ChenYang
Technologies GmbH & Co. KG

CYL840X Linear Hall Effect Sensor ICs

The CYL840X Series are high performance small versatile linear Hall Effect devices which are operated by the magnetic field from a permanent magnet or an electromagnet. The ratio metric output voltage is set by the supply voltage and varies in proportion to the strength of the magnetic field. The CYL840X family has a quiescent output voltage that is 50% of the supply voltage and output sensitivity options of 3.125mV/G and 5mV/G. The integrated circuitry provides increased temperature stability and sensitivity. The CYL840X provides high accuracy and temperature compensation. These linear position sensors have an operating temperature range of -40°C to +150°C, appropriate for industrial and automotive environments. They respond to either positive or negative magnetic field, monitoring either or both magnetic poles.

Features

- 3.5 to 10.5 V operation
- Single current sourcing or current sinking output
- Precise sensitivity and temperature compensation
- Power consumption of 4.5mA at 5 VDC for energy efficiency
- Output voltage proportional to magnetic flux density
- Temperature range of -40°C to 150°C
- Ratiometric rail-to-rail output
- Robust EMC protection
- 3-pin SIP package

Applications

- Current sensing
- Position sensing
- Magnetic code reading
- Motor control
- Weight and liquid level sensing
- Motion detection
- Proximity detection
- Speed detection

Absolute Maximum Ratings

Supply Voltage V_{DD}	30V
Supply Current I_{DD}	20mA
Output Sink Current, I_{OUT}	2mA
Power Dissipation, P_D	100mW
Operating Temperature Range, T_A	-40°C ~ +150°C
Storage Temperature Range, T_S	-65°C ~ +175°C
Maximum Junction Temperature, T_J	165°C

ESD Protection

Human Body Model (HBM) tests according to: standard EIA/JESD22-A114-B HBM

Parameter	Symbol	Min.	Max.	Unit
HBM ESD stress voltage	V_{ESD}	-4000	4000	V

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Electrical Specifications

DC Operating Parameters T_A = -40℃ to 150℃, V_{DD} = 3.5V to 10.5V (unless otherwise specified)

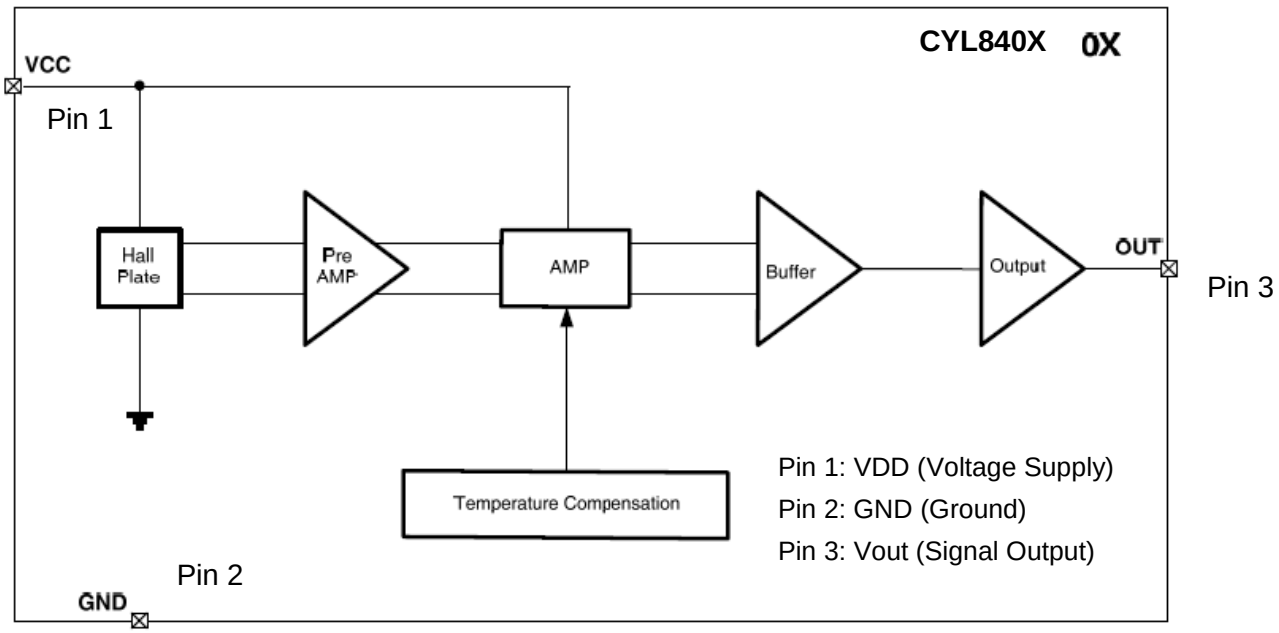
Parameter	Symbol	Test Conditions	Min	Typ	Max	Units
Supply Voltage	V_{DD}	Operating	3.5	5.0	10.5	V
Supply Current	I_{DD}	V_{DD} =5V, T_A=25°C	2.5	4.5	10.0	mA
Quiescent Output Voltage	V_{null}	B= 0, T_A =25°C, V_{DD} =5V	2.3	2.5	2.7	V
Output Voltage	V_H	T_A=25°C, B=1000Gs	4.8	4.9	-	V
	V_L	T_A=25°C, B=-1000Gs	-	0.1	0.2	V
Output Source Current Limit	I_{out} (LMT)	B →0		-2.0		mA
Step response time	t_r	Output signal reaching 90%		1		µs
Frequency bandwidth (-3dB)	f_B		0	200	250	kHz

