

The CD-552R2 is an on-board phase detector possessing frequencies falling within the range of 100 Hz to 20 kHz.

The signal system is composed of the phase sensitive detector(PSD), low-pass filter(LPF), and output amplifier. A low-pass expansion of output low-pass filter cut-off frequency is available with the addition of one external resistor, and the gain setting(1 to 10) is also enabled. The reference signal system consists of a 0°-90° phase shifter and 50%-duty circuit, which enables the detection of $A \sin \phi$ or $A \cos \phi$ phase. The phase detection with double frequency is permitted if 2f mode is placed through the connection with the specified pin.

The CD-552R2 is in a 6-surface shielded 20-pin single in-line package(SIP), which is a great contributor to the implementation of high precision signal processing and high density mounting.

▼ Absolute maximum ratings

Supply voltage ($\pm V_s$)	± 18 V
Signal input voltage(SIG IN)	$\pm V_s$
Reference signal input voltage(REF IN)	-0.5 V to +5.5 V
Logic control voltage	-0.5 V to +5.5 V

▼ Signal system

● Signal input(SIG IN)

Input impedance	10 k Ω ± 5 % @100 Hz
Linear max. input voltage	± 10 V
Allowable slew rate	≤ 5 V/ms

● Phase detector

Detection method	Synchronous rectifying type by square-wave multiplication
Detection characteristics	Vout=Vin·A·cos ϕ :Pin 16 open Vout=-Vin·A·sin ϕ :Pin 16 shorted A:Gain, ϕ :Phase difference between SIG IN and REF IN (REF IN is a reference.)
Operating frequency range	100 Hz to 20 kHz
Gain ($\phi=0$)	1 Vdc/Vpk(sin-wave):Pins 12-13 open 10 Vdc/Vpk(sin-wave):Pins 12-13 shorted Selectable from 1 to 10 Vdc/Vpk with the external resistor (between Pins 12 and 13)
Gain accuracy	± 3 %
Phase difference (SIG IN / REF IN)	$\pm 0.5^\circ$ (typ.) @100 Hz $-0.5^\circ \pm 0.5^\circ$ (typ.) @20 kHz

● Low-pass filter

Order	1-pole(6 dB/oct)
Cut-off frequency	1 kHz ± 10 %: Pins 9-10 shorted Cut-off frequency range is expanded for lower frequency by external resistor and/or capacitor

Detection output(SIG OUT)

Output impedance	50 Ω ± 10 % @100 Hz
Linear max. output voltage	± 10 V @DC, load ≥ 2 k Ω
Linear max. output current	± 5 mA @DC
Offset voltage	± 15 mV @Short in input, Gain 1Vdc/Vpk
Offset voltage adjustment	Zero adjustment available with an external semi-fixed resistor(Pin 14)

▼ Reference signal system

● Reference signal input(REF IN)

Input circuit(REF IN)	CMOS schmitt trigger input, pulled up by 100k Ω resistor +3.5 V / +1.5 V
Input voltage	CMOS(0/5 V)level
Settling time	When REF IN is turned on:Approx. 10 s When REF IN frequency is changed:Approx. 5 s
Single edge (1f) mode	A rising or falling edge is regarded as a reference
Mode setting	Unconnected REF IN(Pin 18) and REF POL(Pin 17)
Input circuit(REF POL)	CMOS schmitt trigger input, pulled up by 100k Ω resistor
Polarity switch(REF POL)	Pin 17 open or +5 V:The rising edge regarded as a reference 0 V:The falling edge regarded as a reference
Pulse duration	≥ 50 ns

Input frequency range	100 Hz to 20 kHz
dual edge (2f) mode	Both rising and falling edge are regarded as a reference
Mode setting	Connected REF IN(Pin 18) and REF POL(Pin 17)
Input waveform	Duty ratio 50%
Input frequency range	100 Hz to 10 kHz

● 0°-90° phase shifter(SIN/COS)

Function	The detection of COS or SIN is made possible by pin 16
0°-90° phase difference	$-90^\circ \pm 0.5^\circ$ @20 kHz
Input circuit(SIN/COS)	CMOS schmitt trigger input, pulled up by 100k Ω resistor
Control Logic	Pin 16 open or +5 V:0°(cos) 0 V:-90°(sin)

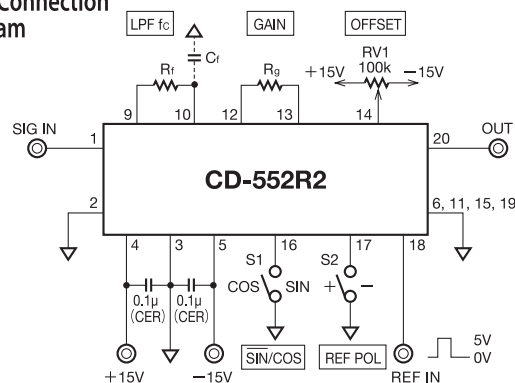
▼ Power supply

Operating voltage range	± 15 V ± 1 V
Quiescent current	± 25 mA(max.), ± 20 mA(typ.) -20 mA (max.), -12 mA (typ.)

▼ General

Specified temperature	23°C ± 5 °C
Operating environment	-20°C to 70°C, 10 %RH to 90 %RH
Storage environment	-30°C to 80°C, 10 %RH to 80 %RH
Package type	Type SS20(20-pin shielded SIP)
Dimensions	66.7 \times 10.5 \times 19.0 mm(not including protrusions)
Weight (NET)	Approx. 20 g
RoHS	Directive 2011/65/EU

Basic Connection Diagram



Block Diagram

