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Representative photograph, actual product appearance may vary.

Due to regional agency approval requirements, some products may not be available in your area. Please contact your regional Honeywell office regarding your product of choice.

CSNX25

CSN Series closed loop current sensor utilizing MR technology, measures AC, DC or impulse current, 25 amp-turns nominal, ± 56 amp-turns range, 2000 turn

Features

- Current sensing up to 1200 amps
- Measures ac, dc and impulse currents
- Competitive cost/performance ratio
- Rapid response
- High overload capability
- High level of electrical isolation between primary and secondary circuits
- Industrial operating temperature range
- Small size and weight

Typical Applications

- Variable speed drives
- Overcurrent protection
- Ground fault detectors
- Current feedback control systems
- Robotics
- UPS and telecommunication power supplies
- Welding power supplies
- Automotive Battery management systems
- Wattmeters

Description

The CSN Series of closed loop current sensors are based on the principles of the Magnetoresistive or Hall effects, and the null balance or zero magnetic flux method (feedback system). The magnetic flux in the sensor core is constantly controlled at zero. The amount of current required to balance zero flux is the measure of the primary current flowing through the conductor, multiplied by the ratio of the primary to secondary windings. This closed loop current is the output from the device and presents an image of the primary current reduced by the number of secondary turns at any time. This current can be expressed as a voltage by passing it through a resistor.

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	Product Specifications
Sensor Type	Closed Loop Linear
Sensed Current Type	ac or dc
Sensed Current Range	± 56 A
Package Style	Series Connect PCB Mount
Output Type	Current
Maximum Continuous Current	± 40 A
Supply Current	± 12 mA + output
Supply Voltage	4.75 Vdc to 5.25 Vdc
Offset Current	< ± 0.03 mA
Offset Current Drift	< ± 0.01 mA
Coil Resistance @ 70 °C	50 Ohm
Response Time	< 0.2 µs
Coil Turns	2000
Output Nominal	12.5 mA
Operating Temperature Range	-40 °C to 85 °C [-40 °F to 185 °F]
Storage Temperature Range	-40 °C to 90 °C [-40 °F to 194 °F]
Minimum Measuring Resistance	0 Ohm
Maximum Measuring Resistance	80 Ohm
Housing Material	Glass-filled Polyamide (UL94-V0)
Mounting	PCB on 11 pins
Pinout Style	Unipolar
Accuracy	± 0.24 %
Availability	Global
Comment	Unipolar supply sensor incorporating patented magnetoresistive sensing technology to achieve ultra-low offset drift with temperature.
UNSPSC Code	411121
UNSPSC Commodity	411121 Transducers
Series Name	CSN Series

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Mounting drawing in mm and [inches]

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CSN Series Magnetoresistive (MR) Closed Loop Current Sensor



Features

- Ultra low offset drift with temperature
- Unipolar voltage supply
- Superior global accuracy over temperature range -40 °C to 85 °C
- Customer adjustable gain
- Customer accessible voltage reference
- Self calibrating
- Designed for auto assembly
- Current output

Typical applications

- Servo drives
- Variable speed drives
- Frequency converters
- Power supply systems
- Over current protection
- Uninterruptible power supplies
 UPS
- Power metering

The CSN Series MR current sensor builds on patented Honeywell technology to offer superior sensor performance and accuracy in current measuring applications.

The current sensor utilises an ASIC (Application Specific Integrated Circuit) and a magnetoresistive (MR) Honeywell magnetic sensor to provide extremely low offset drift with temperature resulting in stable, repeatable, accurate measurements. This is achieved by using an ASIC to exploit the unique features of the MR sensor. There is virtually no offset drift over the entire operating temperature range.

The sensor operates from a +5 V unipolar supply and has an accessible, internal 2.5 V voltage reference. The sensor can operate from either the internal voltage reference or an external voltage reference, thus enabling several sensors to be used without offset imbalance. Three primary pins enable the sensor to be configured for different measuring ranges and the current output signal enables different load resistors to be used depending on the application.

The sensor offers flexibility and performance to meet many applications.

WARNING

PERSONAL INJURY

DO NOT USE these products as safety or emergency stop devices, or in any other application where failure of the product could result in personal injury.

Failure to comply with these instructions could result in death or serious injury.

MISUSE OF DOCUMENTATION

- The information presented in this product sheet (or catalogue) is for reference only. DO NOT USE this document as product installation information.
- Complete installation, operation and maintenance information is provided in the instructions supplied with each product.

Failure to comply with these instructions could result in death or serious injury.

