SENTECH

STC-MBE132U3V

STC-MCE132U3V
USB 3.0 Vision Camera

Product Specifications

Safety Precautions
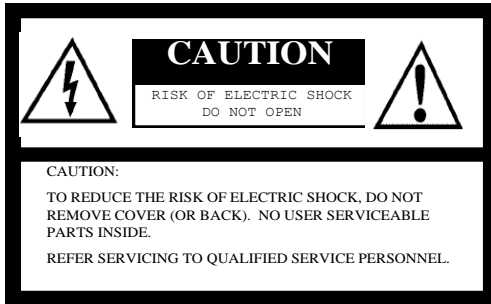
CAUTION RISK OF ELECTRIC SHOCK DO NOT OPEN CAUTION: TO REDUCE THE RISK OF ELECTRIC SHOCK, DO NOT REMOVE COVER (OR BACK). NO USER SERVICEABLE PARTS INSIDE. REFER SERVICING TO QUALIFIED SERVICE PERSONNEL.	For U.S.A. Warning: This equipment generates and uses radio frequency energy and if not installed and used properly, I.e., in strict accordance with the instruction manual, may cause harmful interference to radio communications. It has been tested and found to comply with the limits for a Class A computing device pursuant to Subpart J of Part 15 of FCC Rules, which are designed to provide reasonable protection against such interference when operated in a commercial environment.

The lightning flash with arrowhead symbol, within an equilateral triangle, is intended to alert the user to the presence of uninsulated "dangerous voltage" within the product's enclosure that may be of sufficient magnitude to constitute a risk of electric shock to persons.

For Canada
Warning:
This digital apparatus does not exceed the Class A limits for radio noise emissions from digital apparatus set out in the Radio Interference Regulations of the Canadian Department of Communications.

The exclamation point within an equilateral triangle is intended to alert the user to the presence of important operating and maintenance (servicing) instructions in the literature accompanying the appliance.

WARNING:
TO PREVENT FIRE OR SHOCK HAZARD, DO NOT EXPOSE THIS APPLIANCE TO RAIN OR MOISTURE.

Product Precautions

- Handle the camera with care. Do not abuse the camera. Avoid striking or shaking it. Improper handling or storage could damage the camera.
- Avoid pulling or damaging the camera cable.
- During camera use, avoid wrapping the unit in any material. This will cause the internal temperature of the unit to increase.
- Avoid exposing the camera to moisture, or operate it in wet areas.
- Avoid operating the camera beyond its temperature, humidity and power source ratings.
- While the camera is not being used, keep the lens or lens cap on the camera to prevent dust or contamination from getting in the CCD or filter area and scratching or damaging this area.
- Do not store the camera under the following conditions:
    - In wet, moist, and high humidity areas
    - Under hot direct sunlight
    - In high temperature areas
    - Near an object that releases a strong magnetic or electric field
    - Areas with strong vibrations
- Use a soft cloth to clean the camera. Use compressed air to clean the surface of the glass. Avoid scratching the surface of the glass.
- Defect pixels may appear due to the sensor characteristics.
- During camera use, avoid plugging or unplugging other USB devices (USB storage, etc.). Plugging or unplugging other devices may result in a failure to recognize the USB camera.
- Increasing gain level also increases the noise level.
- Note that the noise level increases when in long exposure mode.

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Notes on PCs with Power Save Mode

When the USB camera is used with a motherboard containing processor chipsets with power save mode, Intel Core i3, i5, or i7, the following problems may occur:

- An image cannot be obtained with the USB camera
- A frame drops frequently

* The issue may occur with other USB camera manufacturers as well.

A. Cause of the Issue

The computer is unable to transfer the image because the processor enters power save mode during the image transfer process.

B. Solutions for the Issue

This problem can be avoided by disabling power save mode on the processor chipset (if possible). However, increased power consumption and heat dissipation may be undesired effects of disabling power save mode.

1. Disable the power save mode by changing the BIOS settings.

Either set "ACPI C State" to "Disable" or decrease the "Max ACPI C State" value step by step until you see the effect (i.e. C3->C2->C1). (This setting may have a different name depending on the BIOS)

➢ If necessary, please contact the manufacturer of the PC about the BIOS settings.
➢ Users will be responsible for any changes made to the BIOS.

2. Disable the power save mode using the Sentech PC power management software (StPowerCtrl)
Please refer to the Start-Up Guide for the details.

