



Signal Consulting, LLC

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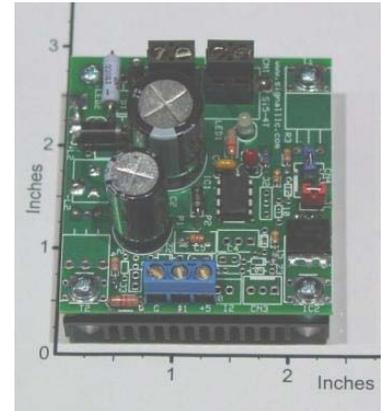
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## Si5SDAFT1-50V-20A, Single, 50V 20A Solenoid Driver with Adjustable Fast-Timer and with Integrated Heat Sink, T-Chip

The **Si5SDAFT1-50V-20A** is a single, 50V 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 50V 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 2 to 200 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 1ms to 128ms in 0.5ms steps using an on-board 25-turn potentiometer (**P2**); while the time-delay between pulses is adjustable from 1ms to 128ms in 1ms steps 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.

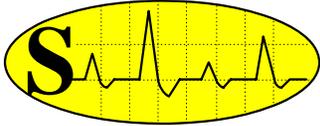
**Both of these jumpers are examined only at power turn-on; consequently, the power must be turned on and off whenever these jumpers are reconfigured.**



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 1000W power levels. Higher power-levels (50V, 30A or 1500W) 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 **Si5SDAFT1-50V-20A-16Hz**

- **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 50V, 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 (50V and 20A).



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- **Pulse Width Adjustment:** The pulse width is adjustable from 1ms to 128ms in 0.5ms steps 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 1ms to 256ms in 1ms steps 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 50V 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 Si5SDAFT1-50V-20A

In this **One-Shot Mode and High Initial-Current State** application, a 20A at 50V 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 and an optional capacitor ( $C=2200\mu F$ , 50V). 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](http://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.**

