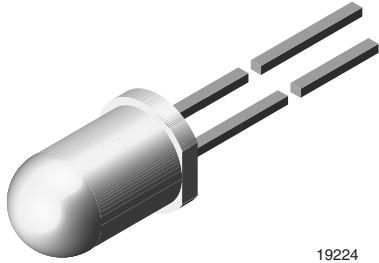




## High Efficiency LED in Ø 5 mm Tinted Diffused Package



19224

### DESCRIPTION

The TLH.640. 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-1¾ package
- Small mechanical tolerances
- Suitable for DC and high peak current
- Wide viewing angle
- Luminous intensity categorized
- Yellow and green color categorized
- TLH.640. without stand-offs
- Material categorization: for definitions of compliance please see [www.vishay.com/doc?99912](http://www.vishay.com/doc?99912)



### APPLICATIONS

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

PARTS TABLE														
PART	COLOR	LUMINOUS INTENSITY (mcd)			at I <sub>F</sub> (mA)	WAVELENGTH (nm)			at I <sub>F</sub> (mA)	FORWARD VOLTAGE (V)			at I <sub>F</sub> (mA)	TECHNOLOGY
		MIN.	TYP.	MAX.		MIN.	TYP.	MAX.		MIN.	TYP.	MAX.		
TLHR6400	Red	1.6	10	-	10	612	-	630	10	-	2	3	20	GaAsP on GaP
TLHR6400-CS12Z	Red	1.6	10	-	10	612	-	630	10	-	2	3	20	GaAsP on GaP
TLHR6401	Red	4	12	-	10	612	-	630	10	-	2	3	20	GaAsP on GaP
TLHR6405	Red	6.3	14	-	10	612	-	630	10	-	2	3	20	GaAsP on GaP
TLHR6405-ASZ	Red	6.3	14	-	10	612	-	630	10	-	2	3	20	GaAsP on GaP
TLHY6400	Yellow	1.6	10	-	10	581	-	594	10	-	2.4	3	20	GaAsP on GaP
TLHY6405	Yellow	6.3	14	-	10	581	-	594	10	-	2.4	3	20	GaAsP on GaP
TLHY6405-ASZ	Yellow	6.3	14	-	10	581	-	594	10	-	2.4	3	20	GaAsP on GaP
TLHG6400	Green	1.6	10	-	10	562	-	575	10	-	2.4	3	20	GaP on GaP
TLHG6400-AS12Z	Green	1.6	10	-	10	562	-	575	10	-	2.4	3	20	GaP on GaP
TLHG6400-CS12Z	Green	1.6	10	-	10	562	-	575	10	-	2.4	3	20	GaP on GaP
TLHG6401	Green	4	12	-	10	562	-	575	10	-	2.4	3	20	GaP on GaP
TLHG6405	Green	6.3	15	-	10	562	-	575	10	-	2.4	3	20	GaP on GaP
TLHG6405-ASZ	Green	6.3	15	-	10	562	-	575	10	-	2.4	3	20	GaP on GaP

**ABSOLUTE MAXIMUM RATINGS** ( $T_{amb} = 25\text{ }^{\circ}\text{C}$ , unless otherwise specified)  
**TLHR640., TLHY640., TLHG640.**

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)  
**TLHR640., RED**

PARAMETER	TEST CONDITION	PART	SYMBOL	MIN.	TYP.	MAX.	UNIT
Luminous intensity <sup>(1)</sup>	$I_F = 10\text{ mA}$	TLHR6400	$I_V$	1.6	10	-	mcd
		TLHR6401	$I_V$	4	12	-	mcd
		TLHR6405	$I_V$	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>(1)</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)  
**TLHY640., YELLOW**

PARAMETER	TEST CONDITION	PART	SYMBOL	MIN.	TYP.	MAX.	UNIT
Luminous intensity <sup>(1)</sup>	$I_F = 10\text{ mA}$	TLHY6400	$I_V$	1.6	10	-	mcd
		TLHY6405	$I_V$	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 ( $T_{amb} = 25\text{ }^{\circ}\text{C}$ , unless otherwise specified)							
TLHG640., GREEN							
PARAMETER	TEST CONDITION	PART	SYMBOL	MIN.	TYP.	MAX.	UNIT
Luminous intensity <sup>(1)</sup>	$I_F = 10\text{ mA}$	TLHG6400	$I_V$	1.6	10	-	mcd
		TLHG6401	$I_V$	4	12	-	mcd
		TLHG6405	$I_V$	6.3	15	-	mcd
Dominant wavelength	$I_F = 10\text{ mA}$		$\lambda_d$	562	-	575	nm
Peak wavelength	$I_F = 10\text{ mA}$		$\lambda_p$	-	565	-	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**

