

Magnetic Sensor IC**Unipolar Detection High Performance Hall-Effect Sensor IC****AS1917****● General Description**

Using BiCMOS process, the AS1917 is designed for high performance unipolar detection hall-effect application, such as home appliances, rotor position sensing, brushless DC motor etc. The hall IC integrated an on-chip hall voltage generator for magnetic sensing, a comparator that amplifies the hall voltage, hall sensor with dynamic offset cancellation system, an pull-up resistance, and a Schmitt trigger to provide switching hysteresis for noise rejection, and a voltage regulator for operation with supply voltage of 2.2V to 5.5V.

AS1917 is designed to respond to alternating North or South poles. While the magnetic flux density (B) is larger than operate point (B_{OP}), the output will be turned on (low), the output is held until the magnetic flux density (B) is lower than release point (B_{RP}), then turn off (high).

The device is available in DFN1014-4L Package and is rated over the -40°C to 150°C. the package is RoHS compliant.

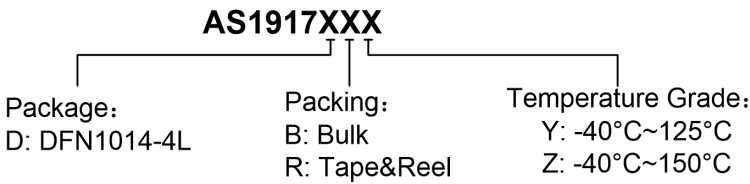
● Features

- High Performance BiCMOS Process Tech.
- Input Voltage Range : 2.2V to 5.5V
- Resistant to physical stress
- Unipolar Latch Operation
- High Sensitivity Hall Sensor
- High Chopping Frequency
- Magnetic Sensitivity (typical)
 $B_{OPS}=18\text{Gauss}$, $B_{RPS}=12\text{Gauss}$
- Small Solution Size
- RoHS Compliant
- DFN1014-4L Package
- -40°C to +150 °C Temperature Range

● Applications

- Electric Tools
- Automotive, Home appliances, Industrial
- Rotor Position Sensing and Flow Meters
- Brushless DC Motor/Fan
- Speed Measurement
- Revolution Counting
- Valve and Solenoid Status
- Proximity Sensing
- Tachometers
- Magnetic Encoder

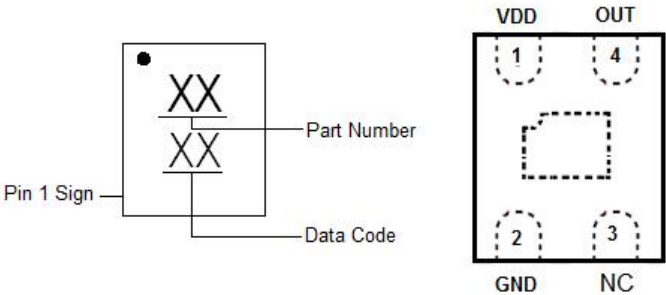
■ Ordering Information



Part Number	B _{OPS} /B _{RPS} (Gauss)	Package Type	Package Qty	Temperature	Eco Plan
AS1917DRY	18/12	DFN1014-4L	7-in reel 3000pcs/reel	-40~125°C	RoHS
AS1917DRZ	18/12	DFN1014-4L	7-in reel 3000pcs/reel	-40~150°C	RoHS

■ Pin Configuration

DFN1014-4L:



Pin Name	Pin No.	I/O	Pin Function
	DFN1014-4L		
VDD	1	P	Input Power Supply.
GND	2	P	Ground.
NC	3	-	Not Connected.
OUT	4	O	Output Pin.

