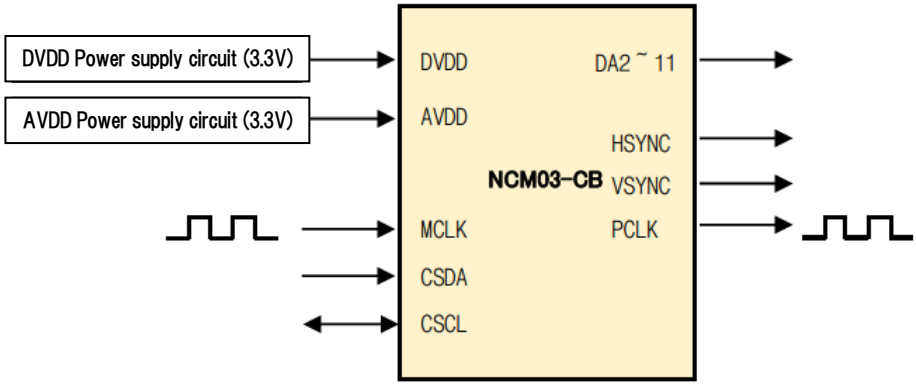
Terminal#	Symbol	I/O	Description
1	DGND	—	GND(digital)
2	MCLK	I	System clock
3	DGND	—	GND(digital)
4	EXPOSURE	I	External synchronization input
5	DGND	—	GND(digital)
6	DA2	O	Digital data output
7	DA3	O	Digital data output
8	DA4	O	Digital data output
9	DA5	O	Digital data output
10	DA6	O	Digital data output
11	DA7	O	Digital data output
12	DA8	O	Digital data output
13	DA9	O	Digital data output
14	DA10	O	Digital data output
15	DA11	O	Digital data output
16	STAND-BY	I	Stand-by mode (Active L) *1
17	RESET	I	System input reset
18	CSCL	I	Serial bus clock (Need to Pull-up) *2
19	CSDA	I/O	Serial bus data (Need to Pull-up) *2
20	HSYNC	O	Horizontal sync pulse output
21	VSYNC	O	Vertical sync pulse output
22	DGND	—	GND(digital)
23	PCLK	O	Data clock
24	DGND	—	GND(digital)
25	DVDD	—	Power(digital) for Core
26	AGND	—	GND(analog)
27	AVDD	—	Power(analog)
28	AGND	—	GND(analog)



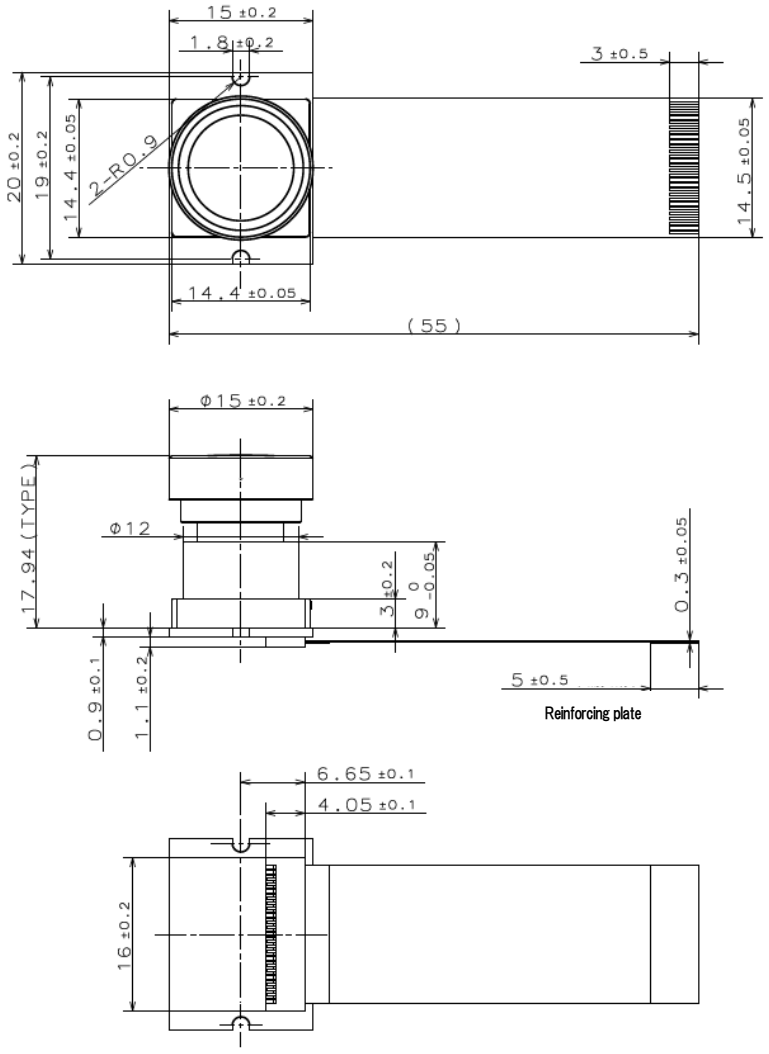
FPC specification
Number of terminals: 28
Thickness: 0.3±0.05mm
Terminal: 0.5mm pitch
Gold(Au) plating

*1 Do not leave this terminal open.
*2 There is no pull-up resistor in I^2C bus of this camera module.
Please add a pull-up circuit at your end if necessary.

5. Recommended power supply block diagram



6. Dimensions (Tentative)



※ Please attach thermal conducting sheet etc. on the connector side of the module to dissipate the heat.

7. Handling precautions

This camera module is designed to be incorporated into electronic equipment. Please note the following precautions to ensure safety design.

1) Operating temperature
Please make sure that the inside temperature of the equipment does not exceed the operating temperature.

2) Durability of CMOS imaging device against sunlight
If the device will be used under sunlight for long duration, the optical performance may be affected by deterioration of lens and sensor. Please confirm the application environment in advance.

3) Installation method
This camera module is not a dust or drip-proof. Please prevent water/dust to come inside when installing on equipment.

4) Electrostatic countermeasure
Please handle this camera module in the same way as semiconductor devices, avoiding electrostatic.
Recommended environment
① Use an electrically conductive mat on the workbench and the floor in the work area to remove static electricity.
② Workers should use antistatic clothing, wrist strap, etc.
③ Use electrostatically discharged jigs, boxes, bags, etc..
④ When handling, remove static electricity with an ionizer or the like.

5) Mechanical strength
This camera module is a precision optical component. Please handle with care so as not to give excessive mechanical shock.
Especially stress on the FPC crimping part should not be applied during and/or after the installation.
Please prevent dust and dirt from adhering to the surface of the lens, and be careful not to scratch the lens while handling or when removing foreign matter on the lens surface.

6) Disassembly/Modification
Please do not disassemble or modify this module. The warranty does not cover the product if it is disassembled or modified.

7) Safety standard
This camera module is a semi-finished product (module part), and we do not guarantee compliance to any safety standards by itself. Please obtain the safety standard with your finished product.

8) Safety design
Although we strive to improve the quality and reliability, there is always a risk of malfunctioning generally with semiconductor products. Please design the safety function in your equipment to prevent a harm to human life/health or property in case of potential malfunction of this camera module.

9) Storage
This camera module is a precision optical component. Avoid storing in high temperature/humidity/dust/environment and/or direct sunlight.

10) Use for specific applications
This camera module is intended to be used for commonly used electronic equipment (such as computer, office equipment, measuring equipment, industrial robot, home appliances, etc.). It is not intended to be used for equipment which requires extremely high quality and reliability, where its malfunction may directly affect human life or health, including but not limited to, nuclear power control equipment, aerospace equipment, transportation equipment, traffic signal equipment, combustion control, medical equipment, life support system, various safety devices, etc. (hereinafter referred to as specific applications).
If you are planning to use this module for applications other than those for general, commonly used electronic equipment, please contact us in advance.
We will not be responsible for any damage caused by this camera module if it is used for those specific applications without prior consultation.

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

12) Handling of export restricted cargo
Please follow the local laws/regulations of your country/region for exporting technical information of this product or the product itself.

13) Laws and Regulations
You cannot use this camera module for the products that are prohibited to manufacture or sell according to applicable laws and regulations.

HD Automotive (HDR) Camera Module NCM10-B

NCM10-B is a HD color camera module with built-in DSP.
It has vertical 800 pixels, horizontal 1280 pixels via 1/2.7 inch sensor.
Advantages: Low power consumption, good color reproducibility by primary color filter, downsizing by built-in DSP.
Suitable for image input device such as automotive view camera, event data recorder, security, network camera and authentication.

1. Features

1-1. Outline

- Compact all-in-one package
- 1Mega pixels, YUV422, 30fps uncompressed digital output
- HDR(High Dynamic Range) provides excellent imaging performance under various illumination environments
- Standby-mode available
- Serial bus control
- Power consumption current(TYP): 250[mA]

1-2. Sensor

- Optical format 1/2.7 inch optical format
- Active pixels 1280(H) x 800(V)
- Image transfer rate Max 30fps (Full resolution)
- Scan mode Progressive
- Shutter Rolling shutter
- Sensitivity 3650mV/Lux-Sec
- Dynamic range 115dB
- S/N ratio Max 39dB

1-3. Signal processing

- Digital output YUV422
- Image format WXGA(1280x800),HD720p(1280x720),WVGA(752x480),VGA(640x480),CIF,QVGA
- Automatic control Auto Exposure Control(AEC), Auto White Balance(AWB), Auto Gain Control(AGC), 50/60Hz flicker cancellation
- Image mirroring (flipping up/down, left/right)

1-4. Lens

- Structure 2Grass 3Plastic
- F number 2.4
- Angle of view 124(D) / 110(H) / 70(V) (HD 1280(H) x720(V))
- Imaging range 40cm～∞
- IRCF Cut-off 650nm(50%)
- TV distortion -10.8%

2. Recommended operating conditions

	NIM	TYP	MAX	Unit
DVDD(Digital Core)	1.425	1.5	1.575	V
AVDD(Analog)	3.14	3.3	3.47	V
HVDD(Digital I/O)	1.7	3.3(1.8)	3.47	V
Operating temperature	-30	-	80	℃
Storage temperature	-40	-	85	℃

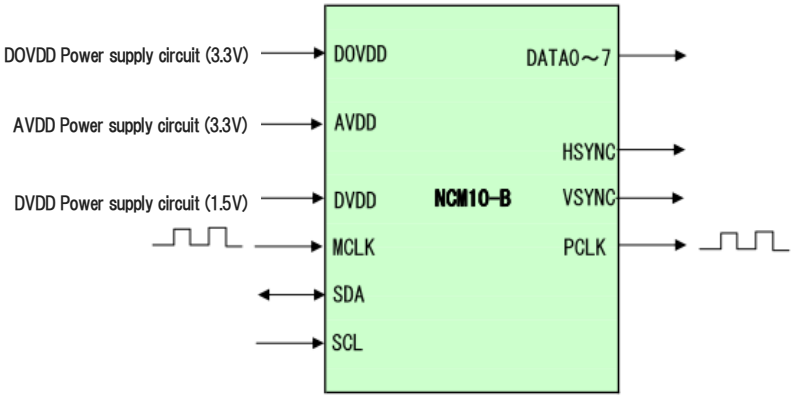
※Operation/storage should be under humidity 85%RH and at no dew condensation nor freezing environment.

