

# Application Specific Components For Smoke Detection

## SMOKE DETECTION MODULES ■

Photodiodes and IREDS



## Selected Photodiodes and Infrared Emitting Diodes (IREDs)

### Applications

- Electro-optical smoke detection

### Features and Benefits

- High quality components: photodiodes, IREDS (UL- listed)
- Binning for optimized transfer function
- Customized optical block (PD+IRED) assemblies
- Smoke chamber assemblies according specified transfer function

### Product Description

An electro-optical smoke detector consists of an Infrared LED (IRED) and Photodiode (PD) assembly, which exhibits a signal under the presence of smoke in the detection volume (smoke chamber). Signal range under smoke and clean-air conditions and their long term stability are key features of a smoke detector module. Excelitas offers IRED and PD components as well as customized assemblies with specified signal level range. Such an assembly can be an optical block containing an IRED and PD for (SMD) board soldering or the complete smoke chamber, which are produced in high-volumes. Please contact Excelitas to discuss your requirements. In addition to the components presented in the table below, Excelitas can provide higher value-add assemblies, including the following for smoke detection applications:

- 1) An optics block which consists in a Photodiode-IRED pair selected, assembled into a plastic housing and tested to have a controlled range of transfer function between the IRED to photodiode signal under given smoke conditions.
- 2) A smoke chamber with base which can be easily integrated on a PCB for use with the optics block.

For further details on these or other sub-assemblies, including readout ICs, please contact Excelitas.

Product Table

### Selected Photodiodes Used in Smoke Detection Applications

Symbol Unit	Package	Active Area (mm <sup>2</sup> ) mm	Minimum Short Circuit Current @ 100fc, 2850K	Maximum Dark Current @ VR = 10V	Maximum Junction Capacitance (pF)	Radiometric Sensitivity @ λ <sub>p</sub> typ S <sub>R</sub>	Spectral Range λ <sub>RANGE</sub> nm	Peak Wavelength λ <sub>P</sub> nm	Noise Equivalent Power typ NEP
			μA	nA		A/W		W/√Hz	
VTP7840H	Lensed Sidelooker IRT	5.27	50	20	40 @V <sub>R</sub> = 3V	0.55	725-1150	925	5.3 X 10-14
VTP413H	Lensed Sidelooker IRT	7	120 (Typical)	20	50 @V <sub>R</sub> = 0V	0.55	725-1150	925	2.3 X 10-14
VTP100H	Flat Sidelooker IRT	7.45	35	30	50 @V <sub>R</sub> = 3V	0.5	725-1150	925	2.5 X 10-14
VTP1188SH	Lensed Ceramic	11	200 (Typical)	30 @V <sub>R</sub> = 10mV	300 @V <sub>R</sub> = 0V	0.55	400-1100	925	-
VTP1232H	T-1 3/4 lensed	2.326	100	25	100 @V <sub>R</sub> = 0V	0.6	400-1100	920	-
VTP3410LAH	T-1 lensed IRT	0.684	15	35 @V <sub>R</sub> = 50V	25 @V <sub>R</sub> = 3V	0.55	700-1150	925	1.9 X 10-13
VTP3420LA	T-1 lensed IRT	1.64	34	35	150 @V <sub>R</sub> = 15V	0.55	700-1150	925	-
VTP3430LA	T-1 lensed IRT	1.64	41	35	150 @V <sub>R</sub> = 15V	0.55	400-1150	925	-

Product Table

### Selected Infrared LEDs (IREDS) Used in Smoke Detection Applications

Symbol Unit	Package	Typical Total Power (mW)	Typical Irradiance (mW/cm <sup>2</sup> )	Test Current/ Pulsed (mA)	Typical Forward Voltage Drop (V)	Wavelength (nm)	Half Power Beam Angle
							°
VTE1291-1H	T-1 3/4 lensed	20	3.3 <sup>(1)</sup>	100	1.5	880	±12°
VTE1291-2H	T-1 3/4 lensed	25	6.5 <sup>(1)</sup>	100	1.5	880	±12°
VTE1295H	T-1 3/4 lensed	20	5.5 <sup>(1)</sup>	100	1.5	895	±8°
VTE3374LAH	T-1 lensed	5	5.2 <sup>(2)</sup>	20	1.3	880	±10°
VTE3375LA	T-1 lensed	3	2 <sup>(2)</sup> (Min.)	20	1.3	880	±12.5°
VTE3310	T-1 lensed	1	0.5 (Min.)	20	3.2	460	±5°

(1): Tested at 36mm on a 6.4mm diameter.

