

## General Description

The OCH1510 is an integrated Hall effect omnipolar sensor. The device using High Voltage process 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 an Open-Drain output. An internal band-gap regulator is used to provide temperature compensated supply voltage for internal circuits and allows a wide operating supply range.

## Features

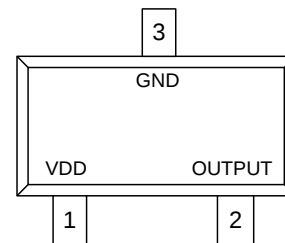
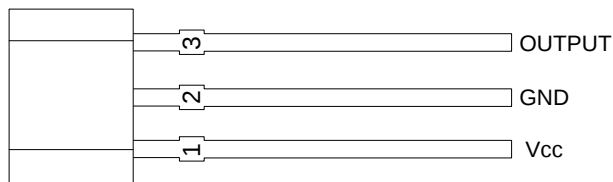
- Wide operating voltage range: 2.7V~30V
- Operating temperature range: -40°C ~+150°C
- Temperature compensation
- Reverse polarity protection
- Open-Drain pre-driver
- Package: SIP-3L、SSIP-3L、SOT23-3L

## Applications

- Rotor Position Sensing
- Brush-less DC Motor
- Speed measurement
- Revolution counting

## Pin Configuration

(Top View)



SIP-3L/SSIP3    SOT23-3L

| Name   | PIN No.           |          | Description     |
|--------|-------------------|----------|-----------------|
|        | SIP-3L<br>SSIP-3L | SOT23-3L |                 |
| VDD    | 1                 | 1        | IC Power Supply |
| GND    | 2                 | 3        | IC Ground       |
| OUTPUT | 3                 | 2        | Output PIN      |

## Application Circuit

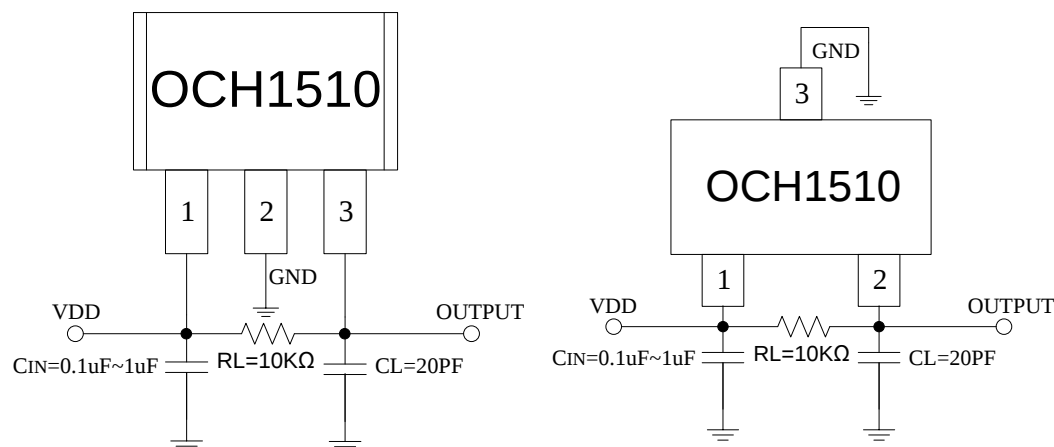


Figure 1, application circuit

Note:  $C_{IN}$  is for power stabilization and to strengthen the noise immunity, the recommended capacitance is 0.1~1uF.



## Ordering Information

| Part Number | Package Type | Packing Qty | B <sub>OP</sub> (Gauss) | B <sub>RP</sub> (Gauss) | Temperature | Eco Plan | Lead |
|-------------|--------------|-------------|-------------------------|-------------------------|-------------|----------|------|
| OCH1510MF   | SIP-3L       | 1000pcs     | ± 35(Typ.)              | ± 25(Typ.)              | -40~ 150℃   | ROHS     | Cu   |
| OCH1510WAF  | SOT23-3L     | 3000pcs     | ± 35(Typ.)              | ± 25(Typ.)              | -40~ 150℃   | ROHS     | Cu   |
| OCH1510SMAF | SSIP-3L      | 4000pcs     | ± 35(Typ.)              | ± 25(Typ.)              | -40~ 150℃   | ROHS     | Cu   |

