

## 1.0 General Description

The AMIS-710201 (PI201M-A4) is a contact image sensor (CIS) module using MOS image sensor technology for high-speed performance and high sensitivity. The AMIS-710201 is suitable for scanning A4 size (216mm) documents with 8 dots per millimeter (dpm) resolution. Applications include document scanners, mark readers and other office automation equipment.

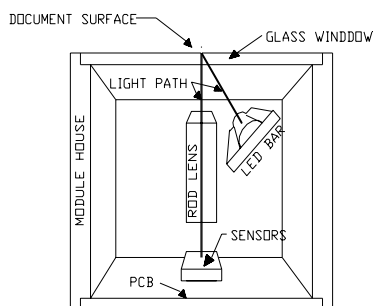
## 2.0 Key Features

- Light source, lens and sensor are integrated into a single module
- 8dpm resolution, 216mm scanning length
- 1.72ms/line scanning speed
- Wide dynamic range analog output
- Yellow-Green light source
- Compact size – 13.5mm x 18mm x 232mm
- Low power
- Light weight

## 3.0 Functional Description

The AMIS-710201 imaging array consists of 27 sensors that are cascaded to provide 1728 photo-detectors with their associated multiplex switches and a digital shift register that controls its sequential readout. Mounted in the module is a one-to-one graded indexed micro lens array that focuses the scanned documents to image onto its sensing plane. The on-board amplifier processes the video signal to produce a sequential stream of video at the video output pin of the AMIS-710201 module.

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INSIDE PICTORIAL  
OF THE MODULE

Figure 1: AMIS-710201 Cross Section

Illumination is by means of an integrated LED light source. All components are housed in a small plastic housing which has a cover glass which acts as the focal point for the object being scanned and protects the imaging array, micro lens assembly and LED light source from dust. I/O to the module is the 10-pin connector located on one end of the module. The cross section of the AMIS-710201 is shown in Figure 1 and the block diagram in Figure 2.

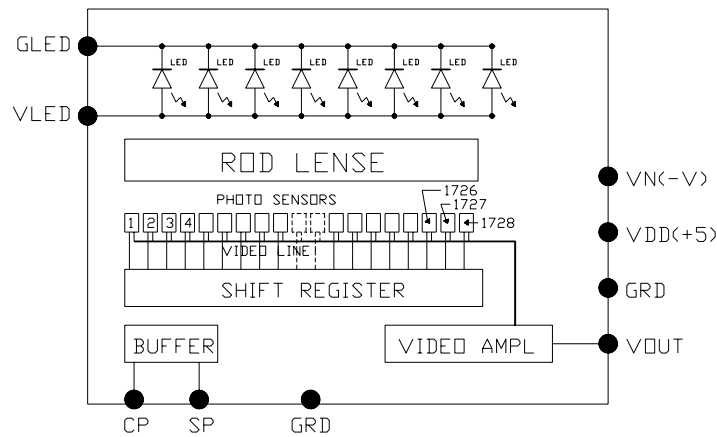


Figure 2: AMIS-710201 Module Block Diagram

## 4.0 Absolute Maximum Rating

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Table 1: Absolute Maximum Rating

Parameter	Symbols	Maximum Rating	Units
Power supply voltage	Vdd	10	V
	Idd	40	mA
	Vn	-15	V
	In	10	mA
	VLED	5.25	V
	ILED	650	ma
Input clock pulse (high level)	Vih	Vdd - 0.5V	V
Input clock pulse (low level)	Vil	-0.8	V

## 5.0 Recommended Operating Conditions (25°C)

Table 2: Recommended Operating Conditions (25°C)

Item	Symbol	Min.	Typical	Max.	Units
Power supply	Vdd	4.5	5.0	5.5	V
	Vn.	-4.5	-5	-12	V
	VLED		5		V
	Idd		11	30	ma
	Ivn		6.0	10.0	ma
	ILED		350	550	ma
Input voltage at digital high	Vih	Vdd-1.0	Vdd-.5	Vdd	V
Input voltage at digital low	Vil	0		0.8	V
Clock frequency	f			1.0 <sup>(1)</sup>	MHz
Clock pulse high duty cycle		25			%
Clock pulse high duration		250			ns
Integration time	Tint	1.728		10.0	ms
Operating temperature	Top		25	50	°C

**Note:**

- The module will produce video above 1.5MHz, but with adjacent pixel smearing. Hence, with signal degradation it can be used above 1.5MHz.

