

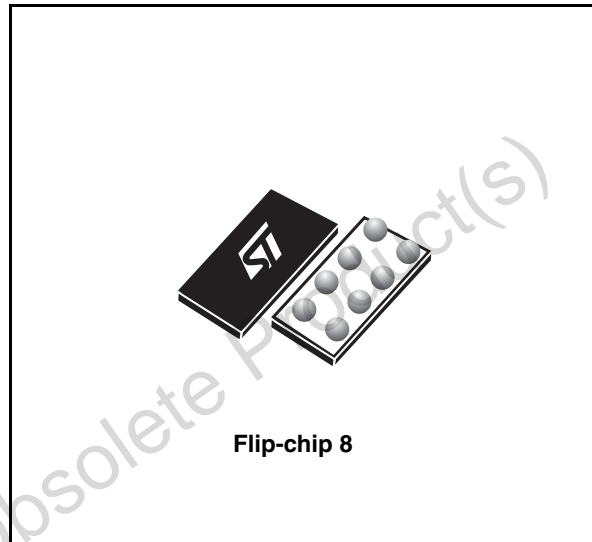
Triple buffer/driver with open drain

Features

- 5 V tolerant inputs
- High speed: $t_{PD} = 3.7$ ns (max.) at $V_{CC} = 3.3$ V
- Low power dissipation:
 - $I_{CC} = 10$ μ A (max.) at $T_A = 85$ °C
- Power down protection on inputs and outputs
- Operating voltage range:
 - $V_{CC} (opr) = 1.65$ to 5.5 V
- Latch-up performance exceeds 300 mA (JESD 17)
- ESD performance
 - 2000-V human body model (JESD 22 A114-A)
 - 200-V machine model (JESD 22 A115-A)
 - 1000-V charge device model (JESD 22 C101)

Applications

- Mobile phones



Description

The 74LX3G07 is a low voltage CMOS triple buffer/driver (open drain) fabricated with sub-micron silicon gate and double-layer metal wiring C²MOS technology.

The internal circuit composed of 2 stages including buffer output, provides high noise immunity and stable output.

Power down protection is provided on input and 0 to 7 V can be accepted on input with no regards to the supply voltage. This device can be used to interface 5 to 3 V.

Table 1. Device summary

| Order code | Package | Packaging |
|-------------|-------------|---------------|
| 74LX3G07BJR | Flip-chip 8 | Tape and reel |

