Introduction to Toshiba One-Gate Logic (L-MOS)

We are a pioneer of one-gate logic (L-MOS) products, which commercialized one-gate logic for the first time in the world(*). We will continue to expand our lineup for small, thin, and low-voltage operation products.

(*) Based on our survey (as of Sep 13, 2021)

•What is One-Gate Logic?
One-gate logic is a product which 1 to 3 gates of standard logic ICs are mounted in a small package.

•Advantages of One-Gate Logic
One-gate logic can be used as follows, by taking advantage of its small and single function.
•When circuit correction of the board is required, it is possible to carry out correction easily with space saving.
•Buffering and waveform shaping of signals can be performed in a space-saving manner.
•The layout can be optimized by distributing the one-gate logic. Refer to the following.

One-gate logic distributed layout example

Ex. using two circuits in CMOS logic Ex. using one-gate logic 2 products

•Lineup of one-gate logic
In addition to the current 5V and 3V lineups, we will expand a lineup of super low-voltage series that supports future low-voltage operation.
In particular, the use of 7UL Series operable at a low voltage, can achieve the signal level changes and the logical conversion between different voltage systems a single product.

We realize the function by taking advantage of the features of the product.

Ex. Level down + logical conversion using 7UL1G series.
Ex. Level up + logical conversion using 7UL1T series.

We are expanding the lineup that supports an operating temperature of 125 deg C according to the customer’s usage environment.
### One-Gate Logic (L-MOS) Line-up

#### 7UL Series
- 7ULxT: Level Shift
- 7ULxG: Low Voltage

#### SHS Series
For 3V system

#### VHS Series
For 5V System

### One-Gate Logic (L-MOS) Recommended product summary

<table>
<thead>
<tr>
<th>Features</th>
<th>Series</th>
<th>Product family</th>
<th>Number of Function</th>
<th>Supply voltage (V)</th>
<th>Tpd (ns)</th>
<th>Output Current (mA)</th>
<th>Input Tolerant (V)</th>
<th>Output powerdown protection (V)</th>
<th>Package</th>
<th>Buy Online</th>
</tr>
</thead>
<tbody>
<tr>
<td>Low voltage system</td>
<td>7UL (LVP)</td>
<td>7UL1G</td>
<td>20</td>
<td>0.9〜3.6</td>
<td>2.5 (@3.0V)</td>
<td>±8.0 (@3.0V)</td>
<td>0〜3.6</td>
<td>0〜3.6</td>
<td>fSV,USV</td>
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<tr>
<td></td>
<td></td>
<td>7UL2G</td>
<td>2</td>
<td></td>
<td></td>
<td></td>
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<td></td>
<td>US8</td>
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</tr>
<tr>
<td></td>
<td></td>
<td>7UL1T</td>
<td>9</td>
<td>2.3〜3.6</td>
<td>3.6 (@3.0V)</td>
<td>±8.0 (@3.0V)</td>
<td>0〜3.6</td>
<td>0〜3.6</td>
<td>fSV,USV, US8</td>
<td><img src="image" alt="Buy Online" /></td>
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<tr>
<td></td>
<td></td>
<td>7UL2T</td>
<td>2</td>
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<td></td>
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<td></td>
<td>US8</td>
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<tr>
<td>3V system</td>
<td>SHS</td>
<td>TC7SZ</td>
<td>56</td>
<td>1.8〜5.5</td>
<td>4.5 (@3.0V)</td>
<td>±24 (@3.0V)</td>
<td>0〜5.5</td>
<td>0〜5.5</td>
<td>USV,SMV, ESV, fSV</td>
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<tr>
<td></td>
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<td>TC7PZ</td>
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<td>US6</td>
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<td>TC7WZ</td>
<td>30</td>
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<td>US8,SM8</td>
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<tr>
<td>5V system</td>
<td>VHS (Very High Speed)</td>
<td>TC7SH</td>
<td>26</td>
<td>2〜5.5</td>
<td>9 (@4.5V)</td>
<td>±8.0 (@4.5V)</td>
<td>0〜5.5</td>
<td>—</td>
<td>USV,SMV</td>
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<tr>
<td></td>
<td></td>
<td>TC7WH</td>
<td>26</td>
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<td></td>
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<td>USV,SMV</td>
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## Pakage line-up

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<th>Type</th>
<th>Surface Mount</th>
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<th>0.5mm</th>
<th>0.65mm</th>
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<tr>
<td>5pin</td>
<td>FS</td>
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<td><img src="image" alt="ESV(SOT-553)" /></td>
<td><img src="image" alt="USV(SOT-353)" /></td>
<td><img src="image" alt="SMV(SOT-25)" /></td>
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<tr>
<td>6pin</td>
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<tr>
<td>8pin</td>
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<td><img src="image" alt="US8(SOT-765)" /></td>
<td><img src="image" alt="SM8(SOT-505)" /></td>
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</tr>
<tr>
<td>Code</td>
<td>FS</td>
<td>5pin:FE, 8pin:FK</td>
<td>FU</td>
<td>F</td>
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</tr>
</tbody>
</table>

Please also refer to the following documents for related explanations.

- To perform a parametric search of Logic ICs:
  - CMOS logic ICs
  - One-Gate logic ICs
  - Bus Switches

- Application notes

- FAQs of Logic ICs

- Stock Check & Purchase

- Cross Reference Search page

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