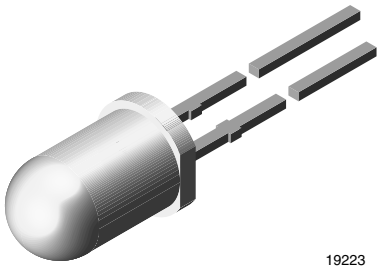
Ultrabright LED, Ø 5 mm Untinted Non-Diffused Package



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.

PRODUCT GROUP AND PACKAGE DATA

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

FEATURES

- Untinted non-diffused lens
- Utilizing ultrabright AlInGaP (AS)
- High luminous intensity
- High operating temperature: 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
- Material categorization: for definitions of compliance please see www.vishay.com/doc?99912

Pb-free
e3
RoHS COMPLIANT
HALOGEN FREE
GREEN (5-2008)

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

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.		
TLCS5100	Super red	2400	7500	-	50	626	630	638	50	-	2.1	2.7	50	AlInGaP on GaAs
TLCR5100	Red	4300	11 000	-	50	611	616	622	50	-	2.1	2.7	50	AlInGaP on GaAs
TLCYG5100	Yellow green	1350	3500	-	50	565	572	576	50	-	2.2	2.7	50	AlInGaP on GaAs
TLCPG5100	Pure green	430	1250	-	50	555	562	567	50	-	2.1	2.7	50	AlInGaP on GaAs

ABSOLUTE MAXIMUM RATINGS (T_{amb} = 25 °C, unless otherwise specified)
TLCS5100, TLCR5100, TLCYG5100, TLCPG5100

PARAMETER	TEST CONDITION	SYMBOL	VALUE	UNIT
Reverse voltage [1]		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 to ambient		R_{thJA}	300	K/W

Note

[1] Driving the LED in reverse direction is suitable for a short term application

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OPTICAL AND ELECTRICAL CHARACTERISTICS (T_{amb} = 25 °C, unless otherwise specified)
TLCS5100, SUPER RED

PARAMETER	TEST CONDITION	PART	SYMBOL	MIN.	TYP.	MAX.	UNIT
Luminous intensity [1]	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	-	°
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) In one packing unit $I_{Vmax.}/I_{Vmin.} \leq 2.0$

OPTICAL AND ELECTRICAL CHARACTERISTICS (T_{amb} = 25 °C, unless otherwise specified)
TLCR5100, RED

PARAMETER	TEST CONDITION	PART	SYMBOL	MIN.	TYP.	MAX.	UNIT
Luminous intensity [1]	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	-	°
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) In one packing unit $I_{Vmax.}/I_{Vmin.} \leq 2.0$

OPTICAL AND ELECTRICAL CHARACTERISTICS (T_{amb} = 25 °C, unless otherwise specified)
TLCYG5100, YELLOW GREEN

PARAMETER	TEST CONDITION	PART	SYMBOL	MIN.	TYP.	MAX.	UNIT
Luminous intensity [1]	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	-	°
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) In one packing unit $I_{Vmax.}/I_{Vmin.} \leq 2.0$

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OPTICAL AND ELECTRICAL CHARACTERISTICS (T_{amb} = 25 °C, unless otherwise specified) **TLCPG5100, PURE GREEN**							
PARAMETER	**TEST CONDITION**	**PART**	**SYMBOL**	**MIN.**	**TYP.**	**MAX.**	**UNIT**
Luminous intensity [1]	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	-	°
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] 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

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COLOR CLASSIFICATION						
GROUP	DOM. WAVELENGTH (nm)					
	RED		YELLOW GREEN		PURE GREEN	
	MIN.	MAX.	MIN.	MAX.	MIN.	MAX.
0	-	-	-	-	555	559
1	611	618	-	-	558	561
2	614	622	-	-	560	563
3	-	-	-	-	562	565
4	-	-	-	-	564	567
5	-	-	565	570	-	-
6	-	-	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)

