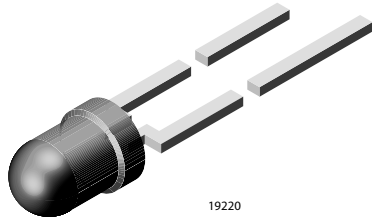


High Efficiency LED, Ø 3 mm Tinted Total Diffused Package



FEATURES

- Choice of three bright colors
- Standard Ø 3 (T-1) package
- Small mechanical tolerances
- Suitable for DC and high peak current
- Very wide viewing angle
- Luminous intensity categorized
- Yellow and green color categorized
- Compliant to RoHS Directive 2002/95/EC and in accordance to WEEE 2002/96/EC



DESCRIPTION

The TLH.46.. series was developed for applications which need a very wide radiation angle like backlighting, general indicating and lighting purposes. It is housed in a 3 mm tinted total 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.

APPLICATIONS

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

PRODUCT GROUP AND PACKAGE DATA

- Product group: LED
- Package: 3 mm
- Product series: standard
- Angle of half intensity: $\pm 60^\circ$

| PARTS TABLE | | |
|----------------|---------------------------|--------------|
| PART | COLOR, LUMINOUS INTENSITY | TECHNOLOGY |
| TLHR4600 | Red, $I_V > 1$ mcd | GaAsP on GaP |
| TLHR4605 | Red, $I_V > 2.5$ mcd | GaAsP on GaP |
| TLHR4605-MS12Z | Red, $I_V > 2.5$ mcd | GaAsP on GaP |
| TLHY4600 | Yellow, $I_V > 0.63$ mcd | GaAsP on GaP |
| TLHY4600-AS12 | Yellow, $I_V > 0.63$ mcd | GaAsP on GaP |
| TLHY4601 | Yellow, $I_V > 1$ mcd | GaAsP on GaP |
| TLHY4605 | Yellow, $I_V > 2.5$ mcd | GaAsP on GaP |
| TLHY4605-AS12Z | Yellow, $I_V > 2.5$ mcd | GaAsP on GaP |
| TLHY4605-CS12Z | Yellow, $I_V > 2.5$ mcd | GaAsP on GaP |
| TLHY4605-MS12Z | Yellow, $I_V > 2.5$ mcd | GaAsP on GaP |
| TLHG4600 | Green, $I_V > 1$ mcd | GaP on GaP |
| TLHG4601-AS21 | Green, $I_V > 1.6$ mcd | GaP on GaP |
| TLHG4605 | Green, $I_V > 4$ mcd | GaP on GaP |
| TLHG4605-AS12Z | Green, $I_V > 4$ mcd | GaP on GaP |
| TLHG4605-MS21Z | Green, $I_V > 4$ mcd | GaP on GaP |

** Please see document "Vishay Material Category Policy": www.vishay.com/doc?99902

ABSOLUTE MAXIMUM RATINGS ($T_{amb} = 25\text{ }^{\circ}\text{C}$, unless otherwise specified)
TLHR460., TLHY460., TLHG460.

| PARAMETER | TEST CONDITION | SYMBOL | VALUE | UNIT |
|-------------------------------------|---|------------|---------------|--------------------|
| Reverse voltage | | V_R | 6 | V |
| DC Forward current | $T_{amb} \leq 60\text{ }^{\circ}\text{C}$ | I_F | 30 | mA |
| Surge forward current | $t_p \leq 10\text{ }\mu\text{s}$ | I_{FSM} | 1 | A |
| Power dissipation | $T_{amb} \leq 60\text{ }^{\circ}\text{C}$ | P_V | 100 | mW |
| Junction temperature | | T_j | 100 | $^{\circ}\text{C}$ |
| Operating temperature range | | T_{amb} | - 20 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/ambient | | R_{thJA} | 400 | K/W |

