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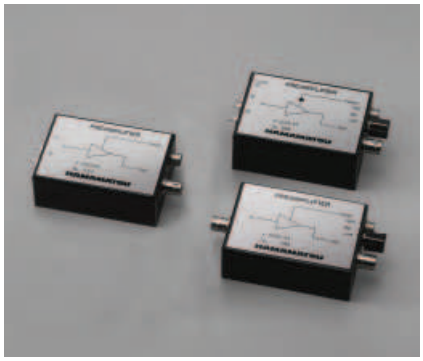
Amplifier for infrared detector



C4159/C5185 series
C3757-02

Low noise amplifiers for infrared detector (InSb, InAs, InAsSb, InGaAs, MCT, PbS, PbSe)

Accessories

Instruction manual **Power cable (one end with 4-pin connector for connection to amplifier and the other end unterminated, 2 m) A4372-02**

Required power supply specifications

- C4159 series: ±15 V ± 0.5
- C5185 series: ±15 V ± 0.5
- Current-carrying capacity: 1.5 times or more of amplifier's maximum current consumption
- Ripple noise: 5 mVp-p or less
- Analog power supply only
  Recommended DC power supply: E3620A, E3630A (Agilent Technologies)

Absolute maximum ratings (Ta=25 °C)

Parameter	Value	Unit
Supply voltage	18.0 max.	V
Operating temperature	0 to +40	°C
Storage temperature	-20 to +70	°C

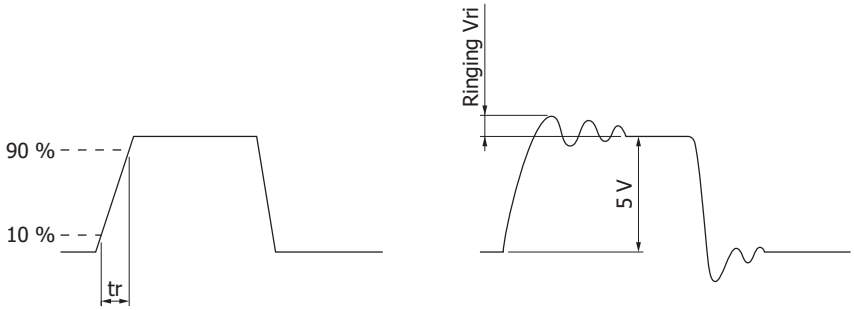
Note: Absolute maximum ratings are the values that must not be exceeded at any time. If even one of the absolute maximum ratings is exceeded even for a moment, the product quality may be impaired. Always be sure to use the product within the absolute maximum ratings.

Amplifiers for photovoltaic detectors (Typ.)

Parameter	C4159-01	C4159-04	C4159-05	C4159-06	Unit
Applicable detector *1 *2 *3	Dewar type InSb (P5968-060, P5968-100) Dewar type InAsSb (P11120-901)	Dewar type InSb (P5968-200)	Dewar type InAs (P7163)	InAs (P10090 series)	-
Conversion impedance	10^8, 10^7, 10^6 (3 ranges switchable)	2×10^7, 2×10^6, 2×10^5 (3 ranges switchable)	10^8, 10^7, 10^6 (3 ranges switchable)	10^6, 10^5, 10^4 (3 ranges switchable)	V/A
Frequency response (amp only, -3 dB)	DC to 100 kHz *4	DC to 45 kHz	DC to 15 kHz	DC to 100 kHz	-
Output impedance	50	50	50	50	Ω
Maximum output voltage (1 kΩ load)	+10	+10	+10	+10	V
Output offset voltage	±5	±5	±10	±5	mV
Equivalent input noise current (f=1 kHz)	0.15 (10^8, 10^7 range) 0.65 (10^6 range)	0.55	0.15 (10^8, 10^7 range) 0.65 (10^6 range)	6	pA/Hz$^{1/2}$
Reverse voltage	Limited to 0 V operation				-
External power supply *5	±15				V
Current consumption	+30, -10 max.			+30, -22 max.	mA