3. Change the camera blanking period and reduce frame rate.

Contents

I. Overview

This document describes the specification of the following cameras:

STC-MBE132U3V / MCE132U3V (1.3 Megapixel)

A. Features

- USB 3 Vision (Pending)
- 60 FPS (Full Scan)
- CMOS Global / Rolling Shutter
- Up to 32 pixel blemish static collection (Default:ON) *Note1
- 8, 10 bit output (RGB 8 is supported on the color camera)

*Note 1: Even in camera initialization, pixel blemish static collection data will not be initialized on the EEPROM. The pixel blemish static collection data on the EEPROM can be set after camera initialization has read the data.

B. Naming Method

STC-MxE132U3V

U3V: USB3 Vision

132: 1.3M Pixel, 1/1.8" Sensor

Sensor Manufacturer
e: e2V

C: Color
B: Mono Chrome
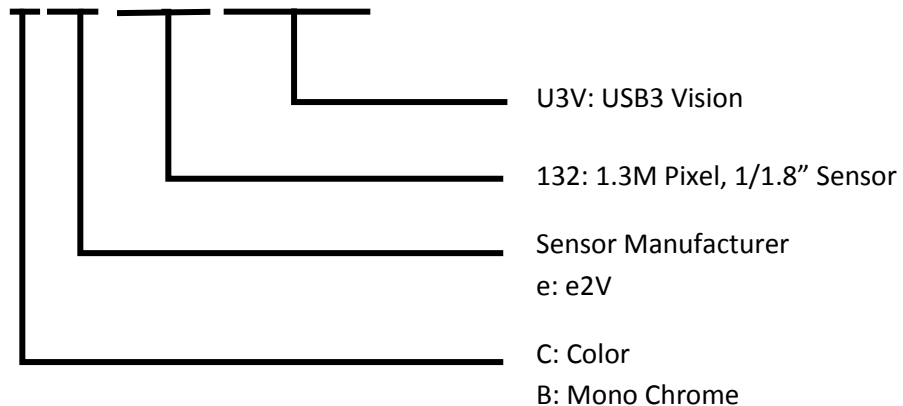
C. Support Application

This model supports the USB 3 Vision standard proposed by the Automated Imaging Association. Vision control software/libraries that support USB3 Vision can deploy their own USB3 Vision-compliant driver to control the camera. Otherwise, Sentech also provides its own driver and SDK for users to build their own application. A GenTL Common Transport Interface (CTI) layer is also provided.
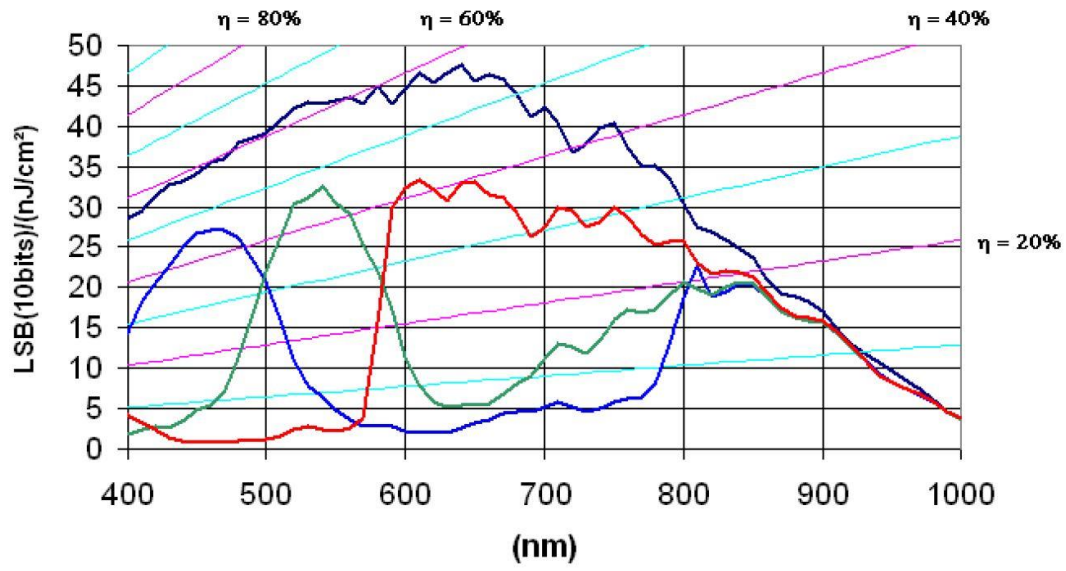
D. USB3 Vision GeniCam Compliance