## Block Diagram

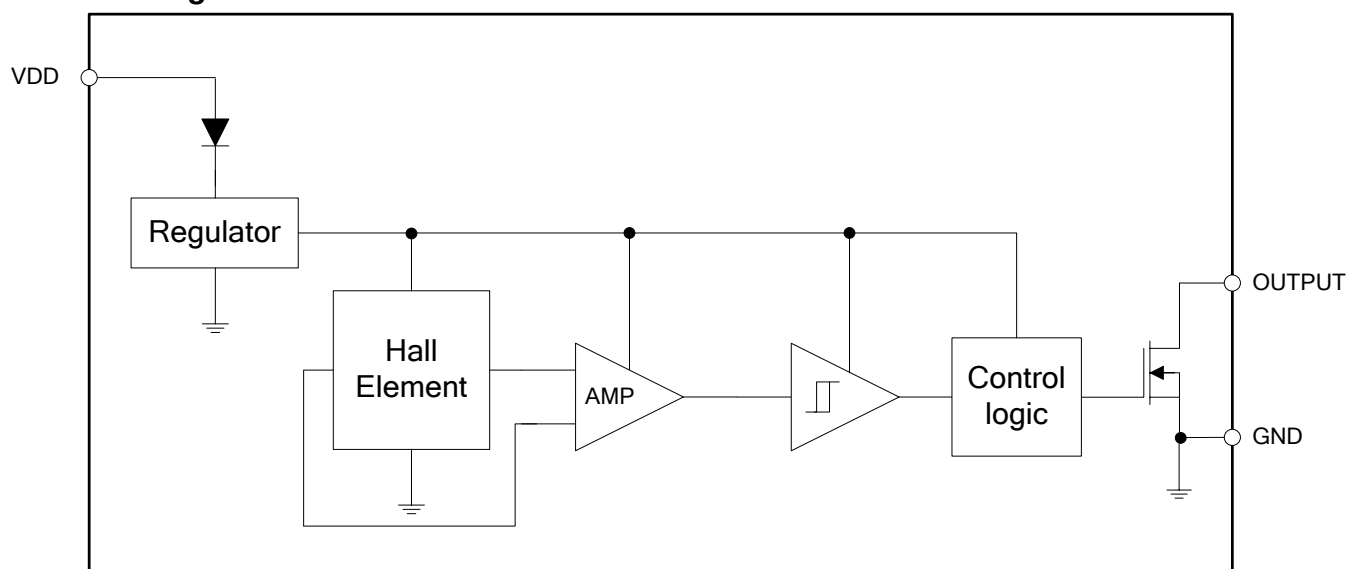


Figure 2, Block Diagram of OCH1510

## Absolute Maximum Ratings

|                                     |                     |             |
|-------------------------------------|---------------------|-------------|
| Supply Voltage                      |                     | 36V         |
| Output OFF Voltage, V <sub>DS</sub> |                     | 36V         |
| Output Maximum Sink Current(AVG)    |                     | 25mA        |
| Power Dissipation (SIP-3L、SSIP-3L)  | T <sub>a</sub> =25℃ | 400mW       |
| Power Dissipation (SOT23-3L)        | T <sub>a</sub> =25℃ | 260mW       |
| Thermal Resistance (SIP-3L、SSIP-3L) | T <sub>ja</sub>     | 0.34℃/mW    |
|                                     | T <sub>jc</sub>     | 0.42℃/mW    |
| Thermal Resistance (SOT23-3L)       | T <sub>ja</sub>     | 0.52℃/mW    |
|                                     | T <sub>jc</sub>     | 0.64℃/mW    |
| Operating Temperature Range         |                     | -40℃ ~+150℃ |
| Storage Temperature Range           |                     | -65℃ ~+150℃ |
| Junction Temperature                |                     | +150℃       |
| Lead Temperature(Soldering,10 sec)  |                     | +260℃       |

## DC Electrical Characteristics(at T<sub>a</sub>=25℃)

| Parameter         | Symbol          | Test Conditions    | Min. | Typ. | Max. | Unit |
|-------------------|-----------------|--------------------|------|------|------|------|
| Operating Voltage | V <sub>DD</sub> |                    | 2.7  | -    | 30   | V    |
| Supply current    | I <sub>DD</sub> | No use pin is open | 0.8  | 2.45 | 5    | mA   |



