

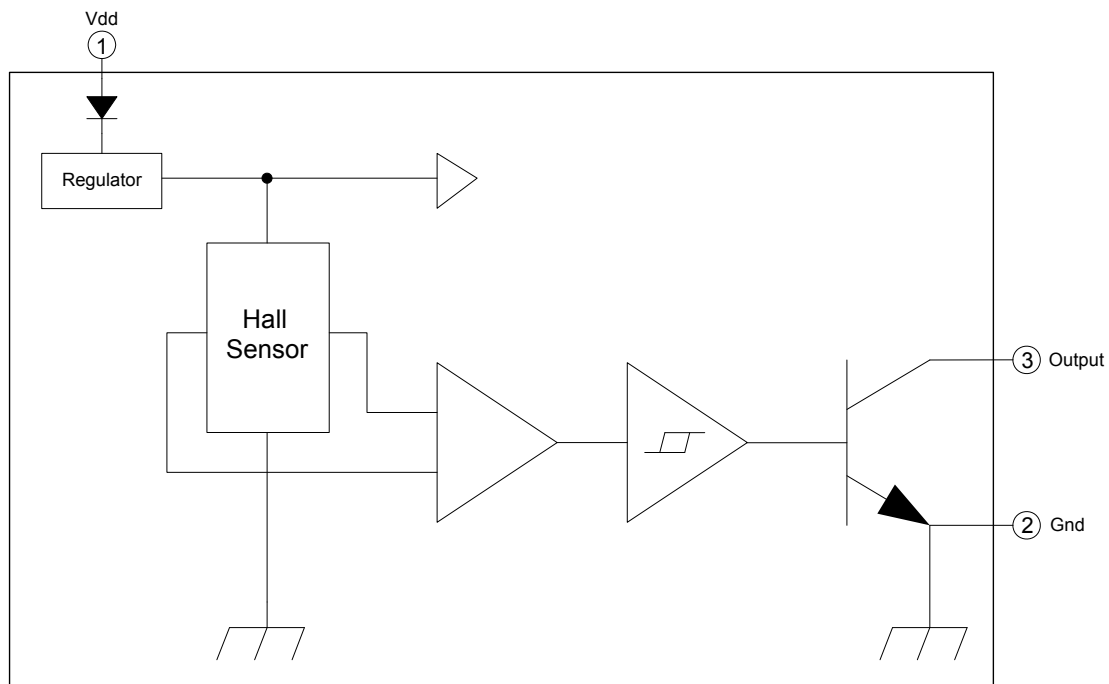
**Features**

- Wide operating voltage range: 3.0V to 28V
- Maximum output sink current 50mA
- Open-Collector pre-driver
- Power reverse polarity protection
- Available in SIP-3L package


**Halogen Free**
**General Description**

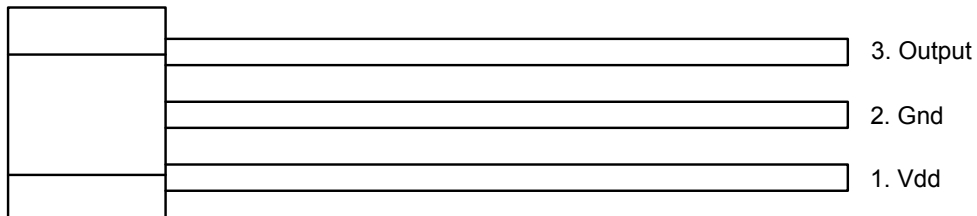
The FS177N is an integrated Hall effect sensor designed for electronic commutation of brush-less DC motor applications. The device includes an on-chip Hall voltage generator for magnetic sensing, a comparator that amplifies the Hall voltage, and a Schmitt trigger to provide switching hysteresis for noise rejection, and open-collector output. An internal bandgap regulator is used to provide temperature compensated supply voltage for internal circuits and allows a wide operating supply range.

A north pole of sufficient strength will turn the output ON. In the absence of a magnetic field, the output is OFF.