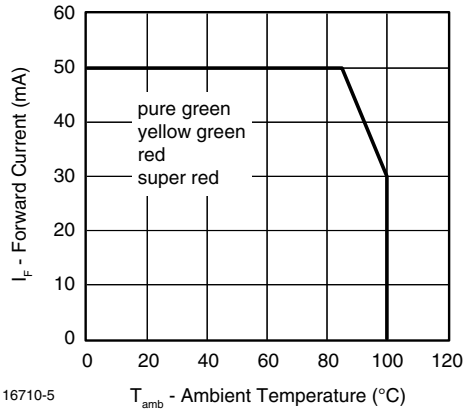

Fig. 1 - Forward Current vs. Ambient Temperature

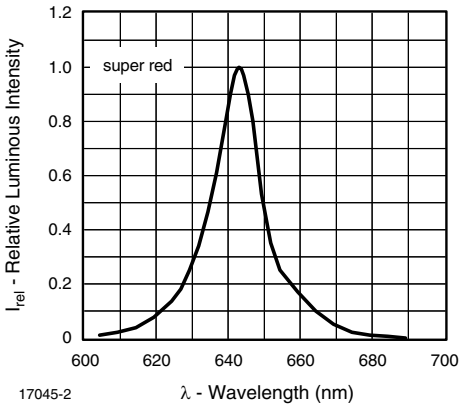

Fig. 3 - Relative Intensity vs. Wavelength

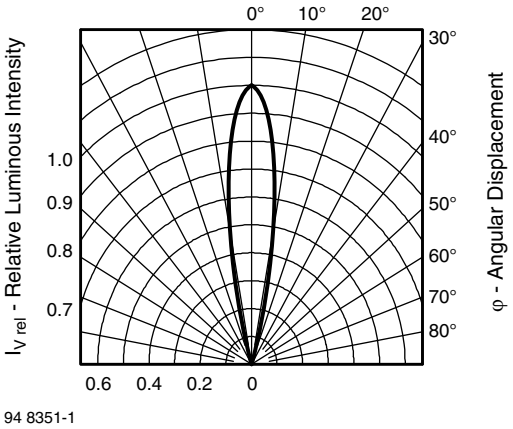

Fig. 2 - Relative Luminous Intensity vs. Angular Displacement

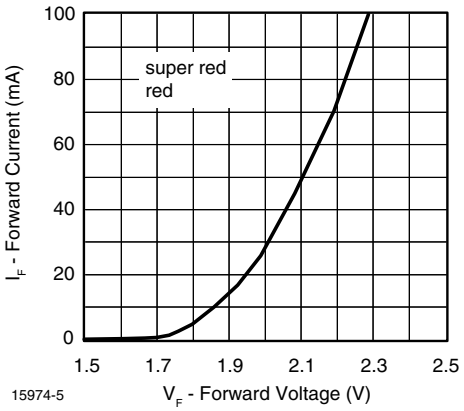

Fig. 4 - Forward Current vs. Forward Voltage

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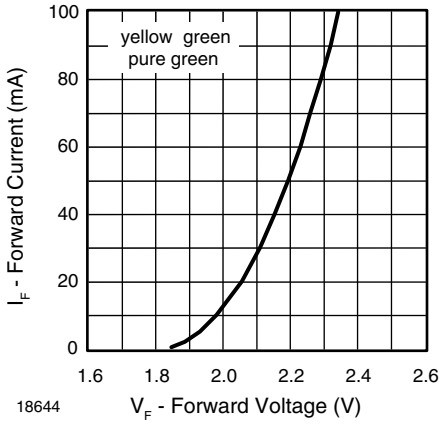

