AUTOMOTIVE GRADE OPTOELECTRONICS

Vishay Automotive Grade and AEC-Q101 Qualified Parts

VISHAY OPTOELECTRONICS – AUTOMOTIVE GRADE BY DESIGN

This catalog lists our AEC-Q101 qualified optoelectronics components, including LEDs, infrared emitters, photo detectors, ambient light sensors, and optical interrupters. It provides real-life application examples. Vishay strictly adheres to the Automotive Electronics Council's Q101 Stress Test Qualification for Automotive Grade Discrete Semiconductors. The minimum operating temperature range for discrete semiconductors per this specification is -40 °C to +85 °C ambient, but could go up to the range of -40 °C to +125 °C based on the respective application and requirements (e.g. most LED applications require at least up to +100 °C). In addition to these parts, Vishay also manufactures custom optical sensors for the automotive market, including rain light tunnel sensors, steering angle sensors, climate control sensors, and infrared emitter arrays for occupant sensing and driver assistance systems.

RESOURCES

- To view the full Optoelectronics portfolio - www.vishay.com/optoelectronics
- To view Optoelectronics videos - www.vishay.com/videos/
- To view Automotive Grade requirements - www.vishay.com/doc?49924
- For technical questions contact: Optical Sensors - sensorstechsupport@vishay.com
  Photodetector - detectortechsupport@vishay.com
  Emitter - emittertechsupport@vishay.com
  LED - LED@Vishay.com

AUTOMOTIVE GRADE

A WORLD OF SOLUTIONS™

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Applications

A number of automotive applications using Vishay components are described in the following pages. The use of Vishay standard and custom optical sensors and components is increasing. Take a look at what we have done and think about what we can do for you.

- **Position Sensors:** gear shift position, steering angle, ignition key, door lock, control knob encoders and switches
- **Convenience and Climate:** rain sensor, tunnel sensor, daylight sensor, solar angle sensor
- **Backlight Control:** instrument panel, indicator lamps, center console and navigation LCD
- **Safety:** occupant detection, drowsy driver detection, night vision, optical immobilizer, remote keyless entry
- **Lighting:** instrument panel, center control console, brake lights, truck

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AUTOMOTIVE GRADE OPTOELECTRONICS

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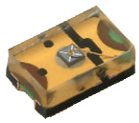
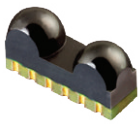
TCPT1300X01

TCUT13000X01



VSMB1940X01
TEMT7000X01

PLCC-2



TFBS2711X01

Steering Angle

One of the most critical position sensors in an automobile is the steering angle sensor. For cars equipped with electronic power steering, drive by wire, and rollover avoidance, the position of the steering wheel, the direction of steering, and the velocity at which the wheel is being turned are paramount input data. An encoding wheel is connected to the steering wheel and a transmissive sensor, also known as a slotted interrupter, is used. Key features of the sensor include dual channels to provide both rate of change and direction of steering, a wide gap to account for the tolerances commonly associated with steering assemblies, and a moisture sensitivity level that allows for long durations on the plant floor.

- TCPT1300X01, TCUT1300X01, TCPT1350X01, TCUT1350X01, TCPT1600X01, TCUT1600X01, TCUT1630X01, TCUT1800X01

Center Console Knobs and Switches

Similar to steering angle sensors, the knobs and switches used for climate control, radio / CD, navigation, and other entertainment systems feature encoding wheels to determine the position as the knob is turned. Transmissive sensors are used with knobs and switches.

- TCPT1300X01, TCUT1300X01, TCPT1350X01, TCUT1350X01, TCPT1600X01, TCUT1600X01, TCUT1630X01, TCUT1800X01

Ignition Switch

Insert the key, turn it, and the car starts. Sounds simple, but in that tight area of the ignition switch a small transmissive sensor is used to not only determine if a key is inserted, but also initiates the immobilizer function and determines the position of the key. The sensor needs to be rugged and accurate with a wide gap to account for mechanical tolerances of the switch.

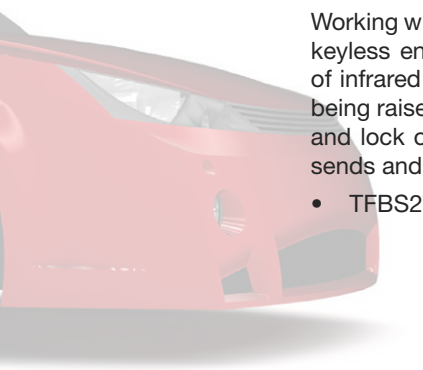
- TCPT1300X01, TCUT1300X01, TCPT1350X01, TCUT1350X01, TCPT1600X01, TCUT1600X01, TCUT1630X01, TCUT1800X01

Gear Shift

As the gear shift is moved through Park, Neutral, Reverse, Low 1, Low 2, and Drive, a transmissive sensor is used to determine its position. The data is sent to the transmission control unit where the gear selected is engaged.

- TCPT1300X01, TCUT1300X01, TCUT1630X01, TCUT1800X01 or discrete emitter detector pair like:
  PLCC-2: VSMB3940X01, VEMT3700FX01
  0805: VSMB1940X01, TEMT7100X01

Remote Keyless Entry



Working with a leading keyless entry tier-1 supplier, Vishay manufactures an infrared keyless entry and immobilizer system. The key fob uses the line of sight feature of infrared to avoid pinching or trapping fingers and hands while the windows are being raised or the convertible top is being closed. RF is used for traditional unlock and lock operations. The optical key fob is also used as an immobilizer, where it sends and receives an infrared security code each time the car is started.

- TFBS2711X01

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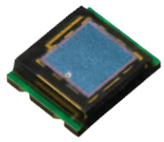
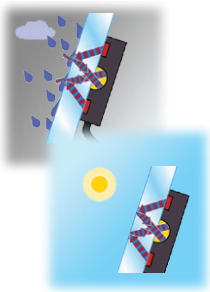
Tunnel Sensor

The change in ambient light when driving into and out of a tunnel can be jarring. The last thing a driver needs to be doing while adjusting to the ambient light is to be fiddling with the light switch. A tunnel sensor measures the ambient light at two forward angles. Depending on the difference in these values, the cars' headlights will be automatically turned on or off. A tunnel sensor often does double duty as an ambient light sensor.

- TEMD5510FX01, TEMD6200FX01, TEMD7000X01



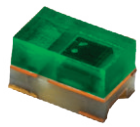
TEMD5510FX01



Rain Sensor

When water hits the windshield, there is a change in the index of refraction and the amount of light being reflected off the windshield from a sensor mounted on the inside glass. The degree of change helps determine the rate of rain falling. Vishay works with several tier-1 suppliers in providing custom rain sensors that use our infrared emitters and phototransistor, photodiode, and PIN photodiode chips. We provide chip on board assembly, lensing design, and molding.

