VISHAY INTERTECHNOLOGY, INC.

LIGHTING SOLUTIONS

Surface-Mount and Leaded LEDs

Little Star®
PLCC-2 Plus
RGB
Bi Color
Reverse Gullwing
PLCC-4 Power SMD
PLCC-2
MiniLED
0603
Telux
5 mm
3 mm

OPTOELECTRONICS
SELECTOR GUIDE

www.vishay.com

SEMICONDUCTORS

RECTIFIERS
- Schottky (single, dual)
- Standard, Fast and Ultra-Fast Recovery (single, dual)
- Bridge
- Superectifier®
- Sinterglass Avalanche Diodes

HIGH-POWER DIODES AND THYRISTORS
- High-Power Fast-Recovery Diodes
- Phase-Control Thyristors
- Fast Thyristors

SMALL-SIGNAL DIODES
- Schottky and Switching (single, dual)
- Tuner/Capacitance (single, dual)
- Bandswitching
- PIN

ZENER AND SUPPRESSOR DIODES
- Zener (single, dual)
- TVS (TRANSZORB®, Automotive, ESD, Arrays)

FETs
- Low-Voltage TrenchFET® Power MOSFETs
- High-Voltage TrenchFET® Power MOSFETs
- High-Voltage Planar MOSFETs
- JFETs

OPTOELECTRONICS
- IR Emitters and Detectors, and IR Receiver Modules
- Optocouplers and Solid-State Relays
- Optical Sensors
- LEDs and 7-Segment Displays
- Infrared Data Transceiver Modules
- Custom Products

ICs
- Power ICs
- Analog Switches

MODULES
- Power Modules (contain power diodes, thyristors, MOSFETs, IGBTs)

PASSIVE COMPONENTS

RESISTIVE PRODUCTS
- Film Resistors
  - Metal Film Resistors
  - Thin Film Resistors
  - Thick Film Resistors
  - Metal Oxide Film Resistors
  - Carbon Film Resistors
- Wirewound Resistors
- Power Metal Strip® Resistors
- Chip Fuses
- Variable Resistors
  - Cermet Variable Resistors
  - Wirewound Variable Resistors
  - Conductive Plastic Variable Resistors
- Networks/Arrays
- Non-Linear Resistors
  - NTC Thermistors
  - PTC Thermistors
  - Varistors

MAGNETICS
- Inductors
- Transformers

CAPACITORS
- Tantalum Capacitors
  - Molded Chip Tantalum Capacitors
  - Coated Chip Tantalum Capacitors
  - Solid Through-Hole Tantalum Capacitors
  - Wet Tantalum Capacitors
- Ceramic Capacitors
  - Multilayer Chip Capacitors
  - Disc Capacitors
- Film Capacitors
- Power Capacitors
- Heavy-Current Capacitors
- Aluminum Capacitors

Lighting Solutions

Surface-Mount and Leaded LEDs

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Introduction

Vishay offers LEDs in a variety of surface-mount package types. Standard and power LEDs are offered in packages with standard PLCC-2 dimensions. Mini-LED products feature a small white surface-mount package measuring just 2.3 mm (L) x 1.4 mm (H) mm with a viewing angle of 120°. The new 0603 LED series with industry-standard 0603 compatible dimensions of 1.6 mm (L) x 0.8 mm (W) x 0.6 (H) mm and a viewing angle of 160°, is now the smallest surface-mount LED in the Vishay portfolio. Vishay offers a number of new high-brightness SMD LED packages such as the PLCC-2 Plus and the 1-Watt Little Star®. Vishay's first 1-Watt LED is Little Star, which features footprint dimensions of 6 mm by 6 mm and a height profile of < 1.5 mm that is even thinner than a typical PLCC6 package with 1.8mm package height. Vishay LEDs are ideal for applications such as instruments, switches, and icon backlighting. Designed for operation with an extended -40 °C to +100 °C temperature range, these surface-mount devices additionally provide a high level of reliability which is crucial for automotive applications.

For further information please visit **http://www.vishay.com/leds/**

Features

- Automotive qualified to AEC-Q101 (all SMD and TELUX devices, 3 and 5mm only selected devices)
- 120° viewing angle for SMD (160° for 0603 types) down to 8° for leaded devices
- Luminous intensity and color categorized per packing unit
- Component in accordance to RoHS 2002/95/EC and WEEE 2002/96/EC
- Lead (Pb)-free device
- SMD devices compatible with infrared reflow solder processes according to CECC 00802 and J-STD-020C
- TELUX, 3mm and 5mm compatible with wave solder processes according to CECC 00802 and J-STD-020
- ESD withstand voltage: up to 2 kV according to JESD22-A114-B (AlIGaP)
- ESD withstand voltage: up to 1 kV according to JESD22-A114-B (InGaN)

Applications*

- Automotive: backlighting in dashboards and switches
- Indicator and backlighting for architectural and office equipment applications*
- Telecommunication: indicator and backlighting in telephones and fax machines
- Indicator and backlighting in audio and video equipment
- Signals and symbol luminaires

* general lighting and backlighting for architectural is possible for Little Star and 0603



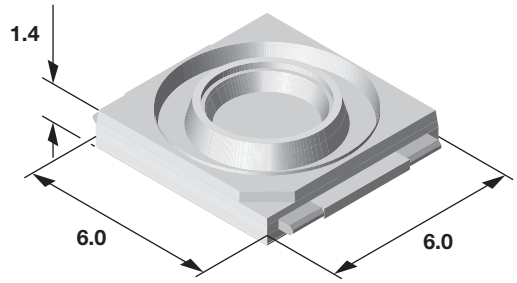
Little Star®

Features

- Super high brightness surface-mount LED
- High flux output 21 to 113 lumens
- Compact package outline
- Ultra low 1.5-mm height profile
- Designed for high current drive up to 350 mA
- Low thermal resistance; R_{thJP} = 10-18 K/W
- Qualified according to JEDEC moisture sensitivity level 2a
- Little Star® LEDs are class 1M LED products. Do not view directly with optical instrument

Applications

- Automotive fog-lamps, rearview mirror lighting, and more
- Camera flash
- Ovens, microwaves, and other white goods
- Landscape, architectural, and general lighting



Material	Color	I_F (mA)	I_V in mcd		ϕ_V in lm (Calculated)		Wavelength	Full Angle (°)
			Min	Max	Min	Max		
VLMK71ABAD	Amber	400	9000	18000	26	52	610 – 620	120
VLMR71AAAC	Red	400	7150	14000	21	39	620 – 630	120
VLMY71AAAC	Yellow	400	7150	14000	21	39	585 – 597	120
VLMW71ACAE	Warm White	350	11250	22400	33	71	X 0.42 – Y 0.40	120
VLMW71AC	Warm White	350	11250	14000	33	39	X 0.42 – Y 0.40	120
VLMW71AD	Warm White	350	14000	18000	39	52	X 0.42 – Y 0.40	120
VLMW711ADAF	White	350	14000	28500	39	97	X 0.33 – Y 0.33	120
VLMW711AE	White	350	18000	22400	52	71	X 0.33 – Y 0.33	120

Advanced White Power Series									
Material	Color	I_F (mA)	I_V in mcd	ϕv in lm		Color temperature		Wavelength	Full Angle (°)
			typ.	Min	Max	Min	Max		
VLMW711S2S3QN	Warm White	350	19000	51.7	67.2	2670K	3500K	X=0.44, Y= 0.41	120
VLMW711T3U2US	Natural White	350	25000	76.5	99.4	2850K	5000K	X=0.37; Y=0.38	120
VLMW711U2U3XV	Cold White	350	29700	87.4	113.6	5000	7000	X=0.33; Y=0.33	120

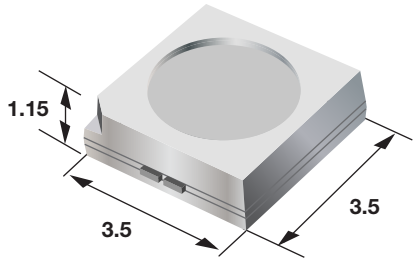
PLCC-2 Plus

Features

- High efficient InGaN and AlInGaP technology
- Long life, due to silicone resin casting
- Compact package outline 3, 5 x 3, 5 x 1, 2 mm
- Angle of half intensity ϕ = ± 60°
- Luminous flux and colour categorized per package unit
- Luminous flux ratio per packing unit ϕmin/ϕmax < 1,2
- ESD withstand voltage up to 2 KV (HBM) according to JESD22-A114-B
- Preconditioning according Jedec 2a
- Compatible wit IR reflow soldering profiles according JSTD-020
- AEC Q101 qualified

Applications

- Camera flash light
- Marker lights
- Interior and exterior automotive lighting
- Decorative lighting
- Architectural lighting
- All kinds of general lighting
- Backlighting (TFT LCD Display)



PLCC-2 PLUS white									
Material	Color	If (mA)	Iv in mcd typ.	ϕv in mlm		Color temperature		Wavelength CIA 1931	Full Angle (°)
				min	max	min	max		
VLMW51N2P3	White	150	8000	18100	30600	4500K	10.000K	X=0.33, Y= 0.33	120

Material	Color	If (mA)	ϕv in lm typ.	Iv in mcd		nm		Full Angle (°)
				min	max	min	max	
VLMR51	Red	140	10, 6	2850	5600	620	630	120
VLMK51	Amber	140	11, 9	2850	5600	610	621	120
VLMY51	Yellow	140	13, 2	3550	7150	585	594	120

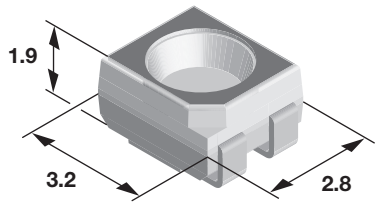
RGB

Features

- High brightness tricolor SMD LED
- RGB individual control
- Compact package outline
- Black surface
- Qualified according to JEDEC moisture sensitivity level 2a

Applications

- Accent and decorative lighting
- Electronic signage, video displays
- Backlighting for LCDs, PDAs, and TVs
- Ovens, microwaves, and other white goods



Material	Color	I_F (mA)	I_V in mcd		Wavelength	Full Angle (°)
			Min	Max		
VLMRGB343-ST-UV-RS	Red	20	140	285	618-628	120
	True Green	20	285	560	521-536	120
	Blue	20	100	200	465-475	120

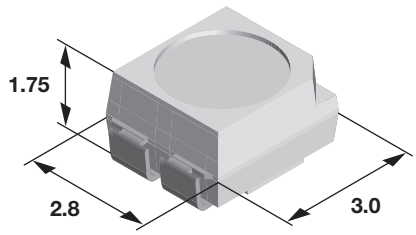
Bi Color

Features

- SMD LED with exceptional brightness
- Multicolor red, Green, and blue
- Available in 8-mm tape
- Non-diffused lens: excellent for coupling to light pipes and backlighting
- Low power consumption
- JEDEC level 2a
- Preconditioned per JEDEC level 2a

