

Infrared Emitters, Photo Detectors, and Optical Sensors



Infrared Emitters

PIN Photo Diodes

Phototransistors

Reflective Sensors – Analog

Transmissive Sensors – Analog

Ambient Light Sensors

Fully Integrated Proximity and Ambient Light Sensors

RESOURCES

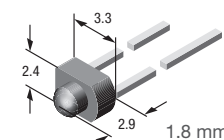
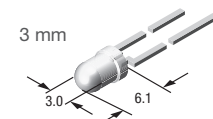
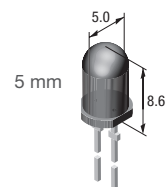
- Optical sensors product portfolio <http://www.vishay.com/optical-sensors/>
- Infrared emitters product portfolio <http://www.vishay.com/ir-emitting-diodes/>
- Photo detectors product portfolio <http://www.vishay.com/photo-detectors/>
- Optoelectronics complete product portfolio <http://www.vishay.com/optoelectronics/>
- Technical support:
 - emittertechsupport@vishay.com
 - sensortechsupport@vishay.com
 - detectortechsupport@vishay.com
- Sales contacts: <http://www.vishay.com/doc?99914>



Infrared Emitters

Vishay offers emitters in more wavelengths than any other supplier: 830 nm, 850 nm, 870 nm, 890 nm, 940 nm, and 950 nm. Providing fast rise and fall response times, Vishay also has the broadest selection of double hetero infrared emitters. They are the highest-power infrared emitters with the lowest forward voltages on the market and ideal for high-current applications. The latest surface emitter technology based devices, which provide highest radiant intensities, round up our extensive IR emitter portfolio.

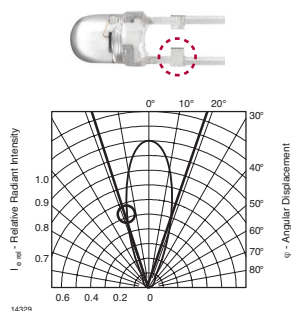
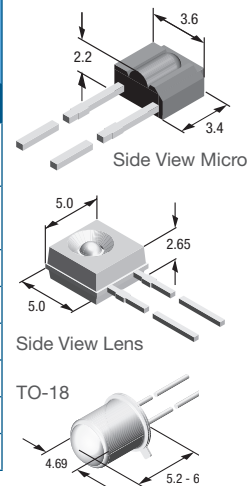
Package	Part Number	Peak Wavelength (nm)	Angle of Half Intensity (+/-°)	Radiant Intensity, I_e (mW/sr) ⁽¹⁾	Rise and Fall Time, t_r/t_f (ns)	Remark
Through-Hole Packages						
5mm	TSAL6100	940	10	170	15	No stand-off
	TSAL6200	940	17	72	15	No stand-off
	TSAL6400	940	25	50	15	No stand-off
	TSFF5210	870	10	180	15	Stand-off
	TSFF5410	870	22	70	15	Stand-off
	TSFF5510	870	38	32	15	Stand-off
	TSFF6210	870	10	180	15	No stand-off
	TSFF6410	870	22	70	15	No stand-off
	TSHA5203	875	12	65	600	Stand-off
	TSHA5500	875	24	30	600	Stand-off
	TSHA6203	875	12	65	600	No stand-off
	TSHA6500	875	24	30	600	No stand-off
	TSHF5210	890	10	180	30	Stand-off
	TSHF5410	890	22	70	30	Stand-off
	TSHF6210	890	10	180	30	No stand-off
	TSHF6410	890	22	70	30	No stand-off
	TSHG5210	850	10	230	20	Stand-off
	TSHG5410	850	18	90	20	Stand-off
	TSHG5510	830	38	32	15	Stand-off
	TSHG6200	850	10	180	20	No stand-off
	TSHG6210	850	10	230	20	No stand-off
	TSHG6400	850	22	70	20	No stand-off
	TSHG6410	850	18	90	20	No stand-off
	TSHG8200	830	10	180	20	No stand-off
	TSHG8400	830	22	70	20	No stand-off
	TSUS5202	950	15	30	800	Stand-off
	TSUS5402	950	22	20	800	Stand-off
	TSUS6402	950	22	30	800	
	VSLY5850	850	3	600	10	Stand-off
	VSLY5940	940	3	600	10	Stand-off
3 mm	TSAL4400	940	25	30	800	No stand-off
	TSHA4400	875	20	20	600	No stand-off
	TSUS4300	950	16	18	800	No stand-off
	TSUS4400	950	18	15	800	No stand-off
	VSLB3940	940	22	65	15	No stand-off
	VSLB3948	940	22	65	15	No stand-off
1.8 mm	CQY36N	950	55	1.50	800	No stand-off
	CQY37N	950	12	5	800	No stand-off



