

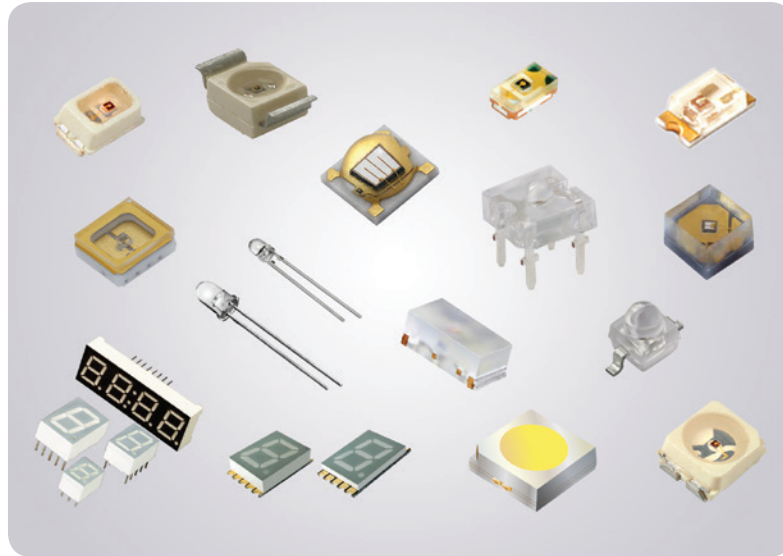


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OPTOELECTRONICS

LEDs for Lighting Solutions

Surface-Mount and Leaded LEDs, Displays, and LED Modules



RGB	0402	1.8 mm
Bicolor	Dome Lens	Side-View LED
PLCC-2	TELUX	Displays
Reverse Gullwing	5 mm	Clock Modules
MiniLED	3 mm	UV LED
0603	Backlight	

RESOURCES

- LED product portfolio: www.vishay.com/leds/
- Technical support: LED@vishay.com
- Sales contacts: www.vishay.com/doc?99914
- Material categorization:
for definitions of compliance please see www.vishay.com/doc?99912



RoHS
COMPLIANT

HALOGEN
FREE

GREEN
[5-2009]



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Introduction

Vishay offers LEDs in a variety of surface-mount and leaded package types. Leaded LEDs are offered in 1.8 mm, 3 mm, 5 mm, and square 4-lead TELUX packages. Standard and power LEDs are offered in packages with standard PLCC-2 dimensions. Mini products feature a small white surface-mount package measuring just 2.3 mm (L) x 1.4 mm (W) x 1.2 mm (H). The next smallest package is the 0603, measuring 1.8 mm (L) x 0.8 mm (W) x 0.6 mm (H), available in lead-frame and PCB-based versions. The new 0402 series with industry-standard 0402-compatible dimensions of 1.0 mm (L) x 0.5 mm (W) x 0.35 mm (H) is now the smallest package in the Vishay portfolio. Vishay LEDs are ideal for applications such as instruments, switches, and icon backlighting. The 0402 and 0603 are ideal for all types of general and architectural lighting. Vishay also now offers lighting modules for general lighting applications.

For further information please visit www.vishay.com/leds/.

Features

- Automotive-qualified to AEC-Q101 (most SMD and TELUX devices, as well as selected 3 mm and 5 mm devices)
- 120° viewing angle for SMD (160° for 0603 types), down to 8° for leaded devices
- Luminous intensity and color categorized per packing unit
- Automotive-qualified to AEC-Q101 (all SMD and TELUX devices, as well as selected 5 mm devices)
- LM-80 certified LEDs for lighting modules
- SMD devices compatible with infrared reflow solder processes according to CECC 00802 and J-STD-020C
- TELUX, 3 mm, and 5 mm devices are 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 (AlInGaP)
- ESD withstand voltage: up to 1 kV according to JESD22-A114-B (InGaN)

Applications

- Automotive: backlighting in dashboards and switches
- Indicators and backlighting for architectural and office equipment applications ⁽¹⁾
- Telecommunications: indicators and backlighting in telephones and fax machines
- Indicators and backlighting in audio and video equipment
- Signals and symbol luminaires

Note

⁽¹⁾ PLCC-2 and Mini-white devices are not recommended for general lighting and backlighting applications





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RGB

Features

- Utilize high brightness AlInGaP and InGaN chip technologies
- 6-pin RGB SMD LED package allows for independent control of each chip
- Compact package outline dimensions (L x W x H in mm): 3.5 x 2.8 x 1.45
- AEC-Q101 qualified, according to version D
- Qualified according to JEDEC® moisture sensitivity level 2
- Compatible to IR reflow soldering
- Operation temperature range: -40 °C to +110 °C
- Excellent corrosion robustness (H2S)
- ESD withstand voltage: up to 2 kV according to JESD22-A114-B
- Luminous intensities and colors categorized per reel

Applications

- Automotive interior lighting
- Wide range of accent and decorative lighting
- Displays: full color message and video boards
- Consumer appliances: backlighting for LCDs, PDAs, TVs
- White goods: ovens, microwaves, etc.



Resources

- [RGB classification of components](#)
- [RGB ordering information](#)

RGB PLCC-6

Part Number	Color	Full Angle (°)	Luminous Intensity (mcd)			at I _F (mA)	Wavelength Dom. (nm)			at I _F (mA)	Forward Voltage (V)			at I _F (mA)
			Min.	Typ.	Max.		Min.	Typ.	Max.		Min.	Typ.	Max.	
VLMRGB6112-00-GS08	Red	120	560	730	920	20	618	624	629	20	1.8	2.0	2.4	20
	True green	120	900	1030	1800	20	519	526	534	20	2.7	3.1	3.6	20
	Blue	120	180	230	450	20	463	469	476	20	2.7	3.0	3.6	20



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Bicolor

Features

- SMD LED with exceptional brightness in red, yellow, and green
- SMD available in 8 mm tape
- Moisture sensitivity level of 2a for SMD
- 5 mm available in round and rectangular 2.5 mm x 5 mm untinted, top-diffused package
- Luminous intensity selected into groups
- Categorized for green and yellow

Applications

- Flat backlight for LCDs, switches, and symbols

Resources

- [Bicolor leaded classification of components](#)
- [Bicolor ordering information](#)
- [Bicolor leaded ordering information](#)



Bicolor (PLCC-4)

Part Number	Color	Full Angle (°)	Luminous Intensity (mcd)			at I _F (mA)	Wavelength Dom. (nm)			at I _F (mA)	Forward Voltage (V)			at I _F (mA)
			Min.	Typ.	Max.		Min.	Typ.	Max.		Min.	Typ.	Max.	
VLMV3100 ⁽¹⁾	Red	120	2.8	6	-	10	612	-	625	10	-	2.4	3	10
	Green		2.8	6	-		562	-	575		-	2.4	3	
VLMKG3400	Green	120	56	-	140	20	627	633	639	20	-	1.9	2.6	20
	Red		35.5	-	90		564	570	575		-	2		
VLMKE3400	Red	120	56	-	180	20	-	630	-	20	-	1.9	2.6	20
	Yellow		90	-	280		581	588	594		-	2		
VLMKE3401	Red	120	71	-	140	20	-	630	-	20	-	1.9	2.6	20
	Yellow		112	-	224		581	588	594		-	2		

Bicolor (Leaded)

Part Number	Color	Full Angle (°)	Luminous Intensity (mcd)			at I _F (mA)	Wavelength Dom. (nm)			at I _F (mA)	Forward Voltage (V)			at I _F (mA)
			Min.	Typ.	Max.		Min.	Typ.	Max.		Min.	Typ.	Max.	
TLUV5300 ⁽²⁾	Super red	60	1	2.5	-	10	612	-	625	10	-	2	3	20
	Green		1	2.5	-		552	-	575		-	2.4	3	

Notes

⁽¹⁾ PLCC-3 common cathode⁽²⁾ 5 mm symbol LED



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Reverse Gullwing

Features

- Uses AlInGaP technology
- Available in 8 mm tape
- Preconditioned per JEDEC® level 2a
- Automotive-qualified AEC-Q101

Applications

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



Resources

- [Reverse gullwing classification of components](#)
- [Reverse gullwing ordering information](#)

PLCC-2 Reverse Gullwing

Part Number	Color	Full Angle (°)	Luminous Intensity (mcd)			at I _F (mA)	Wavelength Dom. (nm)			at I _F (mA)	Forward Voltage (V)			at I _F (mA)
			Min.	Typ.	Max.		Min.	Typ.	Max.		Min.	Typ.	Max.	
VLRK31Q1R2	Red	120	71	-	180	20	620	630	635	20	-	2.1	2.3	20
VLRK31R1S2	Red	120	112	-	285	20	620	630	635	20	-	2.1	2.3	20
VLRE31R1S2	Yellow	120	112	-	285	20	581	588	594	20	-	2.1	2.3	20
VLRG31P1Q2	Yellow green	120	45	72	112.5	20	564.5	571	576.5	20	-	2.1	2.3	20
VLRG31Q1R2	Yellow green	120	71.5	112	180	20	564.5	571	576.5	20	-	2.1	2.3	20



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PLCC-2

Features

- Uses AS AlInGaP / InGaN technology
- Available in 8 mm tape
- Preconditioned per JEDEC® level 2
- Automotive-qualified AEC-Q101

Applications

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



Resources

- [PLCC-2 classification of components](#)
- [PLCC-2 ordering information](#)

PLCC-2 Standard

Part Number	Color	Full Angle (°)	Luminous Intensity (mcd)			at I _F (mA)	Wavelength Dom. (nm) Chromaticity Coordinate x / y			at I _F (mA)	Forward Voltage (V)			at I _F (mA)
			Min.	Typ.	Max.		Min.	Typ.	Max.		Min.	Typ.	Max.	
VLMD3100	Red	120	11.2	22	-	10	-	648	-	10	-	1.8	2.2	20
VLMD3105	Red	120	11.2	22	28	10	-	648	-	10	-	1.8	2.2	20
VLMD31L2N1	Red	120	14	22	35.5	10	-	648	-	10	-	1.8	2.2	20
VLMD31M2P1	Red	120	22.4	25	56	10	-	648	-	10	-	1.8	2.2	20
VLMK3100	Red	120	11.2	50	-	10	-	630	-	10	-	1.9	2.6	20
VLMK3102	Red	120	22.4	43	56	10	-	630	-	10	-	1.9	2.6	20
VLMK3105	Red	120	35.5	50	90	10	-	630	-	10	-	1.9	2.6	20
VLMK31Q1R2	Red	120	71	138	180	20	-	630	-	20	-	1.9	2.6	20
VLMK31R1S1	Red	120	112	142	224	20	-	630	-	20	-	1.9	2.6	20
VLMK31R1S2	Red	120	112	142	280	20	-	630	-	20	-	1.9	2.6	20
VLMK31R2S2	Red	120	140	160	280	20	-	630	-	20	-	1.9	2.6	20
VLMS3100	Red	120	2.8	7.1	-	10	624	630	636	10	-	2	2.6	20
VLMS31J1K2	Red	120	4.5	7.8	11.2	10	624	630	638	10	-	1.9	2.6	20
VLMS31J1L2	Red	120	4.5	7.8	18	10	624	630	638	10	-	1.9	2.6	20
VLMS31J2L1	Red	120	5.6	8	14	10	624	630	638	10	-	1.9	2.6	20
VLMS31K1L2	Red	120	7.1	8.5	18	10	624	630	638	10	-	1.9	2.6	20
VLMR31Q2T1	Amber	120	90	160	355	20	612	618	624	20	1.8	2	2.4	20
VLMH3100	Amber	120	2.8	10	-	10	612	619	625	10	-	2	2.8	20
VLMH3102	Amber	120	7.1	10.3	18	10	612	619	625	10	-	2	2.8	20
VLMO3100	Soft orange	120	2.8	8	-	10	598	605	611	10	-	2	2.8	20
VLMO31J1K2	Soft orange	120	4.5	8.6	11.2	10	598	605	611	10	-	2.2	2.8	20
VLMO31K1L2	Soft orange	120	7.1	9	18	10	598	605	611	10	-	2.2	2.8	20
VLMF3100	Soft orange	120	28	90	-	10	598	605	611	10	-	2	2.6	20
VLMF31Q2T1	Soft orange	120	90	200	355	20	598	605	611	20	-	2	2.6	20
VLMY3100	Yellow	120	2.8	10	-	10	581	588	594	10	-	2.1	2.8	20
VLMY31J1K2	Yellow	120	4.5	7.6	11.2	10	581	588	594	10	-	2.1	2.8	20
VLMY3101	Yellow	120	4.5	7.6	11.2	10	581	588	594	10	-	2.1	2.8	20

PLCC-2 listing is continued on the next page



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PLCC-2 (Continued)

PLCC-2 Standard (Continued)

