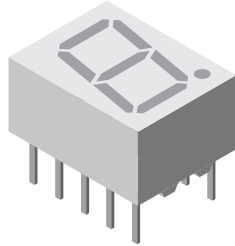




Standard 7-Segment Display 10 mm



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.

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
- Compliant to RoHS Directive 2002/95/EC and in accordance to WEEE 2002/96/EC



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: ± 50°

| PARTS TABLE | | | |
|-------------|------------|---|----------------|
| PART | COLOR | LUMINOUS INTENSITY AT 10 mA | CIRCUITRY |
| TDSO3150 | Orange red | $I_V = 4500 \mu\text{cd}$ (typ.) | Common anode |
| TDSO3150-KL | Orange red | $I_V = (1800 \text{ to } 5600) \mu\text{cd}$ | Common anode |
| TDSO3150-L | Orange red | $I_V = (2800 \text{ to } 5600) \mu\text{cd}$ | Common anode |
| TDSO3160 | Orange red | $I_V = 4500 \mu\text{cd}$ (typ.) | Common cathode |
| TDSO3160-KL | Orange red | $I_V = (1800 \text{ to } 5600) \mu\text{cd}$ | Common cathode |
| TDSO3160-L | Orange red | $I_V = (2800 \text{ to } 5600) \mu\text{cd}$ | Common cathode |
| TDSY3150 | Yellow | $I_V = 3000 \mu\text{cd}$ (typ.) | Common anode |
| TDSY3150-K | Yellow | $I_V = (1800 \text{ to } 3600) \mu\text{cd}$ | Common anode |
| TDSY3160 | Yellow | $I_V = 3000 \mu\text{cd}$ (typ.) | Common cathode |
| TDSG3150 | Green | $I_V = 6500 \mu\text{cd}$ (typ.) | Common anode |
| TDSG3150-M | Green | $I_V = (4500 \text{ to } 9000) \mu\text{cd}$ | Common anode |
| TDSG3150-MN | Green | $I_V = (4500 \text{ to } 14\ 000) \mu\text{cd}$ | Common anode |
| TDSG3160 | Green | $I_V = 6500 \mu\text{cd}$ (typ.) | Common cathode |
| TDSG3160-M | Green | $I_V = (4500 \text{ to } 9000) \mu\text{cd}$ | Common cathode |

| ABSOLUTE MAXIMUM RATINGS ($T_{amb} = 25\text{ }^{\circ}\text{C}$, unless otherwise specified) TDSO3150, TDSO3160, TDSY3150, TDSY3160, TDSG3150, TDSG3160 | | | | | |
|---|---|---|------------|--------------|--------------------|
| PARAMETER | TEST CONDITION | PART | SYMBOL | VALUE | UNIT |
| Reverse voltage per segment or DP | | | V_R | 6 | V |
| DC forward current per segment or DP | | TDSO3150 | I_F | 20 | mA |
| | | TDSO3160 | | 20 | |
| | | TDSY3150 | | 20 | |
| | | TDSY3160 | | 20 | |
| | | TDSG3150 | | 20 | |
| | | TDSG3160 | | 20 | |
| DC forward current per segment or DP | $t_p \leq 10\text{ }\mu\text{s}$ (non repetitive) | TDSO3150 | I_{FSM} | 0.15 | A |
| | | TDSO3160 | | 0.15 | |
| | | TDSY3150 | | 0.15 | |
| | | TDSY3160 | | 0.15 | |
| | | TDSG3150 | | 0.15 | |
| | | TDSG3160 | | 0.15 | |
| Power dissipation | $T_{amb} \leq 45\text{ }^{\circ}\text{C}$ | TDSO3150, TDSO3160, TDSY3150, TDSY3160, TDSG3150, TDSG3160 | 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/ambient | | | R_{thJA} | 120 | K/W |

| OPTICAL AND ELECTRICAL CHARACTERISTICS ($T_{amb} = 25\text{ }^{\circ}\text{C}$, unless otherwise specified) TDSO3150, TDSO3160, 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 | |
| | | TDSO3160 | | 450 | 4500 | - | |
| | | TDSO3160-KL | | 1800 | - | 5600 | |
| | | TDSO3160-L | | 2800 | - | 5600 | |
| Dominant wavelength | $I_F = 10\text{ mA}$ | TDSO3150, TDSO3160 | λ_d | 612 | - | 625 | nm |
| Peak wavelength | $I_F = 10\text{ mA}$ | | λ_p | - | 630 | - | nm |
| Angle of half intensity | $I_F = 10\text{ mA}$ | | ϕ | - | ± 50 | - | deg |
| 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.