OPTICAL AND ELECTRICAL CHARACTERISTICS ($T_{amb} = 25\text{ }^{\circ}\text{C}$, unless otherwise specified)
TLHR460., RED

| PARAMETER | TEST CONDITION | PART | SYMBOL | MIN. | TYP. | MAX. | UNIT |
|----------------------------------|--------------------------------|----------|-------------|------|----------|------|------|
| Luminous intensity ¹⁾ | $I_F = 10\text{ mA}$ | TLHR4600 | I_V | 1 | 4 | | mcd |
| | | TLHR4605 | I_V | 2.5 | 6 | | mcd |
| Dominant wavelength | $I_F = 10\text{ mA}$ | | λ_d | 612 | | 625 | nm |
| Peak wavelength | $I_F = 10\text{ mA}$ | | λ_p | | 635 | | nm |
| Angle of half intensity | $I_F = 10\text{ mA}$ | | φ | | ± 60 | | deg |
| 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 | $V_R = 0$, $f = 1\text{ MHz}$ | | C_j | | 50 | | pF |

Note:

¹⁾ 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)
TLHY460., YELLOW

| PARAMETER | TEST CONDITION | PART | SYMBOL | MIN. | TYP. | MAX. | UNIT |
|----------------------------------|--------------------------------|----------|-------------|------|----------|------|------|
| Luminous intensity ¹⁾ | $I_F = 10\text{ mA}$ | TLHY4600 | I_V | 0.63 | 3.5 | | mcd |
| | | TLHY4601 | I_V | 1 | 4 | | mcd |
| | | TLHY4605 | I_V | 2.5 | 5 | | mcd |
| Dominant wavelength | $I_F = 10\text{ mA}$ | | λ_d | 581 | | 594 | nm |
| Peak wavelength | $I_F = 10\text{ mA}$ | | λ_p | | 585 | | nm |
| Angle of half intensity | $I_F = 10\text{ mA}$ | | φ | | ± 60 | | deg |
| 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 | $V_R = 0$, $f = 1\text{ MHz}$ | | C_j | | 50 | | pF |

Note:

¹⁾ 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) | | | | | | | |
|---|-------------------------------|----------|-------------|------|----------|------|------|
| TLHG460., GREEN | | | | | | | |
| PARAMETER | TEST CONDITION | PART | SYMBOL | MIN. | TYP. | MAX. | UNIT |
| Luminous intensity ¹⁾ | $I_F = 10\text{ mA}$ | TLHG4600 | I_V | 1 | 4 | | mcd |
| | | TLHG4601 | I_V | 1.6 | 3.5 | | mcd |
| | | TLHG4605 | I_V | 4 | 6 | | mcd |
| Dominant wavelength | $I_F = 10\text{ mA}$ | | λ_d | 562 | | 575 | nm |
| Peak wavelength | $I_F = 10\text{ mA}$ | | λ_p | | 565 | | nm |
| Angle of half intensity | $I_F = 10\text{ mA}$ | | ϕ | | ± 60 | | deg |
| 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 | $V_R = 0, f = 1\text{ MHz}$ | | C_j | | 50 | | pF |

Note:

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

| LUMINOUS INTENSITY CLASSIFICATION | | | |
|-----------------------------------|-----------------------|------|------|
| GROUP | LIGHT INTENSITY (mcd) | | |
| | STANDARD | MIN. | MAX. |
| K | 0.63 | 1.25 | |
| L | 1 | 2 | |
| 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 | |

Note:

Luminous intensity is tested at a current pulse duration of 25 ms and an accuracy of $\pm 11\%$.

These 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 on 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.

| 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.