Applications

- Flat backlight for LCDs, switches, and symbols



Material	Color	I_F (mA)	I_V in mcd		Wavelength	Full Angle (°)
			Min	Max		
VLMV3100	Red	10	2.8		612-625	120
	Green	10	2.8		562-575	120
VLMKG3400	Red	20	56	140	627-639	120
	Green	20	35.5	90	564-575	120
VLMKE3400	Red	20	56	180	630	120
	Yellow	20	90	280	581-594	120
VLMKE3401	Red	20	71	140	630	120
	Yellow	20	112	224	581-594	120
VLMRY3420	Red	50	355	900	617	120
	Yellow	50	560	1120	581-594	120
VLMSY3420	Red	50	224	900	630	120
	Yellow	50	280	1120	581-594	120

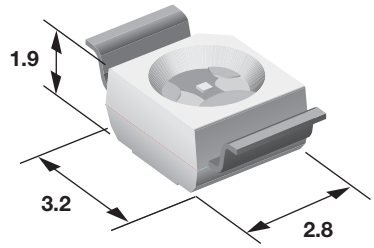
Reverse Gullwing

Features

- Uses AS AlInGaP/InGaN technology
- Available in 8 mm tape
- Preconditioned per JEDEC Level 2a

Applications

- Indicator and backlighting in automotive, telecommunication, and consumer applications such as dashboards, telephones, or A/V equipment
- Flat backlight for LCDs, switches, and symbols



Material	Color	I_F (mA)	I_V in mcd		Wavelength	Full Angle (°)
			Min	Max		
VLRK31R1S2	Red	20	112	285	630	120
VLRK31Q1R2	Red	20	71	180	630	120
VLRK31R1R2	Red	20	112	180	630	120
VLRK31Q2R1	Red	20	90	140	630	120
VLRE31R1S1	Yellow	20	112	224	588	120
VLRE31R1S2	Yellow	20	112	285	588	120
VLRE31R2S2	Yellow	20	140	285	588	120

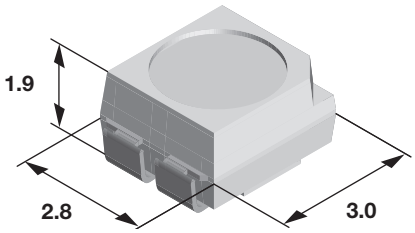
PLCC-4 Power

Features

- High-efficiency AlInGaP/INGaN technology
- Suitable for all soldering methods according to CECC
- SMD LED with exceptional brightness
- Preconditioned per JEDEC level 2a

Applications

- Camera flash light
- Automotive brake lights, turn signals, and more
- Flat backlight for LCDs, switches, and symbols



Material	Color	IF (mA)	I_V in mcd		Wavelength (nm)	Full angle (°)
			Min	Max		
VLMS322T2V1	Red	50	355	900	625-640	120
VLMK32ABBB	Amber	50	1400	2850	610-621	120
VLMK322U1V2	Amber	50	450	1125	610-621	120
VLMO322U1V2	Orange	50	450	1125	600-612	120
VLMY32ABBB	Yellow	50	1400	2850	585-594	120
VLMY322 U1V2	Yellow	50	450	1125	582-594	120
VLMPG32P1Q1	Pure Green	50	45	90	554,5 - 565,5	120
VLMW321ABBB-5K8L	White	50	1400	2850	X=0.33; Y=0.33	120
VLMW321BACA-5K8L	White	50	1800	3550	X=0.33; Y=0.33	120
VLMW322ABBB-5K8L	White	50	1400	2850	X=0.33; Y=0.33	120
VLMW322BACA-5K8L	White	50	1800	3550	X=0.33; Y=0.33	120

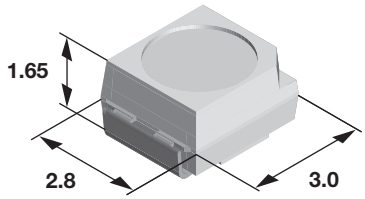
PLCC-2

Features

- Uses AS AlInGaP/InGaN technology
- Available in 8 mm tape
- Preconditioned per JEDEC Level 2

Applications

- Indicator and backlighting in automotive, telecommunication, and consumer applications such as dashboards, telephones, or A/V equipment
- Flat backlight for LCDs, switches, and symbols
- Illumination purposes, alternative to incandescent lamps



Material	Color	I_F (mA)	I_V in mcd		Wavelength	Full Angle (°)
			Min	Max		
VLMB3140	Blue	20	45		462-476	120
VLMB314P2R1	Blue	20	56	140	462-476	120
VLMB314P2S1	Blue	20	56	224	462-476	120
VLMB314Q2S1	Blue	20	90	224	462-476	120
VLMB31J2K2	Blue	10	5.6	11.2	458-472	120
VLMB31J2L2	Blue	10	5.6	18	458-472	120
VLMB31K2L2	Blue	10	9	18	458-472	120
VLMB41P1Q1	Blue	10	45	90	462-476	120
VLMB41P1Q2	Blue	10	45	112	462-476	120
VLMB41P2Q2	Blue	10	56	112	462-476	120
VLMBG3100	Blue Green	20	140		496-514	120
VLMC3100	Green	2	0.71		562-575	120
VLMG3100	Green	10	4.5		562-575	120
VLMG31K1L2	Green	10	7.1	18	562-575	120
VLMG31K1M2	Green	10	7.1	28	562-575	120
VLMG31L1M2	Green	10	11.2	28	562-575	120
VLMYG30G2J1	Green	**2**	**2.24**	**5.6**	**566-575**	**120**
VLMG30G2K1	Green	**2**	**2.24**	**9**	**566-575**	**120**
VLMP3100	Pure Green	10	1.12		555-565	120
VLMP31G2J1	Pure Green	10	2.24	5.6	555-565	120
VLMP31G2J2	Pure Green	10	2.24	7.1	555-565	120
VLMP31H2J2	Pure Green	10	3.55	7.1	555-565	120
VLMPG31L1M2	Pure Green	20	11.2	28	555-565	120
VLMPG33N1P2	Pure Green	30	28	71	555-565	120
VLMPG30E1F2	Pure Green	**2**	**0.71**	**1.8**	**555-565**	**120**
VLMPG30F1G2	Pure Green	**2**	**1.12**	**2.8**	**555-565**	**120**
VLMPG30E2G2	Pure Green	**2**	**0.71**	**2.8**	**555-565**	**120**
VLMTG3100	True Green	20	180		515-541	120
VLMTG31N2S1	True Green	10	35.5	224	521-541	120
VLMTG31Q1R2	True Green	10	71	180	521-541	120

PLCC-2 listing is continued on the next page.

PLCC-2 (Continued)

Material	Color	I_F (mA)	I_V in mcd		Wavelength	Full Angle (°)
			Min	Max		
VLMD3100	Red	10	11.2	--	648	120
VLMD31L2N1	Red	10	14	35.5	648	120
VLMD31L2P1	Red	10	14	56	648	120
VLMD31M2P1	Red	10	22.4	56	648	120
VLMH3100	Red	10	2.8		612 -625	120
VLMK3100	Red	10	11.2		630	120
VLMK31P2S1	Red	20	56	224	630	120
VLMK31Q1R2	Red	20	71	180	630	120
VLMK31R1S1	Red	20	112	224	630	120
VLMK31R1S2	Red	20	112	280	630	120
VLMK33Q2T1	Red	20	90	355	611-622	120
VLMK33R1S2	Red	20	112	280	611-622	120
VLMK33S1T1	Red	20	180	355	611-622	120
VLMR33R2U2	Red	30	140	710	611-622	120
VLMR33T1U2	Red	30	280	710	611-622	120
VLMS3000	Red	2	2.8		624-636	120
VLMS30J1K2	Red	2	4.5	11.2	624-636	120
VLMS30J1L2	Red	2	4.5	18	624-636	120
VLMS30K1L2	Red	2	7.1	18	624-636	120
VLMS3100	Red	10	2.8		624-636	120
VLMS31J1K2	Red	10	4.5	11.2	624-638	120
VLMS31J1L2	Red	10	4.5	18	624-638	120
VLMS31K1L2	Red	10	7.1	18	624-638	120
VLMS33S1T2	Red	30	180	18	626-638	120
VLMS33S1U1	Red	30	180	450	626-638	120
VLMF3100	Soft Orange	10	28		598-611	120
VLMF31Q2T1	Soft Orange	20	90	355	598-611	120
VLMF31R1S2	Soft Orange	20	112	280	598-611	120
VLMF31S1T1	Soft Orange	20	180	355	598-611	120
VLMO3000	Soft Orange	2	5.6		600-609	120
VLMO30K1L2	Soft Orange	2	7.1	18	600-609	120
VLMO30K1M2	Soft Orange	2	7.1	28	600-609	120
VLMO30L1M2	Soft Orange	2	11.2	28	600-609	120
VLMO3100	Soft Orange	10	2.8		598-611	120
VLMO31J1K2	Soft Orange	10	4.5	11.2	598-611	120
VLMO31J1L2	Soft Orange	10	4.5	18	598-611	120
VLMO31K1L2	Soft Orange	10	7.1	18	598-611	120
VLMO33R2U2	Soft Orange	30	140	710	600-611	120
VLMO33S1T2	Soft Orange	30	180	450	600-611	120
VLMO33T1U2	Soft Orange	30	280	710	600-611	120

PLCC-2 (Continued)

Material	Color	I_F (mA)	I_V in mcd		Wavelength	Full Angle (°)
			Min	Max		
VLMA3100	Yellow	2	0.28		581-594	120
VLME3100	Yellow	10	28		581-594	120
VLME31Q2T1	Yellow	20	90	355	581-594	120
VLME31R1S2	Yellow	20	112	280	581-594	120
VLME31S1T1	Yellow	20	180	355	581-594	120
VLMY3000	Yellow	2	4.5		581-594	120
VLMY30J2L1	Yellow	2	5.6	14	581-594	120
VLMY30J2M1	Yellow	2	5.6	22.4	581-594	120
VLMY30K2M1	Yellow	2	9	22.4	581-594	120
VLMY3100	Yellow	10	2.8		581-594	120
VLMY31J1K2	Yellow	10	4.5	11.2	581-594	120
VLMY31J1L2	Yellow	10	4.5	18	581-594	120
VLMY33R2U2	Yellow	30	140	710	583-594	120
VLMY33T1U2	Yellow	30	280	710	583-594	120
VLME23Q2S1	**Yellow**	**20**	**90**	**224**	**581-594**	**120**
VLMW3100-5K8L	White	10	56		X 0.33 - Y 0.33	120
VLMW31P1S1-5K8L	White	10	45	224	X 0.33 - Y 0.33	120
VLMW31Q2R2-5K8L	White	10	90	180	X 0.33 - Y 0.33	120
VLMW33S2V1-5K8L	White	20	224	900	X 0.33 - Y 0.33	120
VLMW33T2AA-5K8L	White	20	355	1400	X 0.33 - Y 0.33	120
VLMW33T2U2-5K8L	White	20	355	710	X 0.33 - Y 0.33	120
VLMW33U2AA-5K8L	White	20	560	1400	X 0.33 - Y 0.33	120
VLMW41R1T1-5K8L	White	10	112	355	X 0.33 - Y 0.33	120
VLMW41R2S2-5K8L	White	10	140	280	X 0.33 - Y 0.33	120
VLMW41S1T1-5K8L	White	10	180	355	X 0.33 - Y 0.33	120

