

Digital car audio solutions



ST automotive audio



ST applications and portfolio



**HFDA801A
2 Mhz Class-D audio amplifier**



Advanced diagnostics & protections



STMicroelectronics audio excellence

The leading provider of automotive audio power amplifiers

#1 >40% share in automotive audio

>2 Billion audio amplifiers for automotive sold to-date



- Audio amplifiers for any in-vehicle application
 - Head units, smart cockpits...
 - Premium sound systems
 - Telematic boxes, e-call
 - AVAS (eVehicles)
- Multiple-award winning unique sound
- HD audio ready
- The most advanced diagnostic and safety features
- Speaker monitoring and control
- Fully digital audio
- Widest offer of operating range support
- Solutions for high efficiency and green cars

Market focus

Assisted & autonomous driving



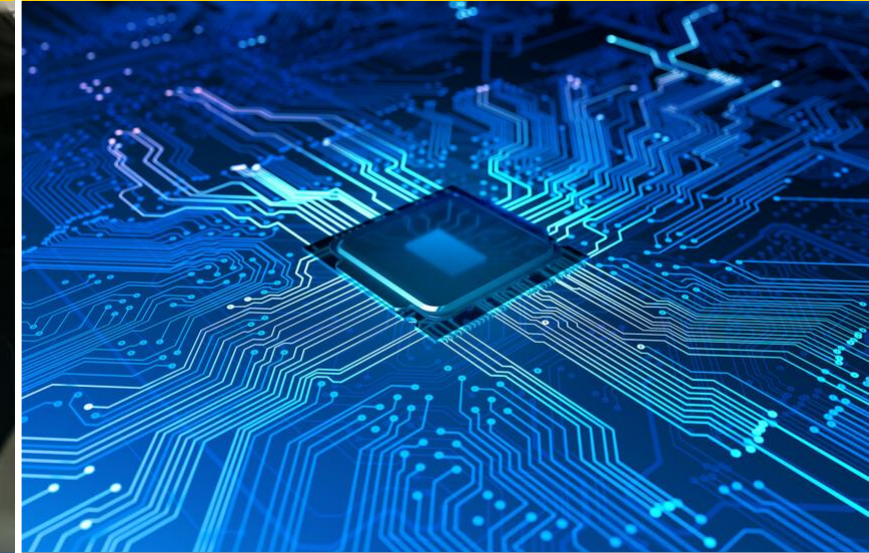
Support ADAS L2 & L2++ acceleration (short term) and L4/L5 towards autonomous mobility (long term)

Infotainment



Premium audio amplifiers and GNSS solutions for outstanding audio and positioning accuracy in every condition

ASICs



High-quality automotive ASIC design, supply services and advanced manufacturing technology platforms



A wide portfolio for a versatile set of applications

Head unit



Emergency call



EV sound generator



Sound system



Instrument cluster



Truck & utility

- High sound quality
- Digital sound stream
- High efficiency
- Advanced & reliable diagnostic
- Comprehensive offer



