

HIGH SPEED BIPOLAR AMPLIFIER

HSASERIES

BASERIES

DC to 10 MHz, High Speed and Broad Range Maximum 300Vp-p high output voltage plus, minus, source and sink operation are available











NICHT mehr verfügbar

Tough Bipolar Power Amplifier against High Speed, Broad Range, High Voltage, High Power and Various Loads.

HSA and BA series is a power amplifier which has high speed, broad band (HSA: DC to max.10 MHz, BA: DC to 2MHz) and the capability of supplying high voltage and high power. DC+/DC-signal is variable continuously with wide output range of maximum 300Vp-p without switching. Furthermore, as 4 dimensions output is possible, source mode (providing a power to load from a power amplifier in coincidence of voltage polarity and current polarity as normal amplifier) and sink mode (Sinking a power from load to power amplifier in reverse current) operation are available. Therefore, It is possible to drive smoothly a capacitive load and an inductive load like a piezo electric component, a solenoid and others.

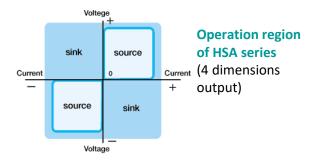
6 difference models concerning frequency range, output voltage and output current are available as HSA series.

Selection Guide	HSA4051	HSA4052	HSA4101	HSA42011	Nicht mehr verfügbar
Frequency band	DC to 500kHz		DC to 10MHz	DC to 1MHz	DC to 2MHz
Outut voltage	300Vp-p		142Vp-p	150Vp-p	300Vp-p
Output current	2.83Ap-p	5.66Ap-p	2.8Ap-p	ЗАр-р	0.5 Arms
Slew rate	450V/μs		5000V/μs	475V/μs	500V/μs

More details on the following pages

Step response

Slew rate which is important when large amplitude output is required, is maximum 5000V/ μ s (HSA 4101). Reproduce a signal in high fidelity by good response for high speed repetitive and high speed transient phenomenon signal.

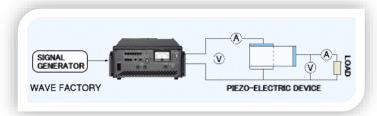


Features

- High speed, broad band and high slew rate Frequency range is DC to max. 10MHz. Slew rate is max. 5000V/μs. A fast rise time pulse signal and a complicated waveform signal can be amplified with a high fidelity.
- **Function of output range shift** Equipped with the range shift function which is able to change output range.
- **High voltage output** Max. output voltage is 300Vp-p. Possible to drive piezo actuators and display devices by a big margin.
- 4 dimensions output (bipolar output) Available for output plus/minus of voltage and current freely. Changing of plus/minus polarity continuously without switching.
- Excellent step response Possible to get a clean waveform of few overshoot and ringing.
- Two inputs are provided Input is A and B of dual inputs. One touch operation for addition and input change.
- DC bias Equipped with DC bias function enabling to add DC to the output.
 Low output impedance Enable to get excellent response in capacitive and inductive load
- Others Equipped with DC offset adjustment function, protection circuit, monitor meter & monitor output, output ON/OFF switch and others.
 - *The above mentioned functions are not equipped with some model. Please refer to the specifications as below for the detail functions and the comparison of each model.

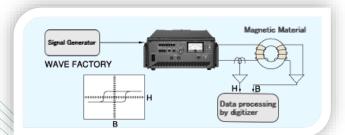
Applications

Driving of Piezo Electric Devices



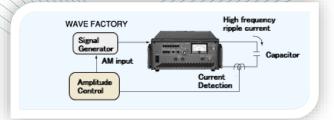
Example of a driving for piezo-electric devices which is used for piezo inverter, piezo actuator and etc. As HSA series have a very low output impedance, good step response is obtained against large capacitance of piezo-electric devices.

Measurement of (B-H curve) for magnetized characteristics of magnetic material



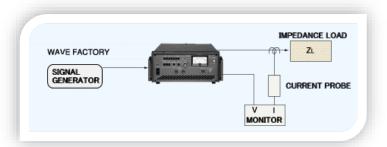
Example of magnetized devices for B-H curve measuring of high frequency magnetic materials. As HSA series have a flat and a wide frequency response and a high stability against inductive loads, high repeatability data is obtained with no influence of loads.

High frequency ripple of capacitors



Example of a withstand ripple test for electric capacitors using a switching power supply. HSA series has not only bias function but also a stable operation against large capacitor loads. It is not caused a difference between a maximum charge current and a maximum discharge current for stable operation against large capacitor loads and symmetry of operation area.

