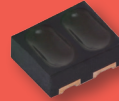


# Optical Sensors

**Reflective Sensors With Analog Output**



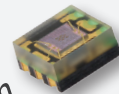
REFLECTIVE SENSORS

**Triple and Quad Channel Transmissive Sensors**



TCUT1630X01  
TCUT1800X01

**Ambient Light Sensors With Analog and Digital Output**



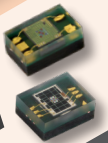
AMBIENT LIGHT SENSORS

**Sensors With Analog Output**



TRANSMISSIVE SENSORS

**Integrated Multiple Band Sensors**



COLOR SENSORS

**Single and Dual Channel Transmissive Sensors**



TCXT13X0X01

**Integrated Proximity and Ambient Light Sensors With Digital Output**







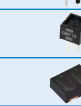
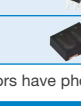
VCNL FAMILY











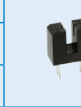


The DNA of tech.®

# OPTICAL SENSORS





## Focus Products

Reflective Sensors, Analog Output						
Part Number <sup>(1)(2)</sup>		Package		Peak Operating Range <sup>(2)</sup> (mm)	Peak Operating Distance (mm)	Typical Output Current (mA)
		L x W (mm)	H (mm)			
TCND5000 <sup>(3)</sup>		6.0 x 4.3	3.75	2 to 25	6	0.0015
TCRT1000/1010		7.0 x 4.0	2.5	0.2 to 4.0	1	0.5
TCRT5000(L)		10.2 x 5.8	7	0.2 to 15	2.5	1
CNY70		7.0 x 7.0	6	0 to 5.0	0	1
VCNT2020		2.5 x 2	0.8	0.2 to 2.5	0.5	1.6

Notes: <sup>(1)</sup> All optical sensors have phototransistor output except where noted <sup>(2)</sup> Relative collector current > 20 % <sup>(3)</sup> TCND5000 has a PIN photodiode output

Transmissive Sensors, Analog Output								
Part Number <sup>(1)(2)</sup>		Package		Gap (mm)	Aperture (mm)	Typical Output Current (mA)	On / Off Time $t_{on} / t_{off}$ (μs)	Operating Temperature Max. (°C)
		L x W (mm)	H (mm)					
TCPT1300X01		5.5 x 4.0	4.0	3.0	0.3	0.6	20 / 30	+105
TCPT1350X01		5.5 x 4.0	4.0	3.0	0.3	1.6	9 / 16	+125
TCUT1300X01 <sup>(2)</sup>		5.5 x 4.0	4.0	3.0	0.3	0.6	20 / 30	+105
TCUT1350X01 <sup>(2)</sup>		5.5 x 4.0	4.0	3.0	0.3	1.6	9 / 16	+125
TCPT1600X01		5.5 x 4.0	5.7	3.0	0.3	1.6	9 / 16	+105
TCUT1600X01 <sup>(2)</sup>		5.5 x 4.0	5.7	3.0	0.3	1.6	9 / 16	+105
TCUT1630X01 <sup>(3)</sup>		5.5 x 5.85	7.0	3.0	0.3	1.3	9 / 16	+105
TCUT1800X01 <sup>(4)</sup>		5.5 x 5.85	7.0	3.0	0.3	1.3	9 / 16	+105
TCST1030		8.3 x 4.7	8.15	3.1	None	2.4	15 / 10	+85
TCST1103		11.9 x 6.3	10.8	3.1	1	4.0	10 / 8	+85
TCST1202		11.9 x 6.3	10.8	3.1	0.5	2.0	10 / 8	+85
TCST1300		11.9 x 6.3	10.8	3.1	0.25	0.5	10 / 8	+85
TCST1230		9.2 x 4.8	5.4	2.8	0.5	2.0	15 / 10	+85
TCST2103		24.5 x 6.3	10.8	3.1	1	4.0	10 / 8	+85
TCST2202		24.5 x 6.3	10.8	3.1	0.5	2.0	10 / 8	+85
TCST2300		24.5 x 6.3	10.8	3.1	0.25	0.5	10 / 8	+85
TCST5250		14.3 x 6.0	9.5	2.7	0.5	1.5	15 / 10	+85

Notes: <sup>(1)</sup> All optical sensors have phototransistor output <sup>(2)</sup> Dual channel <sup>(3)</sup> Triple channel <sup>(4)</sup> Quad channel <sup>(5)</sup> Products ending in "X01" are AEC-Q101 qualified

Ambient Light Sensors, Digital Output									
Part Number		Package		Ambient Light Resolution (lx)	Ambient Light Range (lx)	Operating Voltage Range (V)	Output Code	Operating Temp. Range (°C)	AEC-Q101
		L x W (mm)	H (mm)						
VEML6030		2 x 2	0.87	0.0036	0 to 120 000	2.5 to 3.6	16 bit, I <sup>2</sup> C	-25 to 85	No
VEML7700		6.8 x 2.35	3	0.0036	0 to 120 000	2.5 to 3.6	16 bit, I <sup>2</sup> C	-25 to 85	No
VEML6035 <sup>(1)</sup>		2 x 2	0.4	0.0004	0 to 6710	1.7 to 3.6	16 bit, I <sup>2</sup> C	-25 to 85	No

