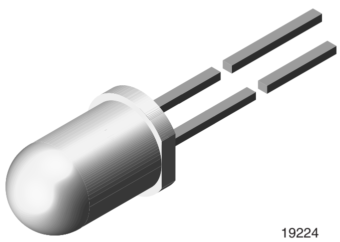
High Efficiency LED in Ø 5 mm Tinted Diffused Package


19224

FEATURES

- Choice of three bright colors
- Standard T-1¾ package
- Small mechanical tolerances
- Suitable for DC and high peak current
- Wide viewing angle
- Luminous intensity categorized
- Yellow and green color categorized
- TLH.640. without stand-offs
- Compliant to RoHS directive 2002/95/EC and in accordance to WEEE 2002/96/EC

Pb-free
e3
RoHS COMPLIANT

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 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: 5 mm
- Product series: standard
- Angle of half intensity: ± 30°

PARTS TABLE

PART	COLOR, LUMINOUS INTENSITY	TECHNOLOGY
TLHR6400	Red, I_V = 10 mcd (typ.)	GaAsP on GaP
TLHR6400-CS12Z	Red, I_V = 10 mcd (typ.)	GaAsP on GaP
TLHR6401	Red, I_V = 12 mcd (typ.)	GaAsP on GaP
TLHR6405	Red, I_V = 14 mcd (typ.)	GaAsP on GaP
TLHR6405-ASZ	Red, I_V = 14 mcd (typ.)	GaAsP on GaP
TLHR6405-BT12Z	Red, I_V = 14 mcd (typ.)	GaAsP on GaP
TLHY6400	Yellow, I_V = 10 mcd (typ.)	GaAsP on GaP
TLHY6400-CS12Z	Yellow, I_V = 10 mcd (typ.)	GaAsP on GaP
TLHY6400-MS12Z	Yellow, I_V = 10 mcd (typ.)	GaAsP on GaP
TLHY6401	Yellow, I_V = 12 mcd (typ.)	GaAsP on GaP
TLHY6405	Yellow, I_V = 14 mcd (typ.)	GaAsP on GaP
TLHY6405-ASZ	Yellow, I_V = 14 mcd (typ.)	GaAsP on GaP
TLHY6405-BTZ	Yellow, I_V = 14 mcd (typ.)	GaAsP on GaP
TLHG6400	Green, I_V = 10 mcd (typ.)	GaP on GaP
TLHG6400-AS12Z	Green, I_V = 10 mcd (typ.)	GaP on GaP
TLHG6400-CS12Z	Green, I_V = 10 mcd (typ.)	GaP on GaP
TLHG6401	Green, I_V = 12 mcd (typ.)	GaP on GaP

PARTS TABLE

PART	COLOR, LUMINOUS INTENSITY	TECHNOLOGY
TLHG6401-AS12Z	Green, I_V = 12 mcd (typ.)	GaP on GaP
TLHG6405	Green, I_V > 15 mcd (typ.)	GaP on GaP
TLHG6405-ASZ	Green, I_V > 15 mcd (typ.)	GaP on GaP
TLHG6405-BTZ	Green, I_V > 15 mcd (typ.)	GaP on GaP

ABSOLUTE MAXIMUM RATINGS [1] TLHR640. , TLHY640. , TLHG640.

PARAMETER	TEST CONDITION	SYMBOL	VALUE	UNIT
Reverse voltage		V_R	6	V
DC Forward current	$T_{amb} \leq 65$ °C	I_F	30	mA
Surge forward current	$t_p \leq 10$ µs	I_{FSM}	1	A
Power dissipation	$T_{amb} \leq 65$ °C	P_V	100	mW
Junction temperature		T_j	100	°C
Operating temperature range		T_{amb}	- 20 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}	350	K/W

Note:
[1] T_{amb} = 25 °C, unless otherwise specified

OPTICAL AND ELECTRICAL CHARACTERISTICS [1] TLHR640., RED

PARAMETER	TEST CONDITION	PART	SYMBOL	MIN.	TYP.	MAX.	UNIT
Luminous intensity [2]	I_F = 10 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 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		± 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, f = 1 MHz		C_j		50		pF

Note:
[1] T_{amb} = 25 °C, unless otherwise specified
[2] In one packing unit $I_{Vmin.}/I_{Vmax.} \leq 0.5$