- Detectors: TEMD5110X01, TEMD7100X01
  Emitters: VSMB1940X01 (0805)
  VSMB3940X01, VSMF3710, VSMG3700 (PLCC-2)

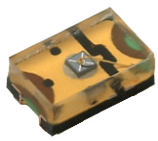


TEMT62000FX01
TEMD6200FX01

Ambient Light Sensor

The simplest example of the use of an ambient light sensor is to control the daytime running lights and headlights. Sun goes down, lights come on. But there are many more applications, as described below. Vishay is a leading supplier of ambient light sensors with a wide range of packaging and outputs.

- TEMD5510FX01, TEMD6200FX01, TEMT6200FX01, TEMT6000X01

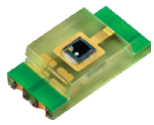


TEMD7000X01

Auto Dimming Rearview Mirrors

Nighttime driving will soon get a little easier with ultra sensitive light sensors located in rearview mirrors. The mirrors will be able to automatically reduce the glare to the driver's eyes based on the intensity of the light hitting the mirror surface.

- TEMT6200FX01, TEMD5510FX01



TEMT6000FX01
TEMD6000FX01

Instrument Panel Backlight Intensity

The days of the knob used to adjust the intensity of the instrument panel backlights are over, even on the least expensive models. An ambient light sensor is used to adjust the backlights automatically.

- TEMD5510FX01, TEMD6200FX01, TEMT6200FX01, TEMT6000X01

LCD Displays

Whether it is the center console control LCD, the navigation display, or the entertainment LCD displays, an ambient light sensor is used to automatically adjust the backlight of the display for optimal viewing. Vishay's ambient light sensors are used by several of the world's largest display manufacturers to do just this.

- TEMD5510FX01, TEMD6200FX01, TEMT6200FX01, TEMT6000X01

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Brake Lights

Just as the bulbs in traffic signals in cities around the world are being replaced by LEDs, so too are the bulbs traditionally used for brake lights, center high mount stop lights, and interior overhead and door lights in cars. AEC-Q101 qualified packages, a broad array of red, orange, and amber colors, and appropriate binning options have made Vishay one of the largest suppliers of LED truck brake lights in the world.

TELUX

- TELUX: VLWR9630, TLWY9630
  PLCC-2: VLMR51Y1Z1, VLMY51Y2Z2, VLMK51Y1Z1, VLMW51Q2R3

Occupant Sensing

Vishay has been on the leading edge of research and development of optical occupant sensing. Given that weight has become insufficient for the automotive industry to determine the presence of a passenger, optical arrays have been adopted to “profile” the contents of the passenger seat, deploying the airbag only when a person is present.

PLCC-2

- PLCC-2: VSMF4720, VSMB3940X01

Drowsy Driver

Vishay’s development of a drowsy driver sensor, which determines the blink rate of the driver and sets off an audible tone when the rate goes below a threshold, is ongoing. Working with several tier-1 suppliers, fully functional prototypes are in review.

- PLCC-2: VSMF4720, VSMB3940X01

Heads-Up Display / Night Vision

Using Vishay’s high powered infrared emitters allows a driver to see much farther than their headlights illuminate; presenting the driver with the ability to avoid life-altering collisions. Using the near-infrared wavelength of 850 nm, Vishay’s portfolio of emitting diodes includes the industry’s highest intensity package.

- PLCC-2: VSMY7850X01

LED Backlight

MiniLED

Whether it is a Volkswagen blue, a Mercedes Benz white, or a BMW red, Vishay has hundreds of automotive-qualified LEDs for backlighting instrument panels, control panels, window and door lock switches, and cabin lighting. Vishay is a top-5 supplier to the automotive industry. We have what it takes to be successful in this quality-intensive market. And, as the industry migrates to consumer-selected lighting colors, Vishay is ready with a broad portfolio of multi-die products, including RGB LEDs.

- PLCC-2: VLMK31x, VLMK310x, VLME31x, VLME310x, VLMD31x, VLMF31x, VLMW4x, VLMF310x
  MiniLED: VLMK20x, VLMK23x, VLMK230x
  RGB: VLMRGB343x

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Infrared Emitters

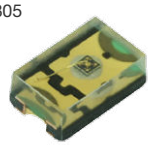
Vishay offers automotive-qualified emitters in wavelengths from 830 nm to 940 nm with fast response times. Vishay has a broad selection of double hetero infrared emitters – the industry's highest power infrared emitters with the lowest forward voltages. Applications include occupant sensing arrays, nighttime illumination for head-up displays, rain sensors, and driver assist systems.

Package	Part Number	Peak Wavelength (nm)	Angle of Half Intensity (± °)	Radiant Intensity, I_e (mW/sr)	Rise and Fall Time, t_r / t_f (ns)	Remark
IR EMITTER						
0805	VSMY1850ITX01	850	60	10	10	
	VSMY1850X01	850	60	10	10	
	VSMY1940ITX01	940	60	10	10	
	VSMY1940X01	940	60	10	10	
	VSMY5850X01	850	60	13	7	
	VSMY5890X01	890	60	13	7	
	VSMY5940X01	940	60	13	7	
	VSMB1940ITX01	940	60	6	15	
	VSMB1940X01	940	60	6	15	
1.8 mm	VSMB2020X01	940	12	40	15	Gullwing
	VSMB2943GX01	940	25	20	15	Gullwing
	VSMF288011GX01	890	11	36	50	Gullwing
	VSMF2890GX01	890	12	40	30	Gullwing
	VSMF2893GX01	890	25	20	30	Gullwing
	VSMG2020X01	850	12	40	20	Gullwing
	VSMY2850GX01	850	10	125	10	Gullwing
	VSMY2853GX01	850	28	50	10	Gullwing
	VSMY2940GX01	940	10	145	10	Gullwing
	VSMY2941GX01	940	8	160	5	Gullwing
	VSMY2943GX01	940	28	50	10	Gullwing
	VSMB2000X01	940	12	40	15	Reverse gullwing
	VSMB2943RGX01	940	25	20	15	Reverse gullwing
	VSMF288011RGX01	890	11	36	50	Reverse gullwing
	VSMF2890RGX01	890	12	40	30	Reverse gullwing
	VSMF2893RGX01	890	25	20	30	Reverse gullwing
	VSMG2000X01	850	12	40	20	Reverse gullwing
	VSMY2850RGX01	850	10	125	10	Reverse gullwing
	VSMY2853RGX01	850	28	50	10	Reverse gullwing
	VSMY2940RGX01	940	10	145	10	Reverse gullwing
	VSMY2941RGX01	940	8	160	5	Reverse gullwing
	VSMY2943RGX01	940	28	50	10	Reverse gullwing
Little Star	VSMY7850X01	850	60	200	15	
	VSMY7852X01	850	60	55	8	
PLCC-2	VSMB3940X01	940	60	13	15	
	VSMF970011X01	890	60	9	50	
	VSMF9700X01	890	60	8	50	
	VSMY3890X01	890	60	18	15	
	VSMY3940X01	940	60	15	10	
Side View	VSMB10940X01	940	75	1	15	
	VSMB11940X01	940	75	1	15	
	VSMB2943SLX01	940	25	20	15	
	VSMF2893SLX01	890	25	20	30	
	VSMY2853SLX01	850	28	50	10	
	VSMY2943SLX01	940	28	50	10	

