TTC 94 – Universal Automotive Control Unit

General Description

The TTC 94 is an extremely robust and powerful electronic control unit for use in automotive applications. This controller compliance with the international EN ISO 13849 standard and has been certified by TÜV Nord. It meets the requirements of Functional Safety according to Performance Level (PL) d. The TTC 94 is equipped with the Infineon XC2287M CPU providing enhanced safety features for protecting internal RAM and flash. The control unit supports programming in C (MATLAB Simulink I/O block library available) and is protected by a compact, automotive housing suited to various applications in harsh environments.

Specifications

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>ECU Dimensions</td>
<td>147.6 x 180.3 x 39.8 mm</td>
</tr>
<tr>
<td>Dimensions for minimum connector release clearance</td>
<td>197.7 x 202.8 x 39.8 mm</td>
</tr>
<tr>
<td>Weight</td>
<td>about 650 g</td>
</tr>
<tr>
<td>Operating Temperature</td>
<td>-40 to +85 °C (full load)</td>
</tr>
<tr>
<td>Operating Altitude</td>
<td>0 to 4000 m</td>
</tr>
<tr>
<td>Supply Voltage</td>
<td>8 to 32 V</td>
</tr>
<tr>
<td>Peak Voltage</td>
<td>45 V&lt;sub&gt;max&lt;/sub&gt;</td>
</tr>
<tr>
<td>Standby Current</td>
<td>0.5 mA&lt;sub&gt;max&lt;/sub&gt;</td>
</tr>
<tr>
<td>Idle Current</td>
<td>0.15 at 9 V, 25 mA&lt;sub&gt;max&lt;/sub&gt;</td>
</tr>
</tbody>
</table>

Fulfills the following standards

- Functional Safety: EN ISO 13849 PL d
- CE-Mark: 2014/30/EU 2006/42/EC
- E-Mark: ECE-R10 Rev.4
- EMC: ISO 13766, up to 200 V/m, 20 MHz to 1GHz
- ESD: IEC 61000-4-2
- Load Dump: ISO 7637-2, 173 V, 2 Ohm
- Ingression Protection: EN 60529 IP 65, 6P7
- Temperature: EN 60068-2-1, -14Nb, -2, -4, -7, -8, -30
- Vibration, Shock, Bump: IEC 60068-2-29, -64, -27, -32

Features

- All I/Os and interfaces mentioned below are protected against short circuit to GND and BAT+.

CPU Core
- 16/32-bit Infineon XC2287M safety microcontroller, 80 MHz, 832 kB int. Flash, 50 kB int. RAM, 512 kB ext. RAM
- CPU-internal safety features
  - Hardware CRC checker for supervising flash memory
  - Integrated Memory Protection Unit (MPU)
  - RAM content protection through Error-Correcting-Code (ECC).
- Watchdog CPU Freescale HC908, including monitoring software
- 64 kbit EEPROM

Interface
- 1 x RS-232 and 1 x LIN serial interfaces
- 4 x CAN, 125 kbit/s up to 1 Mbit/s

Outputs
- 8 x digital OUT 2A high-side, PWM, configurable as timer inputs
- 8 x digital OUT 4A high-side, configurable as analog inputs

Inputs
- 8 x analog IN 0 to 5 V / 10 bit, configured by software alternative use as resistive measurements
- 8 x analog IN 0 to 32 V / 10 bit, range configurable by SW
- 4 x current feedback, configurable as digital outputs/lowside 2 A
- 4 x digital IN (4 timer 0.1 Hz to 10 kHz)
- 8 x digital IN

Other
- Internal: monitoring of board temperature, sensor supply and battery
- 1 x sensor supply 8.5/10.0/14.5 V configurable
- 2 x sensor supply 5 V

Software Options
- C Programming Environment (incl. BSP and driver library)
- MATLAB Simulink I/O block library
- CODESYS® 2.3 including support for CANopen®
Infineon XC2287M

**CPU core**
- 16/32 bit / 80 MHz
- 50 kB RAM
- 832 kB Flash
- Watchdog CPU

**INTERFACES**

<table>
<thead>
<tr>
<th>IN / OUT</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>K15 Key Switch</td>
</tr>
<tr>
<td>8</td>
<td>analog IN 0-32 V</td>
</tr>
<tr>
<td>8</td>
<td>analog IN 0-5 V / 4-20 mA / 0-65 kΩ</td>
</tr>
<tr>
<td>4</td>
<td>current feedback or LS digital OUT</td>
</tr>
<tr>
<td>4</td>
<td>digital timer IN 0.1 Hz – 10 MHz high/low active</td>
</tr>
<tr>
<td>8</td>
<td>digital IN high/low active</td>
</tr>
<tr>
<td>2</td>
<td>Sensor supply 5 V / 50 mA</td>
</tr>
<tr>
<td>1</td>
<td>Sensor supply 8.5V / 10V / 15V</td>
</tr>
<tr>
<td></td>
<td>HS PWM OUT up to 2 A or timer input</td>
</tr>
<tr>
<td>8</td>
<td>HS digital OUT up to 4 A or analog input</td>
</tr>
</tbody>
</table>

**RAM:** 512 kB

**EEPROM:** 64 kB

**INTERFACES**

- RS-232
- LIN
- CAN

**Housing and Connector**

- Aluminum pressure die-cast housing
- Water-proof 80-pin connector
- Pressure adjusting with water barrier

For further information, including price and availability, please contact products@tttech-auto.com.

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