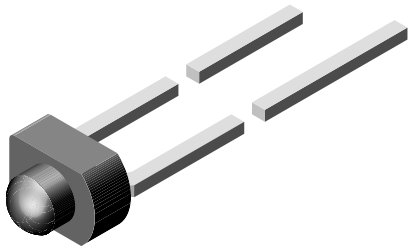
# Universal LED, Ø 1.8 mm Tinted Diffused Miniplast Package



19229

## FEATURES

- Three colors
- For DC and pulse operation
- Luminous intensity categorized
- End-to-end stackable in center-to-center spacing of 0.1" (2.54 mm)
- Material categorization: for definitions of compliance please see www.vishay.com/doc?99912

Pb-free

e4

RoHS COMPLIANT

HALOGEN FREE

GREEN (5-2008)

## PRODUCT GROUP AND PACKAGE DATA

- Product group: LED
- Package: 1.8 mm (miniplast)
- Product series: standard
- Angle of half intensity: ± 20°

## APPLICATIONS

- General indicating and lighting purposes

## PARTS TABLE

| PART | COLOR | LUMINOUS INTENSITY (mcd) | | | at $I_F$ (mA) | WAVELENGTH (nm) | | | at $I_F$ (mA) | FORWARD VOLTAGE (V) | | | at $I_F$ (mA) | TECHNOLOGY |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | MIN. | TYP. | MAX. | | MIN. | TYP. | MAX. | | MIN. | TYP. | MAX. | | |
| TLUO2401 | Red | 4 | 10 | 20 | 10 | 612 | 618 | 625 | 10 | - | 2 | 3 | 20 | GaAsP on GaP |
| TLUY2400 | Yellow | 1 | 8 | - | 10 | 581 | 586 | 594 | 10 | - | 2.4 | 3 | 20 | GaAsP on GaP |
| TLUY2401 | Yellow | 2.5 | 6 | 12.5 | 10 | 581 | 586 | 594 | 10 | - | 2.4 | 3 | 20 | GaAsP on GaP |
| TLUG2400 | Green | 1.6 | 10 | - | 10 | 562 | 568 | 575 | 10 | - | 2.4 | 3 | 20 | GaP on GaP |
| TLUG2401 | Green | 4 | 12 | 20 | 10 | 562 | 568 | 575 | 10 | - | 2.4 | 3 | 20 | GaP on GaP |

## ABSOLUTE MAXIMUM RATINGS ($T_{amb}$ = 25 °C, unless otherwise specified)
## TLUO2401, TLUY240., TLUG240.

| PARAMETER | TEST CONDITION | PART | SYMBOL | VALUE | UNIT |
|---|---|---|---|---|---|
| Reverse voltage | | | $V_R$ | 6 | V |
| DC forward current | | TLUO2401 | $I_F$ | 30 | mA |
| | | TLUY240. | $I_F$ | 30 | mA |
| | | TLUG240. | $I_F$ | 30 | mA |
| Surge forward current | $t_p \leq 10$ µs | | $I_{FSM}$ | 1 | A |
| Power dissipation | $T_{amb} \leq 55$ °C | TLUO2401 | $P_V$ | 100 | mW |
| | | TLUY240. | $P_V$ | 100 | mW |
| | | TLUG240. | $P_V$ | 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 ≤ 3 s, 2 mm from body | | $T_{sd}$ | 260 | °C |
| | t ≤ 5 s, 4 mm from body | | $T_{sd}$ | 260 | °C |
| Thermal resistance junction to ambient | | TLUO2401 | $R_{thJA}$ | 450 | K/W |
| | | TLUY240. | $R_{thJA}$ | 450 | K/W |
| | | TLUG240. | $R_{thJA}$ | 450 | K/W |



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**OPTICAL AND ELECTRICAL CHARACTERISTICS** ($T_{amb}$ = 25 °C, unless otherwise specified)
**TLUO2401, RED**

| PARAMETER | TEST CONDITION | PART | SYMBOL | MIN. | TYP. | MAX. | UNIT |
|---|---|---|---|---|---|---|---|
| Luminous intensity (1) | $I_F$ = 10 mA | TLUO2401 | $I_V$ | 4 | 10 | 20 | mcd |
| Dominant wavelength | $I_F$ = 10 mA | | $\lambda_d$ | 612 | 618 | 625 | nm |
| Peak wavelength | $I_F$ = 10 mA | | $\lambda_p$ | - | 630 | - | nm |
| Angle of half intensity | $I_F$ = 10 mA | | φ | - | ± 20 | - | ° |
| 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)
**TLUY240., YELLOW**