Table 3: Operating Environment

Parameter	Symbols	Maximum Rating	Units
Operating temperature	Top	0 to 50	°C
Operating humidity	Hop	10 to 85	%
Storage temperature	Tstg	-25 to+75	°C
Storage humidity	Hstg	10 to 90	%

## 6.0 Electro-Optical Characteristics (25°C)

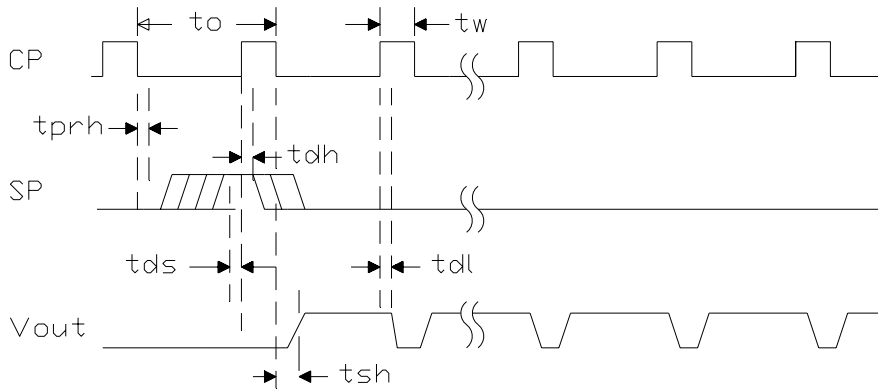
Table 4: Electro-Optical Characteristics (25°C)

Parameter	Symbol	Parameter	Units	Note
Number of photo detectors		1728	Elements	
Pixel-to-pixel spacing		125	µm	
Line scanning rate	Tint <sup>(1)</sup>	1.728	ms	@ 1.0MHz clock frequency
Clock frequency <sup>(2)</sup>		1.0	MHz	
Bright output voltage <sup>(3)</sup>		0.6	Volts	
Bright output non-uniformity <sup>(4)</sup>		<+/-30	%	
Adjacent pixel non-uniformity <sup>(5)</sup>		<25	%	
Dark non-uniformity <sup>(6)</sup>		<200	mV	
Dark output voltage <sup>(6)</sup>		<200	mV	
Modulation transfer function <sup>(7)</sup>		>30	%	

**Definitions:**

- Tint: line scanning rate or integration time. Tint is determined by the interval of two start pulse (SP).
- f: main clock frequency.
- $V_{pavg} = \sum V_p(n)/1728$
- $Up = [(V_{pmax} - V_p) / V_p] \times 100\%$  or  $[(V_p - V_{pmin}) / V_p] \times 100\%$ .
- $Upadj = \text{MAX} [ | (V_p(n) - V_p(n+1)) | / V_p(n) ] \times 100\%$  Upadj is the nonuniformity percentage pixel-to-pixel.
- $Ud = V_{dmax} - V_{dmin}$   
Vdmin is the minimum output on a black document(O.D.=0.8).  
Vdmax: maximum output voltage of black document (O.D.= 0.8).
- $MTF = [(V_{max} - V_{min}) / (V_{max} + V_{min})] \times 100 \%$  Vmax: maximum output voltage at 4.0lp/mm Vmin: minimum output voltage at 4.0lp/mm.
- lp / mm: line pair per mm.
- O.D. Optical Density

## 7.0 Switching Characteristics (25°C)



### MODULE TIMING DIAGRAM

Note: See timing symbol definitions in the following table

Figure 3: AMIS-710201 Timing Diagram

Table 5: Symbol Definitions for the Above Timing Diagram

Item	Symbol	Min.	Typical	Max.	Units
Clock cycle time	$t_o$	1.0		4.0	$\mu\text{s}$
Clock pulse width	$t_w$	250			ns
Clock duty cycle		25		75	%
Prohibit crossing time of start pulse	$t_{prh}$	15			ns
Data setup time	$t_{ds}$	20			ns
Data hold time	$t_{dh}$	20			ns
Signal delay time	$t_{dl}$	50			ns
Signal settling time	$t_{sh}$	350			ns