This product conforms to the USB3 Vision GeniCam standard. The product specifications are subject to change without notice.
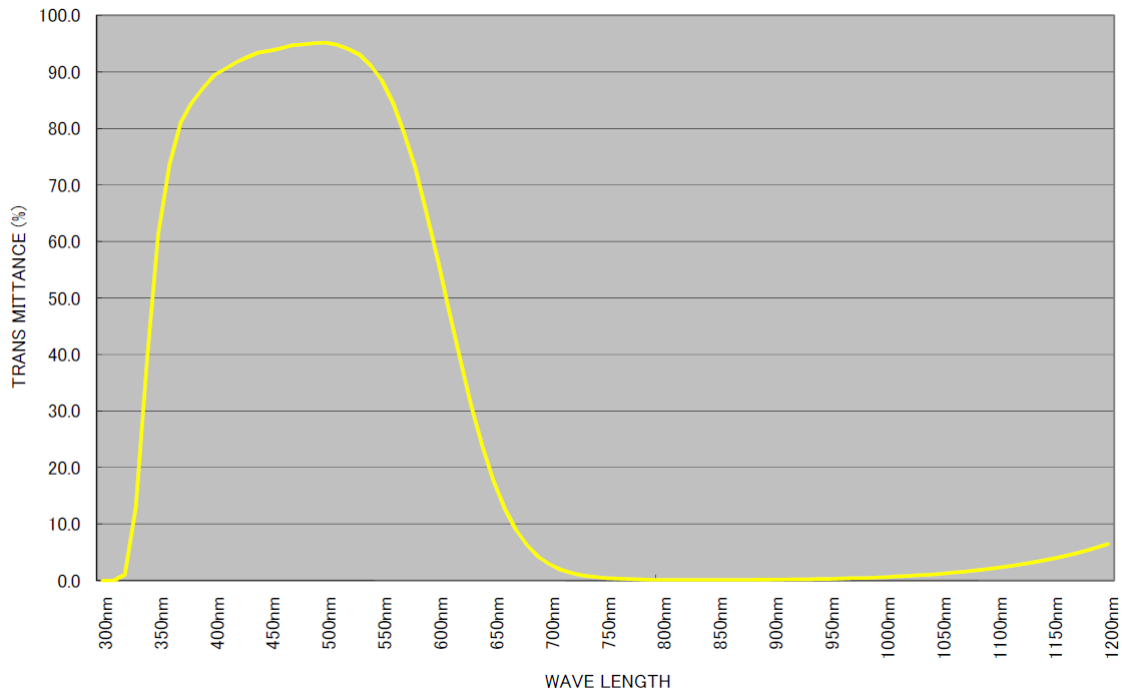
II. Specifications

A. Electronic Specifications

Model Number		STC-MCE132U3V	STC-MBE132U3V
Image Sensor		1/1.8" 1.3M pixel Color CMOS (e2V: EV76C560ACT-EQV)	1/1.8" 1.3M pixel Monochrome CMOS (e2V: EV76C560ABT-EQV)
Active Picture Elements		1280(H) x 1024(V)	
Cell Size		5.3 (H) x 5.3 (V) μm	
Scanning System		Progressive	
Shutter Type		Rolling Shutter / Global Shutter	
Scanning Mode		Full Scanning, Variable AOI (Horizontal and Vertical)	
Maximum Frame Rate (in Full Scanning Mode)		1.3M: 1280 x 1024 : 60fps (Raw8/10 bit), 55fps (RGB8 only on color model) *Frame rate will drop if connected with the USB2.0 port	
Maximum Frame Rate (in Full Scanning Mode and AOI)		XGA (1024 x 768) : 80fps (Raw8/10 bit) , 71fps (RGB8 only on color model) VGA (640 x 480) : 127fps (Raw8/10 bit) , 106fps (RGB8 only on color model) Minimum AOI (32 x 32): 1222fps (Raw8/10 bit, Rolling Shutter), 1270fps (Raw8/10 bit, Global Shutter) Minimum AOI (32 x 32): 416fps (RGB8, Rolling Shutter), 424fps (RGB8, Global Shutter)	
Sync. System		Internal	
Video Output Format		RGB8, RAW8bit/10bit,	RAW8bit/10bit
S/N Ratio (8bit)		Less than 3 digit(Gain 0 dB)	
Minimum Scene Illumination		28.14lx at F1.2	0.26lx at F1.2
ALC		Auto Shutter / Auto Gain (Default: OFF）	
Electronic Shutter		Preset・Free-run Mode: Exposure Time　16 usec to 0.97 sec (in full scanning mode) Preset・Trigger Mode: Exposure Time　16 usec to 0.97 sec (in full scanning mode)	
Gain	Analog	0 to 11.97dB (Default: 0dB）	
	Digital	x0.00 to x7.98 (Default: x0.00）	
Offset	Digital	0 to 255 digit on 12bit（Default: 168）	
AOI		AOI (Horizontal：32 to 1280 pixels / Vertical：32 to 1024 Line）(Default: 1280 x 1024） Adjustable Steps: 4 pixels in horizontal direction and 4 lines in vertical direction	
Binning Function		Horizontal 1/2,　Vertical 1/2,　（Default: 1/1） *Pixels in the horizontal and vertical direction can be added to increase the brightness. Available on "Horizontal and Vertical"	
Skipping Function		Horizontal 1/2, 1/4,　Vertical 1/2, 1/4　（Default: 1/1）	
Mirror Image		Horizontal / Vertical / Horizontal and Vertical（Default: OFF）	
Pixel Defect Correction		Up to 32 pixels　(Default: ON）	
White Balance		Auto / Manual/ One-shot （Default: Manual）	N/A
Operational Mode		Free-run / Edge-preset Trigger	
Frame Memory		One Frame	
Interface		USB3.0 Super speed (USB3.0 Micro B)	
Input/Output		Two Inputs and Two Outputs	
Power	Input Voltage	+5V(typ.) (Conform to USB Standard)	
	Consumption	Less than TBD W	

