# Bipolar TTL Logic – 5406

**High Voltage Hex Inverter Buffer / Driver Logic IC in bare die form**

## Description

The 5406 comprises x6 inverter buffer/drivers with high voltage open-collector outputs.  The device finds use as high-level circuit interface or for driving high-current loads and is also characterised to drive TTL inputs as inverted buffer. The device has a 30V minimum breakdown voltage and 30mA maximum sink current.

## Features:

- High Sink-Current Capability: 30mA
- High Voltage Open-Collector Driver
- Minimum breakdown voltage: 30V
- Input Clamp Diodes minimize transmission-line effects
- TTL compatible inputs
- Direct drop-in replacement for obsolete components in long term programs

## Ordering Information

The following part suffixes apply:

- No suffix - MIL-STD-883 /2010B Visual Inspection

- "**H**" - MIL-STD-883 /2010B  Visual Inspection
         + MIL-PRF-38534 Class H LAT

- "**K**" - MIL-STD-883 /2010A  Visual Inspection (Space)
         + MIL-PRF-38534 Class K LAT

LAT = Lot Acceptance Test.

For further information on LAT process flows see below.

www.siliconsupplies.com\quality\bare-die-lot-qualification

## Die Dimensions in µm (mils)



1450 (57)

1400 (55)
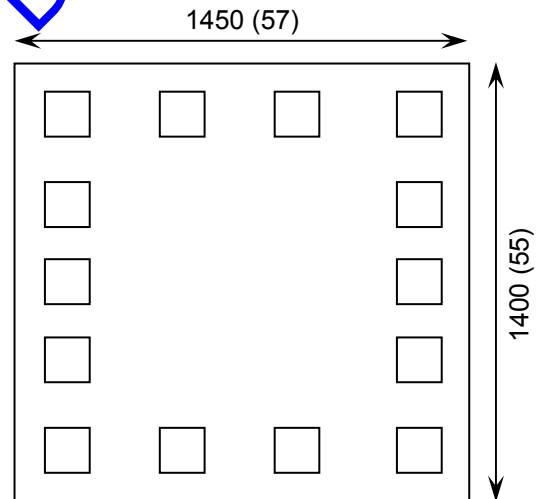
## Supply Formats:

- Default – Die in Waffle Pack (400 per tray capacity)
- Sawn Wafer on Tape – On request
- Unsawn Wafer – On request
- Die Thickness <> 350µm(14 Mils) – On request
- Assembled into Ceramic Package – On request

## Mechanical Specification

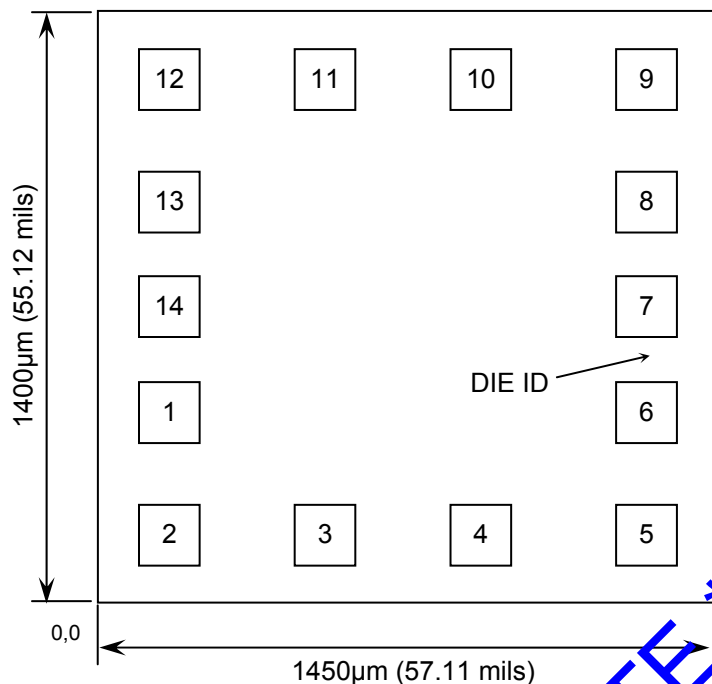| | | |
|---|---|---|
| Die Size (Unsawn) | 1450 x 1400<br>57 x 55 | µm<br>mils |
| Minimum Bond Pad Size | 140 x 140<br>5.5 x 5.5 | µm<br>mils |
| Die Thickness | 350 (±20)<br>13.78 (±0.79) | µm<br>mils |
| Top Metal Composition | Al 1%Si 1.1µm | |
| Back Metal Composition | N/A – Bare Si | |

