

1. Description

The differential Hall Effect sensor ES4922 is designed to provide information about rotational speed to modern vehicle dynamics control systems. The device integrates two Hall sensors, a voltage regulator, Schmitt trigger and an open-drain output driver, all in a single package. Excellent accuracy and sensitivity are specified for harsh automotive requirements with a wide temperature range and EMC robustness.

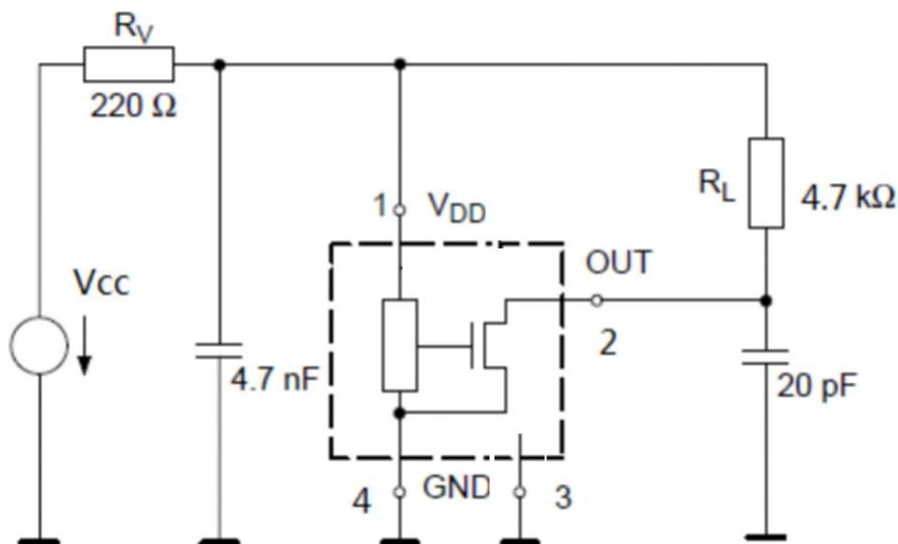
The 2.5mm spacing between the dual Hall elements is optimized for fine pitch ring-magnet-based configurations.

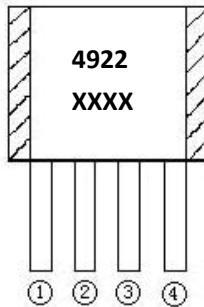
The device is packaged in a plastic VK (TO-94). It is lead (Pb) free, with 100% matte tin plated leadframe.

2. Features

- ◆ Distance between Hall plates: 2.5 mm
- ◆ High sensitivity
- ◆ Large air gap
- ◆ South and North pole pre-induction possible
- ◆ Wide operating temperature range
- ◆ Single chip solution
- ◆ ESD 8KV HBM

3. TYPICAL APPLICATION



4. PACKAGE REFERENCE


TO-94 Pin #	Name	Description
1	VDD	Supply Voltage
2	Vout	OUTPUT
3	GND	Ground
4	GND	Ground

5. Absolute maximum Ratings

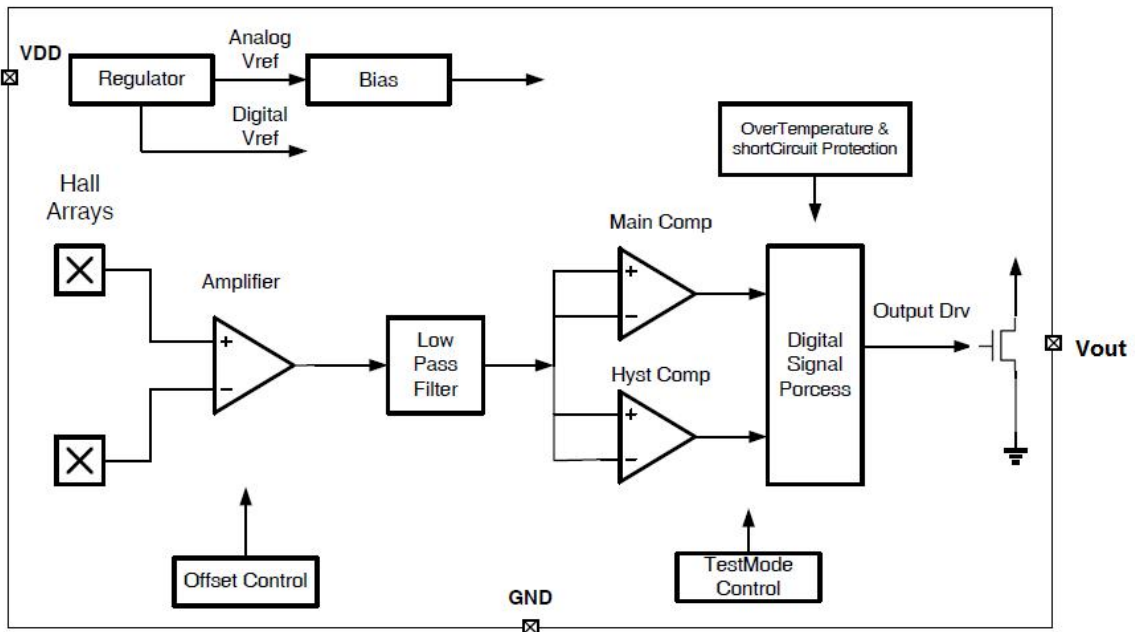
Parameter	Value	Units
Power supply voltage	-30 to +30	V
Operating ambient temperature	-40-150	°C
Maximum junction temperature	165	°C
Storage Temperature	-55-150	°C

