PRODUCT NUMBER: HML1215

DESCRIPTION: L2048 ELEMENT LINEARIMAGE SENSOR

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REVISED DATA:

*THIS SPECIFICATION ARE SUBJECT TO BE CHANGED WITHOUT NOTICE.

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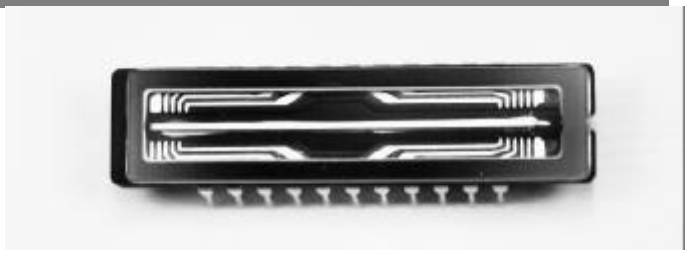
HML1215

L2048 ELEMENTS LINEAR IMAGE SENSOR

GENERAL DESCRIPTION

◆The HML1215 is a low power and high sensitive linear image sensor with 2048 elements of sensor which sensor size is 14μm × 200μm on 14μm pitch. The operating DC power voltage is 5V and the pulse clocking is also 5V .

The package is 22 pin cerdip which is made by high quality ceramic sealing with optical glass_window.



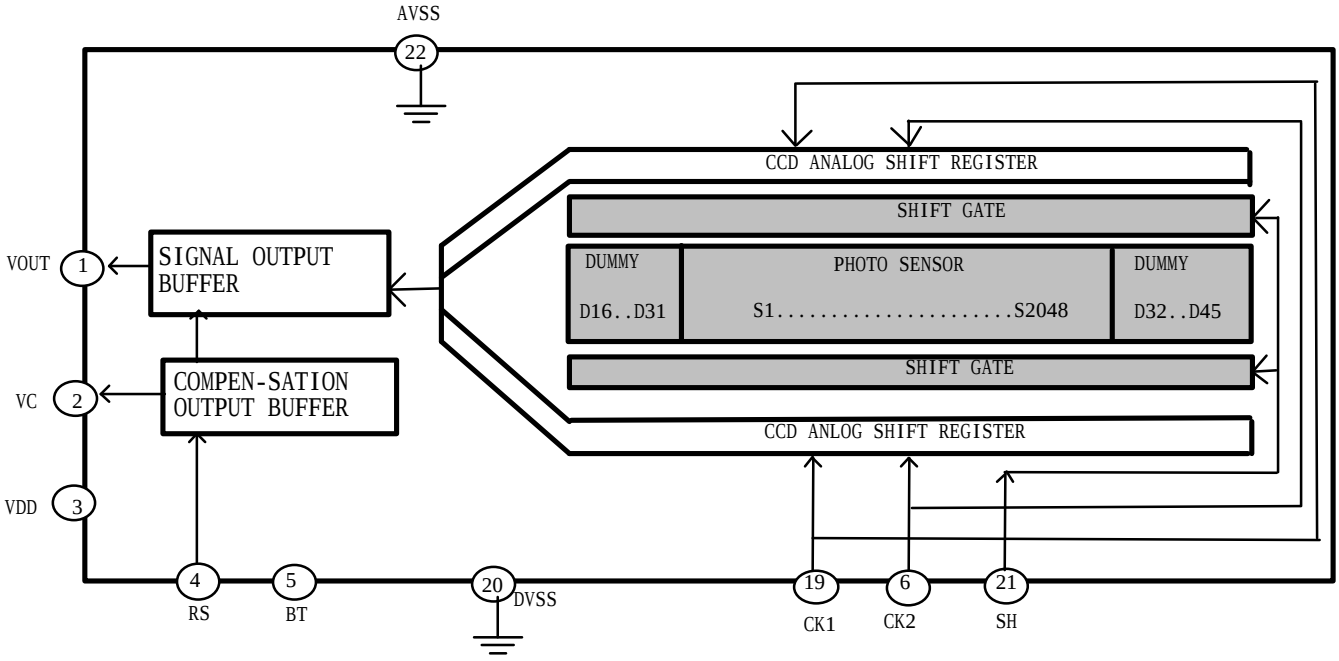
APPLICATIONS

◆**portable low power bar code reader.**
◆**spectrum analyzer .**

FEATURES

◆**2048´1 elements of image sensor.**
◆**sensor size 14mm ´200mm on 14mm pitch** .
◆**operation frequency(typical) :500KHZ**.
◆**responsivity : 58 V/(lux·sec)**
◆**2 phase clocking**.
◆**5V DC power, 5V pulse clocking**.
◆**Peak wavelength spectral response : 570nm**.

