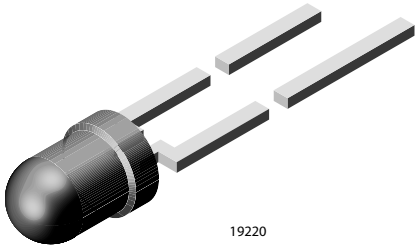
High Efficiency LED in Ø 3 mm Tinted Non-Diffused Package



DESCRIPTION

The TLH.42.. series was developed for standard applications like general indicating and lighting purposes.

It is housed in a 3 mm tinted clear 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.

FEATURES

- Choice of five bright colors
- Standard 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

e3

RoHS COMPLIANT

HALOGEN FREE GREEN (5-2008)

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: ± 22°

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.		
TLHR4200	Red	4	8	-	10	612	-	625	10	-	2	3	20	GaAsP on GaP
TLHR4205	Red	10	15	-	10	612	-	625	10	-	2	3	20	GaAsP on GaP
TLHO4200	Soft orange	4	10	-	10	598	-	611	10	-	2.4	3	20	GaAsP on GaP
TLHO4201	Soft orange	10	18	-	10	598	-	611	10	-	2.4	3	20	GaAsP on GaP
TLHY4200	Yellow	4	10	-	10	581	-	594	10	-	2.4	3	20	GaAsP on GaP
TLHY4205	Yellow	10	20	-	10	581	-	594	10	-	2.4	3	20	GaAsP on GaP
TLHG4200	Green	6.3	10	-	10	562	-	575	10	-	2.4	3	20	GaP on GaP
TLHG4200-AS12Z	Green	6.3	10	-	10	562	-	575	10	-	2.4	3	20	GaP on GaP
TLHG4201	Green	10	15	-	10	562	-	575	10	-	2.4	3	20	GaP on GaP
TLHG4205	Green	16	20	-	10	562	-	575	10	-	2.4	3	20	GaP on GaP

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ABSOLUTE MAXIMUM RATINGS (T_{amb} = 25 °C, unless otherwise specified)
TLHR420., TLHO420., TLHY420., TLHG420.

PARAMETER	TEST CONDITION	SYMBOL	VALUE	UNIT
Reverse voltage (1)		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		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 to ambient		R_{thJA}	400	K/W

Note

(1) Driving the LED in reverse direction is suitable for a short term application

OPTICAL AND ELECTRICAL CHARACTERISTICS (T_{amb} = 25 °C, unless otherwise specified)
TLHR420., RED

PARAMETER	TEST CONDITION	PARTS	SYMBOL	MIN.	TYP.	MAX.	UNIT
Luminous intensity	I_F = 10 mA	TLHR4200	I_V	4	8	-	mcd
		TLHR4205	I_V	10	15	-	mcd
Dominant wavelength	I_F = 10 mA		λ_d	612	-	625	nm
Peak wavelength	I_F = 10 mA		λ_p	-	635	-	nm
Angle of half intensity	I_F = 10 mA		φ	-	± 22	-	°
Forward voltage	I_F = 20 mA		V_F	-	2	3	V
Reverse current	V_R = 6 V		I_R	-	-	10	µA
Junction capacitance	V_R = 0 V, f = 1 MHz		C_j	-	50	-	pF

OPTICAL AND ELECTRICAL CHARACTERISTICS (T_{amb} = 25 °C, unless otherwise specified)
TLHO420., SOFT ORANGE

PARAMETER	TEST CONDITION	PARTS	SYMBOL	MIN.	TYP.	MAX.	UNIT
Luminous intensity	I_F = 10 mA	TLHO4200	I_V	4	10	-	mcd
		TLHO4201	I_V	10	18	-	mcd
Dominant wavelength	I_F = 10 mA		λ_d	598	-	611	nm
Peak wavelength	I_F = 10 mA		λ_p	-	605	-	nm
Angle of half intensity	I_F = 10 mA		φ	-	± 22	-	°
Forward voltage	I_F = 20 mA		V_F	-	2.4	3	V
Reverse current	V_R = 6 V		I_R	-	-	10	µA
Junction capacitance	V_R = 0 V, f = 1 MHz		C_j	-	50	-	pF

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OPTICAL AND ELECTRICAL CHARACTERISTICS (T_{amb} = 25 °C, unless otherwise specified)
TLHY420., YELLOW

