# Single supply logic gates with voltage translation



Our 74LV1Txxx logic family provides solutions that integrate voltage level translation with a Boolean function. 74LV1Txxx types are single 1.6 V to 5.5 V supply general-purpose voltage translating devices. Our 74LV1Txxx family is currently composed of ten logic functions including buffers, inverters and gates (AND, OR, NAND, NOR, EXCLUSIVE-OR, EXCLUSIVE-NOR).

Our 74LV1Txxx family provides single-supply translation using overvoltage-tolerant, low-threshold inputs. The output level is always referenced to $V_{cc}$ which can range from 1.6 V to 5.5 V. For $V_{cc}$ = 3.3 V, input logic signals from systems at 1.8 V to 5.5 V are valid. This wide $V_{cc}$ range allows interconnection between systems at most of the different logic signal levels. 74LV1Txxx has a low-noise balanced output drive capability of 8 mA reducing line reflections, overshoot and undershoot.

## Key Features

- Wide supply voltage range 1.6 V to 5.5 V
- Up and down translation possible
- Overvoltage tolerant inputs
- Up to 50 MHz operation at 3.3 V

## Applications

- Portable devices
- Industrial controllers
- Servers, PC & Notebooks
- Automotive

## Benefits

- No external pull-up or pull down resistors required
- Integration of logic function with translation saves device count and PCB space
- Footprint-compatible with existing non-translating devices
- Low dynamic power consumption increasing battery longevity
- Available in smallest package for use without step-down mask (X2SON5)

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## Translation properties

| Translation | $V_{CC}$ (V) | Input system supply (V) | Output system supply (V) |
|---|---|---|---|
| Up | 1.8 | 1.2 | 1.8 |
| | 2.5 | 1.5 | 2.5 |
| | 3.3 | 1.8 | 3.3 |
| | 5.0 | 3.3 | 5.0 |
| Down | 1.8 | 3.3 | 1.8 |
| | 2.5 | 3.3 | 2.5 |
| | 3.3 | 5.0 | 3.3 |

## Available types

| Type | |
|---|---|
| 74LV1T00 | 2-input NAND gate |
| 74LV1T02 | 2-input NOR gate |
| 74LV1T04 | Inverter |
| 74LV1T08 | 2-input AND gate |
| 74LV1T32 | 2-input OR gate |
| 74LV1T34 | Buffer |
| 74LV1T86 | 2-input XOR gate |
| 74LV1T87 | 2-input XNOR gate |
| 74LV1T125 | Buffer / line driver; 3-state |
| 74LV1T126 | Buffer / line driver; 3-state |

## Parametrics

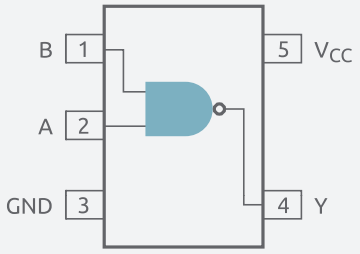
| Type | $V_{CC}$ Range | Output Drive | Prop Delay ($t_{PD}$) | Temperature Range | Static Current ($I_{CC}$) |
|---|---|---|---|---|---|
| LV1Txxx | 1.6 – 5.5 V | +/- 8 mA | < 5.0 ns | −40 ~125 °C | < 0.1 µA (typ.) |

## Packages

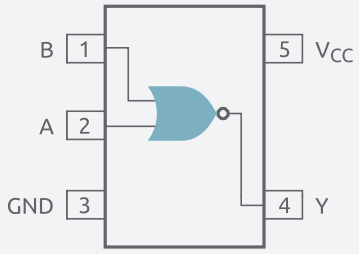
| Suffix | Package version | Package name | Dimensions (L x W x H, pitch - in mm) | |
|---|---|---|---|---|
| GW | SOT353-1 | TSSOP5 | 2.0 x 2.1 x 1.0, 0.65 |  |
| GX | SOT1226 | X2SON5 | 0.8 x 0.8 x 0.35, 0.48 |  |

