BII5100 Series Power Amplifier Driving Sonar Transducer / Projector

DESCRIPTION

BII5100 series are switching power amplifiers which offer high efficiency and low power consumption for use in underwater, NDT, and HIFU acoustic system.

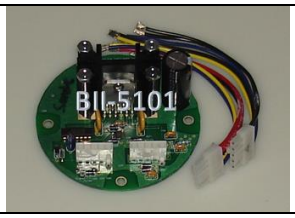
APPLICATIONS

Sub-bottom Investigation, Seafloor-mapping System	Acoustic Modem, Communication, Acoustic Beacon/Transponder
Navigation Echosounder, Underwater Acoustic Positioning	Fishery Sounder, Netsonde, Dipping Sonar, Sonobuoy, HIFU Transducer, Cavitation
Robotics, Proximity Detection, Sound Ranging	Automatic Sizing, Sorting & Positioning of Parts
Level Measurement, Speed Measurement	Counting, Monitoring, Remote Control, Alarming, Motion Detection
Edge Detection, Web Guiding System	Surface/Profile Characterization and Quality Control

ABSOLUTE MAXIMUM RATINGS

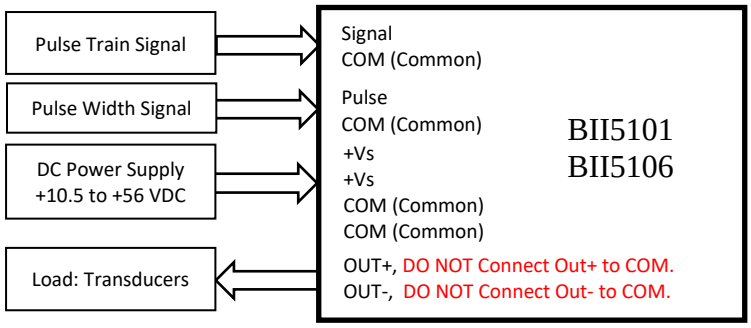
Part Number	BII5101	BII5106
DC Supply Voltage	+60 VDC	+60 VDC
Input Voltage Range	-0.5 V to 5.5 V	-0.5 V to 5.5 V
Output Peak Current	6 A	25 A

