PP/655/2   21 October 2019

CMX655D

Ultra-low Power Voice Codec

Direct connection to MEMS microphones and includes a 1W Class-D Speaker Driver

Features

- Digital microphone support
- High efficiency Class-D amplifier
- Low power consumption
- 16 bit audio data
- Supports conventional telephony and HD voice (300Hz - 3.4kHz and 50Hz -7kHz bandwidths)
- Supports audio bandwidths up to 21kHz
- Supports 8/16/32/48 ksps sample rates
- Flexible serial audio interface
- SPI™/TWI control interface
- Small 24-lead VQFN Package
- 1.8—3.6V operation

Applications

- Security alarm panels
- Glass break detection
- Intercom and access systems
- Mobile radio and accessories
- Wired telephony
- Voice controlled equipment

Key Values

- Ultra-low operating power
  Typ. 300µA in listening mode
- Dual matched microphone channels
- Direct connection to MEMS microphones
- High efficiency 1W speaker driver
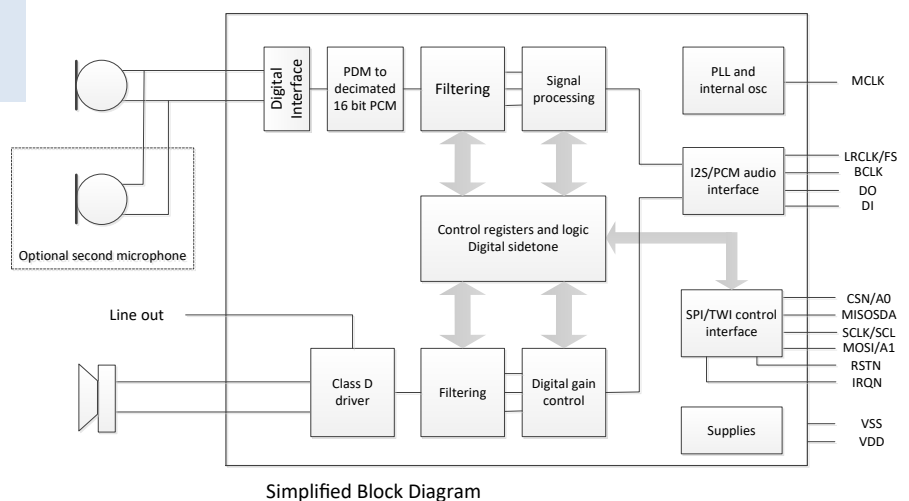- Low cost small package

Traditionally voice codecs have interfaced to electret microphones and speakers providing A to D and D to A functions using precision oversampling data converters. Recent advances in microphone design using MEMS techniques are now changing this, along with higher efficiency speaker driver architectures such as Class D topologies. Both of these advances enable significant reductions in power consumption which is needed to address new applications such as voice control, that require always-on operation. Such applications that are often battery powered, driving the need for ultra-low power consumption.

The CMX655D addresses these needs providing an update to the traditional voice codec that is both very low power and small in size. Microphone interfaces connect single or dual MEMS microphones to the device, with parallel processing of each data stream to maintain phase alignment between the two channels. The device supports programmable on-chip filtering, with digital gain control and an AGC function.
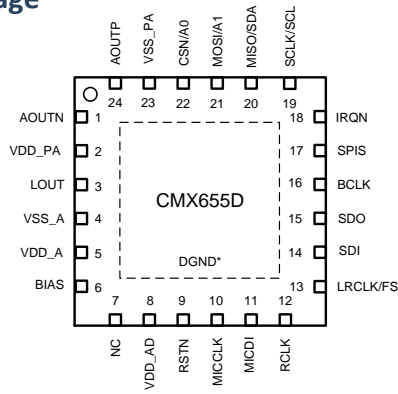
In the reverse channel digital voice data drives a Class-D amplifier, also featuring programmable filtering and digital gain control. This architecture operates with much higher efficiency than conventional speaker drivers. An additional low level output is also provided.

