



EVERLIGHT ELECTRONICS CO., LTD.

DATA SHEET

MODEL NO : HI401

DATE : MAR,24,2000

DEPARTMENT : R&D 2

REVISION : 1.0

| | | | |
|---|----------|---------|----------|
| RECEIVED | | | |
| <input checked="" type="checkbox"/> MASS PRODUCTION | | | |
| <input type="checkbox"/> PRELIMINARY | | | |
| <input type="checkbox"/> CUSTOMER DESIGN | | | |
| DEVICE NUMBER : DHI-092-009 | | | |
| PAGE : 6 | | | |
| CUSTOMER | DESIGNER | CHECKER | APPROVER |
| | | | |

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| | | |
| REV | DESCRIPTION | RELEASE DATE |

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<http://www.everlight.com>



EVERLIGHT ELECTRONICS CO., LTD.

DEVICE NUMBER : DHI-092-009 REV : 1.0
ECN : _____ PAGE : 1/6

Hall Integrated Circuit

MODEL NO : HI401

■ Features :

- 4V to 20V operation.
- High reliability.
- Small size.
- Output compatible with all digital logic families.
- Reverse voltage protection.

■ Description :

- The HI401 is a magnetic sensor used in electric commutation of DC brushless motor applications mostly. The HI401 has a latching behavior and requires a magnetic north and south pole for correct function. The output does not change if the magnetic field is removed. The sensor is designed for industrial and automotive applications and operates at as low as 4 volts.

■ Applications :

- Brushless DC motor.
- Rotation detection.
- Displacement detection.
- Speed sensing.

| PART | CHIP | COLOR |
|---------|----------|-------|
| | MATERIAL | |
| HALL IC | SI | BLACK |

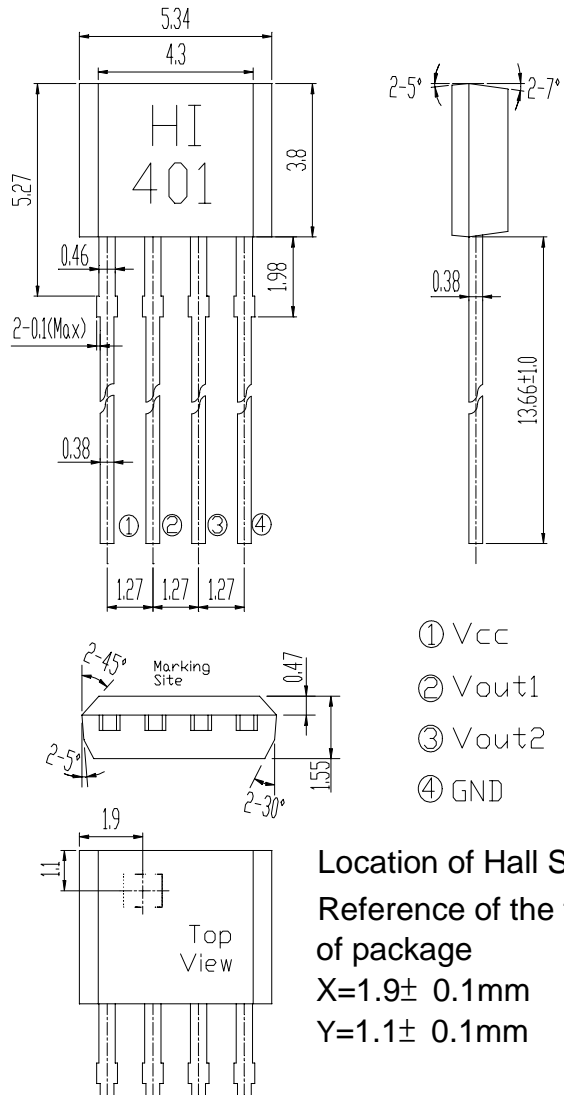
Hall Integrated Circuit

MODEL NO : HI401

■ **NOTES :**

1. This drawing measure is a standard value.
All dimensions are in millimeter.
2. In case of designation is toleranc ± 0.3 mm.
3. Lead spacing is measured where the leads emerge from the package.
4. Protruded resin under flange 1.0mm Max.
5. Lens color: Black.
6. Above specification may be changed without notice. EVERLIGHT will reserve authority on material change for above specification.
7. These specification sheets include materials protected under copyright of EVERLIGHT corporation. Please don't reproduce or cause anyone to reproduce them without EVERLIGHT consent.
8. When using this produce, please observe the absolute maximum ratings and the instructions for use outlined in these specification sheets. EVERLIGHT assumes no responsibility for any damage resulting from use of the product which does not comply with the absolute maximum ratings and the instructions included in these specification sheets.

