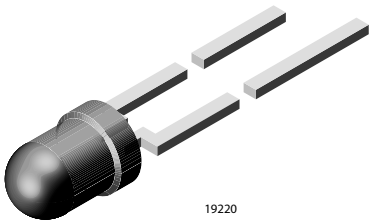
# High Efficiency LED in Ø 3 mm Tinted Diffused Package




## FEATURES

- Standard Ø 3 mm (T-1) package
- Small mechanical tolerances
- Suitable for DC and high peak current
- Wide viewing angle
- Luminous intensity categorized
- Yellow and green color categorized
- Material categorization:
  For definitions of compliance please see www.vishay.com/doc?99912

Pb-free
e8
RoHS COMPLIANT
GREEN (5-2008)

## DESCRIPTION

The TLH.44.. series was developed for standard applications like general indicating and lighting purposes.

It is housed in a 3 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.

## 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: ± 30°

## PARTS TABLE

| PART | COLOR | LUMINOUS INTENSITY (mcd) | | | at $I_F$ (mA) | WAVELENGTH (nm) | | | FORWARD VOLTAGE (V) | | | at $I_F$ (mA) | TECHNOLOGY |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | MIN. | TYP. | MAX. | | MIN. | TYP. | MAX. | MIN. | TYP. | MAX. | | |
| TLHP4401 | Pure green | 1 | 4 | - | 10 | 555 | - | 565 | - | 2.4 | 3 | 20 | GaP on GaP |
| TLHP4401-AS12Z | Pure green | 1 | 4 | - | 10 | 555 | - | 565 | - | 2.4 | 3 | 20 | GaP on GaP |
| TLHG4400 | Green | 2.5 | 13 | - | 10 | 562 | - | 575 | - | 2.4 | 3 | 20 | GaP on GaP |
| TLHG4400-MS12 | Green | 2.5 | 13 | - | 10 | 562 | - | 575 | - | 2.4 | 3 | 20 | GaP on GaP |
| TLHG4401 | Green | 4 | 14 | - | 10 | 562 | - | 575 | - | 2.4 | 3 | 20 | GaP on GaP |
| TLHG4405 | Green | 6.3 | 15 | | 10 | 562 | - | 575 | - | 2.4 | 3 | 20 | GaP on GaP |
| TLHY4400 | Yellow | 1.6 | 10 | - | 10 | 581 | - | 594 | - | 2.4 | 3 | 20 | GaAsP on GaP |
| TLHY4400-AS12Z | Yellow | 1.6 | 10 | - | 10 | 581 | - | 594 | - | 2.4 | 3 | 20 | GaAsP on GaP |
| TLHY4400-AS21 | Yellow | 1.6 | 10 | - | 10 | 581 | - | 594 | - | 2.4 | 3 | 20 | GaAsP on GaP |
| TLHY4400-AS21Z | Yellow | 1.6 | 10 | - | 10 | 581 | - | 594 | - | 2.4 | 3 | 20 | GaAsP on GaP |
| TLHY4400-BT12 | Yellow | 1.6 | 10 | - | 10 | 581 | - | 594 | - | 2.4 | 3 | 20 | GaAsP on GaP |
| TLHY4400-CS12 | Yellow | 1.6 | 10 | - | 10 | 581 | - | 594 | - | 2.4 | 3 | 20 | GaAsP on GaP |
| TLHY4400-MS12 | Yellow | 1.6 | 10 | - | 10 | 581 | - | 594 | - | 2.4 | 3 | 20 | GaAsP on GaP |
| TLHY4401 | Yellow | 2.5 | 10.5 | - | 10 | 581 | - | 594 | - | 2.4 | 3 | 20 | GaAsP on GaP |
| TLHY4401-AS12 | Yellow | 2.5 | 10.5 | - | 10 | 581 | - | 594 | - | 2.4 | 3 | 20 | GaAsP on GaP |
| TLHY4401-AS12Z | Yellow | 2.5 | 10.5 | - | 10 | 581 | - | 594 | - | 2.4 | 3 | 20 | GaAsP on GaP |
| TLHY4401-AS21 | Yellow | 2.5 | 10.5 | - | 10 | 581 | - | 594 | - | 2.4 | 3 | 20 | GaAsP on GaP |
| TLHY4405 | Yellow | 6.3 | 11 | - | 10 | 581 | - | 594 | - | 2.4 | 3 | 20 | GaAsP on GaP |
| TLHY4405-AS12 | Yellow | 6.3 | 11 | - | 10 | 581 | - | 594 | - | 2.4 | 3 | 20 | GaAsP on GaP |
| TLHY4405-AS12Z | Yellow | 6.3 | 11 | - | 10 | 581 | - | 594 | - | 2.4 | 3 | 20 | GaAsP on GaP |

