# High Power Load Control Module (50A to 200A)

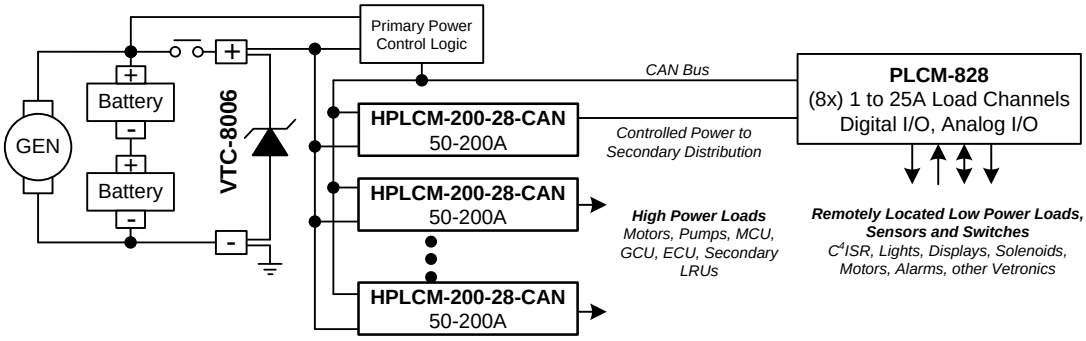
## FEATURES

- Solid state 28VDC load control
- $I^2t$ trip and instant trip protection
- Programmable $I^2t$ trip point, 50A to 200A
- Programmable Instant trip, 400A to 950A
- Overload thermal memory
- Over-temperature protection
- Internal isolated logic power supply
- Analog control input
- Low power dissipation
- Soft turn-on and turn-off
- Isolated CAN bus for control and monitoring


## TYPICAL APPLICATIONS

The 200A High Power Load Control Module (HPLCM-200-28-CAN) is a compact solid state power controller (SSPC) used in 28VDC power distribution systems to control and protect electronic loads. The HPLCM-200-28-CAN is ideally suited for use in rugged applications as a highly reliable, small and low cost alternative to mechanical relays and circuit breakers. The HPLCM provides very low loss high-side load switching, overload protection, and a standard CAN bus (SAE J1939) for load controlling and load monitoring.

- Military and Commercial Vehicles
- Military and Commercial Ships
- Unmanned Aerial and Ground Vehicles
- Industrial Controls and Automation
- 24VDC/28VDC Power Distribution Systems
- Load Control and Protection



## GENERAL DESCRIPTION

The 200A High Power Load Control Module (HPLCM-200-28-CAN) operates in 24VDC/28VDC powered systems and provides load switching, load protection, and load monitoring. The HPLCM-200-28-CAN does not require an external power supply for internal logic operation. All required internal voltages are generated from the main input power (***$V_{IN}$***) and are electrically isolated from (***$V_{IN}$***). The HPLCM-200-28-CAN has an isolated CAN bus, compliant with SAE J1939, for controlling and monitoring the load. The load is controlled by either an analog control signal or CAN bus command while load and module status are provided via CAN bus message and a single open collector status pin. All control and status signals are isolated from the power return (***$V_{IN}$RTN***) and referenced to their isolated return ***(SIGRTN)*** at connector J1.

The HPLCM-200-28-CAN allows inrush and transient current overloads of short duration to pass without causing a trip. The trip times are inversely proportional to the square of the current. A CAN bus command is used to set the trip point from 50A to 200A in 1A increments. The default trip point is set to 100A. An instant trip function defines the upper current level that will initiate a trip without an $I^2t$ delay. A CAN bus command is used to set the instant trip from 400A to 950A in 1A increments. The default instant trip is set to 400A. The default trip point and default instant trip can be modified, prior to shipment, to fit an application's requirements.

In addition to the overcurrent protection features, the HPLCM-200-28-CAN provides an over temperature detection and shutdown function.

The HPLCM-200-28-CAN provides the general interfaces and functions as shown in Figure 1 and Table 1.