OPTICAL AND ELECTRICAL CHARACTERISTICS [1] TLHY640., YELLOW

PARAMETER	TEST CONDITION	PART	SYMBOL	MIN.	TYP.	MAX.	UNIT
Luminous intensity [2]	I_F = 10 mA	TLHY6400	I_V	1.6	10		mcd
		TLHY6401	I_V	4	12		mcd
		TLHY6405	I_V	6.3	14		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		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, f = 1 MHz		C_j		50		pF

Note:
[1] T_{amb} = 25 °C, unless otherwise specified
[2] In one packing unit $I_{Vmin.}/I_{Vmax.} \leq 0.5$

OPTICAL AND ELECTRICAL CHARACTERISTICS [1] TLHG640., GREEN							
PARAMETER	**TEST CONDITION**	**PART**	**SYMBOL**	**MIN.**	**TYP.**	**MAX.**	**UNIT**
Luminous intensity [2]	I_F = 10 mA	TLHG6400	I_V	1.6	10		mcd
		TLHG6401	I_V	4	12		mcd
		TLHG6405	I_V	6.3	15		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		± 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, f = 1 MHz		C_j		50		pF

Note:
[1] T_{amb} = 25 °C, unless otherwise specified
[2] In one packing unit $I_{Vmin.}/I_{Vmax.} \leq 0.5$