PARAMETER	TEST CONDITION	PARTS	SYMBOL	MIN.	TYP.	MAX.	UNIT
Luminous intensity	I_F = 10 mA	TLHY4200	I_V	4	10	-	mcd
		TLHY4205	I_V	10	20	-	mcd
Dominant wavelength	I_F = 10 mA		λ_d	581	-	594	nm
Peak wavelength	I_F = 10 mA		λ_p	-	585	-	nm
Angle of half intensity	I_F = 10 mA		$_j$	-	± 22	-	°
Forward voltage	I_F = 20 mA		V_F	-	2.4	3	V
Reverse current	V_R = 6 V		I_R	-	-	10	µA
Junction capacitance	V_R = 0 V , f = 1 MHz		C_j	-	50	-	pF

OPTICAL AND ELECTRICAL CHARACTERISTICS (T_{amb} = 25 °C, unless otherwise specified)
TLHG420., GREEN

PARAMETER	TEST CONDITION	PARTS	SYMBOL	MIN.	TYP.	MAX.	UNIT
Luminous intensity	I_F = 10 mA	TLHG4200	I_V	6.3	10	-	mcd
		TLHG4201	I_V	10	15	-	mcd
		TLHG4205	I_V	16	20	-	mcd
Dominant wavelength	I_F = 10 mA		λ_d	562	-	575	nm
Peak wavelength	I_F = 10 mA		λ_p	-	565	-	nm
Angle of half intensity	I_F = 10 mA		φ	-	± 22	-	°
Forward voltage	I_F = 20 mA		V_F	-	2.4	3	V
Reverse current	V_R = 6 V		I_R	-	-	10	µA
Junction capacitance	V_R = 0 V , f = 1 MHz		C_j	-	50	-	pF

LUMINOUS INTENSITY CLASSIFICATION

GROUP	LUMINOUS INTENSITY (mcd)	
STANDARD	MIN.	MAX.
N	2.5	5
P	4	8
Q	6.3	12.5
R	10	20
S	16	32
T	25	50
U	40	80
V	63	125
W	100	200
X	130	260
Y	180	360
Z	240	480
AA	320	640
BB	430	860
CC	575	1150
DD	750	1500

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 in 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

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COLOR CLASSIFICATION

GROUP	DOM. WAVELENGTH (nm)					
	SOFT ORANGE		YELLOW		GREEN	
	MIN.	MAX.	MIN.	MAX.	MIN.	MAX.
1	598	601	581	584	-	-
2	600	603	583	586	-	-
3	602	605	585	588	562	565
4	604	607	587	590	564	567
5	606	609	589	592	566	569
6	608	611	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)

