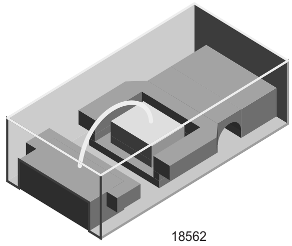
Ultrabright 0603 LED

Description

The new 0603 LED series have been designed in the smallest SMD package. This innovative 0603 LED technology opens the way to
- smaller products of higher performance
- more design in flexibility
- enhanced applications

The 0603 LED is an obvious solution for small-scale, high power products that are expected to work reliability in an arduous environment.



Features

- Smallest SMD package 0603 with exceptional brightness 1.6 mm x 0.8 mm x 0.6 mm (L x W x H)
- High reliability lead frame based
- Temperature range - 40 °C to + 100 °C
- Footprint compatible to 0603 chipled
- Wavelength 470 nm (blue), 570 nm (green), 560 nm (pure green), 587 nm (yellow), 606 nm orange), 633 nm (red)
- AllnGaP and GaN technology
- Viewing angle: extremely wide 160 °
- Grouping parameter: luminous intensity, wavelength
- Available in 8 mm tape
- IR reflow and TTW soldering
- Lead-free device

Applications

Backlight keypads
Navigation systems
Cellular phone displays
Displays for industrial control systems
Automotive features
Miniaturized color effects
Traffic displays

Parts Table

Part	Color, Luminous Intensity
TLMS1100	Red, I_V = 63 mcd (typ.)
TLMO1100	Orange, I_V = 80 mcd (typ.)
TLMY1100	Yellow, I_V = 80 mcd (typ.)
TLMG1100	Green, I_V = 35 mcd (typ.)
TLMP1100	Pure green, I_V = 15 mcd (typ.)
TLMB1100	Blue, I_V = 5 mcd (typ.)

Absolute Maximum Ratings

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

TLMS1100 ,TLMO1100 ,TLMY1100 ,TLMG1100, TLMP1100

Parameter	Test condition	Symbol	Value	Unit
Reverse voltage		V_R	12	V
DC Forward current	$T_{amb} \leq 60$ °C	I_F	30	mA
Surge forward current	$t_p \leq 10$ µs	I_{FSM}	0.5	A
Power dissipation	$T_{amb} \leq 75$ °C	P_V	90	mW
Junction temperature		T_j	120	°C
Operating temperature range		T_{amb}	- 40 to + 100	°C
Storage temperature range		T_{stg}	- 40 to + 100	°C
Soldering temperature	acc. Vishay spec	T_{sd}	260	°C
Thermal resistance junction/ ambient	mounted on PC board (pad size > 5 mm^2)	R_{thJA}	480	K/W

TLMB1100

Parameter	Test condition	Symbol	Value	Unit
Reverse voltage		V_R	5	V
DC Forward current	$T_{amb} \leq 60$ °C	I_F	15	mA
Surge forward current	$t_p \leq 10$ µs	I_{FSM}	0.1	A
Power dissipation	$T_{amb} \leq 60$ °C	P_V	68	mW
Junction temperature		T_j	100	°C
Operating temperature range		T_{amb}	- 40 to + 100	°C
Storage temperature range		T_{stg}	- 40 to + 100	°C
Soldering temperature	acc. Vishay spec	T_{sd}	260	°C
Thermal resistance junction/ ambient	mounted on PC board (pad size > 5 mm^2)	R_{thJA}	480	K/W

Optical and Electrical Characteristics

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

Red

TLMS1100

Parameter	Test condition	Symbol	Min	Typ.	Max	Unit
Luminous intensity [2)]	I_F = 20 mA	I_V	32	63		mcd
Dominant wavelength	I_F = 20 mA	λ_d	627	633	639	nm
Peak wavelength	I_F = 20 mA	λ_p		645		nm
Angle of half intensity	I_F = 20 mA	φ		± 80		deg
Forward voltage	I_F = 20 mA	V_F		2.1	3.0	V
Reverse voltage	I_R = 10 µA	V_R	6			V
Junction capacitance	V_R = 0, f = 1 MHz	C_j		15		pF

[2)] in one Packing Unit $I_{Vmax}/I_{Vmin} \leq 1.6$

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Orange

TLMO1100

Parameter	Test condition	Symbol	Min	Typ.	Max	Unit
Luminous intensity [2)]	I_F = 20 mA	I_V	50	80		mcd
Dominant wavelength	I_F = 20 mA	λ_d	600	606	609	nm
Peak wavelength	I_F = 20 mA	λ_p		610		nm
Angle of half intensity	I_F = 20 mA	φ		± 80		deg
Forward voltage	I_F = 20 mA	V_F		2.1	3	V
Reverse voltage	I_R = 10 µA	V_R	6			V
Junction capacitance	V_R = 0, f = 1 MHz	C_j		15		pF

[2)] in one Packing Unit $I_{Vmax}/I_{Vmin} \leq 1.6$

Yellow

TLMY1100

Parameter	Test condition	Symbol	Min	Typ.	Max	Unit
Luminous intensity [2)]	I_F = 20 mA	I_V	50	80		mcd
Dominant wavelength	I_F = 20 mA	λ_d	580	587	595	nm
Peak wavelength	I_F = 20 mA	λ_p		591		nm
Angle of half intensity	I_F = 20 mA	φ		± 80		deg
Forward voltage	I_F = 20 mA	V_F		2.1	3	V
Reverse voltage	I_R = 10 µA	V_R	6			V
Junction capacitance	V_R = 0, f = 1 MHz	C_j		15		pF