## PARTS TABLE

| PART | COLOR | LUMINOUS INTENSITY (mcd) | | | at $I_F$ (mA) | WAVELENGTH (nm) | | | FORWARD VOLTAGE (V) | | | at $I_F$ (mA) | TECHNOLOGY |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | MIN. | TYP. | MAX. | | MIN. | TYP. | MAX. | MIN. | TYP. | MAX. | | |
| TLHY4405-BT12Z | Yellow | 6.3 | 11 | - | 10 | 581 | - | 594 | - | 2.4 | 3 | 20 | GaAsP on GaP |
| TLHY4405-MS12 | Yellow | 6.3 | 11 | - | 10 | 581 | - | 594 | - | 2.4 | 3 | 20 | GaAsP on GaP |
| TLHY4438 | Yellow | 6.3 | 11 | 20 | 10 | 583 | - | 586 | - | 2.4 | 3 | 20 | GaAsP on GaP |
| TLHY4442-MS12 | Yellow | 6.3 | 11 | 20 | 10 | 585 | - | 590 | - | 2.4 | 3 | 20 | GaAsP on GaP |
| TLHO4400 | Soft orange | 1.6 | 13 | - | 10 | 598 | - | 611 | - | 2.4 | 3 | 20 | GaAsP on GaP |
| TLHO4400-AS12Z | Soft orange | 1.6 | 13 | - | 10 | 598 | - | 611 | - | 2.4 | 3 | 20 | GaAsP on GaP |
| TLHO4400-MS12Z | Soft orange | 1.6 | 13 | - | 10 | 598 | - | 611 | - | 2.4 | 3 | 20 | GaAsP on GaP |
| TLHR4400 | Red | 1.6 | 13 | - | 10 | 612 | - | 625 | - | 2 | 3 | 20 | GaAsP on GaP |
| TLHR4400-AS12 | Red | 1.6 | 13 | - | 10 | 612 | - | 625 | - | 2 | 3 | 20 | GaAsP on GaP |
| TLHR4400-AS21 | Red | 1.6 | 13 | - | 10 | 612 | - | 625 | - | 2 | 3 | 20 | GaAsP on GaP |
| TLHR4400-AS12Z | Red | 1.6 | 13 | - | 10 | 612 | - | 625 | - | 2 | 3 | 20 | GaAsP on GaP |
| TLHR4400-AS21Z | Red | 1.6 | 13 | - | 10 | 612 | - | 625 | - | 2 | 3 | 20 | GaAsP on GaP |
| TLHR4400-MS12Z | Red | 1.6 | 13 | - | 10 | 612 | - | 625 | - | 2 | 3 | 20 | GaAsP on GaP |
| TLHR4401 | Red | 2.5 | 14 | - | 10 | 612 | - | 625 | - | 2 | 3 | 20 | GaAsP on GaP |
| TLHR4401-AS12Z | Red | 2.5 | 14 | - | 10 | 612 | - | 625 | - | 2 | 3 | 20 | GaAsP on GaP |
| TLHR4401-LS12Z | Red | 2.5 | 14 | - | 10 | 612 | - | 625 | - | 2 | 3 | 20 | GaAsP on GaP |
| TLHR4405 | Red | 6.3 | 15 | - | 10 | 612 | - | 625 | - | 2 | 3 | 20 | GaAsP on GaP |
| TLHR4405-AS12 | Red | 6.3 | 15 | - | 10 | 612 | - | 625 | - | 2 | 3 | 20 | GaAsP on GaP |
| TLHR4405-AS21 | Red | 6.3 | 15 | - | 10 | 612 | - | 625 | - | 2 | 3 | 20 | GaAsP on GaP |
| TLHR4407 | Red | 4 | - | 12.5 | 10 | 612 | - | 625 | - | 2 | 3 | 20 | GaAsP on GaP |
| TLHR4407-MS12Z | Red | 4 | - | 12.5 | 10 | 612 | - | 625 | - | 2 | 3 | 20 | GaAsP on GaP |

## ABSOLUTE MAXIMUM RATINGS ($T_{amb}$ = 25 °C, unless otherwise specified)
## TLHG440., TLHO440., TLHP440., TLHR440., TLHY440.

| PARAMETER | TEST CONDITION | SYMBOL | VALUE | UNIT |
|---|---|---|---|---|
| Reverse voltage | | $V_R$ | 6 | V |
| DC forward current | | $I_F$ | 30 | mA |
| Surge forward current | $t_p \leq 10$ µs | $I_{FSM}$ | 1 | A |
| Power dissipation | $T_{amb} \leq 60$ °C | $P_V$ | 100 | mW |
| Junction temperature | | $T_j$ | 100 | °C |
| Operating temperature range | | $T_{amb}$ | - 40 to + 100 | °C |
| Storage temperature range | | $T_{stg}$ | - 55 to + 100 | °C |
| Soldering temperature | t ≤ 5 s, 2 mm from body | $T_{sd}$ | 260 | °C |
| Thermal resistance junction/ambient | | $R_{thJA}$ | 400 | K/W |

## OPTICAL AND ELECTRICAL CHARACTERISTICS ($T_{amb}$ = 25 °C, unless otherwise specified)
## TLHR440., RED

| PARAMETER | TEST CONDITION | PART | SYMBOL | MIN. | TYP. | MAX. | UNIT |
|---|---|---|---|---|---|---|---|
| Luminous intensity (1) | $I_F$ = 10 mA | TLHR4400 | $I_V$ | 1.6 | 13 | - | mcd |
| | | TLHR4401 | $I_V$ | 2.5 | 14 | - | mcd |
| | | TLHR4405 | $I_V$ | 6.3 | 15 | - | mcd |
| | | TLHR4407 | $I_V$ | 4 | - | 12.5 | mcd |
| Dominant wavelength | $I_F$ = 10 mA | | $\lambda_d$ | 612 | - | 625 | nm |
| Peak wavelength | $I_F$ = 10 mA | | $\lambda_p$ | - | 635 | - | nm |
| Angle of half intensity | $I_F$ = 10 mA | | φ | - | ± 30 | - | deg |
| Forward voltage | $I_F$ = 20 mA | | $V_F$ | - | 2 | 3 | V |
| Reverse voltage | $I_R$ = 10 µA | | $V_R$ | 6 | 15 | - | V |
| Junction capacitance | $V_R$ = 0 V, f = 1 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 °C, unless otherwise specified)
**TLHO440., SOFT ORANGE**

| PARAMETER | TEST CONDITION | PART | SYMBOL | MIN. | TYP. | MAX. | UNIT |
|---|---|---|---|---|---|---|---|
| Luminous intensity (1) | $I_F$ = 10 mA | TLHO4400 | $I_V$ | 1.6 | 13 | - | mcd |
| Dominant wavelength | $I_F$ = 10 mA | | $\lambda_d$ | 598 | - | 611 | nm |
| Peak wavelength | $I_F$ = 10 mA | | $\lambda_p$ | - | 605 | - | nm |
| Angle of half intensity | $I_F$ = 10 mA | | φ | - | ± 30 | - | deg |
| Forward voltage | $I_F$ = 20 mA | | $V_F$ | - | 2.4 | 3 | V |
| Reverse voltage | $I_R$ = 10 µA | | $V_R$ | 6 | 15 | - | V |
| Junction capacitance | $V_R$ = 0 V, f = 1 MHz | | $C_j$ | - | 15 | - | pF |