Power amplifiers of signal generators



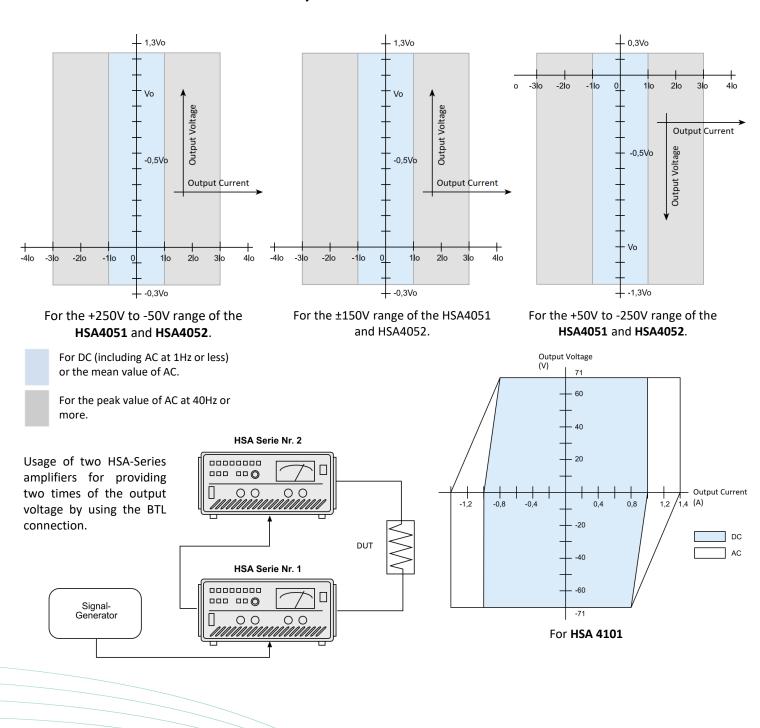
HSA series is suitable for a power amplifier of signal generators. It is possible to provide a stable power against inductive and capacitive loads with wide frequency range , high output voltage and low output impedance.

- Driving for ultra sonic motor
- Research of IC card
- Testing for semiconductor devices
- Bioelectronics
- Chemical electronics