SPECIFICATIONS

	BII5101	BII5106
Power Amplifier:		Available in July 2024.
Source Level Capability:	η = 0.1: 185.7 + DI (dB re µPa*m) in Water.	η = 0.1: 191.0 + DI (dB re µPa*m) in Water.
	η = 0.3: 190.5 + DI (dB re µPa*m) in Water.	η = 0.3: 195.8 + DI (dB re µPa*m) in Water.
	η = 0.5: 192.7 + DI (dB re µPa*m) in Water.	η = 0.5: 198.0 + DI (dB re µPa*m) in Water.
	η = 0.7: 194.2 + DI (dB re µPa*m) in Water.	η = 0.7: 199.5 + DI (dB re µPa*m) in Water.
	η = 0.9: 195.3 + DI (dB re µPa*m) in Water.	η = 0.9: 200.6 + DI (dB re µPa*m) in Water.
	η: Transducer efficiency, DI: Directivity Index, in dB.	
Operating Frequency fs:	1 kHz to 1 MHz	1 kHz to 100 kHz
Input Signal Type:	TTL and CMOS Compatible. Pulse Train, Logic Signals.	
Input Logic Voltage Level:	TTL and CMOS Compatible. **Logic Low "0":** 0 to 0.8V. **Logic High "1":** 3.5 to 5V.	
Output Type:	Differential	
Output Signal:	Square Signal	
Output Voltage:	2*(Supply Voltage Vs – 0.66Ω*Output Current), in Vpp.	
Maximum Output Current:	Pulse and Continuous Signals.	
	≤ 3 A peak current	≤ 20 A peak current
	Pulse Signal: Pulse Width ≤ 200 mS, Duty Cycle ≤ 20%.	
	≤ 6 A peak current.	≤ 20 A peak current
RMS Power Capability:	309W@+56VDC Power Supply 261W@+48VDC Power Supply 189W@+36VDC Power Supply 117W@+24VDC Power Supply 45W @+12VDC Power Supply	1050W@+56VDC Power Supply 890W@+48VDC Power Supply 650W@+36VDC Power Supply 410W@+24VDC Power Supply 170W @+12VDC Power Supply
Power Efficiency:	Driving Tuned Transducers (Resistive load): 92% at @Vs=+56VDC 91% at @Vs=+48VDC 88% at @Vs=+36VDC 81% at @Vs=+24VDC 63% at @Vs=+12VDC.	Driving Tuned Transducers (Resistive load): 93.7% at @Vs=+56VDC 92.6% at @Vs=+48VDC 90.2% at @Vs=+36VDC 85.4% at @Vs=+24VDC 70.8% at @Vs=+12VDC.
	Driving Untuned Transducers: Power efficiency depends on impedance phase angle θ of the untuned transducer. It is NOT recommended to drive untuned transducers (active load) with square and pulse waves.	
Supply Voltage Vs:	+10.5 to +56 VDC	
Suggested DC Supply:	Marine Battery, Automobile Battery, or DC Power Supply with Grounded Output and Protection of Output Current Limit. Fully charged 12V Automobile or Marine Battery are from 12.6 to 14.4 VDC. Ensure that voltage of battery pack is less than maximum DC supply voltage.	
Quiescent Current:	13 mA.	
Cable:	0.15 m or 6" wires	
Cable Connector:	Wire Leads	
Mounting:	4 x Φ4.87 mm (Φ0.192") through-holes	6x4.87mm (Φ0.192") through-holes
Size:	Round PCB, ΦDxH = 101.6x50.8 mm	LxWxH=139.7x95.25x46.5 mm
Weight in Air:	155 grams	490 grams
Operating Temperature:	-20 to 80°C or -4 to 176°F	
Storage Temperature:	-20 to 80°C or -4 to 176°F	

WARNING: The buyer should observe the National Electrical Code or other related codes of buyer's country to assemble and integrate this device into buyer's product or system, and follow the code to ground and insulate this device. It is buyer's sole responsibility to make sure the proper insulation and grounding for operating safety before putting the device into service.

SUGGESTED WIRING:

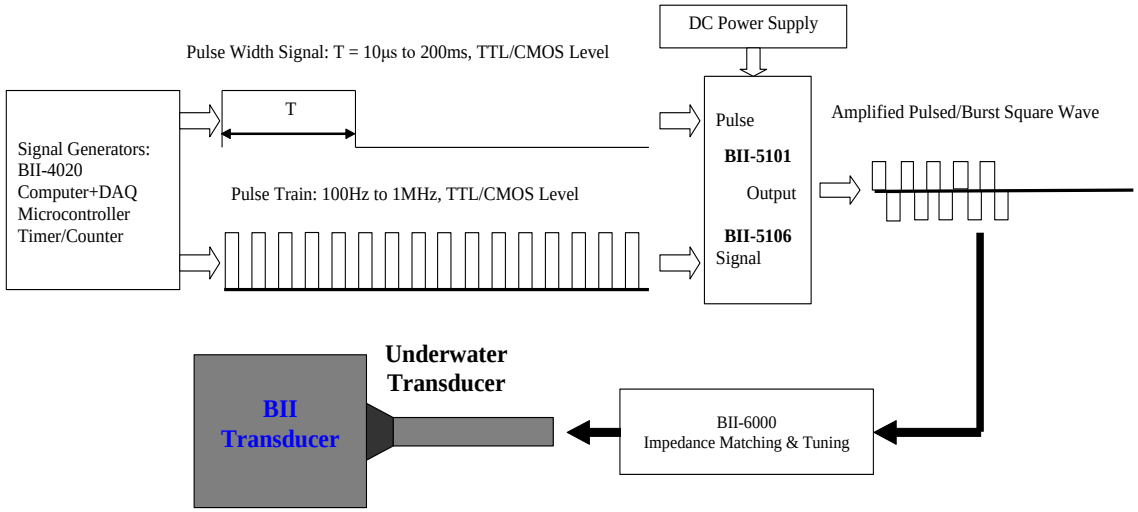


Warning: Outputs of the Power amplifier are differential, DO NOT Connect Out + or Out - to COM.