3. Output terminal

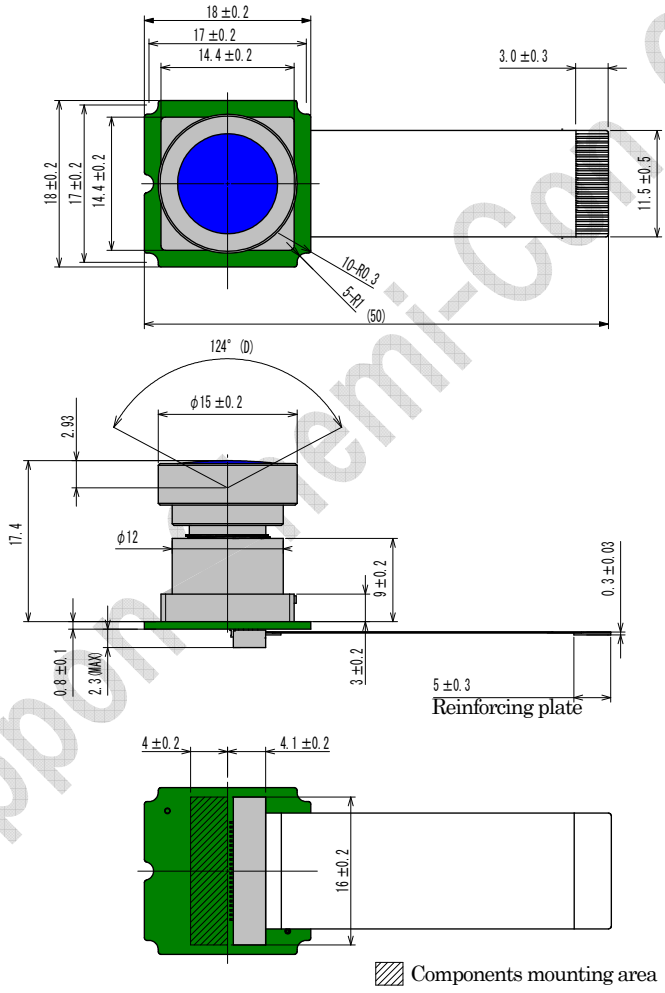
Terminal#	Symbol	I/O	Description
1	DVDD	—	Supply (digital) for Core
2	DGND	—	GND(digital)
3	PCLK	O	Data clock
4	DGND	—	GND(digital)
5	HSYNC	O	Horizontal sync pulse out
6	VSYNC	O	Vertical sync pulse
7	HVDD	—	Supply (digital) for IO
8	SDA	I/O	I2C bus I / F data
9	SCL	I	I2C bus I / F clock
10	RSTB	I	System input reset
11	DATA7	O	Digital data output
12	DATA6	O	Digital data output
13	DATA5	O	Digital data output
14	DATA4	O	Digital data output
15	DATA3	O	Digital data output
16	DATA2	O	Digital data output
17	DATA1	O	Digital data output
18	DATA0	O	Digital data output
19	STDBY	I	Standby mode
20	MCLK	I	System clock
21	AGND	—	GND(analog)
22	AVDD	—	Supply(analog)

<FPC specification>
Number of terminals: 22
Thickness: 0.3mm
Terminal : 0.5mm pitch
Gold(Au) plating

4. Recommended power supply block diagram



5. Dimensions



※ Please attach thermal conducting sheet etc. on the connector side of the module to dissipate the heat.

6. Handling precautions

This camera module is designed to be incorporated into electronic equipment. Please note the following precautions to ensure safety design.

1) Operating temperature
Please make sure that the inside temperature of the equipment does not exceed the operating temperature.

2) Durability of CMOS imaging device against sunlight
If the device will be used under sunlight for long duration, the optical performance may be affected by deterioration of lens and sensor.
Please confirm the application environment in advance.

3) Installation method
This camera module is not a dust or drip-proof. Please prevent water/dust to come inside when installing on equipment.

4) Electrostatic countermeasure
Please handle this camera module in the same way as semiconductor devices, avoiding electrostatic.
Recommended environment
① Use an electrically conductive mat on the workbench and the floor in the work area to remove static electricity.
② Workers should use antistatic clothing, wrist strap, etc.
③ Use electrostatically discharged jigs, boxes, bags, etc..
④ When handling, remove static electricity with an ionizer or the like.

5) Mechanical strength
This camera module is a precision optical component. Please handle with care so as not to give excessive mechanical shock.
Especially stress on the FPC crimping part should not be applied during and/or after the installation.
Please prevent dust and dirt from adhering to the surface of the lens, and be careful not to scratch the lens while handling or when removing foreign matter on the lens surface.

6) Disassembly/Modification
Please do not disassemble or modify this module. The warranty does not cover the product if it is disassembled or modified.

7) Safety standard
This camera module is a semi-finished product (module part), and we do not guarantee compliance to any safety standards by itself.
Please obtain the safety standard with your finished product.

8) Safety design
Although we strive to improve the quality and reliability, there is always a risk of malfunctioning generally with semiconductor products. Please design the safety function in your equipment to prevent a harm to human life/health or property in case of potential malfunction of this camera module.

9) Storage
This camera module is a precision optical component. Avoid storing in high temperature/humidity/dust/environment and/or direct sunlight.

10) Use for specific applications
This camera module is intended to be used for commonly used electronic equipment (such as computer, office equipment, measuring equipment, industrial robot, home appliances, etc.). It is not intended to be used for equipment which requires extremely high quality and reliability, where its malfunction may directly affect human life or health, including but not limited to, nuclear power control equipment, aerospace equipment, transportation equipment, traffic signal equipment, combustion control, medical equipment, life support system, various safety devices, etc. (hereinafter referred to as specific applications).
If you are planning to use this module for applications other than those for general, commonly used electronic equipment, please contact us in advance.
We will not be responsible for any damage caused by this camera module if it is used for those specific applications without prior consultation.

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

12) Handling of export restricted cargo
Please follow the local laws/regulations of your country/region for exporting technical information of this product or the product itself.

13) Laws and Regulations
You cannot use this camera module for the products that are prohibited to manufacture or sell according to applicable laws and regulations.

SXGA (DSP Built-in) Camera Module NCM13-M

NCM13-M is a SXGA color camera module with built-in DSP.
It has vertical 1024 pixels, horizontal 1280 pixels via 1/4 inch sensor.
Advantages: Low power consumption, good color reproducibility by primary color filter, downsizing by built-in DSP.
Suitable for image input device such as PC camera, network camera and authentication.

1. Features

1-1. Outline

- Compact all-in-one package
- Low profile, high quality image, low distortion
- Standby-mode available
- Serial bus control
- Power consumption(TYP): 180[mW]
- Slave address: Write address = 0xBA
  Read address = 0xBB

1-2. Sensor

- Optical format 1/4 inch optical format
- Active pixels 1280(H) x 1024(V)
- On chip color filter Primary color filter
- Image transfer rate Max 15fps (SXGA, MCLK54MHz)

1-3. Signal processing

- Digital output YCbCr, RGB565, RGB555, RGB444
- Image format SXGA, 640x512, 320x256, 160x128, VGA, QVGA, QQVGA, CIF, QCIF, QQCIF
- Automatic control Auto Exposure Control(AEC), Auto White Balance(AWB), 50/60Hz flicker cancellation
- Image mirroring (flipping up/down, left/right)

1-4. Lens

- Structure 3Plastic
- F number 2.8
- Angle of view 66(D) / 55(H) / 42(V)
- Imaging range 40cm～∞
- OLPF None
- IRCF Built-in
- TV distortion <=-0.14%

2. Recommended operating conditions

	MIN	TYP	MAX	Unit
Power supply voltage(DVDD)	1.7	1.8	1.9	V
Power supply voltage(AVDD)	2.5	2.8	3.1	V
Power supply voltage (HVDD)	2.5	2.8	3.1	V
Operating temperature	-20	–	60	℃
Storage temperature	-30	–	70	℃
Input high voltage	2.5	–	–	V
Input low voltage	–	–	0.3	V
MCLK	6	48	54	MHz

※Operation/storage should be under humidity 85%RH and at no dew condensation nor freezing environment.

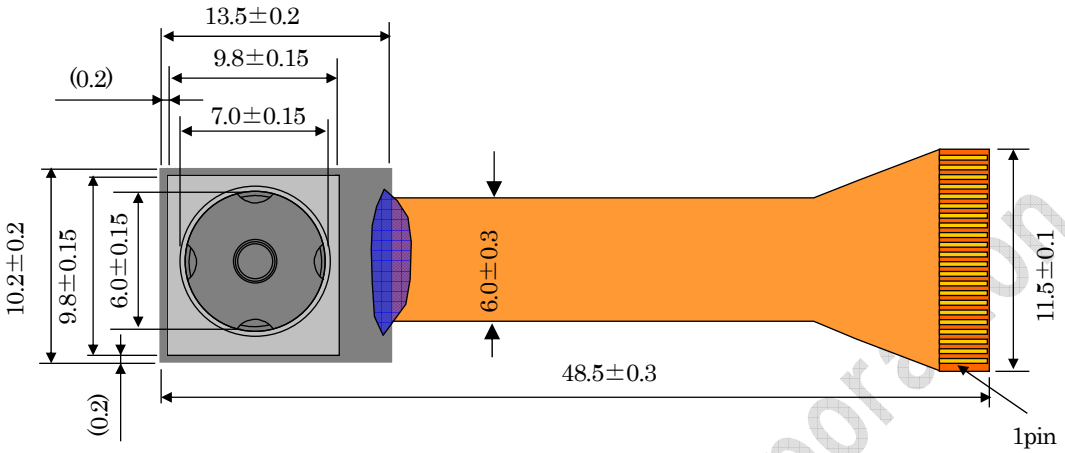
3. Maximum ratings

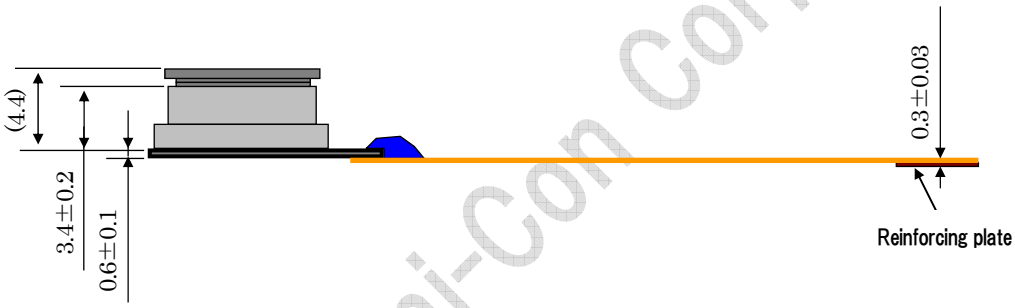
	MIN	MAX	Unit
DVDD(Digital Core)	-0.3	2.1	V
AVDD(Analog)	-0.3	4	V
HVDD(Digital I/O)	-0.3	3.1	V
Vin(DC input voltage)	-0.3	HVDD+0.3	V

