# HIGH DENSITY MOUNTING PHOTOTRANSISTOR OPTICALLY COUPLED ISOLATORS

## DESCRIPTION

The IS121 is an optically coupled isolator consisting of an infrared light emitting diode and NPN silicon photo transistor in a space efficient dual in line plastic package.

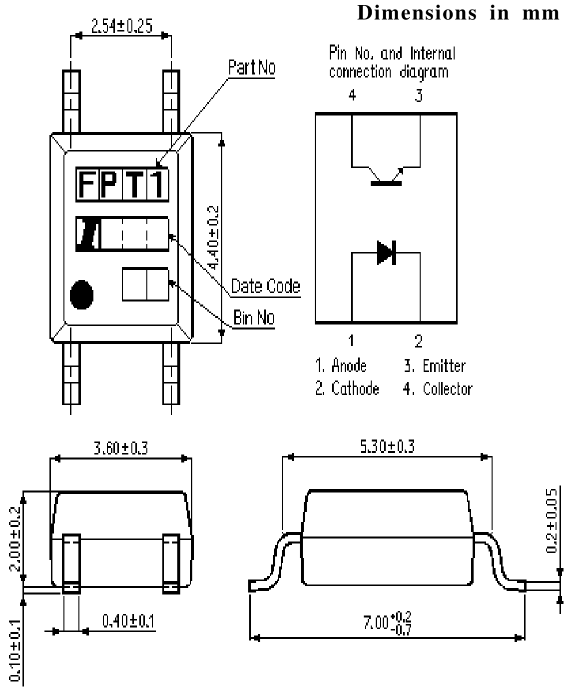
## FEATURES

- Marked as FPT1.
- Current Transfer Ratio MIN. 50%
- Isolation Voltage (3.75kV$_{RMS}$,5.3kV$_{PK}$)
- All electrical parameters 100% tested
- Drop in replacement for Toshiba TLP121

## APPLICATIONS

- Computer terminals
- Industrial systems controllers
- Measuring instruments
- Signal transmission between systems of different potentials and impedances

**Dimensions in mm**





**ISOCOM COMPONENTS LTD**
Unit 25B, Park View Road West,
Park View Industrial Estate, Brenda Road
Hartlepool, Cleveland, TS25 1YD
Tel: (01429) 863609 Fax :(01429) 863581

**ISOCOM INC**
1024 S. Greenville Ave, Suite 240,
Allen, TX 75002 USA
Tel: (214) 495-0755 Fax: (214) 495-0901
e-mail info@isocom.com
http://www.isocom.com

## ABSOLUTE MAXIMUM RATINGS
## (25°C unless otherwise specified)

| | |
|---|---|
| Storage Temperature | -40°C to + 125°C |
| Operating Temperature | -30°C to + 100°C |
| Lead Soldering Temperature (1/16 inch (1.6mm) from case for 10 secs) | 260°C |

## INPUT DIODE

| | |
|---|---|
| Forward Current | 50mA |
| Reverse Voltage | 6V |
| Power Dissipation | 70mW |

## OUTPUT TRANSISTOR

| | |
|---|---|
| Collector-emitter Voltage $BV_{CEO}$ | 35V |
| Emitter-collector Voltage $BV_{ECO}$ | 6V |
| Power Dissipation | 150mW |

