DATA SHEET

UZZ9000
Sensor Conditioning Electronics

Objective specification
Supersedes data of 1996 Dec 03
File under Discrete Semiconductors, SC17

1998 May 18

Philips
Semiconductors

Sensor Conditioning Electronics UZZ9000

FEATURES

- One chip angle sensor output signal conditioning
- Overall accuracy better than 1° for 100° angle range
- Temperature range from –40 to 150 °C
- Adjustable angle range
- Adjustable zero point.

DESCRIPTION

The UZZ9000 is an integrated circuit which is able to combine two sinusoidal signals (sin and cos) into one single linear output signal. These signals might come from magnetoresistive sensors. In that case this function can provide good results as the signal conditioning electronic for angle measurement forming from the output signal of two magnetoresistive sensors. This gives the sin (α) and the cos (α) of the angle to be measured a linear output characteristic for angles up to 360°. This integrated circuit can also be used for all other applications in which the sin and the cos of a signal have to be transferred in one output characteristic. A typical application would be any kind of resolver application. The two primary input signals are converted into the digital domain, with a CORDIC algorithm performing the arctan transformation. Since todays applications work typically with analog output signals (e.g. potentiometers), the resulting signal which is transferred back to the analog domain is a ratiometric one. This integrated circuit enables the user to set both the angle range to be measured (Fig.3, α_2 to α_1) and the zero point (Fig.3, α_1) in wide ranges. These ranges are determined by an external voltage divider.

PINNING

SYMBOL	PIN	DESCRIPTION
$+V_{O2}$	1	sensor 2 positive differential input
$+V_{O1}$	2	sensor 1 positive differential input
V_{DD2}	3	supply voltage (digital 2)
V_{SS}	4	ground (digital)
GND	5	ground
GND	6	ground
GND	7	ground
–	8	note 1
GND	9	ground
GND	10	ground
–	11	note 1
V_{OUT}	12	output voltage
VIA2	13	voltage input adjust 2
VIA1	14	voltage input adjust 1
OFFS2	15	voltage input adjust sensor offset 2
OFFS1	16	voltage input adjust sensor offset 1
V_{DDA}	17	supply voltage (analog)
V_{SSA}	18	ground (analog)
GND	19	ground
GND	20	ground
V_{DD1}	21	supply voltage (digital 1)
–	22	note 1
$-V_{O2}$	23	sensor 2 negative differential input
$-V_{O1}$	24	sensor 1 negative differential input

Note

1. Pin to be left unconnected.

QUICK REFERENCE DATA

SYMBOL	PARAMETER	MIN.	TYP.	MAX.	UNIT
V_{DDA}	supply voltage; note 1	4.5	5	5.5	V
V_{DD1}	supply voltage; note 1	4.5	5	5.5	V
V_{DD2}	supply voltage; note 1	4.5	5	5.5	V
$I_{CC\ (tot)}$	total supply current	–	12	–	mA
V_{S1}	differential input voltage (peak voltage)	–140	–	+140	mV
V_{S2}	differential input voltage (peak voltage)	–140	–	+140	mV
V_{S1}	common mode range	2.2	–	2.8	V
V_{S2}	common mode range	2.2	–	2.8	V
V_{out}	output voltage range (ratiometric)	5	–	95	$\%V_{DD}$
VIA1	programmable offset voltage	–2.5	–	+2.5	$\%V_{DD}$
VIA2	programmable gain factor	1	–	6	
A	accuracy (deviation from best straight line)	–0.5	–	+0.5	$\%V_{DD}$
R	resolution	–	0.05	0.1	$\%V_{DD}$
H	hysteresis	–	0.05	0.1	$\%V_{DD}$
T_{amb}	ambient temperature	–40	–	+150 (2)	°C

