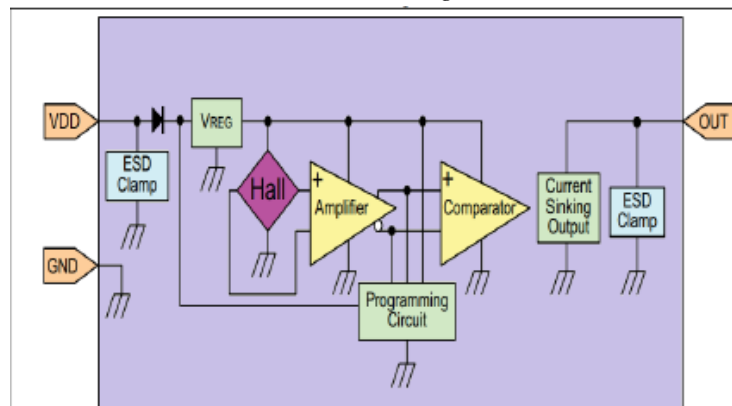


Features and Function Block Diagram

- 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:
 - 2.5mV/Gauss (LC5602)
 - 3.3mV/Gauss (LC5603)
 - 5.0mV/Gauss (LC5604)
- 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
- High ESD Protection
- RoHS-compliant material meets directive 2002/95

Function Block Diagram

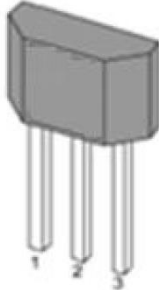


Applications

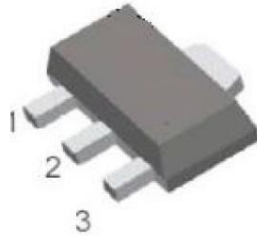
Automotive, Industrial, Home,
 appliances,
 Current sensing
 Speed Detection
 Position Detection
 Magnetic Encoder
 Solid-State Switch
 Ferrous metal sensing
 Liquid level sensing
 Vibration sensing

Weight sensing

Packages



TO-92S



SOT-89-3L

Descriptions

- The LC5602/LC5603/LC5604 family 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 LC5602/LC5603/LC5604 family has a quiescent output voltage that is 50% of the supply voltage.
- The integrated circuitry provides increased temperature stability and sensitivity. The LC5602/LC5603/LC5604 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.

	LiBrave Europe B. V. Add: Sir Winston Churchillaan 299k, 2288DC Rijswijk, the Netherlands Website: www.librave.nl E-mail: info@librave.nl	LC5602/LC5603/LC5604	
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7. Transfer Characteristics	6
8. Parameters Specification	6
9. Typical Application Circuit	7
10. Package Information	8

1. Product Family Members

Part Number	Marking ID	Description
LC5602ATB	C602	Linear, Open Collector Output, Hall-effect digital sensor IC, flat, TO-92S package, bulk packing (1000 units per bag)
LC5603ATB	C603	
LC5604ATB	C604	
LC5602AER	C602	Linear, Open Collector Output, Hall-effect digital sensor IC, SOT-89-3L package, tape and reel packing (1000 units per reel)
LC5603AER	C603	
LC5604AER	C604	

2. Pin Definitions and Descriptions

SOT-23-3L(S)	TO-92S(T)	Name	Type	Function
1	1	VDD	Supply	Supply Voltage pin
2	3	OUT	Output	Collector Output pin (include pull-up resistor)
3	2	GND	Ground	Ground pin

3. Absolute Maximum Ratings

Parameter	Symbol	Min	Max	Unit
Supply Voltage	V_{DD}	-	20	V
Reverse Voltage	R_{DD}	-	-0.3	V
Output Voltage	V_{OUT}	-0.3	20	V
Output Current	I_{OUT}	-	5	mA
Operating Ambient Temperature	T_A	-40	150	°C
Storage Temperature	T_S	-50	150	°C
Junction temperature	T_J	-50	165	°C
Magnetic Flux	B	No Limit		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	V
All pins ²⁾	+/-400 V	V
All pins ³⁾	+/-1500V	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

5. Function Description

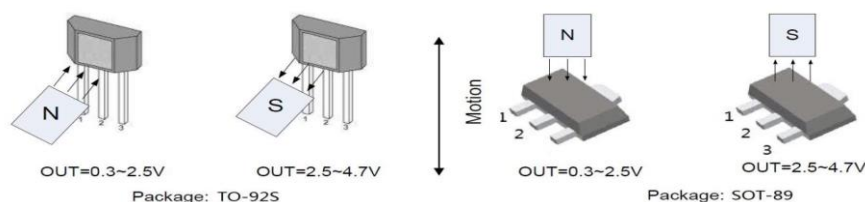
The LC5602/LC5603/LC5604 family MRL (Miniature Ratiometric Linear) sensors are small, versatile linear Hall effect devices which are operated by the magnetic field from a permanent magnet or an electromagnet. The ratiometric output voltage is set by the supply voltage and varies in proportion to the 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.