B. Spectral Sensitivity Characteristics

IR Cut Filter (NF-50D)

C. Mechanical Specifications

Model Number	STC-MCE132U3V	STC-MBE132U3V
Dimensions	28 (W) x 28 (H) x 33.8 (D) mm *excluding the connectors	
Lens Mount	CS Mount	
Optical Filter	IR Cut Filter	No IR Cut Filter
Optical Center Accuracy	Positional accuracy in H and V directions: +/- 0.5 mm Rotational accuracy of H and V: +/- 0.35 deg.	
Weight	Approximately 38 g	
Interface Connectors	USB Connector: USB3.0 MicroB type I/O Connector: HR10A-7R-6PB (Hirose) or equivalent	

D. Environmental Specifications

Model Number	STC-MBE132U3V / STC-MCE132U3V
Operational Temperature	0 ～ +40℃
Storage Temperature	-30 ～+65℃
Vibration	20Hz to 200Hz to 20Hz (5min./cycle), acceleration 10G, 3 directions 30 min. each
Shock	Acceleration 38G, half amplitude 6ms, 3 directions 3 times each
Standard Compliancy	EMS: EN61000-6-2, EMI: EN55011
RoHS	RoHS Compliant

III. Connector Specifications

I/O Connector
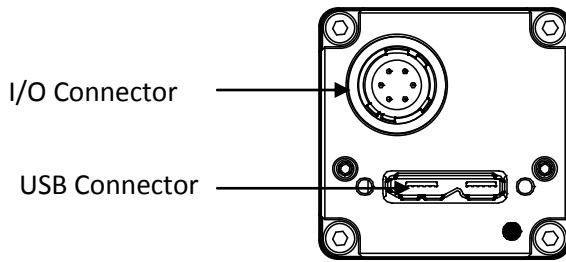
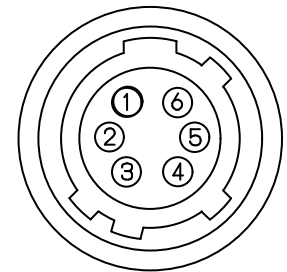USB Connector

A. USB Connector
- USB 3.0 Micro-B Type

B. I/O Connector
- HR10A-7R-6PB (Hirose) or equivalent.
- This connector is for input triggers and output signals.
- Use mating connector HR10A-7P-6S (Hirose) or equivalent.
- **The power input of this connector is for output signals, not to supply power to the camera. Power to the camera is provided via the USB connector through the USB bus which carries +5V.**

1. Pin Assignment

Pin No.	Signal Name	IN / OUT	Voltage	
			Low	**High**
1	GND (IO_GND)	-	0V	
2	Output 2 (IO3)	OUT	Smaller than 0.8 V	+3.3 to +24 V
3	Output 1 (IO2)	OUT	Smaller than 0.8 V	+3.3 to +24 V
4	Input 2 (IO1)	IN	Smaller than 0.7 V	+2.5 to +5 V
5	Input 1 (IO0)	IN	Smaller than 0.7 V	+2.5 to +5 V
6	Power Input (IO_VCC)	-	+3 to +24Vdc	

[Back Side]

IV. Input / Output Signal Specifications

A. Input Signals

1. Input Signal Functions

- Using the software, the following functions can be set on "Input 1" and "Input 2" of the I/O Connector.
- The polarity of the Trigger Input can be selected.

