# Unipolar Hall Switch - High Sensitivity

## ◆ Product Description

The G230 is a unipolar hall switch designed in CMOS technology. The IC internally includes a voltage regulator, Hall sensor with dynamic offset cancellation system, Schmitt trigger and an open-drain output driver.

While the magnetic flux density(B) is larger than operate point(Bop),the output will be turned on(low),the output is held until the magnetic flux density(B) is lower than release point(Brp),then turn off.

It has wide operating voltage range and extended choice of temperature range, it is quite suitable for use in automotive, industrial and consumer applications.

## ◆ Features

- 3.5V to 24V DC Operation Voltage
- CMOS Technology
- Chopper-stablilized amplifier stage
- 25mA Output Sink Current
- Operating Temperature: −40~ +125℃
- High Magnetic Sensitivity:Bhyst=10Gauss(Typ.)
- Lead Free Package: SIP-3L and SC59
(Commonly known as TO-92S and SOT-23-3L in Asia)
- Lead Free Finish/RoHS Compliant

## ◆ Application

- Rotor Position Sensing
- Current Switch
- Encoder
- RPM Detection
- Proximity detection
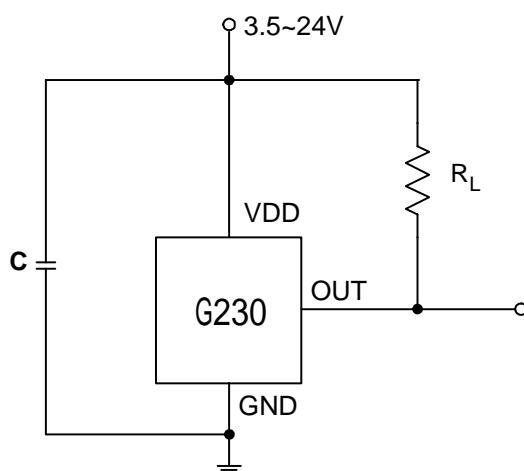


Fig.1 Typical Application Circuit of G230.

## ◆ Pin Description

Table 1-1 Pin definition and description for SIP-3L(TO-92S)

| PIN # | NAME | P/I/O | FUNCTION DESCRIPTION |
|---|---|---|---|
| 1 | VDD | P | Input Power Supply |
| 2 | GND | P | Ground |
| 3 | OUT | O | Output Stage of Open Drain |
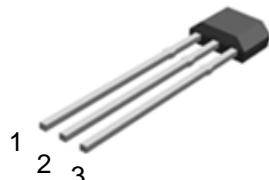
Table 1-2 Pin definition and description for SC59(SOT-23-3L)

| PIN # | NAME | P/I/O | FUNCTION DESCRIPTION |
|---|---|---|---|
| 1 | VDD | P | Input Power Supply |
| 2 | OUT | O | Output Stage of Open Drain |
| 3 | GND | P | Ground |
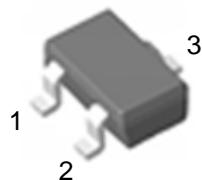
## ◆ Pin Configuration

(Top View)

SIP-3L(TO-92S)



SC59(SOT-23-3L)

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# ◆ Absolute Maximum Rating <sup>(Note 1)</sup>

| SYMBOL | PARAMETER | RATING |
|---|---|---|
| VDD | Supply Voltage | +28VDC |
| Vout (off) | Voltage externally applied to output | +28VDC max, OFF condition only<br>-0.5 V min., OFF or ON condition |
| Io (sink) | Output "ON" Current | 50 mA |
| PD | Power Dissipation | 450mW(SIP-3L);230mW(SC59) |
| Top | Operation Temperature Range | -40 to +125 ℃ |
| Tst | Storage Temperature Range | -65 to +150 ℃ |
| B | Magnetic Flux | No limit. |

