

## Single Phase Hall Effect Switch

### ■ Features

- 4.2V to 28V DC operation voltage
- Temperature compensation
- Wide operating voltage range
- Open drain pre-driver
- 25mA maximum sinking output current.
- Package: SIP3, SOT23

### ■ Applications

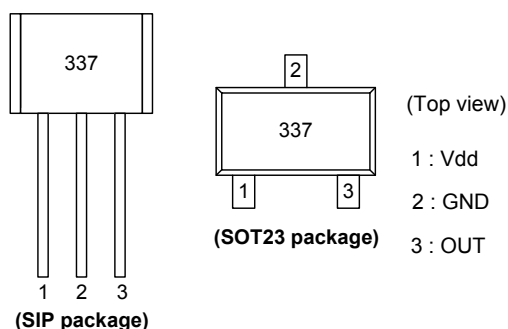
- VCD/DVD loader, CD/DVD ROM
- Cover detector
- Speed measurement
- Home appliances
- Home safety

### ■ General Description

AH337 is an switched Hall-Effect IC which is for contactless switching applications. The device includes an on-chip Hall voltage generator for magnetic sensing, an amplifier that amplifies the Hall voltage, a schmitt trigger to provide switching hysteresis for noise rejection, and an open-drain output. The bandgap regulator allows a wide operating voltage range.

If a magnetic flux density larger than threshold Bop, DO is turned on(low). The output state is held until a magnetic flux density reversal falls below Brp causing DO to be turned off (high).

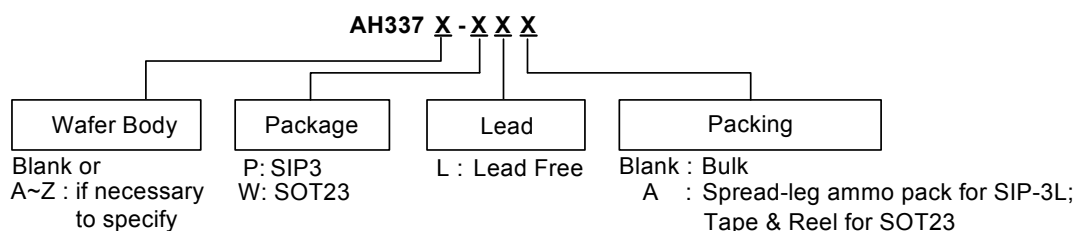
### ■ Pin Assignment



### ■ Pin Descriptions

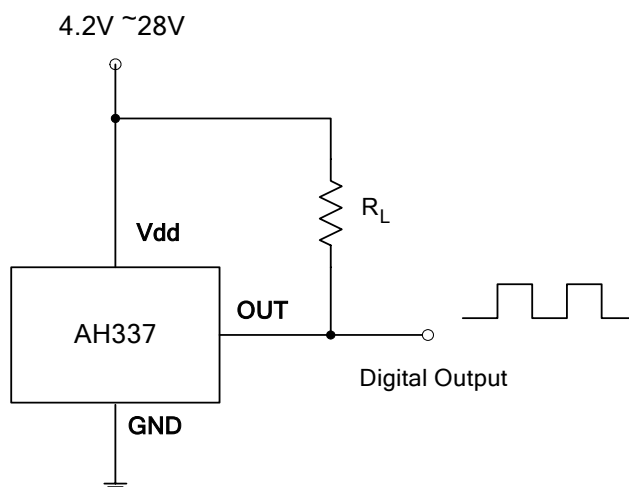
| Name | P/I/O | Pin # | Description           |
|------|-------|-------|-----------------------|
| Vdd  | P     | 1     | Positive Power Supply |
| GND  | P     | 2     | Ground                |
| OUT  | O     | 3     | Output Pin            |