Infrared Emitters (continued)

Package	Part Number	Peak Wavelength (nm)	Angle of Half Intensity (+/-°)	Radiant Intensity, I_e (mW/sr) ⁽¹⁾	Rise and Fall Time, t_r/t_f (ns)	Remark
Through-Hole Packages						
Side View Micro	TSSS2600	950	25H, 65V	2.6	800	No stand-off
Side View Lens	TSKS5400S	950	30	4.5	800	No stand-off
TO-18	TSTA7100	875	5	50	600	No stand-off
	TSTA7300	875	12	20	600	No stand-off
	TSTA7500	875	30	6	600	No stand-off
	TSTS7100	950	5	18	800	No stand-off
	TSTS7300	950	12	6	800	No stand-off
	TSTS7500	950	30	1.6	800	No stand-off

(1) $I_e = 100$ mA



Stand-Off

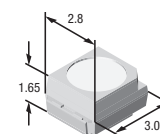
To control the height of the emitter when inserted into the PCB for soldering, some leaded emitters and photo detectors feature a standoff option (shown at left). The stand off is the tab on the leads. It is sometimes called a stopper.

Angle of Half Intensity, $\varphi_{0.5}$ or θ

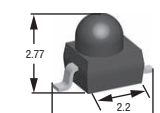
In a radiation diagram, the angle within which the radiant intensity is greater than or equal to half of the maximum intensity. In Vishay datasheets, the symbol $\varphi_{0.5}$ is most commonly used for the angle of half intensity. For visible LEDs this is sometime called the viewing angle. There is still light, be it infrared or visible, outside of this angle.

Infrared Emitters (continued)

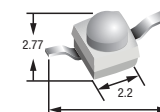
Package	Part Number ⁽²⁾	Peak Wavelength (nm)	Angle of Half Intensity (+/-°)	Radiant Intensity, I _e (mW/sr) ⁽¹⁾	Rise and Fall Time, t _r /t _f (ns)	Remark
Surface-Mount Packages						
PLCC-2	VSMB3940X01	940	60	13	15	
	VSMY3940X01	940	60	15	10	
	VSMF3710	890	60	10	30	
	VSMF4710	870	60	10	15	
	VSMF4720	870	60	16	15	
	VSMF9700	800	60	8	50	
	VSMF970011X01	890	60	9	50	
	VSMG2700	830	60	10	20	
	VSMG2720	830	60	14	20	
	VSMG3700	850	60	10	20	
	VSML3710	940	60	6	800	
	VSMS3700	950	60	4.5	800	
	VSMY3850	850	60	17	10	
	VSMY385010	850	60	9	10	I _F = 70 mA
1.8 mm	VSMY2850RG, -G	850	10	100	10	
	VSMG2000X01, -2020X01	850	12	40	20	
	VSMG285011RG, -G	850	12	40	20	
	VSMY2853RG, -G	850	28	35	10	
	VSMF2890RGX01, -GX01	890	12	40	30	
	VSMF2893RGX01, -GX01	890	25	20	30	
	VSMB294008RG, -G	940	7	60	15	
	VSMY2940RG, -G	940	10	120	10	
	VSMB2000X01, -2020X01	940	12	40	15	
	VSMB2943RGX01, -GX01	940	25	20	15	
	VSMB2948RG, -G	940	25	20	15	
	VSMY2943RG, -G	940	28	35	10	
	VSMY294310RG, -G	940	25	25	10	I _F = 70 mA
	VSMY2853SL	850	28	35	10	
1.8 mm Side View	VSMF2893SLX01	890	25	20	30	
	VSMB2943SLX01	940	25	20	15	Max pulse current: 1A
	VSMB2948SL	940	25	20	15	Max pulse current: 500mA
	VSMY294310SL	940	25	32	10	I _F = 70 mA
	VSMY2943SL	940	28	35	10	
	VSMY1940X01	940	60	10	10	
0805	VSMB1940X01	940	60	6	15	
	VSMY1850	850	60	12	10	
Little Star®	VSMY7850X01	850	60	170	18	I _F = 1.0 A
	VSMY7852X01	850	60	42	10	I _F = 250 mA



