This version: Jan. 1998
Previous version: May. 1997

OKI electronic components

# T36CP2, T36CP3, T54LCP, OPU860CP, OPU862CP

**Photo capsule**

## GENERAL DESCRIPTION

The T36CP2/T36CP3/T54LCP/OPU860CP/OPU862 are sensors that are most suited to paper detection. For superior dustproof packaging and easy mounting, a phototransistor can be sealed (encapsulated) into a package with connectors.
The OPU862CP can be mounted with a space (200mm) between the device and the LED capsule because the device has a non-spherical surface lens.
The OPU860CP and OPU862CP assure a high quality because they have been assembled without soldering or using adhesive.

## FEATURES

- The light axis is positioned for efficient insertion into LED capsules and photosensors.
- The sensor unit element is protected from dust.
- The assembly and mount are easy (without soldering).

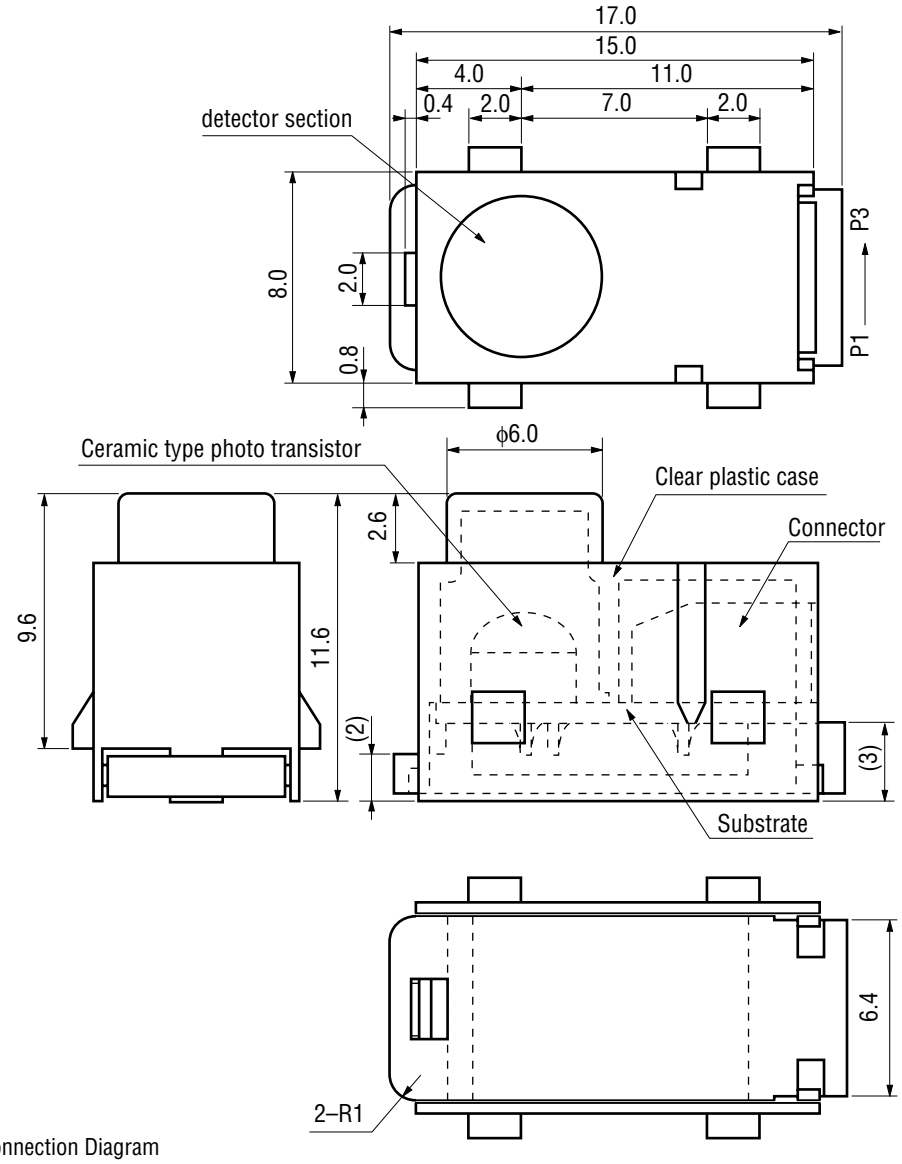
## APPLICATIONS

- Banking terminals (ATM, etc.)
- Printers
- Copying machines
- Communications terminals (FAX, etc.)