[2)] in one Packing Unit $I_{Vmax}/I_{Vmin} \leq 1.6$

Green

TLMG1100

Parameter	Test condition	Symbol	Min	Typ.	Max	Unit
Luminous intensity [2)]	I_F = 20 mA	I_V	12.5	35		mcd
Dominant wavelength	I_F = 20 mA	λ_d	564	570	575	nm
Peak wavelength	I_F = 20 mA	λ_p		572		nm
Angle of half intensity	I_F = 20 mA	φ		± 80		deg
Forward voltage	I_F = 20 mA	V_F		2.1	3.0	V
Reverse voltage	I_R = 10 µA	V_R	6			V
Junction capacitance	V_R = 0, f = 1 MHz	C_j		15		pF

[2)] in one Packing Unit $I_{Vmax}/I_{Vmin} \leq 1.6$

Pure green

TLMP1100

Parameter	Test condition	Symbol	Min	Typ.	Max	Unit
Luminous intensity [2]	I_F = 20 mA	I_V	6.3	15		mcd
Dominant wavelength	I_F = 20 mA	λ_d	551	558	566	nm
Peak wavelength	I_F = 20 mA	λ_p		555		nm
Angle of half intensity	I_F = 20 mA	φ		± 80		deg
Forward voltage	I_F = 20 mA	V_F		2.1	3	V
Reverse voltage	I_R = 10 µA	V_R	6			V
Junction capacitance	V_R = 0, f = 1 MHz	C_j		15		pF

[2] in one Packing Unit $I_{Vmax}/I_{Vmin} \leq 1.6$

Blue

TLMB1100

Parameter	Test condition	Symbol	Min	Typ.	Max	Unit
Luminous intensity [1]	I_F = 10 mA	I_V	2.8	5		mcd
Dominant wavelength	I_F = 10 mA	λ_d		466		nm
Peak wavelength	I_F = 10 mA	λ_p		428		nm
Angle of half intensity	I_F = 10 mA	φ		± 80		deg
Forward voltage	I_F = 20 mA	V_F		3.9	4.5	V
Reverse voltage	I_R = 10 µA	V_R	5.0			V

[1] in one Packing Unit $I_{Vmax}/I_{Vmin} \leq 1.6$

Color Classification

Group	Dominant Wavelength (nm)									
	Blue		Pure Green		Green		Yellow		Orange	
	min	max	min	max	min	max	min	max	min	max
- 1			551	554	564	565				
- 2	460	464	554	557	566	569	580	583	600	603
- 3	464	468	557	560	569	572	583	586	603	606
- 4	468	472	560	563	572	575	586	589	606	609
- 5	472	476	563	566			589	592	609	612
- 6							592	595		

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

Luminous Intensity Classification

Group	Luminous Intensity (mcd)	
	min	max
Pa	4	6.3
Pb	5	8
Qa	6.3	10
Qb	8	12.5
Ra	10	16
Rb	12.5	20
Sa	16	25
Sb	20	32
Ta	25	40
Tb	32	50
Ua	40	63
Ub	50	80
Va	63	100
Vb	80	125
Wa	100	160
Wb	125	200

Group Name on Label

Luminous Intensity Group	Halfgroup	Wavelength	Forward Voltage
Q	b	4	1

One packing unit/tape contains only one classification group of luminous intensity, color and forward voltage

Only one single classification groups is not available

The given groups are not order codes, customer specific group combinations require marketing agreement

No color subgrouping for Super Red

Typical Characteristics (T$_{amb}$ = 25 °C unless otherwise specified)

