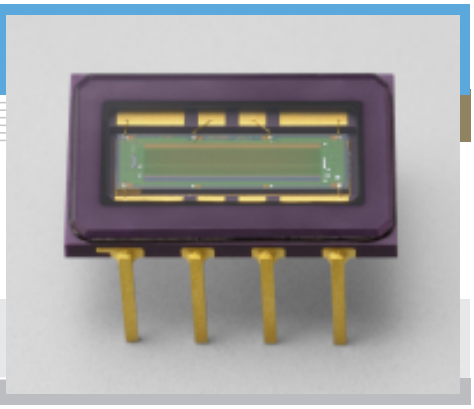
NEW

IMAGE SENSOR

CMOS linear image sensor
S9227

High-speed readout, simultaneous integration



S9227 is a small CMOS linear image sensor designed for image input applications. Signal charge is integrated on all pixels simultaneously and then read out at high speeds of 5 MHz.

Features

- Pixel pitch: 12.5 µm
  Pixel height: 250 µm
- Number of pixels: 512 ch
- Single 5 V power supply operation
- Video data rate: 5 MHz Max.
- Simultaneous charge integration
- Shutter function
- High sensitivity, low dark current, low noise
- Built-in timing generator allows operation with only start and clock pulse inputs
- Spectral response range: 400 to 1000 nm
- 8-pin DIP, 16-pin surface mount type also available

Applications

- Position detection
- Image reading

■ Absolute maximum ratings

Parameter	Symbol	Value	Unit
Supply voltage	Vdd	-0.3 to +6	V
Clock pulse voltage	V (CLK)	-0.3 to +6	V
Start pulse voltage	V (ST)	-0.3 to +6	V
Operating temperature *1	Topr	-5 to +60	°C
Storage temperature	Tstg	-10 to +70	°C

*1: No condensation

■ Mechanical specifications

Parameter	Value	Unit
Number of pixels	512	-
Pixel pitch	12.5	µm
Pixel height	250	µm
Active area length	6.4	mm
Window material	TEMPAX	-

PRELIMINARY DATA
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SOLID STATE DIVISION

■ Recommended terminal voltage

Parameter		Symbol	Min.	Typ.	Max.	Unit
Supply voltage		Vdd	4.75	5	5.25	V
Clock pulse voltage	High	V (CLK)	Vdd-0.25	Vdd	Vdd+0.25	V
	Low		-	0	-	V
Start pulse voltage	High	V (ST)	Vdd-0.25	Vdd	Vdd+0.25	V
	Low		-	0	-	V

■ Electrical characteristics [Ta=25 °C, Vdd=5 V, V (CLK) =V (ST)=5 V]

Parameter	Symbol	Min.	Typ.	Max.	Unit
Clock pulse frequency	f (CLK)	0.001	-	5	MHz
Video data rate	VR	-	f (CLK)	-	MHz
Power consumption	P	-	150	-	mW
Conversion efficiency	CE	-	1.6	-	μV/e^-

■ Electrical and optical characteristics [Ta=25 °C, Vdd=5 V, V (CLK)=V (ST)=5 V]

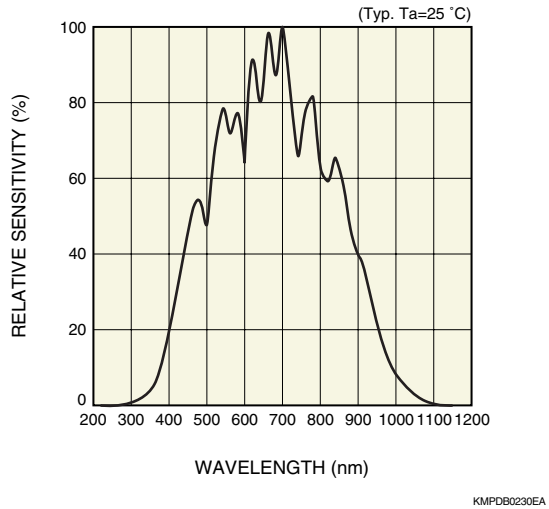
Parameter	Symbol	Min.	Typ.	Max.	Unit
Spectral response range	λ		400 to 1000		nm
Peak sensitivity wavelength	λp	-	700	-	nm
Dark current	ID	-	5	-	fA
Saturation charge	Qsat	-	420	-	fC
Dark output voltage *2	Vd	-	0.5	5	mV
Saturation output voltage	Vsat	-	4.2	-	V
Readout noise	Nr	-	0.4	-	mV-rms
Offset output voltage	Vo	-	0.6	-	V
Photo response non-uniformity *3 *4	PRNU	-	-	±5	%

*2: Storage time Ts=10 ms

*3: Uniformity is defined under the condition that the device is uniformly illuminated by light which is 50 % of the saturation exposure level as follows:
PRNU= ΔX/X × 100 (%)
Where X is the average output of all pixels and ΔX is the difference from the maximum or minimum output and X.