PLCC-2 New Power Series

Material	Color	IF (mA)	I_V in mcd		Wavelength (nm)	Full angle (°)
			Min	Max		
VLMS333T2V1	Super-red	20	355	1120	630	120
VLMR333U1AA	Red	20	450	1400	625	120
VLMK333U2AB	Amber	20	560	1800	616	120
VLMO333U2AB	Orange	20	560	1800	605	120
VLMY333U1AA	Yellow	20	450	1400	590	120

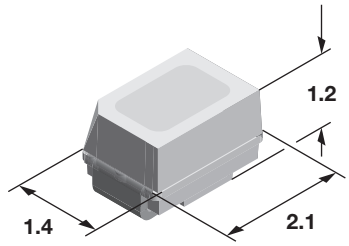
MiniLED

Features

- SMD LEDs with exceptional brightness
- Available in 8-mm tape
- Low profile package
- Low power consumption
- Preconditioned per JEDEC Level 2a
- Automotive qualified AEC-Q101

Applications

- Indicator and backlighting in automotive, telecommunication, and consumer applications such as dashboards, telephones, or A/V equipment
- Flat backlight for LCDs, switches, and symbols



Material	Color	I_F (mA)	I_V in mcd		Wavelength	Full Angle (°)
			Min	Max		
VLMP232M2N2	Pure Green	30	22.4		555-565	120
VLMP232M2P1	Pure Green	30	22.4	45	555-565	120
VLMP232N1P1	Pure Green	30	28	56	555-565	120
VLMK2000	Red	2	7.1		612-624	120
VLMK20J2L1	Red	2	5.6	14	612-624	120
VLMK20J2L2	Red	2	5.6	18	612-624	120
VLMK20K1L2	Red	2	7.1	18	612-624	120
VLMK2300	Red	20	35.5		630	120
VLMK23P2R1	Red	20	56	140	630	120
VLMK23P2S1	Red	20	56	224	630	120
VLMK23Q2S1	Red	20	90	224	630	120
VLMS2000	Red	2	2.24		630	120
VLMS20H2K1	Red	2	3.55	9	630	120
VLMS20H2L1	Red	2	3.55	14	630	120
VLMS20J2L1	Red	2	5.6	14	630	120
VLMS2100	Red	10	2.8		624-636	120
VLMS21H2L1	Red	10	3.55	14	624-636	120
VLMS21H2K1	Red	10	3.55	9	624-636	120
VLMS21J2L1	Red	10	5.6	14	624-636	120
VLMF2300	Soft Orange	20	56		598-611	120
VLMF23Q2S1	Soft Orange	20	90	224	598-611	120
VLMF23R2T1	Soft Orange	20	140	355	598-611	120
VLMF23Q2T1	Soft Orange	20	90	355	598-611	120
VLMO2000	Soft Orange	2	4.5		598-611	120
VLMO20J2M1	Soft Orange	2	5.6	22.4	598-611	120
VLMO20J2L1	Soft Orange	2	5.6	14	598-611	120
VLMO20K2M1	Soft Orange	2	9	22.4	598-611	120
VLMO2100	Soft Orange	10	3.55		598-611	120
VLMO21H2K1	Soft Orange	10	3.55	9	598-611	120
VLMO21H2L1	Soft Orange	10	3.55	14	598-611	120
VLMO21J2L1	Soft Orange	10	5.6	14	598-611	120

MiniLED listing is continued on the next page.

MiniLED (Continued)

Material	Color	I_F (mA)	I_V in mcd		Wavelength	Full Angle (°)
			Min	Max		
VLME2300	Yellow	20	56		581-594	120
VLME23Q2S1	Yellow	20	90	224	581-594	120
VLME23Q2T1	Yellow	20	90	355	581-594	120
VLME23R2T1	Yellow	20	140	355	581-594	120
VLMY2000	Yellow	2	3.55		581-594	120
VLMY20J1L2	Yellow	2	4.5	18	581-594	120
VLMY20K1L2	Yellow	2	7.1	18	581-594	120
VLMY2100	Yellow	10	3.55		581-594	120
VLMY21H2K1	Yellow	10	3.55	9	581-594	120
VLMY21H2L1	Yellow	10	3.55	14	581-594	120
VLMY21J2L1	Yellow	10	5.6	14	581-594	120
VLMW2100-5K8L	White	10	56		X 0.33 - Y 0.33	120
VLMW21N2R2-5K8L	White	10	35.5	180	X 0.33 - Y 0.33	120
VLMW21P1Q2-5K8L	White	10	45	112	X 0.33 - Y 0.33	120
VLMW21Q1R2-5K8L	White	10	71	180	X 0.33 - Y 0.33	120

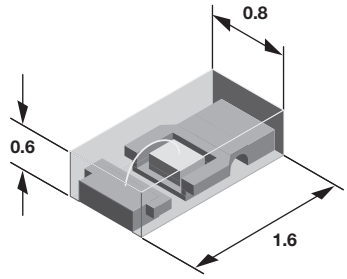
0603

Features

- Smallest SMD package 0603 with exceptional brightness
- Measures 1.6 mm x 0.8 mm x 0.6 mm (L x W x H)
- High reliability leadframe based
- Preconditioned per JEDEC level 2
- Extremely wide 160° viewing angle
- Available in 8-mm tape
- Highly efficient AlGaN/InGaN technology

Applications

- Indoor and outdoor message boards
- Flat backlight for LCDs, switches, and symbols
- Backlight for portable device keypads
- Displays for industrial control systems
- Miniaturized color effects
- Traffic displays
- General lighting



Material	Color	I_F (mA)	I_V in mcd		Wavelength	Full Angle (°)
			Min	Max		
TLMB1100	Blue	10	4.0		466	160
TLMG1100	Green	20	12.5		564-575	160
TLMP1100	Pure Green	20	6.3		551-566	160
TLMS1000	Red	2	1.8		624-636	160
TLMS1100	Red	20	32		627-639	160
TLMO1000	Soft Orange	2	3.55		600-609	160
TLMO1100	Soft Orange	20	50		600-609	160
VLMO11Q1R2	Soft Orange	20	71	180	600-609	160
TLMY1000	Yellow	2	3.55		580-595	160
TLMY1100	Yellow	20	50		580-595	160
VLMW11R2S2-5K8L	White	10	140	280	X 0.33 – Y 0.33	160

Ordering Information (only valid for this SMD short form)

Color Indicator:

Single Colors

A = yellow low current
B = blue
BG = blue green
C = green low current
D = red
E = yellow
F = orange
G = green
H = orange red
K = red or amber
O = orange
P = pure green
PG = pure green
R = red
S = super red
T = red low current
TG = true green
W = white
Y = yellow
YG = yellow green

Multi Colors

EK = yellow / red
KE = red / yellow
KG = red / green
RGB = red/ green / blue
RY = red / yellow
SY = super red / yellow
V = red / green

Packing Method:

Package	Taping	Qty (Pcs)
PLCC-2/ PLCC-4	GS08 or 08	7500 (5x1500)
	GS18 or 18	8000
0603	GS08	3000
MiniLED	GS08	3000
CLCC-2 Flat / CLCC-6	GS08 or 08	1000
	GS18 or 18	4000
Little Star®	GS08	2000
Reverse Gullwing	GS08	2000
	GS18	8000
RBG		2050

V L M E 31 Q 1 R 1 - 5 K 8 L - G S 1 8

Package Style:

M = SMD
R = Reverse

Package:

10 = 0603 / low current
11 = 0603 / ultra bright
20 = Mini / low current
21 = Mini / standard
23 = Mini / ultra bright
30 = PLCC-2 / low current
31 = PLCC-2 / standard
32 = PLCC-4 / power
33 = PLCC-2 / power
34 = Multicolor
41 = PLCC-2 / low cost
61 = 0.5 W / CLCC-6
62 = 0.5 W / CLCC-6 / power / flat
64 = 0.5 W / CLCC-6 / power / flat / low-cost
71 = 1.0 W / Little Star
82 = 1.0 W / CLCC-2 / power

Brightness classification:

According to standard

White color classification:

According to standard

Classification of Components for 0603 Series, MiniLED Series, and PLCC-x Series

Brightness Grouping

Intensity		
Half-Groups	I_V in mcd	
	Min	Max
C1	0.28	0.36
C2	0.36	0.45
D1	0.45	0.56
D2	0.56	0.71
E1	0.71	0.90
E2	0.90	1.12
F1	1.12	1.4
F2	1.4	1.8
G1	1.8	2.24
G2	2.24	2.8
H1	2.8	3.55
H2	3.55	4.5
J1	4.5	5.6
J2	5.6	7.1
K1	7.10	9
K2	9	11.2
L1	11.2	14
L2	14	18
M1	18	22.4
M2	22.4	28
N1	28	35.5
N2	35.5	45
P1	45	56
P2	56	71
Q1	71	90
Q2	90	112

Intensity		
Half-Groups	I_V in mcd	
	Min	Max
R1	112	140
R2	140	180
S1	180	224
S2	224	280
T1	280	355
T2	355	450
U1	450	560
U2	560	710
V1	710	900
V2	900	1120
AA	1120	1400
AB	1400	1800
BA	1800	2240
BB	2240	2800
CA	2800	3550
CB	3550	4500
DA	4500	5600
DB	5600	7100
EA	7100	9000
EB	9000	11200
FA	11200	14000
FB	14000	18000
GA	18000	22400
GB	22400	28000
HA	28000	35500
HB	35500	45000

Note: Luminous intensity is tested at a current pulse duration of 25 ms and an accuracy of ±11 %.