## Functional diagrams

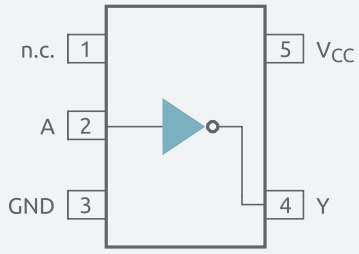
74LV1T00



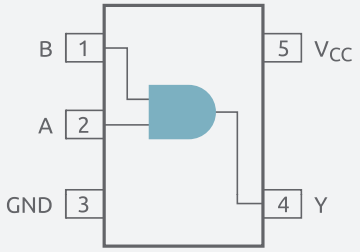

74LV1T02



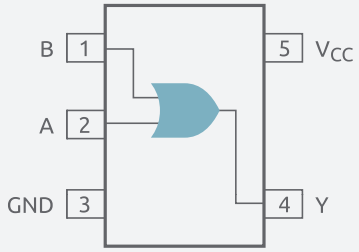

74LV1T04



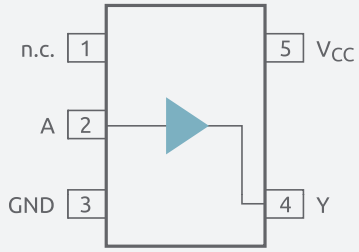

74LV1T08



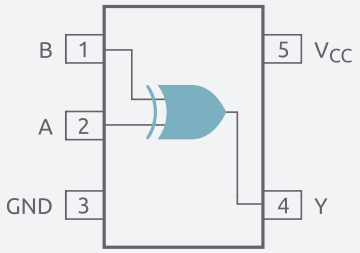

74LV1T32



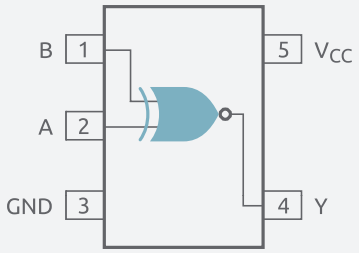

74LV1T34



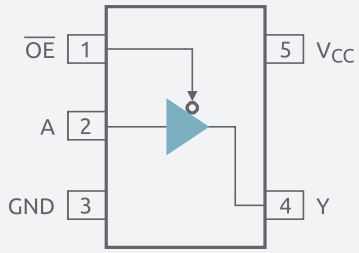

74LV1T86




74LV1T87




74LV1T125

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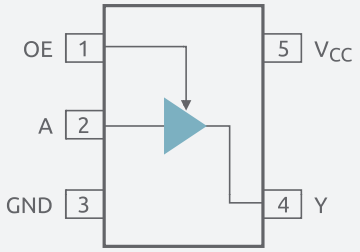
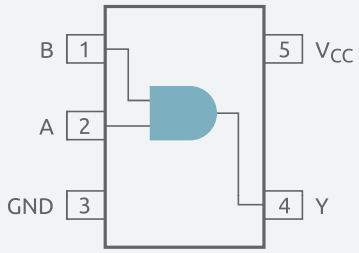
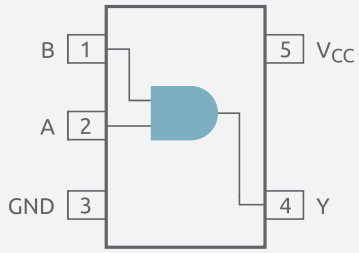



