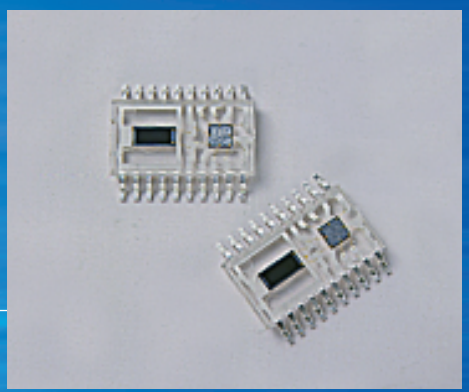


Photo IC for laser beam synchronous detection

S7858

Photo IC with switchable internal amplifier gain



S7858 uses a dual-element PIN photodiode and compares the two photocurrent signals to maintain a highly stable output even when input laser power or ambient temperature fluctuates. The internal amplifier gain is switchable with changes in the input laser power.

Features

- Switchable gain function (6 or 20)
- Photo IC for fast printing
- High sensitivity
- Stable output versus laser power or temperature variations

Applications

- Print start timing detection for laser printers, digital copiers, fax machines, etc.

■ Absolute maximum ratings (Ta=25 °C, Vcc1=Vcc2=Vcc)

Parameter	Symbol	Value	Unit
Supply voltage	Vcc	-0.5 to +7	V
Power dissipation *1	P	150	mW
External input voltage	Vext	-0.5 to +Vcc+0.5	V
Output voltage	Vo	-0.5 to Vcc	V
Output current	Io	20	mA
Ro1, Ro2 terminal current	IRO	5	mA
Operating temperature	Topr	-25 to +80	°C
Storage temperature	Tstg	-40 to +85	°C
Soldering	-	230 °C, 5 s	-

*1: Derate power dissipation at a rate of 2 mW/°C above Ta=25 °C.

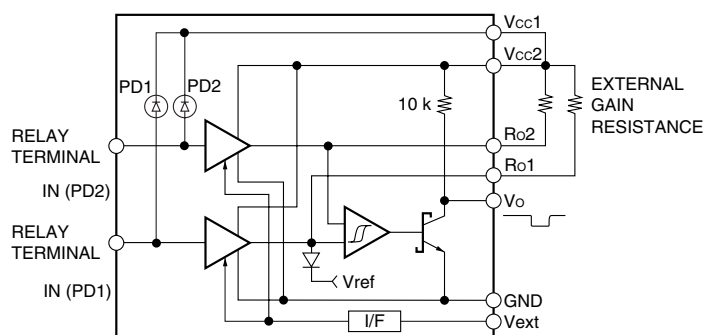
■ Electrical and optical characteristics (Ta=25 °C, λ=780 nm, Vcc1=Vcc2=Vcc=5 V, Ro1=Ro2=5.1 kΩ, unless otherwise noted)

Parameter	Symbol	Condition	Min.	Typ.	Max.	Unit
High level output voltage	VOH	PI=0	4.9	-	-	V
Low level output voltage	VOL	PI=140 μW, at Vext=L PI=40 μW, at Vext=H IoL=10 mA	-	0.4	0.6	V
High level current consumption	ICCH	PI=0	-	4	7	mA
Low level current consumption	ICCL	PI=140 μW, at Vext=L PI=40 μW, at Vext=H	-	6	9	mA
Threshold input power 1	PTH	Vext=L	25	35	45	μW
Threshold input power 2	PTH	Vext=H	7	10	13	μW
H→L propagation delay time	ΔtPHL	PI=200 μW center, at Vext=L PI=60 μW center, at Vext=H Δ PI=±10 % *2	-	-	±10	ns
Rise time	tr	RL=510 Ω, CL=15 pF	-	60	180	ns
Fall time	tf		-	20	100	ns

*2: Beam diameter φ (1/e²)=100 μm, scan speed=0.5 mm/μs

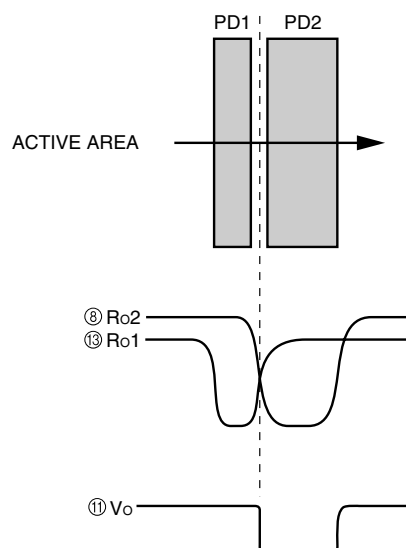
Not including jitter caused by polygon mirror non-uniformity, etc.

■ Equivalent circuit



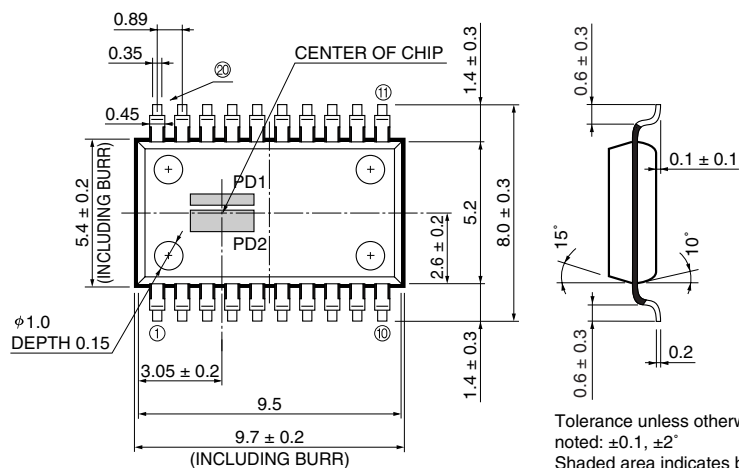
KPIC0050EA

■ Output waveforms of terminal 8, 11 and 13

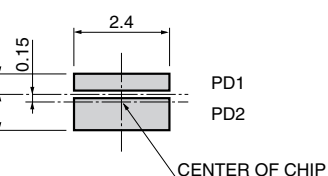
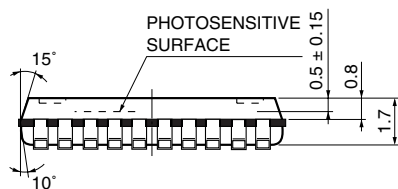


KPIC0008EB

■ Dimensional outline (unit: mm)



Tolerance unless otherwise noted: ± 0.1 , $\pm 2^\circ$
Shaded area indicates burr.



DETAILS OF PHOTODIODE

Tolerance unless otherwise noted: ± 0.03

①	
②	
③	Vcc1
④	
⑤	
⑥	IN (PD2)
⑦	(GND)
⑧	Ro2
⑨	Vext
⑩	GND
⑪	Vo
⑫	(GND)
⑬	Ro1
⑭	Vcc2
⑮	IN (PD1)
⑯	
⑰	
⑱	Vcc1
⑲	
⑳	

Pins ⑦ and ⑫ should be connected to Pin ⑩ on the PC board.

KPIC0039EA

■ Gain switchable terminal logic

Vext TTL input	Built-in gain
L	6 times
H	20 times
Open	6 times

HAMAMATSU

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