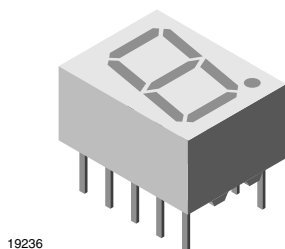


## High Intensity Red Low Current 7-Segment Display



19236

### DESCRIPTION

This series defines a new standard for low current displays. It is a single digit 7-segment LED display utilizing AlInGaP 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 1500  $\mu\text{cd}$  at 1 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  $-40\text{ }^{\circ}\text{C}$  to  $+85\text{ }^{\circ}\text{C}$  without current derating.

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

- 1500  $\mu\text{cd}$  typical at 1 mA
- Very low power consumption
- Wide viewing angle
- Grey package surface
- Light intensity categorized at  $I_F = 1\text{ mA}$
- Material categorization: for definitions of compliance please see [www.vishay.com/doc?99912](http://www.vishay.com/doc?99912)


**RoHS**  
COMPLIANT

### APPLICATIONS

- Battery driven instruments
- Telecom devices
- Home appliances
- Instrumentation
- POS terminals

### PRODUCT GROUP AND PACKAGE DATA

- Product group: display
- Package: 10 mm
- Product series: low current
- Angle of half intensity:  $\pm 50^{\circ}$

### PARTS TABLE

PART	COLOR	LUMINOUS INTENSITY ( $\mu\text{cd}$ )			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.		
TDSR1050	Red	280	-	3600	1	-	640	-	1	-	1.8	2.4	1	Common anode
TDSR1050-IK	Red	1100	-	3600	1	-	640	-	1	-	1.8	2.4	1	Common anode
TDSR1060	Red	280	-	3600	1	-	640	-	1	-	1.8	2.4	1	Common cathode

### ABSOLUTE MAXIMUM RATINGS ( $T_{\text{amb}} = 25\text{ }^{\circ}\text{C}$ , unless otherwise specified)

#### TDSR1050, TDSR1050-IK, TDSR1060

PARAMETER	TEST CONDITION	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	$t_p \leq 10\text{ }\mu\text{s}$ , duty cycle 1/10	$I_{FM}$	50	mA
Power dissipation	$T_{\text{amb}} \leq 85\text{ }^{\circ}\text{C}$	$P_V$	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	$t \leq 3\text{ s}$ , 2 mm below seating plane	$T_{\text{sd}}$	260	$^{\circ}\text{C}$
Thermal resistance LED junction to ambient		$R_{\text{thJA}}$	100	K/W

**OPTICAL AND ELECTRICAL CHARACTERISTICS** ( $T_{amb} = 25^{\circ}\text{C}$ , unless otherwise specified)  
**TDSR1050, TDSR1050-IK, TDSR1060, RED**

PARAMETER	TEST CONDITION	PART	SYMBOL	MIN.	TYP.	MAX.	UNIT
Luminous intensity per segment (digit average)	$I_F = 1\text{ mA}$	TDSR1050	$I_V$	280	-	3600	$\mu\text{cd}$
		TDSR1050-IK		1100	-	3600	
		TDSR1060		280	-	3600	
Dominant wavelength	$I_F = 1\text{ mA}$	TDSR1050, TDSR1050-IK, TDSR1060	$\lambda_d$	-	640	-	nm
Peak wavelength	$I_F = 1\text{ mA}$		$\lambda_p$	-	650	-	nm
Angle of half intensity	$I_F = 1\text{ mA}$		$\phi$	-	$\pm 50$	-	$^{\circ}$
Forward voltage per segment or DP	$I_F = 1\text{ mA}$		$V_F$	-	1.8	2.4	V
Reverse voltage per segment or DP	$V_R = 6\text{ V}$		$I_R$	-	10	-	$\mu\text{A}$

**LUMINOUS INTENSITY CLASSIFICATION**

GROUP	LIGHT INTENSITY ( $\mu\text{cd}$ )	
	MIN.	MAX.
F	280	560
G	450	900
H	700	1400
I	1100	2200
K	1800	3600
L	2800	5600

