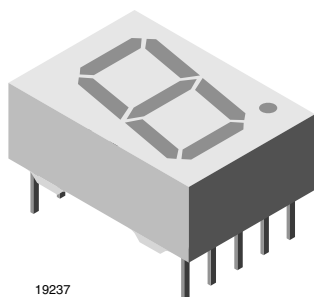


Standard 7-Segment Display 13 mm



19237

DESCRIPTION

The TDS.51.. series are 13 mm character seven segment LED displays in a very compact package.

The displays are designed for a viewing distance up to 7 m and available in two 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 13 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
- 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
- TV sets

PRODUCT GROUP AND PACKAGE DATA

- Product group: Display
- Package: 13 mm
- Product series: Standard
- Angle of half intensity: $\pm 50^\circ$

PARTS TABLE

PART	COLOR	LUMINOUS INTENSITY (μ cd)			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.		
TDSO5150	Orange red	700	5000	-	10	612	-	625	10	-	2	3	20	Common anode
TDSO5150-LM	Orange red	2800	-	9000	10	612	-	625	10	-	2	3	20	Common anode
TDSO5160	Orange red	700	5000	-	10	612	-	625	10	-	2	3	20	Common cathode
TDSO5160-LM	Orange red	2800	-	9000	10	612	-	625	10	-	2	3	20	Common cathode
TDSG5150	Green	700	9500	-	10	562	-	575	10	-	2.4	3	20	Common anode
TDSG5150-MN	Green	4500	-	14 000	10	562	-	575	10	-	2.4	3	20	Common anode
TDSG5150-N	Green	7000	-	14 000	10	562	-	575	10	-	2.4	3	20	Common anode
TDSG5160	Green	700	9500	-	10	562	-	575	10	-	2.4	3	20	Common cathode
TDSG5160-MN	Green	4500	-	14 000	10	562	-	575	10	-	2.4	3	20	Common cathode
TDSG5160-N	Green	7000	-	14 000	10	562	-	575	10	-	2.4	3	20	Common cathode

**ABSOLUTE MAXIMUM RATINGS** ($T_{amb} = 25\text{ }^{\circ}\text{C}$, unless otherwise specified)
TDSO5150, TDSO5160, TDSG5150, TDSG5160

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	25	mA
Surge 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	550	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}	100	K/W

OPTICAL AND ELECTRICAL CHARACTERISTICS ($T_{amb} = 25\text{ }^{\circ}\text{C}$, unless otherwise specified)
TDSO51..., ORANGE RED

PARAMETER	TEST CONDITION	PART	SYMBOL	MIN.	TYP.	MAX.	UNIT
Luminous intensity per segment (digit average) ⁽¹⁾	$I_F = 10\text{ mA}$	TDSO5150	I_V	700	5000	-	μcd
		TDSO5150-LM		2800	-	9000	
		TDSO5160		700	5000	-	
		TDSO5160-LM		2800	-	9000	
Dominant wavelength	$I_F = 10\text{ mA}$	TDSO5150, TDSO5150-LM, TDSO5160, TDSO5160-LM	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), 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)
TDSG51..., GREEN

PARAMETER	TEST CONDITION	PART	SYMBOL	MIN.	TYP.	MAX.	UNIT
Luminous intensity per segment (digit average) ⁽¹⁾	$I_F = 10\text{ mA}$	TDSG5150	I_V	700	9500	-	μcd
		TDSG5150-MN		4500	-	14 000	
		TDSG5150-N		7000	-	14 000	
		TDSG5160		700	9500	-	
		TDSG5160-MN		4500	-	14 000	
		TDSG5160-N		7000	-	14 000	
Dominant wavelength	$I_F = 10\text{ mA}$	TDSG5150, TDSG5150-MN, TDSG5150-N, TDSG5160, TDSG5160-MN, TDSG5160-N	λ_d	562	-	575	nm
Peak wavelength	$I_F = 10\text{ mA}$		λ_p	-	565	-	nm
Angle of half intensity	$I_F = 10\text{ mA}$		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

