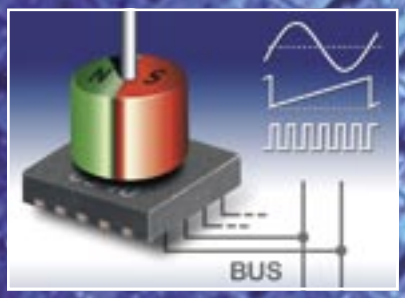
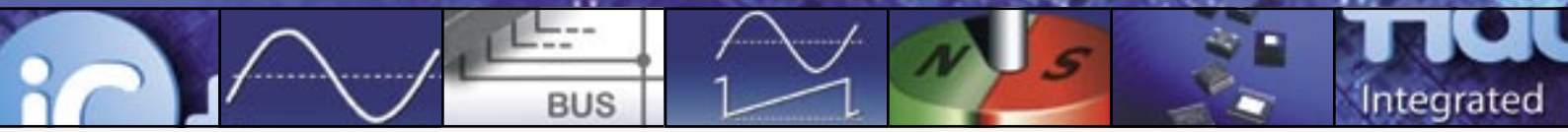
iC-MA

ANGULAR HALL ENCODER





iC-MA supplies the absolute angular position of a magnet placed above or below the chip's package, with a set of four distributed Hall sensors granting a reasonable system assembly tolerance. Controlled signal amplitudes are ensured by the embedded signal conditioning circuit also monitoring a "loss of magnet" condition for z-axis detection.

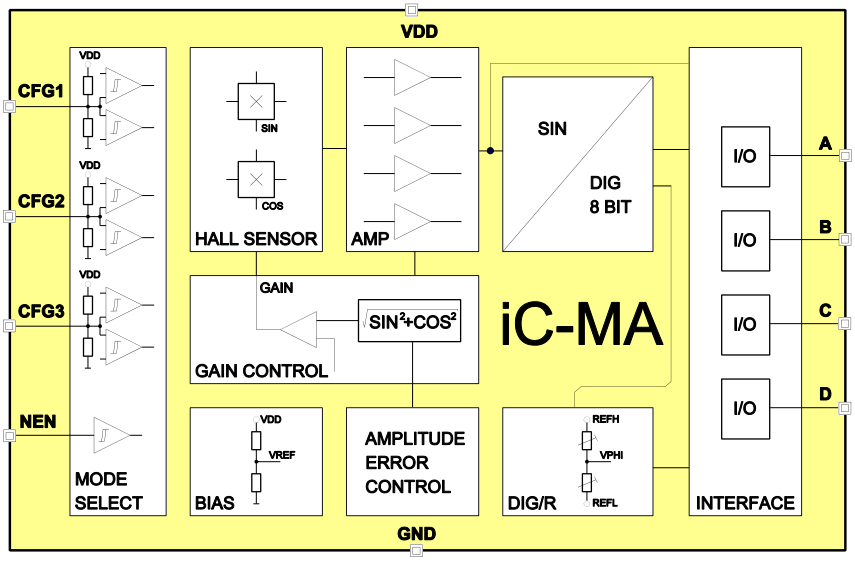
The encoding stage operates on 6, 7 or 8 bits of resolution and can resolve a 360° magnet turn into 256 angular steps, i.e. into increments of 1.4°. Different operating modes are available by pin selection, offering both analog output signals (sawtooth, triangle and sine/cosine) and digital output signals (encoder quadrature and counter control). A sequencer logic eases daisy chaining of multiple sensors on a 4-wire bus and can be selected optionally.

Applications

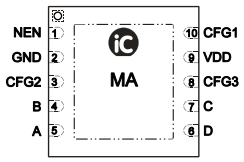
– Contactless rotary switch
– Digital potentiometer
– Angular encoding
– Motion control and robotics
– Positioning and servo systems
– Commutation of brushless DC motors
– Vehicle control
– Office equipment
– Flow meter
– Household appliances
– Joystick and front panel controls

Features

– Resolution of 64, 128 and 256 positions within 360°
– Rotation speed of up to 60,000 rpm
– Outputs configurable to provide analog and digital signals
– Fail signal for low magnetic strength
– Cascading multiple iC-MAs allows the use of a single bus
– Enable input for low power standby
– Small DFN10 package (4 x 4 x 1 mm)
– Wide operating temperature range of -40 to +125°C



Package DFN10
4 x 4 x 1 mm



Scale 5 : 1 (top view)