### 74LV1Txxx share the same footprint as 74HC1Gxxx functions

74HC1G08




74LV1T08

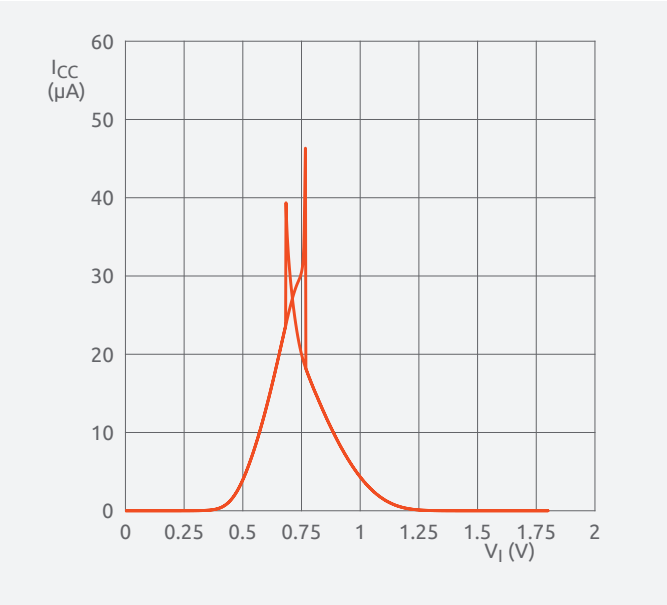


## Overvoltage tolerant inputs

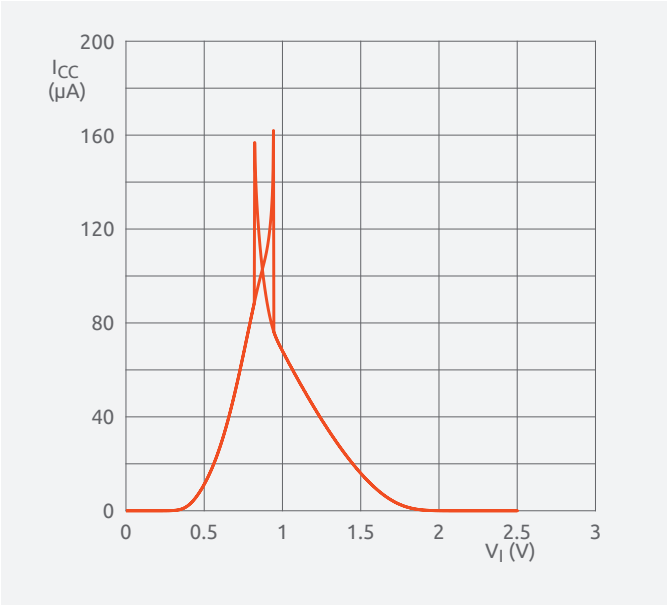
74LV1Txxx series has overvoltage tolerant inputs, which do not have input clamp diodes to $V_{CC}$ and can be used to interface to higher-voltage systems without using external current-limiting resistors, effectively reducing BOM and cost.

## Input characteristics

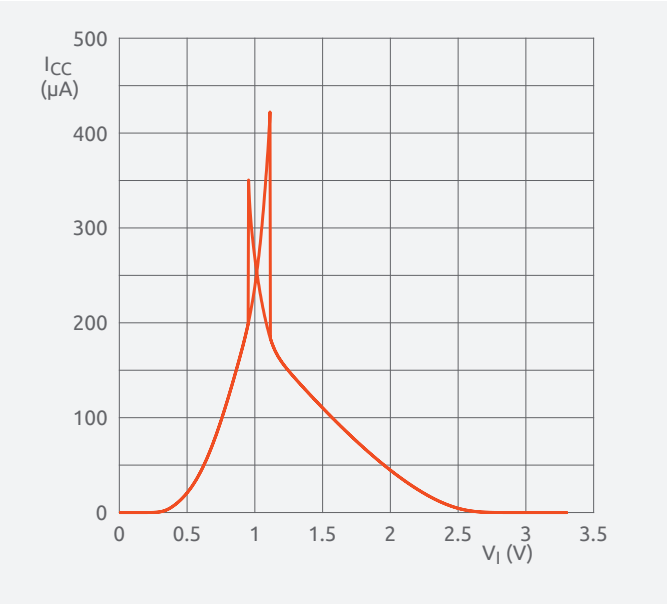
These devices have input-switching thresholds lower than the typical $V_{CC}/2$ value of CMOS and can be used for low-to-high voltage level translation.Schmitt action is included to provide hysteresis, preventing false switching and ensuring well-defined outputs when driven by slowly transitioning signals.