⁽²⁾ $I_{Vmin.}$ and I_V groups are mean values of all segments (a to g), matching factor within segments is ≥ 0.5 , excluding decimal points and colon

LUMINOUS INTENSITY CLASSIFICATION		
GROUP	LIGHT INTENSITY (μcd)	
STANDARD	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		GREEN	
	MIN.	MAX.	MIN.	MAX.
1	612	617	-	-
2	616	621	-	-
3	620	625	562	565
4	-	-	564	567
5	-	-	566	569
6	-	-	568	571
7	-	-	570	573
8	-	-	572	575

Note

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

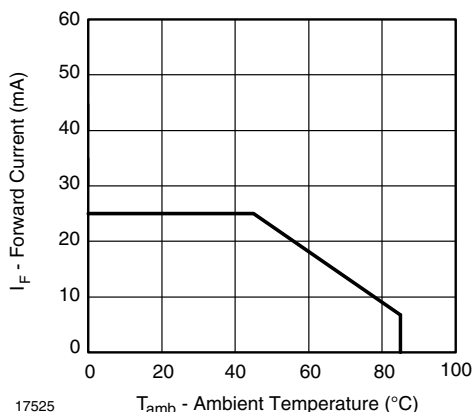
TYPICAL CHARACTERISTICS ($T_{\text{amb}} = 25^\circ\text{C}$, unless otherwise specified)