| PARAMETER | TEST CONDITION | PART | SYMBOL | MIN. | TYP. | MAX. | UNIT |
|---|---|---|---|---|---|---|---|
| Luminous intensity (1) | $I_F$ = 10 mA | TLUY2400 | $I_V$ | 1 | 8 | - | mcd |
| | | TLUY2401 | $I_V$ | 2.5 | 6 | 12.5 | mcd |
| Dominant wavelength | $I_F$ = 10 mA | | $\lambda_d$ | 581 | 586 | 594 | nm |
| Peak wavelength | $I_F$ = 10 mA | | $\lambda_p$ | - | 585 | - | nm |
| Angle of half intensity | $I_F$ = 10 mA | | φ | - | ± 20 | - | ° |
| 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)
**TLUG240., GREEN**

| PARAMETER | TEST CONDITION | PART | SYMBOL | MIN. | TYP. | MAX. | UNIT |
|---|---|---|---|---|---|---|---|
| Luminous intensity (1) | $I_F$ = 10 mA | TLUG2400 | $I_V$ | 1.6 | 10 | - | mcd |
| | | TLUG2401 | $I_V$ | 4 | 12 | 20 | mcd |
| Dominant wavelength | $I_F$ = 10 mA | | $\lambda_d$ | 562 | 568 | 575 | nm |
| Peak wavelength | $I_F$ = 10 mA | | $\lambda_p$ | - | 565 | - | nm |
| Angle of half intensity | $I_F$ = 10 mA | | φ | - | ± 20 | - | ° |
| 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 $I_{Vmin.}/I_{Vmax.} \leq 0.5$


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| 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 |

**Note**

- Luminous intensity is tested at a current pulse duration of 25 ms and an accuracy of ± 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. |
| 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 °C, unless otherwise specified)

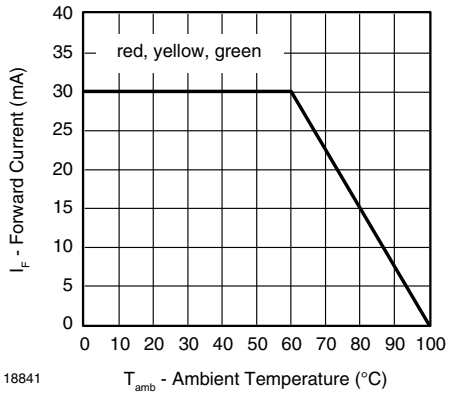



Fig. 1 - Forward Current vs. Ambient Temperature

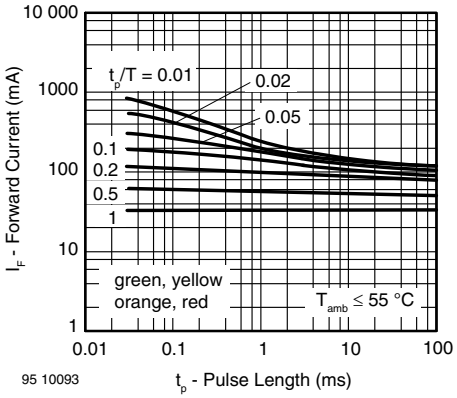



Fig. 2 - Forward Current vs. Pulse Length



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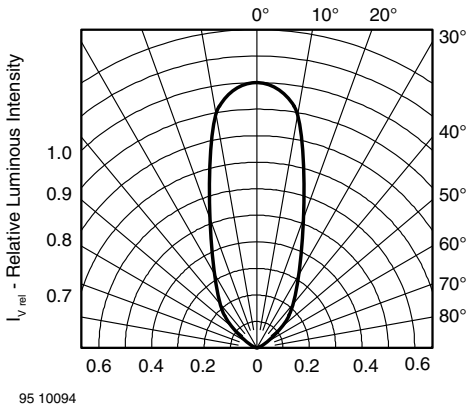