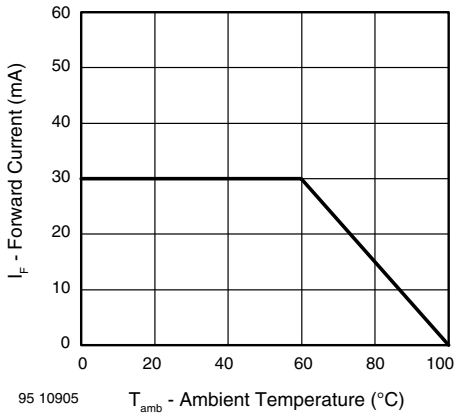

Fig. 1 - Forward Current vs. Ambient Temperature

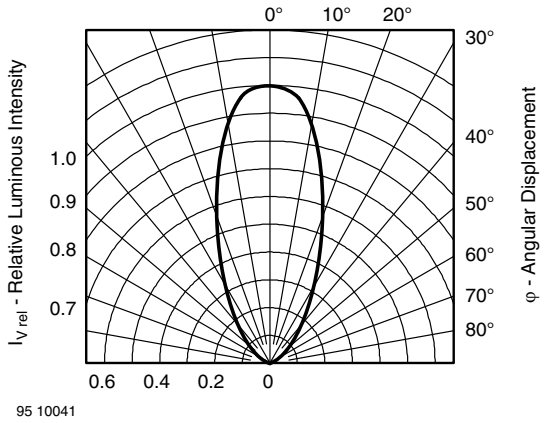

Fig. 3 - Relative Luminous Intensity vs. Angular Displacement

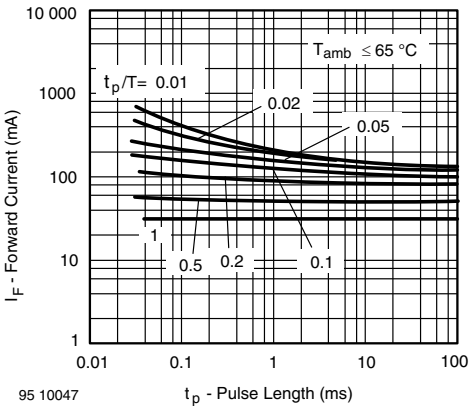

Fig. 2 - Forward Current vs. Pulse Length

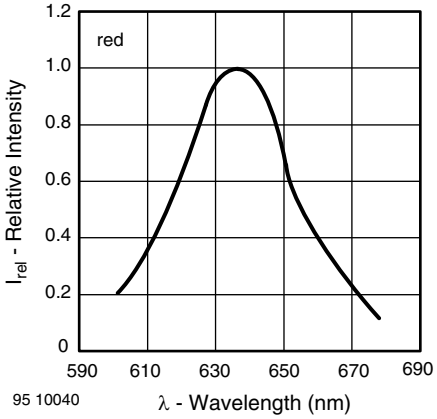

Fig. 4 - Relative Intensity vs. Wavelength

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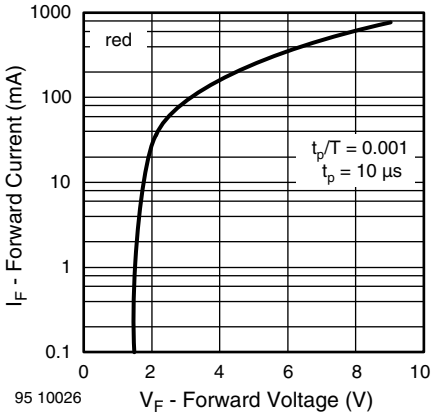