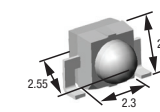
PLCC-2



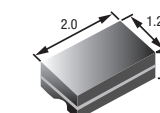
1.8 mm Gullwing



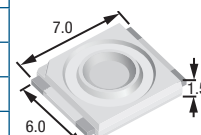
1.8 mm Reverse Gullwing



1.8 mm Side View



0805



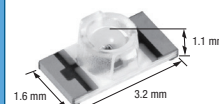
Little Star

(1) I_F = 100 mA unless otherwise stated (2) Products ending in "X01" are AEC Q101 qualified

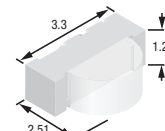
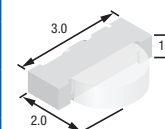


Inner Lens PCB

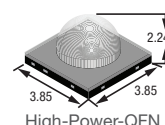
Package	Part Number ⁽²⁾	Peak Wavelength (nm)	Angle of Half Intensity (+/-°)	Radiant Intensity, I _e (mW/sr) ⁽¹⁾	Rise and Fall Time, t _r /t _f (ns)	Remark
Surface-Mount Packages						
Inner Lens PCB	VSMY12850	850	40	16	10	I _F = 70 mA
	VSMY12940	940	40	16	10	I _F = 70 mA
SMD SV ultra wide view	VSMB10940	940	75	1	15	I _F = 20 mA
	VSMB10940X01	940	75	1	15	I _F = 20 mA
	VSMB11940X01	940	75	1	15	I _F = 20 mA
	VSMG10850	850	75	1	15	I _F = 20 mA
SMD SV	VSMB14940	940	9	35	15	I _F = 70 mA
	VSMY14940	940	9	35	15	I _F = 70 mA
	VSMB14942	940	16	26	15	side view
High-power QFN	VSMY98545	850	45	350	15	I _F = 1.0 A
	VSMY98545DS	850	45	600	30	I _F = 1.0 A



Inner Lens PCB


SMD SV
Ultra Wide View


SMD SV



High-Power-QFN

(1) I_F = 100 mA unless otherwise stated (2) Products ending in "X01" are AEC Q101 qualified

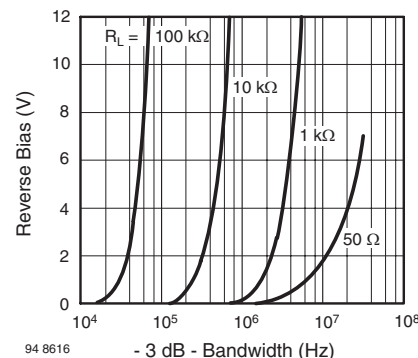
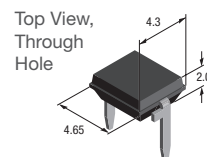
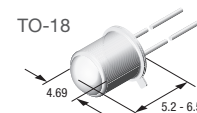
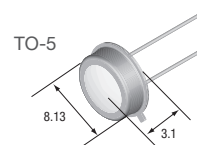
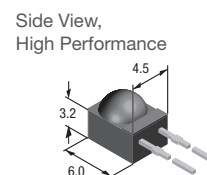
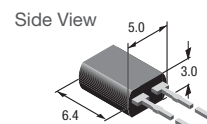
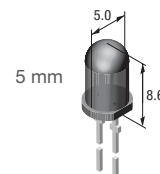
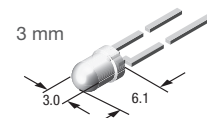
PIN Photo Diodes

Vishay has the broadest portfolio of PIN photodiodes on the market. With lower capacitance, they provide high-speed response, low noise and low dark current along with excellent sensitivity. They are ideal for high-speed data transfer, light barriers, alarm systems, and linear light measurement.

Package	Part Number	Peak Wave length (nm)	Bandwidth $\lambda_{0.5}$ (nm)	Sensitivity I_{ra} (μA) ⁽¹⁾	Angle of Half Sensitivity (+/- °)	Photo Area (mm)	Rise/Fall Time, t_r/t_f (ns) ⁽²⁾	Remark
Through-Hole Packages								
3 mm	TEFD4300	950	350 to 1120	17	20	0.23	100	
	TEFD4300F	950	770 to 1070	17	20	0.23	100	
5 mm	BPV10	920	380 to 1140 ⁽⁷⁾	70	20	0.78	2,5 ⁽³⁾	Stand-off
	BPV10NF	940	790 to 1050	60	20	0.78	2,5 ⁽³⁾	Stand-off
Side View	BPW41N	950	870 to 1050	45	65	7.5	100	5 x 4 x 6.8
	BPW46 (L)	900	430 to 1100 ⁽⁷⁾	50	65	7.5	100	5 x 3 x 6.4
	BPW82	950	790 to 1050	45	65	7.5	100	5 x 4 x 6.8
	BPW83	950	790 to 1050	45	65	7.5	100	5 x 3 x 6.4
Side View High Performance	BPV22F	950	870 to 1050	80	60	7.5	100	
	BPV22NF	940	790 to 1050	85	60	7.5	100	
	BPV23F	950	870 to 1050	63	60	4.4	70	
	BPV23NF	940	790 to 1050	65	60	4.4	70	
TO-5	BPW20RF	920	400 to 1100 ⁽⁷⁾	42	50	7.5	3600 ⁽⁶⁾	
TO-18	BPW24R	900	430 to 1100 ⁽⁷⁾	60	12	0.78	7 ⁽⁴⁾⁽⁵⁾	
Top View Leaded	BP104	950	870 to 1050	45	65	7.5	100	
	BPW34	900	430 to 1100 ⁽⁷⁾	55	65	7.5	100	