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

**OPTICAL AND ELECTRICAL CHARACTERISTICS** ($T_{amb}$ = 25 °C, unless otherwise specified)
**TLHY440., YELLOW**

| PARAMETER | TEST CONDITION | PART | SYMBOL | MIN. | TYP. | MAX. | UNIT |
|---|---|---|---|---|---|---|---|
| Luminous intensity (1) | $I_F$ = 10 mA | TLHY4400 | $I_V$ | 1.6 | 10 | - | mcd |
| | | TLHY4401 | $I_V$ | 2.5 | 10.5 | - | mcd |
| | | TLHY4405 | $I_V$ | 6.3 | 11 | - | mcd |
| | | TLHY4438 | $I_V$ | 6.3 | - | 20 | mcd |
| | | TLHY4442 | $I_V$ | 6.3 | - | 20 | mcd |
| Dominant wavelength | $I_F$ = 10 mA | TLHY4400 | $\lambda_d$ | 581 | - | 594 | nm |
| | | TLHY4401 | $\lambda_d$ | 581 | - | 594 | nm |
| | | TLHY4405 | $\lambda_d$ | 581 | - | 594 | nm |
| | | TLHY4438 | $\lambda_d$ | 583 | - | 590 | nm |
| | | TLHY4442 | $\lambda_d$ | 585 | - | 592 | nm |
| Peak wavelength | $I_F$ = 10 mA | | $\lambda_p$ | - | 585 | - | nm |
| Angle of half intensity | $I_F$ = 10 mA | | φ | - | ± 30 | - | deg |
| Forward voltage | $I_F$ = 20 mA | | $V_F$ | - | 2.4 | 3 | V |
| Reverse voltage | $I_R$ = 10 µA | | $V_R$ | 6 | 15 | - | V |
| Junction capacitance | $V_R$ = 0 V, f = 1 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 °C, unless otherwise specified)
**TLHG440., GREEN**

| PARAMETER | TEST CONDITION | PART | SYMBOL | MIN. | TYP. | MAX. | UNIT |
|---|---|---|---|---|---|---|---|
| Luminous intensity (1) | $I_F$ = 10 mA | TLHG4400 | $I_V$ | 2.5 | 13 | - | mcd |
| | | TLHG4401 | $I_V$ | 4 | 14 | - | mcd |
| | | TLHG4405 | $I_V$ | 6.3 | 15 | - | mcd |
| Dominant wavelength | $I_F$ = 10 mA | | $\lambda_d$ | 562 | - | 575 | nm |
| Peak wavelength | $I_F$ = 10 mA | | $\lambda_p$ | - | 565 | - | nm |
| Angle of half intensity | $I_F$ = 10 mA | | φ | - | ± 30 | - | deg |
| Forward voltage | $I_F$ = 20 mA | | $V_F$ | - | 2.4 | 3 | V |
| Reverse voltage | $I_R$ = 10 µA | | $V_R$ | 6 | 15 | - | V |
| Junction capacitance | $V_R$ = 0 V, f = 1 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 °C, unless otherwise specified)
## TLHP440., PURE GREEN

| PARAMETER | TEST CONDITION | PART | SYMBOL | MIN. | TYP. | MAX. | UNIT |
|---|---|---|---|---|---|---|---|
| Luminous intensity (1) | $I_F$ = 10 mA | TLHP4401 | $I_V$ | 1 | 4 | - | mcd |
| Dominant wavelength | $I_F$ = 10 mA | | $\lambda_d$ | 555 | - | 565 | nm |
| Peak wavelength | $I_F$ = 10 mA | | $\lambda_p$ | - | 555 | - | nm |
| Angle of half intensity | $I_F$ = 10 mA | | $\varphi$ | - | ± 30 | - | deg |
| Forward voltage | $I_F$ = 20 mA | | $V_F$ | - | 2.4 | 3 | V |
| Reverse voltage | $I_R$ = 10 µA | | $V_R$ | 6 | 15 | - | V |
| Junction capacitance | $V_R$ = 0 V, f = 1 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. |
| 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. 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 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 | | PURE GREEN | |
| | MIN. | MAX. | MIN. | MAX. | MIN. | MAX. |
| 0 | - | - | - | - | 555 | 559 |
| 1 | 581 | 584 | - | - | 558 | 561 |
| 2 | 583 | 586 | - | - | 560 | 563 |
| 3 | 585 | 588 | 562 | 565 | 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 °C, unless otherwise specified)