TYPICAL CHARACTERISTICS

T_{amb} = 25 °C, unless otherwise specified

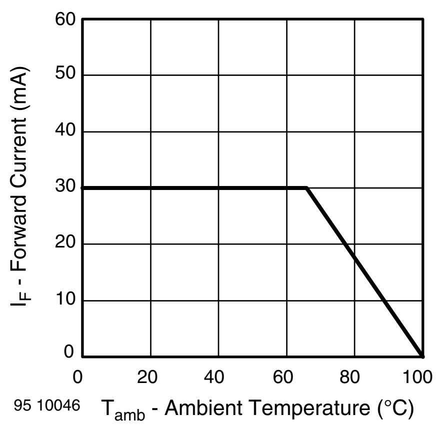


Figure 1. Forward Current vs. Ambient Temperature

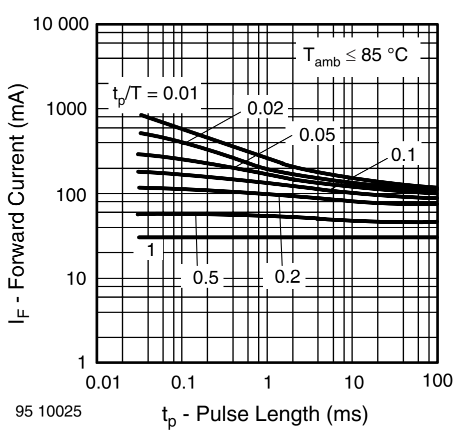


Figure 2. Forward Current vs. Pulse Length

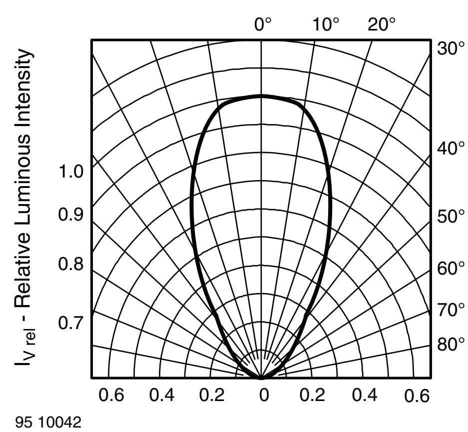


Figure 3. Rel. Luminous Intensity vs. Angular Displacement

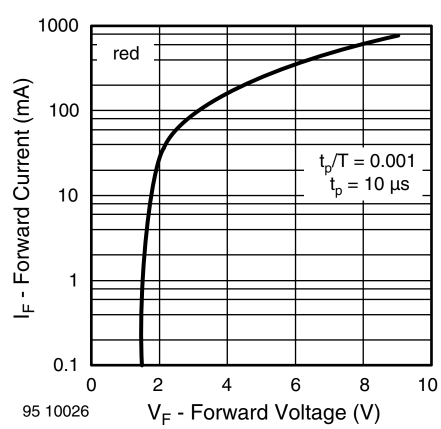


Figure 4. Forward Current vs. Forward Voltage

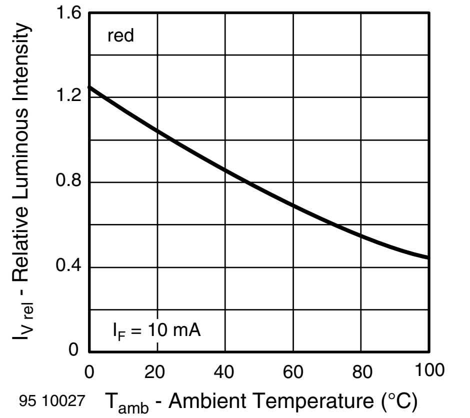


Figure 5. Rel. Luminous Intensity vs. Ambient Temperature

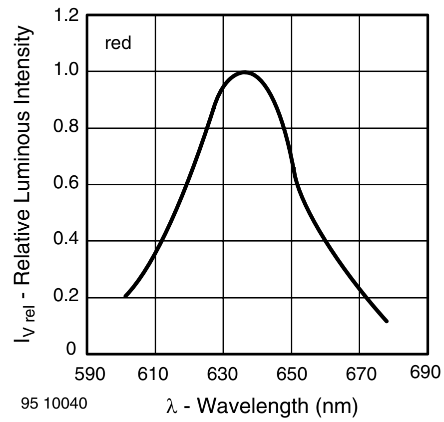