Fig. 5 - Forward Current vs. Forward Voltage

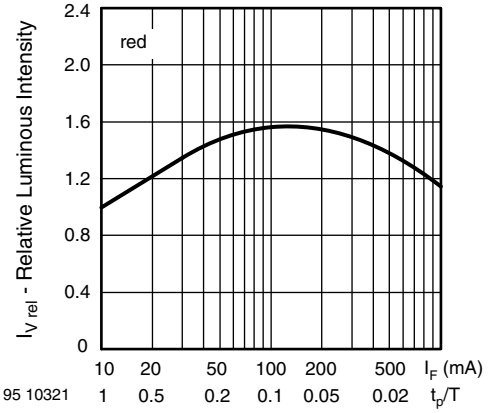

Fig. 8 - Relative Luminous Intensity vs. Forward Current/Duty Cycle

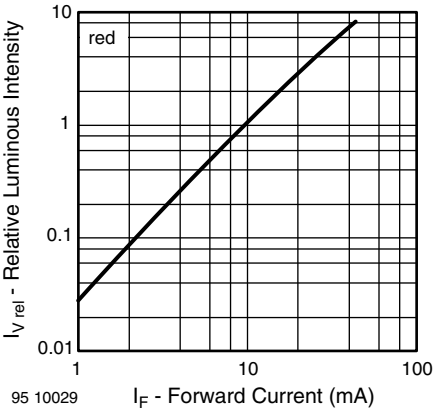

Fig. 6 - Relative Luminous Intensity vs. Forward Current

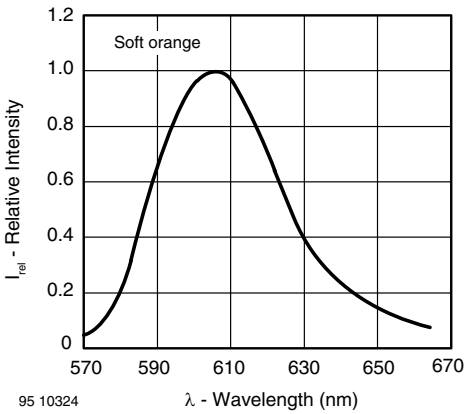

Fig. 9 - Relative Intensity vs. Wavelength

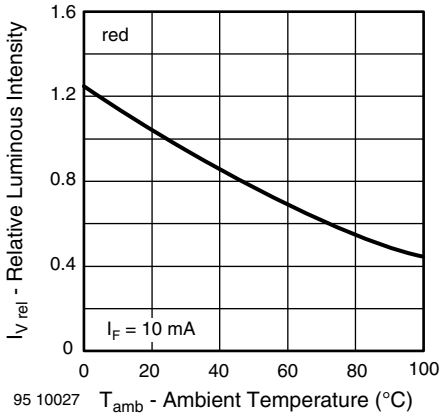

Fig. 7 - Relative Luminous Intensity vs. Ambient Temperature

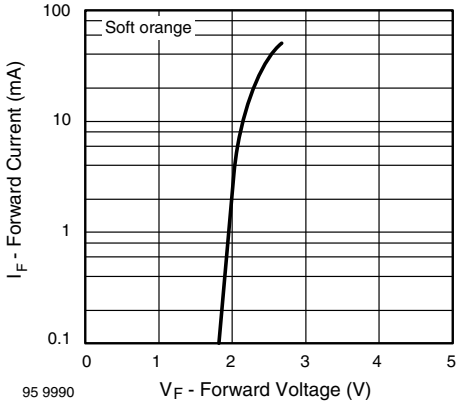

Fig. 10 - Forward Current vs. Forward Voltage

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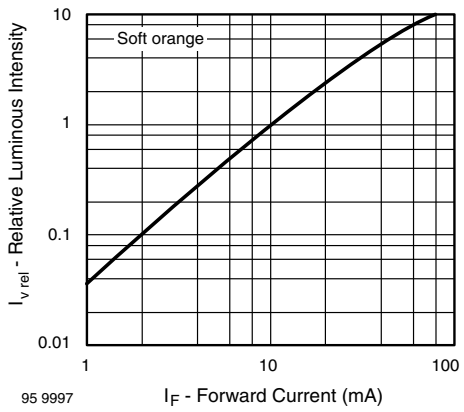