|                           |           |                                   |     |     |     |         |
|---------------------------|-----------|-----------------------------------|-----|-----|-----|---------|
|                           |           | $V_{DD}: 2.7V \sim 28V$ , OUT "H" |     |     |     |         |
| Output Saturation Voltage | $V_{SAT}$ | $V_{CC}=5V$ , OUT "L", $I_o=15mA$ | -   | 0.3 | 0.5 | V       |
| Output drop voltage       | $V_d$     | $V_{CC}=5V$ , OUT "H" $I_o=0mA$   | -   | -   | 10  | mV      |
| Output current limitation | $I_L$     | Intenally limited                 | 35  | 55  | 75  | mA      |
| Output rise time          | $t_r$     | $R_L=1.5K\Omega$ , $C_L=50PF$     | 0.1 | 0.5 | 1   | $\mu S$ |
| Output fall time          | $t_f$     | $R_L=1.5K\Omega$ , $C_L=50PF$     | 0.1 | 0.5 | 1   | $\mu S$ |
| ESD Voltage (HBM)         | $V_{ESD}$ | $R=1.5K\Omega$ , $C=100pF$        | 8   |     |     | KV      |
| Delay Time                | $t_d$     |                                   |     | 15  | 25  | $\mu S$ |
| Chopper frequency         | $f_c$     |                                   |     | 350 |     | KHZ     |

## ■ Magnetic Characteristics

| $T_a=25^\circ C$         |        |      |      |      |      |
|--------------------------|--------|------|------|------|------|
| Parameter                | Symbol | Min. | Typ. | Max. | Unit |
| South Pole Operate point | Bops   | 10   | 35   | 55   | G    |
| South Pole Release Point | Brps   | 5    | 25   | 50   | G    |
| South Pole Hysteresis    | Bhys   | 3    | 10   | 17   | G    |
| North Pole Operate point | BopN   | -55  | -35  | -10  | G    |
| North Pole Release Point | BrpN   | -50  | -25  | -5   | G    |
| North Pole Hysteresis    | BhyN   | 5    | 10   | 17   | G    |

## ■ Output VS Magnetic Pole

| Part No. | Magnetic Pole | Test Conditions | Output |
|----------|---------------|-----------------|--------|
| OCH1510  | South Pole    | $B > B_{ops}$   | Low    |
| OCH1510  | South Pole    | $B < B_{rps}$   | High   |
| OCH1510  | North Pole    | $B > B_{opN}$   | High   |
| OCH1510  | North Pole    | $B < B_{rpN}$   | Low    |

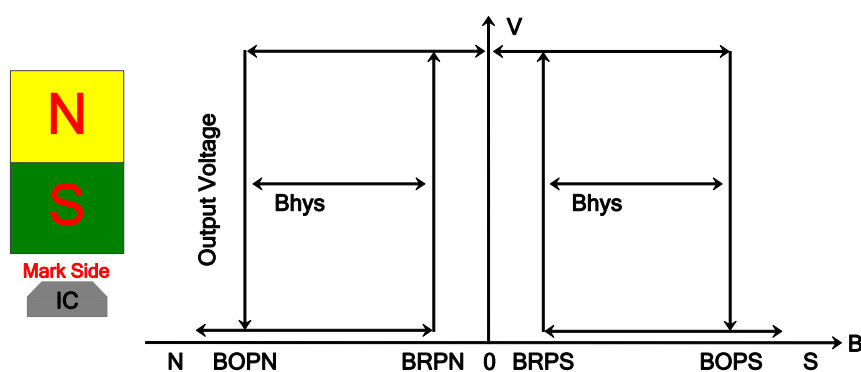
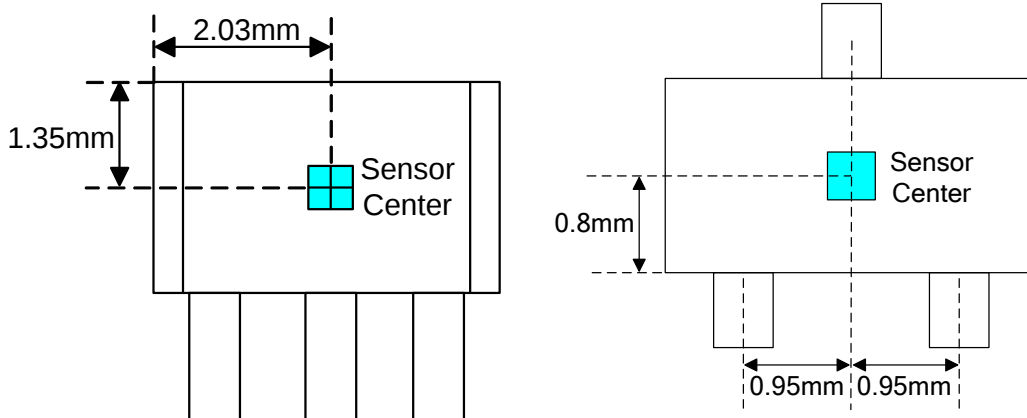