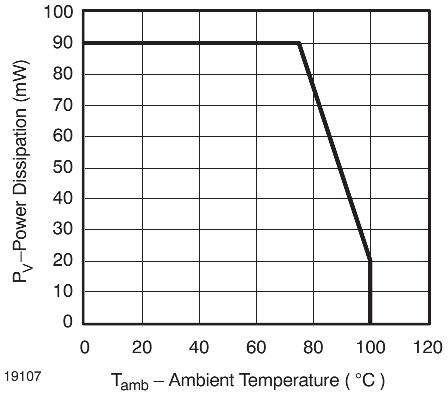


Figure 1. Power Dissipation vs. Ambient Temperature

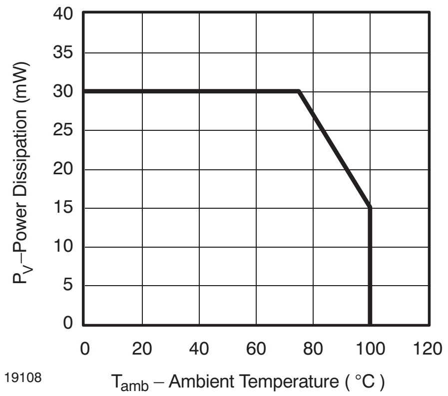


Figure 2. Power Dissipation vs. Ambient Temperature

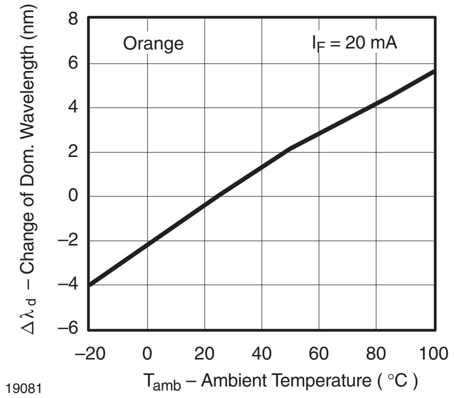


Figure 3. Change of Dominant Wavelength vs. Ambient Temperature

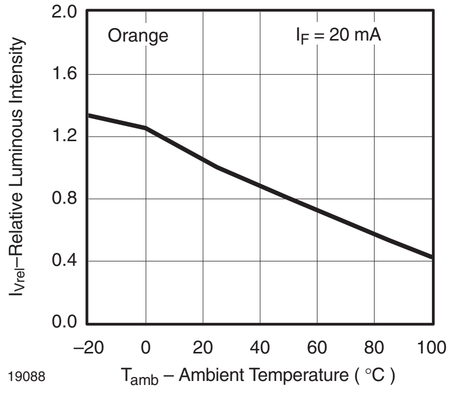


Figure 4. Relative Luminous Intensity vs. Amb. Temperature

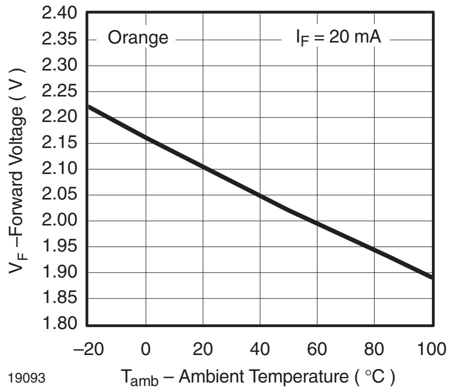


Figure 5. Forward Voltage vs. Ambient Temperature

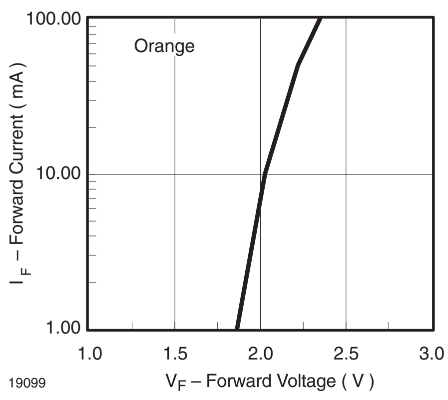


Figure 6. Forward Current vs. Forward Voltage

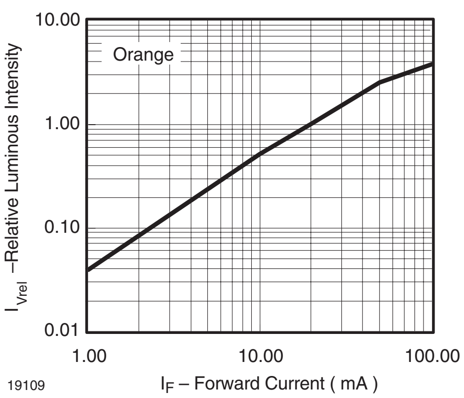


Figure 7. Relative Luminous Intensity vs. Forward Current