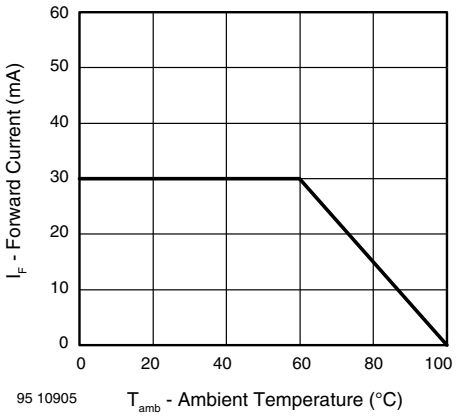



Fig. 1 - Forward Current vs. Ambient Temperature for InGaN

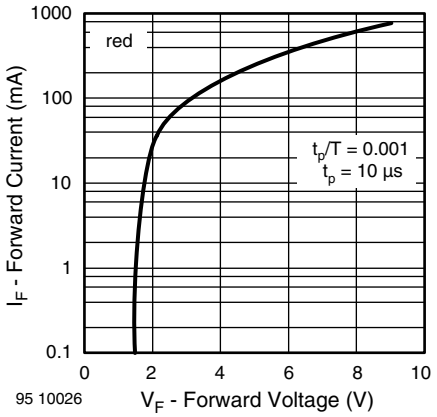



Fig. 4 - Forward Current vs. Forward Voltage

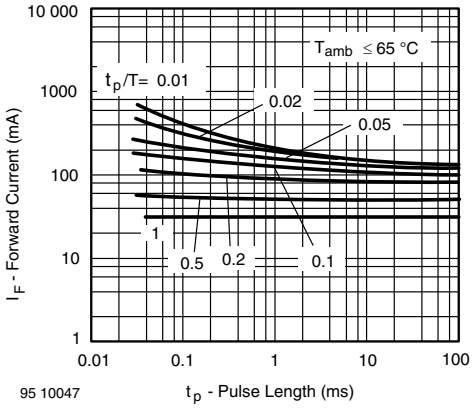



Fig. 2 - Forward Current vs. Pulse Length

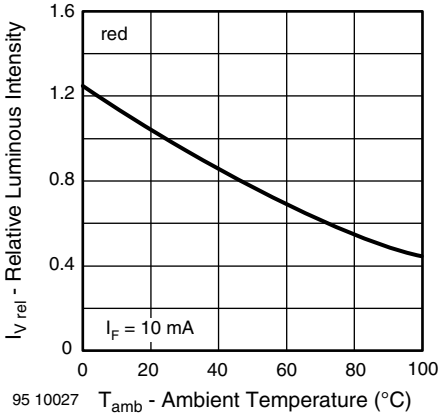



Fig. 5 - Relative Luminous Intensity vs. Ambient Temperature

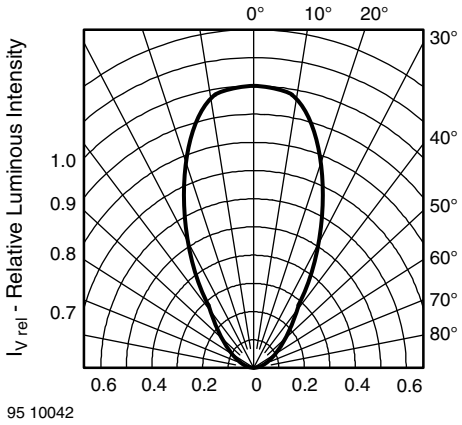



Fig. 3 - Relative Luminous Intensity vs. Angular Displacement

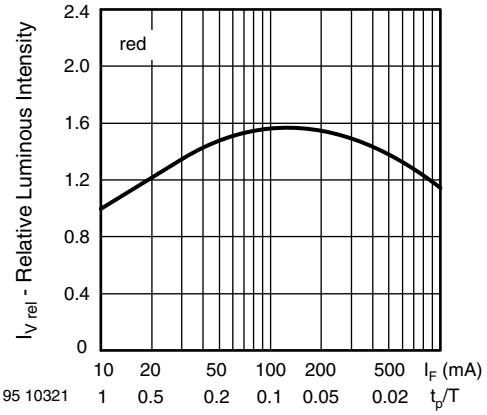



Fig. 6 - Relative Luminous Intensity vs. Forward Current/Duty Cycle

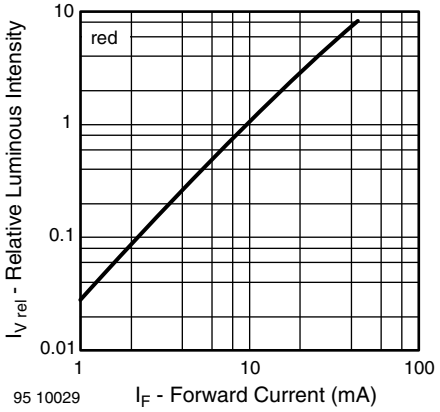



Fig. 7 - Relative Luminous Intensity vs. Forward Current

