CONTACT IMAGE SENSOR

U8R216

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1. Description

This specification is applied to U8R216 Contact Image Sensor module (CIS).

2. Scope

This U8R216 is a CIS consists of a Rod Lens Array, a LED light source guide and an array of linear MOS image sensor.

3. Outline

Item	Specification	Note
Scanning width	216 mm	
Sensor element density	8 dot/mm	
Number of sensor elements	1728 elements	
Scanning speed	5 msec/line	
Clock speed	500 KHz	
Rod lens array	Single row	
Light source	λp = 520 nm Band width =30nm +24V x 30 mA	Light Guide
Power supply	+5V x 50 mA	
Data output	1 analog output	Synchronous
Block diagram	Fig.4	
Dimensions	Fig.1-1, Fig.1-2, Fig.1-3	

4.Image Data Output Characteristics (Ta = 25ºC)
The shipment test of HEC is done on the condition of this table.

Item	Symbol	Specification	Note
DC supply voltage	Vdd	+5.0V	Detector, Logic
	Vled	+24.0V	LED
White image target		0.05 ~ 0.09 OD	
Timing chart		Fig.5	
White output average	Vp	1.4±0.2V	4.1
White output uniformity	Up	Less than 30%	4.2
Dark output	Vd	0 ~ 150mV	4.3
Dark output uniformity	Ud	Less than 100mV	4.4
MTF		More than 30%	4.5 3.85lp/mm

The output level of image signal like white and dark and MTF is defined at the point of "ts1"which described in section 6.
A test target is set on the reading position described Fig.1 outline.

4.1 Vp
Vp is the middle of white output signal and is define by:

Vp=(Vpmax+Vpmin)/2
Vpmax=MAX[Vp(n)]
Vpmin=MIN[Vp(n)]
Vp(n) is the output signal of the nth pixel using a white image target.

4.2 Up
Up is the white output non-uniformity and is define by:

Up=((Vpmax-Vp)/Vp)×100% or
((Vp-Vpmin)/Vp)×100%

4.3 Vd
As shown in Figure 2, Vd is the output signal in the dark (turning off the LED) .

4.4 Ud
Ud is the dark output non-uniformity and is defined by:
Ud = Vdmax – Vdmin
Vdmax = MAX[Vd(n)]
Vdmin = MIN[Vd(n)]
Vd(n) is the output signal of the nth pixel turning off the LED .

4.5 MTF

Modulation Transfer Function is defined by:

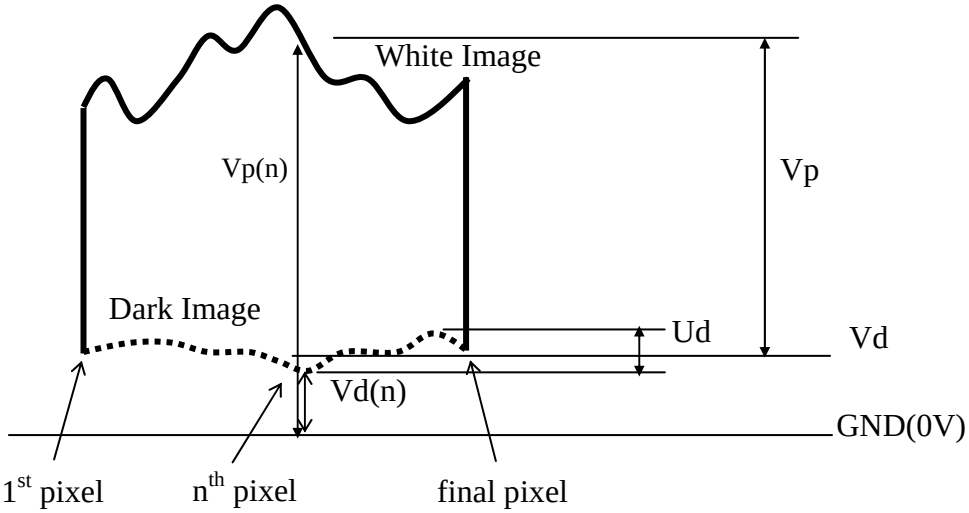
MTF = { [(Vmax-Vmin) / (Vmax+Vmin)] } x 100%

Vmax is the maximum output signal using the MTF image target

Vmin is the minimum output signal using the MTF image target

4.6 Dark compensation is achieved by subtracting the dark level of every pixel.

4.7 For the best performance two points correction (dark and white) is strongly recommended.



[p9-1]

