HX6659 (T) Specifications

CMOS Ratio-Metric Linear Hall Effect IC

HX6659-B,HX6659-C,HX6659-D, a linear Hall-effect sensor, is composed of Hall sensor, linear amplifier and Totem-Pole output stage. It features low noise output, which makes it unnecessary to use external filtering. It also can provide increased temperature stability and accuracy. The linear Hall sensor has a wide operating temperature range of -40℃ to +105℃, appropriate for commercial, consumer, and industrial environments.

The high sensitivity of Hall-effect sensor accurately tracks extremely weak changes in magnetic flux density. The linear sourcing output voltage is set by the supply voltage and in proportion of vary of the magnetic flux density. Typical operation current is 2.5 mA and operating voltage range is 2.8 volts to 6.0 volts. Trim version is available for an ultra low offset products.

The three package styles available provide magnetically optimized solutions for most applications. Package types SO is an SOT-23(1.1 mm nominal height),SQ is an QFN2020-3(0.5 mm nominal height),a miniature low-profile surface-mount package, while package UA is a three-lead ultra-mini SIP for through-hole mounting.

Features and Benefits

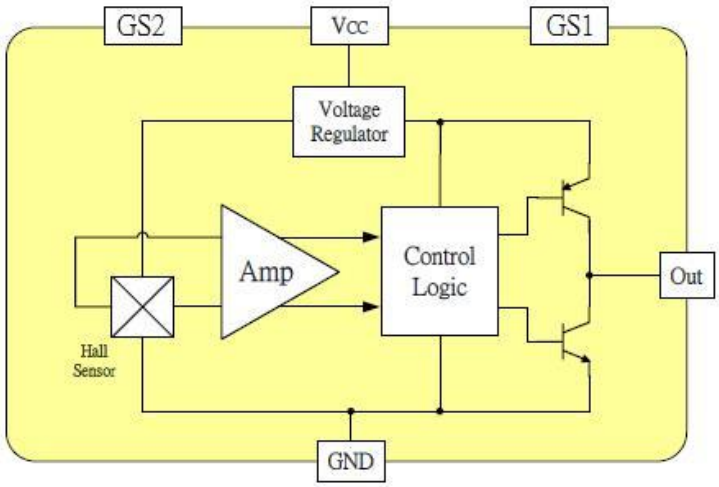
- Operating Voltage Range: 2.8V~6.0V
- Power consumption of 2.5 mA at 5 V_{DC} for energy efficiency
- Low-Noise Operation
- Linear output for circuit design flexibility
- Totem-Pole for a stable and accurate output
- Responds to either positive or negative gauss
- Magnetically Optimized Package for UA,SQ,SO
- Trim version is precise on offset
- Robust ESD performance

Applications

- Current sensing
- Motor control
- Position sensing
- Magnetic code reading
- Rotary encoder
- Ferrous metal detector
- Vibration sensing
- Liquid level sensing
- Weight sensing

Part No.	Temperature Suffix	Package Type
HX6659IUA-B	I (-40℃ to +105℃)	UA (TO92-3L)
HX6659IUA-C	I (-40℃ to +105℃)	UA (TO92-3L)
HX6659IUA-D	I (-40℃ to +105℃)	UA (TO92-3L)
HX6659ISQ-B	I (-40℃ to +105℃)	SQ (QFN2020-3)
HX6659ISQ-C	I (-40℃ to +105℃)	SQ (QFN2020-3)
HX6659ISQ-D	I (-40℃ to +105℃)	SQ (QFN2020-3)
HX6659ISO-B	I (-40℃ to +105℃)	SO(SOT-23)
HX6659ISO-C	I (-40℃ to +105℃)	SO(SOT-23)
HX6659ISO-D	I (-40℃ to +105℃)	SO(SOT-23)
HX6659IUA-B-T	I (-40℃ to +105℃)	UA (TO92-3L)
HX6659IUA-C-T	I (-40℃ to +105℃)	UA (TO92-3L)
HX6659IUA-D-T	I (-40℃ to +105℃)	UA (TO92-3L)
HX6659ISQ-B-T	I (-40℃ to +105℃)	SQ (QFN2020-3)
HX6659ISQ-C-T	I (-40℃ to +105℃)	SQ (QFN2020-3)
HX6659ISQ-D-T	I (-40℃ to +105℃)	SQ (QFN2020-3)
HX6659ISO-B-T	I (-40℃ to +105℃)	SO(SOT-23)
HX6659ISO-C-T	I (-40℃ to +105℃)	SO(SOT-23)
HX6659ISO-D-T	I (-40℃ to +105℃)	SO(SOT-23)