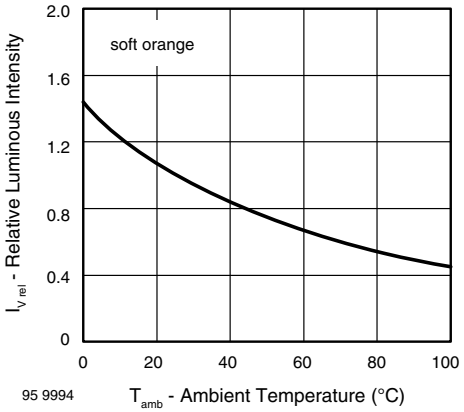



Fig. 10 - Relative Luminous Intensity vs. Ambient Temperature

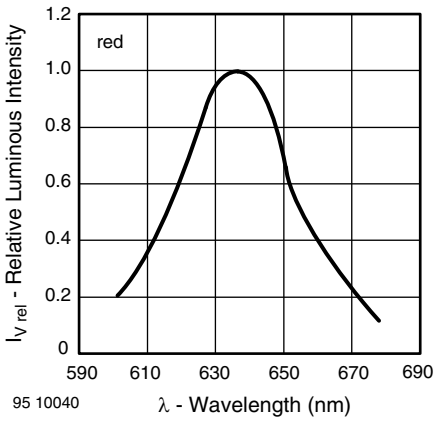



Fig. 8 - Relative Intensity vs. Wavelength

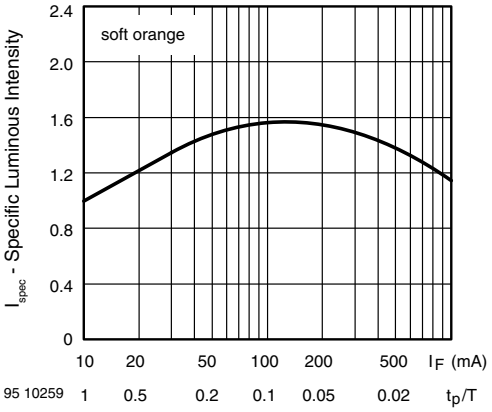



Fig. 11 - Relative Luminous Intensity vs. Forward Current/Duty Cycle

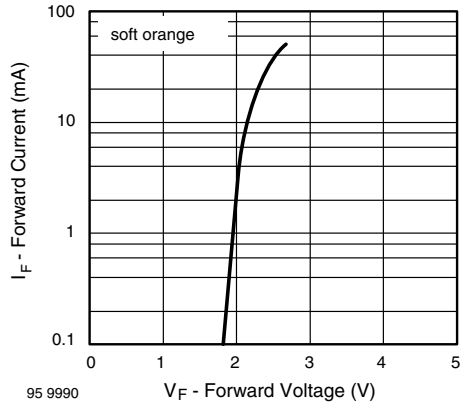



Fig. 9 - Forward Current vs. Forward Voltage

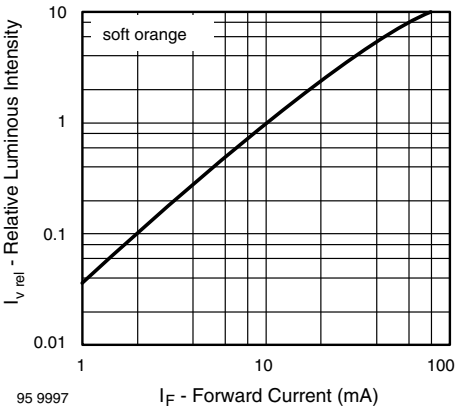



Fig. 12 - Relative Luminous Intensity vs. Forward Current

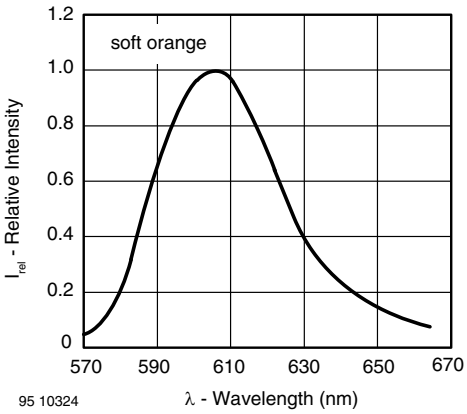



Fig. 13 - Relative Intensity vs. Wavelength

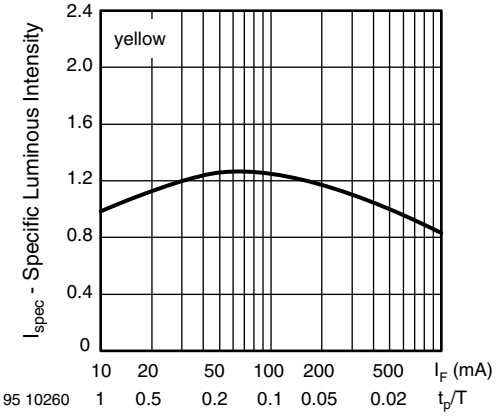



Fig. 16 - Relative Luminous Intensity vs. Forward Current/Duty Cycle