Color Grouping

Group	Min	Max
Blue		
2	458	464
3	462	468
4	466	472
5	470	476
6	474	480
Verde (BlueGreen)		
2	492	498
3	496	502
4	500	506
5	504	510
6	508	514
True Green		
2	509	517
3	515	523
4	521	529
5	527	535
6	533	541
Pure Green		
0	555	559
1	558	561
2	560	563
3	562	565

Group	Min	Max
Green		
3	562	565
4	564	567
5	566	569
6	568	571
7	570	573
8	572	575
Yellow		
1	581	584
2	583	586
3	585	588
4	587	590
5	589	592
6	591	594
Orange (Soft Orange)		
1	598	601
2	600	603
3	602	605
4	604	607
5	606	609
6	608	611
Amber		
1	611	618
2	614	622
3	616	634

Color Grouping (PLCC-4 Power)

Group	Min	Max
Yellow		
X	585	588
Y	588	591
Z	591	594

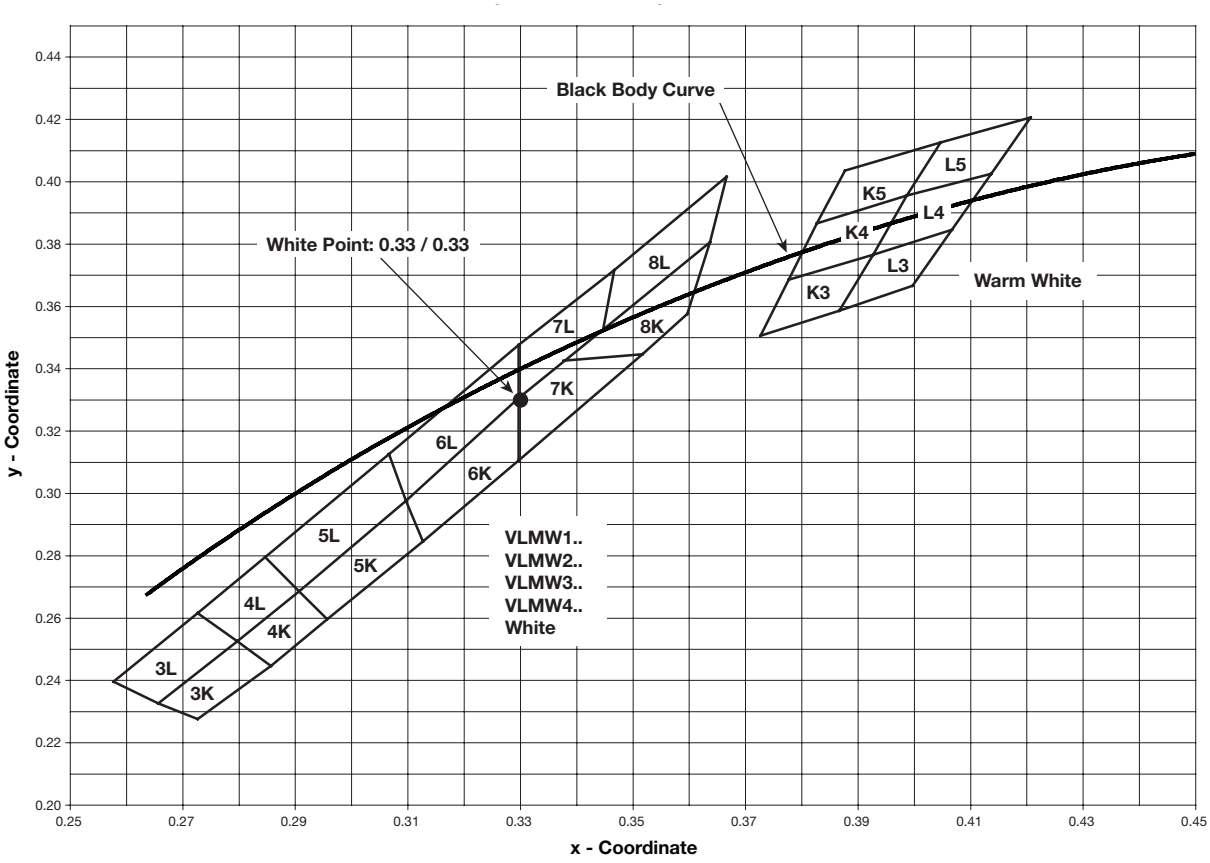
Group	Min	Max
Amber		
W	610	615
X	615	621

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

Chromaticity Coordinated Groups for 0603 Series, MiniLED Series, and PLCC-x Series (Continued)

Chromaticity Coordinated Groups

CLCC-6



Note: Chromaticity coordinate groups are tested at a current pulse duration of 25 ms and a tolerance of ± 0.01.

Classification of Components for PLCC-2 Plus Series

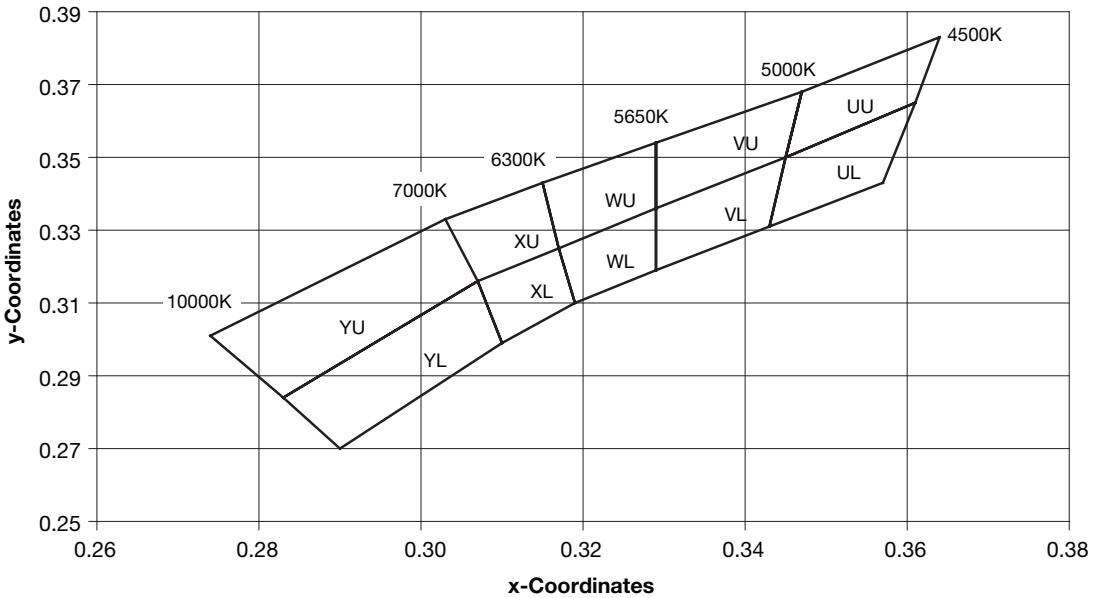
Luminous Intensity Classification		
Group	Luminous Intensity (mcd)	
Standard	Min	Max
Y1	2850	3550
Y2	3550	4500
Z1	4500	5600
Z2	5600	7150

Note: Luminous intensity is tested at a current pulse duration of 25 ms and an accuracy of ± 11 %.

Color Classification				
Group	Amber		Yellow	
	Dominant Wavelength (nm)			
	Min	Max	Min	Max
W	610	615		
X	615	621	585	588
Y			588	591
Z			591	594

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

PLCC-2 Plus



Note: Chromaticity coordinate groups are tested at a current pulse duration of 25 ms and a tolerance of ± 0.01.

Classification of Components for VLMx71.. Series

Brightness Grouping

Intensity				
Group	I_V in mcd		ϕ_V in mlm (Calculated)	
	Min	Max	Min	Max
AA	7150	9000	20700	26100
AB	9000	11250	26100	33000
AC	11250	14000	33000	39000
AD	14000	18000	39000	52000
AE	18000	22400	52000	71000
AF	22400	28500	71000	97000

Notes:

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 reel (there will be no mixing of two groups on each reel).

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 reel.

In order to ensure availability, single wavelength groups will not be orderable.

Color Grouping

Group	Min	Max
Yellow		
A	585	588
B	588	591
C	591	594
D	594	597

Group	Min	Max
Amber		
A	610	616
B	616	620

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

Forward Voltage Classification

Group	Forward Voltage (V)	
	Min	Max
02	2.2	2.5
03	2.5	2.8

Notes:

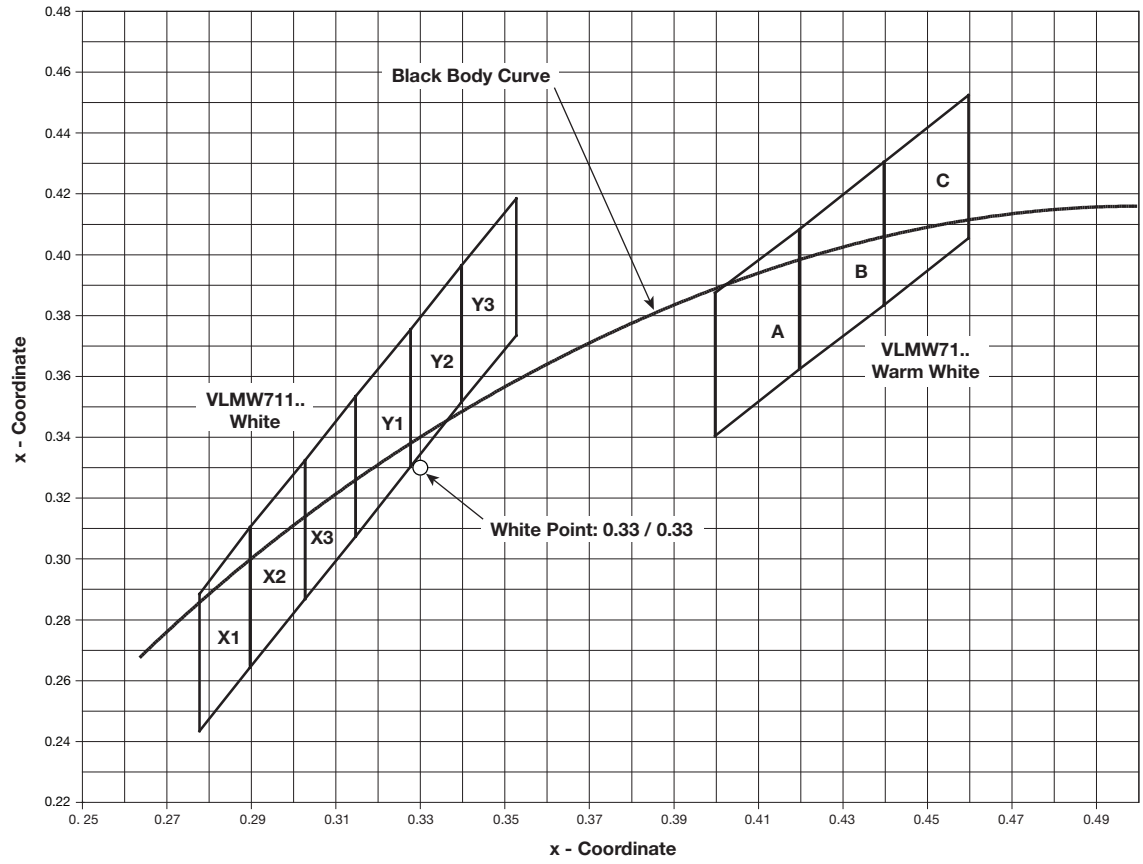
Forward voltages are tested at a current pulse duration of 25 ms and a tolerance of ±0.05 V.

In order to ensure availability, a single forward voltage group can not be ordered.