TDSG3150, TDSG3160, TDSO3150, TDSO3160, TDSY3150, TDSY3160

Standard 7-Segment Display 10 mm Vishay Semiconductors

| OPTICAL AND ELECTRICAL CHARACTERISTICS ($T_{amb} = 25\text{ }^{\circ}\text{C}$, unless otherwise specified) | | | | | | | |
|---|-------------------------------|-----------------------|-------------|------|----------|------|----------------|
| TDSY3150, TDSY3160, 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 | |
| | | TDSY3160 | | 450 | 3000 | - | |
| Dominant wavelength | $I_F = 10\text{ mA}$ | TDSY3150, TDSY3160 | λ_d | 581 | - | 594 | nm |
| Peak wavelength | $I_F = 10\text{ mA}$ | | λ_p | - | 585 | - | nm |
| Angle of half intensity | $I_F = 10\text{ mA}$ | | ϕ | - | ± 50 | - | deg |
| 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 ($T_{amb} = 25\text{ }^{\circ}\text{C}$, unless otherwise specified) | | | | | | | |
|---|-------------------------------|-----------------------|-------------|------|----------|--------|----------------|
| TDSG3150, TDSG3160, GREEN | | | | | | | |
| PARAMETER | TEST CONDITION | PART | SYMBOL | MIN. | TYP. | MAX. | UNIT |
| Luminous intensity per segment (digit average) ⁽¹⁾ | $I_F = 10\text{ mA}$ | TDSG3150 | I_V | 450 | 6800 | - | μcd |
| | | TDSG3150-M | | 4500 | - | 9000 | |
| | | TDSG3150-MN | | 4500 | - | 14 000 | |
| | | TDSG3160 | | 450 | 6800 | - | |
| | | TDSG3160-M | | 4500 | - | 9000 | |
| Dominant wavelength | $I_F = 10\text{ mA}$ | TDSG3150, TDSG3160 | λ_d | 562 | - | 575 | nm |
| Peak wavelength | $I_F = 10\text{ mA}$ | | λ_p | - | 565 | - | nm |
| Angle of half intensity | $I_F = 10\text{ mA}$ | | ϕ | - | ± 50 | - | deg |
| 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.

| LUMINOUS INTENSITY CLASSIFICATION | | |
|-----------------------------------|------------------------------------|--------|
| GROUP | LIGHT INTENSITY (μcd) | |
| | MIN. | MAX. |
| 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 | 598 | 601 | 581 | 584 | | |
| 2 | 600 | 603 | 583 | 586 | 562 | 565 |
| 3 | 602 | 605 | 585 | 588 | 564 | 567 |
| 4 | 604 | 607 | 587 | 590 | 566 | 569 |
| 5 | 606 | 609 | 589 | 592 | 568 | 571 |
| 6 | 608 | 611 | 591 | 594 | 570 | 573 |
| 7 | | | | | 570 | 575 |

Note

Wavelengths are tested at a current pulse duration of 25 ms and an accuracy of $\pm 1\text{ nm}$.