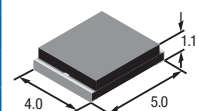
Notes: (1) Sensitivity: $V_R = 5\text{ V}$, $E_o = 1\text{ mW/cm}^2$, $\lambda = 950\text{ nm}$; (2) Speed: $R_L = 1\text{ k}\Omega$, $\lambda = 820\text{ nm}$, $V_R = 10\text{ V}$, (3) $V_R = 50\text{ V}$, $R_L = 50\text{ }\Omega$, $\lambda = 820\text{ nm}$; (4) $R_L = 50\text{ }\Omega$; (5) $V_R = 20\text{ V}$; (6) $V_R = 0\text{ V}$ (7) Bandwidth $\lambda_{0.1}$ (nm)

Rise and Fall Time: Switching times of photo detectors are strongly dependent on the measurement conditions. Shown in the diagrams are two major conditions: the reverse bias and the value of the load resistor used in the circuit. The switching time of a photo diode varies by two orders of magnitude when the load resistor value changes from $50\text{ }\Omega$ to $10\text{ k}\Omega$. The lower the value of the load resistor, the faster the diode becomes. Also, the higher the reverse bias, the faster the switching times.

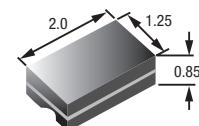


PIN Photo Diodes (continued)

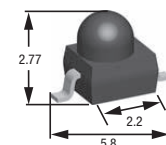
Package	Part Number ⁽⁵⁾	Peak Wave length (nm)	Bandwidth $\lambda_{0.5}$ (nm)	Sensitivity I_{RE} (μA) ⁽¹⁾	Angle of Half Sensitivity (+/-°)	Photo Area (mm^2)	Rise/Fall Time, t_r/t_f (ns) ⁽²⁾	Remark
Surface-Mount Packages								
Top View	TMD5080X01	940	350 to 1100 ⁽⁴⁾	60	65	7.5	40 ⁽⁴⁾	AEC-Q101
	TMD5020X01	940	430 to 1100 ⁽⁴⁾	35	65	4.4	100	AEC-Q101
	TMD5120X01	940	790 to 1050	35	65	4.4	100	AEC-Q101
	TMD5010X01	940	430 to 1100 ⁽⁴⁾	55	65	7.5	100	AEC-Q101
	TMD5110X01	940	790 to 1050	55	65	7.5	100	AEC-Q101
	VBP104S	940	430 to 1100 ⁽⁴⁾	35	65	4.4	100	Gullwing
	VBP104SR	940	430 to 1100 ⁽⁴⁾	35	65	4.4	100	Reverse gullwing
	VBP104FAS	950	780 to 1050	35	65	4.4	100	Gullwing
	VBP104FASR	950	780 to 1050	35	65	4.4	100	Reverse gullwing
	VBPW34S	940	430 to 1100 ⁽⁴⁾	55	65	7.5	100	Gullwing
	VBPW34SR	940	430 to 1100 ⁽⁴⁾	55	65	7.5	100	Reverse gullwing
	VBPW34FAS	950	780 to 1050	55	65	7.5	100	Gullwing
	VBPW34FASR	950	780 to 1050	55	65	7.5	100	Reverse gullwing
1206	VEMD6010X01	900	430 to 1100	9.5	60	0.85	100	
	VEMD6110X01	950	750 to 1050	9.5	60	0.85	100	
QFN	VEMD5010X01	940	430 to 1100	48	65	7.5	100	
	VEMD5110X01	940	790 to 1050	48	65	7.5	100	
0805	TMD7000X01	900	350 to 1120 ⁽⁴⁾	3	60	0.23	100	
	TMD7100X01	950	750 to 1050	3	60	0.23	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 ⁽⁴⁾	12	15	0.23	100	Reverse gullwing
	VEMD2520X01	900	350 to 1120 ⁽⁴⁾	12	15	0.23	100	Gullwing
	VEMD2503X01	900	350 to 1120 ⁽⁴⁾	10	30	0.23	100	Reverse gullwing
	VEMD2523X01	900	350 to 1120 ⁽⁴⁾	10	30	0.23	100	Gullwing
	VEMD2003X01	940	750 to 1050	10	30	0.23	100	Reverse gullwing
	VEMD2023X01	900	750 to 1050	10	30	0.23	100	Gullwing
1.8 mm Side View	VEMD2523SLX01	900	350 to 1120 ⁽⁴⁾	10	30	0.23	100	
	VEMD2023SLX01	940	750 to 1050	10	30	0.23	100	
SMD SV ultra wide view	VEMD10940F	920	780 to 1050	3	75	0.23	100	side view
	VEMD10940FX01	950	790 to 1070	3	75	0.23	1000	side view
	VEMD11940FX01	950	780 to 1050	1.13	75	0.053	1000	side view



