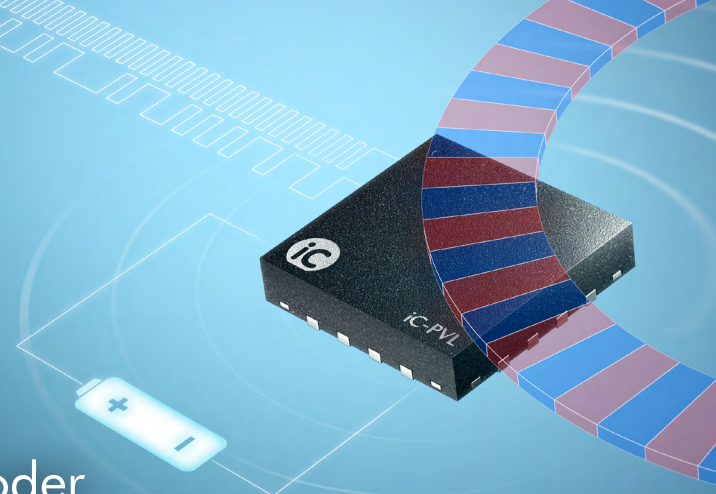


iC-PVL

Linear Off/On-Axis Battery-Buffered Hall Multiturn Encoder



Description

iC-PVL is an ultra low power magnetic encoder, used for linear and off/on-axis multiturn position sensing. On main power disconnect, iC-PVL automatically switches to battery supply and continues to scan the position.

iC-PVL operates with pole wheels or linear scales with a pole width of 1.0 mm up to 5.0 mm. For on-axis applications it can be used with a diametral magnet. Due to various operating modes, iC-PVL can work with iC-Haus singleturn encoders, as stand-alone SSI or incremental encoder, or links to embedded controllers via I²C.

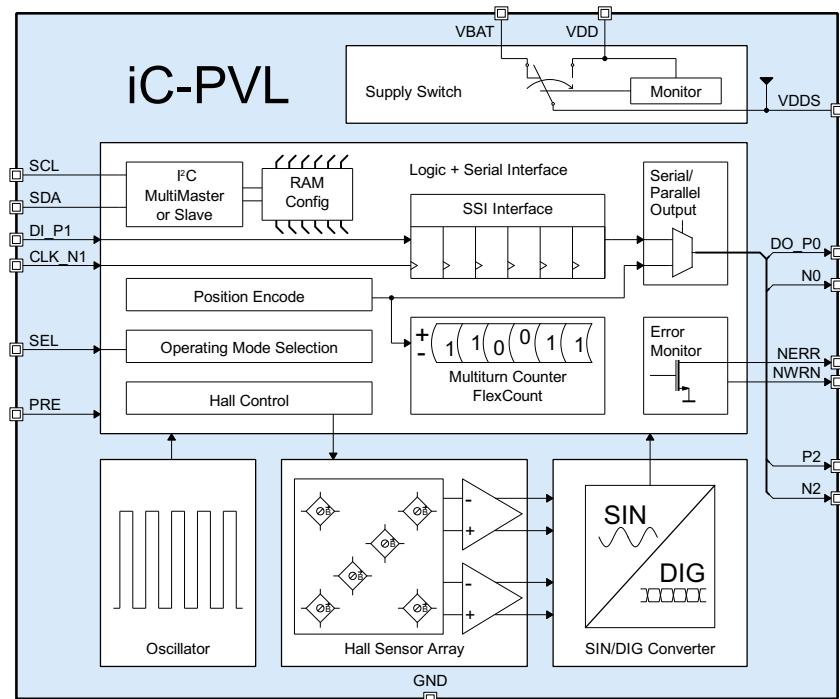
Applications

- Absolute hollow-shaft position encoders
- Absolute on-axis position encoders
- Gearless revolution counting
- Linear position sensors
- Metering applications
- Battery-powered portable equipment

Features

- Integrated Hall sensors with automatic gain and offset control
- For magnetic scales of 1.0 up to 5.0 mm pole width and diametral magnets
- Battery supply current of <math><2 \mu A</math> to $30 \mu A$ in typical applications
- Tracking speed of up to 24 m/s (1.5 mm poles) or 15000 rpm (32 pole pairs)
- Configurable multiturn counting up to 40 bits
- Adjustable period count per revolution: FlexCount® logic for 1 to 256 pole pairs
- Serial, parallel, and incremental singleturn operating modes
- SSI multiturn data output with error, warning, parity, and synchronization bits
- Multiturn preset by pin or command
- I²C master function for initial boot-up from EEPROM
- I²C slave function for controller operation
- Supply voltage of 3.0 V to 5.5 V
- Automatic low-power operation on backup battery
- Overspeed, battery, and RAM (CRC) monitoring
- Space-saving 16-pin QFN package