(1) In one packing unit  $I_{Vmin.}/I_{Vmax.} \leq 0.5$

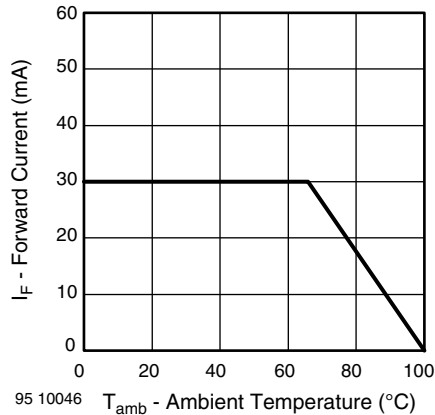
**TYPICAL CHARACTERISTICS** ( $T_{amb} = 25\text{ }^{\circ}\text{C}$ , unless otherwise specified)


Fig. 1 - Forward Current vs. Ambient Temperature

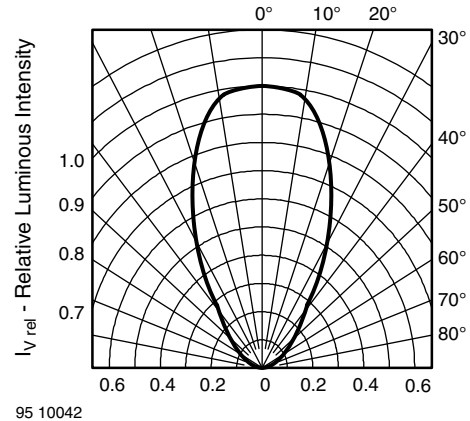


Fig. 3 - Relative Luminous Intensity vs. Angular Displacement

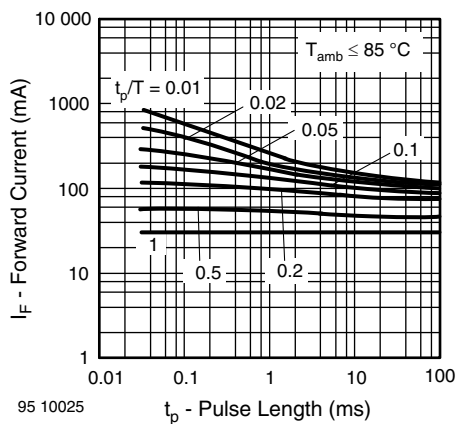


Fig. 2 - Forward Current vs. Pulse Length

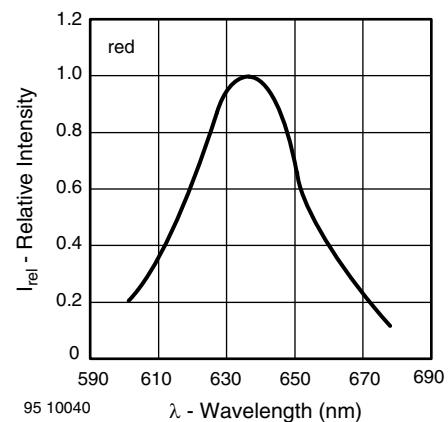