Functional Diagram



Absolute Maximum Ratings *At (Ta=25℃)*

Characteristics		Values	Unit
Supply Voltage (***VDD***)		8	V
Reverse Voltage, (***VDDR***)		-0.5	V
Output Voltage, (***Vout***)		8	V
Output current, (***IOUT***)		5	mA
Operating Temperature Range, (***TA***)		-40 ~ +125	℃
Storage temperature Range, (***Ts***)		-65 ~ +150	℃
Package Power Dissipation, (P_D)	UA/SO/SQ	606/230/230	mW

***Note**: Do not apply reverse voltage to* V_{DD} *and* V_{OUT} *Pin, It may be caused for Miss function or damaged device.*

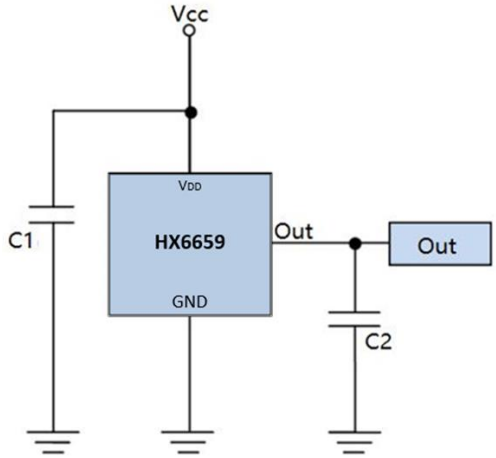
Electrical Specifications

DC Operating Parameters : T_A=+25℃, V_{CC}=5.0V

Parameters	Test Conditions	Min	Typ	Max	Units
Supply Voltage,(V_{DD})	Operating	2.8		6.0	V
Supply Current,(I_{DD})	B= 0 Gauss		3.3	5.0	mA
Output Current,(I_O)	V_{DD} > 3V	1.0	1.5		mA
Null Output Voltage,(V_{NULL})	B= 0 Gauss, (T type)	2.375 (2.475)	2.5	2.625 (2.525)	V
High Output Voltage, (V_{OH})	B> Max Magnetic Gauss		4.9	4.99	V
Low Output Voltage, (V_{OL})	B> Min Magnetic Gauss	0.01	0.1		V
Output Voltage Span,(V_{OS})			4.8		V
Output Referred Noise, (V_{ON})	Ta=25℃, output open		20		mV
Power-On Time, (T_P)				100	uS
Output Switch Time, (T_{SW})				150	uS
Output Switch Frequency, (F_{SW})		3			kHz
Magnetic Range Gauss	B	±1200			Gauss
	C	±960			Gauss
	D	±800			Gauss
Ratiometry Null output error,	Operating voltage range		±1.5		%

(R_{VON})	relative to 5V					
Ratiometry Sensitivity error, (R_{SEN})	Operating voltage range relative to 5V			±1.5		%
Linearity, (*LIN*)	% of Span			±1.5		%
Sensitivity	B	Standard, (T type)	1.8 (1.9)	2.0	2.2 (2.1)	mV/G
	C	Standard, (T type)	2.250 (2.375)	2.5	2.750 (2.625)	mV/G
	D	Standard, (T type)	2.70 (2.85)	3.0	3.30 (3.15)	mV/G
Sensitivity Temperature Coefficient, (TC_{Sens})	Ta=125℃, relative to Sens@25℃			±10		%/℃
Delta null voltage, (ΔV_{ON})	Ta=125℃, relative to V_{ON} @25℃			20		mV
Electro-Static Discharge	HBM		4			KV

Typical application circuit

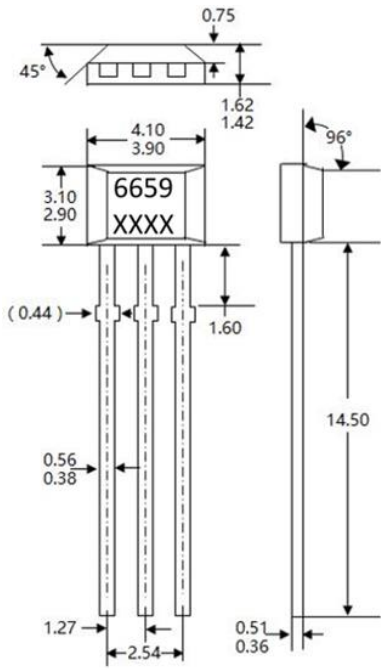


C1 : 1000PF
C2 : 10PF

Sensor Location, Package Dimension and Marking

Package

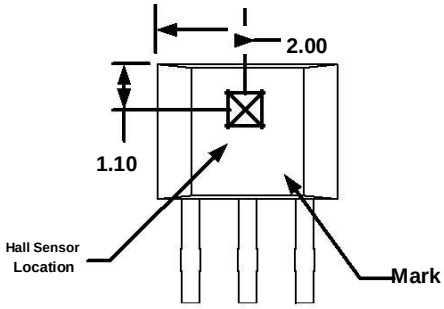
UA package



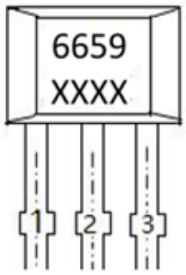
NOTES:

1. Controlling dimension: mm
2. Leads must be free of flash an plating voids
3. Do not bend leads within 1 mm of lead to package interface.
4. PINOUT:
   Pin 1 VCC
   Pin 2 GND
   Pin 3 Output
5. XXXX, 1st X = B/C/D
   2nd -4th X=Date Code

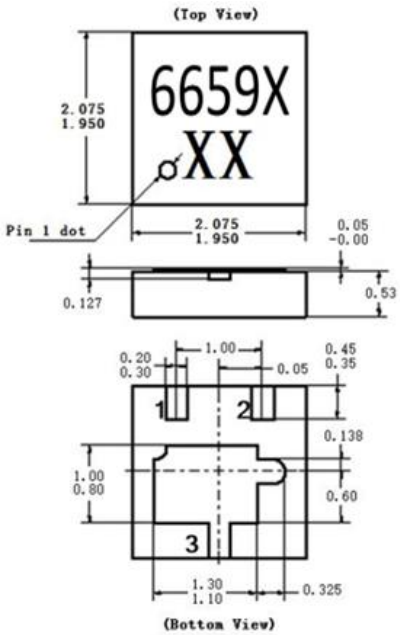
Hall Chip location



Output Pin Assignment (Top view)



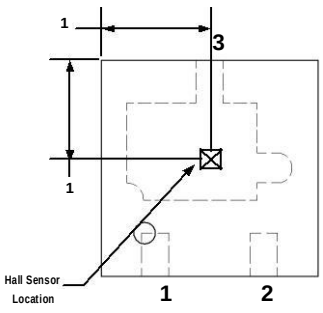
SQ Package



NOTES:

1. PINOUT (See Top View at left)
   Pin 1 VCC
   Pin 2 Output
   Pin 3 GND
2. Controlling dimension: mm;
3. Chip rubbing will be 10mil maximum;
4. Chip must be in PKG. center.
5. 6659X, X= B/C/D
6. XX= Date code

Hall Plate Chip Location (Top view)

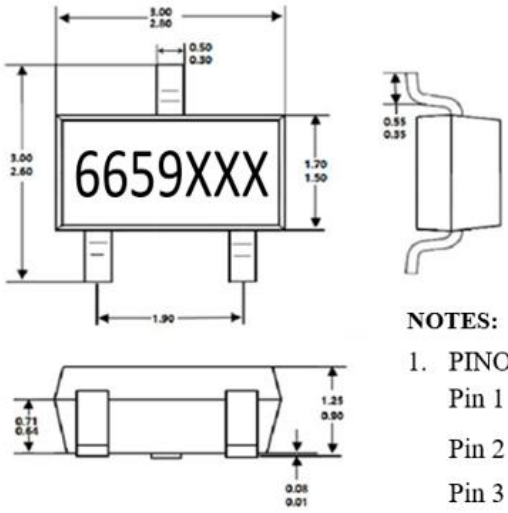


HX6659 (T) Specifications

CMOS Ratio-Metric Linear Hall Effect IC

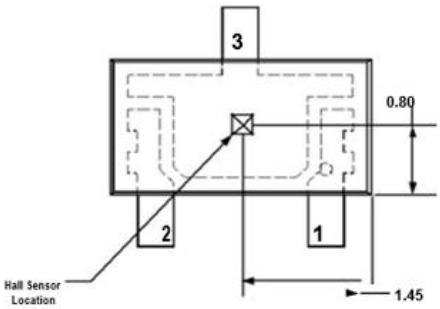
SO Package

(Top View)



Hall Plate Chip Location

(Bottom view)



NOTES:

1. PINOUT (See Top View at left :)
   Pin 1 V_{DD}
   Pin 2 Output
   Pin 3 GND
2. Controlling dimension: mm
3. Lead thickness after solder plating will be 0.254mm maximum
4. Chip must be in PKG. center.
5. 6659XXX , 1^{st} X = B/C/D 2^{nd}~3^{rd} =Date Code