WM2000

Handset Receiver Speaker Driver with Wolfson myZone^{TM} Ambient Noise Cancellation

DESCRIPTION

The WM2000 is a low power, high quality handset receiver speaker driver with Wolfson myZone^{TM} Ambient Noise Cancellation (ANC). It provides enhanced voice communication quality in a noisy environment if the handset acoustics are designed appropriately.

The device integrates into the handset output signal path with minimal architectural changes. WM2000 drives the receiver speaker directly.

The Wolfson myZone^{TM} (ANC) engine uses an adaptive filtering algorithm which requires one or two dedicated analogue microphones. The filtering algorithm can be adapted to the handset's acoustic characteristics for optimum noise cancellation performance. A dynamic control algorithm adjusts ANC parameters for variations in ambient noise levels.

High power supply rejection allows WM2000 to operate in a noisy electrical environment without degrading signal quality. The device is controlled via registers which can be accessed using a 2-wire serial control interface. A pre-configured Internal Sequencer controls the internal hardware such that a single register write can be used to perform key analogue sequences during power up / power down or mode transition.

FEATURES

- Wolfson myZone^{TM} Ambient Noise Cancellation (ANC)
  - Wide noise cancellation bandwidth (300Hz-2.5kHz)*
  - Up to 20dB ambient noise reduction*
  - Dynamic control algorithm copes with extremes of ambient noise

- Handset Receiver Speaker driver
  - -79dB THD at 31mW into 32Ω
  - -68dB THD at 80mW into 16Ω
  - Pop-click minimisation

- Two inputs
  - Differential Microphone input for ambient noise
  - Differential Line input for received voice

- Low power consumption
  - 20mW added to voice call when noise cancellation enabled
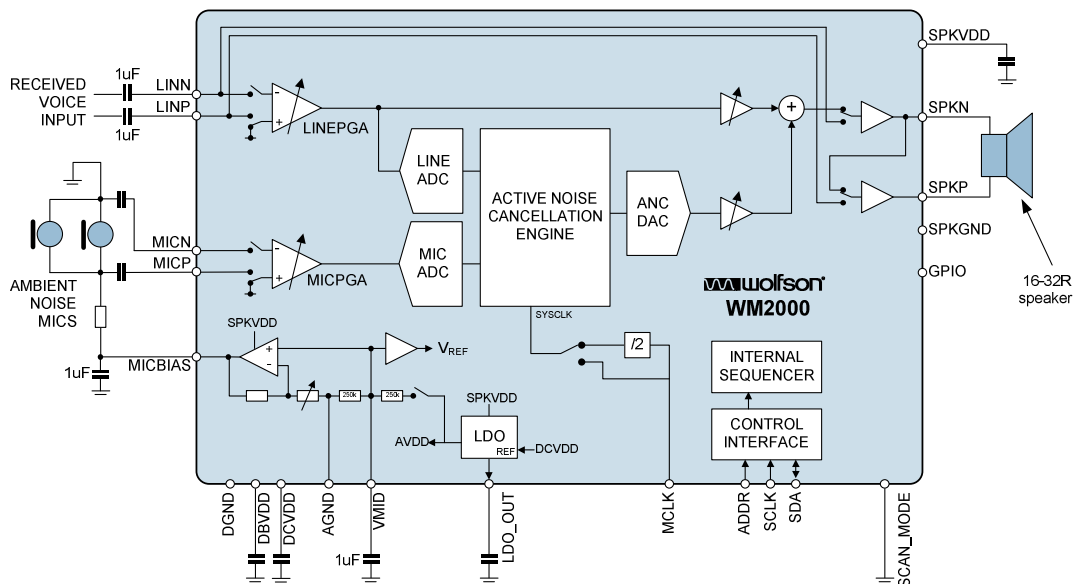 - 8µW standby power