Magnetic Specifications

DC Operating Parameters T_A =25°C, V_{DD} = 5V (unless otherwise specified)

Parameter	Symbol	Part Name	Min	Typ	Max	Units
Sensitivity	Sens	CYL8402	20.0	25.00	30.0	mV/mT
		CYL8403	27.5	31.25	35.0	mV/mT
		CYL8405	40.0	50.0	60.0	mV/mT
Linearity	Lin	CYL840X Series			±1.0	%
Thermal drift of zero offset		CYL840X Series		300		ppm/°C
Delta V_{null} v.s. Temperature	V_{null} (T)	CYL840X Series			±2.0	%
Radiometry, V_{null}	V_{null} (V)	CYL840X Series			±2.0	%
Delta Sens V.s. Temperature	Sens (T)	CYL840X Series			±10	%

Functional Diagram



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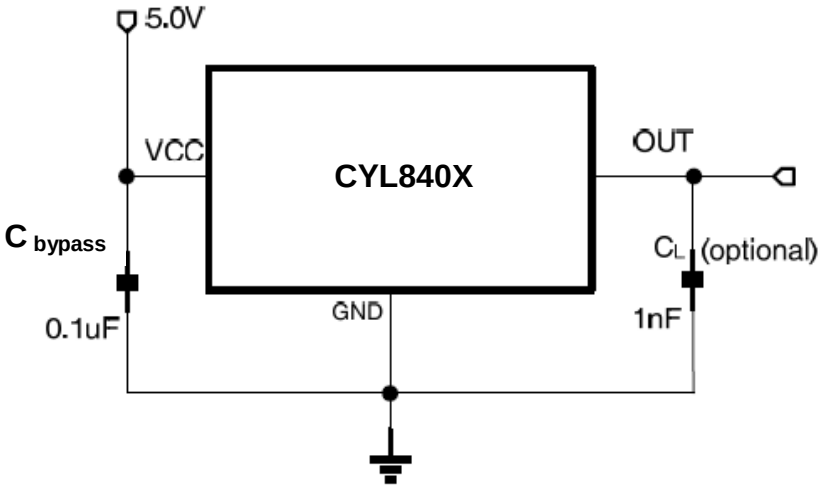
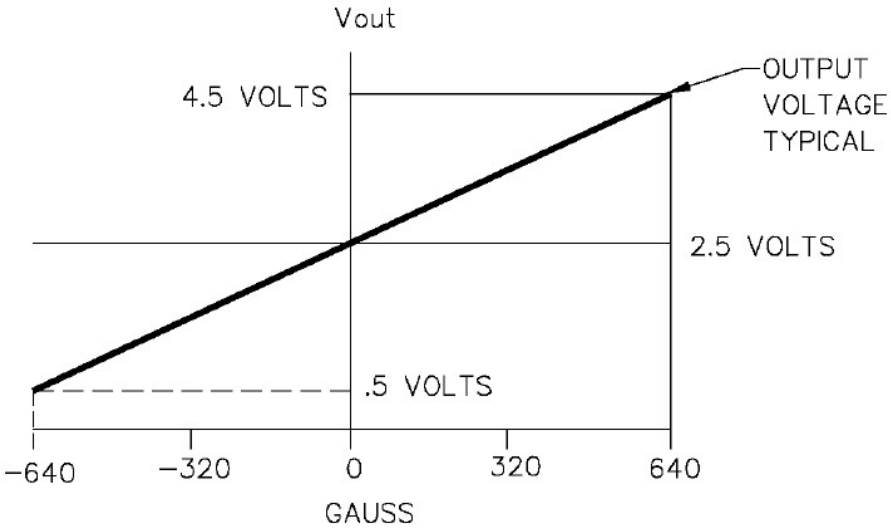
Typical Application Connection



