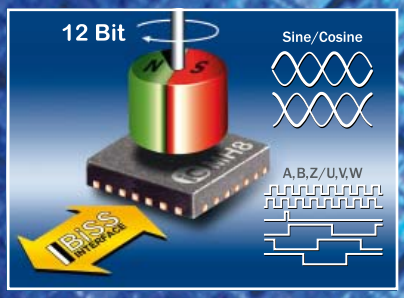
iC-MH8

12 BIT HALL ENCODER



The iC-MH8 is an integrated Hall encoder for sensing the angular position of a diametral magnet.
The amplified Hall voltages are available as complementary analog sine and cosine signals with regulated 1 Vpp differential amplitude.

The interpolator can be set to binary interpolation factors from 1 to 1024 to achieve up to 4096 angle steps per revolution.
ABZ quadrature signals up to a rate of 2 MHz are available at the incremental outputs, permitting 120 000 rpm at the highest resolution. The position of the index pulse Z is adjustable.
For block commutation pins U, V and W provide three phase-shiftet output signals. The starting angle is freely definable over a revolution. Brushless motors with 1, 2 or 4 pole pairs of poles can be operated. The incremental and commutation outputs are RS422 compatible and can be adjusted in output current and slew rate.

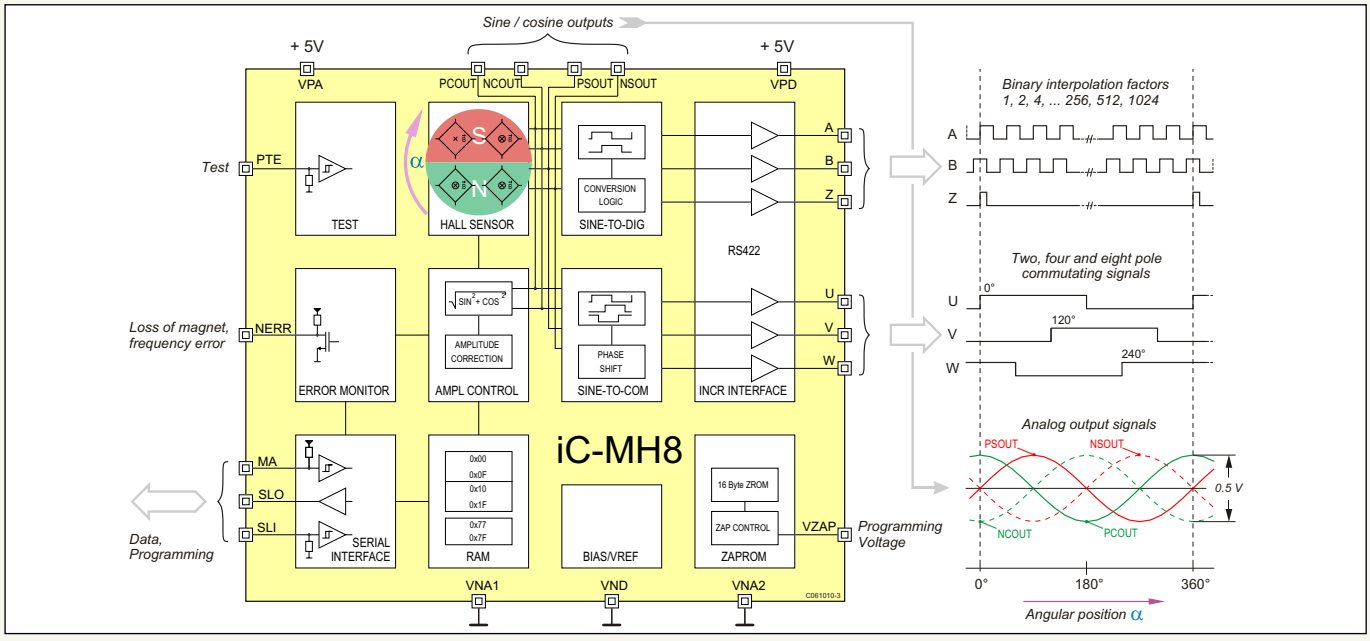
Using the serial interface the output data can be transmitted serially and allows also access to the internal memory of iC-MH8. The configuration and internal parameters can then be stored permanently in a zapping diode based ROM.

Features

- Automatic signal conditioning with manual fine control
- Analog Output Drivers (1 Vpp to 100 Ω)
- 12 bit realtime interpolation for 120 000 rpm:
  Binary factors of 1, 2, 4, ..., 256, 512, 1024
  Commutation signals for 2, 4 and 8 pole motors
  Independent zero positions for ABZ or UVW
- Incremental output frequency of up to 2 MHz
- RS422 output driving stages for ABZ and UVW
- BiSS C Int. for singleturn position and programming
- Integrated Zapping diodes for permanent storage
- Device setup and OEM data programmable
- Error output (loss of magnet, frequency error), error codes accessible via BiSS interface
- Extended temperature range -40 °C to +125 °C

Applications

- Electronic commutation of brushless motors
- Contactless rotary switch / digital potentiometer
- Absolute and incremental rotary encoders
- Motor feedback / Resolver replacement



iC-Haus

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Key Specifications

General	
Supply Voltage	5 V +/-10 %
Supply Current, normal mode power reduction mode	40 mA max. 32 mA max.
Max. Rotation Speed	120,000 rpm
Magnetic Field Strength	20 ... 100 kA/m
Resolution (digital / angular)	12 bit / 0.087°
Operational Temperature Range	-40 to +125 °C
ESD Susceptibility	2 kV (HBM 100 pF, 1.5 kΩ)

