CL-608 Product Family Specification

PFS-CL608

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USING THIS DOCUMENT

The specifications contained herein represent all possible configurations for this product family. The actual configurations available on each module may be a subset of this specification. Please refer to the module-specific datasheet for the connector pinout and configurations that are available.

USER LIABILITY

The OEM of a machine or vehicle in which HED® electronic controls are installed is fully responsible for all consequences that might occur. HED®, and any authorized distributor, has no responsibility for any consequences, direct or indirect, caused by failures or malfunctions. Failure or improper selection or improper use of HED® products can cause death, personal injury and property damage.

The OEM must analyze all aspects of their application and review the information concerning product or system in the current product documentation. Due to the variety of operating conditions and applications for these products or systems, the user, through its own analysis and testing, is solely responsible for making the final selection of the products and systems and assuring that all performance, safety and warning requirements of the application are met.

The products described herein, including without limitation, product features, specifications, designs, availability and pricing, are subject to change by HED® at any time without notice.

INPUT STB/STG/VTD (PIN B01)
INPUT STB/STG/FREQ (PIN B02)
INPUT STB/STG (PINS B03–B04)

Switch-to-Battery (STB) Mode[1]

Input Resistance
- 1.4KΩ (typical)

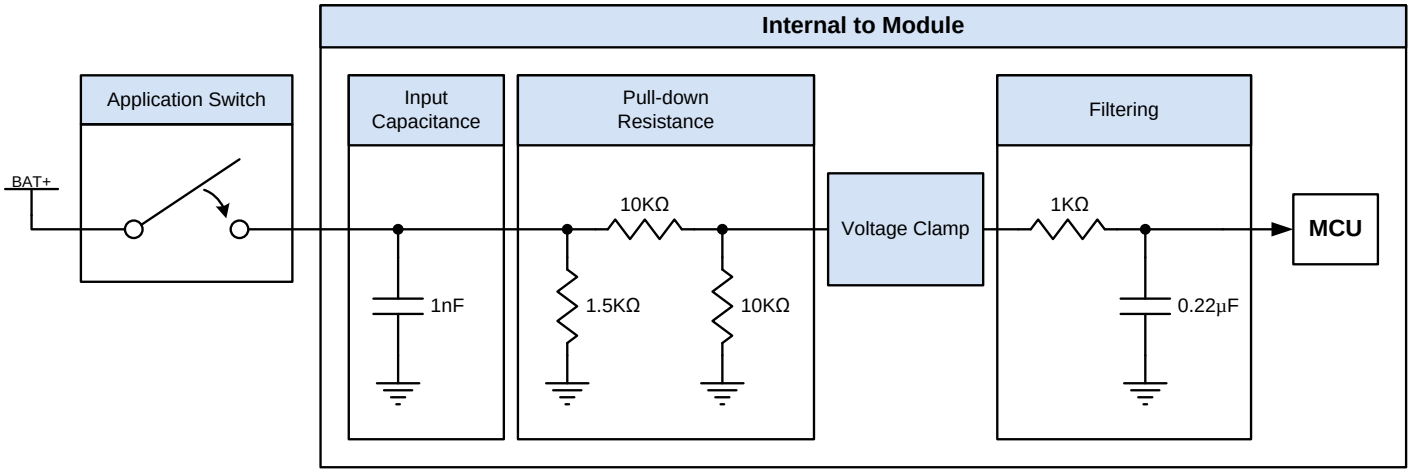
Input Current
- 5.7mA at 8V (typ)
- 24.0mA at 32V (typ)

Positive Going Threshold
- > 6.5V

Negative Going Threshold
- < 3.5V

Parallel Resistance
- 2KΩ at 8V (minimum)
- 12KΩ at 32V (minimum)

Series Resistance
- 220Ω (maximum)



Switch-to-Ground (STG) Mode[2]

Pull-up Resistance
- 560Ω (typical)