Fig. 5 - Forward Current vs. Forward Voltage

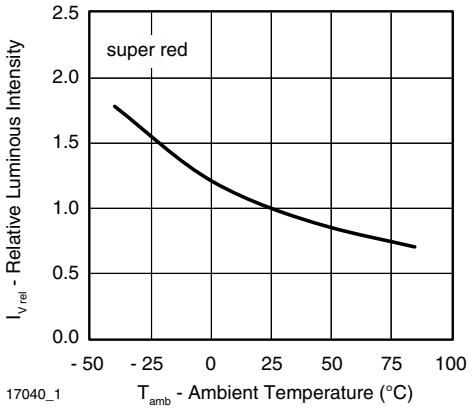

Fig. 8 - Relative Luminous Intensity vs. Ambient Temperature

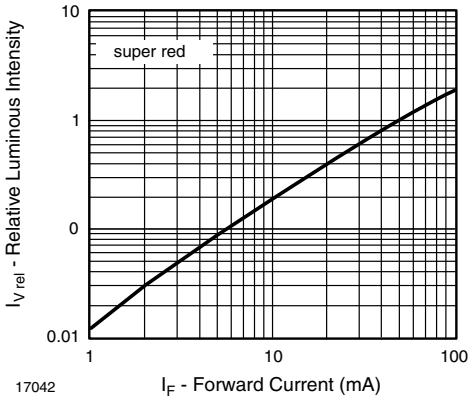

Fig. 6 - Relative Luminous Intensity vs. Forward Current

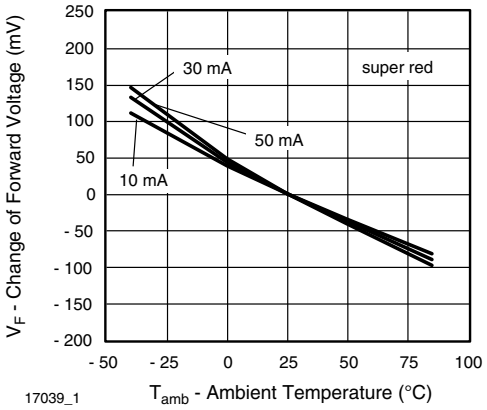

Fig. 9 - Change of Forward Voltage vs. Ambient Temperature

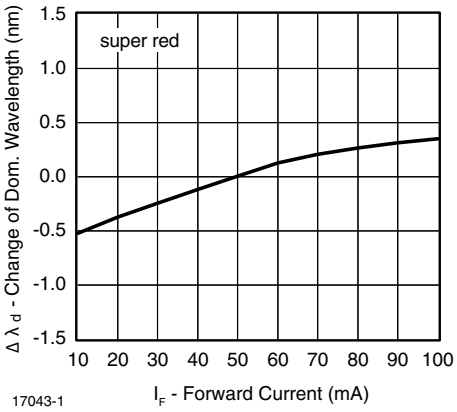

Fig. 7 - Change of Dominant Wavelength vs. Ambient Temperature

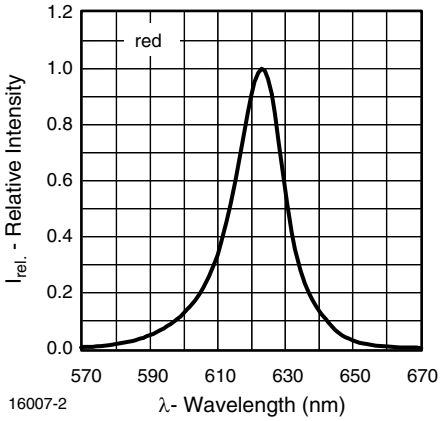

Fig. 10 - Relative Intensity vs. Wavelength

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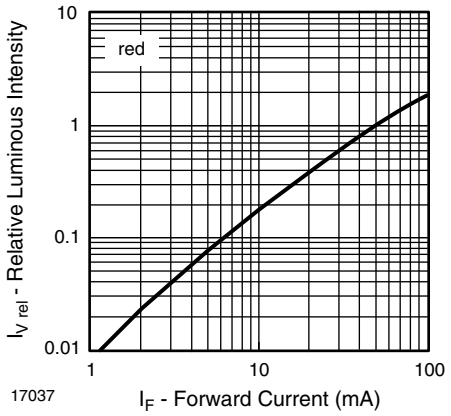