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

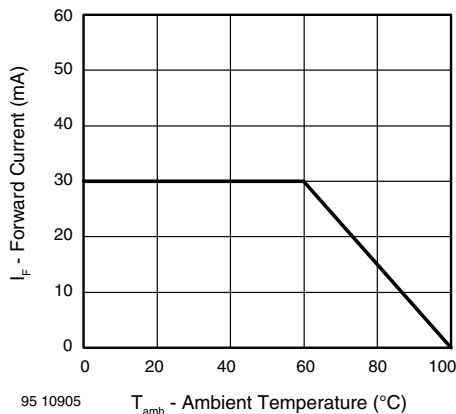


Figure 1. Forward Current vs. Ambient Temperature

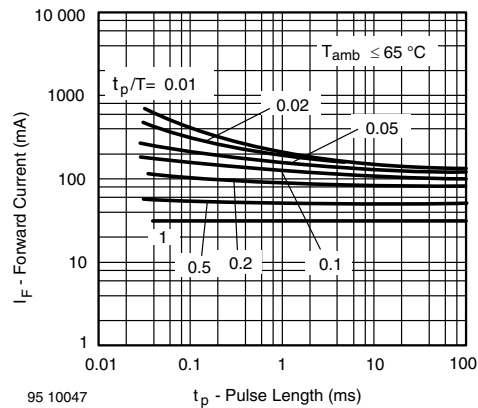


Figure 2. Forward Current vs. Pulse Length

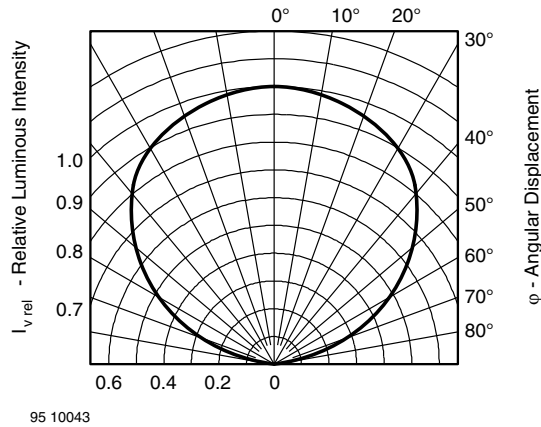


Figure 3. Rel. Luminous Intensity vs. Angular Displacement

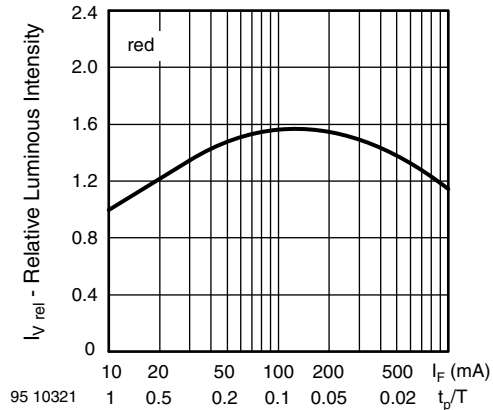


Figure 6. Rel. Lumin. Intensity vs. Forw. Current/Duty Cycle