In the quiescent state (that is, with no significant magnetic field: B=0), the output, VOUT(Q), equals to half of the supply voltage VCC, throughout the entire operating range of VCC. The presence of a South-polarity magnetic field perpendicular to the branded surface of the package increases the output voltage from its quiescent value toward the supply voltage rail. The amount of the output voltage increase is proportional to the magnitude of the magnetic field applied. Conversely, the application of a North polarity field will decrease the output voltage from its quiescent value. This proportionality is specified as the magnetic sensitivity, Sens (mV/Gs), of the device.

Transfer Characteristics at Vs=5.0VDC



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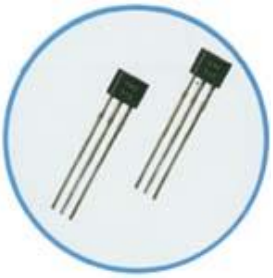
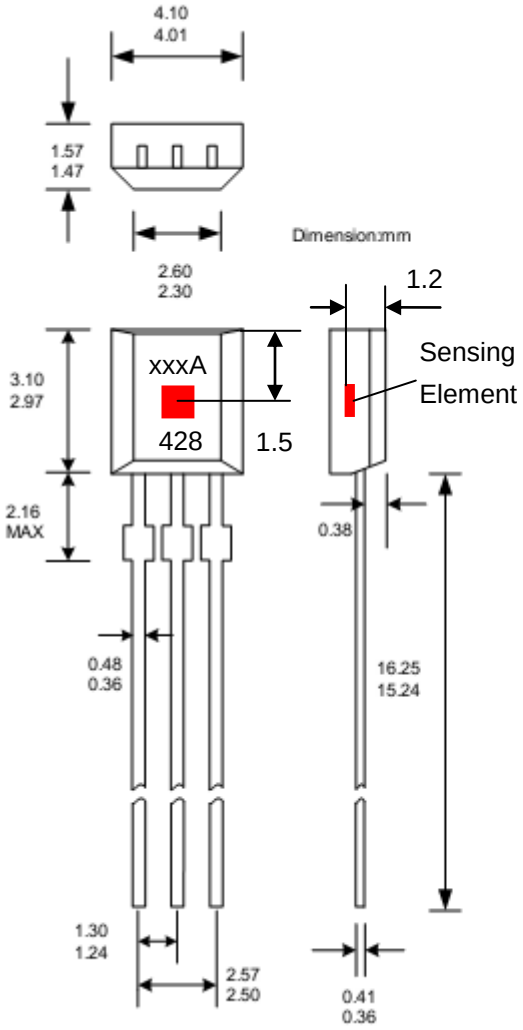
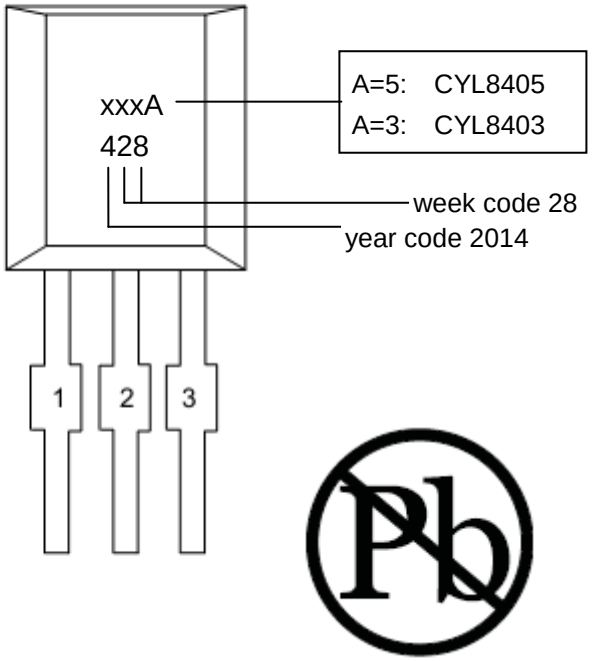
Dimensions







Pin 1: VDD (Voltage Supply)
Pin 2: GND (Ground)
Pin 3: Vout (Signal Output)

Notes:

1. Exact body and lead configuration at vendor's option within limits shown
2. Height does not include mold gate flash
3. Where no tolerance is specified, dimension is nominal

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