1 Pin connection

Figure 1. Pin connection and IEC symbols

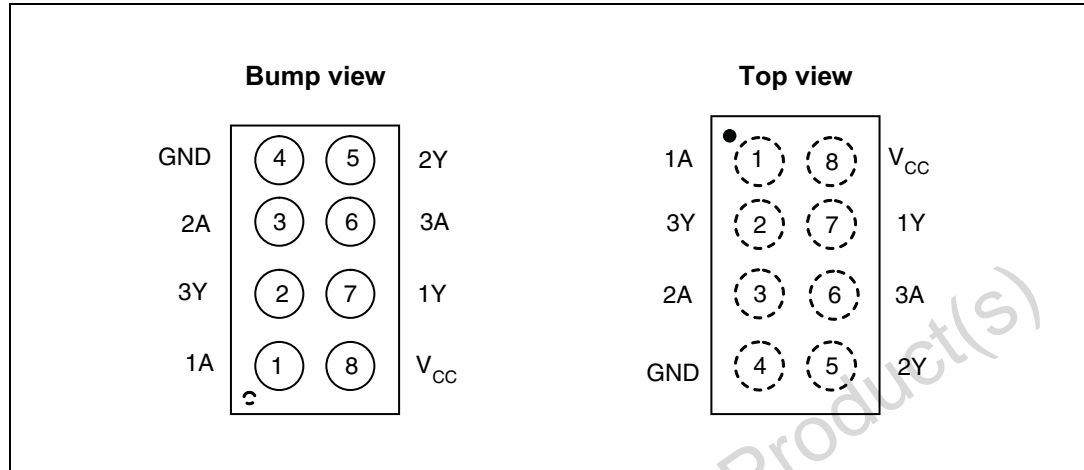


Table 2. Pin assignments

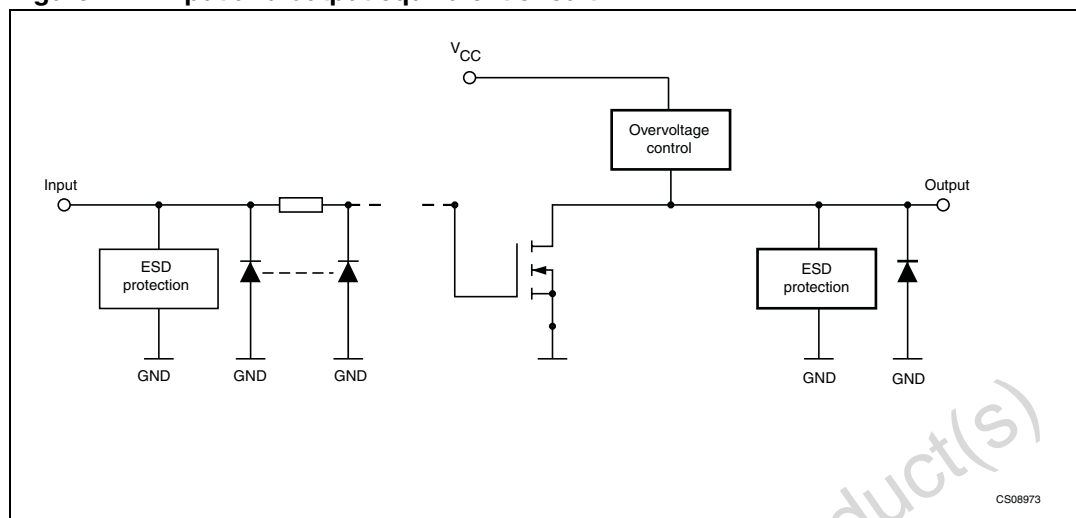
| Pin number | Symbol | Name and function |
|------------|-----------------|-------------------------|
| 1 | 1A | Data input 1 |
| 2 | 3Y | Data output 3 |
| 3 | 2A | Data input 2 |
| 4 | GND | Ground (0V) |
| 5 | 2Y | Data output 2 |
| 6 | 3A | Data input 3 |
| 7 | 1Y | Data output 1 |
| 8 | V _{CC} | Positive supply voltage |

Table 3. Truth table

| nA | nY |
|----|----|
| L | L |
| H | Z |

Z: High impedance

Figure 2. Input and output equivalent circuit



Obsolete Product(s) - Obsolete Product(s)

2 Maximum rating

Stressing the device above the rating listed in the “Absolute maximum ratings” table may cause permanent damage to the device. These are stress ratings only and operation of the device at these or any other conditions above those indicated in the operating sections of this specification is not implied. Exposure to absolute maximum rating conditions for extended periods may affect device reliability.

Table 4. Absolute maximum ratings

| Symbol | Parameter | Value | Unit |
|-----------|---------------------------------------|------------------------|------|
| V_{CC} | Supply voltage | -0.5 to +7.0 | V |
| V_I | DC input voltage | -0.5 to +7.0 | V |
| V_O | DC output voltage ($V_{CC} = 0$ V) | -0.5 to +7.0 | V |
| V_O | DC output voltage (high or low state) | -0.5 to $V_{CC} + 0.5$ | V |
| I_{IK} | DC input diode current | - 50 | mA |
| I_{OK} | DC output diode current | - 50 | mA |
| I_O | DC output current | ± 50 | mA |
| I_{CC} | DC supply current per supply pin | ± 100 | mA |
| I_{GND} | DC ground current per supply pin | ± 100 | mA |
| T_{stg} | Storage temperature | -65 to +150 | °C |
| T_L | Lead temperature (10 sec) | 300 | °C |

2.1 Recommended operating conditions

Table 5. Recommended operating conditions

| Symbol | Parameter | Value | Unit |
|----------|--|---------------|------|
| V_{CC} | Supply voltage | 1.65 to 5.5 | V |
| V_I | Input voltage | 0 to 5.5 | V |
| V_O | Output voltage ($V_{CC} = 0$ V) | 0 to 5.5 | V |
| V_O | Output voltage (high or low state) | 0 to V_{CC} | V |
| I_{OL} | High or low level output current ($V_{CC} = 4.5$ to 5.5 V) | + 32 | mA |
| I_{OL} | High or low level output current ($V_{CC} = 3.0$ to 3.6 V) | +24 | mA |
| I_{OL} | High or low level output current ($V_{CC} = 2.7$ to 3.0 V) | +12 | mA |
| I_{OL} | High or low level output current ($V_{CC} = 2.3$ to 2.7 V) | +8 | mA |
| I_{OL} | High or low level output current ($V_{CC} = 1.65$ to 2.3 V) | +4 | mA |
| T_{op} | Operating temperature | -40 to 85 | °C |
| dt/dv | Input rise and fall time | 0 to 10 | ns/V |