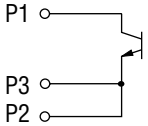
## PIN CONFIGURATION

- **T36CP2, T36CP3**

**(Unit: mm)**

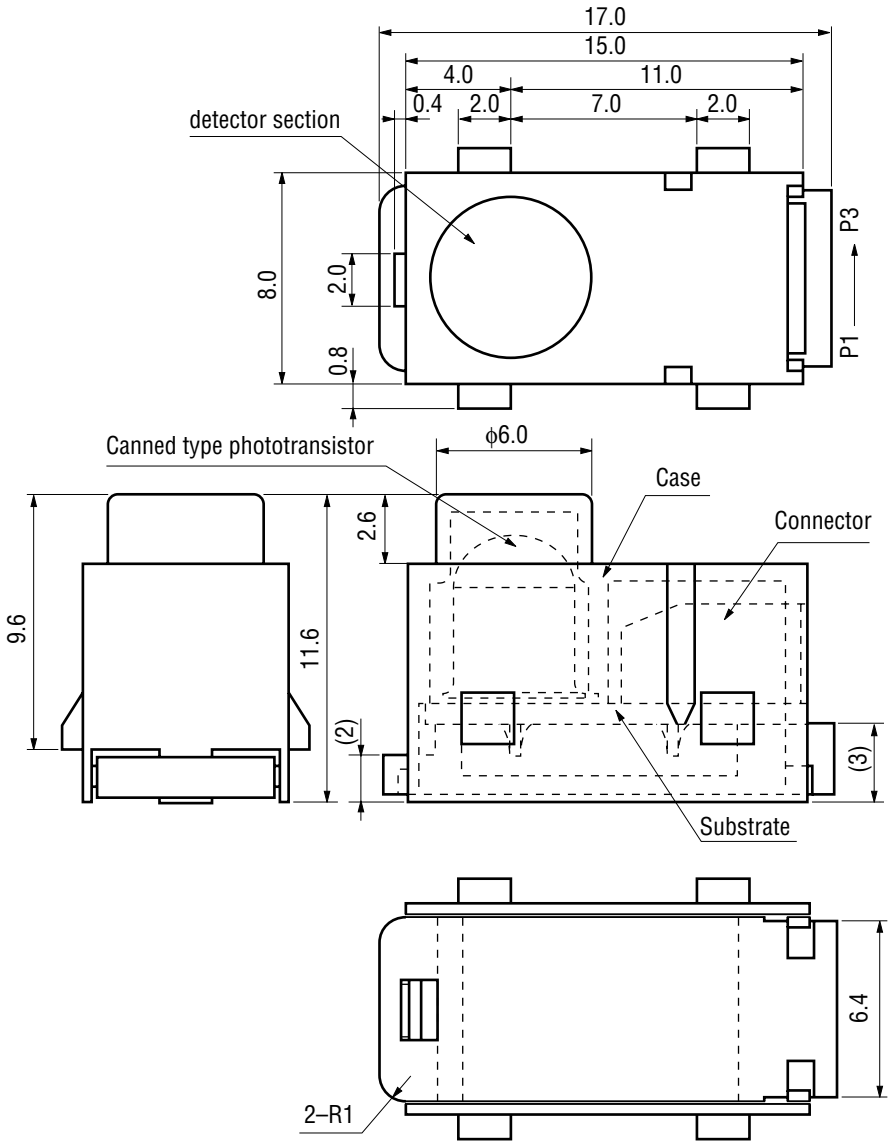



- Pin Connection Diagram
  (P No. indicates the pin number of connectors.)

