

## High Intensity 13 mm Seven Segment Display

Color	Type	Circuitry
High intensity red	TDSR135.	Common anode
Low current red	TDSR136.	Common cathode

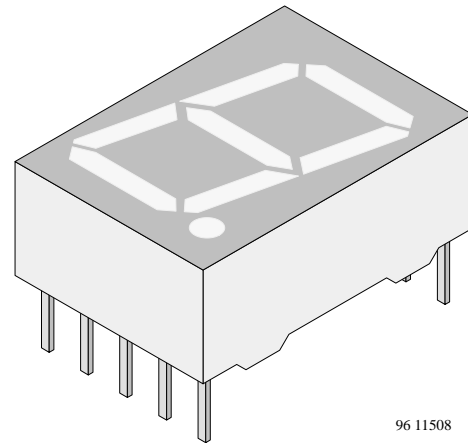
### Description

This series defines a new standard for Low Current Displays. It is a single digit 7-Segment LED display utilizing AllnGaP technology in color red.

The supreme light intensity allows applications under direct sunlight or "black front" designs by using tinted filter glass in front of the display.

Typical 750  $\mu\text{cd}$  at 0.5 mA is Best in Class Performance for applications with very limited power supply. The maximum forward current of 10 mA is allowed for an ambient temperature range of  $-40^\circ$  to  $+85^\circ$  C without current derating.

Crosstalk between segments is possible at drive currents above 5 mA per segment. Therefore it is recommend to apply more than 5 mA only under direct sunlight or with tinted filter glass.



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### Features

- 750  $\mu\text{cd}$  typical at 0.5 mA
- 33000  $\mu\text{cd}$  typical at 10 mA
- Very low power consumption
- Wide viewing angle
- Grey package surface
- Light intensity categorized at  $I_F=0.5\text{mA}$

### Applications

Battery driven instruments  
Telecom devices  
Home appliances  
Instrumentation  
POS Terminals

### Absolute Maximum Ratings

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

#### TDS.13..

Parameter	Test Conditions	Symbol	Value	Unit
Reverse voltage per segment		$V_R$	5	V
DC forward current per segment		$I_F$	10	mA
Peak forward current per segment	$t_p \leq 10 \mu\text{s}$ , duty cycle 1/10	$I_{FM}$	50	mA
Power dissipation	$T_{\text{amb}} \leq 85^\circ\text{C}$	$P_V$	185	mW
Junction temperature		$T_j$	105	$^\circ\text{C}$
Operating temperature range		$T_{\text{amb}}$	$-40$ to $+85$	$^\circ\text{C}$
Storage temperature range		$T_{\text{stg}}$	$-40$ to $+85$	$^\circ\text{C}$
Soldering temperature	$t \leq 3$ sec, 2mm below seating plane	$T_{\text{sd}}$	260	$^\circ\text{C}$
Thermal resistance LED junction/ambient		$R_{\text{thJA}}$	100	K/W

### Optical and Electrical Characteristics

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

Red (TDSR135., TDSR136. )

Parameter	Test Conditions	Type	Symbol	Min	Typ	Max	Unit
Luminous intensity per segment (digit average) <sup>1)</sup>	$I_F = 0.5 \text{ mA}$		$I_V$	280	750	2200	$\mu\text{cd}$
	$I_F = 1 \text{ mA}$		$I_V$		2000		$\mu\text{cd}$
	$I_F = 10 \text{ mA}$		$I_V$		33000		$\mu\text{cd}$
Dominant wavelength	$I_F = 0.5 \text{ mA}$		$\lambda_d$	618	624	630	nm
Peak wavelength	$I_F = 0.5 \text{ mA}$		$\lambda_p$		632		nm
Angle of half intensity			$\phi$		$\pm 50$		deg
Forward voltage per segment	$I_F = 0.5 \text{ mA}$		$V_F$		1.7	2.0	V
	$I_F = 10 \text{ mA}$		$V_F$		1.9		V
Reverse voltage per segment	$I_R = 10 \mu\text{A}$		$V_R$	6	20		V
Junction capacitance	$V_R = 0, f = 1 \text{ MHz}$		$C_j$		30		pF

Note<sup>1)</sup>:  $I_{V_{min}}$  and  $I_V$  groups are mean values of segments a to g matching factor within segments is  $\leq 1/2$ , without Decimal Point.