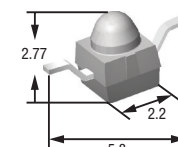
Top View, Surface-Mount



0805



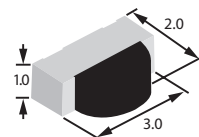
1.8 mm Gullwing



1.8 mm Reverse Gullwing



1.8 mm Side View



SMD SV ultra wide view

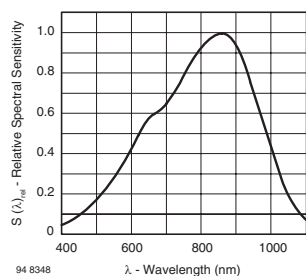
Notes: (1) Sensitivity: $V_R = 5\text{ V}$, $E_g = 1\text{ mW/cm}^2$, $\lambda = 950\text{ nm}$; (2) Speed: $R_L = 1\text{ k}\Omega$, $\lambda = 820\text{ nm}$, $V_R = 10\text{ V}$, (3) $R_L = 50\text{ }\Omega$; (4) Bandwidth $\lambda_{0.5}$ (nm) (5) Products ending in "X01" are AEC-Q101 qualified

Phototransistors

Vishay provides the industry's widest selection of phototransistors. Offered in over 10 different packages, Vishay's phototransistors are exceptionally sensitive and simplify circuit design by eliminating the need for a separate amplifier.

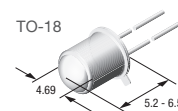
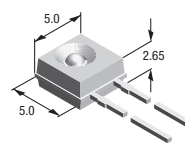
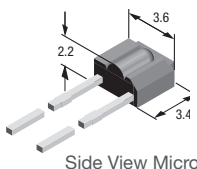
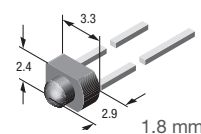
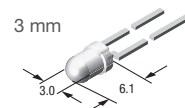
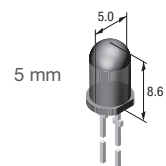
Package	Part Number	Peak Wave-length (nm)	Bandwidth $\lambda_{0.5}$ (nm)	Collector Light Current, I_{ca} (mA) ⁽¹⁾	Angle of Half Sensitivity (+/-°)	Rise and Fall Time, t_r/t_f (μs) ⁽²⁾	Remark
Through-Hole Packages							
5 mm	BPV11	850	450 to 1080 ⁽³⁾	10	15	6	With base pin
	BPV11F	930	900 to 980	9	15	6	With base pin
	BPW96C	850	450 to 1080 ⁽³⁾	8	20	2	Stand-off
3 mm	BPW85C	850	450 to 1080 ⁽³⁾	5	25	2	Stand-off
	TEFT4300	925	875 to 1000	3.2	30	2	No stand-off
1.8 mm	BPW16N	825	450 to 1040 ⁽³⁾	0.14	40	4.8	
	BPW17N	825	450 to 1040 ⁽³⁾	1	12	4.8	
Side View Micro	TEST2600	920	850 to 980	2.5	30H, 60V	6	
Side View Lens	TEKT5400S	920	850 to 980	4	37	6	
TO-18	BPW76B	850	450 to 1080 ⁽³⁾	1.2	40	6	
	BPW77NB	850	450 to 1080 ⁽³⁾	20	10	6	

Notes: (1) Collector light current: $V_{CE} = 5$ V, $E_e = 1$ mW/cm², $\lambda = 950$ nm, typical (2) Speed: $V_s = 5$ V, $I_c = 5$ mA, $R_L = 100$ Ω (3) Bandwidth $\lambda_{0.1}$ (nm)



Bandwidth: $\lambda_{0.5}$ and $\lambda_{0.1}$

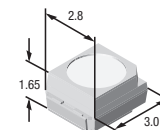
The diagram to the left shows the relative spectral sensitivity of the BPV11 phototransistor. The peak sensitivity is found at 850 nm. The bandwidth of the detector can be defined by using a relative spectral sensitivity value of 0.5 or 0.1. Vishay datasheets will show one of these values. In the case of the BPV11, the bandwidth in the datasheet is 450 nm to 1080 nm, $\lambda_{0.1}$.