CIRCUIT DIAGRAM



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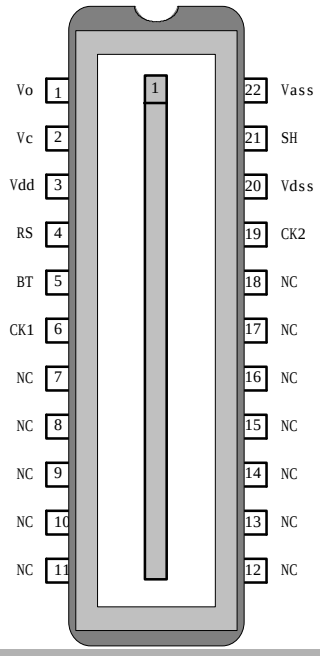
PIN ASSIGNMENT



PIN DESCRIPTION	
Name	Description
Vo	Signal output
Vc	Compensation output
Vdd	DC power supply
CK1	Clock phase 1
CK2	Clock phase 2
RS	Reset gate
BT	Boost pulse
SH	Shift gate
Vass	Analog ground
Vdss	Digital ground
NC	Nonconnection

ABSOLUTE MAXIMUM RATINGS

Parameter	Rating		
	Min	Max	Unit
Operating temperature	-25	+60	°C
Storage temperature	-40	+80	°C
Operating humidity	35%	80%	at 40°C
Storage humidity	20%	90%	at 40°C
Clock pulse voltage	-0.2	Vdd	V
Shift pulse voltage	-0.2	Vdd	V
Reset pulse voltage	-0.2	Vdd	V
Power supply voltage	-0.2	+8	V

OPTICAL /ELECTRICAL CHARACTERISTICS

Temperature=25°C, Vdd=5V, CK1(CK2,RS,SH,BT)=5V pulse, f_{CK} =0.25MHZ, f_{RS} =0.5MHZ, Tint =10ms

, Load resistance=100KΩ,Light source = 3200°K halogen lamp +CM500(infrared IR cutoff filter)

CHARACTERISTIC	SYMBOL	MIN	TYP	MAX	UNIT	NOTE
Responsivity	R	47	58	69	$V/lx \bullet sec$	
Dynamic range	DR	---	120	---		1
Saturation Voltage	Vsat	0.8	1.2	---	V	2
Saturation exposure	SE	0.01	0.02	---	lx•sec	2
Total transfer efficiency	TTE	92	96	---	%	
Output impedance	Z	---	450	1000	Ω	
DC power dissipation	P	---	18	25	mW	
Photorespons non-uniformity	PRNU1	---	---	10	%	3
Photorespons non-uniformity	PRNU2	---	---	10	%	3
Register imbalance	RI	---	---	3	%	4
Dark signal voltage	DS	---	10	20	mV	5
Dark signal non-uniformity	DSNU	---	5	15	mV	6
Output DC level	Vo	1.2	2.0	4.0	V	7
Compensation DC level	Vc	1.2	2.0	4.0	V	7
DC mismatch voltage	MDC	---	---	300	mV	7

NOTE:

1.Dynamic range (DR):

Dynamic range is defined as

$$DR = \frac{V_{SAT}}{DS}$$

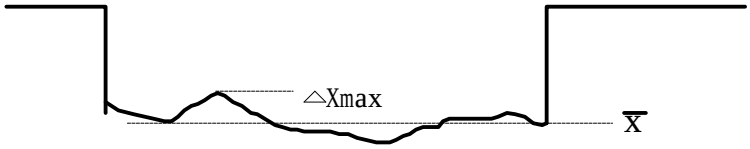
¡ DS is proportional to Tint (integration time)

2.Saturation voltag(Vsat) and Saturation exposure(SE):

Vsat is defined as the minimum saturation output voltage of all effective pixels.

And the exposure is defined as saturation exposure SE.