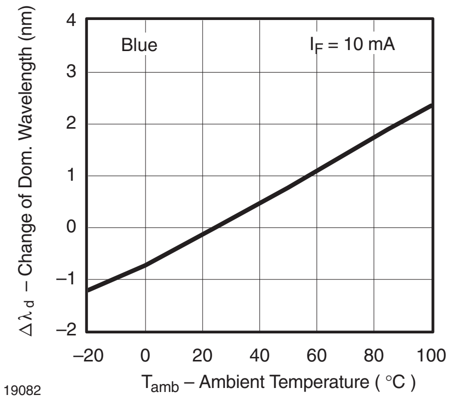


Figure 10. Change of Dominant Wavelength vs. Ambient Temperature

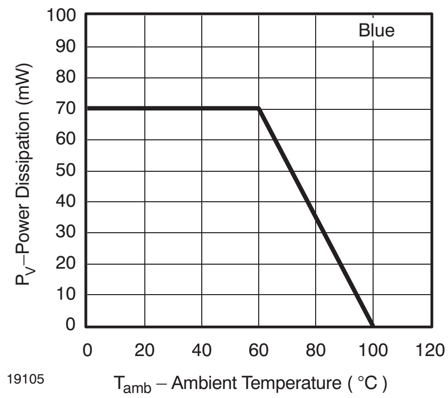


Figure 8. Power Dissipation vs. Ambient Temperature

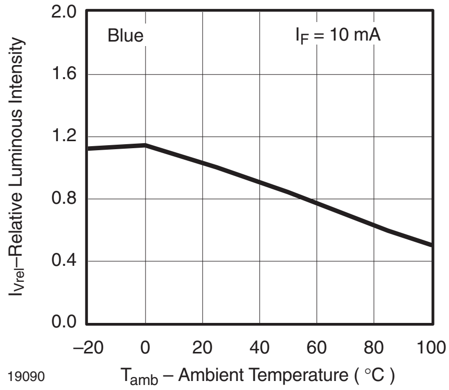


Figure 11. Relative Luminous Intensity vs. Amb. Temperature

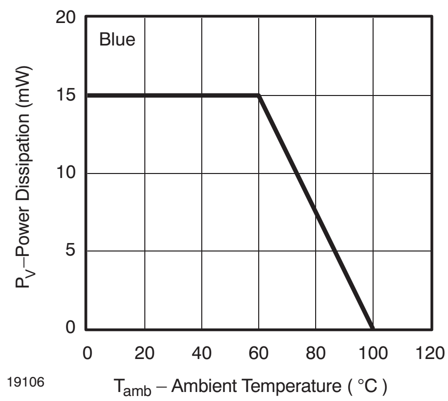


Figure 9. Power Dissipation vs. Ambient Temperature

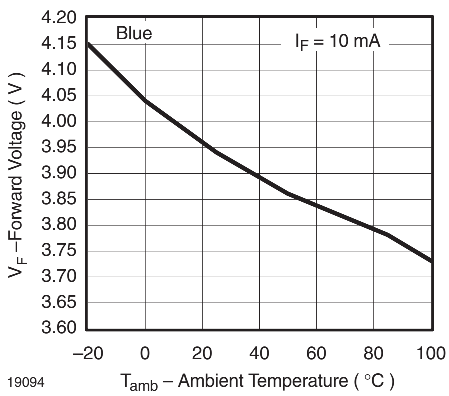


Figure 12. Forward Voltage vs. Ambient Temperature

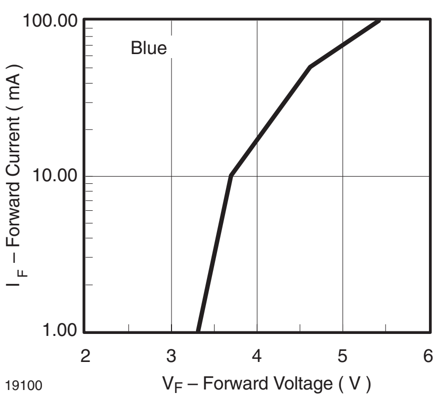


Figure 13. Forward Current vs. Forward Voltage

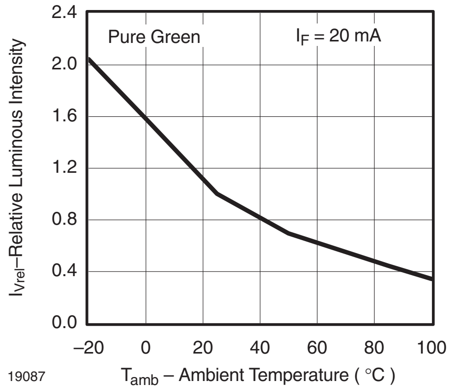


Figure 16. Relative Luminous Intensity vs. Amb. Temperature