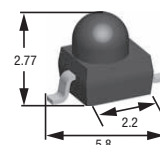
Phototransistors (continued)

Package	Part Number ⁽⁴⁾	Peak Wave-length (nm)	Bandwidth $\lambda_{0.5}$ (nm)	Collector Light Current, I_{ca} (mA) ⁽¹⁾	Angle of Half Sensitivity (+/- °)	Rise and Fall Time, t_r/t_f (μs) ⁽²⁾	Remark
Surface-Mount Packages							
PLCC-2	VEMT3700	850	450 to 1080 ⁽³⁾	0.5	60	2	
	VEMT3700F	940	850 to 1050	0.5	60	2	
	VEMT4700	850	450 to 1080 ⁽³⁾	0.5	60	2	With base pin
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
	VEMT2503X01	860	470 to 1090 ⁽³⁾	4	30	10	Reverse gullwing
	VEMT2523X01	860	470 to 1090 ⁽³⁾	4	30	10	Gullwing
	VEMT2003X01	860	790 to 970	4	30	10	Reverse gullwing
	VEMT2023X01	860	790 to 970	4	30	10	Gullwing
1.8 mm Side View	VEMT2523SLX01	850	470 to 1090 ⁽³⁾	4	30	10	
	VEMT2023SLX01	860	790 to 970	4	30	10	
0805	TEMT7000X01	850	470 to 1090 ⁽³⁾	0.45	60	2	
	TEMT7100X01	870	750 to 1010	0.45	60	2	

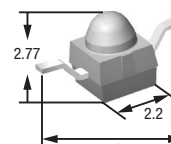
Notes: (1) Collector light current: $V_{CE} = 5\text{ V}$, $E_o = 1\text{ mW/cm}^2$, $\lambda = 950\text{ nm}$, typical (2) Speed: $V_s = 5\text{ V}$, $I_c = 5\text{ mA}$, $R_L = 100\ \Omega$
(3) Bandwidth $\lambda_{0.1}$ (nm) (4) Products ending in "X01" are AEC-Q101 qualified



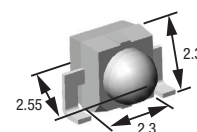
PLCC-2



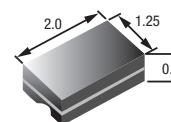
1.8 mm Gullwing



1.8 mm Reverse Gullwing



1.8 mm Side View



0805

Reflective Sensors, Analog Output

Part Number ⁽¹⁾⁽³⁾	Package		Peak Operating Range ⁽²⁾ (mm)	Peak Operating Distance (mm)	Typical Output Current (mA)
	L x W (mm)	H (mm)			
TCND5000⁽³⁾	6.0 x 4.3	3.75	2 to 25	6.0	0.0015
TCRT1000/1010	7.0 x 4.0	2.5	0.2 to 4.0	1.0	0.5
TCRT5000(L)	10.2 x 5.8	7.0	0.2 to 15	2.5	1
CNY70	7.0 x 7.0	6.0	0 to 5.0	0	1

Notes: ⁽¹⁾ All optical sensors have phototransistor output except where noted

⁽²⁾ Relative collector current > 20 %

⁽³⁾ TCND5000 has a PIN photodiode output


TCND5000

TCRT1000

TCRT1010

TCRT5000(L)

CNY70

Transmissive Sensors, Analog Output

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
TCST1030	8.3 x 4.7	8.15	3.1	none	2.4	15 / 10	+85 °C
TCST1103	11.9 x 6.3	10.8	3.1	1.0	4.0	10 / 8	+85 °C
TCST1202	11.9 x 6.3	10.8	3.1	0.5	2.0	10 / 8	+85 °C
TCST1230	9.2 x 4.8	5.4	2.8	0.5	2.0	15 / 10	+85 °C
TCST1300	11.9 x 6.3	10.8	3.1	0.25	0.5	10 / 8	+85 °C
TCST2103	24.5 x 6.3	10.8	3.1	1.0	4.0	10 / 8	+85 °C
TCST2202	24.5 x 6.3	10.8	3.1	0.5	2.0	10 / 8	+85 °C
TCST2300	24.5 x 6.3	10.8	3.1	0.25	0.5	10 / 8	+85 °C
TCST5250	14.3 x 6.0	9.5	2.7	0.5	1.5	15 / 10	+85 °C