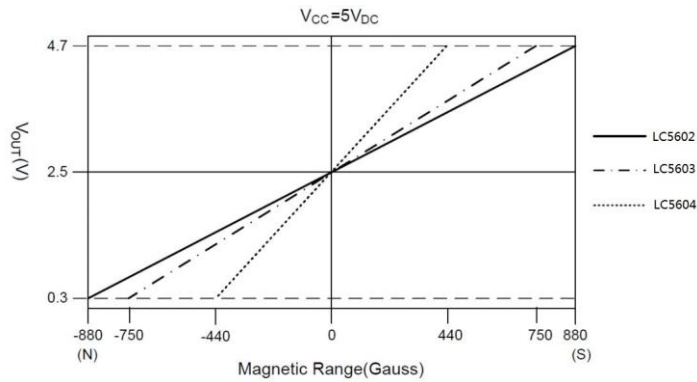
The quad Hall sensing element minimizes the effects of mechanical or thermal stress on the output. The product providing a robust design over a wide temperature range. Rail-to-rail operation (over full voltage range) provides a more usable signal for higher accuracy.

The LC5602/LC5603/LC5604 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 LC5602/LC5603/LC5604 family Series sensors have wider null and sensitivity tolerances.

6. Magnetic Activation



7. Transfer Characteristics

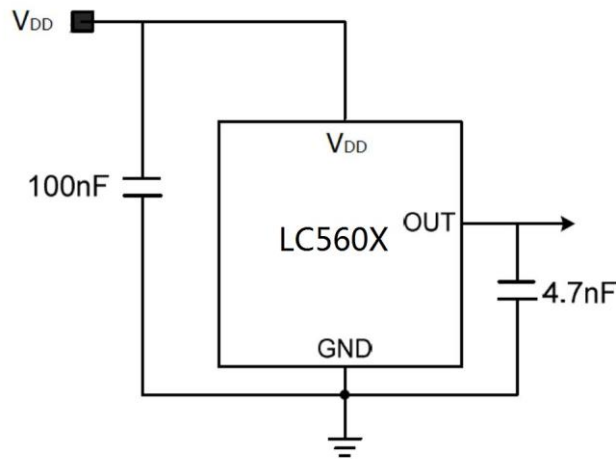


8. Parameters Specification (At 3.0V to 15V supply, TA= -40 °C to 150 °C except where otherwise specified.)

Symbol	Parameter	Test Condition	Min	Typ	Max	Unit
V _{DD}	Supply voltage	-40 °C to 150 °C	3.0	5	15	V
I _{DD}	Supply current	B=0	-	4	8	mA
V _H	Output voltage	B=+1000 Gs	-	-	0.4	V
V _L		B=-1000 Gs	4.7	-		V
V _{NULL}	Quiescent Voltage	B=0 at 25 °C	2.45	-	2.55	V
I _{SINK}	Sink Current	V _{DD} =3V T _A =25 °C	-0.8	-		mA
I _{SINK}		V _{DD} =5V T _A =25 °C	-1			mA
I _{SOURCE}	Source Current	V _{DD} =3V T _A =25 °C			1.5	mA
I _{SOURCE}		V _{DD} =5V T _A =25 °C			2.0	mA
L _{IN}	Linearity		-5		+5	%
V _{NULL(T)}	Delta Vnull as temperature		-5		+5	%
V _{NULL(V)}	Ratiometry, Vnull		-5		+5	%
S _{ENS(T)}	Delta Sens as temperature	-	-10		+10	%
S _{ENS}	Sensitivity(LC5602)	T _A =25 °C		2.5		mV/Gs
S _{ENS}	Sensitivity(LC5603)			3.3		mV/Gs
S _{ENS}	Sensitivity(LC5604)			5		mV/Gs

B+ B-	Magnetic Range(LC5602)	$T_A = 25 \text{ } ^\circ\text{C}$		880		Gauss
				-880		Gauss
B+ B-	Magnetic Range(LC5603)	$T_A = 25 \text{ } ^\circ\text{C}$		666		Gauss
				-666		Gauss
B+ B-	Magnetic Range(LC5604)	$T_A = 25 \text{ } ^\circ\text{C}$		440		Gauss
				-440		Gauss

