

## Compact CANopen® Safety I/O Module – TTC 2038XS

### General description

The TTC 2038XS is an I/O slave module which is designed for distributed safety applications that require a high number of PWM outputs in remote locations and cost-sensitive projects. The TTC 2038XS is designed following functional safety standards and is certified by TÜV NORD. It is equipped with Infineon's TriCore™ Aurix™ TC367 CPU and meets the requirements in state-of-the-art safety relevant applications.

The TTC 2038XS is part of a complete and compatible product range for the off-highway and automotive industries. The module is protected by compact automotive style housings which is perfectly suited for harsh operating conditions.

The TTC 2038XS is controlled using the CANopen® Safety protocol. The module provides a wide range of flexible configurable I/Os and allows local current control using PWM outputs.

### Specifications

Parameter	Unit
ECU dimensions	147 x 92 x 38 mm
Dimensions for minimum connector release clearance	208 x 92 x 38 mm
Weight	330 g
Connector	1 x 48 pins
Operating temperature	-40 to +85 °C
Operating altitude	0 to 4000 m
Supply voltage	8 to 32 V
Supply current at 12/24V without load	200/100 mA <sub>max</sub>
Standby current	≤ 0,8 mA <sub>max</sub>
Total load current	24 A <sub>max</sub>

### Standards

Functional safety	EN ISO 13849 PL d
CE	2014/30/EU 2006/42/EC 2011/65/EU
E-Mark	ECE-R10 Rev.6
FCC	47 CFR Part 15B, Class A
EMC	EN ISO 13766-1/-2 EN 61000-6-2 EN 61000-6-4
ESD	ISO 10605
Electrical	ISO 16750-2 ISO 7637-2 /-3, limited to 58 V by external load dump protection
Protection Ratings	EN 60529 IP65 and IP67 ISO 20653 IP6k9k
Climatic	ISO 16750-4
Mechanical	ISO 16750-3
CANopen® Standards	EN50325-5, CiA-401, CiA-305, CiA-301



### Features

#### CPU Core

- 32-Bit Infineon TriCore™ Aurix™ TC367
- 2 cores (lockstep cores) running at 300 MHz and memory protection for safety-relevant applications
- Floating-Point Unit and Hardware Security Module\*

#### Interfaces

- 1 x CAN
- 4 x SENT

#### Outputs

- 8 x PWM OUT up to 1 kHz or digital OUT, up to 4 A, high side, with current measurement, alternative use as digital timer IN (0.1 Hz - 20 kHz) configurable pull-up in groups of 2 or analog IN 12 bit, 0 - 32 V with configurable pull-up
- 6 x digital OUT up to 4 A, high side, current sense, alternative use as PVG OUT, 10 - 90% of BAT+ or voltage OUT 0 V - 75 % BAT+ or analog IN 12 bit, 0 - 32 V
- 2 x PWM OUT up to 4 kHz, up to 4 A, low side, current measurement, featuring timer feedback alternative use digital timer IN (0.1 Hz - 20 kHz) or analog IN 12 bit, 0 - 5 V, 0 - 32 V

#### Inputs

- 8 x analog IN 12 bit, 0 - 5 V, 0 - 25 mA, 0 - 100 kOhm,
- 2 x analog IN 12 bit, 0 - 5 V, 0 - 32 V with configurable pull-up/down
- 2 x digital timer IN (0.1 Hz - 20 kHz), encoder support, configurable pull-up/down, support for 7/14 mA current loop speed-sensor alternative use as analog IN 12 bit, 0 - 32 V, 0 - 25 mA
- 4 x digital timer IN (0.1 Hz - 20 kHz), encoder support, configurable pull-up alternative use as analog IN 12 bit, 0 - 32 V or SENT interface or digital IN for switching to GND and BAT+
- 1 x Terminal 15
- 1 x Wake-Up

#### Sensor supply

- 1 x sensor supply, 5 V, max. 250 mA

#### Software

- CANopen® Safety I/O Module software preinstalled

All inputs and outputs supporting analog IN can also be used as digital Input.