### ■ Ordering Information

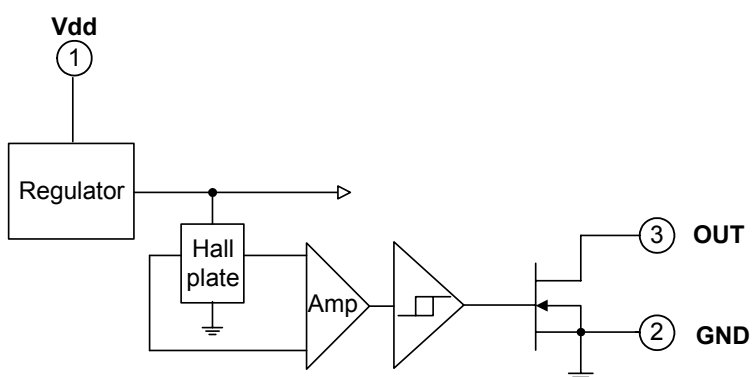


## Single Phase Hall Effect Switch

### ■ Typical Application Circuit



### ■ Functional Block Diagrams



## Single Phase Hall Effect Switch

### ■ Absolute Maximum Ratings ( at Ta=25°C )

| Characteristics             |            | Symbol          | Values    | Unit |
|-----------------------------|------------|-----------------|-----------|------|
| Supply Voltage              |            | Vdd             | 30        | V    |
| Magnetic Flux Density       |            | B               | Unlimited |      |
| Output OFF Voltage          |            | V <sub>DS</sub> | 30        | V    |
| Output "ON" Current         | Continuous | I <sub>d</sub>  | 25        | mA   |
| Operating Temperature Range |            | Ta              | -40~+125  | °C   |
| Storage Temperature Range   |            | Ts              | -65~+150  | °C   |
| Maximum Junction Temp.      |            | Tj              | 150       | °C   |
| Package Power Dissipation   | SIP-3L     | Pd              | 550       | mW   |
|                             | SOT23-3L   |                 | 230       | mW   |

### ■ Recommended Operating Conditions ( Ta=25°C )

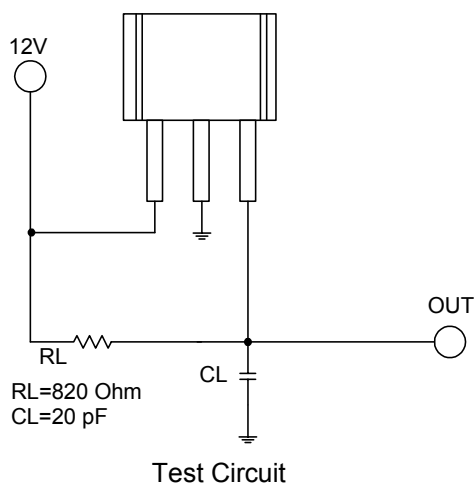
| Paramter       | Symbol | Conditions | Rating  | Unit |
|----------------|--------|------------|---------|------|
| Supply Voltage | Vdd    | Operating  | 4.2*~28 | V    |

**\*Note:** The output of IC will be switched after the supply voltage is over 4.2V, but the magnetic characteristics won't be normal until the supply is over 4.5V.

### ■ Electrical Characteristics (Ta=+ 25°C, Vdd=12V)

| Characteristic            | Symbol               | Test Conditions                             | Min | Typ  | Max | Units |
|---------------------------|----------------------|---------------------------------------------|-----|------|-----|-------|
| Output Saturation Voltage | V <sub>DS(sat)</sub> | I <sub>out</sub> =10mA, B > B <sub>op</sub> | -   | 300  | 400 | mV    |
| Output Leakage Current    | I <sub>off</sub>     | B < B <sub>rp</sub>                         | -   | <0.1 | 10  | uA    |
| Supply Current            | I <sub>dd</sub>      | Output Open                                 | -   | 2    | 4   | mA    |
| Output Rise Time          | t <sub>r</sub>       | R <sub>L</sub> =820Ω, C <sub>L</sub> =20pF  | -   | 0.1  | 1   | us    |
| Output Falling Time       | t <sub>f</sub>       | R <sub>L</sub> =820Ω, C <sub>L</sub> =20pF  | -   | 0.1  | 1   | us    |