CSN Series MR Current Sensor

Technical information

Supply	voltage is +5 V and temperat	ure is 25 °C	unless	s otherwise stated
Electrical				
Nominal current (In)		25 A.t rms		
Measuring range		0 to ± 56 A	t [1]	
Measuring resistance [2]		Rm min.		Rm max.
with +5 V	@ ± 25 A.t rms	0 Ohm		80 Ohm
	@ ± 40 A.t rms	0 Ohm		31 Ohm
Nominal analogue outpu	ut current	12.5 mA m	IS	
Turns ratio		1-2-3/2000		
Accuracy ^[3] @ 25 °C		max. ± 0.24	1 % @ I	In
@ -40 °C to	≥ 85 °C	max. ± 0.3	2%@	In
Supply voltage		+5 Vdc (± \$	5 %)	
Internal reference volta	ge	+2.5 Vdc (:	: 10 m\	/)
Galvanic isolation		5.0 kV rms	′50 Hz/ ⁻	1 minute
Accuracy - dynamic per	formance			
Zero offset current at 25	5 °C	< ± 30 uA	(= 0.2	24 % of 25 A)
Thermal drift of offset ca	urrent 10 °C to 50 °C	< ± 5 uA	(= 0.0	94 % of 25 A)
Thermal drift of offset c	urrent -40 °C to 85 °C	< ± 10 uA	(= 0.0	8 % of 25 A)
Linearity		< ± 0.1 %		
Response time @ 90 %	of pulse amplitude	< 200 ns		
di/dt accurately followed	t	> 100 A/us		
Bandwidth (-1 dB)		dc to 200 k	Hz	
General data				
Operating temperature		-40 °C to 8	5 °C	
Storage temperature		-40 °C to 9	0°C	
Current consumption		12 mA (+5	V) plus	output current
Secondary internal resi	stance (@ 70 °C)	50 Ohm		
Positive primary current	t	In direction	of arro	w
Sensor housing		Glass-filled	Polyan	nide (UL94-V0)
Approvals		EN 50082-	2, EN 5	0081-2, UL, CE
Rated insulation voltage	e (RIV)/Insulation classification	400 V reini	orced	
Dimensions [LxWx]	H](mm)	34 x 12,6 x	25,5	
Construction		Fully enca	osulated	t
Environment		Pollution d	egree 2	, Category III
Fastening		PCB mour	ted sen	isor
Weight		20 g		
Connection to primary		Via 6 x 0,8	mm sq	uare pins
Connection to seconda	ry	Via 5 x 0,6	4 mm s	quare pins
Notes				· · ·

^[1] ac peak. Maximum dc or ac rms range is 40 A.t.

^[2] Higher resistance (Rm) values can be used with reduced measuring range. Specified values conditional on 70 °C ambient and no power supply tolerance.

^[3] Excludes the effects of tolerances of reference voltage and external load resistance.

CSN Series MR Current Sensor

Mounting drawing in mm and [inches]







Electrical wiring diagram

Internal voltage reference mode



External voltage reference mode



Order guide Description Listing 25 A MR current sensor CSNX25

Primary pin connections (3 turns)

	Primary	Current		
Primary turns	Nom Ipn (A)	Max Ip (A)	(mA)	connection
1	25	56	12.5	$\begin{array}{c} 3 & 2 & 1 \\ 0 & - & 0 \\ 0 & 0 \\ 0 \\ 0 \\ 0 \\ 0 \\ 0 \\ 0 \\ 0$
2	12	27	12	3 2 1 in 0 4 5 6
3	8	18	12	3 2 1 In 0 4 5 6

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Sensing and Control www.honeywell.com/sensing Honeywell Control Systems Ltd Newhouse Industrial Estate Motherwell, Lanarkshire ML1 5SB Scotland, UK



NGE Max	(AC PEAK)	OUTPUT NOMINAL	MAXIMUM COIL RESISTANCE AT 70°C	No. OF TURNS
	56A	2.5mA	50Ω	2000

ANCES	UNLESS	
RWISE	STATED	± 0.2

Honeywell Fig. 1 Fig. 3 Fig. 4 Fig. 5 Fig. 6 Fig. 7 Fig. 2 6 4 Sensing and Control Þ Sensors 0 Fig. 12 Fig. 8 Fig. 13 Fig. 14 Fig. 15 Fig. 9 Fig. 10 Fig. 11 ۲

