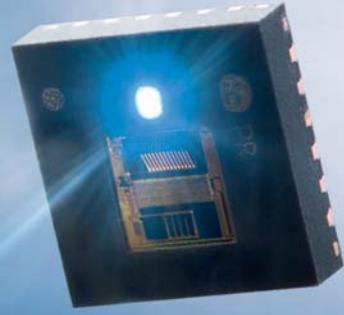


# iC-PR Series

## EncoderBlue goes reflective



### Description

The iC-PR series are advanced optical, reflective, lensless encoder iCs featuring integrated HD Phased Array photosensors and a blue LED. They provide high signal quality with relaxed alignment tolerances. Differential digital ABZ outputs with or without interpolation or analog SIN/COS outputs with index are available. Typical applications are incremental encoders for motor control. Blue-enhanced photosensors are adapted to the short wavelength of the embedded blue LED, and provide low-jitter outputs due to improved signal contrast. The unique assembly technology of the blue LED emitter and sensors results in low optical crosstalk.

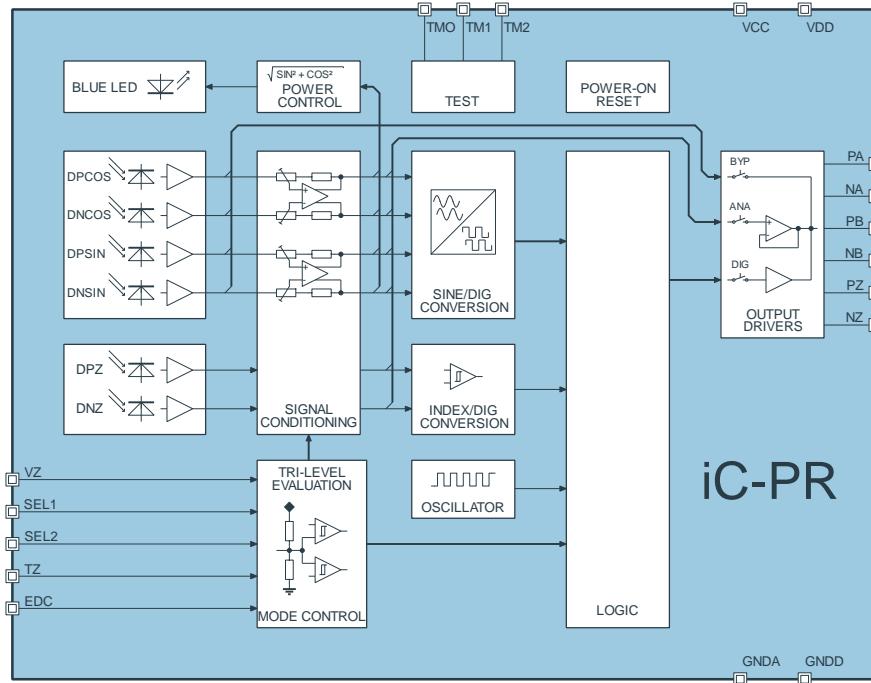
### Features

- Lensless reflective opto-encoder iCs, compact, high-resolution, incremental
- Suitable reflective code discs of Ø 4, Ø 14, Ø 26 and Ø 43 mm
- Monolithic HD Phased Array with excellent signal matching
- Integrated blue LED with power control, EncoderBlue®
- Low-noise signal amplifiers with high EMI tolerance
- Pin-selectable modes of operation:  
Digital A/B/Z (x1, x2, x4, x8, x16 interpolated),  
analog COS/SIN with analog or digital Z
- Index gating: Ungated (1T), B-gated (0.5T), AB-gated (0.25T)
- Pin-selectable minimal edge distance: 80 ns, 1 µs, 10 µs
- Complementary quadrature outputs PA, NA, PB and NB
- Complementary index outputs PZ and NZ
- Analog signal output for ease of alignment and resolution enhancement by external interpolation
- Operating temperature range of -40°C to +105°C
- Compact and lensless optoQFN mold package (4 mm x 4 mm x 0.9 mm)
- Evaluation kits on request