Figure 3, Operational Characteristics



## ■ Hall Sensor Location

TOP View



SIP-3L/SSIP-3L SOT23-3L  
Fig. 4, Hall Sensor Location

## ■ Land Pattern (for reference only)

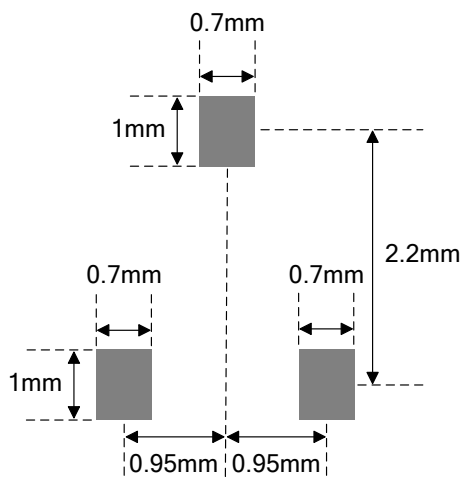
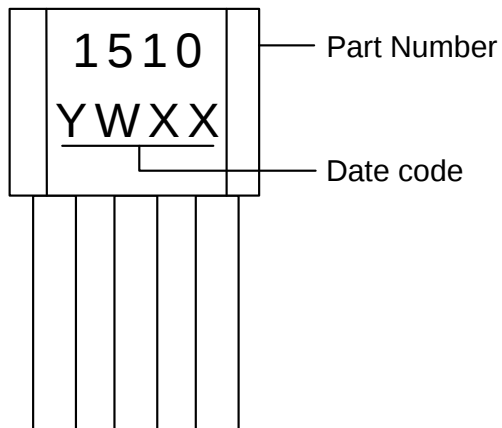


Figure 5, Land Pattern Dimension (SOT23-3L)