Classification of Components for VLMx71.. Series (Continued)

Chromaticity Coordinated Groups

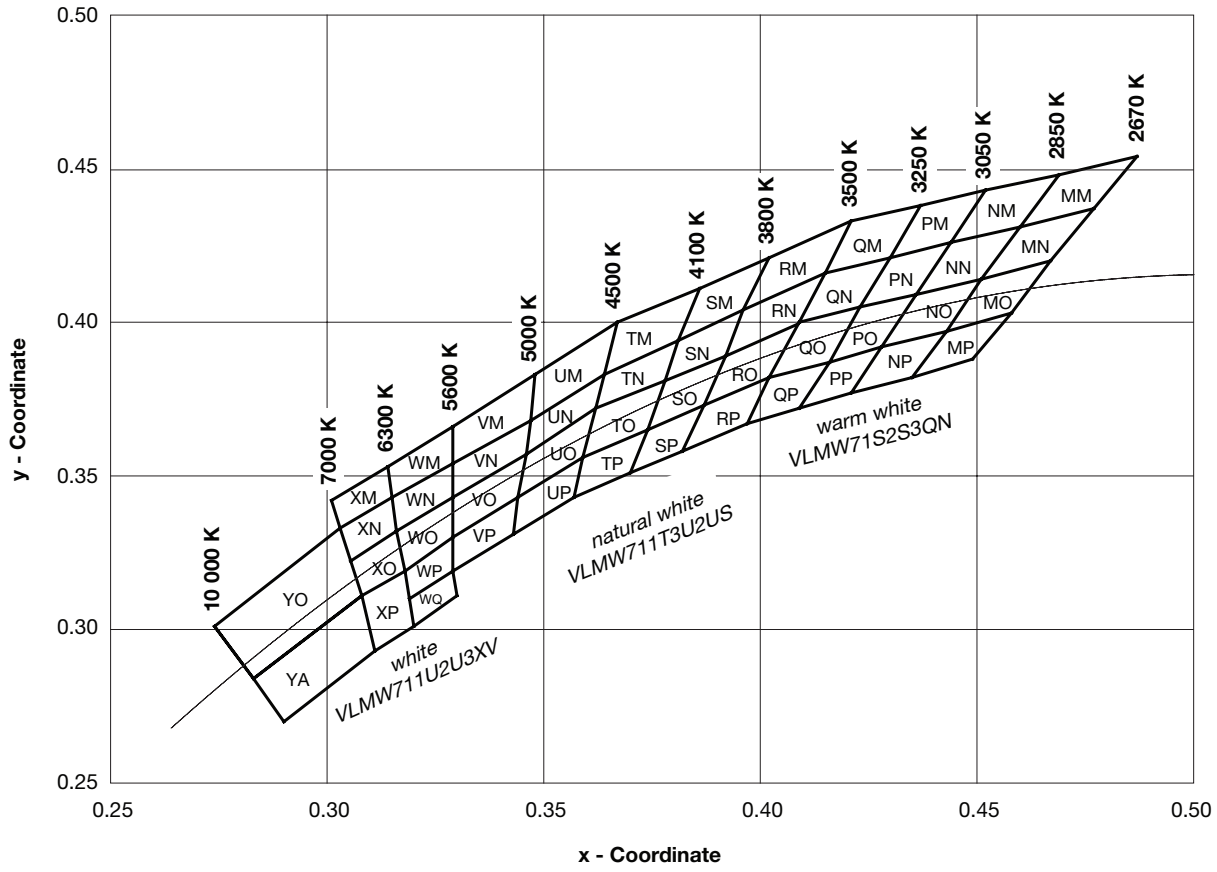
Little Star® White and Warm White (VLMW711.. and VLMW71..)



Classification of Components for New White Series VLMW7

Chromaticity Coordinated Groups

New White Series VLMW7



Note:

Chromaticity coordinate groups are tested at a current pulse duration of 25 ms and a tolerance of ± 0.01.

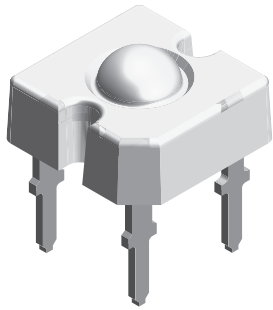
TELUX

Features

- High luminous flux
- Supreme heat dissipation: RthJP is 90 K/W
- High operating temperature: Tamb = - 40 °C to + 110 °C
- Meets SAE and ECE color requirements for the automobile industry for color red
- Packed in tubes for automatic insertion
- Luminous flux, forward voltage and color categorized for each tube
- Small mechanical tolerances allow precise usage of external reflectors or lightguides
- Lead (Pb)-free device
- Component in accordance to RoHS 2002/95/EC and WEEE 2002/96/EC
- Compatible with wave solder processes acc. to CECC 00802 and J-STD-020C
- ESD-withstand voltage: up to 2 kV according to JESD22-A114-B
- Automotive qualified

Applications

- Exterior lighting
- Dashboard illumination
- Tail-, stop - and turn signals of motor vehicles
- Replaces small incandescent lamps
- Traffic signals and signs



Telux (Continued)

Material	Color	I_F (mA)	Iv /ϕv Typ	ϕv in lm		V_F in V		Wavelength (nm)	Full Angle (°)
				Min	Typ (Max)	Min	Typ (Max)		
TLWR7600	Red	70	0.8	1.5	2.1	1.83	2,2 (2,67)	611-634	60
TLWR7900	Red	70	0.7	1.5	2,1 (3,0)	1.83	2,2 (2,67)	611-634	90
TLWR8600	Red	70	0.8	2.0	3.0	1.83	2,2 (2,67)	611-634	60
TLWR8900	Red	70	0.7	2.0	3.0	2	2,2 (2,7)	611-634	90
TLWR8901	Red	70	0.7	2.0	3 (4,8)	2	2,2 (2,7)	611-634	90
TLWR9000	Red	70	0.5	2.5	3.2	1.83	2,2 (2,7)	611-634	100
TLWR9600	Red	70	0.8	2.5	3.2	1.83	2,2 (2,7)	611-634	60
TLWR9900	Red	70	0.7	2.5	3.2	1.83	2,2 (2,7)	611-634	90
VLWR9631	Red	70	0.8	5.0	n.a. (12,2)	1.83	2,5 (3,03)	611-634	60
VLWR9631	Red	70	n.a	5.0	6.0	1.83	2,4 (3,03)	611-634	25 x 68
VLWR9530	Red	70	n.a	5.0	6.0	1.83	2,4 (3,03)	611-634	40 x 90
VLWR9630	Red	70	0.8	4.0	n.a. (12,2)	1.83	2,5 (3,03)	611-634	60
VLWR9930	Red	70	0.7	4.0	n.a. (12,2)	1.83	2,5 (3,03)	611-634	90
VLWR9931	Red	70	0.7	5.0	n.a. (12,2)	1.83	2,5 (3,03)	611-634	90
TLWO7600	Orange	70	0.8	1.5	2.1	1.83	2,2 (2,67)	598-611	60
TLWO7900	Orange	70	0.7	1.5	2,1 (3,0)	1.83	2,2 (2,67)	598-611	90
TLWY7600	Yellow	70	0.8	1.0	1.4	1.83	2,1 (2,67)	585-597	60
TLWY7900	Yellow	70	0.7	1.0	1.4	1.83	2,1 (2,67)	585-597	90
TLWY8600	Yellow	70	0.8	2.0	3.0	1.83	2,1 (2,67)	585-597	60
TLWY8900	Yellow	70	0.7	2.0	3.0	1.83	2,1 (2,7)	585-597	90
VLWY9630	Yellow	70	0.8	4.0	n.a. (12,2)	1.83	2,5 (3,03)	585-597	60
VLWY9930	Yellow	70	0.7	4.0	n.a. (12,2)	1.83	2,5 (3,03)	585-597	90
VLWTG9600	True Green	50	0.8	2.0	2.5	n.a.	3,9 (4,7)	509-523	60
VLWTG9900	True Green	50	0.7	2.0	2.5	n.a.	3,9 (4,7)	509-523	90
VLWW8605	White	50	0.8	0.60	1.0	n.a.	4,3 (5,2)	White 5500K	90
VLWW9600	White	50	0.8	1.5	2.2	n.a.	4,3 (5,2)	White 5500K	60
VLWW9601	White	50	0.8	1.5	n.a. (3,6)	n.a.	4,3 (5,2)	White 5500K	60
VLWW9900	White	50	0.7	1.5	2.2	n.a.	4,3 (5,2)	White 5500K	90

5 mm

Features

- AlInGaP, AlGaS; GaALS; GaAsP; GaP, GaN, InGaN technology
- Untinted non diffused, diffused or diffused tinted lens
- High luminous intensity
- High operating tempreature: Tj (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

Application

- 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

Material	Color	Product Series	Wavelength (nm)	Ivv in mcd	V_F in V	Full Angle (°)
				(Min; Typ; Max) @ I_F (mA)	(Typ.Max) @ I_F	
TLDR5400	Red	Standard	648 (typ.)	(min 35 I typ 70) @ 20	(typ 1.8 I max 2.2) @ 20	60
TLDR5800	Red	Standard	648 (typ.)	(min 1000 I typ 2500) @ 20	(typ 1.8 I max 2.2) @ 20	8
TLDR5800-AS12Z	Red	Standard	648 (typ.)	(min 1000 I typ 2500) @ 20	(typ 1.8 I max 2.2) @ 20	8
TLDR6400	Red	Standard	648 (typ.)	(min 35 I typ 70) @ 20	(typ 1.8 I max 2.2) @ 20	60
TLDR6800	Red	Standard	648 (typ.)	(min 1000 I typ 2500) @ 20	(typ 1.8 I max 2.2) @ 20	8
TLDR6800-AS12Z	Red	Standard	648 (typ.)	(min 1000 I typ 2500) @ 20	(typ 1.8 I max 2.2) @ 20	8
TLHK5400	Red	Standard	630 (typ.)	(min 10 I typ 50) @ 10	(typ 2 I max 2.6) @ 20	60
TLHK5800	Red	Standard	630 (typ.)	(min 1000 I typ 5500) @ 20	(typ 1.9 I max 2.6) @ 20	8
TLUR5400	Red	Standard	630 (typ.)	(min 4 I typ 15) @ 10	(typ 2 I max 3) @ 20	60
TLUR5401	Red	Standard	630 (typ.)	(min 4 I typ 15 I max 32) @ 10	(typ 2 I max 3) @ 20	60
TLUR6400	Red	Standard	630 (typ.)	(min 4 I typ 15) @ 10	(typ 2 I max 3) @ 20	60
TLUR6401	Red	Standard	630 (typ.)	(min 4 I typ 15 I max 32) @ 10	(typ 2 I max 3) @ 20	60
TLHK5100	Red	Standard	625 - 638	(min 320) @ 20	(typ 1.9 I max 2.6) @ 20	18
TLCR5100	Red	Power	611-622	(min 4300 I typ 11 000) @ 50	(typ 2.1 I max 2.7) @ 50	18
TLCS5100	Red	Power	620 - 630	(min 2400 I typ 7500) @ 50	(typ 2.1 I max 2.7) @ 50	18
VLCS5130	Red	Power	620 - 630	(min 7500 I typ 25 000) @ 50	(typ 2.2 I max 3.0) @ 50	18
VLCS5230	Red	Power	620 - 630	(min 3200 I typ 7500) @ 50	(typ 2.2 I max 3.0) @ 50	30
VLCS5830	Red	Power	620 - 630	(min 24 000 I typ 65 000) @ 50	(typ 2.2 I max 3.0) @ 50	8
TLHR5200	Red	Standard	612 - 625	(min 10 I typ 50) @ 10	(typ 2 I max 3) @ 20	28
TLHR5201	Red	Standard	612 - 625	(min 16 I typ 60) @ 10	(typ 2 I max 3) @ 20	28
TLHR5205	Red	Standard	612 - 625	(min 25 I typ 70) @ 10	(typ 2 I max 3) @ 20	28
TLHR5400	Red	Standard	612 - 625	(min 1.6 I typ 10) @ 10	(typ 2 I max 3) @ 20	60
TLHR5400-AS12Z	Red	Standard	612 - 625	(min 1.6 I typ 10) @ 10	(typ 2 I max 3) @ 20	60
TLHR5401	Red	Standard	612 - 625	(min 4 I typ 12) @ 10	(typ 2 I max 3) @ 20	60
TLHR5405	Red	Standard	612 - 625	(min 6.3 I typ 14) @ 10	(typ 2 I max 3) @ 20	60
TLHR5405-AS12Z	Red	Standard	612 - 625	(min 6.3 I typ 14) @ 10	(typ 2 I max 3) @ 20	60
TLHR5405-AS21	Red	Standard	612 - 625	(min 4 I typ 12) @ 10	(typ 2 I max 3) @ 20	60
TLHR6200-CS12	Red	Standard	612 - 625	(min 10 I typ 50) @ 10	(typ 2 I max 3) @ 20	28