Figure 2. Output Signals Waveform

5. Maximum Rating

Item	Symbol	Specification	Note
DC supply voltage	Vdd Vled	+5V ± 0.25V +24V ± 1.2V	
Input voltage	Vin	0 ~ Vdd+0.3V	SI, CLK
Ambient temperature	Ta	0 ~ +50 ºC	Opearating
		-20 ~ +60 ºC	Non-operating
Ambient humidity		10 ~ 90%RH	Avoid a build up condensation
Maximum operating Temperature		65 ºC 30minutes MAX	

6. Electrical Characteristics (Ta = 25 ºC)

Item	Symbol	Condition	Specification			Unit
			Min.	Typ.	Max.	
DC supply Voltage	Vdd	GND reference	4.75	5.0	5.25	V
	Vled	Gled reference	22.6	24.0	25.2	V
DC supply Current	Idd	Vdd = 5V			70	mA
	Iled	Vled = 24V		20	30	mA
Input voltage (Note 1)	Vih	SI,CLK	3.7			V
	Vil				1.4	V
Input Current (Note 1)	Iih	SI,CLK			± 0.1	μA
	Iil				± 4	μA
Clock frequency	f	CLK		500	1,000	KHz
Clock pulse “L” duty		tw(T)/to to=1/f	73	75	77	%
SI delay time	td1	SI-CLK	200		to	ns
	td2	SI-CLK	0		to – 200	ns
Data output stability time	ts1	CLK-SIG	0		50	ns

(Note1) 74HC244 or equivalent is recommended for input signal.

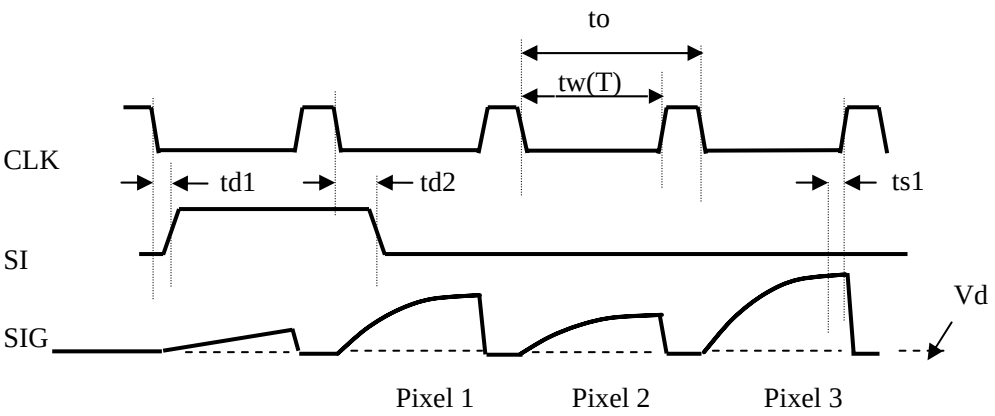


Figure 3. Timing Diagram [p5-1]

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7. Reliability

The following table satisfies the reliability when the CIS is operated continuously under standard operating conditions as specified in section 4.

Item	Variable Amount (%)	Note
White output (Vp)	Initial level +10% -30%	1000Hr
	Initial level +10% -50%	5000Hr

8. Precautions before use:

8.1 Glass surface

The Glass surface should be kept clean. Don't wipe the glass surface with hand. Don't use the CIS module in a dust-polluted environment. If the glass surface gets dirty, wipe the glass surface gently with a clean cloth soaked in alcohol. The glass surface should be wiped very carefully.

8.2 Extracting / Inserting the connector

The maximum number of times that the connector should be extracted and connected is 10. If the connector is inserted / extracted more than 10 times, the connector 'burrs' will be eroded, thereby making the connector ineffective.

8.3 Stable operation

(1) The connector pins should not be touched by bare hand or electrostatic charge materials.

(2) Noise

a. Insert a low frequency noise suppressing capacitor(100uF) between Vdd(+5V) and GND. A high frequency noise suppressing capacitor is already integrated into the circuit.

b. Ensure that the sensor connecting cables are 30cm or less in length. The CLK and GND, SIG and GND and Vled and Gled respectively from form twisted cable pairs.