## POWER DISSIPATION

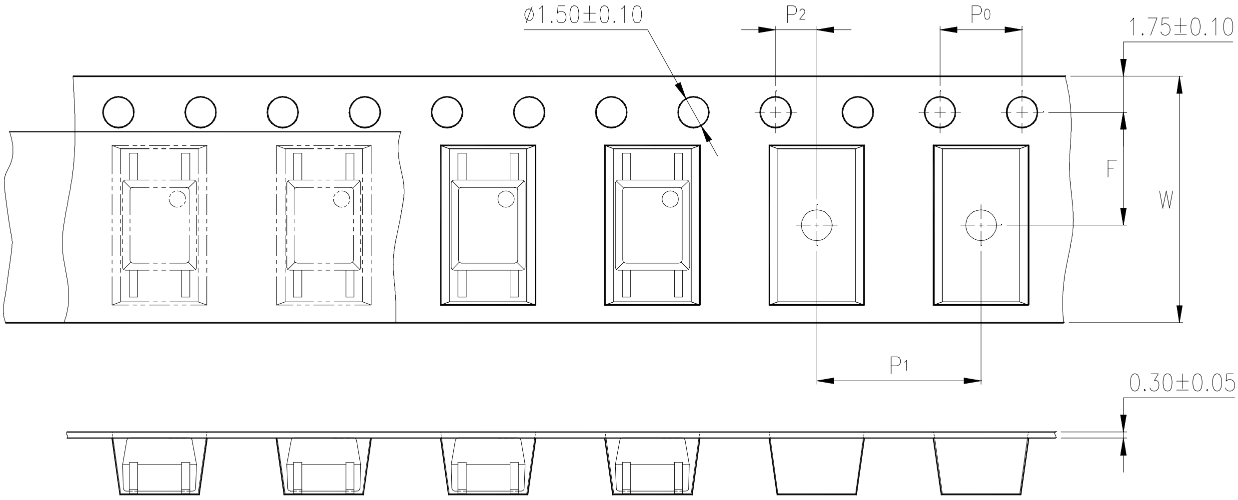
| | |
|---|---|
| Total Power Dissipation (derate linearly 2.26mW/°C above 25°C) | 170mW |

## ELECTRICAL CHARACTERISTICS ( $T_A$ = 25°C Unless otherwise noted )

| PARAMETER | | MIN | TYP | MAX | UNITS | TEST CONDITION |
|---|---|---|---|---|---|---|
| Input | Forward Voltage ($V_F$) | | 1.2 | 1.4 | V | $I_F$ = 20mA |
| | Reverse Voltage ($V_R$) | 4 | | | V | $I_R$ = 10μA |
| | Reverse Current ($I_R$) | | | 10 | μA | $V_R$ = 4V |
| Output | Collector-emitter Breakdown ($BV_{CEO}$) | 35 | | | V | $I_C$ = 0.1mA |
| | Emitter-collector Breakdown ($BV_{ECO}$) | 6 | | | V | $I_E$ = 10μA |
| | Collector-emitter Dark Current ($I_{CEO}$) | | | 100 | nA | $V_{CE}$ = 20V |
| Coupled | Current Transfer Ratio (CTR) | 50 | | 600 | % | 5mA $I_F$, 5V $V_{CE}$ |
| | Optional CTR Grades: IS121A | 80 | | 160 | % | 5mA $I_F$, 5V $V_{CE}$ |
| | IS121B | 130 | | 260 | % | 5mA $I_F$, 5V $V_{CE}$ |
| | IS121C | 200 | | 400 | % | 5mA $I_F$, 5V $V_{CE}$ |
| | IS121D | 300 | | 600 | % | 5mA $I_F$, 5V $V_{CE}$ |
| | Collector-emitter Saturation Voltage $V_{CE(SAT)}$ | | | 0.2 | V | 20mA $I_F$, 1mA $I_C$ |
| | Input to Output Isolation Voltage $V_{ISO}$ | 3750 | | | $V_{RMS}$ | See note 1 |
| | | 5300 | | | $V_{PK}$ | See note 1 |
| | Input-output Isolation Resistance $R_{ISO}$ | $5x10^{10}$ | | | Ω | $V_{IO}$ = 500V (note 1) |
| | Output Rise Time tr | | 4 | 18 | μs | $V_{CE}$ = 2V , |
| | Output Fall Time tf | | 3 | 18 | μs | $I_C$ = 2mA, $R_L$ = 100Ω |

Note 1 Measured with input leads shorted together and output leads shorted together.

