Infineon

TC1167
Highly integrated 32-bit TriCore™-based Microcontroller for Industrial Applications

The TC1167 is the value optimized member of the Audo Future product family designed for high demanding real-time applications. Its award-winning TriCore™ CPU provides high-end microcontroller performance combined with sophisticated DSP capabilities.

A dedicated peripheral control processor (PCP) manages on-chip peripherals and relieves the TriCore™ from standard processing tasks. On top of this, a fast interrupt response time assures low latencies and low performance overhead for interrupt driven systems. Equipped with 1MByte of embedded Flash and a total of 128KByte RAM the TC1167 is a high performance device offering best value for embedded real-time industrial applications. The device is positioned in the mid-range of the audo future product family that covers the complete range from the very high end to very low cost. The comprehensive tool support emphasizes the great scalability of the family products.

Applications
- Multi-axis controller for up to two 3-phase complementary PWM
- Supporting multiple modulation strategies (SVPWM, DPWM, Soft-PWM, Direct Torque Control)
- Ready for 4Q-Inverters, Matrix-Inverters
- Field oriented control with less than 10% CPU load
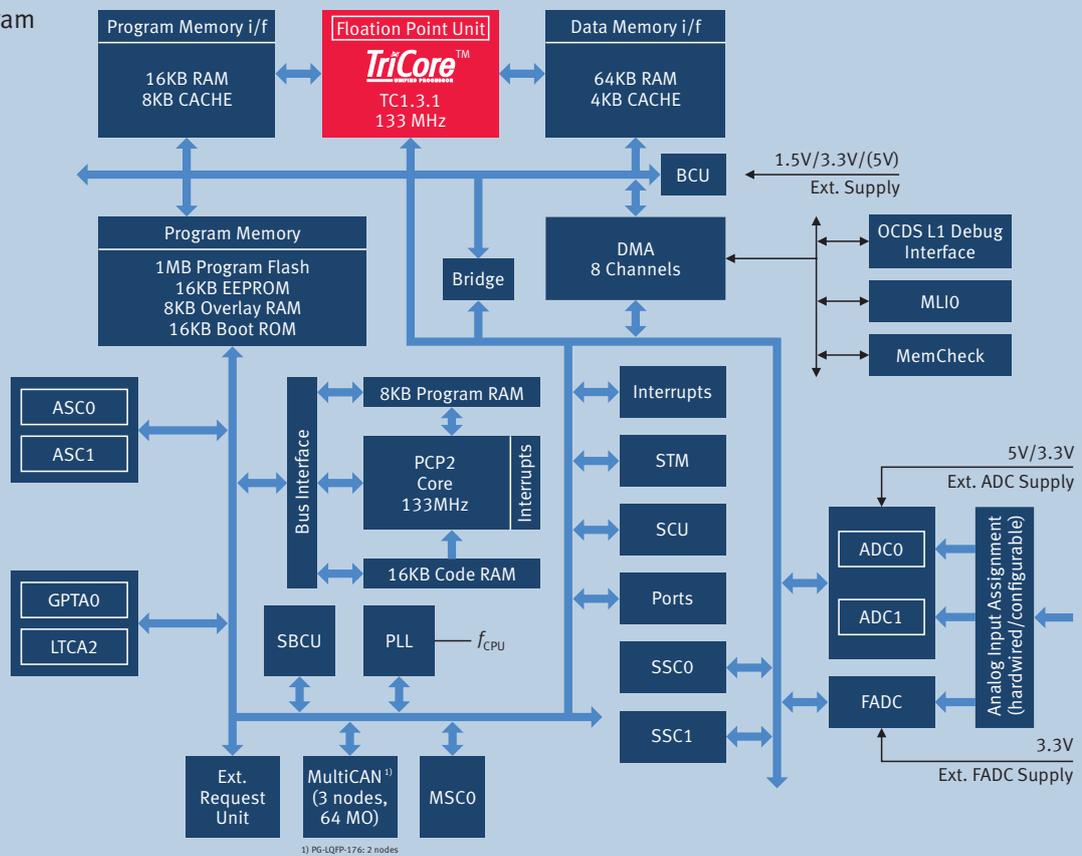- Multiprocessor support for reliability and safety

Features
- High performance 32-bit super-scalar TriCore™ V1.3.1 CPU with 4 stage pipeline
  - 133MHz
  - Superior real-time performance
  - Strong bit handling
  - Fully integrated DSP capabilities
  - Single precision floating point unit (FPU)
- 32-bit Peripheral Control Processor with single cycle instruction (PCP2)
  - 24KByte on-chip SRAM

Features
- Memories
  - 1MByte embedded program flash with ECC
  - 16KByte EEPROM (emulated by
  - 64KByte data Flash)
  - 92KByte on-chip SRAM
  - 4KByte data cache
  - 8KByte instruction cache
- 8 DMA channels
- General Purpose Timer Array and local timer cells with digital signal filters and timer functionality to realize complex I/O signalling (GPTA)
- Micro Second bus interface (MSC)
- 2 asynchronous/synchronous serial
  - interfaces (ASC)
- 2 high speed synchronous serial interfaces (SSC)
- High-speed Micro Link Interface (MLI)
- MultiCAN module with three CAN nodes and 64 message objects
- 4 channel fast analog-to-digital converter
- 32 channel analog-to-digital converter @ 5V
- On-chip debug support (OCDS)
- Dedicated emulation device chip for multicore debugging, tracing and calibration
- Core supply voltage 1.5V
- I/O voltage 3.3V and 5V
- Industrial temperature range: -40°C to +85°C

TC1167

Block Diagram

Program Memory i/f
16KB RAM
8KB CACHE

Floation Point Unit
TriCore™
TC1.3.1
133 MHz

Data Memory i/f
64KB RAM
4KB CACHE

BCU

1.5V/3.3V/(5V)
Ext. Supply

Program Memory
1MB Program Flash
16KB EEPROM
8KB Overlay RAM
16KB Boot ROM

Bridge

DMA
8 Channels

OCDS L1 Debug Interface

MLI0

MemCheck

ASC0
ASC1

Bus Interface

8KB Program RAM

PCP2
Core
133MHz

Interrupts

16KB Code RAM

Interrupts

STM

SCU

Ports

5V/3.3V
Ext. ADC Supply

ADC0

ADC1

Analog Input Assignment
(hardwired/configurable)

GPTA0
LTCA2

SBCU

PLL

f_{CPU}

SSC0

SSC1

FADC

3.3V
Ext. FADC Supply

Ext.
Request
Unit

MultiCAN[1]
(3 nodes,
64 MO)

MSC0

1) PG-LQFP-176: 2 nodes

Product Summary

Type	CPU Clock	Temperature	Program Flash	Package
SAF-TC1167-128F133HL	133MHz	-40°C to +85°C	1MByte	LQFP-176

Application Examples

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