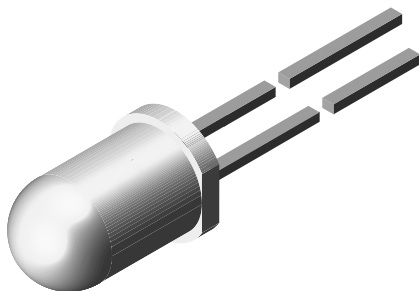


## High Efficiency LED in Ø 5 mm Tinted Diffused Package



### 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 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:  $\pm 30^\circ$

### FEATURES

- Choice of two bright colors
- Standard T-1 $\frac{1}{2}$  package
- Small mechanical tolerances
- Suitable for DC and high peak current
- Wide viewing angle
- Luminous intensity categorized
- Yellow 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)



**RoHS**  
COMPLIANT  
HALOGEN  
**FREE**  
**GREEN**  
(5-2008)

### 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 |

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

| 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  $I_{Vmin.}/I_{Vmax.} \leq 0.5$

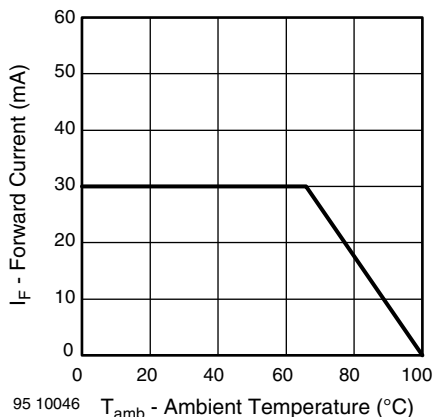
**TYPICAL CHARACTERISTICS** ( $T_{amb} = 25\text{ }^{\circ}\text{C}$ , unless otherwise specified)