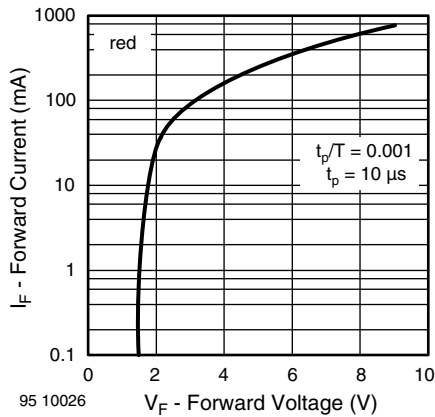


Figure 4. Forward Current vs. Forward Voltage

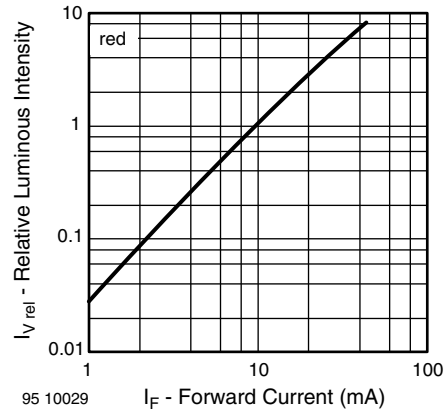


Figure 7. Relative Luminous Intensity vs. Forward Current

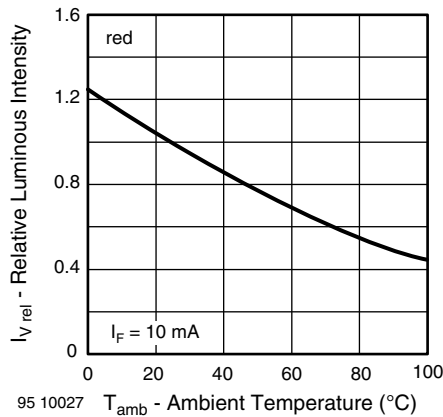


Figure 5. Rel. Luminous Intensity vs. Ambient Temperature

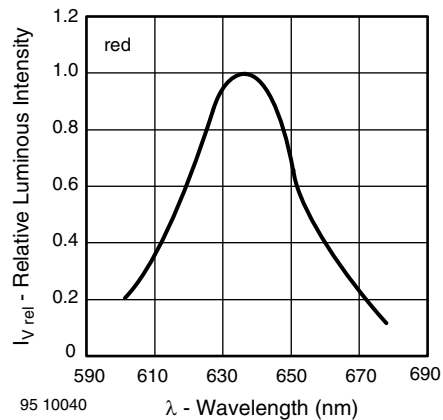


Figure 8. Relative Intensity vs. Wavelength

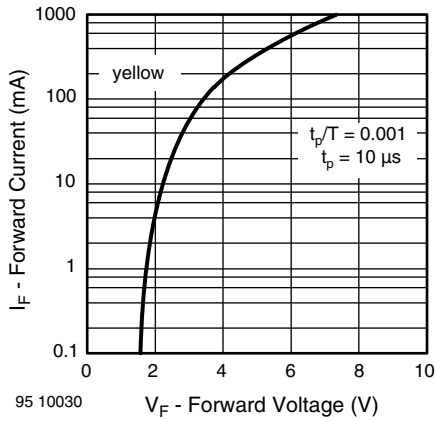


Figure 9. Forward Current vs. Forward Voltage

