

SH491 Ratio-metric Linear Hall Effect IC

SH491, a linear Hall-effect sensor, is composed of Hall sensor, linear amplifier and push-pull output stage. It has a wide operating temperature range -40°C to 105°C , appropriate for consumer and industrial field.

Features

- Various sensitivity line up: 15mV/mT~30mV/mT
- Ratio-metric output
- Cost competitive
- Robust ESD performance

Typical Application

- Position sensing
- Current sensing
- Motor control

Order Information

| Order No. | Parts No. | Sensitivity | Temperature | Package | — | Sorting |
|-------------|-----------|-------------|-------------|---------|---|---------|
| SH491AIUA | SH491 | A | I | UA | | |
| SH491BIUA | SH491 | B | I | UA | | |
| SH491CIUA | SH491 | C | I | UA | | |
| SH491DIUA | SH491 | D | I | UA | | |
| SH491AIUA-T | SH491 | A | I | UA | — | T |
| SH491BIUA-T | SH491 | B | I | UA | — | T |
| SH491CIUA-T | SH491 | C | I | UA | — | T |
| SH491DIUA-T | SH491 | D | I | UA | — | T |
| SH491AISO | SH491 | A | I | SO | | |
| SH491BISO | SH491 | B | I | SO | | |
| SH491CISO | SH491 | C | I | SO | | |
| SH491DISO | SH491 | D | I | SO | | |
| SH491AISO-T | SH491 | A | I | SO | — | T |
| SH491BISO-T | SH491 | B | I | SO | — | T |
| SH491CISO-T | SH491 | C | I | SO | — | T |
| SH491DISO-T | SH491 | D | I | SO | — | T |
| SH491AISQ | SH491 | A | I | SQ | | |
| SH491BISQ | SH491 | B | I | SQ | | |
| SH491CISQ | SH491 | C | I | SQ | | |
| SH491DISQ | SH491 | D | I | SQ | | |
| SH491AISQ-T | SH491 | A | I | SQ | — | T |
| SH491BISQ-T | SH491 | B | I | SQ | — | T |
| SH491CISQ-T | SH491 | C | I | SQ | — | T |
| SH491DISQ-T | SH491 | D | I | SQ | — | T |

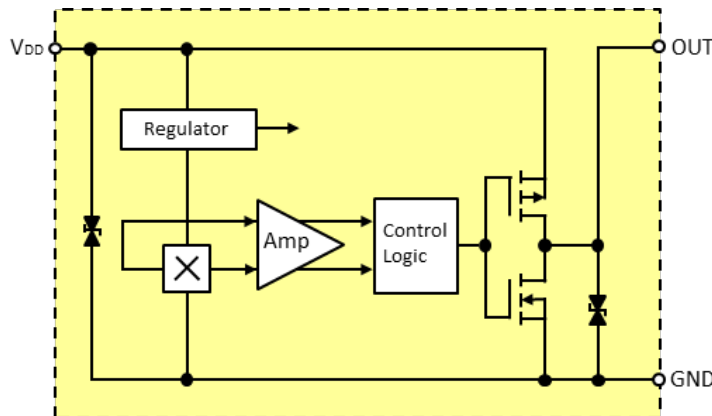
Legend:

Sensitivity Code: A (15mV/mT), B (20mV/mT), C (25mV/mT), D (30 mV/mT)

Temperature Code: I ($-40^{\circ}\text{C}\sim 105^{\circ}\text{C}$)

Package Code: UA (TO-92S), SO (SOT23), SQ (QFN2020-3)

Sorting Code: Brank (Normal), T (Trimmed)

Functional Block Diagram

Absolute Maximum Ratings ($T_A=25^{\circ}\text{C}$)

| Parameter | Symbol | Value | | Unit |
|---------------------------------|-----------|-------|-------------|--------------------|
| | | Min | Max | |
| Supply Voltage | V_{DD} | -0.5 | 8 | V |
| Output Voltage | V_{OUT} | - | 8 | V |
| Output Current | I_{OUT} | - | 5 | mA |
| Operating Temperature Range (I) | T_A | -40 | 105 | $^{\circ}\text{C}$ |
| Storage Temperature Range | T_S | -55 | 150 | $^{\circ}\text{C}$ |
| Maximum Junction Temperature | T_J | - | 150 | $^{\circ}\text{C}$ |
| Power Dissipation (UA/SO/SQ) | P_D | - | 606/230/230 | mW |

Electrical & Magnetic Characteristics ($T_A=25^{\circ}\text{C}$, $V_{DD}=5\text{V}$)