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

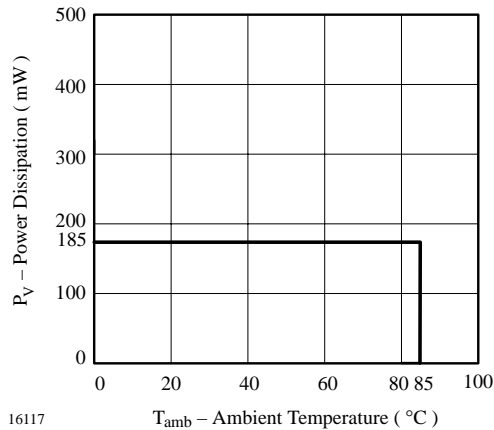


Figure 1. Power Dissipation vs. Ambient Temperature

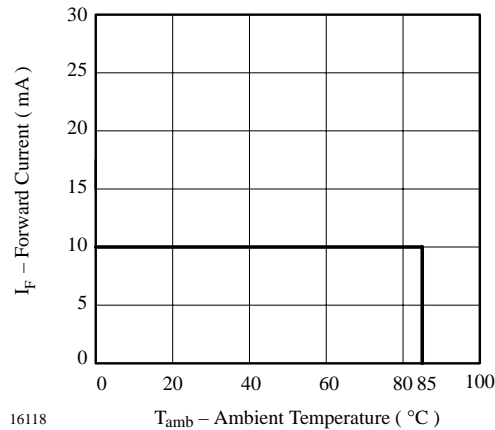
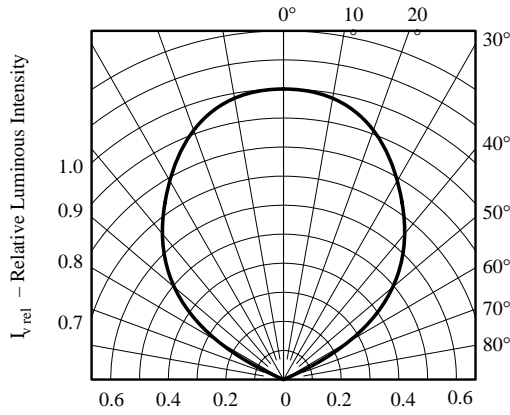
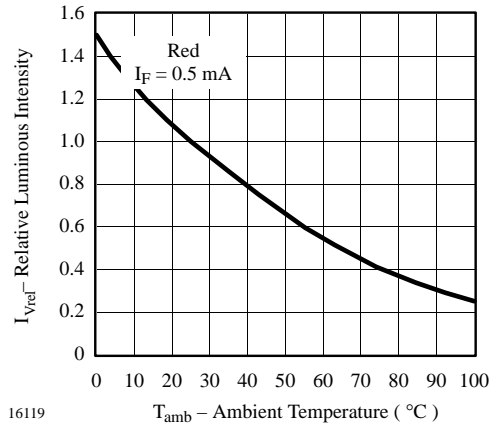


Figure 2. Forward Current vs. Ambient Temperature



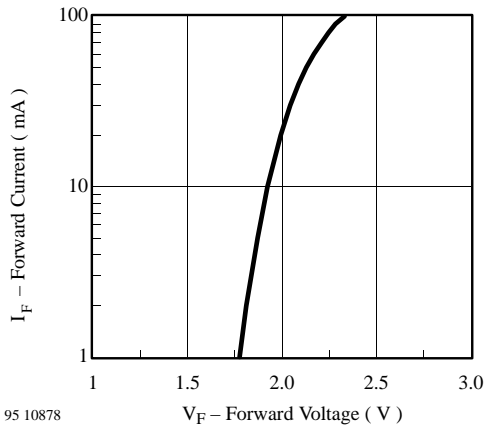
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Figure 3. Rel. Luminous Intensity vs. Angular Displacement



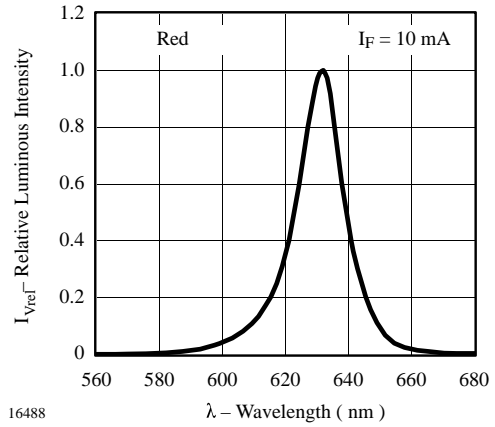
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Figure 6. Rel. Luminous Intensity vs. Ambient Temperature



