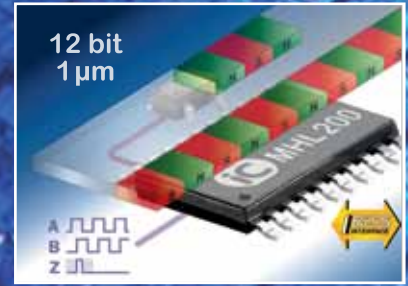


iC-MHL200

12-BIT LINEAR / ROTARY POSITION HALL ENCODER



The iC-MHL200 is an integrated Hall encoder for sensing linear and rotary magnetic targets with a 2 mm pole pitch. A smallest linear position increment of 1 μm can be achieved when the device is operated at 12 bit resolution. The interpolator resolution can be programmed up to a maximum of 4096 increments per magnetic signal period (equivalent to a 4 mm position shift).

Incremental ABZ quadrature position signals up to a rate of 2 MHz are available on single-ended or differential outputs, permitting at least a linear speed of 8 m/s at 12 bit resolution, and even higher velocities at a reduced resolution.

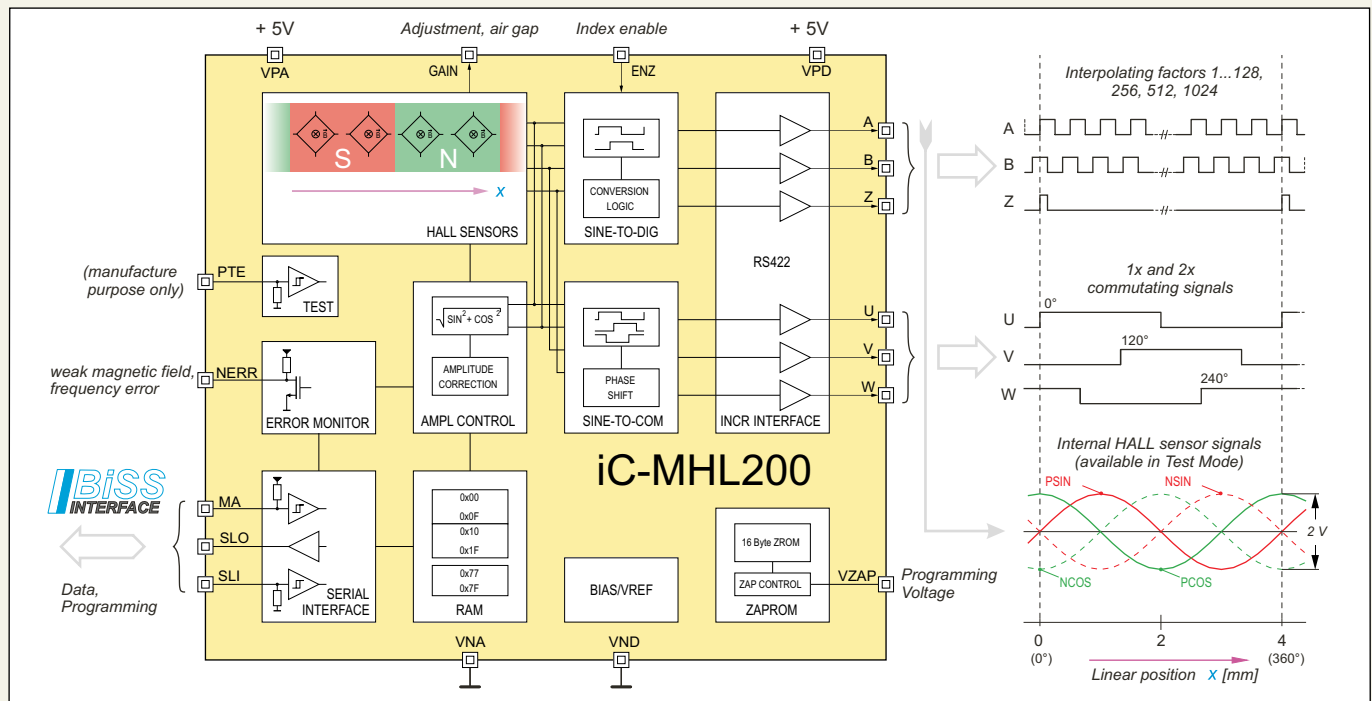
The position of the index pulse Z is adjustable within the magnetic signal period. For linear motor applications, one and twofold UVW commutation signal over a signal period are available. Both incremental and commutation outputs are RS422 compatible and can be configured regarding output drive current and slew rate. Using the serial BiSS interface position data can be transmitted and iC-MHL200 can be accessed for setup. The power-on configuration and internal parameters can then be stored permanently in an on-chip zapping ROM. For position data readout only, the SSI protocol is also available.