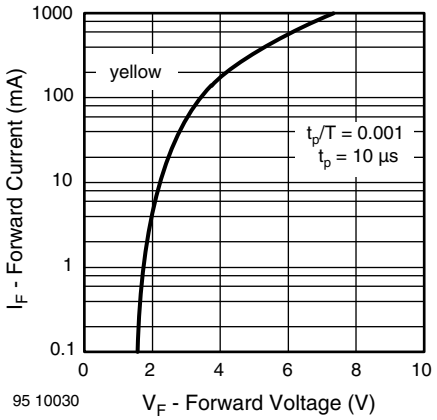



Fig. 14 - Forward Current vs. Forward Voltage

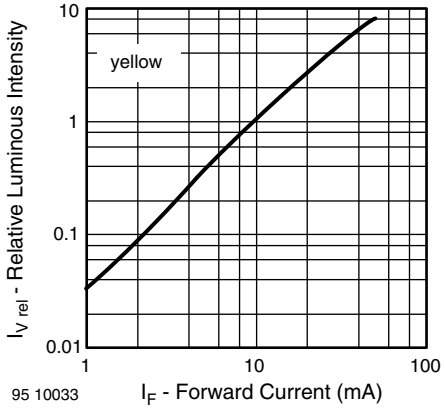



Fig. 17 - Relative Luminous Intensity vs. Forward Current

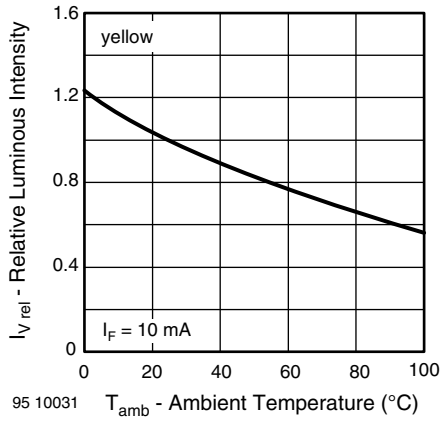



Fig. 15 - Relative Luminous Intensity vs. Ambient Temperature

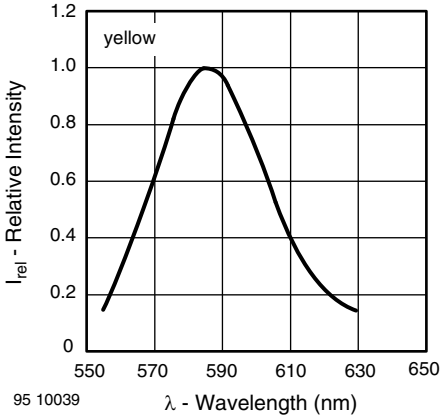



Fig. 18 - Relative Intensity vs. Wavelength

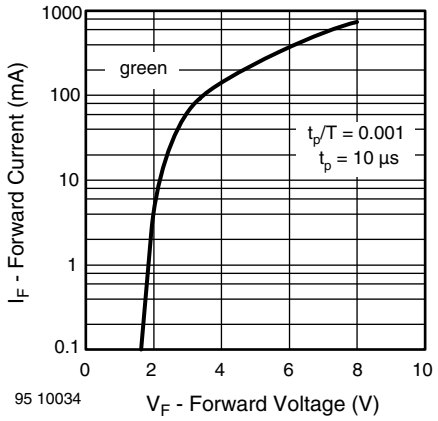



Fig. 19 - Forward Current vs. Forward Voltage

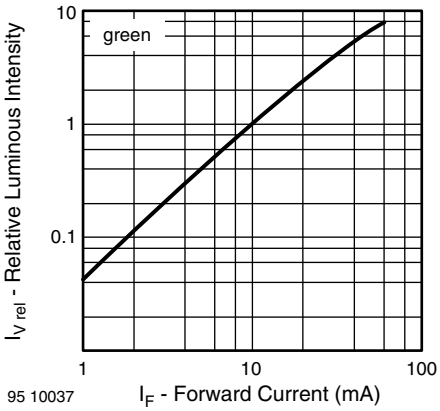



Fig. 22 - Relative Luminous Intensity vs. Forward Current

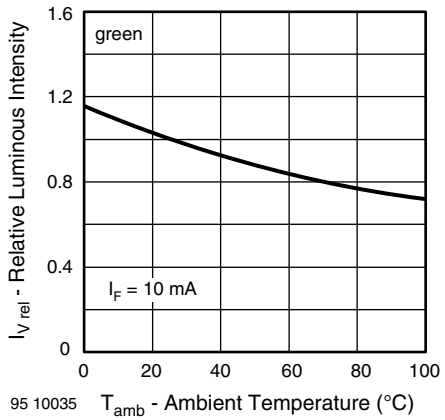



Fig. 20 - Relative Luminous Intensity vs. Ambient Temperature

