

4.5-24V V_{DD} Hall Effect Sensor

1. Description

The ES44ESO is small, versatile digital Hall-effect devices that are operated by the magnetic field from a permanent magnet or an electromagnet.

These unipolar sensors are designed to meet the requirements of a wide range of potential applications. These economical unipolar sensors are well suited for simple, high-volume, cost-sensitive position and motion sensing applications.

The 4.5Vdc to 24Vdc supply voltage range allows this device to be used in very wide voltage applications.

2. Features

- Wide operating voltage range: 4.5V to 24V
- Built-in reverse voltage protecting capability
- RoHS-compliant material meets directive 2011/65/EU
- Robust design: will operate up to 85°C
- Package: SOT-23-3L package
- Unipolar respond to a single pole: North (AT) or South (A,BT and ET), making these products well-suited for shift selectors, wiper end/home position, door ajar/open, and vane-interrupt systems etc.

3. Applications

- Speed and RPM sensing
- Door or lid closure detection
- Flow-rate sensing
- Printer head position sensing
- Robotics control
- Medication bin monitor on portable drug carts

4. Package Information

Part Number	Marking	Description
ES44ESO	44E	Flat, SOT-23-3L package, bulk packing (3000 units per reel)

Table-1 Package Information

5. Pin Configuration and Functions

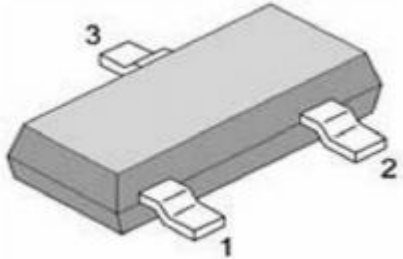
Name	Number	Description	Outline
VDD	1	Supply Voltage pin	
OUT	2	Collector Output pin	
GND	3	Ground pin	

Table-2 Pin configuration

6. Specification

6.1 Absolute Maximum rating

Over operating free-air temperature range (unless otherwise noted)

Parameter	Symbol	Min	Max	Units
Supply Voltage	V_{DD}		24	V
VDD Reverse Voltage V_{DD}	V_{RDD}		-24	V
Output Voltage	V_{OUT}		24	V
Output Current	I_{OUT}		50	mA
Operating Ambient Temperature	T_A	-40	85	°C
Storage Temperature	T_s	-65	170	°C
Magnetic Flux	B	No Limit		Gauss

Table-3 Absolute Maximum rating

6.2 ESD Protection

Parameter	Value	Unit
HBM (human body mode, C=100pF, R=1.5 kohm)	+/-4000	V

Table-4 ESD Protection

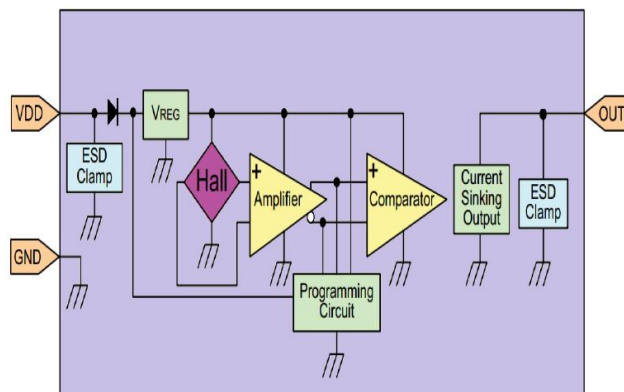
6.3 Electric Characteristics

(At 4.5V to 24V supply, 20mA load, TA= -40°C to 85°C)

Symbol	Parameter	Test Condition	Min	Typ	Max	Units
V _{DD}	Supply voltage	-40°C to 85°C	4.5		24	V
I _{DD}	Supply Current	V _{DD} = 12V		4.0	10	mA
V _{DSon}	Output saturation voltage	at 20mA, Gauss >Bop			0.4	V
I _{OFF}	Output Leakage Current	B<Brp			10	uA
T _R	Output rise time	V _{DD} =12V at 25°C C _L = 20pF			1.5	us
T _F	Output fall time	V _{DD} =12V at 25°C C _L = 20pF			1.5	us
B _{OP}	Magnetic operating point	TA=25°C	70		240	Gauss
B _{RP}	Magnetic release point	TA=25°C	50		220	Gauss
B _{HYST}	Magnetic hysteresis window	TA=25°C B _{OP} -B _{RP}	30	55	80	Gauss
T	Operating temperature		-40		85	°C
Ts	Storage temperature:		-65		170	°C