Fig. 4 - Relative Intensity vs. Wavelength

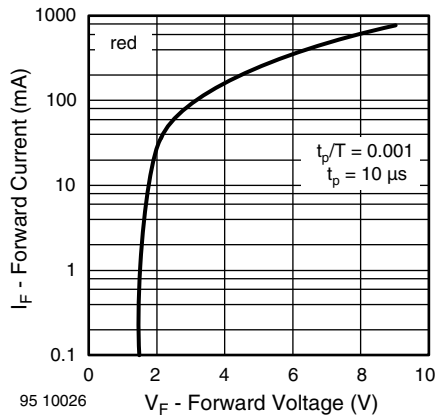


Fig. 5 - Forward Current vs. Forward Voltage

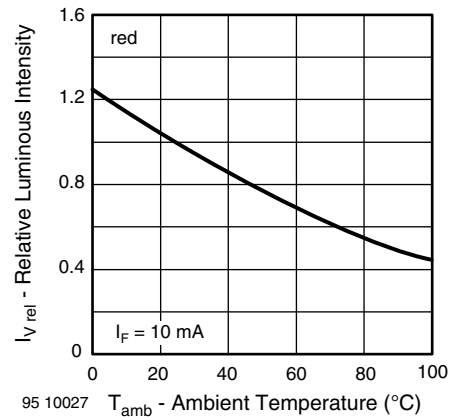


Fig. 8 - Relative Luminous Intensity vs. Ambient Temperature

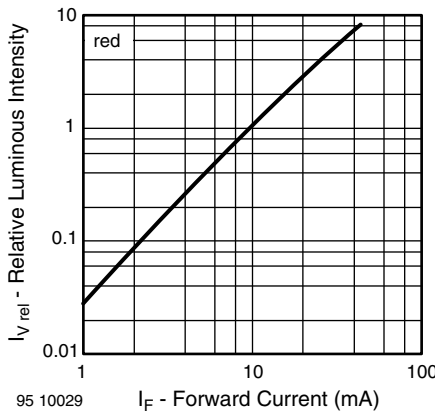


Fig. 6 - Relative Luminous Intensity vs. Forward Current

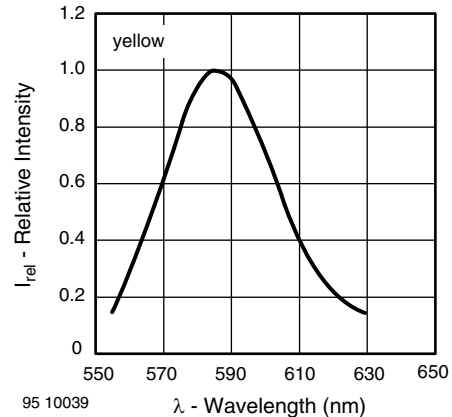


Fig. 9 - Relative Intensity vs. Wavelength

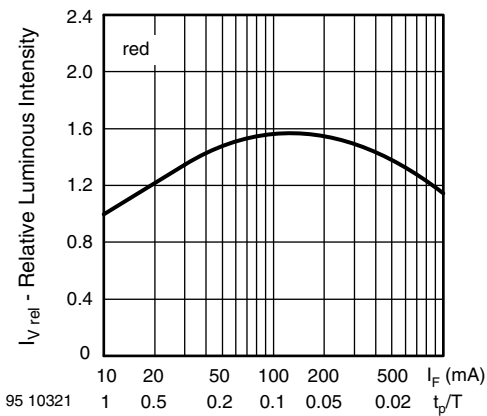


