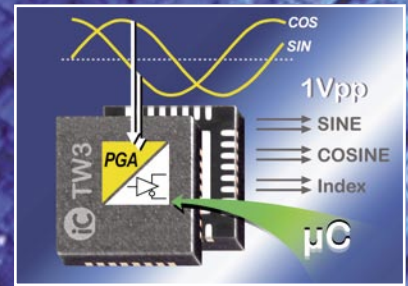


iC-TW3

SIN/COS SIGNAL CONDITIONER WITH 1 Vpp DRIVER AND INTEGRATED TEMPERATURE COMPENSATION



The general purpose sensor signal conditioner iC-TW3 provides highly accurate non contact trimming of three independent sine/cosine sensor signals. The differential output signals can be calibrated to 1 Vpp or to 2 Vpp, alternatively.

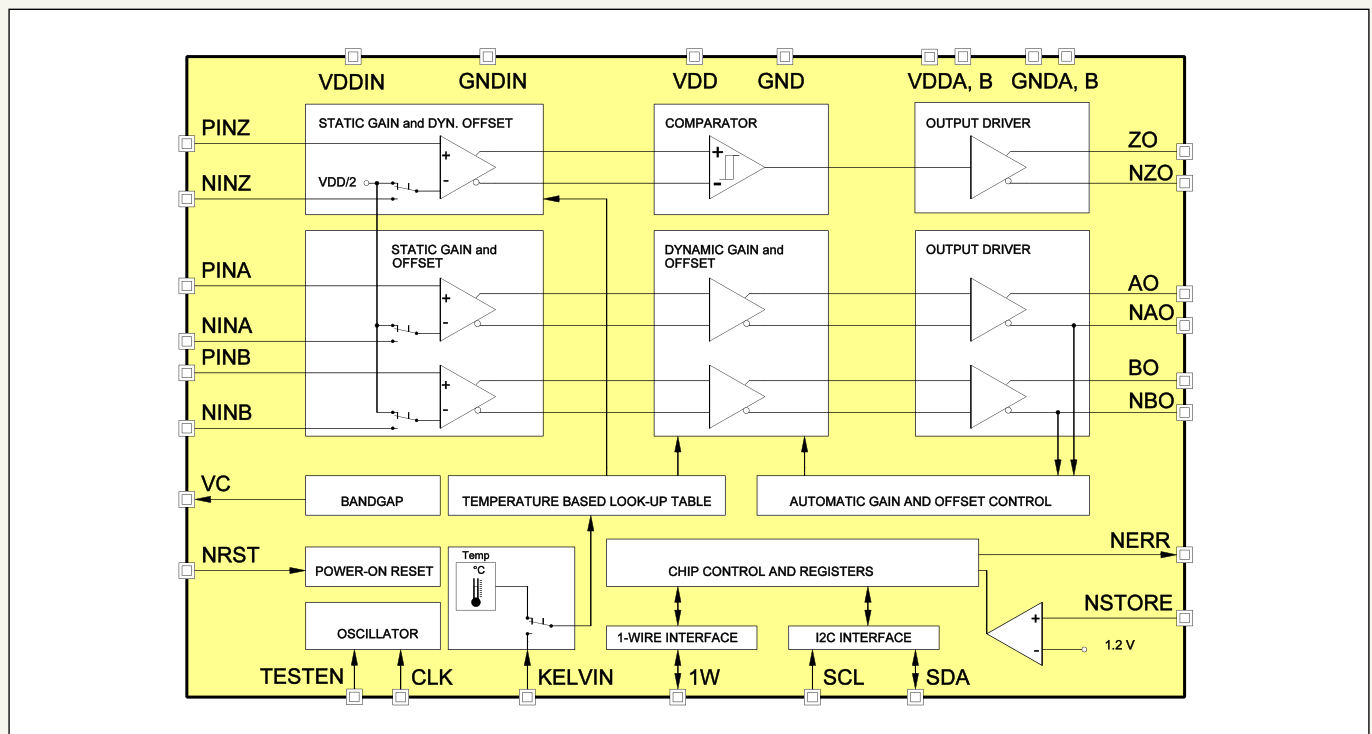
The internal or an external temperature sensor linked to the chip can influence the gain and offset correction by arbitrary temperature-dependent compensation parameters sourced from a lookup table.

Applications

- Programmable general purpose sensor interface
- Optical position sensors
- Magnetic position sensors
- Incremental position sensors
- Linear scales