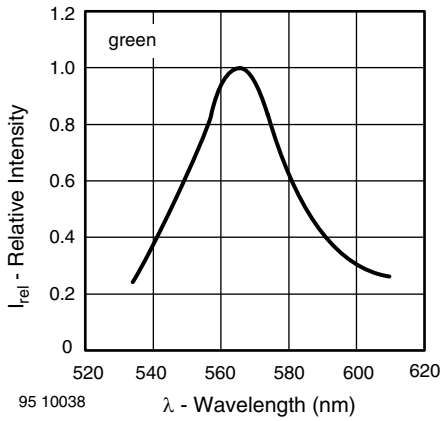



Fig. 23 - Relative Intensity vs. Wavelength

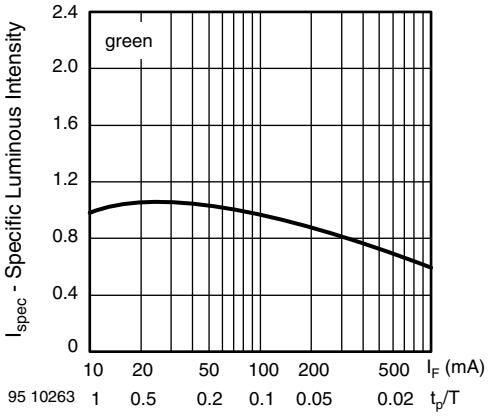



Fig. 21 - Specific Luminous Intensity vs. Forward Current

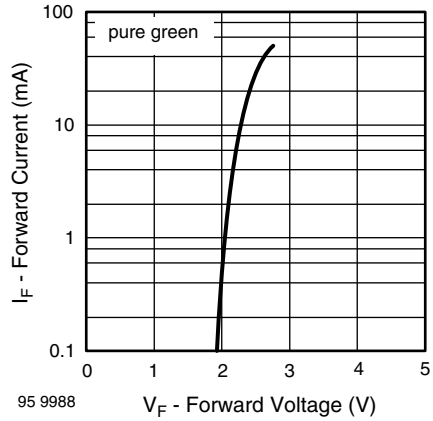



Fig. 24 - Forward Current vs. Forward Voltage

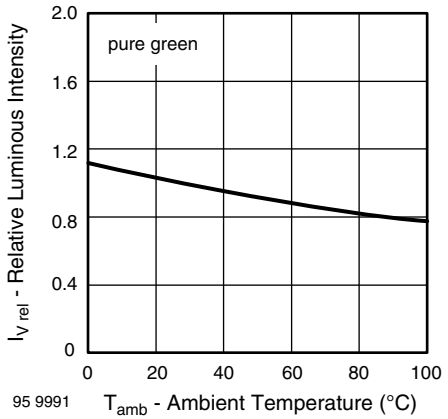



Fig. 25 - Relative Luminous Intensity vs. Ambient Temperature

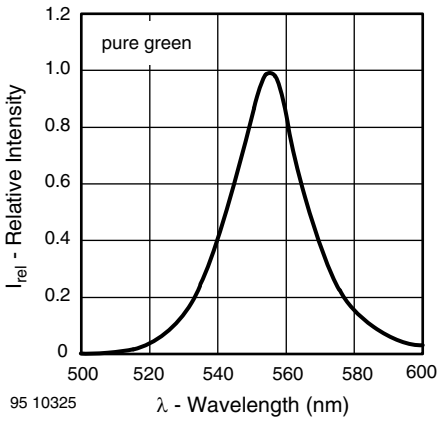



Fig. 28 - Relative Intensity vs. Wavelength

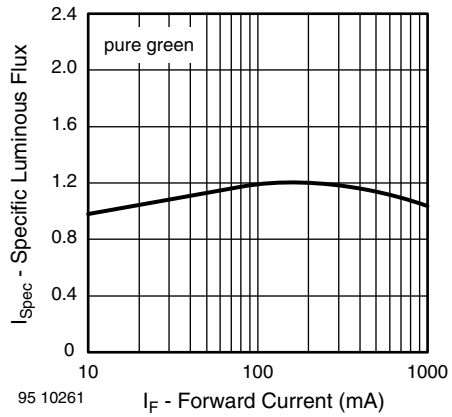



Fig. 26 - Specific Luminous Intensity vs. Forward Current

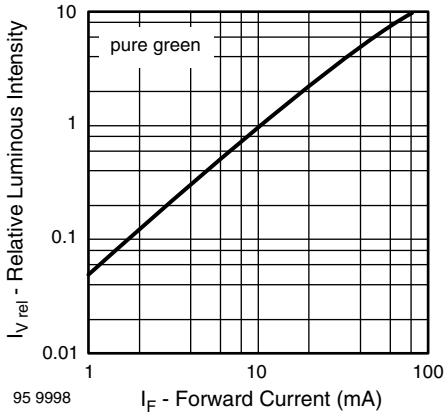
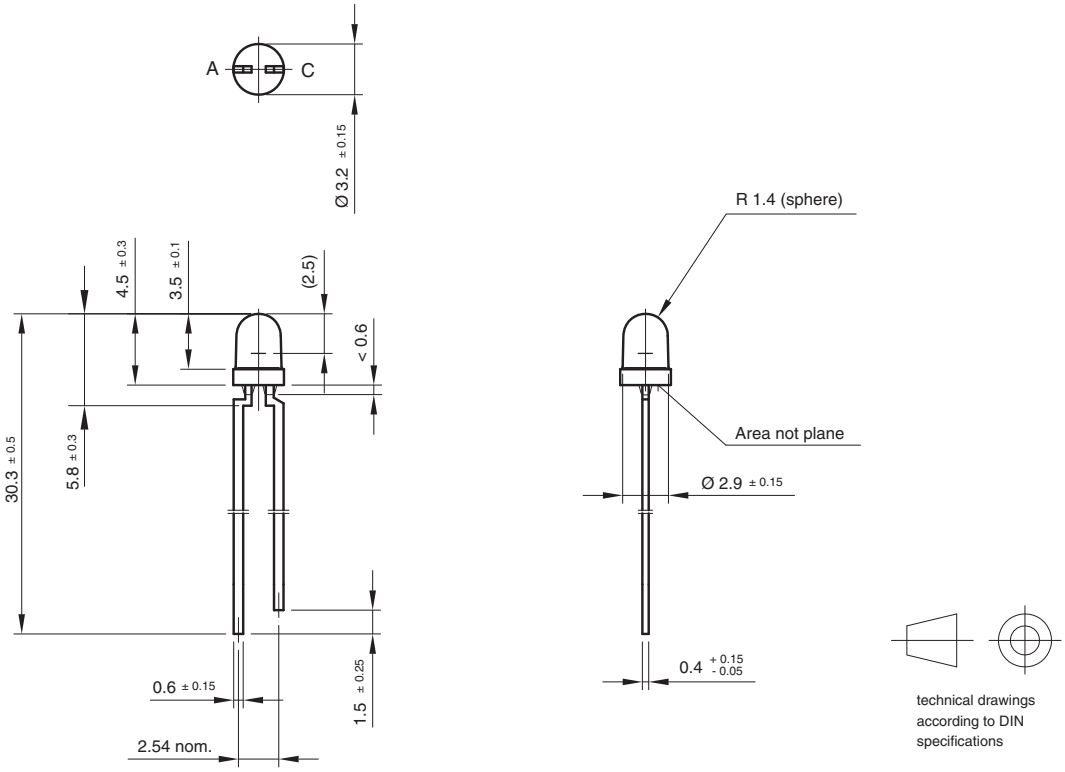