**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.

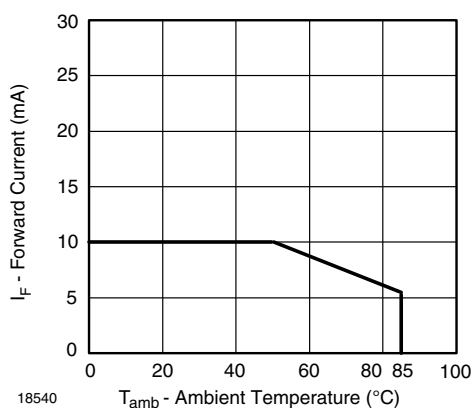
**TYPICAL CHARACTERISTICS** ( $T_{amb} = 25^{\circ}\text{C}$ , unless otherwise specified)


Fig. 1 - Forward Current vs. Ambient Temperature

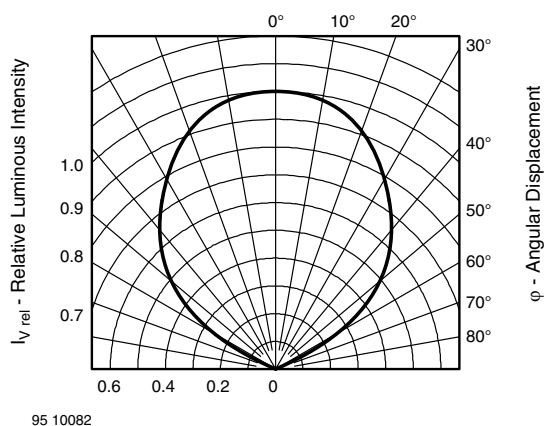


Fig. 2 - Relative Luminous Intensity vs. Angular Displacement

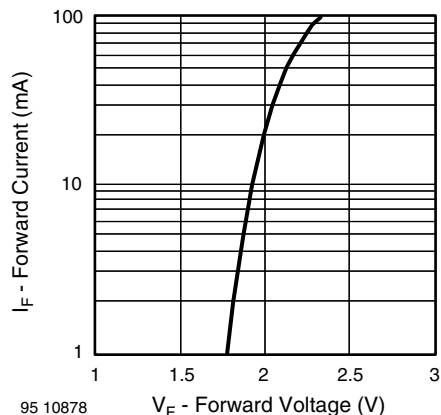


Fig. 3 - Forward Current vs. Forward Voltage

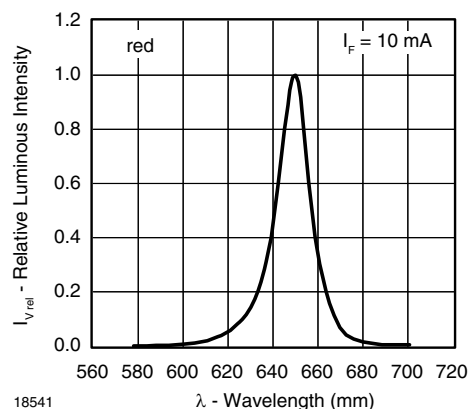


Fig. 6 - Relative Luminous Intensity vs. Ambient Temperature

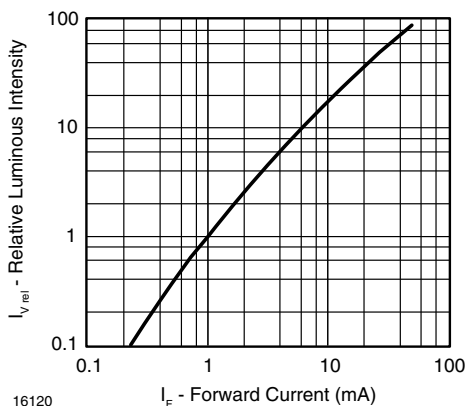


Fig. 4 - Relative Luminous Intensity vs. Forward Current

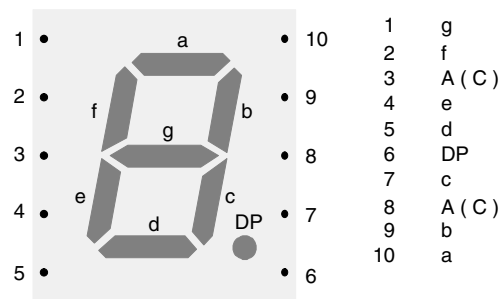


Fig. 7 - TDSR10..