5 mm (Continued)

Material	Color	Product Series	Wavelength (nm)	Ivv in mcd (Min; Typ; Max) @ I_F (mA)	V_F in V (Typ.Max) @ I_F	Full Angle (°)
TLHR6200-CS12Z	Red	Standard	612 - 625	(min 10 I typ 50) @ 10	(typ 2 I max 3) @ 20	28
TLHR6205	Red	Standard	612 - 625	(min 25 I typ 70) @ 10	(typ 2 I max 3) @ 20	28
TLHR6400	Red	Standard	612 - 625	(min 1.6 I typ 10) @ 10	(typ 2 I max 3) @ 20	60
TLHR6400-CS12Z	Red	Standard	612 - 625	(min 1.6 I typ 10) @ 10	(typ 2 I max 3) @ 20	60
TLHR6401	Red	Standard	612 - 625	(min 4 I typ 12) @ 10	(typ 2 I max 3) @ 20	60
TLHR6405	Red	Standard	612 - 625	(min 6.3 I typ 14) @ 10	(typ 2 I max 3) @ 20	60
TLHR6405-ASZ	Red	Standard	612 - 625	(min 6.3 I typ 14) @ 10	(typ 2 I max 3) @ 20	60
TLHR6405-BT12Z	Red	Standard	612 - 625	(min 6.3 I typ 14) @ 10	(typ 2 I max 3) @ 20	60
TLLR5400	Red	Low current	612 - 625	(min 0.63 I typ 1.2) @ 2	(typ 1.9 I max 2.4) @ 2	50
TLLR5401	Red	Low current	612 - 625	(min 1 I typ 2) @ 2	(typ 1.9 I max 2.4) @ 2	50
TLUV5300	Red	Bi-color	612 - 625	(min 1 I typ 2.5) @ 10	(typ 2 I max 3) @ 20	60
TLCR5200	Red	Power	611 - 622	(min 1350 I typ 4000) @ 50	(typ 2.1 I max 2.7) @ 50	30
TLCR5800	Red	Power	611 - 622	(min 7500 I typ 35 000) @ 50	(typ 2.1 I max 2.7) @ 50	8
TLCR5800-AS21	Red	Power	611 - 622	(min 7500 I typ 35 000) @ 50	(typ 2.1 I max 2.7) @ 50	8
TLCR6100	Red	Power	611 - 622	(min 4300 I typ 11 000) @ 50	(typ 2.1 I max 2.7) @ 50	18
TLCR6200-AS12	Red	Power	611 - 622	(min 1350 I typ 4000) @ 50	(typ 2.1 I max 2.7) @ 50	30
TLCR6800	Red	Power	611 - 622	(min 7500 I typ 35 000) @ 50	(typ 2.1 I max 2.7) @ 50	8
TLCO5100	Soft Orange	Power	600 - 611	(min 4300 I typ 12 000) @ 50	(typ 2.1 I max 2.7) @ 50	18
TLHF5400	Soft Orange	Standard	598 - 611	(min 16 I typ 160) @ 10	(typ 2 I max 2.6) @ 20	60
TLCY5100	Yellow	Power	585 - 597	(min 3200 I typ 7500) @ 50	(typ 2.1 I max 2.7) @ 50	18
TLCY5101	Yellow	Power	585 - 597	(min 5750 I max 20 000) @ 50	(typ 2.1 I max 2.7) @ 50	18
TLCY5101-AS12Z	Yellow	Power	585 - 597	(min 5750 I max 20 000) @ 50	(typ 2.1 I max 2.7) @ 50	18
TLCY5200	Yellow	Power	585 - 597	(min 1350 I typ 4000) @ 50	(typ 2.1 I max 2.7) @ 50	30
TLCY5800	Yellow	Power	585 - 597	(min 5750 I typ 25 000) @ 50	(typ 2.1 I max 2.7) @ 50	8
TLCY6100	Yellow	Power	585 - 597	(min 3200 I typ 7500) @ 50	(typ 2.1 I max 2.7) @ 50	18
TLCY6100-AS21	Yellow	Power	585 - 597	(min 3200 I typ 7500) @ 50	(typ 2.1 I max 2.7) @ 50	18
TLCY6101	Yellow	Power	585 - 597	(min 5750 I max 20 000) @ 50	(typ 2.1 I max 2.7) @ 50	18
TLCY6101-ASZ	Yellow	Power	585 - 597	(min 5750 I max 20 000) @ 50	(typ 2.1 I max 2.7) @ 50	18
TLCY6200	Yellow	Power	585 - 597	(min 1350 I typ 4000) @ 50	(typ 2.1 I max 2.7) @ 50	30
TLCY6200-AS12	Yellow	Power	585 - 597	(min 1350 I typ 4000) @ 50	(typ 2.1 I max 2.7) @ 50	30
TLCY6800	Yellow	Power	585 - 597	(min 5750 I typ 25 000) @ 50	(typ 2.1 I max 2.7) @ 50	8
TLHE5100	Yellow	Standard	581 - 594	(min 750) @ 20	(typ 2 I max 2.6) @ 20	18
TLHE5800	Yellow	Standard	581 - 594	(min 1000 I typ 3500) @ 20	(typ 2 I max 2.6) @ 20	8
TLHY5200	Yellow	Standard	581 - 594	(min 10 I typ 50) @ 10	(typ 2.4 I max 3) @ 20	28
TLHY5400	Yellow	Standard	581 - 594	(min 1.6 I typ 10) @ 10	(typ 2.4 I max 3) @ 20	60
TLHY5400-AS12Z	Yellow	Standard	581 - 594	(min 1.6 I typ 10) @ 10	(typ 2.4 I max 3) @ 20	60
TLHY5401	Yellow	Standard	581 - 594	(min 6.3 I typ 14) @ 10	(typ 2.4 I max 3) @ 20	60
TLHY5405	Yellow	Standard	581 - 594	(min 6.3 I typ 14) @ 10	(typ 2.4 I max 3) @ 20	60

5 mm (Continued)

Material	Color	Product Series	Wavelength (nm)	Ivv in mcd	V_F in V	Full Angle (°)
				(Min; Typ; Max) @ I_F (mA)	(Typ.Max) @ I_F	
TLHY5800	Yellow	Standard	581 - 594	(min 100 I typ 250) @ 20	(typ 2.4 I max 3) @ 20	8
TLHY6200-CS12	Yellow	Standard	581 - 594	(min 10 I typ 50) @ 10	(typ 2.4 I max 3) @ 20	28
TLHY6200-CS12Z	Yellow	Standard	581 - 594	(min 10 I typ 50) @ 10	(typ 2.4 I max 3) @ 20	28
TLHY6400	Yellow	Standard	581 - 594	(min 1.6 I typ 10) @ 10	(typ 2.4 I max 3) @ 20	60
TLHY6400-CS12Z	Yellow	Standard	581 - 594	(min 1.6 I typ 10) @ 10	(typ 2.4 I max 3) @ 20	60
TLHY6400-MS12Z	Yellow	Standard	581 - 594	(min 1.6 I typ 10) @ 10	(typ 2.4 I max 3) @ 20	60
TLHY6401	Yellow	Standard	581 - 594	(min 4 I typ 12) @ 10	(typ 2.4 I max 3) @ 20	60
TLHY6405	Yellow	Standard	581 - 594	(min 6.3 I typ 14) @ 10	(typ 2.4 I max 3) @ 20	60
TLHY6405-ASZ	Yellow	Standard	581 - 594	(min 6.3 I typ 14) @ 10	(typ 2.4 I max 3) @ 20	60
TLHY6405-BTZ	Yellow	Standard	581 - 594	(min 6.3 I typ 14) @ 10	(typ 2.4 I max 3) @ 20	60
TLLY5400	Yellow	Low current	581 - 594	(min 0.63 I typ 1.2) @ 2	(typ 2.4 I max 2.9) @ 2	50
TLLY5401	Yellow	Low current	581 - 594	(min 1 I typ 2) @ 2	(typ 2.4 I max 2.9) @ 2	50
TLCYG5100	Yellow-Green	Power	565 - 576	(min 1350 I typ 3500) @ 50	(typ 2.2 I max 2.7) @ 50	18
TLHG5100	Green	Standard	562 - 575	(min 240) @ 20	(typ 2.4 I max 3) @ 20	18
TLHG5200	Green	Standard	562 - 575	(min 16 I typ 40) @ 10	(typ 2.4 I max 3) @ 20	28
TLHG5201	Green	Standard	562 - 575	(min 25 I typ 45) @ 10	(typ 2.4 I max 3) @ 20	28
TLHG5201-AS12Z	Green	Standard	562 - 575	(min 25 I typ 45) @ 10	(typ 2.4 I max 3) @ 20	28
TLHG5205	Green	Standard	562 - 575	(min 40 I typ 50) @ 10	(typ 2.4 I max 3) @ 20	28
TLHG5205-AS21	Green	Standard	562 - 575	(min 40 I typ 50) @ 10	(typ 2.4 I max 3) @ 20	28
TLHG5400	Green	Standard	562 - 575	(min 1.6 I typ 10) @ 10	(typ 2.4 I max 3) @ 20	60
TLHG5400-AS12Z	Green	Standard	562 - 575	(min 1.6 I typ 10) @ 10	(typ 2.4 I max 3) @ 20	60
TLHG5400-BT12	Green	Standard	562 - 575	(min 1.6 I typ 10) @ 10	(typ 2.4 I max 3) @ 20	60
TLHG5401	Green	Standard	562 - 575	(min 4 I typ 12) @ 10	(typ 2.4 I max 3) @ 20	60
TLHG5405	Green	Standard	562 - 575	(min 6.3 I typ 15) @ 10	(typ 2.4 I max 3) @ 20	60
TLHG5405-AS12Z	Green	Standard	562 - 575	(min 6.3 I typ 15) @ 10	(typ 2.4 I max 3) @ 20	60
TLHG5800	Green	Standard	562 - 575	(min 430 I typ 700) @ 20	(typ 2.4 I max 3) @ 20	8
TLHG6200	Green	Standard	562 - 575	(min 16 I typ 40) @ 10	(typ 2.4 I max 3) @ 20	28
TLHG6200-CS12	Green	Standard	562 - 575	(min 16 I typ 40) @ 10	(typ 2.4 I max 3) @ 20	28
TLHG6200-CS12Z	Green	Standard	562 - 575	(min 16 I typ 40) @ 10	(typ 2.4 I max 3) @ 20	28
TLHG6400	Green	Standard	562 - 575	(min 1.6 I typ 10) @ 10	(typ 2.4 I max 3) @ 20	60
TLHG6400-AS12Z	Green	Standard	562 - 575	(min 1.6 I typ 10) @ 10	(typ 2.4 I max 3) @ 20	60
TLHG6400-CS12Z	Green	Standard	562 - 575	(min 1.6 I typ 10) @ 10	(typ 2.4 I max 3) @ 20	60
TLHG6401	Green	Standard	562 - 575	(min 4 I typ 12) @ 10	(typ 2.4 I max 3) @ 20	60
TLHG6401-AS12Z	Green	Standard	562 - 575	(min 4 I typ 12) @ 10	(typ 2.4 I max 3) @ 20	60
TLHG6405	Green	Standard	562 - 575	(min 6.3 I typ 15) @ 10	(typ 2.4 I max 3) @ 20	60
TLHG6405-ASZ	Green	Standard	562 - 575	(min 6.3 I typ 15) @ 10	(typ 2.4 I max 3) @ 20	60
TLHG6405-BTZ	Green	Standard	562 - 575	(min 6.3 I typ 15) @ 10	(typ 2.4 I max 3) @ 20	60