Features

- Automatic signal conditioning with configurable control
- 12-bit real-time interpolation at 8 m/s velocity
- Interpolation factors $\times 1$ to $\times 128$, $\times 256$, $\times 512$, $\times 1024$
- Quadrature AB and index Z signal outputs
- Z output can be enabled via strobe input ENZ
- One and twofold UVW commutation signals
- Independent zero position for ABZ or UVW
- Incremental AB frequency of up to 2 MHz
- RS422 output driving stages for ABZ and UVW
- BiSS C interface for position readout and programming
- Device setup and OEM data stored into OTP ZAPROM
- Open-drain NERR signal (loss of magnet, frequency error)
- Error codes accessible via BiSS C interface
- Operating temperature range of $-40\text{ }^{\circ}\text{C}$ to $+125\text{ }^{\circ}\text{C}$

Applications

- Incremental linear and rotary encoders
- Electronic commutation of linear motors



iC-MHL200

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Key Specifications

General	
Supply Voltage	5 V +/- 10 %
Supply Current, normal mode	24 mA max.
power reduction mode	16 mA max.
Linear Speed (@ 12 bit)	8 m/s
Magnetic Field Strength	20 ... 100 kA/m
Resolution (digital / linear)	12 bit / 1 µm
Operational Temperature Range	-40 to +125 °C
ESD Susceptibility	2 kV (HBM 100 pF, 1.5 kΩ)

Operating Modes

Output Modes	ABZ and UVW ABZ and inverted ABZ UVW and inverted UVW ABZ and AB period signals
Interpolation Factors	x1 ... x128, x256, x512, x1024 @ A, B
Commutation Signals UVW	one and two periods every 360°

Output Driver Settings

Drive Modes	push-pull (RS422), high-side, low-side, tristate
Driving Capability (driving current, rise/fall time, frequency)	+/- 4 mA, 12 ns, 10 MHz +/- 60 mA, 12 ns, 10 MHz +/- 60 mA, 200 ns, 300 kHz +/- 20 mA, 20 ns, 3 MHz

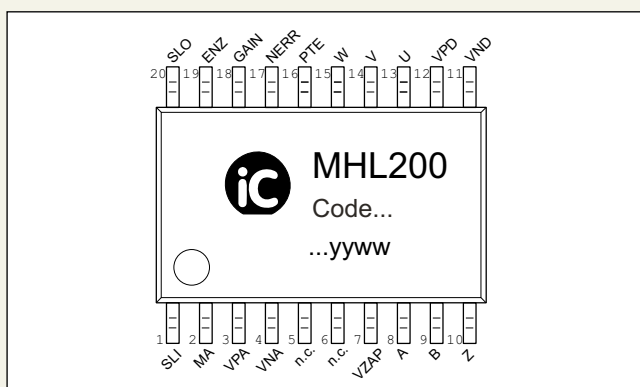
Signal Conditioning

Internal Hall Signal Level	controlled to 2 Vpp
Coarse Gain Selection	x5, x10, x15, x20
Fine Gain (AGC range)	x1 ... x19 (64 steps)
Sin/Cos Amplitude Ratio	0.91 ... 1.097 (128 steps)
Offset Correction Range	+/- 63 mV in steps of 1 mV
Hysteresis ABZ	0.17°, 0.35°, 0.7° and 1.4°
Zero Position ABZ	adjustable in increments of 1.4°
Zero Position UVW	adjustable in increments of 1.875°

Serial Interface Output

SSI Mode	data output to 2 MHz, 13 bit format
BiSS Mode	10 MHz, register access, CRC

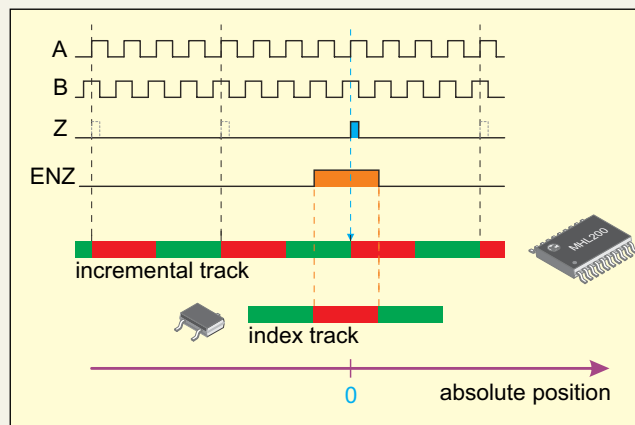
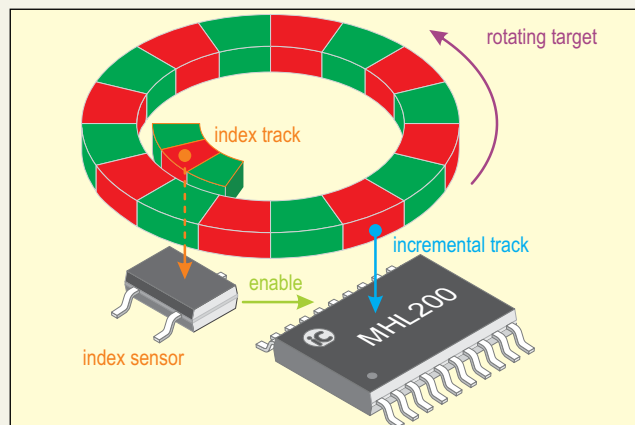
Pin Configuration TSSOP20



Pin Functions

No.	Name	Function
1	SLI	Serial Interface, Data Input
2	MA	Serial Interface, Clock Input
3	VPA	+5 V Supply Voltage (analog)
4	VNA	Ground (analog)
5, 6	nc	not connected
7	VZAP	Zener Zapping Programming Voltage
8	A	Incremental Output A (+NU)
9	B	Incremental Output B (+NV)
10	Z	Index Output Z (+NW)
11	VND	Ground (digital)
12	VPD	+5 V Supply Voltage (digital)
13	U	Commutation Output U (+NA)
14	V	Commutation Output V (+NB)
15	W	Commutation Output W (+NZ)
16	PTE	Test Enable Input
17	NERR	Error output (active low)
18	GAIN	Gain Signal
19	ENZ	Index Z Enable Input
20	SLO	Serial Interface, Data Output

Application Example



This preliminary information is not tantamount to a guarantee of device characteristics. All rights to technical changes reserved.