(3) Latch up

When the supply voltage is higher than the absolute maximum, latch up will cause the sensor to break, even if the voltage is caused by a surge. If the current varies rapidly in the external in the external circuit, or when the power is turned on an off very frequently, ensure that the voltage o each terminal does not exceed the values indecated in below.

(4) Absolute maximum ratio

Item	Symbol	Condition	Specification		Unit
			Min	Max	
Supply Voltage	Vdd	GND reference	-0.3	+6.5	V
Input voltage	Vin	SI,CLK	GND-0.3	Vdd+0.3	V

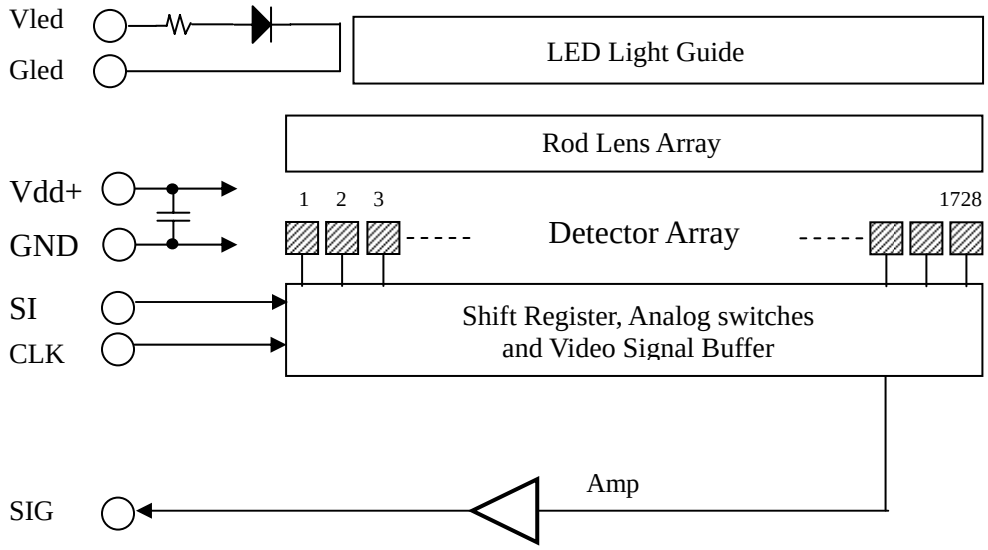


Figure 4. Block Diagram

CLK:500KHz (L:duty 75%)
This is the SHEC shipping test condition.

