



High Efficiency LED, Ø 5 mm Tinted Diffused Package



19223

DESCRIPTION

The TLH.54.. series was developed for standard applications like general indicating and lighting purposes.

It is housed in a 5 mm tinted diffused plastic package. The wide viewing angle of these devices provides a high on-off contrast.

Several selection types with different luminous intensities are offered. All LEDs are categorized in luminous intensity groups. The green and yellow LEDs are categorized additionally in wavelength groups.

That allows users to assemble LEDs with uniform appearance.

PRODUCT GROUP AND PACKAGE DATA

- Product group: LED
• Package: 5 mm
• Product series: standard
• Angle of half intensity: ± 30°

FEATURES

- Choice of three bright colors
• Standard T-1¼ package
• Small mechanical tolerances
• Suitable for DC and high peak current
• Wide viewing angle
• Luminous intensity categorized
• Yellow and green color categorized
• TLH.54.. with stand-offs
• Material categorization: for definitions of compliance please see www.vishay.com/doc?99912



APPLICATIONS

- Status lights
• Off / on indicator
• Background illumination
• Readout lights
• Maintenance lights
• Legend light

Table with 14 columns: PART, COLOR, LUMINOUS INTENSITY (mcd) [MIN, TYP, MAX], at If (mA), WAVELENGTH (nm) [MIN, TYP, MAX], at If (mA), FORWARD VOLTAGE (V) [MIN, TYP, MAX], at If (mA), TECHNOLOGY. Rows include TLHR5400 (Red), TLHR5405 (Red), TLHY5400 (Yellow), and TLHG5400 (Green).

Note

(1) Not for new designs

**ABSOLUTE MAXIMUM RATINGS** ( $T_{amb} = 25\text{ }^{\circ}\text{C}$ , unless otherwise specified)  
**TLHR54.., TLHY54.., TLHG54..**

PARAMETER	TEST CONDITION	SYMBOL	VALUE	UNIT
Reverse voltage		$V_R$	6	V
DC forward current	$T_{amb} \leq 65\text{ }^{\circ}\text{C}$	$I_F$	30	mA
Surge forward current	$t_p \leq 10\text{ }\mu\text{s}$	$I_{FSM}$	1	A
Power dissipation	$T_{amb} \leq 65\text{ }^{\circ}\text{C}$	$P_V$	100	mW
Junction temperature		$T_j$	100	$^{\circ}\text{C}$
Operating temperature range		$T_{amb}$	-40 to +100	$^{\circ}\text{C}$
Storage temperature range		$T_{stg}$	-55 to +100	$^{\circ}\text{C}$
Soldering temperature	$t \leq 5\text{ s}$ , 2 mm from body	$T_{sd}$	260	$^{\circ}\text{C}$
Thermal resistance junction to ambient		$R_{thJA}$	350	K/W

**OPTICAL AND ELECTRICAL CHARACTERISTICS** ( $T_{amb} = 25\text{ }^{\circ}\text{C}$ , unless otherwise specified)  
**TLHR540., RED**

PARAMETER	TEST CONDITION	PART	SYMBOL	MIN.	TYP.	MAX.	UNIT
Luminous intensity <sup>(1)</sup>	$I_F = 10\text{ mA}$	TLHR5400	$I_V$	1.6	10	-	mcd
		TLHR5401	$I_V$	4	12	-	mcd
		TLHR5405	$I_V$	6.3	14	-	mcd
Dominant wavelength	$I_F = 10\text{ mA}$		$\lambda_d$	612	-	630	nm
Peak wavelength	$I_F = 10\text{ mA}$		$\lambda_p$	-	635	-	nm
Angle of half intensity	$I_F = 10\text{ mA}$		$\phi$	-	$\pm 30$	-	$^{\circ}$
Forward voltage	$I_F = 20\text{ mA}$		$V_F$	-	2	3	V
Reverse voltage	$I_R = 10\text{ }\mu\text{A}$		$V_R$	6	15	-	V
Junction capacitance	$V_R = 0\text{ V}$ , $f = 1\text{ MHz}$		$C_j$	-	50	-	pF

