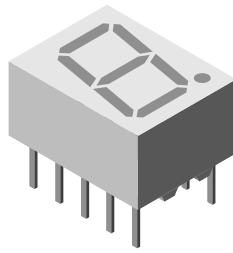




Standard 7-Segment Display 10 mm



19236

DESCRIPTION

The TDS.31.. series are 10 mm character seven segment LED displays in a very compact package.

The displays are designed for a viewing distance up to 6 m and available in four bright colors. 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.

Due to the design of 10 mm displays, a certain amount of cross-talk between segments is unavoidable. This light leakage becomes more noticeable as the brightness of the operated segments increases. However, higher environmental illumination, or a partially transparent cover, may reduce this effect. Therefore, it's important to consider this phenomenon during design-in and to validate suitability for the particular application and all its operation modes.

FEATURES

- Evenly lighted segments
- Grey package surface
- Untinted segments
- Luminous intensity categorized
- Yellow and green categorized for color
- Wide viewing angle
- Suitable for DC and high peak current
- Material categorization: for definitions of compliance please see www.vishay.com/doc?99912



RoHS
COMPLIANT

APPLICATIONS

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

PRODUCT GROUP AND PACKAGE DATA

- Product group: display
- Package: 10 mm
- Product series: standard
- Angle of half intensity: $\pm 50^\circ$

| PARTS TABLE | | | | | | | | | | | | | | |
|---------------------------|------------|---------------------------------------|------|--------|---------------|-----------------|------|------|---------------|---------------------|------|------|---------------|----------------|
| PART | COLOR | LUMINOUS INTENSITY (μcd) | | | at I_F (mA) | WAVELENGTH (nm) | | | at I_F (mA) | FORWARD VOLTAGE (V) | | | at I_F (mA) | CIRCUITRY |
| | | MIN. | TYP. | MAX. | | MIN. | TYP. | MAX. | | MIN. | TYP. | MAX. | | |
| TDSO3150 | Orange red | 450 | 4500 | - | 10 | 612 | - | 625 | 10 | - | 2 | 3 | 20 | Common anode |
| TDSO3150-KL | Orange red | 1800 | - | 5600 | 10 | 612 | - | 625 | 10 | - | 2 | 3 | 20 | Common anode |
| TDSO3150-L | Orange red | 2800 | - | 5600 | 10 | 612 | - | 625 | 10 | - | 2 | 3 | 20 | Common anode |
| TDSO3155 | Orange red | 1100 | - | 9000 | 10 | 612 | - | 625 | 10 | - | 2 | 3 | 20 | Common anode |
| TDSO3160 | Orange red | 450 | 4500 | - | 10 | 612 | - | 625 | 10 | - | 2 | 3 | 20 | Common cathode |
| TDSO3160-KL | Orange red | 1800 | - | 5600 | 10 | 612 | - | 625 | 10 | - | 2 | 3 | 20 | Common cathode |
| TDSO3160-L | Orange red | 2800 | - | 5600 | 10 | 612 | - | 625 | 10 | - | 2 | 3 | 20 | Common cathode |
| TDSY3150 ⁽¹⁾ | Yellow | 450 | 3000 | - | 10 | 581 | - | 594 | 10 | - | 2.4 | 3 | 20 | Common anode |
| TDSY3150-K ⁽¹⁾ | Yellow | 1800 | - | 3600 | 10 | 581 | - | 594 | 10 | - | 2.4 | 3 | 20 | Common anode |
| TDSG3150 | Green | 450 | 6800 | - | 10 | 562 | - | 575 | 10 | - | 2.4 | 3 | 20 | Common anode |
| TDSG3150-M | Green | 4500 | - | 9000 | 10 | 562 | - | 575 | 10 | - | 2.4 | 3 | 20 | Common anode |
| TDSG3150-MN | Green | 4500 | - | 14 000 | 10 | 562 | - | 575 | 10 | - | 2.4 | 3 | 20 | Common anode |
| TDSG3160 | Green | 450 | 6800 | - | 10 | 562 | - | 575 | 10 | - | 2.4 | 3 | 20 | Common cathode |
| TDSG3160-M | Green | 4500 | - | 9000 | 10 | 562 | - | 575 | 10 | - | 2.4 | 3 | 20 | Common cathode |