ST car audio systems

Optional sound system

FDAXXX HFDA80X TDA780X

- From 4CH to 30CH, class-D or class-AB

EV sound & AVAS

FDA90X FDA803/903X HFDA80X

- Single or dual, low power, low space

Battery operated applications

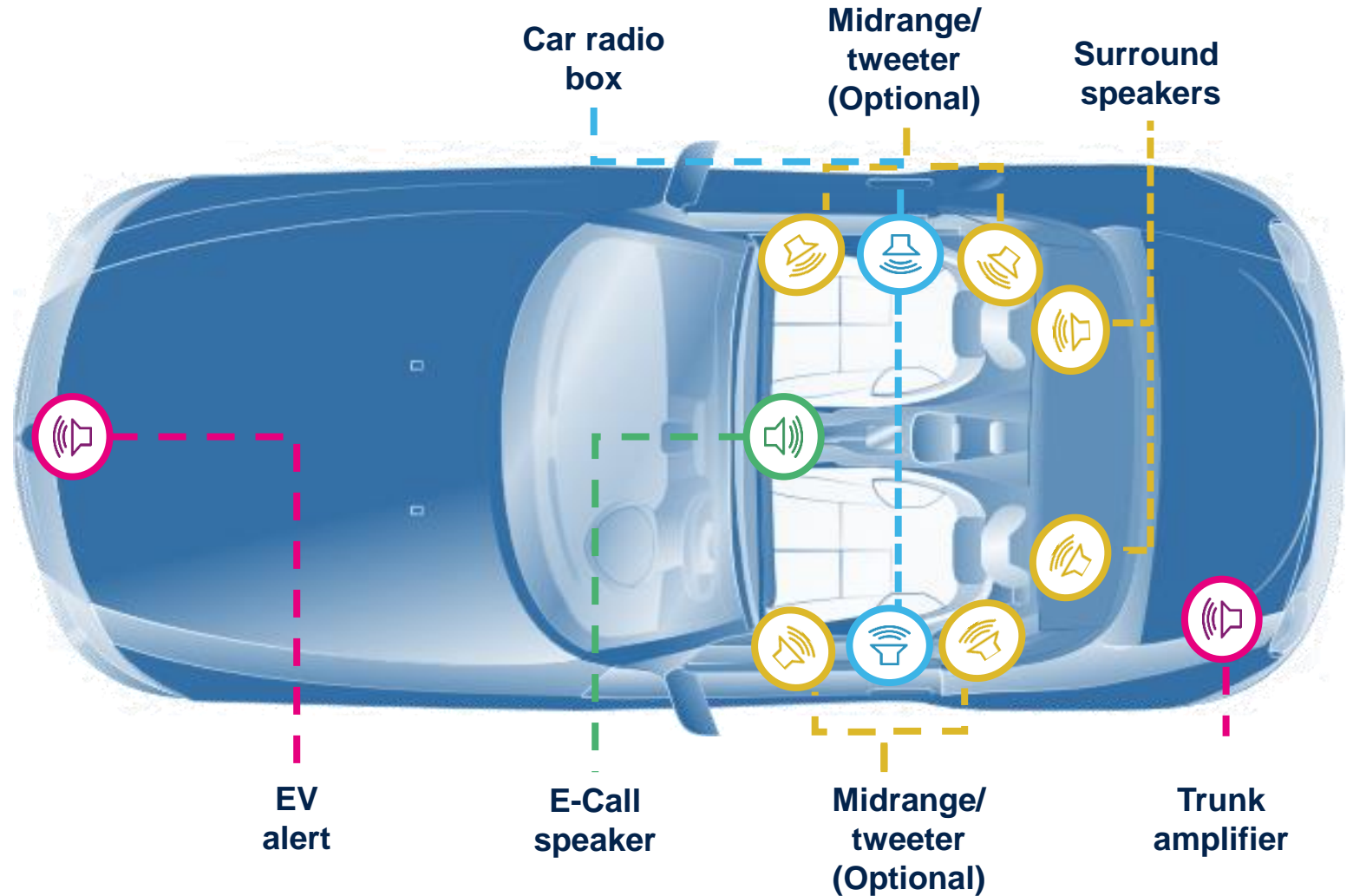
TDA780X TDA756X FDAXXX HFDA80X

- Traditional head-units (4CH to 8CH) – OEM and AM
- Cluster audio channels
- E-cockpit
- Smart antenna

Telematics & e-Call

FDA803/903X

- Single or dual, low power, low space





ST audio amplifier portfolio

Covering the full range of automotive applications

- Outstanding performance
- 1-, 2- and 4-channel audio solutions
- Wide voltage range
- Advanced diagnostic
- High efficiency
- Automotive grade
- Digital input
- Extremely low noise
- Class D & Class AB
- Supporting all automotive applications