Specifications HSA series

Model		HSA 4051	HSA 4052	HSA 4101	HSA 42011	BA4825
Model					THE PRINCIPLE PR	Nicht mehr BA4825
Freque	ncy range	DC to 5		DC to 10MHz	DC to 1MHz	DC to 2MHz
Output Wa	aximum voltage	RL=100Ω	300Vp-p(±150V) ±150V range RL=50Ω 100Vrms(40Hz to 200kHz) 40Vrms(20Hz to 500kHz) RL=150Ω ±150V(DC to 50kHz) ±55V(DC to 50kHz) -50 to +250V range RL=250Ω -50 to +250V(DC to 50kHz) +45 to +155V(DC to 500kHz) -250 to +50V(DC to 500kHz) -250 to +50V(DC to 500kHz) -250 to +50V(DC to 500kHz) -155 to -45V(DC to 500kHz)	142Vp-p(±71V) RL=50Ω 50Vrms(40Hz to 100kHz) 46Vrms(100kHz to 1MHz) 35Vrms(1MHz to 10MHz) 17Vrms(10MHz to 20MHz) RL=71Ω ±71V(DC to 40Hz)	150Vp-p RL=50Ω 53 Vrms (40 Hz to 1 MHz) 45 Vrms (20 Hz to 40 Hz) RL=75Ω ±75 V (DC to 1 MHz)	#150V range (rated resistance load 200Ω) 100Vrm or greater 40Hz to 500kHz 70Vrms or greater 500kHz to 1MHz 40Vrms or greater 1MHz to 2MHz ±150V range (rated resistance load 450Ω) ±150V (300Vp-p) DC to 500kHz ±100V (200Vp-p) 500kHz to 1MHz ±56V (112Vp-p) 1MHz to 2MHz +250V range (rated resistance load 1,250Ω) -50V to +250V DC to 500kHz +40V to +240V 500kHz to 1MHz +80V to +200V 1MHz to 2MHz -250V range (rated resistance load 1,250Ω) -250V to +50V DC to 500kHz -250V range (rated resistance load 1,250Ω) -250V to +50V DC to 500kHz -240V to -40V 500kHz to 1MHz -200V to -80V 1MHz to 2MHz
Ma	aximum current	1 Arms, 2.83Ap-p(40Hz to 200kHz) ±0.5A(DC to 40Hz)	2 Arms, 5.66Ap-p(40Hz to 200kHz) ±1.0A(DC to 40Hz)	±1.4A(40Hz to 100kHz),±1.3A(100kHz to 1MHz) ±1.0A(1MHzto10MHz),±1A(DC to 40Hz)	1.06 Arms, 3 Ap-p (40 Hz to 1 MHz) AC ±1 A DC	0.5Arms (±150V range, rated resistance load 200Ω)
SI	ew rate	450V/µs typ.	450V/µs typ.	5000V/µs typ.	475V/µs typ.	500V/µs
Im	pedance	1Ω+3.2μH max.	0.5Ω+1.6μH max.	1.5Ω+0.5μH typ.	[0.19+0.0155 f (1+j)] Ω or less (typ.) f : frequency (Hz)	0.5Ω + 1.5μH or less (typ.)
Pr	eamplifier output	Opposite phase of input. (Available for 2 units BTL connection), Connector BNC-R on rear panel				
DC	C bias	±200V(by 10 turns potentiometer)		±70V(by 10 turns potentiometer)	±75 V or above on/off with switch on front panel	±200V or more Allows turning on/off by the front panel switch.
Ot	ther functions	Monitor meter* ¹ , Monitor output, DC offset adjustment, Output ON/OFF switch			Monitor meter*1, Monitor output, DC offset adjustment, Output ON/OFF switch, Protection function: Overload, Output overvoltage, Internal power supply error, Cooling fan error	Output polarity switching, output range shift, output monitoring, external output on/off control, DC bias addition, and DC offset adjustment
tndul Ty	ре	2 inputs of A and B(Enable to add),Same phase both of A and B input against output $50\Omega/600\Omega \text{ selectable}$ ×20,×40,×100,×200 and×(1 to 3)variable continuously		one input(enable to change polarity)	Input A, Input B or addition of input A and input B (When two inputs are on, the maximum input voltage is within ±10 V in total)	2 (A input: Front panel, B input: Rear panel) (Input type may be A input, B input, or both A input and B input.)
	pedance			50Ω	50 Ω± 5%,10 kΩ±5% switchable (Unbalanced, switch between two inputs A and B at once)	5Ω and $10k\Omega$, switchable
Gain				×10,×20,×50,×100 and×(0.4 to 1)variable continuously	Fixed: x1, x10, x20, x50 Variable: x1(CAL) to x3 consecutive Gain Setting is (Fixed)x(Variable).	Fixed: ×1, ×10, ×20, ×50 Variable: ×1 (CAL) to ×3, consecutive The set gain equals to (Fixed × Variable).
Freque	ncy response	500kHz(+0.5 to -3dB, 20Vrms,±150V range)		10MHz(+0.5 to-3dB,10Vrms) ^{*2}	DC to 100 kHz: -1 dB to +1 dB 100 kHz to 1 MHz: -3 dB to +1 dB (Output Amplitude 10 Vrms, reference 400 Hz)	DC to 100kHz, ±0.5 dB 100kHz to 2MHz, +1, -3 dB Conditions: Output amplitude 20 Vrms, reference 1 kHz
Input vo	_	AC100V (One of 120V/200V/220V/240V can be modified by factory option), 48Hz to 62Hz		AC85V to 138V, AC170V to 250V,48Hz to 62Hz	AC100 V to 230 V±10% (Maximum voltage 250 V), Overvoltage category II 50 Hz ±2 Hz or 60 Hz ±2 Hz (Single-phase), Power factor 0.95 or mo	±10V
Power	consumption	340W/500VA	700W/900VA	400W/700VA	290VA	350VA or less
	sions(mm)/Weight	290(W)×132.5 (H)×450(D)/approx.13kg	290(W)×177(H)×450(D)/approx.18kg	220(W)×177(H)x450(D)/approx.7.8kg	220(W)×132.5(H)x450(D)/approx.10kg	58(W)×132.5(H)×390(D) (not including protrusions)/
Dimens	sions(mm)/weight	230(W)×132.3 (11)×430(D)/appiox.13kg	200(11)×177(11)×400(B)/approx.10kg	220(11)*****(11)***100(2)*approx****iong	-()()()	approx. 7kg
Dimens Referer		230(W) x 132.3 (11) x 430(D)/ approx. 13kg	250(**)*****(*)******(*)*****************	*1 Average value indication of DC+AC	() - () - () - () - () - () - () - () - () - () - () - () - () - () - () - () - () - () - () - () - () - () - () - () - () - () - () - () - () - () - () - () - () - () - () - () - () - () - () - () - () - () - () - () - () - () - () - () - () - () - () - () - () - () - () - () - () - () - () - () - () - () - () - () - () - () - () - () - () - () - () - () - () - () - () - () - () - () - () - () - () - () - () - () - () - () - () - () - () - () - () - () - () - () - () - () - () - () - () - () - () - () - () - () - () - () - () - () - () - () - () - () - () - () - () - () - () - () - () - () - () - () - () - () - () - () - () - () - () - () - () - () - () - () - () - () - () - () - () - () - () - () - () - () - () - () - () - () - () - () - () - () - () - () - () - () - () - () - () - () - () - () - () - () - () - () - () - () - () - () - () - () - () - () - () - () - () - () - () - () - () - () - () - () - () - () - () - () - () - () - () - () - () - () - () - () - () - () - () - () - () - () - () - () - () - () - () - () - () - () - () - () - () - () - () - () - () - () - () - () - () - () - () - () - () - () - () - () - () - () - () - () - () - () - () - () - () - () - () - () - () - () - () - () - () - () - () - () - () - () - () - () - () - () - () - () - () - () - () - () - () - () - () - () - () - () - () - () - () - () - () - () - () - () - () - () - () - () - () - () - () - () - () - () - () - () - () - () - () - () - () - () - () - () - () - () - () - () - () - () - () - () - () - () - () - () - () - () - () - () - () - () - () - () - () - () - () - () - () - () - () - () - () - () - () - () - () - () - () - () - () - () - () - () - () - () - () - () - () - () - () -	Japprox. 7kg

