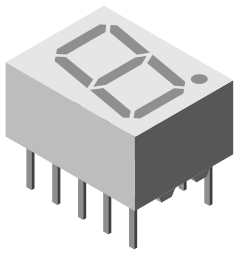
Standard 7-Segment Display 10 mm


19236

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

Pb-free

e4

RoHS COMPLIANT

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.

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 (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 °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	$t_p \leq 10$ µs (non repetitive)	I_{FSM}	0.15	A
Power dissipation	$T_{amb} \leq 45$ °C	P_V	480	mW
Junction temperature		T_j	100	°C
Operating temperature range		T_{amb}	-40 to +85	°C
Storage temperature range		T_{stg}	-40 to +85	°C
Soldering temperature	t ≤ 3 s, 2 mm below seating plane	T_{sd}	260	°C
Thermal resistance LED junction to ambient		R_{thJA}	120	K/W

OPTICAL AND ELECTRICAL CHARACTERISTICS (T_{amb} = 25 °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 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 mA	TDSO3150, TDSO3150-KL, TDSO3150-L, TDSO3155, TDSO3160, TDSO3160-KL, TDSO3160-L	λ_d	612	-	625	nm
Peak wavelength	I_F = 10 mA		λ_p	-	630	-	nm
Angle of half intensity	I_F = 10 mA		j	-	± 50	-	°
Forward voltage per segment or DP	I_F = 20 mA		V_F	-	2	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

OPTICAL AND ELECTRICAL CHARACTERISTICS (T_{amb} = 25 °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 mA	TDSY3150	I_V	450	3000	-	µcd
		TDSY3150-K		1800	-	3600	
Dominant wavelength	I_F = 10 mA	TDSY3150, TDSY3150-K	λ_d	581	-	594	nm
Peak wavelength	I_F = 10 mA		λ_p	-	585	-	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

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)	
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		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)