Block Diagram



iC-PVL

Linear Off/On-Axis Battery-Buffered Hall Multiturn Encoder

Key Specifications

General

Main Supply Voltage	3.0 V to 5.5 V
Main Supply Current	typ. 4.0 mA
Battery Supply Voltage	3.0 V to 5.5 V
Battery Supply Current	typ. <math>< 10 \mu\text{A}</math> at 3.6 V
Operational Temperature Range	-40 °C to +125 °C
Magnetic Field Strength	10 to 100 kA/m
Magnetic Input Frequency	8 kHz max.
Magnetic Input Acceleration	$3 \cdot 10^6 \text{ rad/s}^2$ elec. max.

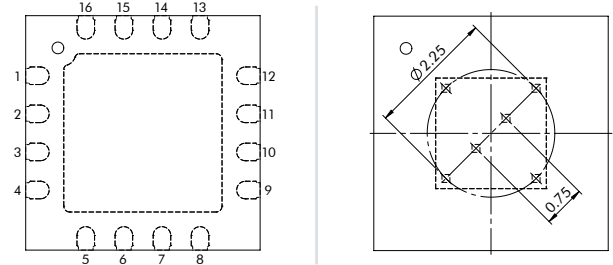
Magnetic Target Requirements

Pole Size	Ideal Size	Scanning
1.0–2.0 mm	1.5 mm	off-axis, differential
1.0–2.0 mm	1.5 mm	off-axis, single-ended
2.0–4.0 mm	3.0 mm	off-axis, single-ended
4.0–5.0 mm	4.5 mm	off-axis, single-ended
$\varnothing 3$ to 8 mm, diametric magnet		on-axis, differential, $\varnothing 2.25$ mm Hall circle

Operating Modes

Operating Mode	Application
SSI Multiturn (9 to 40 bit)	for sensors with MT interface (iC-MHM, iC-MU, iC-LGC, iC-MN, etc.)
Chain Multiturn (9 to 40 bit) with Singleturn Input (3 to 18 bit)	with singleturn synchronization (iC-LNG, iC-LNB, etc.)
Stand-alone SSI Multiturn (9 to 40 bit)	for battery-buffered position encoder and metering applications
Parallel Singleturn (3 bit)	parallel complementary output
I ² C Slave Mode (embedded controller operation)	for configuration, position data, and command execution via I ² C

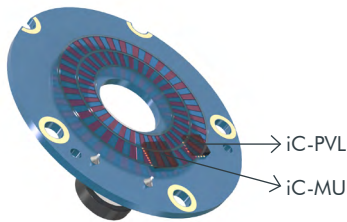
Pin Configuration QFN16-4x4



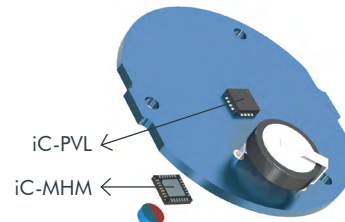
Pin Functions

No.	Name	Function
1	SEL	Mode Select Input
2	PRE	Preset Trigger Input
3	NERR	Error Output (active low)
4	SDA	I ² C Interface, Data Line
5	GND	Ground
6	VBAT	Battery Supply Voltage Input (typ. 3.6 V)
7	VDDS	Switched Supply Voltage Output
8	VDD	+3.0 V to 5.5 V Main Supply Voltage Input
9, 11	N2, N0	Parallel Output Bit 2, Bit 0 (negative logic)
10	P2	Parallel Output Bit 2 (positive logic)
12	NWRN	Battery Warning Output (active low)
13	DO_P0	MT Interface, Data Outp. / Par. Output Bit 0 (pos.)
14	CLK_N1	MT Interface, Clock Line / Par. Output Bit 1 (neg.)
15	DI_P1	MT Interface, Data Input / Par. Output Bit 1 (pos.)
16	SCL	I ² C Interface, Clock Line

Application Example



- Off-axis magnetic multiturn encoder utilizing iC-PVL and iC-MU
- Up to 19 bit singleturn and 18 bit multiturn resolution
- Setup from a single I²C EEPROM



- On-axis magnetic multiturn encoder utilizing iC-PVL and iC-MHM
- Up to 14 bit singleturn and 32 bit multiturn resolution
- Setup from a single I²C EEPROM