Figure 8. Relative Intensity vs. Wavelength

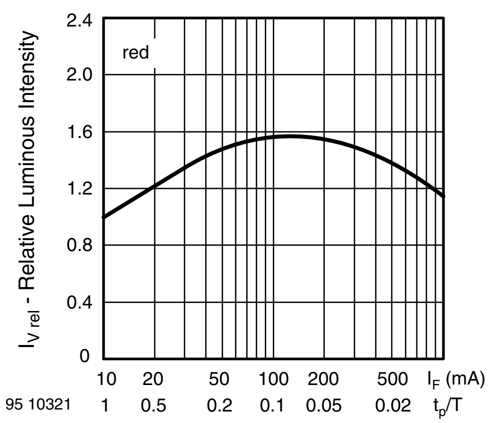


Figure 6. Rel. Lumin. Intensity vs. Forw. Current/Duty Cycle

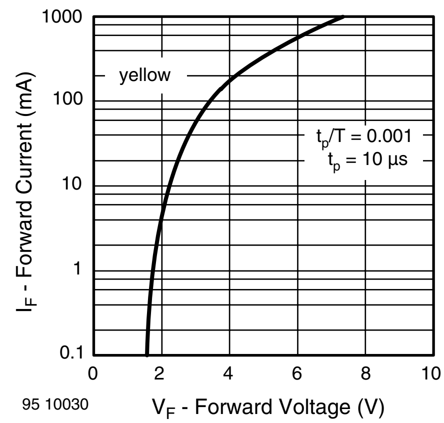


Figure 9. Forward Current vs. Forward Voltage

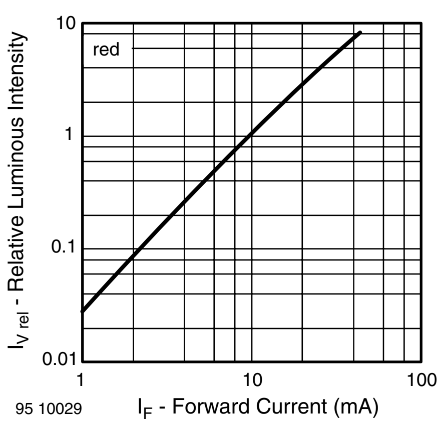


Figure 7. Relative Luminous Intensity vs. Forward Current

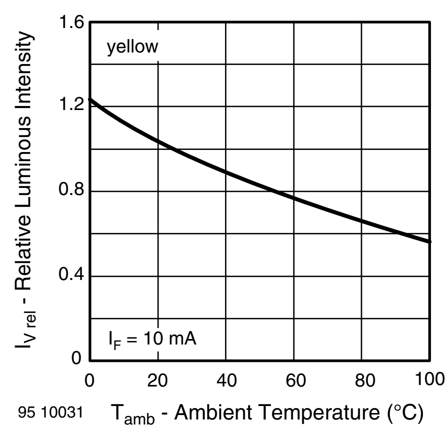


Figure 10. Rel. Luminous Intensity vs. Ambient Temperature

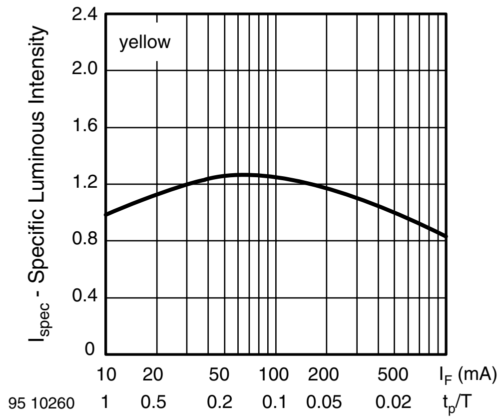


Figure 11. Rel. Lumin. Intensity vs. Forw. Current/Duty Cycle

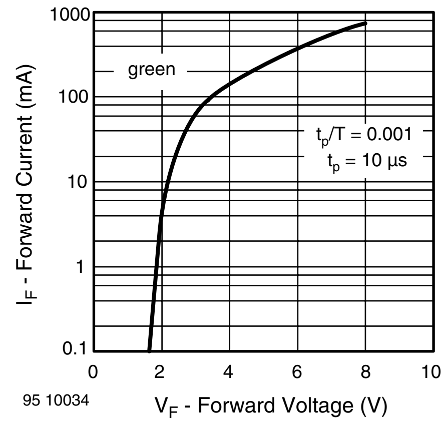


Figure 14. Forward Current vs. Forward Voltage