Fig. 1 - Forward Current vs. Ambient Temperature

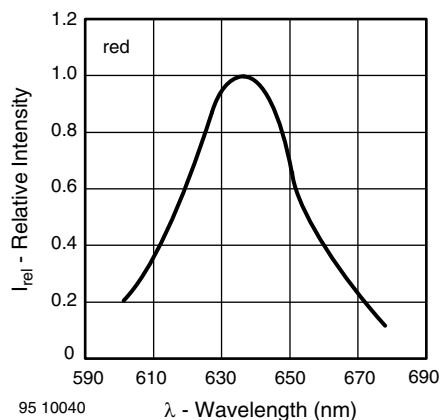


Fig. 4 - Relative Intensity vs. Wavelength

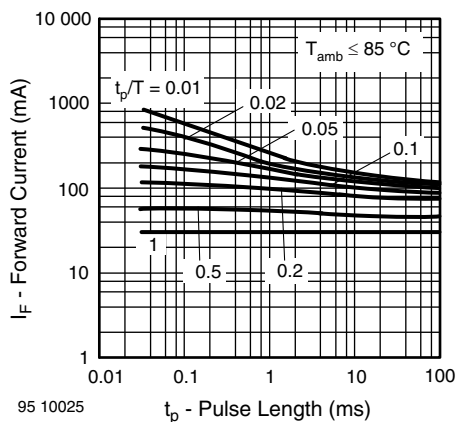


Fig. 2 - Forward Current vs. Pulse Length

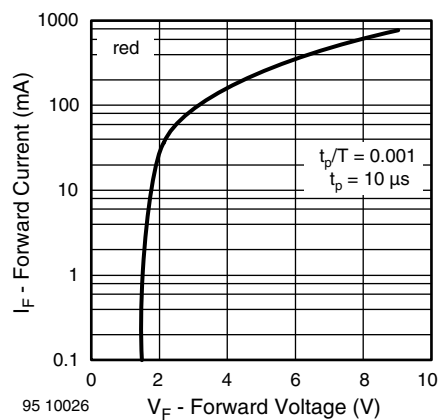


Fig. 5 - Forward Current vs. Forward Voltage

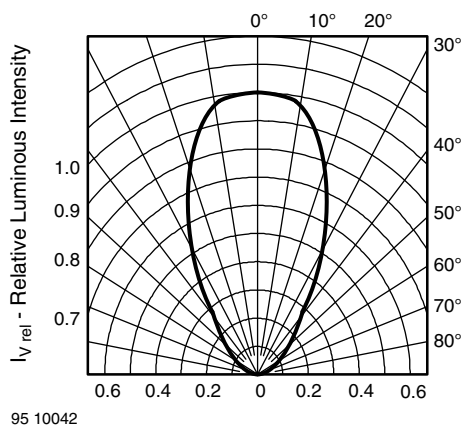


Fig. 3 - Relative Luminous Intensity vs. Angular Displacement

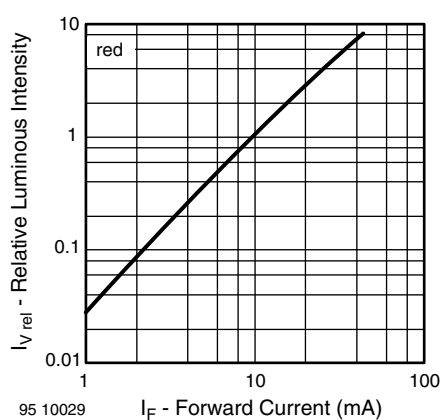


Fig. 6 - Relative Luminous Intensity vs. Forward Current

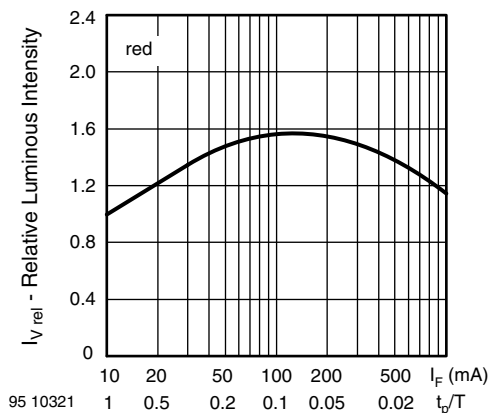


Fig. 7 - Relative Luminous Intensity vs. Forward Current / Duty Cycle