Hall Effect Sensors

	Supply	Output	Output	Terminal		Digi-Key		Price Each		T & R Pricing *	Honeywell
Fig.	Voltage	Current	Туре	Туре	Polarity	Part No.	1	50	100	1,000	Part No.
1	3.8 VDC ~ 30 VDC	10 mA	Sink	Lead Wires	—	480-1992-ND	5.75	4.89	4.32	—	SR16C-J6
2	4.5 VDC ~ 24 VDC	40 mA	Sink	Lead Wires	_	480-1990-ND	22.85	19.02	16.79	—	4AV16F
3	3.8 VDC ~ 30 VDC	20 mA	Sink	Lead Wires	Unipolar	480-1991-ND	4.30	3.66	3.23	—	SR13C-A1
4	3.8 VDC ~ 30 VDC	40 mA	Sink	Lead Wires	_	480-1993-ND	5.80	4.93	4.35	—	SR17C-J6
5	4.5 VDC ~ 24 VDC	20 mA	Sink	SOT89	Bipolar	480-2010-1-ND	2.60	2.24	1.86	1116.00	SS51T
6	4.5 VDC ~ 24 VDC	40 mA	Sink	Lead Wires	_	480-2021-ND	23.53	20.01	17.66	—	1GT101DC
	8 VDC ~ 16 VDC	10 mA	Source		Ratiometric Linear	480-2007-ND	10.80	9.18	8.10	-	91SS12-2
7	6.6 VDC ~ 12.6 VDC	1 mA	Sink/Source	PC Board	Ratiometric	480-2008-ND	13.70	11.65	10.28	-	SS94A1
	6.6 VDC ~ 12.6 VDC	1 mA	Sink/Source		Ratiometric	480-2009-ND	16.00	13.60	12.00	_	SS94A1F
	3.8 VDC ~ 30 VDC		Sink		Bipolar	480-2011-1-ND	3.17	2.73	2.27	1361.00	SS511AT
5	3.8 VDC ~ 30 VDC	20 mA	Sink	SOT89	Unipolar	480-2012-1-ND	3.17	2.73	2.27	1361.00	SS541AT
	3.8 VDC ~ 30 VDC		Sink		Bipolar Latch	480-2013-1-ND	3.17	2.73	2.27	1361.00	SS561AT
	4.5 VDC ~ 24 VDC	20 mA	Sink		Bipolar	480-1998-ND	1.30	1.05	.84	-	SS40A
	4.5 VDC ~ 24 VDC	20 mA	Sink		Bipolar	480-1999-ND	1.69	1.35	1.09	-	SS41
	3.8 VDC ~ 30 VDC	20 mA	Sink		Bipolar	480-2000-ND	2.15	1.72	1.39	—	SS411A
	3.8 VDC ~ 30 VDC	20 mA	Sink		Unipolar	480-2001-ND	2.15	1.72	1.39	—	SS441A
8	3.8 VDC ~ 30 VDC	20 mA	Sink	PC Board	Unipolar	480-2002-ND	1.80	1.45	1.17	-	SS443A
	3.8 VDC ~ 30 VDC	20 mA	Sink		Bipolar Latch	480-2003-ND	2.15	1.72	1.39	—	SS461A
	3.8 VDC ~ 30 VDC	20 mA	Sink		Bipolar Latch	480-2004-ND	1.86	1.49	1.20	-	SS466A
	4.5 VDC ~ 10.5 VDC	1.5 mA	Sink/Source		Ratiometric	480-2005-ND	3.02	2.42	1.95	-	SS495A
	3 VDC ~ 6.5 VDC	1.5 mA	Source		Analog	480-2006-ND	1.80	1.45	1.17	—	SS49E
9	4.5 VDC ~ 24 VDC	20 mA	Sink	Lead Wires	Unipolar	480-2014-ND	21.34	18.15	16.01	—	103SR13A-1

* For Tape and Reel part number, change -1-ND to -2-ND

Magnet

Fig.	Outside Diameter mm (Inch)	Thread Dim.	Length mm (Inch)	Digi-Key Part No.	1	Price Each 50	100	Honeywell Part No.
10	7.9 (0.31)	8-32	17.0 (0.67)	480-2015-ND	7.25	6.16	5.44	102MG11

Current Sensor

Fig.	Supply Voltage	Output Current	Output Type	Terminal Type	Polarity	Sensor Type	Current Type	Response Time	Digi-Key Part No.	1	Price Each 50	100	Honeywell Part No.
11	5.4 VDC ~ 13.2 VDC	_	Voltage	PCB	—	Open Loop Linear	AC or DC	3µs	480-1994-ND	14.05	11.95	10.54	CSLA2CD
12	4.5 VDC ~ 10.5 VDC	1.5 mA	Voltage	PCB	Positive	Open Loop	DC	50µs	480-1995-ND	6.35	5.40	4.77	CSLH3A45
13	4.75 VDC ~ 5.25 VDC	12.5 mA	Current	PCB	—	Closed Loop Linear	AC or DC	≤0.2µs	480-1996-ND	21.10	17.94	15.83	CSNX25

