AutoChips Company Profile
AutoChips Overview

Entity
- Set up on Dec, 2013
- China IC company holding by NavInfo
- Over 600M RMB of revenue in 2017

Business
- Automotive Chipset and solution provider
- IVI (In-vehicle infotainment) chipset, Telematics chipset, Automotive Audio, Vehicle body control MCU, MEMS

Operation
- 280+ employees
- Located at Hefei, Shenzhen & Shanghai
Qualification Report: QR-H-0005

Product: AC8225/B
Prepared By: Winston Sun
Report Date: Jan.8, 2016

AutoChips Inc.
10F Building A3, Innovation Industrial Park, No.820
WuJi Industrial Park, New-Taipei City, Taiwan
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Fax: +886-2-88373803
www.AutoChips.com

AEC-Q100

Foundry

AEC-Q100 & TS16949

Assembly & Testing House

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www.autochips.com
AutoChips 2017

1. 1st and the only dedicated Automotive IC design house in China

2. 3rd generation IVI SoC chipset covered WinCE/Linux/Android OS

3. IVI chipset Adopted by over 120 vehicle models in China market

4. IVI chipset shipment is over 220K/month and keeps growing in OEM

5. ATC shipped over 35,000 thousand IVI chipset
IVI Customer Base
IVI OEM Market Achievement
Agenda

- AutoChips Overview
- Product Roadmap
- Competitive Solution
- Process & Quality Control
AutoChips Product Lines

**Auto**motive **Chipset**
Turnkey Plus Solution

- Infotainment
- Telematics
- Audio Amplifier
- MCU
- e-Cockpit
- MEMS
- New Energy

Year:
- Y2009
- Y2010
- Y2011
- Y2012
- Y2013
- Y2014
- Y2015
- Y2016
- Y2017
- Y2018
- Y2019
- 2020
- 2021
- 2022
AutoChips Technology Roadmap

**Infortainment**
- Audio
  - Decoder
  - Hi-Fi Audio DSP
- Video Decoder
- Navigation
- Connectivity
- DVD/CD Servo

**Car Body Control**
- MCU
- BLDC Control
- In Vehicle Bus
- Embedded Flash

**E-Cockpit**
- Digital Cluster
- Image Processing ADAS
- AVM
- 2G/3G/4G
- 802.11 b/g/n/ac/p
- Phone Link

**Active Safety**
- MEMS
  - P Sensor
  - G Sensor
  - Gateway

**Autopilot**
- Hardware Security
- Vision Engine
- V2V
- High Accuracy Map
- Deep Learning
- Big Data

**Power**
- Audio AMP, Power Management

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<tr>
<th>Advanced SoC Design</th>
<th>Low Power Design</th>
<th>Function Safety</th>
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<td>Quality Assurance System</td>
<td>AEC -Q100 -40~85/105/125°C</td>
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AutoChips Roadmap (1)

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|          |          | AC7325   |      |          |      |          |      |          |
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|          |          | • high side driver |      |          |      |          |      |          |
|          |          | • Tj:150°C |      |          |      |          |      |          |
|          |          | • FlexiWatt27 |      |          |      |          |      |          |

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| MCU      |       |          |      |          |      |          |      |          |
|          | Q1    | Q2       | Q3   | Q4       | Q1   | Q2       | Q3   | Q4       |
| AC7811   |       |          |      |          |      |          |      |          |
|          | • CM3 100MHz |          |      |          |      |          |      |          |
|          | • 16*12-bit ADC |          |      |          |      |          |      |          |
|          | • CAN 2.0B/LIN2.1 |          |      |          |      |          |      |          |
|          | • I2C/SPI/JAART/PWM |          |      |          |      |          |      |          |
|          | • Embedded Flash |          |      |          |      |          |      |          |
|          | • AEC-Q100 Grade1 |          |      |          |      |          |      |          |

|          | AC7815 |          |      |          |      |          |      |          |
|          | • CM3 100MHz |          |      |          |      |          |      |          |
|          | • CAN FD |          |      |          |      |          |      |          |
|          | • Ethernet |          |      |          |      |          |      |          |
|          | • AEC-Q100 |          |      |          |      |          |      |          |

|          | AC7825 |          |      |          |      |          |      |          |
|          | • T8051 48MHz |          |      |          |      |          |      |          |
|          | • CAN2.0B/LIN2.1 |          |      |          |      |          |      |          |
|          | • AEC-Q100 |          |      |          |      |          |      |          |