Fig. 1 - Forward Current vs. Ambient Temperature

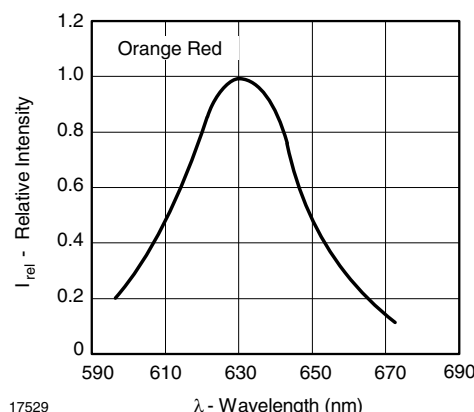


Fig. 3 - Relative Intensity vs. Wavelength

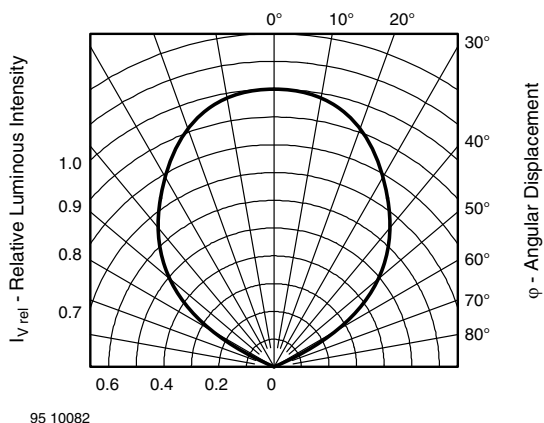


Fig. 2 - Relative Luminous Intensity vs. Angular Displacement

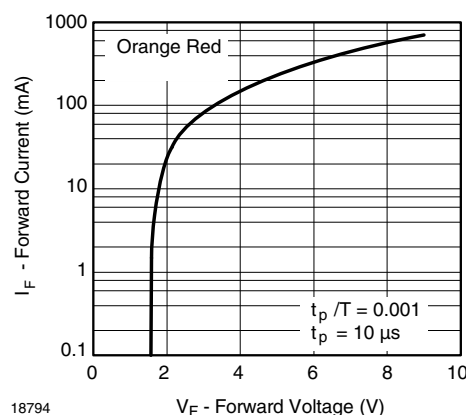


Fig. 4 - Forward Current vs. Forward Voltage

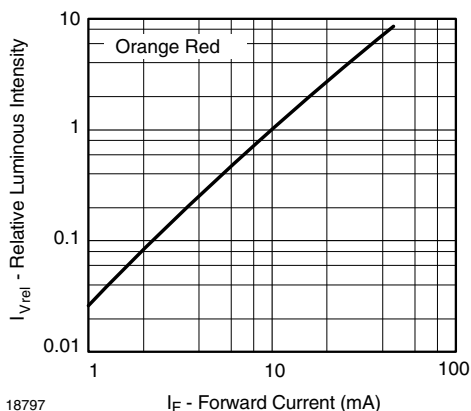


Fig. 5 - Relative Luminous Intensity vs. Forward Current

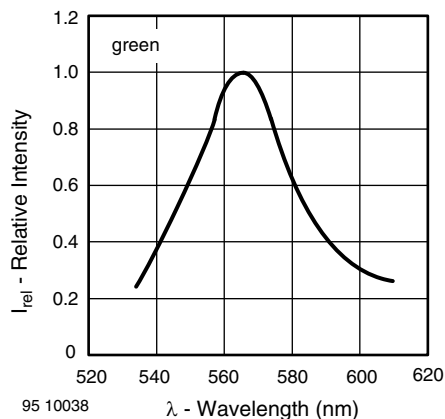


Fig. 8 - Relative Intensity vs. Wavelength

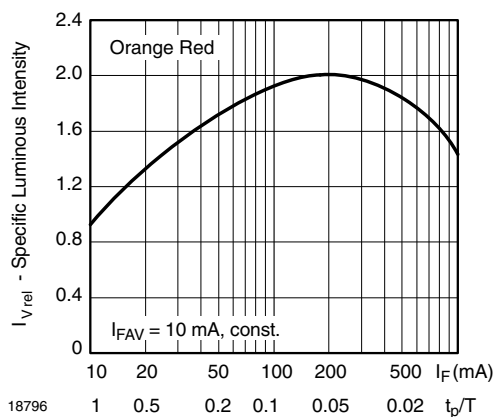


Fig. 6 - Relative Luminous Intensity vs. Forward Current/Duty Cycle

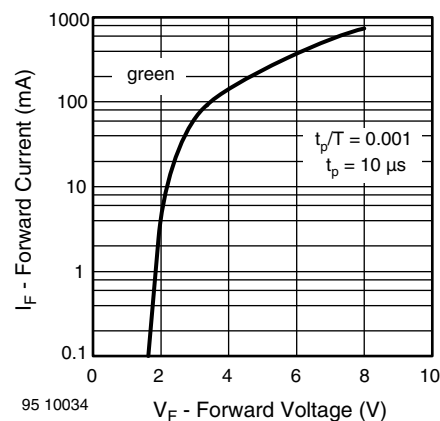


