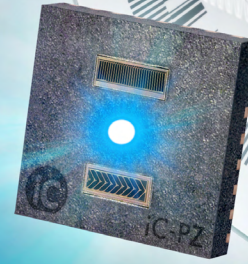


iC-PZ Series

High-Resolution Optical Reflective Absolute Encoder



Description

The iC-PZ is a complete lensless optical reflective absolute encoder IC. With its integrated blue LED and interpolator, the iC-PZ provides a high-resolution single-chip absolute linear or rotary encoder solution. Independently configurable BiSS/SSI, ABZ, UVW, SPI, and analog Sin/Cos outputs may be used singly or in combination to provide a highly flexible system. FlexCount® allows arbitrary ABZ resolution.

Automatic calibration corrects for sin/cos signal errors (offset, gain, and phase) and codewheel eccentricity without requiring external hardware or software. Calibrated parameter values are stored in an external EEPROM. Wide assembly tolerances ensure that the iC-PZ is easy to install and align, making design-in to any application simple.

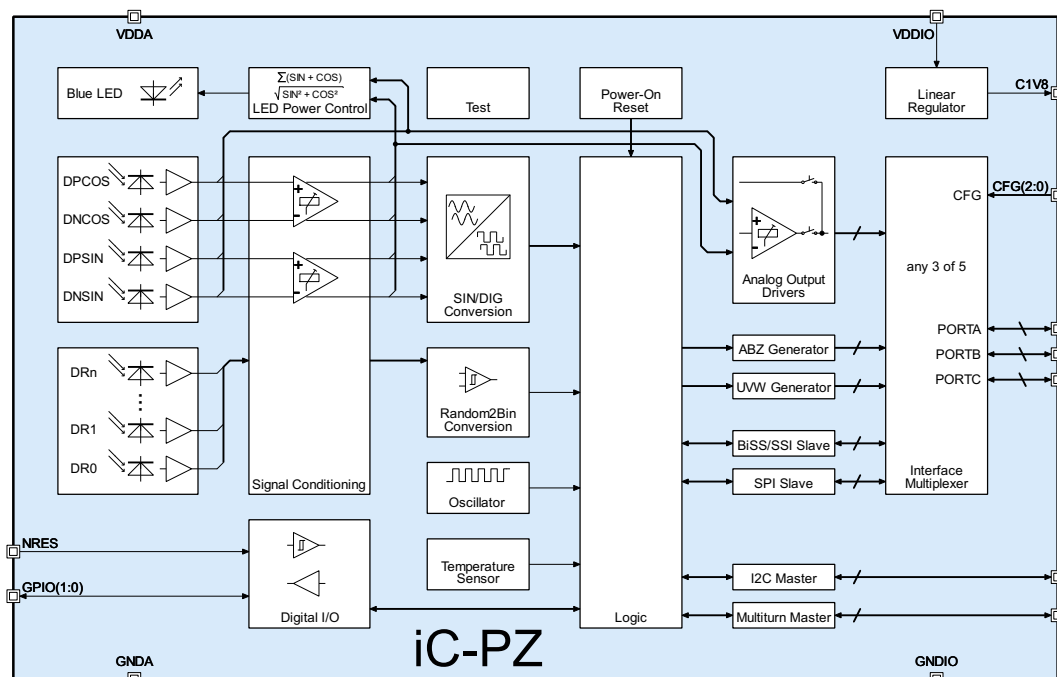
Applications

- Linear scales and rotary encoders
- High accuracy absolute encoders
- Motion control

Features

- Reflective, compact, high-resolution, absolute encoder iC
- iC-PZ2656 for reflective code discs (ø26 mm) and iC-PZ205 for linear scales (max. 6.71 m)
- Miniature oQFN32 5x5 package
- Monolithic HD Phased Array with excellent signal matching
- System-on-chip design with embedded blue LED for excellent reliability, EncoderBlue®
- FlexCount® interpolation for arbitrary ABZ resolution
- UVW commutation signals with 1 to 32 CPR, for motors of up to 32 pole pairs
- LED power control for constant illumination (sine square or sum control)
- Absolute singleturn resolution of 22 bits (ø26 mm) via built-in interpolation
- On-chip automatic signal adjustment
- Calibration and configuration storage via external I²C EEPROM
- Digital BiSS, SSI, and SPI interfaces with CMOS I/O
- Temperature detection and monitoring
- 2.5, 3.3, and 5.0 V compatible I/O ports
- Configurable analog outputs
- Absolute data interface for connection of external multiturn sensors

Block Diagram



iC-PZ Series

High-Resolution Optical Reflective Absolute Encoder

Key Specifications

General

Supply Voltage	VDDA: 4.5 to 5.5 V VDDIO: 2.25 to 5.5 V
Supply Current	typ. 35 mA
Operational Temperature	-40 to +125 °C
Package (RoHS compliant)	32-pin optoQFN (5.0 mm × 5.0 mm, thickness 0.9 mm)

Position Acquisition

Singleturn Resolution	up to 22 bits (ø26 mm), iC-PZ2656
Linear Resolution	12.5 nm max., iC-PZ205
Absolute Sensor Accuracy	±1 LSB at 18 bits
Position Update Rate	80 MHz

ABZ FlexCount®

Selectable Resolution	1 to 2 ²⁰ AB cycles per revolution
AB Frequency	6.5 MHz max.

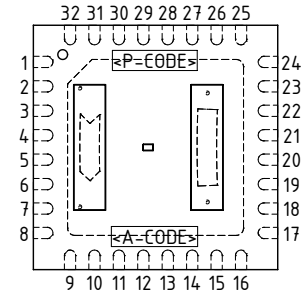
Outputs and Interfaces

Sin/Cos Analog	VDDA/2 ± 250 mV VDDA/2 ± 1000 mV
UVW Interpolation	1 to 32 UVW cycles per revolution
I/O	BiSS (20 MHz), SSI (20 MHz), SPI (12 MHz), I ² C master to serial EEPROM (400 kHz)
ADI Format	Multiturn SSI master, 1 to 32 bit position data, up to 8 slaves, built-in sync. (1 to 4 bits)

Signal Conditioning

Auto Calibration	Sin/Cos offset, gain, phase Eccentricity
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Pin Configuration oQFN32-5×5



Pin Functions

No.	Name	Function
1	CFG0	Port Configuration Input
2-7		not connected
8-11	PORTA (3-0)	Interface Port A
12	C1V8	Core Voltage Buffer Capacitance
13	GNDIO	Digital I/O Ground
14	VDDIO	+ 2.25 to + 5.5 V Digital I/O Supply Voltage
15-17	PORTB (2-0)	Interface Port B
18	ACL	Absolute Data Interface, clock line
19	ADA	Absolute Data Interface, data line
20	GPIO1	General Purpose I/O
21	GPIO0	General Purpose I/O
22	NRES	Reset Input
23-26	PORTC (3-0)	Interface Port C
27	SCL	I ² C Config. Interface, clock line
28	SDA	I ² C Config. Interface, data line
29	GNDA	Analog Ground
30	VDDA	+ 4.5 to + 5.5 V Analog Supply Voltage
31	CFG2	Port Configuration Input
32	CFG1	Port Configuration Input
	BP	Backside Pad/Exposed Pad

Assembly Tolerances