Part Number	Color	Full Angle (°)	Luminous Intensity (mcd)			at I _F (mA)	Wavelength Dom. (nm) Chromaticity Coordinate x / y			at I _F (mA)	Forward Voltage (V)			at I _F (mA)
			Min.	Typ.	Max.		Min.	Typ.	Max.		Min.	Typ.	Max.	
VLMY31K1L2	Yellow	120	7.1	8.6	18	10	581	588	594	10	-	2.1	2.8	20
VLMY3102	Yellow	120	7.1	8.6	18	10	581	588	594	10	-	2.1	2.8	20
VLME3100	Yellow	120	28	75	-	10	581	588	594	10	-	2	2.6	20
VLME31Q2T1	Yellow	120	90	190	355	20	581	588	594	20	-	2.1	2.8	20
VLME31R1S2	Yellow	120	112	195	280	20	581	588	594	20	-	2.1	2.8	20
VLME31S1T1	Yellow	120	180	210	355	20	581	588	594	20	-	2.1	2.8	20
VLMG3100	Green	120	4.5	12	-	10	562	572	575	10	-	2.2	2.8	20
VLMG31K1L2	Green	120	7.1	12	18	10	562	572	575	10	-	2.2	2.8	20
VLMG3105	Green	120	7.1	12	18	10	562	572	575	10	-	2.2	2.8	20
VLMG31K1M2	Green	120	7.1	12	28	10	562	572	575	10	-	2.2	2.8	20
VLMG3102	Green	120	11.2	13.6	18	10	562	572	575	10	-	2.2	2.8	20
VLMG31L1M2	Green	120	11.2	13.7	28	10	562	572	575	10	-	2.2	2.8	20
VLMP3100	Pure green	120	1.12	4	-	10	555	560	565	10	-	2.1	2.8	20
VLMP31G2J1	Pure green	120	2.24	3.6	5.6	10	555	560	565	10	-	2.1	2.8	20
VLMP31H2J2	Pure green	120	2.24	3.6	7.1	10	555	560	565	10	-	2.1	2.8	20
VLMP3102	Pure green	120	2.8	3.8	7.1	10	555	560	565	10	-	2.1	2.8	20
VLMPG31L1M2	Pure green	120	11.2	18	28	20	555	559	565	20	-	2	2.6	20
VLMTG41S2U1	True green	120	224	380	560	10	515	530	541	10	-	3.2	4.2	20
VLMB41P1Q2	Blue	120	45	90	112	10	462	469	476	10	-	3.2	4.2	20
VLMB41P2Q2	Blue	120	56	90	112	10	462	469	476	10	-	3.2	4.2	20
VLMU3100	Ultraviolet	120	1.8 ⁽²⁾	2.5 ⁽²⁾	3 ⁽²⁾	20	400 ⁽¹⁾	405 ⁽¹⁾	410 ⁽¹⁾	20	2.8	3.2	3.8	20
VLMW41R1T1-5K8L	White	120	112	275	355	10	-	0.33 / 0.33	-	10	-	3.3	4.2	20
VLMW41R1T1-7K8L	White	120	112	275	355	10	-	0.345 / 0.352	-	10	-	3.3	4.2	20
VLMW41S1T1-5K8L	White	120	180	275	355	10	-	0.33 / 0.33	-	10	-	3.3	4.2	20
VLMW41S1T2-7K8L	White	120	180	275	450	10	-	0.33 / 0.33	-	10	-	3.3	4.2	20
VLMW41S1T2-JKKL	White	120	180	275	450	10	-	0.3 / 0.28	-	10	2.7	3.3	4.2	20
VLMW41S1T2-MKNL	White	120	180	275	450	10	-	0.33 / 0.33	-	10	2.7	3.3	4.2	20
VLMW33S2V1-5K8L	White	120	224	635	900	20	-	0.33 / 0.33	-	20	-	3.7	4.2	20
VLMW33U2AA-5K8L	White	120	560	650	1400	20	-	0.33 / 0.33	-	20	-	3.7	4.2	20

Notes

⁽¹⁾ Peak wavelength

⁽²⁾ Radiant intensity (mW/sr)

PLCC-2 listing is continued on the next page



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PLCC-2 (Continued)

PLCC-2 Low Current

Part Number	Color	Full Angle (°)	Luminous Intensity (mcd)			at I _F (mA)	Wavelength Dom. (nm) Chromaticity Coordinate x / y			at I _F (mA)	Forward Voltage (V)			at I _F (mA)
			Min.	Typ.	Max.		Min.	Typ.	Max.		Min.	Typ.	Max.	
VLMS3000	Red	120	2.8	10	-	2	624	630	636	2	-	1.8	2.2	2
VLMS30J1K2	Red	120	4.5	8.5	11.2	2	624	630	636	2	-	1.8	2.2	2
VLMS30J1L2	Red	120	4.5	18	18	2	624	630	636	2	-	2.2	2.2	2
VLMS30K1L2	Red	120	7.1	10.5	18	2	624	630	636	2	-	1.8	2.2	2
VLMS30K2L2	Red	120	9	12	18	2	624	630	636	2	-	1.8	2.2	2
VLMT3100	Red	120	0.28	1.1	-	2	612	618	625	2	-	2.2	2.9	2
VLMO30K1M2	Orange	120	7.1	16	28	2	600	605	609	2	-	1.8	2.2	2
VLMO30L1M2	Orange	120	11.2	16.5	28	2	600	605	609	2	-	1.8	2.2	2
VLMA3100	Yellow	120	0.28	0.8	-	2	581	588	594	2	-	2.2	2.9	2
VLMA3101	Yellow	120	0.56	-	1.4	2	581	588	594	2	-	2.2	2.9	2
VLMY3000	Yellow	120	4.5	11.6	-	2	581	587	594	2	-	1.8	2.2	2
VLMY30J2L1	Yellow	120	5.6	10.6	14	2	581	587	594	2	-	1.8	2.2	2
VLMY30J2M1	Yellow	120	5.6	11.6	22.4	2	581	587	594	2	-	1.8	2.2	2
VLMY30K2M1	Yellow	120	9	12.3	22.4	2	581	587	594	2	-	1.8	2.2	2
VLMYG30H2K1	Yellow green	120	3.55	4.2	9	2	566	574	575	2	-	1.9	2.2	2
VLMC3100	Green	120	0.71	1.6	-	2	562	572	575	2	-	1.9	2.4	2
VLMC3101	Green	120	1.12	1.6	-	2	562	572	575	2	-	1.9	2.4	2
VLMW45R1S1-5K6L	White	120	112	160	224	5	-	0.33 / 0.33	-	5	-	3.3	4.2	5



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PLCC-2 (Continued)

PLCC-2 Power

Part Number	Color	Full Angle (°)	Luminous Intensity (mcd)			at I _F (mA)	Wavelength Dom. (nm)			at I _F (mA)	Forward Voltage (V)			at I _F (mA)
			Min.	Typ.	Max.		Min.	Typ.	Max.		Min.	Typ.	Max.	
VLMS33S1T2	Super red	120	180	290	450	30	626	630	638	30	1.7	2.0	2.5	30
VLMS33S1U1	Super red	120	180	290	560	30	626	630	638	30	1.7	2.0	2.5	30
VLMS33S1U2	Super red	120	280	390	710	20	626	360	639	20	1.8	2.0	2.6	20
VLMS33T2V2	Super red	120	355	550	1120	20	626	630	639	20	1.8	2.0	2.6	20
VLMS334AABB	Super red	120	1120	1600	2800	50	626	630	639	50	1.9	2.2	2.8	50
VLMR335U1V2	Red	120	450	560	1120	20	619	625	631	20	1.8	2.0	2.6	20
VLMR333U1AA	Red	120	450	750	1400	20	619	625	631	20	1.8	2.0	2.6	20
VLMR334BACB	Red	120	1800	2200	4500	50	619	625	631	50	1.9	2.2	2.8	50
VLMK33S1T1	Amber	120	180	275	355	20	611	617	622	20	-	1.9	2.5	20
VLMR33T1U2	Amber	120	280	450	710	30	611	617	622	30	1.7	2	2.5	30
VLMK335U1V2	Amber	120	450	630	1120	20	611	616	622	20	1.8	2.1	2.6	20
VLMK333U2AB	Amber	120	560	850	1800	20	611	616	622	20	1.8	2.1	2.6	20
VLMK334BACB	Amber	120	1800	2800	4500	50	611	616	622	50	1.9	2.25	2.8	50
VLMO335U2AA	Soft orange	120	560	700	1400	20	600	605	611	20	1.8	2.1	2.6	20
VLMO333U2AB	Soft orange	120	560	950	1800	20	600	605	611	20	1.8	2.1	2.6	20
VLMY33T1U2	Yellow	120	280	425	710	30	583	588	594	30	1.7	2.0	2.5	30
VLMY335U1V2	Yellow	120	450	600	1120	20	583	589	594	20	1.8	2.15	2.6	20
VLMY333U1AA	Yellow	120	450	750	1400	20	583	589	594	20	1.8	2.15	2.6	20
VLMY334BACB	Yellow	120	1800	2300	4500	50	583	589	594	50	1.9	2.3	2.8	50
VLMYG33P1Q2	Yellow green	120	45	90	112	30	566	570	577	30	1.7	2.0	2.5	30
VLMPG33N1P2	Pure green	120	28	42	71	30	555	560	565	30	-	2.0	2.5	30



The DNA of tech.™

OPTOELECTRONICS

LEDs for Lighting Solutions

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, telecommunications, and consumer applications such as dashboards, telephones, and A/V equipment
- Flat backlight for LCDs, switches, and symbols

Resources

- [MiniLED classification of components](#)
- [MiniLED ordering information](#)



Mini Standard

Part Number	Color	Full Angle (°)	Luminous Intensity (mcd)			at I _F (mA)	Wavelength Dom. (nm)			at I _F (mA)	Forward Voltage (V)			at I _F (mA)
			Min.	Typ.	Max.		Min.	Typ.	Max.		Min.	Typ.	Max.	
VLM02100	Soft orange	120	3.55	7.3	-	10	598	605	611	10	-	2.1	3	20
VLMY2100	Yellow	120	3.55	7.7	-	10	581	588	594	10	-	2.2	3	20
VLMG21J2L1	Green	120	5.6	11.5	14	10	562	568	572	10	-	2.1	2.8	10
VLMG21J2M1	Green	120	5.6	12	22.4	10	562	568	572	10	-	2.1	2.8	10
VLMG21K1L2	Green	120	7.1	12	18	10	562	568	572	10	-	2.1	2.8	10

Mini Low Current

Part Number	Color	Full Angle (°)	Luminous Intensity (mcd)			at I _F (mA)	Wavelength Dom. (nm)			at I _F (mA)	Forward Voltage (V)			at I _F (mA)
			Min.	Typ.	Max.		Min.	Typ.	Max.		Min.	Typ.	Max.	
VLMS2000	Super red	120	2.24	4.5	-	2	-	630	-	2	-	1.8	2.2	2
VLMS20H2K1	Super red	120	3.55	-	9	2	-	630	-	2	-	1.8	2.2	2
VLMS20H2L1	Super red	120	3.55	-	14	2	-	630	-	2	-	1.8	2.2	2
VLMS20J2L1	Super red	120	5.6	-	14	2	-	630	-	2	-	1.8	2.2	2
VLMS20K1L2	Amber	120	7.1	-	18	2	612	622	624	2	-	1.8	2.2	2
VLM020J2M1	Soft orange	120	5.6	-	22.4	2	598	605	611	2	-	1.8	2.2	2
VLMY2000	Yellow	120	3.55	7.1	-	2	581	588	594	2	-	2.8	2.2	2
VLMY20K1L2	Yellow	120	7.1	-	18	2	581	588	594	2	-	2.8	2.2	2
VLMP20D2G1	Pure green	120	0.56	-	2.24	2	555	-	565	2	-	1.8	2.2	2



The DNA of tech.™

OPTOELECTRONICS

LEDs for Lighting Solutions

MiniLED (Continued)

Mini Power

Part Number	Color	Full Angle (°)	Luminous Intensity (mcd)			at I _F (mA)	Wavelength Dom. (nm)			at I _F (mA)	Forward Voltage (V)			at I _F (mA)
			Min.	Typ.	Max.		Min.	Typ.	Max.		Min.	Typ.	Max.	
VLMK2300	Super red	120	35.5	90	-	20	-	630	-	20	-	1.9	2.6	20
VLMK23P2R1	Super red	120	56	120	140	20	-	630	-	20	-	1.9	2.6	20
VLMK23P2S1	Super red	120	56	125	224	20	-	630	-	20	-	1.9	2.6	20
VLMS233T1V1	Super red	120	280	450	900	20	626	630	639	20	1.8	2	2.6	20
VLMS234V2BA	Super red	120	900	1400	2240	50	626	630	639	50	1.9	2.2	2.8	50
VLMS235S2U1	Super red	120	224	370	560	20	626	630	639	20	1.8	22.1	2.6	20
VLMR233T2V2	Red	120	355	650	1120	20	619	625	631	20	1.8	2	2.6	20
VLMR234ABCA	Red	120	1400	2000	3550	50	619	625	631	50	1.9	2.2	2.8	50
VLMK235T2V1	Red	120	344	520	900	20	619	625	631	20	1.8	2.1	2.6	20
VLMK233U1AA	Amber	120	450	680	1400	20	611	616	622	20	1.8	2.1	2.6	20
VLMK234ABCA	Amber	120	1400	2500	3550	50	611	616	622	50	1.9	2.25	2.8	50
VLMK235T2V1	Amber	120	355	550	900	20	611	616	622	20	1.8	2.0	2.6	20
VLM0233U1AA	Soft orange	120	450	760	1400	20	600	605	611	20	1.8	2.1	2.6	20
VLMF2300	Soft orange	120	56	112	-	20	598	605	611	20	-	2	2.6	20
VLMF23Q2S1	Soft orange	120	90	180	224	20	598	605	611	20	-	2	2.6	20
VLM0235U1V2	Soft orange	120	450	650	1120	20	600	605	611	20	1.8	2.0	2.6	20
VLM0235U2V2-35-08	Soft orange	120	560	700	1120	20	602	605	609	20	1.8	2.0	2.6	20
VLMY233T2V2	Yellow	120	355	650	1120	20	583	589	594	20	1.8	2.15	2.6	20
VLMY234ABCA	Yellow	120	1400	2500	3550	50	583	589	594	50	1.9	2.3	2.8	50
VLME23Q2T1	Yellow	120	90	170	355	20	581	588	594	20	-	2	2.6	20
VLMY235T2V1	Yellow	120	355	520	900	20	583	589	594	20	1.8	2.1	2.6	20
VLMP23L2M2	Pure green	120	14	-	28	20	555	560	565	20	-	2.2	2.6	20