**Note**<sup>(2)</sup> In one packing unit  $I_{Vmin.}/I_{Vmax.} \leq 0.5$ **OPTICAL AND ELECTRICAL CHARACTERISTICS** ( $T_{amb} = 25\text{ }^{\circ}\text{C}$ , unless otherwise specified)  
**TLHY540., YELLOW**

PARAMETER	TEST CONDITION	PART	SYMBOL	MIN.	TYP.	MAX.	UNIT
Luminous intensity <sup>(1)</sup>	$I_F = 10\text{ mA}$	TLHY5400	$I_V$	1.6	10	-	mcd
		TLHY5401	$I_V$	4	12	-	mcd
		TLHY5405	$I_V$	6.3	14	-	mcd
Dominant wavelength	$I_F = 10\text{ mA}$		$\lambda_d$	581	-	594	nm
Peak wavelength	$I_F = 10\text{ mA}$		$\lambda_p$	-	585	-	nm
Angle of half intensity	$I_F = 10\text{ mA}$		$\phi$	-	$\pm 30$	-	$^{\circ}$
Forward voltage	$I_F = 20\text{ mA}$		$V_F$	-	2.4	3	V
Reverse voltage	$I_R = 10\text{ }\mu\text{A}$		$V_R$	6	15	-	V
Junction capacitance	$V_R = 0\text{ V}$ , $f = 1\text{ MHz}$		$C_j$	-	50	-	pF

**Note**<sup>(1)</sup> In one packing unit  $I_{Vmin.}/I_{Vmax.} \leq 0.5$



**OPTICAL AND ELECTRICAL CHARACTERISTICS** (T<sub>amb</sub> = 25 °C, unless otherwise specified)  
**TLHG540., GREEN**

PARAMETER	TEST CONDITION	PART	SYMBOL	MIN.	TYP.	MAX.	UNIT
Luminous intensity <sup>(1)</sup>	I <sub>F</sub> = 10 mA	TLHG5400	I <sub>V</sub>	1.6	10	-	mcd
		TLHG5401	I <sub>V</sub>	4	12	-	mcd
		TLHG5405	I <sub>V</sub>	6.3	15	-	mcd
Dominant wavelength	I <sub>F</sub> = 10 mA		λ <sub>d</sub>	562	-	575	nm
Peak wavelength	I <sub>F</sub> = 10 mA		λ <sub>p</sub>	-	565	-	nm
Angle of half intensity	I <sub>F</sub> = 10 mA		φ	-	± 30	-	°
Forward voltage	I <sub>F</sub> = 20 mA		V <sub>F</sub>	-	2.4	3	V
Reverse voltage	I <sub>R</sub> = 10 μA		V <sub>R</sub>	6	15	-	V
Junction capacitance	V <sub>R</sub> = 0 V, f = 1 MHz		C <sub>j</sub>	-	50	-	pF

**Note**

<sup>(1)</sup> In one packing unit I<sub>Vmin</sub>/I<sub>Vmax</sub> ≤ 0.5

**LUMINOUS INTENSITY CLASSIFICATION**

GROUP	LUMINOUS INTENSITY (mcd)	
	MIN.	MAX.
STANDARD		
M	1.6	3.2
N	2.5	5
P	4	8
Q	6.3	12.5
R	10	20
S	16	32
T	25	50
U	40	80
V	63	125
W	100	200
X	130	260
Y	180	360
Z	240	480

**COLOR CLASSIFICATION**

GROUP	DOM. WAVELENGTH (nm)			
	YELLOW		GREEN	
	MIN.	MAX.	MIN.	MAX.
0				
1	581	584		
2	583	586		
3	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

**Note**

- Luminous flux is tested at a current pulse duration of 25 ms and an accuracy of ± 11 %.  
The above type numbers represent the order groups which include only a few brightness groups. Only one group will be shipped on each bag (there will be no mixing of two groups in each bag).  
In order to ensure availability, single brightness groups will not be orderable.  
In a similar manner for colors where wavelength groups are measured and binned, single wavelength groups will be shipped on any one bag.  
In order to ensure availability, single wavelength groups will not be orderable

