

CH601

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Draft Datasheet REV 0.4

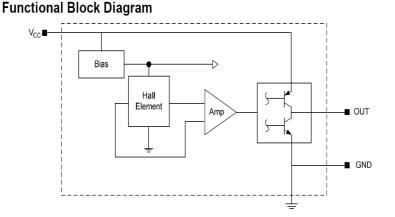
PACKAGE

Automotive Product Group

FEATURES and FUNCTIONAL DIAGRAM

- Power consumption of 4 mA at 5 VDC for energy efficiency
- Single Current Sinking or Current Sourcing Output
- Linear output for circuit design flexibility
- Ratiometric Rail to Rail Linear Output
- Precise Sensitivity and Temperature Compensation
- Wide Operating Voltage Range: Supply Voltage 3.0~15V
- Sensitivity at 5V:
 - 1.5mV/Gauss (CH601)
- Specified Operating Temperature Range: From -40°C~150°C
- Responds to either positive or negative gauss
- Quad Hall sensing element for stable output
- Lead Free Package: Flat TO-92, SOT-89-3L, SOT-23-3L
- High ESD Protection
- RoHS Compliant 2011/65/EU

Automativa Indu



TO-92S SOT-23-3L SOT-89-3L

APPLICATIONS

Automotive, Industrial, Home, appliances,

Current sensing
Speed Detection
Position Detection
Magnetic Encoder
Solid-State Switch
Ferrous metal sensing
Liquid level sensing
Vibration sensing
Weight sensing

DESCRIPTION

The CH601 is high performance ratiometric linear hall effect sensor, produced with Bipolar technology; it is high performance small versatile linear Hall-effect devices which are operated by the magnetic field from a permanent magnet or an electromagnet. The ratiometric output voltage is set by the supply voltage and varies in proportion to the strength of the magnetic field. The CH601 family has a quiescent output voltage that is 50% of the supply voltage.

The integrated circuitry provides increased temperature stability and sensitivity. The CH601 provide high accuracy and temperature compensation. The linear hall sensors have an operating temperature range from -40 to +150°C, appropriate for home appliances, industrial and automotive environments. They respond to either South or North pole.



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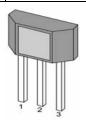
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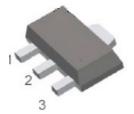
1. Product Family Members

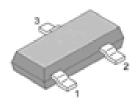
Part Number	Marking ID	Description
CH601ATB	C601	Linear Hall sensor IC, flat, TO-92S package, bulk packing (1000 units per bag)
CH601AER	C601	Linear Hall sensor IC, SOT-89-3L package, tape and reel packing (1000 units per reel)
CH601ASR	C601	Linear Hall sensor IC, SOT-23-3L package, tape and reel packing (3000 units per reel)

2. Pin Definitions and Descriptions

TO-92S (T)	SOT-89-3L (E)	SOT-23-3L (E)	Name	Туре	Function
1	1	1	VDD	Supply	Supply Voltage pin
2	2	3	GND	Ground	Ground pin
3	3	2	OUT	Output	Output pin







TO-92S

SOT-89-3L

SOT-23-3L

3. Absolute Maximum Ratings

Parameter	Symbol	Min	Max	Units
Supply Voltage	V_{DD}	-	15	V
VDD Reverse Voltage VDD	V_{RDD}	-	-0.3	V
Output Voltage	V_{OUT}	-0.3	15	V
Output Current	I _{OUT}	-	5	mA
Operating Ambient Temperature	T _A	-40	150	°C
Storage Temperature	T _S	-50	150	°C
Junction temperature	TJ	-50	165	°C
Magnetic Flux	В	No l	_imit	Gauss

Note: Exceeding the absolute maximum ratings may cause permanent damage. Exposure to absolute-maximum-rated conditions for extended periods may affect device reliability.