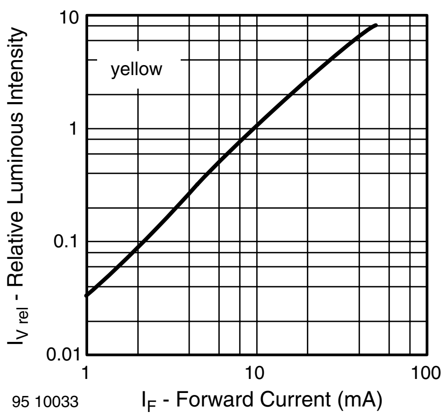


Figure 12. Relative Luminous Intensity vs. Forward Current

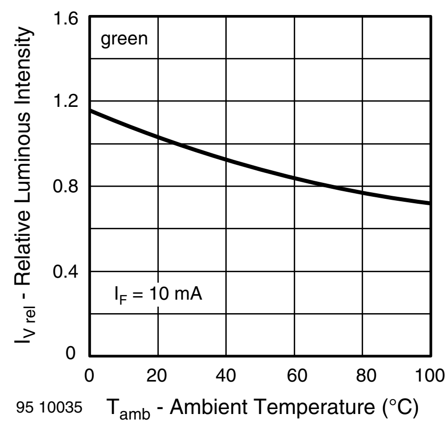


Figure 15. Rel. Luminous Intensity vs. Ambient Temperature

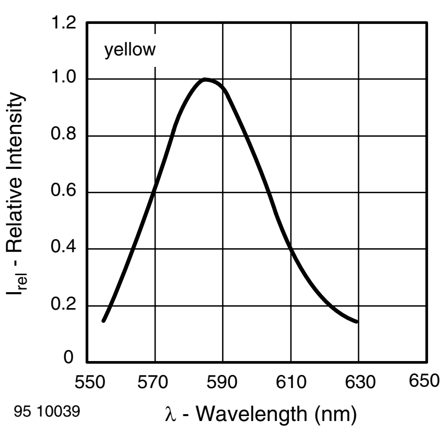


Figure 13. Relative Intensity vs. Wavelength

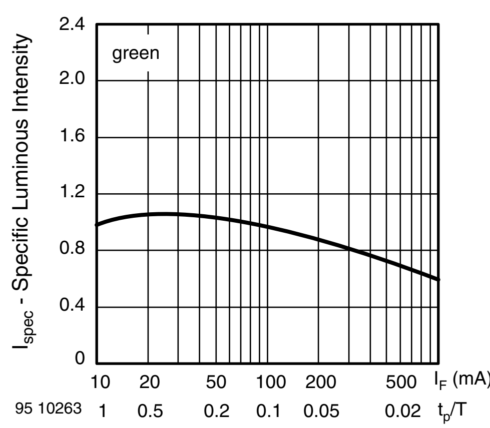


Figure 16. Specific Luminous Intensity vs. Forward Current

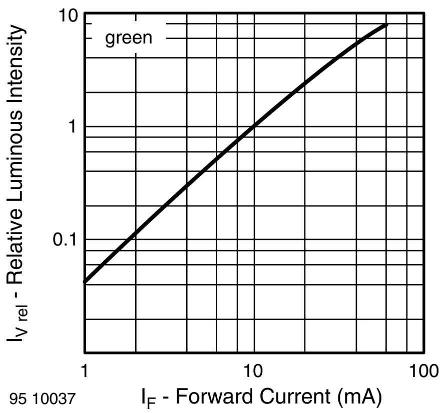


Figure 17. Relative Luminous Intensity vs. Forward Current

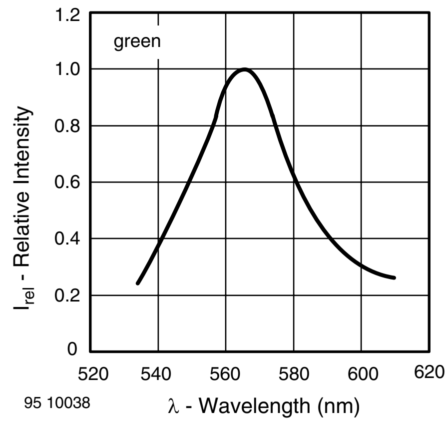
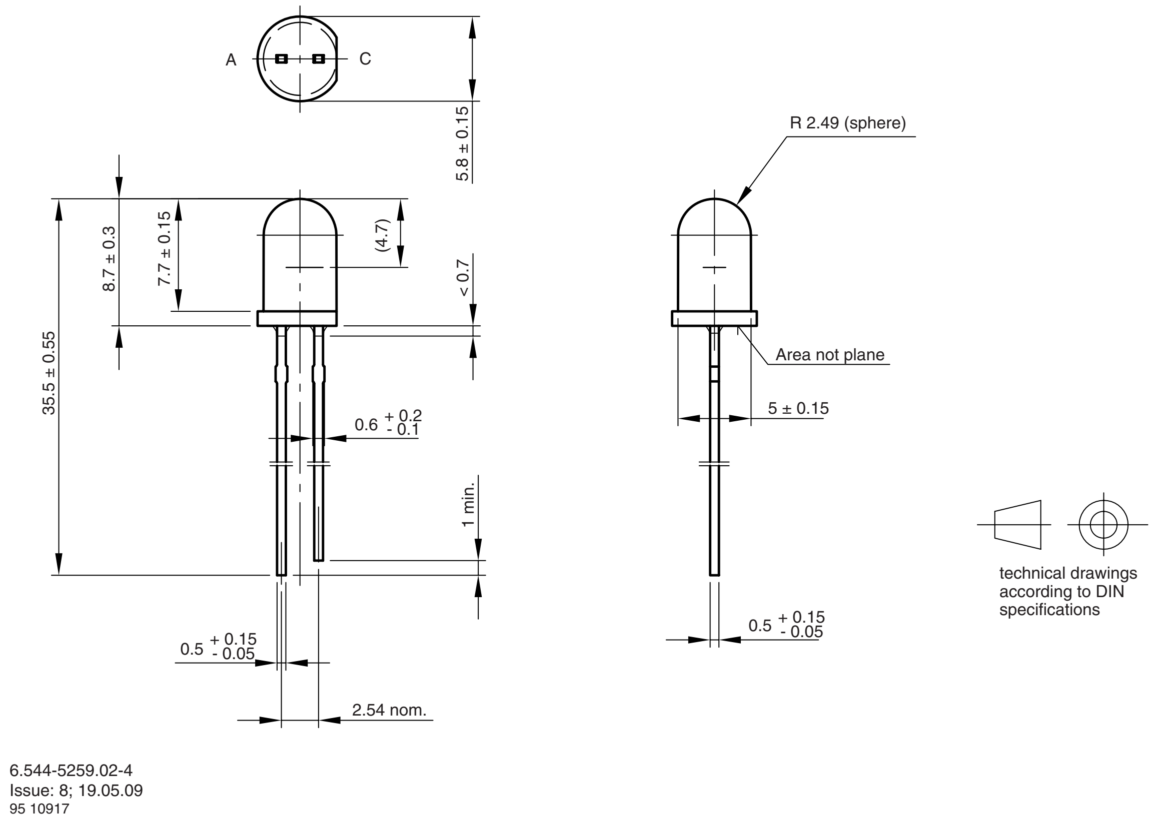