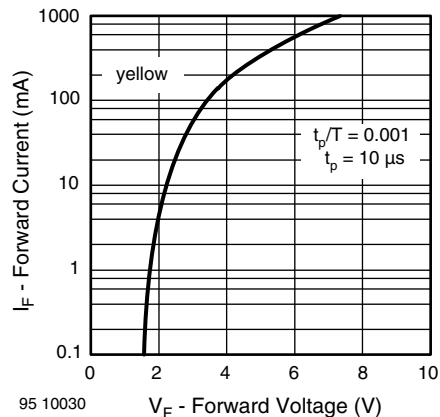


Fig. 10 - Forward Current vs. Forward Voltage

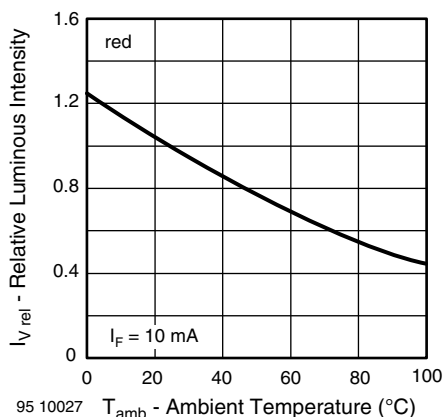


Fig. 8 - Relative Luminous Intensity vs. Ambient Temperature

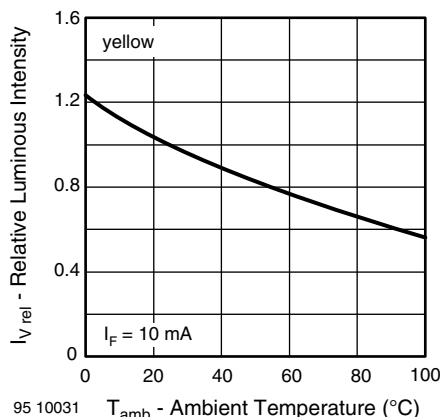


Fig. 11 - Relative Luminous Intensity vs. Ambient Temperature

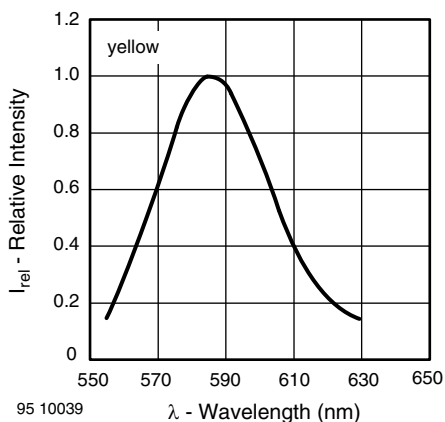


Fig. 9 - Relative Intensity vs. Wavelength

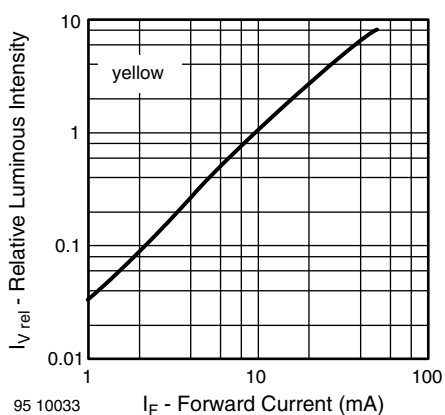


Fig. 12 - Relative Luminous Intensity vs. Forward Current

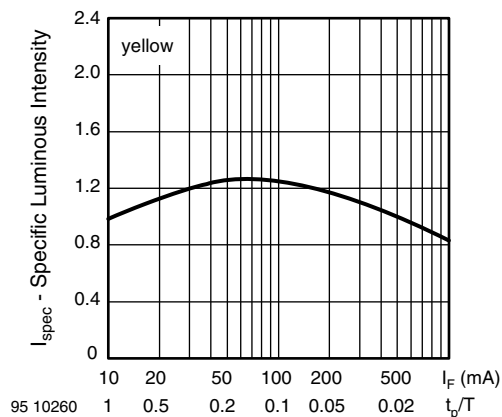
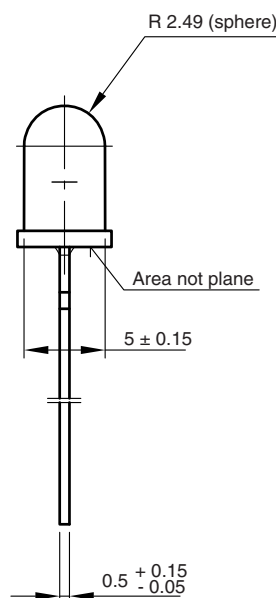
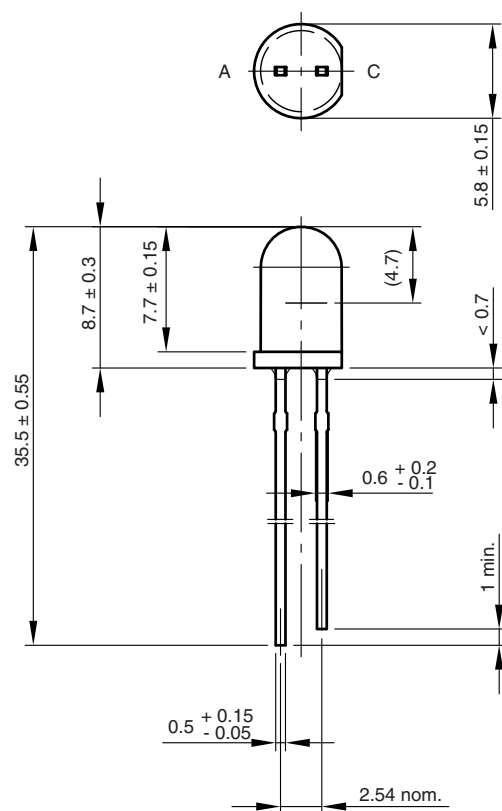