|          | AC7821 |          |      |          |      |          |      |          |
|          | • CM0+ 72MHz |          |      |          |      |          |      |          |
|          | • CAN FD/LIN2.1 |          |      |          |      |          |      |          |
|          | • FOC |          |      |          |      |          |      |          |
|          | • AEC-Q100 |          |      |          |      |          |      |          |

|          | AC7825 |          |      |          |      |          |      |          |
|          | • CM3 100MHz |          |      |          |      |          |      |          |
|          | • CAN FD |          |      |          |      |          |      |          |
|          | • Ethernet |          |      |          |      |          |      |          |
|          | • AEC-Q100 |          |      |          |      |          |      |          |

|          | AC7835 |          |      |          |      |          |      |          |
|          | • CM3 120MHz |          |      |          |      |          |      |          |
|          | • CAN FD |          |      |          |      |          |      |          |
|          | • Ethernet |          |      |          |      |          |      |          |
|          | • AEC-Q100 |          |      |          |      |          |      |          |

|          | AC7831 |          |      |          |      |          |      |          |
|          | • CM3 120MHz |          |      |          |      |          |      |          |
|          | • CAN FD |          |      |          |      |          |      |          |
|          | • Ethernet |          |      |          |      |          |      |          |
|          | • AEC-Q100 |          |      |          |      |          |      |          |

|          | AC7851 |          |      |          |      |          |      |          |
|          | • CM0+ 72MHz |          |      |          |      |          |      |          |
|          | • CAN FD/LIN2.1 |          |      |          |      |          |      |          |
|          | • FOC |          |      |          |      |          |      |          |
|          | • AEC-Q100 |          |      |          |      |          |      |          |

|          | AC7855 |          |      |          |      |          |      |          |
|          | • CR4 120MNz |          |      |          |      |          |      |          |
|          | • CAN FD |          |      |          |      |          |      |          |
|          | • Ethernet |          |      |          |      |          |      |          |
|          | • AEC-Q100 |          |      |          |      |          |      |          |

|          | AC7861 |          |      |          |      |          |      |          |
|          | • CM0+ 72MHz |          |      |          |      |          |      |          |
|          | • CAN FD/LIN2.1 |          |      |          |      |          |      |          |
|          | • FOC |          |      |          |      |          |      |          |
|          | • AEC-Q100 |          |      |          |      |          |      |          |

|          | AC7865 |          |      |          |      |          |      |          |
|          | • CM0+ 72MHz |          |      |          |      |          |      |          |
|          | • CAN FD/LIN2.1 |          |      |          |      |          |      |          |
|          | • FOC |          |      |          |      |          |      |          |
|          | • AEC-Q100 |          |      |          |      |          |      |          |
# AutoChips Roadmap (3)

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### AC5111
- **P Sensor**: 0~950kPa
- **X, Z axis G Sensor**
- **Ta**: -40~125°C

### AC5121
- **P Sensor**: 0~1500kPa
- **X, Z axis G Sensor**
- **Ta**: -40~125°C

*Note: Confidential A*
ATC IVI Platform Key Value

Platform Solution in HW/SW/SYS
- WinCE/Android/Linux
- DVD Serve/Diskless/AVN/DA/MP5/SmartMirror
- OEM/OES/DOP/AM

Rich Connectivity Solution
- GNSS: GPS, Beidou, Glonass
- Bluetooth: BT4.1, BLE
- WIFI: 802.11b/g/n/ac, dual band
- 4G: module, Build-in Modem

Leading Technology
- Phone link: CarPlay/CarLife/Miracast/WeLink/MHL/USB Link/etc.
- Professional sound effect: AutoSurround™
- Exclusive MHL remote control technology

Google:
- Android automotive exclusive participant in China
Agenda

- AutoChips Overview
- Product Roadmap
- Competitive Solution
- Process & Quality Control
### AC781x Series Block Diagram