Fig. 3 - Relative Luminous Intensity vs. Angular Displacement

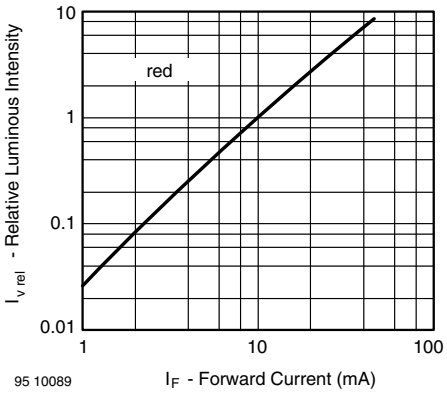



Fig. 6 - Relative Luminous Intensity vs. Forward Current

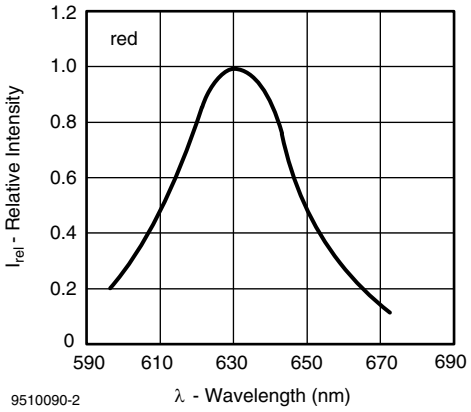



Fig. 4 - Relative Intensity vs. Wavelength

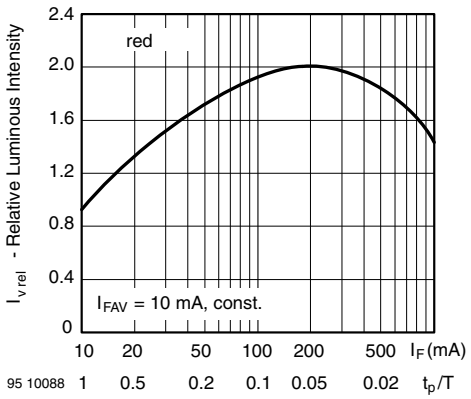



Fig. 7 - Relative Luminous Intensity vs. Forward Current / Duty Cycle

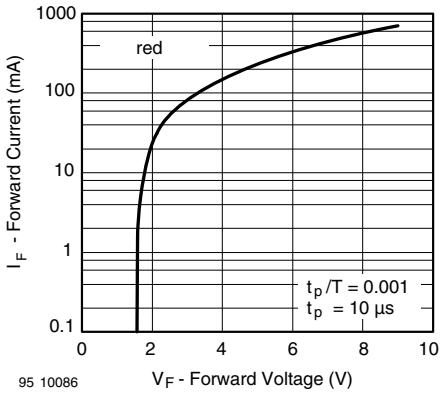



Fig. 5 - Forward Current vs. Forward Voltage

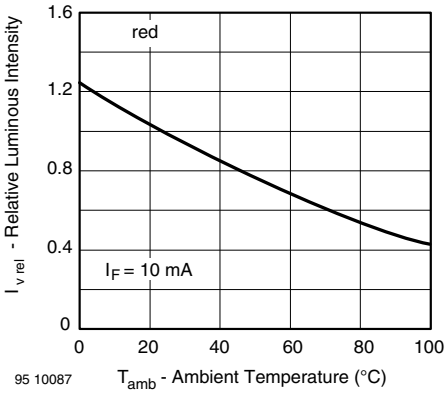



Fig. 8 - Relative Luminous Intensity vs. Ambient Temperature


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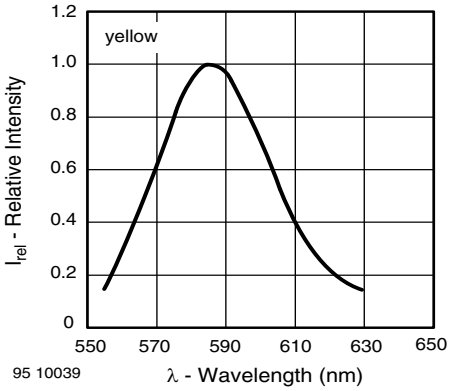