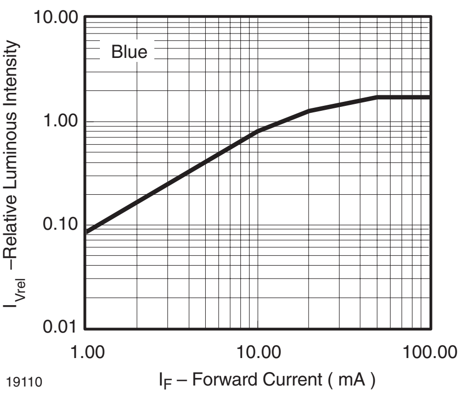


Figure 14. Relative Luminous Intensity vs. Forward Current

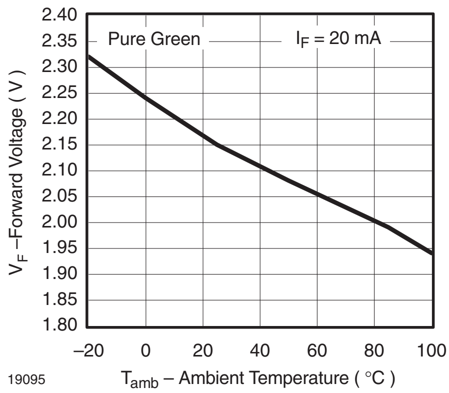


Figure 17. Forward Voltage vs. Ambient Temperature

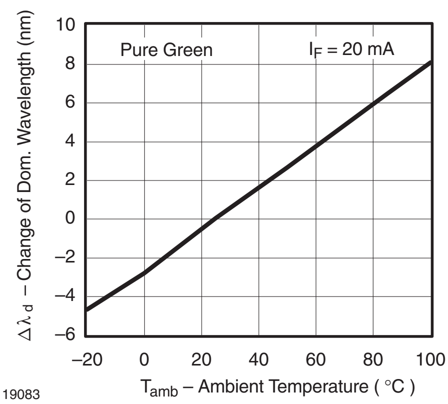


Figure 15. Change of Dominant Wavelength vs. Ambient Temperature

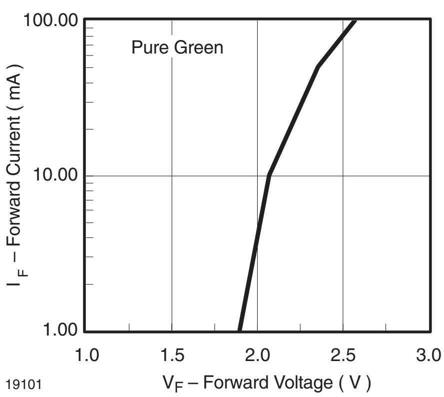


Figure 18. Forward Current vs. Forward Voltage

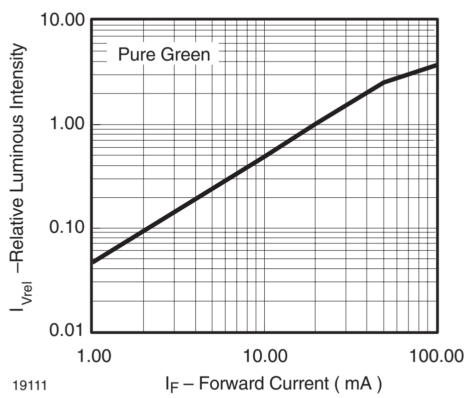


Figure 19. Relative Luminous Intensity vs. Forward Current

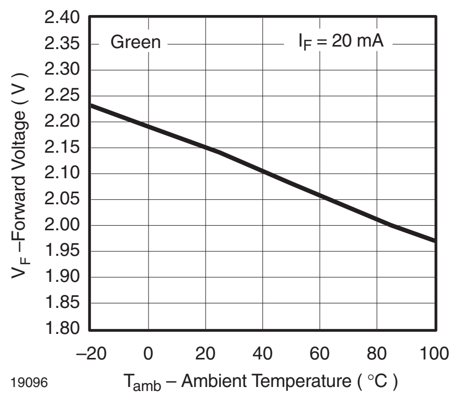


Figure 22. Forward Voltage vs. Ambient Temperature

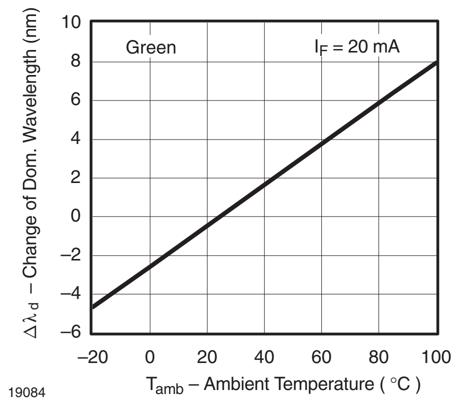