3 Electrical characteristics

Table 6. DC specifications

| Symbol | Parameter | Test condition | | Value | | Unit |
|------------------|---------------------------------------|------------------------|---|----------------------|----------------------|------|
| | | V _{CC} (V) | | -40 to 85 °C | | |
| | | | | Min | Max | |
| V _{IH} | High level input voltage | 1.65 – 1.95 | | 0.65 V _{CC} | | V |
| | | 2.3 – 2.7 | | 0.7 V _{CC} | | |
| | | 3.0 – 5.5 | | 0.7 V _{CC} | | |
| V _{IL} | Low level input voltage | 1.65 – 1.95 | | | 0.35 V _{CC} | V |
| | | 2.3 – 2.7 | | | 0.3 V _{CC} | |
| | | 3.0 – 5.5 | | | 0.3 V _{CC} | |
| V _{OL} | Low level output voltage | 1.65 – 4.5 | I _O = 100 µA | | 0.1 | V |
| | | 1.65 | I _O = 4 mA | | 0.45 | |
| | | 2.3 | I _O = 8 mA | | 0.3 | |
| | | 3.0 | I _O = 16 mA | | 0.4 | |
| | | | I _O = 24 mA | | 0.55 | |
| 4.5 | I _O = 32 mA | | 0.55 | | | |
| I _{OZ} | High impedance output leakage current | 3.6 | V _I = 5.5 V | | ±10 | µA |
| I _I | Input leakage current | 1.65 – 5.5 | V _I = 0 – 5.5 V | | ±5 | µA |
| I _{off} | Power off leakage current | 0 | V _I or V _O = 5.5 V | | 10 | µA |
| I _{CC} | Quiescent supply current | 1.65 – 5.5 | V _I = V _{CC} or GND | | 10 | µA |
| | | 3.6 | V _I or V _O = 3.6 to 5.5 V | | ±10 | |

Table 7. AC electrical characteristics

| Symbol | Parameter | Test conditions | | | | Value | | Unit |
|------------------|------------------------|------------------------|------------------------|-----------------------|---|--------------|-----|------|
| | | V _{CC} (V) | C _L (pF) | R ₁ (Ω) | t _s = t _r (ns) | -40 to 85 °C | | |
| | | | | | | Min | Max | |
| t _{PLZ} | Propagation delay time | 1.65 – 1.95 | 30 | 1000 | 2.0 | 1.5 | 7.8 | ns |
| | | 2.3 – 2.7 | 30 | 500 | 2.0 | 1.0 | 4.3 | |
| | | 3.0 – 3.6 | 50 | 500 | 2.5 | 1.1 | 3.7 | |
| | | 4.5 – 5.5 | 50 | 500 | 2.5 | 1.0 | 2.9 | |
| t _{PZL} | Propagation delay time | 1.65 – 1.95 | 30 | 1000 | 2.0 | 1.5 | 7.8 | ns |
| | | 2.3 – 2.7 | 30 | 500 | 2.0 | 1.0 | 4.3 | |
| | | 3.0 – 3.6 | 50 | 500 | 2.5 | 1.1 | 3.7 | |
| | | 4.5 – 5.5 | 50 | 500 | 2.5 | 1.0 | 2.9 | |

Table 8. Capacitive characteristics

| Symbol | Parameter | Test conditions | | Value | | | Unit |
|------------------|--|------------------------|--|------------------------|-----|-----|------|
| | | V _{CC} (V) | | T _A = 25 °C | | | |
| | | | | Min | Typ | Max | |
| C _{IN} | Input capacitance | 3.3 | V _{IN} = 0 or V _{CC} | | 2.5 | | pF |
| C _{OUT} | Output capacitance | 3.3 | V _{IN} = 0 or V _{CC} | | 4 | | pF |
| C _{PD} | Power dissipation capacitance ⁽¹⁾ | 1.8 | f _{IN} = 10 MHz | | 8 | | pF |
| | | 2.5 | | | 8 | | |
| | | 3.3 | | | 8 | | |

