GP1S273LCS1F

Gap : 5.0mm Slit : 0.7mm
Phototransistor Output,
Compact Transmissive Photointerrupter with connector

■Description

GP1S273LCS1F is a standard, phototransistor output, transmissive photointerrupter with opposing emitter and detector in a case, providing non-contact sensing. For this family of devices, the emitter and detector are inserted in a case, and a 3-pin connector is included to allow remote-mount or off-board designs.

■Agency approvals/Compliance

1. Compliant with RoHS directive (2002/95/EC)

■Applications

1. General purpose detection of object presence or motion.
   Example : PPC, FAX, Printer

■Features

1. Transmissive with phototransistor output
2. Highlights :
   • Special position hooks compatible with 3 different Plate thicknesses (1.0, 1.2, 1.6mm)
   • Snap insertion
3. Key Parameters :
   • Gap Width : 5mm
   • Slit Width (detector side) : 0.7mm
   • Package : 15 x 11.8 x 6mm (without connector and hooks)
   • Connector : Tyco Electronics JAPAN G.K.
     (353293-3 and 353908-3)
4. RoHS directive compliant

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Sheet No.: OP13034EN

1
Internal Connection Diagram

Outline

Drawing No. CY14344i02  Scale: 2/1  Unit: 1/1 mm

Note) 1. Unspecified tolerance shall be followed the list below.
2. Dimensions in parenthesis are shown for reference.
3. Coupling and contact: MT receptacle connector (353293-3 and 353908-3)
   by Tyco Electronics Japan G.K.

<table>
<thead>
<tr>
<th>Dimension</th>
<th>Tolerance</th>
</tr>
</thead>
<tbody>
<tr>
<td>less than 5.0</td>
<td>±0.15</td>
</tr>
<tr>
<td>5.0 or more less than 15.0</td>
<td>±0.2</td>
</tr>
<tr>
<td>15.0 or more</td>
<td>±0.3</td>
</tr>
</tbody>
</table>
### Absolute maximum ratings

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Symbol</th>
<th>Rating</th>
<th>Unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Input</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>*1 Forward current</td>
<td>$I_F$</td>
<td>50</td>
<td>mA</td>
</tr>
<tr>
<td>*1, 2 Peak forward current</td>
<td>$I_{FM}$</td>
<td>1</td>
<td>A</td>
</tr>
<tr>
<td>Reverse voltage</td>
<td>$V_R$</td>
<td>5</td>
<td>V</td>
</tr>
<tr>
<td>Power dissipation</td>
<td>$P$</td>
<td>75</td>
<td>mW</td>
</tr>
<tr>
<td>Output</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Collector-emitter voltage</td>
<td>$V_{CEO}$</td>
<td>35</td>
<td>V</td>
</tr>
<tr>
<td>Emitter-collector voltage</td>
<td>$V_{ECO}$</td>
<td>6</td>
<td>V</td>
</tr>
<tr>
<td>Collector current</td>
<td>$I_C$</td>
<td>20</td>
<td>mA</td>
</tr>
<tr>
<td>*1 Collector power dissipation</td>
<td>$P_C$</td>
<td>75</td>
<td>mW</td>
</tr>
<tr>
<td>*3 Operating temperature</td>
<td>Topr</td>
<td>-30 to +95</td>
<td>°C</td>
</tr>
<tr>
<td>Storage temperature</td>
<td>Tstg</td>
<td>-40 to +100</td>
<td>°C</td>
</tr>
</tbody>
</table>

*1 The derating factors of absolute maximum ratings due to ambient temperature are shown in Fig. 1, 2, 3.

*2 Pulse width ≤ 100μs, Duty ratio : 0.01

*3 Connector attachment and release shall be done at normal temperature.

