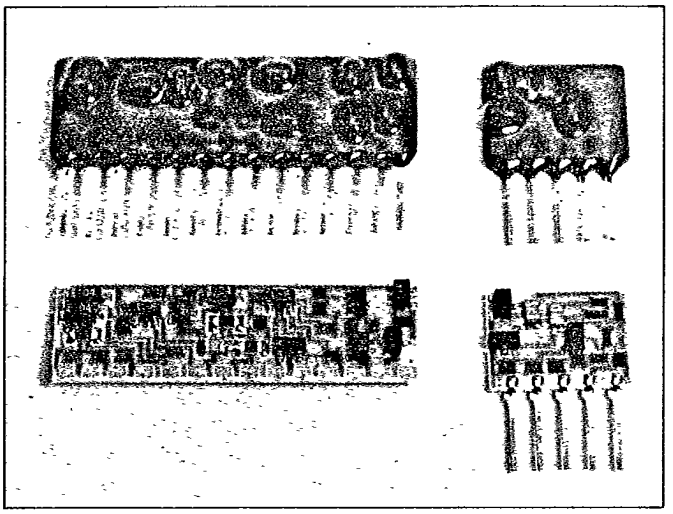
HAMAMATSU

TECHNICAL DATA SHEET

OPTO-HYBRID ICs FOR PHOTOELECTRIC RELAYS H1941/H1940

Hamamatsu H1941 and H1940 are opto-hybrid ICs specially designed for transmission or reflection-mode photoelectric relays using infrared LEDs and PIN silicon photocells. The H1941 is a light-emitting hybrid IC and the H1940 is a light-receiving hybrid IC. Since the combination of the H1941 and H1940 is synchronized, transmission-mode operation at a distance as long as 5 meters is possible. When used as a reflection-mode photoelectric relay, it is capable to detect the distance to the object.



FEATURES:

- **Operatable distance is 0 to 5 meters.**
- **Not influenced by background light due to synchronized operation.**
- **Sensitivity is adjustable precisely.**
- **Operation requires minimum external components.**

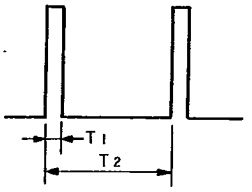
MAXIMUM RATINGS:

Parameters	H1941	H1940	Units
Source Voltage	13	13	V
Power Consumption	220	870	mW
Operating Temperature	−10 to +55	−10 to +55	°C
Storage Temperature	−20 to +65	−20 to +65	°C

CHARACTERISTICS (at 25°C, 12V):

- **H1941 (Light-Emitting Type)**

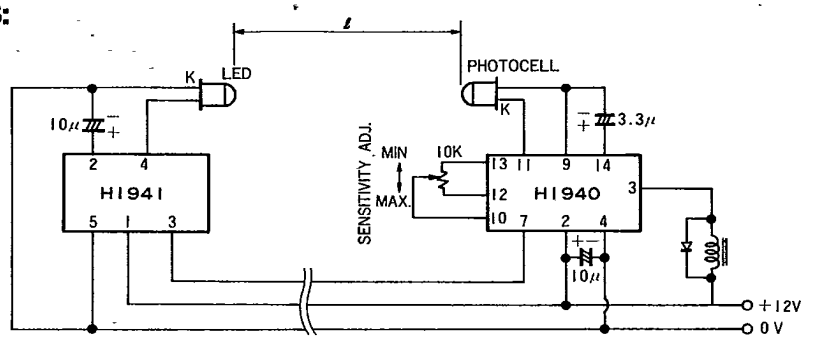
Parameters	Conditions	Min.	Typ.	Max.	Units
Current Consumption	LED "ON"	—	55	—	mA
Driver Terminal Voltage	5Ω between Pin No.4 and No.5, 10 μF between Pin No.2 and No.5	—	1.7	—	V
Emission Time, T_1		40	50	60	μs
Emission Interval, T_2		370	430	490	μs
Sync. Output Resistance		—	20	—	kΩ



- **H1940 (Light-Receiving Type)**

Parameters	Conditions	Min.	Typ.	Max.	Units
Current Consumption	Output "ON"	—	11	—	mA
Output Voltage	at Pin No.3, I_L = −30 mA	—	—	0.8	V
Load Voltage		—	—	40	V
Load Current		—	—	100	mA
Operation Delay Time		1	—	8	ms

TYPICAL CONNECTIONS:



LED: Hamamatsu L1915-01 (High-power GaAlAs LED with lens window)
Photocell: Hamamatsu S1190-01 (PIN photocell with lens window)

OPERATION EXAMPLES:

1. Transmission Mode

The LED and photocell face each other. The operating distance depends on sensitivity adjustment of H1940.

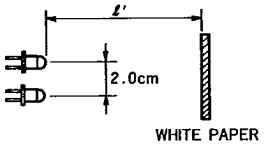
Sensitivity	Operating Distance, ℓ
Minimum	0 to 1.2 m
Maximum	0 to 5 m

In this mode, point sources such as tungsten lamps should not be present in the field of view of the photocell (± 15°). In the minimum position of sensitivity, however, the operation is not disturbed by a point source up to 1500 lux (on the photocell surface) unless rapid change in intensity is performed.

2. Reflection Mode

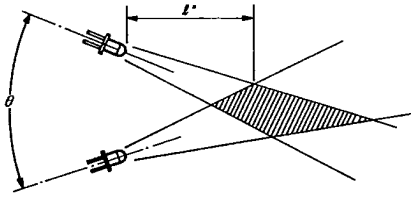
The LED and photocell are placed in parallel. The operating distance when a white paper is used as reflective target is as follows.

Sensitivity	Operating Distance, ℓ'
Minimum	1.0 to 15 cm
Maximum	1.0 to 20 cm



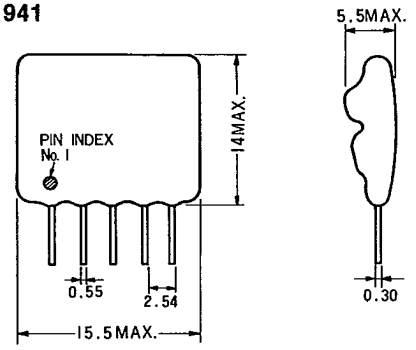
3. Distance Detection Mode

Light axes of the LED and photocell intercross as shown below. The distance ℓ " is determined by the crossing angle θ.

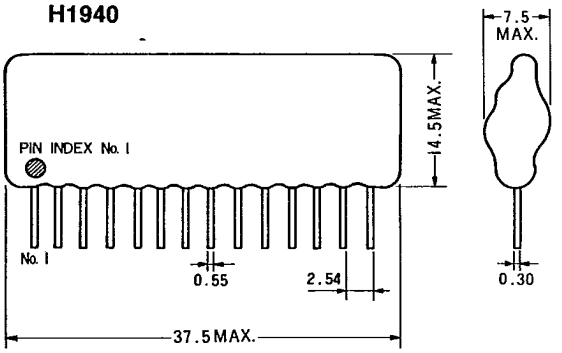


● Dimensional Outline (Unit: mm)

H1941



H1940



NOTES

- LED emission cycle can be specified at a value between 1.5 and 25 kHz.
- It is recommended to use a Hamamatsu LED L1915-01 and PIN silicon photocell S1190-01. Both have a TO-18 metal case with lens window.

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