Features

- Fully differential 3-channel signal conditioning
- Differential/single-ended PGA inputs
- Overall gain of -3 to 57 dB, adjustable in steps of 0.08 dB
- Output referred offset range of ± 1.2 V, adj. in steps of 2 mV
- Signal bandwidth to 1 MHz and in/out latency below 1 μ s
- Selectable automatic gain and offset control for encoder applications
- On-chip or off-chip temperature sensing
- Temperature drift compensation for gain and offset via programmable look-up-tables
- Short-circuit-proof 1 Vpp / 2 Vpp output drivers to 100 Ohm
- I2C interface to restore device setup from serial EEPROM
- Bidirectional 1-wire interface for direct RAM and EEPROM access
- Optical setup link via 1-wire interface operating a photo receiver
- Single 3.0 V to 5.5 V supply
- Extended operating temperature range of -50 to $+150$ °C



iC-TW3 SIN/COS SIGNAL CONDITIONER WITH 1 V_{pp} DRIVER AND INTEGRATED TEMPERATURE COMPENSATION

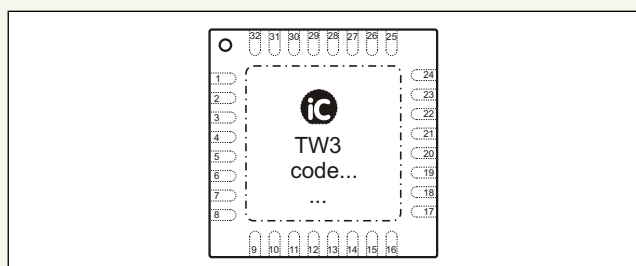
For encoder applications an automatic gain and offset control compensates sensor offset voltages and stabilizes the output signal level.

The direct connection of sine/cosine encoders, MR sensor bridges or photosensor arrays is possible and supported by a selectable input impedance.

Pin Functions

No.	Name	Function
1	PINZ	Pos. Input Signal Z
2	NINZ	Neg. Input Signal Z
3	TESTEN	Test Mode Enable Input
4	CLK	External Clock Input
5	NZO	Inverted Signal Output Z
6	ZO	Signal Output Z
7	GNDB	Analog Ground For Output Drivers
8	VDDB	+3.3 to 5.5 V Analog Output Power Supply
9	NBO	Inverted Signal Output B
10	BO	Signal Output B
11	GND	Digital Ground
12	SCL	Serial 2-Wire Interface, clock line
13	SDA	Serial 2-Wire Interface, bidirectional data line
14	VDD	+3.3 to 5.5 V Digital Power Supply
15	GNDA	Analog Ground For Output Drivers
16	n.c.	-
17	AO	Signal Output A
18	NAO	Inverted Signal Output A
19	VDDA	+3.3 to 5.5 V Analog Output Power Supply
20	1W	Serial 1-Wire Interface, bidirectional port
21	NERR	Alarm Message Output (active low)
22	NRST	Reset Input (active low)
23	NSTORE	Coefficient Store Input (active low)
24	n.c.	-
25	NINA	Neg. Input Signal A
26	PINA	Pos. Input Signal A
27	KELVIN	External Temperature Sensor Input
28	GNDIN	Analog Ground For Input Drivers
29	VDDIN	Analog Power For Input Drivers
30	PINB	Pos. Input Signal B
31	NINB	Neg. Input Signal B
32	VC	1.21 V Reference Output

Pin Configuration QFN32 5 mm x 5 mm



Key Specifications

Inputs And Signal Conditioning Channel A/B	
Coarse Gain Range	1 to 63 in logarithmic steps
Fine Gain	1 to 7.07 in logarithmic steps
Coarse Offset	-1.24 V to +1.24 V in steps of 40 mV
Fine Offset	-0.254 V to +0.254 V in steps of 2 mV
Low Pass Filter (-3dB)	200 kHz, 500 kHz, 1 MHz
Output Gain	0.707, 1.0, 1.41, 2.0

Inputs And Signal Conditioning Channel Z	
Gain	1 to 63 in logarithmic steps
Offset	-1.86 V to +1.86 V in steps of 60 mV
Polarity	selectable
Op Mode	compared (1 V _{pp}), amplified
Output Gain	0.707, 1.0, 1.41, 2.0

Automatic Fine Gain and Fine Offset Control	
Output Signal	Controlled to 1 V _{pp} (to 2 V _{pp})
Control Tracking Limit	2 kHz, 20 kHz, 200 kHz and no limit

Temperature Sensor And Compensation	
Internal Sensor Range	-50 °C to +150 °C equals to 10 to 245 digits
External Sensor Range	-50 °C to +150 °C equals to 1.7 V to 0.9 V input voltage
Hysteresis	+/- 2 increments
Interpolation	piecewise linear, up to 16 breakpoints affecting gain and offset calibration

Power Supply Monitor	
Sensing Power Loss	all channels are powered down immediately, dynamic calibration registers are written to EEPROM with new checksum

Other Operational Data	
Supply Voltage VDD	3.0 V to 5.5 V
Supply Current IDD (into VDDA+VDD)	15 mA (VDD = 3.3 V) 25 mA (VDD = 5.0 V)
Operational Temp. Range	-50 °C to +150 °C
Package	QFN32 (5 mm x 5 mm)
Device Configuration	via serial 1-wire interface via serial 2-wire interface 16 bytes configuration data + 16 x 6 bytes Look-Up-Table
Monitoring And Alarm	EEPROM error conditions (checksum error, read error, write error), temperature alarm unconnected input terminal

Compatible Sensors	
Photo diode arrays, AMR / GMR sensors, multi purpose sensors	