Notes

1. V_{DDA}, V_{DD1} and V_{DD2} must be connected to the same supply voltage.
2. 200 hours (125 °C continuous).

CIRCUIT BLOCK DIAGRAM

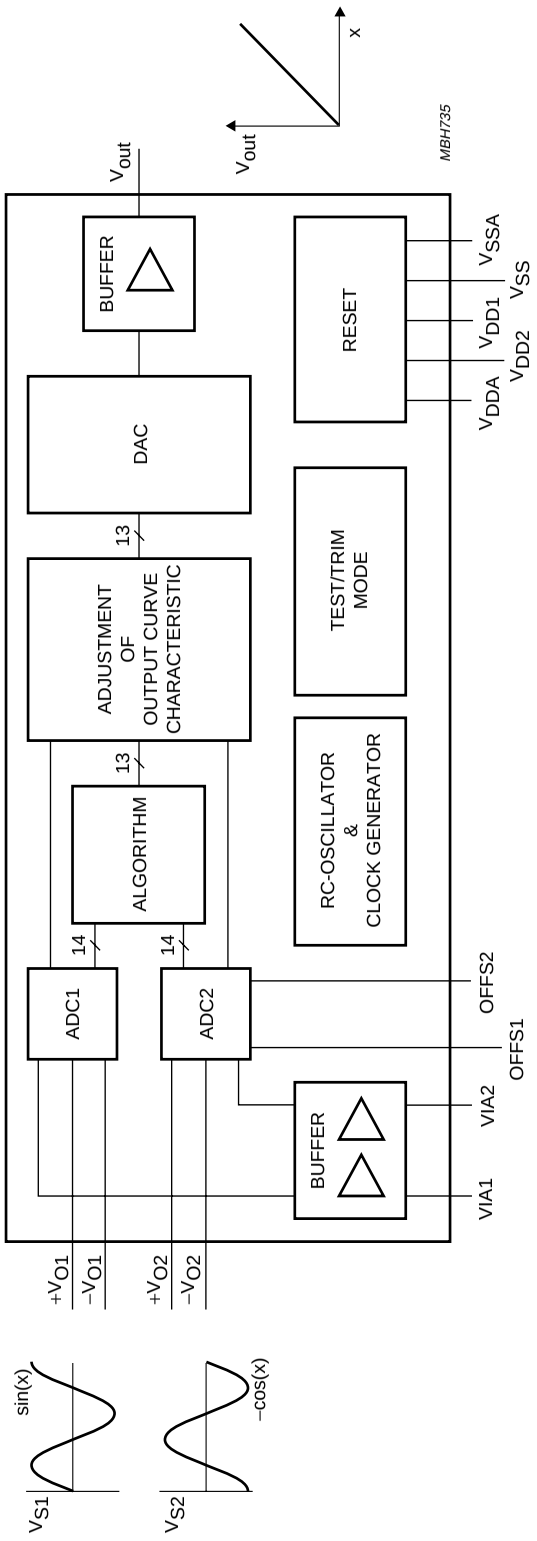
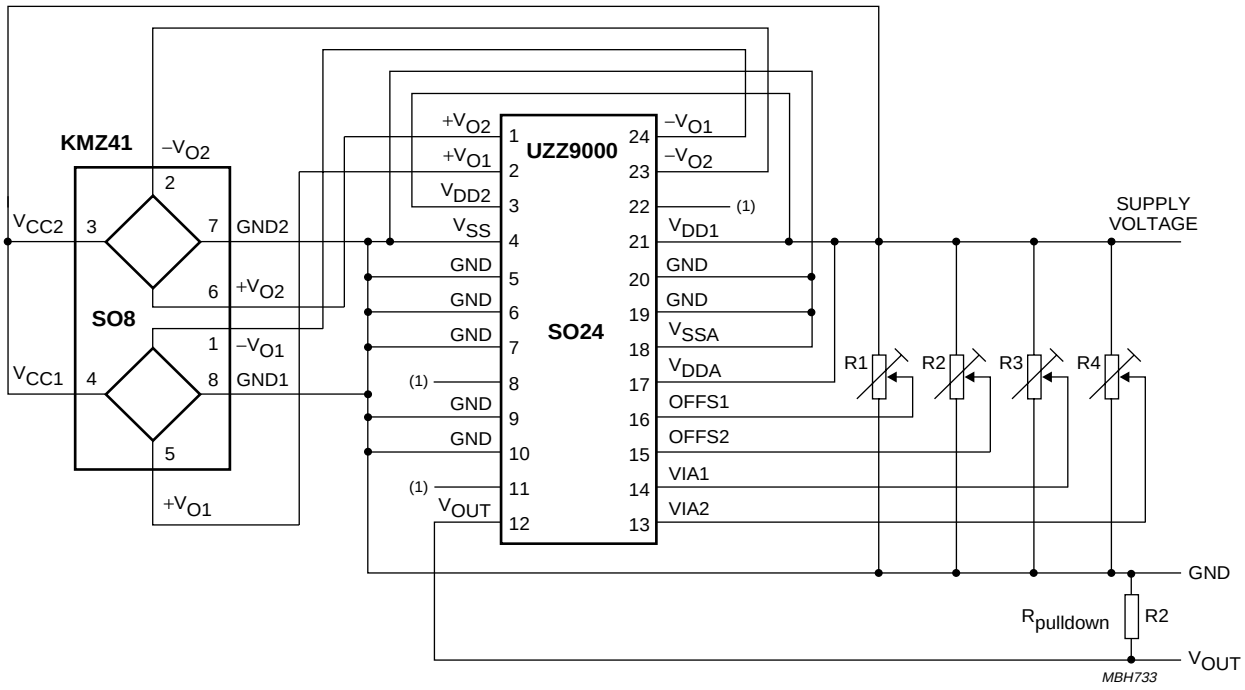