### Applications

- Incremental encoders
- Miniature motors and actuators
- X-Y and linear stages
- Factory automation robots
- Consumer robots

### Block Diagram



# iC-PR Series

## Reflective Opto Encoders

### Key Specifications

General	
Supply Voltage	VCC: 4.5V ... 5.5V VDD: 3.0V ... 5.5V
Supply Current	typ. 20 mA
ESD Susceptibility	CDM, HBM (JEDEC)
Operational Temperature	-40°C to +105°C
Package (RoHS compliant)	24-pin optoQFN (4.0 mm x 4.0 mm, thickness 0.9 mm)

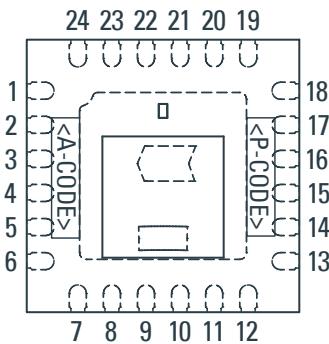
### Outputs

Max. Output Frequency	1.6 MHz min.
Saturation Voltage hi / lo	0.4 V max. at +/− 4 mA
AB Duty Cycle Variation	Mode DX1: +/− 5% Mode DX2, DX4, DX8, DX16: +/− 10 %
Digital Hysteresis of Interpolator	typ. 5.6° (@ one cycle of sine / cosine)
Analog Output Signal	AAMP = single-ended ± 250 mV A250 = VCC / 2 ± 250 mV A500DZ = VCC / 2 ± 500 mV

### Operation Modes

SEL 1	SEL 2	Mode	Description
low	high	DX1	digital A/B/Z (x1 interpolation)
high	low	DX2	digital A/B/Z (x2 interpolation)
low	open	DX4	digital A/B/Z (x4 interpolation)
high	high	DX8	digital A/B/Z (x8 interpolation)
high	open	DX16	digital A/B/Z (x16 interpolation)
open	low	A250	analog COS/SIN/Z
open	high	AAMP	analog COS/SIN/Z
open	open	A500DZ	analog COS/SIN, digital Z (ungated)

### Pin Configuration oQFN24-4x4



### Pin Functions

No.	Name	Function
1	VDD	3.0V...5.5V Digital Supply Voltage
2	SEL1	Mode Selection Input 1
3	SEL2	Mode Selection Input 2
4	TZ	Index Gating Control Input
5	PZ	Index Output Z+
6	NZ	Index Output Z-
13	EDC	Edge Distance Control Input
14	NB	Incr. Output B-/Analog Sine-
15	PB	Incr. Output B+/Analog Sine+
16	NA	Incr. Output A-/Analog Cos-
17	PA	Incr. Output A+/Analog Cos+
18	GNDD	Digital Ground
19	GNDA	Analog Ground
20	TMO	Test Mode Output
21	TM2	Test Mode Input 2
22	TM1	Test Mode Input 1
23	VZ	Index Detection Control Input
24	VCC	4.5V...5.5V Analog Supply Voltage
7 ... 12	n. c.	not connected

### Device Overview

Encoder	iC-PR0464	iC-PR1456		iC-PR2656		iC-PR2604	iC-PR4307
Disc Size	Ø 4 mm	Ø 14 mm		Ø 26 mm		Ø 26 mm	Ø 43 mm
Optical Radius	1.6 mm	4.8 mm		10.8 mm		10.8 mm	19.8 mm
Native CPR	64	250	256	250	256	360	720
CPR x2	128	500	512	500	512	720	1440
CPR x4	256	1000	1024	1000	1024	1440	2880
CPR x8	512	2000	2048	2000	2048	2880	5760
CPR x16	1024	4000	4096	4000	4096	5760	11520