- CSP25 package, -40°C to +85°C temperature range

* with well designed acoustics and careful transducer selection

APPLICATIONS

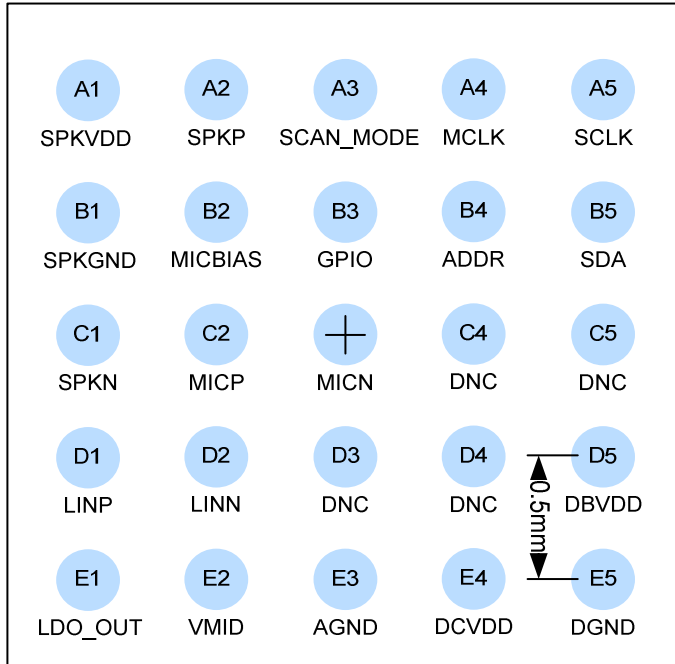- Mobile telephony

BLOCK DIAGRAM

PIN CONFIGURATION

A1	A2	A3	A4	A5
SPKVDD	SPKP	SCAN_MODE	MCLK	SCLK
B1	B2	B3	B4	B5
SPKGND	MICBIAS	GPIO	ADDR	SDA
C1	C2		C4	C5
SPKN	MICP	MICN	DNC	DNC
D1	D2	D3	D4	D5
LINP	LINN	DNC	DNC	DBVDD
E1	E2	E3	E4	E5
LDO_OUT	VMID	AGND	DCVDD	DGND

0.5mm

Figure 1   Pin Configuration (25 ball Chip Scale Package) - Top View

ORDERING INFORMATION

DEVICE	TEMPERATURE RANGE	PACKAGE	MOISTURE SENSITIVITY LEVEL	PEAK SOLDERING TEMPERATURE
WM2000ECS/RV	-40°C to +85°C	CSP25 (Pb-free, tape and reel)	MSL1	260°C

Note:

Reel quantity = 3,500

PIN DESCRIPTION

The following pins/balls are available on WM2000.

BALL	NAME	TYPE	DESCRIPTION
A5	SCLK	Digital Input	2 wire control interface clock
B5	SDA	Digital Input/Output	2 wire control interface data
D3	DNC	Production test pins	Do not connect. Wolfson internal use only.
C4	DNC		
C5	DNC		
D4	DNC		
D5	DBVDD	Supply	Digital buffer (I/O) supply
E5	DGND	Ground	Digital ground (return path for DCVDD and DBVDD)
E4	DCVDD	Supply	Digital core supply
E3	AGND	Ground	Analogue ground
E2	VMID	Analogue Output	Mid rail reference decoupling pin
D2	LINN	Analogue Input	Received Voice (Line) inverting differential input
D1	LINP	Analogue Input	Received Voice (Line) non-inverting differential input
C3	MICN	Analogue Input	Noise Cancelling (Mic) inverting differential input
C2	MICP	Analogue Input	Noise Cancelling (Mic) non-inverting differential input
A1	SPKVDD	Supply	Supply for speaker driver and internal LDO.
C1	SPKN	Analogue Output	Inverting differential speaker output (BTL negative)
B1	SPKGND	Ground	Speaker ground (return path for SPKVDD)
A2	SPKP	Analogue Output	Non-inverting differential speaker output (BTL positive)
B2	MICBIAS	Analogue Output	Bias supply for external microphone
E1	LDO_OUT	Analogue Output	Voltage regulator decoupling connection.
A3	SCAN_MODE	Digital Input	This pin must be grounded.
A4	MCLK	Digital Input	Master clock
B3	GPIO	Digital Input/Output	General purpose I/O pin
B4	ADDR	Digital Input	2 wire control interface device address select. Should be pulled up to DBVDD or grounded.

ABSOLUTE MAXIMUM RATINGS

Absolute Maximum Ratings are stress ratings only. Permanent damage to the device may be caused by continuously operating at or beyond these limits. Device functional operating limits and guaranteed performance specifications are given under Electrical Characteristics at the test conditions specified.

ESD Sensitive Device. This device is manufactured on a CMOS process. It is therefore generically susceptible to damage from excessive static voltages. Proper ESD precautions must be taken during handling and storage of this device.

Wolfson tests its package types according to IPC/JEDEC J-STD-020B for Moisture Sensitivity to determine acceptable storage conditions prior to surface mount assembly. These levels are:

MSL1 = unlimited floor life at <30°C / 85% Relative Humidity. Not normally stored in moisture barrier bag.
MSL2 = out of bag storage for 1 year at <30°C / 60% Relative Humidity. Supplied in moisture barrier bag.
MSL3 = out of bag storage for 168 hours at <30°C / 60% Relative Humidity. Supplied in moisture barrier bag.