**Note 1:** Absolute Maximum Ratings are those values beyond which the life of a device may be impaired.

# ◆ Electrical Characteristics (T$_A$ = 25℃)

| SYMBOL | PARAMETER | | CONDITIONS | MIN. | TYP. | MAX. | UNIT |
|---|---|---|---|---|---|---|---|
| VDD | Supply Voltage | | Operating | 3.5 | | 24 | V |
| V$_{O (SAT)}$ | Output Saturation Voltage | | VDD = 12V, OUT "ON", Io = 10mA | | | 300 | mV |
| | | | VDD = 12V, OUT "ON", Io = 20mA | | | 500 | mV |
| IDD | Supply Current | | VDD =3.5~24V, OUT "OFF" | | 2.0 | 5.0 | mA |
| I$_{LE}$ | Output Leakage Current (Leakage into sensor output) | | Released | | | 10 | μA |
| Tr | Output Switching Time | Rise Time | RL=820Ω, CL=20pF | | | 0.45 | μS |
| Tf | | Fall Time | RL=820Ω, CL=20pF | | | 0.45 | μS |
| F$_{SW}$ | Maximum Switching Frequency | | | | 10 | | KHz |

# ◆ Magnetic Characteristics (T$_A$ = 25℃, VDD=12V)

| SYMBOL | PARAMETER | MIN. | TYP. | MAX. | UNIT |
|---|---|---|---|---|---|
| Bop | Operation Point | 15 | 30 | 45 | Gauss |
| Brp | Release Point | 10 | 20 | 30 | Gauss |
| Bhy | Hysteresis | 5 | 10 | 15 | Gauss |