Fig.1 Block diagram.

V_{S1}, V_{S2}: differential input voltages.

APPLICATION INFORMATION



(1) Pin to be left unconnected.

Fig.2 Application circuit.

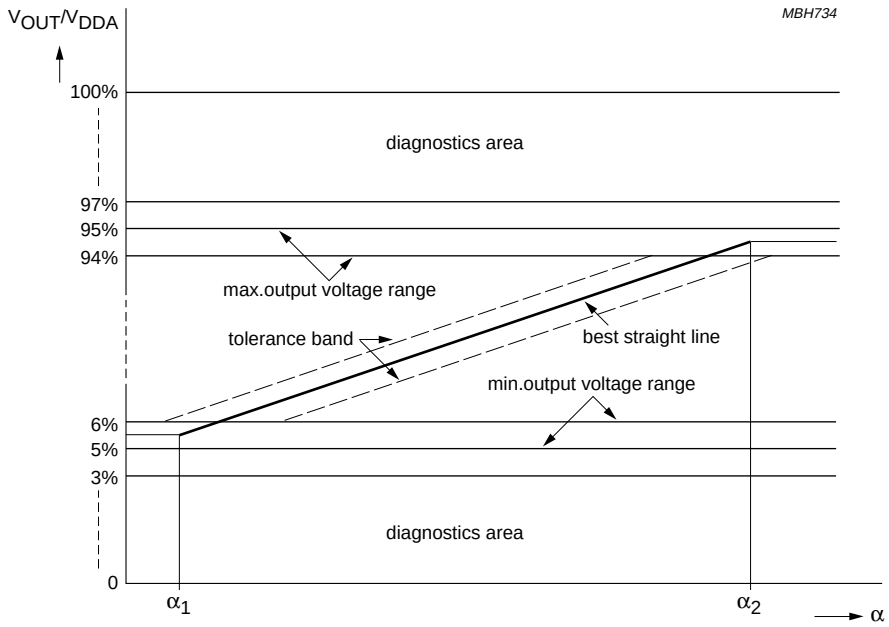


Fig.3 Output characteristic.

DEFINITIONS

Data Sheet Status	
Objective specification	This data sheet contains target or goal specifications for product development.
Preliminary specification	This data sheet contains preliminary data; supplementary data may be published later.
Product specification	This data sheet contains final product specifications.
Limiting values	
Limiting values given are in accordance with the Absolute Maximum Rating System (IEC 134). Stress above one or more of the limiting values may cause permanent damage to the device. These are stress ratings only and operation of the device at these or at any other conditions above those given in the Characteristics sections of the specification is not implied. Exposure to limiting values for extended periods may affect device reliability.	
Application information	
Where application information is given, it is advisory and does not form part of the specification.	

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