Fig. 9 - Relative Intensity vs. Wavelength

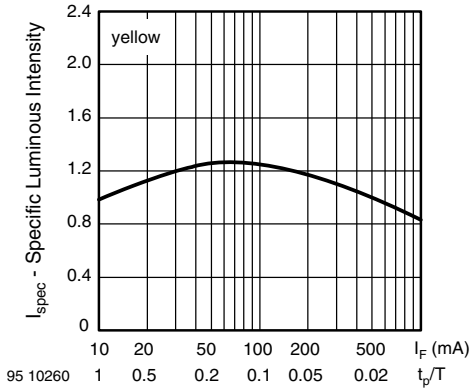



Fig. 12 - Relative Luminous Intensity vs. Forward Current/Duty Cycle

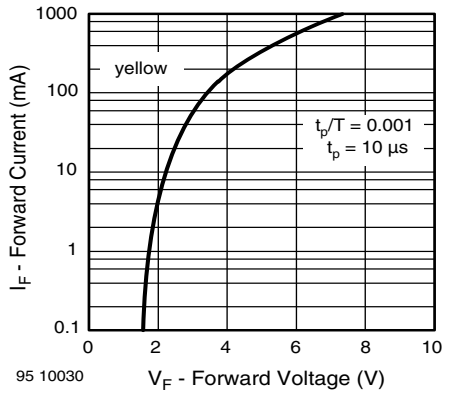



Fig. 10 - Forward Current vs. Forward Voltage

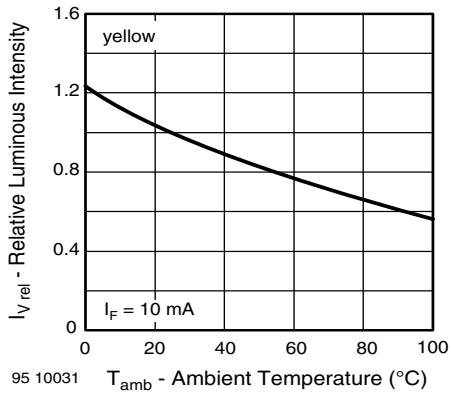



Fig. 13 - Relative Luminous Intensity vs. Ambient Temperature

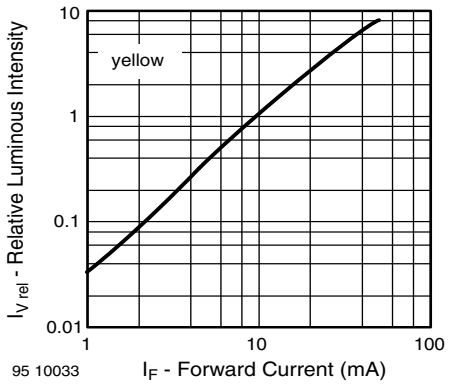



Fig. 11 - Relative Luminous Intensity vs. Forward Current

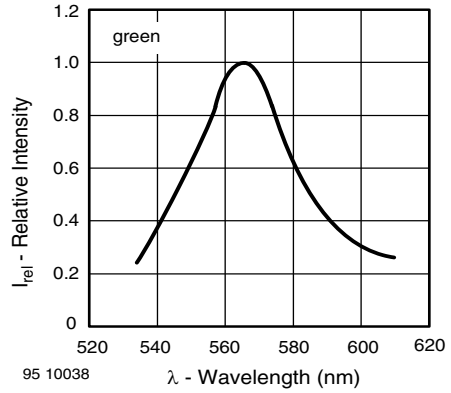



Fig. 14 - Relative Intensity vs. Wavelength


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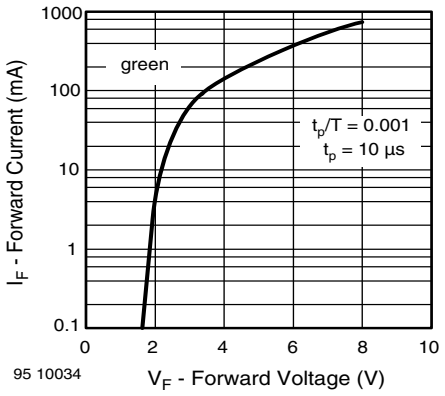