Notes: ⁽¹⁾ All optical sensors have phototransistor output

⁽²⁾ Dual channel

⁽³⁾ Products ending in "X01" are AEC-Q101 qualified


TCPT13x0X01

TCUT13x0X01

TCST1030

TCST1230

TCST1x0x

TCST2x0x

TCPT1600X01

TCUT1600X01

Ambient Light Sensors

Ambient light sensors are used to detect light or brightness in a manner similar to the human eye. They are most commonly found in industrial lighting, consumer electronics, and automotive systems, where they allow settings to be adjusted automatically in response to changing ambient light conditions. By turning on, turning off, or adjusting features, ambient light sensors can conserve battery power or provide extra safety while eliminating the need for manual adjustments.

Package	Part Number ⁽³⁾	Peak Wave-length (nm)	Band-width $\lambda_{0.5}$ (nm)	Angle of Half Sensitivity (+/- °)	Light Current ⁽¹⁾ Incandescent (μA)	Light Current ⁽²⁾ Fluorescent (μA)	Remark
Photo Diodes							
0805, SMD	TEMD6200FX01	540	430 to 610	60	0.04	0.03	Stand-off
1206, SMD	TEMD6010FX01	540	430 to 610	60	0.04	0.03	
Top View SMD	TEMD5510FX01	540	430 to 610	65	1	0.7	
TO-5, Leaded	BPW21R	565	420 to 675	50	0.9	0.75	
Phototransistors							
0805, SMD	TEMT6200FX01	550	450 to 610	60	12	7	
1206, SMD	TEMT6000X01	570	430 to 800	60	50	21	
5 mm, flat top	TEPT5700	570	430 to 800	50	75	31	Leaded
5 mm	TEPT5600	570	430 to 800	20	350	145	Leaded
3 mm	TEPT4400	570	430 to 800	30	200	83	Leaded

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

(3) Products ending in "X01" are AEC-Q101 qualified

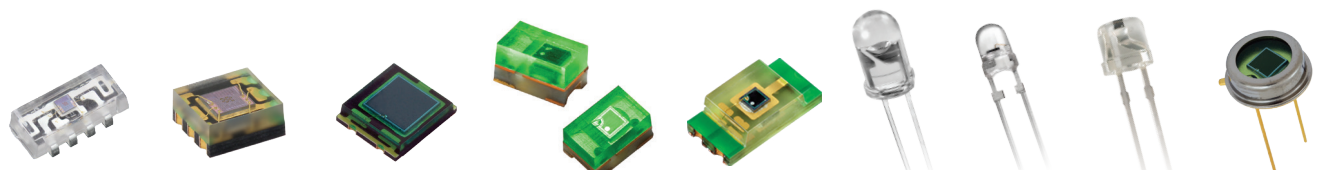
Part number	Mounting	Size (mm)	Ambient Light Range (lx)	Operating Voltage Range (V)	I ² C bus voltage range (V)	Ambient Light Resolution (lx/ct)	Output Code
I²C Output							
VEML6030	SMD	2.0 x 2.0 x 0.85	0 to 120 000	2.5 to 3.6	1.7 to 3.6	0.0036	16-bit, I ² C
VEML7700	SMD	6.8 x 2.35 x 3	0 to 120 000	2.5 to 3.6	1.7 to 3.6	0.0036	16-bit, I ² C

F

Part numbers with an F contain an infrared filtering epoxy to further improve the ambient light sensing performance

X01

Part numbers with an X01 are qualified to the AEC Q101 standard and support operating temperatures from -40 °C to +100 °C



VEML7700

VEML6030

TEMD5510FX01

TEMT6200FX01
TEMD6200FX01

TEMD6010FX01
TEMT6000X01

TEPT5600

TEPT4400

TEPT5700

BPW21R

High-Accuracy Digital Light Sensors

Based on patented Filtron™ technology implementation, digital light sensors introduced by Vishay provide red, green, blue, IR, and UVAB light sensing for precise color measurement. All digital light sensors have 16-bit resolution and feature miniature transparent OPLGA packages. These are fully integrated sensors — including a high-sensitivity photodiode, a low noise amplifier, and a 16-bit A/D converter — with support for an easy-to-use I²C bus communication.