#### Memory Interfaces
- Up to 256 KB eFlash
- Up to 64 KB RAM
- Advanced Embedded Flash Access Engine

#### Core
- ARM Cortex-M3
- Up to 100MHz
- JTAG/SW Debug
- ETM trace

#### IO
- Up to 68 GPIO
- External Interrupt
- Seven 5V Tolerance PIN*

#### Analog
- One 16-channel 12-bit ADC
- Two Analog Comparator
- 3.3V/5V Power

#### Clocks
- 8MHz Internal RC Oscillator
- 32.768KHz Internal LP Oscillator
- 4 - 30 MHz External Crystal Oscillator

#### System
- Power Management
- Low-voltage Detection
- Programmable Voltage Detection
- Power On Reset
- Aliased SRAM Bitband Region
- Watchdog
- Programmable CRC
- 12-channel DMA
- T-sensor

#### Timers
- One 6-channel PWM
- Three 2-channel PWM
- One 8-channel 32bit Timer
- One Pulse Width Detection Timer
- One Real-time Clock

#### Communications
- 6 x UART (1 x SWLIN)
- 1 x Q-SPI (16M serial flash)
- 2 x CAN
- 1 x LIN
- 2 x SPI
- 2 x I2C

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*5V Tolerance: 3.3V VDD, support 5V tolerance (CAN, I2C, UART)
AC781x Series Key Features

- 32bit ARM Cortex-M3 up to 100MHz
- Embedded Flash up to 256KByte, with Advanced Embedded Flash Access Engine
- Build-in SRAM up to 64KByte
- CAN x 2, LIN x 1, and UART LIN x 1
- Stop current: 5uA, Standby current: 2uA
- 2.7-5.5V power supply
- ESD HBM 6KV, CDM 750V
- Temperature range: -40 to 125 °C
- UCOS (Integration Test Pass)
- Package options
  - 80-pin LQFP
  - 64-pin LQFP

LQFP80 (12 x 12) LQFP64 (7 x 7)
AutoChips Automotive MCU IDE

- ARM Keil uVision V5
AC781x Series Demo Board

12V power

I2C2

UART2

USB

Power switch

Trap PIN

SWLIN

HWLIN

CAN1

I2C1

CAN2

UART1

UART

SPI2

JTAG

CAN1 RX

CAN1 TX
AC7811 BCM Applications

Auto Console
- Lighting Controller
- Wiper Controller
- Infotainment /GPS
- HVAC

Sunroof
- Power Sunroof
- Rain Sensors

Tailgate
- Power Tailgate
- Visual Reversing Image

Rear Lamp
- Brake lamp
- Rear fog lamp
- Rear cornering lamp

Door
- Power Windows
- Wing mirror
- Control/Heater
- Door lock Control
- Child Locks

Seats
- Power Seats
- Heated Seats
- Memory Seats

Front Lamp
- Low Beam
- High Beam
- Front Cornering Lamp
- Front Fog lamp
AC7811 BLDC motor Application

AC7811
- CAN
- LIN
- GPIO
- 32-bit ARM Cortex-M3
- PWM
- 12-bit ADC
- Diagnostics
- GPIO

LDO
12V
BLDC motor
Hall sensor
3~
current

Switch
AC7811 Headlamp Application

AC7811

- CAN
- LIN
- GPIO
- ADC
- 32-bit ARM Cortex-M3
- GPIO/PWM
- 12-bit ADC
- Diagnostics

12V

Diagnostics

Binning and temperature

Switch

Switch
AC7811 DC motor Application

AC7811

- CAN
- LIN
- GPIO
- 32-bit ARM Cortex-M3
- GPIO/PWM
- 12-bit ADC
- Diagnostics

LDO

12V

Switch

current

DC motor

Position sensor

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Process & Quality Control---Wafer & Testing

Blank Wafer

Wafer Fab Process
- Incoming Quality Control
- Laser Marking
- Isolation (STI formation)
- Well Implant
- Gate Ox Formation
- Gate Formation
- Spacer Formation
- Source/Drain Implant
- ILD Formation (ILD: Inter Layer Dielectric)
- Contact Hole Formation
- IMD Formation (IMD: Inter Metal Dielectric)
- Metal Pattern Formation
- Passivation Formation
- Metal Pad Formation
- Alloy
- Wafer Acceptance Test
- Outgoing Quality Control => Packing & Shipping

Processed Wafer

Chip Probe Test
- Document Control
- Visual Inspection
- Prober set up/correlation
- Chip Probe Test (CP)
- Visual inspection
- Packing & Shipping

:Incoming Material

:Inspection Process

:Manufacturing Process