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

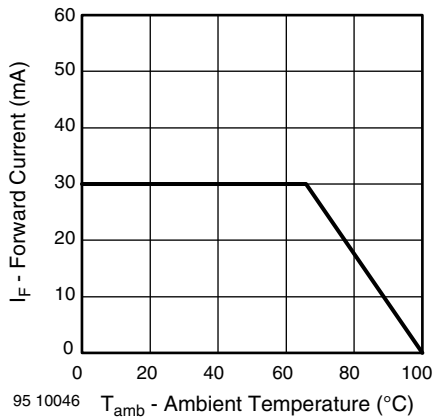


Fig. 1 - Forward Current vs. Ambient Temperature

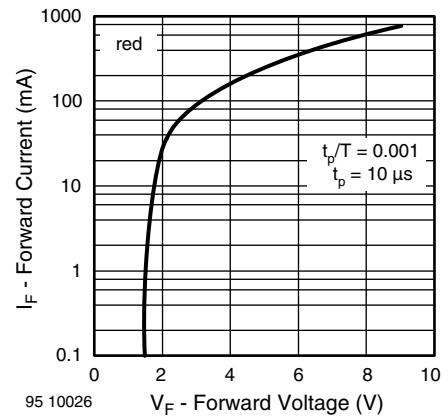


Fig. 4 - Forward Current vs. Forward Voltage

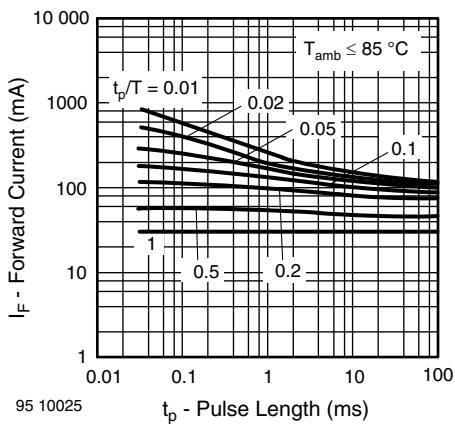


Fig. 2 - Forward Current vs. Pulse Length

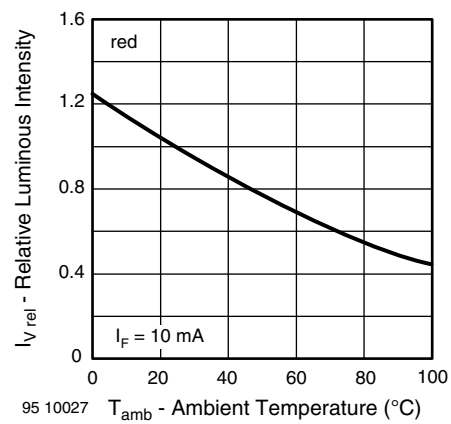


Fig. 5 - Relative Luminous Intensity vs. Ambient Temperature

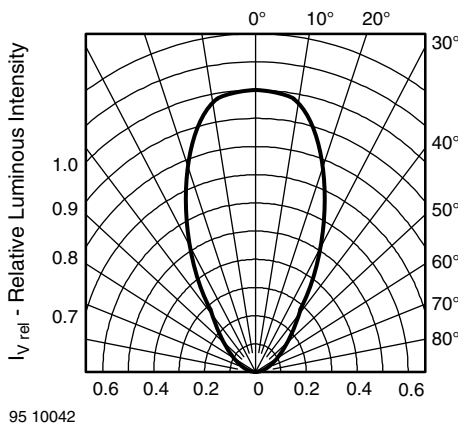