Note

⁽¹⁾ Not for new designs



| ABSOLUTE MAXIMUM RATINGS ($T_{amb} = 25\text{ }^{\circ}\text{C}$, unless otherwise specified) TDSO315., TDSO316., TDSY315., TDSG315., TDSG316. | | | | |
|---|---|------------|------------|--------------------|
| PARAMETER | TEST CONDITION | SYMBOL | VALUE | UNIT |
| Reverse voltage per segment or DP | | V_R | 6 | V |
| DC forward current per segment or DP | | I_F | 20 | mA |
| DC forward current per segment or DP | $t_p \leq 10\text{ }\mu\text{s}$ (non repetitive) | I_{FSM} | 0.15 | A |
| Power dissipation | $T_{amb} \leq 45\text{ }^{\circ}\text{C}$ | P_V | 480 | mW |
| Junction temperature | | T_j | 100 | $^{\circ}\text{C}$ |
| Operating temperature range | | T_{amb} | -40 to +85 | $^{\circ}\text{C}$ |
| Storage temperature range | | T_{stg} | -40 to +85 | $^{\circ}\text{C}$ |
| Soldering temperature | $t \leq 3\text{ s}$, 2 mm below seating plane | T_{sd} | 260 | $^{\circ}\text{C}$ |
| Thermal resistance LED junction to ambient | | R_{thJA} | 120 | K/W |

| OPTICAL AND ELECTRICAL CHARACTERISTICS ($T_{amb} = 25\text{ }^{\circ}\text{C}$, unless otherwise specified) TDSO3150, TDSO3150-KL, TDSO3150-L, TDSO3155, TDSO3160, TDSO3160-KL, TDSO3160-L, ORANGE RED | | | | | | | |
|---|-------------------------------|--|-------------|------|----------|------|----------------|
| PARAMETER | TEST CONDITION | PART | SYMBOL | MIN. | TYP. | MAX. | UNIT |
| Luminous intensity per segment (digit average) ⁽¹⁾ | $I_F = 10\text{ mA}$ | TDSO3150 | I_V | 450 | 4500 | - | μcd |
| | | TDSO3150-KL | | 1800 | - | 5600 | |
| | | TDSO3150-L | | 2800 | - | 5600 | |
| | | TDSO3155 | | 1100 | - | 9000 | |
| | | TDSO3160 | | 450 | 4500 | - | |
| | | TDSO3160-KL | | 1800 | - | 5600 | |
| | | TDSO3160-L | | 2800 | - | 5600 | |
| Dominant wavelength | $I_F = 10\text{ mA}$ | TDSO3150, TDSO3150-KL, TDSO3150-L, TDSO3155, TDSO3160, TDSO3160-KL, TDSO3160-L | λ_d | 612 | - | 625 | nm |
| Peak wavelength | $I_F = 10\text{ mA}$ | | λ_p | - | 630 | - | nm |
| Angle of half intensity | $I_F = 10\text{ mA}$ | | j | - | ± 50 | - | $^{\circ}$ |
| Forward voltage per segment or DP | $I_F = 20\text{ mA}$ | | V_F | - | 2 | 3 | V |
| Reverse voltage per segment or DP | $I_R = 10\text{ }\mu\text{A}$ | | V_R | 6 | 15 | - | V |

Note

⁽¹⁾ $I_{Vmin.}$ and I_V groups are mean values of all segments (a to g, D1 to D4), matching factor within segments is ≥ 0.5 , excluding decimal points and colon

| OPTICAL AND ELECTRICAL CHARACTERISTICS ($T_{amb} = 25\text{ }^{\circ}\text{C}$, unless otherwise specified) TDSY3150, TDSY3150-K, YELLOW | | | | | | | |
|---|-------------------------------|----------------------|-------------|------|----------|------|----------------|
| PARAMETER | TEST CONDITION | PART | SYMBOL | MIN. | TYP. | MAX. | UNIT |
| Luminous intensity per segment (digit average) ⁽¹⁾ | $I_F = 10\text{ mA}$ | TDSY3150 | I_V | 450 | 3000 | - | μcd |
| | | TDSY3150-K | | 1800 | - | 3600 | |
| Dominant wavelength | $I_F = 10\text{ mA}$ | TDSY3150, TDSY3150-K | λ_d | 581 | - | 594 | nm |
| Peak wavelength | $I_F = 10\text{ mA}$ | | λ_p | - | 585 | - | nm |
| Angle of half intensity | $I_F = 10\text{ mA}$ | | j | - | ± 50 | - | $^{\circ}$ |
| Forward voltage per segment or DP | $I_F = 20\text{ mA}$ | | V_F | - | 2.4 | 3 | V |
| Reverse voltage per segment or DP | $I_R = 10\text{ }\mu\text{A}$ | | V_R | 6 | 15 | - | V |