Function No.	Function Name	Polarity
1)	Disabled (Default)	-
2)	General Input	-
3)	Trigger Input	Positive or Negative

1) Disabled (Default)

Set this function when no input signal is necessary.

2) General Input

When "General Input" is selected, the user can input logical high or low signals through this input. Then the state of the "General Input" can be read by applications.
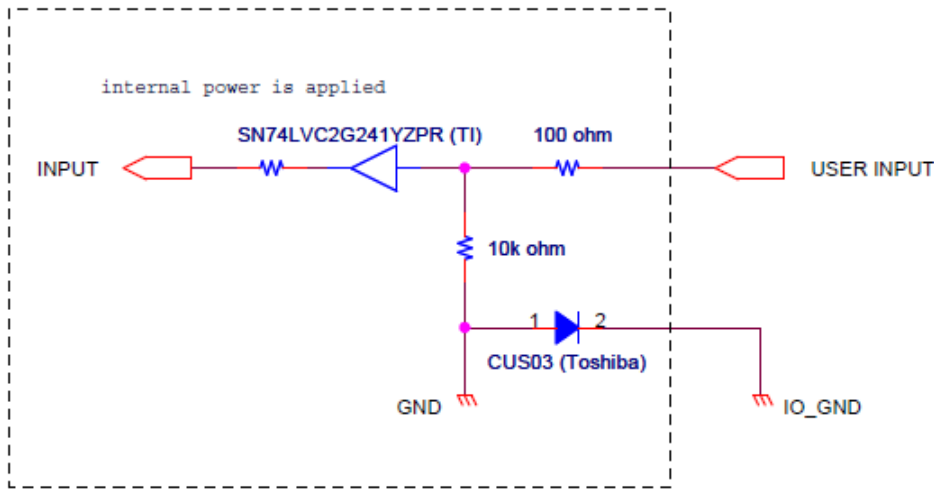
3) Trigger Input

Use this function for the trigger signal in the edge preset mode.

1. Input Signal Electronic Characteristics
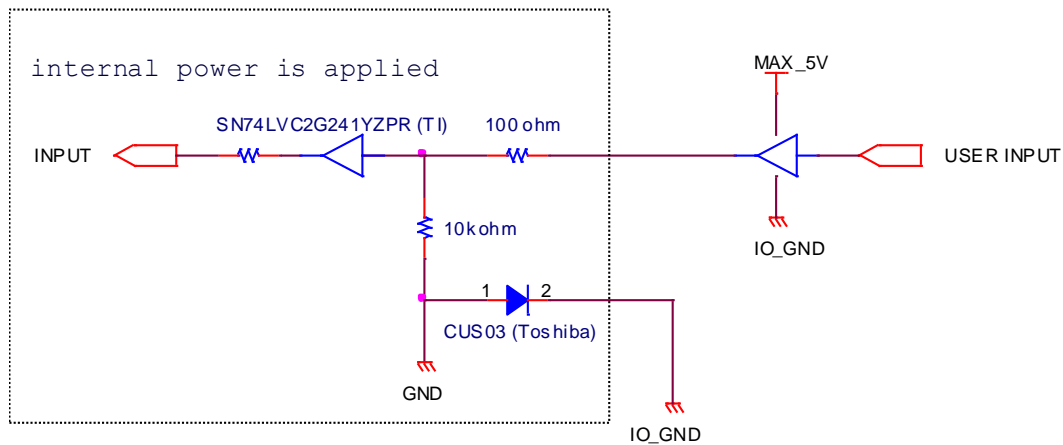
- Input Signal / Input Voltage: 0 to 5V
- Input Signal / Voltage Level

  High Level: 2.5V (min)

  Low Level: 0.7V (max)

3. Input Signal Circuit

4. Input Signal Circuit Examples

Caution:

The voltage applied on "Input 1" and "Input 2" must be less than or equal to 5V, the absolute maximum voltage.

B. Output Signals

1. Output Signal Functions

- Using the software, the following functions can be set on "Output 1" and "Output 2" of the I/O Connector.
- The polarity of the Trigger Output Programmable, the Trigger Output Loop Through, Exposure End, CCD Read End Output, Strobe Output Programmable, Strobe Output Exposure and Trigger Valid Out is selectable.
- Negative Polarity is recommended for use in order to reduce the timing delay due to open corrector output.

