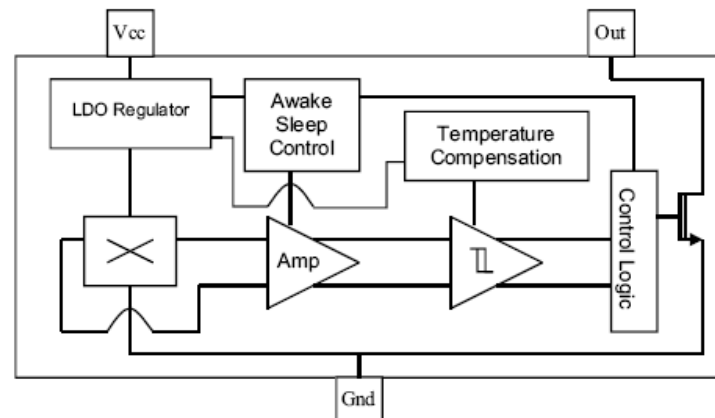


Features and Function Block Diagram

- The circuit with micro power dissipation works with all magnetic poles, which is applicable to special occasions where magnetic poles are unable or not necessary to be distinguished.
- Enhanced sensitivity: will operate from only 30 Gauss typical, at 25 °C allowing the use of smaller, potentially lower-cost magnets or wider air gaps
- Subminiature, SOT-23-3L(LC4661S) or SOT-89-3L(LC4661E) surface mount package supplied on tape and reel allows for a compact design with automated component placement, helping to reduce manufacturing costs
- Small, leaded, flat, TO-92S package (LC4661T) allows for a compact PCB layout
- Wide operating voltage range of 2.5V to 5.5V makes these sensors useable in a wide range of applications. Their power consumption is only 8 μ W under 2.75V.
- Built-in dynamic offset voltage compensation circuit brings about higher temperature stability, smaller drifting of switching point, and better resistance to mechanical stress and thermal stress.
- Robust design: will operate up to 125 °C
- Compliant with requirements of EU RoHS Directive 2011/65/ EU and REACH 1907/2006/EU.

Function Block Diagram

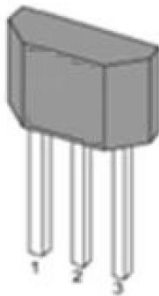


Applications

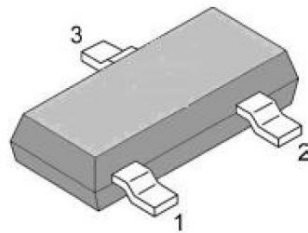
- Transportation
 - Speed and RPM (revolutions per minute)
- Sensing
 - Tachometer, counter pickup
 - Motor and fan control
 - Electric window lift
 - Convertible roof position
 - Automotive transmission position
- Industrial
 - Speed and RPM sensing
 - Tachometer, counter pickup

- Flow-rate sensing
- Brushless dc (direct current) motor commutation
- Motor and fan control
- Robotics control
- Medical
 - Motor assemblies
 - Medication dispense control

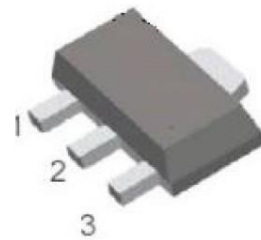
Packages



TO-92S



SOT-23 -3L



SOT-89-3L

Descriptions

- The LC4661S, LC4661E and LC4661T are small, versatile digital Hall-effect devices that are operated by the magnetic field from a permanent magnet or an electromagnet.
- These omni-polar sensors are designed to meet the requirements of a wide range of potential applications. These economical omni-polar sensors are well suited for simple, high-volume, cost-sensitive position and motion sensing applications.
- The 2.5Vdc to 7 Vdc supply voltage range allows this device to be used in very wide voltage applications.
- These sensors are available in two package styles: the LC4661S in the subminiature SOT-23-3L surface mount package, the LC4661E in the subminiature SOT-89-3L surface mount package, the LC4661T is available in the leaded, flat TO-92-style package.
- The LC4661S and LC4661E are available on tape and reel (LC4661S 3000 units per reel, LC4661E 1000 units per reel), the LC4661T is available in a bulk package (1000 units per bag).