Fig. 13 - Relative Luminous Intensity vs. Forward Current / Duty Cycle

### PACKAGE DIMENSIONS in millimeters



technical drawings  
according to DIN  
specifications

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

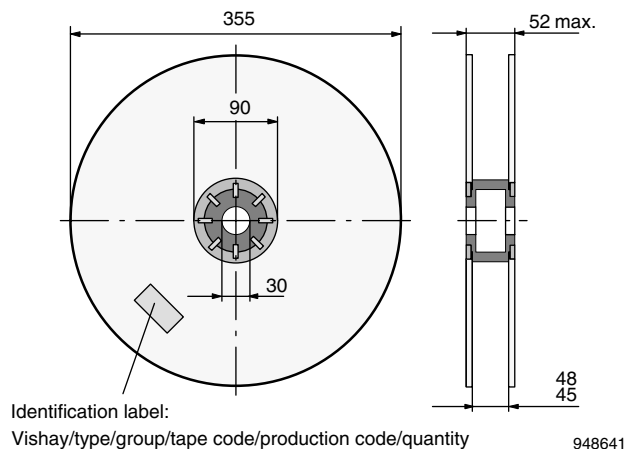
**REEL**


Fig. 14 - Reel Dimensions

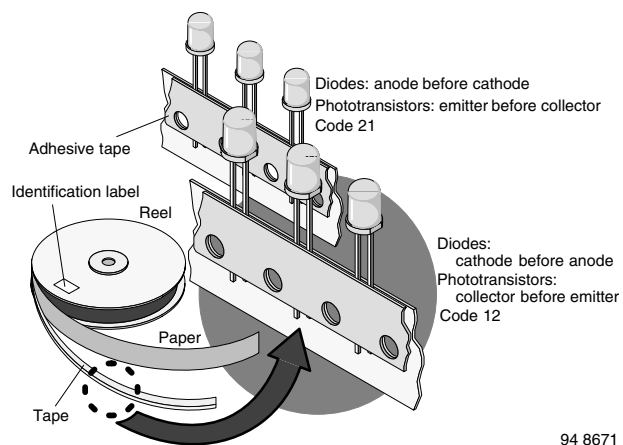
**TAPE**


Fig. 15 - LED in Tape

AS12 = cathode leaves tape first

AS21 = anode leaves tape first

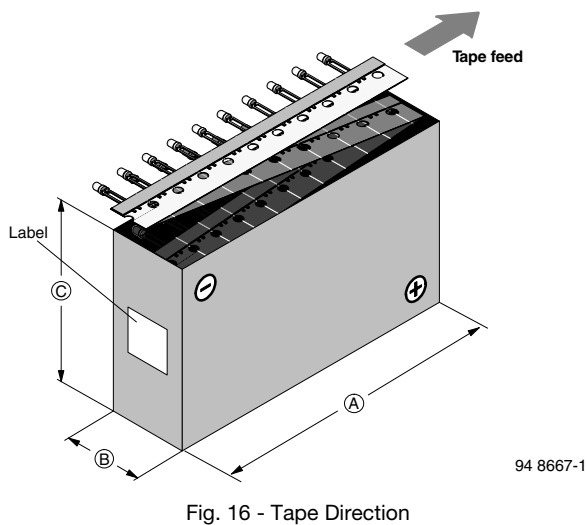
**AMMOPACK**


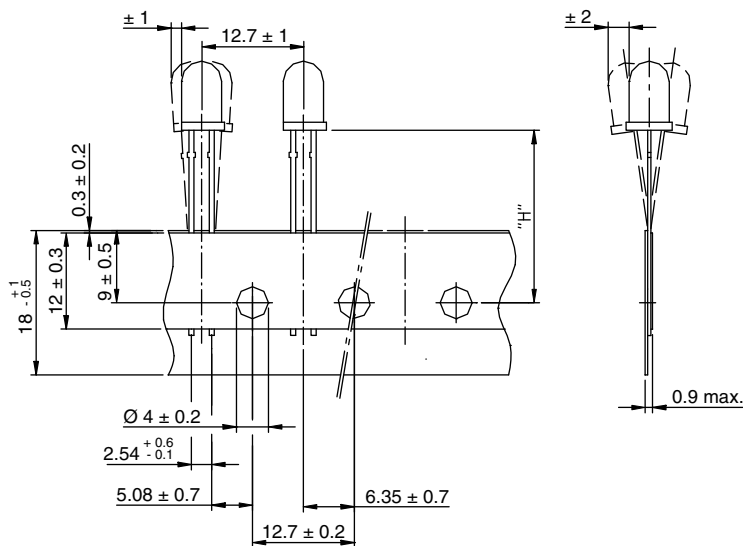
Fig. 16 - Tape Direction

**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<br>(Mat.-no. 1764) |
|               | 1000                    |

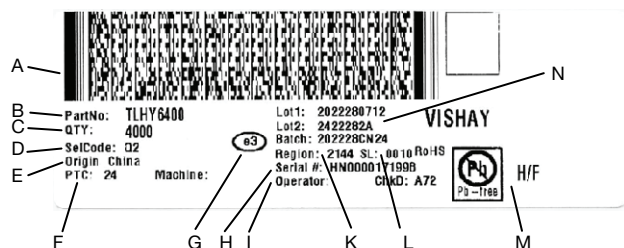
94 8172

| 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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