**Block Diagram**

**Figure.1**

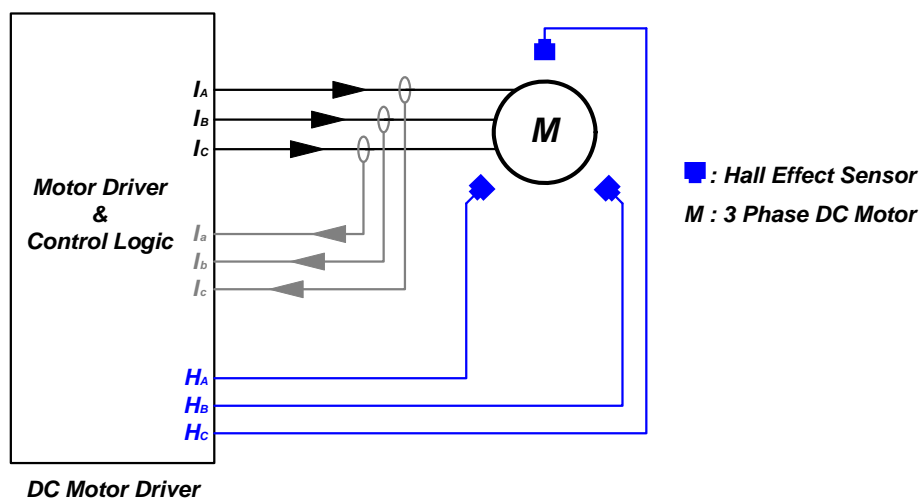
**Pin Connection**

[Top View]


**Figure.2**
**Pin Descriptions**

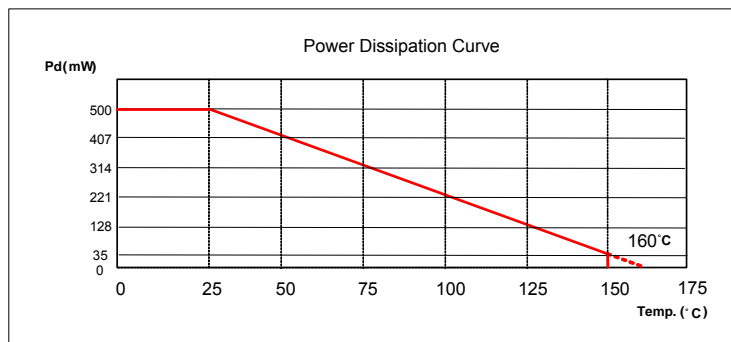
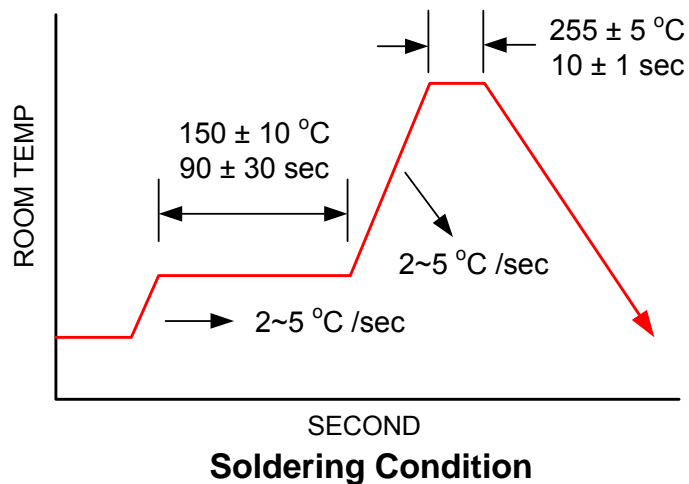
| Name   | I/O | Pin No. | Description           |
|--------|-----|---------|-----------------------|
| Vdd    | P   | 1       | Positive power supply |
| Gnd    | G   | 2       | Ground                |
| Output | O   | 3       | Driver output         |

Legend: I=input, O=output, I/O=input/output, P=power supply, G=ground

**Functional Application Circuit**

**Figure.3**

**Absolute Maximum Ratings**

| Parameter             | Symbol               | Conditions | Values |      |      | Unit  |
|-----------------------|----------------------|------------|--------|------|------|-------|
|                       |                      |            | Min.   | Typ. | Max. |       |
| Operating Temperature | T <sub>OP</sub>      | -          | -40    |      | 150  | °C    |
| Storage Temperature   | T <sub>ST</sub>      | -          | -65    |      | 150  | °C    |
| DC Supply Voltage     | V <sub>DD</sub>      | -          | 3.0    |      | 28   | V     |
| Supply Current        | I <sub>DD</sub>      | -          |        |      | 10   | mA    |
| Continuous Current    | I <sub>O(CONT)</sub> |            |        |      | 50   | mA    |
| Junction temperature  | T <sub>J</sub>       |            |        |      | 160  | °C    |
| Power Dissipation     | P <sub>D</sub>       | SIP-3L     |        |      | 500  | mW    |
| Thermal Resistance    | θ <sub>JC</sub>      | SIP-3L     |        | 0.27 |      | °C/mW |
| Lead Temperature      |                      | 10sec      |        |      | 260  | °C    |