	<p style="text-align: center;">LiBrave Europe B. V.</p> <p style="text-align: center;">Add: Sir Winston Churchillaan 299k, 2288DC Rijswijk, the Netherlands Website: www.librave.nl E-mail: info@librave.nl</p>	LC4661S/LC4661T/LC4661E	
		Version 0.25	Page 3 / 11

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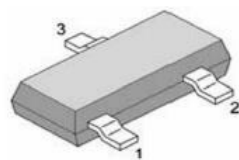
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1. Product Family Members

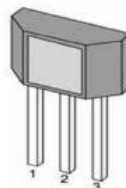
Part Number	Marking ID	Description
LC4661SR	661/XXX	Micro-power Omnipolar-Switch, Hall-effect digital sensor IC, SOT-23-3L package, tape and reel packing (3000 units per reel)
LC4661TB	661/XXX	Micro-power Omnipolar-Switch, Hall-effect digital sensor IC, flat, TO-92S package, bulk packing (1000 units per bag)

2. Pin Definitions and Descriptions

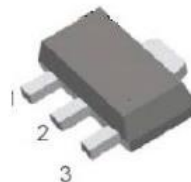
SOT-23-3L(S)	TO-92S(T)	Name	Type	Function
1	1	VDD	Supply	Supply Voltage pin
2	3	OUT	Output	Collector Output pin (include pull-up resistor)
3	2	GND	Ground	Ground pin



SOT-23-3L



TO-92S



SOT-89-3L

3. Absolute Maximum Ratings

Parameter	Symbol	Min	Max	Unit
Supply Voltage	V_{DD}	-	5	V
Reverse Voltage	R_{DD}	-	-5	V
Supply Current	I_{DD}	-	5	mA
Output Voltage	V_{OUT}	-	7	V
Output Current	I_{OUT}	-	5	mA

Operating Ambient Temperature		T_A	-40	125	°C	
Storage Temperature		T_S	-50	150	°C	
Junction temperature		T_J	-50	165	°C	
Parameter	Symbol	Test Condition	Value			Units
			Min.	Typ.	Max.	
Operate Point	B _{OP}		-	±35	±70	GS
Release Point	B _{RP}		±10	±25	-	GS
Hysteresis	B _H			10	8	GS

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⁾	+/-3000 V	V
All pins ²⁾	+/-300 V	V
All pins ³⁾	+/-1200V	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

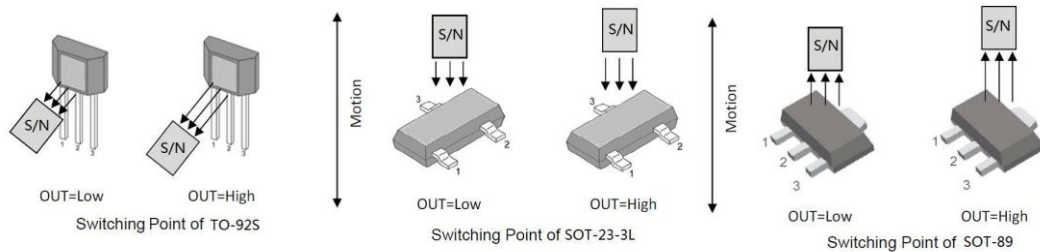
The LC4661S/LC4661T/LC4661E exhibits latch magnetic switching characteristics. Therefore, it requires both south and north poles to operate properly.

The device behaves as a latch with symmetric operating and release switching points (BOP=|BRP|). This means magnetic fields with equivalent strength and opposite direction drive the output high and low.