4. ESD Protections

Parameter	Value	Unit
All pins 1)	+/-6000	V
All pins 2)	+/-400	V
All pins 3)	+/-1000	V

- 1) HBM (human body mode, 100pF, 1.5 kohm) according to MIL-STD-883H Method 3015.8
- 2) MM (Machine Mode C=200pF, R=0Ω) according to JEDEC EIA/JESD22-A115
- 3) CDM (charged device mode) according to JEDEC EIA/JESD22-C101F



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5. Function Description

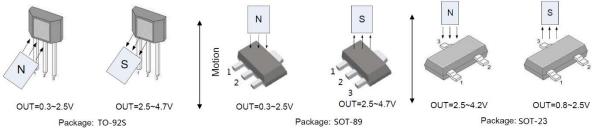
The CH601 family MRL (Miniature Ratiometric Linear) sensors are small, versatile linear Hall effect devices which are operated by the magnetic field from a permanent magnet or an electromagnet. The ratiometric output voltage is set by the supply voltage and varies in proportion to the strength of the magnetic field.

The integrated circuitry provides increased temperature stability, sensitivity and temperature compensation. These linear position sensors have an operating temperature range of -40°C to +150°C, appropriate for industrial and automotive environments. They respond to either positive or negative gauss, monitoring either or both magnetic poles.

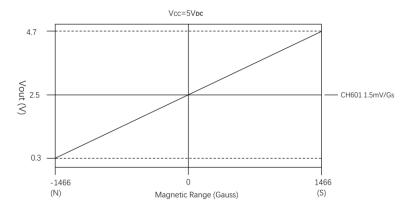
The quad Hall sensing element minimizes the effects of mechanical or thermal stress on the output. The product providing a robust design over a wide temperature range. Rail-to-rail operation (over full voltage range) provides a more usable signal for higher accuracy.

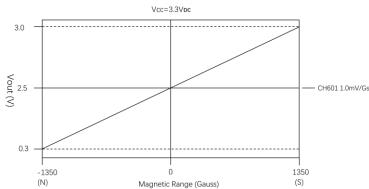
The CH601 family has a typical sinking or sourcing output of 1.5 mA continuous, uses 4 mA of supply current at 5.0 volts and 25°C, and provides predictable performance over the full temperature range. The CH601 family Series sensors have wider null and sensitivity tolerances.

6. Magnetic Activation



7. Transfer Characteristics







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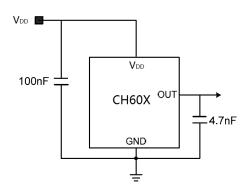
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8. Parameters Specification (At V_{DD}=5V, T_A= -40 °C to 150 °C except where

otherwise specified.)

Symbo I	Parameter	Test Condition	Min	Тур	Max	Units
V_{DD}	Supply voltage	-40 °C to 150 °C	3.0	5.0	15	V
I _{DD}	Supply Current	B=0		3	6.5	mA
V _H	Outrot well-	B>=+1100 Gs			0.4	V
VL	Output voltage	B<=-1100 Gs	4.7			V
		B=0 at 25 °C and VDD=5V	2.425	2.5	2.575	V
V _{NULL}	Quiescent Voltage	B=0 at 25 °C and VDD=3.3V	1.585	1.65	1.715	V
Isink	Circle Comment	V _{DD} =3.3V T _A =25°C	1.2			mA
I _{SINK}	Sink Current	V _{DD} =5V T _A =25°C	2.0			mA
ISOURCE		V _{DD} =3.3V T _A =25°C	0.8			mA
Isource	Source Current	V _{DD} =5V T _A =25°C	1			mA
V _N	Output Referred Noise(CH601)	TA = 25°C, CL = 0.1 μF		5		mV(p-p)
L _{IN}	Linearity		-5		5	%
V _{NULL} (T)	Delta Vnull as temperature		-5		5	%
V _{NULL} (V)	Ratiometry, Vnull		-5		5	%
SENS(T)	Delta Sens as temperature			±10		%
S _{ENS}	Sensitivity(CH601)	TA=25°C, VDD=5V	1.2	1.5	1.8	mV/Gs
Sens	Sensitivity(CH601)	TA=25°C, VDD=3.3V	0.8	1	1.2	mV/Gs
B+	Managia Bassa (OHOO)	T 0500 VDD 577		1466		Gauss
B-	Magnetic Range (CH601)	T _A =25°C, VDD=5V		-1466		Gauss
B+	Manualla Danna (OHOOA)	T 0500 V/DD 0 0V		1350		Gauss
B- Magnetic Range (CH601)		T _A =25°C, VDD=3.3V		-1350		Gauss