PLCC-2

1.8 mm Surface-Mount

0805



Little Star®

Side View

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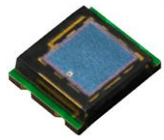
Photo Detectors

Vishay has the broadest portfolio of PIN photodiodes on the market. In addition to low capacitance, they provide high speed response, low noise, low dark current, and excellent sensitivity. Vishay also provides the industry's widest selection of phototransistors. Offered in more than 12 different packages, Vishay's phototransistors are exceptionally sensitive and simplify circuit design by eliminating the need for a separate amplifier.

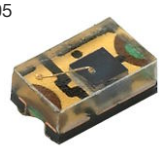
Package	Part Number	Peak Wavelength (nm)	Bandwidth $\lambda_{0.5}$ (nm)	Sensitivity I_{ra} (µA) (1)	Angle of Half Sensitivity (± °)	Photo Area (nm) (2)	Rise / Fall Time, t_r / t_f (ns) (2)	Remark
PIN PHOTODIODES								
Top View	TEMD5080X01	940	350 to 1100 (5)	60	65	7.5	40 (4)	
	TEMD5020X01	940	430 to 1100 (5)	35	65	4.4	100	
	TEMD5120X01	940	790 to 1050	35	65	4.4	100	
	TEMD5010X01	940	430 to 1100 (5)	55	65	7.5	100	
	TEMD5110X01	940	790 to 1050	55	65	7.5	100	
1.8 mm	VEMD2000X01	940	750 to 1050	12	15	0.23	100	Reverse gullwing
	VEMD2020X01	940	750 to 1050	12	15	0.23	100	Gullwing
	VEMD2500X01	900	350 to 1120 (5)	12	15	0.23	100	Reverse gullwing
	VEMD2520X01	900	350 to 1120 (5)	12	15	0.23	100	Gullwing
0805	TEMD7000X01	900	350 to 1120 (5)	3	60	0.23	100	
	TEMD7100X01	950	750 to 1050	3	60	0.23	100	
PHOTO TRANSISTORS								
1.8 mm	VEMT2000X01	860	790 to 970	6	15		2	Reverse gullwing
	VEMT2020X01	860	790 to 970	6	15		2	Gullwing
	VEMT2500X01	850	470 to 1090 (3)	6	15		2	Reverse gullwing
	VEMT2520X01	850	470 to 1090 (3)	6	15		2	Gullwing
0805	TEMT7000X01	850	470 to 1090 (3)	0.45	60		2	
	TEMT7100X01	870	750 to 1010	0.45	60		2	

Top View



1.8 mm Surface-Mount

0805



1.8 mm Surface-Mount

0805

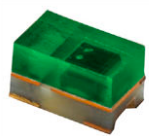
Notes: (1) Sensitivity: V_R = 5 V, E_e = 1 mW/cm², I = 950 nm; (2) Speed: R_L = 1 kΩ, I = 820 nm, V_R = 10 V; (3) V_R = 50 V, R_L = 50 Ω, I = 820 nm; (4) R_L = 50 Ω; (5) Bandwidth $\lambda_{0.1}$ (nm)

Ambient Light Sensors

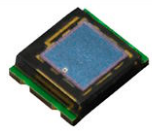
Ambient light sensors from Vishay enable headlights, display backlighting, and other automotive systems to sense and respond to light in ways similar to the human eye. With a unique, patent-pending filtering material, interference from infrared and ultraviolet light is virtually eliminated.

Package	Part Number	Peak Wavelength (nm)	Bandwidth $\lambda_{0.5}$ (nm)	Angle of Half Sensitvity (± °)	Light Current (1) Incandescent (µA)	Light Current (2) Fluorescent (µA)	Remark
PIN DIODES							
0805	TEMD6200FX01	540	430 to 610	60	0.04	0.03	Stand-off
1206	TEMD6010FX01	540	430 to 610	60	0.04	0.03	
Top View	TEMD5510FX01	540	430 to 610	65	1	0.7	
PHOTOTRANSISTORS							
0805	TEMT6200FX01	550	450 to 610	60	12	7	
1206	TEMT6000X01	570	430 to 800	60	50	21	

0805



Top View



1206

Notes: (1) Ev = 100 lx, V_{CE} = 5 V, CIE illuminant A, typical (2) Ev = 100 lx, V_{CE} = 5 V, e.g. Sylvania color abbrev. D830, typical

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Optical Sensors

Vishay offers interrupter sensors used for steering wheel sensors, radio and climate control knobs, and gear shift position sensors.

Part Number (1)(3)	Package		Gap (mm)	Aperture (mm)	Typical Output Current (mA)	On / Off Time t_{on} / t_{off} (µs)	Operating Temp Max.
	L x W (mm)	H (mm)					
TCPT1300X01	5.5 x 4.0	4.0	3.0	0.3	0.6	20 / 30	+105 °C
TCUT1300X01 (2)	5.5 x 4.0	4.0	3.0	0.3	0.6	20 / 30	+105 °C
TCPT1350X01	5.5 x 4.0	4.0	3.0	0.3	1.6	9 / 16	+125 °C
TCUT1350X01 (2)	5.5 x 4.0	4.0	3.0	0.3	1.6	9 / 16	+125 °C
TCPT1600X01	5.5 x 4.0	5.7	3.0	0.3	1.6	9 / 16	+105 °C
TCUT1600X01 (2)	5.5 x 4.0	5.7	3.0	0.3	1.6	9 / 16	+105 °C
TCUT1630X01 (3)	5.5 x 5.85	7.0	3.0	0.3	1.3	9 / 16	+105 °C
TCUT1800X01 (4)	5.5 x 5.85	7.0	3.0	0.3	1.3	9 / 16	+105 °C

Notes: (1) All optical sensors have phototransistor output (2) Dual channel (3) Triple channel (4) Quad channel

TCPT13x0X01

TCUT13x0X01

TCPT1600X01

TCUT1600X01

TCUT1630X01

TCUT1800X01

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Fully Integrated Proximity and Ambient Light Sensors

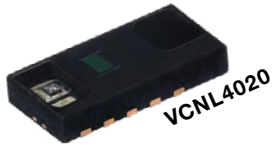
To simplify the design process, Vishay has integrated the infrared emitter, proximity photodiode, ambient light sensor, and signal processing IC in one package. Window design and sensor placement are no longer geometric puzzles and the need for mechanical cross-talk barriers is eliminated. Each sensor is a leadless surface-mount package with standard I²C communication and features an interrupt function. Interrupts reduce power consumption by eliminating polling traffic between the sensor and microcontroller.