Figure 20. Change of Dominant Wavelength vs. Ambient Temperature

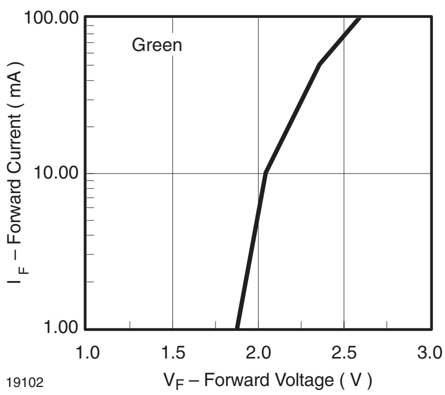


Figure 23. Forward Current vs. Forward Voltage

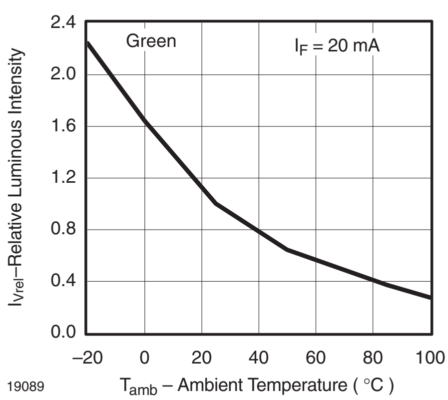


Figure 21. Relative Luminous Intensity vs. Amb. Temperature

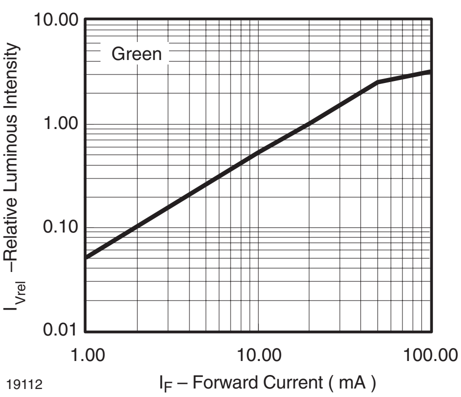


Figure 24. Relative Luminous Intensity vs. Forward Current

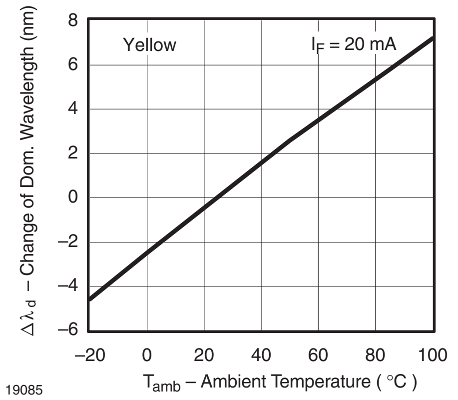


Figure 25. Change of Dominant Wavelength vs. Ambient Temperature

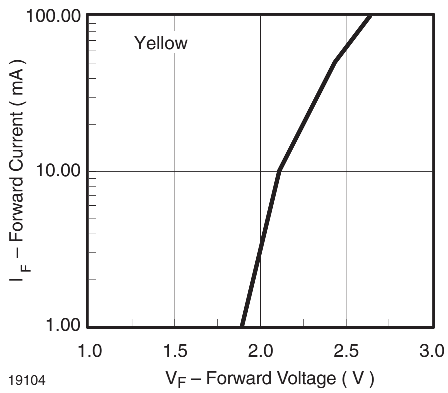


Figure 28. Forward Current vs. Forward Voltage

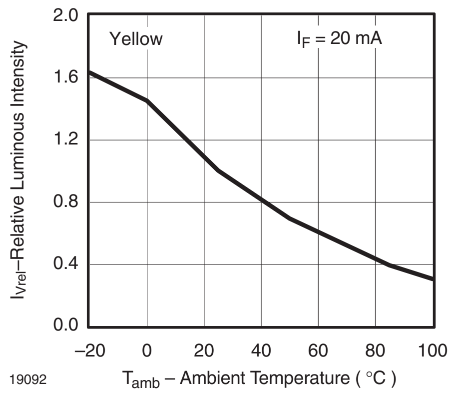


Figure 26. Relative Luminous Intensity vs. Amb. Temperature

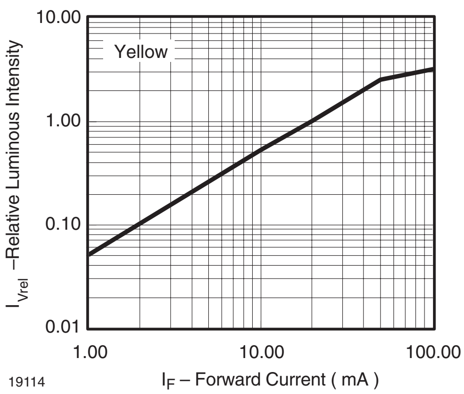