The DNA of tech.™

OPTOELECTRONICS

LEDs for Lighting Solutions

0603

Features

- Smallest SMD package 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 AlGaIn / InGaIn technology

Applications

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

Resources

- [0603 \(leadframe\) classification of components](#)
- [0603 \(PCB\) classification of components](#)
- [0603 ordering information](#)



0603 Standard, Leadframe-Based

Part Number	Color	Full Angle (°)	Luminous Intensity (mcd)			at I _F (mA)	Wavelength Dom. (nm) Chromaticity Coordinate x / y			at I _F (mA)	Forward Voltage (V)			at I _F (mA)
			Min.	Typ.	Max.		Min.	Typ.	Max.		Min.	Typ.	Max.	
TLMS1100	Red	160	32	63	-	20	627	633	639	20	-	2.1	3	20
TLMQ1100	Soft orange	160	50	80	-	20	600	606	609	20	-	2.1	3	20
TLMY1100	Yellow	160	50	80	-	20	580	587	595	20	-	2.1	3	20
TLMG1100	Yellow green	160	12.5	35	-	20	564	570	575	20	-	2.1	3	20
TLMP1100	Pure green	160	6.3	15	-	20	551	558	566	20	-	2.1	3	20

0603 Low Current, Leadframe-Based

Part Number	Color	Full Angle (°)	Luminous Intensity (mcd)			at I _F (mA)	Wavelength Dom. (nm)			at I _F (mA)	Forward Voltage (V)			at I _F (mA)
			Min.	Typ.	Max.		Min.	Typ.	Max.		Min.	Typ.	Max.	
TLMS1000	Red	160	1.8	4	-	2	624	628	636	2	-	1.8	2.6	2
TLMQ1000	Soft orange	160	3.55	7.5	-	2	600	605	609	2	-	1.8	2.6	2
TLMY1000	Yellow	160	3.55	7.5	-	2	580	588	595	2	-	1.8	2.6	2

0603 Standard, PCB-Based

Part Number	Color	Full Angle (°)	Luminous Intensity (mcd)			at I _F (mA)	Wavelength Dom. (nm) Chromaticity Coordinate x / y			at I _F (mA)	Forward Voltage (V)			at I _F (mA)
			Min.	Typ.	Max.		Min.	Typ.	Max.		Min.	Typ.	Max.	
VLMS1300	Super red	130	18	54	-	20	-	631	-	20	-	2	2.4	20
VLMQ1300	Soft orange	130	45	90	-	20	-	605	-	20	-	2	2.4	20
VLMY1300	Yellow	130	28	-	180	20	584.5	-	597	20	1.8	-	2.4	20
VLMY1301	Yellow	130	71	-	180	20	584.5	-	597	20	1.8	-	2.4	20
VLMG1300	Green	130	18	35	-	20	-	571	-	20	-	2	2.4	20
VLMTG1300	True green	130	71	-	450	20	-	525	-	20	2.8	3.2	3.6	20
VLMTG1400	True green	146	1200	1400	2800	20	515	525	535	20	2.45	2.8	3.05	20
VLMTG1401	True green	146	1200	1400	2800	20	515	525	535	20	2.6	2.8	3.05	20
VLMTG1402	True green	146	1200	1400	2800	20	520	527	535	20	2.45	2.8	3.05	20
VLMB1300	Blue	130	28	-	180	20	465	-	475	20	2.8	-	3.8	20
VLMB1310⁽¹⁾	Blue	130	28	-	180	20	465	-	475	20	2.8	-	3.8	20
VLMW1300	White	130	45	-	180	5	-	0.294 / 0.286	-	5	2.7	-	3.13	5
VLMW1301	White	130	90	-	180	5	-	0.294 / 0.286	-	5	2.7	-	3.0	5

Note

⁽¹⁾ With protection diode



OPTOELECTRONICS

LEDs for Lighting Solutions

The DNA of tech.™

0402

Features

- Super thin ChipLED with exceptional brightness and dimensions of 1.0 mm x 0.5 mm x 0.35 mm (L x W x H)
- EIA standard package
- High efficiency AlInGaP and InGaN technology
- Full color program: super red, soft orange, yellow, yellow green, blue, and white
- Extremely wide 130° viewing angle
- Grouping parameter: luminous intensity; V_F wavelength for color; x, y for white
- Preconditioning according to JEDEC® level 2a
- Compatible with IR reflow soldering
- Available in 8 mm tape on 7 in diameter reel
- InGaN devices are ESD-sensitive

Applications

- Backlighting for keypads, audio, and video equipment
- Navigation systems
- Cellular phone displays
- Backlighting in office equipment
- Indoor and outdoor message boards
- Flat backlight for LCDs, switches, and symbols
- Telecommunications: indicators and backlighting in telephones and fax machines
- Miniaturized color effects for traffic displays



Resources

- [0402 classification of components](#)
- [0402 ordering information](#)

0402 Standard

Part Number	Color	Full Angle (°)	Luminous Intensity (mcd)			at I_F (mA)	Wavelength Dom. (nm) Chromaticity Coordinate x / y			at I_F (mA)	Forward Voltage (V)			at I_F (mA)
			Min.	Typ.	Max.		Min.	Typ.	Max.		Min.	Typ.	Max.	
VLMS1500	Super red	130	18	54	-	20	-	631	-	20	-	2	2.4	20
VLMS1501	Super red	130	28	54	180	20	-	631	-	20	-	2	2.4	20
VLM01500	Soft orange	130	45	90	-	20	-	605	-	20	-	2	2.4	20
VLMY1500	Yellow	130	28	-	180	20	587	-	597	20	-	2	2.4	20
VLMY1501	Yellow	130	40	90	180	20	587	590	597	20	1.8	2	2.4	20
VLMG1500	Yellow green	130	18	35	-	20	-	571	-	20	-	2	2.4	20
VLMTG1500	True green	130	28	-	280	5	520	-	535	5	2.50	-	3.10	5
VLMTG1501	True green	130	56	-	180	5	520	-	535	5	2.50	-	3.10	5
VLMB1500	Blue	130	11.2	-	45	5	470	-	475	5	2.65	-	3.15	5
VLMB1501	Blue	130	22.4	28	71	5	470	-	475	5	2.65	-	3.15	5
VLMW1500	White	130	45	90	180	5	-	0.304 / 0.300	-	5	2.65	2.90	3.05	5
VLMW1501	White	130	71	90	180	5	-	0.294 / 0.286	-	5	2.65	2.90	3.05	5
VLMW1502	White	130	71	90	180	5	-	0.314 / 0.315	-	5	2.65	2.90	3.05	5
VLMW1503	White	130	71	90	180	5	-	0.304 / 0.300	-	5	2.65	2.90	3.05	5



The DNA of tech.™

Dome Lens

Features

- Utilizing latest advanced AlInGaP and InGaN technology
 - AllInGaP: VLDS/R/K/Y12xxx and VLDS/R/K/Y15xxx
 - InGaN: VLDB/TG12xxx
- Package type: surface-mount
- Package form: gullwing, reverse gullwing
- Dimensions:
 - VLdX12xxx (L x W x H in mm): 2.3 x 2.3 x 2.8
 - VLdX15xxx (L x W x H in mm): 2.3 x 2.3 x 2.6
- High luminous flux and luminous intensity
- Luminous intensity and color categorized per packing unit
- Luminous intensity ratio per packing unit
- $I_{Vmax.}/I_{Vmin.} \leq 1.6$
- ESD withstand voltage: up to 2 kV according to JESD 22-A114-B
- Preconditioning according to JEDEC® level 2a
- Suitable for reflow soldering according to J-STD-020

Applications

- Traffic signals and signs
- Interior and exterior lighting
- Indicator and backlighting purposes for audio, video, LCDs switches, symbols, illuminated advertising etc.

Resources

- [Dome lens classification of components](#)
- [Dome lens ordering information](#)



Dome Lens

Part Number	Color	Full Angle (°)	Luminous Intensity (mcd)			at I _F (mA)	Wavelength Dom. (nm)			at I _F (mA)	Forward Voltage (V)			at I _F (mA)
			Min.	Typ.	Max.		Min.	Typ.	Max.		Min.	Typ.	Max.	
VLDS1235G	Super red	22	5600	11 000	22 400	50	626	630	637	50	1.9	2.2	2.7	50
VLDS1235R	Super red	22	5600	11 000	22 400	50	626	630	637	50	1.9	2.2	2.7	50
VLDR1235G	Red	22	9000	14 500	35 500	50	619	624	631	50	1.9	2.2	2.7	50
VLDR1235R	Red	22	9000	14 500	35 500	50	619	624	631	50	1.9	2.2	2.7	50
VLDK1235G	Amber	22	9000	18 000	35 500	50	611	616	621	50	1.9	2.25	2.7	50
VLDK1235R	Amber	22	9000	18 000	35 500	50	611	616	621	50	1.9	2.25	2.7	50
VLDY1235G	Yellow	22	9000	18 000	35 500	50	583	589	595	50	1.9	2.3	2.7	50
VLDY1235R	Yellow	22	9000	18 000	35 500	50	583	589	595	50	1.9	2.3	2.7	50
VLDTG1232G	True green	18	7100	16 000	-	20	515	525	541	20	2.6	2.9	3.4	20
VLDTG1232R	True green	18	7100	16 000	-	20	515	525	541	20	2.6	2.9	3.4	20
VLDB1232G	Blue	18	1800	3500	-	20	458	465	472	20	2.6	3.0	3.4	20
VLDB1235R	Blue	18	1800	3500	-	20	458	465	472	20	2.6	3.0	3.4	20

Wide Angle Dome Lens

Part Number	Color	Full Angle (°)	Luminous Intensity (mcd)			at I _F (mA)	Wavelength Dom. (nm)			at I _F (mA)	Forward Voltage (V)			at I _F (mA)
			Min.	Typ.	Max.		Min.	Typ.	Max.		Min.	Typ.	Max.	
VLDS1535G	Super red	44	2800	5000	9000	50	626	630	637	50	1.9	2.2	2.7	50
VLDS1535R	Super red	44	2800	5000	9000	50	626	630	637	50	1.9	2.2	2.7	50
VLDR1535G	Red	44	3550	6500	11 200	50	619	624	631	50	1.9	2.2	2.7	50
VLDR1535R	Red	44	3550	6500	11 200	50	619	624	631	50	1.9	2.2	2.7	50
VLDK1535G	Amber	44	4500	8000	14 000	50	611	616	621	50	1.9	2.25	2.7	50
VLDK1535R	Amber	44	4500	8000	14 000	50	611	616	621	50	1.9	2.25	2.7	50
VLDY1535G	Yellow	44	4500	8000	14 000	50	583	589	595	50	1.9	2.3	2.7	50
VLDY1535R	Yellow	44	4500	8000	14 000	50	583	589	595	50	1.9	2.3	2.7	50



The DNA of tech.™

TELUX

Features

- High luminous flux
- Superior heat dissipation: R_{thJP} is 90 K/W
- High operating temperature: $T_{amb} = -40\text{ }^{\circ}\text{C}$ up to $+110\text{ }^{\circ}\text{C}$
- Meets SAE and ECE color requirements for the automobile industry for the 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 devices
- Component in accordance to RoHS 2011/65/EU and WEEE 2012/19/EU
- 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 lights, stop lights, and turn signals for motor vehicles
- Replaces small incandescent lamps
- Traffic signals and signs

Resources

- [TELUX classification of components](#)
- [TELUX ordering information](#)

TELUX

Part Number	Color	Full Angle (°)	Luminous Flux (lm)			at I_f (mA)	Wavelength Dom. (nm)			at I_f (mA)	Forward Voltage (V)			at I_f (mA)
			Min.	Typ.	Max.		Min.	Typ.	Max.		Min.	Typ.	Max.	
TLWR7600	Red	60	1500	2800	-	70	611	618	634	70	1.83	2.2	2.67	70
TLWR7900	Red	90	1500	2800	-	70	611	618	634	70	1.83	2.2	2.67	70
TLWR8600	Red	60	2000	3700	-	70	611	616	634	70	1.83	2.2	2.67	70
TLWR8900	Red	90	2000	3700	-	70	611	616	634	70	1.83	2.2	2.67	70
TLWR8901	Red	90	2000	3700	4800	70	611	616	634	70	1.83	2.2	2.67	70
TLWR8902	Red	90	3000	3900	4800	70	611	616	634	70	1.83	2.2	2.67	70
VLWR9930	Red	90	4000	8500	12 200	70	611	616	634	70	1.83	2.2	3.03	70
VLWR9932	Red	90	6000	9000	12 200	70	611	616	634	70	1.95	2.2	2.67	70
TLWY7600	Yellow	60	1000	1400	-	70	585	592	597	70	1.83	2.1	2.67	70
TLWY7900	Yellow	90	1000	2800	-	70	585	592	597	70	1.83	2.1	2.67	70
VLWY9930	Yellow	90	4000	8500	12 200	70	585	592	597	70	1.83	2.2	3.03	70
TLWY8600	Yellow	60	2000	3200	-	70	585	591	597	70	1.83	2.1	2.67	70
TLWY8900	Yellow	90	2000	3200	-	70	585	591	597	70	1.83	2.1	2.67	70