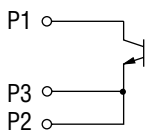



P2 , P3: Emitter
P1 : Collector

- **T54LCP** **(Unit: mm)**

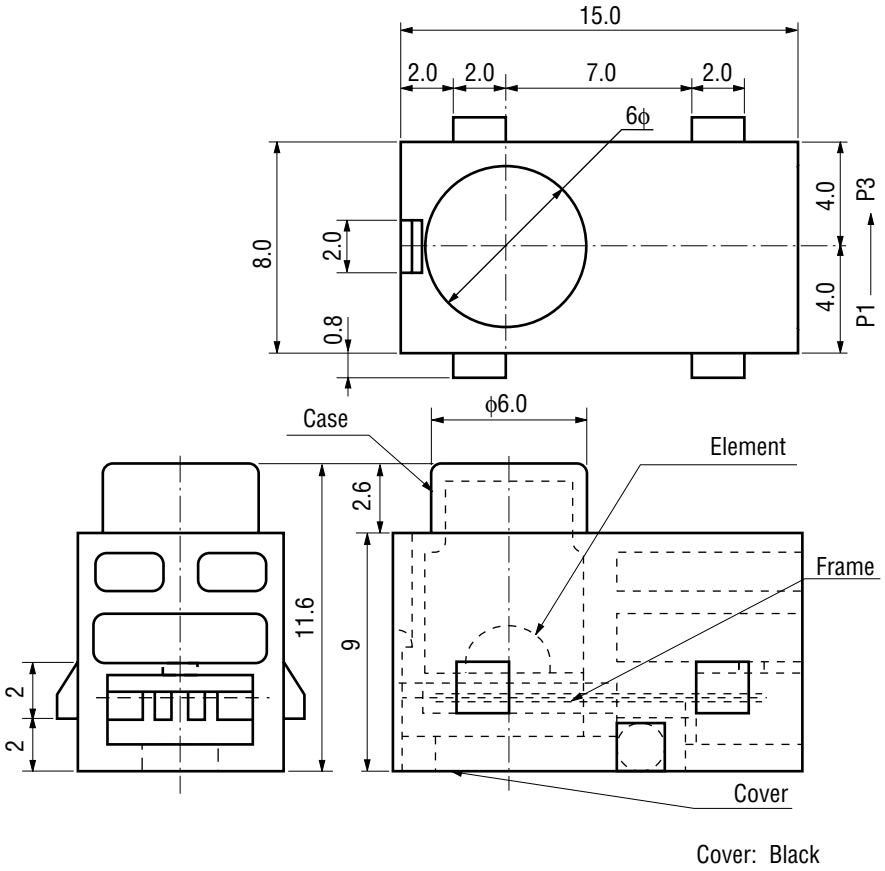



- Pin Connection Diagram
  (P No. indicates the pin number of connectors.)

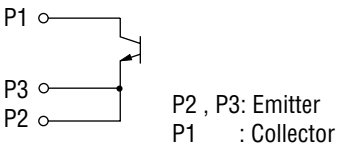



P2 , P3: Emitter
P1 : Collector

- **OPU860CP, OPU862CP** **(Unit: mm)**




- Pin Connection Diagram
  (P No. indicates the pin number of connectors.)



## ABSOLUTE MAXIMUM RATINGS

| Parameter | Symbol | Test Condition | Rating | | Unit |
|---|---|---|---|---|---|
| | | | T36CP2, 3 | T54LCP | |
| Temperature Storage | $T_{stg}$ | — | –20 to +80 | | °C |
| Operating Temperature | $T_{opr}$ | — | –10 to +60 | | °C |
| Emitter-Collector Voltage | $V_{ECO}$ | Ta=25°C | 5 | | V |
| Collector-Emitter Voltage | $V_{CEO}$ | | 20 | | V |
| Collector Current | $I_C$ | | 10 | 30 | mA |
| Power Dissipation | $P_C$ | | 150 | | mW |

| Parameter | Symbol | Test Condition | Rating | | Unit |
|---|---|---|---|---|---|
| | | | OPU860CP | OPU862CP | |
| Temperature Storage | $T_{stg}$ | — | –10 to +60 | | °C |
| Operating Temperature | $T_{opr}$ | — | –10 to +60 | | °C |
| Emitter-Collector Voltage | $V_{ECO}$ | Ta=25°C | 5 | | V |
| Collector-Emitter Voltage | $V_{CEO}$ | | 20 | | V |
| Collector Current | $I_C$ | | 10 | 30 | mA |
| Power Dissipation | $P_C$ | | 150 | | mW |

