

Signal Consulting, LLC

16 Wilelinor Drive, Edgewater, MD 21037-1003, USA

Phone: 410-224-8429, Fax: 410-510-1821, E-mail: info@signallc.com

Si30HFHB-50V-30A-ALC, 50V at 30A High-Frequency H-Bridge, DC to 20kHz PWM, with Integrated Finned Heat-Sink, Active-Low Control Inputs, Y-Chip

The **Si30HFHB-50V-30A-ALC** is a 50V 30A, microprocessor based, high-frequency, H-Bridge with high-pulse (0 to +5V PWM) control input. **This controller requires two active Low inputs (or two 0 to 20kHz PWM inputs) on pin I1 and on pin I2 to control the speed and rotation direction of a DC motor (as shown on the truth table given below).** An onboard microprocessor samples the control inputs at 150kHz rate and generates the timing signals for the H-Bridge. The high sampling rate provides a worst-case control latency of 7 μ S when the bridge is changing current direction or switching on or off. Two active Low digital (0 to +5V) control signals ($V_{F,G}$ and $V_{R,G}$) or switches are used to select the direction of rotation (or load current direction) These inputs can be Pulse Width Modulated (PWM) from DC to 20kHz carrier rate. This board uses a single (12V to 50V at 30A) DC power supply to control the speed of a DC motor (or load current) in forward or reverse direction. A bicolor LED is used to monitor the motor (or load) voltage (Red = Forward, Green = Reverse). A small (4.6"x2.4"x1.0") integrated finned heat-sink is used to operate the bridge at 30A (continuous) current levels. Higher current-levels (40A) can be achieved with more efficient heat-sinks. Please click on this link and read the [Board Mounting Instructions and Heat Sink Selection Guide](#). This board operates in a wide voltage-range (12V to 50V) at a maximum continuous load-current of 30A. Typical applications are: Bi-directional DC Motor-Speed Controller, Peltier Effect TE Coolers, Heat Pumps, DPDT Solid State Relay, etc. This board can be configured and programmed to perform efficiently in many customized applications.



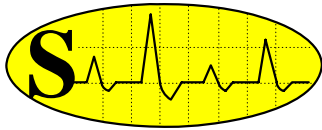
ALC Control Truth Table (on connector CN5)

$V_{F,G}$	$V_{R,G}$	Motor/Load Action
High=5V or pin Open	High=5V or pin Open	Motor Stop / Load Current OFF
Low=0V @ 1mA Sink	High=5V or pin Open	Motor Forward / +Load Current
High=5V or pin Open	Low=0V @ 1mA Sink	Motor Reverse / -Load Current
Low=0V @ 1mA Sink	Low=0V @ 1mA Sink	Motor Forward / +Load Current

- The control lines F and R ($V_{F,G}$, $V_{R,G}$) can be Pulse-Width Modulated (PWM in a range of 0-20k Hz) to vary the average current supplied to a load or to a DC Motor.
- Typical Input Resistance of I1 and I2 is 4.7kOhm, relative to pin +5V

Specification and Application of Si30HFHB-50V-30A-ALC

- **Typical Operating Temperature at 30A:** 45 $^{\circ}$ C with the Metal Heat-Ring Bolted to the (4.6"x2.4"x1.0") Finned Heat-Sink, while it is exposed to air at 25 $^{\circ}$ C (as shown on photograph).
- **Overall Dimensions:** Length=4.6", Width=2.4", Height=2.0" Inches, (L=117, W=62, H=51 mm).
- **Source-Voltage Requirements:** V_p (pin +P to pin -P) 12V to 50V, unregulated or regulated DC.
- **Average Load Voltage (pin +L to pin -L):** 0V at 0% Duty-Cycle and V_p at 100% Duty-Cycle.



