

21R084 – SMD OpticBlock for electro-optical Smoke Detection

Features and benefits:

Preset transfer function
IRED UL approved
SMT reflow mountable

Applications:

Electro-optical Smoke Detection



1. Introduction

The 21R084 OpticBlock employs an infrared LED (IRED) and a photodiode (PD) in a defined optical arrangement that detects scatter signals from smoke particles inside a dark baffle chamber.

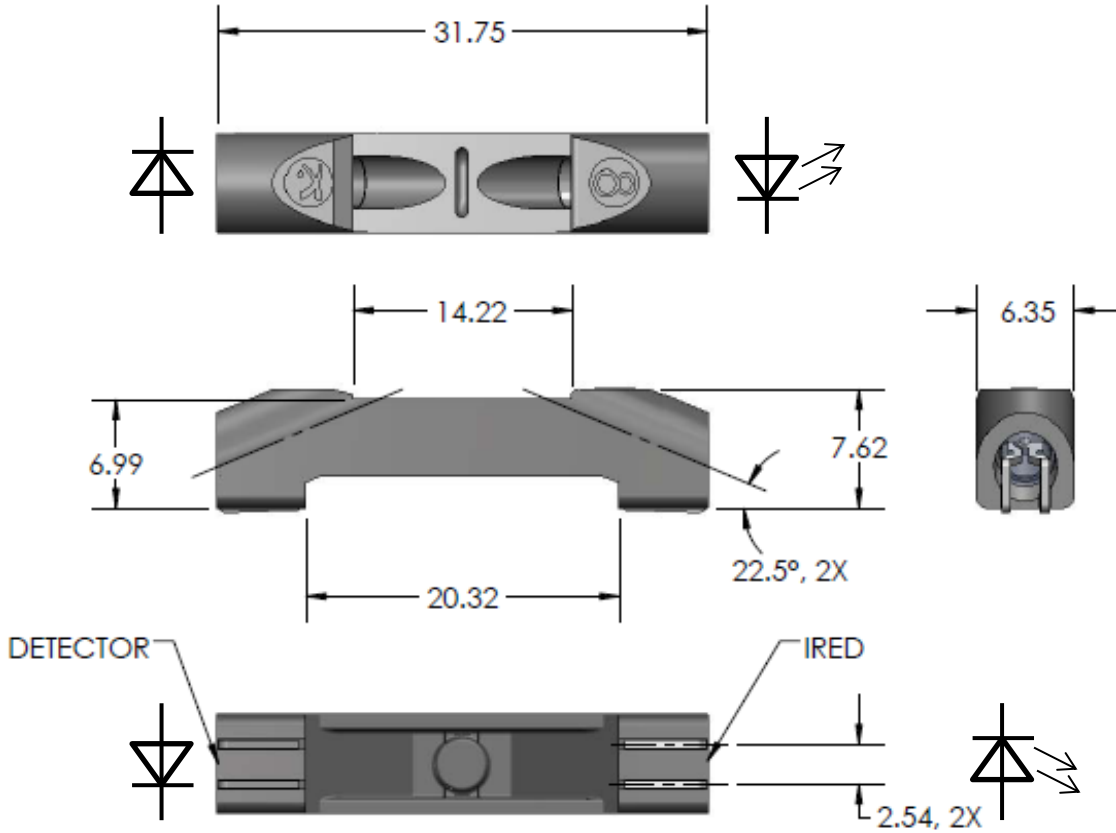
The OpticBlock can be lead-free soldered to a pcb surface using surface mount techniques (SMT).

The transfer function, i.e. the signal received at the PD under defined conditions, is set to an agreed range which helps to narrow the smoke alarm threshold variation. At the same time the optics is optimized to have a small clean air signal which helps to keep the overall noise signal low.

The OpticBlock needs to be covered by a smoke baffle chamber that ensures a surround air flow, but does not let light in. Please contact Excelitas to work out your final solution for your smoke detector application.

Part number: 21R084 – SMD OpticBlock

2. Mechanical drawings and electrical connections



DIMENSIONS ARE IN millimeters

VS-366R2

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3. Performance Characteristics

Maximum Ratings

Parameters	Symbol	Min	Typical	Max	Units	Test Conditions
Storage Temperature		-30		60	°C	
Operation Temperature		-30		55	°C	

IRED Characteristics

Parameters	Symbol	Min	Typical	Max	Units	Test Conditions
Forward Voltage Drop Across IRED	V_F			2.3	V	$I_{FC} = 50\text{mA}$
Continuous Power Dissipation	P			100	mW	At 25°C. Above 30°C max value decreases by 1.43 mW/°C
Continuous Current	I_{FC}			50	mA	At 25°C. Above 30°C max value decreases by 0.71 mA/°C
Peak Forward Current	I_{FP}			2.5	A	10 μs , 100 Hz (i.e. max 0.1% duty cycle)
Peak Forward Current * Pulse Width * Repetition Rate			$1.25 \cdot 10^{-5}$	$2.5 \cdot 10^{-3}$	A*s*Hz	Example for typical long time operating conditions: $I_F = 250\text{ mA}$, pulse width = 250 μs , repetition rate = 0.2 Hz.
Rise and Fall Time			1		μs	$I_{FP} = 20\text{mA}$

The IRED is UL approved under File S3506 for the use in electro-optical smoke detectors.

Photodiode Characteristics

Parameters	Symbol	Min	Typical	Max	Units	Test Conditions
Forward Voltage Drop Across PD	$V_{F,PD}$			1.5	V	At 0fc, $I_{F,PD} = 10\text{mA}$
Capacitance	C_{PD}			150	pF	At -15V bias

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Transfer Function

Parameters	Symbol	Minimum	Typical	Maximum	Units	Test Conditions
Photodiode Light Current, Light Reflected from White Target (optimum depth), Bin 1	IL1	10.00		16.00	μA	With $I_{FC} = 50 \text{ mA}$ on the IRED
Photodiode Light Current, Light Reflected from White Target (optimum depth), Bin 2	IL1	16.01		25.60	μA	With $I_{FC} = 50 \text{ mA}$ on the IRED
Photodiode Light Current, Light Reflected from White Target (optimum depth), Bin 3	IL1	25.61		40.96	μA	With $I_{FC} = 50 \text{ mA}$ on the IRED
Photodiode Light Current, Light Reflected from Black Target (simulates clean air conditions)	IL2-test	0		0.1	μA	With $I_{FC} = 50 \text{ mA}$ on the IRED

4. Soldering Conditions

The OpticBlock can be lead-free reflow soldered according JEDEC 020D

5. Packaging

Tape-and-reel packaging in mass production.