6. ELECTRICAL CHARACTERISTICS

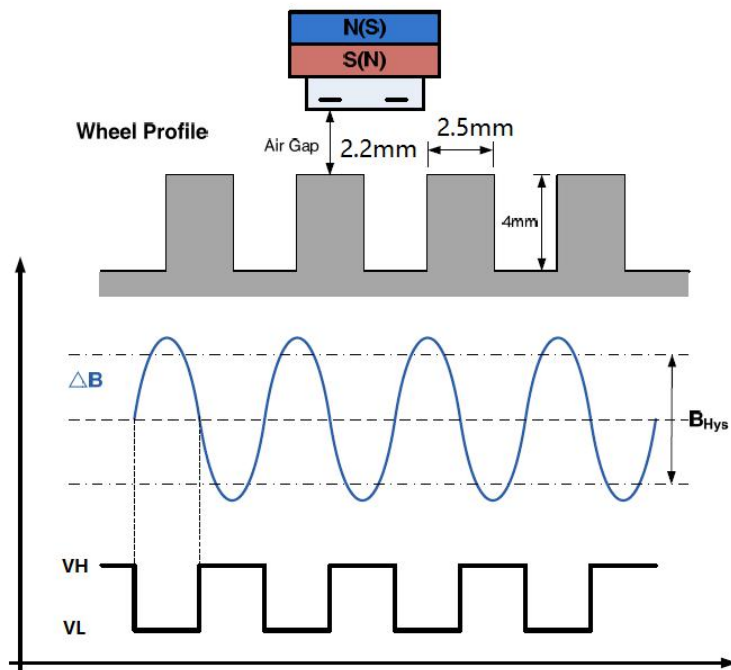
VDD = 12V, TA= +25°C, unless otherwise noted.

Parameter	Symbol	Conditions	Min	Typ	Max	Units
Operating voltage	V _{DD}	T _J <T _J (max)	4.5		24	V
Operating supply current	I _{DD}	V _{DD} =4.5V to 24 V	5.5	7.0	8.4	mA
Supply current ratio	R _{CUR}	I _{DD} (lower)/ I _{DD} (high)	1.8	2	2.4	
Power-on time	t _{po} ²	V _{DD} >4.5 V		3.8	9	ms
Settling time	t _{settle} ²	V _{DD} >4.5 V ,f=1kHz	0		50	ms
Response time	t _{response} ³	V _{DD} >4.5 V ,f=1kHz	3.8		59	ms
Upper corner frequency	f _{cu}	- 3dB, single pole	15			kHz
Lower corner frequency	f _{cl}	- 3dB, single pole			5	Hz
Magnetic Characteristics						
Pre-induction	B _{back}		-500		500	mT
Operated point	B _{op}	f=1kHz,Bdiff=5mT			0	mT
Released point	B _{rp}	f=1kHz,Bdiff=5mT	0			mT
Hysteresis	B _{hys}		0.7	1.3	2.8	mT
Center of switching points	ΔBM		-2.0	0	2.0	mT

7. BLOCK DIAGRAM



8. GEAR TOOTH SENSING

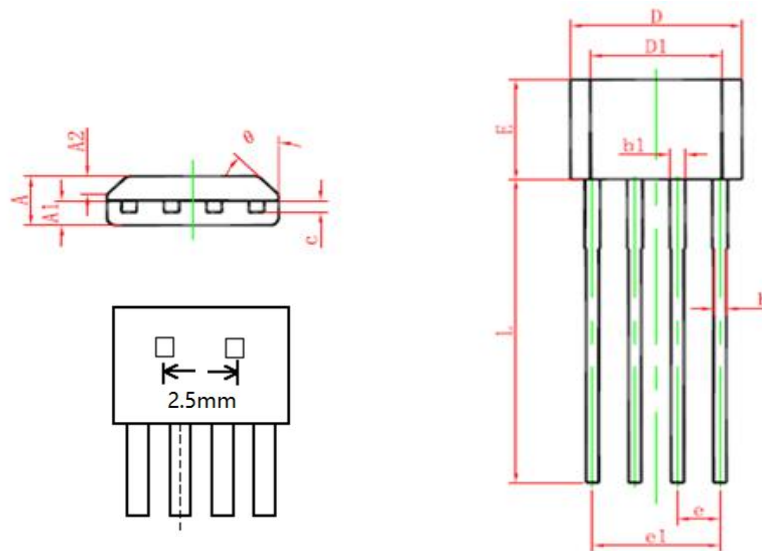


In the case of ferromagnetic toothed wheel application the IC has to be biased by the South or North pole of a permanent magnet which should cover both Hall probes.

The maximum air gap depends on

- the magnetic field strength (magnet used; pre-induction)
- the toothed wheel that is used (dimensions, material, etc.)

9. PACKAGE INFORMATION VK (TO - 94)



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	1.400	1.800	0.055	0.071
A1	0.700	0.900	0.028	0.035
A2	0.500	0.700	0.020	0.028
b	0.360	0.500	0.014	0.020
b1	0.380	0.550	0.015	0.022
c	0.360	0.510	0.014	0.020
D	4.980	5.280	0.196	0.208
D1	3.780	4.080	0.149	0.161
E	3.450	3.750	0.136	0.148
e	1.270 TYP.		0.050 TYP.	
e1	3.710	3.910	0.146	0.154
L	14.900	15.300	0.587	0.602
θ	45° TYP.		45° TYP.	

10. Ordering Information

Part No.	Package Code
ES4922	VK(TO-94)