Note

⁽¹⁾ $I_{Vmin.}$ and I_V groups are mean values of all segments (a to g, D1 to D4), matching factor within segments is ≥ 0.5 , excluding decimal points and colon



| OPTICAL AND ELECTRICAL CHARACTERISTICS (T _{amb} = 25 °C, unless otherwise specified) | | | | | | | |
|---|------------------------|---|----------------|------|------|--------|------|
| TDSG315., TDSG316., GREEN | | | | | | | |
| PARAMETER | TEST CONDITION | PART | SYMBOL | MIN. | TYP. | MAX. | UNIT |
| Luminous intensity per segment (digit average) ⁽¹⁾ | I _F = 10 mA | TDSG3150 | I _V | 450 | 6800 | - | μcd |
| | | TDSG3150-M | | 4500 | - | 9000 | |
| | | TDSG3150-MN | | 4500 | - | 14 000 | |
| | | TDSG3160 | | 450 | 6800 | - | |
| | | TDSG3160-M | | 4500 | - | 9000 | |
| Dominant wavelength | I _F = 10 mA | TDSG3150, TDSG3150-M, TDSG3150-MN, TDSG3160, TDSG3160-M | λ _d | 562 | - | 575 | nm |
| Peak wavelength | I _F = 10 mA | | λ _p | - | 565 | - | nm |
| Angle of half intensity | I _F = 10 mA | | j | - | ± 50 | - | ° |
| Forward voltage per segment or DP | I _F = 20 mA | | V _F | - | 2.4 | 3 | V |
| Reverse voltage per segment or DP | I _R = 10 μA | | V _R | 6 | 15 | - | V |

Note

⁽¹⁾ I_{Vmin.} and I_V groups are mean values of all segments (a to g, D1 to D4), matching factor within segments is ≥ 0.5, excluding decimal points and colon

| LUMINOUS INTENSITY CLASSIFICATION | | |
|-----------------------------------|-----------------------|--------|
| GROUP | LIGHT INTENSITY (μcd) | |
| | MIN. | MAX. |
| STANDARD | | |
| E | 180 | 360 |
| F | 280 | 560 |
| G | 450 | 900 |
| H | 700 | 1400 |
| I | 1100 | 2200 |
| K | 1800 | 3600 |
| L | 2800 | 5600 |
| M | 4500 | 9000 |
| N | 7000 | 14 000 |

Note

- The above type numbers represent the order groups which include only a few brightness groups. Only one group will be shipped in one tube (there will be no mixing of two groups in one tube). In order to ensure availability, single brightness groups will not be orderable

| COLOR CLASSIFICATION | | | | | | |
|----------------------|------------|------|--------|------|-------|------|
| GROUP | ORANGE RED | | YELLOW | | GREEN | |
| | MIN. | MAX. | MIN. | MAX. | MIN. | MAX. |
| 1 | 612 | 617 | 581 | 584 | | |
| 2 | 616 | 621 | 583 | 586 | | |
| 3 | 620 | 625 | 585 | 588 | 562 | 565 |
| 4 | | | 587 | 590 | 564 | 567 |
| 5 | | | 589 | 592 | 566 | 569 |
| 6 | | | 591 | 594 | 568 | 571 |
| 7 | | | | | 570 | 573 |
| 8 | | | | | 572 | 575 |

Note

- Wavelengths are tested at a current pulse duration of 25 ms and an accuracy of ± 1 nm



TYPICAL CHARACTERISTICS (T_{amb} = 25 °C, unless otherwise specified)