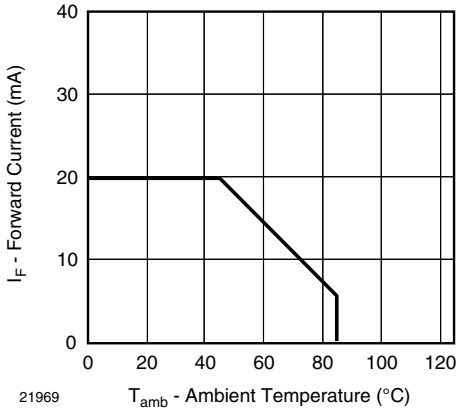


Fig. 1 - Forward Current vs. Ambient Temperature

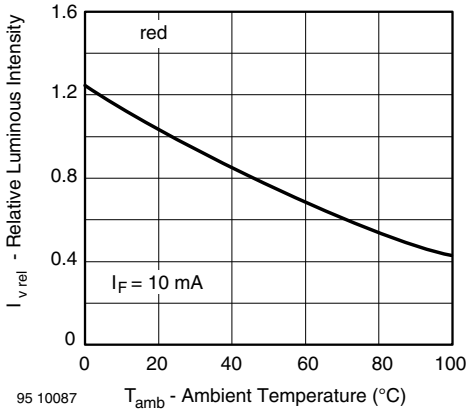


Fig. 4 - Relative Luminous Intensity vs. Ambient Temperature

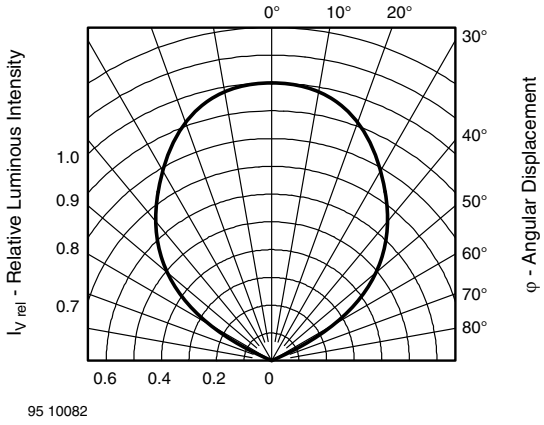


Fig. 2 - Relative Luminous Intensity vs. Angular Displacement

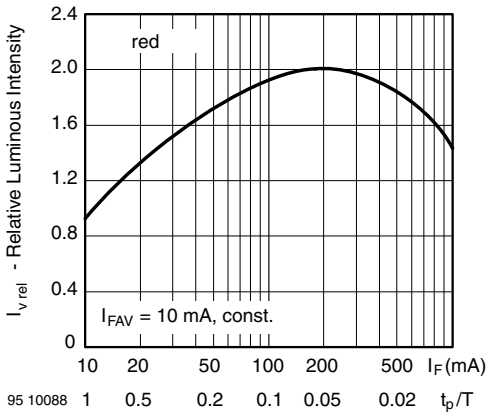


Fig. 5 - Relative Luminous Intensity vs. Forward Current/Duty Cycle

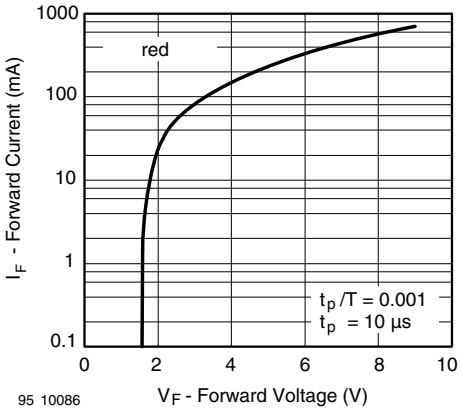


Fig. 3 - Forward Current vs. Forward Voltage

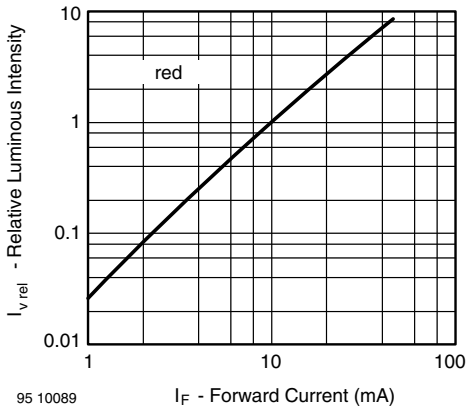


Fig. 6 - Relative Luminous Intensity vs. Forward Current