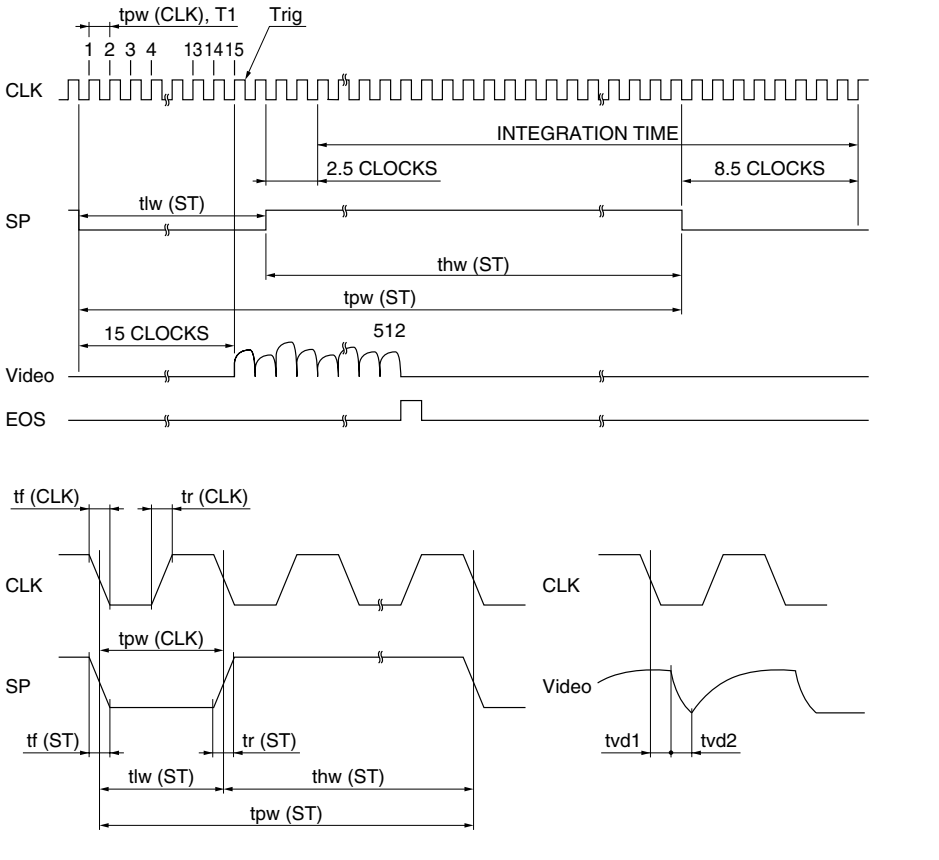
*4: Measured with a tungsten lamp of 2856 K.

■ Spectral response (typical example)



KMPDB0230EA

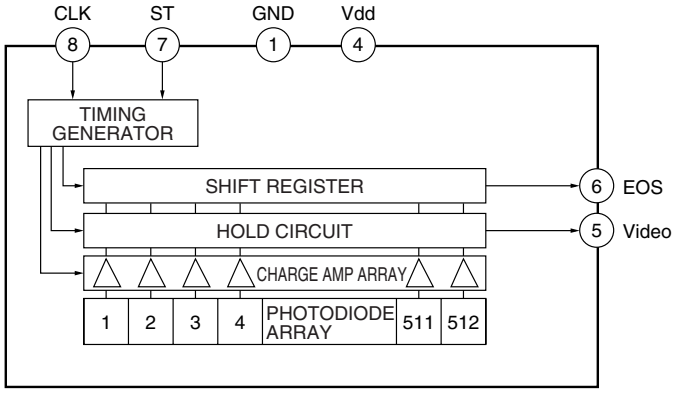
■ Timing chart



Parameter	Symbol	Min.	Typ.	Max.	Unit
Start pulse width	tpw (ST)	T1 × 530	-	-	ns
Start pulse high width	thw (ST)	T1 × 3	-	-	ns
Start pulse low width	tlw (ST)	T1 × 15	-	-	ns
Start pulse rise and fall time	tr (ST), tf (ST)	0	20	30	ns
Clock pulse width	tpw (CLK), T1	200	-	-	ns
Clock pulse rise and fall time	tr (CLK), tf (CLK)	0	20	30	ns
Video delay time 1	tvd1	-	30	-	ns
Video delay time 2	tvd2	-	40	-	ns

Note) The internal circuit starts operating at the rise of CLK pulse immediately after ST pulse sets to low.
The integration time equals the high period of ST pulse plus 6 CLK cycles.

■ Block diagram



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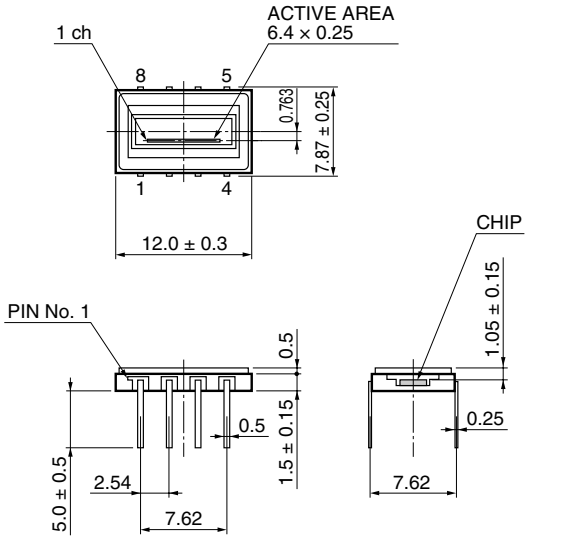
■ Pin connections

Pin No.	Symbol	Name of pin	I/O
1	GND	Ground	I
2	NC		Open
3	NC		Open
4	Vdd	Supply voltage	I
5	Video	Video output	O
6	EOS	End of scan	O
7	ST	Start pulse	I
8	CLK	Clock pulse	I

■ Dimensional outline (unit: mm)



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