Function No.	Function Name	Polarity
1)	Disabled (Default)	-
2)	General Output	-
3)	Trigger Output Programmable	Positive or Negative
4)	Trigger Output Loop Through	Positive or Negative
5)	Exposure End	Positive or Negative
6)	Read End Output	Positive or Negative
7)	Strobe Output Programmable	Positive or Negative
8)	Strobe Output Exposure	Positive or Negative
9)	Trigger Valid Out	Positive or Negative

1) Disabled (Default)

This should be set when no output signal is necessary.

2) General Output

Outputs high or low signal set on the software.

3) Trigger Output Programmable

Outputs the trigger input signal with preset delay time.

4) Trigger Output Loop Through

Outputs the trigger input signal (with a slight internal delay).

5) Exposure End

When the global shutter is selected, this signal is enabled when the exposure is finished. When the rolling shutter is selected, this signal is enabled when the exposure of the first line is finished.

("Trigger Out Delay" and Trigger Pulse Width" settings are applied).

6) Read End Output

Output a signal upon completion of the transfer of a full frame.

("Trigger Out Delay" and Trigger Pulse Width" settings are applied).

7) Strobe Output Programmable

Output a signal for the period set with "strobe end delay", starting at the trigger input signal with the addition of "strobe start delay"

8) Strobe Output Exposure

When the global shutter is selected, this signal is enabled while the exposure is happening. When the rolling shutter is selected, this signal is enabled while the first line exposure is happening.

9) Trigger Valid Out

This output provides the acceptable timing for the trigger input signal. The trigger signal is accepted when this output is enabled, and it is not accepted when this output is disabled. The disable period is from the beginning of the exposure to the end of the data read out.

2. Output Signal Electronic Characteristics

- Output Signal / Voltage Level

High Level: Power input of the I/O Connector (+3.3V to +24V)

Low Level: Smaller than 0.8V

- Output Signal / Pulse Width

Pulse width is configurable through the software.

Please refer to the response timing chart below and create a setting with a sufficient margin.
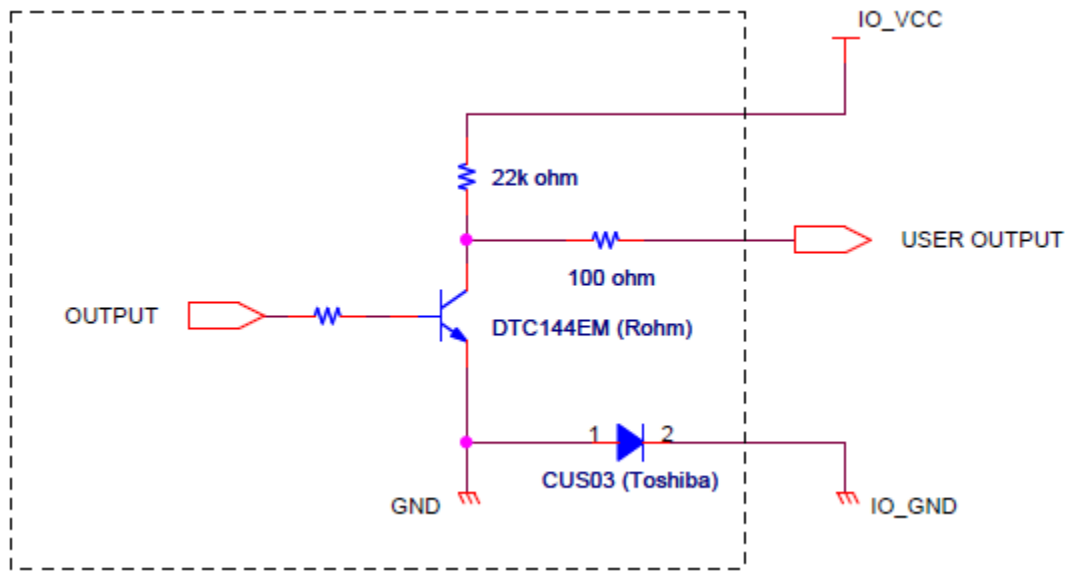
- Output Signal / Response Timing