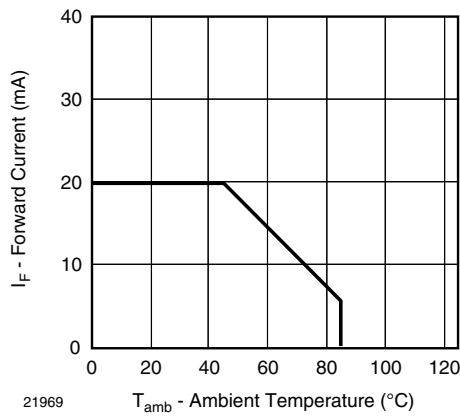


Fig. 1 - Forward Current vs. Ambient Temperature

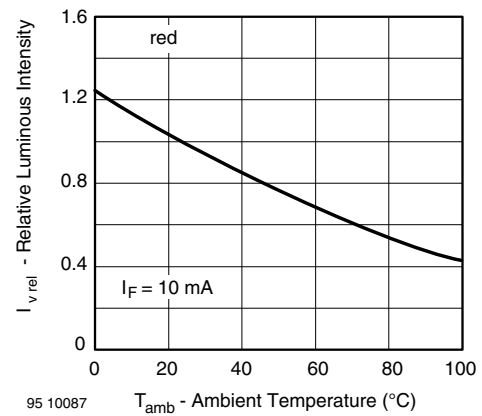


Fig. 4 - Relative Luminous Intensity vs. Ambient Temperature

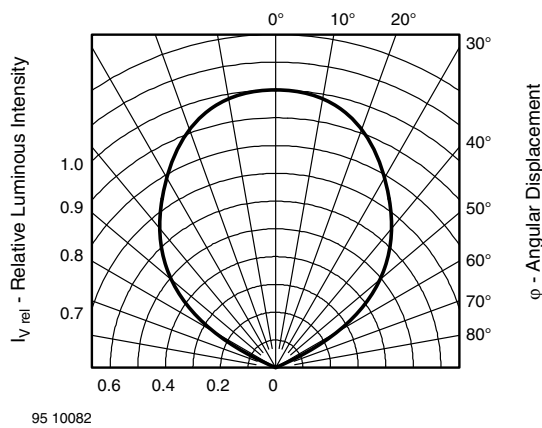


Fig. 2 - Relative Luminous Intensity vs. Angular Displacement

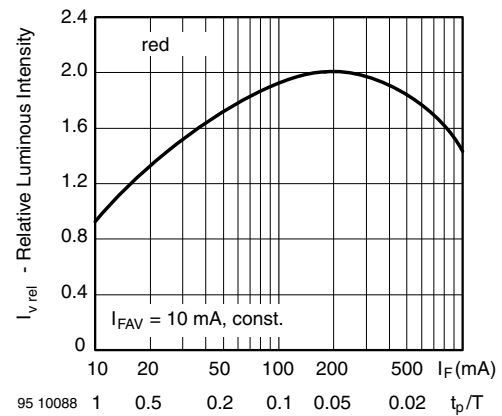


Fig. 5 - Relative Luminous Intensity vs. Forward Current/Duty Cycle

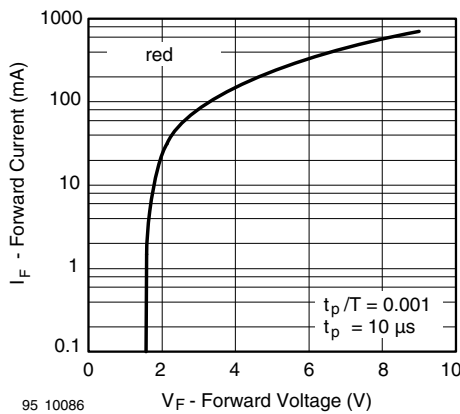


Fig. 3 - Forward Current vs. Forward Voltage

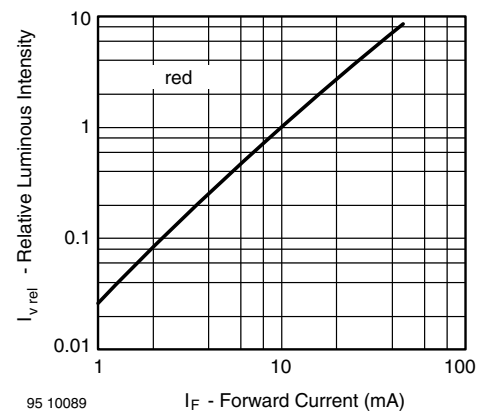


Fig. 6 - Relative Luminous Intensity vs. Forward Current

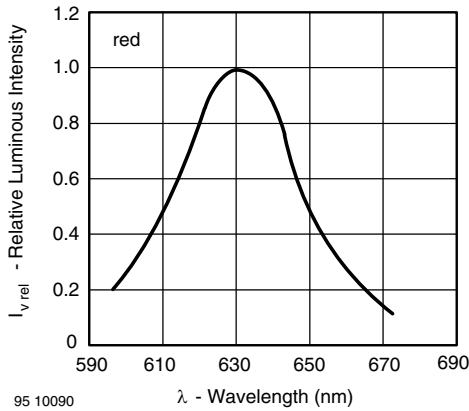


Fig. 7 - Relative Intensity vs. Wavelength



Fig. 10 - Relative Luminous Intensity vs. Forward Current/Duty Cycle



Fig. 8 - Forward Current vs. Forward Voltage



Fig. 11 - Relative Luminous Intensity vs. Forward Current

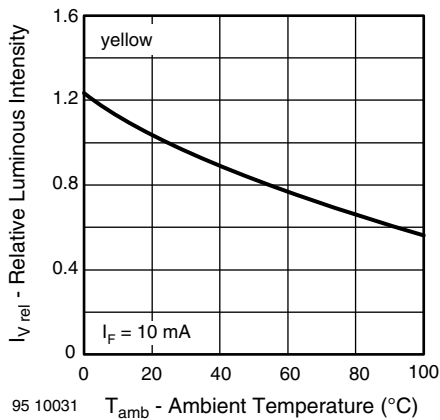


Fig. 9 - Relative Luminous Intensity vs. Ambient Temperature



Fig. 12 - Relative Intensity vs. Wavelength



Fig. 13 - Forward Current vs. Forward Voltage