Features and Benefits

- Low profile; height less than 0.83 mm
- 16-bit dynamic range
- Programmable emitter drive current
  - 10 mA to 200 mA (in 10 mA steps)
- Detection range up to 5 m
- Light sensing from 0.04 lux to 16 klux
- I²C Interface

Applications

- Display wake-up and touchscreen locking
- Backlight and contrast control for consumer and automotive displays
- Gesture recognition with two or three external emitters



Proximity Sensors

Part Number	Package		Integrated Components			Operating Temp. Range (°C)	AEC-Q101
	L x W (mm)	H (mm)	Infrared Emitter	Proximity Detector	Ambient Light Sensor		
VCNL4020X01	4.90 x 2.40	0.83	x	x	x	-40 to 105	x
VCNL4035X01	4.0 x 2.36	0.75	-	x	x	-40 to 105	x
VCNL4030X01	4.0 x 2.36	0.75	x	x	x	-40 to 105	x

Optocouplers

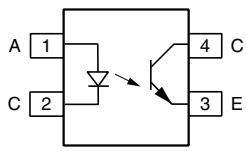
For signal transmission between two electrically separated circuits, Vishay offers automotive-qualified optocouplers with phototransistor output in small mini-flat packages. They feature a high current transfer ratio at low input current, low coupling capacitance, and high isolation voltage.

Features

- AEC-Q101 qualified
- High CTR with low input current
- Low power consumption
- SOP-4 low profile package
- High collector emitter voltage, V_{CEO} = 80 V
- Isolation voltage, V_{ISO} = 3750 V_{RMS}
- Low coupling capacitance

Applications

- Galvanic and noise isolation
- Signal transmission
- Hybrid / electric vehicle applications
- Battery management
- 48 V board net
- System control



Phototransistor Output

Part Number	Forward Current I_F (mA)	CTR min. (%)	CTR max. (%)	Package	V_{ISO} (V_{RMS})	Creepage (mm)	V_{CEO} (V)	Operating Temp. Range (°C)	Safety Standards
VOMA617A-X001T	5	50	600	SOP-4	3750	≥ 5	80	-40 to 110	UL, cUL, VDE, CQC
VOMA617A-3X001T		100	200						
VOMA617A-4X001T		160	320						
VOMA617A-8X001T		130	260						
VOMA618A-X001T	1	50	600						
VOMA618A-2X001T		63	125						
VOMA618A-3X001T		100	200						
VOMA618A-4X001T		160	320						
VOMA618A-8X001T		130	260						

Note: Additional options may be possible, please contact sales office

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AUTOMOTIVE GRADE OPTOELECTRONICS

Vishay Automotive Grade and AEC-Q101 Qualified Parts

LEDs

Vishay offers LEDs in a variety of surface-mount packages. Standard and power LEDs are offered in packages with standard PLCC-2 dimensions. MiniLED products feature a small white surface-mount package measuring just 2.3 mm (L) x 1.3 mm (W) x 1.4 mm (H) 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 Little Star®. The 1 W Little Star features footprint dimensions of 6 mm x 6 mm and a height profile of < 1.5 mm — even thinner than a typical PLCC-6 package with a 1.8 mm 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 provide a high level of reliability, which is crucial for automotive applications.

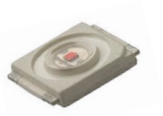

TELUX


0603


PLCC-2


MiniLED


PLCC-4


Little Star


Reverse Gullwing

TELUX

Part Number	Color	Dominant Wavelength (nm) or Color Coordinate (x, y)			Luminous Flux I_V			I_F for I_V (mA)	Forward Voltage V_F (V)		Angle of Half Intensity (± °)
		Min.	Typ.	Max.	Min.	Typ.	Max.		Typ.	Max.	
STANDARD											
TLWR7600	Red	611	618	634	1500	2800		70	2.2	2.67	30
TLWR7900	Red	611	618	634	1500	2800		70	2.2	2.67	45
TLWY7600	Yellow	585	592	597	1000	2800		70	2.1	2.67	30
TLWY7900	Yellow	585	592	597	1000	2800		70	2.1	2.67	45
POWER											
TLWR8600	Red	611	616	634	2000	3700		70	2.2	2.67	30
TLWR8900	Red	611	616	634	2000	3700		70	2.2	2.67	45
TLWR8901	Red	611	616	634	2000	3700	4800	70	2.2	2.67	45
TLWR8902	Red	611	616	634	3000	3900	4800	70	2.2	2.67	45
TLWY8600	Yellow	585	591	597	2000	3200		70	2.1	2.67	30
TLWY8900	Yellow	585	591	597	2000	3200		70	2.1	2.67	45
VLWB9600	Blue	462	470	476	800	1600		50	3.9	4.7	30
VLWB9900	Blue	462	470	476	800	1600		50	3.9	4.7	45
VLWR9630	Red	611	616	634	4000	8500	12 200	70	2.2	3.03	30
VLWR9930	Red	611	616	634	4000	8500	12 200	70	2.2	3.03	45
VLWR9931	Red	611	616	634	5000	8500	12 200	70	2.2	3.03	45
VLWR9932	Red	611	616	634	6000	9000	12 200	70	2.2	2.67	45
VLWR9933	Red	611	616	634	7000	9500	12 200	70	2.2	2.67	45
VLWTG9600	True green	509	520	535	2000	4000		50	3.9	4.7	30
VLWTG9900	True green	509	520	535	2000	4000		50	3.9	4.7	45
VLWY9630	Yellow	585	592	597	4000	8500	12 200	70	2.2	3.03	30
VLWY9930	Yellow	585	592	597	4000	8500	12 200	70	2.2	3.03	45
VLWY9932	Yellow	587	592	597	6000	9000	12 200	70	2.2	2.67	45

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AUTOMOTIVE GRADE OPTOELECTRONICS