Generation of Square Waveform and Pulse Signal:		
Digital I/O Board or Microcontroller Digital I/O port.	Timer circuit or astable multivibrator.	Benthowave's SONAR signal generation modules.
SHIPMENT:		
Assembled board, Qty.: 1	Input Terminal with 6" wires: Qty.: 1	Output and Power Supply Plug with 6" wires: Qty.: 1

System Diagram:

Pulse Operation	**Continuous Operation:**
1. Apply Pulse Signal with Pulse Width ≤ 200 mS to **Pulse** terminal. 2. Apply Pulse Train to **Signal** terminal.	1. Apply Logic High or "1" to **Pulse** terminal. 2. Apply Pulse Train to **Signal** terminal.



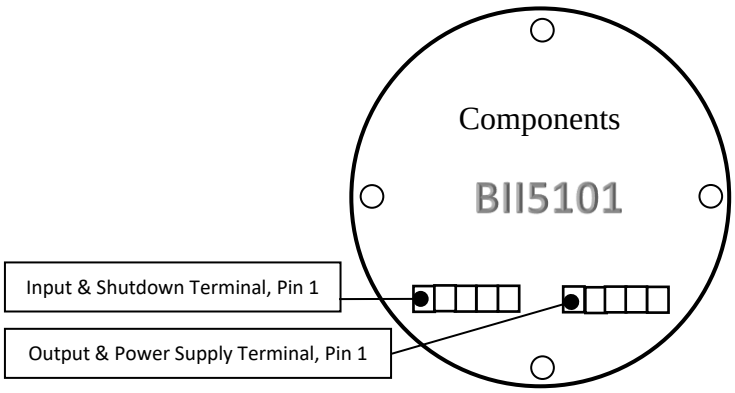
BII5101 TERMINALS and WIRINGS

Input and ST-by (Shutdown) Terminal

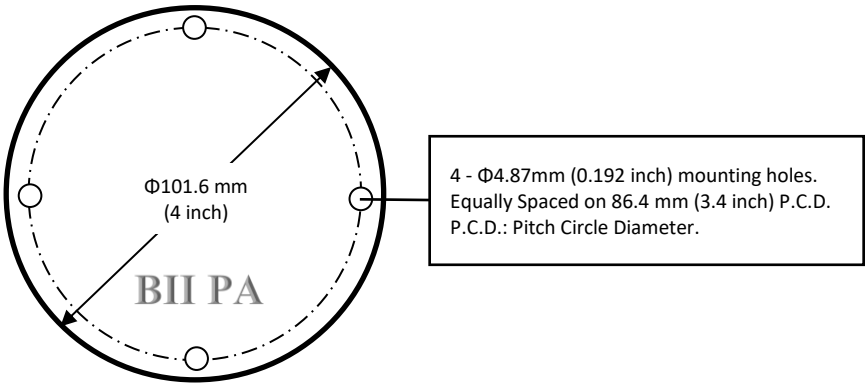
Pin 1: Signal,	Blue,	6" Wire
Pin 2: Pulse,	Yellow,	6" Wire
Pin 3: COM (Common)	Black,	6" Wire
Pin 4: COM (Common)	Black,	6" Wire
Pin 5: COM (Common)	Black,	6" Wire

Output and Power Supply Terminal

Pin 1 OUT+	Blue,	6" Wire
Pin 2: OUT-	Yellow,	6" Wire
Pin 3: COM (Common)	Black,	6" Wire
Pin 4: +Vs,	Red,	6" Wire
Pin 5: +Vs,	Red,	6" Wire