Class D

Class AB



Head units/ clusters/ cockpit

TDA780X

4-ch – 18 V
Fully digital
High efficiency

TDA756X

4-ch – 18 V
Analog
High efficiency

HFDA801A

4-ch – 25 V
2 MHz PWM
HD ready **2MHz**

TDA7901

4-ch – 18 V
Load current monitor
Class G



High end / branded sound systems

FDA801/B

4-ch – 25 V
>90% efficiency
Full diagnostic

FDA802A/B

2-ch – 50 V
High power
Full diagnostic

FDA901

4-ch – 25 V
>90% efficiency
Load current monitor

FDA802P

2-ch – 40 V
High power
Full diagnostic



Telematics/ EV sound & AVAS

FDA903D/U

1-ch – 3 to 18 V
>90% efficiency
Load current monitor

FDA8/903s

1-ch – 3 to 18 V
10 W – full diag
Load current monitor

HFDA802

2-ch – 25 V
2 MHz PWM
HD ready **2MHz**



life.augmented



In-car digital stream audio

The most comprehensive family of digital input amplifiers



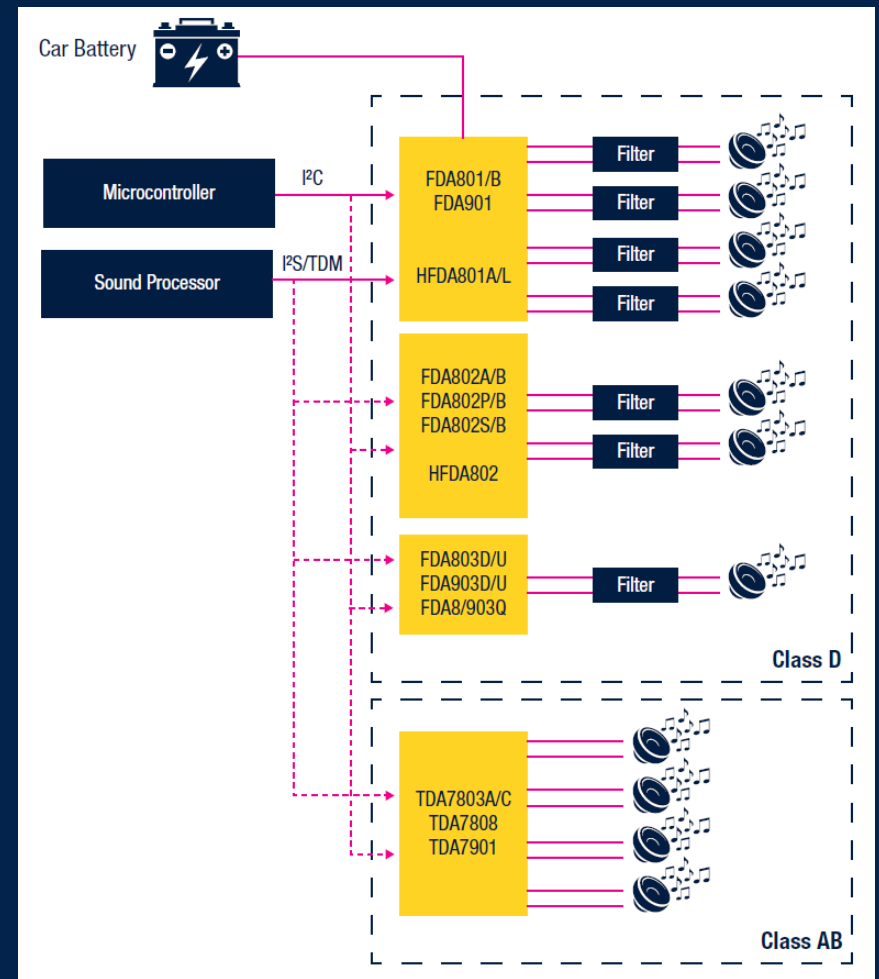
Sales type	Channels / Power	Class
TDA7802	4 x 47 W	Class AB /SB-i
TDA7803A/8	4 x 45 W	
TDA7901: Current monitor HD audio	4 x 43 W	Class G
FDA801/B: 25 V supply	4 x 100 W	Class D ~400 kHz PWM
FDA802A/B: 50 V applications	2 x 150 W	
FDA803D/U/Q: AVAS Telematics	1 x 40 W	
FDA903D/U/Q: Current monitoring	1 x 40 W	
FDA901: Current monitoring	4 x 100 W	
FDA8/903s: Current monitoring	1 x 10 W	Class D ~2 MHz PWM
HFDA801A: 25 V HD audio	4 x 80 W	
HFDA802: 25 V HD audio	2 x 80 W	

