Hall Effect Sensor IC with Complementary Output Drivers and Frequency Generator

Features:

- Operate from 2.8V to 20V supply voltage.
- On-chip Hall sensor.
- Internal bandgap regulator allows temperature compensated operations and a wide operating voltage range.
- High output sinking capability up to 400mA for driving large load.
- Lower current change rate reduces the peak output voltages during switching.
- Available in rugged low profile SIP-4L/SIP-5L packages.
- Built-in protection diode for reverse power supply fault.

General Description:

WSH410 is designed to integrate Hall sensor with complementary output drivers and frequency generator together on the same chip, it is suitable for speed measurement, revolution counting, positioning, and DC brushless motors. It includes a temperature compensated voltage regulator, a differential amplifier, a Hysteresis controller, two open-collector output drivers capable of sinking 400mA current load. An on-chip protection diode is implemented to prevent reverse power fault.

The temperature-dependent bias increases the supply voltage of the hall plates and adjusts the switching points to the decreasing induction of magnets at higher temperatures. Subsequently, the open collector output switches to the appropriate state. WSH410 are rated for operation over temperature range from –20˚ C to125˚C and voltage ranges from 2.8V to 20V.

Pin Descriptions: SIP-4L

Name	P/I/O	Pin#	Description
Vcc	P	1	Positive Power Supply
OUT1	O	2	Output Pin #1
OUT2	O	3	Output Pin #2
Vss	P	4	Ground

Winson reserves the right to make changes to improve reliability or manufacturability.

Pin Descriptions: SIP-5L

Name	P/I/O	Pin#	Description
Vcc	P	1	Positive Power Supply
OUT1	O	2	Output Pin #1
OUT2	O	3	Output Pin #2
FG	O	4	Frequency Generator
Vss	P	5	Ground

Absolute Maximum Rating (at Ta=25˚ C)

Supply Voltage		Vcc ----------	20V
Output / FG breakdown Voltage		Vout/Vfg ----------	25V
Magnetic flux density		B ----------	Unlimited
Reverse Protection Voltage		Vr ----------	20V
Output Current	continuous	Ic ----------	300mA
	Hold current	Ih ----------	400mA
	Peak current	Ip ----------	800mA
FG ON Current (continuous)		If ----------	20mA
Operating Temperature Range		Ta ----------	(-20˚C to +125˚C)
Storage Temperature Range		Ts ----------	(-65˚C to +150˚C)
Package Power Dissipation		Pd ----------	500mw for SIP-4L
			SIP-5L

Electrical Characteristics: (T=+25˚C, Vcc=2.8V to 20V)

Characteristic	Symbol	Test Conditions	Min	Typ	Max	Units
Supply Voltage	Vcc	—	2.8	—	20	V
Output Saturation Voltage	Vout(sat)	Vcc=20V, Ic=200mA B > Bop	—	0.2	0.4	V
FG Saturation Voltage	Vfg(sat)	Vcc=20V, If=10mA B > Bop	—	0.15	0.4	V
Output Leakage Current	Ileakage	Vcc=20V, B < Brp	—	<0.1	10	UA
Supply Current	Isupply	Vcc=20V, Output & FG Open	—	14	25	MA
Output / FG Rising Time	Tr	Vcc=12V, RL=820Ω CL=20Pf	—	3.0	10	Us
Output / FG Falling Time	Tf	Vcc=12V, RL=820Ω CL=20Pf	—	0.3	1.5	Us
Output / FG Time Differential	△t	Vcc=12V, RL=820Ω CL=20Pf	—	0.3	3	Us