*1: These amplifiers cannot operate multiple detectors.
*2: Consult us before purchasing if you want to use with a detector other than listed here.
*3: Consult us before purchasing if you want to use with a multi-element detector.
*4: When connected to a detector, frequency response becomes 60 kHz or less depending on the detector active area. (ϕ0.6 mm: 60 kHz or less, ϕ1 mm: 25 kHz or less) Ringing occurs in the output if the rise time tr (0 to 90%) of incident light is approximately 100 µs or less. The ringing becomes larger as the rise time becomes shorter. No ringing occurs when detecting sine-wave light. (For information on the ringing specifications, see page 2.)
*5: Recommended DC power supply (analog power supply): ±15 V
Current capacity: More than 1.5 times the maximum current consumption
Ripple noise: 5 mVp-p or less
Note: Output noise voltage = Equivalent input noise current × Conversion impedance
For information about accessories except for the amplifiers, refer to our datasheet "Infrared detector accessories".

Ringing specifications



Incident light

Output waveform when tr = 40 µs and active area is ϕ0.6 mm
Ringing Vri ≤ 1.5 V
Oscillating cycle ≤ 3 cycles

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Amplifier for InGaAs PIN photodiodes (Typ.)

Parameter	C4159-03	Unit
Applicable detector *6 *7	InGaAs	-
Conversion impedance	10^7, 10^6, 10^5 (3 ranges switchable)	V/A
Frequency response (amp only, -3 dB)	DC to 15 kHz	-
Output impedance	50	Ω
Maximum output voltage (1 kΩ load)	+10	V
Output offset voltage	±5	mV
Equivalent input noise current (f=1 kHz)	2.5	pA/Hz$^{1/2}$
Reverse voltage	Can be applied from external unit	-
External power supply *8	±15	V
Current consumption	±15 max.	mA

Amplifier for photoconductive detectors (Typ.) *9

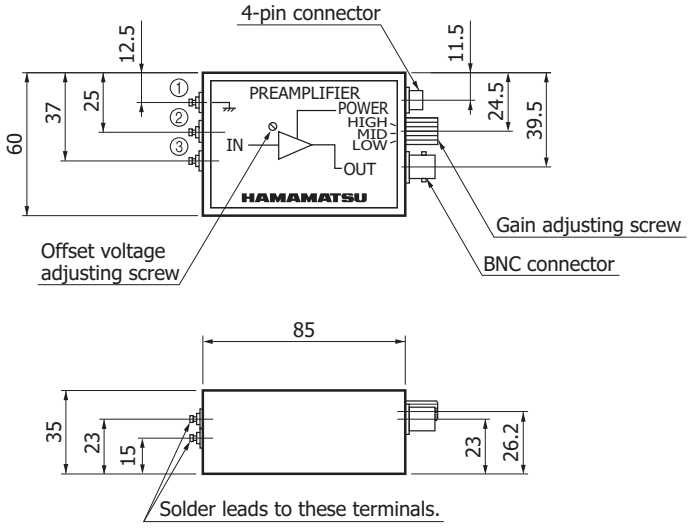
Parameter	C5185-02	C5185-03	C3757-02	Unit
Applicable detector *6 *7 *10	Dewar type MCT, InSb (P6606 series)	MCT (P3981/P2750 series) *11	PbS, PbSe	-
Input impedance	5	5	10000	kΩ
Voltage gain	66 (× 2000)	66 (× 2000)	40 (× 100)	dB
Frequency response (amp only, -3 dB)	5 Hz to 250 kHz	5 Hz to 250 kHz	0.2 Hz to 10 kHz	-
Detector bias current	5 mA, 10 mA, 15 mA (3 ranges switchable)	0.1 mA, 0.5 mA, 1 mA (3 ranges switchable)	Internal bias	-
Output impedance	50	50	50	Ω
Maximum output voltage (1 kΩ load)	±10	±10	±10	V
Equivalent input noise voltage (f=1 kHz)	2.6	1.8	40	nV/Hz$^{1/2}$
External power supply *8	±15	±15	±15	V
Current consumption	+100, -30 max.	+100, -30 max.	+15, -15 max.	mA

