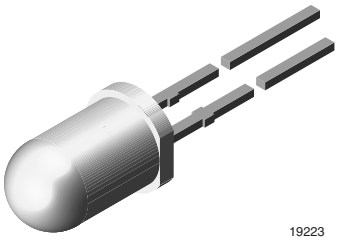
Ultrabright LED, Ø 5 mm Untinted Non-Diffused



FEATURES

- Untinted non diffused lens
- Utilizing ultrabright AlInGaP (AS)
- High luminous intensity
- High operating tempreature: T_j (chip junction temperature) up to 125 °C for AlInGaP devices
- Luminous intensity and color categorized for each packing unit
- ESD-withstand voltage: up to 2 kV according to JESD22-A114-B
- Compliant to RoHS directive 2002/95/EC and in accordance to WEEE 2002/96/EC

Pb-free

e3

RoHS COMPLIANT

DESCRIPTION

The TLC.51.. series is a clear, non diffused 5 mm LED for high end applications where supreme luminous intensity required.

These lamps with clear untinted plastic case utilize the highly developed ultrabright AlInGaP (AS).

The lens and the viewing angle is optimized to achieve best performance of light output and visibility.

APPLICATIONS

- Interior and exterior lighting
- Outdoor LED panels
- Instrumentation and front panel indicators
- Central high mounted stop lights (CHMSL) for motor vehicles
- Replaces incandescent lamps
- Traffic signals
- Light guide design

PRODUCT GROUP AND PACKAGE DATA

- Product group: LED
- Package: 5 mm
- Product series: power
- Angle of half intensity: ± 9°

PARTS TABLE

PART	COLOR, LUMINOUS INTENSITY	TECHNOLOGY
TLCR5100	Red, $I_V \geq 4300$ mcd	AlInGaP on GaAs
TLCY5100	Yellow, $I_V \geq 3200$ mcd	AlInGaP on GaAs
TLCY5100-ASZ	Yellow, $I_V \geq 3200$ mcd	AlInGaP on GaAs
TLCY5101	Yellow, I_V = (5750 to 20 000) mcd	AlInGaP on GaAs
TLCY5101-AS12Z	Yellow, I_V = (5750 to 20 000) mcd	AlInGaP on GaAs
TLCS5100	Super red, $I_V \geq 2400$ mcd	AlInGaP on GaAs
TLCO5100	Soft orange, $I_V \geq 4300$ mcd	AlInGaP on GaAs
TLCYG5100	Yellow green, $I_V \geq 1350$ mcd	AlInGaP on GaAs
TLCPG5100	Pure green, $I_V \geq 430$ mcd	AlInGaP on GaAs

ABSOLUTE MAXIMUM RATINGS [1] TLCS/R/O/Y/YG/PG510.				
PARAMETER	**TEST CONDITION**	**SYMBOL**	**VALUE**	**UNIT**
Reverse voltage [2]		V_R	5	V
DC Forward current	$T_{amb} \leq 85$ °C	I_F	50	mA
Surge forward current	$t_p \leq 10$ µs	I_{FSM}	1	A
Power dissipation		P_V	135	mW
Junction temperature		T_j	125	°C
Operating temperature range		T_{amb}	- 40 to + 100	°C
Storage temperature range		T_{stg}	- 40 to + 100	°C
Soldering temperature	t ≤ 5 s, 2 mm from body	T_{sd}	260	°C
Thermal resistance junction/ ambient		R_{thJA}	300	K/W

Note:
[1] T_{amb} = 25 °C, unless otherwise specified
[2] Driving the LED in reverse direction is suitable for a short term application

OPTICAL AND ELECTRICAL CHARACTERISTICS [1] TLCS5100, SUPER RED							
PARAMETER	**TEST CONDITION**	**PART**	**SYMBOL**	**MIN.**	**TYP.**	**MAX.**	**UNIT**
Luminous intensity [2]	I_F = 50 mA	TLCS5100	I_V	2400	7500		mcd
Dominant wavelength	I_F = 50 mA		λ_d	626	630	638	nm
Peak wavelength	I_F = 50 mA		λ_p		641		nm
Spectral bandwidth at 50 % $I_{rel\ max.}$	I_F = 50 mA		$\Delta\lambda$		20		nm
Angle of half intensity	I_F = 50 mA		φ		± 9		deg
Forward voltage	I_F = 50 mA		V_F		2.1	2.7	V
Reverse voltage	I_R = 10 µA		V_R	5			V
Temperature coefficient of V_F	I_F = 50 mA		TC_{VF}		- 2		mV/K
Temperature coefficient of λ_d	I_F = 50 mA		$TC\lambda_d$		0.04		nm/K

Note:
[1] T_{amb} = 25 °C, unless otherwise specified
[2] In one packing unit $I_{Vmax.}/I_{Vmin.} \leq 2.0$

OPTICAL AND ELECTRICAL CHARACTERISTICS [1] TLCR5100, RED							
PARAMETER	**TEST CONDITION**	**PART**	**SYMBOL**	**MIN.**	**TYP.**	**MAX.**	**UNIT**
Luminous intensity [2]	I_F = 50 mA	TLCR5100	I_V	4300	11 000		mcd
Dominant wavelength	I_F = 50 mA		λ_d	611	616	622	nm
Peak wavelength	I_F = 50 mA		λ_p		622		nm
Spectral bandwidth at 50 % $I_{rel\ max.}$	I_F = 50 mA		$\Delta\lambda$		18		nm
Angle of half intensity	I_F = 50 mA		φ		± 9		deg
Forward voltage	I_F = 50 mA		V_F		2.1	2.7	V
Reverse voltage	I_R = 10 µA		V_R	5			V
Temperature coefficient of V_F	I_F = 50 mA		TC_{VF}		- 3.5		mV/K
Temperature coefficient of λ_d	I_F = 50 mA		$TC\lambda_d$		0.05		nm/K