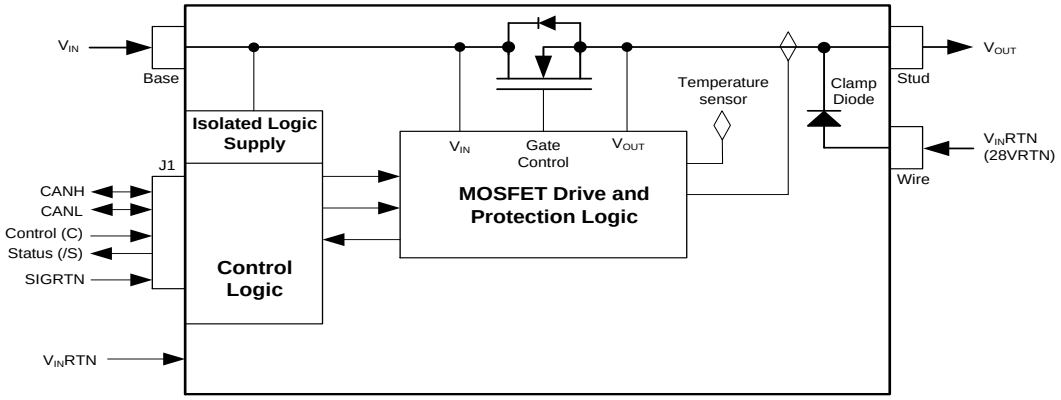



Figure 1. HPLCM-200-28-CAN General Interface

Table 1. HPLCM-200-28-CAN Basic Functional Characteristics

| | |
|---|---|
| Input voltage ($V_{IN}$) | 6V to 40V steady state, 65V surge |
| $I^2t$ trip point (CAN command) | 50A to 200A |
| Instant trip point (CAN command) | 400 to 950A |
| Voltage drop ($V_{IN}$ to $V_{OUT}$) at 200A load current | 75mV maximum |
| Power dissipation at 200A load current | 15.6W maximum |
| Voltage drop ($V_{IN}$ to $V_{OUT}$) at 160A load current | 60mV maximum |
| Power dissipation at 160A load current | 10.2W maximum |
| Load current monitor | 25A to 950A (± 7%) |

## Package

The HPLCM-200-28-CAN package, shown in Figure 2 and Figure 3, minimizes load distribution losses and cost while providing the highest functional density. The logic signals are connected using a standard 11-pin connector. The positive input power is connected through the electrically conductive base and the load output is connected to the threaded output stud using bus bars or cables with ring terminals. The HPLCM-200-28-CAN weighs less than 300 grams.

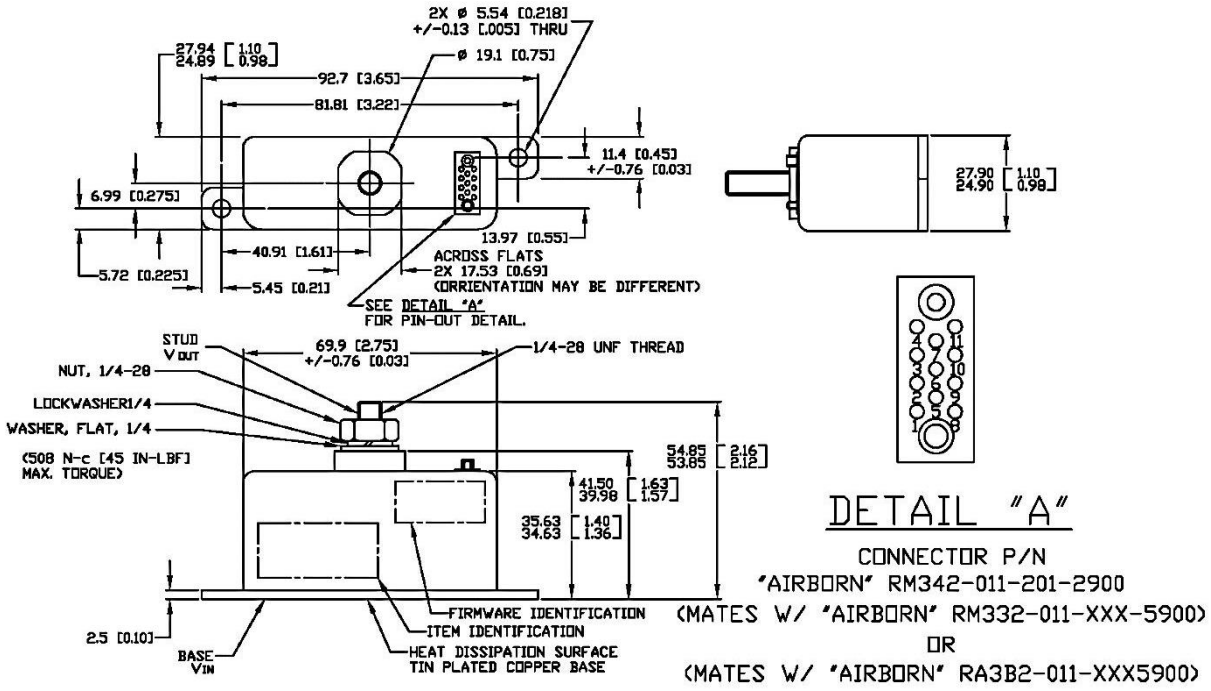



Figure 2. HPLCM-200-28-CAN Package Outline (without clamp diode option)