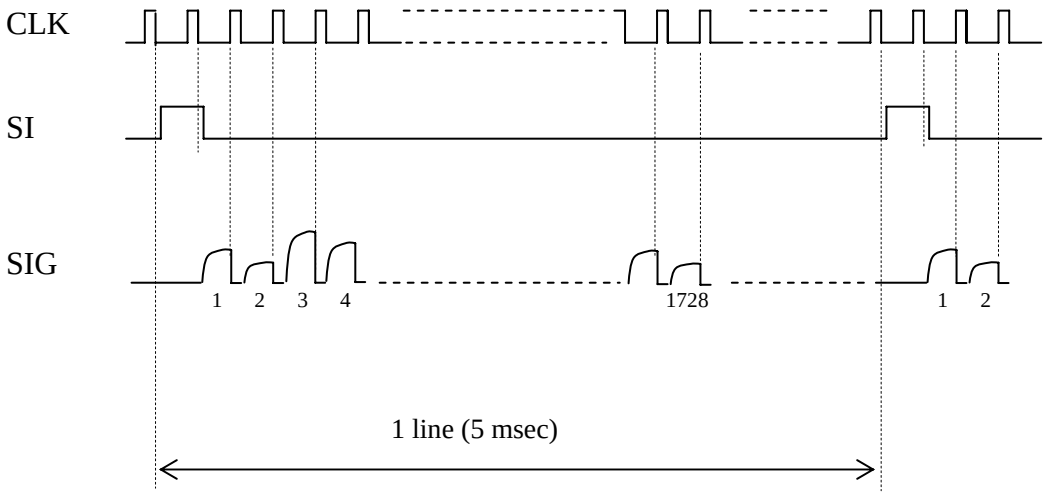
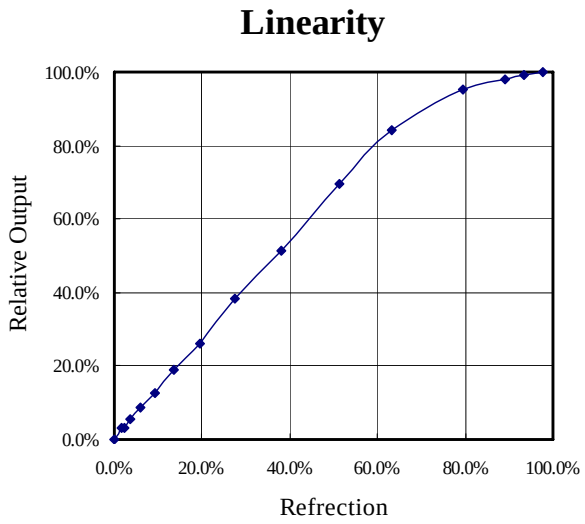
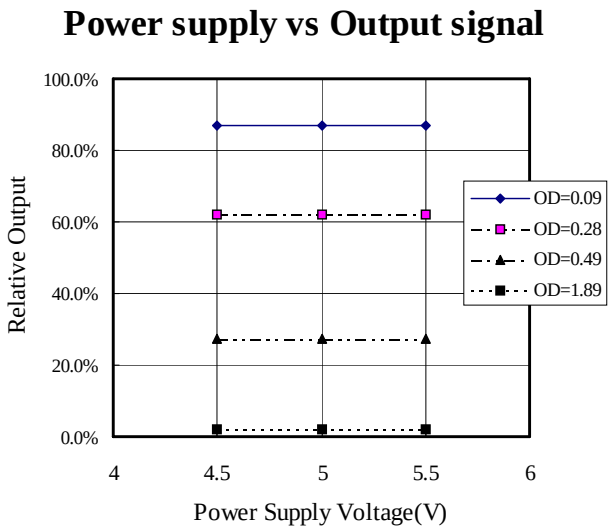


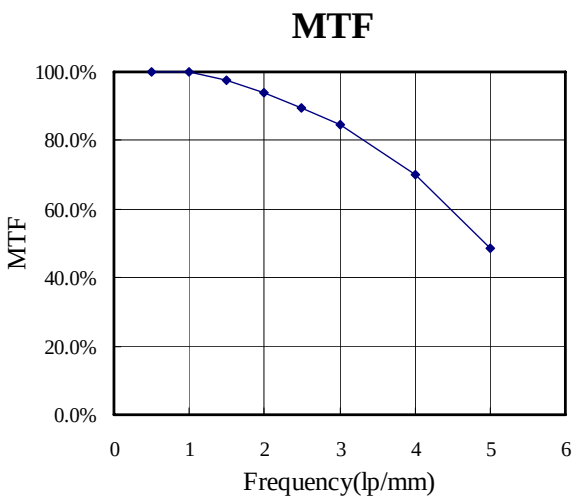
Figure 5. Line Timing Diagram

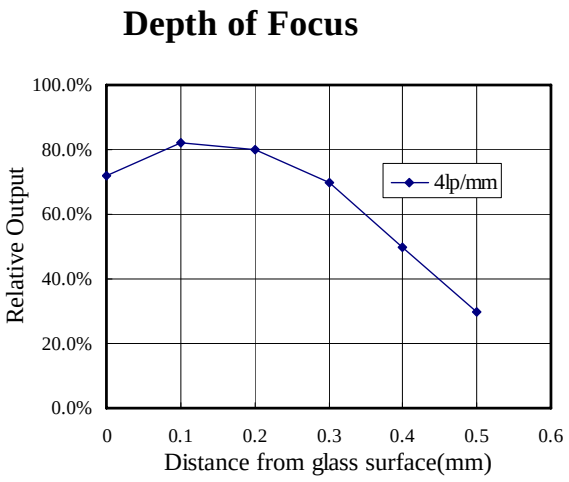
Figure 6. Typical Performance Curve

Unless otherwise specified, Ta=25ºC, Scanning speed = 5msec/line,
Clock speed=500KHz,Vdd=5.0V, and Vled=24.0V