# ◆ Functional Block Diagram
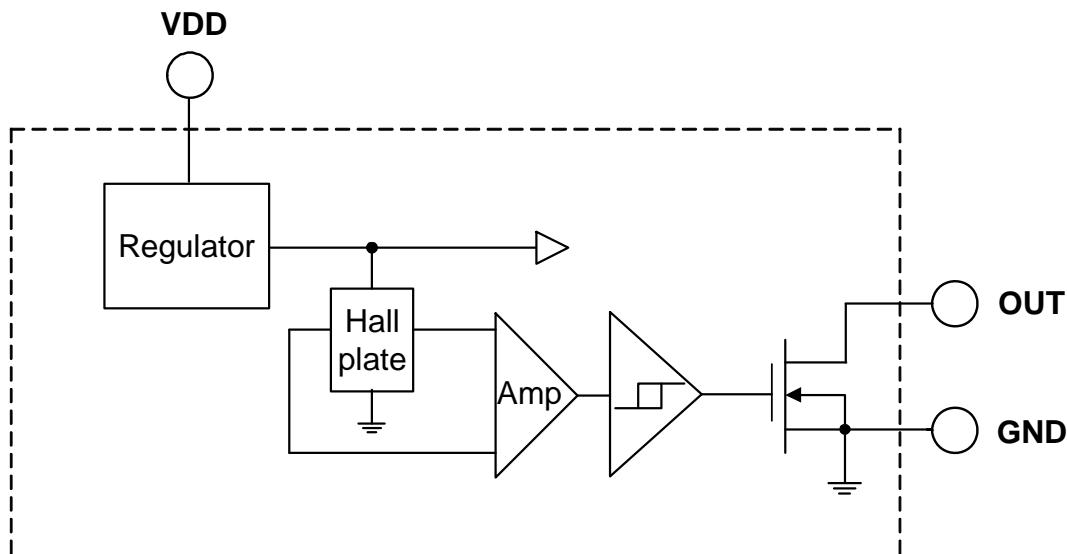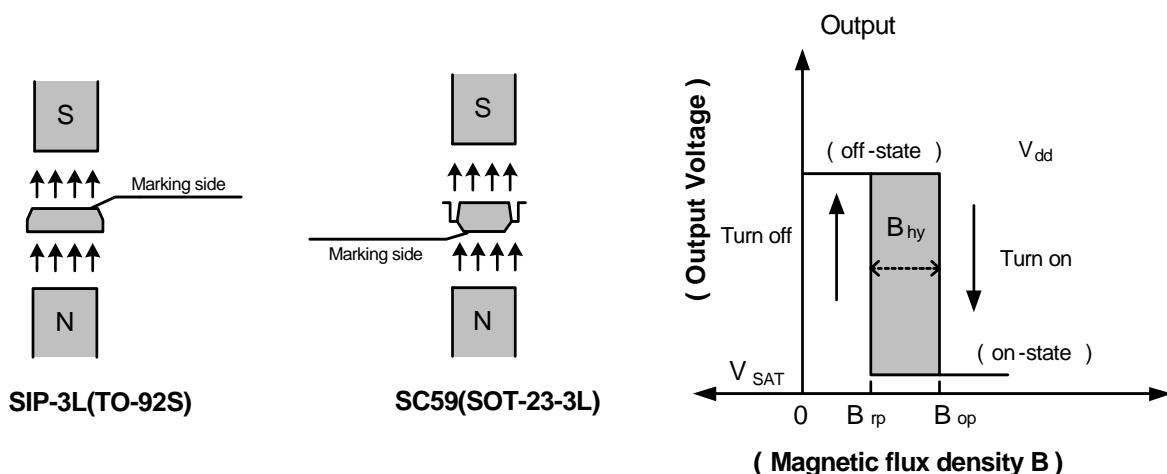


Figure 1. Function Block Diagram of G230

# ◆ Operating Characteristics



**SIP-3L(TO-92S)**

**SC59(SOT-23-3L)**

The SC59 package is south pole active;The SIP-3L package is north pole active; Removing the magnetic field (B=0)switches the output high.

Table 2: Switching Function

| Parameter | Magnetic Field (B) | OUT (SIP-3L/TO-92S) | OUT (SC59/SOT23-3) |
|---|---|---|---|
| South Pole | $B>B_{OP}$ | Low | High |
| Null or Weak Magnetic Field | $B=0$ or $B<B_{RP}$ | High | High |
| North Pole | $B>B_{OP}$ | High | Low |

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# ◆ Typical Characteristics
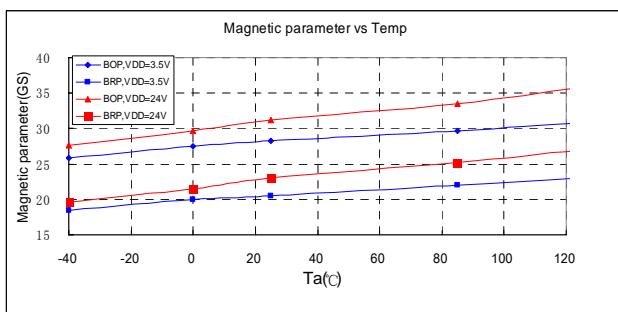


