

iC-RC1000

SIN/COS SIGNAL SAFETY MONITOR IC



iC-RC1000 acts as an independent monitoring device for industrial safety controllers and drive systems in the evaluation of sine encoders for SIL applications.

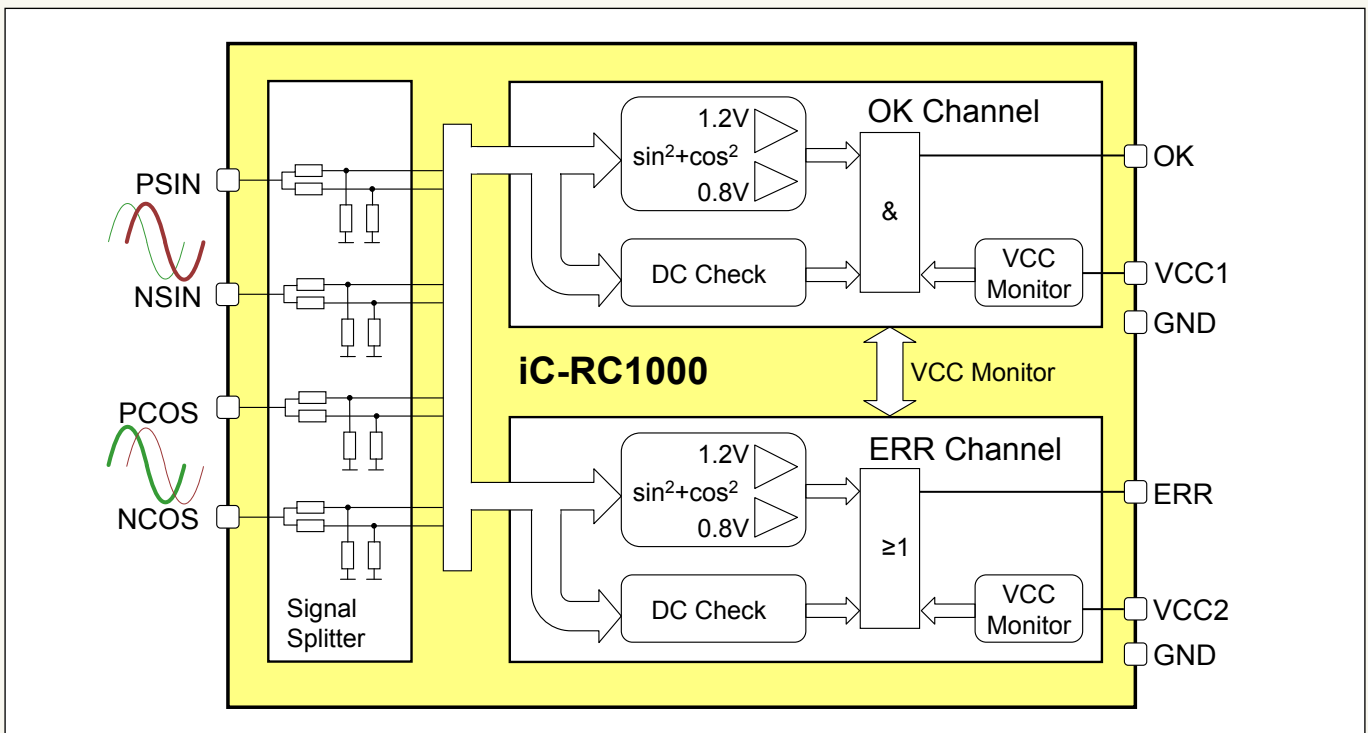
The IC checks in real time that four analog signal lines have the correct DC voltage (DC range: 30 to 80 % from VCC1 or VCC2) and that two respective paired lines have the correct differential 1 Vpp signal amplitude (amplitude range: 200 to 300 mV).

Applications

- Sine/cosine encoder monitoring for SIL applications
- Motion control
- Functional safety

Features

- Suitable for differential encoder signals of 1 Vpp (250 mV amplitude per line)
- Suitable for single-ended signals (500 mV amplitude per line)
- Verification of DC common mode range per signal line
- Analog Lissajous figure monitoring with min/max limits
- Cable fracture detection
- Source decoupling and overvoltage clamping per pin by external resistors
- Single-failure-proof dual channel concept
- Independent diagnostic channels and outputs: signal OK message and signal error message
- Prolonged indication time
- ESD protection and input overvoltage clamping