1. C_{PD} is defined as the value of the IC's internal equivalent capacitance which is calculated from the operating current consumption without load. (Refer to test circuit). Average operating current can be obtained by the following equation: I_{CC(opr)} = C_{PD} × V_{CC} × f_{IN} + I_{CC}

Figure 3. Test circuit

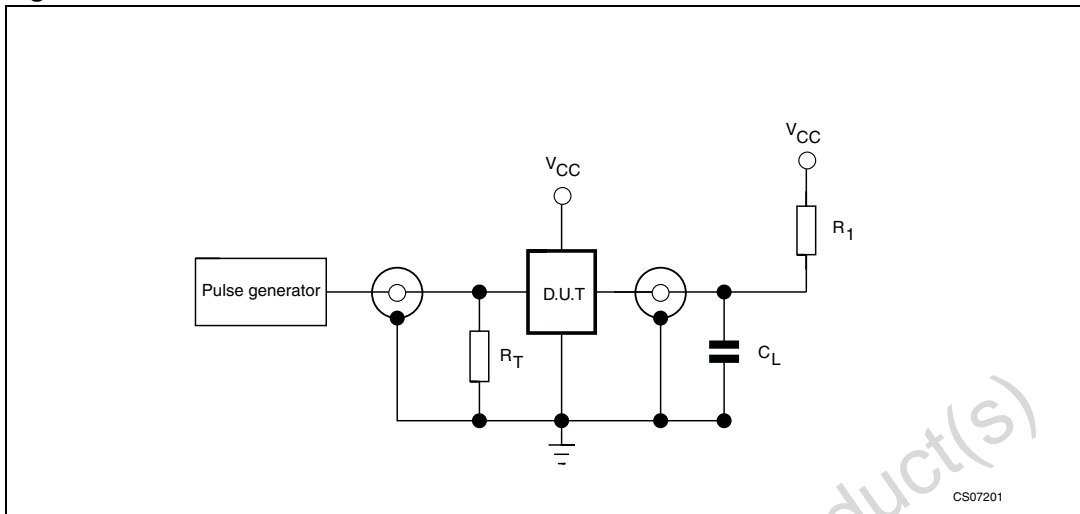
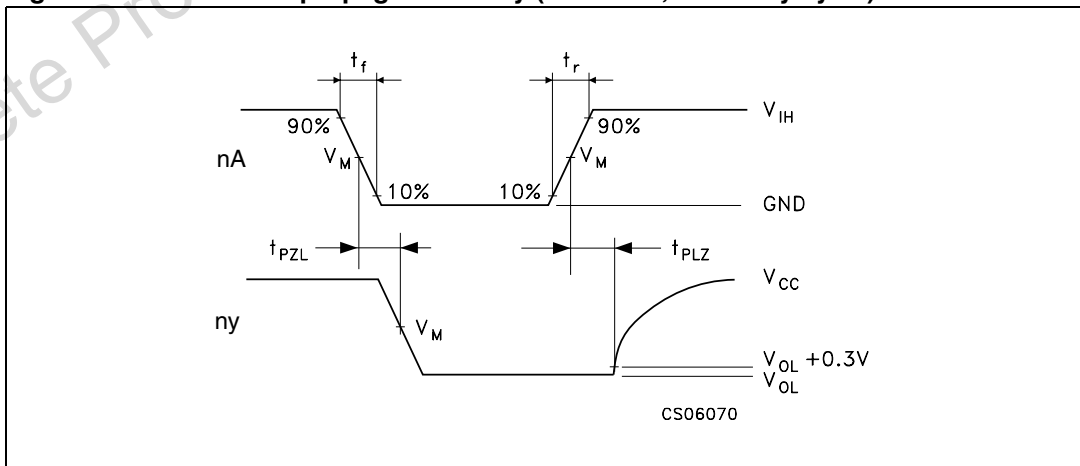