# TAPING DIMENSIONS




| Description | Symbol | Dimensions in mm ( inches ) |
|---|---|---|
| Tape wide | W | 12 ± 0.3 ( .47 ) |
| Pitch of sprocket holes | $P_0$ | 4 ± 0.1 ( .15 ) |
| Distance of compartment | F<br>$P_2$ | 5.5 ± 0.1 ( .217 )<br>2 ± 0.1 ( .079 ) |
| Distance of compartment to compartment | $P_1$ | 8 ± 0.1 ( .315 ) |

# CHARACTERISTIC CURVES

Fig.1 Forword Current
vs. Ambient Temperatute

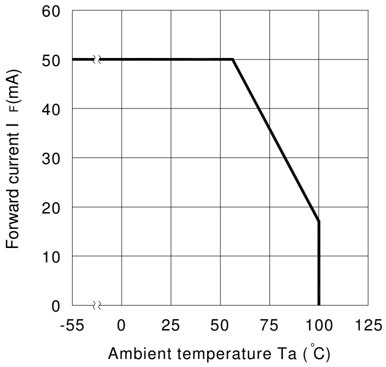



Fig.2 Collector Power Dissiption
vs. Ambient Temperature

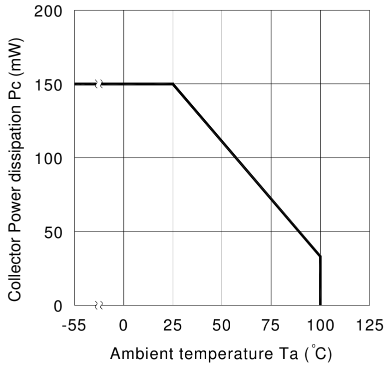



Fig.3 Collector-emitter Saturation
Voltage vs. Forward Current

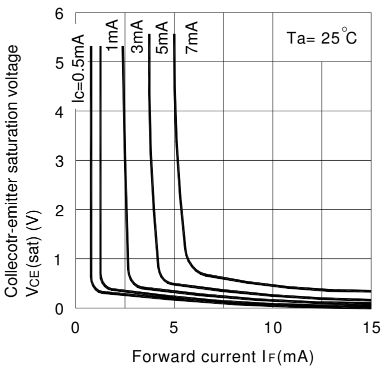



Fig.4 Forward Current vs. Forward
Voltage

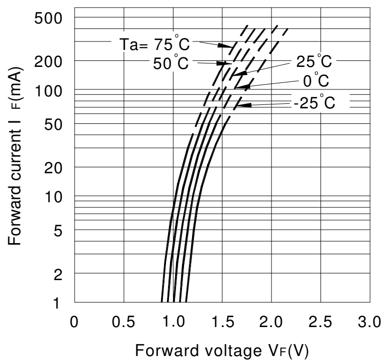



Fig.5 Current Transfer Ratio vs.
Forward Current

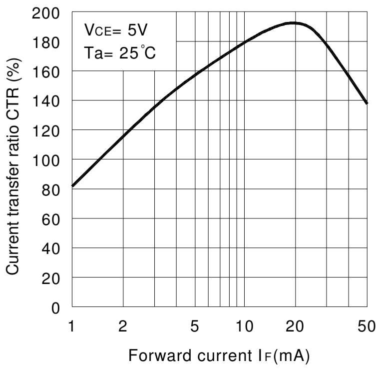
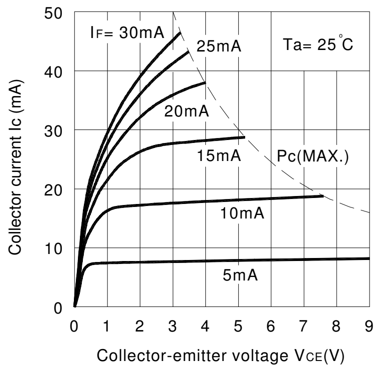



