Compact Safety Electronic Control Unit – TTC 2038

General description

The TTC 2038 is a robust and powerful compact electronic control solution for off-highway applications. The TTC 2038 is equipped with Infineon's TriCore™ Aurix™ TC367 CPU and designed to fulfil the requirements of demanding safety-relevant off-highway and automotive applications.

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

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_{max}
Standby current	$\leq 0,8$		mA_{max}
Total load current	24		A_{max}
Standards			
Functional safety	IEC 61508 SIL2 EN ISO 13849 PL d ISO 25119 AgPL d SRL2	ISO 26262 ASIL C ISO 19014 MPL d	
CE	2014/30/EU 2006/42/EC 2011/65/EU		
UKCA	SI 2016 no.1091 SI 2008 no.1597 SI 2012 no. 2032		
E-Mark	ECE-R10 Rev.6		
FCC	47 CFR Part 15B, Class A		
EMC	EN 13766 ISO 14982 CISPR 25	IEC 61000-4-2/-3/-4/-5/-6/-8 IEC 61000-6-4	
ESD	ISO 10605		
Electrical	ISO 16750-2 ISO 7637-2, -3, limited to 58 V by external load dump protection		
Ingress protection	EN 60529 IP65 and IP67 ISO 20653 IP6k9k		
Climatic	ISO 16750-4		
Mechanical	ISO 16750-3		
ISOBUS	ISO 11783		

Board temperature, sensor supply and supply voltage are monitored by software. One safety shut-off group for output stages is available.

Details to the standards can be found on the system manual.

Software:

- Available with the software platform MATCH® by HYDAC Software
- C Programming Environment with real-time operating system
- CODESYS® Safety SIL 2 including support for CANopen® Safety Master *

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
- 576 KB int. SRAM, 4 MB int. Flash
- 128 KB int. EEPROM emulation

Interfaces

- 2 x CAN FD 50 kbit/s up to 2 Mbit/s (1 x CAN FD with wake-up capability and 1 x CAN FD ISOBUS)
- 4 x SENT with SPC * support
- 1 x LIN

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 or LED control OUT *
- 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 LED control OUT or analog IN 12 bit, 0 - 32 V or 1 x as emergency stop OUT *
- 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 with configurable pull-up/down, 0 - 25 mA, 0 - 100 kOhm, LED control *
- 2 x analog IN 12 bit, 0 - 5 V, 0 - 32 V with configurable pull-up/down or emergency stop IN *
- 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+
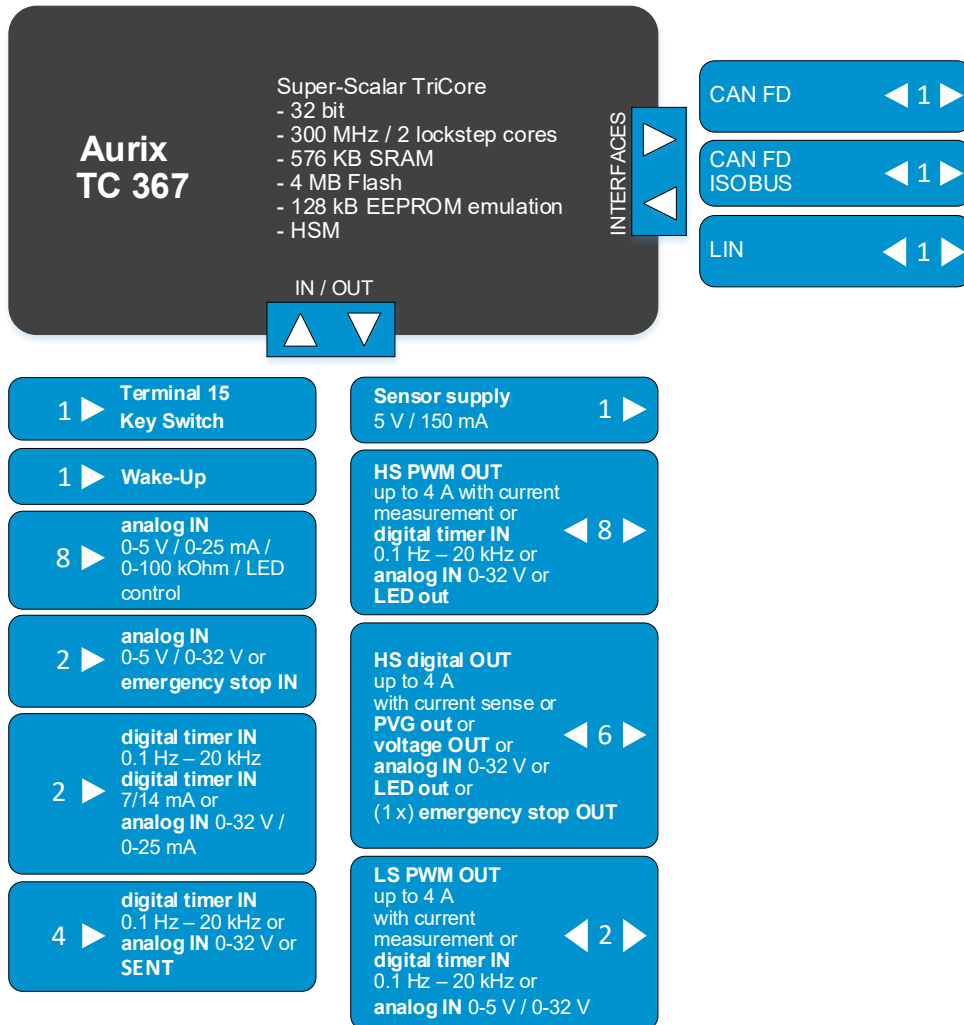- 1 x Terminal 15
- 1 x Wake-Up