### ■ Test Circuit

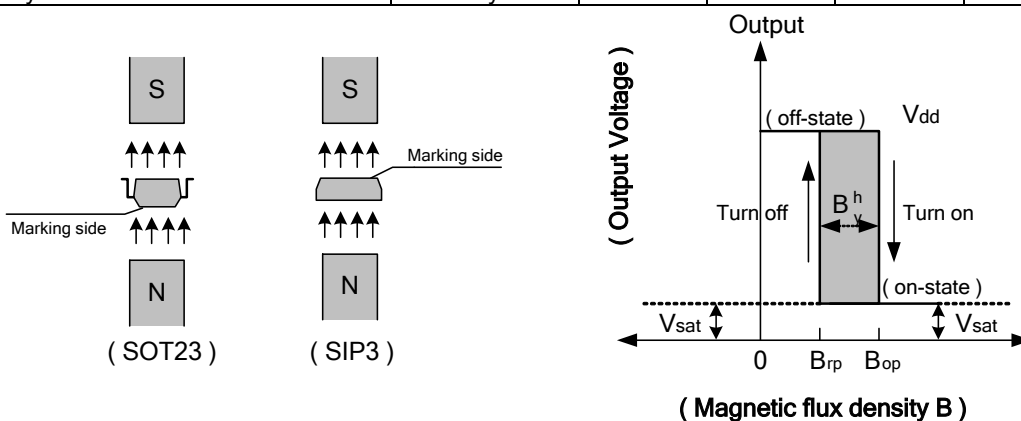


## Single Phase Hall Effect Switch

### ■ Magnetic Characteristics (Ta=25°C, Vdd=4.5V to 28V)

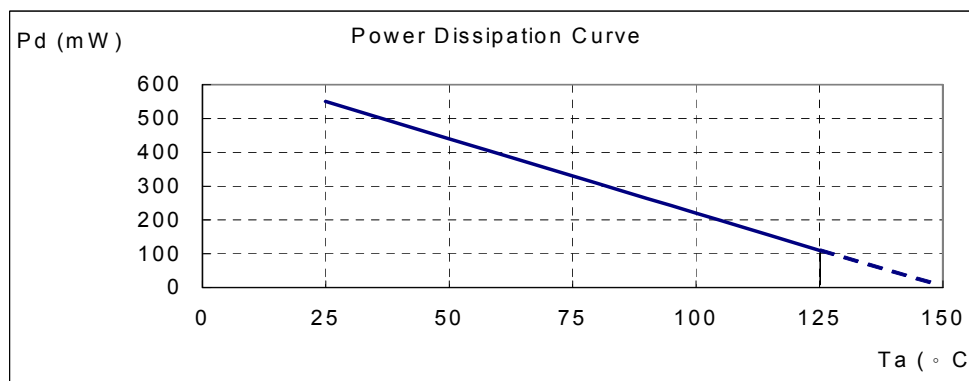
(1mT=10Gauss)

| Parameter     | Symbol           | Min. | Typ. | Max. | Unit  |
|---------------|------------------|------|------|------|-------|
| Operate Point | B <sub>op</sub>  | 90   | 120  | 150  | Gauss |
| Release Point | B <sub>rp</sub>  | 30   | 60   | 90   | Gauss |
| Hysteresis    | B <sub>hys</sub> | -    | 60   | -    | Gauss |



### ■ Performance Characteristics (SIP3)

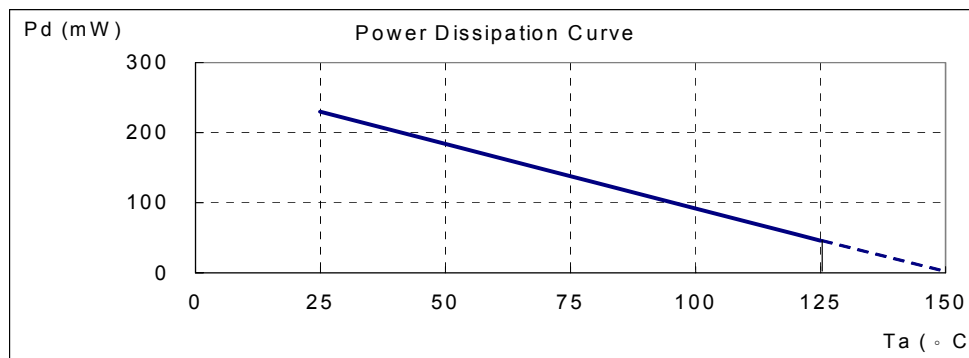
| Ta (°C) | 25  | 50  | 60  | 70  | 80  | 85  | 90  | 95  | 100 |
|---------|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| Pd (mW) | 550 | 440 | 396 | 352 | 308 | 286 | 264 | 242 | 220 |
| Ta (°C) | 105 | 110 | 115 | 120 | 125 | 130 | 135 | 140 | 150 |
| Pd (mW) | 198 | 176 | 154 | 132 | 110 | 88  | 66  | 44  | 0   |