Note:
[1] T_{amb} = 25 °C, unless otherwise specified
[2] In one packing unit $I_{Vmax.}/I_{Vmin.} \leq 2.0$

OPTICAL AND ELECTRICAL CHARACTERISTICS [1] TLCO5100, SOFT ORANGE							
PARAMETER	**TEST CONDITION**	**PART**	**SYMBOL**	**MIN.**	**TYP.**	**MAX.**	**UNIT**
Luminous intensity [2]	I_F = 50 mA	TLCO5100	I_V	4300	12 000		mcd
Dominant wavelength	I_F = 50 mA		λ_d	600	605	611	nm
Peak wavelength	I_F = 50 mA		λ_p		611		nm
Spectral bandwidth at 50 % $I_{rel\ max.}$	I_F = 50 mA		$\Delta\lambda$		17		nm
Angle of half intensity	I_F = 50 mA		φ		± 9		deg
Forward voltage	I_F = 50 mA		V_F		2.1	2.7	V
Reverse voltage	I_R = 10 µA		V_R	5			V
Temperature coefficient of V_F	I_F = 50 mA		TC_{VF}		- 2.5		mV/K
Temperature coefficient of λ_d	I_F = 50 mA		$TC\lambda_d$		0.08		nm/K

Note:
[1] T_{amb} = 25 °C, unless otherwise specified
[2] In one packing unit $I_{Vmax.}/I_{Vmin.} \leq 2.0$

OPTICAL AND ELECTRICAL CHARACTERISTICS [1] TLCY5100, TLCY5101, YELLOW							
PARAMETER	**TEST CONDITION**	**PART**	**SYMBOL**	**MIN.**	**TYP.**	**MAX.**	**UNIT**
Luminous intensity [2]	I_F = 50 mA	TLCY5100	I_V	3200	7500		mcd
		TLCY5101	I_V	5750		20 000	mcd
Dominant wavelength	I_F = 50 mA		λ_d	585	590	597	nm
Peak wavelength	I_F = 50 mA		λ_p		593		nm
Spectral bandwidth at 50 % $I_{rel\ max.}$	I_F = 50 mA		$\Delta\lambda$		17		nm
Angle of half intensity	I_F = 50 mA		φ		± 9		deg
Forward voltage	I_F = 50 mA		V_F		2.1	2.7	V
Reverse voltage	I_R = 10 µA		V_R	5			V
Temperature coefficient of V_F	I_F = 50 mA		TC_{VF}		- 3.5		mV/K
Temperature coefficient of λ_d	I_F = 50 mA		$TC\lambda_d$		0.1		nm/K

Note:
[1] T_{amb} = 25 °C, unless otherwise specified
[2] In one packing unit $I_{Vmax.}/I_{Vmin.} \leq 2.0$

OPTICAL AND ELECTRICAL CHARACTERISTICS [1] TLCYG5100, YELLOW GREEN							
PARAMETER	**TEST CONDITION**	**PART**	**SYMBOL**	**MIN.**	**TYP.**	**MAX.**	**UNIT**
Luminous intensity [2]	I_F = 50 mA	TLCYG5100	I_V	1350	3500		mcd
Dominant wavelength	I_F = 50 mA		λ_d	565	572	576	nm
Peak wavelength	I_F = 50 mA		λ_p		574		nm
Spectral bandwidth at 50 % $I_{rel\ max.}$	I_F = 50 mA		$\Delta\lambda$		15		nm
Angle of half intensity	I_F = 50 mA		φ		± 9		deg
Forward voltage	I_F = 50 mA		V_F		2.2	2.7	V
Reverse voltage	I_R = 10 µA		V_R	5			V
Temperature coefficient of V_F	I_F = 50 mA		TC_{VF}		- 4.5		mV/K
Temperature coefficient of λ_d	I_F = 50 mA		$TC\lambda_d$		0.1		nm/K

Note:
[1] T_{amb} = 25 °C, unless otherwise specified
[2] In one packing unit $I_{Vmax.}/I_{Vmin.} \leq 2.0$

OPTICAL AND ELECTRICAL CHARACTERISTICS [1] TLCPG5100, PURE GREEN							
PARAMETER	**TEST CONDITION**	**PART**	**SYMBOL**	**MIN.**	**TYP.**	**MAX.**	**UNIT**
Luminous intensity [2]	I_F = 50 mA	TLCPG5100	I_V	430	1250		mcd
Dominant wavelength	I_F = 50 mA		λ_d	555	562	567	nm
Peak wavelength	I_F = 50 mA		λ_p		563		nm
Spectral bandwidth at 50 % $I_{rel\ max.}$	I_F = 50 mA		$\Delta\lambda$		20		nm
Angle of half intensity	I_F = 50 mA		φ		± 9		deg
Forward voltage	I_F = 50 mA		V_F		2.2	2.7	V
Reverse voltage	I_R = 10 µA		V_R	5			V
Temperature coefficient of V_F	I_F = 50 mA		TC_{VF}		- 3.5		mV/K
Temperature coefficient of λ_d	I_F = 50 mA		$TC\lambda_d$		0.1		nm/K

Note:
[1] T_{amb} = 25 °C, unless otherwise specified
[2] In one packing unit $I_{Vmax.}/I_{Vmin.} \leq 2.0$

LUMINOUS INTENSITY CLASSIFICATION		
GROUP	**LUMINOUS INTENSITY (mcd)**	
STANDARD	**MIN.**	**MAX.**
BB	430	860
CC	575	1150
DD	750	1500
EE	1000	2000
FF	1350	2700
GG	1800	3600
HH	2400	4800
II	3200	6400
KK	4300	8600
LL	5750	11 500
MM	7500	15 000
NN	10 000	20 000
PP	13 500	27 000
QQ	18 000	36 000
RR	24 000	48 000
SS	32 000	64 000
TT	43 000	86 000
UU	57 500	115 000

Note:
Luminous intensity is tested at a current pulse duration of 25 ms and an accuracy of ± 11 %.
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 in any one bag.
In order to ensure availability, single wavelength groups will not be orderable.