Battery operated platforms

Low power dissipation → High efficiency
Digital input signal

Applications

- Head unit
- Multi CHs external AMP system

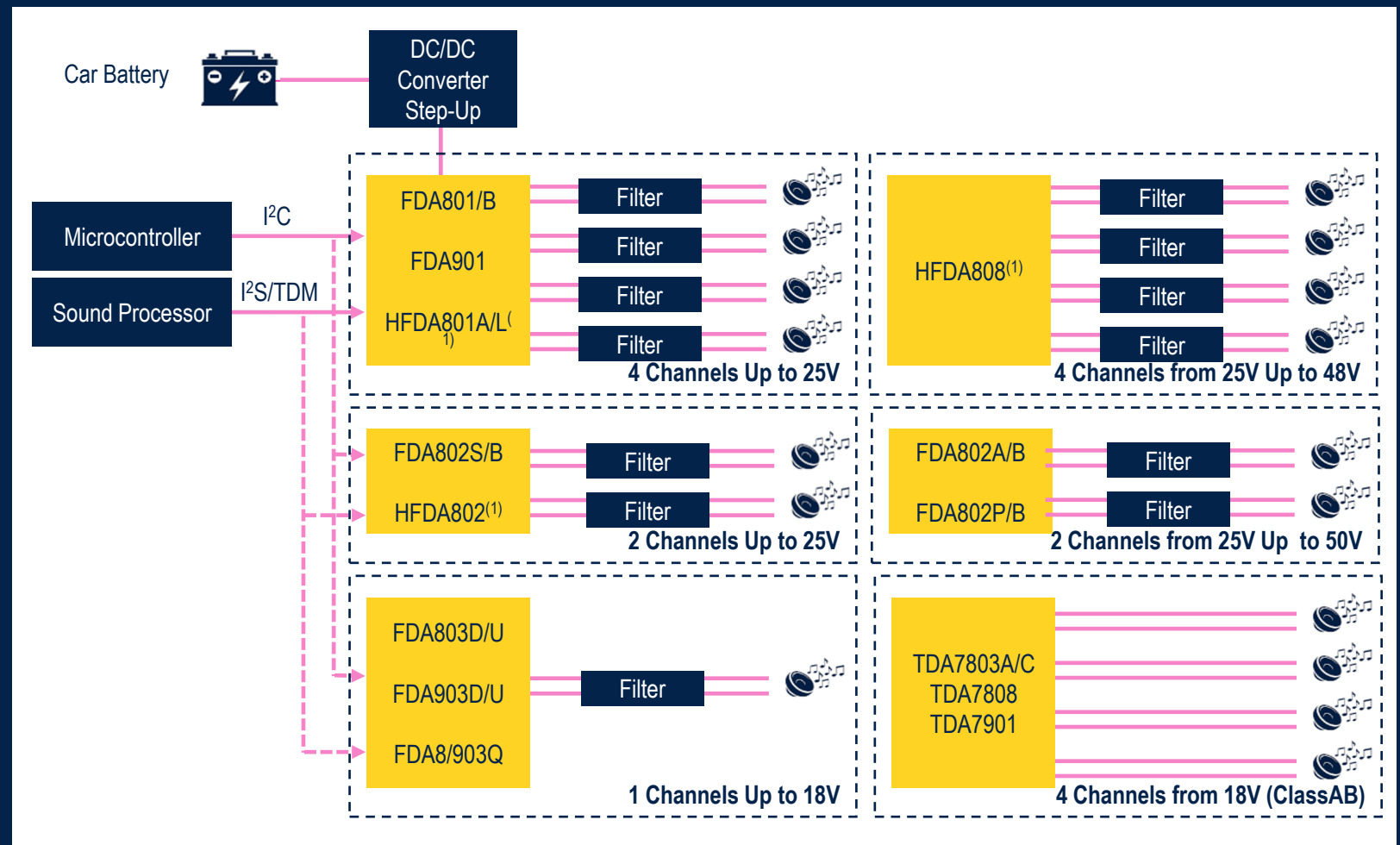


Step-up platforms

Multiple operating voltage solutions
High frequency PWM switching

Applications

- External booster
- Multi CHs external AMP system



HFDA – High Frequency Digital Amp

Introducing 3rd generation 2 Mhz family of digital class-D

High-definition audio for compact applications

Real-time diagnostics enable advanced speaker tuning for audio enhancement and protections