Fig. 11 - Relative Luminous Intensity vs. Forward Current

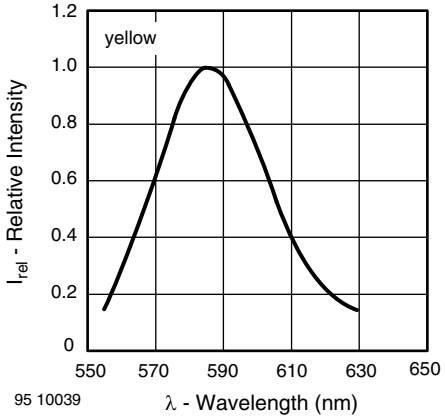

Fig. 14 - Relative Intensity vs. Wavelength

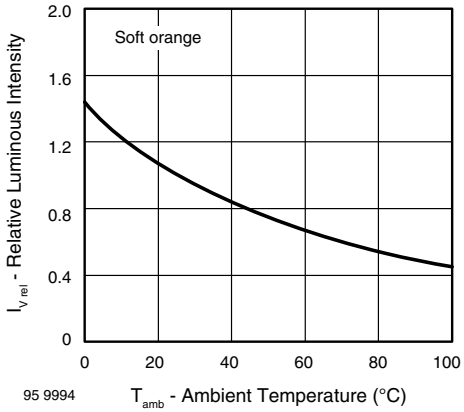

Fig. 12 - Relative Luminous Intensity vs. Ambient Temperature

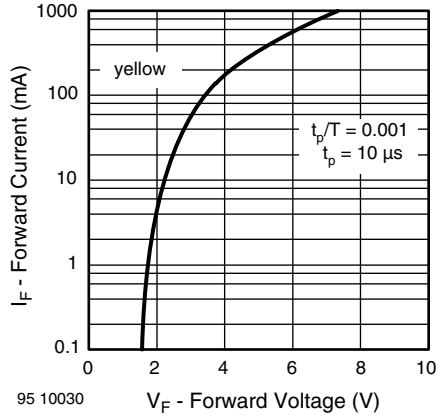

Fig. 15 - Forward Current vs. Forward Voltage

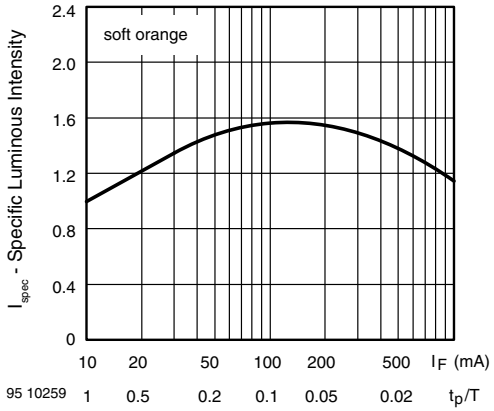

Fig. 13 - Relative Luminous Intensity vs. Forward Current/Duty Cycle

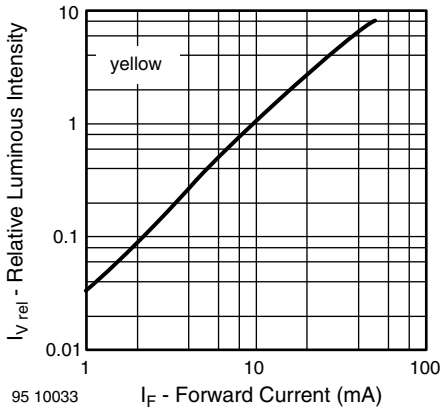

Fig. 16 - Relative Luminous Intensity vs. Forward Current

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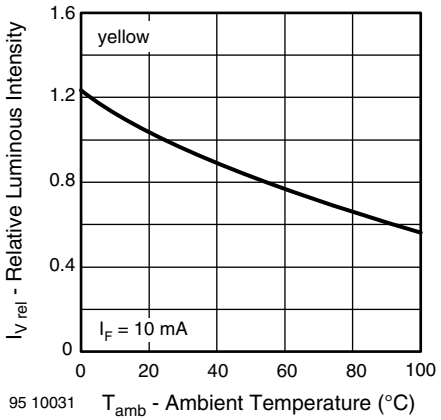