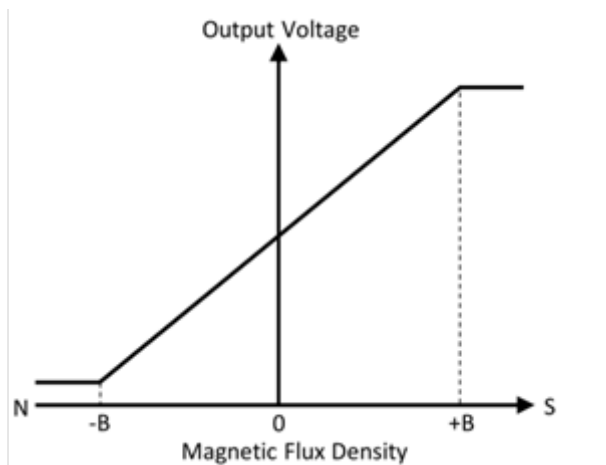
| Parameter | Test Condition | Symbol | Value | | | Unit |
|--------------------------------|----------------|-------------|-------|-----------|-----|---------------|
| | | | Min | Typ | Max | |
| Supply Voltage | | V_{DD} | 4.5 | - | 5.5 | V |
| Consumption Current | B=0mT | I_{DD} | - | 3.3 | 5 | mA |
| Output Voltage Span | | V_{OS} | - | 4.8 | - | V |
| Power-ON Time | | t_{ON} | - | 50 | - | μs |
| Output Switching Frequency | | f_{BW} | 3 | - | - | kHz |
| Null Ratio-metric Error | | RE_{NULL} | - | ± 1.5 | - | % |
| Sensitivity Ratio-metric Error | | RE_{SENS} | - | ± 1.5 | - | % |
| Linearity | | LIN | - | ± 1.5 | - | % |

Electrical & Magnetic Characteristics ($T_A=25^\circ\text{C}$, $V_{DD}=5\text{V}$) *cont'd*

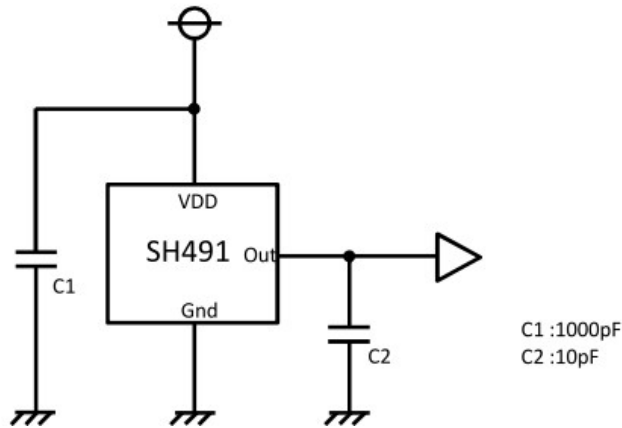
| Parameter | | Test Condition | Symbol | Value | | | Unit |
|-------------------------------|--------|----------------|-------------------|------------------|-----|------------------|-------|
| | | | | Min | Typ | Max | |
| Null Output Voltage (Trimmed) | | B=0mT | V_{NULL} | 2.375 (2.475) | 2.5 | 2.625 (2.525) | V |
| Sensitivity (Trimmed) | SH491A | | SENS | 13 (14) | 15 | 17 (16) | mV/mT |
| | SH491B | | SENS | 18 (19) | 20 | 22 (21) | mV/mT |
| | SH491C | | SENS | 22.5 (23.75) | 25 | 27.5 (26.25) | mV/mT |
| | SH491D | | SENS | 27 (28.5) | 30 | 33 (31.5) | mV/mT |
| Electro-static Discharge | | HBM | | 4 | - | - | kV |

Magnetic Pole Direction

| Package | The magnetic pole facing the marking surface where the output voltage increases |
|---------|---|
| All | S-pole |