Operational Modes	
Output Modes	ABZ and UVW ABZ and inverted ABZ UVW and inverted UVW ABZ and AB period signals
Interpolating Factors @ AB	×1...×128, ×256, ×512, ×1024
Commutation Signals UVW	two, four and eight pole EC motors
Analog Outputs	complementary sine / cosine

Driver Settings (ABZ, UVW)	
Output Drivers Capabilities	10 MHz 4 mA (default) 10 MHz 50 mA 300 kHz 50 mA 3 MHz 20 mA
Output Driving Configurations	push-pull, high-side, low-side, tristate

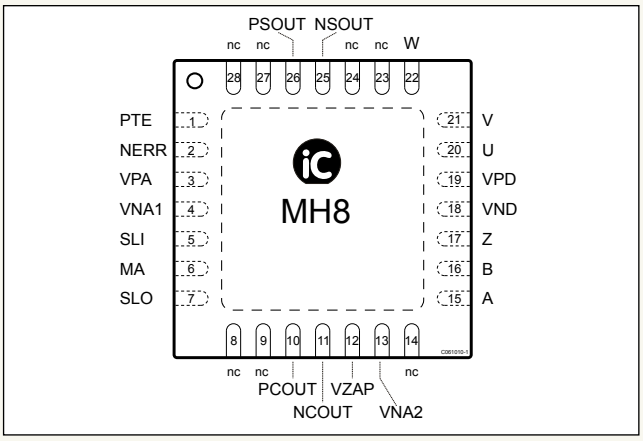
Signal Settings	
Analog Signal Outputs	0.5 Vpp with gain control
Gross Gain Selection	×5, ×10, ×15, ×20
Fine Gain (automatic gain off)	64 steps, from 1.0 to 19.08
Sin/Cos Amplitude Ratio	0.91 ...1.097 (128 steps)
Offset Correction Range	± 63 mV in 1mV steps
Hysteresis ABZ	0.17°, 0.35°, 0.7° and 1.4°
Zero Positions ABZ/UVW	adjustable in increments of 1.4°

Serial Interface	
BiSS C	bidirectional, data read out and programming
SSI	data read out only (SSI 13 bit standard)

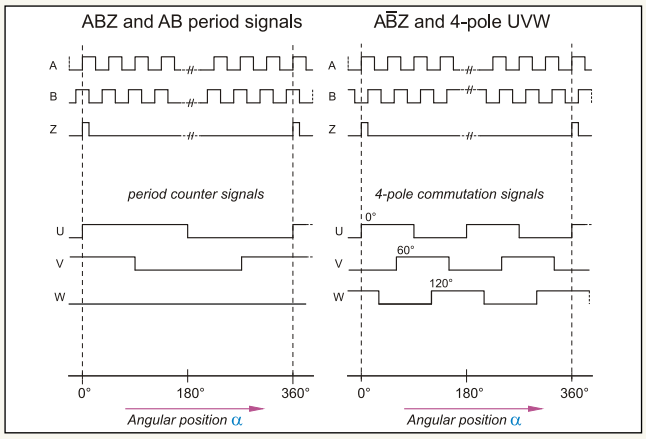
Pin Functions

No.	Name	Function
1	PTE	Test Enable Pin
2	NERR	Not Error (active low)
3	VPA	+5 V Analog Supply Voltage
4	VNA1	Analog Ground
5	SLI	Serial Data Input
6	MA	Serial Clock Input
7	SLO	Serial Data Output
8, 9, 14	n.c.	not connected
10	PCOUT	Positive Cosine Output
11	NCOUT	Negative Cosine Output
12	VZAP	Zapping Supply Voltage
13	VNA2	Analog Ground
15, 16, 17	A, B, Z	Incremental Outputs A, B, Index Z
18	VND	Digital Ground
19	VPD	+5 V Digital Supply Voltage
20, 21, 22	U, V, W	Commutation Signal U, V, W
25	NSOUT	Negative Sine Output
26	PSOUT	Positive Sine Output
23, 24, 27, 28	n.c.	not connected

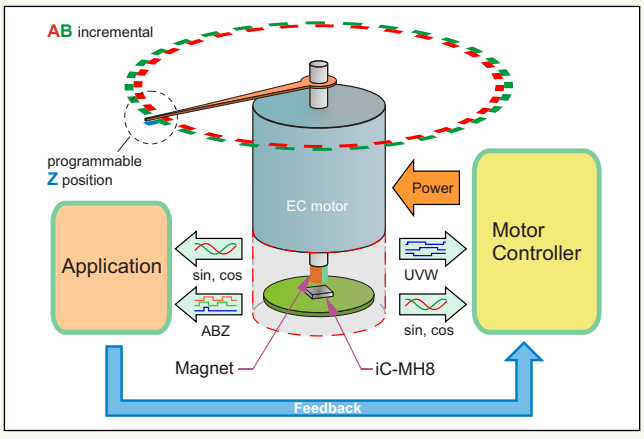
Pin Configuration QFN28 5x5 mm²



Output Signal Examples



Application Example



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