Fig. 11 - Relative Luminous Intensity vs. Forward Current

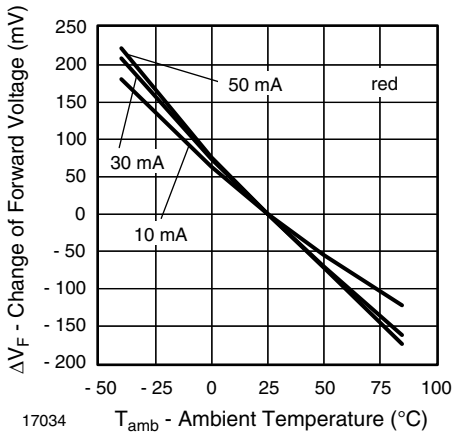

Fig. 14 - Change of Forward Voltage vs. Ambient Temperature

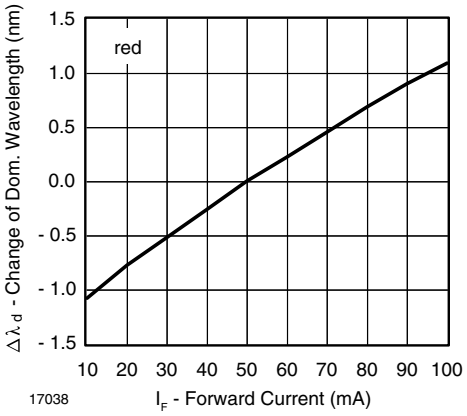

Fig. 12 - Changes of Dominant Wavelength vs. Forward Current

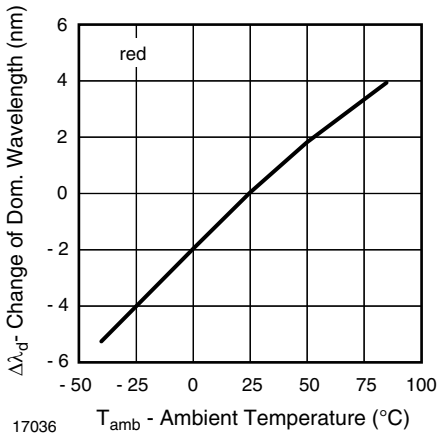

Fig. 15 - Change of Dominant Wavelength vs. Ambient Temperature

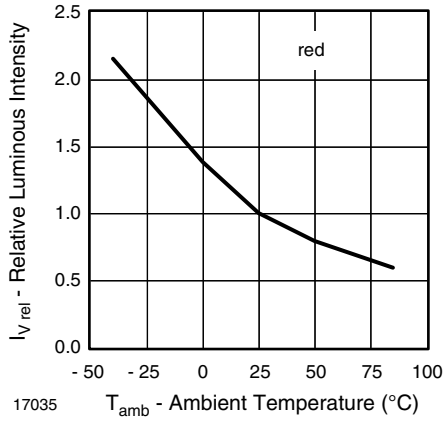

Fig. 13 - Relative Luminous Intensity vs. Ambient Temperature

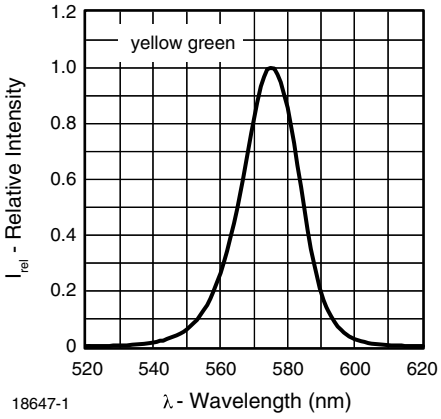

Fig. 16 - Relative Intensity vs. Wavelength

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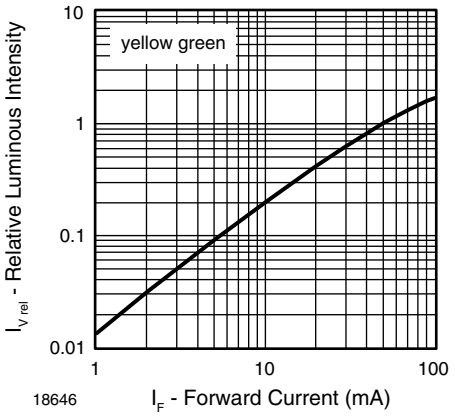