5 mm (Continued)

Material	Color	Product Series	Wavelength (nm)	Ivv in mcd (Min; Typ; Max) @ I_F (mA)	V_F in V (Typ.Max) @ I_F	Full Angle (°)
TLHG6800-AS12Z	Green	Standard	562 - 575	(min 430 I typ 700) @ 20	(typ 2.4 I max 3) @ 20	8
TLLG5400	Green	Low current	562 - 575	(min 0.63 I typ 1.2) @ 2	(typ 1.9 I max 2.4) @ 2	50
TLLG5400-AS12	Green	Low current	562 - 575	(min 0.63 I typ 1.2) @ 2	(typ 1.9 I max 2.4) @ 2	50
TLLG5401	Green	Low current	562 - 575	(min 1 I typ 2) @ 2	(typ 1.9 I max 2.4) @ 2	50
TLCPG5100	Pure Green	Power	555 - 567	(min 430 I typ 1250) @ 50	(typ 2.2 I max 2.7) @ 50	18
TLHP5800	Pure Green	Standard	555 - 565	(min 25 I typ 85) @ 20	(typ 2.4 I max 3) @ 20	8
TLUV5300	Green	Bi-color	552 - 575	(min 1 I typ 2.5) @ 10	(typ 2.4 I max 3) @ 20	60
TLHB5400	Blue	Standard	466 (typ.)	(min 6.3 I typ 15) @ 20	(typ 3.9 I max 4.5) @ 20	60
TLHB5800	Blue	Standard	466 (typ.)	(min 130 I typ 380) @ 20	(typ 3.9 I max 4.5) @ 20	8
TLHB5100	Blue	Standard	466 (typ.)	(min 63 I typ 250) @ 20	(typ 3.9 I max 4.5) @ 20	18
TLHB5102	Blue	Standard	466 (typ.)	(min 130 I max 360) @ 20	(typ 3.9 I max 4.5) @ 20	18
VLHW5100	White	Standard	x = 0,33/ y = 0,33	(min 5600 I max 11 200) @ 20	(min 2.8 I max 3.6) @ 20	20
VLHW5100-CS12	White	Standard	x = 0,33/ y = 0,33	(min 5600 I max 11 200) @ 20	(min 2.8 I max 3.6) @ 20	20

3 mm

Features

- AlInGaP, AlGaS; GaALS; GaAsP; GaP, GaN, InGaN technology
- Standard ϕ3 mm (T-1) package
- Small mechanical tolerances
- Suitable for DC and high peak current
- Wide viewing angle range
- Very high intensity
- Luminous intensity color categorized
- Lead (Pb)-free device, ROHS, halogen free special types for backlighting or 12V application

Application

- Status lights
- OFF/ON indicator
- Background illumination
- Readout lights
- Maintenance lights
- Legend light
- Status light in cars
- OFF/ON indicator in cars
- Background illumination for switches
- OFF/ON indicator in switches

Material	Color	Product Series	I	Iv in mcd			Full Angle	Wavelength (nm)	V_F in (V) (Typ. Max) @ I_F
			(mA)	Min	Av	Max			
TLDR4400	Red	Standard	20	25	45		80	648 (typ.)	(typ 2) @ 20
TLDR4401	Red	Standard		25		50	80	648 (typ.)	(typ 2) @ 20
TLDR4900	Red	Standard		63	200		32	648 (typ.)	(typ 1.8 I max 2.2) @ 20
TLDR4901	Red	Standard		63		200	32	648 (typ.)	(typ 1.8 I max 2.2) @ 20
TLUR4400	Red	Standard	10	4	15		60	630 (typ.)	(typ 2 I max 3) @ 20
TLUR4401	Red	Standard		4		32	60	630 (typ.)	(typ 2 I max 3) @ 20
TLLR4400	Red	Low current	2	0.63	1.2		50	612 - 62	(typ 1.9 I max 2.4) @ 2
TLLR4401	Red	Low current	2	1	2		50	612 - 62	(typ 1.9 I max 2.4) @ 2
TLHR4400	Red	Standard	10	1.6	3		60	612 - 625	(typ 1.9 I max 2.4) @ 20
TLHR4400-AS12	Red	Standard		1.6	3		60	612 - 625	(typ 1.9 I max 2.4) @ 20
TLHR4400-AS12Z	Red	Standard		1.6	3		60	612 - 625	(typ 1.9 I max 2.4) @ 20
TLHR4400-AS21Z	Red	Standard		1.6	3		60	612 - 625	(typ 1.9 I max 2.4) @ 20
TLHR4400-MS12Z	Red	Standard		1.6	3		60	612 - 625	(typ 1.9 I max 2.4) @ 20
TLHR4401	Red	Standard		2.5	5		60	612 - 625	(typ 1.9 I max 2.4) @ 20
TLHR4401-AS12Z	Red	Standard		2.5	5		60	612 - 625	(typ 1.9 I max 2.4) @ 20
TLHR4401-LS12Z	Red	Standard		2.5	5		60	612 - 625	(typ 1.9 I max 2.4) @ 20
TLHR4405	Red	Standard		6.3	10		60	612 - 625	(typ 1.9 I max 2.4) @ 20
TLHR4405-AS12	Red	Standard		6.3	10		60	612 - 625	(typ 1.9 I max 2.4) @ 20
TLHR4405-AS21	Red	Standard		6.3	10		60	612 - 625	(typ 1.9 I max 2.4) @ 20
TLHR4200	Red	Standard		4	8		44	612 - 625	(typ 2 I max 3) @ 20
TLHR4201	Red	Standard		6.3	10		44	612 - 625	(typ 2 I max 3) @ 20
TLHR4205	Red	Standard		10	15		44	612 - 625	(typ 2 I max 3) @ 20
TLHR4600	Red	Standard		1	4		120	612 - 625	(typ 2 I max 3) @ 20
TLHR4605	Red	Standard		2.5	6		120	612 - 625	(typ 2 I max 3) @ 20
TLHR4605-MS12Z	Red	Standard		2.5	6		120	612 - 625	(typ 2 I max 3) @ 20
TLVD4200	Red	Standard	15*	14*	18*		170	640 (typ.)	(typ 1.8 I max 2.2) @ 20

3 mm (Continued)

Material	Color	Product Series	I	Iv in mcd			Full Angle	Wavelength (nm)	V_F in (V) (Typ. Max) @ I_F
			(mA)	Min	Av	Max			
TLHK4200	Red	Standard	10	25	100		44	630 (typ.)	(typ 1.9 I max 2.6) @ 20
TLHK4600	Red	Standard		6.3	15		120	630 (typ.)	(typ 1.9 I max 2.6) @ 20
TLHR4206	Red	Standard		16	25	50	44	620 - 628	(typ 2 I max 3) @ 20
TLHR4900	Red	Standard		6.3	25		32	612 - 625	(typ 2 I max 3) @ 20
TLRH4400CU	Red	Resistor	12	1.6	10		60	612 - 625	(typ.10/max.12)mA @ 12V
TLRH4420CU	Red	Resistor		1.6	10		60	612 - 625	(typ.10/max.12) mA @ 12V
TLHO4200	Soft orange	Standard	10	4	10		44	598 - 611	(typ 2,4 I max 3) @ 20
TLHO4201	Soft orange	Standard		10	18		44	598 - 611	(typ 2,4 I max 3) @ 20
TLHO4400	Soft orange	Standard		1.6	4		60	598 - 611	(typ 2,4 I max 3) @ 20
TLHO4400-MS12Z	Soft orange	Standard		1.6	4		60	598 - 611	(typ 2,4 I max 3) @ 20
TLHO4400_AS12Z	Soft orange	Standard		1.6	4		60	598 - 611	(typ 2,4 I max 3) @ 20
TLHF4900	Soft orange	Standard		66	300		32	598 - 611	(typ 1.9 I max 2.6) @ 20
TLRO4400CU	Soft orange	Resistor	12	4	10		60	598 - 611	(typ.10/max.12) mA@12V
TLRO4420CU	Soft orange	Resistor		4	10		60	598 - 611	(typ.10/max.12) mA@12V
TLHY4400	Yellow	Standard	10	1.6	3		60	581 - 594	(typ 2,4 I max 3) @ 20
TLHY4400-AS12Z	Yellow	Standard		1.6	3		60	581 - 594	(typ 2,4 I max 3) @ 20
TLHY4400-AS21	Yellow	Standard		1.6	3		60	581 - 594	(typ 2,4 I max 3) @ 20
TLHY4400-AS21Z	Yellow	Standard		1.6	3		60	581 - 594	(typ 2,4 I max 3) @ 20
TLHY4400-BT12	Yellow	Standard		1.6	3		60	581 - 594	(typ 2,4 I max 3) @ 20
TLHY4400-CS12	Yellow	Standard		1.6	3		60	581 - 594	(typ 2,4 I max 3) @ 20
TLHY4401	Yellow	Standard		2.5	5		60	581 - 594	(typ 2,4 I max 3) @ 20
TLHY4401-AS12	Yellow	Standard		2.5	5		60	581 - 594	(typ 2,4 I max 3) @ 20
TLHY4401-AS12Z	Yellow	Standard		2.5	5		60	581 - 594	(typ 2,4 I max 3) @ 20
TLHY4401-AS21	Yellow	Standard		2.5	5		60	581 - 594	(typ 2,4 I max 3) @ 20
TLHY4405	Yellow	Standard		6.3	10		60	581 - 594	(typ 2,4 I max 3) @ 20
TLHY4405-AS12	Yellow	Standard		6.3	10		60	581 - 594	(typ 2,4 I max 3) @ 20
TLHY4405-AS12Z	Yellow	Standard		6.3	10		60	581 - 594	(typ 2,4 I max 3) @ 20
TLHY4405-BT12Z	Yellow	Standard		6.3	10		60	581 - 594	(typ 2,4 I max 3) @ 20
TLHY4405-MS12	Yellow	Standard		6.3	10		60	581 - 594	(typ 2,4 I max 3) @ 20
TLLY4400	Yellow	Low current	2	0.63	1.2		50	581 - 594	(typ 2,4 I max 2,9) @ 2
TLLY4401	Yellow	Low current	2	1	2		50	581 - 594	(typ 2,4 I max 2,9) @ 2
TLHY4200	Yellow	Standard	10	4	10		44	581 - 594	(typ 2,4 I max 3) @ 20
TLHY4201	Yellow	Standard		6.3	15		44	581 - 594	(typ 2,4 I max 3) @ 20
TLHY4205	Yellow	Standard		10	20		44	581 - 594	(typ 2,4 I max 3) @ 20
TLHY4600	Yellow	Standard		0.63	3.5		120	581 - 594	(typ 2,4 I max 3) @ 20
TLHY4600-AS12	Yellow	Standard		0.63	3.5		120	581 - 594	(typ 2,4 I max 3) @ 20
TLHY4601	Yellow	Standard		1	4		120	581 - 594	(typ 2,4 I max 3) @ 20
TLHY4605	Yellow	Standard		2.5	5		120	581 - 594	(typ 2,4 I max 3) @ 20