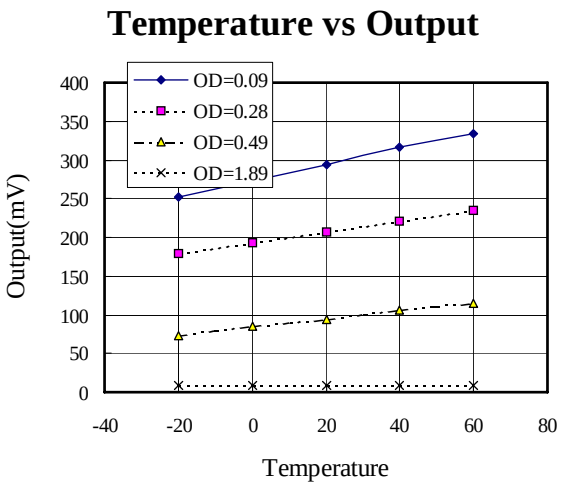


Figure 1-2. U8R216-1 dimensions

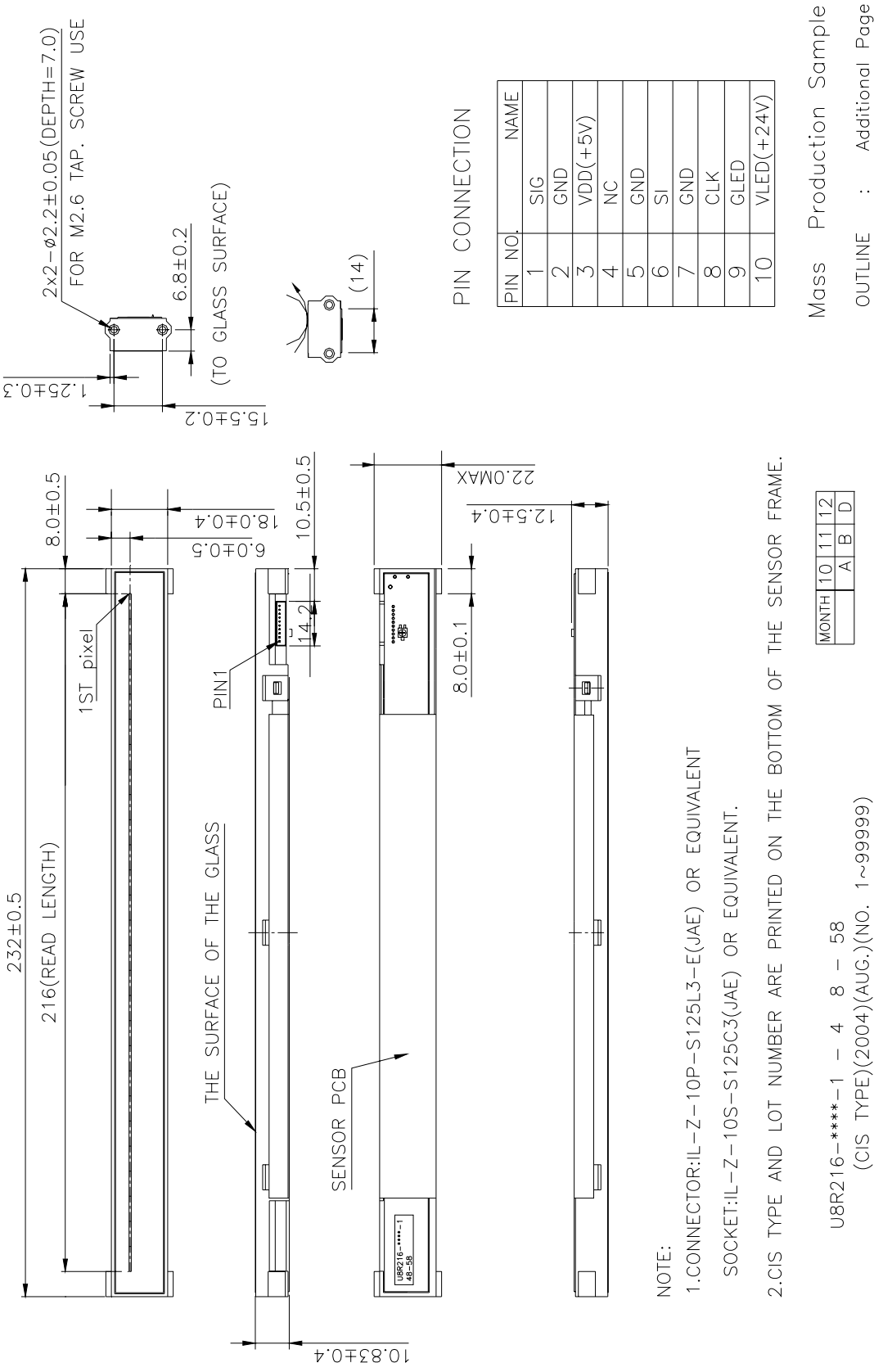