Note: Output noise voltage = Equivalent input noise voltage × Voltage gain

*6: These amplifiers cannot operate multiple detectors.
*7: Consult us before purchasing if you want to use with a detector other than listed here.
*8: Recommended DC power supply (analog power supply): ±15 V
Current capacity: More than 1.5 times the maximum current consumption
Ripple noise: 5 mVp-p or less
*9: Before purchasing, make sure the bias current to the detector matches the detector bias current specified in the above table.
*10: Consult us before purchasing if you want to use with a multi-element detector.
*11: Preamp for P3257-25/-30/-31 available upon request

Dimensional outline (unit: mm, tolerance unless otherwise noted: ±1)

C4159-01/-03/-04/-05/-06



PIN connections
① GND
② Cathode
③ Anode

Note: Socket for lead attachment is not provided.

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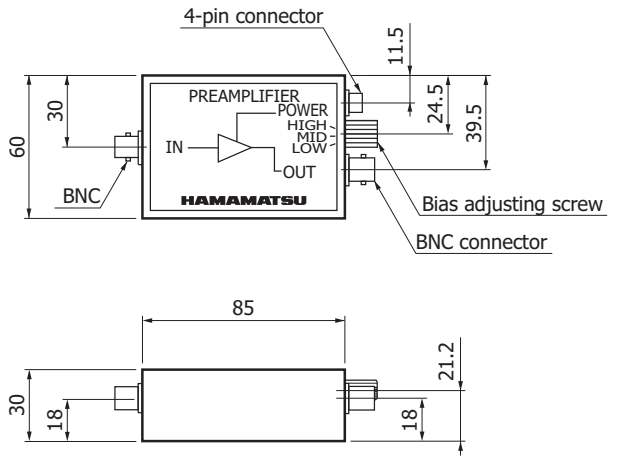
C5185-02/-03



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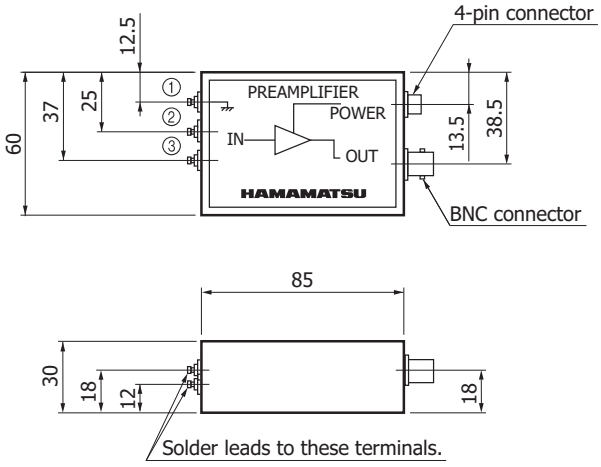
C3757-02



PIN connections
① GND
② Detector
③ Detector

Note: Socket for lead attachment is not provided.

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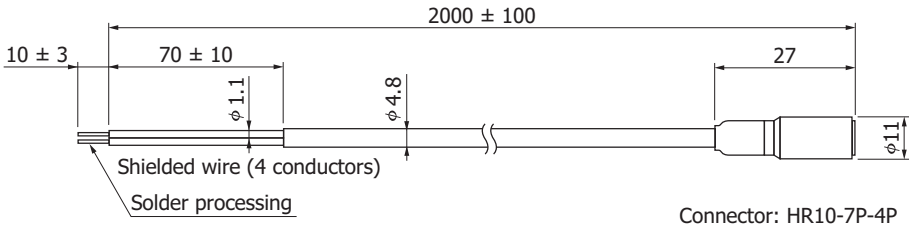
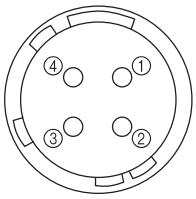
A4372-02



Connector: HR10-7P-4P
(made by Hirose Electric)



As viewed from connector side

Pin no.	Pin connection	Lead color
①	-Vs	Blue
②	GND	Black/white/blue stranded wire
③	GND	
④	+Vs	White

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CE

The C4159-03, C5185-02/-03 and C3757-02 conform to the European EMC directives (Applied standard: EN 61326-1 Class B).

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