Fig. 3 - Rel. Luminous Intensity vs. Angular Displacement

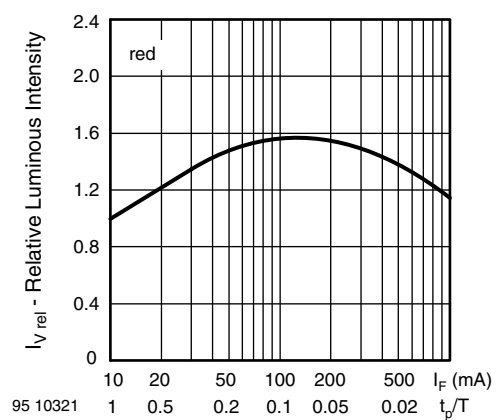


Fig. 6 - Relative Luminous Intensity vs. Forward Current/Duty Cycle

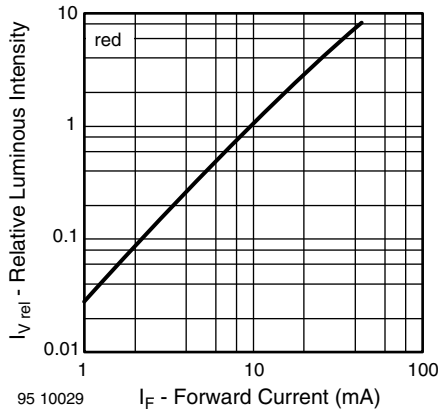


Fig. 7 - Relative Luminous Intensity vs. Forward Current

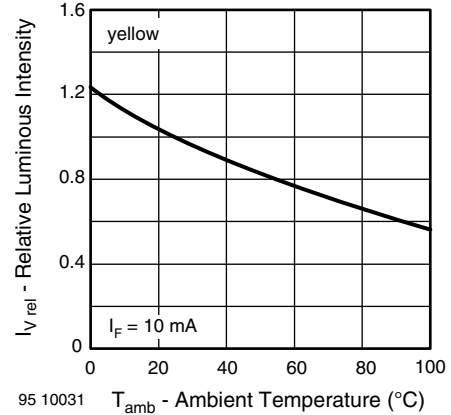


Fig. 10 - Relative Luminous Intensity vs. Ambient Temperature

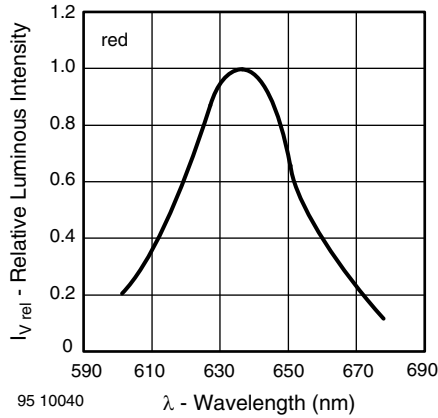


Fig. 8 - Relative Intensity vs. Wavelength