3.Photorespons nonuniformity (PRNU):



PRNU1 is defined as $PRNU1 = \frac{\Delta X_{\max}}{\overline{X}} \times 100\%$

$\overline{X}$ is average of total output signal ¡ A

$\Delta X_{\max}$ is the maximum deviation from $\overline{X}$

PRNU2 is defined as $PRNU2 = \frac{\Delta X_{next}}{\overline{X}} \times 100\%$

ΔX_{next} is maximum difference of next pixel

4.Register Imbalance (RI):

RI is defined as follows

$$RI = \frac{\sum_{1}^{2047} | X_n - X_{n+1} |}{2047 \times \overline{X}} \times 100\%$$

Where X_n and X_{n+1} are output signal of each pixel .

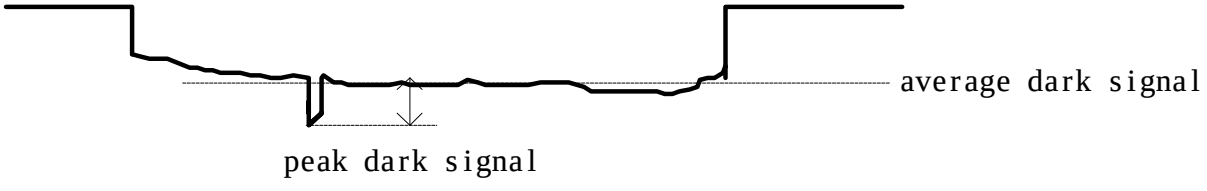
$\overline{X}$ is average of total output signal.

5.Dark signal voltage (DS):

Dark signal is defined as average dark signal voltage of all effective pixels under room temperature 25°C, and integration time 10ms.

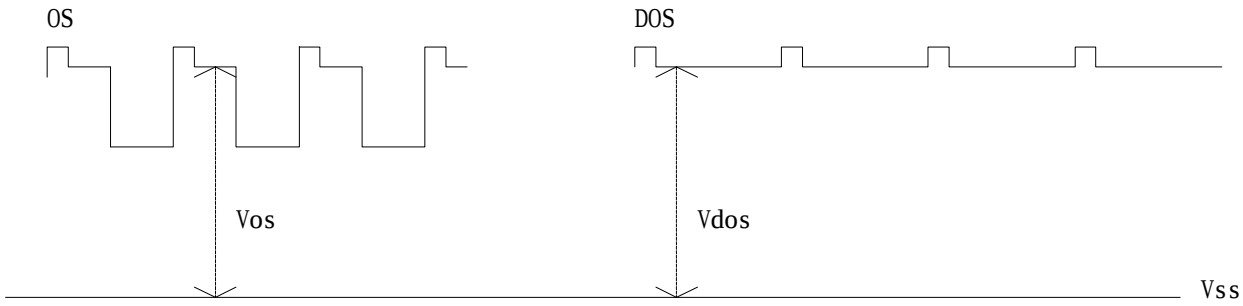
6.Dark signal nonuniformity (DSNU):

The DSNU is defined as the different dark voltage between the peak voltage and average voltage under room temperature 25°C and integration time 10ms.



7.Output DC level (Vo):

Output DC level and Compensation DC level are defined as



OPERATING CONDITION

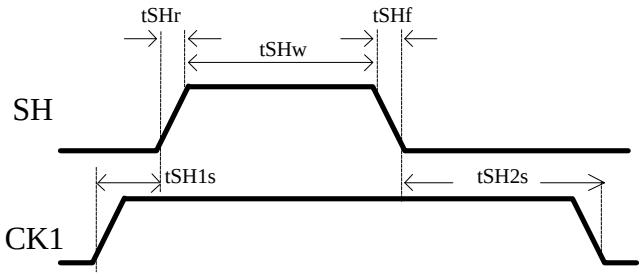
Characteristic		Symbol	Min	Typ	Max	Unit
Clock pulse voltage	H-level	CK1,CK2	4.5	5.0	Vdd	V
	L-level	CK1,CK2	-0.2	0	0.5	V
Shift pulse voltage	H-level	SH	4.5	5.0	Vdd	V
	L-level		-0.2	0	0.5	V
Reset pulse voltage	H-level	RS	4.5	5.0	Vdd	V
	L-level		-0.2	0	0.5	V
Boost pulse voltage	H-level	BT	4.5	5.0	Vdd	V
	L-level		-0.2	0	0.5	V
Power supply voltage		Vdd	4.5	5	5.5	V

