

SA-200 Series Specifications

Single-ended Input

| | | DC to 800 kHz SA-200F3 LOW NOISE AMPLIFIER | 1 kHz to 80 MHz SA-220F5 LOW NOISE FET AMPLIFIER |
|-------------------|---|---|---|
| INPUT SECTION | Input form | DC coupling, unbalanced single-ended input, SMA | AC coupling, unbalanced single-ended input, SMA |
| | Input impedance | 1 k / 10 k / 100 kΩ ±5 % (DC) // 150 pF or less | 1 MΩ ±5 % (5 kHz) // 57 pF typ. |
| | Maximum input voltage (Non-destructive) | ±0.5 V | ±1.0 V |
| | Equivalent input noise voltage density (Input terminal short circuit) | 0.7 nV/√Hz or less (1 kHz) 0.5 nV/√Hz typ. (1 kHz) | 0.7 nV/√Hz or less (100 kHz) 0.5 nV/√Hz typ. (10 kHz to 1 MHz) |
| | Equivalent input noise current density | 2.2 pA/√Hz typ. (10 kHz) | 200 fA/√Hz typ. (100 kHz) |
| | Noise figure (50 Ω system) | — | — |
| OUTPUT SECTION | Output form | DC coupling, unbalanced single-ended output, SMA | AC coupling, unbalanced single-ended output, SMA |
| | Maximum output voltage | ±10 V, 1 kΩ (1 kHz) | 2.0 Vp-p, 50 Ω (1 kHz to 20 MHz) |
| | Output impedance | 50 Ω ±5 % (DC) | 50 Ω ±5 % (100 kHz) |
| AMPLIFIER SECTION | Voltage gain | 40±0.5 dB, 1 MΩ (1 kHz) | 46 ±0.5 dB, 50 Ω (1 MHz) |
| | Voltage gain frequency characteristic | DC to 800 kHz : +0.5 dB, -3 dB typ. | 1 kHz to 80 MHz : +0.5 dB, -3 dB |
| | Total harmonic distortion | 0.009 % typ. (1 kHz, ±10 V) | — |
| | Intercept point | — | — |
| GENERAL | Power input | Through feed-through capacitor | Through feed-through capacitor |
| | Operating supply voltage range | ±15 V ±5 % | ±15 V ±5% |
| | Consumption current (no signal) | ±50 mA or less | +65 mA typ. +75 mA or less -10 mA typ. -15 mA or less |
| | Operating temperature ranges | 0°C to 40°C | 0°C to 40°C |
| | Storage temperature and humidity ranges (non-condensation) | -10°C to 50°C 10 % RH to 80 % RH | -10°C to 50°C 10 % RH to 80 % RH |
| | Dimensions (without protrusions and bottom plate) | 68(W)×43(D)×17.6(H) mm | 68(W)×43(D)×28(H) mm |
| | Weight | Approx. 90 g | Approx. 130 g |
| | Accessories | Instruction manual, bottom plate | |

If not specified, Supply voltage ±15 V (SA-230F5: +15 V), temperature 23°C ±5°C

• Recommended power supply: Low Noise DC Power Supply LP series
Use a dedicated cable for power supply from LP series. See back cover.

SA-400 Series Specifications

Differential Input

| | | DC to 1 MHz SA-410F3 LOW NOISE DIFFERENTIAL AMPLIFIER | 1 kHz to 70 MHz SA-420F5 LOW NOISE DIFFERENTIAL FET AMPLIFIER |
|-------------------|---|---|---|
| INPUT SECTION | Input form | DC coupling, balanced differential input, SMA | AC coupling, balanced differential input, SMA |
| | Input impedance | 1 k/10 k/100 kΩ ±5 % // 100 pF typ. | 1 MΩ ±5 % (1 kHz) // 15 pF typ. |
| | Maximum input voltage (Non-destructive) | Differential input : ±1 V Common-mode input : ±15 V | Differential input : ±10 V DC or 4 Vp-p AC Common-mode input : ±10 V DC or 6 Vp-p AC |
| | CMRR (Equivalent input) | 110 dB or more (55 Hz) 80 dB typ. (100 kHz) | 55 dB or more (1 kHz to 10 MHz) |
| | Equivalent input noise voltage density (Input terminal short circuit) | 0.75 nV/√Hz typ. (1 kHz) | 1.2 nV/√Hz or less (100 kHz) 0.9 nV/√Hz typ. (100 kHz to 10 MHz) |
| | Equivalent input noise current density | 4.5 pA/√Hz typ. (10 kHz) | 100 fA/√Hz typ. (1 kHz) |
| | Noise figure (50 Ω system) | — | — |
| OUTPUT SECTION | Output form | DC coupling, unbalanced single-ended output, SMA | AC coupling, unbalanced single-ended output, SMA |
| | Maximum output voltage | ±10 V, 1 kΩ (1 kHz) | 2.0 Vp-p, 50 Ω (1 kHz to 20 MHz) |
| | Output impedance | 50 Ω ±5 % (100 Hz) | 50 Ω ±5 % (100 kHz) |
| AMPLIFIER SECTION | Voltage gain | 40 ±0.2 dB, 1 MΩ (1 kHz) | 46 ±0.5 dB, 50 Ω (1 MHz) |
| | Voltage gain frequency characteristic | DC to 1 MHz : +0.5 dB, -3 dB | 1 kHz to 70 MHz : +0.5 dB, -3 dB |
| | Total harmonic distortion | 0.004 % typ. (1 kHz, ±10 V) | — |
| | Intercept point | — | — |
| GENERAL | Power input | HR10-7R-4P(73) (Hirose Electric) | Through feed-through capacitor |
| | Operating supply voltage range | ±15 V ±1 V | ±15 V ±5 % |
| | Consumption current (no signal) | ±45 mA typ. ±75 mA or less (Max. output, load: 1 kΩ) | +54 mA typ. +70 mA or less -25 mA typ. -40 mA or less |
| | Operating temperature ranges | 0 °C to 40 °C | +5 °C to +35 °C |
| | Storage temperature and humidity ranges (non-condensation) | -10 °C to 50 °C 5 % RH to 95 % RH | -10 °C to 50 °C 5 % RH to 95 % RH |
| | Dimensions (without protrusions and bottom plate) | 76(W)×50(D)×21.1(H) mm | 68(W)×43(D)×28(H) mm |
| | Weight | Approx. 105 g | Approx. 100 g |
| | Accessories | Instruction manual, bottom plate, SMA shorting plug | |

