Low Noise Amplifier

SA-220F5 SA-230F5 SA-430F5 SA-200F3 SA-400F3

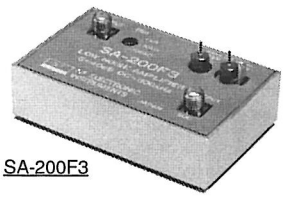
SA series amplifiers are preamplifiers for submicro-signal detection, which have been developed to assure noise reduction never before accomplished. 5 types of SA series amplifiers, which vary by a frequency band, input form, and input impedance, are available. Not only the dedicated power supply but the sensor control power supply is offered for outstanding noise reduction.

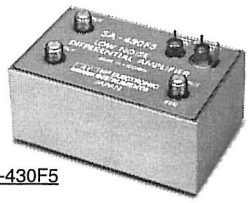
SA series amplifiers have actualized low noise featuring the following items through the adoption of our original circuit that is the application of the negative feedback technology: 50Ω of input impedance, 0.6dB of noise figure (SA-230F5), 0.5nV/√Hz of input voltage noise at 100kΩ (SA-200F3), and 200fA/√Hz of input voltage noise at 1MΩ (SA-220F5).

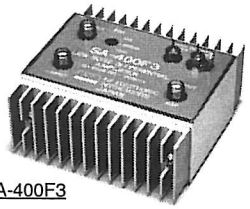
Model	SA-220F5 Low noise FET amplifier	SA-230F5 Low noise amplifier	SA-430F5 Low noise differential amplifier
Frequency band (typ)	300Hz to 100MHz	400Hz to 140MHz	400Hz to 110MHz
▼Input			
Input form	AC coupling, unbalanced single ended input (SMA connector)	AC coupling, unbalanced single ended input (SMA connector)	AC coupling, balanced differential input (2 SMA connectors)
Input impedance	1MΩ ±5% (5kHz) Shunt capacitance: 57pF (typ)	50Ω ±5% (100kHz)	Differential input: 50Ω ±5% (100kHz) Common mode input: 530Ω typ (100kHz)
Maximum input voltage (burnout voltage)	±1.0V	±1.0V	±2.0V (differential input/common input)
CMRR (RTI)	– –	– –	Min. 80dB (100kHz) 90dB typ (100kHz), 80dB typ (10MHz)
Input voltage noise density (short-circuit in input terminal)	Max. 0.7nV/√Hz (100kHz) 0.5nV/√Hz typ (10k to 1MHz)	Max. 0.35nV/√Hz (100kHz) 0.25nV/√Hz typ (10k to 1MHz)	Max. 0.45nV/√Hz (100kHz) 0.35nV/√Hz typ (10k to 1MHz)
Input noise current density	200fA/√Hz typ (100kHz)	5.0pA/√Hz typ (100kHz)	7.0pA/√Hz typ (100kHz)
Noise figure (50Ω)	–	Max. 0.7dB, 0.6dB typ (10MHz) Max. 1.0dB, 0.8dB typ (100MHz)	Max. 1.25dB, 1.10dB typ (10MHz) Max. 1.75dB, 1.40dB typ (100MHz)
▼Output characteristics			
Maximum output voltage	2Vp-p (1kHz to 20MHz, load resistance: 50Ω)	2Vp-p (1kHz to 20MHz, load resistance: 50Ω)	2Vp-p (1kHz to 20MHz, load resistance: 50Ω)
Output impedance	50Ω ±5% (100kHz)	50Ω ±5% (100kHz)	50Ω ±5% (100kHz)
▼Amplifier			
Voltage gain	46±0.5dB (1MHz, load resistance: 50Ω)	46±0.5dB (1MHz, load resistance: 50Ω)	46±0.5dB (1MHz, load resistance: 50Ω)
Voltage gain frequency characteristics	1kHz to 80MHz +0.5, Max. –3dB 300Hz to 100MHz +0.5, –3dB typ	1kHz to 100MHz +0.5, Max. –3dB 400Hz to 140MHz +0.5, –3dB typ	1kHz to 100MHz +0.5, Max. –3dB 400Hz to 110MHz +0.5, –3dB typ
Intercept point	–	+30dBm typ (68MHz)	+28dBm typ (68MHz)
▼Power supply			
Recommended power supply voltage range	±15V ±5%	+15V ±5%	±15V ±5%
Quiescent current (no signal)	Max. +65mA typ +75mA Max. –10mA typ –15mA	Max. +55mA	Max. +55mA typ +65mA Max. –30mA typ –45mA
▼Environment			
Specified temperature range	23°C±5°C	23°C±5°C	23°C±5°C
Storage temperature/ humidity range	–10°C to 50°C, 10 to 80%RH (no condensation)	–10°C to 50°C, 10 to 80%RH (no condensation)	–10°C to 50°C, 10 to 80%RH (no condensation)
▼Dimensions			
Dimensions	68 × 43 × 28mm (protrusion not included)	68 × 43 × 17.6mm (protrusion not included)	68 × 43 × 28mm (protrusion not included)
Weight (NET)	Approx. 130g	Approx. 90g	Approx. 130g

Note: Power supply: SA-915D1

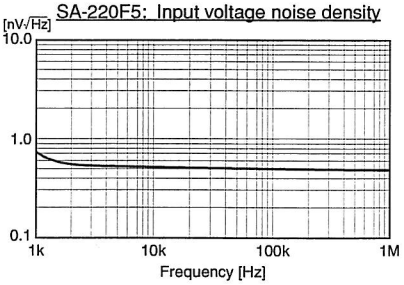

SA-220F5


SA-200F3


SA-430F5


SA-400F3

SA-220F5: Input voltage noise density



SA-230F5: Noise figure