CLOCK CHARACTERISTICS

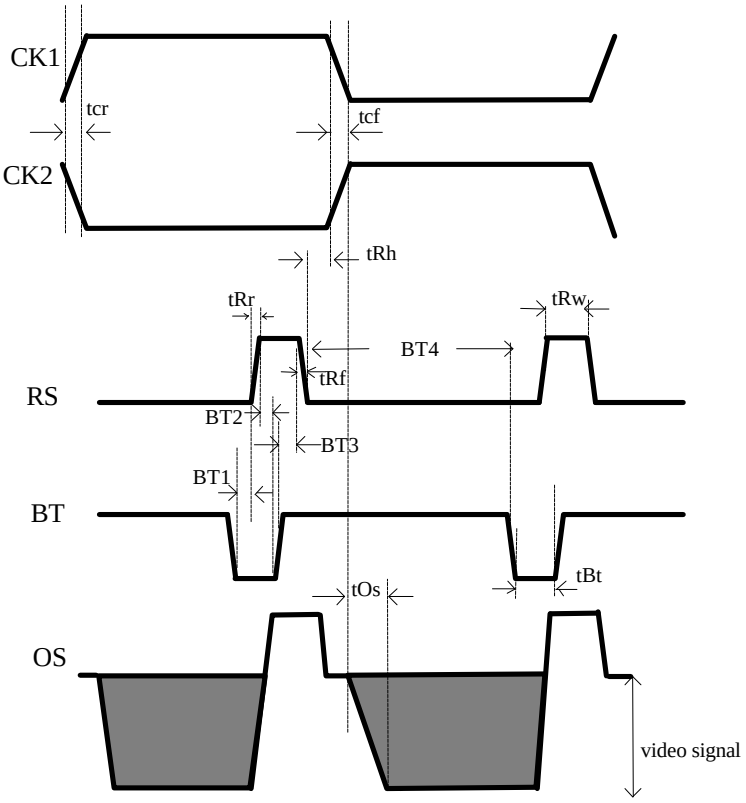
Temperature 25°C

Parameter	Symbol	Min	Typ	Max	
Clock pulse frequency	CK1,CK2	0.05	0.25	0.5	MHZ
Reset pulse frequency	RS	0.1	0.5	1	MHZ
Boost pulse frequency	BT	0.1	0.5	1	MHZ
Clock capacitance	Cck1,Cck2	---	500	800	pF
Shift gate capacitance	C_{SH}	---	200	400	pF
BT gate capacitance	C_{BT}	---	10	30	pF
Reset gate capacitance	C_{RS}	---	10	30	pF