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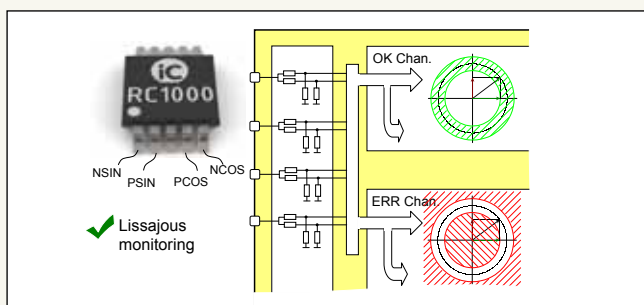
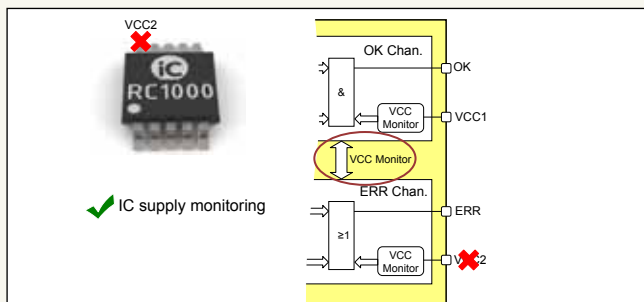
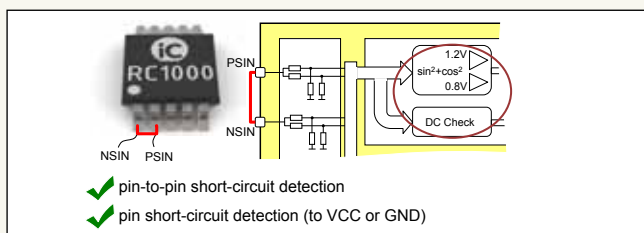
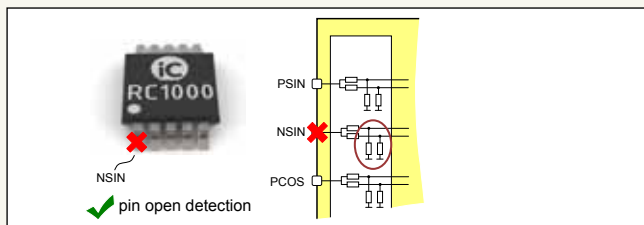
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iC-RC1000 has intrinsic safety, enabling single errors to be securely identified through redundancy; two different diagnostic channels monitor the input signals and independently generate complementary messages: signal OK and signal ERROR. So that the external controller can safely detect an interrupt, indication times are extended to at least 4 ms.

The status outputs are push-pull drivers and allow optocouplers to be directly connected up to the device. The diagnostic channels can be supplied by one or two separate power supplies and mutually monitor the applied supply voltage.

Overvoltage protection up to 36 V is provided by an internal clamping circuit and the help of external resistors of 18 kΩ at each input.

Principle Functions



Pin Configuration MSOP10

No.	Name	Function	MSOP10 (3x3 mm)
1	NSIN	Input Sine -	
2	PSIN	Input Sine +	
3	GND	Ground	
4	PCOS	Input Cosine +	
5	NCOS	Input Cosine -	
6	OK	OK Indication Output	
7	VCC1	+5 V Supply Voltage Chan. OK	
8	GND	GND	
9	VCC2	+5 V Supply Voltage Chan. ERR	
10	ERR	ERROR Indication Output	

Key Specifications

Signal Inputs	
Permissible Input Frequency	0 to 500 kHz for DC check 0 to 100 kHz for Lissajous monitoring
Lissajous Monitoring (P vs. N input)	equivalent differential amplitude: maximum 1.2...1.4 V minimum 0.6...0.8 V equivalent single-ended amplitude: maximum 2.4...2.8 V minimum 1.2...1.6 V
DC Monitoring (each pin)	maximum 73...79 % of VCC minimum 30...36 % of VCC
Input Pull-Down Resistor	2.5 MΩ
Overvoltage Clamping	to 36 V with external series resistors

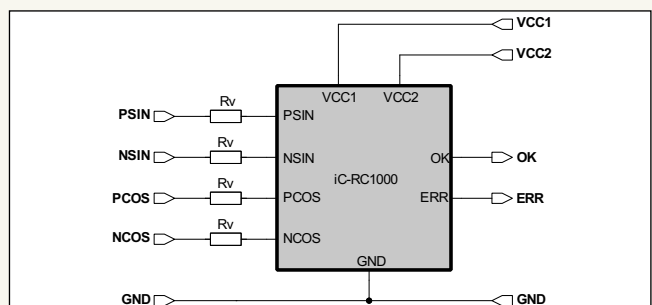
Indication Outputs OK, ERR

Push-Pull Driving Capability	highside 4 mA, lowside 10 mA
Saturation Voltage hi	1 V max. (@ 4 mA)
Saturation Voltage lo	0.5 V max. (@ 4 mA)
Indication Time	4 ms min. (low at OK, hi at ERR)

General

Supply Voltage	+5 V +/- 10 %
Supply Current	typ. 1.4 mA
Supply Monitoring	VCC1, VCC2 > 4.4 V
Operational Temperature	-40 °C to +110 °C
Package	MSOP10 (3 mm x 3 mm)

Application Example



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