Vishay Automotive Grade and AEC-Q101 Qualified Parts

SMD LEDs 0603

Part Number	Color	Dominant Wavelength (nm) or Color Coordinate (x, y)			Luminous Flux I_V			I_F for I_V (mA)	Forward Voltage V_F (V)		Angle of Half Intensity (± °)
		Min.	Typ.	Max.	Min.	Typ.	Max.		Typ.	Max.	
STANDARD											
TLMB1100	Blue		466		4	5		10	3.9	4.5	80
TLMG1100	Green	564	570	575	12.5	35		20	2.1	3	80
TLMO1100	Orange	600	606	609	50	80		20	2.1	3	80
TLMP1100	Pure green	551	561	566	6.3	15		20	2.1	3	80
TLMS1100	Red	627	633	639	32	63		20	2.1	3	80
TLMY1100	Yellow	580	589	595	50	80		20	2.1	3	80
VLMW11R2S2-5K8L	White		0.33, 0.33		140		280	10		4	80
LOW CURRENT											
TLMO1000	Soft orange	600	605	609	3.55	7.5		2	1.8	2.6	80
TLMS1000	Red	624	628	636	1.8	4		2	1.8	2.6	80
TLMY1000	Yellow	580	588	595	3.55	7.5		2	1.8	2.6	80
VLMY10J2K2-4	Yellow	585	588	590	5.6		11.25	2	1.8	2.6	80

SMD PLCC-2 Plus

Part Number	Color	Dominant Wavelength (nm) or Color Coordinate (x, y)			Luminous Intensity I_V			I_F for I_V (mA)	Forward Voltage V_F (V)		Angle of Half Intensity (± °)
		Min.	Typ.	Max.	Min.	Typ.	Max.		Typ.	Max.	
VLMK51Z1AA	Amber	610		621	4500	7100	9000	140	2.2	2.65	60
VLMR51Z1AA	Red	620		630	4500	7100	9000	140	2.2	2.65	60
VLMY51Z1AA	Yellow	585		594	4500	7100	9000	140	2.2	2.65	60

SMD PLCC-2 Plus White

Part Number	Color	Dominant Wavelength (nm) or Color Coordinate (x, y)	Luminous Flux Φ_V			I_F for Φ_V (mA)	Forward Voltage V_F (V)		Angle of Half Intensity (± °)
		Typ.	Min.	Typ.	Max.		Typ.	Max.	
VLMW51Q2R3	White	0.33, 0.33	30 600	40 000	51 700	150	3.4	4.1	60

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AUTOMOTIVE GRADE OPTOELECTRONICS

Vishay Automotive Grade and AEC-Q101 Qualified Parts

SMD LEDs Mini

Part Number	Color	Dominant Wavelength (nm) or Color Coordinate (x, y)			Luminous Intensity I_V			I_F for I_V (mA)	Forward Voltage V_F (V)		Angle of Half Intensity (± °)
		Min.	Typ.	Max.	Min.	Typ.	Max.		Typ.	Max.	
STANDARD											
VLME2302	Yellow	581	588	594	28	45	56	10	2	2.6	60
VLMG21J2L1	Green	562	572	575	5.6	11.5	14	10	2.1	2.8	60
VLMG21J2M1	Green	562	572	575	5.6	12	22.4	10	2.1	2.8	60
VLMG21K1L2	Green	562	572	575	7.1	12	18	10	2.1	2.8	60
VLMG21K2M1	Green	562	572	575	9	12.5	22.4	10	2.1	2.8	60
VLMO2100	Soft orange	598	605	611	3.55	7.3		10	2.1	3	60
VLMO21H2K1	Soft orange	598	605	611	3.55	7.3	9	10	2.1	3	60
VLMO21J2L1	Soft orange	598	605	611	5.6	7.3	14	10	2.1	3	60
VLMP23K2M2	Pure green	555	560	565	9		28	20	2.2	2.6	60
VLMP23L2M2	Pure green	555	560	565	14		28	20	2.2	2.6	60
VLMS2100	Red	624	628	636	2.8	7		10	2.1	3	60
VLMS21H2K1	Red	624	628	636	3.55	7	9	10	2.1	3	60
VLMS21H2L1	Red	624	628	636	3.55	7	14	10	2.1	3	60
VLMS21J2L1	Red	624	628	636	5.6	7	14	10	2.1	3	60
VLMY2100	Yellow	581	588	594	3.55	7.7		10	2.2	3	60
LOW CURRENT											
VLMK2000	Amber	612	622	624	7.1	16		2	1.8	2.2	60
VLMK20J2L1	Amber	612	622	624	5.6		14	2	1.8	2.2	60
VLMK20J2L2	Amber	612	622	624	5.6		18	2	1.8	2.2	60
VLMK20K1L2	Amber	612	622	624	7.1		18	2	1.8	2.2	60
VLMO20J2M1	Soft orange	598	605	611	5.6		22.4	2	1.8	2.2	60
VLMO20K2L2-35	Soft orange	602		609	9		18	2	1.8	2.2	60
VLMP20D2G1	Pure green	555		565	0.56		2.24	2	1.8	2.2	60
VLMS2000	Super red		630		2.24	4.5		2	1.8	2.2	60
VLMS20H2K1	Super red		630		3.55		9	2	1.8	2.2	60
VLMS20H2L1	Super red		630		3.55		14	2	1.8	2.2	60
VLMS20J2L1	Super red		630		5.6		14	2	1.8	2.2	60
VLMY2000	Yellow	581	588	594	3.55	7.1		2	1.8	2.2	60
VLMY20J1L2	Yellow	581	588	594	4.5		18	2	1.8	2.2	60
VLMY20K1L2	Yellow	581	588	594	7.1		18	2	1.8	2.2	60

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AUTOMOTIVE GRADE OPTOELECTRONICS

Vishay Automotive Grade and AEC-Q101 Qualified Parts

SMD LEDs Mini (continued)