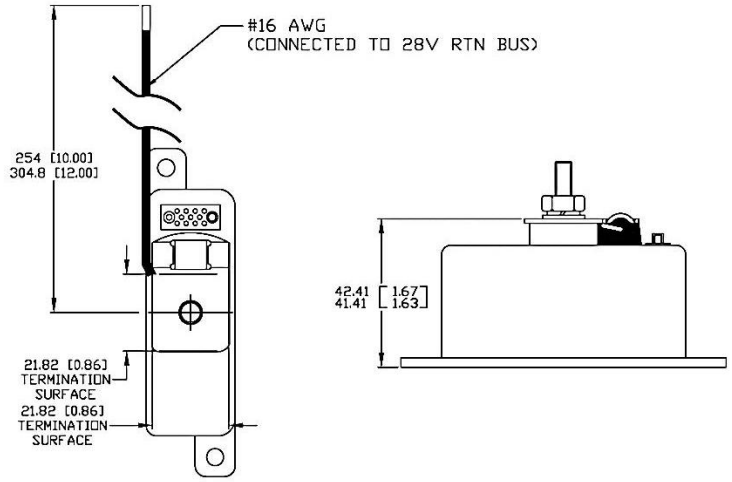



Figure 3. HPLCM-200-28-CAN Package Outline (with clamp diode option)

Note: All dimensions are in mm[in] and have tolerances of +/- 0.25mm[0.010"] unless otherwise specified.

## PERFORMANCE CHARACTERISTICS

### External Electrical Connection Interface

All electrical connections to the HPLCM-200-28-CAN are shown in Table 2. Logic signal connections are made using an 11-pin connector mate as shown in Figure 2 and Figure 3 above. The load output (***$V_{OUT}$***) connection is made to a threaded terminal (stud) using a ring terminal or bus bar. The input power (***$V_{IN}$***) connection is made through the package base when attached to a conductive surface using two mounting fasteners.

The HPLCM-200-28-CAN enclosure was designed to provide a dense packaging footprint where the physical mounting would also provide the main input electrical connection and thermal dissipation interface. This packaging allows multiple modules to be mounted directly to a positive bus bar thereby eliminating separate input terminals on each device. The load output terminal and the entire base are matte tin plated copper. The portion of the module between the load output terminal and the base is electrically isolated from all other electrical signals.

The HPLCM-200-28-CAN is provided with an optional diode used to suppress voltage transients caused by the store energy in an unclamped inductive load. The diode's cathode is connected directly to the load output terminal and, a 16 AWG wire is connected to the diode's anode. A ring terminal can be connected to the diode wire (anode) before it is attached to a nearby ***$V_{IN}$RTN*** point. The diode will clamp the negative kickback voltage on ***$V_{OUT}$*** to just a few volts during inductive load turn-off.

Table 2. HPLCM-200-28-CAN Electrical Connections

| PIN NAME | NUMBER | PIN DESCRIPTION |
|---|---|---|
| CANL | 1 | CAN bus line (dominant low), CAN ground is SIGRTN. |
| CANH | 2 | CAN bus line (dominant high), CAN ground is SIGRTN. |
| **NC** | 3 | Factory test pin. Do Not Connect. |
| SIGRTN | 4 | Signal reference |
| CAN_Address | 5 | Set CAN address by an external resistor between Pin 5 and Pin 11 |
| STATUS (***/S***) | 6 | Load Output Status - Active Low. Open collector with 50VDC, 25mA maximum load, referenced to SIGRTN (See Table 6). |
| **NC** | 7 | Factory test pin. Do Not Connect. |
| CONTROL (***C***) | 8 | Control Input ON/OFF, referenced to SIGRTN. When driven (rising) above 10.5-11.5V (HW Version 2) the load output turns ON. The load output turns OFF when left floating or driven (falling) below 4-5V (HW Version 2). |
| ***$V_{IN}$RTN*** | 9 | $V_{IN}$ Return (***$V_{IN}$RTN*** or 28VRTN) |
| **NC** | 10 | Factory test pin. Do Not Connect. |
| Address_RTN | 11 | CAN address Return |
| ***$V_{IN}$*** | Base | +28V Input Power |
| ***$V_{OUT}$*** | Stud | Load Output Power. This pin is internally pulled down to ***$V_{IN}$RTN*** through 10K ohm resistor. |
| ***Diode*** | Wire | Clamp diode anode connection. Connect to ***$V_{IN}$RTN*** bus. |