Fig. 16 - Relative Luminous Intensity vs. Forward Current

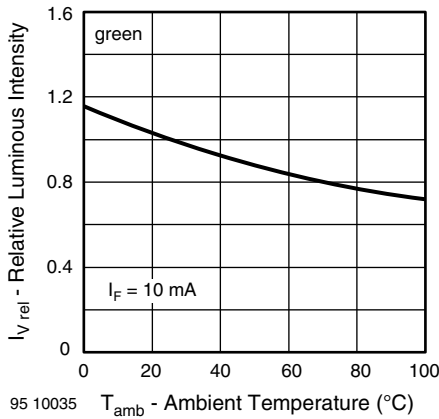


Fig. 14 - Relative Luminous Intensity vs. Ambient Temperature



Fig. 17 - Relative Intensity vs. Wavelength



Fig. 15 - Specific Luminous Intensity vs. Forward Current

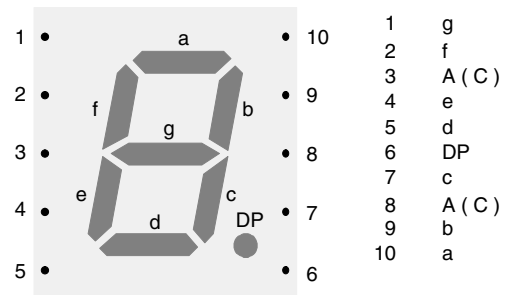
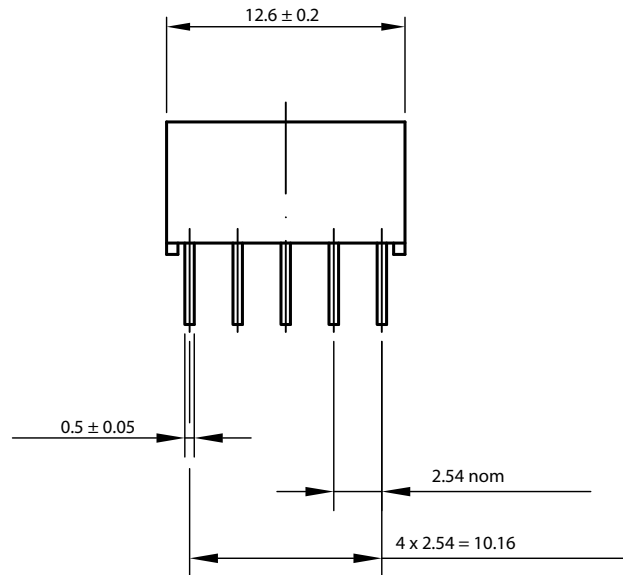


Fig. 18 - TDS.31..

96 11678



PACKAGE DIMENSIONS FOR TDS.31.. in millimeters



technical drawings
according to DIN
specifications

Drawing-No.: 6.544-5093.01-4
Issue: 2; 23.03.2012



Pin Connections 10 mm



9611678

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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.

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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
3. Council Decision 88/540/EEC and 91/690/EEC Annex A, B and C (transitional substances) respectively.

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**We reserve the right to make changes to improve technical design
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