## Single Phase Hall Effect Switch

### ■ Performance Characteristics (SOT23-3)

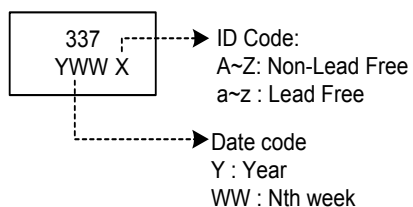
| Ta (°C) | 25  | 50  | 60  | 70  | 80  | 90  | 100 | 110 | 120 | 125 | 130 | 140 | 150 |
|---------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| Pd (mW) | 230 | 184 | 166 | 147 | 129 | 110 | 92  | 74  | 55  | 46  | 37  | 18  | 0   |



### ■ Marking Information

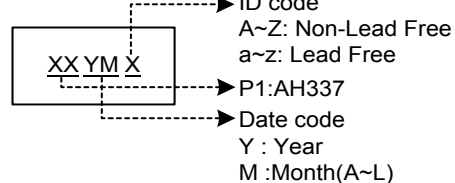
#### (1) SIP3

(Top View)



#### (2) SOT23

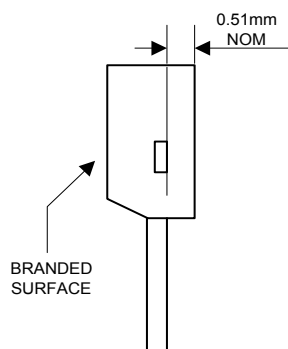
(Top View)