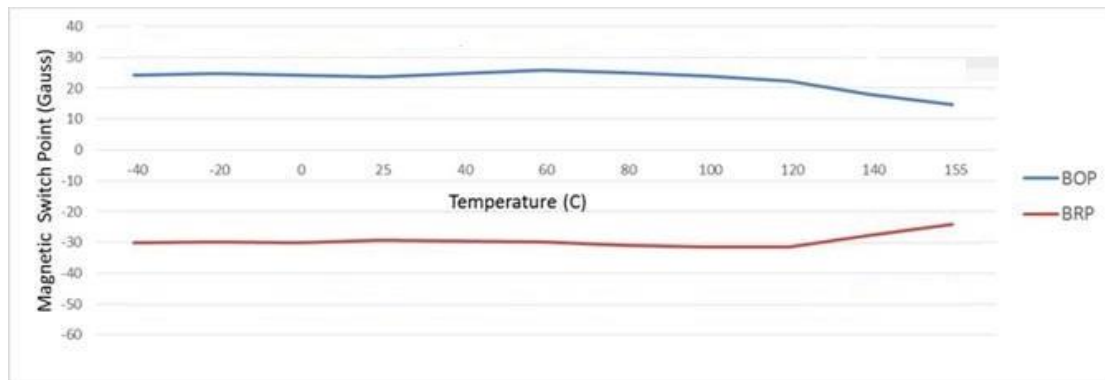
Removing the magnetic field (B→0) keeps the output in its previous state. This latching property defines the device as a magnetic memory.

A magnetic hysteresis BHYST keeps BOP and BRP separated by a minimal value. This hysteresis prevents output oscillation near the switching point.

6. Magnetic Activation



7. Temperature Characteristics



8. Parameters Specification (At 2.5V to 5V supply, 1mA load, TA= -40 °C to 125 °C except where otherwise specified.)

Parameter	Symbol	Test condition	Value			Units
			Min.	Typ.	Max.	
Supply voltage	V_{DD}		2.4	-	5.5	V
Output sink voltage	V_{DS}	$I_{out}=1mA, V_{DD}=2.75V$	-	0.1	0.25	V
Supply current	I_{AWK}	Awake, $V_{DD}=2.75V$	-	3	5	mA
	I_{SLP}	Sleep, $V_{DD}=2.75V$		2	4	μA
	I_{AVG}	$V_{DD}=2.75V$		2.75	5.25	μA
Awake time	T_{AWK}			125	150	μS
Period	T_P			60	800	MS
Duty cycle				0.1		%

Δ NOTICE

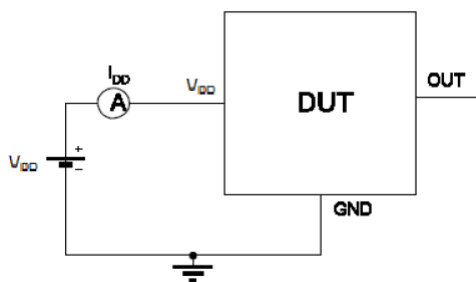
1. Bipolar Hall-effect sensor ICs may have an initial output in either the ON or OFF state if powered up with an applied magnetic field in the differential zone (applied magnetic field $>B_{RP}$ and $<B_{OP}$). LiBrave recommends allowing 10 μs for output voltage to stabilize after supply voltage has reached 5V.

2. The magnetic field strength (Gauss) required to cause the switch to change state (operate and release) will be as specified in the magnetic characteristics. To test the switch against the specified magnetic characteristics, the switch must be placed in a uniform magnetic field.

9. Test Conditions

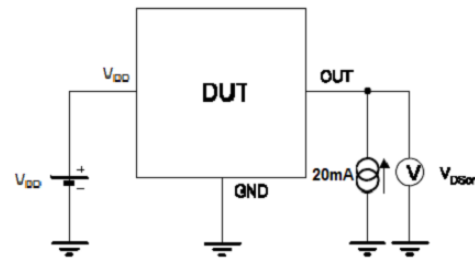
Note: DUT=Device Under Test

Supply Current



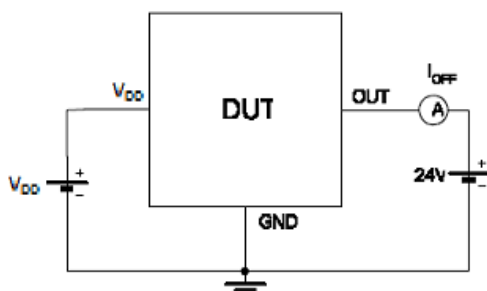
Note 1: The supply current I_{DD} represents the static supply current. OUT is left open during measurement;
 Note 2: The device is put under magnetic field with $B < B_{RP}$.