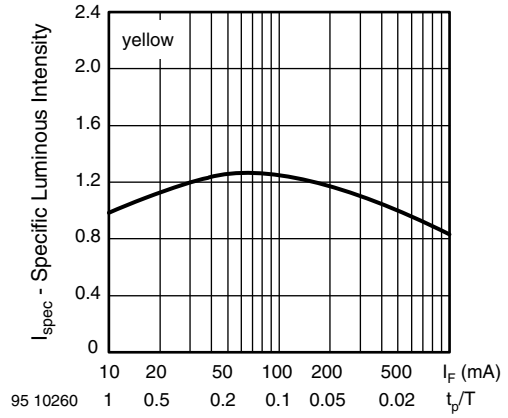


Fig. 11 - Relative Luminous Intensity vs. Forward Current/Duty Cycle

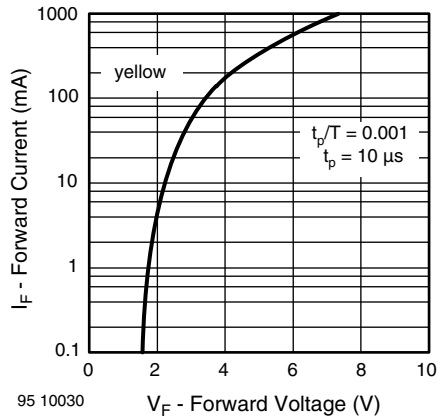


Fig. 9 - Forward Current vs. Forward Voltage

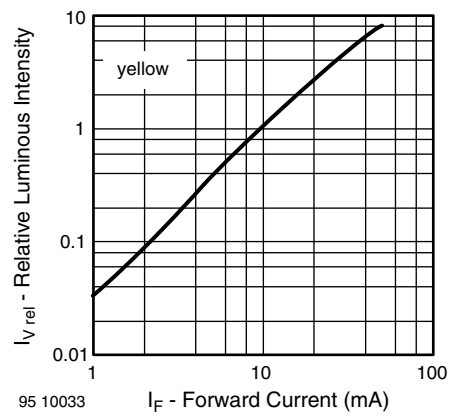


Fig. 12 - Relative Luminous Intensity vs. Forward Current

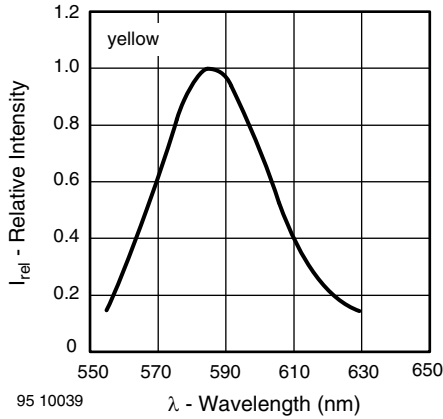


Fig. 13 - Relative Intensity vs. Wavelength

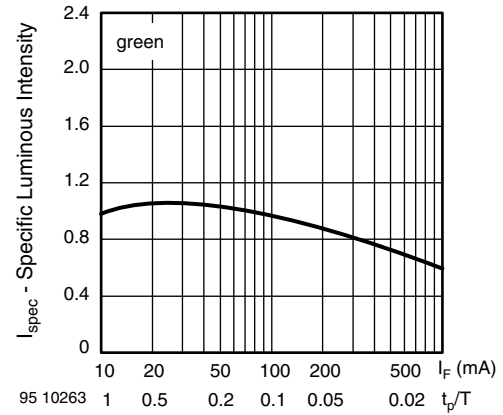


