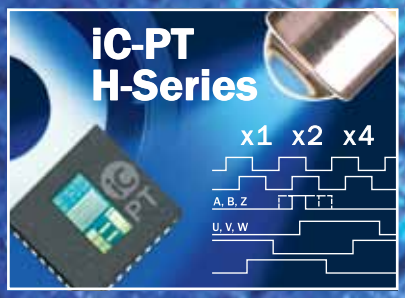
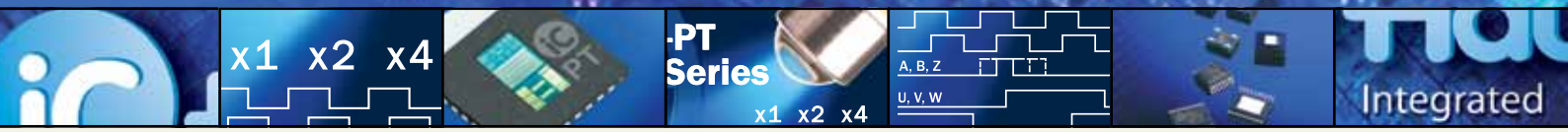
iC-PT H-Series

6-CH. PHASED ARRAY OPTO ENCODERS





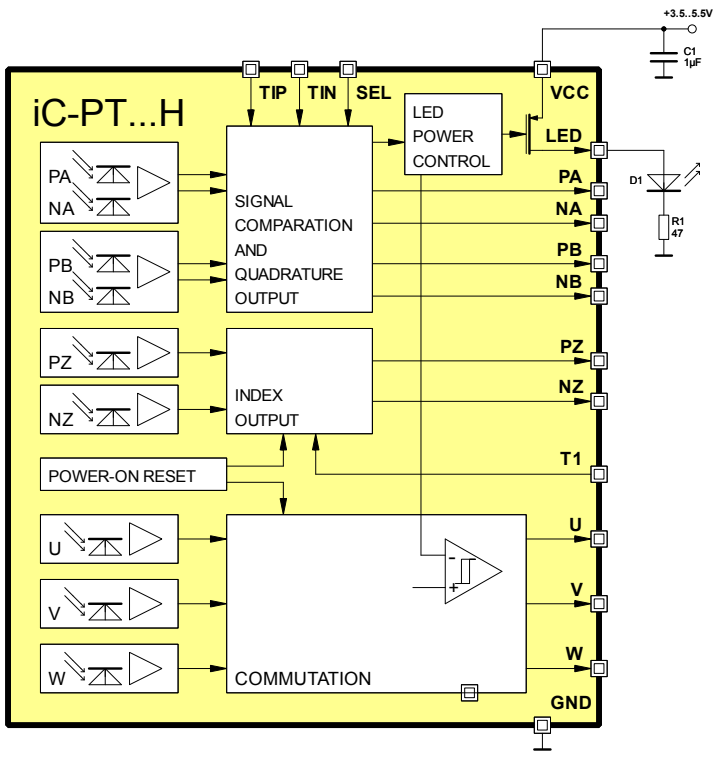
The iC-PT H-series represents advanced optical encoder ICs featuring integrated photosensors arranged as an *HD Phased Array*, providing signal fidelity at relaxed alignment tolerances. The devices provide differential A/B tracks, a differential index track and three more tracks to generate block commutation signals.

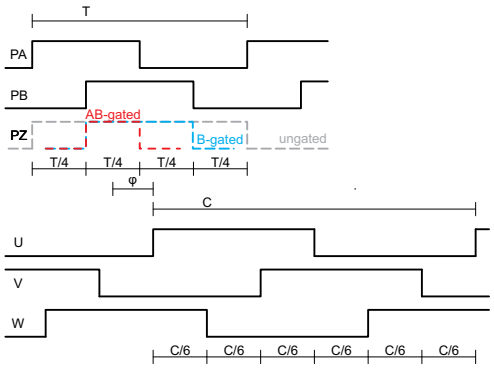
Applications

- Incremental encoder
- Brushless DC motor commutation
- Industrial drives

Features

- Compact, high resolution incremental encoder ICs with up to 2500 CPR (native) and 10,000 CPR (interpolated)
- For code discs of Ø 26 mm, Ø 33 mm, Ø 39 mm
- Excellent signal matching
- Moderate track pitch for relaxed assembly tolerances
- Low-noise signal amplifiers with high EMI tolerance
- Pin-selectable operating modes:
  analog, comparated (x1), interpolated (x2, x4)
- Pin-selectable index gating:
  ungated (1 T), B-gated (0.5 T), AB-gated (0.25 T)
- Complementary quadrature outputs:
  A, B, Z and NA, NB, NZ
- Commutation signal outputs: U, V, W
- Short-circuit-proof, current-limited, +/- 4mA push-pull
- Analog signal output for ease of alignment and resolution enhancement by external interpolation
- LED power control with 40 mA high-side driver
- Low power consumption from single 3.5 V to 5.5 V supply
- Operating temperature range of -40 °C to +120 °C
- Evaluation kits with LED and code disc available





Example of output signals with gated/ungated index

iC-Haus

Am Kuemmerling 18 • D-55294 Bodenheim, Germany
Phone: +49 (6135) 9292-300 • Fax: +49 (6135) 9292-192 • http://www.ichaus.com

iC-PT H-Series 6-CH. PHASED ARRAY OPTO ENCODERS

Blue-enhanced photosensors allow the application of LEDs with short wavelenght leading to an outstanding jitter performance due to improved signal contrast. However, for most devices the photosensors are IR compatible as well.