The DNA of tech.™

5 mm and 5 mm Side-View

Features

- AllnGaP, AlGaAs, GaAlAs, GaAsP, GaP, GaN, and InGaN technology
- Untinted non-diffused, diffused, or diffused tinted lens
- High luminous intensity
- High operating temperature: T_j (chip junction temperature) up to 125 °C for AllnGaP devices
- Luminous intensity and color categorized for each packing unit
- ESD withstand voltage: up to 2 kV for AllnGaP and 1 kV for InGaN-based types according to JESD22-A114-B
- Compliant to RoHS directive 2011/65/EU and in accordance to WEEE 2012/19/EU

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



Resources

- [5 mm classification of components](#)
- [5 mm ordering information](#)

5 mm Standard

Part Number	Color	Full Angle (°)	Luminous Intensity (mcd)			at I_F (mA)	Wavelength Dom. (nm) Chromaticity Coordinate x / y			at I_F (mA)	Forward Voltage (V)			at I_F (mA)
			Min.	Typ.	Max.		Min.	Typ.	Max.		Min.	Typ.	Max.	
TLDR5400	Red	60	35	70	-	20	-	648	-	20	-	1.8	2.2	20
TLDR6400	Red	60	35	70	-	20	-	648	-	20	-	1.8	2.2	20
TLDR5800	Red	8	1000	2500	-	20	-	648	-	20	-	1.8	2.2	20
TLUR5401	Red	60	4	15	32	10	-	630	-	10	-	2	3	20
TLUR5400	Red	60	4	15	-	10	-	630	-	10	-	2	3	20
TLHK5100	Red	18	320	1400	-	20	626	630	639	10	-	2	2.6	20
TLHK5800	Red	8	1000	5500	-	20	-	630	-	10	-	1.9	2.6	20
TLHR5400	Red	60	1.6	10	-	10	612	-	625	10	-	2	3	20
TLHR6400	Red	60	1.6	10	-	10	612	-	625	10	-	2	3	20
TLHR5401	Red	60	4	12	-	10	612	-	625	10	-	2	3	20
TLHR5405	Red	60	6.3	14	-	10	612	-	625	10	-	2	3	20
TLHR6405	Red	60	6.3	14	-	10	612	-	625	10	-	2	3	20
TLHR5200	Red	28	10	50	-	10	612	-	625	10	-	2	3	20
TLHY5400	Yellow	60	1.6	10	-	10	581	-	594	10	-	2.4	3	20



OPTOELECTRONICS

LEDs for Lighting Solutions

The DNA of tech.™

5 mm (Continued)

5 mm Standard (Continued)

Part Number	Color	Full Angle (°)	Luminous Intensity (mcd)			at I _F (mA)	Wavelength Dom. (nm) Chromaticity Coordinate x / y			at I _F (mA)	Forward Voltage (V)			at I _F (mA)
			Min.	Typ.	Max.		Min.	Typ.	Max.		Min.	Typ.	Max.	
TLHY6400	Yellow	60	1.6	10	-	10	581	-	594	10	-	2.4	3	20
TLHY5401	Yellow	60	4	12	-	10	581	-	594	10	-	2.4	3	20
TLHY5405	Yellow	60	6.3	14	-	10	581	-	594	10	-	2.4	3	20
TLHY6405	Yellow	60	6.3	14	-	10	581	-	594	10	-	2.4	3	20
TLHE5800	Yellow	8	1000	3500	-	20	581	588	594	10	-	2	2.6	20
TLHG5400	Green	60	1.6	10	-	10	562	-	575	10	-	2.4	3	20
TLHG6400	Green	60	1.6	10	-	10	562	-	575	10	-	2.4	3	20
TLHG5401	Green	60	4	12	-	10	562	-	575	10	-	2.4	3	20
TLHG6401	Green	60	4	12	-	10	562	-	575	10	-	2.4	3	20
TLHG5405	Green	60	6.3	15	-	10	562	-	575	10	-	2.4	3	20
TLHG6405	Green	60	6.3	15	-	10	562	-	575	10	-	2.4	3	20
TLHB5100	Blue	18	63	250	-	20	466	-	-	10	-	3.9	4.5	20
VLHW5100	White	20	5600	-	11 200	20	-	0.33 / 0.33	-	20	2.8	-	3.6	20

5 mm Low Current

Part Number	Color	Full Angle (°)	Luminous Intensity (mcd)			at I _F (mA)	Wavelength Dom. (nm)			at I _F (mA)	Forward Voltage (V)			at I _F (mA)
			Min.	Typ.	Max.		Min.	Typ.	Max.		Min.	Typ.	Max.	
TLLR5400	Red	50	0.63	1.2	-	2	612	-	625	2	-	1.9	2.4	2
TLLR5401	Red	50	1	2	-	2	612	-	625	2	-	1.9	2.4	2
TLLG5400	Green	50	0.63	1.2	-	2	562	-	575	2	-	1.9	2.4	2
TLLG5401	Green	50	1	2	-	2	562	-	575	2	-	1.9	2.4	2



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5 mm (Continued)

5 mm Power

Part Number	Color	Full Angle (°)	Luminous Intensity (mcd)			at I _F (mA)	Wavelength Dom. (nm)			at I _F (mA)	Forward Voltage (V)			at I _F (mA)
			Min.	Typ.	Max.		Min.	Typ.	Max.		Min.	Typ.	Max.	
TLCS5100	Super red	18	2400	7500	-	50	626	630	638	50	-	2.1	2.7	50
TLCR6200	Red	30	1350	4000	-	50	611	616	622	50	-	2.1	2.7	50
TLCR5100	Red	18	4300	11 000	-	50	611	616	622	50	-	2.1	2.7	50
VLCS5130	Red	18	7500	25 000	-	50	620	624	630	50	-	2.2	3	50
TLCR5800	Red	8	7500	35 000	-	50	611	616	622	50	-	2.1	2.7	50
TLCR6800	Red	8	7500	35 000	-	50	611	616	622	50	-	2.1	2.7	50
VLCS5830	Red	8	24 000	65 000	-	50	620	624	630	50	-	2.2	3	50
TLCY5200	Yellow	30	1350	4000	-	50	585	590	597	50	-	2.1	2.7	50
TLCY6100	Yellow	18	3200	7500	-	50	585	590	597	50	-	2.1	2.7	50
TLCY6101	Yellow	18	5750	-	20 000	50	585	590	597	50	-	2.1	2.7	50
TLCY5800	Yellow	8	5750	25 000	-	50	585	590	597	50	-	2.1	2.7	50
TLCY6800	Yellow	8	5750	25 000	-	50	585	590	597	50	-	2.1	2.7	50
TLCYG5100	Yellow green	18	1350	3500	-	50	565	572	576	50	-	2.2	2.7	50
TLCPG5100	Pure green	18	430	1250	-	50	555	562	567	50	-	2.2	2.7	50

5 mm Side-View

Part Number	Color	Full Angle (°)	Luminous Intensity (mcd)			at I _F (mA)	Wavelength Dom. (nm)			at I _F (mA)	Forward Voltage (V)			at I _F (mA)
			Min.	Typ.	Max.		Min.	Typ.	Max.		Min.	Typ.	Max.	
TLPR5600	Red	160	1	3.5	-	10	-	630	-	10	-	2	3	20
TLPH5600	Red	160	0.63	3.5	-	10	612	-	625	10	-	2	3	20
TLPY5600	Yellow	160	0.63	2.5	-	10	581	-	594	10	-	2.4	3	20
TLPG5600	Green	160	0.63	2.5	-	10	562	-	575	10	-	2.4	3	20



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3 mm

Features

- AllnGaP, AlGaAs, GaAlAs, GaAsP, GaP, GaN, and InGaN technology
- Standard Ø3 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-compliant, halogen-free
- Special types for backlighting or 12 V applications

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

Resources

- [3 mm \(half groups\) classification of components](#)
- [3 mm \(full groups\) classification of components](#)
- [3 mm ordering information](#)

3 mm Standard

Part Number	Color	Full Angle (°)	Luminous Intensity (mcd)			at I _F (mA)	Wavelength Dom. (nm) Chromaticity Coordinate x / y			at I _F (mA)	Forward Voltage (V)			at I _F (mA)
			Min.	Typ.	Max.		Min.	Typ.	Max.		Min.	Typ.	Max.	
TLDR4400	Red	80	25	45	-	20	-	648	-	20	-	1.8	2.2	20
TLDR4901	Red	32	63	-	200	20	-	648	-	20	-	1.8	2.2	20
TLDR4900	Red	32	63	200	-	20	-	648	-	20	-	1.8	2.2	20
TLUR4400	Red	60	4	15	-	10	-	630	-	10	-	2	3	20
TLUR4401	Red	60	4	-	32	10	-	630	-	10	-	2	3	20
TLHK4600	Red	120	6.3	15	-	10	-	630	-	10	-	1.9	2.6	20
TLHK4200	Red	44	25	100	-	10	-	630	-	10	-	1.9	2.6	20
TLHK46Q1R2	Red	120	71	-	180	20	-	630	-	20	-	2	2.6	20
TLHK44R1S2	Red	60	112	180	280	20	-	630	-	20	-	1.9	2.6	20
TLHK42S1T2	Red	44	180	-	450	20	-	630	-	20	-	1.9	2.6	20
TLHR4600	Red	120	1	4	-	10	612	-	625	10	-	2	3	20
TLHR4400	Red	60	1.6	13	-	10	612	-	625	10	-	2	3	20
TLHR4605	Red	120	2.5	6	-	10	612	-	625	10	-	2	3	20
TLHR4401	Red	60	2.5	14	-	10	612	-	625	10	-	2	3	20
TLHR4200	Red	44	4	8	-	10	612	-	625	10	-	2	3	20
TLHR4405	Red	60	6.3	15	-	10	612	-	625	10	-	2	3	20
TLHR4900	Red	32	6.3	25	-	10	612	-	625	10	-	2	3	20
TLHR4205	Red	44	10	15	-	10	612	-	625	10	-	2	3	20
TLHA44R1S2	Amber	60	112	-	280	20	612	617	625	20	-	2	2.6	20
TLHO4400	Soft orange	60	1.6	13	-	10	598	-	611	10	-	2.4	3	20
TLHO4200	Soft orange	44	4	10	-	10	598	-	611	10	-	2.4	3	20
TLHO4201	Soft orange	44	10	18	-	10	598	-	611	10	-	2.4	3	20
TLHF4600	Soft orange	120	10	26	-	10	598	605	611	10	-	2	2.6	20
TLHF4601	Soft orange	120	40	-	125	10	598	605	611	10	-	2	2.6	20



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3 mm (Continued)

3 mm Standard

Part Number	Color	Full Angle (°)	Luminous Intensity (mcd)			at I _F (mA)	Wavelength Dom. (nm) Chromaticity Coordinate x / y			at I _F (mA)	Forward Voltage (V)			at I _F (mA)
			Min.	Typ.	Max.		Min.	Typ.	Max.		Min.	Typ.	Max.	
TLHF4900	Soft orange	32	63	300	-	10	598	605	611	10	-	1.9	2.6	20
TLHE44R1S2-26	Yellow	60	112	-	280	20	583	588	594	20	-	1.9	2.6	20
TLHY4600	Yellow	120	0.63	3.5	-	10	581	-	594	10	-	2.4	3	20
TLHY4601	Yellow	120	1	4	-	10	581	-	594	10	-	2.4	3	20
TLHY4400	Yellow	60	1.6	10	-	10	581	-	594	10	-	2.4	3	20
TLHY4401	Yellow	60	2.5	10.5	-	10	581	-	594	10	-	2.4	3	20
TLHY4605	Yellow	120	2.5	5	-	10	581	-	594	10	-	2.4	3	20
TLHY4200	Yellow	44	4	10	-	10	581	-	594	10	-	2.4	3	20
TLHY4405	Yellow	60	6.3	11	-	10	581	-	594	10	-	2.4	3	20
TLHY44K1L2	Yellow	60	7.1	-	18	10	581	-	594	10	-	2.2	2.6	10
TLHE4600	Yellow	120	10	26	-	10	581	588	594	10	-	1.9	2.6	20
TLHY4205	Yellow	44	10	20	-	10	581	-	594	10	-	2.4	3	20
TLHY4900	Yellow	32	10	26	-	10	581	-	594	10	-	2.4	3	20
TLHG4600	Green	120	1	4	-	10	562	-	575	10	-	2.4	3	20
TLHG4400	Green	60	2.5	13	-	10	562	-	575	10	-	2.4	3	20
TLHG4605	Green	120	4	6	-	10	562	-	575	10	-	2.4	3	20
TLHG4401	Green	60	4	14	-	10	562	-	575	10	-	2.4	3	20
TLHG4200	Green	44	6.3	10	-	10	562	-	575	10	-	2.4	3	20
TLHG4405	Green	60	6.3	15	-	10	562	-	575	10	-	2.4	3	20
TLHG4201	Green	44	10	15	-	10	562	-	575	10	-	2.4	3	20
TLHG4205	Green	44	16	20	-	10	562	-	575	10	-	2.4	3	20
TLHG4900	Green	32	16	37	-	10	562	-	575	10	-	2.4	3	20



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3 mm (Continued)**3 mm Low Current**