Fig. 16 - Specific Luminous Intensity vs. Forward Current

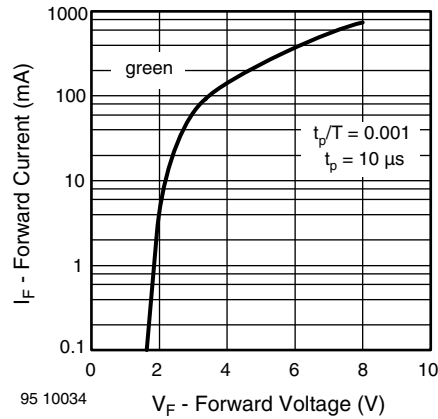


Fig. 14 - Forward Current vs. Forward Voltage

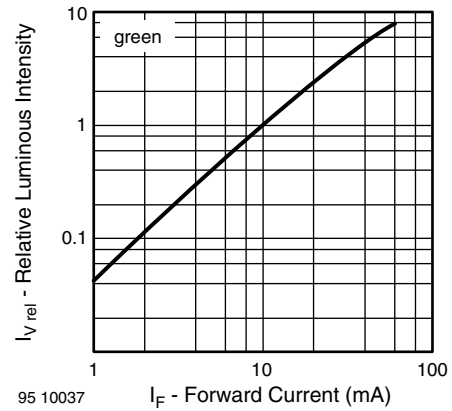


Fig. 17 - Relative Luminous Intensity vs. Forward Current

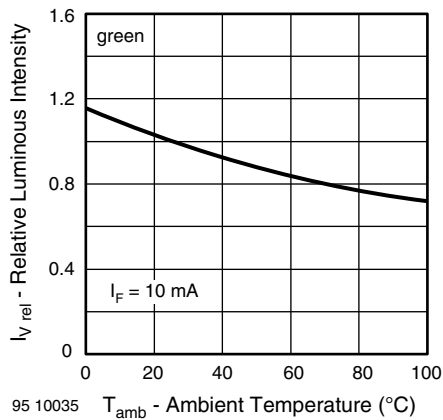


Fig. 15 - Relative Luminous Intensity vs. Ambient Temperature

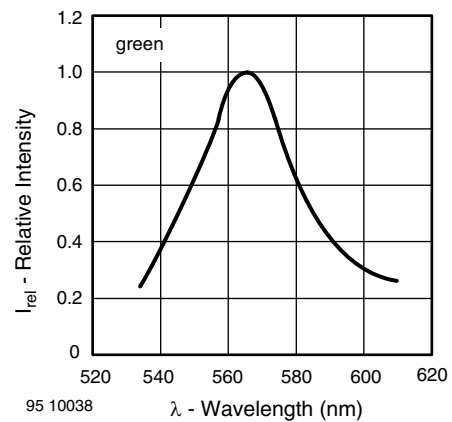
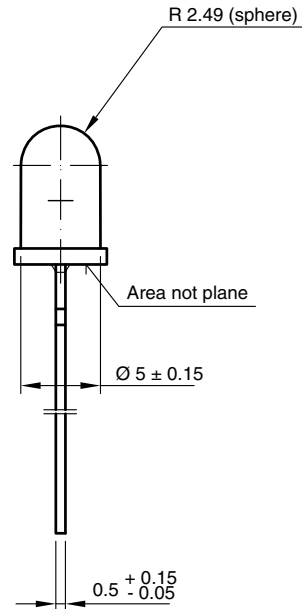
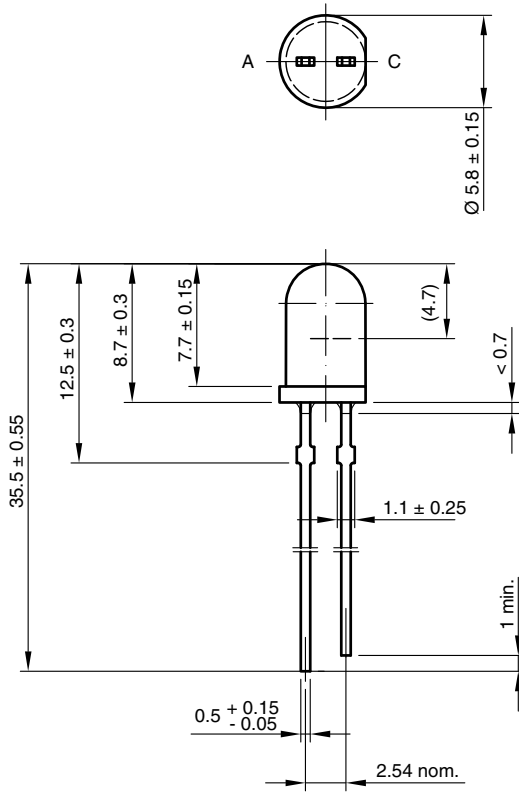