Fig. 17 - Relative Luminous Intensity vs. Forward Current

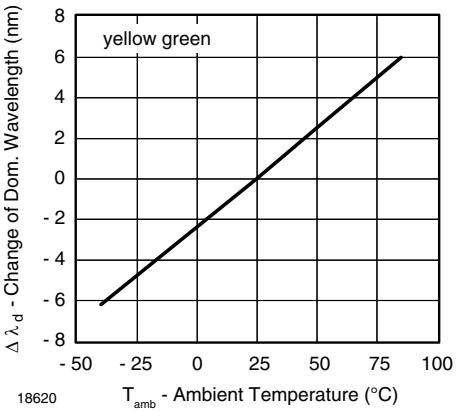

Fig. 20 - Change of Dominant Wavelength vs. Ambient Temperature

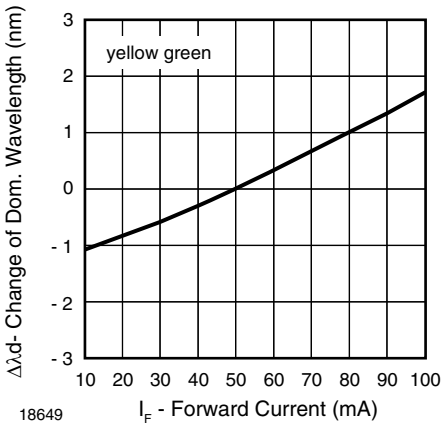

Fig. 18 - Change of Dominant Wavelength vs. Forward Current

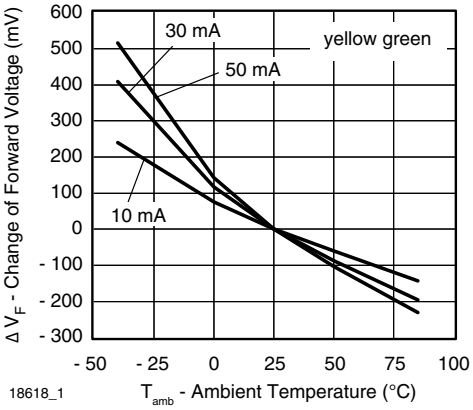

Fig. 21 - Change of Forward Voltage vs. Ambient Temperature

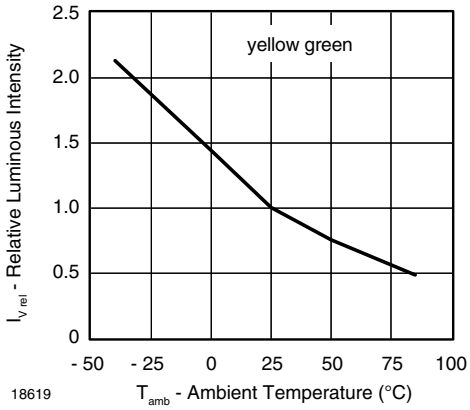

Fig. 19 - Relative Luminous Intensity vs. Ambient Temperature

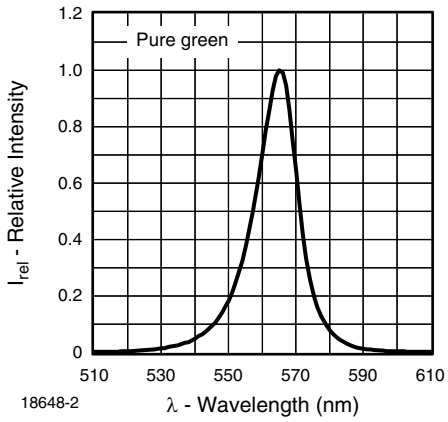

Fig. 22 - Relative Intensity vs. Wavelength

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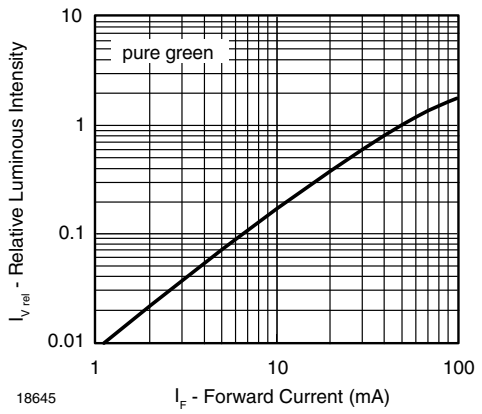

