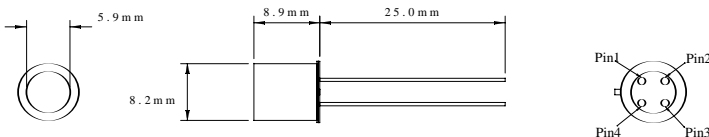


### MECHANICAL DATA

Dimensions in mm



### HIGH PROFILE TO5

### CONNECTIONS:

PIN 1: Vref (typically 0V)

PIN 2: OUT

PIN 3: Vcc + (Positive supply voltage)

PIN 4: Vcc - (Negative supply voltage)

### NOTES:

1. Active area 3.8 x 3.8mm.
2. Contact Semelab Plc. for filter options
3. Above parameters quoted at  $\pm 5V$  supply.

### DESCRIPTION

The SMPX158 and SMPX159 are a range of hybrid opto-electronic components incorporating a 15mm<sup>2</sup> PIN photodiode, operational amplifier and transimpedance circuitry. The photodiode is operated at zero bias for best linearity and lowest dark current.

The SMPX159 is identical to the SMPX158 except for the inclusion of an EMI screen. This screen reduces the detected signal for the SMPX159 to approximately 30% of the SMPX158 levels.

Incorporation of the photodiode and amplifier into a welded metal can (with or without the optional electrostatic screening mesh) minimises noise pickup, leakage current errors and stray capacitance normally associated with discrete designs.

A BG18 optical filter has been incorporated inside the package to pass selected regions of the visible spectrum (see following spectral chart). For more details of other variants of these devices with alternative filter permutations, contact Semelab Plc.

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## THE SMPX158 and SMPX159 HYBRID PHOTODIODES (15mm<sup>2</sup>) WITH INTEGRAL AMPLIFIER AND BG18 OPTICAL FILTER

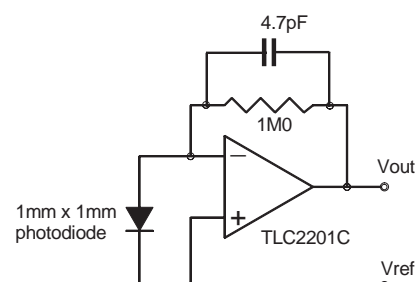
### FEATURES:

- HIGH RESPONSIVITY
- HIGH SENSITIVITY
- PHOTODIODE SIZE: 4 x 4 mm note 1
- INTEGRAL BG18 OPTICAL FILTER
- LOW BIAS CURRENT: < 20nA @ 70°C
- LOW OFFSET ERRORS: < 0.6mV @ 70°C
- LOW NOISE: typ 0.5 $\mu$ V/ $\sqrt{\text{Hz}}$  note 3
- SUPPLY VOLTAGES:  $\pm 2.5V$  to  $\pm 8V$
- WIDE BANDWIDTH: > 30KHz (3dB)
- HIGH TRANSIMPEDANCE GAIN: 1M $\Omega$  max.
- EMI SCREENING MESH SMPX159
- HERMETIC TO5 METAL CAN

### APPLICATIONS:

- MEDICAL INSTRUMENTS
- DOCUMENT VERIFICATION
- LABORATORY INSTRUMENTATION
- POSITION AND PROXIMITY DETECTORS
- PHOTOGRAPHIC ANALYSERS
- SMOKE DETECTORS
- FIBRE-OPTIC DETECTORS

### CIRCUIT SCHEMATIC



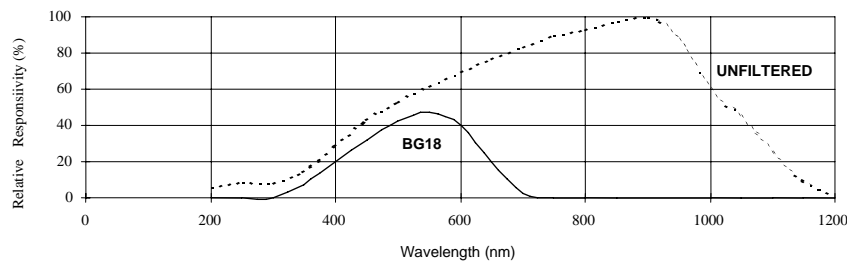
## SPECIFICATIONS

(At 25°C unless otherwise stated)

### PHOTODIODE

Parameter	Conditions	Value	Units
Responsivity (see chart)	350nm	>0.12	A/W
	900nm	0.55	A/W
Active area		15	mm <sup>2</sup>
Dark Current	0V bias	300	pA
vs. temperature		doubles every 8°C	
Capacitance	0V bias	450	pF

**Spectral Response of Unfiltered Photodiode  
and BG18 Combination**



### AMPLIFIER

Parameter	Conditions	Value	Units
Input Offset Voltage	$V_o = 0, T_a = 25^\circ\text{C}$	0.5	mV
Input Bias Current	$V_o = 0, T_a = 25^\circ\text{C}$	0.5	pA
Unity Gain Bandwidth		1.9	MHz
Supply Current	$V_o = 0, \text{no load}$	1.1	mA
Input Noise Voltage	$f = 1\text{KHz}$	8	nV/ $\sqrt{\text{Hz}}$
Input Noise Current	$f = 1\text{KHz}$	0.8	fA/ $\sqrt{\text{Hz}}$

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