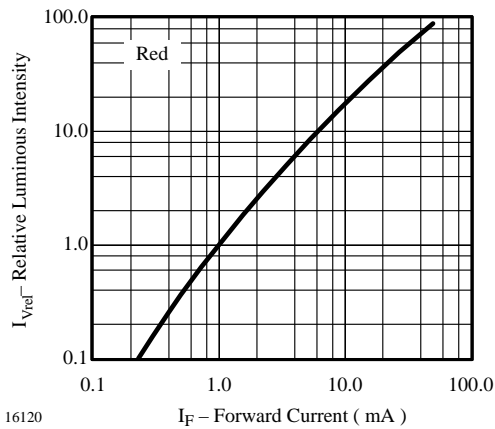
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Figure 4. Forward Current vs. Forward Voltage



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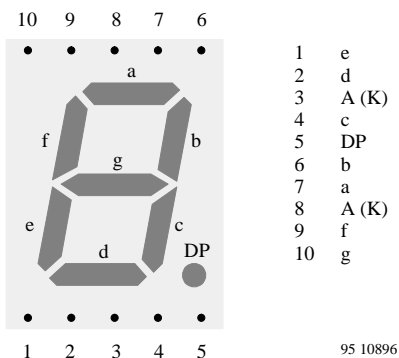
Figure 7. Rel. Luminous Intensity vs. Ambient Temperature



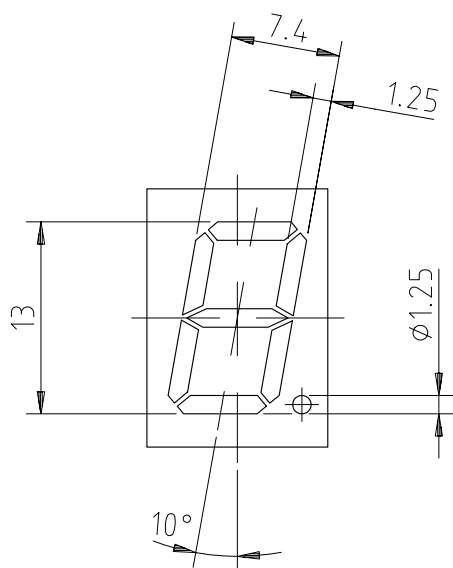
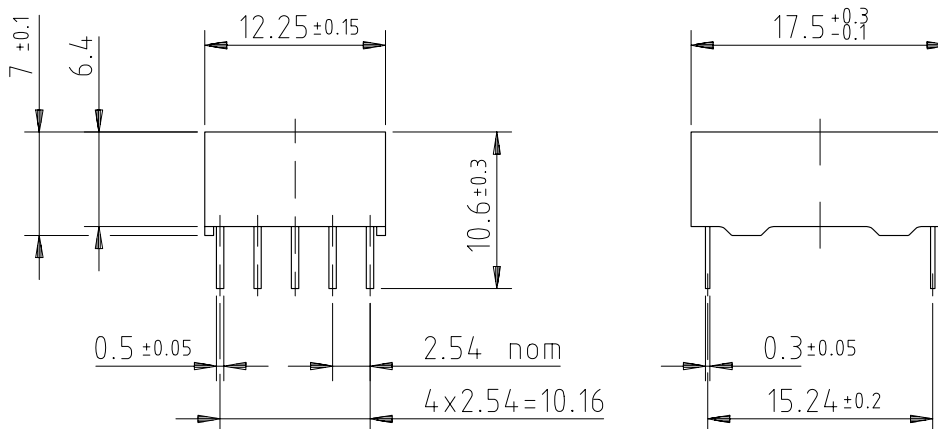
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Figure 5. Rel. Luminous Intensity vs. Forward Current

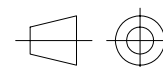
### Pin connections



### Dimensions in mm



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technical drawings  
according to DIN  
specifications



## 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.

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

Parameters can vary in different applications. All operating parameters must be validated for each customer application by the customer. Should the buyer use Vishay Semiconductors products for any unintended or unauthorized application, the buyer shall indemnify Vishay Semiconductors against all claims, costs, damages, and expenses, arising out of, directly or indirectly, any claim of personal damage, injury or death associated with such unintended or unauthorized use.

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