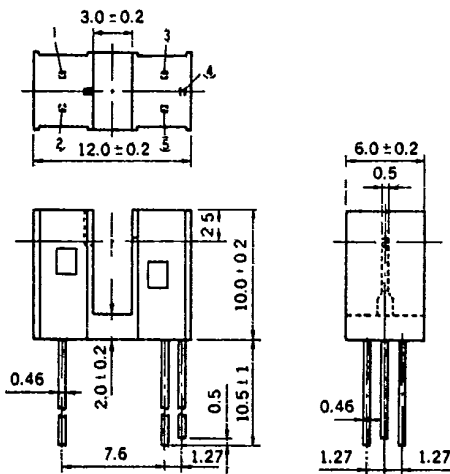


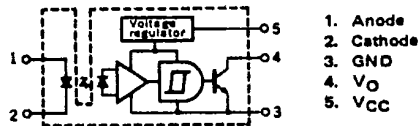
# PHOTO INTERRUPTER PS5003HC

## PHOTO IC INTERRUPTER

### PACKAGE DIMENSIONS (Unit : mm)



### CONNECTION DIAGRAM



### APPLICATIONS

- PPC
- FACSIMILE
- PRINTER
- FDD

### DESCRIPTION

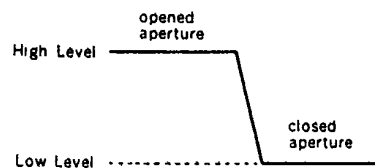
The PS5003HC photo interrupter module is a GaAs Light Emitting Diode coupled to a Si monolithic integrated circuit including a Photo Diode in a plastic housing.

The output incorporates a Schmitt Trigger circuit which provides hysteresis for noise immunity and pulse shaping.

### FEATURES

- Built-in Schmitt Trigger circuit
- Low threshold input current ( $I_{FLH} = 5 \text{ mA MAX.}$ )
- TTL, LSTTL, CMOS compatible
- Wide supply voltage capability ( $V_{CC} = 4.5 \text{ to } 17 \text{ V}$ )
- High On/Off resolution (Slit width: 0.5 mm (equivalent to  $0.5 \text{ mm}^2$  aperture))
- High speed switching ( $t_{PLH} (t_{PHL}) = 3 \mu\text{s TYP.}$   
 $t_r = 100 \text{ ns}, t_f = 50 \text{ ns TYP.}$   
 $@ R_L = 280 \Omega$ )
- Active "High"
- Open collector output

### OUTPUT PATTERN



**PS5003HC**

**ABSOLUTE MAXIMUM RATINGS ( $T_a = 25^\circ\text{C}$ )**

|                          |           |             |                  |
|--------------------------|-----------|-------------|------------------|
| <b>Diode</b>             |           |             |                  |
| Reverse Voltage          | $V_R$     | 6           | V                |
| Forward Current          | $I_F$     | 50          | mA               |
| Power Dissipation        | $P_D$     | 75          | mW               |
| <b>Detector</b>          |           |             |                  |
| Supply Voltage           | $V_{CC}$  | 17          | V                |
| Output Voltage           | $V_O$     | 28          | V                |
| Low Level Output Current | $I_{OL}$  | 50          | mA               |
| Power Dissipation        | $P_C$     | 250         | mW               |
| Storage Temperature      | $T_{stg}$ | -40 to +100 | $^\circ\text{C}$ |
| Operating Temperature    | $T_{opt}$ | -30 to +85  | $^\circ\text{C}$ |

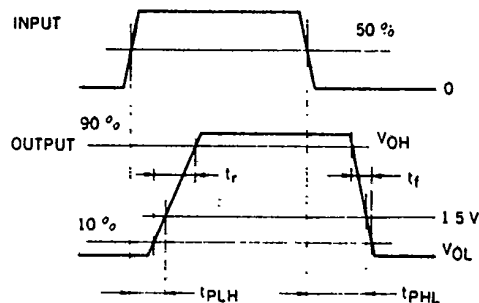
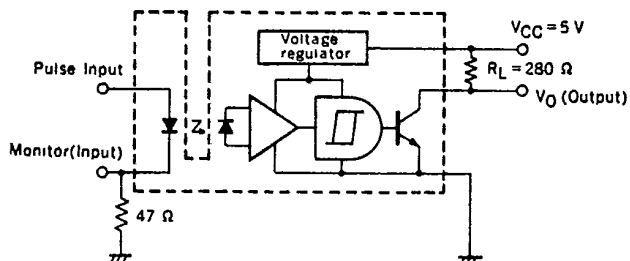
**RECOMMENDED OPERATING CONDITIONS ( $T_a = 25^\circ\text{C}$ )**

| CHARACTERISTIC        | SYMBOL    | MIN. | TYP. | MAX. | UNIT             |
|-----------------------|-----------|------|------|------|------------------|
| Operating Temperature | $T_{opt}$ | -10  |      | +60  | $^\circ\text{C}$ |
| Supply Voltage        | $V_{CC}$  | 4.5  | 5    | 12   | V                |
| Forward Current       | $I_F$     | 5    |      | 20   | mA               |

**ELECTRICAL CHARACTERISTICS ( $T_a = 25^\circ\text{C}$ )**

|          | CHARACTERISTIC            | SYMBOL            | MIN. | TYP. | MAX. | UNIT          | TEST CONDITIONS   |
|----------|---------------------------|-------------------|------|------|------|---------------|---|
| Diode    | Forward Voltage           | $V_F$             |      | 1.1  | 1.4  | V             | $I_F = 5\text{ mA}$   |
|          | Reverse Current           | $I_R$             |      |      | 10   | $\mu\text{A}$ | $V_R = 5\text{ V}$  |
|          | Junction Capacitance      | $C_t$             |      | 20   |      | pF            | $V = 0, f = 1\text{ MHz}$   |
| Detector | Operating Supply Voltage  | $V_{CC}$          | 4.5  |      | 17   | V             |   |
|          | Low Level Output Voltage  | $V_{OL}$          |      | 0.15 | 0.4  | V             | $I_{OL} = 16\text{ mA}, V_{CC} = 5\text{ V}$                        |
|          | High Level Output Voltage | $V_{OH}$          | 4.9  |      |      | V             | $V_{CC} = 5\text{ V}, I_F = 5\text{ mA}$                            |
|          | Low Level Supply Current  | $I_{CCL}$         |      | 2.5  | 5    | mA            | $V_{CC} = 5\text{ V}, I_F = 0$                                      |
| Coupled  | High Level Supply Current | $I_{CCH}$         |      | 1    | 3    | mA            | $V_{CC} = 5\text{ V}, I_F = 5\text{ mA}$                            |
|          | Threshold Input Current   | $I_{FLH}$         |      |      | 5    | mA            | $V_{CC} = 5\text{ V}, R_L = 280\ \Omega$                            |
| Coupled  | Hysteresis Ratio          | $I_{FHL}/I_{FLH}$ |      | 0.7  |      |               | $V_{CC} = 5\text{ V}, R_L = 280\ \Omega$                            |
|          | Propagation Delay Time    | $t_{PLH}$         |      | 3    | 9    | $\mu\text{s}$ | $V_{CC} = 5\text{ V}$<br>$I_F = 5\text{ mA}$<br>$R_L = 280\ \Omega$ |
|          |                           | $t_{PHL}$         |      | 3    | 9    | $\mu\text{s}$ |   |
|          | Rise Time                 | $t_r$             |      | 100  | 300  | ns            |   |
|          | Fall Time                 | $t_f$             |      | 50   | 150  | ns            |   |

Test Circuit for Switching Time



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