■ **Package Dimension :**



Hall Integrated Circuit

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Absolute Maximum Ratings at T_A = 25°C

| Parameter | Symbol | Rating | Unit | Notice |
|-------------------------------|------------------|--|------|-------------------------------------|
| Supply Voltage | V _{CC} | 20 | V | |
| Supply Current | I _{CC} | 25 | mA | |
| Output Current | I _{OUT} | Continuous 300 Hold 400 Peak(Start up) 600 | mA | |
| Maximum Power Dissipation | P _D | 500 | mW | |
| Operating Ambient Temperature | T _A | -20 ~ +85 | °C | |
| Storage Temperature | T _{STG} | -55 ~ +120 | °C | |
| Soldering Temperature | T _{SOL} | 260 | °C | 1/16 inches from body for 5 seconds |

Electronic Characteristics : T_A = 25°C

| Parameter | Symbol | MIN. | TYP. | MAX. | Unit | Condition |
|---------------------------|----------------------|------|------|------|------|--|
| Supply Voltage | V _{CC} | 4 | --- | 20 | V | Operating |
| Output Saturation Voltage | V _{CE(SAT)} | --- | 250 | 600 | mV | V _{CC} =14V I _{OUT} =400mA B>Bop |
| Supply Current | I _{CC} | --- | 18 | 25 | mA | V _{CC} =20V Output Open |
| Output Leakage Current | I _{LEAK} | --- | --- | 10 | μA | V _{CE} =14V V _{CC} =14V |
| Output Rise Time | t _r | --- | 3.0 | 10 | μS | V _{CC} =14V, R _L =820Ω, C _L =20pF |
| Output Fall Time | t _f | --- | 0.3 | 1.5 | μS | |
| Switch Time Differential | Δt | --- | --- | 10 | μS | |

Magnetic Specification : T_A = 25°C
 Condition: V_{CC}=20V, B_S=MAX[ABS(Bop), ABS(Brp)] Unit: Gauss

| Bin Number | Bin1 | Bin2 | Bin3 | Bin4 |
|----------------|------|------|------|------|
| B _S | <70 | <100 | <140 | <200 |



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■ Typical Characteristics Curves:

Fig. 1 Supply Current V.S. Supply Voltage

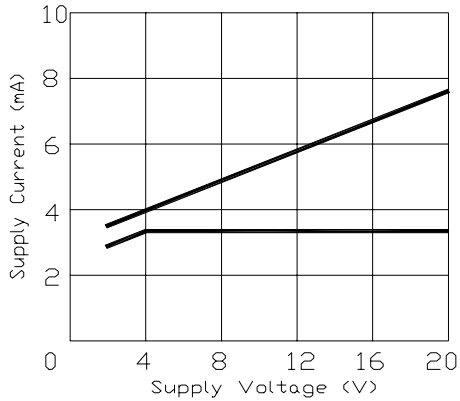


Fig. 2 Output Low Voltage V.S. Supply Voltage

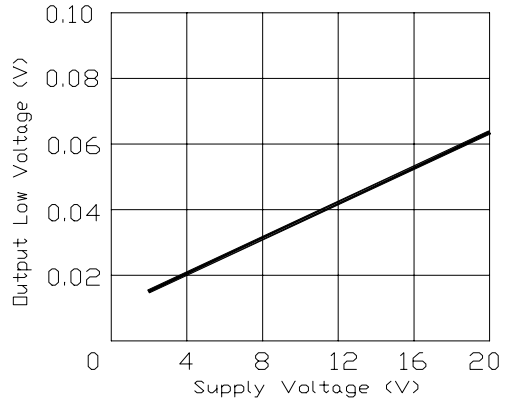


Fig. 3 Switch Points (Bop, Brp) V.S. Supply Voltage

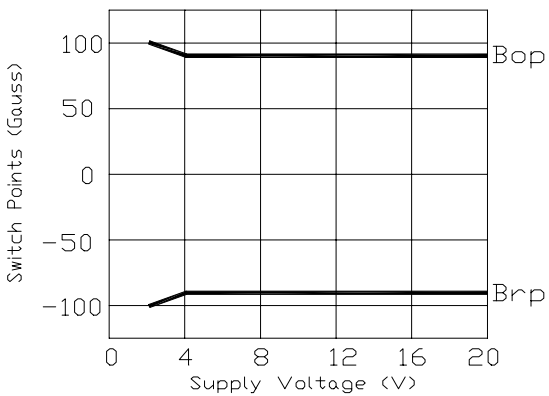


Fig. 4 Switch Points V.S. Ambient Temperature

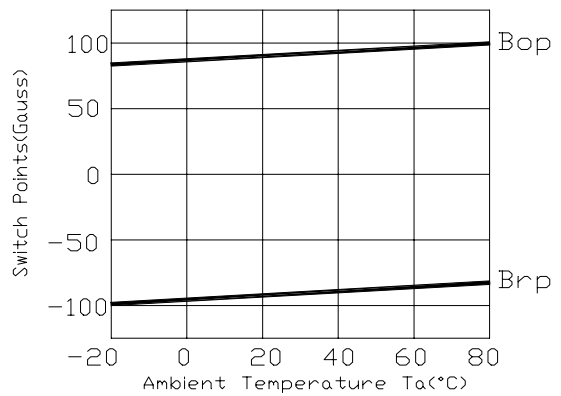


Fig. 5 Supply Current V.S. Ambient Temperature

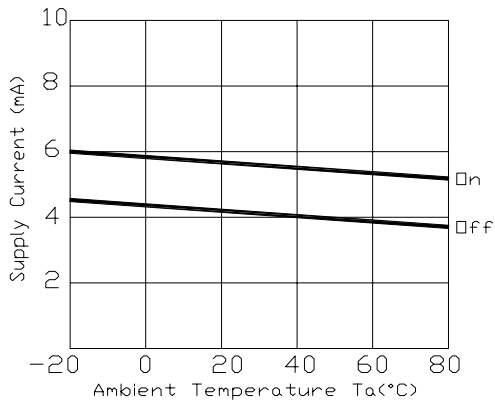
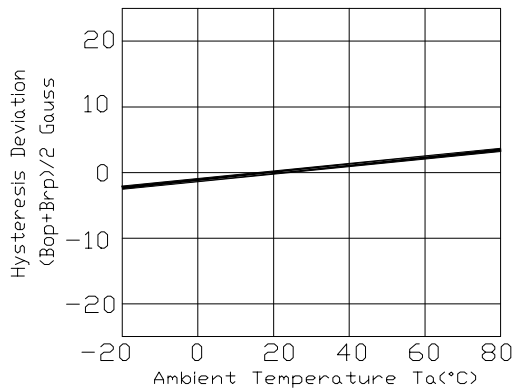


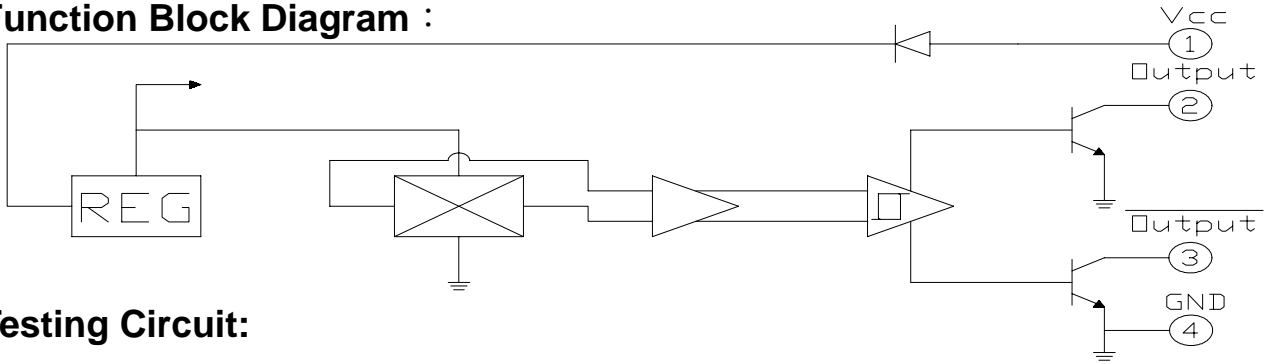
Fig. 6 Hysteresis Deviation V.S. Ambient Temperature