Signal Consulting, LLC

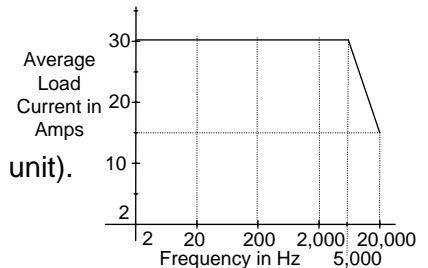
16 Wilelinor Drive, Edgewater, MD 21037-1003, USA

Phone: 410-224-8429, Fax: 410-510-1821, E-mail: info@signallc.com

- **Max. Continuous Load Current:** 30A at 100% Duty-Cycle.
- **Max. Load Current for 5Sec:** 50A at 100% Duty-Cycle.
- **Control Type:** Active-Low Control (0 to +5V).
- **Worst-Case Control Latency:** 7 micro seconds.
- **Load Voltage Rise or Fall-Time (10% to 90%):** 12 micro seconds.
- **Load Isolation:** The Load or Motor must be isolated from the source voltage (V_P).
- **Power-Conversion Efficiency:** Approximately 98.5% at full-load (50V and 30A).
- **Load-Voltage Indicator:** An onboard bicolor LED is used to monitor the motor (or load) voltage (Red = Forward, Green = Reverse).
- **Onboard 30A Fast Mini-Blade Auto Fuse:** Replace, from DigiKey, Part Number: [F6079-ND](#)

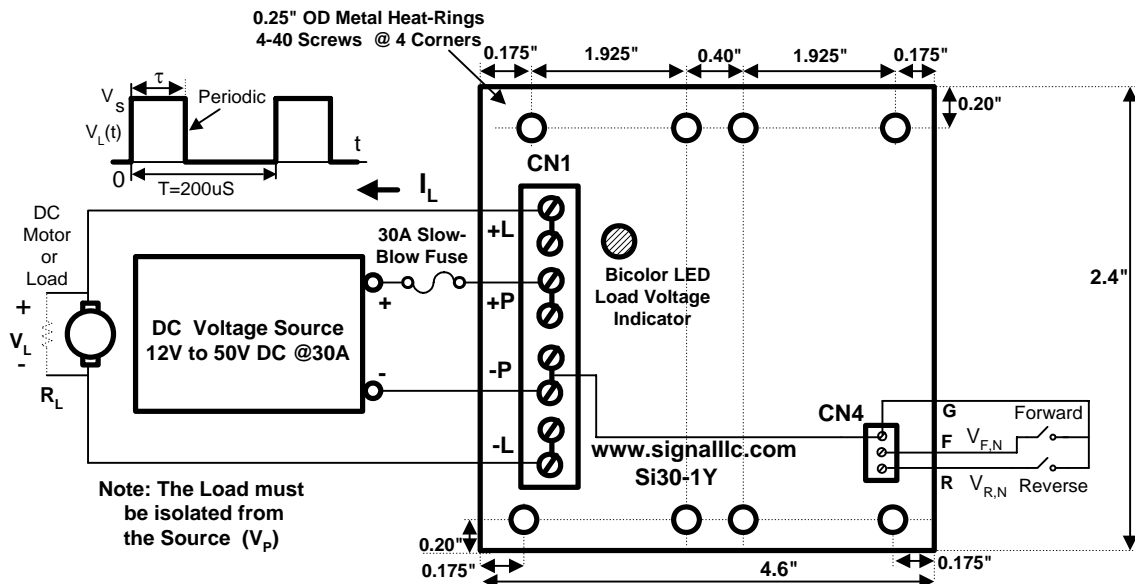
Frequency Response of the Si30HFHB-50V-30A-ALC

The F and R control lines ($V_{F,G}$, $V_{R,G}$ inputs, 0 to +5V) can be Pulse-Width Modulated (PWM with a duty-cycle of 0% to 100%) over a wide range of carrier frequencies, as shown on the graph. This plot was obtained with the finned heat-sink (4.6" x 2.4" x 1.0", as shipped with the unit). Improved performance can be achieved with more effective heat-sinks.



A Typical Motor Control Application of the Si30HFHB-50V-30A-ALC

In this open-loop application, the motor direction is controlled by 2 external normally-open switches connected to pins F (forward) and R (reverse) on port CN4 (as shown below).



Warning: The connecting wires to the Load and the Power Supply must be heavy gauge copper wire (#12 AWG or heavier) to handle the rated current level. In addition, these heavy gauge wires act as a heat sink, protecting the board from overheating. Note that each connecting point on CN1 is available at 2 places, thus two smaller wires can be used in place of a larger one. Each Pin on CN1 has a current rating of 32A (or 64A Jointly).

Typical Applications: Driver for Variable-Speed Bidirectional DC Motors, Peltier Effect TE Cells, Heat Pumps, PPDT Solid State Relays.