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

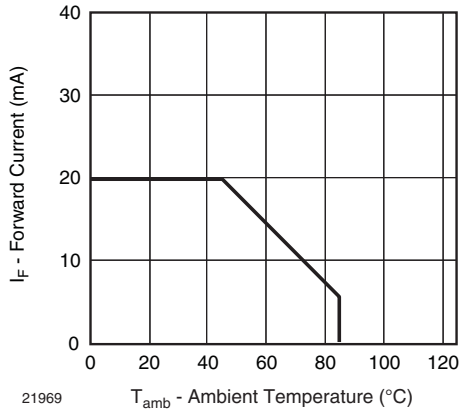


Fig. 1 - Forward Current vs. Ambient Temperature

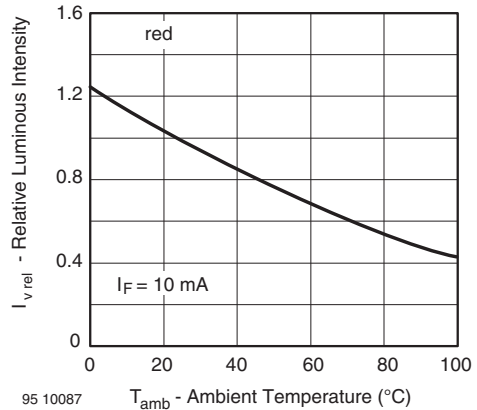


Fig. 4 - Rel. Luminous Intensity vs. Ambient Temperature

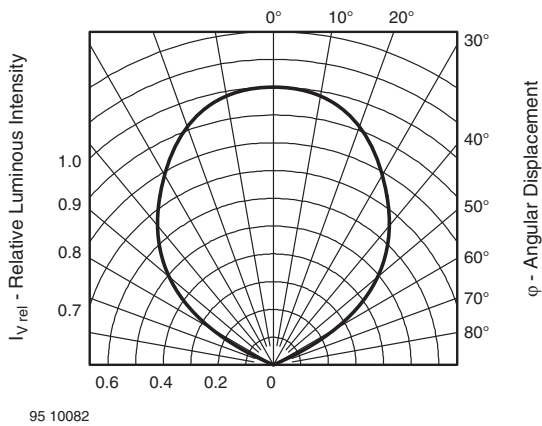


Fig. 2 - Rel. Luminous Intensity vs. Angular Displacement

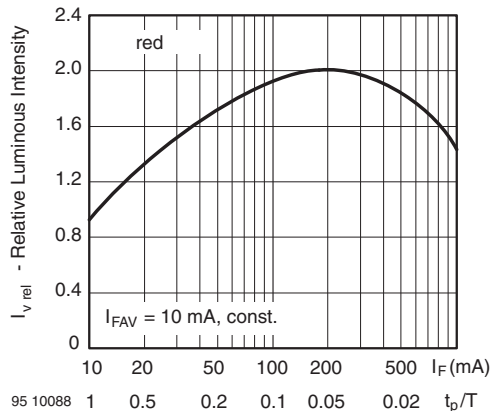


Fig. 5 - Rel. Lumin. Intensity vs. Forw. Current/Duty Cycle

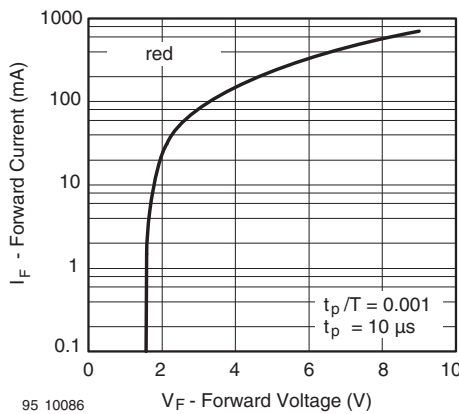


Fig. 3 - Forward Current vs. Forward Voltage

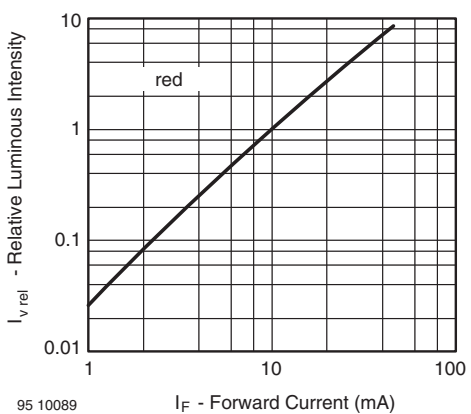


Fig. 6 - Relative Luminous Intensity vs. Forward Current



TDSG3150, TDSG3160, TDSO3150, TDSO3160, TDSY3150, TDSY3160

Standard 7-Segment Display 10 mm Vishay Semiconductors

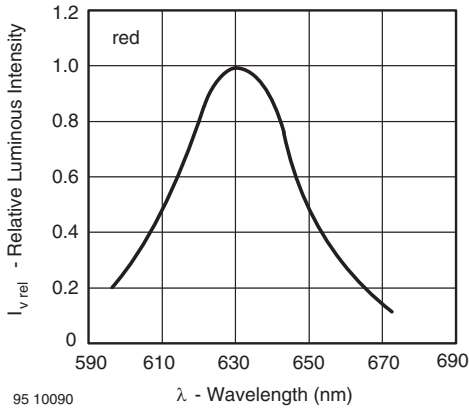