■ Typical Application Circuit

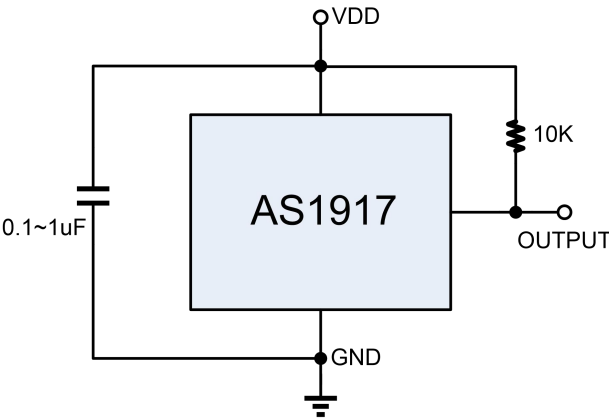


Figure 1, Typical Application Circuit of AS1917

■ Block Diagram

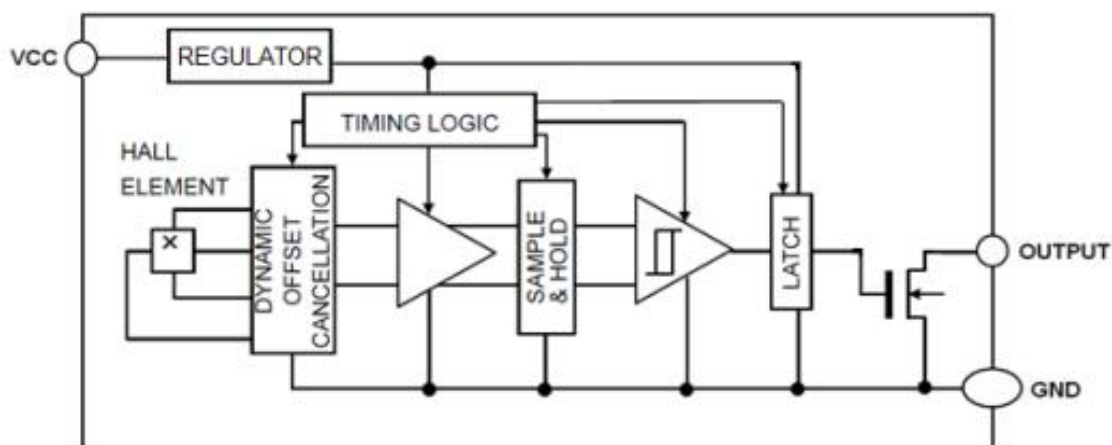


Figure 2, Block Diagram of AS1917

■ Absolute Maximum Ratings¹ (T_A=25°C, unless otherwise noted)

Parameter	Symbol	Rating	Unit
V _{CC} Pin to GND	V _{CC}	-0.3 to 6.0	V
Output Pin to GND	V _{OUTPUT}	-0.3 to 6.0	V
Max. Continuous Output Current	I _{OUTMAX}	30	mA
Thermal Resistance	T _{JA}	250	°C/W
ESD (HBM)	ESD	6000	V
Storage Temperature Range	T _S	-55 to +150	°C
Operating Junction Temperature Range	T _{OP}	-40 to +150	°C
Maximum Soldering Temperature (at leads, 10 sec)	T _{LEAD}	300	°C

■ Recommended Operating Conditions²

Parameter	Symbol	Rating	Unit
V _{CC} Pin to GND	V _{CC}	2.2 to 5.5	V
Continuous Output Current	I _{OUT}	30	mA
Operating Temperature Range	T _{OP}	-40 to +150	°C

■ Electrical Characteristics

(T_A = -40 to +150°C unless otherwise noted. Typical values are at T_A = +25°C, V_{CC} = 3.6V)

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
V _{CC}	Input Voltage		2.2	-	5.5	V
I _Q	Supply Current	V _{CC} =3.6V	-	2.0	4.0	mA
t _{ON}	Power On Time		-	28	50	μs
V _{SON}	Output Saturation Voltage	V _{CC} = 5V, I _{OUT} =20mA	-	0.2	0.4	V
I _{OFF}	Off-state Leakage Current	Output Hi-Z	-	-	10	μA
T _R	Output Rise Time	R _L =1000Ω, C _L =50pF	-	0.45	-	μs
T _F	Output Fall Time	R _L =1000Ω, C _L =50pF	-	0.09	-	μs
T _D	Output Delay Time	B=B _{RP} -100Gs to B _{OP} +100Gs	-	15	25	μs
f _{BW}	Operation Bandwidth		10	-	-	KHz
B _{OP}	Magnetic Operating Point	T _A = +25°C	-	18	30	Gauss
B _{RP}	Magnetic Release Point	T _A = +25°C	5	12	-	Gauss
B _{HYS}	Hysteresis Window	T _A = +25°C	-	6	-	Gauss

Note: 1: Stresses above those listed in absolute maximum ratings may cause permanent damage to the device. Functional operation at conditions other than the operating conditions specified is not implied. Only one absolute maximum rating should be applied at any one time.