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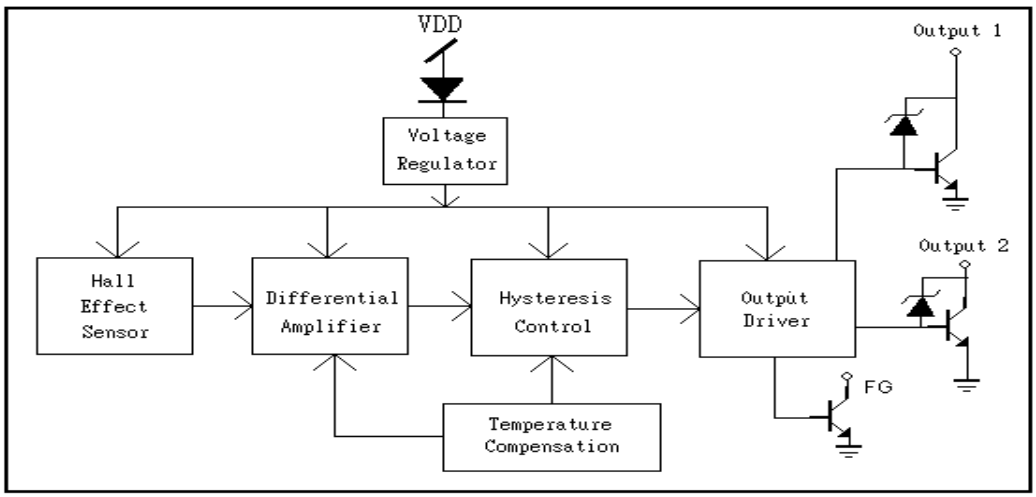
Function Block:



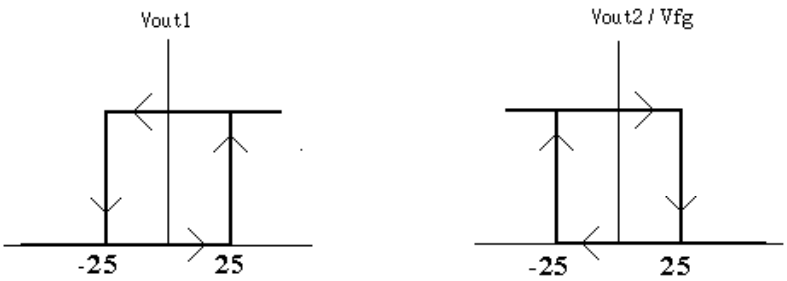
Magnetic Characteristics:

Characteristics	Symbol	Quantity	Ta= -20˚C to +90˚C Min	Typ.	Max	Unit
Operate Point	Bop			70	120	Gauss
Release Point	Brp		-120	-70		Gauss
Hysteresis Window	Bop-Brp			40	200	Gauss

Ordering Information:

SIP- 4L: WSH410-XPAN3	(120 Guass) N:Non-lead Process
SIP- 5L: WSH410-XPCN3	(120 Guass)

WSH410 Complementary Output1 vs.Output2/Vfg



Magnetic Flux Density in Gauss

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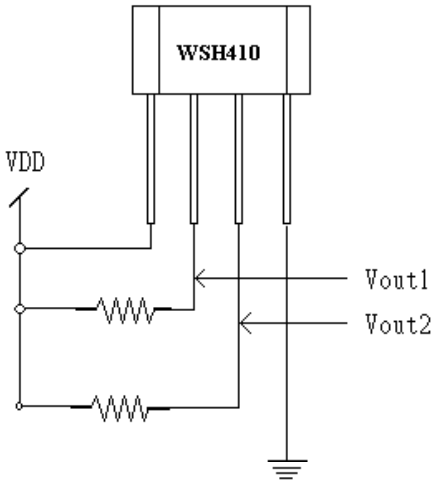
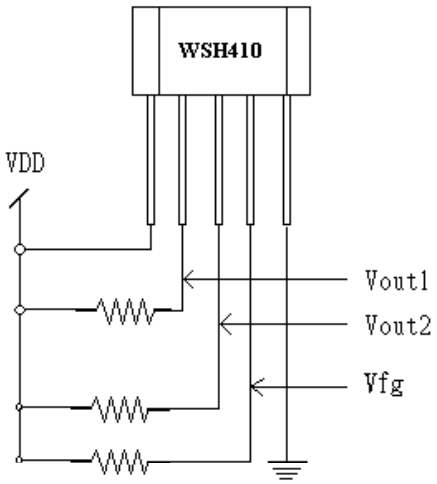
Test Circuit:

SIP-4L



SIP-5L



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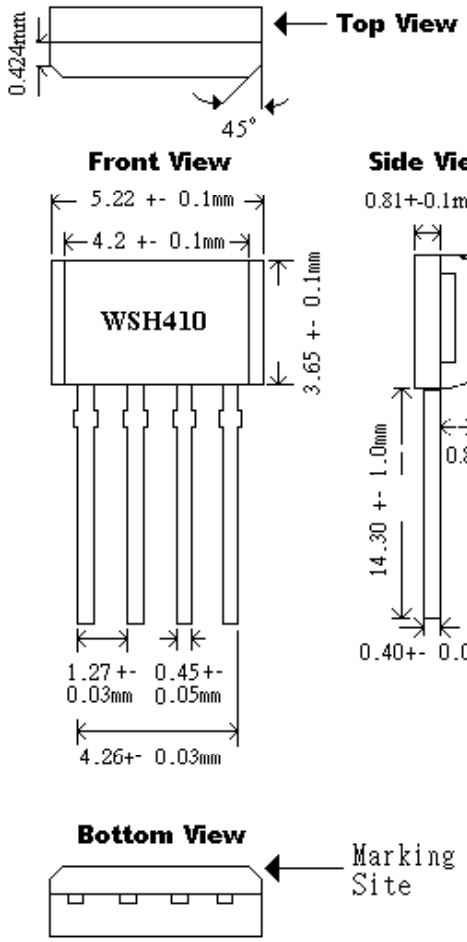
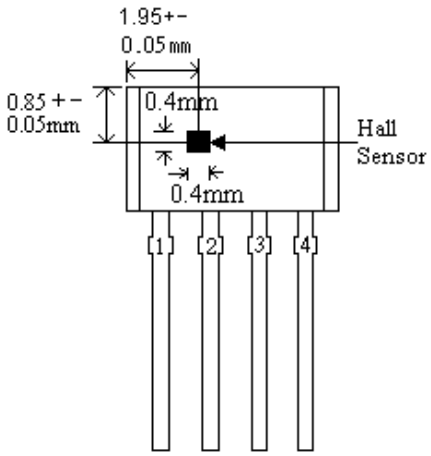
Package Information:

SIP-4L

Package Dimension



Hall Sensor Location



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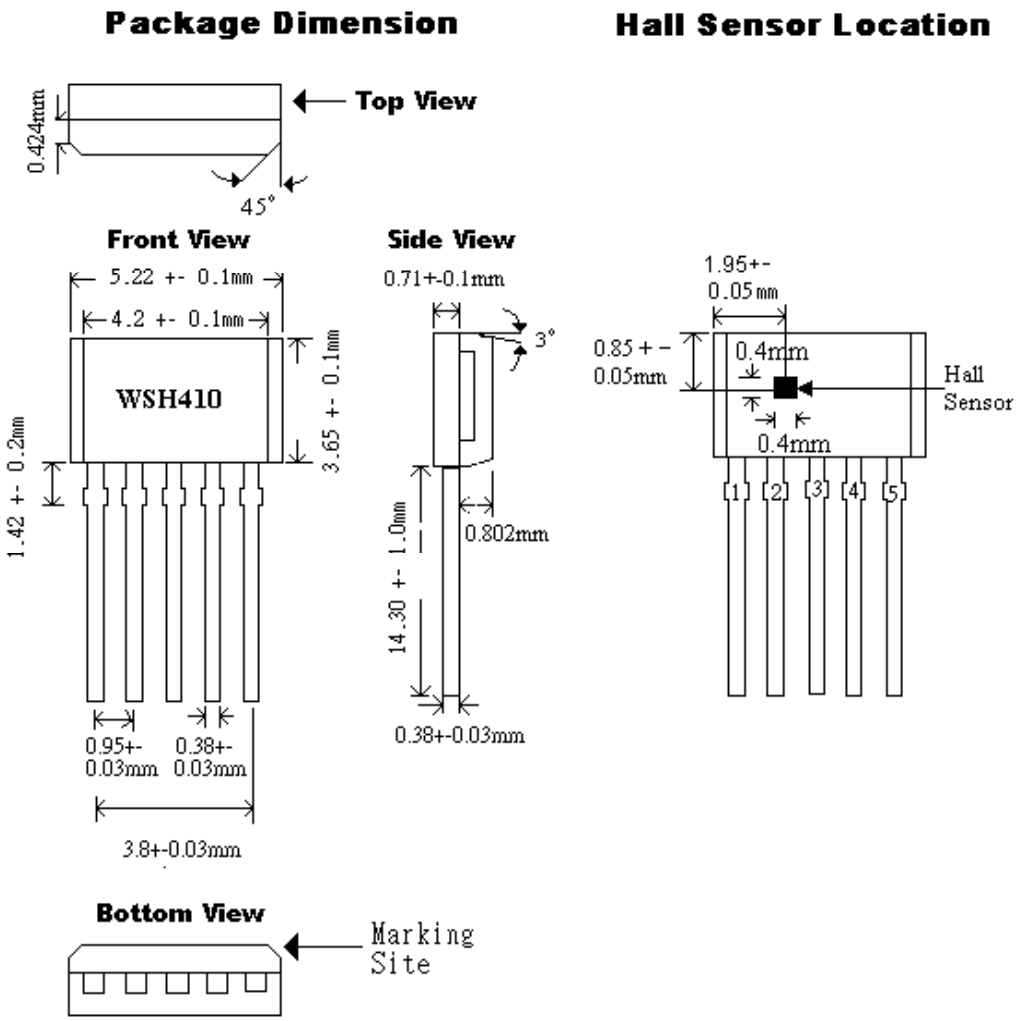
SIP-5L