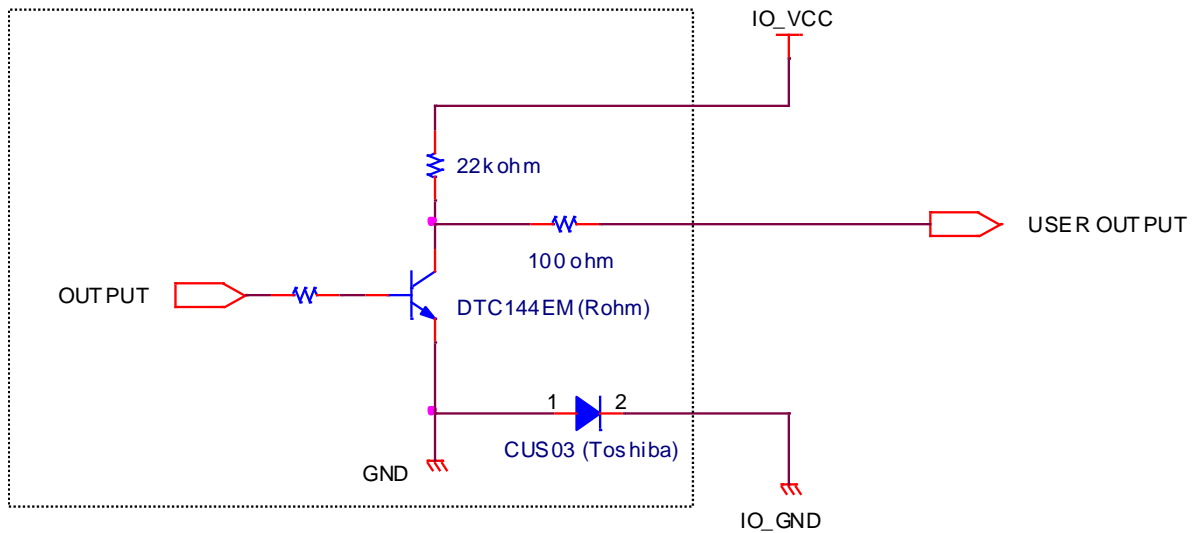The response timing shown below is a reference value measured without any eternal resistance.
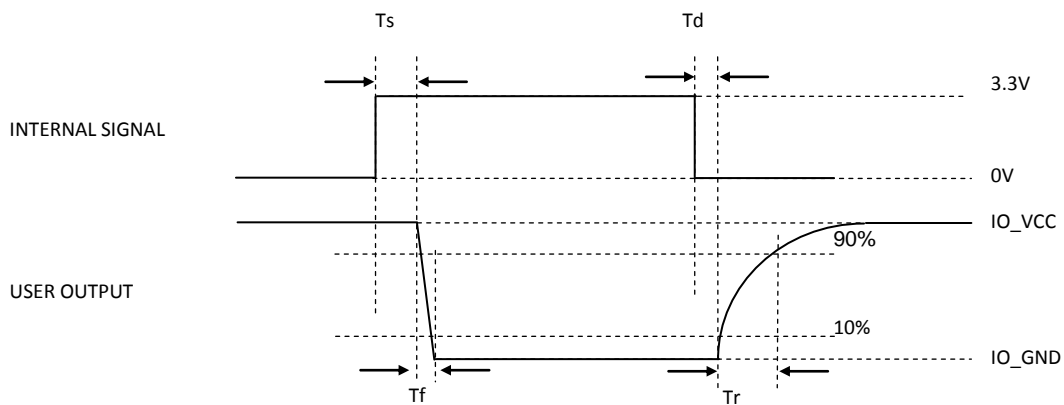
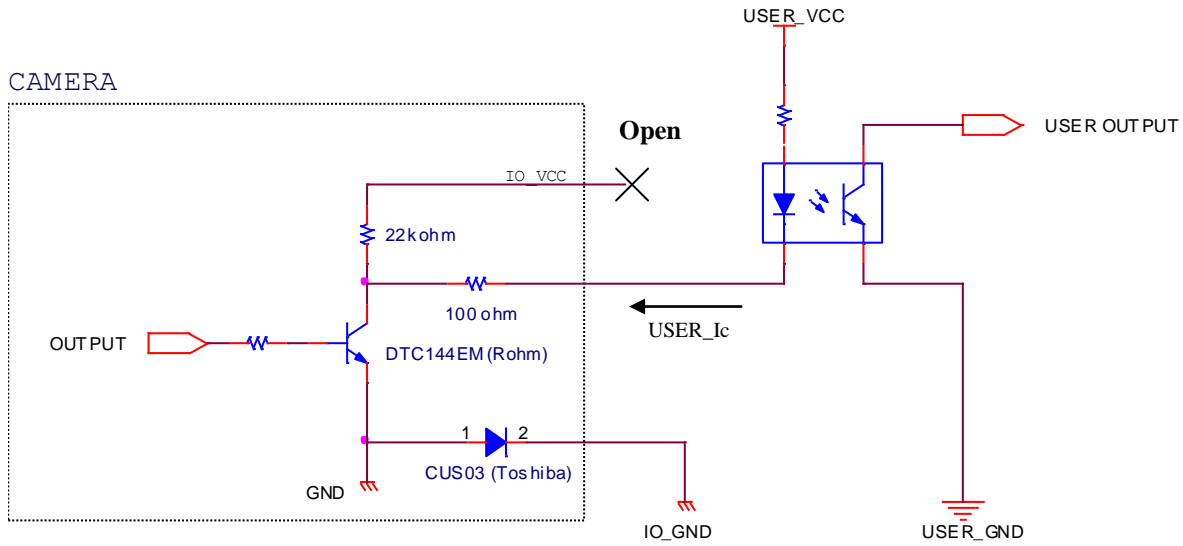|	IO_VCC			
	3.3[V]	5.0[V]	12[V]	24[V]
Td	2.00 [us]	1.82 [us]	1.66 [us]	1.60 [us]
Tr	0.82 [us]	0.84 [us]	1.16 [us]	1.44 [us]
Ts	0.50 [us]	0.56 [us]	0.56 [us]	0.70 [us]
Tf	0.56 [us]	0.66 [us]	1.16 [us]	2.04 [us]