(2): Tested at 10.16mm on a 2.1mm diameter.

# Application Specific Components

For Ambient Light Sensors & Radon Detection

## PHOTODIODES & -TRANSISTORS FOR HIGH-VOLUME APPLICATIONS ■

Left: Spectrally Adapted Photodiodes and Phototransistors

Right: C30737PH Series T-1¾ (TO-like) Through-Hole Package (4.9 mm Diameter)



## Spectrally Adapted Photodiodes and Phototransistors

### Applications

- Interior and exterior light switching (dusk/dawn switch)
- Interior and exterior light control (dimming)
- Automotive headlight dimmer
- Display contrast control
- Energy conservation

### Features and Benefits

- Response approaching human eye using Excelitas' IR-BLOC™ technology
- Perfect light sensor in conjunction with Excelitas' pyroelectric detectors for motion controlled light switches
- RoHS compliant
- Selectable wavelength detection range
- Small footprint
- Surface mount packages

### Product Description

Ambient light sensors from Excelitas provide an easy solution for applications that require a response similar to the human eye, making it ideal when the response should only be influenced by visible light. These devices contribute in various applications to energy conservation in both fixed and portable devices. There are three main device types, one being filtered photodiodes, the second filtered phototransistors and finally wavelength selective devices based on III-V material. They are available in a number of standard packages, including surface mount for automated assembly.

Product Table

### Spectrally Adapted Photodiodes and Phototransistors

Symbol	Package	Active Area mm <sup>2</sup>	Min. Short Circuit Current @H=100fc 2850K min I <sub>SC</sub> μA	Maximum Dark Current (nA)	Maximum Junction Capacitance (nF)	Typical Radio-metric Sensitivity @ λ <sub>p</sub> typ S <sub>R</sub> A/W	Spectral Range λ <sub>RANGE</sub> nm	Typical Peak Wavelength λ <sub>p</sub> nm	Typical Noise Equivalent Power (W/√Hz)
VTP9812FH	T-1 3/4 flat	1.548	0.7	10 @V <sub>R</sub> = 10V	0.15 @V <sub>R</sub> = 10V	0.034	400-700	580	-
VTB1012BH	TO-46	1.6	0.8	0.1 @V <sub>R</sub> = 2V	0.31 @V <sub>R</sub> = 0V	0.3	330-720	580	5.3 X 10 <sup>-14</sup>
VTB1013BH	TO-46	1.6	0.8	0.02 @V <sub>R</sub> = 2V	0.31 @V <sub>R</sub> = 0V	0.3	330-720	580	1.1 X 10 <sup>-14</sup>
VTB6061CIEH	TO-8	37.7	-	2 @V <sub>R</sub> = 2V	11 @V <sub>R</sub> = 0V	-	475-650	555	1.3 X 10 <sup>-13</sup>
VTT9812FH	T-1 3/4 flat	0.191	60	50 @V <sub>CE</sub> = 5V	-	7	450-700	585	-
VTT9814FH	T-1 3/4 flat	0.191	80 (min) 120 (max)	50 @V <sub>CE</sub> = 5V	-	7	450-700	585	-

Electrical characteristics at T<sub>Ambient</sub> = 25 °C

### Product Description

The VTH21xx series photodiodes have a large active area and low capacitance and are specifically designed for alpha particle detection. They are available in bare chips to suit the alpha particle / radon detection, shipped in wafer pack. Custom packages are available as options.

Product Table

### Large Area Photodiodes for Alpha Particle / Radon Detection

Part Number	Package	Active Size (mm)	Active Area (mm)	Dark Current Typical (nA)	Junction Capacitance Typical (pF)
VTH2110	Bare chip	5 x 5	25	0.2 nA @ Vr = 50V	20pF @ Vr = 50V
VTH2120	Bare chip	10 x 10	100	1 nA @ Vr = 50V	80pF @ Vr = 50V