### Electro-optical Characteristics

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Symbol</th>
<th>Conditions</th>
<th>MIN.</th>
<th>TYP.</th>
<th>MAX.</th>
<th>Unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Input</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Forward voltage</td>
<td>$V_F$</td>
<td>$I_F=20mA$</td>
<td>-</td>
<td>1.2</td>
<td>1.4</td>
<td>V</td>
</tr>
<tr>
<td>Peak forward voltage</td>
<td>$V_{FM}$</td>
<td>$I_{FM}=0.5A$</td>
<td>-</td>
<td>2</td>
<td>3</td>
<td>V</td>
</tr>
<tr>
<td>Reverse current</td>
<td>$I_R$</td>
<td>$V_R=3V$</td>
<td>-</td>
<td>-</td>
<td>5</td>
<td>μA</td>
</tr>
<tr>
<td>Output</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Dark current</td>
<td>$I_{CEO}$</td>
<td>$V_{CE}=20V$</td>
<td>-</td>
<td>-</td>
<td>100</td>
<td>nA</td>
</tr>
<tr>
<td>Collector current</td>
<td>$I_C$</td>
<td>$V_{CE}=5V$, $I_F=20mA$</td>
<td>0.5</td>
<td>-</td>
<td>15</td>
<td>mA</td>
</tr>
<tr>
<td>Collector-emitter saturation voltage</td>
<td>$V_{CE(sat)}$</td>
<td>$I_F=40mA$, $I_C=0.5mA$</td>
<td>-</td>
<td>-</td>
<td>0.4</td>
<td>V</td>
</tr>
<tr>
<td>Response time</td>
<td>(Rise)</td>
<td>$V_{CE}=2V$, $I_C=2mA$</td>
<td>-</td>
<td>3</td>
<td>15</td>
<td>μs</td>
</tr>
<tr>
<td></td>
<td>(Fall)</td>
<td>$R_L=100\Omega$</td>
<td>-</td>
<td>4</td>
<td>20</td>
<td>μs</td>
</tr>
</tbody>
</table>

(Test circuit for response time)

![Test circuit for response time]
Fig. 1 Forward current vs. ambient temperature

Fig. 2 Collector power dissipation vs. ambient temperature

Fig. 3 Peak forward current vs. duty ratio

Pulse width $\leq 100 \mu$s  $Ta=25^\circ C$
■Supplements

- ODS materials
  - This product shall not contain the following materials.
  - Also, the following materials shall not be used in the production process for this product.
    Materials for ODS: CFCs, Halon, Carbon tetrachloride 1.1.1-Trichloroethane (Methyl chloroform)
- Specified brominated flame retardants
  - Specified brominated flame retardants (PBB and PBDE) are not used in this device at all.
- Country of origin: Philippine
- Product mass: Approx. 0.73g
- Compliance with each regulation
  1) The RoHS directive(2002/95/EC)
     - This product complies with the RoHS directive(2002/95/EC).
     - Object substances: mercury, lead, cadmium, hexavalent chromium, polybrominated biphenyls (PBB) and polybrominated diphenyl ethers (PBDE)
  2) Content of six substances specified in Management Methods for Control of Pollution Caused by Electronic Information Products Regulation (Chinese: 电子信息产品污染控制管理办法).

<table>
<thead>
<tr>
<th>Category</th>
<th>Lead (Pb)</th>
<th>Mercury (Hg)</th>
<th>Cadmium (Cd)</th>
<th>Hexavalent chromium (Cr_{6+})</th>
<th>Polybrominated biphenyls (PBB)</th>
<th>Polybrominated diphenyl ethers (PBDE)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Photointerrupter</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
</tbody>
</table>

✓: indicates that the content of the toxic and hazardous substance in all the homogeneous materials of the part is below the concentration limit requirement as described in SJ/T 11363-2006 standard.
Notes

- Circuit design
  In circuit designing, make allowance for the degradation of the light emitting diode output that results from long continuous operation. (50% degradation/5 years)

- Position of opaque board
  Opaque board shall be installed at place 4mm or more from the top of elements.
  (Example)

- Cleaning
  Please don't carry out immersion cleaning or ultrasonic cleaning to avoid keeping solvent inside case of this device.