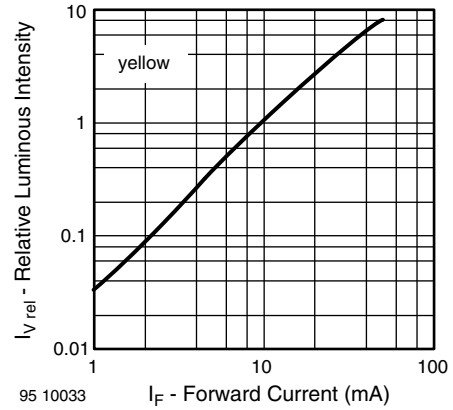


Figure 12. Relative Luminous Intensity vs. Forward Current

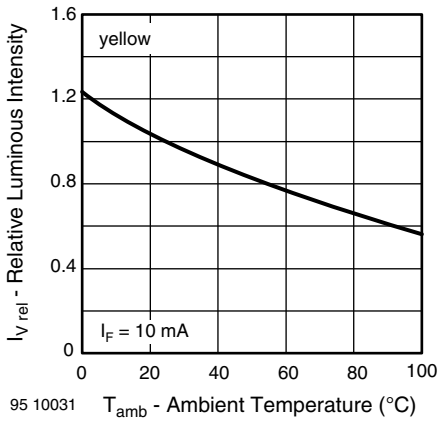


Figure 10. Rel. Luminous Intensity vs. Ambient Temperature

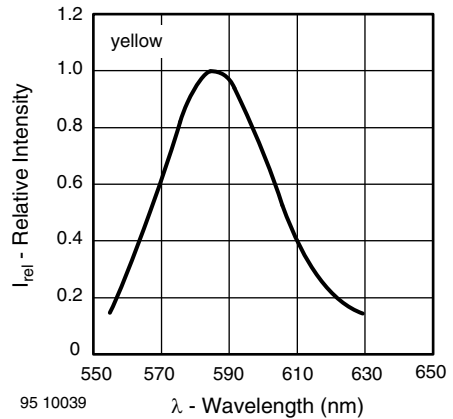


Figure 13. Relative Intensity vs. Wavelength

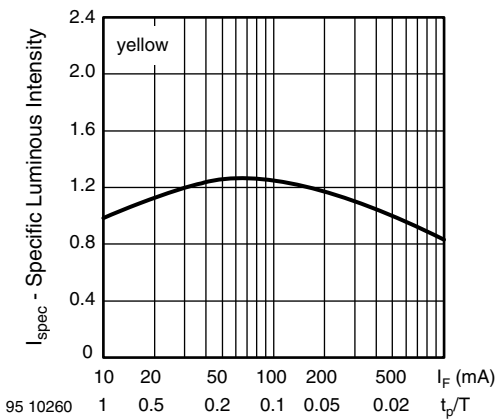


Figure 11. Rel. Lumin. Intensity vs. Forw. Current/Duty Cycle

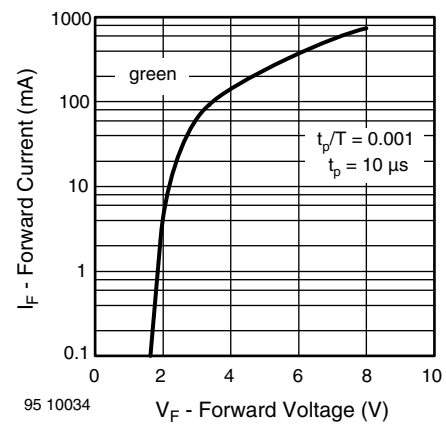