Part Number	Color	Dominant Wavelength (nm) or Color Coordinate (x, y)			Luminous Intensity I_V			I_F for I_V (mA)	Forward Voltage V_F (V)		Angle of Half Intensity (± °)
		Min.	Typ.	Max.	Min.	Typ.	Max.		Typ.	Max.	
POWER											
VLME2300	Yellow	581	588	594	56	112		20	2	2.6	60
VLME23Q2T1	Yellow	581	588	594	90	170	355	20	2	2.6	60
VLME23R2T1	Yellow	581	588	594	140	190	355	20	2	2.6	60
VLMF2300	Soft orange	598	605	611	56	112		20	2	2.6	60
VLMF23Q2S1	Soft orange	598	605	611	90	180	224	20	2	2.6	60
VLMF23R2T1	Soft orange	598	605	611	140	180	355	20	2	2.6	60
VLMK2300	Super red		630		35.5	90		20	1.9	2.6	60
VLMK233U1AA	Amber	611	616	622	450	680	1400	20	2.1	2.6	60
VLMK234ABCA	Amber	611	616	622	1400	2500	3550	50	2.25	2.8	60
VLMK23P2R1	Red		630		56	120	140	20	1.9	2.6	60
VLMK23P2S1	Red		630		56	125	224	20	1.9	2.6	60
VLMK23R1S1	Red		630		112	130	224	20	1.9	2.6	60
VLMO233U1AA	Soft orange	600	605	611	450	760	1400	20	2.1	2.6	60
VLMO233U2V2-35	Soft orange	602	605	609	560	760	1120	20	2.1	2.6	60
VLMP232M2N2	Pure green	555	558	565	22.4		45	30	2.2	2.6	60
VLMP232M2P1	Pure green	555	558	565	22.4		56	30	2.2	2.6	60
VLMP232N1P1	Pure green	555	558	565	28		56	30	2.2	2.6	60
VLMR233T2V2	Red	619	625	631	355	650	1120	20	2	2.6	60
VLMR234ABCA	Red	619	625	631	1400	2000	3550	50	2.2	2.8	60
VLMS233T1V1	Super red	626	630	639	280	450	900	20	2	2.6	60
VLMS234V2BA	Super red	626	630	639	900	1400	2240	50	2.2	2.8	60
VLMY233T2V2	Yellow	583	589	594	355	650	1120	20	2.15	2.6	60
VLMY234ABCA	Yellow	583	589	594	1400	2000	3550	50	2.3	2.8	60
VLMS235S2U1	Super red	626	630	639	224	370	560	20	2.1	2.6	60
VLMR235T2V1	Red	619	625	631	355	520	900	20	2.1	2.6	60
VLMK235T2V1	Amber	611	616	622	355	550	900	20	2.0	2.6	60
VLMO235U1V2	Soft orange	600	605	611	450	650	1120	20	2.0	2.6	60
VLMO235U2V2	Soft orange	602	605	609	560	700	1120	20	2.0	2.6	60
VLMY235T2V1	Yellow	583	589	594	355	520	900	20	2.1	2.6	60

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AUTOMOTIVE GRADE OPTOELECTRONICS

Vishay Automotive Grade and AEC-Q101 Qualified Parts

SMD LEDs PLCC-2

Part Number	Color	Dominant Wavelength (nm) or Color Coordinate (x, y)			Luminous Intensity I_V			I_F for I_V (mA)	Forward Voltage V_F (V)		Angle of Half Intensity (± °)
		Min.	Typ.	Max.	Min.	Typ.	Max.		Typ.	Max.	
STANDARD											
VLMB31J2K2	Blue	458	466	472	5.6	10	11.2	10	3.9	4.5	60
VLMB31J2L2	Blue	458	466	472	5.6	10	18	10	3.9	4.5	60
VLMB31K2L2	Blue	458	466	472	9	10.5	18	10	3.9	4.5	60
VLMB41P1Q2	Blue	462	469	476	45	90	112	10	3.2	4.2	60
VLMB41P2Q2	Blue	462	469	476	56	90	112	10	3.2	4.2	60
VLMC3100	Green	562	572	575	0.71	1.6		2	1.9	2.4	60
VLMC3101	Green	562	572	575	1.12	1.6		2	1.9	2.4	60
VLMD3100	Red		648		11.2	22		10	1.8	2.2	60
VLMD3101	Red		648		18	23	45	10	1.8	2.2	60
VLMD3105	Red		648		11.2	22	28	10	1.8	2.2	60
VLMD31L2N1	Red		648		14	22	35.5	10	1.8	2.2	60
VLMD31L2P1	Red		648		14	22	56	10	1.8	2.2	60
VLMD31M2P1	Red		648		22.4	25	56	10	1.8	2.2	60
VLME3100	Yellow	581	588	594	28	75		10	2	2.6	60
VLME3101	Yellow	581	588	594	35.5	77	90	10	2	2.6	60
VLME3105	Yellow	581	588	594	56	80	140	10	2	2.6	60
VLME31Q2T1	Yellow	581	588	594	90	190	355	20	2	2.6	60
VLME31R1S2	Yellow	581	588	594	112	195	280	20	2	2.6	60
VLME31S1T1	Yellow	581	588	594	180	210	355	20	2	2.6	60
VLMF3100	Soft orange	598	605	611	28	90		10	2	2.6	60
VLMF31Q2T1	Soft orange	598	605	611	90	200	355	20	2	2.6	60
VLMF31S1T1	Soft orange	598	605	611	180	206	355	20	2	2.6	60
VLMG3100	Green	562	572	575	4.5	12		10	2.2	2.8	60
VLMG3102	Green	562	572	575	11.2	13.6	18	10	2.2	2.8	60
VLMG3105	Green	562	572	575	7.1	12	18	10	2.2	2.8	60
VLMG31K1L2	Green	562	572	575	7.1	12	18	10	2.2	2.8	60
VLMG31K1M2	Green	562	572	575	7.1	12	28	10	2.2	2.8	60
VLMG31L1M2	Green	562	572	575	11.2	13.7	28	10	2.2	2.8	60
VLMH3100	Amber	612	619	625	2.8	10		10	2	2.8	60
VLMH3101	Amber	612	619	625	4.5	8.7	11.2	10	2	2.8	60
VLMH3102	Amber	612	619	625	7.1	10.3	18	10	2	2.8	60
VLMK3100	Red		630		11.2	50		10	1.9	2.6	60
VLMK3102	Red		630		22.4	43	56	10	1.9	2.6	60
VLMK3105	Red		630		35.5	50	90	10	1.9	2.6	60

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AUTOMOTIVE GRADE OPTOELECTRONICS

Vishay Automotive Grade and AEC-Q101 Qualified Parts

SMD LEDs PLCC-2 (continued)