The Moisture Sensitivity Level for each package type is specified in Ordering Information.

| CONDITION	MIN	MAX
Supply voltages (SPKVDD, DBVDD)	-0.3V	+4.5V
Supply voltages (DCVDD)	-0.3V	+2.5V
Voltage range digital inputs	DGND - 0.3V	DBVDD + 0.3V
Voltage range analogue inputs	AGND - 0.3V	DCVDD + 0.25V
Operating temperature range, T_A	-40°C	+85°C
Storage temperature after soldering	-65°C	+150°C

RECOMMENDED OPERATING CONDITIONS

PARAMETER	SYMBOL	MIN	TYP	MAX	UNIT
Digital supply range (Core)	DCVDD	1.71	1.8	1.89	V
Digital supply range (Buffer)	DBVDD	1.71	1.8	3.6	V
Speaker supply range	SPKVDD	2.7	2.8	3.6	V
Ground	DGND, AGND, SPKGND		0		V

Notes:

1.   Analogue and digital grounds must always be within 0.3V of each other.

2.   All supplies are completely independent from each other (i.e. not internally connected).

PACKAGE DIMENSIONS

B: 25 BALL W-CSP PACKAGE 2.552 x 2.602 x 0.7mm BODY, 0.50 mm BALL PITCH   DM056.A
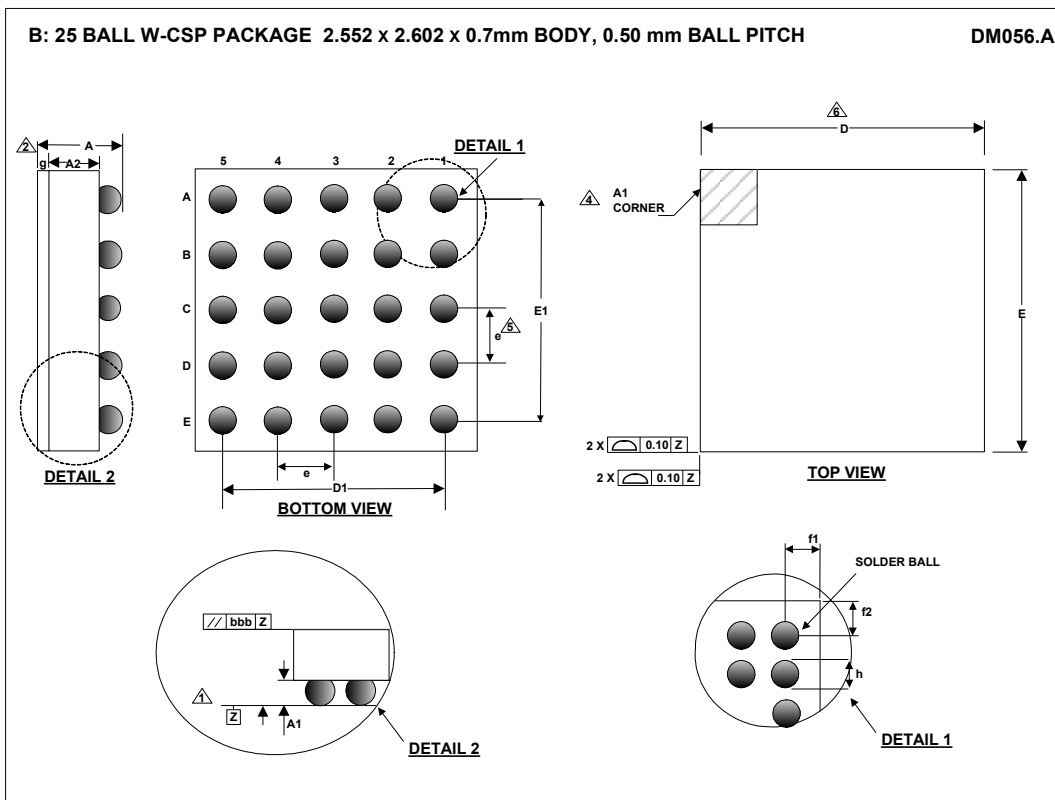
Symbols	Dimensions (mm)			
	MIN	**NOM**	**MAX**	**NOTE**
A	0.615	0.7	0.785	
A1	0.225	0.250	0.275	
A2	0.355	0.380	0.405	
D		2.552 BSC		
D1		2.00 BSC		
E		2.602 BSC		
E1		2.00 BSC		
e		0.50 BSC		5
f1	0.266 BSC			
f2	0.291 BSC			
g	0.035	0.070	0.105	
h		0.314 BSC		

NOTES:
1. PRIMARY DATUM -Z- AND SEATING PLANE ARE DEFINED BY THE SPHERICAL CROWNS OF THE SOLDER BALLS.
2. THIS DIMENSION INCLUDES STAND-OFF HEIGHT 'A1' AND BACKSIDE COATING.
3. A1 CORNER IS IDENTIFIED BY INK/LASER MARK ON TOP PACKAGE.
4. BILATERAL TOLERANCE ZONE IS APPLIED TO EACH SIDE OF THE PACKAGE BODY.
5. 'e' REPRESENTS THE BASIC SOLDER BALL GRID PITCH.
6. THIS DRAWING IS SUBJECT TO CHANGE WITHOUT NOTICE.
7. FOLLOWS JEDEC DESIGN GUIDE MO-211-C.

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