- Washing material
  Dust and stain shall clean by air blow, or shall clean by soft cloth soaked in washing materials.
  And washing material to clean shall be used the below materials only.
  Ethyl alcohol, Methyl alcohol, Isopropyl alcohol

- Connector connection
  For the electrical connection to the connector terminal, please certainly use the connector specified in this specifications.
  Please avoid the connection by the soldering or welding which may damage the main body of the device, and also avoid the contact by the clip and so on which may cause the malfunction by the contact failure.

- Put-in and pull-out of connector
  The connection other than to the correct connection direction, forcing-into, and the pulling-out diagonally (if being not put-in and pulled-out straight) may deform or break the connector terminal and/or housing, which may cause the unusable state of the device.
Recommended Installation Hole drawing

(Drawing No. CY14345i06)

*1 We recommend to fix GP1S273LCS1F at punching side on the fixing plate (metal plate).

*2 Please decide the final dimensions at your side after confirmation by the actual applications, because mounting efficiency and mounted stabilization are dependent on mounting plate corner-R and punched state.

*3 Tolerance shall be ±0.1mm

Normal mounting type

Thickness of plate for 1.6mm

Thickness of plate for 1.2mm

Thickness of plate for 1.0mm
### Parts

This product uses the following parts.

- **Light detector (Quantity : 1)**

<table>
<thead>
<tr>
<th>Type</th>
<th>Material</th>
<th>Maximum sensitivity wavelength (nm)</th>
<th>Sensitivity wavelength (nm)</th>
<th>Response time (μs)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Phototransistor</td>
<td>Silicon (Si)</td>
<td>930</td>
<td>400 to 1200</td>
<td>3</td>
</tr>
</tbody>
</table>

- **Light emitter (Quantity : 1)**

<table>
<thead>
<tr>
<th>Type</th>
<th>Material</th>
<th>Maximum light emitting wavelength (nm)</th>
<th>I/O Frequency (MHz)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Infrared light emitting diode (non-coherent)</td>
<td>GaAs</td>
<td>950</td>
<td>0.3</td>
</tr>
</tbody>
</table>

- **Material**

<table>
<thead>
<tr>
<th>Case</th>
<th>Lead flame</th>
</tr>
</thead>
<tbody>
<tr>
<td>Black polycarbonate resin (UL 94V-2)</td>
<td>Copper Alloy (With plating)</td>
</tr>
</tbody>
</table>

- **Others**
  - This product shall not be radiation flux proof.
  - The laser oscillator is not equipped on this product.
  - The terminals are covered with Tin Plating (more than 99.99%).
Packing specification

- Package

<table>
<thead>
<tr>
<th>No.</th>
<th>Name</th>
<th>Quantity</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Packing case</td>
<td>1/1600</td>
</tr>
<tr>
<td>2</td>
<td>Pad</td>
<td>6/1600</td>
</tr>
<tr>
<td>3</td>
<td>Tray</td>
<td>1/320</td>
</tr>
<tr>
<td>4</td>
<td>Kraft tape</td>
<td>-</td>
</tr>
</tbody>
</table>

- Packing method
  1) 8 products are put in 1 pocket as shown in (a) or (b). <Fig.1>
  2) The pads are attached at the top and the bottom of the trays and also inserted between the trays. <Fig.3>
  3) Seal packing case with Kraft tape, and stamp Model No., quantity, date in Indication phase. <Fig.4>
     (1600pcs. / packing case)
     (Approximately 2.43kg / packing mass)
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--- Telecommunication equipment [terminal]
--- Test and measurement equipment
--- Industrial control
--- Audio visual equipment
--- Consumer electronics

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--- Traffic signals
--- Gas leakage sensor breakers
--- Alarm equipment
--- Various safety devices, etc.

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