Fig. 17 - Relative Luminous Intensity vs. Ambient Temperature

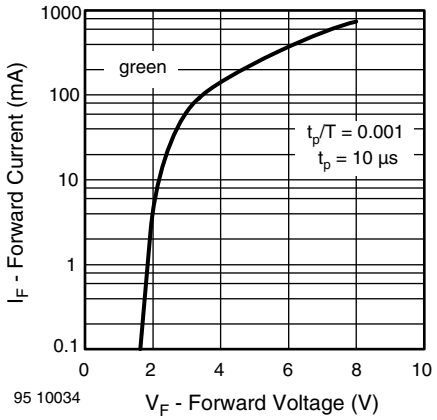

Fig. 20 - Forward Current vs. Forward Voltage

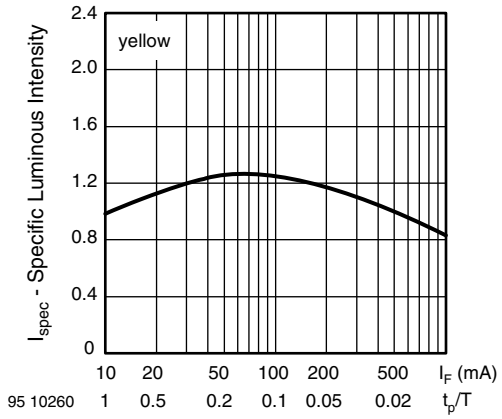

Fig. 18 - Relative Luminous Intensity vs. Forward Current/Duty Cycle

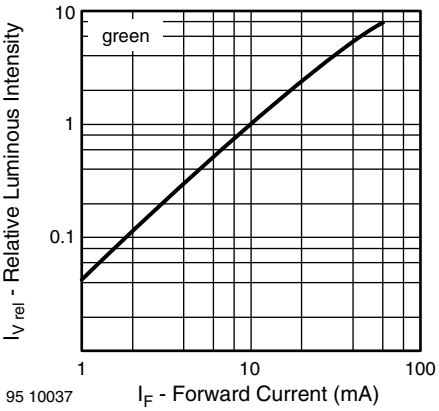

Fig. 21 - Relative Luminous Intensity vs. Forward Current

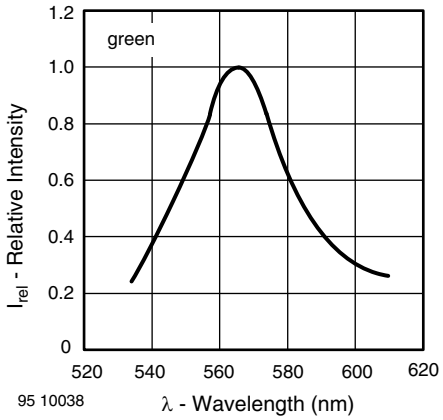

Fig. 19 - Relative Intensity vs. Wavelength

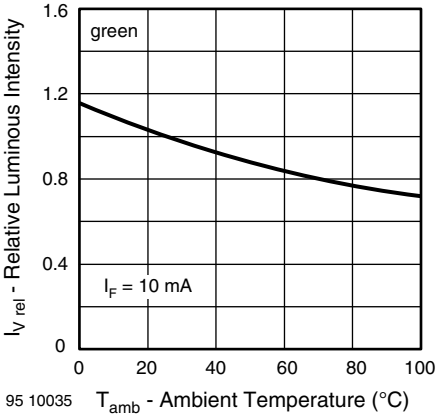

Fig. 22 - Relative Luminous Intensity vs. Ambient Temperature

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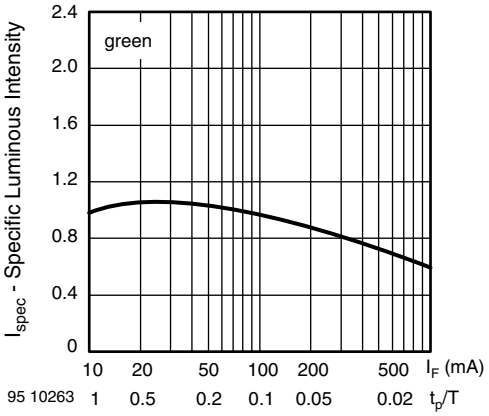
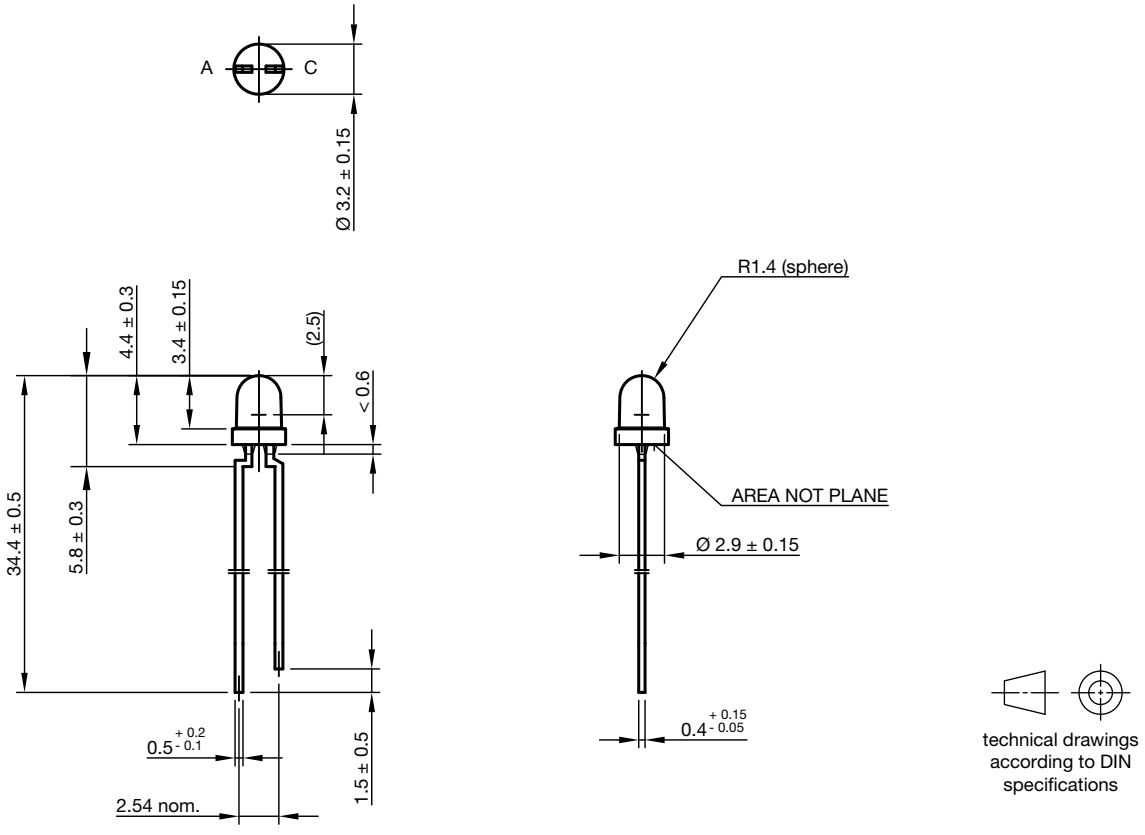