Features and Benefits

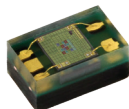
- On-chip coating provides best spectral sensitivity to cover visible and UV spectrum (Filtron™ technology)
- Shutdown mode with < 1μA power consumption
- 16-bit range for ambient light detection, RGB, and UV
- ALS output tolerance < 10%
- I²C Interface

Applications

- Health monitoring
- AWB correction
- Control display brightness
- Home lightning control

Color Sensors

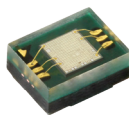
Part Number	Package		Peak Sensitivity (nm)	Operating Voltage Range (v)	Output Code	Operating Temp. Range (°C)	AEC-Q101
	L x W (mm)	H (mm)					
VEML6040	2.0 x 1.25	1	650, 550, 450 (R,G,B)	2.5 to 3.6	16 bit, I ² C	-40 to 85	x



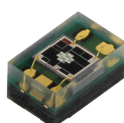
VEML6040

UV Sensors

Part Number	Package		Peak Sensitivity (nm)	Operating Voltage Range (v)	Output Code	Operating Temp. Range (°C)	AEC-Q101
	L x W (mm)	H (mm)					
VEML6070	2.35 x 1.8	1	355	2.7 to 5.5	16 bit, I ² C	-40 to 85	x
VEML6075	2.0 x 1.25	1	365, 330	1.7 to 3.6	16 bit, I ² C	-40 to 85	x



VEML6070



VEML6075

Fully Integrated Proximity and Ambient Light Sensors

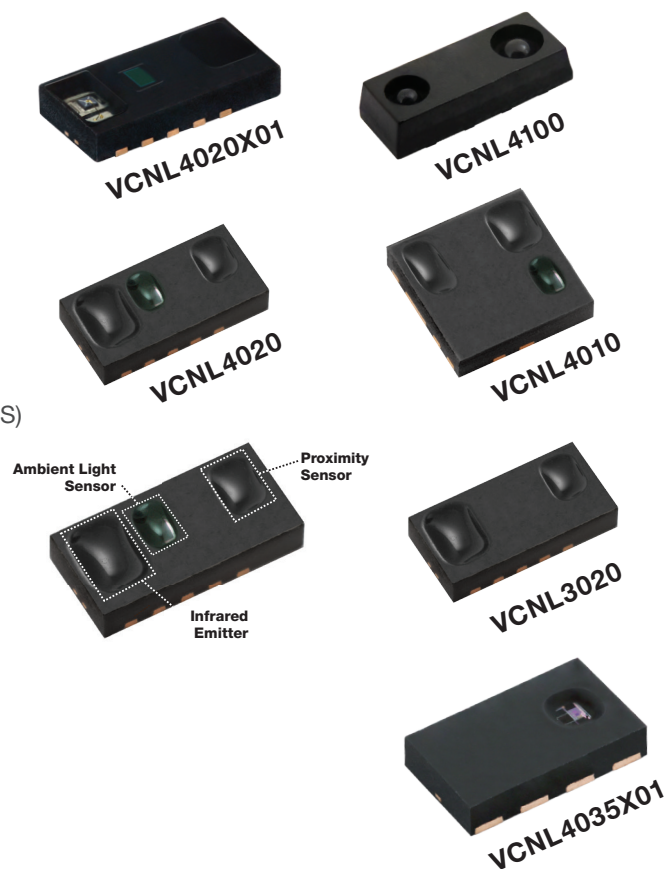
To simplify the design process, Vishay has integrated the infrared emitter, proximity photodiode, ambient light sensor and signal processing IC in one package. Window design and sensor placement are no longer geometric puzzles and the need for mechanical cross-talk barriers is eliminated. Each sensor 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 1 m
- Light sensing from 0.004 lux to 16 klux
- I²C Interface

APPLICATIONS

- Mobile devices (smart phones, touch phones, PDA, GPS)
- Consumer (white goods, cameras, game systems)
- Computing devices (notebooks, tablet PCs)
- Automotive and industrial device (presence detection and displays)



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	.	.	.	-40 to 105	.
VCNL4035X01	4.0 x 2.36	0.75	x	.	.	-40 to 105	.
VCNL3020	4.90 x 2.40	0.83	.	.	x	-25 to 85	x
VCNL4010	3.95 x 3.95	0.75	.	.	.	-25 to 85	x
VCNL4020	4.90 x 2.40	0.83	.	.	.	-25 to 85	x
VCNL4040	4.0 x 2.0	1.1	.	.	.	-25 to 85	x
VCNL4100	8.0 x 3.0	1.8	.	.	.	-40 to 85	x