If not specified, Supply voltage ±15 V, temperature 23°C ±5°C

• Recommended power supply: Low Noise DC Power Supply LP series
Use a dedicated cable for power supply from LP series. See back cover.

| DC to 20 MHz SA-240F5 LOW NOISE FET AMPLIFIER | DC to 20 MHz SA-230F5 LOW NOISE AMPLIFIER | 100 Hz to 250 MHz SA-250F6 LOW NOISE AMPLIFIER | 1 kHz to 500 MHz SA-251F6 LOW NOISE AMPLIFIER |
|---|---|--|--|
| DC coupling, unbalanced single-ended input, SMA | AC coupling, unbalanced single-ended input, SMA | AC coupling, unbalanced single-ended input, SMA | AC coupling, unbalanced single-ended input, SMA |
| 1 MΩ / 100 MΩ / open // 60 pF typ. | 50 Ω ±5 % (100 kHz) | 50 Ω (1 MHz) | 50 Ω (1 MHz) |
| ±1.0 V | ±1.0 V | ±0.7 V | ±0.7 V |
| 1.2 nV/√Hz (1 kHz) | 0.35 nV/√Hz or less (100 kHz) 0.25 nV/√Hz typ. (10 kHz to 1 MHz) | 0.25 nV/√Hz or less (1 MHz) | 0.25 nV/√Hz or less (1 MHz) |
| 5 fA/√Hz (100 Hz) | 5.0 pA/√Hz typ. (100 kHz) | 5 pA/√Hz typ. (1 MHz) | 8 pA/√Hz typ. (1 MHz) |
| — | 0.7 dB or less, 0.6 dB typ. (10 MHz) 1.0 dB or less, 0.8 dB typ. (100 MHz) | 0.6 dB (10 MHz) 1.0 dB (250 MHz) | 0.9 dB (10 MHz) 1.2 dB (250 MHz) 1.8 dB (500 MHz) |
| DC coupling, unbalanced single-ended output, SMA | AC coupling, unbalanced single-ended output, SMA | AC coupling, unbalanced single-ended output, SMA | AC coupling, unbalanced single-ended output, SMA |
| ±10 V, 1 kΩ | 1.8 Vp-p, 50 Ω (1 kHz to 20 MHz) | 2.0 Vp-p | 2.0 Vp-p |
| 50 Ω (1 kHz) | 50 Ω ±5 % (100 kHz) | 50 Ω (1 MHz) | 50 Ω (1 MHz) |
| 40 dB ±0.1 dB or less (1 kHz) | 46 ±0.5 dB, 50 Ω (20 MHz) | 40 ±0.5 dB (1 MHz) | 40 ±0.5 dB (1 MHz) |
| DC to 20 MHz : +0.5 dB, -3 dB | 1 kHz to 100 MHz : +0.5 dB, -3 dB | 100 Hz to 250 MHz (1 MHz Standard) | 1 kHz to 500 MHz (1 MHz Standard) |
| 0.004 % (2 Vp-p) | — | — | — |
| — | +30 dBm typ. (68 MHz) | — | — |
| HR10-7R-4P (73) (Hirose Electric) | Through feed-through capacitor | HR10-7R-4P(73) (Hirose Electric) | HR10-7R-4P(73) (Hirose Electric) |
| ±15 V ±1 V | ±15 V ±5 % | +15 V ±1 V or less | +15 V ±1 V or less |
| ±45 mA | +55 mA or less | +50 mA | +65 mA |
| ±75 mA or less (Max.) | — | +65 mA or less | +85 mA or less |
| 0°C to 40°C | 0°C to 40°C | 0°C to 40°C | 0°C to 40°C |
| -10°C to 50°C 5 % RH to 95 % RH | -10°C to 50°C 10 % RH to 80 % RH | -10°C to 50°C 5 % RH to 95 % RH | -10°C to 50°C 5 % RH to 95 % RH |
| 76(W)×50(D)×25(H) mm | 68(W)×43(D)×17.6(H) mm | 76(W)×50(D)×25(H) mm | 76(W)×50(D)×25(H) mm |
| Approx. 105 g | Approx. 90 g | Approx. 140 g | Approx. 140 g |
| Instruction manual, bottom plate | | | |