Fig. 9 - Forward Current vs. Forward Voltage

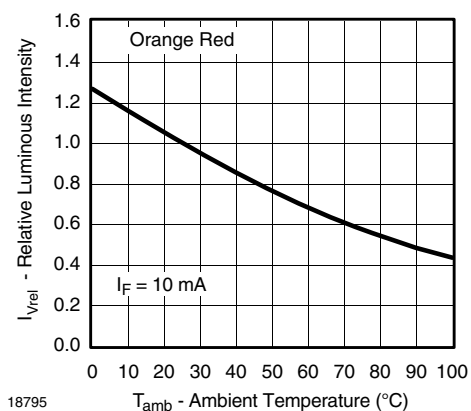


Fig. 7 - Relative Luminous Intensity vs. Ambient Temperature

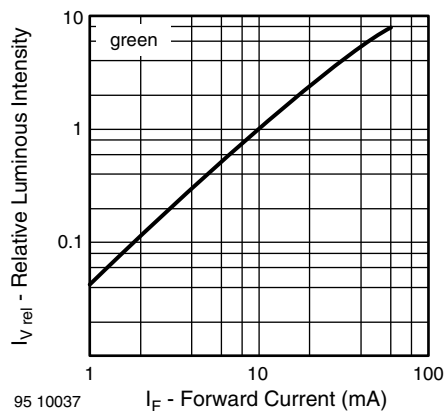


Fig. 10 - Relative Luminous Intensity vs. Forward Current

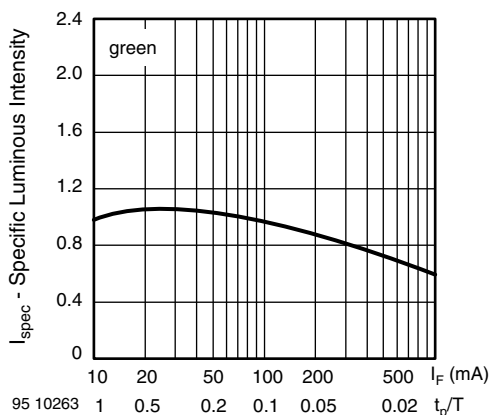


Fig. 11 - Specific Luminous Intensity vs. Forward Current

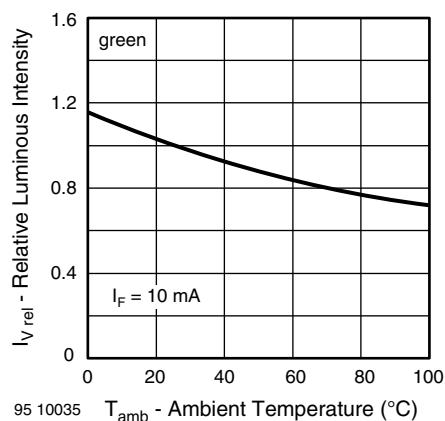


Fig. 12 - Relative Luminous Intensity vs. Ambient Temperature

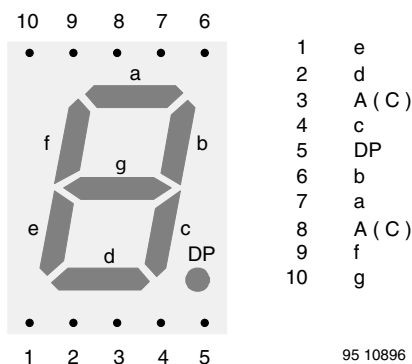
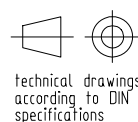
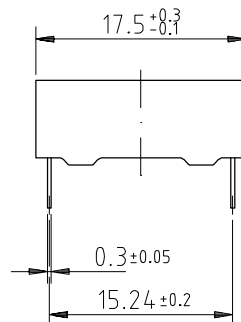
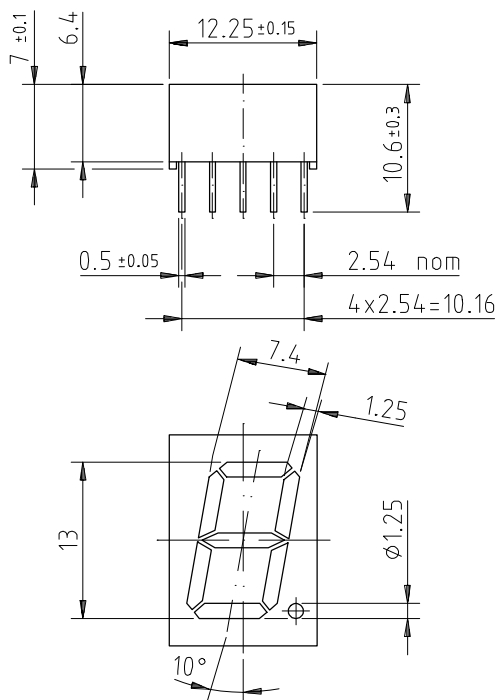


Fig. 13 - TDS.51..