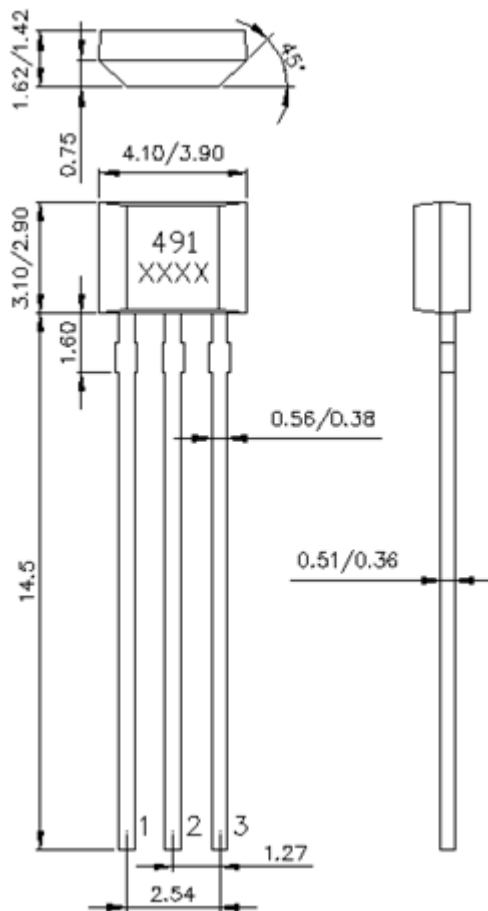


Typical Application Circuit

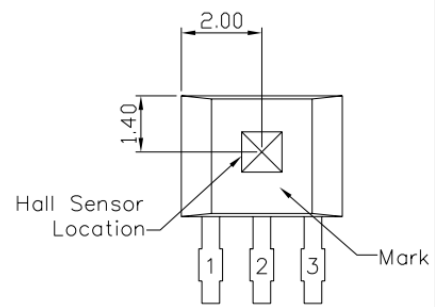


Sensor Location, Package Dimension and Marking

UA-package: TO92S



Hall Sensor Location

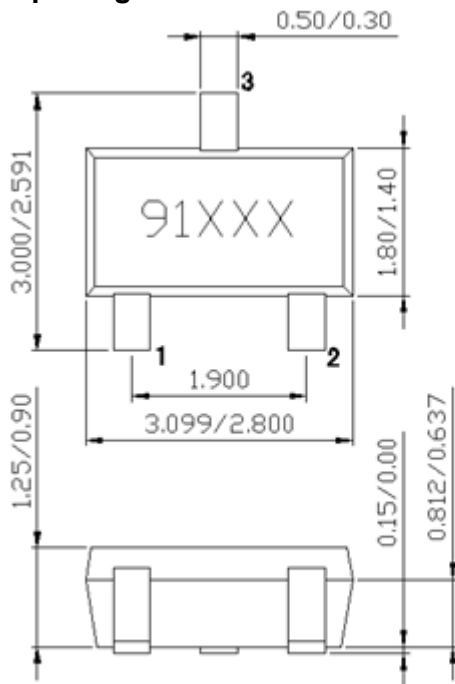
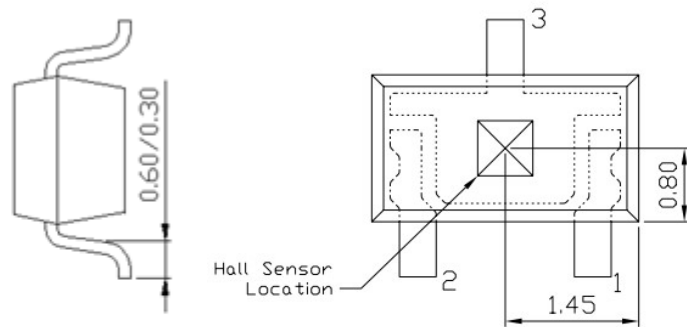


NOTES:

1. Controlling dimension: mm
2. Leads must be free of flash and plating voids.
3. Do not bend leads within 1 mm of lead to package interface.

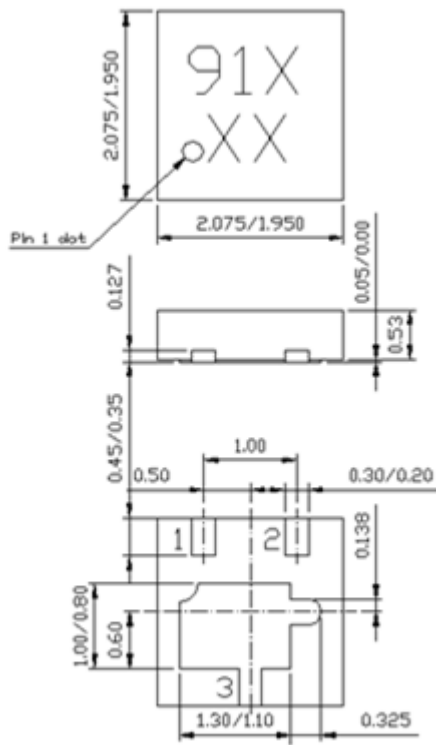
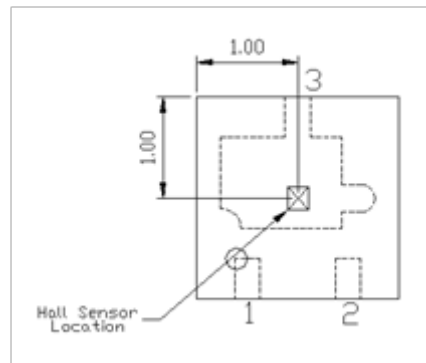
4. PINOUT:

| | |
|-------|-----------------|
| Pin 1 | V _{DD} |
| Pin 2 | GND |
| Pin 3 | Output |

SO-package: SOT23

**Hall Sensor Location
(Bottom view)**

NOTES:

1. Controlling dimension: mm
2. Lead thickness after solder plating will be 0.254mm maximum.
3. PINOUT:

| | |
|-------|-----------------|
| Pin 1 | V _{DD} |
| Pin 2 | Output |
| Pin 3 | GND |

SQ-package: QFN2020-3

**Hall Sensor Location
(Top view)**

NOTES:

1. Controlling dimension: mm
2. Chip rubbing will be 10mil maximum.
3. PINOUT:

| | |
|-------|-----------------|
| Pin 1 | V _{DD} |
| Pin 2 | Output |
| Pin 3 | GND |