4. Output terminal

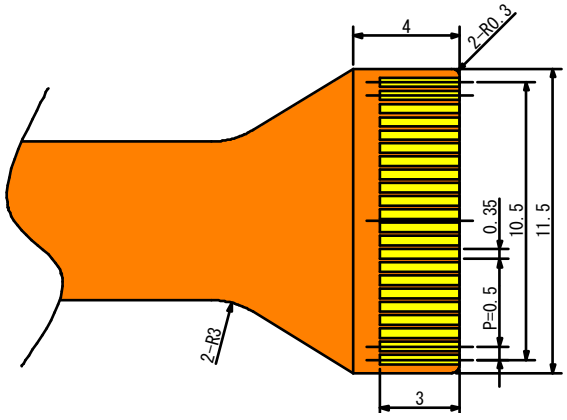
Terminal#	Symbol	I/O	Description
1	DVDD	—	Supply (digital) for Core
2	DGND	—	GND(Digital)
3	PCLK	O	Data clock
4	DGND	—	GND(Digital)
5	HSYNC	O	Horizontal sync pulse out
6	VSYNC	O	Vertical sync pulse
7	HVDD	—	Supply (digital) for IO
8	SDA	I/O	I2C bus I / F data
9	SCL	I	I2C bus I / F clock
10	RSTB	I	System input reset (Low active)
11	DATA7	O	Digital data output
12	DATA6	O	Digital data output
13	DATA5	O	Digital data output
14	DATA4	O	Digital data output
15	DATA3	O	Digital data output
16	DATA2	O	Digital data output
17	DATA1	O	Digital data output
18	DATA0	O	Digital data output
19	STDBY	I	Standby mode (Hi active)
20	MCLK	I	System clock
21	AGND	—	GND(Analog)
22	AVDD	—	Supply(Analog)

5. Dimensions

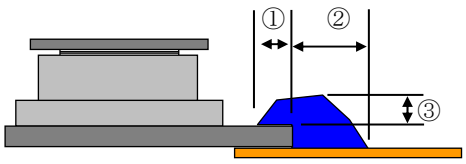




<FPC specification>
Number of terminals: 22
Thickness: 0.3mm
Terminal : 0.5mm pitch
Gold(Au) plating

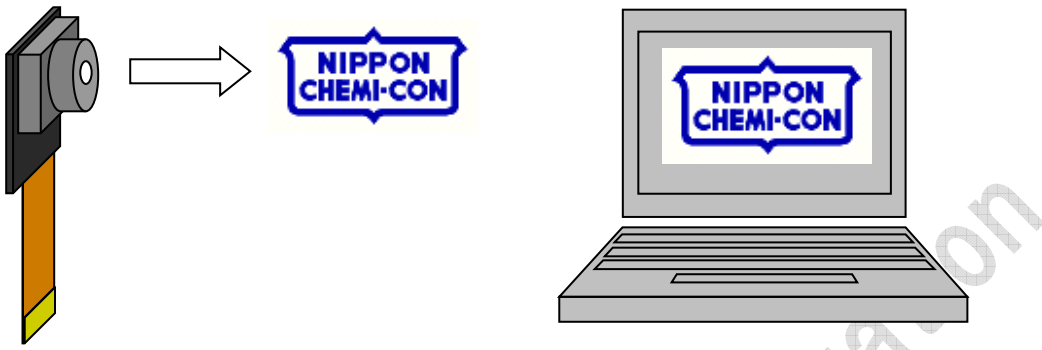


Adhesive to fix the FPC



No.	Standard Value
①	0.5～1.8mm
②	2.0±1.0mm
③	0.05～1.0mm

6. Imaging Direction



7. Handling precautions

This camera module is designed to be incorporated into electronic equipment. Please note the following precautions to ensure safety design.

1) Operating temperature
Please make sure that the inside temperature of the equipment does not exceed the operating temperature.

2) Durability of CMOS imaging device against sunlight
If the device will be used under sunlight for long duration, the optical performance may be affected by deterioration of lens and sensor. Please confirm the application environment in advance.

3) Installation method
This camera module is not a dust or drip-proof. Please prevent water/dust to come inside when installing on equipment.

4) Electrostatic countermeasure
Please handle this camera module in the same way as semiconductor devices, avoiding electrostatic.
Recommended environment
① Use an electrically conductive mat on the workbench and the floor in the work area to remove static electricity.
② Workers should use antistatic clothing, wrist strap, etc.
③ Use electrostatically discharged jigs, boxes, bags, etc..
④ When handling, remove static electricity with an ionizer or the like.

5) Mechanical strength
This camera module is a precision optical component. Please handle with care so as not to give excessive mechanical shock.
Especially stress on the FPC crimping part should not be applied during and/or after the installation.
Please prevent dust and dirt from adhering to the surface of the lens, and be careful not to scratch the lens while handling or when removing foreign matter on the lens surface.

6) Disassembly/Modification
Please do not disassemble or modify this module. The warranty does not cover the product if it is disassembled or modified.

7) Safety standard
This camera module is a semi-finished product (module part), and we do not guarantee compliance to any safety standards by itself. Please obtain the safety standard with your finished product.

8) Safety design
Although we strive to improve the quality and reliability, there is always a risk of malfunctioning generally with semiconductor products. Please design the safety function in your equipment to prevent a harm to human life/health or property in case of potential malfunction of this camera module.

9) Storage
This camera module is a precision optical component. Avoid storing in high temperature/humidity/dust/environment and/or direct sunlight.

10) Use for specific applications
This camera module is intended to be used for commonly used electronic equipment (such as computer, office equipment, measuring equipment, industrial robot, home appliances, etc.). It is not intended to be used for equipment which requires extremely high quality and reliability, where its malfunction may directly affect human life or health, including but not limited to, nuclear power control equipment, aerospace equipment, transportation equipment, traffic signal equipment, combustion control, medical equipment, life support system, various safety devices, etc. (hereinafter referred to as specific applications).
If you are planning to use this module for applications other than those for general, commonly used electronic equipment, please contact us in advance.
We will not be responsible for any damage caused by this camera module if it is used for those specific applications without prior consultation.

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

12) Handling of export restricted cargo
Please follow the local laws/regulations of your country/region for exporting technical information of this product or the product itself.

13) Laws and Regulations
You cannot use this camera module for the products that are prohibited to manufacture or sell according to applicable laws and regulations.

SXGA (DSP Built-in) Camera Module NCM13-K

NCM13-K is a SXGA color camera module with built-in DSP.
It has vertical 1024 pixels, horizontal 1280 pixels via 1/4 inch sensor.
Advantages: Low power consumption, good color reproducibility by primary color filter, downsizing by built-in DSP.
Suitable for image input device such as PC camera, network camera and authentication.

1. Features

1-1. Outline

- Compact all-in-one package
- Small and wide angle plastic lens (H135°)
- Standby-mode available
- Serial bus control
- Power consumption (TYP): 180[mW]
- Slave address: Write address = 0xBA
  Read address = 0xBB

1-2. Sensor

- Optical format 1/4 inch optical format
- Active pixels 1280(H) x 1024(V)
- On chip color filter Primary color filter
- Image transfer rate Max 15fps (SXGA, MCLK54MHz)

1-3. Signal processing

- Digital output YCbCr, RGB565, RGB555, RGB444
- Image format SXGA, 640x512, 320x256, 160x128, VGA, QVGA, QQVGA, CIF, QCIF, QQCIF
- Automatic control Auto Exposure Control(AEC), Auto White Balance(AWB), 50/60Hz flicker cancellation
- Image mirroring (flipping up/down, left/right)

1-4. Lens

- Structure 4Plastic
- F number 2.6
- Angle of view 169(D) / 135(H) / 113(V)
- Imaging range 40cm～∞
- OLPF None
- IRCF Built-in
- TV distortion <=-18.0%(TYP)

2. Recommended operating conditions

	MIN	TYP	MAX	Unit
Power supply voltage(DVDD)	1.7	1.8	1.9	V
Power supply voltage(AVDD)	2.5	2.8	3.1	V
Power supply voltage (HVDD)	2.5	2.8	3.1	V
Operating temperature	-20	–	60	℃
Storage temperature	-30	–	70	℃
Input high voltage	2.5	–	–	V
Input low voltage	–	–	0.3	V
MCLK	6	48	54	MHz

※Operation/storage should be under humidity 85%RH and at no dew condensation nor freezing environment.

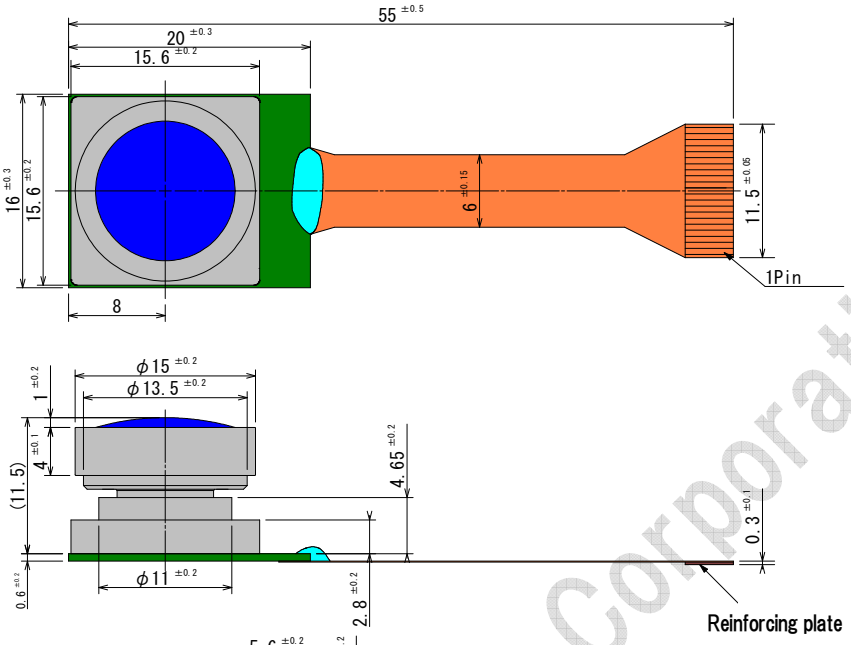
3. Maximum ratings

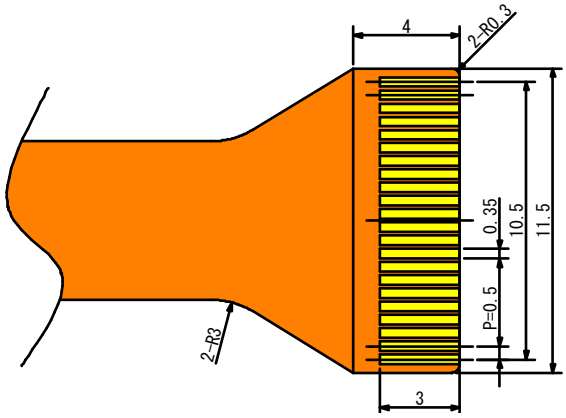
	MIN	MAX	Unit
DVDD(Digital Core)	-0.3	2.1	V
AVDD(Analog)	-0.3	4	V
HVDD(Digital I/O)	-0.3	3.1	V
Vin(DC input voltage)	-0.3	HVDD+0.3	V

4. Output terminal

Terminal#	Symbol	I/O	Description
1	DVDD	—	Supply (digital) for Core
2	DGND	—	GND(Digital)
3	PCLK	O	Data clock
4	DGND	—	GND(Digital)
5	HSYNC	O	Horizontal sync pulse out
6	VSYNC	O	Vertical sync pulse
7	HVDD	—	Supply (digital) for IO
8	SDA	I/O	I2C bus I / F data
9	SCL	I	I2C bus I / F clock
10	RSTB	I	System input reset (Low active)
11	DATA7	O	Digital data output
12	DATA6	O	Digital data output
13	DATA5	O	Digital data output
14	DATA4	O	Digital data output
15	DATA3	O	Digital data output
16	DATA2	O	Digital data output
17	DATA1	O	Digital data output
18	DATA0	O	Digital data output
19	STDBY	I	Standby mode (Hi active)
20	MCLK	I	System clock
21	AGND	—	GND(Analog)
22	AVDD	—	Supply(Analog)

