PHOTO-INTERRUPTER

Part Number: KTIR0721DS

*Features
- Compact and thin.
- Visible light cut-off type.
- High sensitivity.
- Package: 1000pcs/Reel.
- RoHS Compliant.

*Applications
- Cassette tape recorders, VCRs.
- Floppy disk drives.
- Various microcomputerized control equipment.

*Absolute Maximum Ratings  $T_a=25^\circ C$

<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>Forward current</td>
<td>$I_F$</td>
<td>50</td>
<td>mA</td>
</tr>
<tr>
<td>Reverse voltage</td>
<td>$V_R$</td>
<td>6</td>
<td>V</td>
</tr>
<tr>
<td>Power dissipation</td>
<td>$PD$</td>
<td>75</td>
<td>mW</td>
</tr>
<tr>
<td>Peak Forward Current (Pulse Width $\leq 100\mu s$, Duty Cycle $=1%$)</td>
<td>$I_{FP}$</td>
<td>1</td>
<td>A</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>50</td>
<td>mA</td>
</tr>
<tr>
<td>Collector power dissipation</td>
<td>$P_C$</td>
<td>75</td>
<td>mW</td>
</tr>
<tr>
<td>Operating temperature</td>
<td>$Topr$</td>
<td>-25 to 85</td>
<td>°C</td>
</tr>
<tr>
<td>Storage temperature</td>
<td>$Tstg$</td>
<td>-40 to 100</td>
<td>°C</td>
</tr>
<tr>
<td>soldering temperature (1/16 inch from body for 5 seconds)</td>
<td>$Tsol$</td>
<td>260</td>
<td>°C</td>
</tr>
</tbody>
</table>

Notes:
1. All dimensions are in millimeters (inches).
2. Tolerance is ±0.25(0.01") unless otherwise noted.
3. Lead spacing is measured where the leads emerge from the package.
4. The specifications, characteristics and technical data described in the datasheet are subject to change without prior notice.
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## 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>1.0</td>
<td>1.2</td>
<td>1.5</td>
<td>V</td>
</tr>
<tr>
<td>Reverse Current</td>
<td>$I_R$</td>
<td>$V_R=6V$</td>
<td>-</td>
<td>-</td>
<td>10</td>
<td>$\mu$A</td>
</tr>
<tr>
<td>Peak Wavelength</td>
<td>$\lambda_P$</td>
<td>$I_F=20mA$</td>
<td>-</td>
<td>-</td>
<td>940</td>
<td>nm</td>
</tr>
<tr>
<td>Output</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Collector Dark Current</td>
<td>$I_{CEO}$</td>
<td>$V_{CEO}=10V$</td>
<td>-</td>
<td>-</td>
<td>$10^6$</td>
<td>A</td>
</tr>
<tr>
<td><strong>Transfer characteristics</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>+1 Collector Current</td>
<td>$I_C$</td>
<td>$V_{CEO}=2V$</td>
<td>-</td>
<td>3</td>
<td>-</td>
<td>mA</td>
</tr>
<tr>
<td>+2 Leak Current</td>
<td>$I_{LEAK}$</td>
<td>$V_{CEO}=5V$</td>
<td>-</td>
<td>-</td>
<td>5</td>
<td>$\mu$A</td>
</tr>
<tr>
<td>Response time</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rise time</td>
<td>$t_r$</td>
<td>$V_{CEO}=2V$</td>
<td>-</td>
<td>80</td>
<td>400</td>
<td>$\mu$sec</td>
</tr>
<tr>
<td>Fall time</td>
<td>$t_f$</td>
<td>$V_{CEO}=2V$</td>
<td>-</td>
<td>70</td>
<td>400</td>
<td>$\mu$sec</td>
</tr>
</tbody>
</table>

*1 The condition and arrangement of the reflective object are shown below.
*2 Without reflective object.

![Test Condition and Arrangement for Collector Current](image)

![Fig. 1 Forward Current vs. Forward Voltage](image)

![Fig. 2 Collector Current vs. Forward Current](image)

![Fig. 3 Collector Current vs. Collector-emitter Voltage](image)

![Fig. 4 Relative Collector Current vs. Ambient Temperature](image)
Fig. 5 Response Time vs. Load Resistance

Test Circuit for Response Time

Fig. 6 Collector Dark Current vs. Ambient Temperature

Fig. 7 Relative Collector Current vs. Distance between Sensor and Al Evaporation Glass

Fig. 8 Relative Collector Current vs. Card Moving Distance (1)

Fig. 9 Relative Collector Current vs. Card Moving Distance (2)
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Test Condition for Distance & Detecting Position Characteristics

Correspond to Fig. 7

\[
\begin{array}{l}
\hline
\text{Al evaporated glass} & d \\
\hline
\end{array}
\]

Correspond to Fig. 8
Test condition

\[
I_r = 4 \text{mA} \\
V_{oc} = 2V \\
d = 1\text{mm}
\]

Correspond to Fig. 9
Test condition

\[
I_r = 4 \text{mA} \\
V_{oc} = 2V \\
d = 1\text{mm}
\]

Correspond to Fig. 8
Test condition

OVS card

\[
\begin{array}{c}
\text{White} \\
\text{Black}
\end{array}
\]

Correspond to Fig. 9
Test condition

OVS card

\[
\begin{array}{c}
\text{White} \\
\text{Black}
\end{array}
\]

![Graph showing Relative sensitivity vs Wavelength]
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KTIR0721DS

Reflow Soldering Profile For Lead–free SMT Process.

NOTES:
1. We recommend the reflow temperature 245°C (+/-5°C). The maximum soldering temperature should be limited to 250°C.
2. Don’t cause stress to the epoxy resin while it is exposed to high temperature.
3. Number of reflow process shall be 2 times or less.

Recommended Soldering Pattern
(Units : mm; Tolerance: ±0.1)

Reel Dimension

Tape Specifications
(Units : mm)

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