## ELECTRICAL CHARACTERISTICS

- **T36CP2, T36CP3**

(Ambient TemperatureTa=25°C)

| Parameter | Symbol | Condition | Min. | Typ. | Max. | Unit |
|---|---|---|---|---|---|---|
| Dark Current | $I_D$ | $V_{CE}$=9 V | — | — | 100 | nA |
| Collector-Emitter breakdown Voltage | $BV_{CEO}$ | $I_C$=100 μA | 20 | — | — | V |
| Output Photocurrent *** | $I_{P1}$ ** | $I_F$=50 mA, $V_{CE}$=1 V, L*=10 mm | 0.9 | — | 4.1 | mA |
| | | | 1.85 | — | 6.1 | |
| | $I_{P2}$ ** | $I_F$=50 mA, $V_{CE}$=1 V, L*=100 mm | 40 | — | 200 | μA |
| | | | 75 | — | 300 | |

* : Distance between sensors.
** : The specifications for T36CP2 are shown in the upper and for T36CP3 in the lower.
*** : Measuring circuit.

- **T54LCP**

(Ambient TemperatureTa=25°C)

| Parameter | Symbol | Condition | Min. | Typ. | Max. | Unit |
|---|---|---|---|---|---|---|
| Dark Current | $I_D$ | $V_{CE}$=10 V | — | — | 100 | nA |
| Collector-Emitter Breakdown Voltage | $BV_{CEO}$ | $I_C$=500 μA | 20 | — | — | V |
| Output Photocurrent ** | $I_{P1}$ | $I_F$=50 mA<br>$V_{CE}$=1 V<br>L*=50 mm | 5.2 | — | 28 | mA |
| | $I_{P2}$ | $I_F$=50 mA<br>$V_{CE}$=1 V<br>L*=200 mm | 0.4 | — | 2.8 | mA |

* : Distance between sensors

** : Measuring circuit

- **OPU860CP**

(Ambient TemperatureTa=25°C)

| Parameter | Symbol | Condition | Min. | Typ. | Max. | Unit |
|---|---|---|---|---|---|---|
| Dark Current | $I_D$ | $V_{CE}$=9 V | — | — | 100 | nA |
| Collector-Emitter Breakdown Voltage | $BV_{CEO}$ | $I_C$=100 μA | 20 | — | — | V |
| Output Photocurrent ** | $I_{P1}$ | $I_F$=50 mA<br>$V_{CE}$=1 V<br>L*=10 mm | 3 | — | 20 | mA |
| | $I_{P2}$ | $I_F$=50 mA<br>$V_{CE}$=1 V<br>L*=100 mm | 0.1 | — | 1.5 | mA |

* : Distance between sensors

** : Measuring circuit

- **OP862CP**

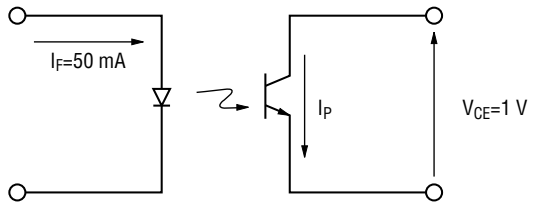
(Ambient TemperatureTa=25°C)

| Parameter | Symbol | Condition | Min. | Typ. | Max. | Unit |
|---|---|---|---|---|---|---|
| Dark Current | $I_D$ | $V_{CE}$=10 V | — | — | 100 | nA |
| Collector-Emitter Breakdown Voltage | $BV_{CEO}$ | $I_C$=500 μA | 20 | — | — | V |
| Output Photocurrent ** | $I_{P1}$ | $I_F$=50 mA<br>$V_{CE}$=1 V<br>L*=50 mm | 5.2 | — | 28 | mA |
| | $I_{P2}$ | $I_F$=50 mA<br>$V_{CE}$=1 V<br>L*=200 mm | 0.4 | — | 5.0 | mA |

* : Distance between sensors

** : Measuring circuit

Measuring circuit

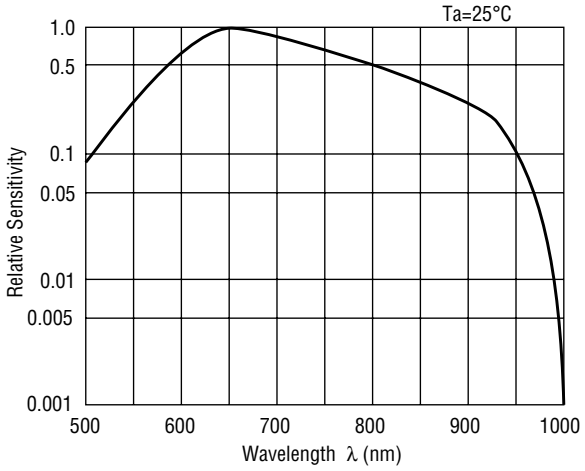



Light emitting master (OLD222CP)