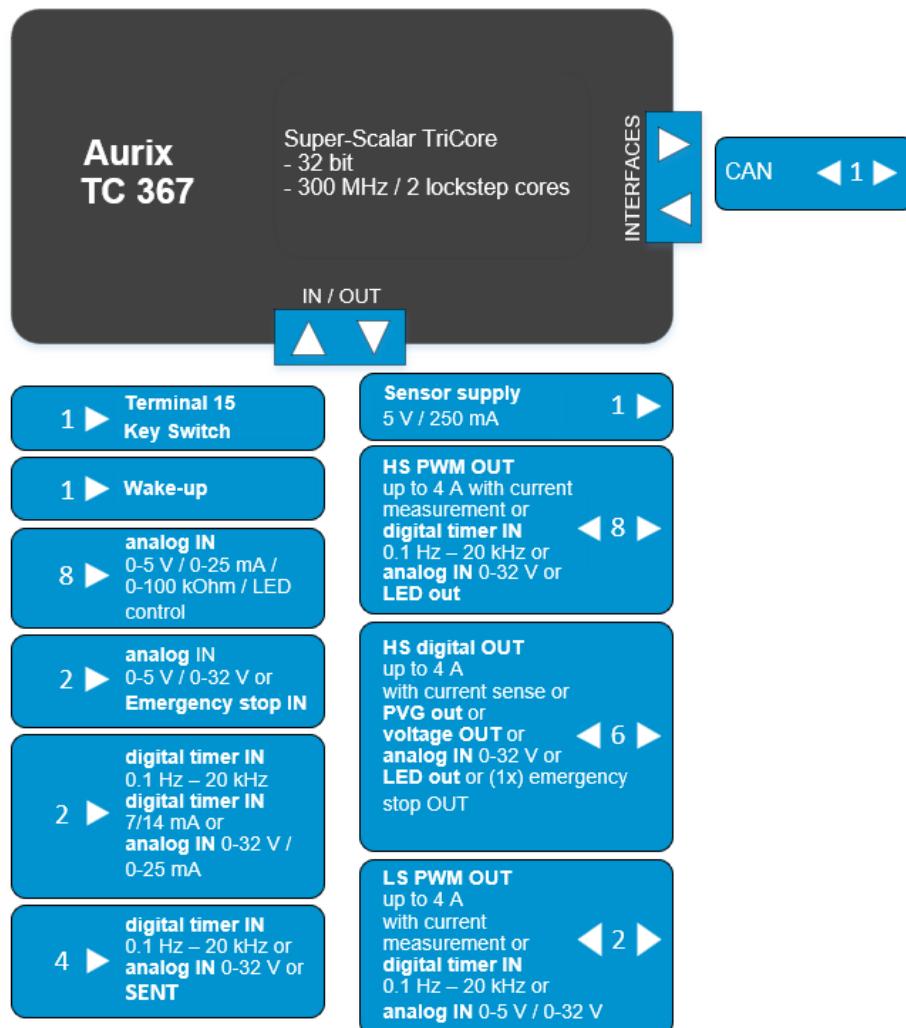
All I/Os and interfaces are protected against short circuit to GND and BAT.

Board temperature, sensor supply and supply voltage are monitored by software.

One safety shut-off group for output stages is available.

\* Upcoming feature

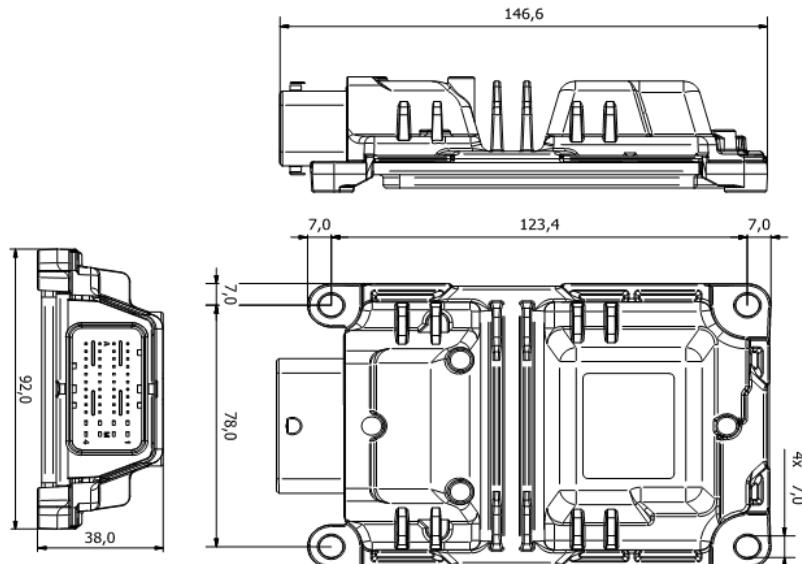
Block diagram



**Housing and connector**

Aluminium die-cast housing

1 x 48 pin connector



For further information, including price and availability, please contact [products@ttcontrol.com](mailto:products@ttcontrol.com)

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