Part Number	Color	Dominant Wavelength (nm) or Color Coordinate (x, y)			Luminous Intensity I_v			I_F for I_v (mA)	Forward Voltage V_F (V)		Angle of Half Intensity (± °)
		Min.	Typ.	Max.	Min.	Typ.	Max.		Typ.	Max.	
STANDARD											
VLMK31Q1R2	Red		630		71	138	180	20	1.9	2.6	60
VLMK31R1S1	Red		630		112	142	224	20	1.9	2.6	60
VLMK31R1S2	Red		630		112	142	280	20	1.9	2.6	60
VLMK31R2S2	Red		630		140	160	280	20	1.9	2.6	60
VLMO3100	Soft orange	598	605	611	2.8	8		10	2	2.8	60
VLMO3101	Soft orange	598	605	611	4.5	8.6	11.2	10	2	2.8	60
VLMO31J1K2	Soft orange	598	605	611	4.5	8.6	11.2	10	2.2	2.8	60
VLMO31J1L2	Soft orange	598	605	611	4.5	8.6	18	10	2.2	2.8	60
VLMO31K1L2	Soft orange	598	605	611	7.1	9	18	10	2.2	2.8	60
VLMP3100	Pure green	555	560	565	1.12	4		10	2.1	2.8	60
VLMP3101	Pure green	555	560	565	1.8	3.4	4.5	10	2.1	2.8	60
VLMP3102	Pure green	555	560	565	2.8	3.8	5.6	10	2.1	2.8	60
VLMP31G2J1	Pure green	555	560	565	2.24	3.6	5.6	10	2.1	2.8	60
VLMP31G2J2	Pure green	555	560	565	2.24	3.6	7.1	10	2.1	2.8	60
VLMP31H2J2	Pure green	555	560	565	3.55	4.3	7.1	10	2.1	2.8	60
VLMPG31L1M2	Pure green	555	559	565	11.2	18	28	20	2	2.6	60
VLMR31Q2T1	Amber	612	618	624	90	160	355	20	2	2.4	60
VLMR31R2T1-34	Amber	616	620	624	140	160	355	20	2	2.4	60
VLMS3100	Red	624	630	636	2.8	7.1		10	2	2.6	60
VLMS3101	Red	624	630	636	4.5	7.8	11.2	10	2	2.6	60
VLMS31J1K2	Red	624	630	638	4.5	7.8	11.2	10	1.9	2.6	60
VLMS31J1L2	Red	624	630	638	4.5	7.8	18	10	1.9	2.6	60
VLMS31J2L1	Red	624	630	638	5.6	8	14	10	1.9	2.6	60
VLMS31K1L2	Red	624	630	638	7.1	8.5	18	10	1.9	2.6	60
VLMTG41S2U1	True green	515	530	541	224	380	560	10	3.2	4.2	60
VLMW41R1T1-5K8L	White		0.33, 0.33		112	275	355	10	3.3	4.2	60
VLMW41R1T1-7K8L	White		0.345, 0.352		112	275	355	10	3.3	4.2	60
VLMW41S1T1-5K8L	White		0.33, 0.33		180	275	355	10	3.3	4.2	60
VLMW41S1T1-8K8L	White		0.33, 0.33		180	275	355	10	3.3	4.2	60
VLMW41S1T2-5K5L	White		0.33, 0.33		180	275	450	10	3.3	4.2	60
VLMW41S1T2-5K6L	White		0.33, 0.33		180	275	450	10	3.3	4.2	60
VLMW41S1T2-6K6L	White		0.33, 0.33		180	275	450	10	3.3	4.2	60
VLMW41S1T2-6K7L	White		0.33, 0.33		180	275	450	10	3.3	4.2	60

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AUTOMOTIVE GRADE OPTOELECTRONICS

Vishay Automotive Grade and AEC-Q101 Qualified Parts

SMD LEDs PLCC-2 (continued)

Part Number	Color	Dominant Wavelength (nm) or Color Coordinate (x, y)			Luminous Intensity I_V			I_F for I_V (mA)	Forward Voltage V_F (V)		Angle of Half Intensity (± °)
		Min.	Typ.	Max.	Min.	Typ.	Max.		Typ.	Max.	
STANDARD											
VLMW41S1T2-7K8L	White		0.33, 0.33		180	275	450	10	3.3	4.2	60
VLMW41S1T2-8K8L	White		0.33, 0.33		180	275	450	10	3.3	4.2	60
VLMW41S1T2-JKKL	White		0.30, 0.28		180	275	450	10	3.3	4.2	60
VLMW41S1T2-JKPL	White		0.33, 0.33		180	275	450	10	3.3	4.2	60
VLMW41S1T2-KKLL	White		0.31, 0.30		180	275	450	10	3.3	4.2	60
VLMW41S1T2-LKML	White		0.32, 0.31		180	275	450	10	3.3	4.2	60
VLMW41S1T2-MKNL	White		0.33, 0.33		180	275	450	10	3.3	4.2	60
VLMW41S1T2-NKOL	White		0.34, 0.34		180	275	450	10	3.3	4.2	60
VLMW41S1T2-OKPL	White		0.35, 0.36		180	275	450	10	3.3	4.2	60
VLMW42T2U2-6K6L	White		0.32, 0.32		355	460	710	20	3.3	4.2	60
VLMW42T2V1-6K7L	White		0.32, 0.32		355	460	900	20	3.3	4.2	60
VLMW45R1S1-5K6L	White		0.33, 0.33		112	160	224	5	3.3	4.2	60
VLMY3100	Yellow	581	588	594	2.8	10		10	2.1	2.8	60
VLMY3101	Yellow	581	588	594	4.5	7.6	11.2	10	2.1	2.8	60
VLMY3102	Yellow	581	588	594	7.1	8.6	18	10	2.1	2.8	60
VLMY31J1K2	Yellow	581	588	594	4.5	7.6	11.2	10	2.1	2.8	60
VLMY31J1L2	Yellow	581	588	594	4.5	7.6	18	10	2.1	2.8	60
VLMY31J2K2	Yellow	581	588	594	5.6	7.8	11.2	10	2.1	2.8	60
VLMY31K1L2	Yellow	581	588	594	7.1	8.6	18	10	2.1	2.8	60
LOW CURRENT											
VLMA3100	Yellow	581	588	594	0.28	0.8		2	2.2	2.9	60
VLMB40L1M2-34	Blue	462	468	472	11.2	23	28	2	3.2	4.2	60
VLMO3000	Orange	600	605	609	5.6	16		2	1.8	2.2	60
VLMO30K1L2	Orange	600	605	609	7.1	15	18	2	1.8	2.2	60
VLMO30K1M2	Orange	600	605	609	7.1	16	28	2	1.8	2.2	60
VLMO30L1M2	Orange	600	605	609	11.2	16.5	28	2	1.8	2.2	60
VLMS3000	Super red	624	630	636	2.8	10		2	1.8	2.2	60
VLMS30J1K2	Super red	624	630	636	4.5	8.5	11.2	2	1.8	2.2	60
VLMS30J1L2	Super red	624	630	636	4.5	10	18	2	1.8	2.2	60
VLMS30J2K2	Super red	624	630	636	5.6	8.5	11.2	2	1.8	2.2	60
VLMS30K1L2	Super red	624	630	636	7.1	10.5	18	2	1.8	2.2	60
VLMS30K2L2	Super red	624	630	636	9	12	18	2	1.8	2.2	60
VLMT3100	Red	612	618	625	0.28	1.1		2	2.2	2.9	60
VLMY3000	Yellow	581	587	594	4.5	11.6		2	1.8	2.2	60

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AUTOMOTIVE GRADE OPTOELECTRONICS

Vishay Automotive Grade and AEC-Q101 Qualified Parts

SMD LEDs PLCC-2 (continued)