Actual package size

iC-Haus
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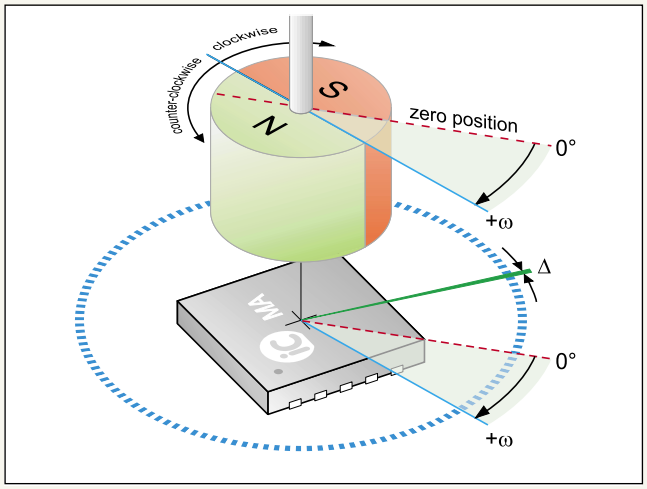
Pin Functions

No.	Name	Function
1	NEN	Not Enable / Standby
2	GND	Ground
3	CFG2	Configuration Input 2
4	B	I/O
5	A	I/O
6	D	I/O
7	C	I/O
8	CFG3	Configuration Input 3
9	VDD	+5 V Supply
10	CFG1	Configuration Input 1

Definition Of Angular Position



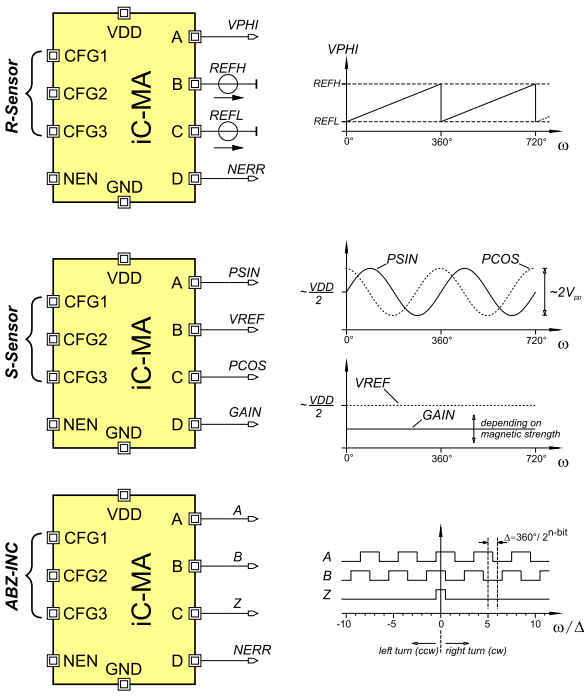
Key Specifications

General	
Supply Voltage	5 V ±10 %
Supply Current	20 mA max.
Standby Current	200 µA max.
Analog Output (sine/cosine)	Controlled to 2 Vpp
Max. Rotation Speed	60,000 rpm
Magnetic Field Strength	20 ...100 kA/m
Digital Resolution	6, 7, 8 bit
Angular Resolution	5.6, 2.8, 1.4 degree
Operational Temperature Range	-40 to +125 °C
ESD Susceptibility	2 kV (HBM 100 pF, 1.5 kΩ)

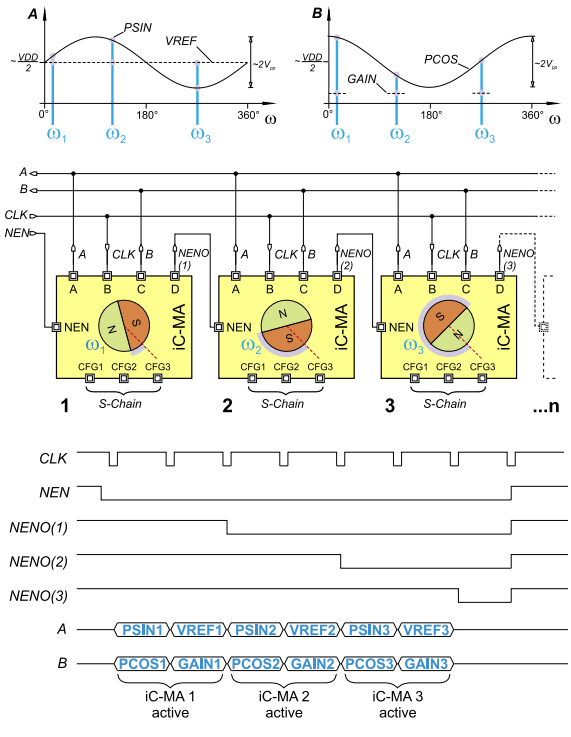
Operational Modes	
Name	**Output Signal**
R-Sensor	Analog triangle or ramp, output magnitude, error (NERR)
D-Sensor*	Analog sine and cosine, mean value, gain signal
S-Sensor*	Analog sine and cosine, noninverted and inverted
ABZ-INC*	Quadrature signals (A,B), index (Z) and error (NERR)
CLK-INC	Counter signals: count up / down, clock, clear, error (NERR)

* Daisy chain operation is configurable.

Configuration Examples



Chain Configuration Example



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