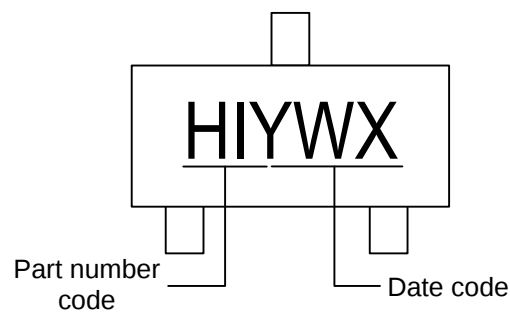


## ■ Marking Information

### 1) SIP-3L/SSIP-3L

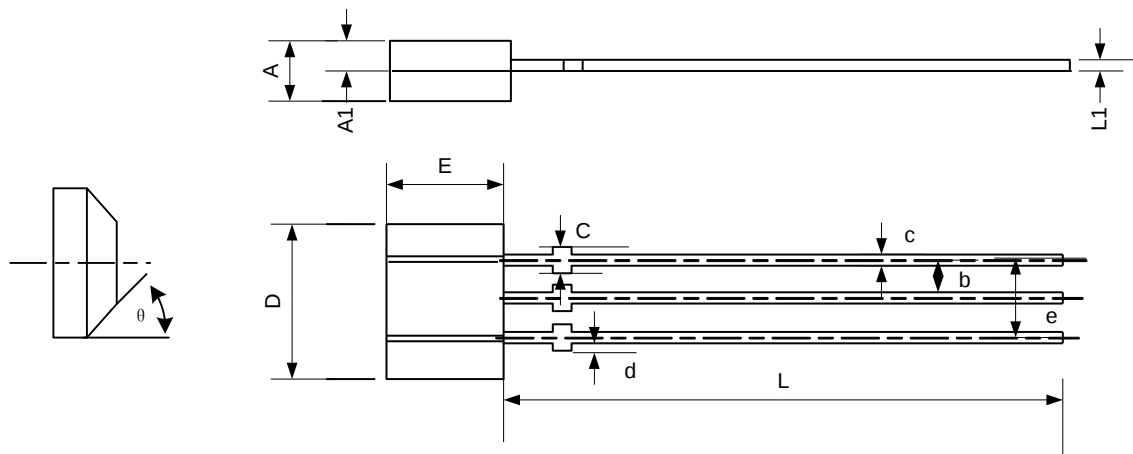


### 2) SOT23-3L



## ■ Package Information

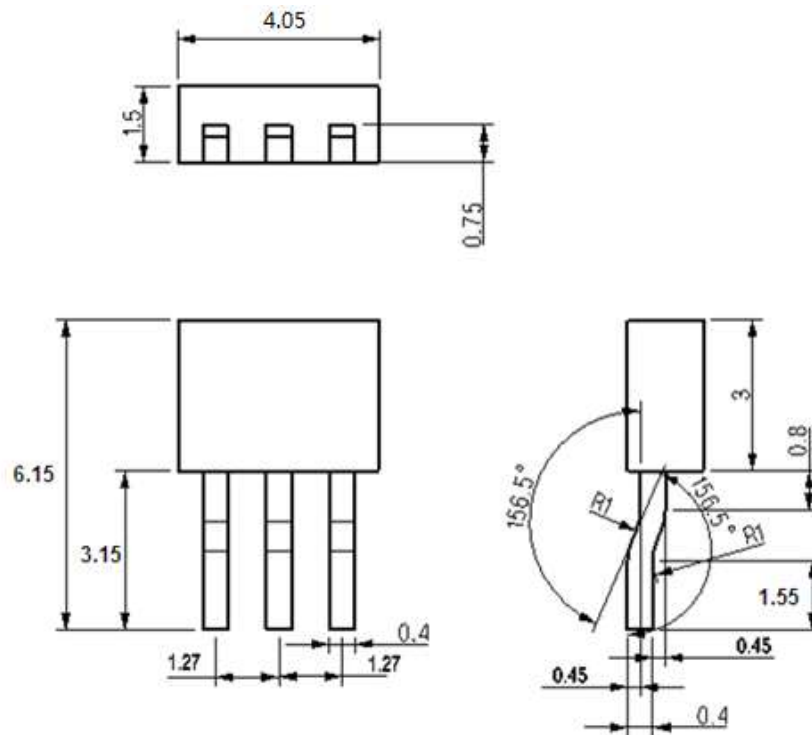
### 1) SIP-3L



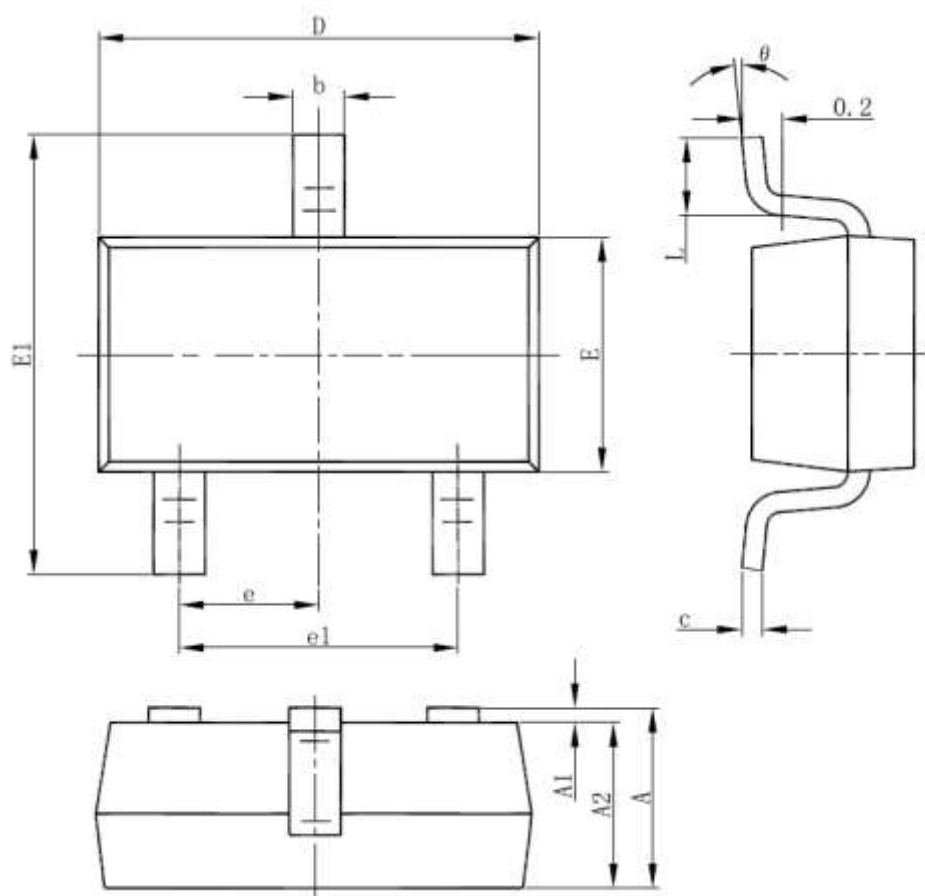
| Symbol | Dimensions In Millimeters |       | Dimensions In Inches |       |
|--------|---------------------------|-------|----------------------|-------|
|        | Min.                      | Max.  | Min.                 | Max.  |
| A      | 1.245                     | 1.753 | 0.049                | 0.069 |
| A1     | 0.750REF                  |       | 0.030REF             |       |
| b      | 1.270REF                  |       | 0.050REF             |       |
| C      | 0.406                     | 0.550 | 0.016                | 0.022 |
| c      | 0.330                     | 0.495 | 0.013                | 0.019 |
| D      | 4.05REF                   |       | 0.159REF             |       |
| d      |                           | 0.100 |                      | 0.004 |
| E      | 2.73                      | 3.27  | 0.107                | 0.129 |
| e      | 2.740REF                  |       | 0.100REF             |       |
| L      | 13.60                     | 15.60 | 0.535                | 0.614 |
| L1     | 0.350                     | 0.410 | 0.014                | 0.016 |
| θ      |                           | 45°   |                      | 45°   |