Sensor supply

- 1 x sensor supply, 5 V, max. 150 mA

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+ and can be configured by software.

* Upcoming feature

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Block diagram

Aurix TC 367

Super-Scalar TriCore
- 32 bit
- 300 MHz / 2 lockstep cores
- 576 KB SRAM
- 4 MB Flash
- 128 kB EEPROM emulation
- HSM

INTERFACES

IN / OUT

CAN FD	◄ 1 ►
CAN FD ISOBUS	◄ 1 ►
LIN	1 ►

1 ► Terminal 15 Key Switch

1 ► Wake-Up

8 ► analog IN 0-5 V / 0-25 mA / 0-100 kOhm / LED control

2 ► analog IN 0-5 V / 0-32 V or emergency stop IN

2 ► digital timer IN 0.1 Hz – 20 kHz digital timer IN 7/14 mA or analog IN 0-32 V / 0-25 mA

4 ► digital timer IN 0.1 Hz – 20 kHz or analog IN 0-32 V or SENT

Sensor supply 5 V / 150 mA **1 ►**

HS PWM OUT up to 4 A with current measurement or digital timer IN 0.1 Hz – 20 kHz or analog IN 0-32 V or LED out **◄ 8 ►**

HS digital OUT up to 4 A with current sense or PVG out or voltage OUT or analog IN 0-32 V or LED out or (1 x) emergency stop OUT **◄ 6 ►**

LS PWM OUT up to 4 A with current measurement or digital timer IN 0.1 Hz – 20 kHz or analog IN 0-5 V / 0-32 V **◄ 2 ►**

Housing and connector

Aluminium die-cast housing

1 x 48 pin connector
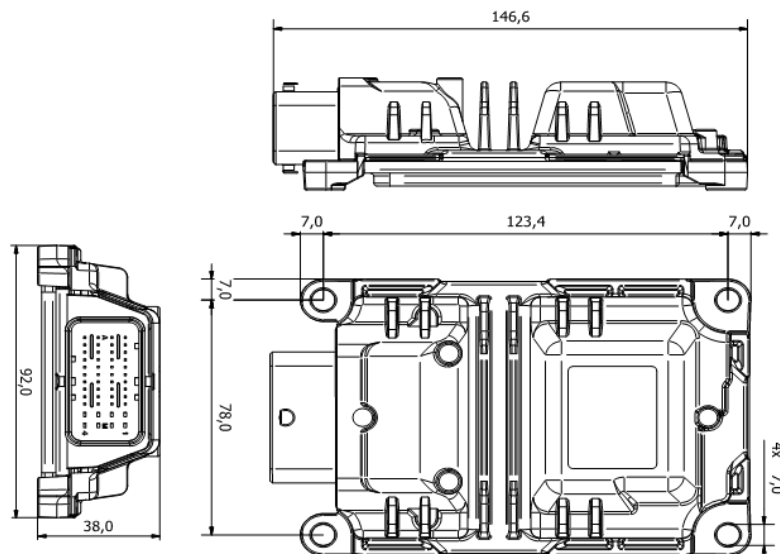
For further information, including price and availability, please contact products@ttcontrol.com