3 mm (Continued)

Material	Color	Product Series	I	Iv in mcd			Full Angle	Wavelength (nm)	V_F in (V) (Typ. Max) @ I_F
			(mA)	Min	Av	Max			
TLHE4600	Yellow	Standard		10	20		120	581 - 594	(typ 1,9 I max 2,4) @ 20
TLHY4900	Yellow	Standard		6.3	25		32	581 - 594	(typ 2I max 3) @ 20
TLRE4200	Yellow	Resistor	12	25			44	581 - 594	(typ.10/max.12) mA @ 12V
TLRE4406	Yellow	Resistor		63			60	581 - 594	(typ.10/max.12) mA @ 12V
TLRY4220CU	Yellow	Resistor		6.3	15		44	581 - 594	(typ.10/max.12) mA @ 12V
TLRY4400CU	Yellow	Resistor		1.6	10		60	581 - 594	(typ.10/max.12) mA @ 12V
TLRY4420CU	Yellow	Resistor		1.6	10		60	581 - 594	(typ.10/max.12) mA @ 12V
TLLG4400	Green	Low current	2	0.63	1.2		50	562 - 575	(typ1,9I max 2,4) @ 2
TLLG4401	Green	Low current		1	2		50	562 - 575	(typ1,9I max 2,4) @ 2
TLHG4200	Green	Standard	10	6.3	10		44	562 - 575	(typ 2,4 I max 3) @ 20
TLHG4201	Green	Standard		10	15		44	562 - 575	(typ 2,4 I max 3) @ 20
TLHG4205	Green	Standard		16	20		44	562 - 575	(typ 2,4 I max 3) @ 20
TLHG4400	Green	Standard		2.5	4		60	562 - 575	(typ 2,4 I max 3) @ 20
TLHG4401	Green	Standard		4	6		60	562 - 575	(typ 2,4 I max 3) @ 20
TLHG4405	Green	Standard		6.3	12		60	562 - 575	(typ 2,4 I max 3) @ 20
TLHG4600	Green	Standard		1	4		120	562 - 575	(typ 2,4 I max 3) @ 20
TLHG4601	Green	Standard		1.6	3.5		120	562 - 575	(typ 2,4 I max 3) @ 20
TLHG4605	Green	Standard		4	6		120	562 - 575	(typ 2,4 I max 3) @ 20
TLHG4900	Green	Standard		16	37		32	562 - 575	(typ 2,4 I max 3) @ 20
TLRG4400CU	Green	Resistor	12	1.6	10		60	562 - 575	(typ.10/max.12)mA @ 12V
TLRG4420CU	Green	Resistor		1.6	10		60	562 - 575	(typ.10/max.12)mA @ 12V
TLHP4200	Pure green	Standard	10	2.5	7		44	555 - 565	(typ 2,4 I max 3) @ 20
TLHP4201	Pure green	Standard		6.3		20	44	555 - 565	(typ 2,4 I max 3) @ 20
TLHP4401	Pure green	Standard		1	3		60	555 - 565	(min 1 I typ 3) @ 10
TLHP4401-AS12Z	Pure green	Standard		1	3		60	555 - 565	(min 1 I typ 3) @ 10
TLRP4400CU	Pure green	Standard	12	0.63	3		60	555 - 565	(typ.10/max.12)mA @ 12V
TLRP4401CU	Pure green	Standard		1.6	4		60	555 - 565	(typ.10/max.12)mA @ 12V
TLRP4406CU	Pure green	Standard		1.6		5	60	555 - 565	(typ.10/max.12)mA @ 12V
TLRP4900CU	Pure green	Standard		4	11		32	555 - 565	(typ.10/max.12)mA @ 12V
TLHB4200	Blue	Standard	20	25	50		44	466 (typ.)	(typ 3,9 I max 4,5) @ 20
TLHB4201	Blue	Standard		40		132	44	466 (typ.)	(typ 3,9 I max 4,5) @ 20
TLHB4400	Blue	Standard		6.3	15		60	466 (typ.)	(typ 3,9 I max 4,5) @ 20
TLVB4200	Blue	Backlighting	15	25	38		170	466 (typ.)	(typ 3,9 I max 4,5) @ 20

* luminous flux (mcd)

Classification Tables for Telux

Luminous Flux Classification Tolerance ± ...%		
Group	Luminous Flux [mlm]	
	Min.	Max.
9	80	125
8	100	160
7	125	200
6	160	250
5	200	320
4	250	400
3	320	500
2	400	630
1	500	800
0	630	1000
A	800	1250
B	1000	1800
C	1500	2400
D	2000	3000
E	2500	3600
F	3000	4200
G	3500	4800
H	4000	6100
I	5000	7300
K	6000	9700
L	7000	12200
M	8000	15000

Forward Voltage Classification		
Group	Forward Voltage [V]	
	Min.	Max.
Y	1.83	2.07
Z	1.95	2.19
0	2.07	2.31
1	2.19	2.43
2	2.31	2.55
3	2.43	2.67
4	2.55	2.79

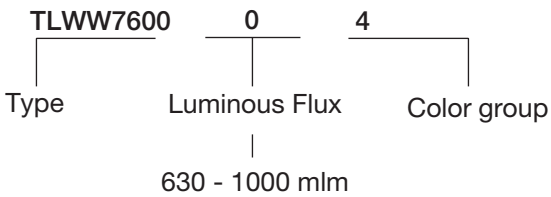
Color Classification				
Group	Red		Yellow	
	Dom. Wavelength [nm]			
	Min.	Max.	Min.	Max.
0			585	588
1	611	618	587	591
2	614	622	589	594
3	616	634	592	597

Group	Soft Orange	
	Dom. wavelength [nm]	
	Min.	Max.
0		
1	598	601
2	600	603
3	602	605
4	604	607
5	606	609
6	608	611

Group	Blue Green		True Green	
	Dom. wavelength [nm]			
	Min.	Max.	Min.	Max.
2	492	498	509	517
3	496	502	515	523
4	500	506	521	529
5	504	510	527	535
6	508	514		

Group	Blue	
	Dom. wavelength [nm]	
	Min.	Max.
2	458	464
3	462	468
4	466	472
5	470	476
6	474	480

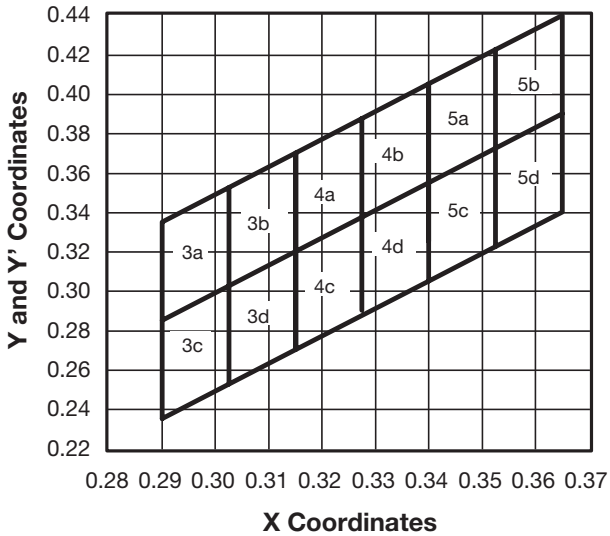
Telux Ordering Information



Classification Tables for 3 mm and 5 mm

Classification of 3 and 5 mm LEDs		
Group	Light Intensity [mcd] / Luminous Flux [mlm]	
	Min	Max
F	0.1	0.2
G	0.16	0.32
H	0.25	0.5
I	0.4	0.8
K	0.63	1.25
L	1.0	2.0
M	1.6	3.2
N	2.5	5.0
P	4.0	8.0
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

Classification of 3 and 5 mm LEDs		
Group	Light Intensity [mcd] / Luminous Flux [mlm]	
	Min	Max
AA	320	640
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	11500
MM	7500	15000
NN	10000	20000
PP	13500	27000
QQ	18000	36000
RR	24000	48000
SS	32000	64000
TT	43000	86000
UU	57500	115000



Classification Tables for 3 mm and 5 mm (Continued)

Color Classification for 3 and 5 mm LEDs				
Group	Yellow		Green	
	Dom. wavelength [nm]			
	Min.	Max.	Min.	Max.
0				
1	581	584		
2	583	586		
3	585	588		
4	587	590	564	567
5	589	592	566	569
6	591	594	568	571
7			570	573
8			572	575
9			574	577

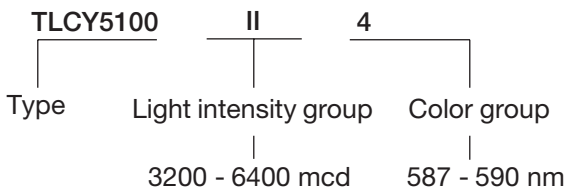
Group	BlueGreen		TrueGreen	
	Dom. wavelength [nm]			
	Min.	Max.	Min.	Max.
2	492	498	509	517
3	496	502	515	523
4	500	506	521	529
5	504	510	527	535
6	508	514	533	541

Group	Softorange		Pure Green	
	Dom. wavelength [nm]			
	Min.	Max.	Min.	Max.
0			555	559
1	598	601	558	561
2	600	603	560	563
3	602	605	562	565
4	604	607	564	567
5	606	609		
6	608	611		

Color Classification for 3 and 5 mm LEDs (cont.)		
Group	Blue	
	Dom. wavelength [nm]	
	Min.	Max.
2	458	464
3	462	468
4	466	472
5	470	476
6	474	480

Group	White			
	x		y	
	Chromaticity Coordinates acc. to CIE 1931			
	Min.	Max.	Min.	Max.
3	0.280	0.325	0.210	0.340
4	0.305	0.350	0.260	0.390
5	0.330	0.375	0.310	0.440

Ordering Information



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