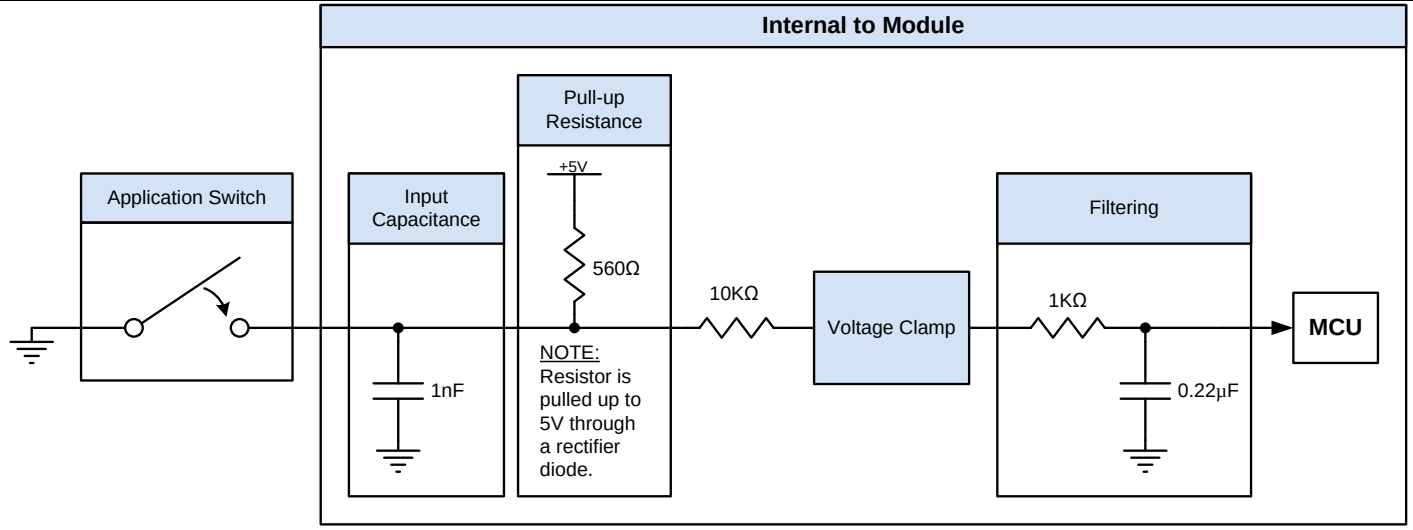
Input Current
- 7.6mA at 0V (typical)

Positive Going Threshold
- > 3.25V

Negative Going Threshold
- < 1.75V

Parallel Resistance
- 2KΩ at 0V (minimum)

Series Resistance
- 220Ω (maximum)



[1] Pin B01 has a voltage divider in STB Mode of 68.1KΩ/68.1KΩ instead of 10KΩ/10KΩ, resulting in approximately 5% to 10% reduction of input current.
[2] Pin B01 has a series resistance in STG Mode of 68.1KΩ instead of 10KΩ.

INPUT STB/STG/VTD (PIN B01)

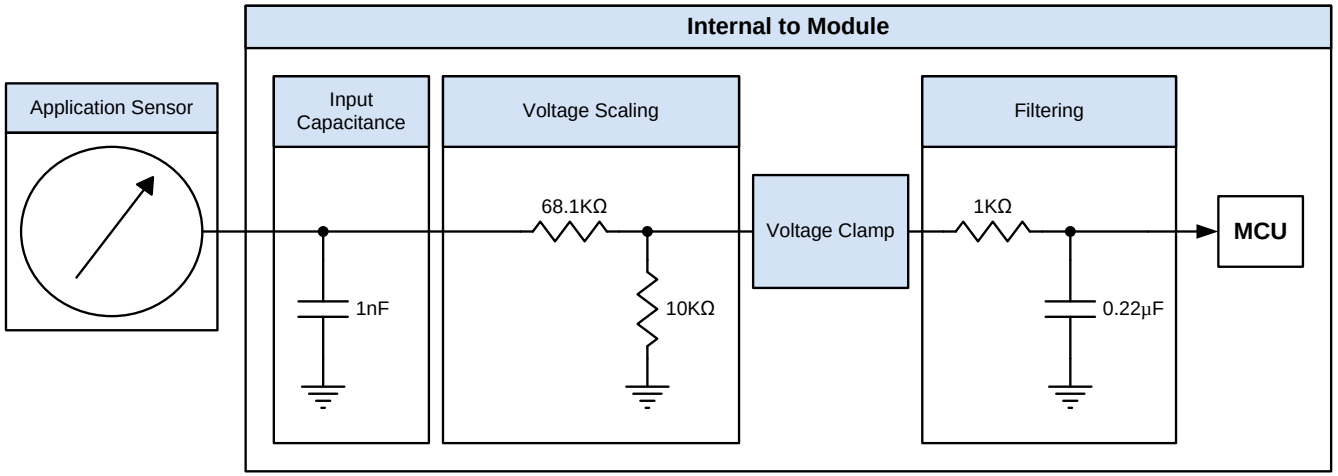
Voltage-to-Digital (VTD) Mode (0 – 36.37VDC)