Figure 3-1. Magnetic parameters Vs. Ta
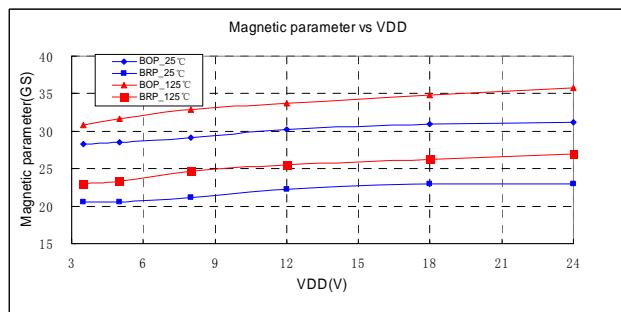


Figure 3-2. Magnetic parameters VS VDD
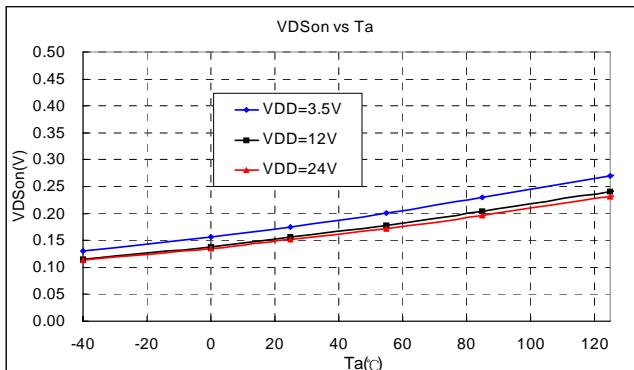


Figure 3-3. VDSon Vs. Ta
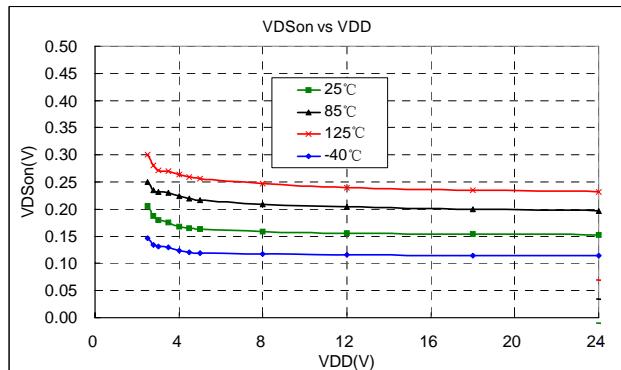


Figure 3-4. VDSon Vs. VDD
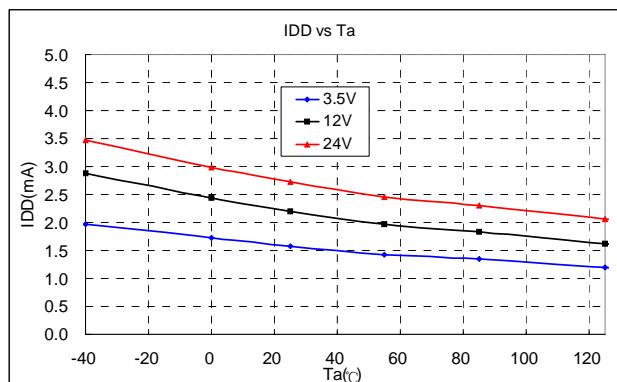


Figure 3-5. IDD Vs. Ta
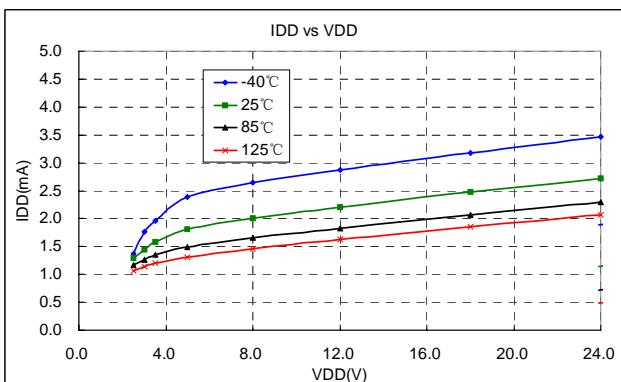


Figure 3-6. IDD Vs. VDD
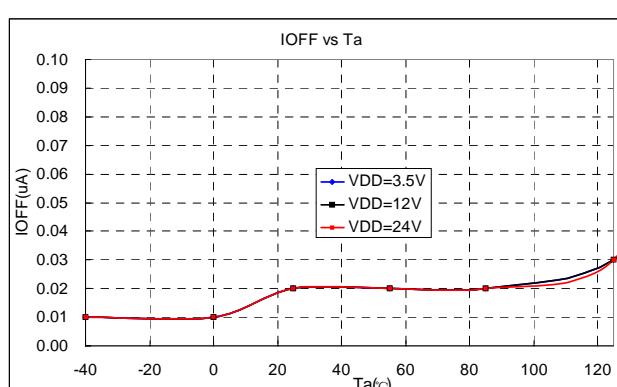


Figure 3-7. IOFF Vs. Ta
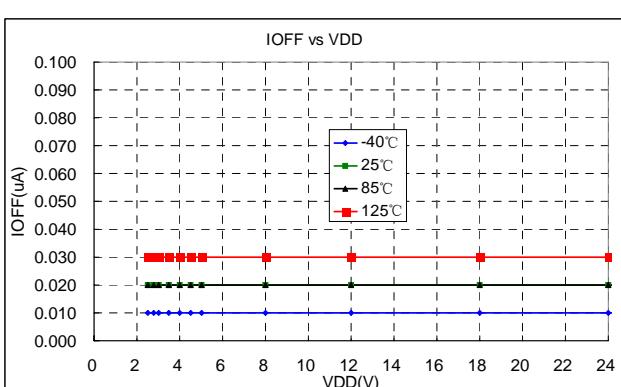


Figure 3-8. IOFF Vs. VDD

Preliminary datasheet

0755-84821761    13430722511
http://www.hall-wafer.com

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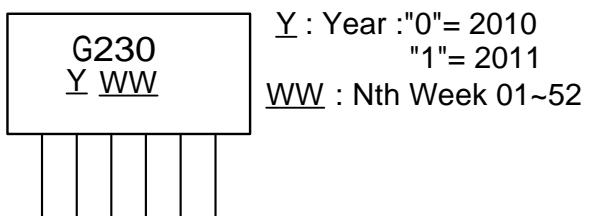
# ◆ Marking Information