Fig. 23 - Specific Luminous Intensity vs. Forward Current

PACKAGE DIMENSIONS in millimeters



Drawing-No.: 6.544-5255.01-4
Issue: 9; 28.07.14

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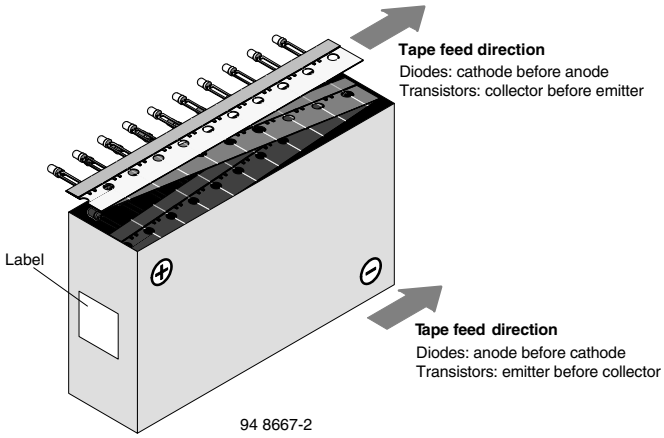

Fig. 24 - Tape Direction

Note

- The new nomenclature for ammopack 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

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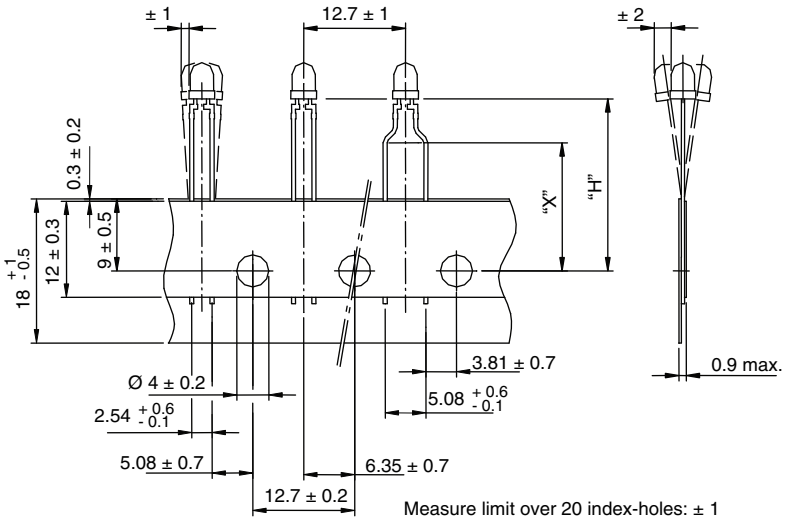
TAPE DIMENSIONS in millimeters



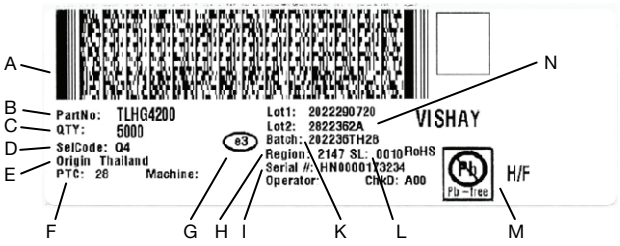
Quantity per:	Reel (Mat.-no. 1764)
	2000

21885

Option	Dim. “H” ± 0.5 mm	Dim. “X” ± 0.5 mm
AS	17.3	-

PACKING INFORMATION		
PART	**BULK**	**TAPE AND REEL**
TLHx420x	5000	-
TLHx420x-AS12Z	-	5 x 2000

BAR CODE PRODUCT LABEL (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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