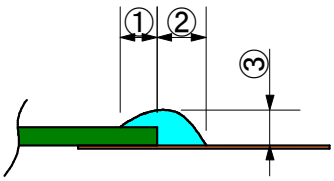
5. Dimensions





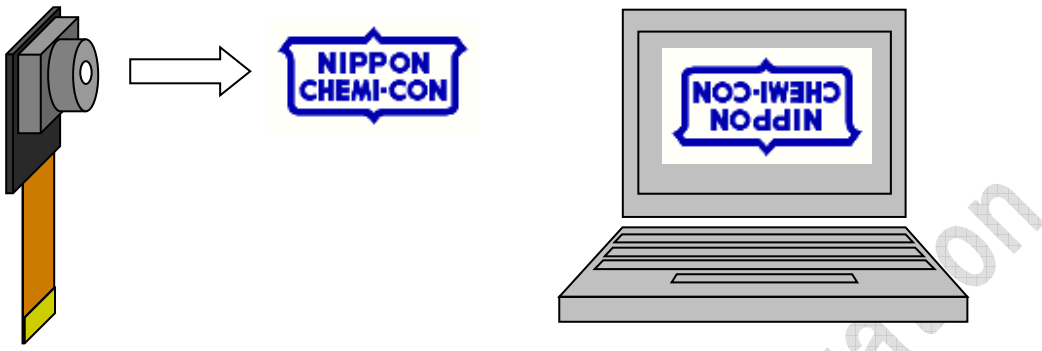
<FPC specification>
Number of terminals: 22
Thickness: 0.3mm
Terminal : 0.5mm pitch
Gold(Au) plating

Adhesive to fix the FPC



No.	Standard Value
①	0.5～1.8mm
②	2.0±1.0mm
③	0.05～0.5mm

6. Imaging Direction



7. Handling precautions

This camera module is designed to be incorporated into electronic equipment. Please note the following precautions to ensure safety design.

1) Operating temperature
Please make sure that the inside temperature of the equipment does not exceed the operating temperature.

2) Durability of CMOS imaging device against sunlight
If the device will be used under sunlight for long duration, the optical performance may be affected by deterioration of lens and sensor. Please confirm the application environment in advance.

3) Installation method
This camera module is not a dust or drip-proof. Please prevent water/dust to come inside when installing on equipment.

4) Electrostatic countermeasure
Please handle this camera module in the same way as semiconductor devices, avoiding electrostatic.
Recommended environment
① Use an electrically conductive mat on the workbench and the floor in the work area to remove static electricity.
② Workers should use antistatic clothing, wrist strap, etc.
③ Use electrostatically discharged jigs, boxes, bags, etc..
④ When handling, remove static electricity with an ionizer or the like.

5) Mechanical strength
This camera module is a precision optical component. Please handle with care so as not to give excessive mechanical shock.
Especially stress on the FPC crimping part should not be applied during and/or after the installation.
Please prevent dust and dirt from adhering to the surface of the lens, and be careful not to scratch the lens while handling or when removing foreign matter on the lens surface.

6) Disassembly/Modification
Please do not disassemble or modify this module. The warranty does not cover the product if it is disassembled or modified.

7) Safety standard
This camera module is a semi-finished product (module part), and we do not guarantee compliance to any safety standards by itself. Please obtain the safety standard with your finished product.

8) Safety design
Although we strive to improve the quality and reliability, there is always a risk of malfunctioning generally with semiconductor products. Please design the safety function in your equipment to prevent a harm to human life/health or property in case of potential malfunction of this camera module.

9) Storage
This camera module is a precision optical component. Avoid storing in high temperature/humidity/dust/environment and/or direct sunlight.

10) Use for specific applications
This camera module is intended to be used for commonly used electronic equipment (such as computer, office equipment, measuring equipment, industrial robot, home appliances, etc.). It is not intended to be used for equipment which requires extremely high quality and reliability, where its malfunction may directly affect human life or health, including but not limited to, nuclear power control equipment, aerospace equipment, transportation equipment, traffic signal equipment, combustion control, medical equipment, life support system, various safety devices, etc. (hereinafter referred to as specific applications).
If you are planning to use this module for applications other than those for general, commonly used electronic equipment, please contact us in advance.
We will not be responsible for any damage caused by this camera module if it is used for those specific applications without prior consultation.

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

12) Handling of export restricted cargo
Please follow the local laws/regulations of your country/region for exporting technical information of this product or the product itself.

13) Laws and Regulations
You cannot use this camera module for the products that are prohibited to manufacture or sell according to applicable laws and regulations.

SXGA (DSP Built-in) Camera Module NCM13-K2

NCM13-K2 is a SXGA color camera module with built-in DSP.
It has vertical 1024 pixels, horizontal 1280 pixels via 1/4 inch sensor.
Advantages: Low power consumption, good color reproducibility by primary color filter, downsizing by built-in DSP.
Suitable for image input device such as PC camera, network camera and authentication.

1. Features

1-1. Outline

- Compact all-in-one package
- Standby-mode available
- Serial bus control
- Power consumption (TYP): 180[mW]
- Slave address: Write address = 0xBA
  Read address = 0xBB

1-2. Sensor

- Optical format 1/4 inch optical format
- Active pixels 1280(H) x 1024(V)
- On chip color filter Primary color filter
- Image transfer rate Max 15fps (SXGA, MCLK54MHz)

1-3. Signal processing

- Digital output YCbCr, RGB565, RGB555, RGB444, Bayer8+2
- Image format SXGA, VGA, QVGA, QQVGA, CIF, QCIF, QQCIF
- Automatic control Auto Exposure Control(AEC), Auto White Balance(AWB), 50/60Hz flicker cancellation
- Image mirroring (flipping up/down, left/right)

1-4. Lens

- Structure 5Plastic(L1:Plastic on hard coat)
- F number 2.6
- Angle of view 190(H) / 156(V)
- Imaging range 40cm～∞
- OLPF None
- IRCF Built-in

2. Recommended operating conditions

	MIN	TYP	MAX	Unit
Power supply voltage(DVDD)	1.7	1.8	1.9	V
Power supply voltage(AVDD)	2.5	2.8	3.1	V
Power supply voltage (HVDD)	2.5	2.8	3.1	V
Operating temperature	-20	–	60	℃
Storage temperature	-30	–	70	℃
Input high voltage	2.5	–	–	V
Input low voltage	–	–	0.3	V
MCLK	6	48	54	MHz

※Operation/storage should be under humidity 85%RH and at no dew condensation nor freezing environment.
※The operating temperature includes a temperature rise.

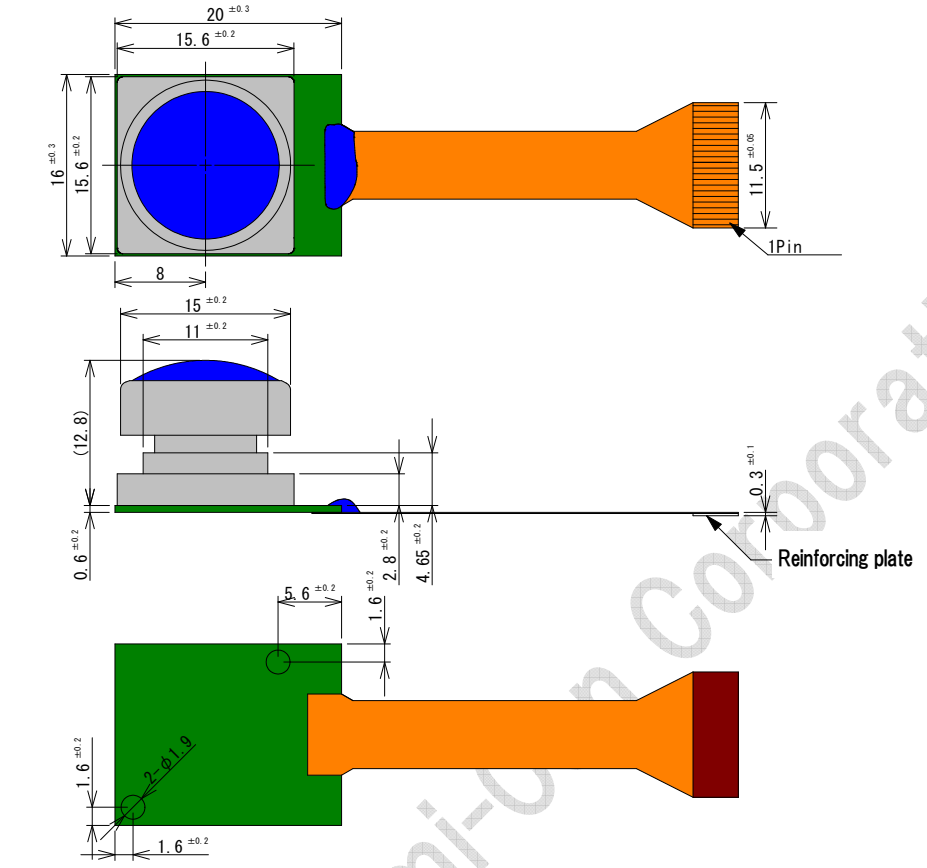
3. Maximum ratings

	MIN	MAX	Unit
DVDD(Digital Core)	-0.3	2.1	V
AVDD(Analog)	-0.3	4	V
HVDD(Digital I/O)	-0.3	3.1	V
Vin(DC input voltage)	-0.3	HVDD+0.3	V

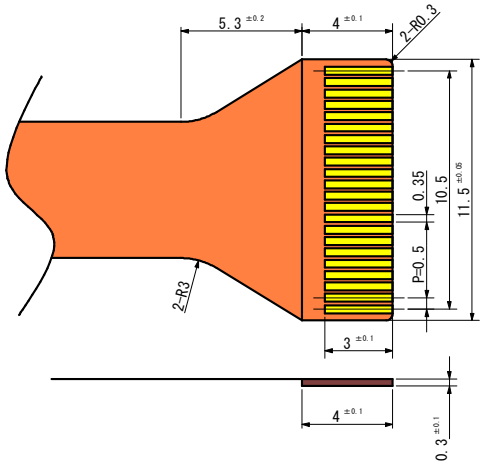
4. Output terminal

Terminal#	Symbol	I/O	Description
1	DVDD	—	Supply (digital) for Core
2	DGND	—	GND(Digital)
3	PCLK	O	Data clock
4	DGND	—	GND(Digital)
5	HSYNC	O	Horizontal sync pulse out
6	VSYNC	O	Vertical sync pulse
7	HVDD	—	Supply (digital) for IO
8	SDA	I/O	I2C bus I / F data
9	SCL	I	I2C bus I / F clock
10	RSTB	I	System input reset (Low active)
11	DATA7	O	Digital data output
12	DATA6	O	Digital data output
13	DATA5	O	Digital data output
14	DATA4	O	Digital data output
15	DATA3	O	Digital data output
16	DATA2	O	Digital data output
17	DATA1	O	Digital data output
18	DATA0	O	Digital data output
19	STDBY	I	Standby mode (Hi active)
20	MCLK	I	System clock
21	AGND	—	GND(Analog)
22	AVDD	—	Supply(Analog)