## Pad Layout and Functions



1400µm (55.12 mils)

0,0

1450µm (57.11 mils)

DIE ID

| PAD | FUNCTION | COORDINATES (mm) | |
|---|---|---|---|
| | | X | Y |
| 1 | 1A | 0.090 | 0.380 |
| 2 | 1Y | 0.090 | 0.090 |
| 3 | 2A | 0.460 | 0.090 |
| 4 | 2Y | 0.830 | 0.090 |
| 5 | 3A | 1.220 | 0.090 |
| 6 | 3Y | 1.220 | 0.380 |
| 7 | GND | 1.220 | 0.630 |
| 8 | 4Y | 1.220 | 0.880 |
| 9 | 4A | 1.220 | 1.170 |
| 10 | 5Y | 0.830 | 1.170 |
| 11 | 5A | 0.460 | 1.170 |
| 12 | 6Y | 0.090 | 1.170 |
| 13 | 6A | 0.090 | 0.880 |
| 14 | $V_{CC}$ | 0.090 | 0.630 |
| CONNECT CHIP BACK TO GND OR FLOAT | | | |

## Logic Diagram



$$Y = \bar{A}$$

Pad 14 = $V_{CC}$
Pad 7 = GND
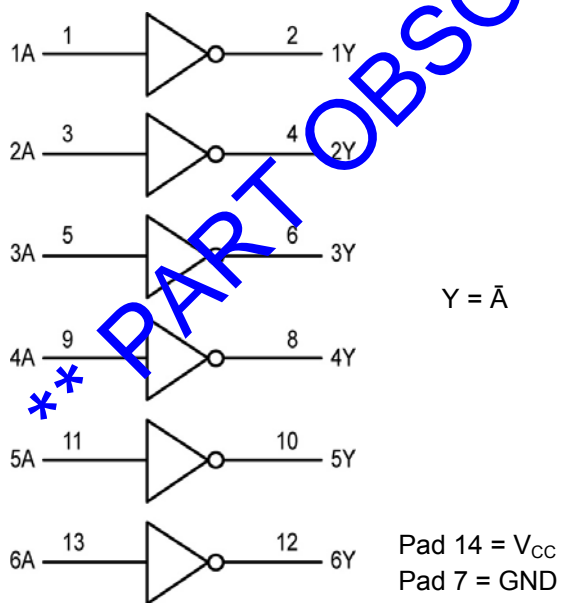
## Truth Table

| INPUTS | OUTPUT |
|---|---|
| A | Y |
| L | Z |
| H | L |
| H = High level (steady state) | |
| L = Low level (steady state) | |
| Z = High Impedance | |

**Rev 1.0**
**29/07/20**

## Absolute Maximum Ratings[1]

| PARAMETER | SYMBOL | VALUE | UNIT |
|---|---|---|---|
| DC Supply Voltage | $V_{CC}$ | 7.0 | V |
| DC Input Voltage | $V_{IN}$ | 5.5 | V |
| DC Output Voltage | $V_{OUT}$ | 30 | V |
| Storage Temperature Range | $T_{STG}$ | -65 to 150 | °C |

1. Operation above the absolute maximum rating may cause device failure. Operation at the absolute maximum ratings, for extended periods, may reduce device reliability.

## Recommended Operating Conditions

| PARAMETER | SYMBOL | MIN | MAX | UNITS |
|---|---|---|---|---|
| Supply Voltage | $V_{CC}$ | 4.5 | 5.5 | V |
| High-Level Input Voltage | $V_{IH}$ | 2 | - | V |
| Low-Level Input Voltage | $V_{IL}$ | - | 0.8 | V |
| High-Level Output Voltage | $V_{OH}$ | - | 30 | V |
| Low-Level Output Current | $I_{OL}$ | - | 30 | mA |
| Operating Temperature Range | $T_J$ | -55 | +125 | °C |