COLOR CLASSIFICATION

GROUP	DOM. WAVELENGTH (nm)									
	RED		SOFT ORANGE		YELLOW		YELLOW GREEN		PURE GREEN	
	MIN.	MAX.	MIN.	MAX.	MIN.	MAX.	MIN.	MAX.	MIN.	MAX.
0					585	588			555	559
1	611	618			587	591			558	561
2	614	622	600	603	589	594			560	563
3			602	605	592	597			562	565
4			604	607					564	567
5			606	609			565	570		
6			608	611			567	572		
7							569	574		
8							571	576		

Note:
Wavelengths are tested at a current pulse duration of 25 ms and an accuracy of ± 1 nm.

TYPICAL CHARACTERISTICS

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

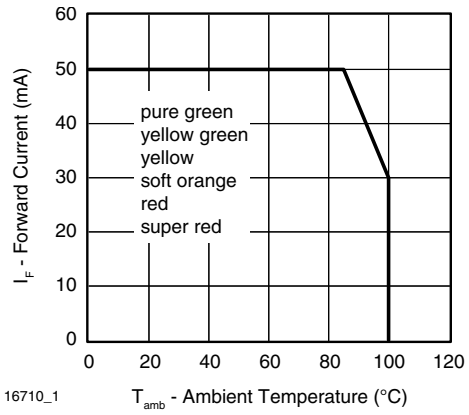


Figure 1. Forward Current vs. Ambient Temperature

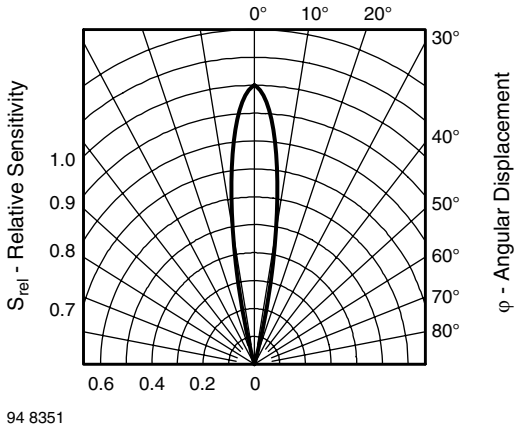


Figure 3. Relative Radiant Sensitivity vs. Angular Displacement

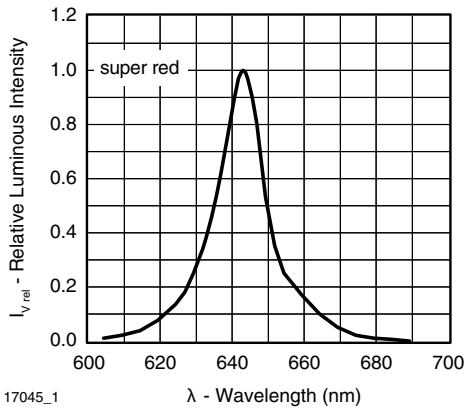


Figure 2. Relative Intensity vs. Wavelength