Figure 14. Forward Current vs. Forward Voltage

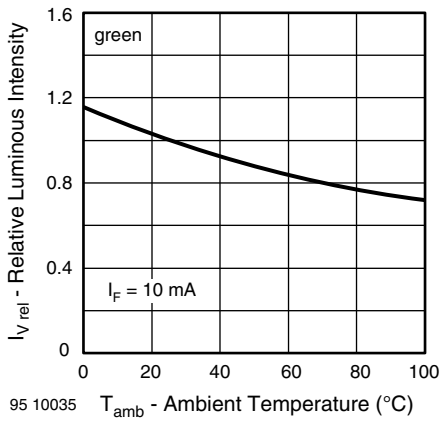


Figure 15. Rel. Luminous Intensity vs. Ambient Temperature

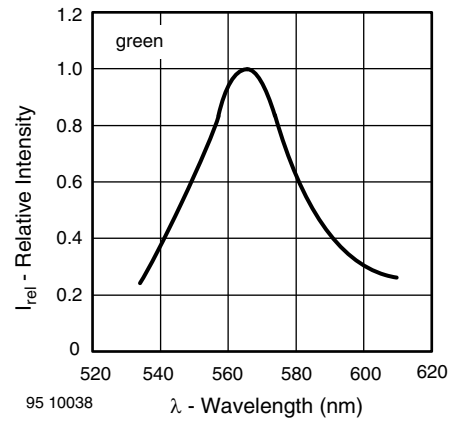


Figure 18. Relative Intensity vs. Wavelength

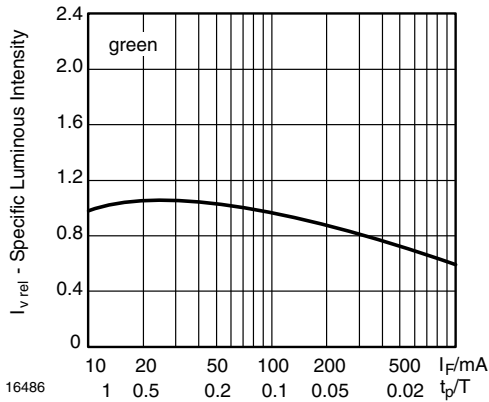


Figure 16. Rel. Lumin. Intensity vs. Forw. Current/Duty Cycle

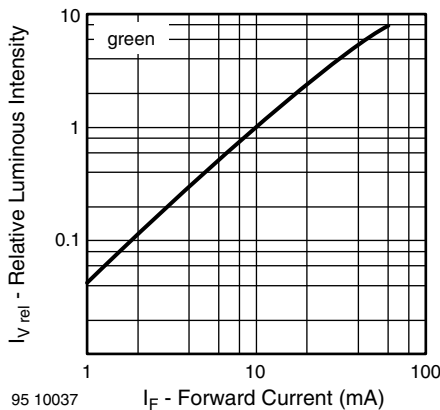
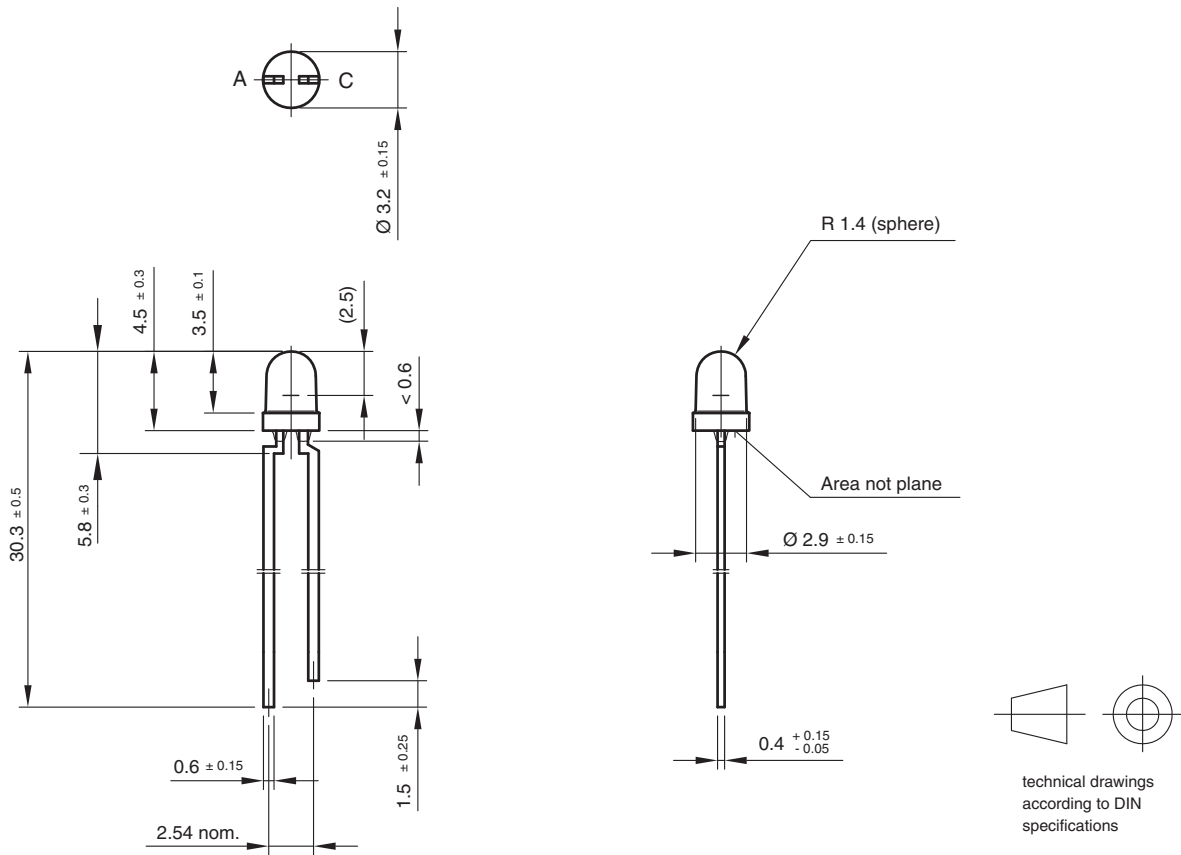