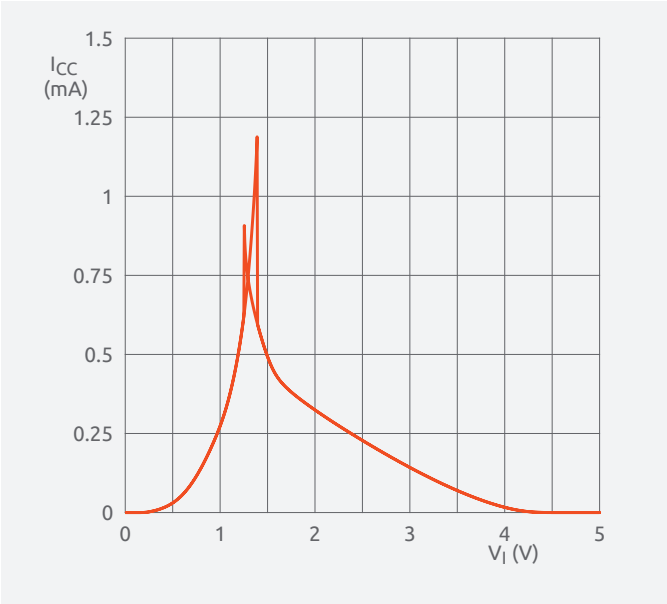

$V_{CC}$ = 1.8 V




$V_{CC}$ = 2.5 V

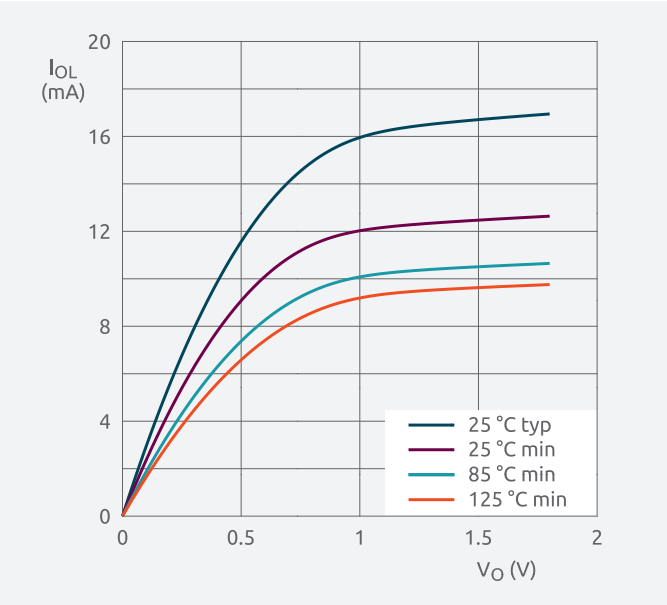



$V_{CC}$ = 3.3 V

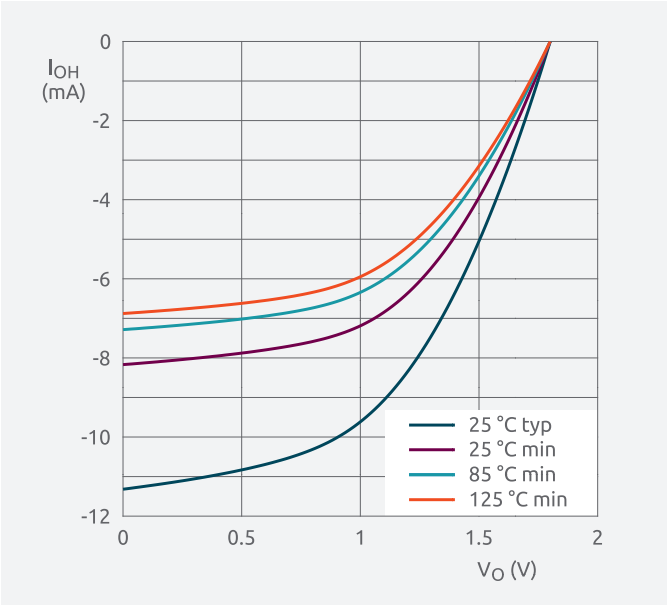



$V_{CC}$ = 5 V

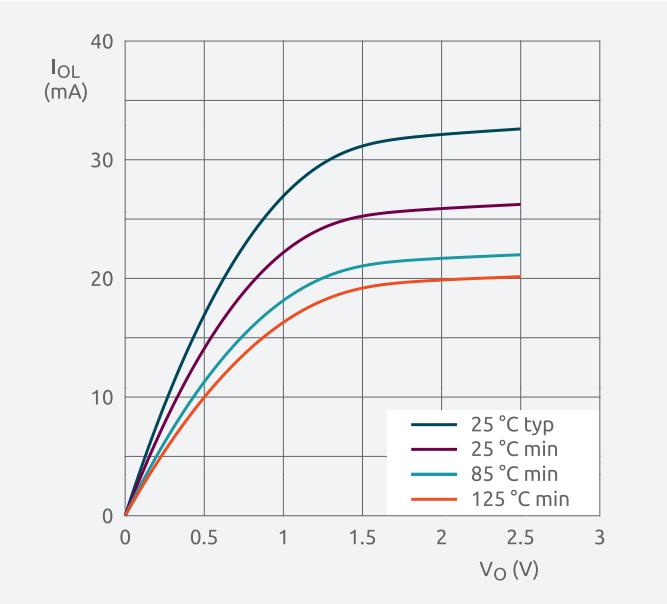
## Output characteristics



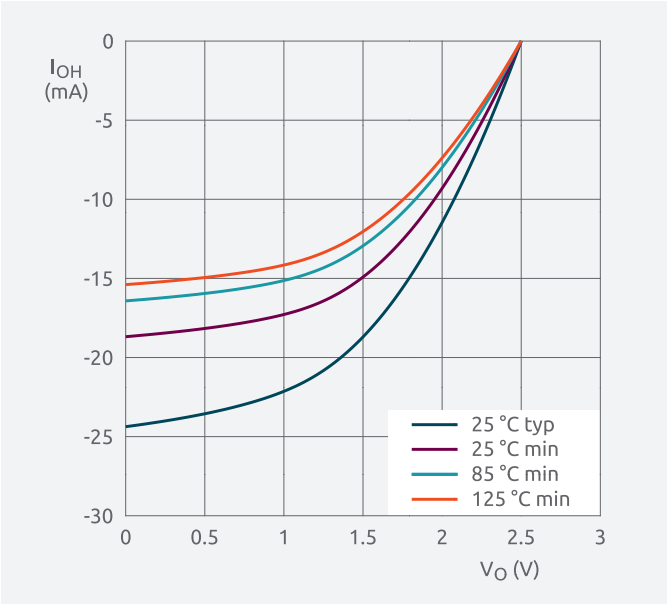