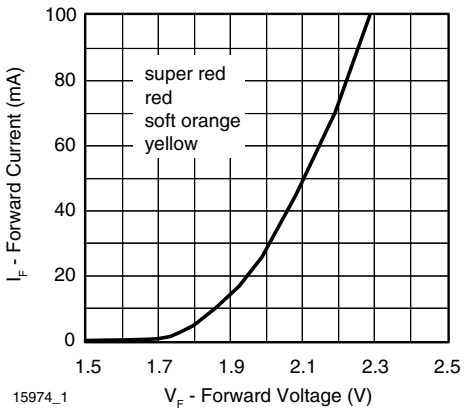


Figure 4. Forward Current vs. Forward Voltage

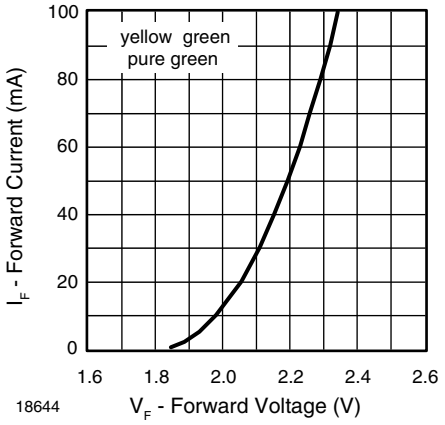


Figure 5. Forward Current vs. Forward Voltage

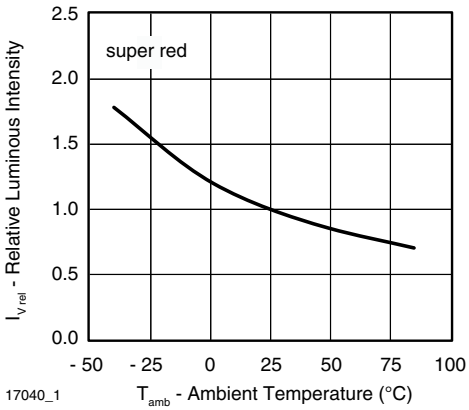


Figure 8. Relative Luminous Intensity vs. Ambient Temperature

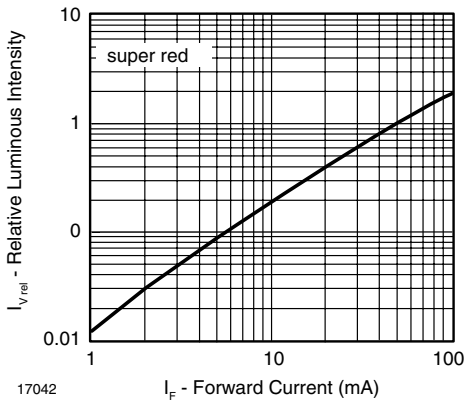


Figure 6. Relative Luminous Flux vs. Forward Current

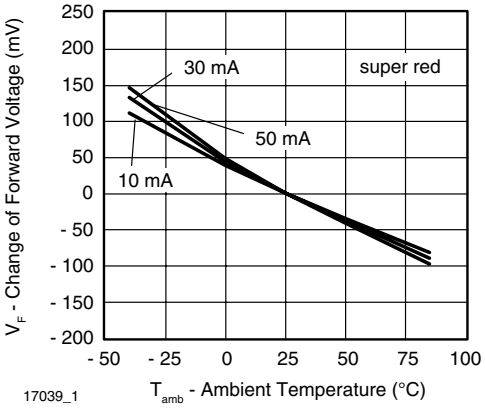


Figure 9. Change of Forward Voltage vs. Ambient Temperature

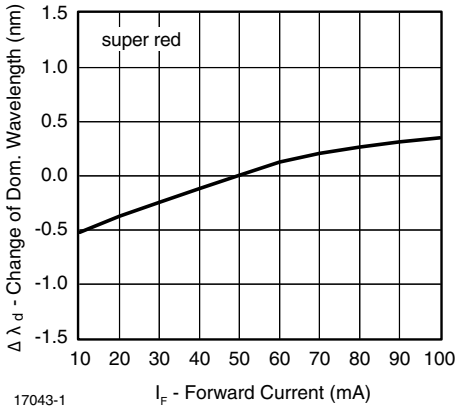


Figure 7. Change of Dominant Wavelength vs. Ambient Temperature

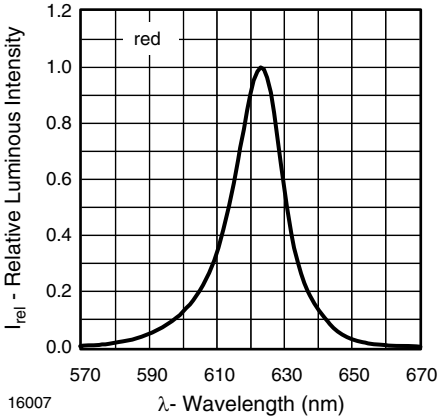


Figure 10. Relative Intensity vs. Wavelength

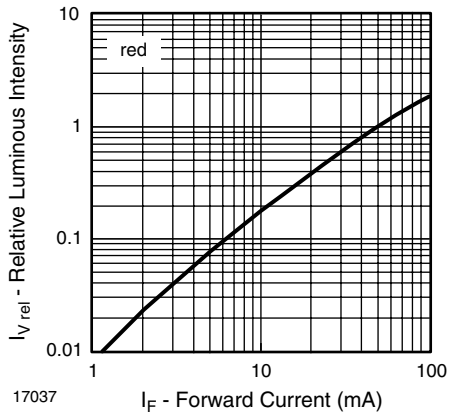


Figure 11. Relative Luminous Flux vs. Forward Current

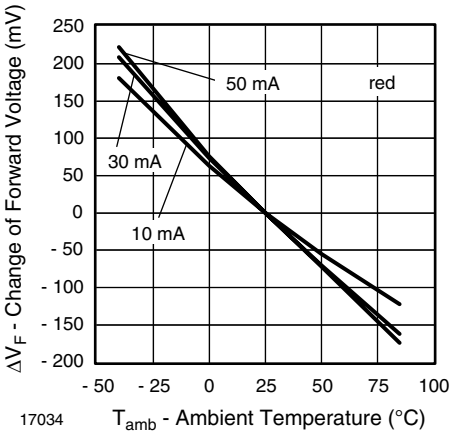