PACKAGE DIMENSIONS FOR TDS.51.. in millimeters

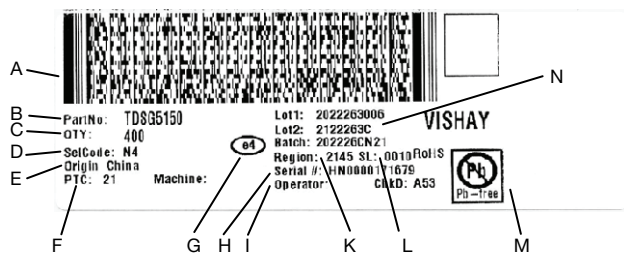


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Issue: 1; 21.11.95

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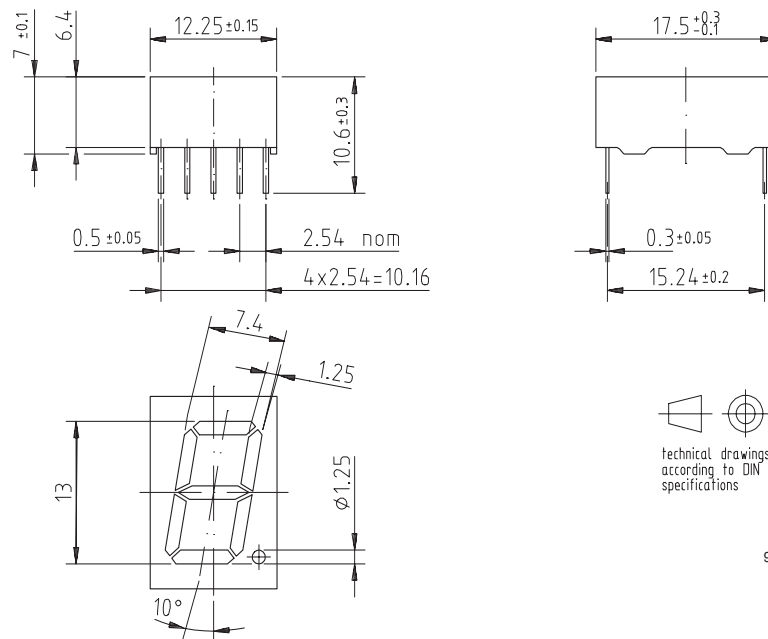
LABEL OF FAN FOLD BOX (example)



- A. 2D barcode
- B. Part No: Vishay part number
- C. QTY: quantity
- D. SelCode: selection bin code
- E. Country of origin
- F. PTC: production plant code
- G. Termination finish
- H. Region code
- I. Serial#: serial number
- K. Batch number: year, week, country code, plant code
- L. SL: storage location
- M. Environmental symbols: RoHS, lead (Pb)-free, halogen-free
- N. Lot numbers

Display-13 mm

Package Dimensions in mm



95 11344

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.

1. Annex A, B and list of transitional substances of the Montreal Protocol and the London Amendments 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
3. Council Decision 88/540/EEC and 91/690/EEC Annex A, B and C (transitional substances) respectively.

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

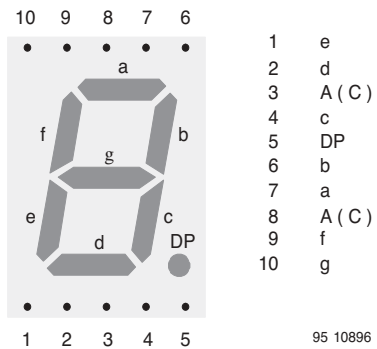
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Vishay Semiconductor GmbH, P.O.B. 3535, D-74025 Heilbronn, Germany
Telephone: 49 (0)7131 67 2831, Fax number: 49 (0)7131 67 2423



Pin Connections 13 mm





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