Table 9. Test circuit and waveform symbol value

| Symbol | V_{CC} | | |
|-------------|---------------|--------------|--------------|
| | 1.65 – 1.95 V | 2.3 – 2.7 V | 2.7 – 5.5 V |
| C_L | 30 pF | 30 pF/ 50 pF | 50 pF |
| R_1 | 1000 Ω | 500 Ω | 500 Ω |
| V_{IH} | V_{CC} | V_{CC} | V_{CC} |
| V_M | $V_{CC}/2$ | $V_{CC}/2$ | $V_{CC}/2$ |
| $t_r = t_f$ | < 2.0 ns | < 2.0 ns | < 2.5 ns |

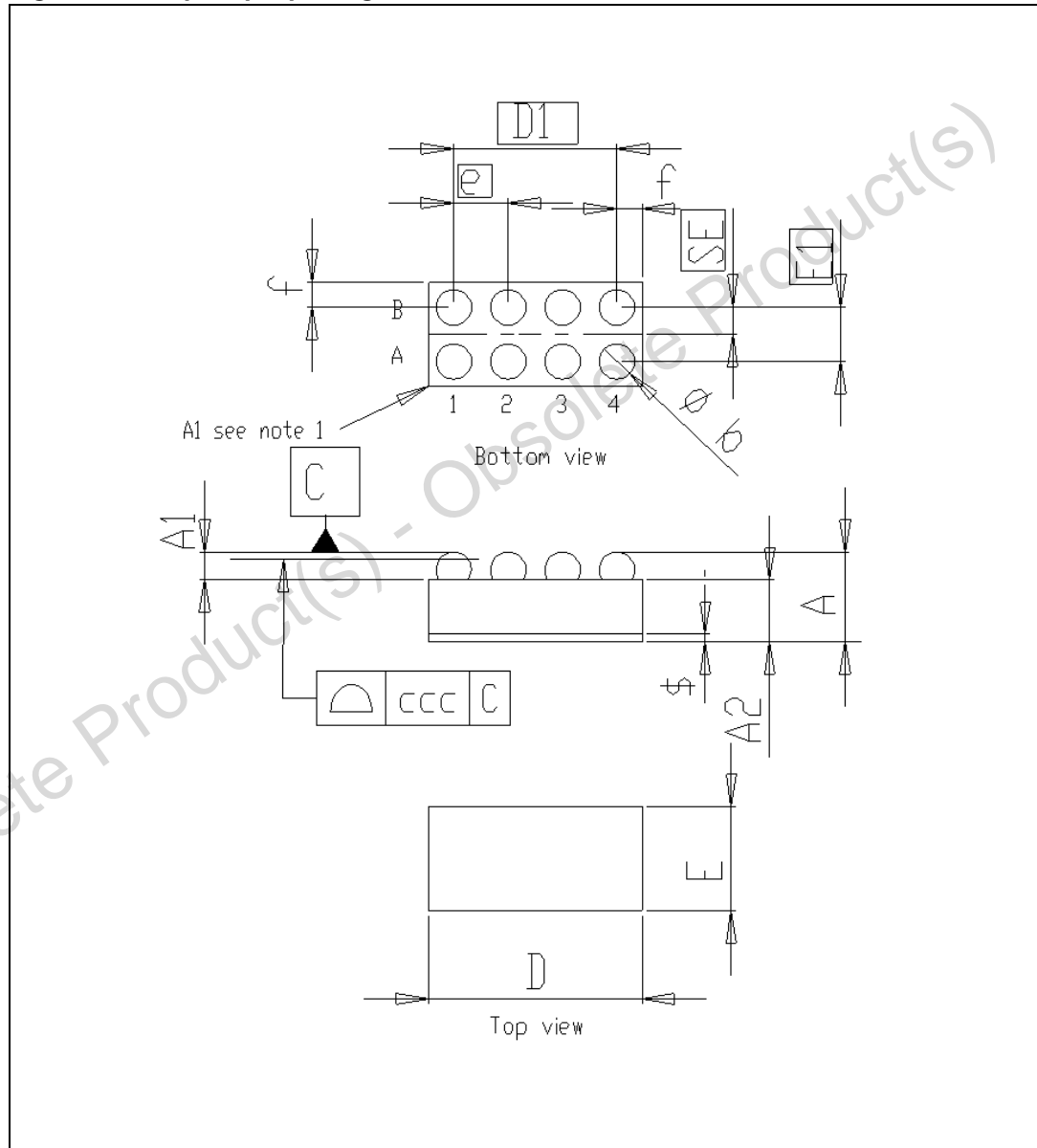
Figure 4. Waveform: propagation delay (f = 1 MHz; 50% duty cycle)