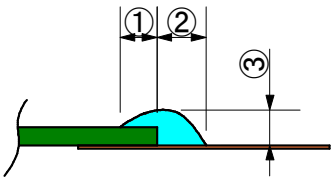
5. Dimensions



<FPC specification>
Number of terminals: 22
Thickness: 0.3mm
Terminal : 0.5mm pitch

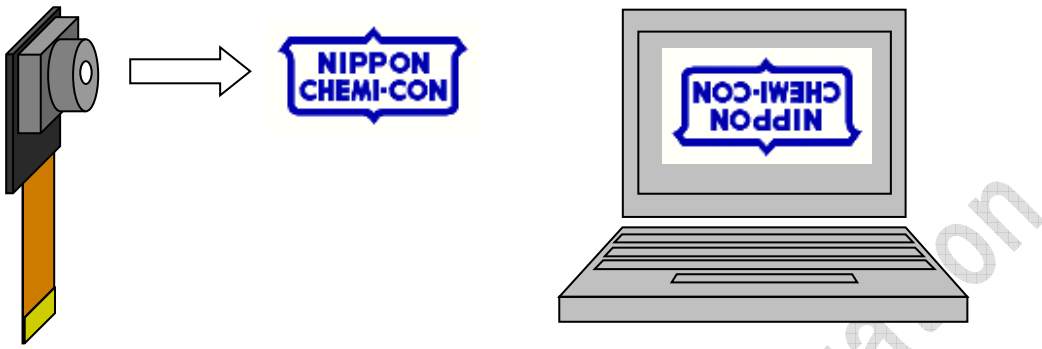


Adhesive to fix the FPC



No.	Standard Value
①	0.5～1.8mm
②	2.0±1.0mm
③	0.05～0.5mm

6. Imaging Direction



7. Handling precautions

This camera module is designed to be incorporated into electronic equipment. Please note the following precautions to ensure safety design.

1) Operating temperature
Please make sure that the inside temperature of the equipment does not exceed the operating temperature.

2) Durability of CMOS imaging device against sunlight
If the device will be used under sunlight for long duration, the optical performance may be affected by deterioration of lens and sensor. Please confirm the application environment in advance.

3) Installation method
This camera module is not a dust or drip-proof. Please prevent water/dust to come inside when installing on equipment.

4) Electrostatic countermeasure
Please handle this camera module in the same way as semiconductor devices, avoiding electrostatic.
Recommended environment
① Use an electrically conductive mat on the workbench and the floor in the work area to remove static electricity.
② Workers should use antistatic clothing, wrist strap, etc.
③ Use electrostatically discharged jigs, boxes, bags, etc..
④ When handling, remove static electricity with an ionizer or the like.

5) Mechanical strength
This camera module is a precision optical component. Please handle with care so as not to give excessive mechanical shock.
Especially stress on the FPC crimping part should not be applied during and/or after the installation.
Please prevent dust and dirt from adhering to the surface of the lens, and be careful not to scratch the lens while handling or when removing foreign matter on the lens surface.

6) Disassembly/Modification
Please do not disassemble or modify this module. The warranty does not cover the product if it is disassembled or modified.

7) Safety standard
This camera module is a semi-finished product (module part), and we do not guarantee compliance to any safety standards by itself. Please obtain the safety standard with your finished product.

8) Safety design
Although we strive to improve the quality and reliability, there is always a risk of malfunctioning generally with semiconductor products. Please design the safety function in your equipment to prevent a harm to human life/health or property in case of potential malfunction of this camera module.

9) Storage
This camera module is a precision optical component. Avoid storing in high temperature/humidity/dust/environment and/or direct sunlight.

10) Use for specific applications
This camera module is intended to be used for commonly used electronic equipment (such as computer, office equipment, measuring equipment, industrial robot, home appliances, etc.). It is not intended to be used for equipment which requires extremely high quality and reliability, where its malfunction may directly affect human life or health, including but not limited to, nuclear power control equipment, aerospace equipment, transportation equipment, traffic signal equipment, combustion control, medical equipment, life support system, various safety devices, etc. (hereinafter referred to as specific applications).
If you are planning to use this module for applications other than those for general, commonly used electronic equipment, please contact us in advance.
We will not be responsible for any damage caused by this camera module if it is used for those specific applications without prior consultation.

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

12) Handling of export restricted cargo
Please follow the local laws/regulations of your country/region for exporting technical information of this product or the product itself.

13) Laws and Regulations
You cannot use this camera module for the products that are prohibited to manufacture or sell according to applicable laws and regulations.

VGA USB I/F Camera Module NCM-USB-03D(55)

NCM-USB-03D(55) is a USB output VGA color camera module.
Advantages: Low power consumption, good color reproducibility by primary color filter.
This product is compatible with USB Video Class 1.0 and is suitable for video input device such as PC camera.
The output signal is YUV or MJPEG.

1. Features

1-1. Outline

- USB Video Class1.0
- No need of designated driver software
- Small plastic lens mounted

1-2. USB specification

- VID: 1742
- IManufacturer: Nippon Chemi-Con Corporation
- IProduct: NCM03-V-**

1-3. Sensor

- Optical format 1/4 inch optical format
- Active pixels 640(H) x 480(V)
- Color filter Primary color filter
- Frame rate Max 30fps

1-4. Signal processing

- Output signal USB2.0 USB Video Class1.0
- Output format YUV or MJPEG (Fixed to either)
- Image format VGA, QVGA, QQVGA, CIF, QCIF
- Automatic control Auto Exposure Control(AEC), Auto White Balance(AWB), Auto Gain Control(AGC)
- 50/60Hz flicker cancellation

1-5. Lens

- Structure 3Plastic
- F number 2.8
- Angle of view(TYP) Horizontal 55° , Vertical 42° , Diagonal 65°
- Imaging range 40cm～∞
- OLPF None
- IRCF Built-in
- TV distortion -0.14%

2. Specification

No.	Parameter	Specification
1	Operating temperature	-20℃～+60℃
2	Storage temperature	-30℃～+70℃
3	Weight	4.0g
4	Interface	USB2.0
5	Protocol	USB_Video_Class1.0 Isochronous YUV or Motion JPEG
6	Image format	VGA, QVGA, QQVGA, CIF, QCIF
7	Input voltage	USB Bus Power(5.0±0.25V)
8	Current consumption	120mA (Typ)
9	Outline	According to Dimensions
10	Connection	5pin connector (JST S5B-ZR(LF)(SN))
11	System requirements	Windows XP SP2･SP3, Windows 7

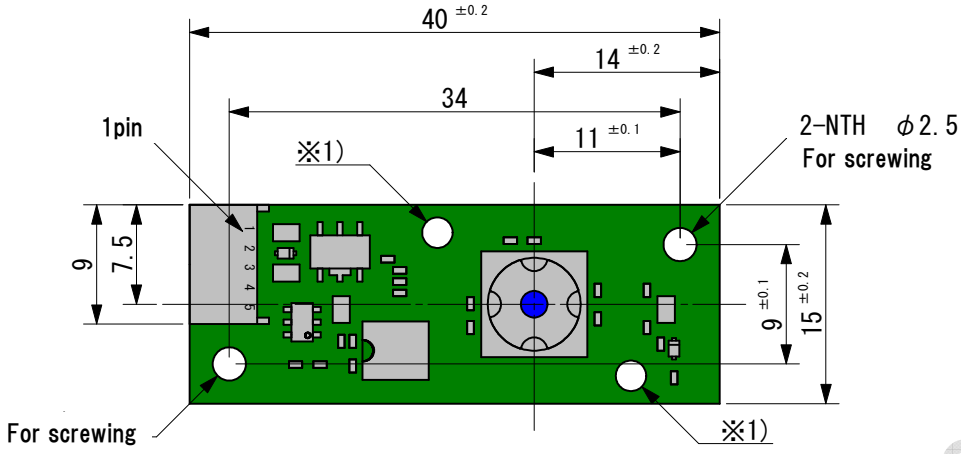
※ Operation/storage should be under humidity 85%RH and at no dew condensation nor freezing environment.

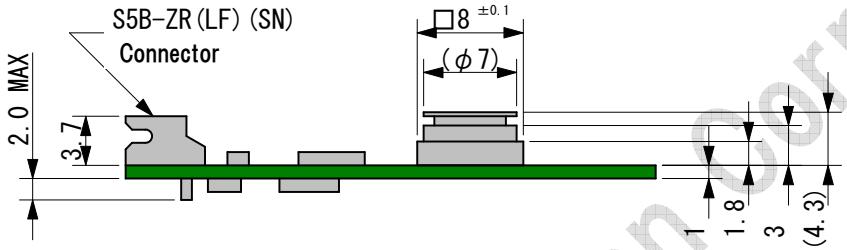
3. I/F Connector terminal

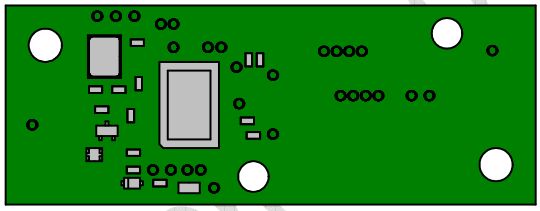
Terminal#	Symbol	Description
1	VBUS	DC power input 5.0±0.25V USB Bus Power
2	D-	USB data output -
3	D+	USB data output +
4	GND	GND
5	FGND	Frame GND

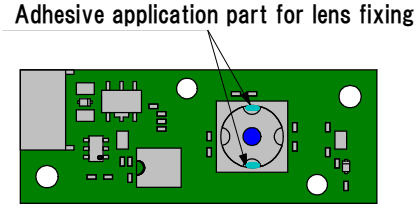
Recommended connector
JST ZHR-5

4. Dimensions



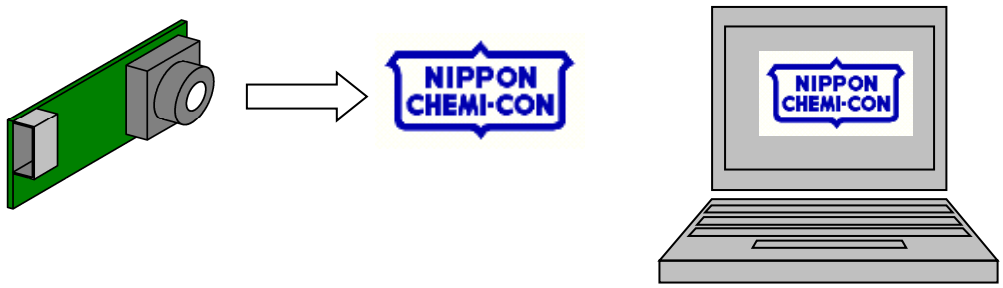






※1) Do not use this hole for screwing

5. Imaging direction



6. Handling precautions

This camera module is designed to be incorporated into electronic equipment. Please note the following precautions to ensure safety design.

1) Operating temperature
Please make sure that the inside temperature of the equipment does not exceed the operating temperature.

2) Durability of CMOS imaging device against sunlight
If the device will be used under sunlight for long duration, the optical performance may be affected by deterioration of lens and sensor. Please confirm the application environment in advance.

3) Installation method
This camera module is not a dust or drip-proof. Please prevent water/dust to come inside when installing on equipment.

4) Electrostatic countermeasure
Please handle this camera module in the same way as semiconductor devices, avoiding electrostatic.
Recommended environment
① Use an electrically conductive mat on the workbench and the floor in the work area to remove static electricity.
② Workers should use antistatic clothing, wrist strap, etc.
③ Use electrostatically discharged jigs, boxes, bags, etc..
④ When handling, remove static electricity with an ionizer or the like.