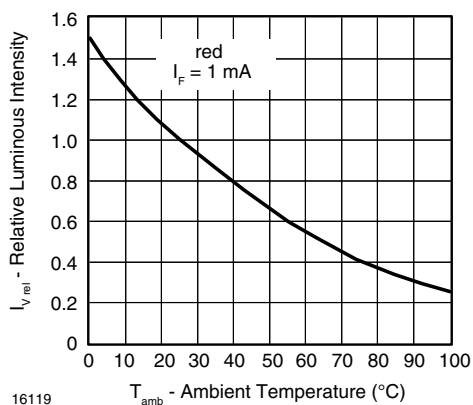
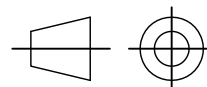
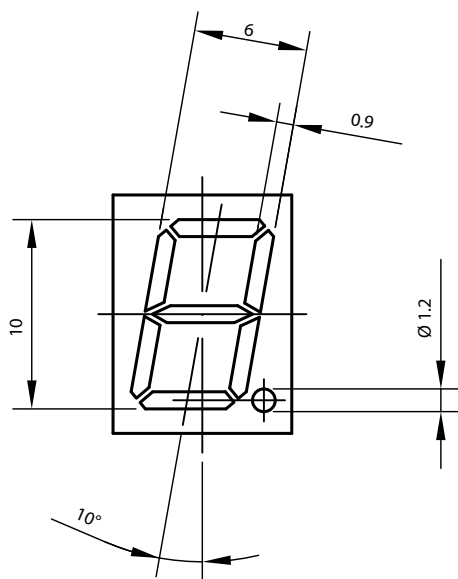
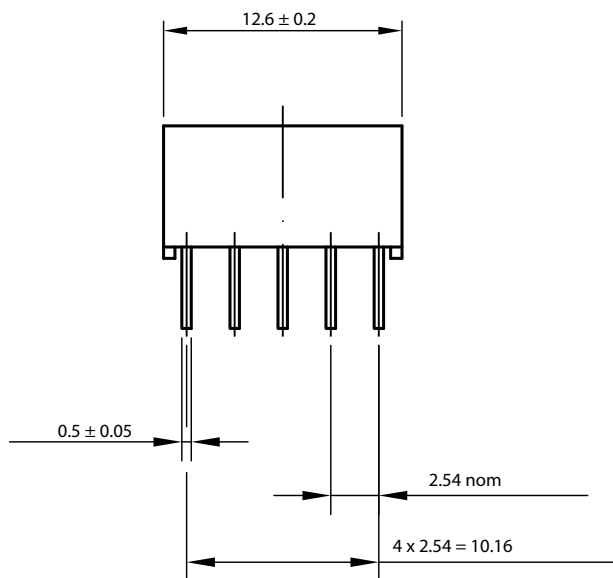
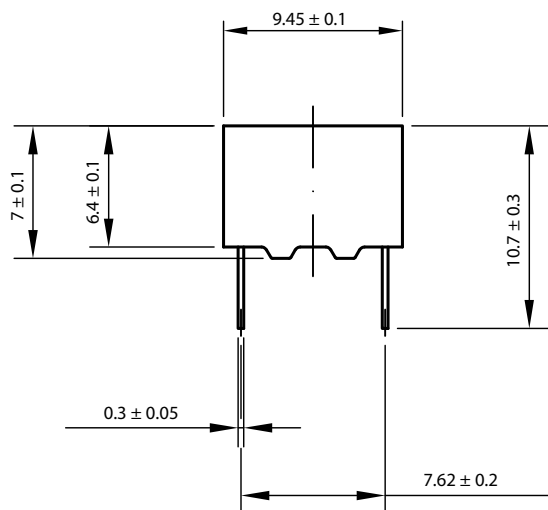


Fig. 5 - Relative Luminous Intensity vs. Ambient Temperature



## PACKAGE DIMENSIONS FOR TDSR10.. in millimeters



technical drawings  
according to DIN  
specifications

Drawing-No.: 6.544-5093.01-4  
Issue: 2; 23.03.2012  
95 11343



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