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Application Circuit:

SIP-4L

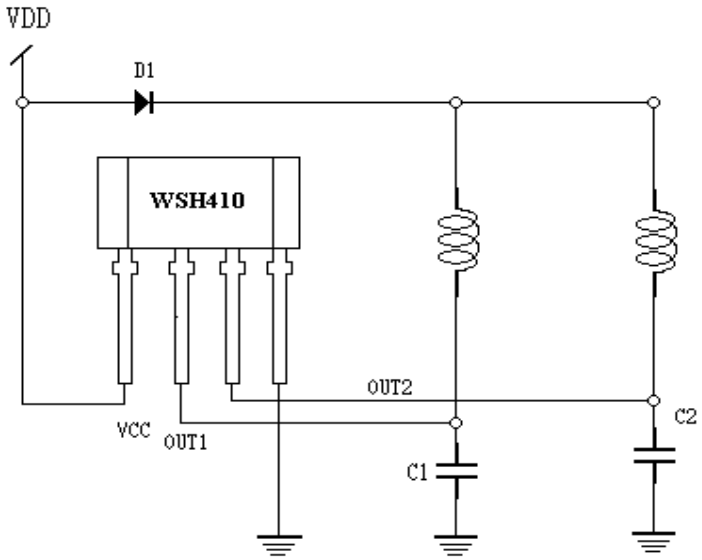

Figure 1.

SIP-5L

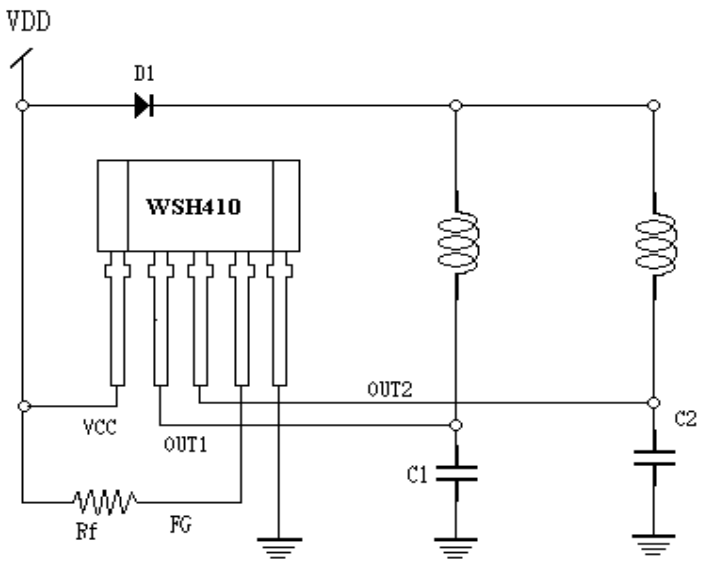

Figure 2.

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