Figure 14. Change of Forward Voltage vs. Ambient Temperature

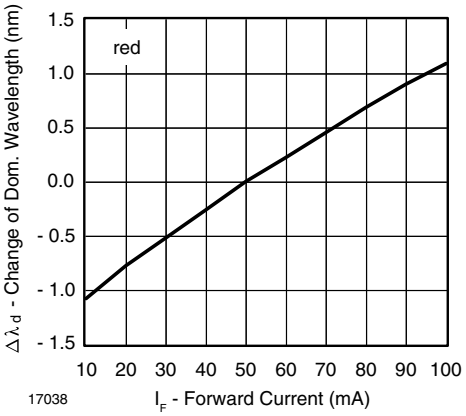


Figure 12. Changes of Dominant Wavelength vs. Forward Current

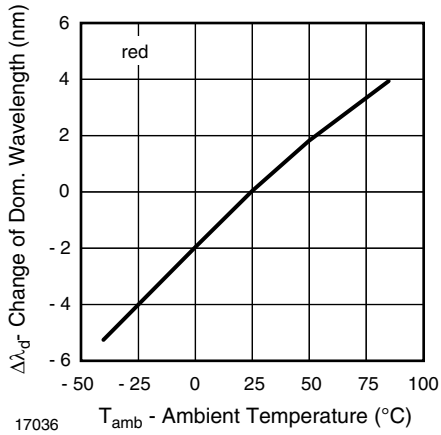


Figure 15. Change of Dominant Wavelength vs. Ambient Temperature

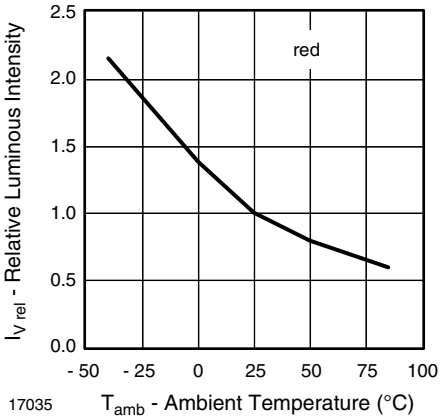


Figure 13. Relative Luminous Intensity vs. Ambient Temperature

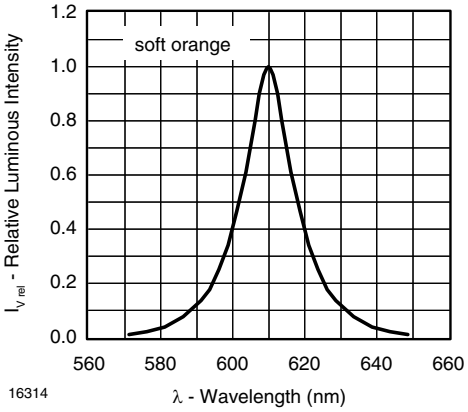


Figure 16. Relative Intensity vs. Wavelength

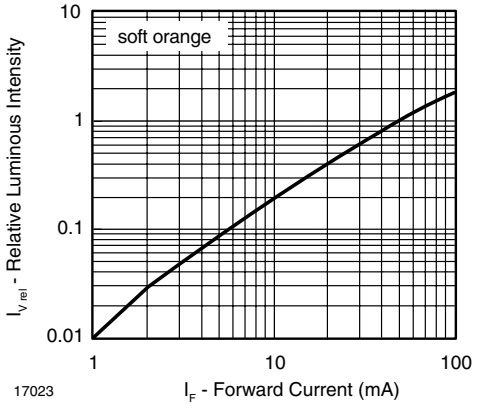


Figure 17. Relative Luminous Flux vs. Forward Current

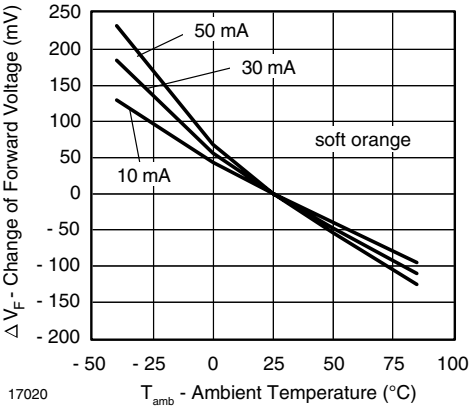


Figure 20. Change of Forward Voltage vs. Ambient Temperature

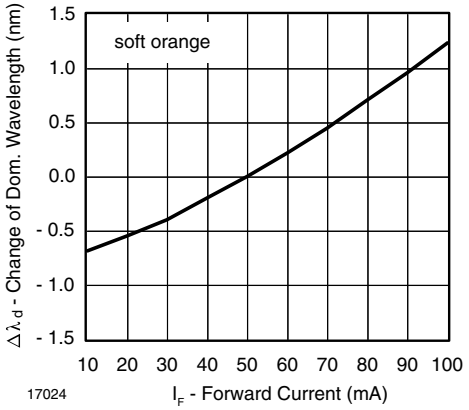


Figure 18. Change of Dominant Wavelength vs. Forward Current

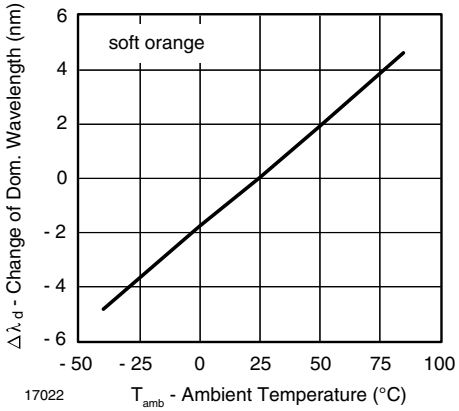