Part Number	Color	Full Angle (°)	Luminous Intensity (mcd)			at I _F (mA)	Wavelength Dom. (nm)			at I _F (mA)	Forward Voltage (V)			at I _F (mA)
			Min.	Typ.	Max.		Min.	Typ.	Max.		Min.	Typ.	Max.	
TLLK4401	Super red	60	6.3	17	32	2	626	630	639	2	1.6	1.8	2.2	2
TLLR4400	Red	50	0.63	1.2	-	2	612	-	625	2	-	1.9	2.4	2
TLLR4401	Red	50	1	2	-	2	612	-	625	2	-	1.9	2.4	2
TLLY4400	Yellow	60	0.63	1.2	-	2	581	-	594	2	-	2.4	2.9	2
TLLY4401	Yellow	60	1	2	-	2	581	-	594	2	-	2.4	2.9	2
TLLF4401	Yellow	60	6.3	17	32	2	581	589	594	2	1.6	1.8	2.2	2
TLLG4400	Green	60	0.63	1.2	-	2	562	-	575	2	-	1.9	2.4	2
TLLG4401	Green	60	1	2	-	2	562	-	575	2	-	1.9	2.4	2

**3 mm Backlight**

Part Number	Color	Full Angle (°)	Luminous Flux (lm)			at I _F (mA)	Wavelength Dom. (nm)			at I _F (mA)	Forward Voltage (V)			at I _F (mA)
			Min.	Typ.	Max.		Min.	Typ.	Max.		Min.	Typ.	Max.	
TLVD4200	Red	170	40	130	-	15	-	640	-	10	-	1.8	2.2	20
TLVY42N1P2-34	Yellow	170	28	-	71	15	585	-	590	10	-	2.4	3	20
TLVY4200	Yellow	170	10	20	-	15	581	-	594	10	-	2.4	3	20
TLVG4200	Green	170	10	30	-	15	562	-	575	10	-	2.4	3	20

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1.8 mm Miniplast**Features**

- Three color options
- For DC and pulse operation
- Five luminous intensity bins
- Eight green to yellow color classifications
- End to end stackable in center to center spacing of 0.1 in (2.54 mm)

Applications

- General indicating and lighting

**Resources**

- [1.8 mm \(miniplast\) classification of components](#)
- [1.8 mm \(miniplast\) ordering information](#)

1.8 mm (Miniplast)

Part Number	Color	Full Angle (°)	Luminous Intensity (mcd)			at I _F (mA)	Wavelength Dom. (nm)			at I _F (mA)	Forward Voltage (V)			at I _F (mA)
			Min.	Typ.	Max.		Min.	Typ.	Max.		Min.	Typ.	Max.	
TLUR2400	Red	40	4	15	-	10	-	630	-	10	-	2	3	20
TLUR2401	Red	40	4	-	32	10	-	630	-	10	-	2	3	20
TLUO2401	Red	40	4	5	20	10	612	-	625	10	-	2	3	20
TLUY2400	Yellow	40	1	4	-	10	581	-	594	10	-	2.4	3	20
TLUY2401	Yellow	40	2.5	8	12.5	10	581	-	594	10	-	2.4	3	20
TLUG2400	Green	40	1.6	5	-	10	562	-	575	10	-	2.4	3	20
TLUG2401	Green	40	4	12	20	10	562	-	575	10	-	2.4	3	20



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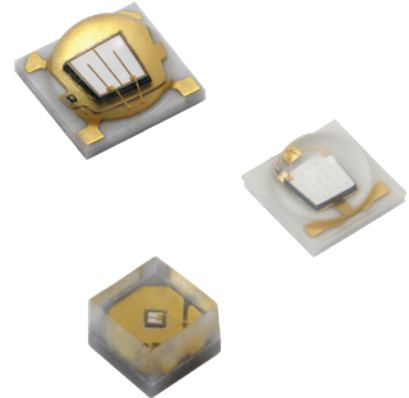
UVA and UVC LEDs

Features

- Utilizing latest advanced InGaN chip technology: 365 nm, 385 nm, 395 nm, and 405 nm
- Radiant power from 6.8 mW to 3300 mW
- Compact surface-mount packages
- Silicone casting for low and mid power, and silicone lens for high power for exceptionally long lifetime
- Compatible with reflow solder processes
- Moisture sensitivity level of 3 in accordance with J-STD.020
- RoHS-compliant, halogen-free, and Vishay Green

Applications

- UV curing
 - Nail salon
 - Dental
 - Printing
- Industrial curing
- Counterfeit money detector and blood detection



Resources

- [UV LEDs classification of components](#)
- [UV LEDs ordering information](#)

UVA LED (Technology: InGaN)

Part Number	Color	Full Angle (°)	Radiant Power (mW)			at I _F (mA)	Wavelength Dom. (nm)			at I _F (mA)	Forward Voltage (V)			at I _F (mA)
			Min.	Typ.	Max.		Min.	Typ.	Max.		Min.	Typ.	Max.	
VLMU3100 ⁽¹⁾	Ultraviolet	120	-	6.8	-	20	400	405	410	20	2.8	3.2	3.8	20
VLMU1610-365-135		135	14	23	26	20	362.5	367	370	20	2.8	3.5	4.0	20
VLMU3510-365-130		130	560	690	835	500	362.5	367	370	500	3.2	4.0	4.4	500
VLMU3511-365-130		130	835	1000	1325	600	360	367	370	600	3.2	3.6	4.0	600
VLMU3520-385-060		60	740	900	-	500	380	385	390	500	3.2	3.6	4	500
VLMU3520-385-120		120	780	930	-	500	380	385	390	500	3.2	3.6	4	500
VLMU3520-395-060		60	740	900	-	500	390	395	400	500	3.2	3.6	4	500
VLMU3520-395-120		120	780	930	-	500	390	395	400	500	3.2	3.6	4	500
VLMU3520-405-060		60	740	900	-	500	400	405	410	500	3.2	3.6	4	500
VLMU3520-405-120		120	780	930	-	500	400	405	410	500	3.2	3.6	4	500
VLMU35CB20-275-120		120	10	13.5	-	120	270	273	280	120	5.0	6.2	7.5	120
VLMU35CB21-275-120		120	12	13.5	-	120	270	273	280	120	5.0	6.2	7.5	120
VLMU35CL20-275-120		120	2	3	-	20	265	277	285	20	5.0	6.0	7.0	20
VLMU35CL21-275-120		120	?	?	-	20	265	277	285	20	5.0	6.0	7.0	20
VLMU35CT20-275-120		120	16.5	21.5	-	180	270	274	280	180	5.0	6.3	7.0	180
VLMU35CT21-275-120		120	18.5	21.5	-	180	270	274	280	180	5.0	6.3	7.0	180

Note

⁽¹⁾ Specification parameter in radiant intensity (min. 1.8 / typ. 2.5 / max. 3.0) mW/sr

UVC LED

Part Number	Color	Full Angle (°)	Radiant Power (mW)			at I _F (mA)	Wavelength Dom. (nm)			at I _F (mA)	Forward Voltage (V)			at I _F (mA)
			Min.	Typ.	Max.		Min.	Typ.	Max.		Min.	Typ.	Max.	
VLMU35CB20-275-120	Ultraviolet	120	7	10	-	100	270	277	285	100	6.5	7	-	100
VLMU35CL20-275-120		120	2	3	-	20	265	277	285	20	6	7	-	20
VLMU35CT20-275-120		120	12.5	19	-	150	265	277	285	150	6.5	7	-	20



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7-Segment Displays: Standard 7 mm, 10 mm, 13 mm, Clock Module, and 10 mm SMD Displays

Features

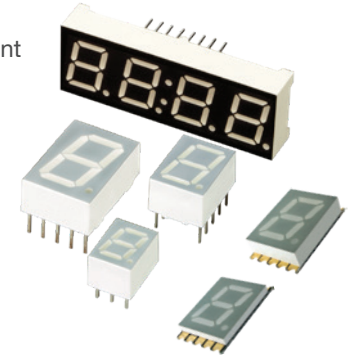
- Evenly lighted segments
- Grey package surface
- Untinted segments
- Luminous intensity categorized
- Green categorized for color
- Wide viewing angle
- Suitable for DC and high peak current
- Low current version for low power consumption available
- Lead (Pb)-free device

Applications

- Panel meters
- Test and measurement equipment
- Point of sale terminals
- Control units

Resources

- [Displays classifications of components](#)
- [Displays ordering information](#)



7 mm 7-Segment Displays, Standard

Part Number	Color	Circuitry	Full Angle (°)	Luminous Intensity (μcd)			at I _F (mA)	Wavelength Dom. (nm)			at I _F (mA)	Forward Voltage (V) Per Segment or DP			at I _F (mA)
				Min.	Typ.	Max.		Min.	Typ.	Max.		Min.	Typ.	Max.	
TDSO1150	Orange red	C.A.	100	450	3000	-	10	612	-	625	10	-	2	3	20
TDSO1150-K	Orange red	C.A.	100	1800	-	3600	10	612	-	625	10	-	2	3	20
TDSO1160	Orange red	C.C.	100	450	3000	-	10	612	-	625	10	-	2	3	20
TDSO1160-KL	Orange red	C.C.	100	1800	-	5600	10	612	-	625	10	-	2	3	20
TDSG1150	Green	C.A.	100	450	6000	-	10	562	-	575	10	-	2.4	3	20
TDSG1150-LM	Green	C.A.	100	2800	-	9000	10	562	-	575	10	-	2.4	3	20
TDSG1160	Green	C.C.	100	450	6000	-	10	562	-	575	10	-	2.4	3	20
TDSG1160-LM	Green	C.C.	100	2800	-	9000	10	562	-	575	10	-	2.4	3	20

7 mm 7-Segment Displays, Low current

Part Number	Color	Circuitry	Full Angle (°)	Luminous Intensity (μcd)			at I _F (mA)	Wavelength Dom. (nm)			at I _F (mA)	Forward Voltage (V) Per Segment or DP			at I _F (mA)
				Min.	Typ.	Max.		Min.	Typ.	Max.		Min.	Typ.	Max.	
TDSR0750	Red	C.A.	100	180	-	2200	1	-	640	-	1	-	1.8	2.4	1
TDSR0750-HI	Red	C.A.	100	700	-	2200	1	-	640	-	1	-	1.8	2.4	1
TDSR0760	Red	C.C.	100	180	-	2200	1	-	640	-	1	-	1.8	2.4	1
TDSL1150	Red	C.A.	100	180	260	-	2	612	-	625	2	-	1.8	2.4	2
TDSL1160	Red	C.C.	100	180	260	-	2	612	-	625	2	-	1.8	2.4	2



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Displays (Continued)

10 mm 7-Segment Displays, Standard

Part Number	Color	Circuitry	Full Angle (°)	Luminous Intensity (μcd)			at I _F (mA)	Wavelength Dom. (nm)			at I _F (mA)	Forward Voltage (V) Per Segment or DP			at I _F (mA)
				Min.	Typ.	Max.		Min.	Typ.	Max.		Min.	Typ.	Max.	
TDSQ3150	Orange red	C.A.	100	450	4500	-	10	612	-	625	10	-	2	3	20
TDSQ3150-KL	Orange red	C.A.	100	1800	-	5600	10	612	-	625	10	-	2	3	20
TDSQ3150-L	Orange red	C.A.	100	2800	-	5600	10	612	-	625	10	-	2	3	20
TDSQ3160	Orange red	C.C.	100	450	4500	-	10	612	-	625	10	-	2	3	20
TDSQ3160-KL	Orange red	C.C.	100	1800	-	5600	10	612	-	625	10	-	2	3	20
TDSQ3160-L	Orange red	C.C.	100	2800	-	5600	10	612	-	625	10	-	2	3	20
TDSG3150	Green	C.A.	100	450	6800	-	10	562	-	575	10	-	2.4	3	20
TDSG3150-M	Green	C.A.	100	4500	-	9000	10	562	-	575	10	-	2.4	3	20
TDSG3150-MN	Green	C.A.	100	4500	-	14 000	10	562	-	575	10	-	2.4	3	20
TDSG3160	Green	C.C.	100	450	6800	-	10	562	-	575	10	-	2.4	3	20
TDSG3160-M	Green	C.C.	100	4500	-	9000	10	562	-	575	10	-	2.4	3	20

10 mm 7-Segment Displays, Low Current

Part Number	Color	Circuitry	Full Angle (°)	Luminous Intensity (μcd)			at I _F (mA)	Wavelength Dom. (nm)			at I _F (mA)	Forward Voltage (V) Per Segment or DP			at I _F (mA)
				Min.	Typ.	Max.		Min.	Typ.	Max.		Min.	Typ.	Max.	
TDSR1050	Red	C.A.	100	280	-	3600	1	-	640	-	1	-	1.8	2.4	1
TDSR1050-K	Red	C.A.	100	1100	-	3600	1	-	640	-	1	-	1.8	2.4	1
TDSR1060	Red	C.C.	100	280	-	3600	1	-	640	-	1	-	1.8	2.4	1
TDSL3150	Red	C.A.	100	180	260	-	2	612	-	625	2	-	1.8	2.4	2
TDSL3150-G	Red	C.A.	100	450	-	900	2	612	-	625	2	-	1.8	2.4	2
TDSL3160	Red	C.C.	100	180	260	-	2	612	-	625	2	-	1.8	2.4	2



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Displays (Continued)