Fig. 15 - Forward Current vs. Forward Voltage

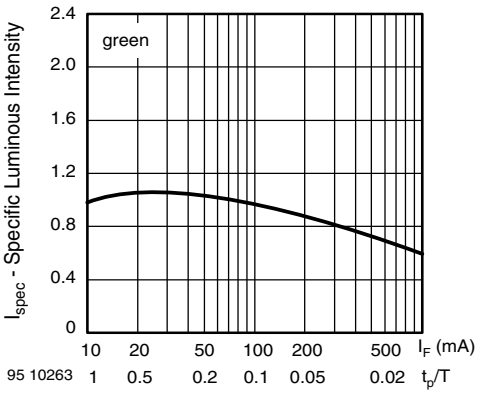



Fig. 17 - Specific Luminous Intensity vs. Forward Current

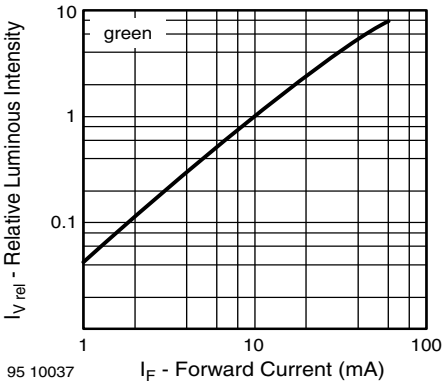



Fig. 16 - Relative Luminous Intensity vs. Forward Current

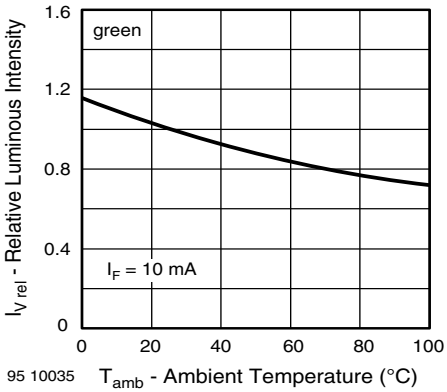
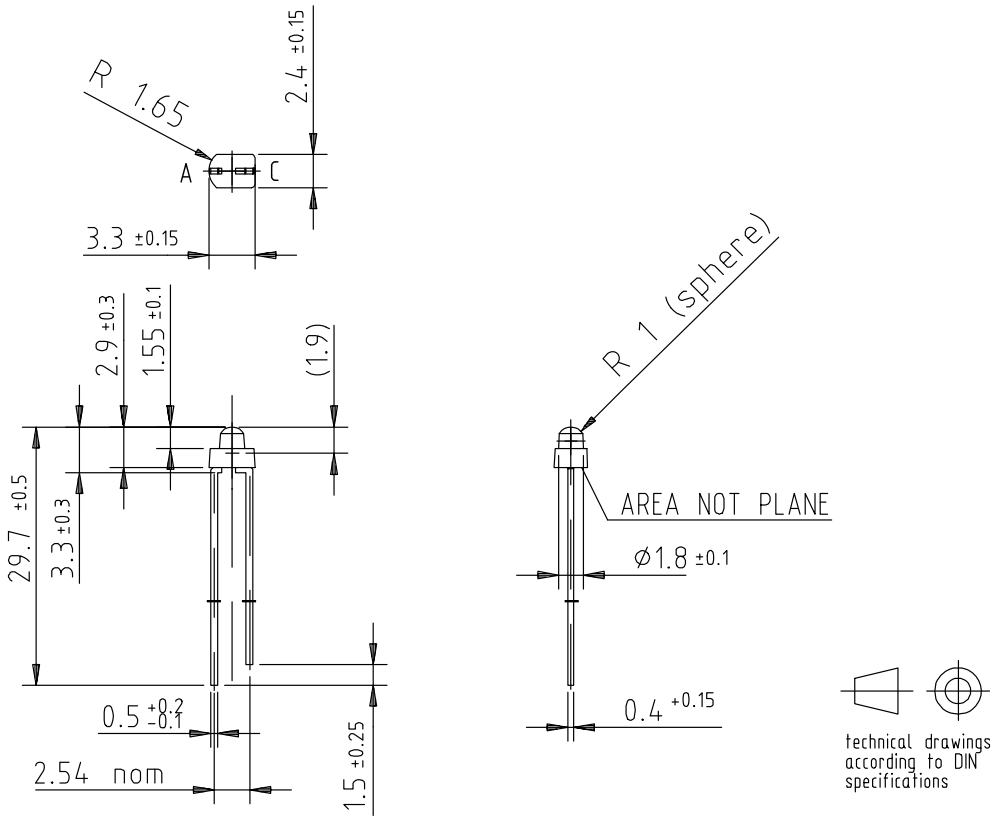



Fig. 18 - Relative Luminous Intensity vs. Ambient Temperature


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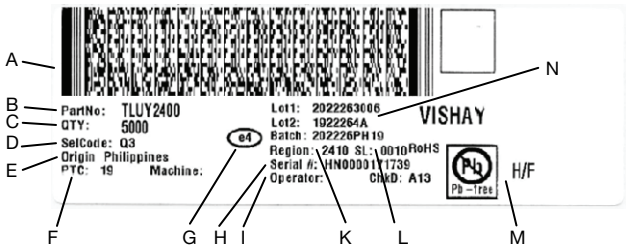
## PACKAGE DIMENSIONS in millimeters




Drawing-No.: 6.544-5052.01-4
Issue: 1; 12.10.95
95 11262

| PACKING | |
|---|---|
| Packing | Quantity |
| Bulk | 1 x 5000 |

## 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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