**(1) SIP-3L(TO-92S)**

**( Top View )**

G230
Y WW

Y : Year :"0"= 2010
"1"= 2011
WW : Nth Week 01~52

**(2) SC59 (SOT-23-3L)**

**( Top View )**

XX Y M X

XX : GO : G230
Y : Year 0~9
M : Month A~L
X : Internal code
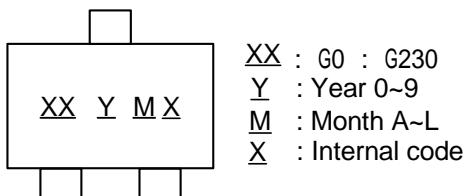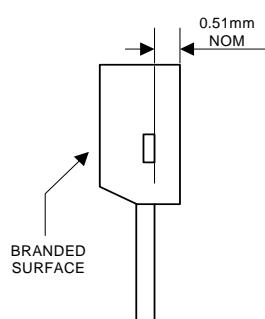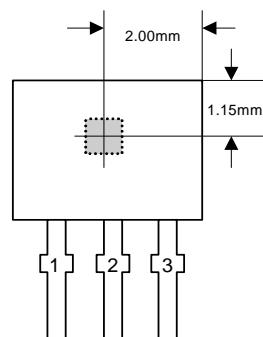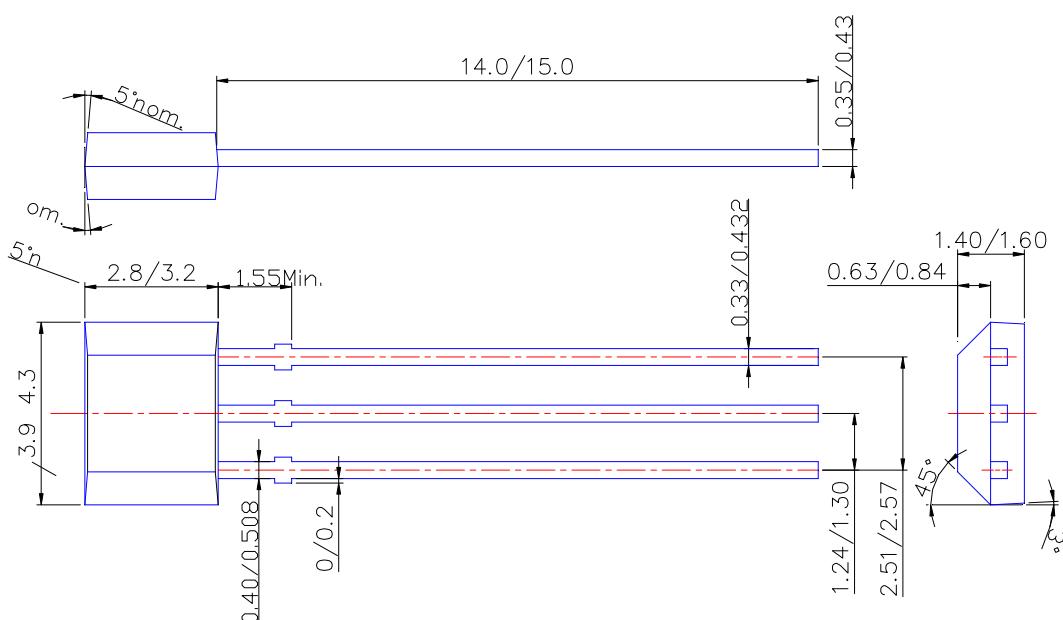
**(1) Package Type: SIP-3L(TO-92S) for Bulk only**

0.51mm
NOM

BRANDED
SURFACE

Active Area Depth

2.00mm

1.15mm

1 2 3

Sensor Location

14.0/15.0

0.35/0.43

5°nom.

om

5°n

2.8/3.2

1.55Min.

3.9  4.3

0.40/0.508

0/0.2

0.33/0.432

1.40/1.60

0.63/0.84

1.24/1.30

2.51/2.57

45°

3°

0755-84821761   13430722511
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