5) Mechanical strength
This camera module is a precision optical component. Please handle with care so as not to give excessive mechanical shock.
Especially stress on the FPC crimping part should not be applied during and/or after the installation.
Please prevent dust and dirt from adhering to the surface of the lens, and be careful not to scratch the lens while handling or when removing foreign matter on the lens surface.

6) Disassembly/Modification
Please do not disassemble or modify this module. The warranty does not cover the product if it is disassembled or modified.

7) Safety standard
This camera module is a semi-finished product (module part), and we do not guarantee compliance to any safety standards by itself. Please obtain the safety standard with your finished product.

8) Safety design
Although we strive to improve the quality and reliability, there is always a risk of malfunctioning generally with semiconductor products. Please design the safety function in your equipment to prevent a harm to human life/health or property in case of potential malfunction of this camera module.

9) Storage
This camera module is a precision optical component. Avoid storing in high temperature/humidity/dust/environment and/or direct sunlight.

10) Use for specific applications
This camera module is intended to be used for commonly used electronic equipment (such as computer, office equipment, measuring equipment, industrial robot, home appliances, etc.). It is not intended to be used for equipment which requires extremely high quality and reliability, where its malfunction may directly affect human life or health, including but not limited to, nuclear power control equipment, aerospace equipment, transportation equipment, traffic signal equipment, combustion control, medical equipment, life support system, various safety devices, etc. (hereinafter referred to as specific applications).
If you are planning to use this module for applications other than those for general, commonly used electronic equipment, please contact us in advance.
We will not be responsible for any damage caused by this camera module if it is used for those specific applications without prior consultation.

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

12) Handling of export restricted cargo
Please follow the local laws/regulations of your country/region for exporting technical information of this product or the product itself.

13) Laws and Regulations
You cannot use this camera module for the products that are prohibited to manufacture or sell according to applicable laws and regulations.

VGA USB I/F Camera Module NCM-USB-03D(105)

NCM-USB-03D(105) is a USB output VGA color camera module.
Advantages: Low power consumption, good color reproducibility by primary color filter.
This product is compatible with USB Video Class 1.0 and is suitable for video input device such as PC camera.
The output signal is YUV or MJPEG.

1. Features

1-1. Outline

- USB Video Class1.0
- No need of designated driver software
- Small plastic lens mounted

1-2. USB specification

- VID: 1742
- IManufacturer: Nippon Chemi-Con Corporation
- IProduct: NCM03-V-**

1-3. Sensor

- Optical format 1/4 inch optical format
- Active pixels 640(H) x 480(V)
- Color filter Primary color filter
- Frame rate Max 30fps

1-4. Signal processing

- Output signal USB2.0 USB Video Class1.0
- Output format YUV or MJPEG (Fixed to either)
- Image format VGA, QVGA, QQVGA, CIF, QCIF
- Automatic control Auto Exposure Control(AEC), Auto White Balance(AWB), Auto Gain Control(AGC)
- 50/60Hz flicker cancellation

1-5. Lens

- Structure 2Plastic
- F number 2.8
- Angle of view(TYP) Horizontal 105° , Vertical 78° , Diagonal 130°
- Imaging range 40cm～∞
- OLPF None
- IRCF Built in
- TV distortion <=-23%(TYP)

2. Specification

No.	Parameter	Specification
1	Operating temperature	-20℃～+60℃
2	Storage temperature	-30℃～+70℃
3	Weight	4.0g
4	Interface	USB2.0
5	Protocol	USB_Video_Class1.0 Isochronous YUV or Motion JPEG
6	Image format	VGA, QVGA, QQVGA, CIF, QCIF
7	Input voltage	USB Bus Power(5.0±0.25V)
8	Current consumption	120mA (Typ)
9	Outline	According to Dimensions
10	Connection	5pin connector (JST S5B-ZR(LF)(SN))
11	System requirements	Windows XP SP2・SP3, Windows 7

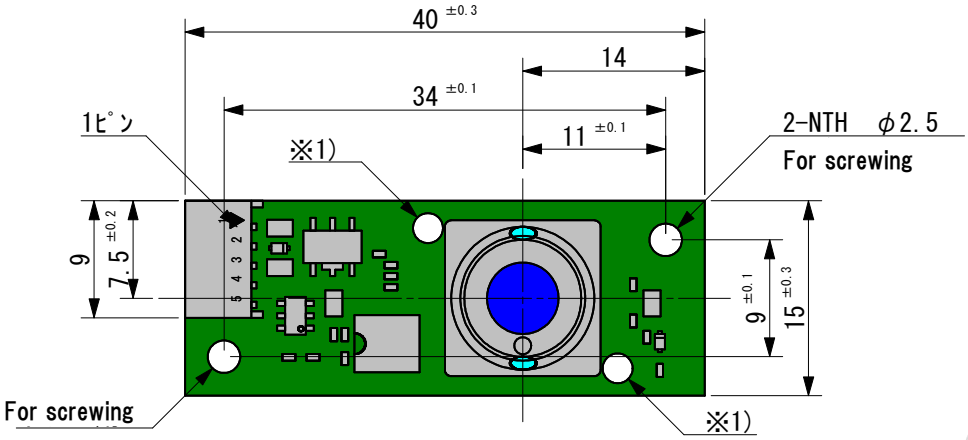
※ Operation/storage should be under humidity 85%RH and at no dew condensation nor freezing environment.

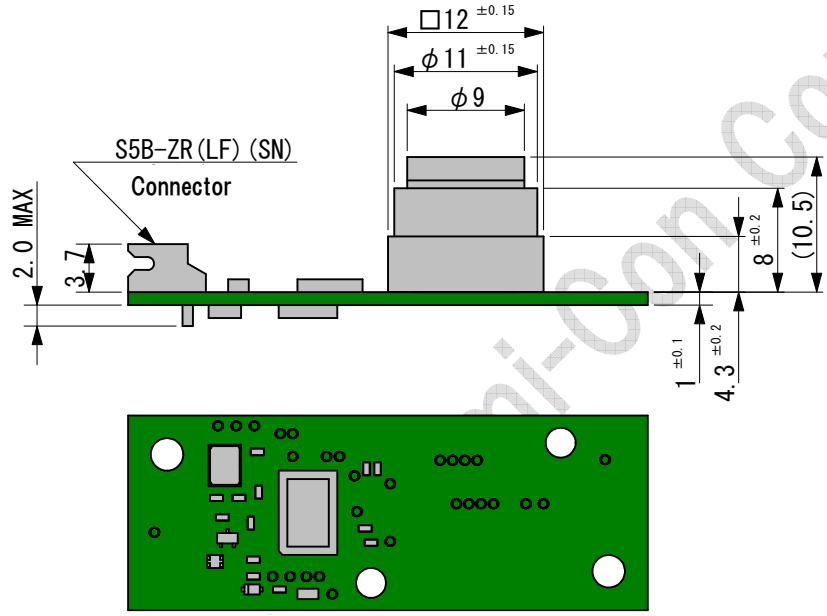
3. I/F Connector terminal

Terminal#	Symbol	Description
1	VBUS	DC power input 5.0±0.25V USB Bus Power
2	D-	USB data output -
3	D+	USB data output +
4	GND	GND
5	FGND	Frame GND

Recommended connector
JST ZHR-5

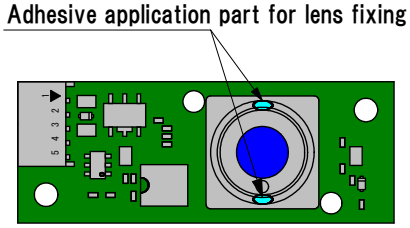
4. Dimensions



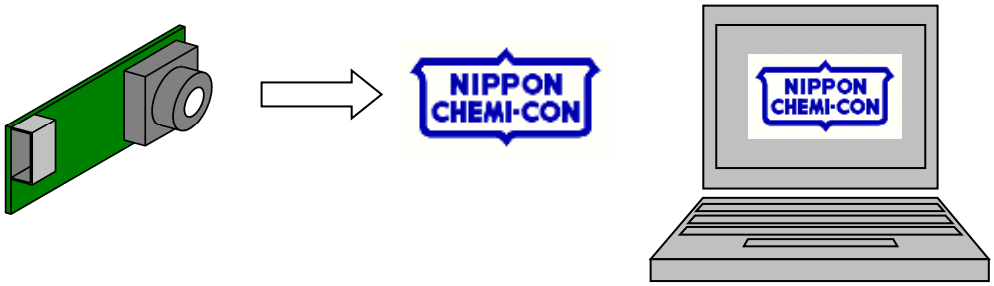


※1) Do not use this hole for screwing

Adhesive application part for lens fixing



5. Imaging direction



6. Handling precautions

This camera module is designed to be incorporated into electronic equipment. Please note the following precautions to ensure safety design.

1) Operating temperature
Please make sure that the inside temperature of the equipment does not exceed the operating temperature.

2) Durability of CMOS imaging device against sunlight
If the device will be used under sunlight for long duration, the optical performance may be affected by deterioration of lens and sensor. Please confirm the application environment in advance.

3) Installation method
This camera module is not a dust or drip-proof. Please prevent water/dust to come inside when installing on equipment.

4) Electrostatic countermeasure
Please handle this camera module in the same way as semiconductor devices, avoiding electrostatic.
Recommended environment
① Use an electrically conductive mat on the workbench and the floor in the work area to remove static electricity.
② Workers should use antistatic clothing, wrist strap, etc.
③ Use electrostatically discharged jigs, boxes, bags, etc..
④ When handling, remove static electricity with an ionizer or the like.

5) Mechanical strength
This camera module is a precision optical component. Please handle with care so as not to give excessive mechanical shock.
Especially stress on the FPC crimping part should not be applied during and/or after the installation.
Please prevent dust and dirt from adhering to the surface of the lens, and be careful not to scratch the lens while handling or when removing foreign matter on the lens surface.

6) Disassembly/Modification
Please do not disassemble or modify this module. The warranty does not cover the product if it is disassembled or modified.

7) Safety standard
This camera module is a semi-finished product (module part), and we do not guarantee compliance to any safety standards by itself. Please obtain the safety standard with your finished product.

8) Safety design
Although we strive to improve the quality and reliability, there is always a risk of malfunctioning generally with semiconductor products. Please design the safety function in your equipment to prevent a harm to human life/health or property in case of potential malfunction of this camera module.

9) Storage
This camera module is a precision optical component. Avoid storing in high temperature/humidity/dust/environment and/or direct sunlight.

10) Use for specific applications
This camera module is intended to be used for commonly used electronic equipment (such as computer, office equipment, measuring equipment, industrial robot, home appliances, etc.). It is not intended to be used for equipment which requires extremely high quality and reliability, where its malfunction may directly affect human life or health, including but not limited to, nuclear power control equipment, aerospace equipment, transportation equipment, traffic signal equipment, combustion control, medical equipment, life support system, various safety devices, etc. (hereinafter referred to as specific applications).
If you are planning to use this module for applications other than those for general, commonly used electronic equipment, please contact us in advance.
We will not be responsible for any damage caused by this camera module if it is used for those specific applications without prior consultation.

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

12) Handling of export restricted cargo
Please follow the local laws/regulations of your country/region for exporting technical information of this product or the product itself.

13) Laws and Regulations
You cannot use this camera module for the products that are prohibited to manufacture or sell according to applicable laws and regulations.