Pulse Timing of SH and CK1



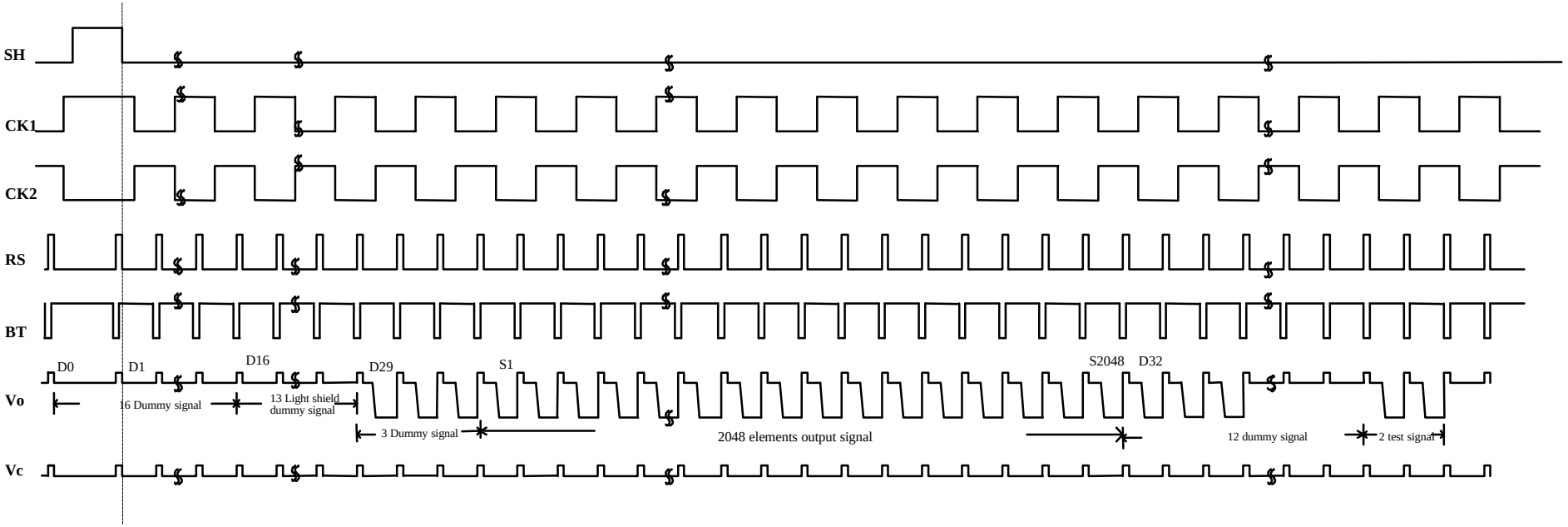
Pulse timing of CK1, CK2, RS, BT and Vo

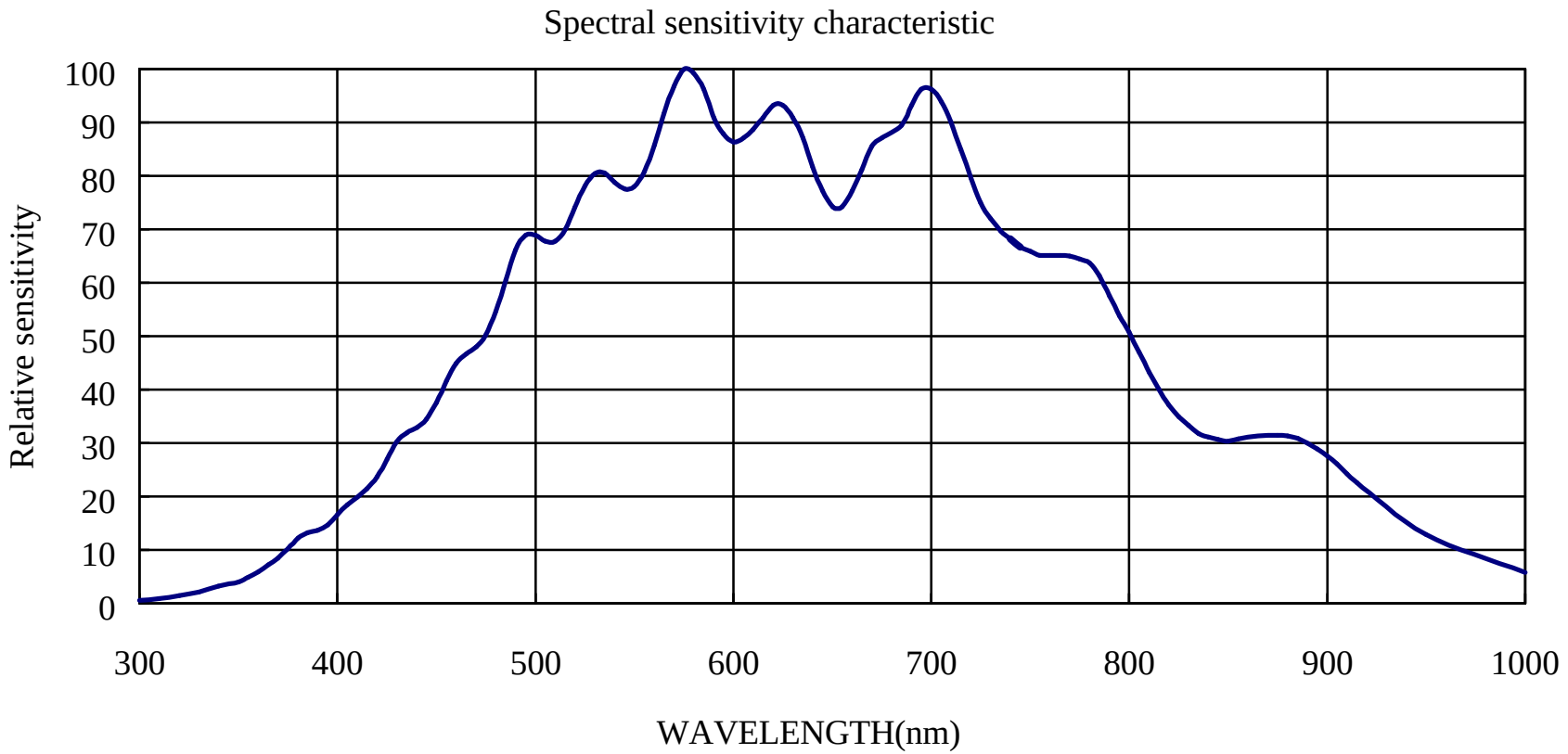


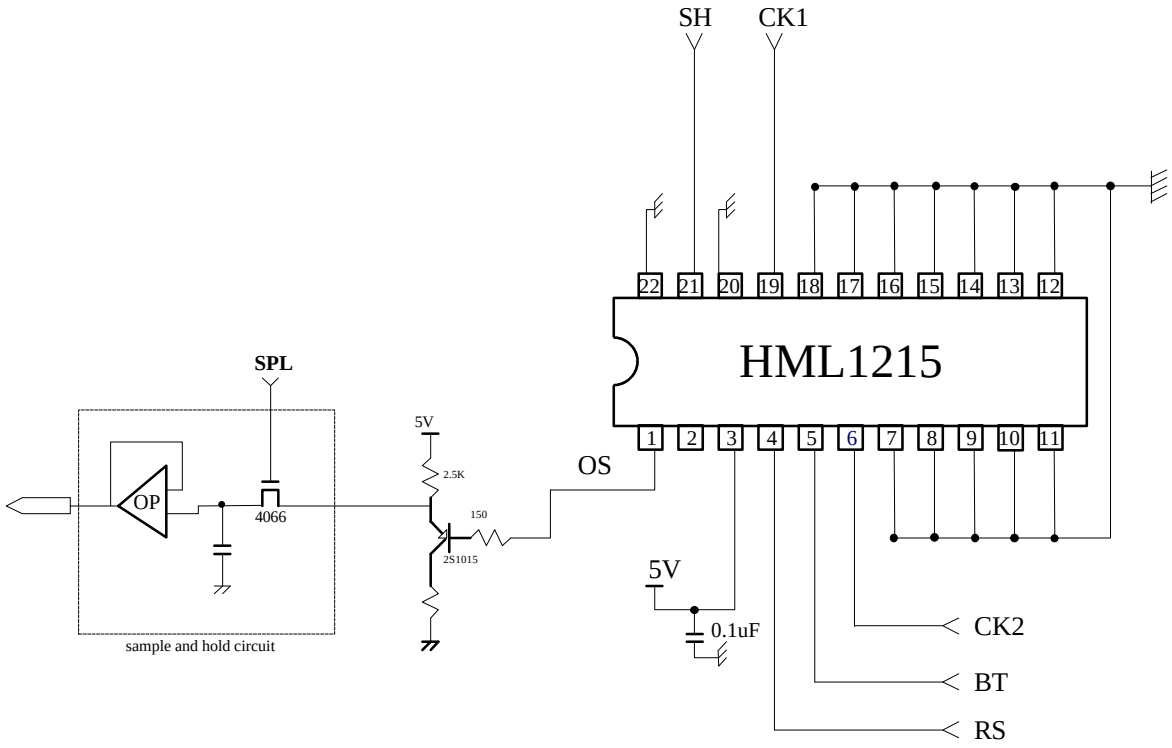
TIMING REQUIRMENT

CHARACTERISTIC	SYMBOL	MIN.	TYP.	MAX.	UNIT
Pulse timing of SH and CK	tSH1s	25	100	---	ns
	tSH2s	1.0	2.0	---	μs
SH pulse rise time, fall time	tSHr,tSHf	0	50	---	ns
SH pulse width	tSHw	1.0	2.0	20.0	μs
CK1, CK2 pulse rise and fall time	tcr,tcf	0	100	---	ns
RS, BT pulse rise and fall time	tRr,tRf	0	20	---	ns
RS pulse width	tRw	200	250	---	ns
BT pulse width	tBt	200	250	---	ns
Pulse timing of RS and BT	BT1	0	50	200	ns
	BT2	10	---	50	ns
	BT3	>0	---	---	ns
	BT4	200	---	---	ns
Pulse time of CK1,CK2,RS	tRh	25	250	---	ns
Video data delay time	tOs	---	50	200	ns

TIMING CHART




Spectral sensitivity characteristic
Relative sensitivity
100
90
80
70
60
50
40
30
20
10
0
300
400
500
600
700
800
900
1000
WAVELENGTH(nm)


SH
CK1
22
21
20
19
18
17
16
15
14
13
12
HML1215
1
2
3
4
5
6
7
8
9
10
11
SPL
OP
4066
sample and hold circuit
5V
2.5K
150
2S1015
OS
5V
0.1uF
CK2
BT
RS

PACKAGE OUTLINE

unit: mm