21R088 – SMD Smoke Detection Module 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 21R088 Smoke Detection Module consists in Excelitas optics block 21R084 integrated into a dark baffle chamber (smoke chamber). The optics block portion employs an infrared LED (IRED) and a photodiode (PD) in a defined optical arrangement that detects scattered signals from smoke particles inside the smoke chamber.

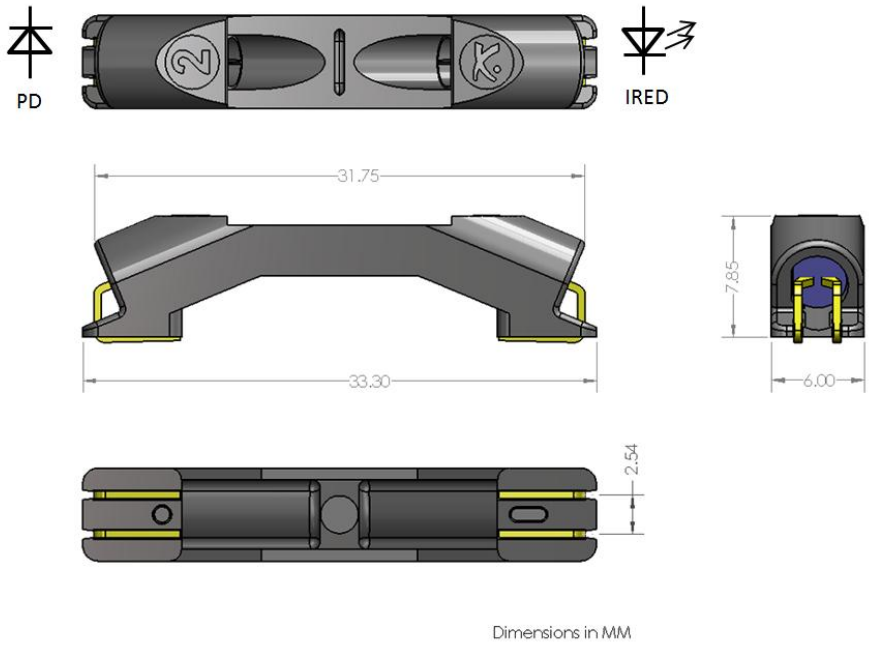
The whole module can be lead-free soldered to a pcb surface using surface mount techniques (SMT).

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.

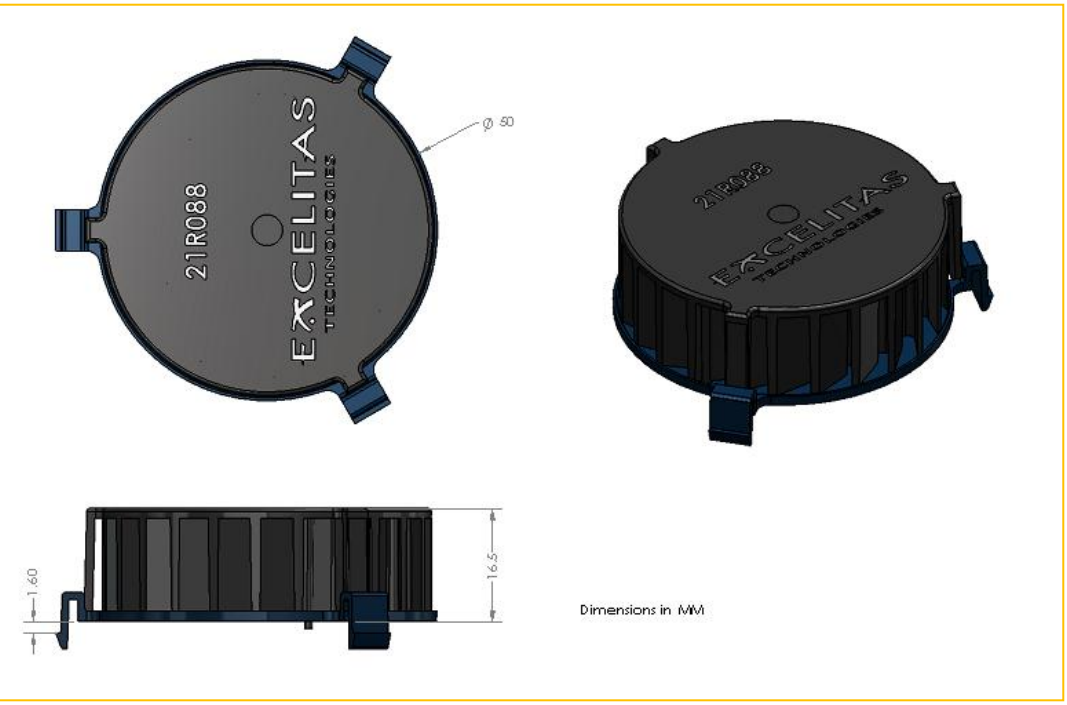
Please contact Excelitas to work out your final solution for your smoke detector application.