$V_{CC}$ = 1.8 V, output driving LOW




$V_{CC}$ = 1.8 V, output driving HIGH

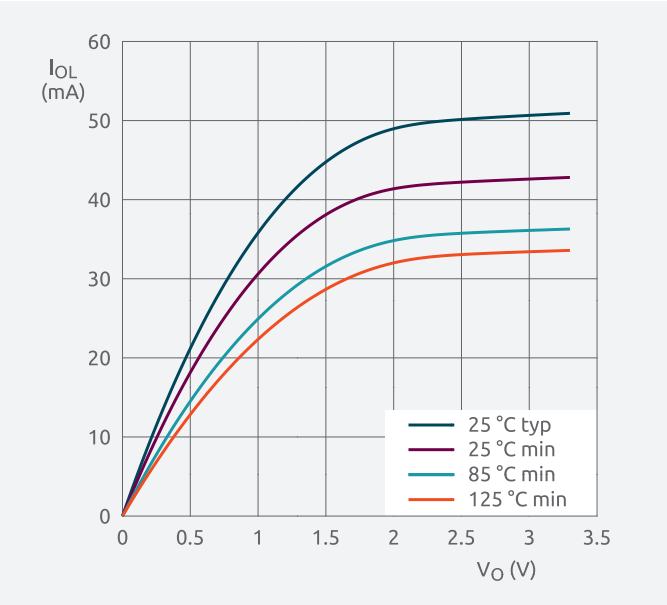



$V_{CC}$ = 2.5 V, output driving LOW

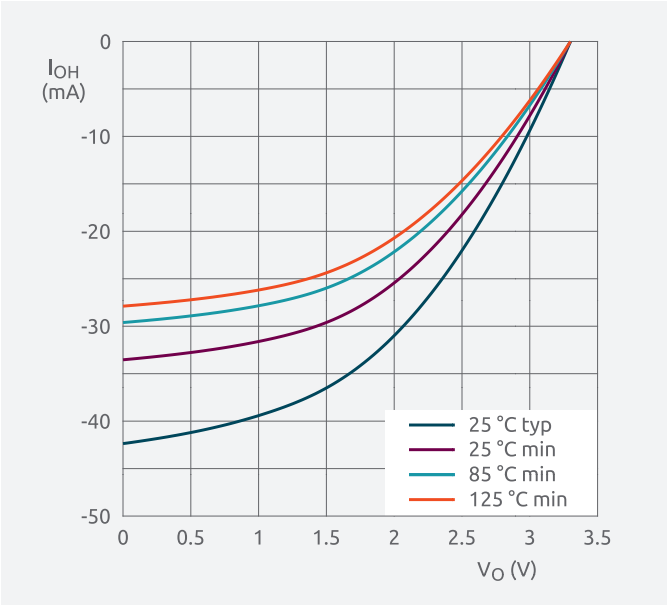



$V_{CC}$ = 2.5 V, output driving HIGH

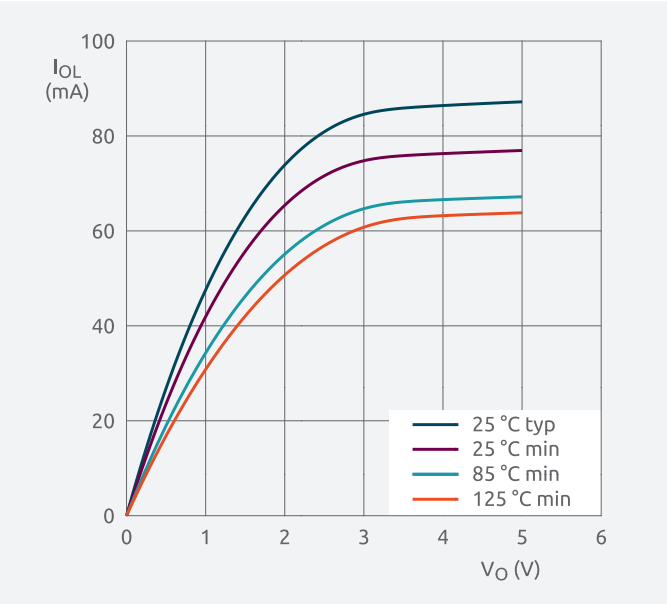