Switch

Fig.	Supply	Output	Output	Transistor	Digi-Key	Price Each		Honeywell	
	Voltage	Current	Type	State	Part No.	1 50 100		Part No.	
14	4.5 VDC ~ 24.0 VDC	10 mA	Sink	Normally Off	480-2018-ND 480-2019-ND 480-2020-ND	7.30 7.30 10.50	6.21 6.21 8.93	5.45 5.48 7.88	VX10 VX80 VX80-C1

MR

	Supply	Supply Output Output Operate Release Digi-Key Price Each						Honeywell			
Fig.	Voltage	Current	Туре	Polarity	Point	Point @25°C	Part No.	1	50	100	Part No.
15	3.8 VDC ~ 30.0 VDC	20 mA	Sink	Omnipolar	1.5 mT	1.1 mT	480-1997-ND	2.68	2.14	1.73	2SS52M

Temperature

Fig.	Supply Voltage	Supply Current	Temp. Sensing Range	Length (Inch)	Termination	Packaging Type	Digi-Key Part No.	1	Price Each 50	100	Honeywell Part No.
9	10.0 VDC	1 mA	-	1.5	Lead Wires	3/8-24 UNF-2A	480-2016-ND	27.54	23.41	20.66	TD4A
8	10.0 VDC	1 mA	-40°C ~ 150°C	—	SIP	Plastic Case	480-2017-ND	3.50	2.98	2.63	TD5A

Panasonic Hall Effect Sensor ICs

Panasonic's Hall IC is a combination of a Hall element, amplifier, Schmidt circuit, and stabilized power supply/temperature compensator integrated on an identical chip by using the IC technology. It amplifies Hall element output at the amplifier, converts into a digital signal through the Schmidt circuit, and drives the TTL or MOS IC directly.



Features: • Stable temperature characteristics due to the additional temperature compensator • TTL and MOS ICs directly driveable by output • Semipermanent service life due to no contact parts • Small change of the operating flux density against mechanical stress \bullet Provided with the output pull-up resistors (typ 27k Ω or open collector output

(see chart) • Operating Temperature: -40°C ~ 100°C (-40°C ~ 85°C for DN6851 - DN6853) • Supply Current Maximum: 6mA • Output Circuit Maximum: 20mA

Applications: • Speed Sensors • Position Sensors • Rotation Sensors • Keyboard Switches • Microswitches

	Fig.	Supply Voltage Range (V)	Op Flux D (Gau (L-H)	er.** lensity lss) (H-L)	Output* Type	Oper.† Type	Pkg.	Digi-Key Part No.	1 1	rice Eact 10	1 100
Γ	1	4.5 - 16	-175	175	Pull-up	Bidirectional	3-Sip	DN6847SE-ND	1.68	1.35	1.01
	2	4.5 – 16	5	220	00	Unidirectional	3-Sip	DN6848-ND	1.04	.87	.70
	3	4.5 – 16	5	220	00	Unidirectional	SOH-4D	DN6848S-E1VCT-ND	.90	.75	.60
	3	4.5 – 16	5	220	00	Unidirectional	SOH-4D	DN6848S-E1VTR-ND	362.00/1000		
Γ	2	4.5 - 16	-175	175	00	Bidirectional	3-Sip	DN6849-ND	1.69	1.36	1.02
	3	4.5 – 16	-175	175	00	Bidirectional	SOH-4D	DN6849S-ND	1.69	1.36	1.02
	1	4.5 – 16	-175	175	00	Bidirectional	3-Sip	DN6849SE-ND	1.69	1.36	1.02
	2	3.6 - 16	-200	200	Pull-up	Bidirectional	3-Sip	DN6851-A-ND	.90	.76	.61
	2	3.6 - 16	100	450	00	Unidirectional	3-Sip	DN6852-A-ND	1.04	.87	.70
Γ	2	4.5 - 16	-120	120	Pull-up	Bidirectional	3-Sip	DN8897-ND	1.69	1.36	1.02
	2	4.5 – 16	-120	120	00	Bidirectional	3-Sip	DN8899-ND	1.69	1.36	1.02

* Output Type: Pull-up Resistors = 27K Internal; 0C = Open Collector. ** To convert Gauss to millitesla, divide by 10 † Unidirectional and is only sensitive to either north or southside of magnetic; Bidirectional is sensitive to an alternating magnetic fields of both north and south sides.

3: Output

4: Gnd

Ν