Input Voltage Range
- 0V to 35.45V (minimum)
- 0V to 36.37V (typical)

Input Resistance
- 78.1KΩ (typical)

Resolution
- 12 Bits
- 8.88mV / count (typical)

Accuracy[2]
- ±2.2% and ±37mV (T_A = 25°C)
- ±4.4% and ±478mV (T_A = Full)



INPUT STB/STG/FREQ (PIN B02)

Frequency / PWM / Encoder

Pull-up Resistance
- 28KΩ (typical)

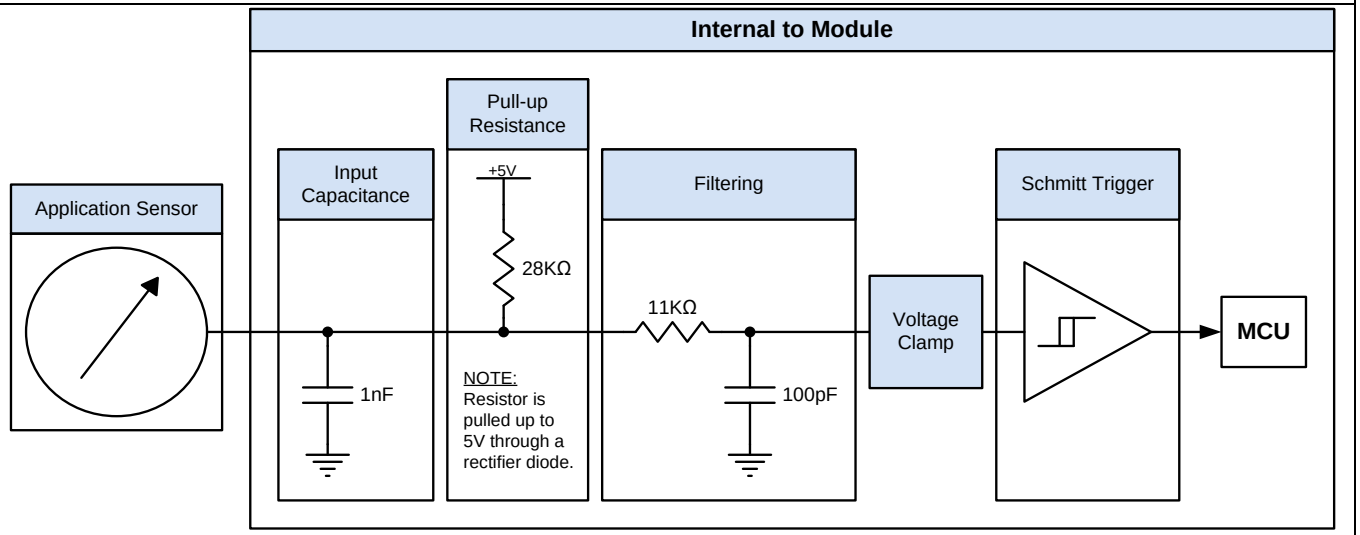
Positive Going Threshold
- > 3.5V

Negative Going Threshold
- < 1.0V

Frequency Range
- 5KHz (maximum)[1]
- 10KHz (maximum)[2]

Resolution
- < 5 Hz

Accuracy
- ±2.0% (T_A = full range)



[1] Frequency range maximum assumes square wave, open-drain, sinking sensor at 50% duty cycle.
[2] Frequency range maximum assumes square wave, active push-pull sensor at 50% duty cycle.