Fig. 7 - Relative Intensity vs. Wavelength

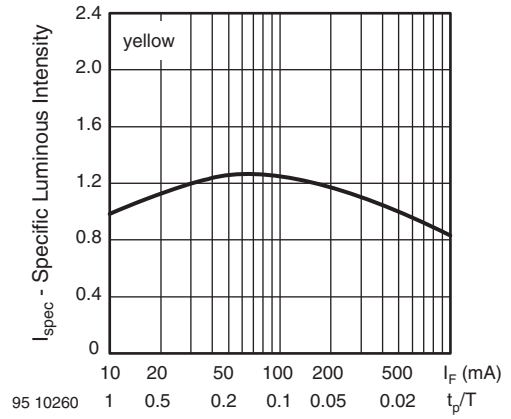


Fig. 10 - Rel. Lumin. Intensity vs. Forw. Current/Duty Cycle

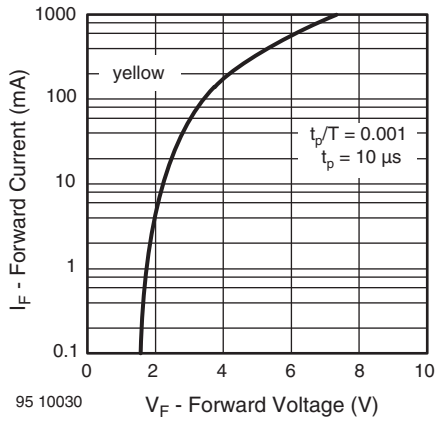


Fig. 8 - Forward Current vs. Forward Voltage

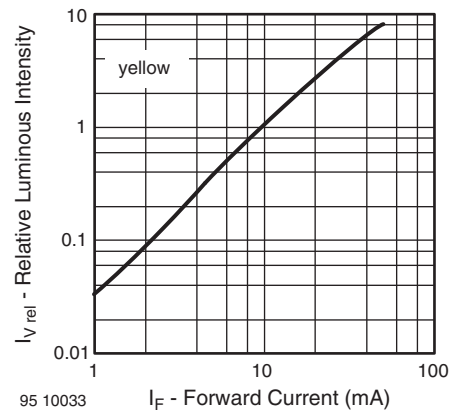


Fig. 11 - Relative Luminous Intensity vs. Forward Current

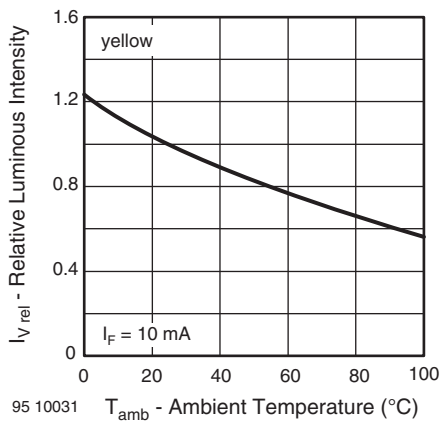


Fig. 9 - Rel. Luminous Intensity vs. Ambient Temperature

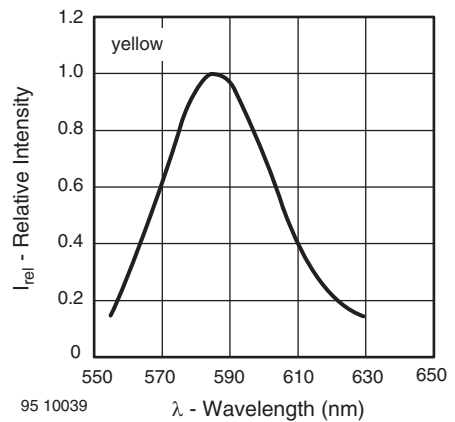


Fig. 12 - Relative Intensity vs. Wavelength

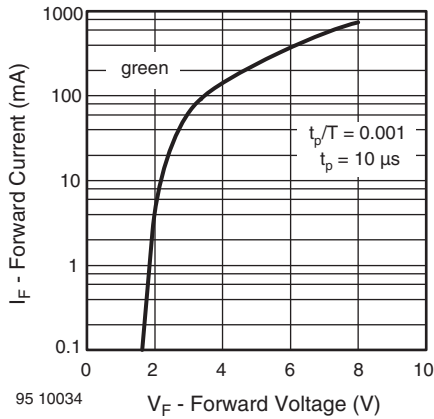


Fig. 13 - Forward Current vs. Forward Voltage

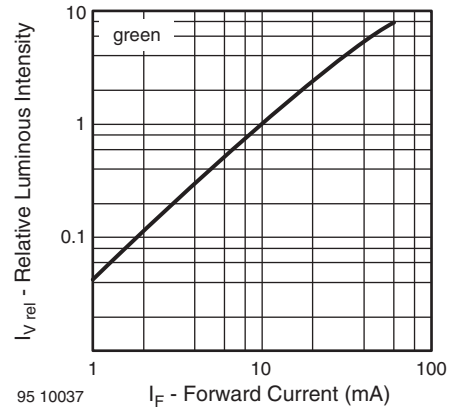


Fig. 16 - Relative Luminous Intensity vs. Forward Current

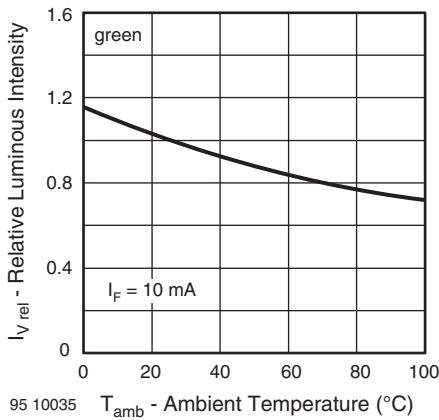


Fig. 14 - Rel. Luminous Intensity vs. Ambient Temperature