3. Output Signal Circuit

4. Output Signal circuit Examples

CAMERA

CAMERA

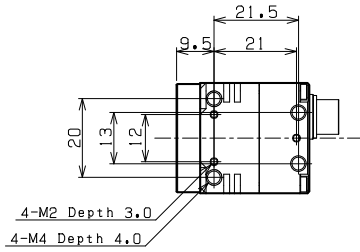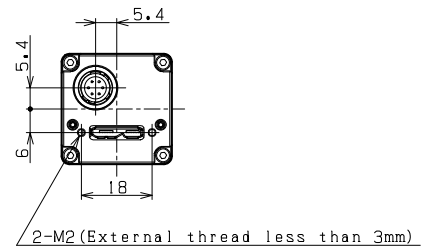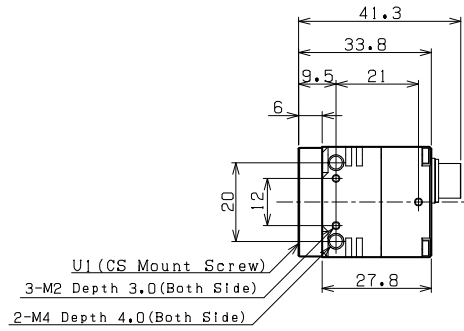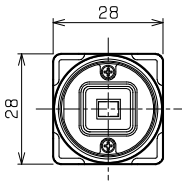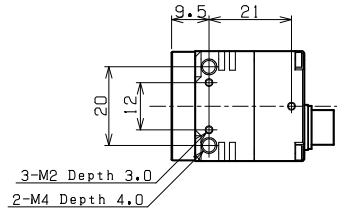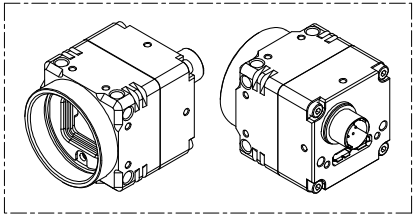
* When no voltage is applied on "IO_VCC", it can be used as an open collector output.
* The voltage applied on "IO2" and "IO3" (USER_VCC) must be less than or equal to 24V.
* The incoming current to "IO2" and "IO3" (USER_lc) must be less than or equal to 15mA.

V. Dimensions

3-M2 Depth 3.0
2-M4 Depth 4.0

41.3
33.8
9.5 21
6
20
12

U1(CS Mount Screw)
3-M2 Depth 3.0(Both Side)
2-M4 Depth 4.0(Both Side)
27.8

28
28

5.4
5.4
6
18
2-M2(External thread less than 3mm)

21.5
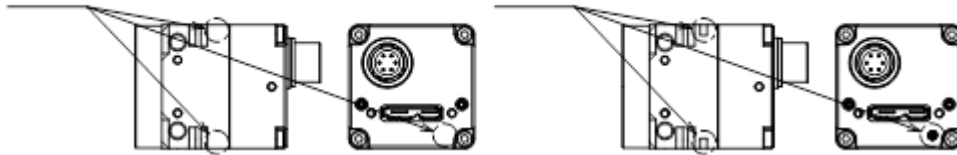9.5 21
20
13
12

4-M2 Depth 3.0
4-M4 Depth 4.0

Unit: mm

*How to Identify Monochrome version Color cameras:

STC-MBE132U3V   STC-MCE132U3V

Revisions

Rev	Date	Changes	Note
.01	August 15, 2013	New document	
1.0	September 11, 2013	Updated to release version	
1.02	September 24, 2013	Update Sensor Model & Spectral Sensitivity Chart	

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