| 30 Hz to 30 MHz SA-421F5 LOW NOISE DIFFERENTIAL FET AMPLIFIER | DC to 20 MHz SA-440F5 LOW NOISE DIFFERENTIAL FET AMPLIFIER | 1 kHz to 100 MHz SA-430F5 LOW NOISE DIFFERENTIAL AMPLIFIER |
|---|--|---|
| AC coupling, balanced differential input, SMA | DC coupling, balanced differential input, SMA | AC coupling, balanced differential input, SMA |
| 1 MΩ ±5 % (1 kHz) // 85 pF typ. | 1 MΩ / 100 MΩ / open // 60 pF typ. | 50 Ω ±5 % (100 kHz) |
| Differential input : ±10 V DC or 4 Vp-p AC Common-mode input : ±10 V DC or 6 Vp-p AC | Differential input : ±1 V Common mode input : ±7.5 V | ±2.0 V (Differential / Common-mode input) |
| 46 dB or more (1 kHz to 10 MHz) | 90 dB (10 Hz to 10 kHz) ,60 dB (1 MHz) | 80 dB or more (100 kHz), 90 dB typ. (100 kHz) 80 dB typ. (10 MHz) |
| 0.7 nV/√Hz or less (100 kHz) 0.5 nV/√Hz typ. (100 kHz to 10 MHz) | 1.8 nV/√Hz (1 kHz) | 0.45 nV/√Hz or less (100 kHz) 0.35 nV/√Hz typ. (10 kHz to 1 MHz) |
| 100 fA/√Hz typ. (100 Hz) | 25 fA/√Hz (100 Hz) | 7.0 pA/√Hz typ. (100 kHz) |
| — | — | 1.25 dB or less, 1.10 dB typ. (10 MHz) 1.75 dB or less, 1.40 dB typ. (100 MHz) |
| AC coupling, unbalanced single-ended output, SMA | DC coupling, unbalanced single-ended output, SMA | AC coupling, unbalanced single-ended output, SMA |
| 2.0 Vp-p, 50 Ω (100 Hz to 20 MHz) | ±10 V, 1 kΩ | 2.0 Vp-p, 50 Ω (1 kHz to 20 MHz) |
| 50 Ω ±5 % (100 kHz) | 50 Ω (1 kHz) | 50 Ω ±5 % (100 kHz) |
| 46 ±0.5 dB, 50 Ω (1 MHz) | 40 dB ±0.1dB or less (1 kHz) | 1 kHz to 100 MHz : +0.5 dB, -3 dB |
| 30 Hz to 30 MHz : +0.5 dB, -3 dB | DC to 20 MHz : +0.5 dB, -3 dB | — |
| — | 0.006 % (2Vp-p) | +28 dBm typ. (68 MHz) |
| — | — | Through feed-through capacitor |
| Through feed-through capacitor | HR10-7R-4P (73) (Hirose Electric) | ±15 V ±5 % |
| ±15 V ±5 % | ±15 V ±1 V | +55 mA typ. +65 mA or less |
| +74 mA typ. +90 mA or less -64 mA typ. -80 mA or less | ±55 mA ±75 mA or less (Max.) | -30 mA typ. -45 mA or less |
| +5 °C to +35 °C | 0 °C to 40 °C | 0 °C to +40 °C |
| -10 °C to 50 °C 5 % RH to 95 % RH | -10 °C to 50 °C 5 % RH to 95 % RH | -10 °C to 50 °C 10 % RH to 80 % RH |
| 68(W)×43(D)×28(H) mm | 76(W)×50(D)×25(H) mm | 68(W)×43(D)×28(H) mm |
| Approx. 100 g | Approx. 120 g | Approx. 130 g |
| Instruction manual, bottom plate, SMA shorting plug | | |

*Note: The contents of this catalog are current as of November 6th, 2024.
Product appearance and specifications are subject to change without notice.
Before purchase, contact us to confirm the latest specifications, price and delivery date.