Notes: <sup>(1)</sup> Q4 2018 release



The DNA of tech.®

# OPTICAL SENSORS

## Focus Products

Ambient Light Sensors, Analog Output									
Part Number <sup>(1)(2)</sup>	Image	Package			Peak Wave-length (nm)	Bandwidth $\lambda_{0.5}$ (nm)	Angle of Half Sensitivity ( $\pm$ °)	Light Current <sup>(1)</sup> Incandescent ( $\mu$ A)	Remark
		Type	L x W (mm)	H (mm)					
<b>Photo Diodes</b>									
TEMD6200FX01		0805, SMD	2 x 1.25	0.85	540	430 to 610	60	0.04	
TEMD6010FX01		1206, SMD	4 x 2	1.05	540	430 to 610	60	0.04	
TEMD5510FX01		Top-view SMD	5 x 4.24	1.12	540	430 to 610	65	1	
VEMD5510C		FAM	5 x 4	0.9	550	440 to 700	65	0.6	Low capacitance
VEMD5510CF		FAM	5 x 4	0.9	540	440 to 620	65	0.25	Low capacitance
BPW21R		TO-5, leaded	$\varnothing$ 8.13		565	420 to 675	50	0.9	
<b>Phototransistors</b>									
TEMT6200FX01		0805, SMD	2 x 1.25	0.85	550	450 to 610	60	23	
TEMT6000X01		1206, SMD	4 x 2	1.05	570	440 to 800	60	50	
TEPT5700		5 mm, flat top	$\varnothing$ 5		570	440 to 800	50	75	Leaded
TEPT5600		5 mm	$\varnothing$ 5		570	440 to 800	20	350	Leaded
TEPT4400		3 mm	$\varnothing$ 3		570	440 to 800	30	200	Leaded

Notes: <sup>(1)</sup>  $E_v = 100$  lux,  $V_{CE} = 5$  V, CIE illuminant A, typical <sup>(2)</sup> Products ending in "X01" are AEC-Q101 qualified

Color Sensors								
Part Number	Image	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	1.0	650, 550, 450 (R,G,B)	2.5 to 3.6	16 bit, I <sup>2</sup> C	-40 to 85	No

Integrated Proximity and Ambient Light Sensors, Digital Output								
Part Number <sup>(1)</sup>	Image	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	Yes
VCNL4035X01		4.0 x 2.36	0.75	x			-40 to 105	Yes
VCNL4030X01		4.0 x 2.36	0.75				-40 to 105	Yes
VCNL3020		4.90 x 2.40	0.83			x	-25 to 85	No
VCNL36687S		3.05 x 2.0	1.0	VCSEL		x	-40 to 85	No
VCNL4020		4.90 x 2.40	0.83				-25 to 85	No
VCNL4040		4.0 x 2.0	1.1				-25 to 85	No
VCNL4200		8.0 x 3.0	1.8				-40 to 85	No

Notes: <sup>(1)</sup> Products ending in "X01" are AEC-Q101 qualified



The DNA of tech.®

# Optoelectronics

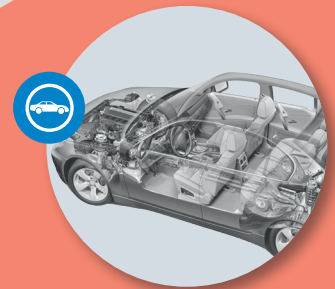
## Bright Ideas, Stellar Products

### Advantages of Vishay Optical Sensors

- Comprehensive range of package types supporting a wide range of applications
- In-house chip manufacturing and assembly including Vishay Automotive Grade production lines

### For the Following Applications

- Sensors for motion, speed, and direction
- Position sensors for encoders in high temperature environments
- Proximity / optical switches for consumer, computing, automotive, and industrial devices
- Dimming controls for consumer, computing, industrial, and automotive displays



No matter what car you drive, optical sensors are close by. Think automotive, think Vishay!



Vishay's proximity, reflective, transmissive, and ambient light sensors put the "smart" into smart devices with best-in-class performance

### Useful Links

- Optical Sensors gateway  
[www.vishay.com/en/optical-sensors/](http://www.vishay.com/en/optical-sensors/)
- Transmissive Sensors infograph  
[www.vishay.com/doc?48352](http://www.vishay.com/doc?48352)
- Proximity Sensors infograph  
[www.vishay.com/doc?49820](http://www.vishay.com/doc?49820)
- Current Estimator calculator  
[www.vishay.com/optoelectronics/opto-sensors-calculator/](http://www.vishay.com/optoelectronics/opto-sensors-calculator/)
- Vishay Automotive Grade Optoelectronics selector guide  
[www.vishay.com/doc?49071](http://www.vishay.com/doc?49071)
- Sensor starter kit  
[www.vishay.com/moreinfo/SensorXplorer/](http://www.vishay.com/moreinfo/SensorXplorer/)

AEC-Q101  
QUALIFIED

AUTOMOTIVE  
GRADE

RoHS  
COMPLIANT