## Output characteristics



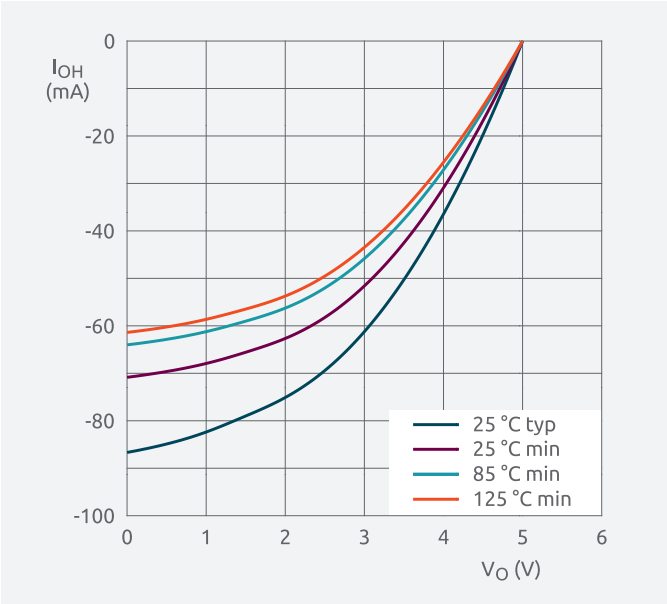

$V_{CC}$ = 3.3 V, output driving LOW




$V_{CC}$ = 3.3 V, output driving HIGH




$V_{CC}$ = 5 V, output driving LOW




$V_{CC}$ = 5 V, output driving HIGH



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