## DC Electrical Characteristics[2] $T_J$ = -55°C to 125°C unless otherwise specified

| PARAMETER | SYMBOL | CONDITIONS | LIMITS | | | UNITS |
|---|---|---|---|---|---|---|
| | | | MIN | TYP | MAX | |
| Input Clamp Voltage | $V_{IK}$ | $V_{CC}$ = 4.5V, $I_{IN}$ = -12mA | - | - | -1.5 | V |
| High-Level Output Current | $I_{OH}$ | $V_{CC}$ = 4.5V, $V_{IL}$ = 0.8V, $V_{OH}$ = 30V | - | - | 0.25 | mA |
| Low-Level Output Voltage | $V_{OL}$ | $V_{CC}$ = 4.5V, $V_{IH}$ = 2V, $I_{OL}$ = 16mA | - | - | 0.4 | V |
| | | $V_{CC}$ = 4.5V, $V_{IH}$ = 2V, $I_{OL}$ = 30mA | - | - | 0.7 | |
| Input Current | $I_{IN}$ | $V_{CC}$ = 5.5V, $V_{IN}$ = 5.5V | - | - | 1 | mA |
| High-Level Input Current | $I_{IH}$ | $V_{CC}$ = 5.5V, $V_{IH}$ = 2.4V | - | - | 0.04 | mA |
| Low-Level Input Current | $I_{IL}$ | $V_{CC}$ = 5.5V, $V_{IL}$ = 0.4V | - | - | -1.6 | mA |
| Supply Current | $I_{CC}$ | $V_{CC}$ = 5.5 ,Output High | - | - | 48 | mA |
| | | $V_{CC}$ = 5.5 ,Output Low | - | - | 51 | |

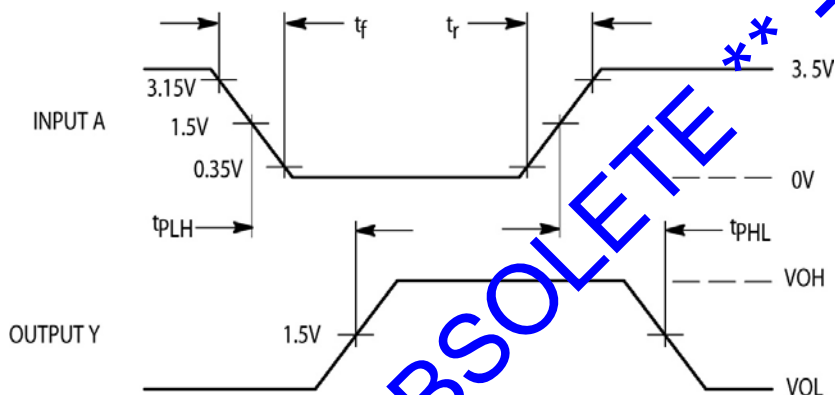**Rev 1.0**
**29/07/20**

## AC Electrical Characteristics[2]

| PARAMETER | SYMBOL | CONDITIONS | LIMITS | | | UNITS |
|---|---|---|---|---|---|---|
| | | | MIN | TYP | MAX | |
| Turn-Off Delay, Input to Output | $t_{PLH}$ | $T_A = 25°C$, $V_{CC} = 5V$, $R_L = 110Ω$, $C_L = 15pF$, Input $t_r = t_f = 10ns$ | - | - | 18 | ns |
| Turn-On Delay, Input to Output | $t_{PHL}$ | | - | - | 28 | |

**2**. Not production tested in die form, characterized by chip design

## Switching Waveform



## Test Circuit
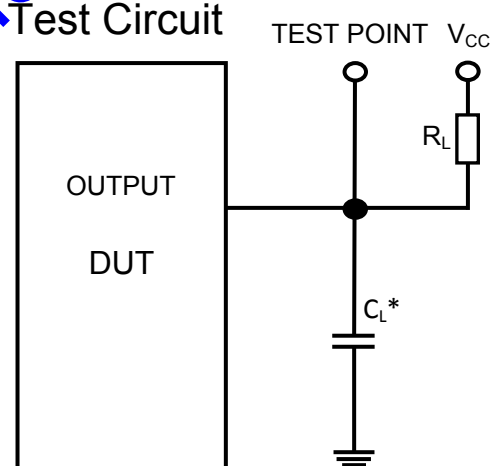


* Includes all probe and jig capacitance

*** PART OBSOLETE *** - DISCONTINUED