9. Typical Application Circuit





CH601

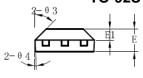
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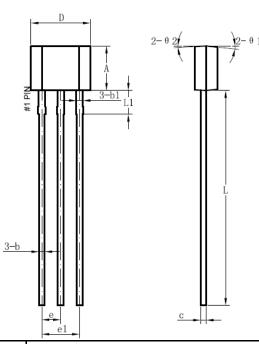
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10. Package Information:







Cymphol	Dim	ensions in Millir	neters
Symbol	Min.	Тур.	Max.
А	2.9	3	3.1
b	0.35	0.39	0.56
b1		0.44	
С	0.36	0.38	0.51
D	3.9	4	4.1
E	1.42	1.52	1.62
E1		0.75	
е		1.27	
e1		2.54	
L	13.5	14.5	15.5
L1		1.6	
θ1		6°	
θ2		3°	
θ3		45°	



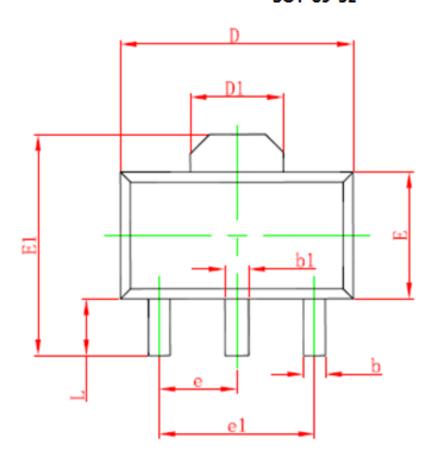
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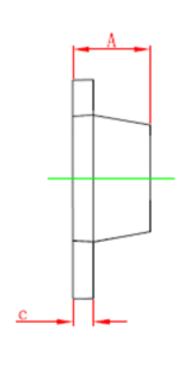
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PACKAGE DESIGNATOR SOT-89-3L





Symbol	Dimensions	In Millimeters	Dimensions In Inches		
Symbol	Min.	Max.	Min.	Max.	
Α	1.400	1.600	0.055	0.063	
b	0.320	0.520	0.013	0.020	
b1	0.400	0.580	0.016	0.023	
С	0.350	0.440	0.014	0.017	
D	4.400	4.600	0.173	0.181	
D1	1.550	REF.	0.061	REF.	
E	2.300	2.600	0.091	0.102	
E1	3.940	4.250	0.155	0.167	
е	1.500	TYP.	0.060	TYP.	
e1	3.000	3.000 TYP.		TYP.	
L	0.900	1.200	0.035	0.047	



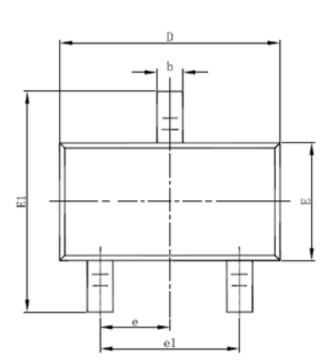
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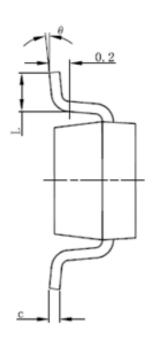
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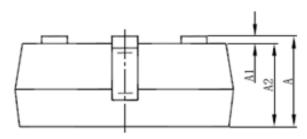
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PACKAGE DESIGNATOR SOT-23-3L







CL . I	Dimensions In	Millimeters	Dimensions	In Inches
Symbol	Min	Max	Min	Max
Α	1.050	1.250	0.041	0.049
A1	0.000	0.100	0.000	0.004
A2	1.050	1.150	0.041	0.045
b	0.300	0.500	0.012	0.020
С	0.100	0.200	0.004	0.008
D	2.820	3.020	0.111	0.119
E	1.500	1.700	0.059	0.067
E1	2.650	2.950	0.104	0.116
е	0.950(BSC)	0.037(BSC)
e1	1.800	2.000	0.071	0.079
L	0.300	0.600	0.012	0.024
θ	0°	8°	0°	8°



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