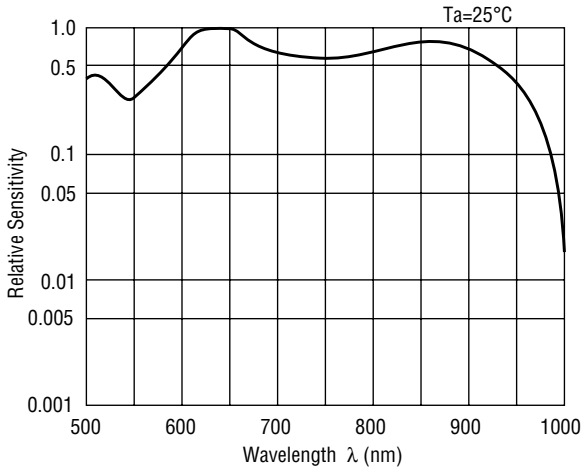
Object to be masured

## TYPICAL CHARACTERISTICS

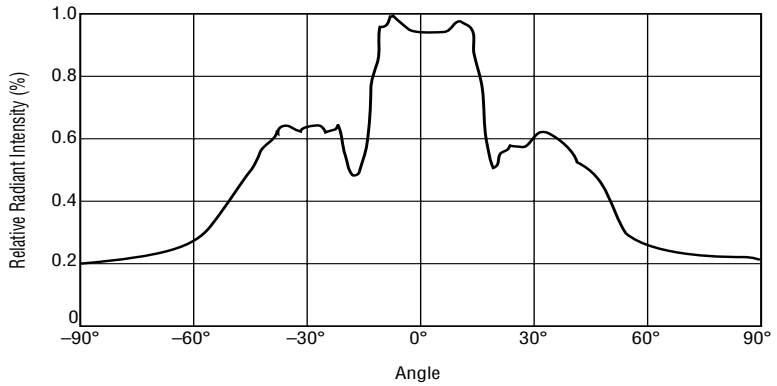
- **T36CP2, OPU860CP Spectral Sensitivity**



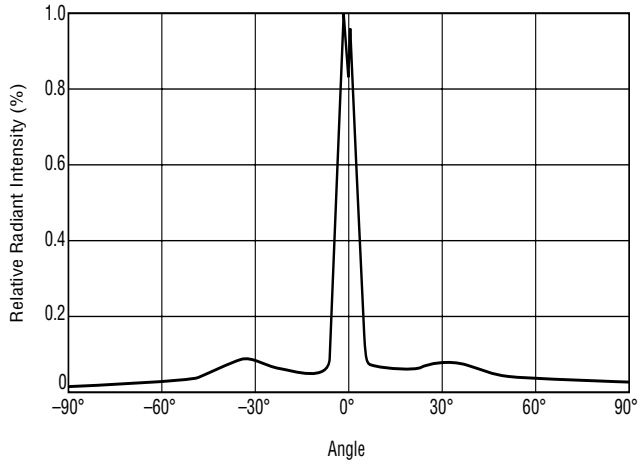

- **T54LCP, OPU862CP Spectral Sensitivity**



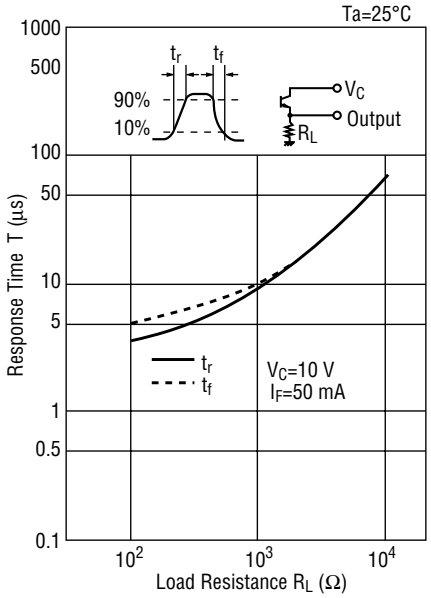
- **OPU860CP Directional Characteristic**