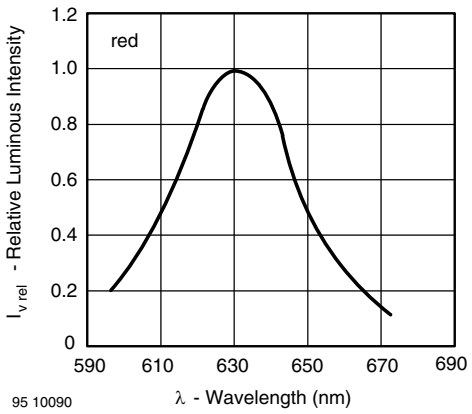


Fig. 7 - Relative Intensity vs. Wavelength

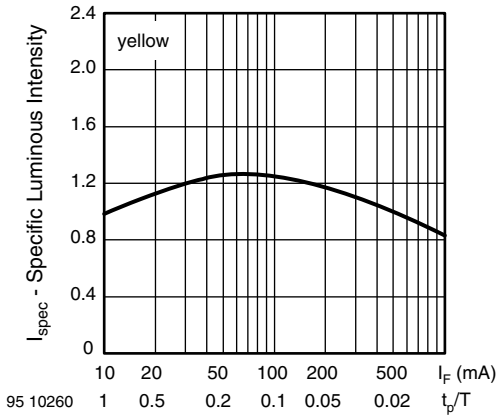


Fig. 10 - Relative Luminous Intensity vs. Forward Current/Duty Cycle

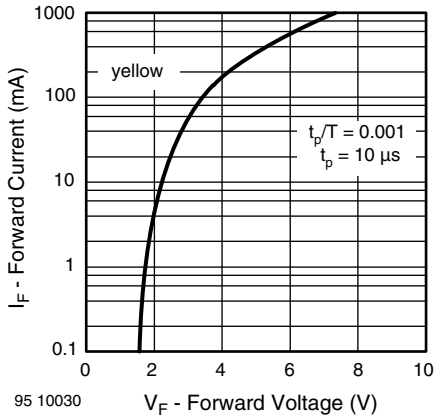


Fig. 8 - Forward Current vs. Forward Voltage

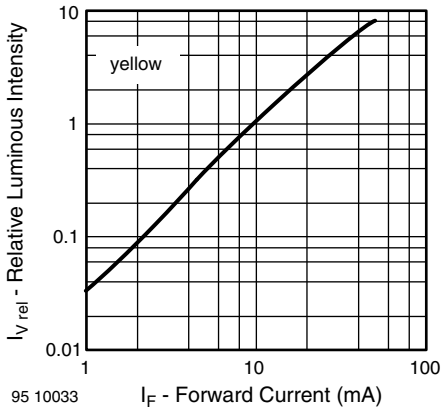


Fig. 11 - Relative Luminous Intensity vs. Forward Current

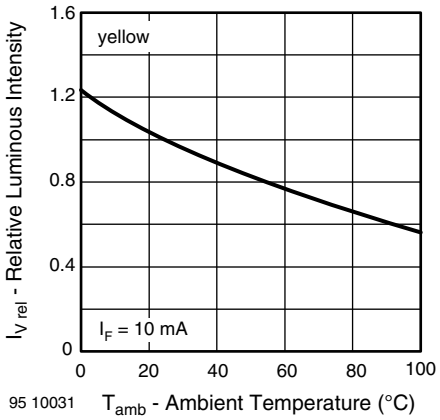


Fig. 9 - Relative Luminous Intensity vs. Ambient Temperature

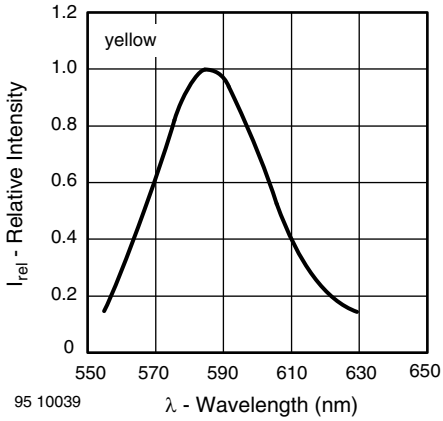


Fig. 12 - Relative Intensity vs. Wavelength