13 mm 7-Segment Displays, Standard

Part Number	Color	Circuitry	Full Angle (°)	Luminous Intensity (μcd)			at I _F (mA)	Wavelength Dom. (nm)			at I _F (mA)	Forward Voltage (V) Per Segment or DP			at I _F (mA)
				Min.	Typ.	Max.		Min.	Typ.	Max.		Min.	Typ.	Max.	
TDSQ5150	Orange red	C.A.	100	700	5000	-	10	612	-	625	10	-	2	3	20
TDSQ5150-LM	Orange red	C.A.	100	2800	-	9000	10	612	-	625	10	-	2	3	20
TDSQ5160	Orange red	C.C.	100	700	5000	-	10	612	-	625	10	-	2	3	20
TDSQ5160-LM	Orange red	C.C.	100	2800	-	9000	10	612	-	625	10	-	2	3	20
TDSG5150	Green	C.A.	100	700	9500	-	10	562	-	575	10	-	2.4	3	20
TDSG5150-MN	Green	C.A.	100	4500	-	14 000	10	562	-	575	10	-	2.4	3	20
TDSG5150-N	Green	C.A.	100	7000	-	14 000	10	562	-	575	10	-	2.4	3	20
TDSG5160	Green	C.C.	100	700	9500	-	10	562	-	575	10	-	2.4	3	20
TDSG5160-MN	Green	C.C.	100	4500	-	14 000	10	562	-	575	10	-	2.4	3	20
TDSG5160-N	Green	C.C.	100	7000	-	14 000	10	562	-	575	10	-	2.4	3	20

13 mm 7-Segment Displays, Low Current

Part Number	Color	Circuitry	Full Angle (°)	Luminous Intensity (μcd)			at I _F (mA)	Wavelength Dom. (nm)			at I _F (mA)	Forward Voltage (V) Per Segment or DP			at I _F (mA)
				Min.	Typ.	Max.		Min.	Typ.	Max.		Min.	Typ.	Max.	
TDSR1350	Red	C.A.	100	280	-	3600	1	-	640	-	1	-	1.8	2.4	1
TDSR1360	Red	C.C.	100	280	-	3600	1	-	640	-	1	-	1.8	2.4	1
TDSR1360-IK	Red	C.C.	100	1100	-	3600	1	-	640	-	1	-	1.8	2.4	1
TDSL5150	Red	C.A.	100	280	400	-	2	612	-	625	2	-	1.8	2.4	2
TDSL5160	Red	C.C.	100	280	400	-	2	612	-	625	2	-	1.8	2.4	2
TDSL5160-GH	Red	C.C.	100	450	-	1400	2	612	-	625	2	-	1.8	2.4	2

Clock Module, 10 mm, 4-Digit Display

Part Number	Color	Circuitry	Full Angle (°)	Luminous Intensity (μcd)			at I _F (mA)	Wavelength Dom. (nm)			at I _F (mA)	Forward Voltage (V) Per Segment or DP			at I _F (mA)
				Min.	Typ.	Max.		Min.	Typ.	Max.		Min.	Typ.	Max.	
TDCR1050M	Red	C.A.	100	4000 / 500	6000 / 800	- / -	10	-	631	-	20	-	2	2.4	20
TDCR1060M	Red	C.C.	100	4000 / 500	6000 / 800	- / -	10	-	631	-	20	-	2	2.4	20
TDCG1050M	Green	C.A.	100	2800 / 500	4000 / 1200	- / -	10	562	573	575	20	-	2	2.4	20
TDCG1060M	Green	C.C.	100	2800 / 500	4000 / 1200	- / -	10	562	573	575	20	-	2	2.4	20



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Displays (Continued)

SMD Display, 7-Segment, 3.75 mm Height

Part Number	Color	Circuitry	Full Angle (°)	Luminous Intensity (μcd)			at I _F (mA)	Wavelength Dom. (nm)			at I _F (mA)	Forward Voltage (V) Per Segment or DP			at I _F (mA)
				Min.	Typ.	Max.		Min.	Typ.	Max.		Min.	Typ.	Max.	
VDMR10A0	Super red	C.A.	100	180	650	-	1	-	631	-	20	-	2.0	2.6	20
VDMR10C0	Super red	C.C.	100	180	650	-	1	-	631	-	20	-	2.0	2.6	20
VDMO10A0	Soft orange	C.A.	100	180	650	-	1	-	605	-	20	-	2.0	2.6	20
VDMO10C0	Soft orange	C.C.	100	180	650	-	1	-	605	-	20	-	2.0	2.6	20
VDMY10A0	Yellow	C.A.	100	1100	2750	-	1	-	589	-	20	-	2.0	2.6	20
VDMY10C0	Yellow	C.C.	100	1100	2750	-	1	-	589	-	20	-	2.0	2.6	20
VDMG10A0	Green	C.A.	100	110	400	-	1	-	572	-	20	-	2.0	2.6	20
VDMG10C0	Green	C.C.	100	110	400	-	1	-	572	-	20	-	2.0	2.6	20

SMD Display 7-Segment, 2.1 mm Height

Part Number	Color	Circuitry	Full Angle (°)	Luminous Intensity (μcd)			at I _F (mA)	Wavelength Dom. (nm)			at I _F (mA)	Forward Voltage (V) Per Segment or DP			at I _F (mA)
				Min.	Typ.	Max.		Min.	Typ.	Max.		Min.	Typ.	Max.	
VDMR10A1	Super red	C.A.	100	450	1600	-	1	-	631	-	20	-	2.0	2.6	20
VDMY10A1	Yellow	C.A.	100	450	1600	-	1	-	587	-	20	-	2.0	2.6	20



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Classification of Components for RGB PLCC-6

Luminous Intensity Classification		
Group	Luminous Intensity (mcd)	
	Min.	Max.
S1	180	224
S2	224	280
T1	280	355
T2	355	450
U2	560	710
V1	710	920
V2	900	1120
AA	1120	1400
AB	1400	1800

Note

- Luminous intensity is tested at a current pulse duration of 25 ms and an accuracy of $\pm 11\%$.
The above classification represents the brightness range that includes 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 on any one reel. In order to ensure availability, single wavelength groups will not be orderable

Group	Color Classification	
	Blue	
	Dominant Wavelength (nm)	
	Min.	Max.
1	463	467
2	467	471
3	471	476

Group	Color Classification	
	Red	
	Dominant Wavelength (nm)	
	Min.	Max.
4	619	629

Group	Color Classification	
	True Green	
	Dominant Wavelength (nm)	
	Min.	Max.
5	519	524
6	524	529
7	529	534

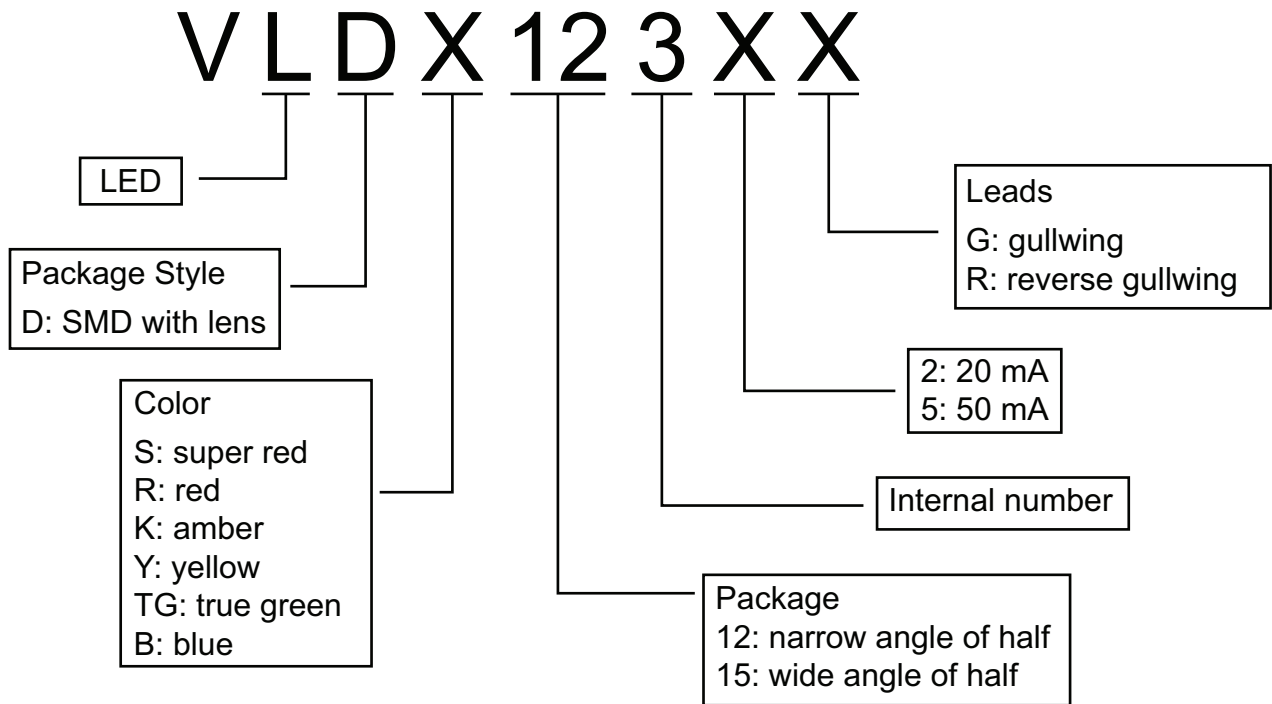
Note

- Wavelengths are tested at a current pulse duration of 25 ms and an accuracy of $\pm 1\text{ nm}$



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Ordering Information for Dome Lens





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LEDs for Lighting Solutions

Classification of Components for MiniLED, PLCC-x Series, and Dome Lens – Also Valid for 3 mm (Half Groups)

Brightness Grouping

Luminous 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

Luminous 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	11 200
FA	11 200	14 000
FB	14 000	18 000
GA	18 000	22 400
GB	22 400	28 000
HA	28 000	35 500
HB	35 500	45 000

Color Grouping

Group	Min.	Max.
Amber: Valid for Mini Power		
1	611	618
2	614	622
3	616	634

Amber: Valid for Mini Low Current		
Group	Min.	Max.
7	610	613
8	612	616
9	615	620
10	619	624

Yellow		
Group	Min.	Max.
1	581	584
2	583	586
3	585	588
4	587	590
5	589	592
6	591	594

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

Group	Min.	Max.
Green: Also Valid for 3 mm (Half Groups)		
3	562	565
4	564	567
5	566	569
6	568	571
7	570	573
8	572	575

Pure Green		
Group	Min.	Max.
0	555	559
1	558	561
2	560	563
3	562	565

True Green		
Group	Min.	Max.
2	509	517
3	515	523
4	521	529
5	527	535
6	533	541

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

Note

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

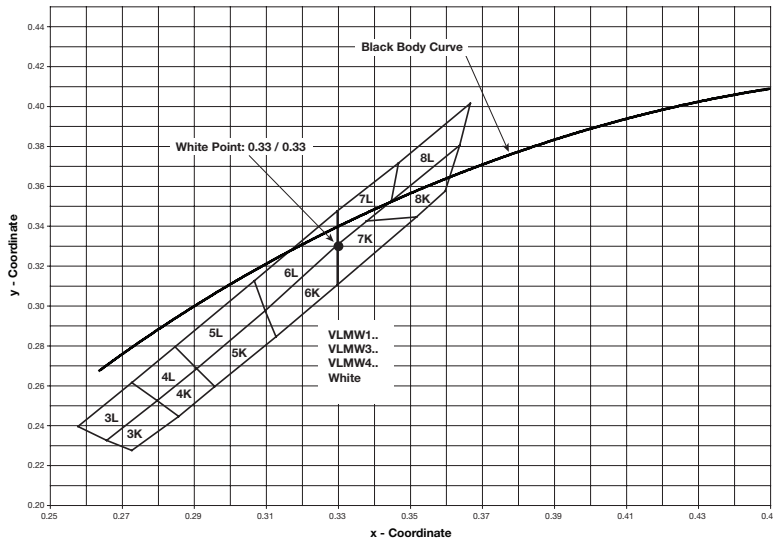
Dome Lens				
Dominant Wavelengths (nm)				
Group	Amber		Yellow	
	Min.	Max.	Min.	Max.
2	611	616	-	-
3	616	621	583	586
4	-	-	586	589
5	-	-	589	592
6	-	-	592	595



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Chromaticity Coordinated Groups for PLCC-x Series

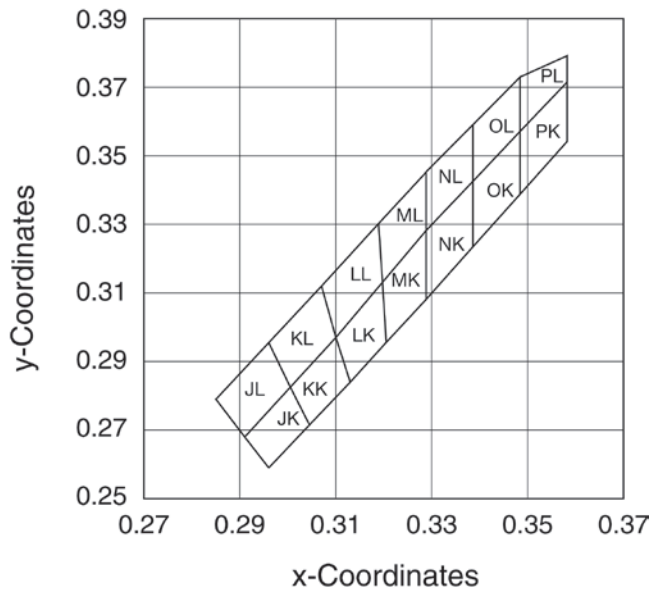
Chromaticity Coordinated Groups for Standard Groups