HSA 4051, HSA 4052 and HSA 4101



HSA 42011

Unless otherwise noted, below setting and conditions are specified after 30 minute warm up period.

- Output Waveform: sine wave
- Output Polarity : In-phase Load: 50 Ω (Power Factor 1, nominal value)
- Input Impedance : 50 Ω
 Gain Setting : ×50 (CAL)

The following values with accuracy represents warranted performance, values without accuracy are not warranted, they are typical values(typ.) or reference values. Reference values are only supplementary data to use for reference, they do not guarantee performance.

Input				
Input type	Input A, Input B or addition of input A and input B			
прис сурс	(When two inputs are on, the maximum input voltage is within ±10 V in total)			
Input impedance	50 Ω±5%,10 kΩ±5% switchable Unbalanced, switch between two inputs A and B at once)			
Maximum input voltage	±10 V			
Non-destructive input voltage	±11 V			
Input terminals	BNC connector Input A: Front panel, Input B: Rea panel Lo side is connected to the chassis. BNC connector Input A: Front panel, Input B: Rea panel Lo side is connected to the chassis.			
	Output			
Output mode	Constant Voltage (CV)			
Output polarity	In-phase or reversed phase (switchable with switch on front panel)			
Gain setting function	Fixed : $\times 1$, $\times 10$, $\times 20$, $\times 50$ Variable: $\times 1$ (CAL) to $\times 3$ consecutive Gain Setting is (Fixed) \times (Variable).			
Gain error	±5% (Fixed Gain : ×1, ×10, ×20, and ×50, Variable Gain : CAL, at 400 Hz)			
Maximum output voltage	Load of Resistance 50 Ω 53 Vrms (40 Hz to 1 MHz) 45 Vrms (20 Hz to 40 Hz)			
	Load of Resistance 75 Ω ±75 V (DC to 1 MHz)			
Maximum current (AC)	1.06 Arms, 3 Ap-p (40 Hz to 1 MHz)			
Maximum current (DC)	±1A			
Low amplitude frequency characteristics	DC to 100 kHz: -1 dB to +1 dB 100 kHz to 1 MHz: -3 dB to +1 dB (Output Amplitude 10 Vrms, reference 400Hz)			
Slew rate	475 V/μs or above (Input Square wave, output 150 Vp-p)			
Output DC offset	Adjustment Range: ± 0.5 V or above (Input Terminal Short circuit) Temperature Drift: within $\pm (1+0.1\times G)$ mV/°C (typ.) %G is gain (DC bias off)			
Output DC bias	±75 V or above on/off with switch on front panel			
Harmonic distortion factor	0.1% or less (40 Hz to 1 kHz, output 40 Vrms) 0.5% or less (1 kHz to 100 kHz, output 40 Vrms)			
Spurious	-30 dBc or less (100 kHz to 1 MHz, output 40 Vrms)			
Output noise	(3.6+0.08×G) mVrms or less **G is gain (Input terminal short circuit, bandwidth 10 Hz to 1 MHz)			
Outoutions	10 40 0 04 T f /4 i i i i i o na laca (har) fa faranzana (lita)			
Output impedance	[0.19+0.0155 f (1+j)] Ω or less (typ.) f: frequency (Hz)			
Output terminals	BNC connector Terminal Number : 2 (1 for front panel and 1 for rear panel) Lo side is connect to chassis.			
	Terminals on front panel and rear panel are connected in parallel.			
Manifestoria	Output voltage monitor			
Monitor ratio	1/100 of output voltage (1 V / 100 V), same polarity as output voltage			
Monitor accuracy	$\pm 5.0\%$ (DC to 1 MHz) (Error between output voltage and monitor output conversion voltage, load impedance 1 MQ)			
Output impedance	50 Ω±5%			
Output terminal	BNC connector (rear panel)			
	Output level LED meter			
Display item	Output voltage and Output current			
Detection method	Level display from 0% to 100% with 11 LEDs. Average value detection (AC+DC). Calibrated with sine wave.			