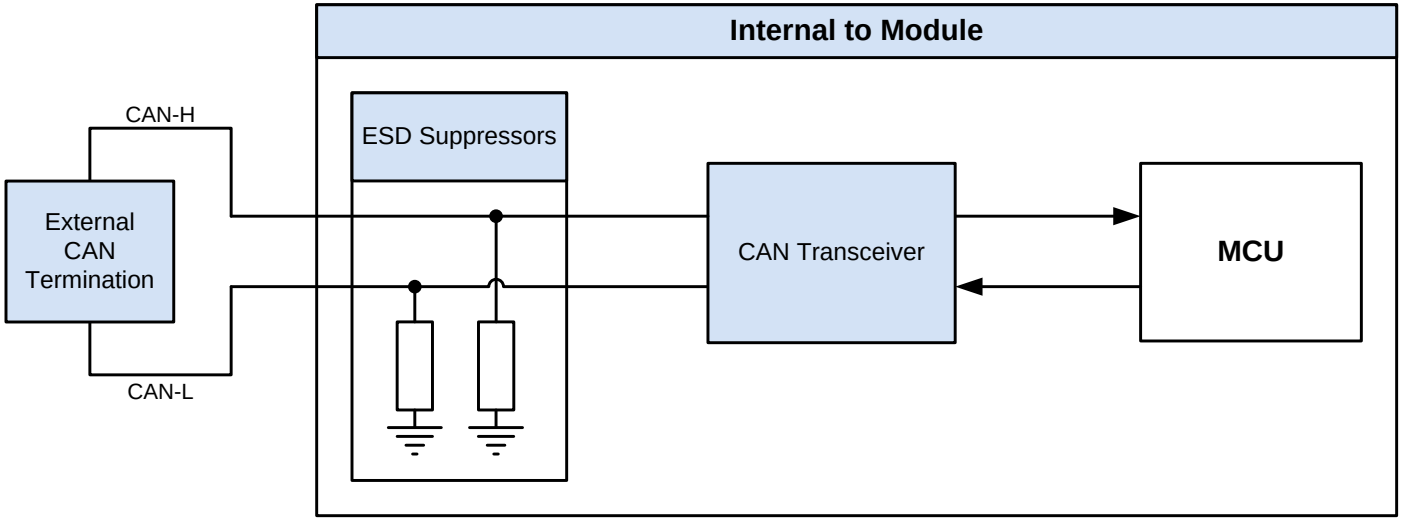
CAN COMMUNICATION (PINS A03/A04)

Baud Rate
- 40kbps to 500kbps

Maximum Allowable Voltage[1]
- -27V to +40V

Input Capacitance (maximum)
- 26pF (f = 1MHz)

No Internal Termination



[1] Maximum allowable voltage defines the voltage extremes that the transceiver can tolerate. Exposure to these voltages for extended periods may affect device reliability.

BACKLIGHT AND INDICATOR LEDs

Backlight LEDs		Indicator LEDs	
Color	**Dominant Wavelength (typical)**	**Color**	**Dominant Wavelength (typical)**
Yellow	589 nm	Green	525 nm
Blue	465 nm	Yellow	590 nm
Green	525 nm	Orange	601 nm
White	Chromaticity: Cx = 0.31, Cy = 0.31	Blue	465 nm
		Red	630 nm

OUTPUT DOUT(+)/PWM(+)/ECC(+) 2A (PINS B01–B04)

Individual Output Current[1]
- Digital Mode = 2.0A (maximum)
- PWM Mode = 2.0A (maximum)

Grouped Output Current[2,3]
- Digital Mode = 2.0A (maximum)
- PWM Mode = 2.0A (maximum)

PWM Frequency[4]
- < 300 Hz (typical)
- < 1KHz (maximum)