USB I/F Module NCM-USB-C

NCM-USB-C is a USB conversion module for our camera module.
This product is compatible with USB Video Class 1.0.
The output signal is YUV or MJPEG.

1. Features

1-1. Outline

- USB Video Class 1.0
- No need of designated driver software
- Supported camera module
  NCM03-S, NCM03-V, NCM03-W2, NCM13-M, NCM13-K, NCM13-K2, NCM20-D (*1)
- System requirements
  Windows XP(SP2～), Windows Vista, Windows7, Windows8 (*2)

1-2. USB specification

- Vender ID: 1742
- Product ID: ****(Depending on the camera module to be connected)
- IProduct: NCM*******(Depending on the camera module to be connected)

(*1) Since the firmware differs for each camera module, it does not work if a different camera module is connected.
(*2) It is not compatible with Linux or embedded OS.

2. Specification

No.	Parameter	Specification
1	Operating temperature	-20℃～+60℃ (Humidity:10%～85%)
2	Storage temperature	-30℃～+80℃ (Humidity:10%～85%)
3	Weight	3.1g (Typ)
4	Interface	USB2.0
5	Protocol	USB_Video_Class1.0 Isochronous YUV or Motion JPEG
6	Image format	VGA～UXGA
7	Input voltage	USB Bus Power(5.0±0.5V)
8	Current consumption	100mA (Typ) Does not include camera module
9	Outline	According to Dimensions
10	Connection	USB mini B

Frame rate

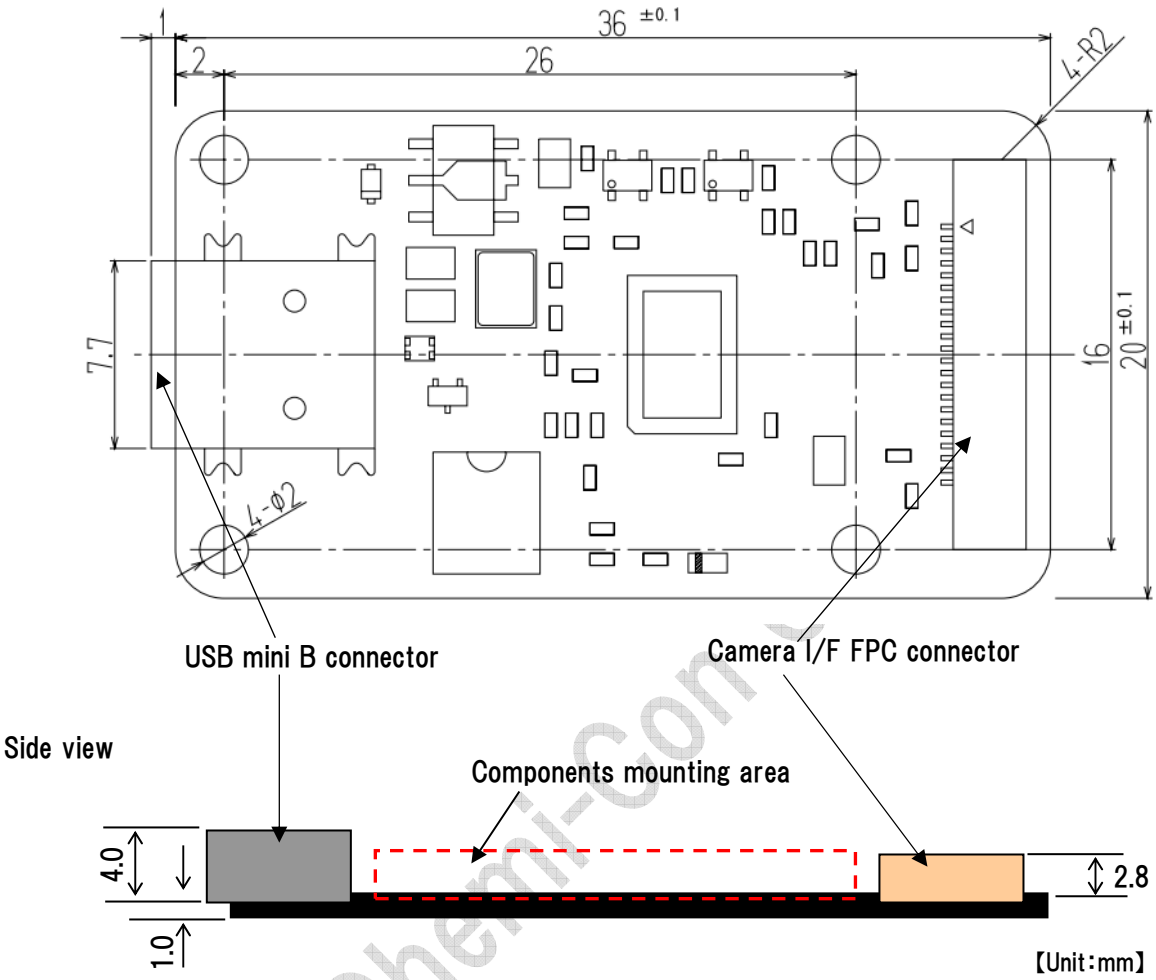
	VGA(0.3M pixels)		SXGA(1.3M pixels)		UXGA(2M pixels)	
Output format	YUV	MJPEG	YUV	MJPEG	YUV	MJPEG
Frame rate (fps)	～30	～30	～7	～14	～4	～10

3. Electrical characteristics

DC characteristics(Tentative)

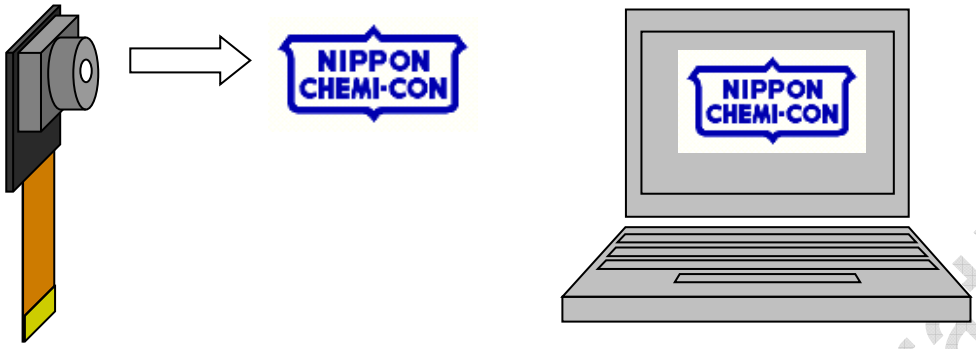
Symbol	Definition	Condition	MIN	TYP	MAX	Unit
V_{IH}	Input High Voltage		5-0.25	5.0	5+0.25	V
V_{OH}	Output High Voltage		DVDD-0.2			V
V_{OL}	Output Low Voltage				0.2	V
I_{DD}	Operating Supply Current	Default Settings CLOAD = 10pF	50.0	—	200.0	mA
I_{AA} Standby	Standby Supply Current	STDBY = DVDD			500	uA

4. Dimensions



<Input terminal specification>	
Terminal pitch	0.5mm
Number of terminals	22pin
Connector	
Manufacturer	JST
Model name	22FKZ-SM1-GB-1-TB(LF)(SN)
Contact	Upper contact

5. Imaging direction



- NCM03-V(YUV, MJPG)
- NCM03-S(YUV, MJPG)
- NCM03-W2(YUV, MJPG)
- NCM13-M(YUV, MJPG)
- NCM13-K(YUV, MJPG)
- NCM13-K2(YUV, MJPG)
- NCM20-D(YUV, MJPG)

6. Handling precautions

This camera module is designed to be incorporated into electronic equipment. Please note the following precautions to ensure safety design.

1) Operating temperature
Please make sure that the inside temperature of the equipment does not exceed the operating temperature.

2) Durability of CMOS imaging device against sunlight
If the device will be used under sunlight for long duration, the optical performance may be affected by deterioration of lens and sensor. Please confirm the application environment in advance.

3) Installation method
This camera module is not a dust or drip-proof. Please prevent water/dust to come inside when installing on equipment.

4) Electrostatic countermeasure
Please handle this camera module in the same way as semiconductor devices, avoiding electrostatic.
Recommended environment
① Use an electrically conductive mat on the workbench and the floor in the work area to remove static electricity.
② Workers should use antistatic clothing, wrist strap, etc.
③ Use electrostatically discharged jigs, boxes, bags, etc..
④ When handling, remove static electricity with an ionizer or the like.

5) Mechanical strength
This camera module is a precision optical component. Please handle with care so as not to give excessive mechanical shock.
Especially stress on the FPC crimping part should not be applied during and/or after the installation.
Please prevent dust and dirt from adhering to the surface of the lens, and be careful not to scratch the lens while handling or when removing foreign matter on the lens surface.

6) Disassembly/Modification
Please do not disassemble or modify this module. The warranty does not cover the product if it is disassembled or modified.

7) Safety standard
This camera module is a semi-finished product (module part), and we do not guarantee compliance to any safety standards by itself. Please obtain the safety standard with your finished product.

8) Safety design
Although we strive to improve the quality and reliability, there is always a risk of malfunctioning generally with semiconductor products. Please design the safety function in your equipment to prevent a harm to human life/health or property in case of potential malfunction of this camera module.

9) Storage
This camera module is a precision optical component. Avoid storing in high temperature/humidity/dust/environment and/or direct sunlight.

10) Use for specific applications
This camera module is intended to be used for commonly used electronic equipment (such as computer, office equipment, measuring equipment, industrial robot, home appliances, etc.). It is not intended to be used for equipment which requires extremely high quality and reliability, where its malfunction may directly affect human life or health, including but not limited to, nuclear power control equipment, aerospace equipment, transportation equipment, traffic signal equipment, combustion control, medical equipment, life support system, various safety devices, etc. (hereinafter referred to as specific applications).
If you are planning to use this module for applications other than those for general, commonly used electronic equipment, please contact us in advance.
We will not be responsible for any damage caused by this camera module if it is used for those specific applications without prior consultation.

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

12) Handling of export restricted cargo
Please follow the local laws/regulations of your country/region for exporting technical information of this product or the product itself.

13) Laws and Regulations
You cannot use this camera module for the products that are prohibited to manufacture or sell according to applicable laws and regulations.

USB I/F Module NCM-USB-E22, E28

NCM-USB-E is a USB conversion module for our camera module.
This product is compatible with USB Video Class 1.1.
The output signal is YUV or MJPEG.
Depending on the camera module type to be connected, a 22pin model and a 28pin model are available.

1. Features

1-1. Outline

- USB Video Class 1.1
- No need of designated driver software
- Supported camera module (*1)
  - 22pin model: NCM03-ZE, NCM10-B, NCM13-K, NCM13-M
    NCM03-S(Under development), NCM20-D(Under development)
  - 28pin model: NCM03-CB
    NCM20-M(Under development)
- System requirements
  Windows XP(SP2～), Windows Vista, Windows7, Windows8 (*2)

1-2. USB specification

- Vender ID: 1742
- Product ID: ****(Depending on the camera module to be connected)
- IProduct: NCM*******(Depending on the camera module to be connected)

(*1) Since the software differs for each camera module, it does not work if a different camera module is connected.
(*2) Operation is not guaranteed for Linux or embedded OS.