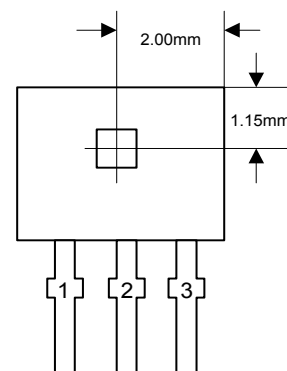
## Single Phase Hall Effect Switch

### ■ Package Information (unit: mm)

#### (1) Package Type: SIP-3L for Bulk Pack

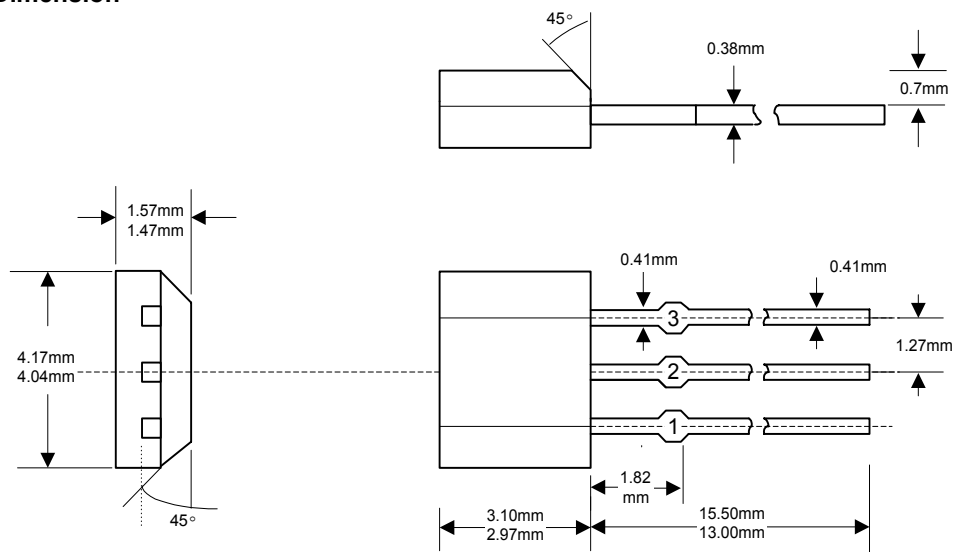


Active Area Depth



Sensor Location

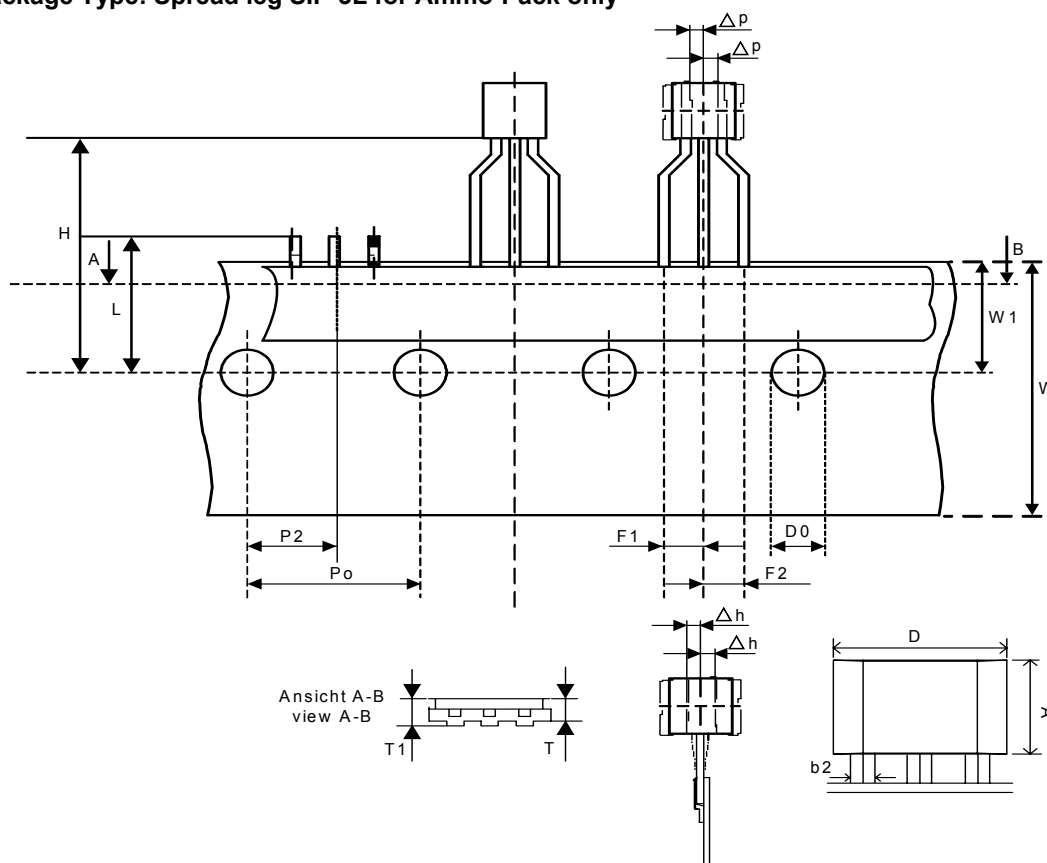
#### Package Dimension



## Single Phase Hall Effect Switch

### ■ Package Information (Continued)

(2) Package Type: Spread leg SIP-3L for Ammo-Pack only

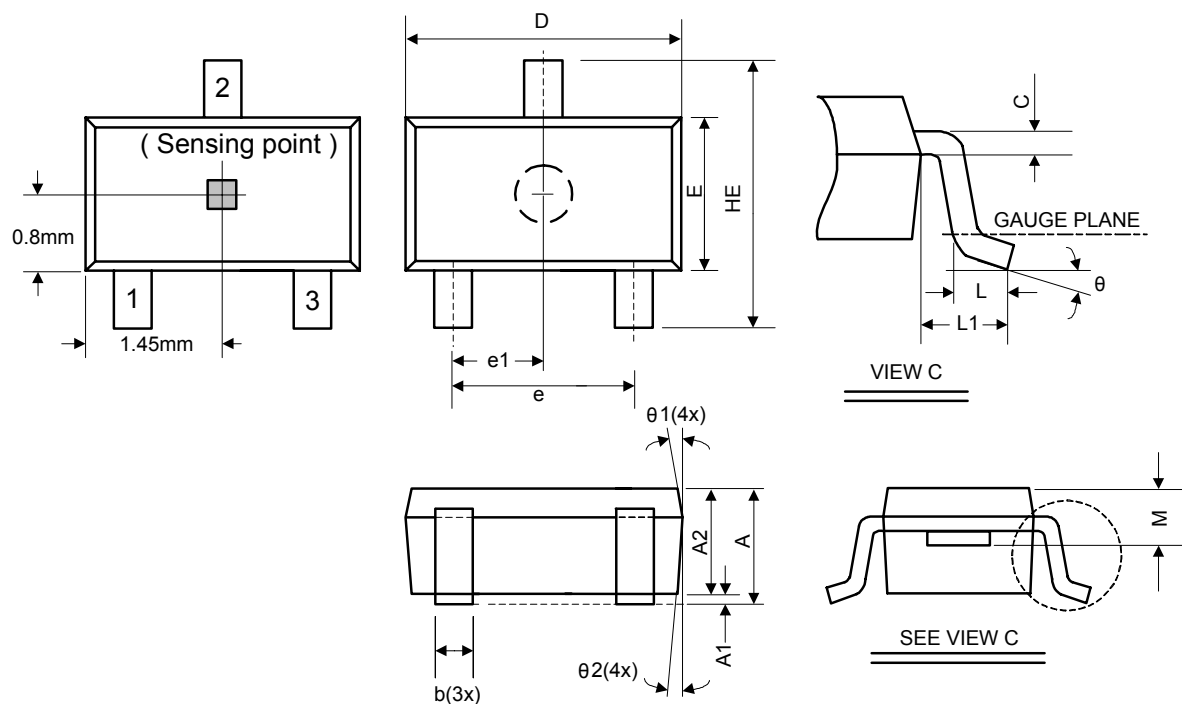


| Symbol     | Dimensions In Millimeters |      |      | Dimensions In Inches |       |       |
|------------|---------------------------|------|------|----------------------|-------|-------|
|            | Min.                      | Nom. | Max. | Min.                 | Nom.  | Max.  |
| A          | 2.80                      | 3.00 | 3.20 | 0.110                | 0.118 | 0.125 |
| D          | 3.90                      | 4.10 | 4.30 | 0.153                | 0.161 | 0.169 |
| b2         | 0.33                      | 0.38 | 0.42 | 0.012                | 0.014 | 0.016 |
| D0         | 3.80                      | 4.00 | 4.20 | 0.149                | 0.157 | 0.165 |
| F1         | 2.35                      | 2.55 | 2.75 | 0.092                | 0.100 | 0.108 |
| F2         | 2.45                      | 2.55 | 2.85 | 0.096                | 0.100 | 0.112 |
| H          | -                         | -    | 20   | -                    | -     | 0.787 |
| $\Delta h$ | -                         | -    | 1    | -                    | -     | 0.039 |
| L          | -                         | -    | 11   | -                    | -     | 0.433 |
| P0         | 12.2                      | 12.7 | 13.2 | 0.480                | 0.5   | 0.519 |
| P2         | 5.95                      | 6.35 | 6.75 | 0.234                | 0.25  | 0.265 |
| $\Delta p$ | -                         | -    | 1    | -                    | -     | 0.039 |
| T          | -                         | -    | 0.55 | -                    | -     | 0.021 |
| T1         | -                         | -    | 1.42 | -                    | -     | 0.055 |