4 Package mechanical data

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Figure 5. Flip-chip 8 package outline



1. Drawing not to scale.

Table 10. Flip-chip 8 mechanical data

| Symbol | Millimeters | | |
|--------|-------------|-------|-------|
| | Min | Typ | Max |
| A | 0.535 | 0.58 | 0.625 |
| A1 | 0.18 | 0.205 | 0.23 |
| A2 | 0.355 | 0.375 | 0.395 |
| b | 0.215 | 0.255 | 0.295 |
| D | 1.85 | 1.9 | 1.95 |
| D1 | | 1.5 | |
| e | 0.45 | 0.5 | 0.55 |
| E | 0.85 | 0.9 | 0.95 |
| E1 | 0.45 | 0.5 | 0.55 |
| SE | | 0.25 | |
| f | 0.19 | 0.2 | 0.21 |
| ccc | | 0.08 | |

Figure 6. Flip-chip 8 footprint

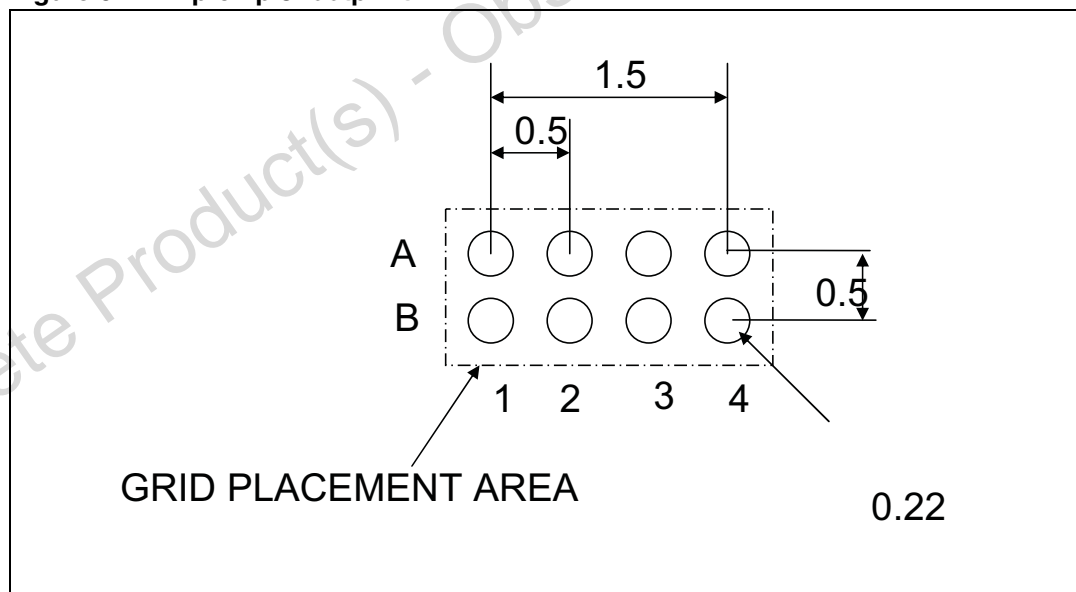


Figure 7. Flip-chip 8 tape and reel

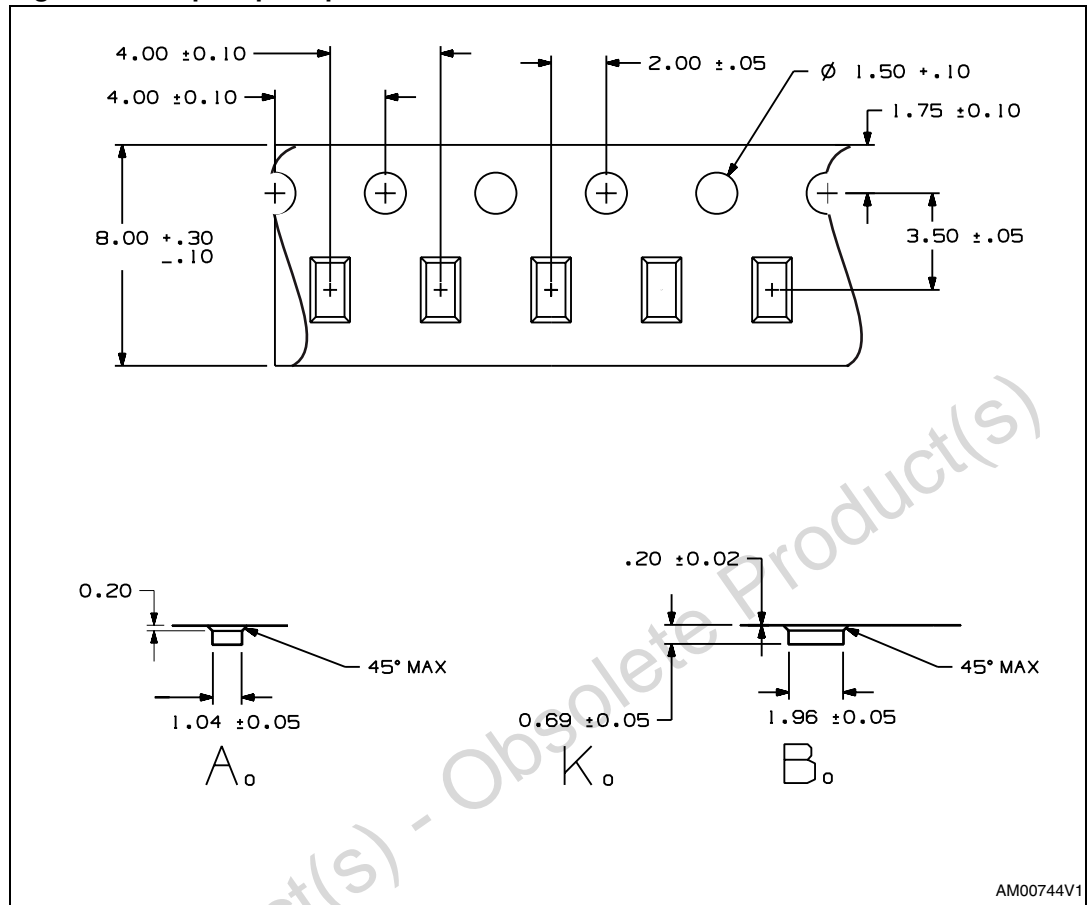


Figure 8. Tape orientation

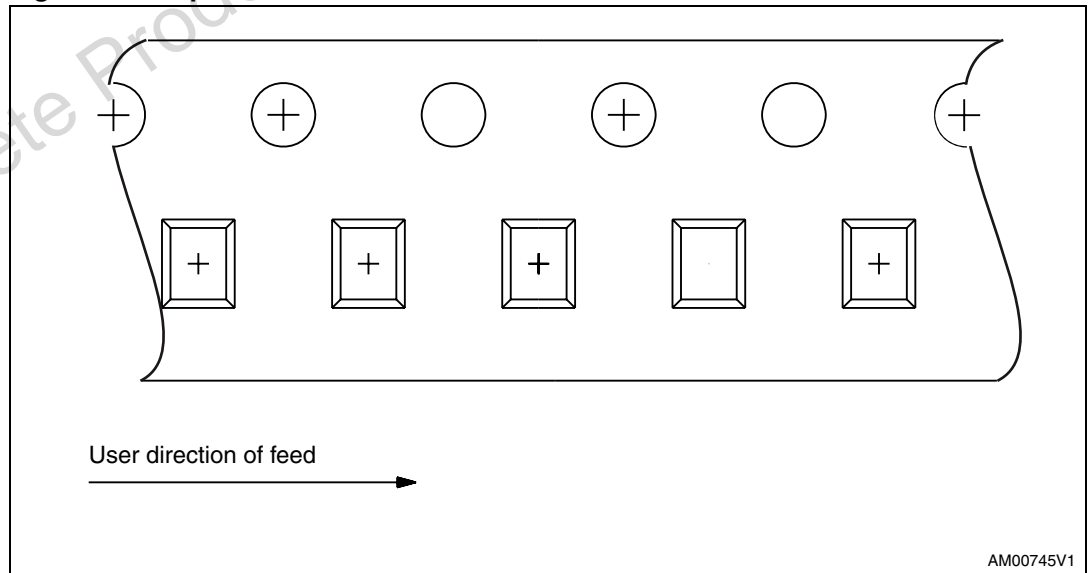