Figure 21. Change of Dominant Wavelength vs. Ambient Temperature

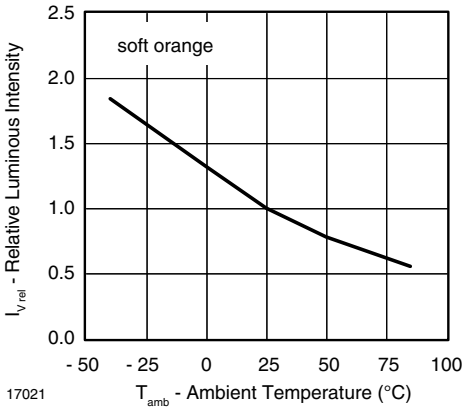


Figure 19. Relative Luminous Intensity vs. Ambient Temperature

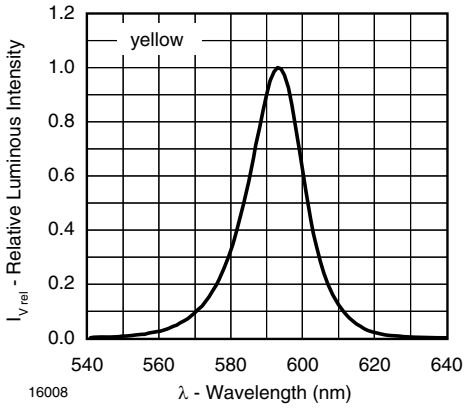


Figure 22. Relative Intensity vs. Wavelength

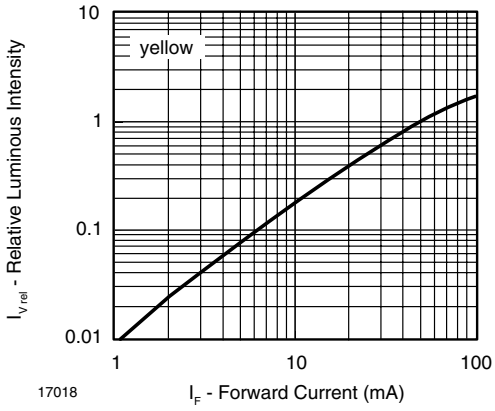


Figure 23. Relative Luminous Flux vs. Forward Current

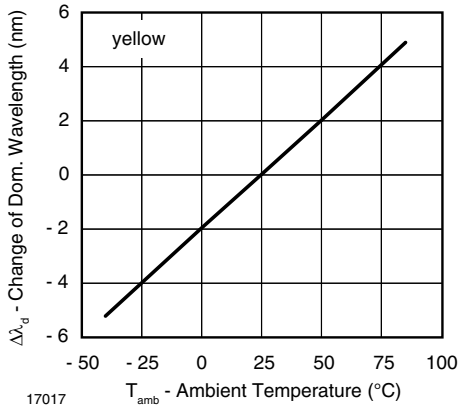


Figure 26. Change of Dominant Wavelength vs. Ambient Temperature

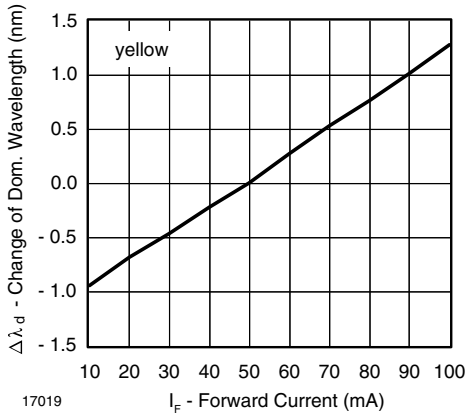


Figure 24. Change of Dominant Wavelength vs. Forward Current

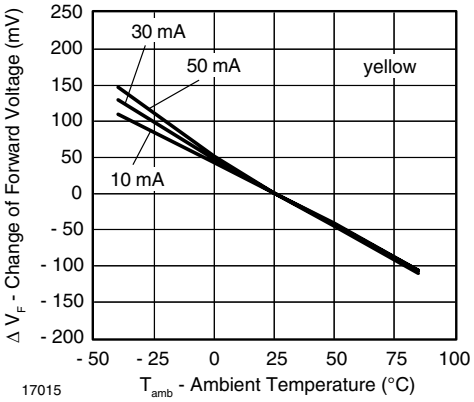


Figure 27. Change of Forward Voltage vs. Ambient Temperature

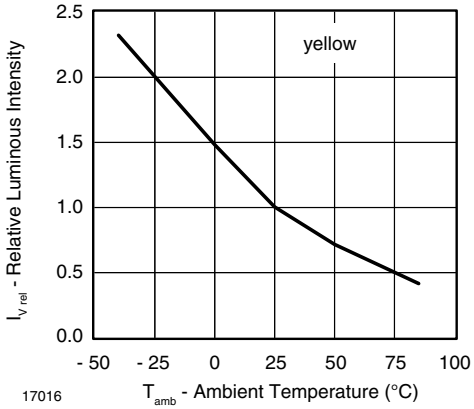


Figure 25. Relative Luminous Intensity vs. Ambient Temperature

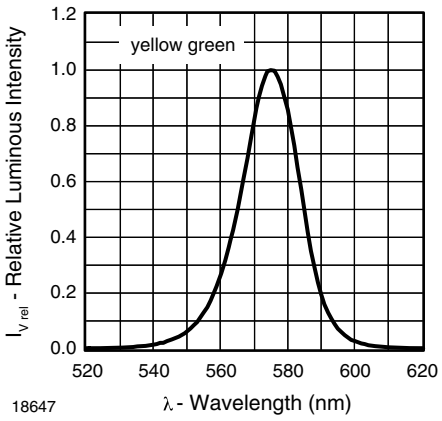


Figure 28. Relative Intensity vs. Wavelength