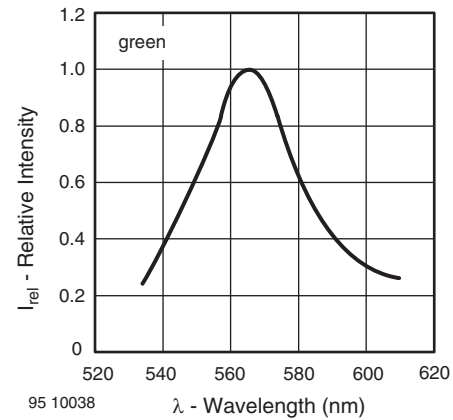


Fig. 17 - Relative Intensity vs. Wavelength

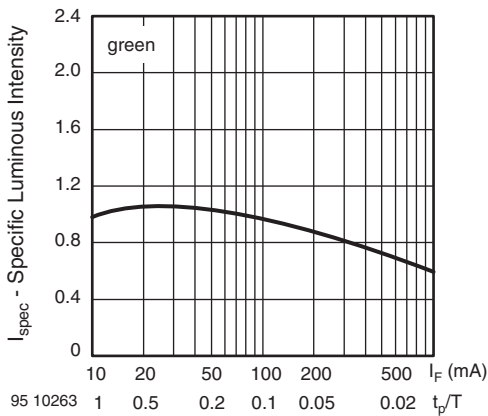


Fig. 15 - Specific Luminous Intensity vs. Forward Current

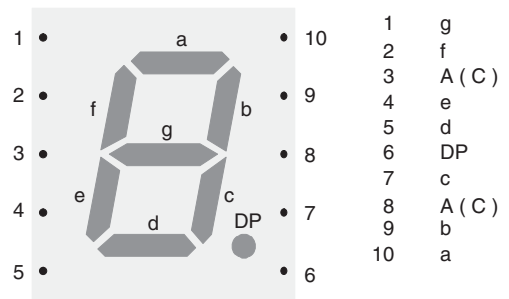


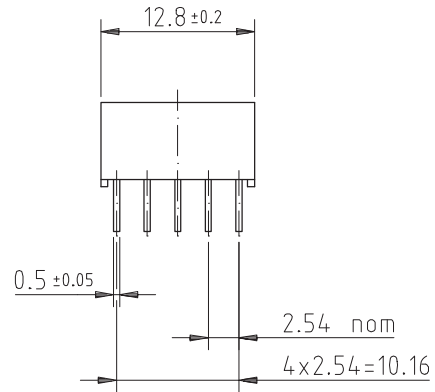
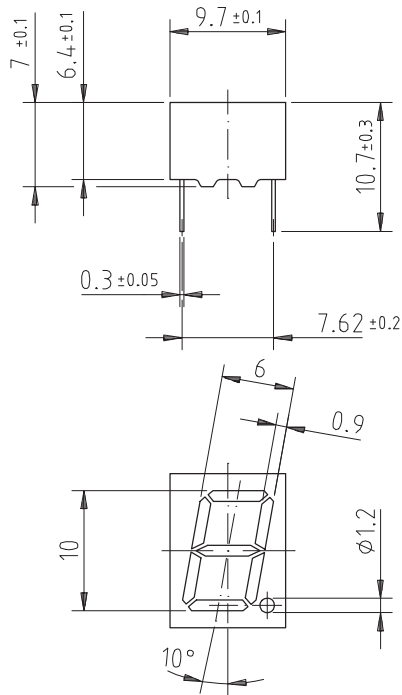
Fig. 18 - TDS.31..

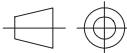


TDSG3150, TDSG3160, TDSO3150, TDSO3160, TDSY3150, TDSY3160

Standard 7-Segment Display 10 mm Vishay Semiconductors

PACKAGE DIMENSIONS FOR TDS.31.. in millimeters




technical drawings
according to DIN
specifications

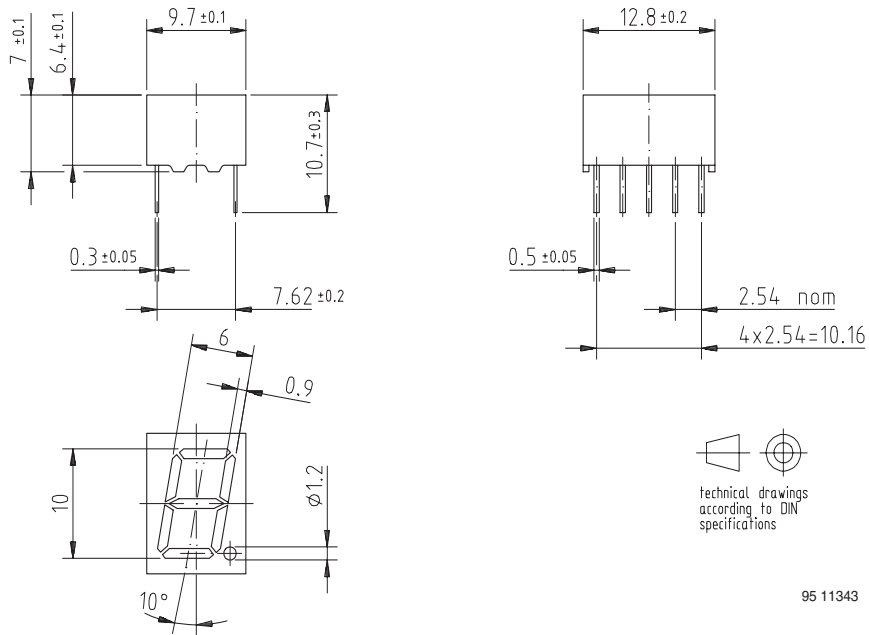
Drawing-No.: 6.544-5093.01-4

Issue: 1; 21.11.95

95 11343

Display-10 mm

Package Dimensions in mm



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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.

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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.

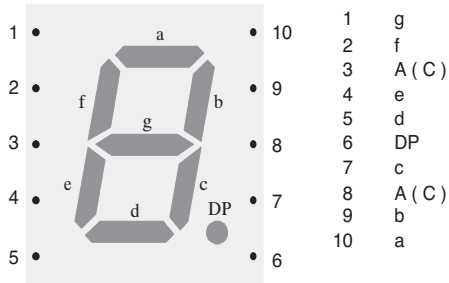
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Vishay Semiconductor GmbH, P.O.B. 3535, D-74025 Heilbronn, Germany
Telephone: 49 (0)7131 67 2831, Fax number: 49 (0)7131 67 2423

Pin Connections 10 mm



96 11678

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Telephone: 49 (0)7131 67 2831, Fax number: 49 (0)7131 67 2423



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Please note that some Vishay documentation may still make reference to RoHS Directive 2002/95/EC. We confirm that all the products identified as being compliant to Directive 2002/95/EC conform to Directive 2011/65/EU.