**Figure.4**

**Figure.5**

**Recommended Operating Conditions**

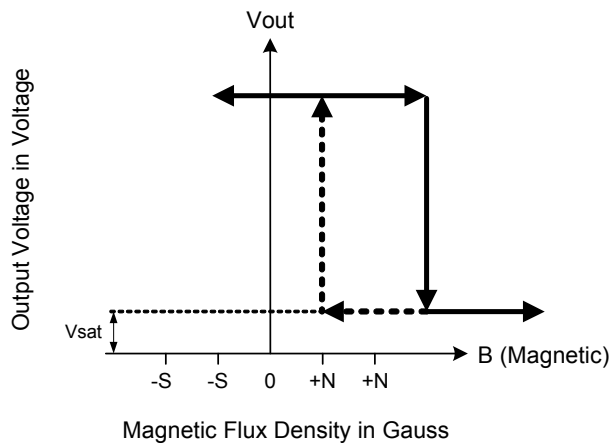
| Parameter                   | Symbol   | Conditions | Values |      |      | Unit |
|-----------------------------|----------|------------|--------|------|------|------|
|                             |          |            | Min.   | Typ. | Max. |      |
| Supply Voltage              | $V_{DD}$ | -          | 3.0    |      | 28   | V    |
| Operating Temperature Range | $T_A$    | -          | -40    |      | 150  | °C   |

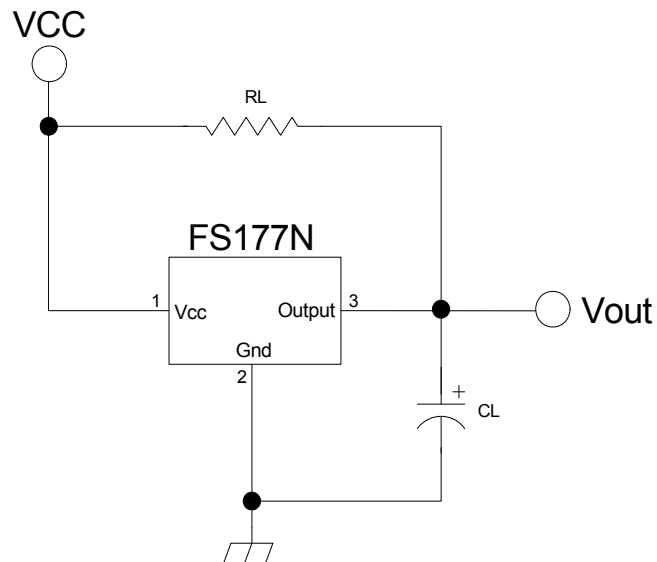
**Electrical Characteristics  $V_{DD}=12.0V$ ,  $T_A=25^\circ C$  (unless otherwise specified)**

| Parameter                       | Symbol    | Conditions                              | Values |      |      | Unit    |
|---------------------------------|-----------|---|--------|------|------|---------|
|                                 |           |   | Min.   | Typ. | Max. |         |
| Average Supply Current(no load) | $I_{DD}$  | -                                       |        | 3.5  | 10   | mA      |
| Output Saturation Voltage       | $V_{SAT}$ | $I_{out}= 20mA$                         |        | 165  | 200  | mV      |
| Output Rise time                | $t_r$     | $R_L=500\Omega$ , $C_L=20pF$ (Figure 7) | 0.2    | -    | 0.75 | $\mu s$ |
| Output Fall time                | $t_f$     | $R_L=500\Omega$ , $C_L=20pF$ (Figure 7) | 20     | -    | 150  | ns      |