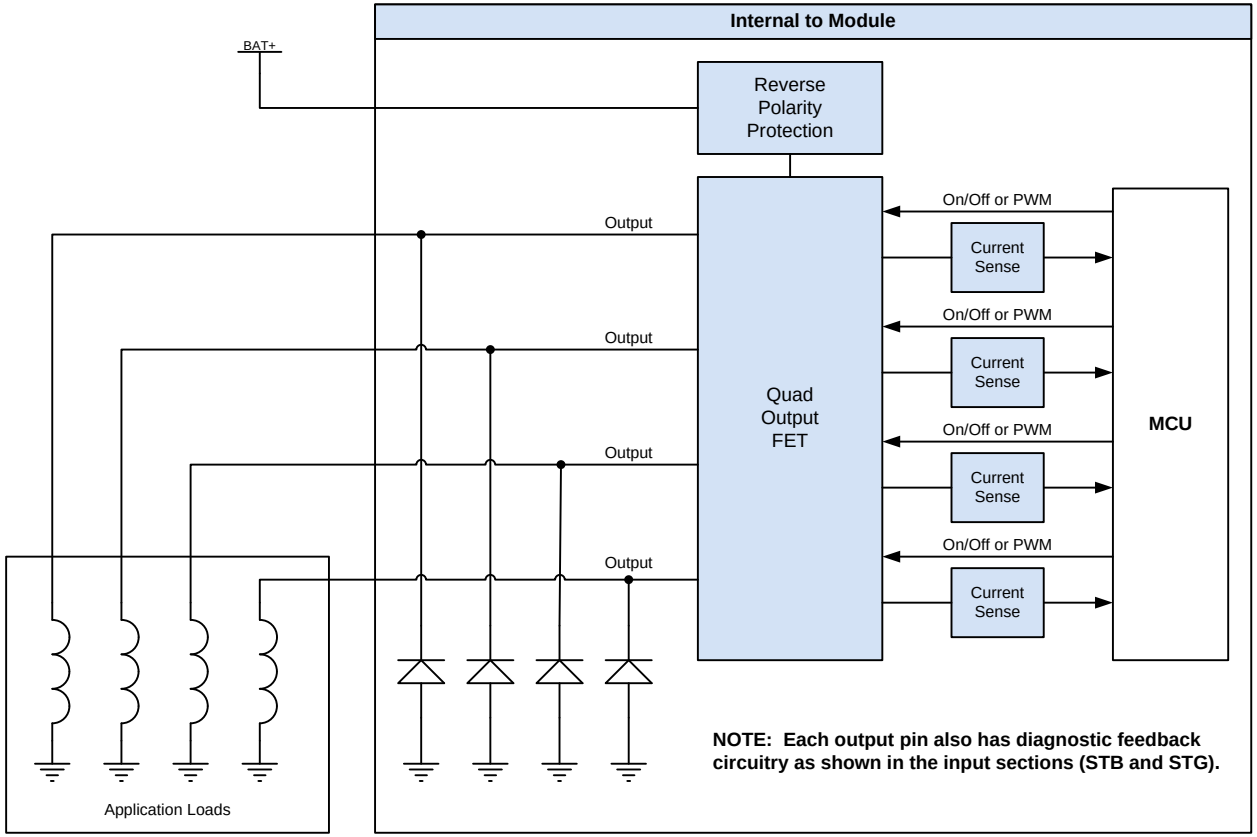
Output Diagnostics
- Short to Battery
- Short to Ground
- Overcurrent
- Open Circuit[5]

Current Sense Range
- Up to 3.2A (minimum)
- Up to 4.0A (typical)

Current Sense Resolution
- 12 bits
- 1.0mA / count (typical)

Current Sense Accuracy (typical)
- ±50mA at 2A, T_A = 25°C

Internal Flyback Diodes



[1] Individual Output Current specifies the maximum current for an individual output channel. Additional restrictions regarding total output current, number of active channels, etc. will apply and are specified in the Grouped Output Current parameter. PWM outputs assume 250Hz frequency.

[2] Output current maximums assume all four channels are active simultaneously and the module is at maximum ambient temperature. PWM outputs assume 250Hz frequency. Output current may be increased per channel (up to the individual output current maximum) if not all channels are active simultaneously or other channels are at a reduced load current. Please contact HED® for further information.

[3] Maximum total output current for Pins B01-B04 is 8 Amps.

[4] The output driver is best suited for PWM frequencies of 300 Hz or less. PWM frequencies of up to 1KHz are possible, but at reduced output current and duty cycle range.

[5] Open circuit can be detected when the output is active using current sense feedback for load currents of at least 250mA and duty cycle of 100%. Open circuit can be detected when the output is inactive using the pull-up resistor for loads that are not influenced by the associated pull-up current (see Input STG circuit diagram and parameters).

OUTPUT DOUT(+)/PWM(+)/ECC(+) 0.5A (PINS B01–B04)