Fig. 23 - Relative Luminous Intensity vs. Forward Current

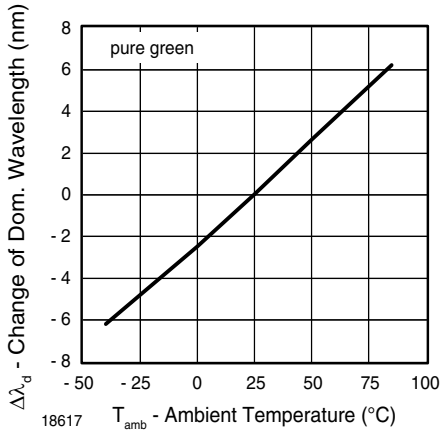

Fig. 26 - Change of Dominant Wavelength vs. Ambient Temperature

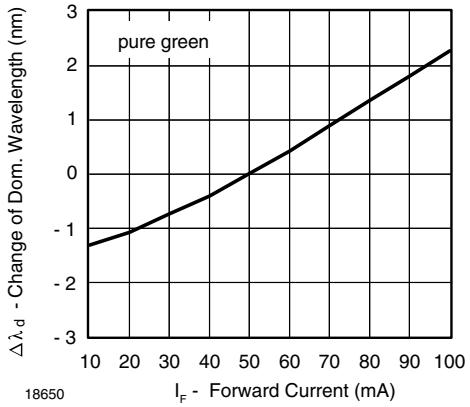

Fig. 24 - Change of Dominant Wavelength vs. Forward Current

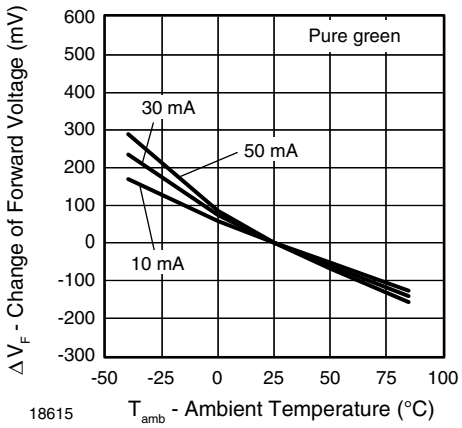

Fig. 27 - Change of Forward Voltage vs. Ambient Temperature

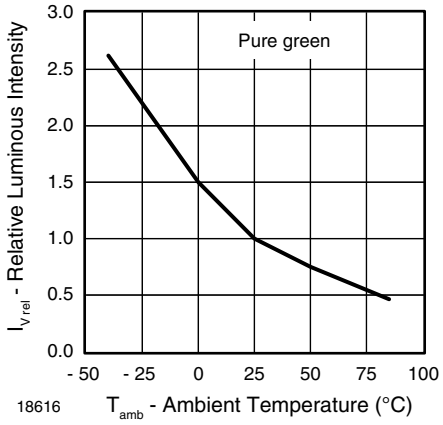