New temperature, open-load in play detection and DIM functions support stringent OEM requirements

2 Mhz digital class-D family HFDA801A/L/H

**4 x 80 W class-D digital input power amplifier with diagnostics,
wide voltage operation range for car audio applications**

Features

Electrical parameters

- 5 V to 25 V operating range
- I2S and up to TDM 16 digital input
- 44.1 / 48 / 96 / 192 kHz selectable input sampling frequency
- 24-bit DAC; 120 dB Dynamic Range
- Extremely low noise: 13 μ V A-wht

Protections

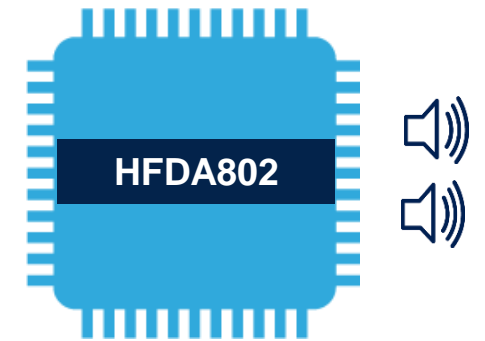
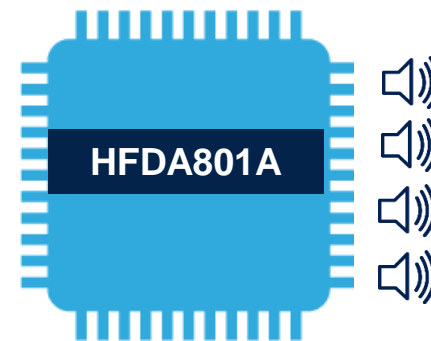
- Input and output offset detection
- 4 x OCP protection levels configurable through I²C
- 4 x thermal warning levels
- Power limiting function – programmable through I²C

Outputs

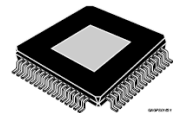
- 2 Mhz PWM switching frequency:
- 3.3 μ F, 150 nF output filter
- 4 x 25W / 4 Ω , 1% THD @ 14.4 V
- 4 x 30W / 4 Ω , 10% THD @ 14.4 V
- 4 x 50W / 2 Ω , 1% THD @ 14.4 V
- 4 x 80W / 4 Ω , 10% THD @ 25 V

Diagnostics

- Digital Impedance Meter (DIM)
- Load current monitoring
- CD / Diag pin with 3 selectable levels
- Average temperature measurement over I²C