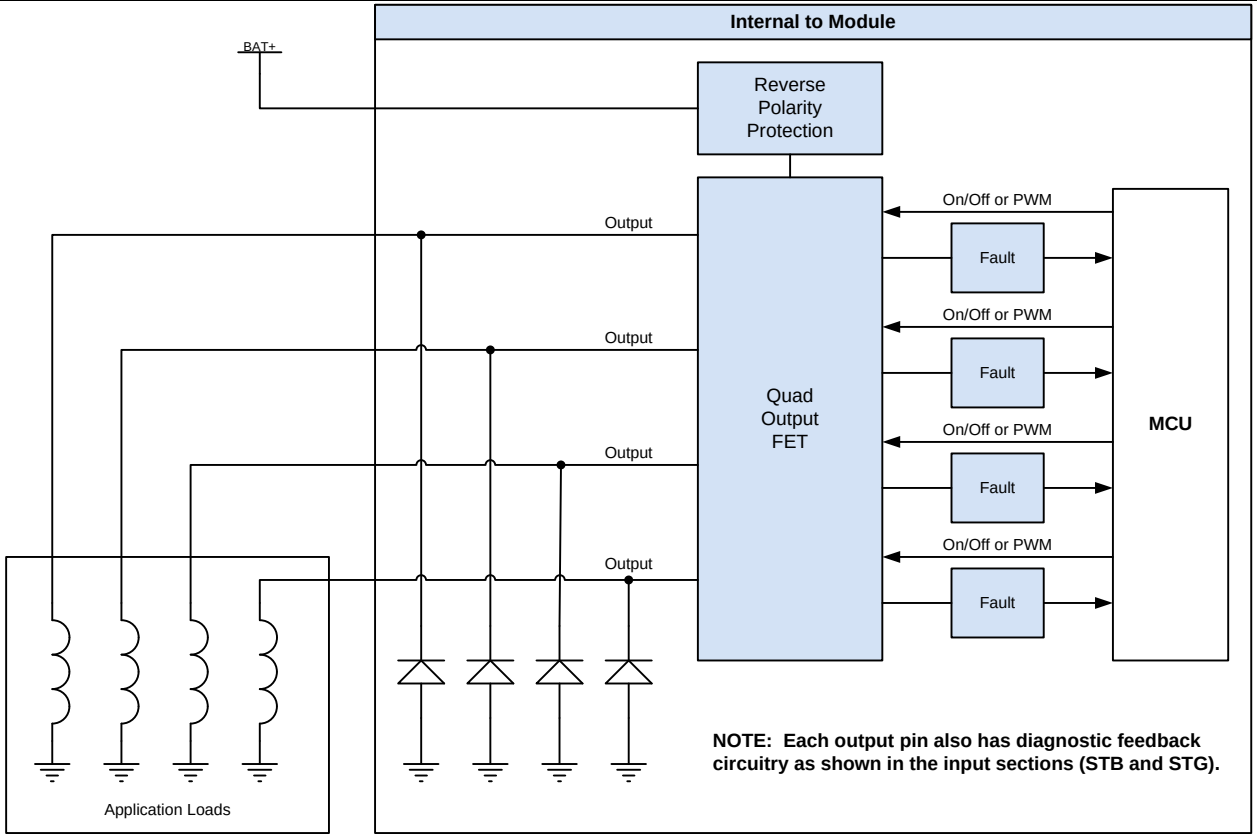
Individual Output Current[1]
- Digital Mode = 1.0A (maximum)
- PWM Mode = 1.0A (maximum)

Grouped Output Current[2,3]
- Digital Mode = 0.5A (maximum)
- PWM Mode = 0.5A (maximum)

PWM Frequency[4]
- < 300 Hz (typical)
- < 1KHz (maximum)

Output Diagnostics
- Short to Battery
- Short to Ground
- Open Circuit[5]

Internal Flyback Diodes



[1] Individual Output Current specifies the maximum current for an individual output channel. Additional restrictions regarding total output current, number of active channels, etc. will apply and are specified in the Grouped Output Current parameter. PWM outputs assume 250Hz frequency.

[2] Output current maximums assume all four channels are active simultaneously and the module is at maximum ambient temperature. PWM outputs assume 250Hz frequency. Output current may be increased per channel (up to the individual output current maximum) if not all channels are active simultaneously or other channels are at a reduced load current. Please contact HED® for further information.

[3] Maximum total output current for Pins B01-B04 is 2 Amps.

[4] The output driver is best suited for PWM frequencies of 300 Hz or less. PWM frequencies of up to 1KHz are possible, but at reduced output current and duty cycle range.

[5] Open circuit can be detected when the output is inactive using the pull-up resistor for loads that are not influenced by the associated pull-up current (see Input STG circuit diagram). Note that the pull-up resistor of the Input STG circuit for 0.5A outputs is configured to a value of 11.5KΩ instead of 560Ω.