Figure 1-2. U8R216-2dimensions

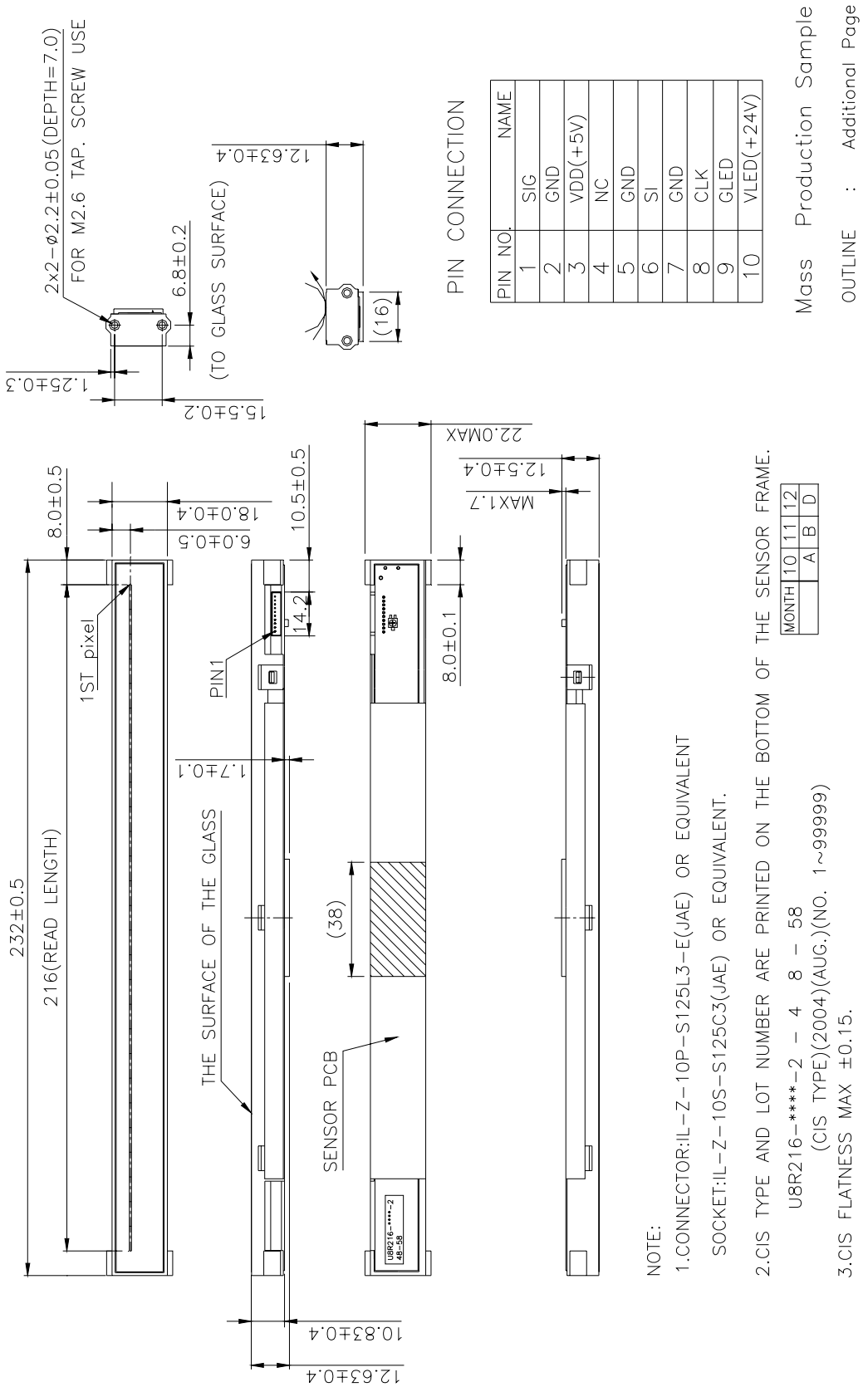


Figure 1-3. U8R216-3dimensions