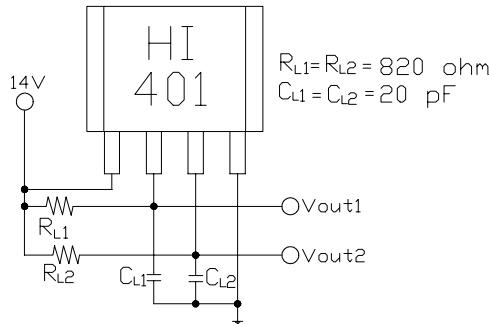
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■ **Function Block Diagram :**



■ **Testing Circuit:**



■ **Reliability:**

The reliability of products shall be satisfied with items listed below.
 Confidence level : 90% ; LTPD : 10%

| Test Items | Test Conditions | Failure Judgement Criteria | Samples(n) |
|--------------------------------|--|--|--------------|
| | | | Defective(c) |
| Operation life | Vcc=12V, Ta=25°C 1000hrs | L : Lower Specification Limit U : Upper Specification Limit | n=22 , c=0 |
| Temperature cycle | 1 cycle -55°C to +85°C (30min)(5min)(30min) 50 cycle test | | n=22 , c=0 |
| Thermal shock | -10°C to +100°C (5min) (10sec) (5min) 50 cycle test | | n=22 , c=0 |
| High temperature storage | Temp : +150°C 1000hrs | | n=22 , c=0 |
| Low temperature storage | Temp : -55°C 1000hrs | | n=22 , c=0 |
| High temperature High humidity | TA : 85°C RH : 85% 1000hrs | | n=22 , c=0 |
| Solder heat | Temp : 260 ± 10°C sec 4mm from the bottom of the package | | n=22 , c=0 |

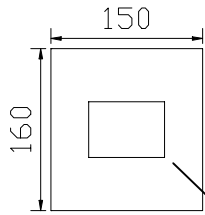
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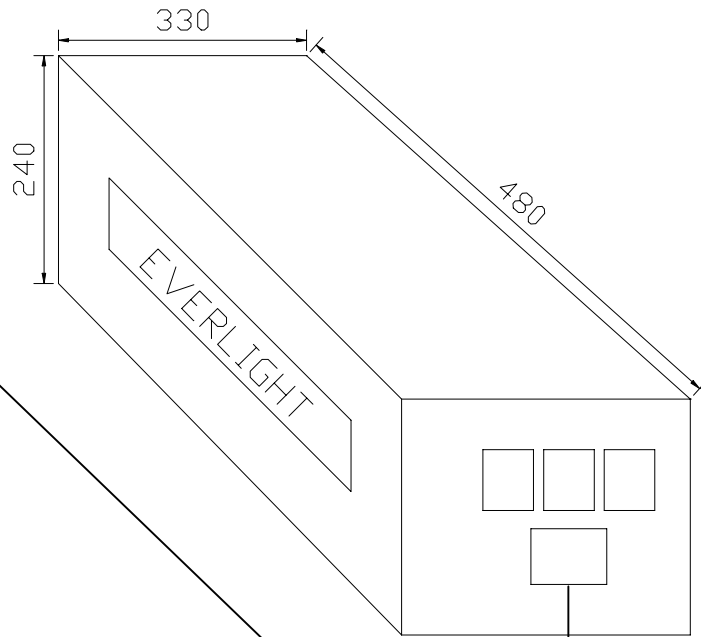
■ Packing Specifications:

(UNIT : mm)

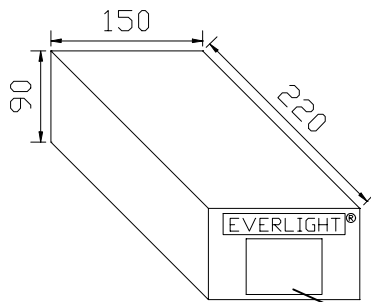
1. Bag:



3. Carton:



2. Box:



■ Packing Quantity Specification:

- 1. 1000Pcs/1Bag, 10Bags/1Box
- 2. 10Boxes/1Carton

■ Label Specification:

- CPN : Customer's Production Number
- P/N : Production Number
- QTY : Packing Quantity
- CAT : Ranks
- HUE : Reference
- REF : Reference
- LOT NO : Lot Number
- MADE IN TAIWAN : Production Place

Label

EVERLIGHT

CPN:

P/N:



HI401

QTY:



LOT NO:

CAT:

HUE:

REF:

MADE IN TAIWAN