Table-5 Electric Characteristics

7. Typical Application

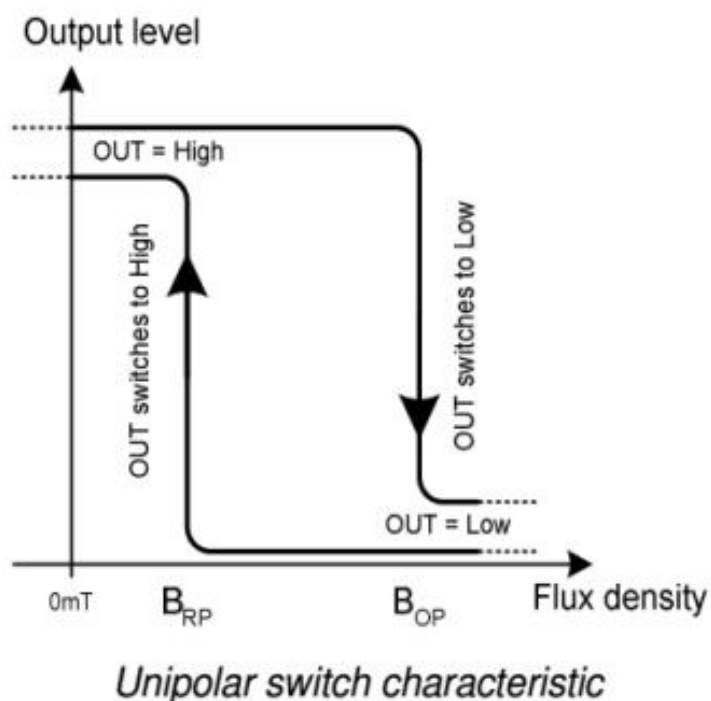


8. Function Description

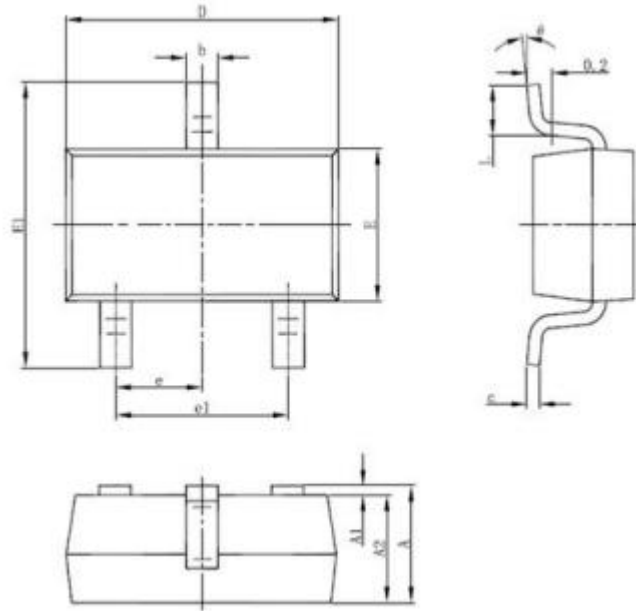
The ES44ESO exhibits unipolar magnetic switching characteristics. Therefore, it requires south or north poles to operate properly.

The device behaves as a unipolar with asymmetric operating and release switching points. This means While the magnetic flux density(B) is larger than operate point (B_{OP}), the output will be turned on (Low), while the magnetic flux density(B) is lower than release point (B_{RP}), then turn off (High).

9. Magnetic Activation



10. Dimension (SOT-23-3L)



Dimension; mm

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	0.3	0.600	0.012	0.024
θ	0°	8°	0°	8°

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