Output Saturation Voltage



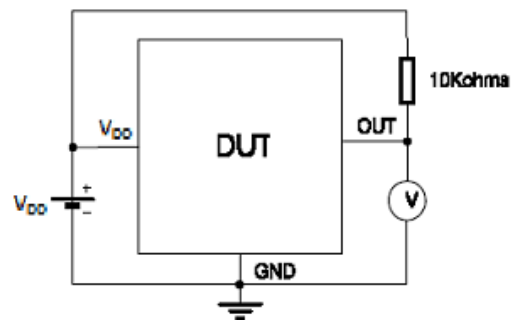
Note 1: The output saturation voltage $V_{DS(on)}$ is measured at $V_{DD}=2.5V$ and $V_{DD}=5.5V$;
 Note 2: The device is put under magnetic field with $B > B_{OP}$.

Output Leakage Current



Note 1: The device is put under magnetic field with $B < B_{RP}$.

Magnetic Thresholds

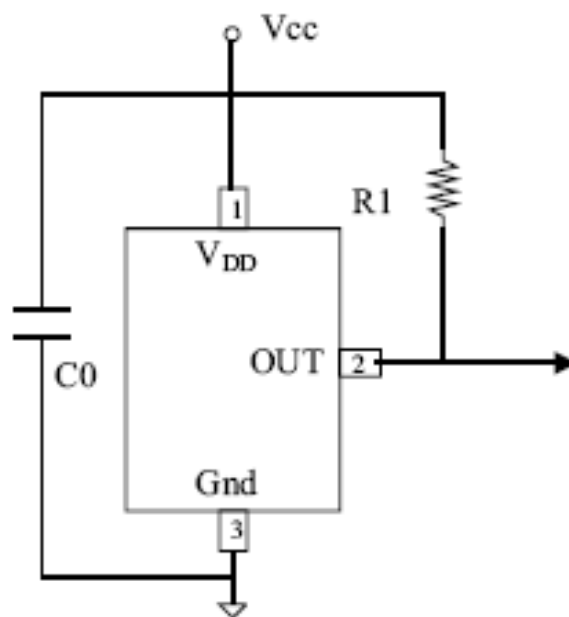


Note 1: BOP is determined by putting the device under magnetic field swept from B_{RPmin} up to B_{OPmax} until the

output is switched on;

Note 2: B_{RP} is determined by putting the device under magnetic field swept from B_{OPmax} down to B_{RPmin} until the output is switched off.

10. Typical Application Circuit



11. Typical Output Waveform (The TO-92S package as an example)

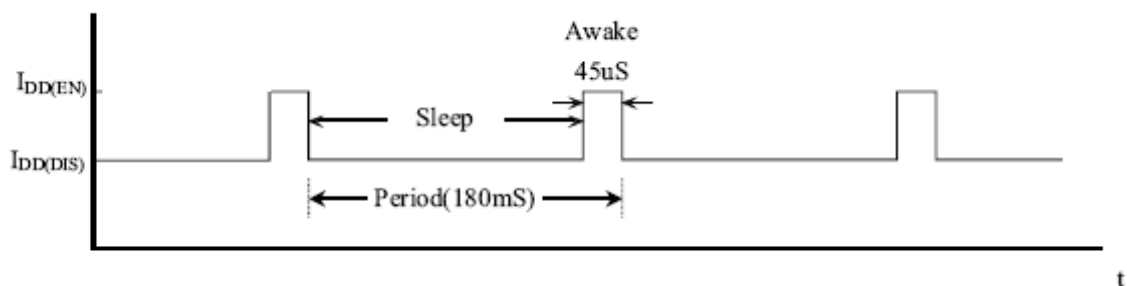
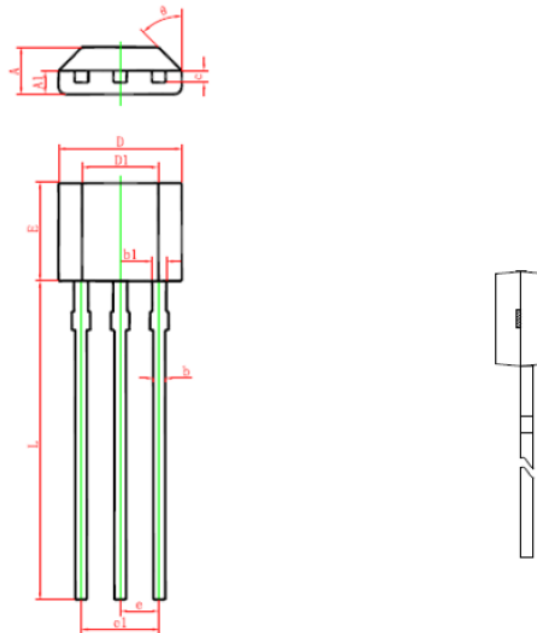


