Low Current 13 mm Seven Segment Display

Description
The TDSL51.0 series are 13 mm character seven segment low current LED displays in a very compact package. The displays are designed for a viewing distance up to 7 meters and available in high efficiency red. The grey package surface and the evenly lighted untinted segments provide an optimum on-off contrast. All displays are categorized in luminous intensity groups. That allows users to assemble displays with uniform appearance.

Typical applications include instruments, panel meters, point-of-sale terminals and household equipment.

Features
- Low power consumption
- Suitable for DC and multiplex operation
- Evenly lighted segments
- Grey package surface
- Untinted segments
- Luminous intensity categorized
- Wide viewing angle
- Lead-free device

Applications
Panel meters
Test- and measure- equipment
Point-of-sale terminals
Control units

Parts Table

<table>
<thead>
<tr>
<th>Part</th>
<th>Color, Luminous Intensity</th>
<th>Circuitry</th>
</tr>
</thead>
<tbody>
<tr>
<td>TDSL5150</td>
<td>Red</td>
<td>Common anode</td>
</tr>
<tr>
<td>TDSL5160</td>
<td>Red</td>
<td>Common cathode</td>
</tr>
</tbody>
</table>

Absolute Maximum Ratings

\(T_{\text{amb}} = 25\, ^\circ\text{C},\) unless otherwise specified

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Test condition</th>
<th>Symbol</th>
<th>Value</th>
<th>Unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reverse voltage per segment</td>
<td></td>
<td>(V_R)</td>
<td>6</td>
<td>V</td>
</tr>
<tr>
<td>DC forward current per segment</td>
<td></td>
<td>(I_F)</td>
<td>15</td>
<td>mA</td>
</tr>
<tr>
<td>Peak forward current per segment</td>
<td></td>
<td>(I_{FM})</td>
<td>45</td>
<td>mA</td>
</tr>
<tr>
<td>Surge forward current per segment</td>
<td>(I_F \leq 10 , \mu\text{s (non repetitive)})</td>
<td>(I_{FSM})</td>
<td>100</td>
<td>mA</td>
</tr>
<tr>
<td>Power dissipation</td>
<td>(T_{\text{amb}} \leq 45^\circ\text{C})</td>
<td>(P_V)</td>
<td>320</td>
<td>mW</td>
</tr>
</tbody>
</table>
Optical and Electrical Characteristics

Red

TDSL5150/TDSL5160

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Symbol</th>
<th>Test condition</th>
<th>Min</th>
<th>Typ.</th>
<th>Max</th>
<th>Unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Luminous intensity per segment (digit average) 1)</td>
<td>$I_F$ = 2 mA</td>
<td>$I_V$</td>
<td>280</td>
<td>400</td>
<td>µcd</td>
<td></td>
</tr>
<tr>
<td></td>
<td>$I_F$ = 5 mA</td>
<td>$I_V$</td>
<td>1600</td>
<td></td>
<td>µcd</td>
<td></td>
</tr>
<tr>
<td></td>
<td>$I_F$ = 20 mA, $I_F/T$ =0.25</td>
<td>$I_V$</td>
<td>2000</td>
<td></td>
<td>µcd</td>
<td></td>
</tr>
<tr>
<td>Dominant wavelength</td>
<td>$I_F$ = 2 mA</td>
<td>$\lambda_d$</td>
<td>612</td>
<td>625</td>
<td>nm</td>
<td></td>
</tr>
<tr>
<td>Peak wavelength</td>
<td>$I_F$ = 2 mA</td>
<td>$\lambda_p$</td>
<td>635</td>
<td></td>
<td>nm</td>
<td></td>
</tr>
<tr>
<td>Angle of half intensity</td>
<td>$I_F$ = 2 mA</td>
<td>$\phi$</td>
<td>±50</td>
<td></td>
<td>deg</td>
<td></td>
</tr>
<tr>
<td>Forward voltage per segment</td>
<td>$I_F$ = 2 mA</td>
<td>$V_F$</td>
<td>1.8</td>
<td>2.4</td>
<td>V</td>
<td></td>
</tr>
<tr>
<td></td>
<td>$I_F$ = 20 mA</td>
<td>$V_F$</td>
<td>2.7</td>
<td>3</td>
<td>V</td>
<td></td>
</tr>
<tr>
<td>Reverse voltage per segment</td>
<td>$I_R$ = 10 µA</td>
<td>$V_R$</td>
<td>6</td>
<td>20</td>
<td>V</td>
<td></td>
</tr>
<tr>
<td>Junction capacitance</td>
<td>$V_R = 0, f = 1 MHz$</td>
<td>$C_j$</td>
<td>30</td>
<td></td>
<td>pF</td>
<td></td>
</tr>
</tbody>
</table>

1) $I_{V_{min}}$ and $I_V$ groups are mean

Typical Characteristics (T$_{amb}$ = 25 °C unless otherwise specified)

![Figure 1. Power Dissipation vs. Ambient Temperature](image1)

![Figure 2. Forward Current vs. Ambient Temperature for AlInGaP](image2)
Figure 3. Rel. Luminous Intensity vs. Angular Displacement

Figure 4. Forward Current vs. Forward Voltage

Figure 5. Rel. Luminous Intensity vs. Ambient Temperature

Figure 6. Rel. Lumin. Intensity vs. Forw. Current/Duty Cycle

Figure 7. Relative Luminous Intensity vs. Forward Current

Figure 8. Relative Intensity vs. Wavelength
Package Dimensions in mm

![Package Diagram]

- **DP**: 12.25 ± 0.1
- **f**: 2.54 mm
  - 4 x 2.54 = 10.16 mm

![Footprint Diagram]

- **DP**: 17.5 ± 0.1
- **f**: 0.3 ± 0.05
  - 15.24 ± 0.2 mm
Ozone Depleting Substances Policy Statement

It is the policy of Vishay Semiconductor GmbH to

1. Meet all present and future national and international statutory requirements.
2. Regularly and continuously improve the performance of our products, processes, distribution and
    operating systems with respect to their impact on the health and safety of our employees and the public, as
    well as their impact on the environment.

It is particular concern to control or eliminate releases of those substances into the atmosphere which are
known as ozone depleting substances (ODSs).

The Montreal Protocol (1987) and its London Amendments (1990) intend to severely restrict the use of ODSs
and forbid their use within the next ten years. Various national and international initiatives are pressing for an
earlier ban on these substances.

Vishay Semiconductor GmbH has been able to use its policy of continuous improvements to eliminate the
use of ODSs listed in the following documents.

   respectively
2. Class I and II ozone depleting substances in the Clean Air Act Amendments of 1990 by the Environmental
   Protection Agency (EPA) in the USA

Vishay Semiconductor GmbH can certify that our semiconductors are not manufactured with ozone depleting
substances and do not contain such substances.

We reserve the right to make changes to improve technical design
and may do so without further notice.

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