2. Specification

No.	Parameter	Specification
1	Operating temperature	-20℃～+60℃ (Humidity:10%～85%)
2	Storage temperature	-30℃～+80℃ (Humidity:10%～85%)
3	Weight	2.5g (22pin),3.2g(28pin)
4	Interface	USB2.0
5	Protocol	USB_Video_Class1.1 Isochronous YUV or Motion JPEG
6	Image format	VGA～Full HD(UXGA)
7	Input voltage	USB Bus Power(5.0±0.25V)
8	Current consumption	50mA～140mA (Typ) (*3)
9	Outline	According to Dimensions
10	Connection	USB micro B

(*3) Depending on the camera module to be connected.

Frame rate

	VGA (0.3Mpixels)		HD (1M pixels)		SXGA (1.3M pixels)		Full HD～UXGA (2M pixels)	
Output format	YUV	MJPEG	YUV	MJPEG	YUV	MJPEG	YUV	MJPEG
Frame rate(fps)	～30	～60	～10	～30	～6	～15	～5	～15

3. Electrical characteristics

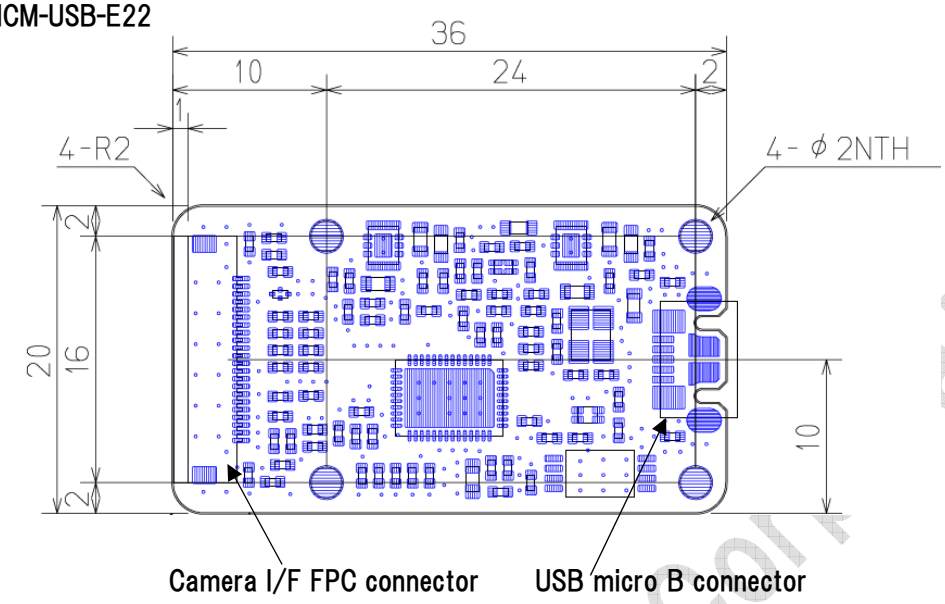
DC characteristics(Tentative)

Symbol	Definition	Condition	MIN	TYP	MAX	Unit	
V_{SUP}	Power Supply Voltage		5-0.25	5.0	5+0.25	V	(*4)
I_{DD}	Operating Supply Current	Default Settings CLOAD = 10pF	50.0	—	140	mA	

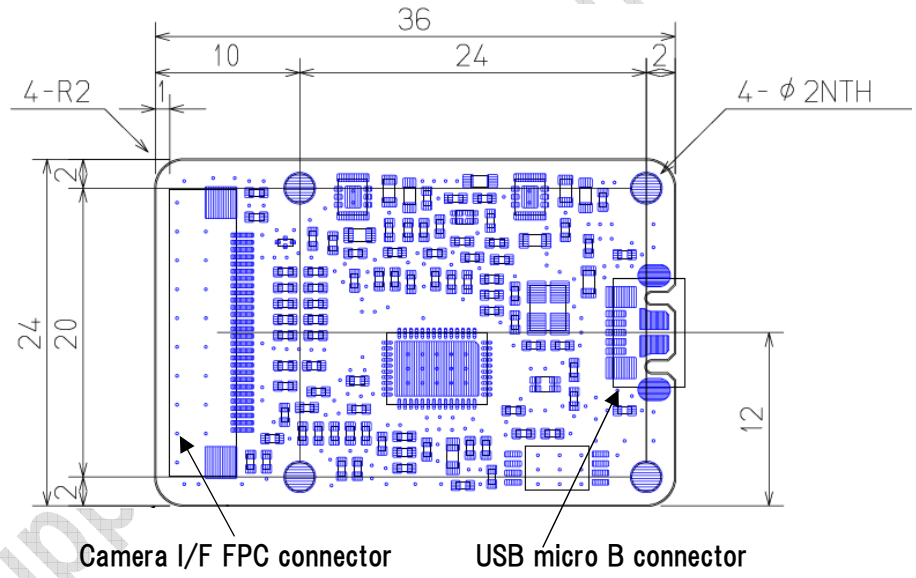
(*4) Depending on the camera module to be connected.

4. Dimensions

NCM-USB-E22



NCM-USB-E28



<Output terminal specification>	
Terminal pitch	0.5mm
Number of terminals	22pin or 28pin
Connector	
Manufacturer	JST
Model name	22FKZ-SM1-GB-1-TB(LF)(SN) / 28FLZ-SM2-GAN-TB(LF)(SN)
Contact	Upper contact

5. Part number

NCM - USB - E□□□

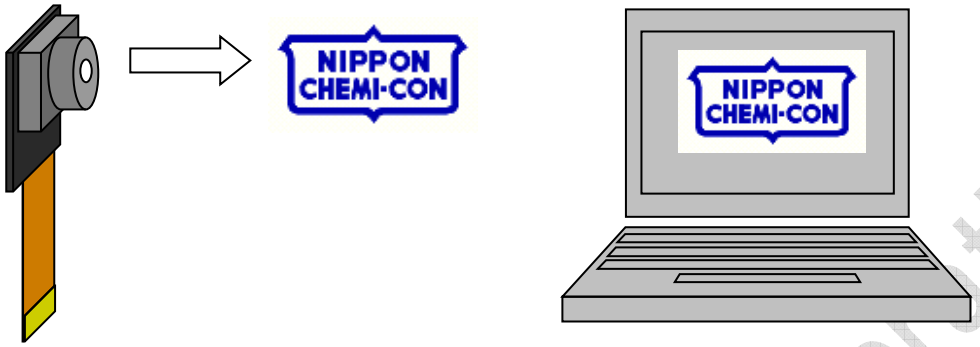
Part number suffix	Number of terminals	Operating conditions
22A	22	Core: 3.3V / Analog: 1.5V
22B	22	Core: 1.8V / Analog: 2.8V
28A	28	Core: 3.3V / Analog: 3.3V
28B(Under development)	28	Core: 1.8V / Analog: 2.8V

5-1. Supported camera module list

Part number	Camera module
NCM-USB-E22A	NCM03-ZE NCM10-B
NCM-USB-E22B	NCM13-K NCM13-M NCM03-S(*5) NCM03-V(*5) NCM20-D(*5)
NCM-USB-E28A	NCM03-CB
NCM-USB-E28B(*5)	NCM20-M(*5)

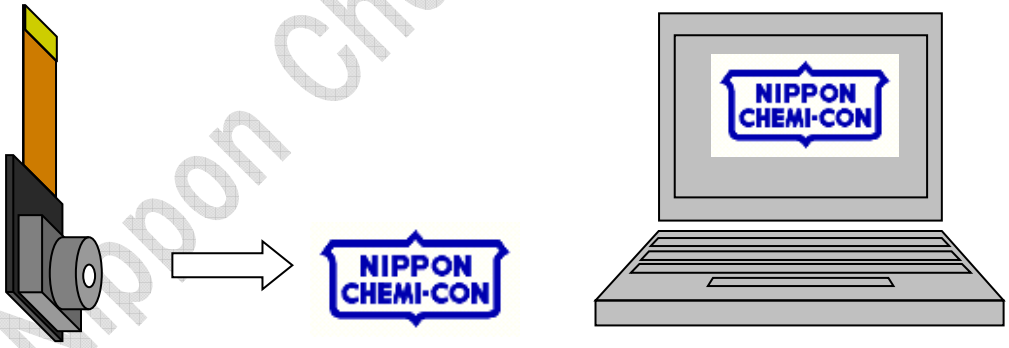
(*5) Under development

6. Imaging Direction



- NCM10-B(YUV, MJPG)
- NCM13-M/K(YUV, MJPG)
- NCM03-S(YUV, MJPG) (*6)
- NCM03-V(YUV, MJPG) (*6)
- NCM20-M(YUV, MJPG) (*6)

(*6) Under development



- NCM03-CB(YUV, MJPG)
- NCM03-ZE(YUV, MJPG)
- NCM20-D(YUV, MJPG) (*7)

(*7) Under development

7. Handling precautions

This camera module is designed to be incorporated into electronic equipment. Please note the following precautions to ensure safety design.

1) Operating temperature
Please make sure that the inside temperature of the equipment does not exceed the operating temperature.

2) Durability of CMOS imaging device against sunlight
If the device will be used under sunlight for long duration, the optical performance may be affected by deterioration of lens and sensor. Please confirm the application environment in advance.

3) Installation method
This camera module is not a dust or drip-proof. Please prevent water/dust to come inside when installing on equipment.

4) Electrostatic countermeasure
Please handle this camera module in the same way as semiconductor devices, avoiding electrostatic.
Recommended environment
① Use an electrically conductive mat on the workbench and the floor in the work area to remove static electricity.
② Workers should use antistatic clothing, wrist strap, etc.
③ Use electrostatically discharged jigs, boxes, bags, etc..
④ When handling, remove static electricity with an ionizer or the like.

5) Mechanical strength
This camera module is a precision optical component. Please handle with care so as not to give excessive mechanical shock.
Especially stress on the FPC crimping part should not be applied during and/or after the installation.
Please prevent dust and dirt from adhering to the surface of the lens, and be careful not to scratch the lens while handling or when removing foreign matter on the lens surface.

6) Disassembly/Modification
Please do not disassemble or modify this module. The warranty does not cover the product if it is disassembled or modified.

7) Safety standard
This camera module is a semi-finished product (module part), and we do not guarantee compliance to any safety standards by itself. Please obtain the safety standard with your finished product.

8) Safety design
Although we strive to improve the quality and reliability, there is always a risk of malfunctioning generally with semiconductor products. Please design the safety function in your equipment to prevent a harm to human life/health or property in case of potential malfunction of this camera module.

9) Storage
This camera module is a precision optical component. Avoid storing in high temperature/humidity/dust/environment and/or direct sunlight.

10) Use for specific applications
This camera module is intended to be used for commonly used electronic equipment (such as computer, office equipment, measuring equipment, industrial robot, home appliances, etc.). It is not intended to be used for equipment which requires extremely high quality and reliability, where its malfunction may directly affect human life or health, including but not limited to, nuclear power control equipment, aerospace equipment, transportation equipment, traffic signal equipment, combustion control, medical equipment, life support system, various safety devices, etc. (hereinafter referred to as specific applications).
If you are planning to use this module for applications other than those for general, commonly used electronic equipment, please contact us in advance.
We will not be responsible for any damage caused by this camera module if it is used for those specific applications without prior consultation.

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

12) Handling of export restricted cargo
Please follow the local laws/regulations of your country/region for exporting technical information of this product or the product itself.

13) Laws and Regulations
You cannot use this camera module for the products that are prohibited to manufacture or sell according to applicable laws and regulations.