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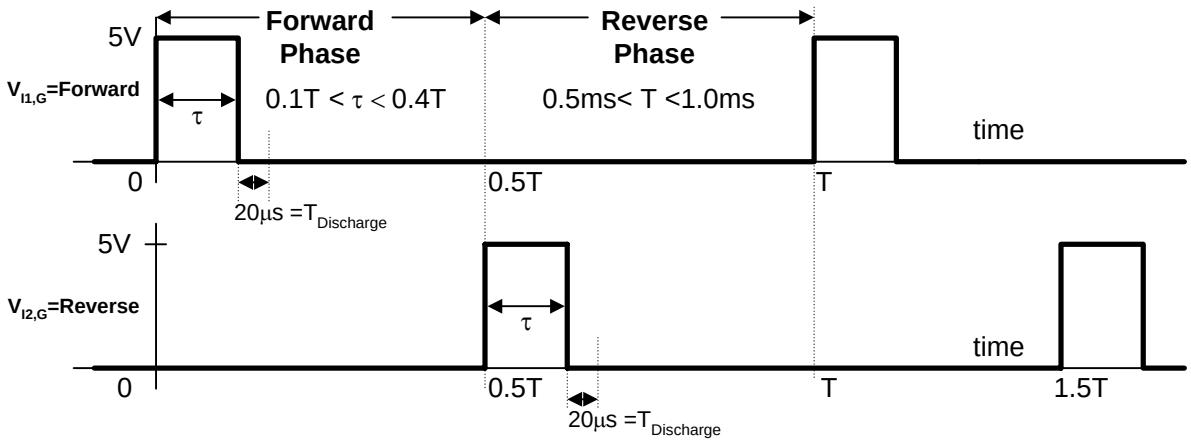
Si26HFHB1-AHC2-30V-20A-FHS4, 30V 20A High-Frequency H-Bridge, with 2-Phase Active High Control Inputs and with Integrated Finned Heat-Sink for 2-Phase DC Brushless Motors, Y-Chip

The **Si26HFHB1-AHC2-30V-20A-FHS4** is a 30V 20A, microprocessor based, high-power, High-Frequency, H-Bridge with a 2-Phase Active High Control and with a small (4.0"x3.6"x0. 55") Integrated Finned Aluminum Heat Sink. This controller uses a single (9V to 30V at 0 to 20A) DC power supply to control the speed of a 2-Phase Brushless DC motor (or Inductive Load) in forward or reverse direction. Two active high control signals $\mathbf{V_{I1,G}}$ and $\mathbf{V_{I2,G}}$ (shown on the Timing Diagram) are required on pins **I1** and **I2** on connector **CN6** (shown on the application diagram) to control the motor speed. These 2-phase control signals are always out of phase by 180^o (**I2** lags **I1** by 180^o) independent of the period T (where the minimum period is 0.5ms). The Pulse Duration τ of each control input is: $0.1T<\tau<0.4T$ and the duty-cycle (τ/T) controls the average load-current in the forward or reverse direction. An onboard microprocessor follows (or mirrors) these control signals ($\mathbf{V_{I1,G}}$ and $\mathbf{V_{I2,G}}$) and generates the necessary timing signals to the High-Power, High-Frequency H-Bridge; controlling the motor-current (coil-current) in the forward and reverse direction. The fast-acting H-bridge conducts current in the forward direction long as control input **I1** is in a high state ($\mathbf{V_{I1,G}}$ = +5V). Similarly, H-bridge conducts current in the reverse direction long as control input **I2** is in a high state ($\mathbf{V_{I2,G}}$ = +5V). After each conduction cycle, inductive load (motor coil) is short circuited for 20μs discharging the stored energy in the motor coil. The H-bridge operates in the open-circuit mode for the remaining part of each cycle. The fast-acting H-bridge responds to control changes within 3.5μs, producing load-voltage rise and fall-times of 4μs. All inputs are optically isolated or zener-diode protected. A bicolor LED is used to monitor the motor (or load) voltage (Red = Forward, Green = Reverse). A small (4.0"x3.6"x0.55") integrated Finned Aluminum Heat-Sink is used to operate at 20A current levels. Higher current-levels (25A or 750W) 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 (9V to 30V) at max. continuous load-current of 20A. Typical applications are: 2-Phase Brushless DC Motor-Speed Controller, Differential Coil Driver, etc.

Input Control Timing Diagram, (I1, I2 Pins are on Connector CN6)



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Specification and Application of Si26HFHB1-AHC2-30V-20A-FHS4

- **Typical Operating Temperature at 20A:** 45^{0}C with the Metal Heat-Ring Bolted to the (4.0"x3.6"x0.55") Finned Aluminum Heat-Sink, while it is exposed to air at 25^{0}C (as shown on photograph).
- **Overall Dimensions:** L=3.9, W=3.65, H=1.7 inches, (L=100, W=93, H=42 mm).
- **Source-Voltage Requirements: V_P (from pin +P to pin -P)** 9V to 30V, unregulated DC voltages.
- **Average Load Voltage (from pin +L to pin -L):** 0V at 0% Duty-Cycle and **V_p** at 100% Duty-Cycle.
- **Max. Continuous Load Current:** 20A at 100% Duty-Cycle.
- **Max. Load Current for 5Sec:** 40A at 100% Duty-Cycle.
- **2-Phase, Active High TTL (0 to +5V) Control Inputs:** On pins I1 and I2 on connector CN6, as shown on the timing diagram.
- **Maximum Control-Signal Frequency:** 2kHz, or T_{min} = 0.5ms
- **Control-Signal Duty-cycle, τ/T:** 0.1< **τ/T** <0.4
- **Coil Discharge-Time (Motor Coil is short-circuited):** 20 μs
- **Maximum H-Bridge Latency to a Control Input:** 3.5 μs
- **Load Isolation:** The Load or Motor must be isolated from the source voltage (**V_P**).
- **Power-Conversion Efficiency:** Approximately 97.5% at full-load (30V and 20A).
- **Load-Current Indicator:** An onboard bicolor LED is used to monitor the motor (or load) voltage (Red = Forward, Green = Reverse).
- **Voltage Requirement:** The Si26 will work with any DC Load in the 9 V to 30 V range. In addition, the power filters are included on this board. Consequently, only unregulated (full-wave rectified) DC input power is required in most applications.

A Typical Application of the Si26HFHB1-AHC2-30V-20A-FHS4

In this open-loop, 2-Phase control application (as shown below) the inductive load-current (in forward or reverse direction) is controlled by the input signals **$V_{I1,G}$** and **$V_{I1,G}$** connected to pins **I1** and **I2** on **CN6**. **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.**