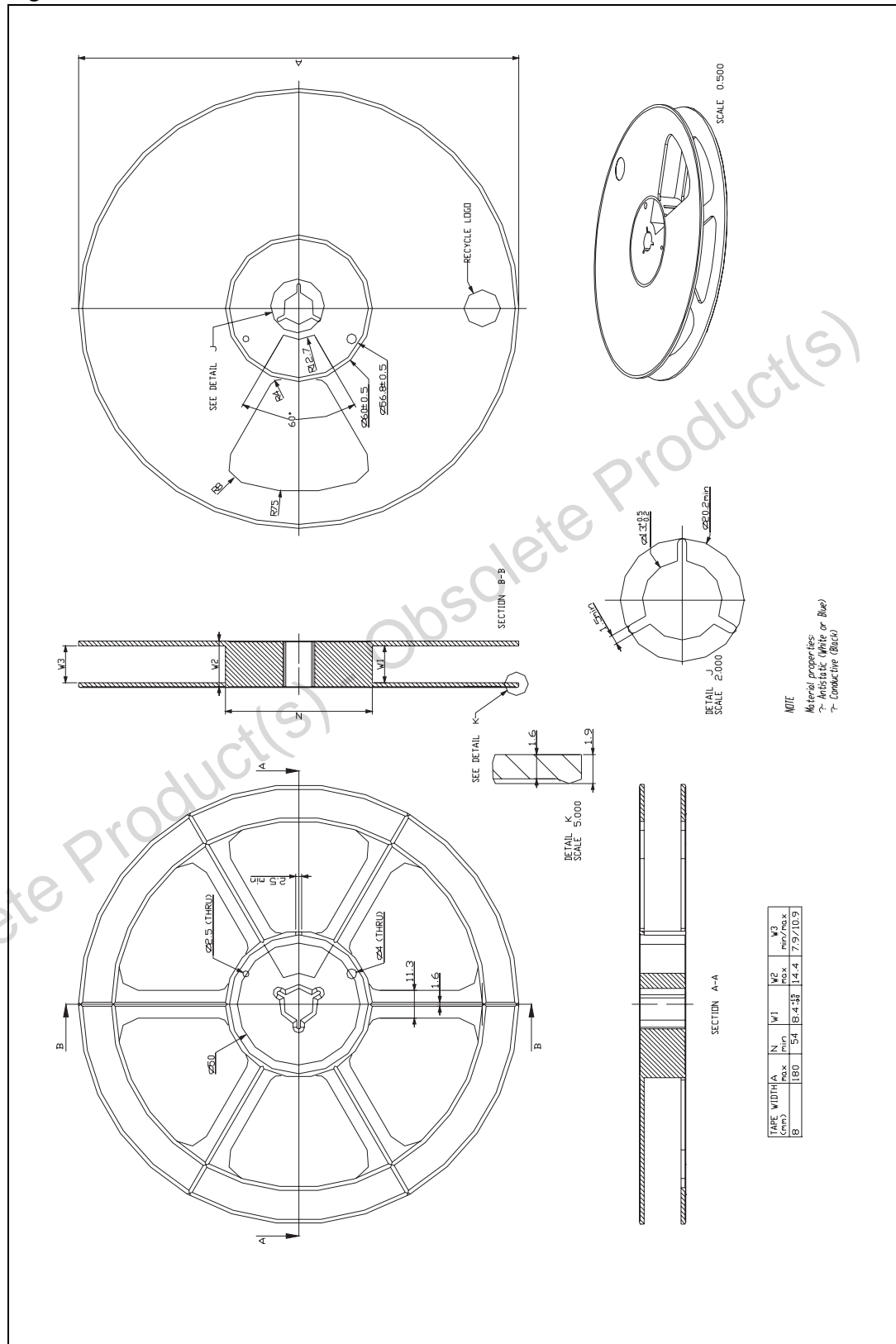


Figure 9. Reel information



5 Revision history

Table 11. Document revision history

| Date | Revision | Changes |
|-------------|----------|--|
| 10-Jul-2008 | 1 | Initial release. |
| 19-Mar-2009 | 2 | Preliminary status promoted to datasheet. Updated Section 4: Package mechanical data . |

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