The device interfaces via standard serial busses that are commonly found on many microcontrollers, DSPs and low cost single chip radio transceivers.
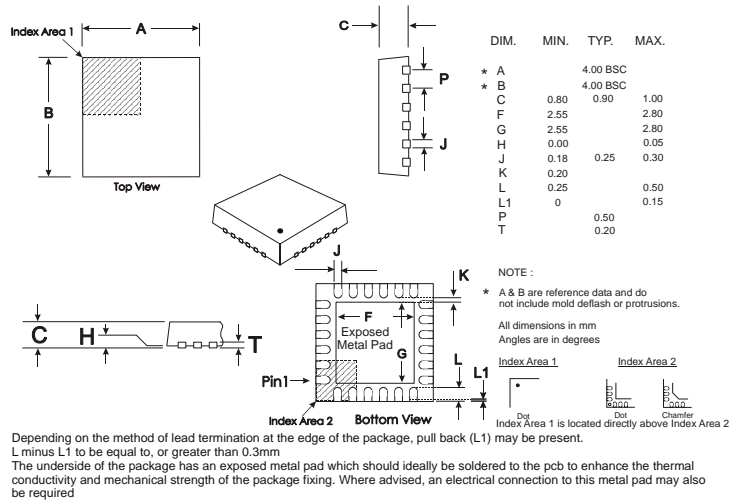
The CMX655D is available in a small VQFN-24 package and supported by a range of development tools including the EV6550D evaluation kit.

CML
CMX655DQ6

24-VQFN (4mm x 4mm)

Simplified Block Diagram

Package

AOUTP VSS_PA CSN/A0 MOSI/A1 MISO/SDA SCLK/SCL

24 23 22 21 20 19

AOUTN	1		18	IRQN
VDD_PA	2		17	SPIS
LOUT	3	CMX655D	16	BCLK
VSS_A	4		15	SDO
VDD_A	5	DGND*	14	SDI
BIAS	6		13	LRCLK/FS

7 8 9 10 11 12

NC VDD_AD RSTN MICCLK MICDI RCLK

VQFN (Q6)
*Exposed Paddle   4mm x 4mm

DIM.	MIN.	TYP.	MAX.
* A		4.00 BSC	
* B		4.00 BSC	
C	0.80	0.90	1.00
F	2.55		2.80
G	2.55		2.80
H	0.00		0.05
J	0.18	0.25	0.30
K	0.20		
L	0.25		0.50
L1	0		0.15
P		0.50	
T		0.20	

NOTE :
* A & B are reference data and do not include mold deflash or protrusions.

All dimensions in mm
Angles are in degrees

Index Area 1 is located directly above Index Area 2

Depending on the method of lead termination at the edge of the package, pull back (L1) may be present.
L minus L1 to be equal to, or greater than 0.3mm
The underside of the package has an exposed metal pad which should ideally be soldered to the pcb to enhance the thermal conductivity and mechanical strength of the package fixing. Where advised, an electrical connection to this metal pad may also be required

Evaluation Support - EV6550D

- Demonstrates the CMX655D
- Sockets to support Digital MEMS microphone evaluation boards
- Direct Class-D connections for full evaluation of Class-D
- On board 24.576MHz clock
- On-board supply regulators operate from a single 5 volt supply
- Host Port allows for quick setup with PE0003
- Optional pull-ups and address selection for TWI
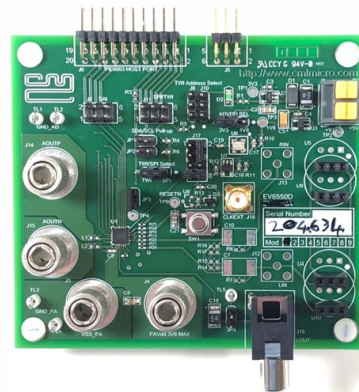
Ordering information:
- CMX655DQ6 - Ultra-low Power Voice Codec
- EV6550D - CMX655D Evaluation Kit

WHAT TO DO NEXT

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www.cmlmicro.com

United Kingdom	Tel: +44 (0) 1621 875500	email: sales@cmlmicro.com
United States	Tel: +1 336 744 5050	email: us.sales@cmlmicro.com
Singapore	Tel: +65 62888129	email: sg.sales@cmlmicro.com