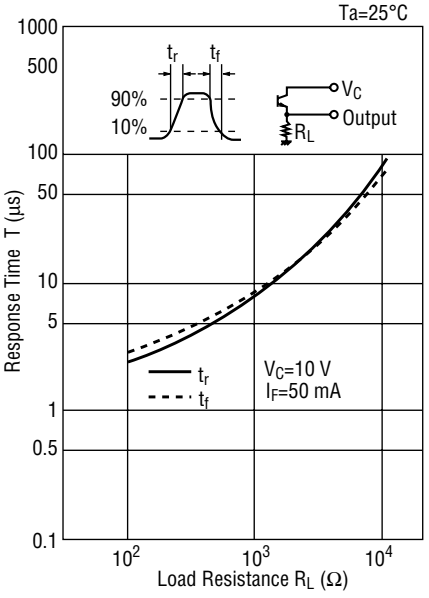

- **OPU862CP Directional Characteristic**



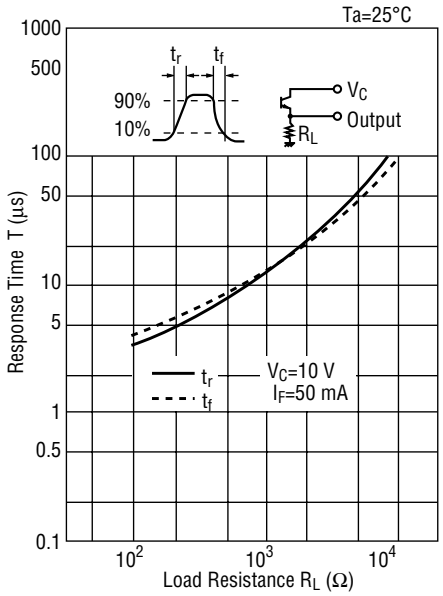

- **T36CP2—OLD122CP3 Switching Time vs. Load Resistance**



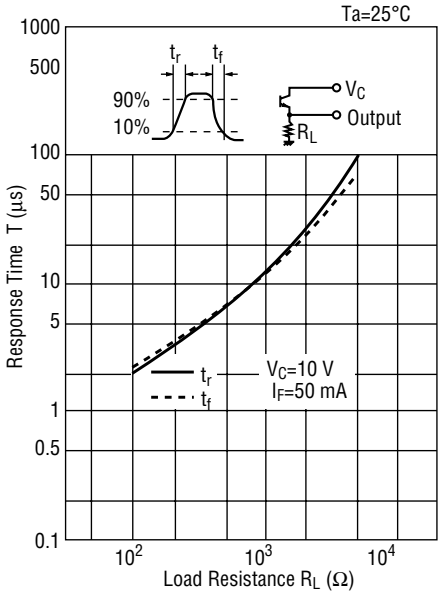

- **T36CP2—OLD222CP Switching Time vs. Load Resistance**



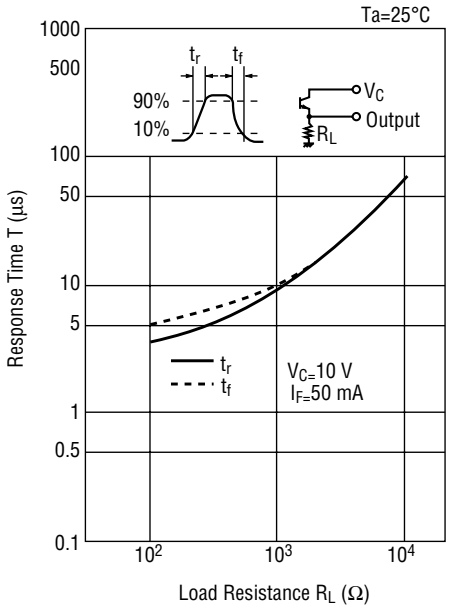
- **T54LCP—OLD122CP3 Switching Time vs. Load Resistance**