		Prot	tection function	
the outpup. Ou		the output up. Output or longer.If	ig excessive output current or excessive internal power loss, current is clipped and the front panel overload LED lights turns off if the overload condition continues for 10 seconds the overload continues for 60 seconds or longer, the mode disabled mode.	
Output overvoltage		Output turns off when an error is detected. If the error continues for 60 seconds or longer, the mode switches to disable mode.		
Internal power supply error		The internal power error LED on the front panel flashes when an error is detected. Then output off ,the mode switches to disable mode.		
Internal temperature error		The front panel overload LED lights up when an error is detected. Output turns off if the temperature error continues for 10 seconds or longer. If the overload continues for 60 seconds or longer, the mode switches to disable mode.		
Cooling fan error		Output turns off when an error is detected. The mode switches to disable mode.		
		External	control input/output	
	Control item		Output on/off	
Control input val		id/invalid	Setting with the DIP switch on the rear panel	

External control input/output			
Control input	Control item	Output on/off	
	Control input valid/invalid	Setting with the DIP switch on the rear panel	
	Input level	Hi:+4.0 V or more Lo:+1.0 V or less	
	Non-destructive input	+6 V/-5 V	
	Input type	Photocoupler LED input (series resistance 150 Ω)	
	Signal detection cycle	50 ms	
Status output	Output type	Open collector output	
	Range of voltage and current	15 V or less, 10 mA or less	
	Status item	Output on/off (output on is short-circuited), Overload (output overload is short-circuited)	
	State update cycle	10 ms	
Terminals		D-sub 9-pin multi connector (rear panel)	

Output on/off control		
Output on/off	Controlled by front panel switch or external control input (When the external control input is valid, only output off is valid for front panel operation)	
Power-on status setting		

Setting method	The DIP switch on the rear panel	
Setting items (8 items)	Output (on/off), Gain, External control (on/off), Output polarity, input A (on/off), input B (on/off), Input impedance ($50\Omega/10k\Omega$), DC bias (on/off)	
Power-on status setting		

	1 ower on status setting	
Power input	AC100 V to 230 V±10% (Maximum voltage 250 V), Overvoltage category II 50 Hz ±2 Hz or 60 Hz ±2 Hz (Single-phase), Power consumption (Maximum) 290 VA Power factor 0.95 or more	
Withstanding voltage*	AC1500 V	
Insulation resistance*	10 M Ω or higher (DC 500 V)	
Operating environment	2000 m or lower	
Altitude	0°C to +40°C 5% RH to 85% RH, (Absolute humidity 1 to 25g/m3, no condensation)	
Guaranteed operation	+5°C to + 35°C 5% RH to 85% RH, (Absolute humidity 1 to 25g/m3, no condensation)	
Guaranteed performance	+5°C to + 35°C 5% RH to 85% RH, (Absolute humidity 1 to 25g/m3, no condensation)	
Storage conditions	−10°to + 50°C 5% RH to 85% RH, (Absolute humidity 1 to 29g/m3, no condensation)	
Dimensions (W×H×D) mm	220×132.5×450 (no protrusions)	
Weight (approx.)	10 kg	

*Between power input vs. others and chassis in total

Output voltage/current range 40 20 Output Current A AC DC

COSINUS Messtechnik - Ihr Partner für Messlösung in allen elektrischen und physikalischen Anwendungen

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