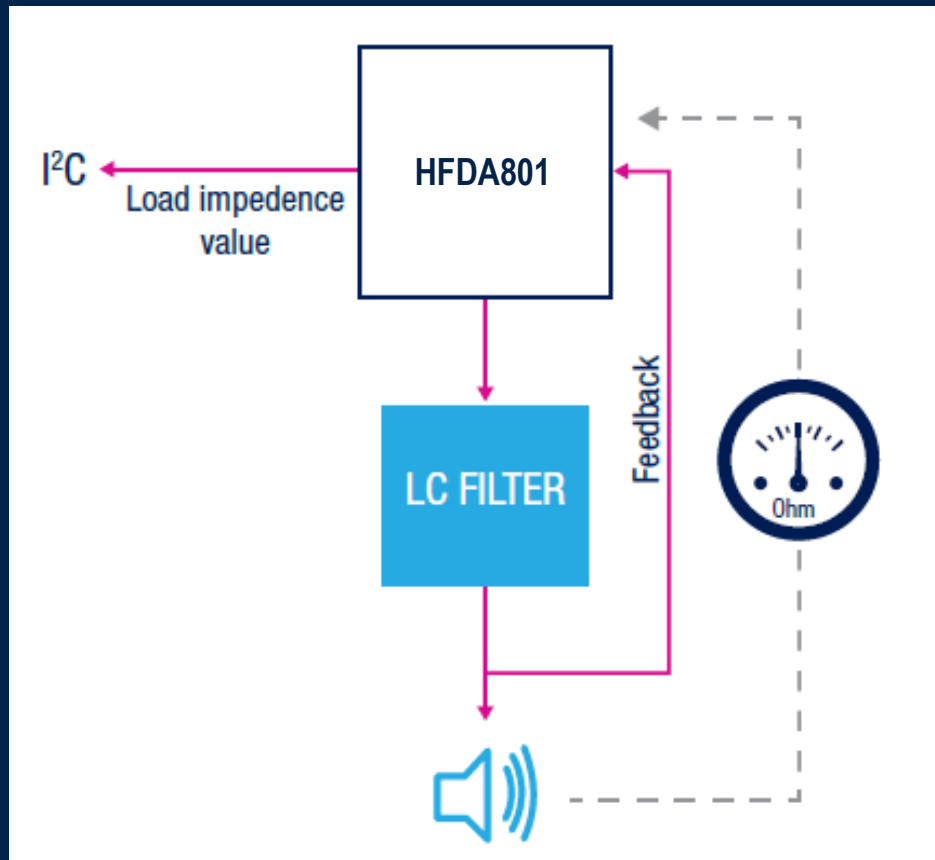
Coming soon: 2CH 25V



LQFP64 (exposed pad up)

Innovative feedback after filter provides flat, load independent, frequency response

Digital impedance meter



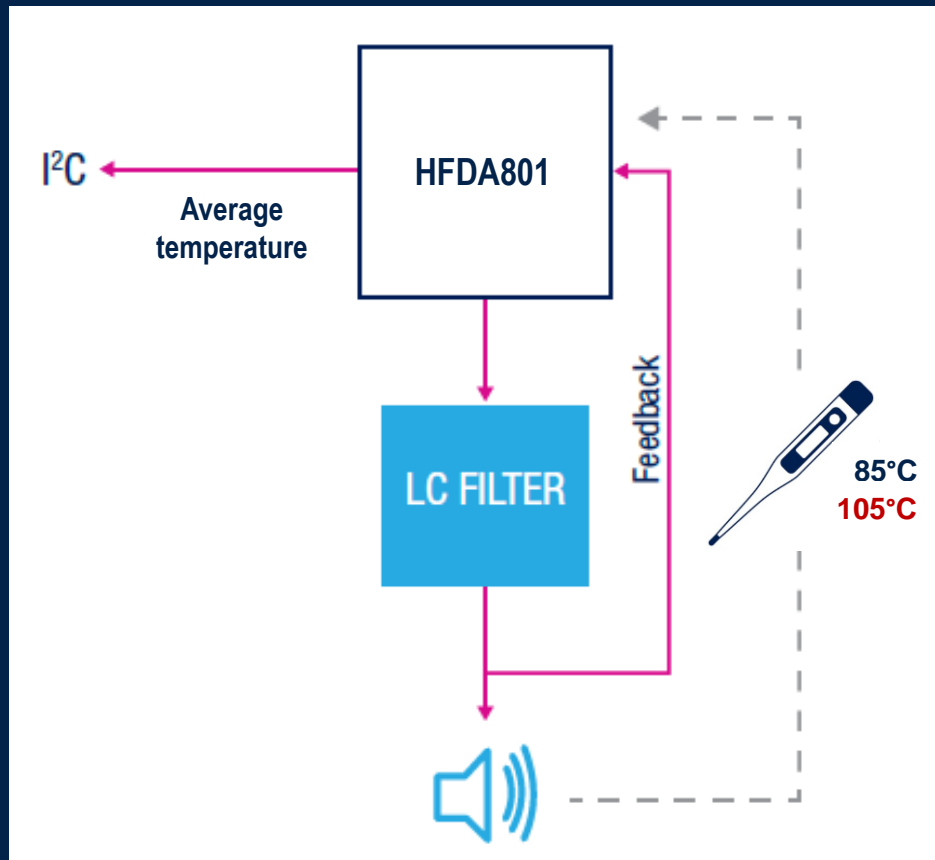
HFDA801A includes a REAL load value recognition