| W          | 17.5                      | 18.0 | 18.5 | 0.688                | 0.708 | 0.728 |
| W1         | 5.5                       | 6.0  | 6.5  | 0.216                | 0.236 | 0.255 |

### ■ Package Information (Continued)

## Single Phase Hall Effect Switch

### (3) Package Type: SOT23-3L



| Symbol | Dimensions In Millimeters |      |      | Dimensions In Inches |       |       |
|--------|---------------------------|------|------|----------------------|-------|-------|
|        | Min.                      | Nom. | Max. | Min.                 | Nom.  | Max.  |
| A      | 1.05                      | -    | 1.35 | 0.041                | -     | 0.053 |
| A1     | 0.05                      | -    | 0.15 | 0.002                | -     | 0.006 |
| A2     | 1.00                      | 1.10 | 1.20 | 0.039                | 0.043 | 0.047 |
| b      | 0.25                      | -    | 0.50 | 0.010                | -     | 0.020 |
| C      | 0.08                      | -    | 0.20 | 0.003                | -     | 0.008 |
| D      | 2.70                      | 2.90 | 3.00 | 0.106                | 0.114 | 0.118 |
| E      | 1.50                      | 1.60 | 1.70 | 0.059                | 0.063 | 0.067 |
| HE     | 2.60                      | 2.80 | 3.00 | 0.102                | 0.110 | 0.118 |
| L      | 0.30                      | -    | 0.60 | 0.012                | -     | 0.024 |
| L1     | 0.50                      | 0.60 | 0.70 | 0.020                | 0.024 | 0.028 |
| M      | 0.73                      | 0.78 | 0.83 | 0.029                | 0.031 | 0.033 |
| e      | 1.80                      | 1.90 | 2.00 | 0.071                | 0.075 | 0.079 |
| e1     | 0.85                      | 0.95 | 1.05 | 0.033                | 0.037 | 0.041 |
| θ      | 0°                        | 5°   | 10°  | 0°                   | 5°    | 10°   |
| θ1     | 3°                        | 5°   | 7°   | 3°                   | 5°    | 7°    |
| θ2     | 6°                        | 8°   | 10°  | 6°                   | 8°    | 10°   |