Part Number	Color	Dominant Wavelength (nm) or Color Coordinate (x, y)			Luminous Intensity I_V			I_F for I_V (mA)	Forward Voltage V_F (V)		Angle of Half Intensity (± °)
		Min.	Typ.	Max.	Min.	Typ.	Max.		Typ.	Max.	
LOW CURRENT											
VLMY30J2L1	Yellow	581	587	594	5.6	10.6	14	2	1.8	2.2	60
VLMY30J2M1	Yellow	581	587	594	5.6	11.6	22.4	2	1.8	2.2	60
VLMY30K2M1	Yellow	581	587	594	9	12.3	22.4	2	1.8	2.2	60
VLMYG30H2K1	Yellow green	566	574	575	3.55	4.2	9	2	1.9	2.2	60
POWER											
VLMK333U2AB	Amber	611	616	622	560	850	1800	20	2.1	2.6	60
VLMK334BACB	Amber	611	616	622	1800	2800	4500	50	2.25	2.8	60
VLMK33Q2T1	Amber	611	617	622	90	275	355	20	1.9	2.5	60
VLMK33R1S2	Amber	611	617	622	112	250	280	20	1.9	2.5	60
VLMK33S1T1	Amber	611	617	622	180	275	355	20	1.9	2.5	60
VLMO333U2AB	Soft orange	600	605	611	560	950	1800	20	2.1	2.6	60
VLMO33R2U2	Soft orange	600	605	611	140	470	710	30	2	2.5	60
VLMO33S1T2	Soft orange	600	605	611	180	327	450	30	2	2.5	60
VLMO33T1U2	Soft orange	600	605	611	280	470	710	30	2	2.5	60
VLMPG33N1P2	Pure green	555	560	565	28	42	71	30	2	2.5	60
VLMR333U1AA	Red	619	625	631	450	750	1400	20	2	2.6	60
VLMR334BACB	Red	619	625	631	1800	2200	4500	50	2.2	2.8	60
VLMR33R2U2	Amber	611	617	622	140	450	710	30	2	2.5	60
VLMR33T1U2	Amber	611	617	622	280	450	710	30	2	2.5	60
VLMS333T2V2	Super red	626	630	639	355	550	1120	20	2	2.6	60
VLMS334AABB	Super red	626	630	639	1120	1600	2800	50	2.2	2.8	60
VLMS33S1T2	Super red	626	630	638	180	290	450	30	2	2.5	60
VLMS33S1U1	Super red	626	630	638	180	290	560	30	2	2.5	60
VLMW33S2V1-5K8L	White		0.33, 0.33		224	635	900	20	3.7	4.2	60
VLMW33T2AA-5K8L	White		0.33, 0.33		355	635	1400	20	3.7	4.2	60
VLMW33T2U2-5K8L	White		0.33, 0.33		355	615	710	20	3.7	4.2	60
VLMW33U2AA-5K8L	White		0.33, 0.33		560	650	1400	20	3.7	4.2	60
VLMY333U1AA	Yellow	583	589	594	450	750	1400	20	2.15	2.6	60
VLMY334BACB	Yellow	583	589	594	1800	2300	4500	50	2.3	2.8	60
VLMY33R2U2	Yellow	583	588	594	140	425	710	30	2	2.5	60
VLMY33T1U2	Yellow	583	588	594	280	425	710	30	2	2.5	60
VLMYG33P1Q2	Yellow green	566	570	577	45	90	112	30	2	2.5	60

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AUTOMOTIVE GRADE OPTOELECTRONICS

Vishay Automotive Grade and AEC-Q101 Qualified Parts

SMD LEDs PLCC-4

Part Number	Color	Dominant Wavelength (nm) or Color Coordinate (x, y)			Luminous Intensity I_V			I_F for I_V (mA)	Forward Voltage V_F (V)		Angle of Half Intensity (± °)
		Min.	Typ.	Max.	Min.	Typ.	Max.		Typ.	Max.	
RGB											
VLMRGB343-ST-UV-RS	Red	618	625	628	140		285	20	1.8	2.45	60
	True green	521	526	536	285		560	20	3.7	4.25	60
	Blue	465	470	475	100		200	20	3.6	4.25	60
BI-COLOR											
VLMRY3420	Yellow	581	588	594	560		1120	50	2.1	2.6	60
	Amber		617		355		900	50	2.1	2.6	60
VLMSY3420	Red		630		224		900	50	2.1	2.6	60
	Yellow	581	588	594	280		1120	50	2.1	2.6	60
POWER											
VLMK322U1V2	Amber	610		621	450	750	1125	50	1.9	2.6	60
VLMK32ABBB	Amber	610		621	1400		2850	50		3.03	60
VLMO322U1V2	Soft orange	600	605	612	450	750	1125	50	2.1	2.6	60
VLMPG32P1Q1	Pure green	555.5		564.5	45		90	50	2.1	2.6	60
VLMR32ABBB	Red	620		630	1400		2800	50	2.2	2.8	60
VLMS322T2V1	Super red	625	630	640	355	450	900	50	2.1	2.6	60
VLMY322U1V2	Yellow	582	588	594	450	750	1125	50	2.1	2.6	60
VLMY32ABBB	Yellow	585	588	594	1400		2850	50		3.03	60

SMD LEDs PLCC-6

Part Number	Color	Dominant Wavelength (nm) or Color Coordinate (x, y)			Luminous Intensity I_V			I_F for I_V (mA)	Forward Voltage V_F (V)			Angle of Half Intensity (± °)
		Min.	Typ.	Max.	Min.	Typ.	Max.		Min.	Typ.	Max.	
RGB												
VLMRGB6112-00	Red	618	624	629	560	730	920	20	1.8	2.0	2.4	60
	True green	519	536	534	900	1030	1800	20	2.7	3.1	3.6	60
	Blue	463	469	476	180	230	450	20	2.7	3.0	3.6	60

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AUTOMOTIVE GRADE OPTOELECTRONICS

Vishay Automotive Grade and AEC-Q101 Qualified Parts

SMD LEDs Little Star

Part Number	Color	Dominant Wavelength (nm) or Color Coordinate (x, y)			Luminous Intensity I_V		I_F for I_V (mA)	Forward Voltage V_F (V)	Angle of Half Intensity (± °)
		Min.	Typ.	Max.	Min.	Max.		Max.	
POWER									
VLMK71ABAD	Amber	610	620	9000	18 000	400	2.8	60	60
VLMR71AAAC	Red	620	630	7150	14 000	400	2.8	60	60
VLMY71AAAC	Yellow	585	597	7150	14 000	400	2.8	60	60

Reverse Gullwing

Part Number	Color	Dominant Wavelength (nm) or Color Coordinate (x, y)			Luminous Intensity I_V		I_F for I_V (mA)	Forward Voltage V_F (V)		Angle of Half Intensity (± °)
		Min.	Typ.	Max.	Min.	Max.		Typ.	Max.	
STANDARD										
VLRE31R1S2	Yellow	581	588	594	112	285	20	2.1	2.3	60
VLRK31Q1R2	Red	620	630	635	71	180	20	2.1	2.3	60
VLRK31R1S2	Red	620	630	635	112	285	20	2.1	2.3	60

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