Part number: 21R088 – SMD Smoke Detection Module

2. Optics Block Mechanical Drawings and Electrical Connections



3. Smoke Detection Module Drawing



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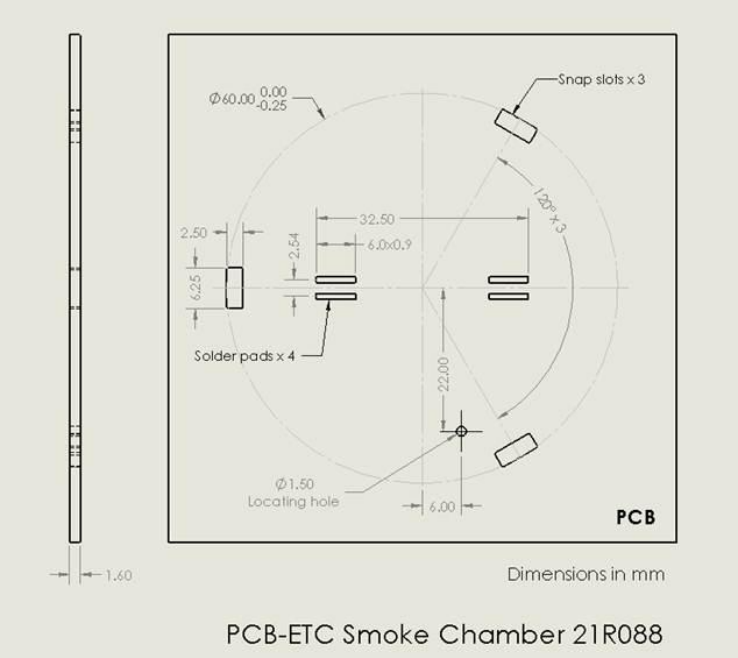
4. Suggested PCB interface



PCB-ETC Smoke Chamber 21R088

5. 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}= 50mA
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			$1.25*10^{-5}$	$2.5*10^{-3}$	A*s*Hz	Example for typical long time operating conditions: I_F=250 mA, pulse width = 250 µs, repetition rate = 0.2 Hz.
Rise and Fall Time			1		µs	I_{FP} = 20mA

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, $I_{F,PD}$= 10mA
Capacitance	C_{PD}			150	pF	At -15V bias

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 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 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 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 mA on the IRED

6. Soldering Conditions

The Smoke Detection Module can be lead-free reflow soldered according JEDEC 020D

7. Packaging

Tape-and-reel packaging in mass production.

8. RoHS compliance

The herein described device is designed and built to be fully compliant with the European Union Directive ROHS 2 2011/65/EU – Restriction of the use of certain Hazardous Substances (RoHS) in Electrical and Electronic equipment.

9. Country of origin

The 21R084 device is made in the Philippines.