

iC-PVL

Linear/Off-Axis Battery-Buffered Hall Multiturn Encoder

Description

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

iC-PVL operates with pole wheels or linear scales with a pole width of 1.0 mm up to 5.0 mm. 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.

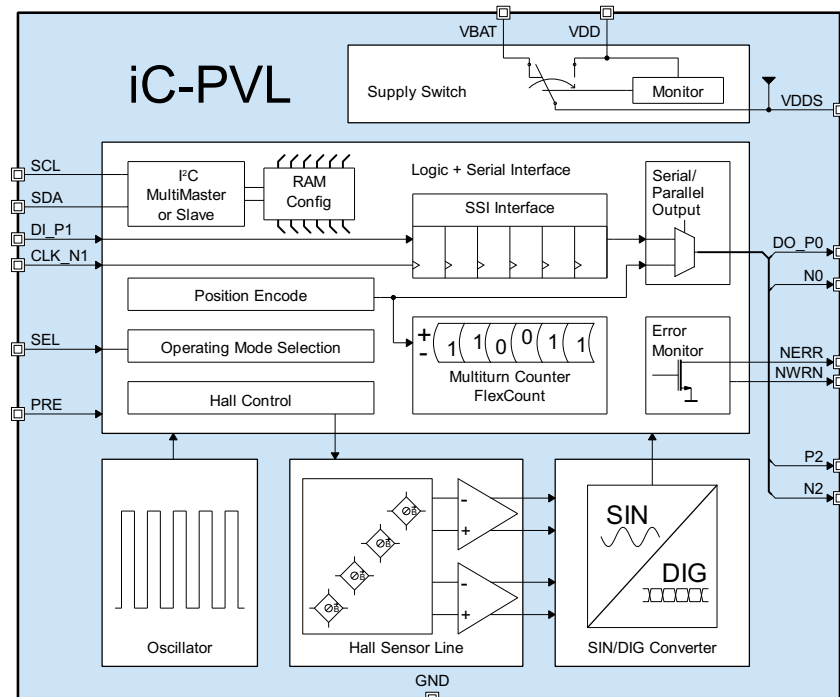
Applications

- Absolute hollow-shaft position encoders
- 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
- Current consumption of only 2 μA to 30 μA in typ. applications
- Tracking speed of up to 24 m/s (1.5 mm poles) or 15 000 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 3.0V to 5.5V
- Automatic low-power operation on backup battery
- Overspeed, battery and RAM (CRC) monitoring
- Space-saving 16-pin QFN package

Block Diagram



iC-PVL

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Key Specifications

General

Main Supply Voltage	3.0V to 5.5V
Main Supply Current	typ. 4.0mA
Battery Supply Voltage	3.0V to 5.5V
Battery Supply Current	typ. < 10µA @ 3.6V
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 · 10 ⁶ rad/s ² elec. max.

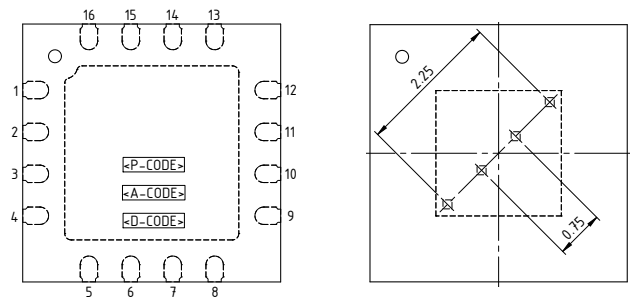
Magnetic Target Requirements

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

Operating Modes

Operating Modes	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 metering applications
Parallel Singleturn (3-bit)	parallel complementary output (default op. mode w/o EEPROM)
I ² C Slave Mode (embedded controller operation)	for configuration, position data, and command execution via I ² C

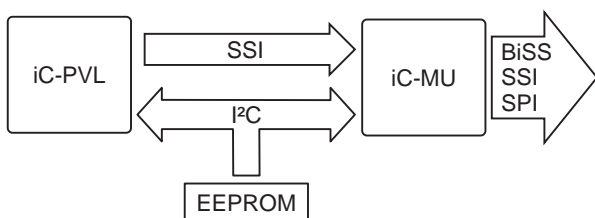
Pin Configuration QFN16-4x4



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. 3.6V)
7	VDDS	Switched Supply Voltage Output
8	VDD	+3.0V to 5.5V 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
- Angle resolution to 524 288 steps
- Setup from single I²C-EEPROM