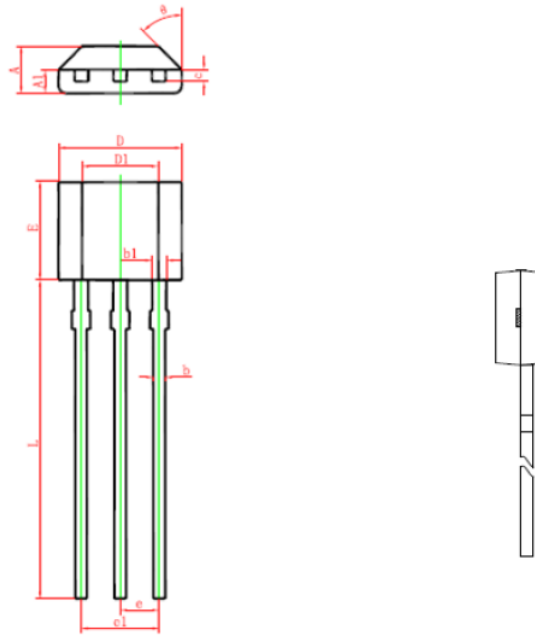
9. Typical Application Circuit



10. Package Information

Package Designator

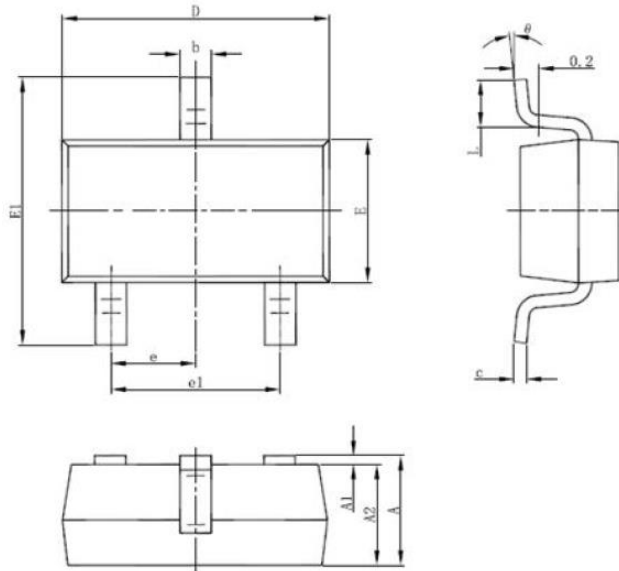
TO-92S



Symbol	Dimensions in Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	1.420	1.620	0.056	0.064
A1	0.660	0.860	0.026	0.034
b	0.350	0.430	0.014	0.019
b1	0.400	0.550	0.016	0.022
c	0.360	0.510	0.014	0.020
D	3.900	4.100	0.154	0.161
D1	2.280	2.680	0.090	0.106
E	3.050	3.250	0.120	0.128
e	1.270 TYP.		0.050 TYP.	
e1	2.440	2.640	0.096	0.104
L	15.100	15.500	0.594	0.610
θ	45 °TYP.		45 °TYP.	

Package Designator

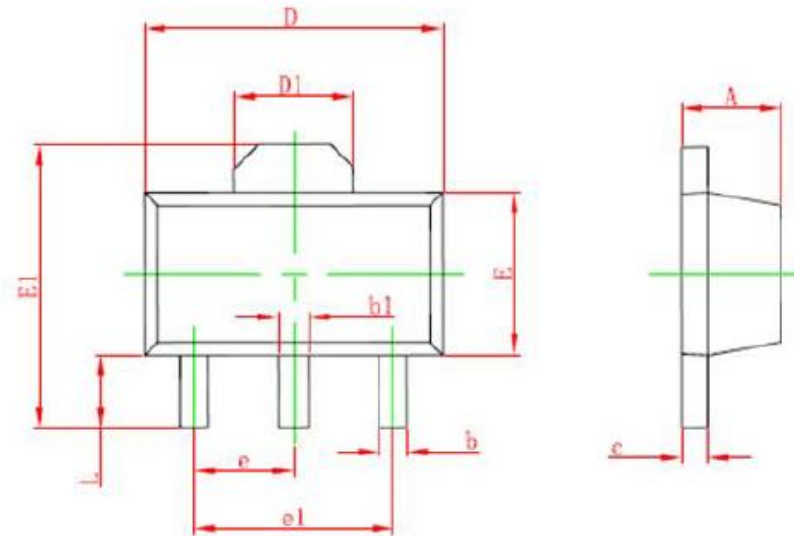
SOT-23-3L



Symbol	Dimensions in Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	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
c	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
e	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°

Package Designator

SOT-89-3L



Symbol	Dimensions in Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	1.400	1.600	0.055	0.063
b	0.320	0.520	0.013	0.020
bl	0.400	0.580	0.016	0.023
c	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
e	1.500 TYP.		0.060 TYP	
e1	3.000 TYP		0.118 TYP	
L	0.900	1.200	0.035	0.047

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