Figure 29. Relative Luminous Intensity vs. Forward Current

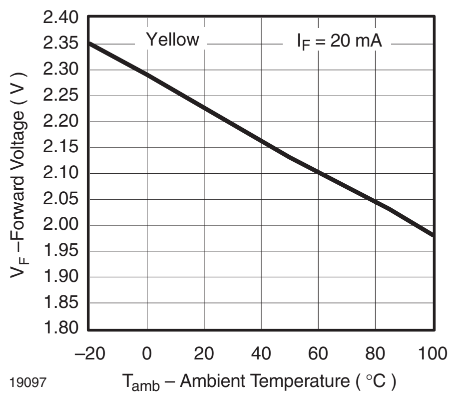


Figure 27. Forward Voltage vs. Ambient Temperature

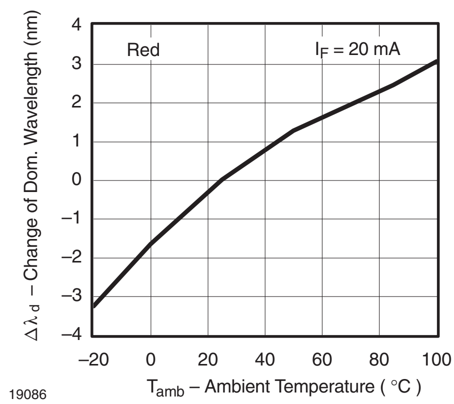


Figure 30. Change of Dominant Wavelength vs. Ambient Temperature

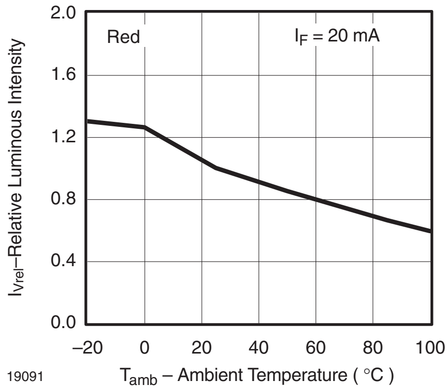


Figure 31. Relative Luminous Intensity vs. Amb. Temperature

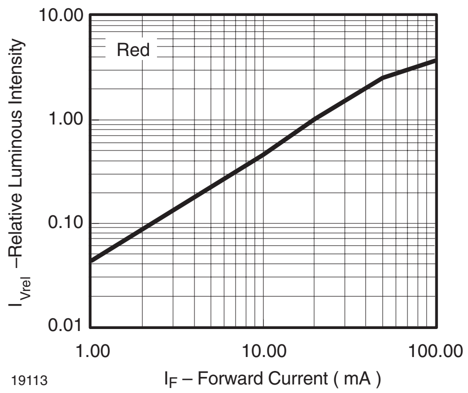


Figure 34. Relative Luminous Intensity vs. Forward Current

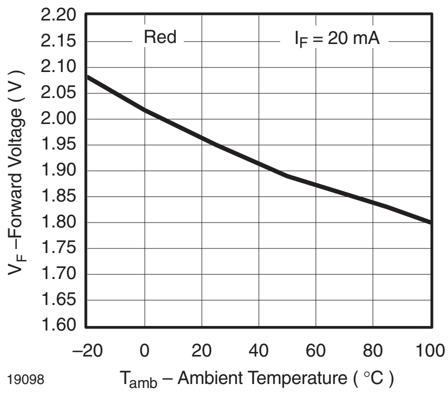


Figure 32. Forward Voltage vs. Ambient Temperature

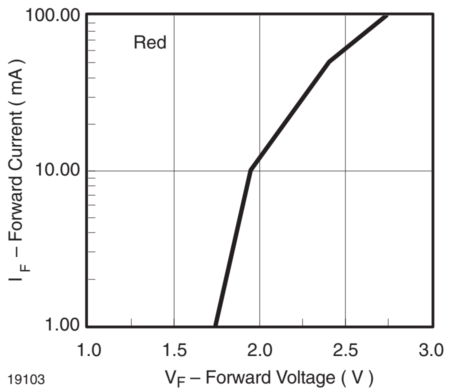
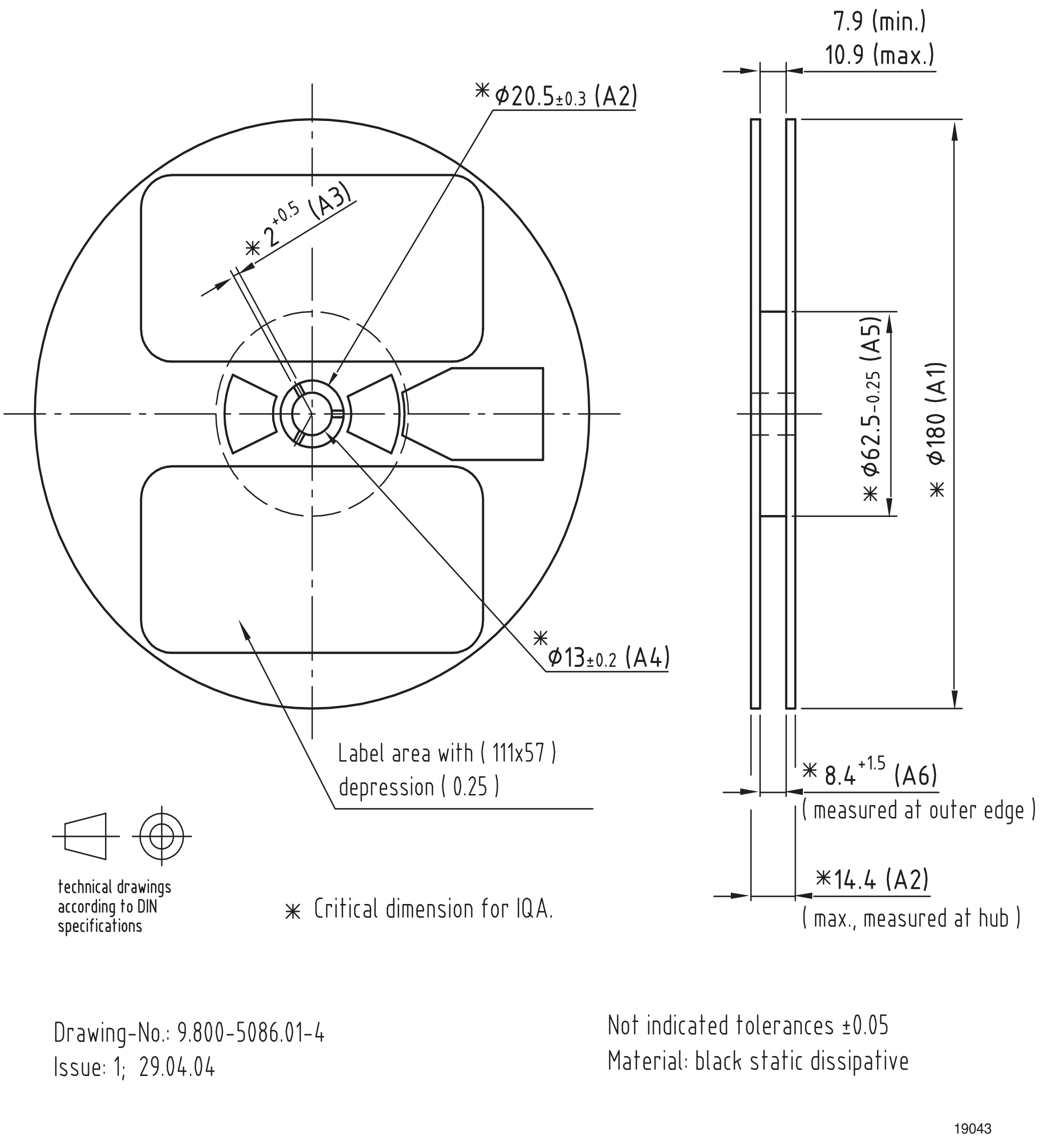
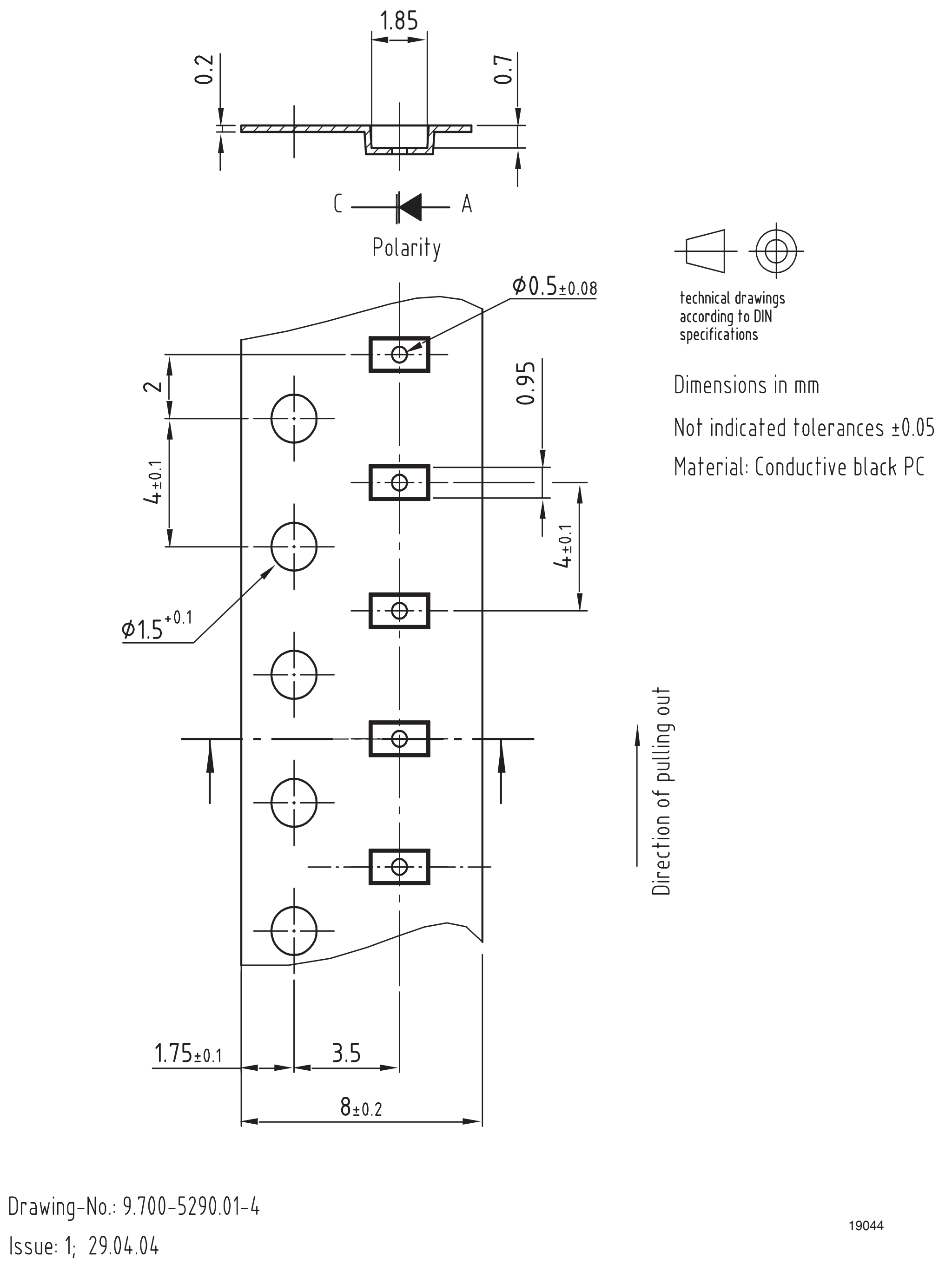