BATTERY (+) MODULE (PIN A01)[1]

Battery (+)

Operating Voltage Range
- 8VDC – 32VDC

Maximum Continuous Voltage[2]
- 36VDC

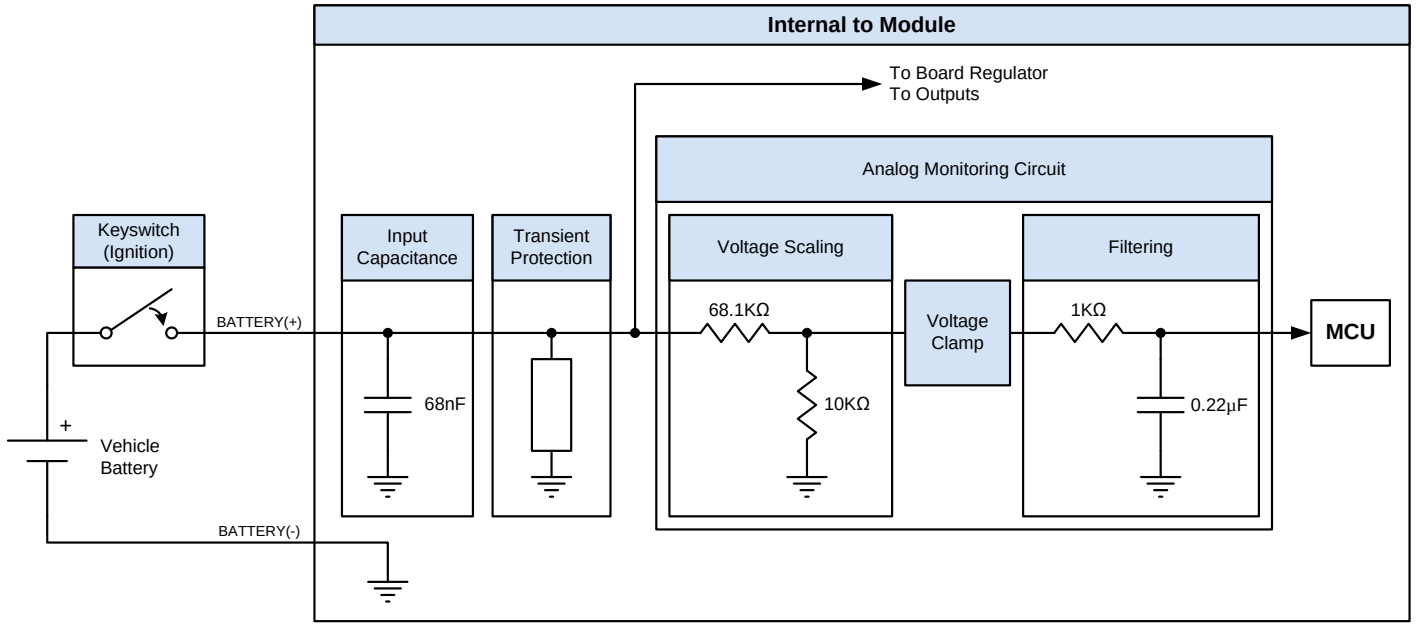
Module Current Draw[3]
- 38mA at 8.0V (typ)
- 25mA at 13.8V (typ)
- 18mA at 28.0V (typ)
- 17mA at 32.0V (typ)

Module Current Draw[4]
- 280mA at 8.0V (typ)
- 147mA at 13.8V (typ)
- 77mA at 28.0V (typ)
- 70mA at 32.0V (typ)

Maximum Total Output Current
- See Output Section for output current constraints

Analog Monitoring Circuit

See Input VTD Mode (0-36.37V) for parameters



[1] The block diagram shown represents one possible implementation in the system. Other implementations may be used based on system requirements.
[2] Exposure to maximum voltages for extended periods may affect device reliability.
[3] Module current draw is measured with I/O inactive, no CAN communication, and all LEDs (indicator / backlight) off.
[4] Module current draw is measured with I/O inactive, no CAN communication, and all LEDs (indicator / backlight) on.

ADDITIONAL NOTES

IMPORTANT: Module configurations that contain sourcing outputs with internal flyback diodes may continue to operate in the event of a loss of module ground. This event can result in a ground shift to the internal board reference (ground). The ground shift is a result of a remaining current path from internal board reference (ground), through internal flyback diode(s), and terminating through an external load to ground (assuming the load is of relatively low resistance). Depending on system configuration and load resistances, analog input accuracy can be affected, especially if the analog sensor is not referenced to the module sensor ground. Be sure to include this condition when conducting a system-level FMEA.

REVISION HISTORY

Revision	Date	EC #	Changes
A1	5/28/15	315-067	Initial Release.