2) SSIP-3L



## 3) SOT23-3L



| Symbol | Dimensions In Millimeters |       |       | Dimensions In Inches |       |       |
|--------|---------------------------|-------|-------|----------------------|-------|-------|
|        | Min.                      | Typ.  | Max.  | Min.                 | Typ.  | Max.  |
| A      | 1.050                     | 1.15  | 1.250 | 0.041                | 0.045 | 0.049 |
| A1     | 0.000                     | 0.050 | 0.100 | 0.000                | 0.002 | 0.004 |
| A2     | 1.050                     | 1.100 | 1.150 | 0.041                | 0.043 | 0.045 |
| b      | 0.300                     | 0.400 | 0.500 | 0.012                | 0.016 | 0.020 |
| c      | 0.100                     | 0.150 | 0.200 | 0.004                | 0.006 | 0.008 |
| D      | 2.820                     | 2.920 | 3.020 | 0.111                | 0.115 | 0.119 |
| E      | 1.500                     | 1.600 | 1.700 | 0.059                | 0.063 | 0.067 |
| E1     | 2.650                     | 2.800 | 2.950 | 0.104                | 0.110 | 0.116 |
| e1     | 1.800                     | 1.900 | 2.000 | 0.071                | 0.075 | 0.079 |
| e      | 0.950 REF                 |       |       | 0.037 REF            |       |       |
| L      | 0.300                     | 0.450 | 0.600 | 0.012                | 0.018 | 0.024 |
| θ      | 0°                        | 4°    | 8°    | 0°                   | 4°    | 8°    |