Figure 33. Forward Current vs. Forward Voltage

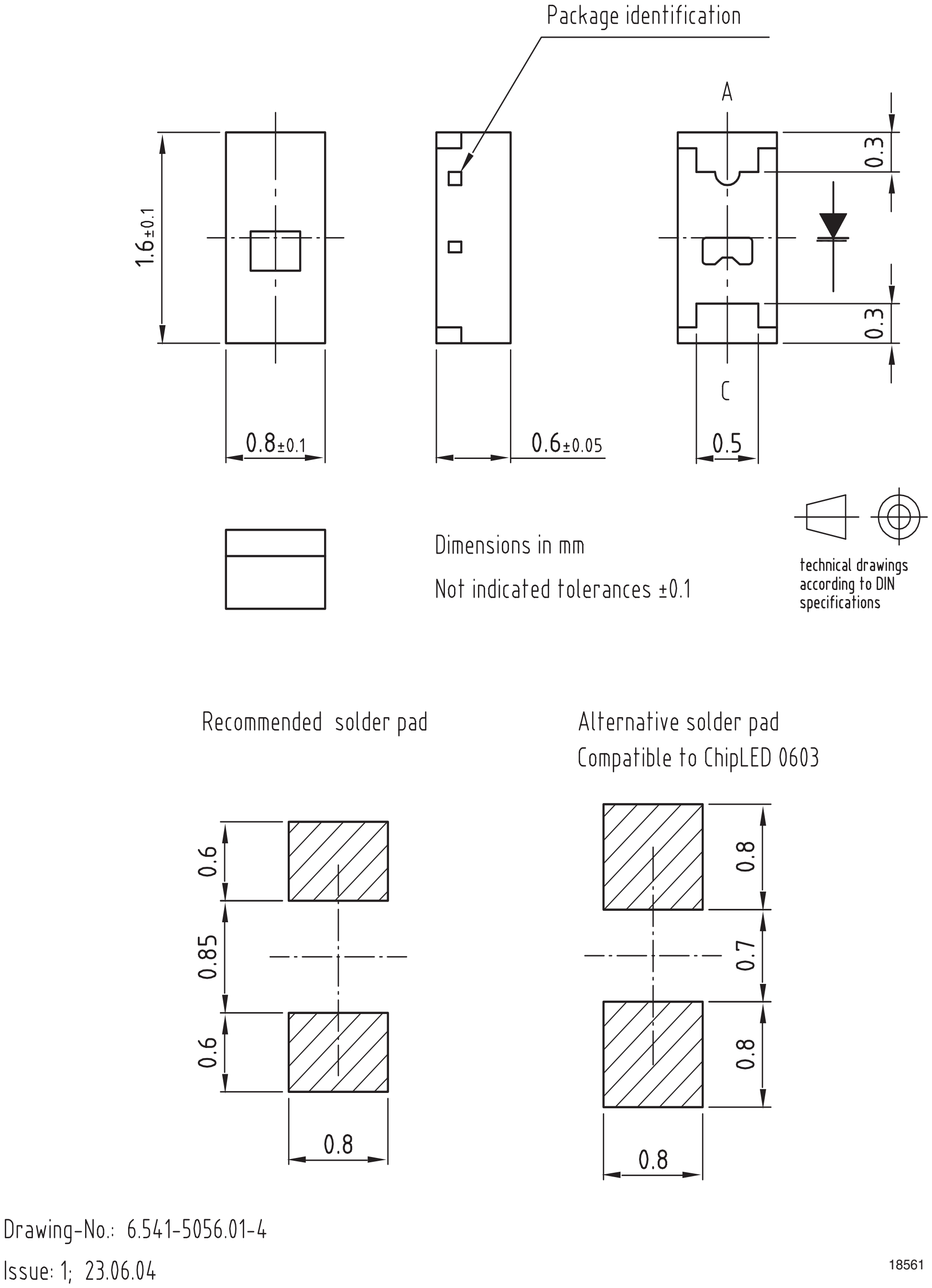
Reel Dimensions



Tape Dimensions



Package Dimensions in mm



Ozone Depleting Substances Policy Statement

It is the policy of **Vishay Semiconductor GmbH** to

1. Meet all present and future national and international statutory requirements.
2. Regularly and continuously improve the performance of our products, processes, distribution and operatingsystems with respect to their impact on the health and safety of our employees and the public, as well as their impact on the environment.

It is particular concern to control or eliminate releases of those substances into the atmosphere which are known as ozone depleting substances (ODSs).

The Montreal Protocol (1987) and its London Amendments (1990) intend to severely restrict the use of ODSs and forbid their use within the next ten years. Various national and international initiatives are pressing for an earlier ban on these substances.

Vishay Semiconductor GmbH has been able to use its policy of continuous improvements to eliminate the use of ODSs listed in the following documents.

1. Annex A, B and list of transitional substances of the Montreal Protocol and the London Amendments respectively
2. Class I and II ozone depleting substances in the Clean Air Act Amendments of 1990 by the Environmental Protection Agency (EPA) in the USA
3. Council Decision 88/540/EEC and 91/690/EEC Annex A, B and C (transitional substances) respectively.

Vishay Semiconductor GmbH can certify that our semiconductors are not manufactured with ozone depleting substances and do not contain such substances.

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