Fig. 7 - Relative Luminous Intensity vs. Forward Current / Duty Cycle

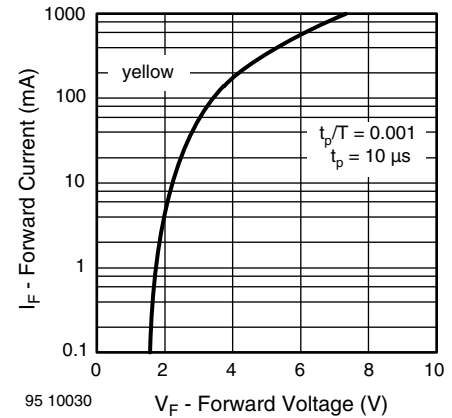


Fig. 10 - Forward Current vs. Forward Voltage

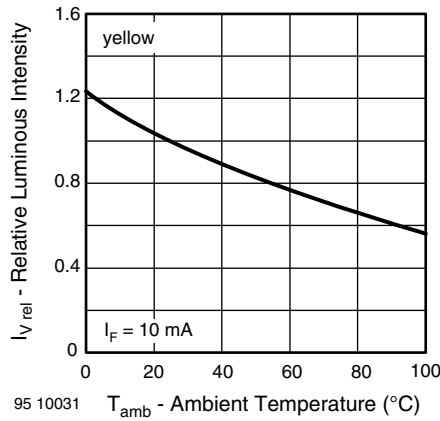


Fig. 11 - Relative Luminous Intensity vs. Ambient Temperature

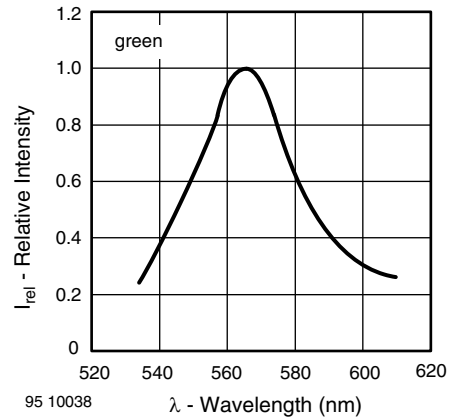


Fig. 14 - Relative Intensity vs. Wavelength

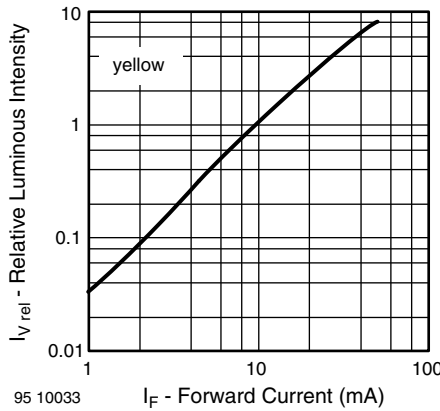


Fig. 12 - Relative Luminous Intensity vs. Forward Current

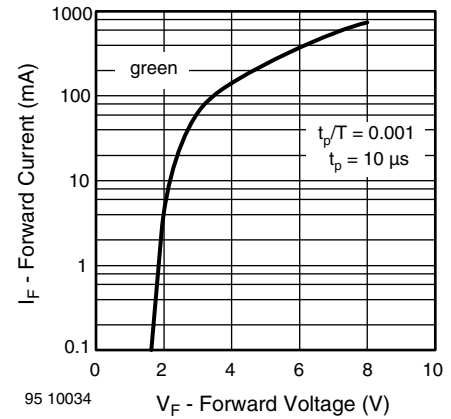


