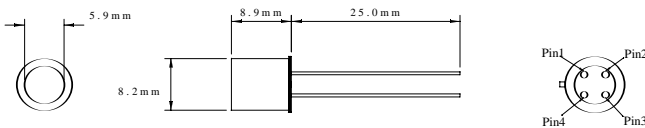


### MECHANICAL DATA

Dimensions in mm



### HIGH PROFILE TO5

### CONNECTIONS:

PIN 1: Vcc – (Negative supply voltage)

PIN 2: Vcc + (Positive supply voltage)

PIN 3: OUT

PIN 4: Vref (typically 0V)

### NOTES:

1. Active area 0.8 x 0.8mm.
2. Contact Semelab Plc. for alternative optical filter options
3. Above parameters quoted at  $\pm 5V$  supply.

### DESCRIPTION

The SMPX160 is a hybrid opto-electronic component incorporating a 0.66mm<sup>2</sup> PIN photodiode, operational amplifier and transimpedance circuitry. The photodiode is operated at zero bias for best linearity and lowest dark current.

Incorporation of the photodiode and amplifier into a welded metal can 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 (for spectral response see following chart). For more details of the other variants of this device with alternative filter permutations, contact Semelab Plc.

## THE SMPX160 HYBRID PHOTODIODE (0.66mm<sup>2</sup>) WITH INTEGRAL AMPLIFIER AND BG18 OPTICAL FILTER

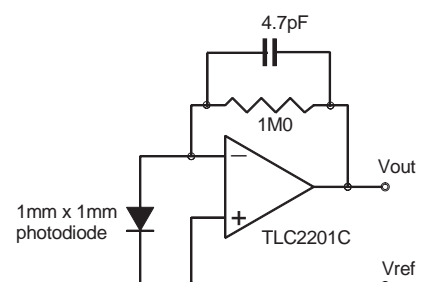
### FEATURES:

- HIGH RESPONSIVITY
- PHOTODIODE SIZE: 1 x 1 mm note 1
- INTEGRAL BG18 OPTICAL FILTER
- LOW DARK CURRENT: < 5nA @ 70°C
- LOW OFFSET ERRORS: < 0.6mV @ 70°C
- LOW NOISE: typ 32nV/ $\sqrt{\text{Hz}}$  (f=1KHz)
- SUPPLY VOLTAGES:  $\pm 2.5V$  to  $\pm 8V$
- WIDE BANDWIDTH: > 30KHz (3dB)
- HIGH TRANSIMPEDANCE GAIN: 1M $\Omega$ .
- HERMETIC TO5 METAL CAN
- LOW COST

### APPLICATIONS:

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

### CIRCUIT SCHEMATIC



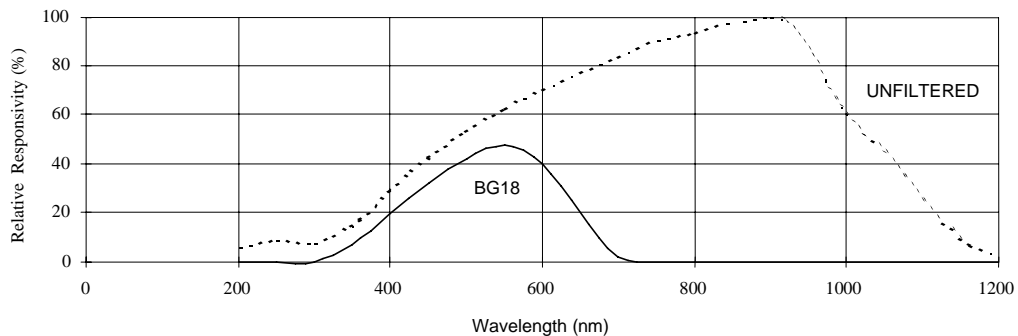
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### SPECIFICATIONS (At 25°C unless otherwise stated)

#### PHOTODIODE

Parameter	Conditions	Value	Units
Responsivity (see chart)	350nm	>0.12	A/W
	900nm	0.55	A/W
Active area		0.66	mm <sup>2</sup>
Dark Current	0V bias	100	pA
vs. temperature		doubles every 8°C	
Capacitance	0V bias	15	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	$f = 1\text{KHz}$	0.6	fA/ $\sqrt{\text{Hz}}$

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