Figure 18. Relative Intensity vs. Wavelength

PACKAGE DIMENSIONS in millimeters



REEL

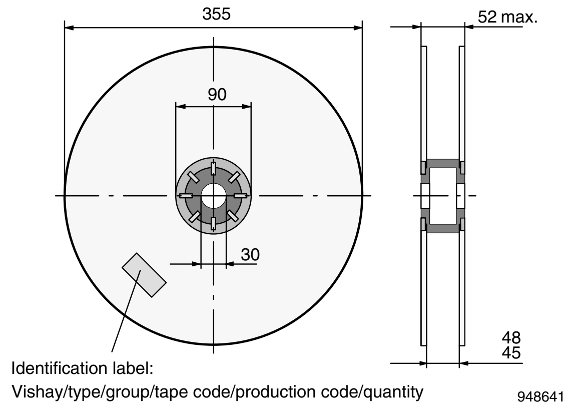


Figure 19. Reel Dimensions

AS12 = cathode leaves tape first

AS21 = anode leaves tape first

TAPE

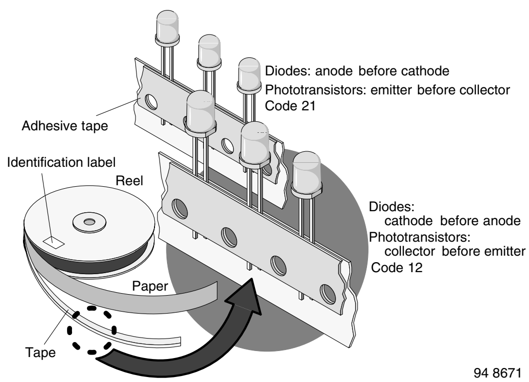


Figure 20. LED in Tape

AMMOPACK

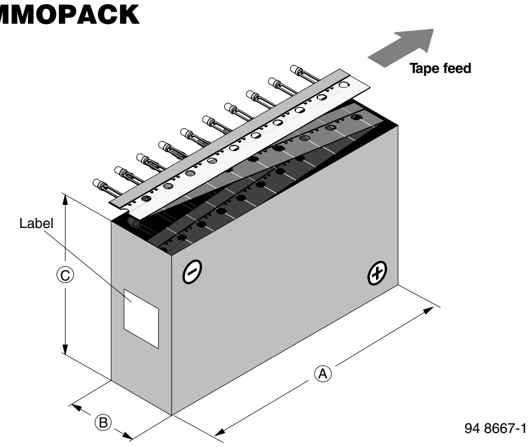
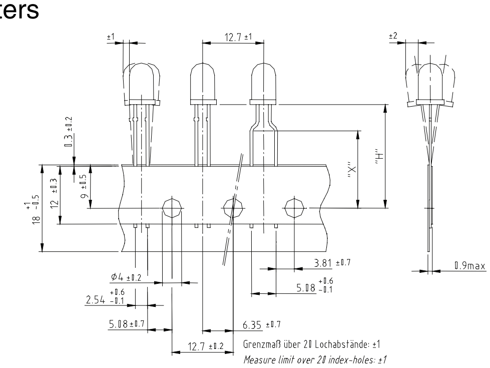


Figure 21. Tape Direction

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

TAPE DIMENSIONS in millimeters



Quantity per:	Ammopack/reel (Mat.-No. 1764)
	1000

Option	Dim. "H" ± 0.5 mm	Dim. "X" ± 0.5 mm
AS	17.3	
BT	20.0	16.0
CS	22.0	
MS	25.5	

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