Device Overview

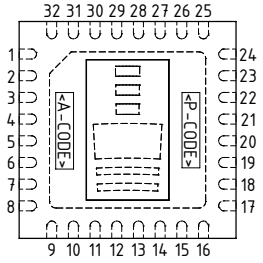
H-Series 26			
Code Disc	film 0.18 mm, Ø 26.0 mm (26.5 mm), bore hole Ø 12.0 mm		
Commutation	4 pole pairs (C 90°, φ 0°)		
Device	**Optical Radius**	**CPR native**	**x2 / x4 interpolated**
iC-PT2656H	11.0 mm 10.74 mm	256 250 by disc	512 / 1024 500 / 1000
iC-PT2650H	11.0 mm 11.26 mm	500 512 by disc	1000 / 2000 1024 / 2048
iC-PT2610H	11.0 mm 11.26 mm	1000 1024 by disc	2000 / 4000 2048 / 4096
iC-PT2613H	11.0 mm	1250	2500 / 5000
iC-PT2615H	11.0 mm	1500	3000 / 6000

H-Series 33			
Code Disc	film 0.18 mm, Ø 33.6 mm, bore hole Ø 12.0 mm		
Commutation	4 pole pairs (C 90°, φ 0°)		
Device	**Optical Radius**	**CPR native**	**x2 / x4 interpolated**
iC-PT3304H	14.5 mm	360	720 / 1440
iC-PT3310H	14.5 mm	1000	2000 / 4000
iC-PT3324H	14.5 mm	1024	2048 / 4096
iC-PT3313H	14.5 mm	1250	2500 / 5000
iC-PT3315H	14.5 mm	1500	3000 / 6000
iC-PT3318H	14.5 mm	1800	3600 / 7200
iC-PT3320H	14.5 mm	2000	4000 / 8000
iC-PT3348H	14.5 mm	2048	4096 / 8192
iC-PT3325H	14.5 mm	2500	5000 / 10000

H-Series 39			
Code Disc	film 0.18 mm, Ø 39.0 mm, bore hole Ø 20.0 mm		
Commutation	4 pole pairs (C 90°, φ 30°)		
Device	**Optical Radius**	**CPR native**	**x2 / x4 interpolated**
iC-PT3912H	17.5 mm	512	1024 / 2048
iC-PT3910H	17.5 mm	1000	2000 / 4000
iC-PT3924H	17.5 mm	1024	2048 / 4096
iC-PT3948H	17.5 mm	2048	4096 / 8192

Availability on request.

Pin Configuration oQFN32 5x5 mm²



Key Specifications

General	
Supply Voltage	+3.5 V to 5.5 V, single-sided
Supply Current	typ. 6 mA
ESD Susceptibility	2 kV (HBM 100 pF, 1.5 kΩ)
Operational Temperature	-40 °C to +120 °C
Package (RoHS compliant)	32-pin optoQFN (5.0 mm x 5.0 mm, thickness 0.9 mm)
LED Recommendation (blue LED for iC-PT3320H, iC-PT3348H and iC-PT3325H)	IR LEDs iC-TL85, iC-SD85, blue LEDs iC-TL46, iC-SD46

Photosensors and Amplifiers	
Spectral Application Range	400 to 950 nm (sensitivity at 25 %)
Transimpedance Gain	0.5 MΩ to 1.6 MΩ
Cut-off Frequency (-3 dB)	typ. 500 kHz
Dark Level	typ. 770 mV

Comparators	
Equivalent Hysteresis	typ. 10 % @ 250 mVpkpk

LED Control	
Operating Range	0 to 40 mA
Controlled LED Current	typ. 5 to 12 mA

Outputs	
Max. Output Frequency	400 kHz min. (x1), 800 kHz min. (x2), 1.6 MHz min. (x4)
Saturation Voltage hi/lo	0.6 V max. at +/- 4 mA
Short-Circuit Current hi/lo	typ. 20 mA source/sink, 70 mA max.
Analog Output Signal	typ. 125 mVpkpk to 500 mVpkpk (source impedance typ. 750 Ω)

Pin Functions

No.	Name	Function
1	VCC	+3.5 V to +5.5 V Supply Voltage
2	LED	LED Controller, High-Side Current Source Output
3, 4	PA, NA	Push-Pull Output A+, A- / Analog Sin+, Sin-
5, 6	PB, NB	Push-Pull Output B+, B- / Analog Cos+, Cos-
7, 8	PZ, NZ	Push-Pull Output Z+, Z- / Analog Z+, Z-
17	SEL	Operation Mode: x1 (lo), x2 (hi), all analog (open or 50% VCC), x4 (25% VCC), analog ABZ / dig. UVW (75% VCC)
18	W	Push-Pull Output W
19, 21	TIN, TIP	Test Current Inputs
20	V	Push-Pull Output V
22	U	Push-Pull Output U
23	T1	Index Gating: ungated / T-gated (hi), B-gated (lo), AB-gated (open)
24	GND	Ground
Pins 9...16 and 25...32 are not connected. H-Series devices are compatible with iC-PT Series ICs regarding pinout and functions.		

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