Fig. 15 - Forward Current vs. Forward Voltage

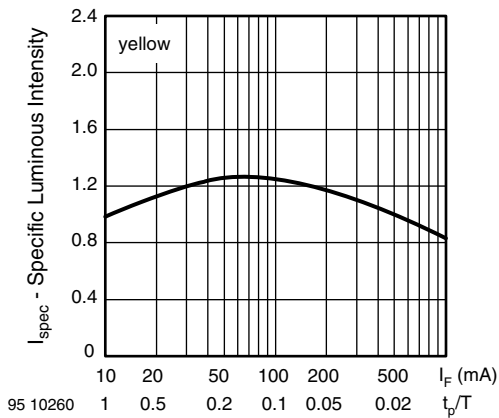


Fig. 13 - Relative Luminous Intensity vs. Forward Current / Duty Cycle

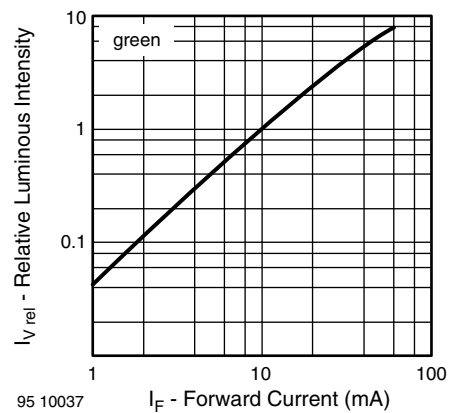


Fig. 16 - Relative Luminous Intensity vs. Forward Current

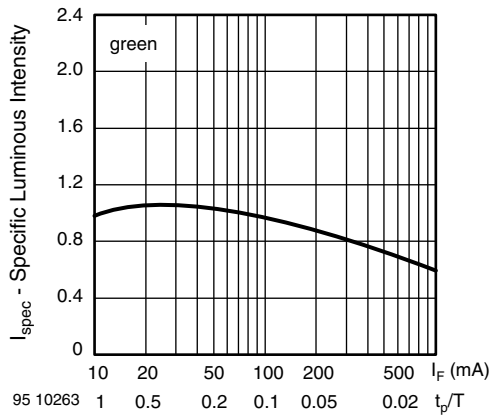


Fig. 17 - Specific Luminous Intensity vs. Forward Current

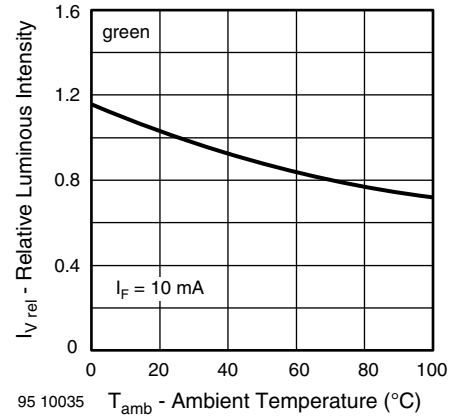
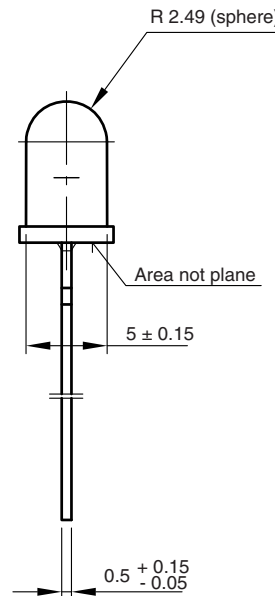
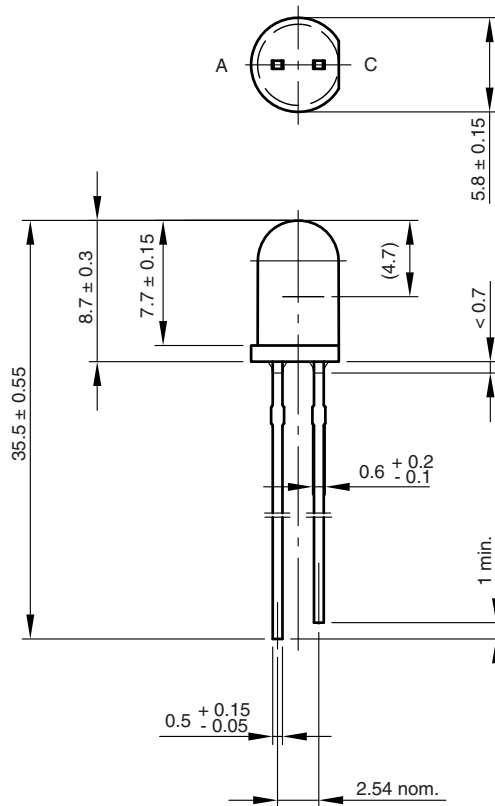