Fig.6 Collector Current vs.
Collector-emitter Voltage



# CHARACTERISTIC CURVES

Fig.7 Relative Current Transfer Ratio
vs. Ambient Temperature

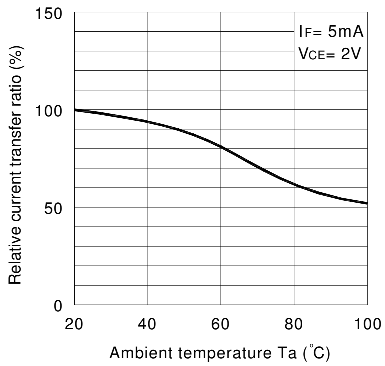



Fig.8 Collector-emitter Saturation Voltage
vs. Ambient Temperature

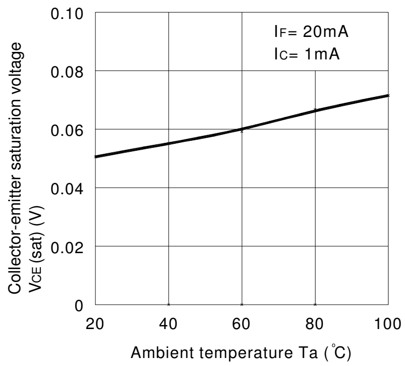



Fig.9 Collector Dark Current vs.
Ambient Temperature

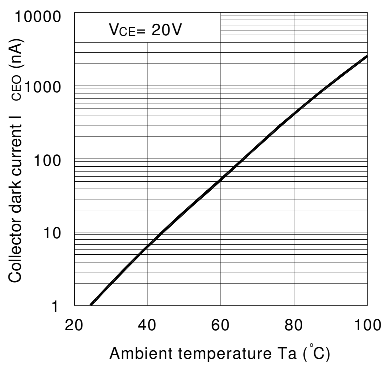



Fig.10 Response Time vs. Load
Resistance

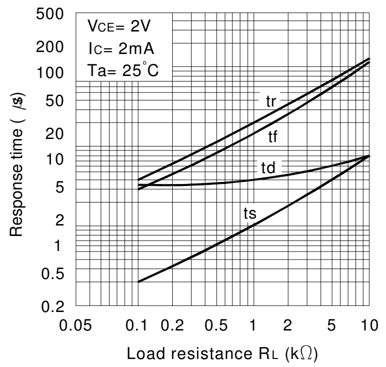
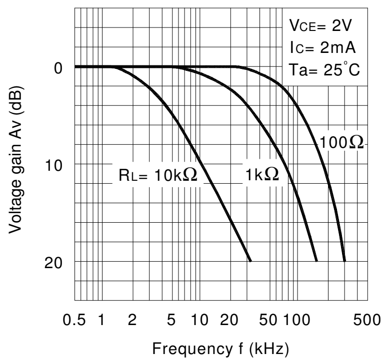
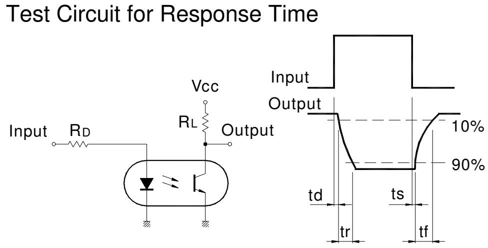


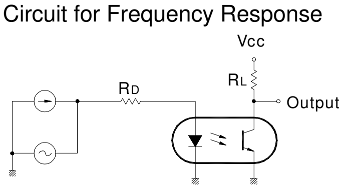

Fig.11 Frequency Response




Test Circuit for Response Time

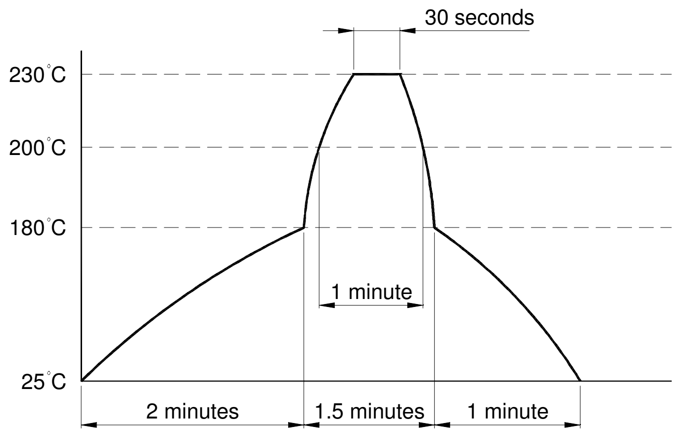



Test Circuit for Frequency Response



# TEMPERATURE PROFILE OF SOLDERING REFLOW

(1) One time soldering reflow is recommended within the condition of temperature and time profile shown below.




(2) When using another soldering method such as infrated ray lamp, the temperature may rise partially in the mold of the device.
Keep the temperature on the package of the device within the condition of above (1).