Fig. 18 - Relative Intensity vs. Wavelength

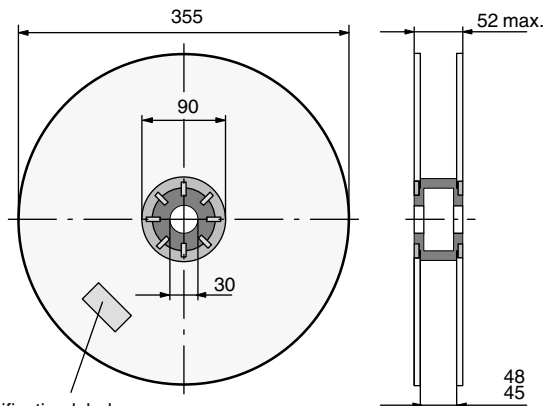


### PACKAGE DIMENSIONS in millimeters



6.544-5258.02-4  
Issue: 7; 23.07.10  
95 10916

### REEL

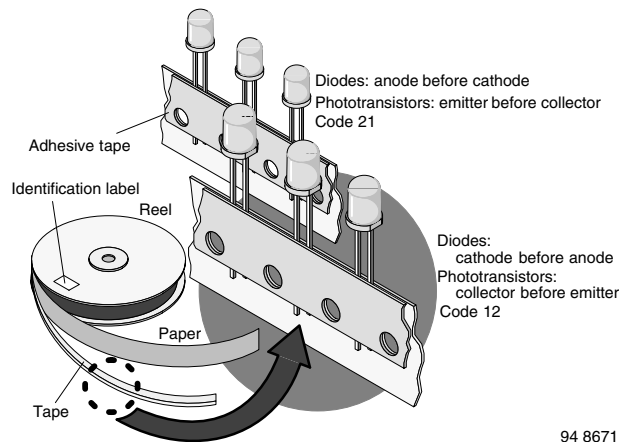


Identification label:  
Vishay/type/group/tape code/production code/quantity

948641

Fig. 19 - Reel Dimensions

### TAPE



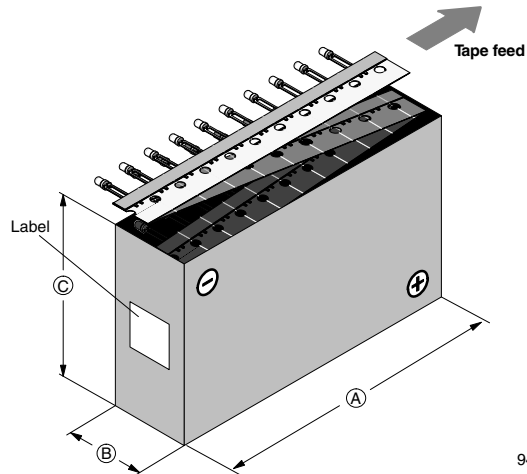
94 8671

Fig. 20 - LED in Tape

AS12 = cathode leaves tape first

AS21 = anode leaves tape first

**AMMOPACK**



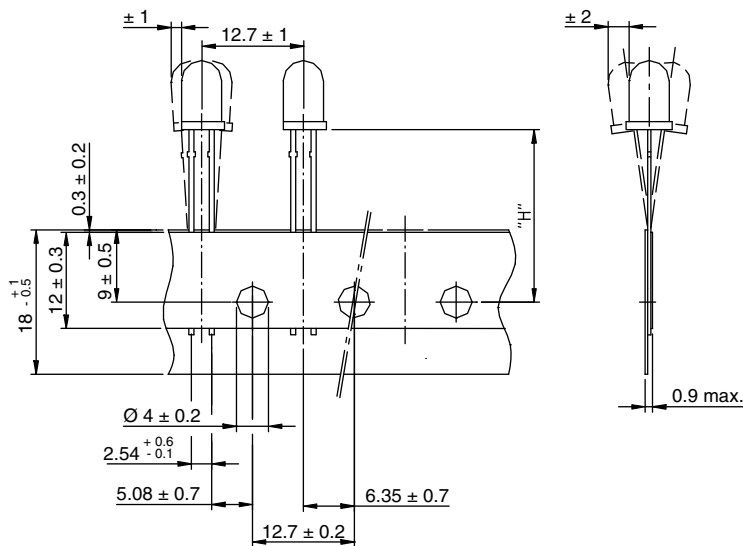
94 8667-1

Fig. 21 - Tape Direction

**Note**

- The new nomenclature for ammpack is e.g. ASZ only, without suffix for the LED orientation. The carton box has to be turned to the desired position: "+" for anode first, or "-" for cathode first. AS12Z and AS21Z are still valid for already existing types, BUT NOT FOR NEW DESIGN

**TAPE DIMENSIONS** in millimeters



Measure limit over 20 index-holes: ± 1

Quantity per:	Reel (Mat.-no. 1764)
	1000

94 8172

Option	Dim. "H" ± 0.5 mm	Dim. "X" ± 0.5 mm
AS	17.3	-
KS	19.7	-





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