Fig. 27 - Relative Luminous Intensity vs. Forward Current

## **PACKAGE DIMENSIONS** in millimeters




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

## **REEL DIMENSIONS** in millimeters

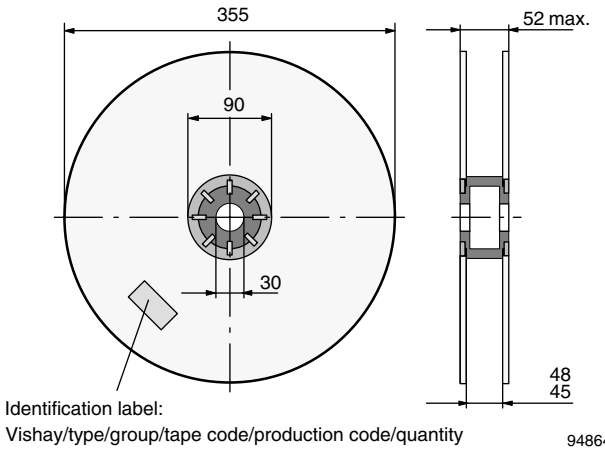



Fig. 29 - Reel

## **TAPE**

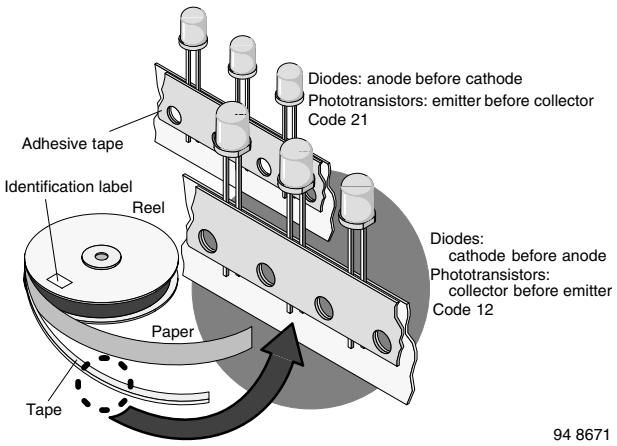



Fig. 30 - LED in Tape

**AMMOPACK**

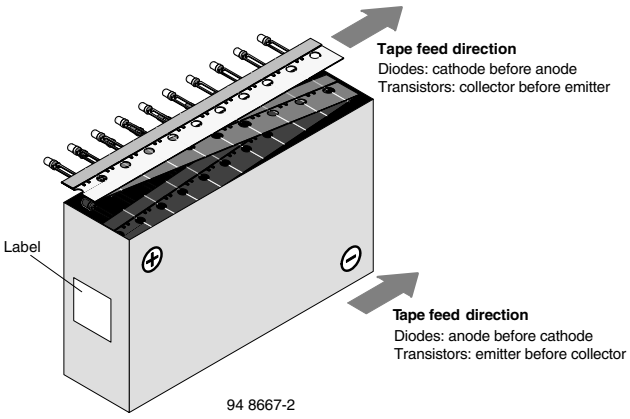
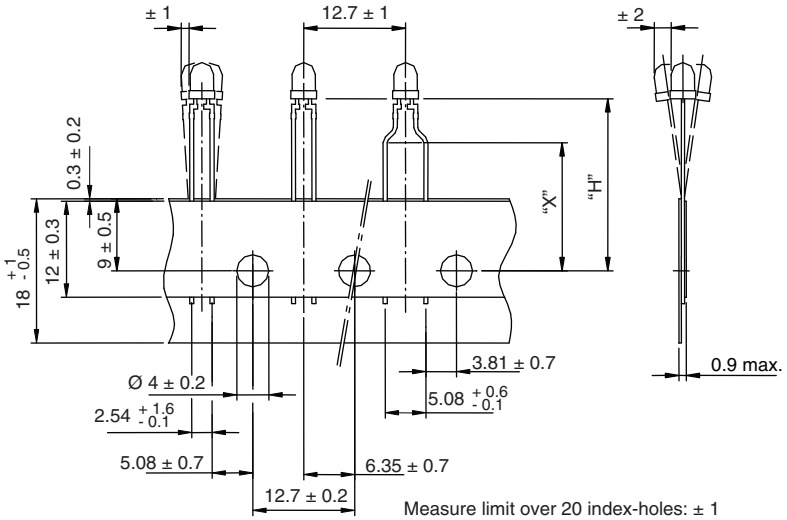



Fig. 31 - Tape Direction

**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 |

21885

| OPTION | DIMENSION "H" ± 0.5 mm | DIMENSION "X" ± 0.5 mm |
|---|---|---|
| AS | 17.3 | - |
| MS | 25.5 | - |
| CS | 22.0 | - |
| LS | 21.0 | - |
| BT | 20.0 | 16.0 |

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**Vishay Intertechnology, Inc. hereby certifies that all its products that are identified as RoHS-Compliant fulfill the definitions and restrictions defined under Directive 2011/65/EU of The European Parliament and of the Council of June 8, 2011 on the restriction of the use of certain hazardous substances in electrical and electronic equipment (EEE) - recast, unless otherwise specified as non-compliant.**

**Please note that some Vishay documentation may still make reference to RoHS Directive 2002/95/EC. We confirm that all the products identified as being compliant to Directive 2002/95/EC conform to Directive 2011/65/EU.**

**Vishay Intertechnology, Inc. hereby certifies that all its products that are identified as Halogen-Free follow Halogen-Free requirements as per JEDEC JS709A standards. Please note that some Vishay documentation may still make reference to the IEC 61249-2-21 definition. We confirm that all the products identified as being compliant to IEC 61249-2-21 conform to JEDEC JS709A standards.**

LifeElectronics
Живое партнерство

**ООО «ЛайфЭлектроникс»** **“LifeElectronics” LLC**

*ИНН 7805602321 КПП 780501001 Р/С 40702810122510004610 ФАКБ "АБСОЛЮТ БАНК" (ЗАО) в г.Санкт-Петербурге К/С 30101810900000000703 БИК 044030703*

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*С конца 2013 года компания активно расширяет линейку поставок компонентов по направлению коаксиальный кабель, кварцевые генераторы и конденсаторы (керамические, пленочные, электролитические), за счёт заключения дистрибьюторских договоров*

*Мы предлагаем:*

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- *Специальные условия для постоянных клиентов.*
- *Подбор аналогов.*
- *Поставку компонентов в любых объемах, удовлетворяющих вашим потребностям.*

- *Приемлемые сроки поставки, возможна ускоренная поставка.*
- *Доставку товара в любую точку России и стран СНГ.*
- *Комплексную поставку.*
- *Работу по проектам и поставку образцов.*
- *Формирование склада под заказчика.*

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- *Тестирование поставляемой продукции.*
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- *Входной контроль качества.*
- *Наличие сертификата ISO.*

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*Конструкторский отдел помогает осуществить:*

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- *Техническую поддержку проекта.*
- *Защиту от снятия компонента с производства.*
- *Оценку стоимости проекта по компонентам.*
- *Изготовление тестовой платы монтаж и пусконаладочные работы.*

*Тел: +7 (812) 336 43 04 (многоканальный)*
*Email: org@lifeelectronics.ru*

***www.lifeelectronics.ru***