Fig. 25 - Relative Luminous Intensity vs. Ambient Temperature

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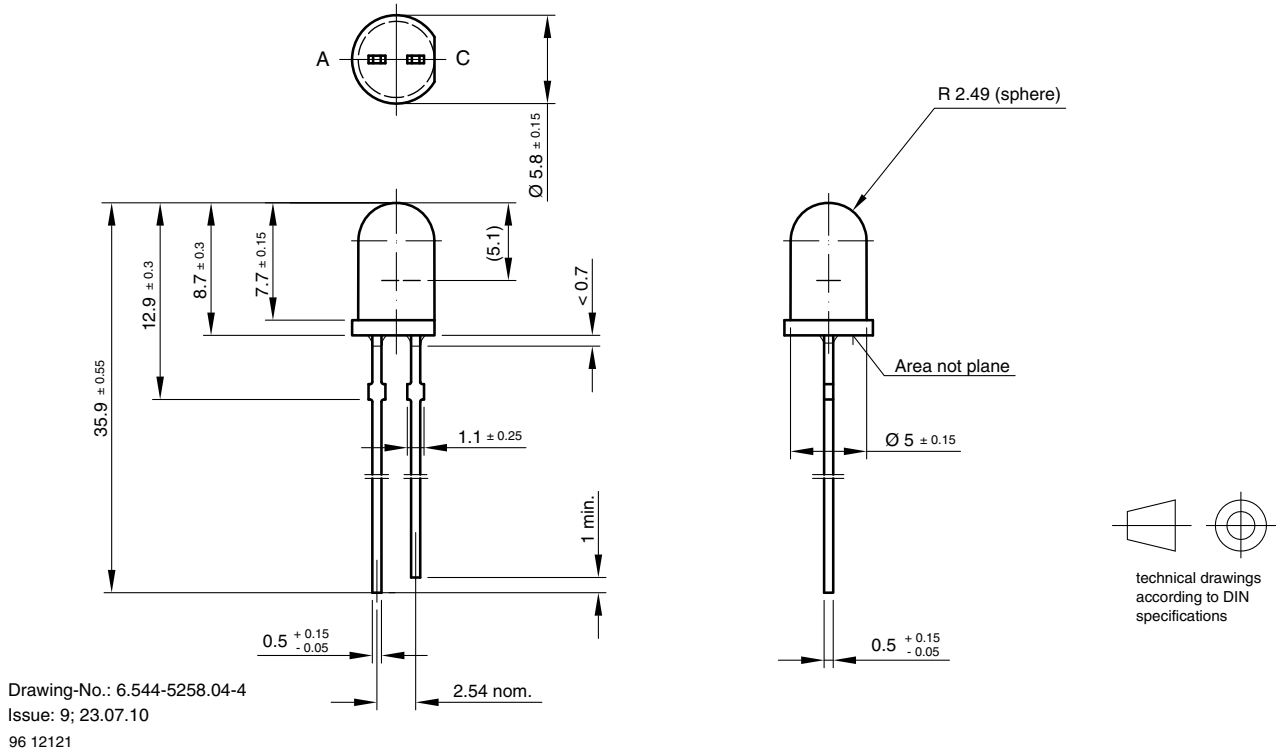
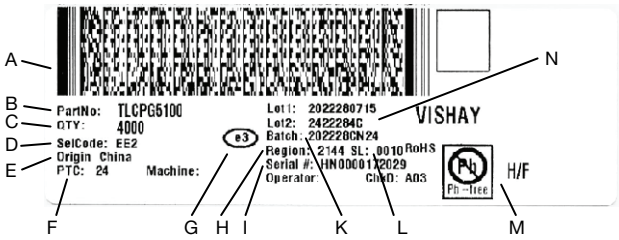
PACKAGE DIMENSIONS in millimeters



PACKING		
MATERIAL	**PACKING**	**QUANTITY**
TLCx5100	Bulk	4000

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

For technical questions, contact: LED@vishay.com
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