SAF86xx RFCMOS AUTOMOTIVE RADAR SoC

High performance single-chip for automotive FMCW radar applications

The SAF86xx is a highly integrated single-chip RFCMOS radar SoC supporting future distributed automotive radar architectures. It provides raw data, e.g. compressed or uncompressed Range-FFT over Gigabit Ethernet to a radar processing unit. The SAF86xx addresses short-, medium- and long-range automotive radar applications, covering the entire radar frequency band from 76 to 81 GHz. It integrates a radar transceiver with a BBE32EP vector DSP and an Arm® Cortex®-M7 core in lockstep for real-time processing and the hardware security engine (HSE). SAF86xx is developed in accordance to ISO 26262 Safety Element out of Context (SEooC) methodology supporting ASIL Level B and is meeting latest security requirements through its HSE security and MACsec engine.

TARGET APPLICATIONS
• Adaptive cruise control
• Autonomous emergency braking
• Lane change assist
• Blind spot detection
• Front cross-traffic alert
• Rear cross-traffic alert
• Park assist

KEY FEATURES
• Highly integrated 4Tx4R transceiver for the 76 to 81 GHz band
• High-performance RF transceiver with high link budget and low phase noise. Effective chirp bandwidth up to 4 GHz
• Range-FFT processing and variable compression
• Arm Cortex-M7 lockstep core for control and AUTOSAR
• Software compatible with S32R and SAF85xx family
• 2 MB SRAM for radar data with ECC and memory protection
• Launcher-in-Package (LiP) available
• Flexible interfaces (Gbit Ethernet, CAN-FD, CSI-2)
• Hardware security engine (HSE)
• Embedded MACsec accelerator (IEEE standard 802.1AE)
• ~2.35 W average power dissipation
• -40 °C to 150 °C junction temperature
• AEC-Q100 automotive qualified
SOFTWARE AND TOOLS
- RFE firmware
- Radar SDK
- Inter-process communication framework (IPCF)
- S32 Flash tool
- Radar Xplorer GUI
- S32 Design Studio
- HSE firmware
- AUTOSAR MCAL
- Compilers and debuggers

BENEFITS
- Single-chip radar supporting distributed architectures
- Supports streaming low-level pre-processed data (compressed range cube)
- Flexible solution supporting raw ADC and Range-FFT based data output
- Meeting latest security requirements with integrated MACsec and HSE hardware
- Package solutions supporting waveguide antennas
- Enhanced resolutions supported by cascading several SAF86xx

SAF86xx BLOCK DIAGRAM

SAF86xx Radar SoC
- RF Transceiver
  - Rx 1
  - Rx 2
  - Rx 3
  - Rx 4
- Radar Processing
  - BBE32EP DSP
  - Arm® Cortex®- M7 LS
- Processor Cores
  - RAM
  - Functional Safety and Security
    - HSE-M Security
    - FCCU
    - MACSec
- Connectivity
  - CSI-2
  - CAN FD
  - SGMII
  - Ethernet
  - CAN SIC
  - TJA1462A
  - SerDes
  - Flash
  - Power Supply PF5103
  - Xtal
  - Xtal Osc.
  - Waveform Generator

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