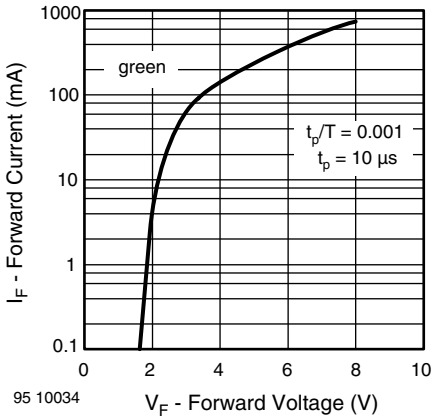


Fig. 13 - Forward Current vs. Forward Voltage

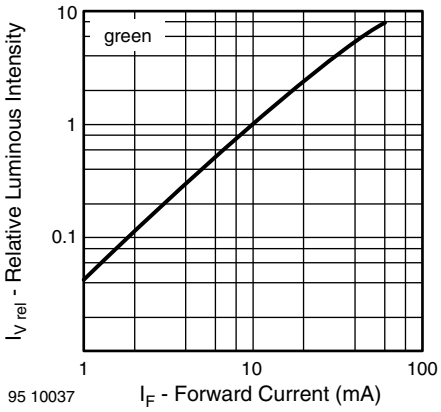


Fig. 16 - Relative Luminous Intensity vs. Forward Current

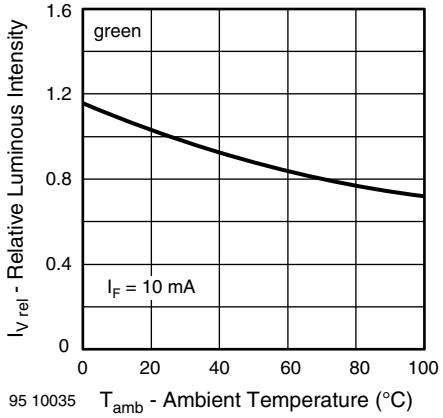


Fig. 14 - Relative Luminous Intensity vs. Ambient Temperature

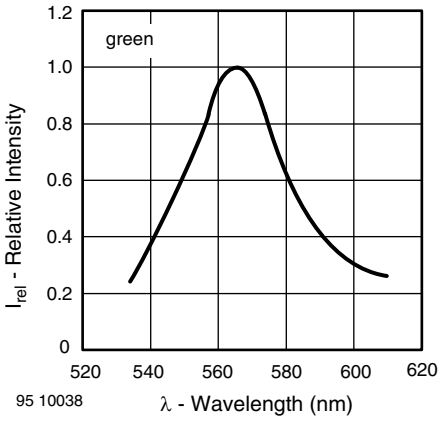


Fig. 17 - Relative Intensity vs. Wavelength

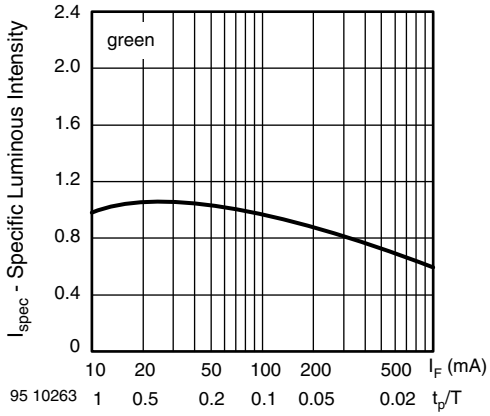


Fig. 15 - Specific Luminous Intensity vs. Forward Current

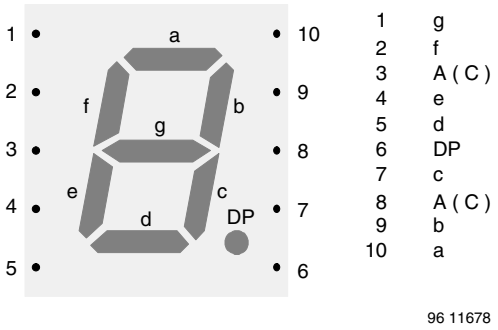
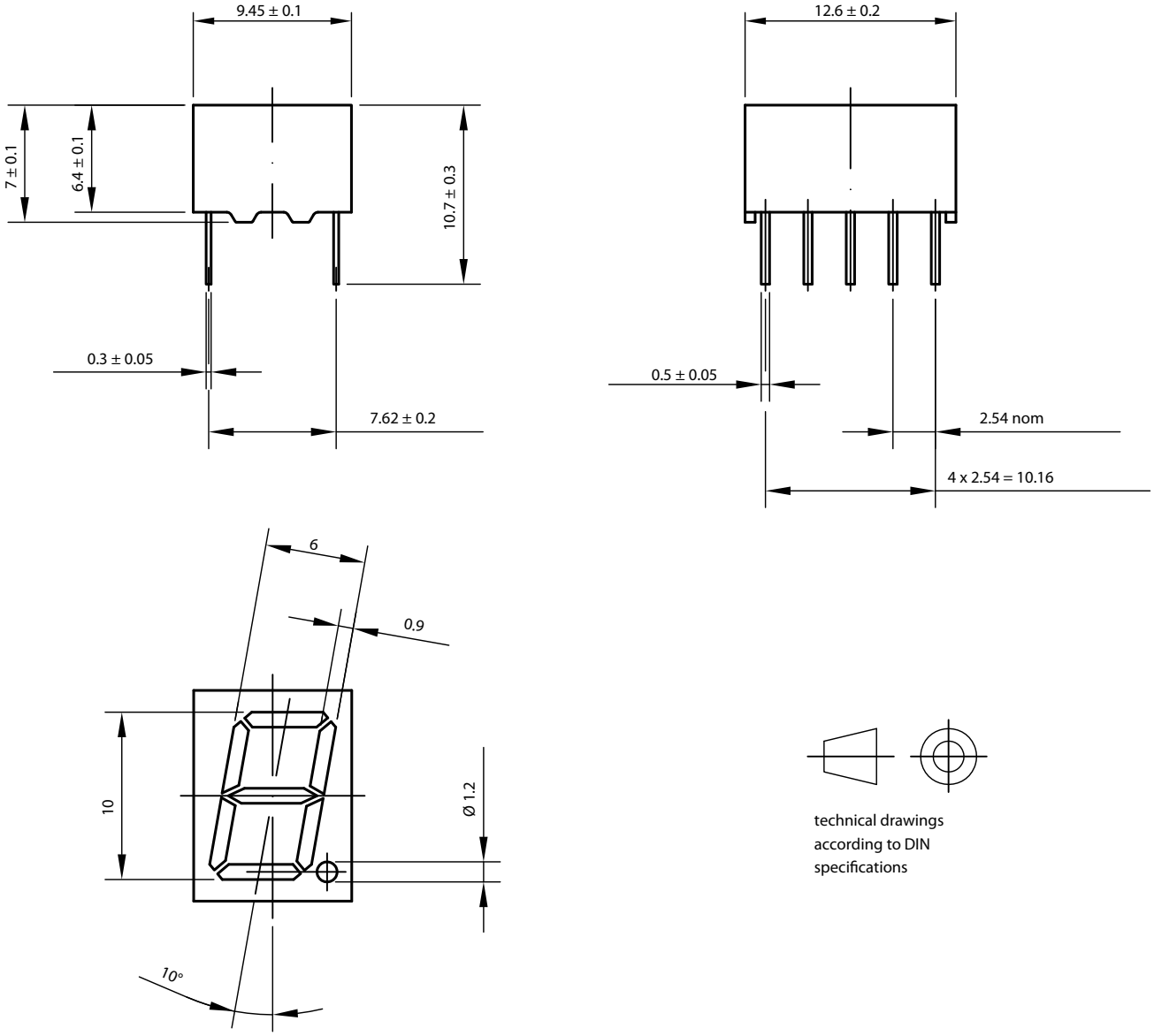


Fig. 18 - TDS.31..

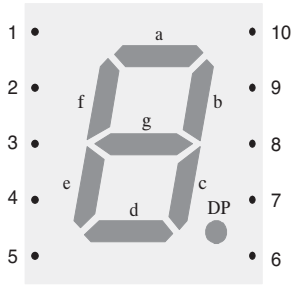
PACKAGE DIMENSIONS FOR TDS.31.. in millimeters



technical drawings
according to DIN
specifications

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

Pin Connections 10 mm



1	g
2	f
3	A (C)
4	e
5	d
6	DP
7	c
8	A (C)
9	b
10	a

96 11678

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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 operatingsystems 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.

Vishay Semiconductor GmbH, P.O.B. 3535, D-74025 Heilbronn, Germany
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