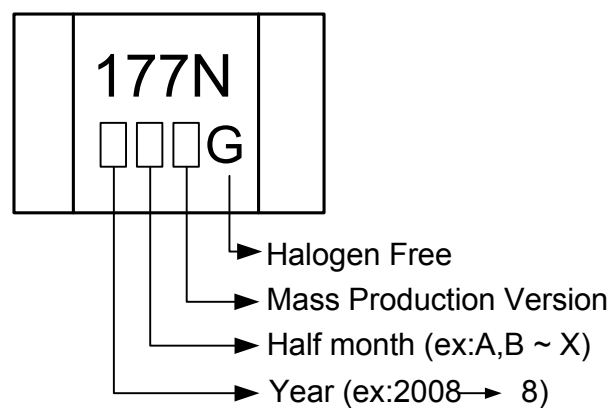
**Magnetic Characteristics**

| Parameter      | Symbol     | Conditions | Values |      |      | Unit |
|----------------|------------|------------|--------|------|------|------|
|                |            |            | Min.   | Typ. | Max. |      |
| Operate Points | $B_{OP}$   |            | +140   | -    | -    | G    |
| Release Points | $B_{RP}$   |            | -      | -    | +60  | G    |
| Hysteresis     | $B_{HYST}$ |            | 30     | -    | 120  | G    |

**Hysteresis Characteristics**

**Figure.6**

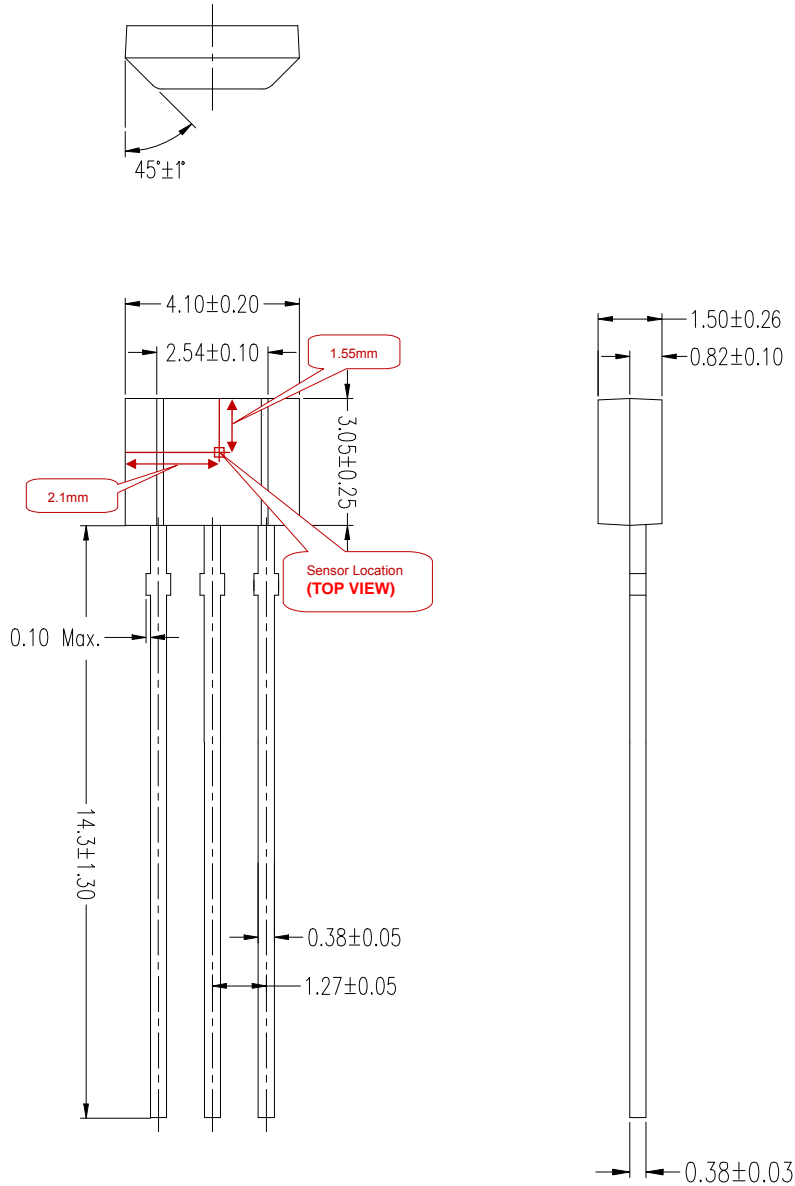
**Test Circuit**

**Figure.7**
**Marking Information**

[Top View]


**Figure.8**



**Package Dimension (Unit: mm)**  
**SIP-3L(Halogen Free)**



**Order Information**

| Part Number | Operating Temperature | Package | MOQ    |
|-------------|-----------------------|---------|--------|
| FS177NG1    | -40 °C to +150 °C     | SIP-3L  | 1000ea |