Fig. 18 - Relative Luminous Intensity vs. Ambient Temperature

**PACKAGE DIMENSIONS** in millimeters



technical drawings according to DIN specifications

6.544-5259.02-4  
Issue: 8; 19.05.09  
95 10917

## REEL

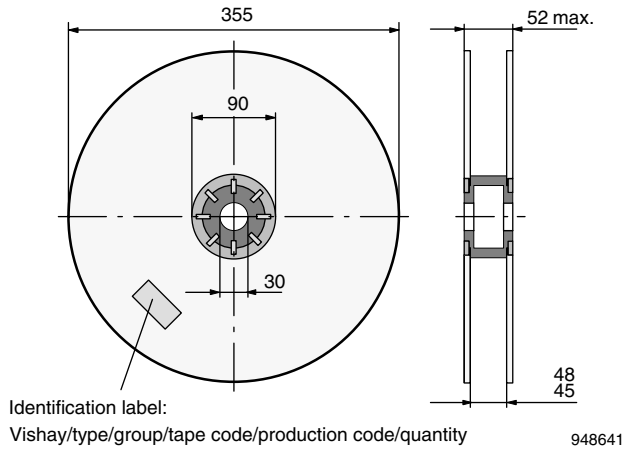


Fig. 19 - Reel Dimensions

## TAPE

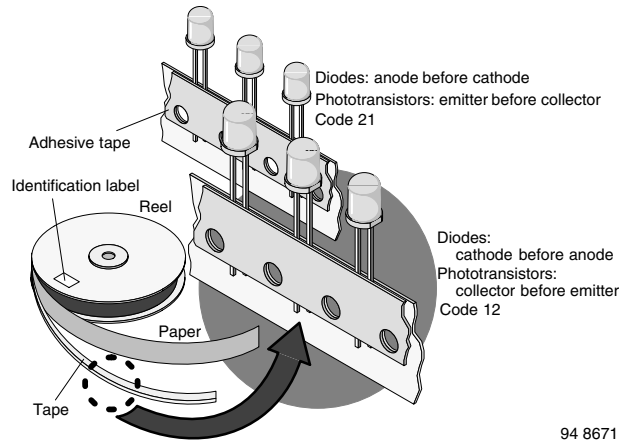


Fig. 20 - LED in Tape

AS12 = cathode leaves tape first  
AS21 = anode leaves tape first

## AMMOPACK

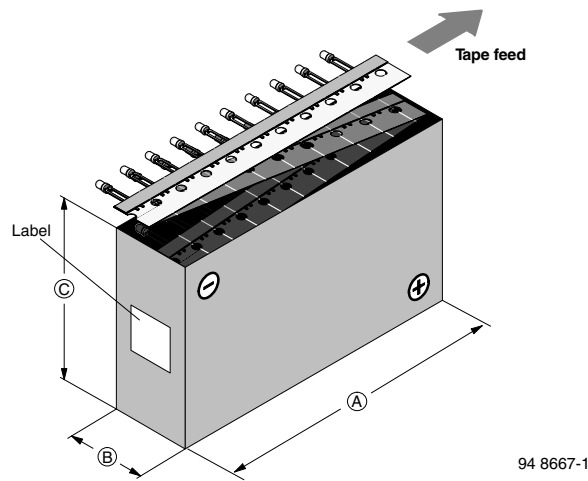


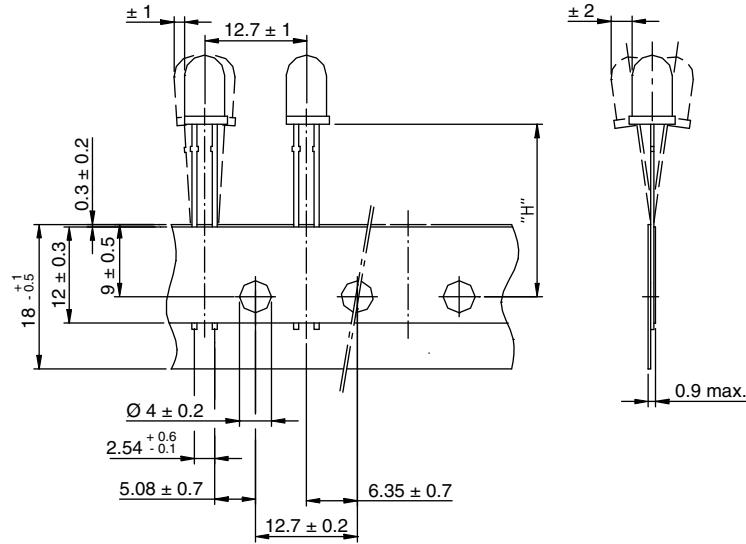
Fig. 21 - Tape Direction

### 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

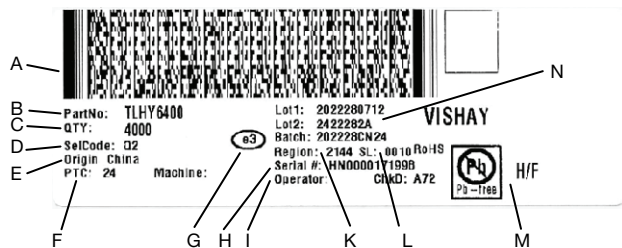
Quantity per:	Reel (Mat.-no. 1764)
	1000

94 8172

Option	Dim. "H" ± 0.5 mm
AS	17.3
CS	22.0
MS	25.5

PACKING INFORMATION			
PART	BULK	TAPE AND REEL	AMMOPACK
TLHx640x	4000	-	-
TLHx640x-xxxx	-	5 x 1000	-
TLHx640x-xxxxZ	-	-	5 x 1000

**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





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