Note

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

Chromaticity Coordinated Groups for Half Groups



Note

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



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Classification of Components for 0603 (Leadframe-Based)

Brightness Grouping

Standard Series Luminous Intensity		
Group	I _v in 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

Note

- Luminous intensity is tested at a current pulse duration of 25 ms

Low Current Series Luminous Intensity		
Group	Min.	Max.
G1	1.80	2.24
G2	2.24	2.80
H1	2.80	3.55
H2	3.55	4.50
J1	4.50	5.60
J2	5.60	7.10
K1	7.10	9.00
K2	9.00	11.20
L1	11.20	14.00
L2	14.00	18.00

Note

- Luminous intensity is tested at a current pulse duration of 25 ms

VLMW11R2S2 Luminous Intensity		
Group	Min.	Max.
R2	140	180
S1	180	224
S2	224	280

Note

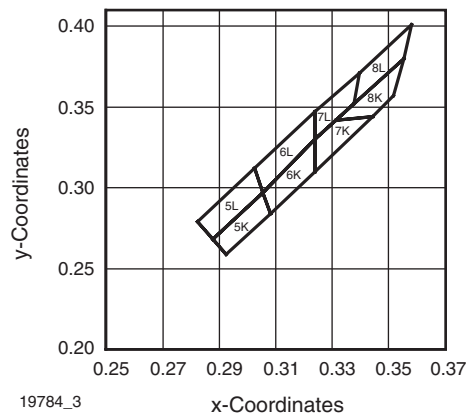
- Luminous intensity is tested at a current pulse duration of 25 ms

Color Grouping

Group	Min.	Max.
Yellow		
-2	580	583
-3	583	586
-4	586	589
-5	589	592
-6	592	595

Group	Min.	Max.
Soft Orange		
-2	600	603
-3	603	606
-4	606	609
-5	609	612

Chromaticity Coordinated Groups



Color Grouping

Group	Min.	Max.
Green		
-2	566	569
-3	569	572
-4	572	575

Group	Min.	Max.
Pure Green		
-1	551	554
-2	554	557
-3	557	560
-4	560	563
-5	563	566

Group	Min.	Max.
Blue		
-2	460	464
-3	464	468
-4	468	472
-5	472	476

Note

- Wavelengths are tested at a current pulse duration of 25 ms and an accuracy of ± 11 nm



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Classification of Components for 0603 (PCB-Based) and 0402 Series

Brightness Grouping

Luminous Intensity		
Half Groups	I _v in mcd	
	Min.	Max.
L	11.2	18
M	18	28
N	28	45
P	45	71
Q	71	112
R	112	180
S	180	280
T	280	450

Note

- Wavelengths are tested at a current pulse duration of 25 ms and an accuracy of ± 15 %

Color Grouping

Group	Min.	Max.
Yellow		
H	584.5	587
J	587.5	589.5
K	589.5	592
L	592	594.5
M	594.5	597

Color Grouping

Group	Min.	Max.
Yellow Green		
C	567.5	570.5
D	570.5	573.5
E	573.5	576.5

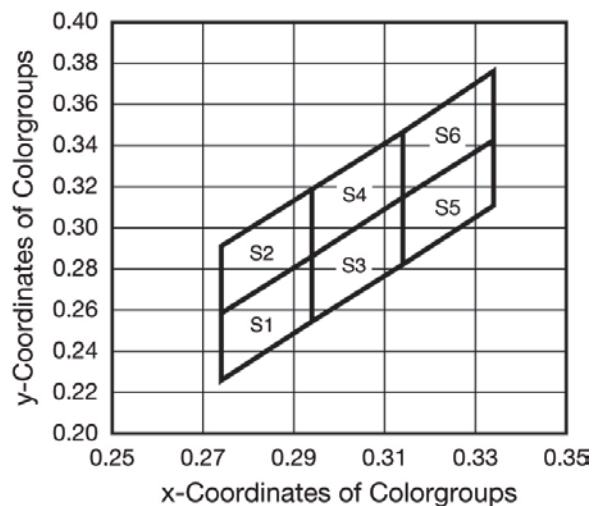
Group	Min.	Max.
True Green		
AP	520	525
AQ	525	530
AR	530	535

Group	Min.	Max.
Blue		
AC	456	470
AD	470	475

Note

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

Chromaticity Coordinated Groups



Note

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



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Ordering Information for SMD (PLCC, Mini, 0603, 0402)

Color Indicator			
Single Colors			
A	Yellow low current	P	Pure green
B	Blue	PG	Pure green
C	Green low current	R	Red or amber
D	Red	S	Super red
E	Yellow	T	Red low current
F	Soft orange	U	Ultraviolet
G	Green or yellow green	W	White
H	Orange red	Y	Yellow
K	Super red, red, or amber	YG	Yellow green
O	Soft orange		
Multi Colors			
KE	Red / yellow	RGB	Red / green / blue
KG	Red / green	V	Red / green

Packing Method		
Package	Taping	Qty (pcs)
PLCC-2 / PLCC-4	GS08 or 08	7500 (5x1500)
	GS18 or 18	8000
PLCC-2 ultraviolet	GS08	2000
0603	GS08	3000
MiniLED	GS08	3000
0402	GS08	9000 (3x3000)
	GS18	8000
Reverse gullwing	GS08	2000
	GS18	8000
RGB	GS08	2000

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

Package Style	
M	SMD
R	Reverse gullwing

Package	
10	0603 / low current / leadframe-based
11	0603 / ultra bright / leadframe-based
13	0603 / standard / PCB-based
14	0603 / standard / PCB-based
15	0402 / standard
20	Mini / low current
21	Mini / standard
23	Mini / power
30	PLCC-2 / low current
31	PLCC-2 / standard
33	PLCC-2 / power
34	Multi-color
41	PLCC-2 / standard / 10 mA / low cost
45	PLCC-2 / 5 mA / low cost

Brightness Classification
According to standard

White Color Classification
According to standard



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Classification of Components for TELUX

Luminous Flux Classification Tolerance $\pm 11\%$		
Group	Luminous Flux (lm)	
	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	12 200
M	8000	15 000

Note

- Luminous flux is tested at a current pulse duration of 25 ms and an accuracy of $\pm 11\%$

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

Note

- Wavelengths are tested at a current pulse duration of 25 ms

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

Note

- Voltages are tested at a current pulse duration of 1 ms

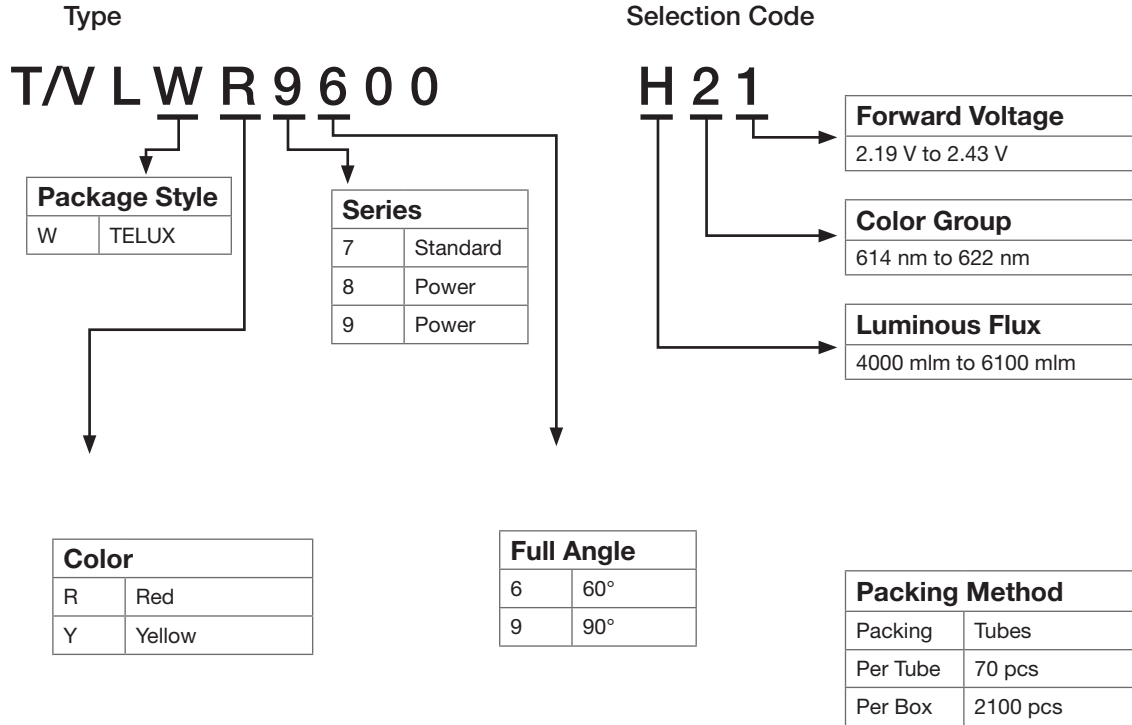


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Ordering Information for TELUX





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Classification of Components for 1.8 mm Miniplast, 3 mm (Full Groups), 5 mm, and 5 mm Side-View

Classification of 1.8 mm, 3 mm, and 5 mm LEDs		
Group	Light Intensity (mcd) / Luminous Flux (lm)	
	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
AA	320	640

Classification of 1.8 mm, 3 mm, and 5 mm LEDs		
Group	Light Intensity (mcd) / Luminous Flux (lm)	
	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

Classification for 5 mm White LEDs

Luminous Intensity Classification		
Group	Light Intensity (mcd)	
	Min.	Max.
DB	5600	7100
EA	7100	9000
EB	9000	11 200



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Color Classification Tables for 3 mm and 5 mm

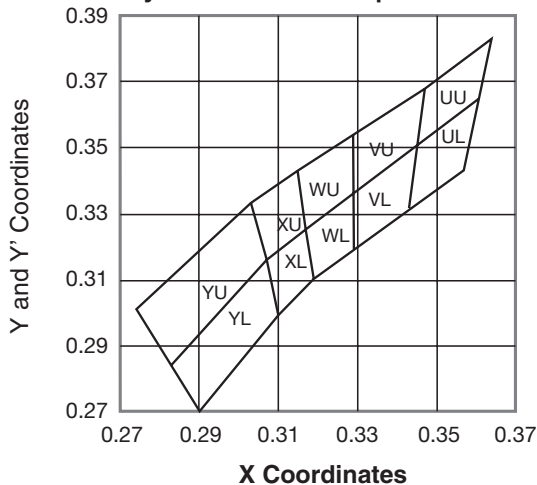
Color Classification for 3 mm and 5 mm LEDs				
Group	Yellow		Green	
	Dom. Wavelength (nm)			
	Min.	Max.	Min.	Max.
0	-	-	-	-
1	581	584	-	-
2	583	586	-	-
3	585	588	562	565
4	587	590	564	567
5	589	592	566	569
6	591	594	568	571
7	-	-	570	573
8	-	-	572	575
9	-	-	574	577

Group	True Green	
	Dom. Wavelength (nm)	
	Min.	Max.
2	509	517
3	515	523
4	521	529
5	527	535
6	533	541

Note

- Wavelengths are tested at a current pulse duration of 25 ms

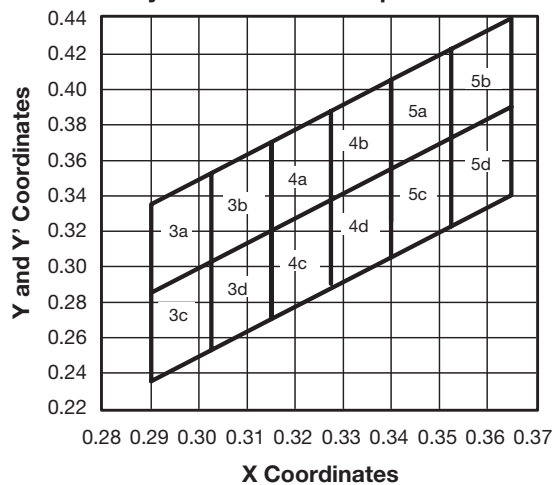
Chromaticity Coordinated Groups for 3 mm



Group	Soft Orange		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 mm and 5 mm LEDs (Continued)		
Group	Blue	
	Dom. Wavelength (nm)	
	Min.	Max.
2	458	464
3	462	468
4	466	472
5	470	476
6	474	480