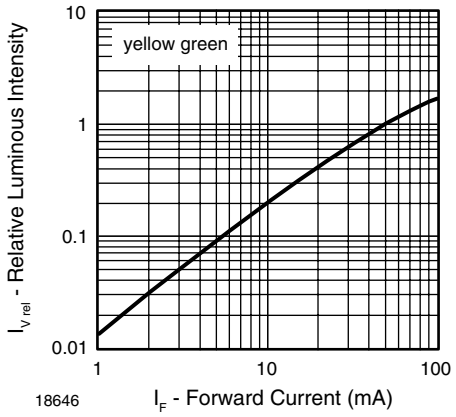


Figure 29. Relative Luminous Flux vs. Forward Current

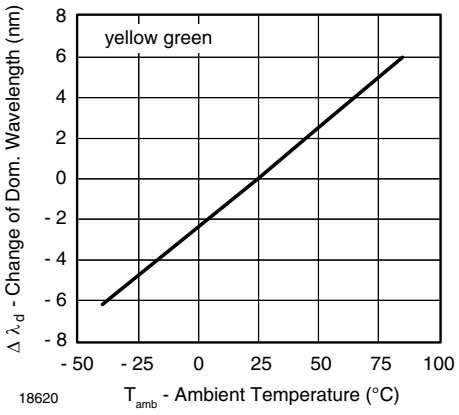


Figure 32. Change of Dominant Wavelength vs. Ambient Temperature

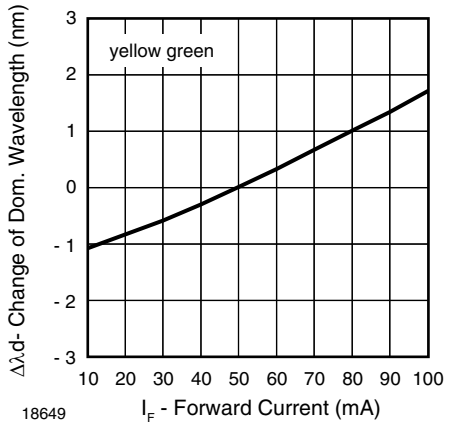


Figure 30. Change of Dominant Wavelength vs. Forward Current

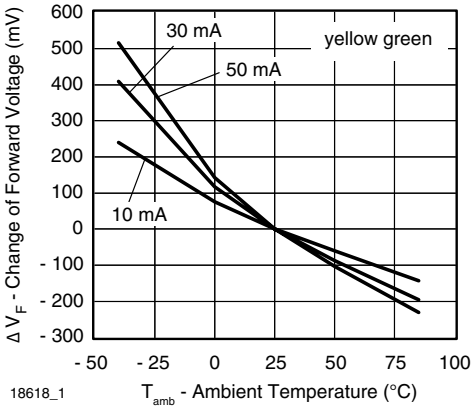


Figure 33. Change of Forward Voltage vs. Ambient Temperature

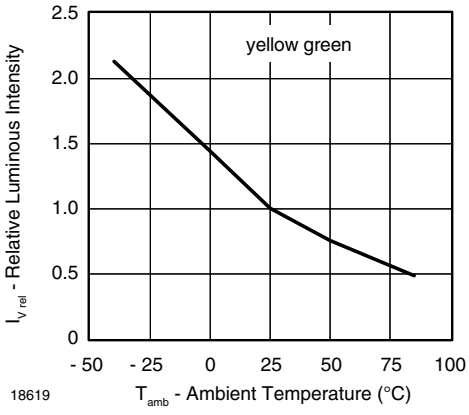


Figure 31. Relative Luminous Intensity vs. Ambient Temperature

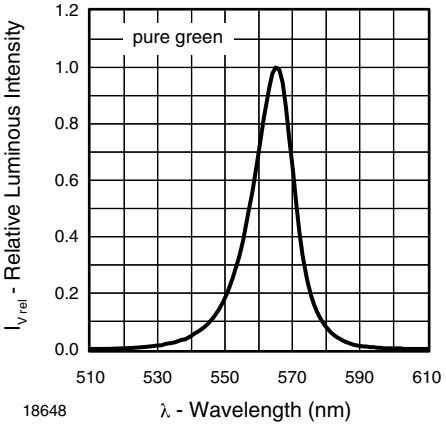


Figure 34. Relative Intensity vs. Wavelength

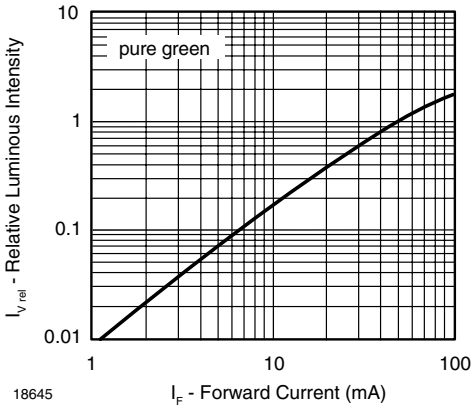


Figure 35. Relative Luminous Flux vs. Forward Current

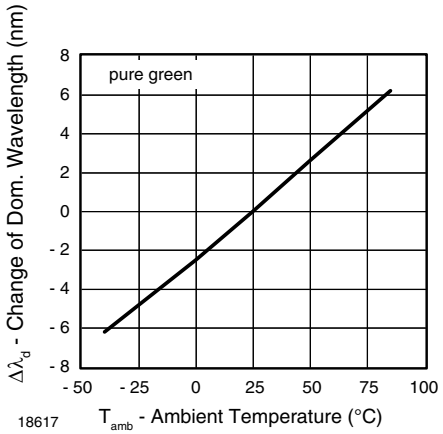


Figure 38. Change of Dominant Wavelength vs. Ambient Temperature