- The value is communicated for each channel via I²C data register
- Each channel is completely independent from others and diag can be launched independently
- DC and AC load impedance can be measured
- AC load measurement with internally generated signal

DIM: Digital impedance meter

➔ Advanced speaker monitoring

Temperature monitoring



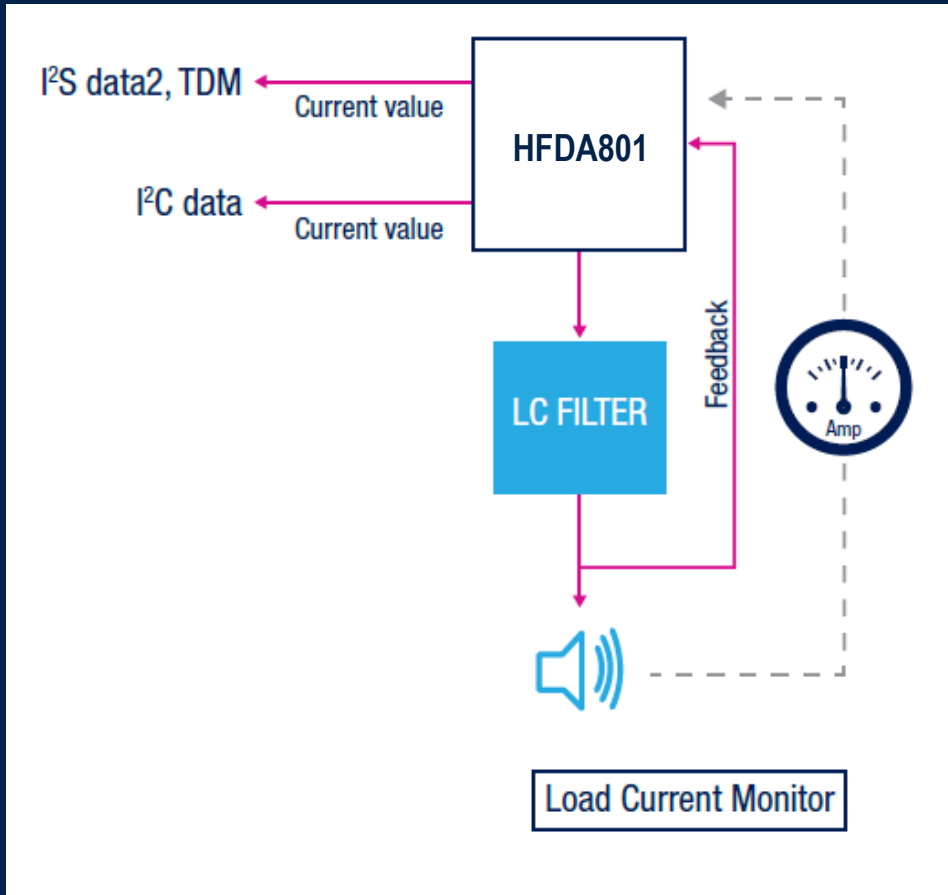
HFDA801A a local thermal sensor & ADC

- The average temperature value is communicated via I2C data register
- 4 thermal warning levels selectable through I2C and flag available when CDDiag is pulled down
- Local thermal protection embedded on each channel.
 - Activation of the local thermal protection will cause the impacted channel to be muted and the related I2C data bit is set

Temperature monitoring

→ Advanced audio amplifier IC protections

Real-time load current monitor



HFDA801A includes a REAL time load current monitor

- The continuous load monitoring enables many applications that could check, control and optimize the speaker operation for their entire life.
- Two possible way to read the current samples from the device:
 - Through the I²S bus using the I²Sdata2 pin set as output with the I²Sclk and I²SWS reference used for data input transmission
 - Through the I²C bus (I²C DBx data registers)

Current Sensing: Real Time Current monitor

➔ Advanced Sound feedback Control