Table 6: Pin Configurations

Pin Number	Symbol	Names and Functions
1	Vout	Analog video output
2	Gnd	Ground; 0V
3	Vdd (+5V)	Positive power supply
4	Vn (-5V to -12V)	Negative power supply
5	Gnd	Ground; 0V
6	SP	Shift register start pulse
7	Gnd	Ground; 0V
8	CP	Sampling clock pulse
9	GLEED	Ground for the light source; 0V
10	VLED	Supply for the light source

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## 8.0 Mechanical Model Dimensions

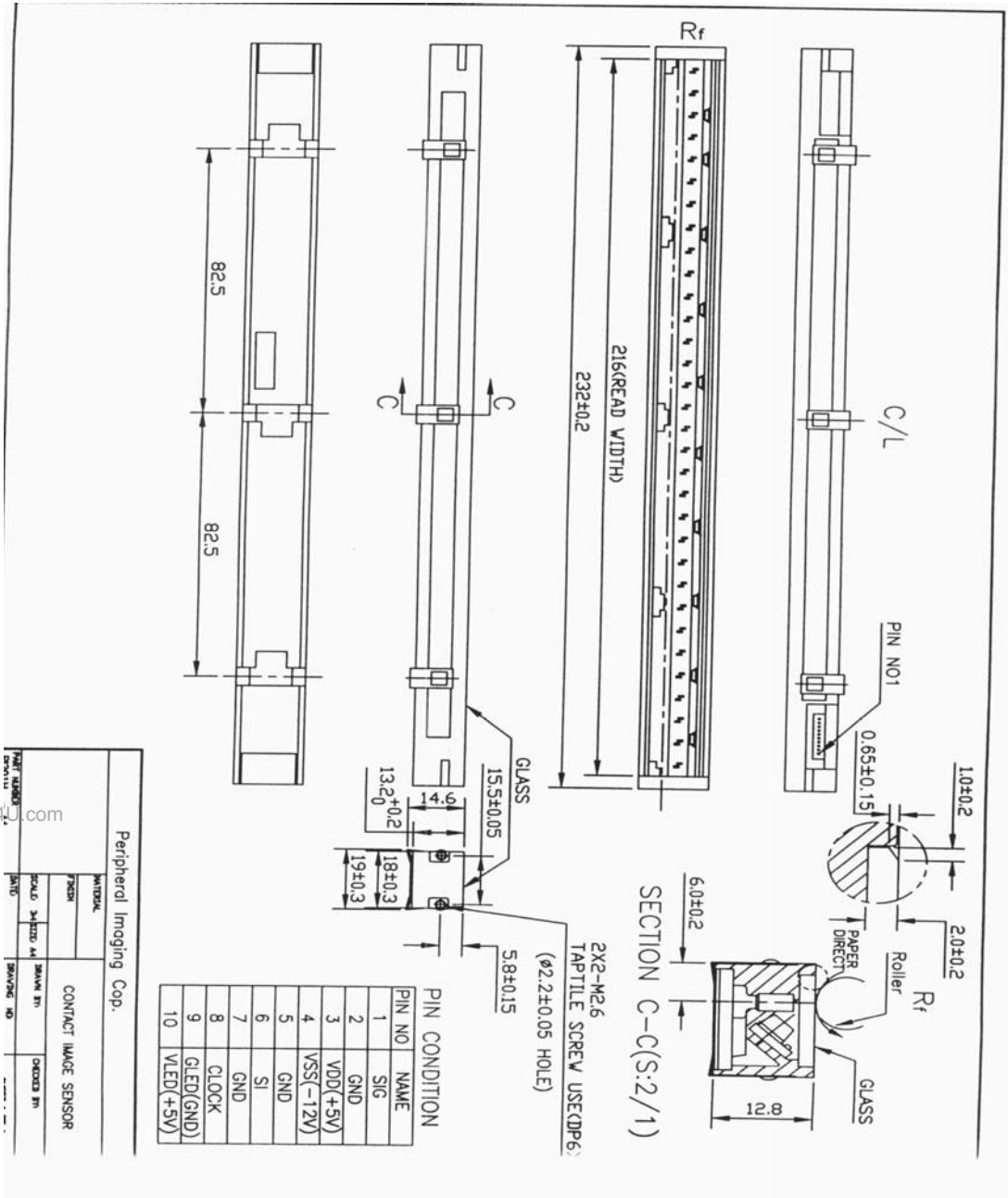


Figure 4: Mechanical Model Dimensions

## 9.0 Company or Product Inquiries

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