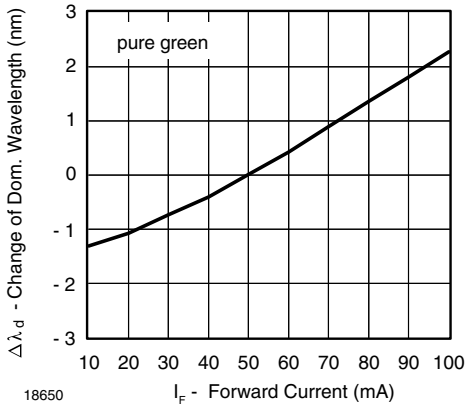


Figure 36. Change of Dominant Wavelength vs. Forward Current

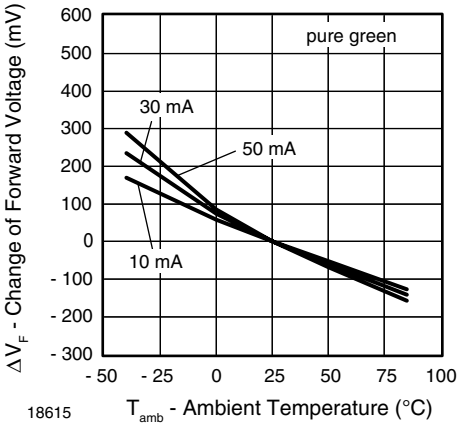


Figure 39. Change of Forward Voltage vs. Ambient Temperature

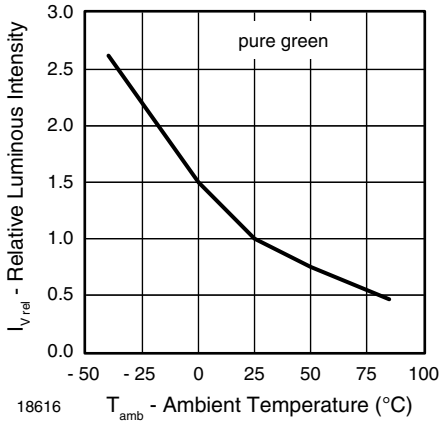
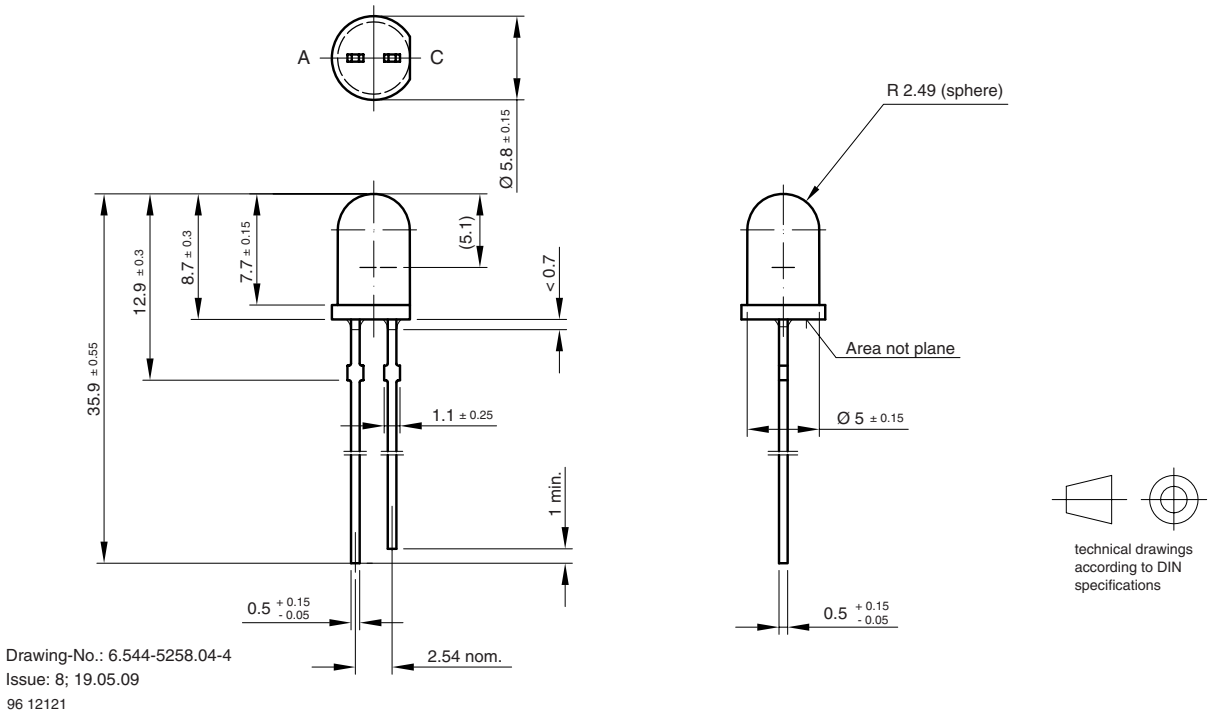


Figure 37. Relative Luminous Intensity vs. Ambient Temperature

PACKAGE DIMENSIONS in millimeters



TAPE

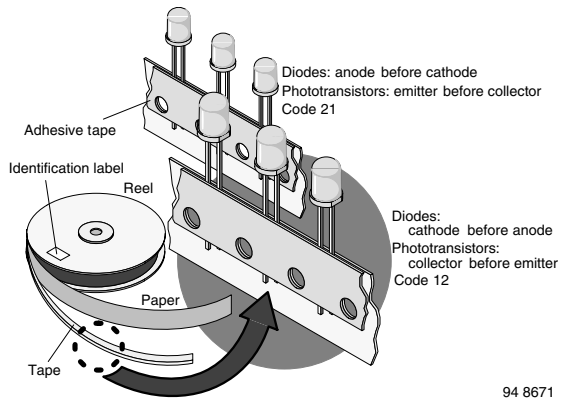


Figure 40. LED in Tape

AMMOPACK

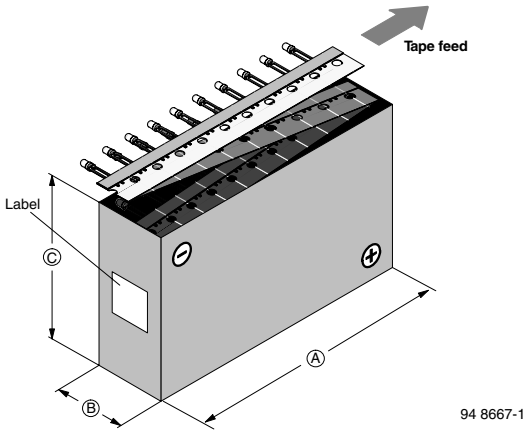
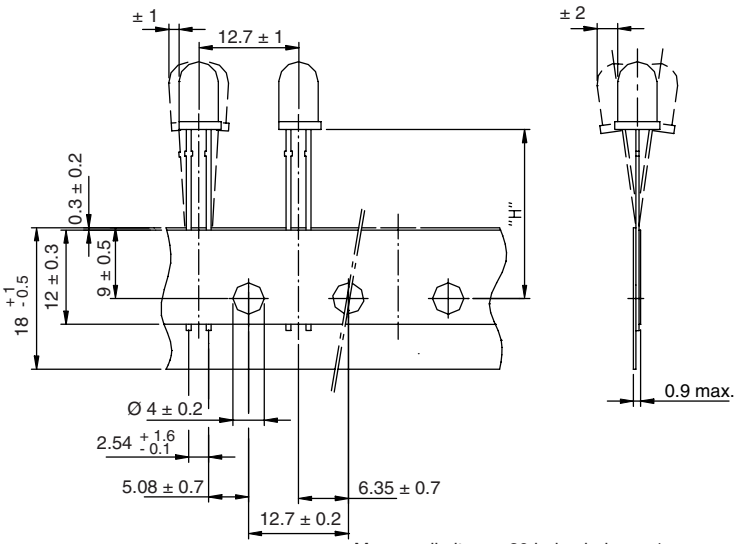


Figure 41. Tape Direction

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

TAPE DIMENSIONS in millimeters



Measure limit over 20 index-holes: ± 1

Quantity per:	Reel (Mat.-no. 1764)
	1000

94 8172

Option	Dim. “H” ± 0.5 mm
AS	17.3

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