Figure 17. Relative Luminous Intensity vs. Forward Current

PACKAGE DIMENSIONS in millimeters



Drawing-No.: 6.544-5255.01-4
Issue: 7; 25.09.08
95 10913

TAPE

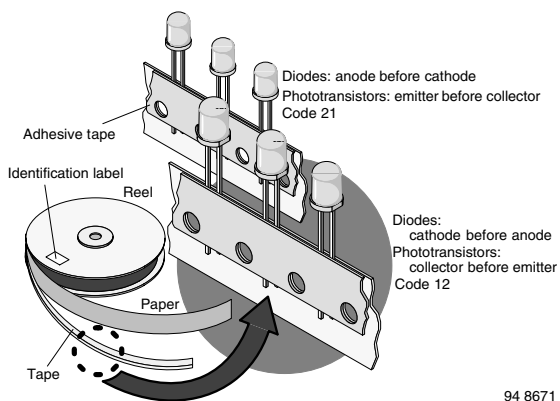


Figure 19. LED in Tape

94 8671

AMMOPACK

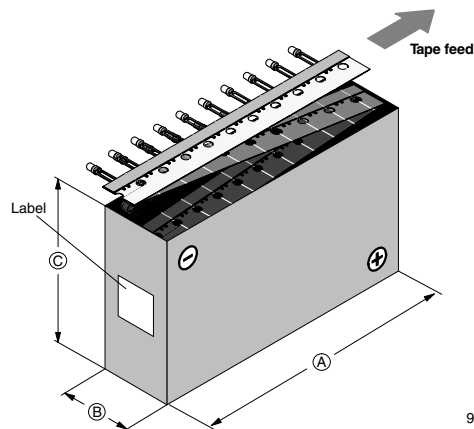
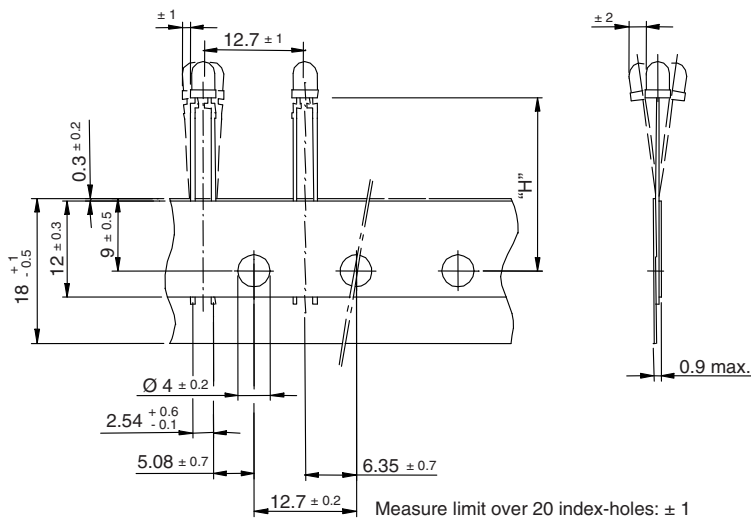


Figure 20. Tape Direction

94 8667-1

Note:
AS12Z and AS21Z still valid for already existing types BUT NOT FOR NEW DESIGN

TAPE DIMENSIONS in millimeters



| | |
|---------------|---------------------------|
| Quantity per: | Reel (Mat. - No. 1764) |
| | 2000 |

94 8171

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



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<http://moschip.ru/get-element>

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Система менеджмента качества компании отвечает требованиям в соответствии с ГОСТ Р ИСО 9001, ГОСТ РВ 0015-002 и ЭС РД 009

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