Fig 2. Awake/Sleep timing

12. Package Information

Package Designator

TO-92S

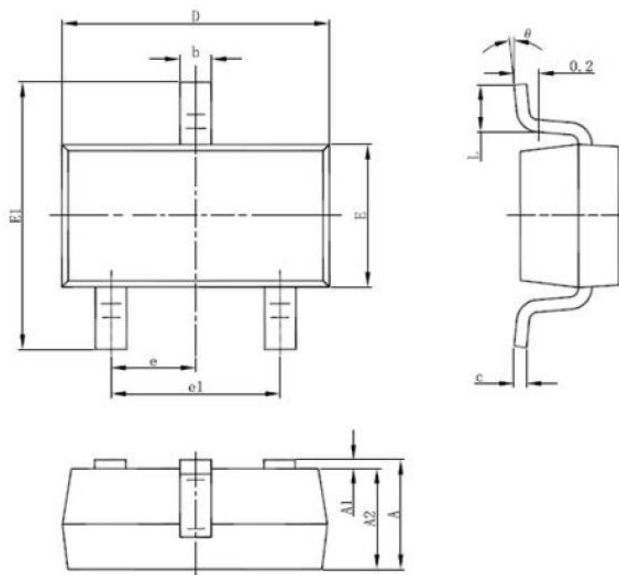


Symbol	Dimensions in Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	1.420	1.620	0.056	0.064
A1	0.660	0.860	0.026	0.034
b	0.350	0.430	0.014	0.019
b1	0.400	0.550	0.016	0.022
c	0.360	0.510	0.014	0.020
D	3.900	4.100	0.154	0.161
D1	2.280	2.680	0.090	0.106
E	3.050	3.250	0.120	0.128
e	1.270 TYP.		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.
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Package Designator

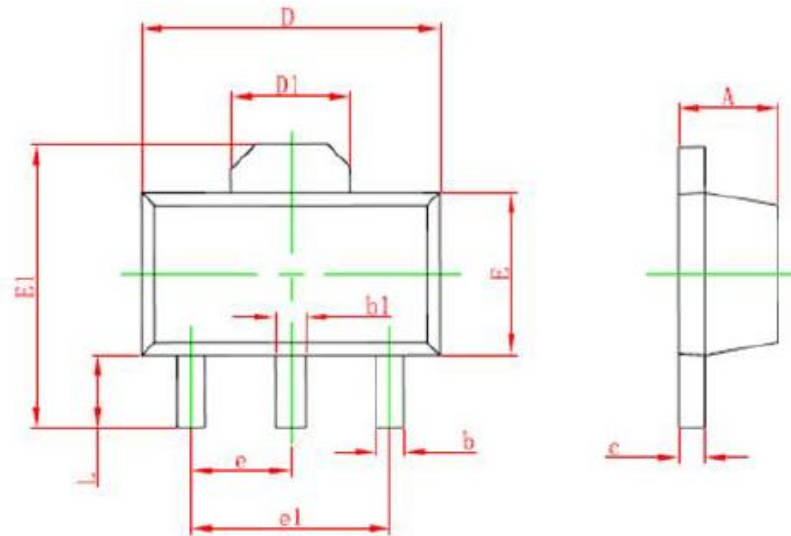
SOT-23-3L



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	0.2:00	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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