2: The device is not guaranteed to function outside of its operating conditions.

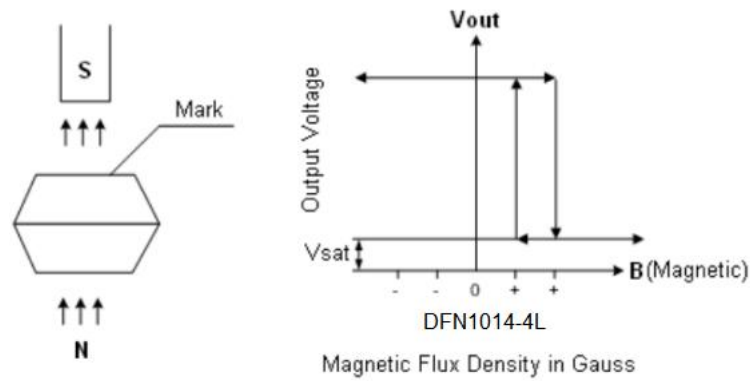
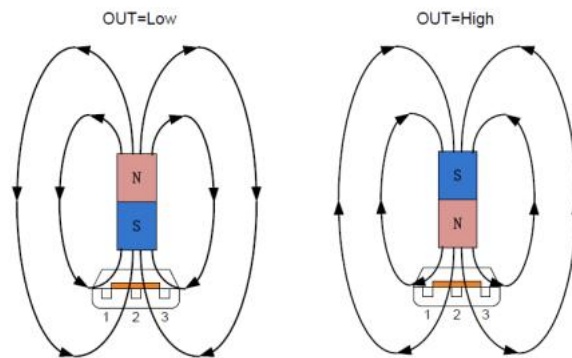


Fig 3, Magnetic Operation Characteristic of AS1917

■ Hall Sensor Location

A positive magnetic field is defined as a south pole near the marked side of the package.



If the device is powered on with a magnetic field strength between BRP and BOP, then the device output is determinate High. For DFN1014-4L package, if the field strength is greater than BOP, then the output is pulled low. If the field strength is less than BRP, the output is released.

Thermal Considerations

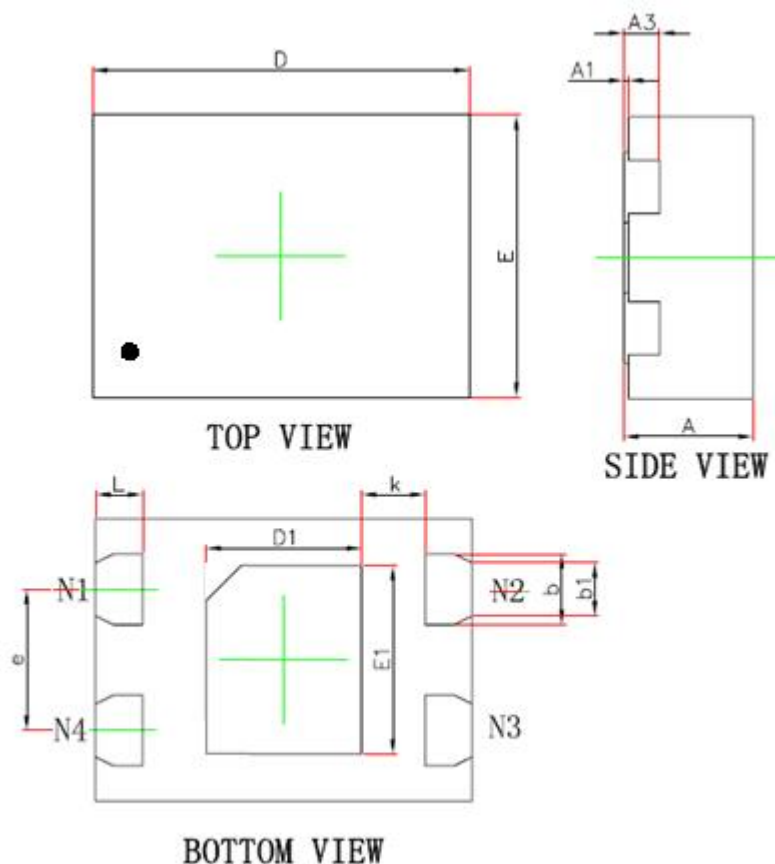
The maximum IC junction temperature should be restricted to 150°C under normal operating conditions. This restriction limits the power dissipation of the AS1917. Calculate the maximum allowable dissipation, $P_{D(max)}$, and keep the actual dissipation less than or equal to $P_{D(max)}$. The maximum-power-dissipation limit is determined using following equation:

$$P_{D(MAX)} = \frac{150^{\circ}\text{C} - T_A}{R_{\theta JA}}$$

Where, T_A is the maximum ambient temperature for the application. $R_{\theta JA}$ is the thermal resistance junction-to-ambient given in Power Dissipation Table.

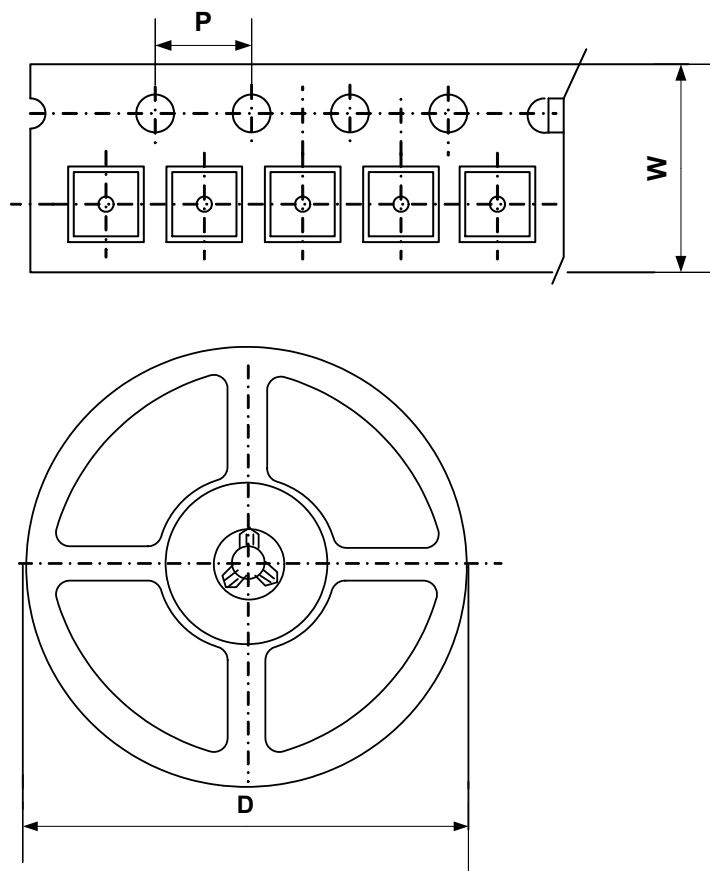
■ Package Information

DFN1014-4L:



Symbol	Dimensions In Millimeters			Dimensions In Inches		
	Min.	Nom.	Max.	Min.	Nom.	Max.
A	0.320	0.370	0.400	0.013	0.014	0.016
A1	0.000	-	0.050	0.000	-	0.002
A3	0.102 (BSC)			0.004 (BSC)		
D	1.400 (BSC)			0.055 (BSC)		
E	1.000 (BSC)			0.039 (BSC)		
D1	0.500	0.600	0.700	0.020	0.024	0.028
E1	0.700	0.800	0.900	0.028	0.031	0.035
L	0.150	0.200	0.250	0.006	0.008	0.010
b	0.170	0.220	0.270	0.007	0.009	0.011
b1	0.170	0.220	0.270	0.007	0.009	0.011
e	0.500 (BSC)			0.020 (BSC)		
k	0.200 (BSC)			0.008 (BSC)		

■ Packing Information



Package Type	Carrier Width (W)	Pitch (P)	Reel Size(D)	Packing Minimum
DFN1014-4L	8.0±0.1 mm	4.0±0.1 mm	180±1 mm	3000pcs

Note: Carrier Tape Dimension, Reel Size and Packing Minimum