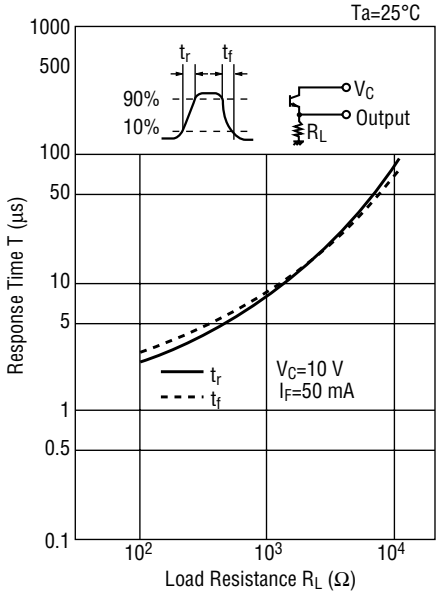

- **T54LCP—OLD222CP Switching Time vs. Load Resistance**



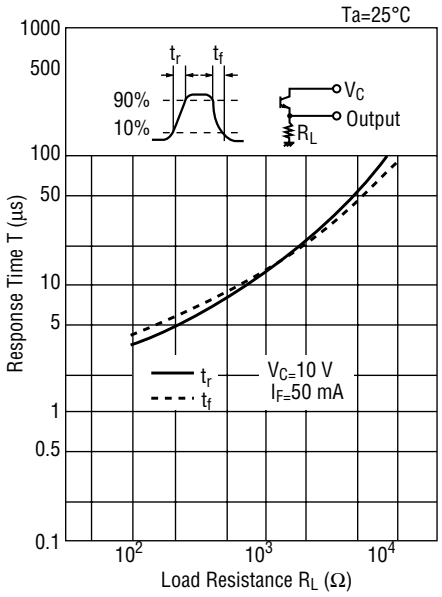

- **OPU860CP—OPU850 Switching Time vs. Load Resistance**



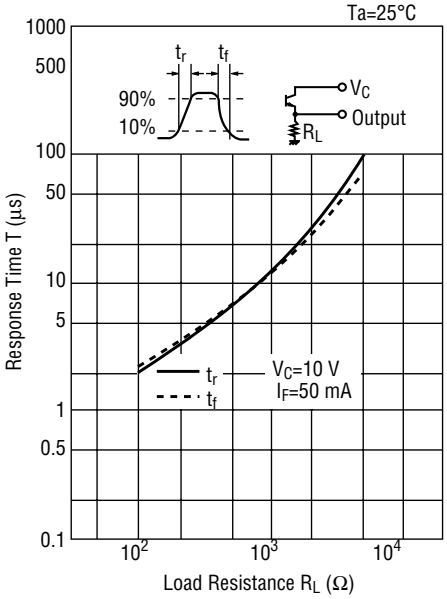

- **OPU860CP—OPU852CP Switching Time vs. Load Resistance**



- **OPU862CP—OPU850 Switching Time vs. Load Resistance**

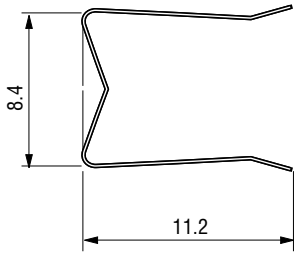


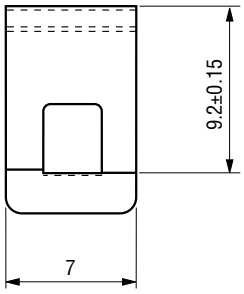

- **OPU862CP—OPU852CP Switching Time vs. Load Resistance**



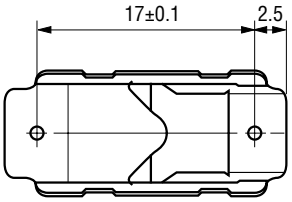
## OPTION PARTS

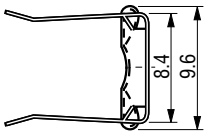
- **Sensor Holder A Type Dimension** **(Unit: mm)**

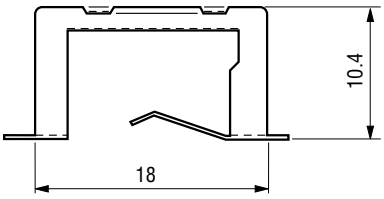



- **Sensor Holder B Type Dimension** **(Unit: mm)**




**Recommended Connector for Capsule Sensor (female connector)**

| Product Name | Type | Maker |
|---|---|---|
| Connector | IL—Y—3S—S15C3 | Japan Aviation Electronics Ind., Ltd. |