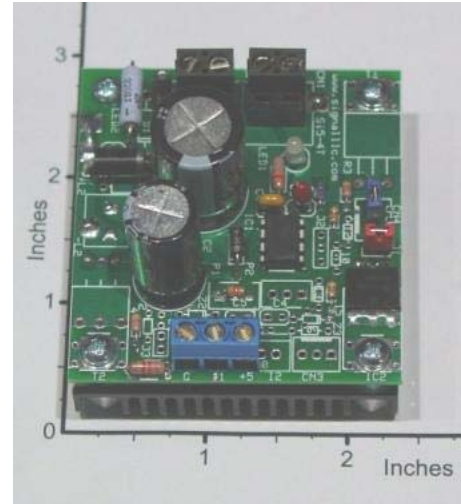




Si5SDAT1-30V-20A, Single, 30V 20A Solenoid Driver with Adjustable Timer and with Integrated Heat Sink, T-Chip

The **Si5SDAT1-30V-20A** is a single, 30V 20A, Solenoid Driver with an integrated heat sink that uses a microprocessor based adjustable timer to fully turn on or off the current in an inductive load. This board requires a single 9V to 30V DC power source (unregulated and unfiltered) at a 0A to 20A current range to operate normally with a wide range of inductive loads (coils or Solenoids). Snubbing circuits and filter capacitors are included to suppress inductive switching transients. An onboard LED (red) is used to monitor the load-voltage. The **onboard timer** can operate in two user-selectable modes (selected by a jumper, labeled as **CN3**). In the **One-Shot Mode** (with **CN3 Open**), each positive voltage edge (0 to +5V transition at pin **I1** relative to pin **G** at **CN5**) produces a coil-current pulse. The pulse width is adjustable from 5 to 500 milliseconds using an on-board 25-turn potentiometer labeled as **P2**. In the **Periodic Mode** (with **CN3 Short**), the coil pulses are periodically generated as long as the input voltage at pin **I1**, relative to pin **G**, at **CN5** is greater than +2.5V. The pulse width is adjustable from 5 to 500 milliseconds using an on-board 25-turn potentiometer (**P2**); while the time-delay between pulses is adjustable from 0.1 to 20 sec using a second 25-turn potentiometer (**P1**). The initial value of the load current is also user selectable by a second jumper (labeled as **J1**). If the jumper **J1 is open**, then the **initial load current is fully on** (or the initial load current is maximum) before a valid positive edge or level has arrived at the control input (pin **I1**). If the jumper **J1 is short**, then the **initial load current is fully off** (or the initial load current is zero) before a valid positive edge or level has arrived at the control input (pin **I1**). The control input (**I1**) requires 0 to 5V voltage levels to operate properly. This input is zener-diode protected and can withstand severe overloads. **Both of these jumpers are examined only at power turn-on; consequently, the power must be turned on and off whenever these jumpers are reconfigured.**



A small (2.3"x2.4"x0.45") finned integrated heat sink is included with mounting hardware (as shown on the photograph) to operate at 20A or 600W power levels. Higher power-levels (30V, 40A or 1200W) can be achieved with more efficient heat-sinks. Please click on this link and read the [Board Mounting Instructions and Heat Sink Selection Guide](#). Typical applications are: Inductive-Plunger Driver, SPST Solid State Relay, etc. This board can be configured to perform efficiently in many customized applications.

Specifications and Application for **Si5SDAT1-30V-20A**

- **Typical Operating Temperature at 20A:** 45°C with the Metal Heat-Ring Bolted to a small (2.3"x2.4"x0.45") finned Aluminum Heat-Sink, while the plate is exposed to air at 25°C (as shown on the photograph).
- **Source-Voltage Requirement (V_P from pin +P to pin -P):** Any DC voltage from 9V to 30V, unregulated and unfiltered DC.
- **Max. Continuous Average Load-Current:** 20A at 100% duty-cycle, with heat-sink (as shown).
- **Max. Load-Current for 5sec:** 40A at 100% duty-cycle, with heat-sink (as shown).
- **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).



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- **Pulse Width Adjustment:** The pulse width is adjustable from 5 to 500 milliseconds using an on-board 25-turn potentiometer (P2) in the One-Shot mode, as well as, in the Periodic mode.
- **Periodic Delay Adjustment:** Time-delay between pulses is adjustable from 0.1 to 20sec using a second 25-turn potentiometer (P1) in the Periodic mode.
- **Scope Output:** The coil action can be monitored and timed by connecting an oscilloscope or a chart recorder to the pins Gnd and +Scope on connector CN4. Voltage levels are 0 to +5V.
- **Load-Voltage Indicator and Board Protection:** An onboard LED (red) is used to monitor the coil (or load) voltage.

About the Voltage Requirement: The Si5 will work with any DC motor or load in the 9V to 30V voltage range. In addition, the power filters are included on this board; consequently, only unfiltered (full-wave rectified) DC input power is required in most applications.

A Typical Application of the Si5SDAT1-30V-20A

In this **One-Shot Mode and High Initial-Current State application**, a 20A at 30V inductive load (coil or solenoid) is turned on and off by the digital control voltage $V_{I1,G}$. The load current is **fully on** (max) when $0 < V_{I1,G} < 2.5V$; and the load current is **Pulsed to zero** when $2.5V < V_{I1,G} < 5V$ and $V_{I1,G}$ has a positive edge. An inexpensive, unregulated DC power supply design is shown in this application drawing. This power supply consists of a transformer, a 25A bridge rectifier (purchased from www.digikey.com with part number MB256-ND) and an optional capacitor (C=2200uF, 35V). A wide variety of linear and switching power supplies can, also, be used with this board. Consult the most recent catalog on www.mpja.com to purchase these power supplies.

Warning: The connecting wires to the Motor and the Power Supply must be heavy gage copper wire (#12 AWG or heavier) to handle the rated current level. In addition, these heavy gage wires act as a heat sink, protecting the board from overheating.