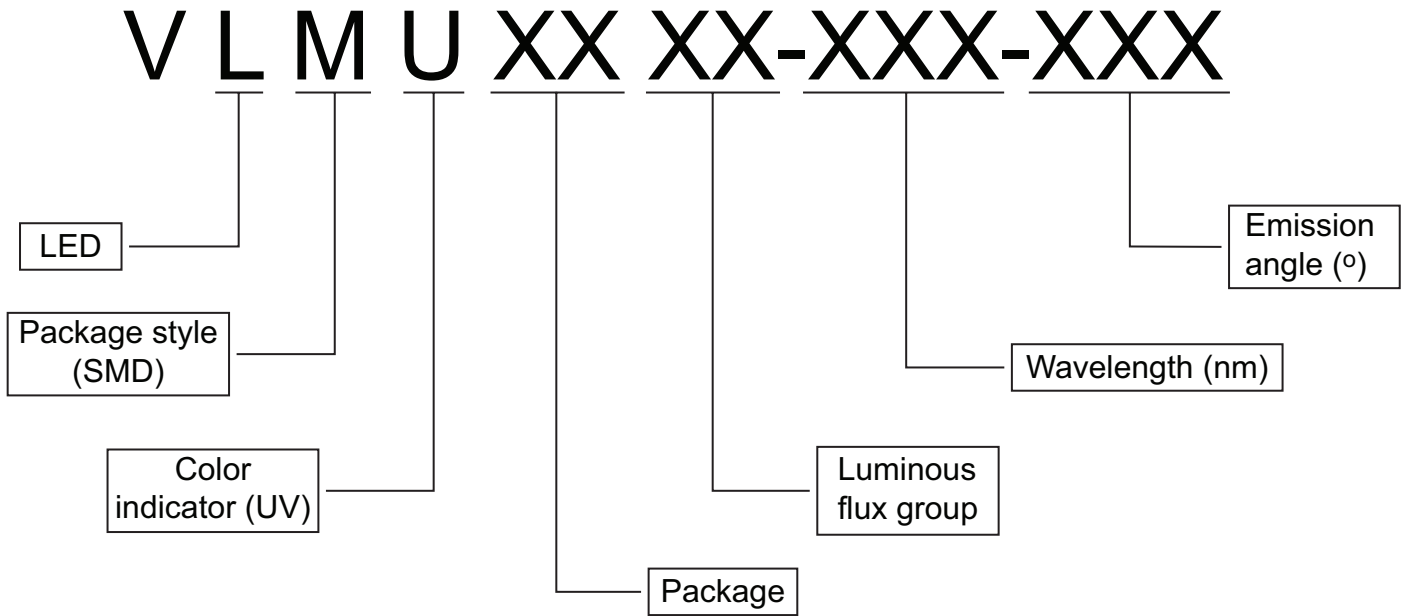
Chromaticity Coordinated Groups for 5 mm





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Ordering Information for UV LED





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Classification of Components for QFN UV LEDs

VLMU3520-xxx-xxx			Radiant Power (mW)			VLMU1610-365-135		
at 500 mA			VLMU3510-365-130			at 20 mA		
Group	Min.	Max.	Group	Min.	Max.	Group	Min.	Max.
U078	780	820	GH	560	610	R3	14	16
U082	820	860	HI	610	665	R4	16	18
U086	860	900	IJ	665	720	R5	18	20
U090	900	940	JK	720	775	R6	20	22
U094	940	980	KL	775	835	R7	22	24
U098	980	1020				R8	24	26
VLMU3511-365-130			VLMU3511-365-130			VLMU35CT2.-275-120		
at 600 mA			at 600 mA			at 180 mA		
Group	Min.	Max.	Group	Min.	Max.	Group	Min.	Max.
MN	835	900	MN	835	900	P1	16.5	18.5
NO	900	975	NO	900	975	P2	18.5	20.5
OP	975	1050	OP	975	1050	P3	20.5	22.5
PR	1050	1135	PR	1050	1135	P4	22.5	24.5
RS	1135	1225	RS	1135	1225			
ST	1225	1325	ST	1225	1325			
						VLMU35CB2.-275-120		
						at 120 mA		
						Group	Min.	Max.
						P1	10	12
						P2	12	14
						P3	14	16
						P4	16	18
						VLMU35CL2.-275-120		
						at 20 mA		
						Group	Min.	Max.
						X1	2.0	-

Selection Code Example: U078Q385V3436

- U078: ϕ_e , range 780 mW to 820 mW
- Q385: λ_p , range 385 nm to 390 nm
- V3436: V_F , range 3.4 V to 3.6 V

Selection Code Example:

- IJ-P3N1-V2
- IJ: ϕ_e , range 665 mW to 720 mW
- P3N1: λ_p , range 365 nm to 367.5 nm
- V2: V_F , range 3.6 V to 4.0 V

Selection Code Example:

- R5-P3N1-V2
- R5: ϕ_e , range 18 mW to 20 mW
- P3N1: λ_p , range 365 nm to 367.5 nm
- V2: V_F , range 3.2 V to 3.6 V



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Classification of Components for QFN UV LEDs (continued)

Peak Wavelength (nm)			
VLMU3520-xxx-xxx			
at 500 mA			
Group	Min.	Max.	
Q380	380	385	
Q385	385	390	
Q390	390	395	
Q395	395	400	
Q400	400	405	
Q405	405	410	
VLMU3510-365-130			
at 500 mA			
Group	Min.	Max.	
P3M2	362.5	365	
P3N1	365	367.5	
P3N2	367.5	370	
VLMU3511-365-130			
at 600 mA			
Group	Min.	Max.	
P3M	360	365	
P3N	365	370	
VLMU1610-365-135			
at 20 mA			
Group	Min.	Max.	
P3M2	362.5	365	
P3N1	365	367.5	
P3N2	367.5	370	
VLMU35CT2.-275-120			
at 180 mA			
Group	Min.	Max.	
W1	270	280	
VLMU35CB2.-275-120			
at 120 mA			
Group	Min.	Max.	
W1	270	280	
VLMU35CL2.-275-120			
at 20 mA			
Group	Min.	Max.	
W1	265	285	

Forward Voltage (V)			
VLMU3520-xxx-xxx			
at 500 mA			
Group	Min.	Max.	
V3234	3.2	3.4	
V3436	3.4	3.6	
V3638	3.6	3.8	
V3840	3.8	4.0	
VLMU3510-365-130			
at 500 mA			
Group	Min.	Max.	
V1	3.2	3.6	
V2	3.6	4.0	
V3	4.0	4.4	
VLMU3511-365-130			
at 600 mA			
Group	Min.	Max.	
V1	3.2	3.6	
V2	3.6	4.0	
VLMU1610-365-135			
at 20 mA			
Group	Min.	Max.	
V3	3.6	4.0	
VLMU35CT2.-275-120			
at 180 mA			
Group	Min.	Max.	
VZ	5.0	5.5	
V0	5.5	6.0	
V1	6.0	6.5	
V2	6.5	7.0	
VLMU35CB2.-275-120			
at 120 mA			
Group	Min.	Max.	
VZ	5.0	5.5	
V0	5.5	6.0	
V1	6.0	6.5	
V2	6.5	7.0	
V3	7.0	7.5	
VLMU35CL2.-275-120			
at 20 mA			
Group	Min.	Max.	
V1	5.0	5.5	
V2	5.5	6.0	
V3	6.0	6.5	
V4	6.5	7.0	

Selection Code Example: U078Q385V3436

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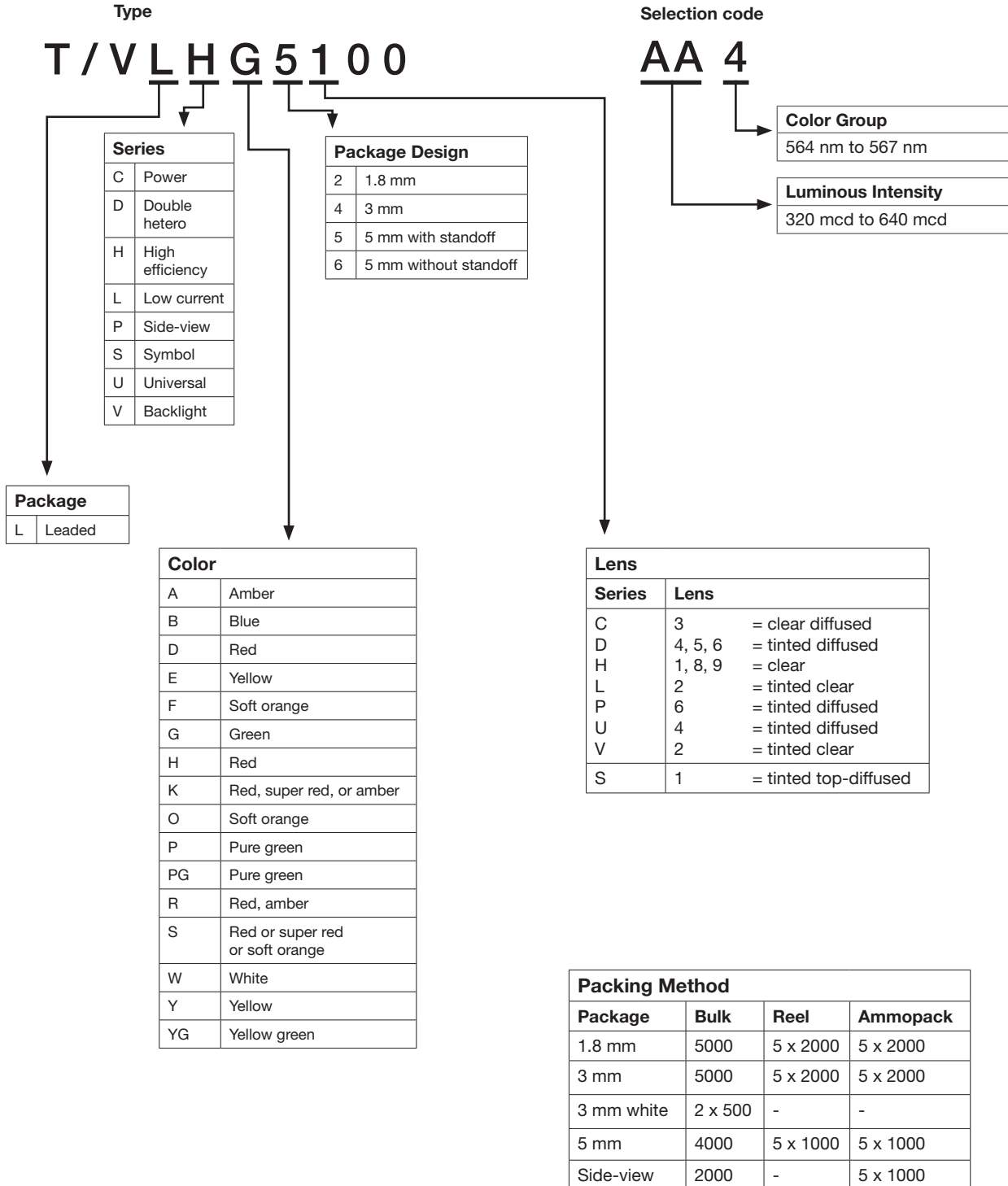
Selection Code Example:

- R5-P3N1-V2
- R5: ϕ_e , range 18 mW to 20 mW
- P3N1: λ_p , range 365 nm to 367.5 nm
- V2: V_f , range 3.2 V to 3.6 V



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Ordering Information for 3 mm and 5 mm





OPTOELECTRONICS

LEDs for Lighting Solutions

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Classification of Components for Displays and Clock Modules

Light Intensity (μcd)		
Group	Min.	Max.
C	70	140
D	110	220
E	180	360
F	280	560
G	450	900
H	700	1400
I	1100	2200
K	1800	3600
L	2800	5600
M	4500	9000
N	7000	14 000

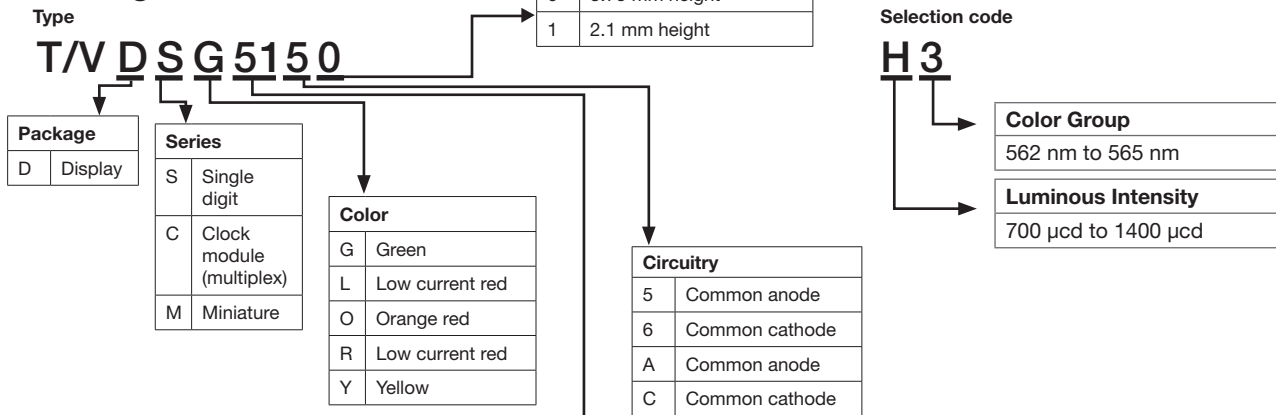
Color Grouping

Group	Orange Red		Yellow		Green	
	Min.	Max.	Min.	Max.	Min.	Max.
1	612	617	581	584	-	-
2	616	621	583	586	-	-
3	620	625	585	588	562	565
4	-	-	587	590	564	567
5	-	-	589	592	566	569
6	-	-	591	594	568	571
7	-	-	-	-	570	573
8	-	-	-	-	572	575

Note

- Wavelengths are tested at a current pulse duration of 25 ms

Ordering information



Package	Pcs Per Tube	Tubes Per Box	Total Qty.
7 mm	50	10	500
10 mm	40	10	400
13 mm	40	10	400
Clock module	32	12	384

Code	Size
07	7 mm
11	7 mm
10	10 mm
31	10 mm
13	13 mm
51	13 mm

Package	Pcs Per Reel	Reels Per Box	Total Qty.
10 mm (2.10 mm height)	800	2	1600
10 mm (3.75 mm height)	800	2	1600