BII5101 Physical Size (unit mm): ΦDxH = Φ101.6x50.8mm



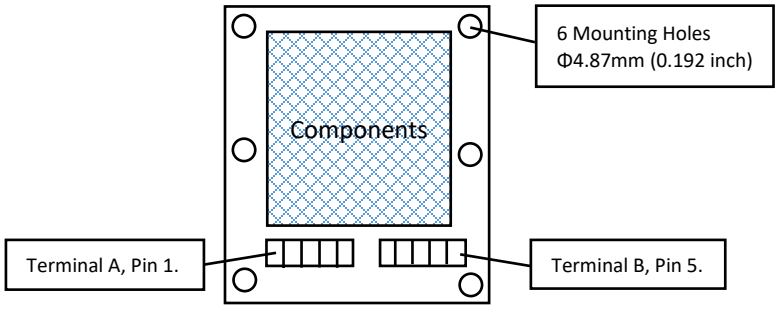
BII5106 TERMINALS and WIRINGS

Terminal A

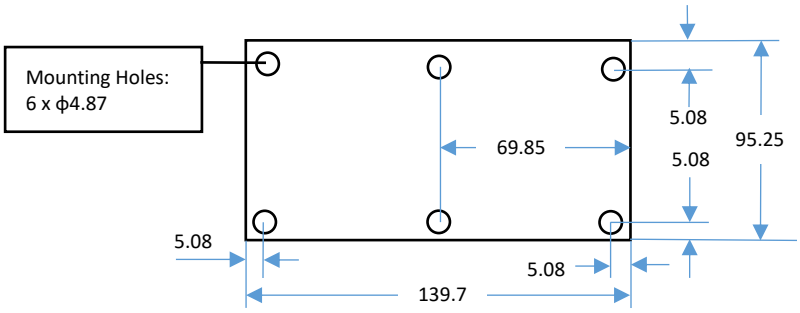
Pin 1: Signal	Blue	6" Wire
Pin 2: Pulse	Yellow	6" Wire
Pin 3: COM (Common)	Black	6" Wire
Pin 4: COM (Common)	Black	6" Wire
Pin 5: +Vs	Red	6" Wire

Terminal B

Pin 1: +Vs	Red	6" Wire
Pin 2: OUT-	Yellow	6" Wire
Pin 3: OUT-	Yellow	6" Wire
Pin 4: OUT+	Blue	6" Wire
Pin 5: OUT+	Blue	6" Wire



BII5106 Physical Size (unit: mm): LxWxH = 140 x 95.25 x 46.5 mm or 5.5" x 3.5" x 1.83"



How to Extend Input and Output Wires of BII Power Amplifiers (PCB Package for Embedded Applications.)?

Input and output wires of BII PA (PCB Package) are 0.15m (6") **AWG16 wires** with wire leads.

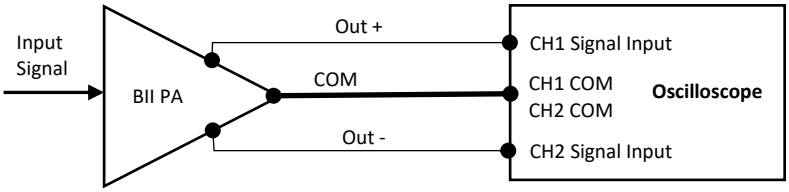
1. **Butt Splice Connectors, Fully Insulated**. Buyers shall refer to the instructions of the manufacturer to strip proper wire leads and crimp the connector for secure connection. If possible, **heat shrink tube** is recommended to sheath the splice and function as strain relief.
2. **Banana Jack and Plug, Fully Insulated, Free Hanging (In-Line)**. Crimp or Solder. Crimp is recommended.

Note:

a. by default, BII does NOT provide these connectors. If buyer needs connectors, please specify when ordering.

b. When wiring, please ensure insulation (avoid short circuit to damage the devices) and safety of operation.

Measure Differential Output of BII Power Amplifiers



Warning: Outputs of the Power amplifier are differential, DO NOT Connect Out + or Out - to any COM.