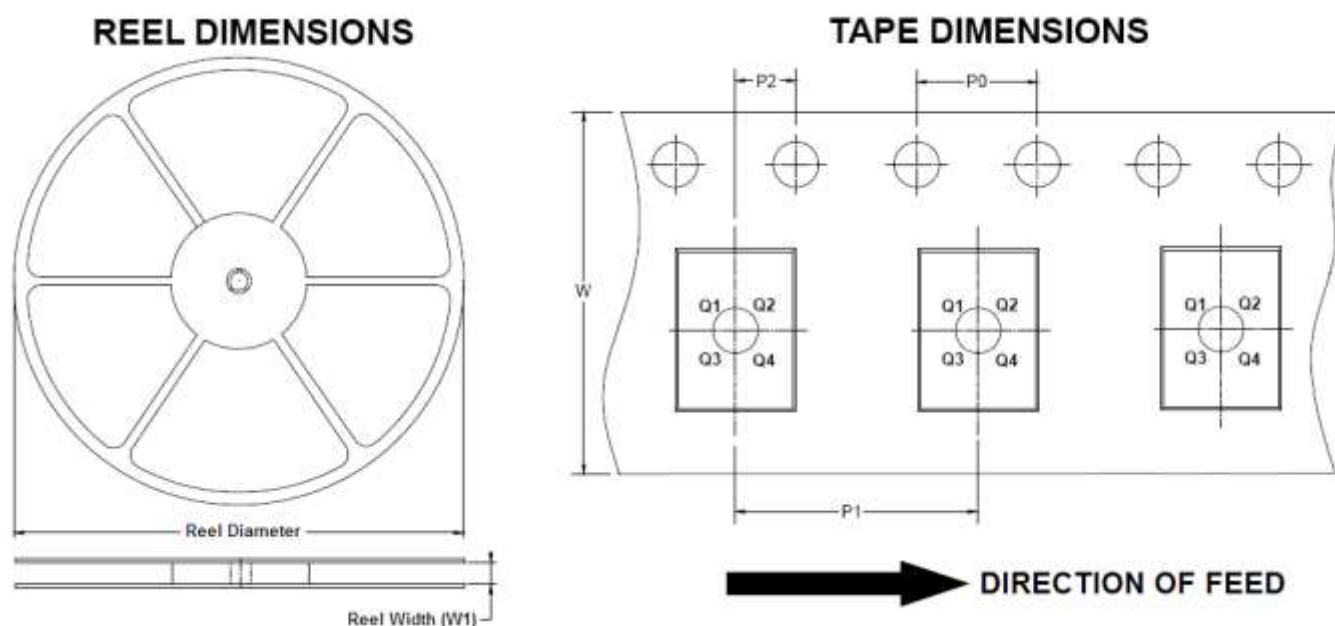


## ■ Packing Information

### 1) SIP-3L

1. Packing type: Box
2. Packing minimum: 1000pcs

### 2) SSIP-3L

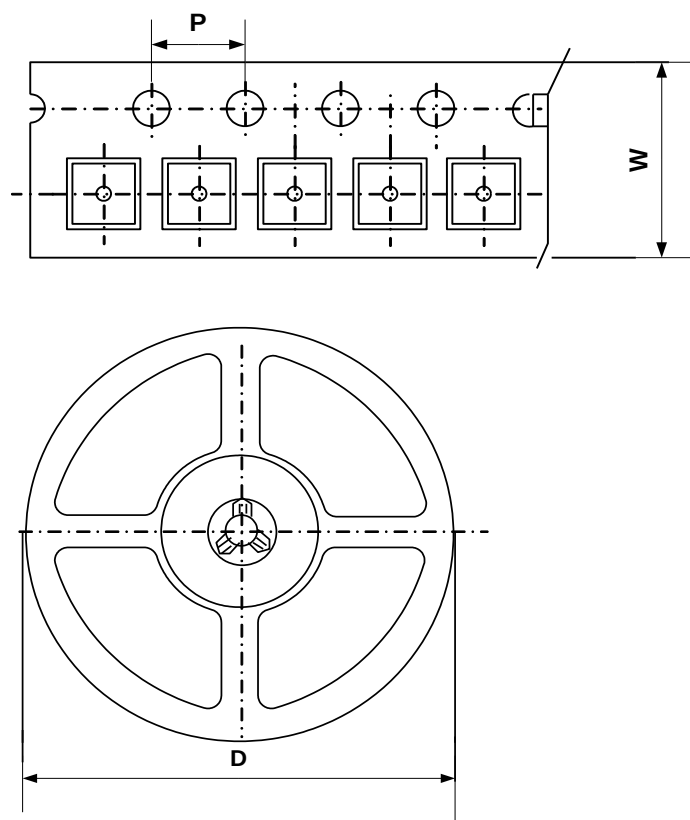


Note: The picture is only for reference. Please make the object as the standard.

| Package Type | SPQ (PCS) | Reel Width W1 (mm) | P0 (mm) | P1 (mm) | P2 (mm) | W (mm) | Pin1 Quadrant |
|--------------|-----------|--------------------|---------|---------|---------|--------|---------------|
| SSIP-3L      | 4000      | 12                 | 4       | 8       | 2       | 12     | Q1            |



3)SOT23-3L



| Package Type | Carrier Width (W) | Pitch (P)  | Reel Size(D) | Packing Minimum |
|--------------|-------------------|------------|--------------|-----------------|
| SOT23-3L     | 8.0±0.1 mm        | 4.0±0.1 mm | 180±1 mm     | 3000pcs         |



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