

## FEATURES

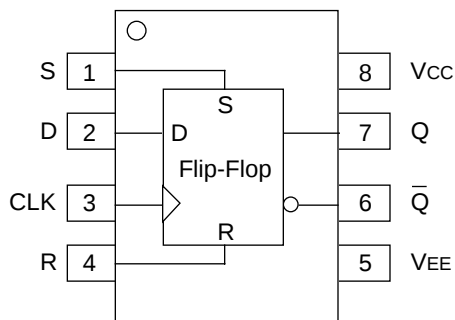
- 475ps propagation delay
- 2.8GHz toggle frequency
- Internal 75K $\Omega$  input pull-down resistors
- Available in 8-pin SOIC package

## DESCRIPTION

The SY10/100EL31 are D flip-flops with set and reset. The devices are functionally equivalent to the E131 devices, with higher performance capabilities. With propagation delays and output transition times significantly faster than the E131, the EL31 is ideally suited for those applications which require the ultimate in AC performance.

Both the set and reset inputs are asynchronous, level triggered signals. Data enters the master portion of the flip-flop when the clock is LOW and is transferred to the slave, and thus the outputs, upon a positive transition of the clock.

## PIN CONFIGURATION/BLOCK DIAGRAM



SOIC  
TOP VIEW

## PIN NAMES

| Pin | Function     |
|-----|--------------|
| D   | Data Inputs  |
| Q   | Data Outputs |
| S   | Set          |
| R   | Reset        |
| CLK | Clock Input  |

## TRUTH TABLE<sup>(1)</sup>

| D | S | R | CLK | Q     |
|---|---|---|-----|-------|
| L | L | L | Z   | L     |
| H | L | L | Z   | H     |
| X | H | L | X   | H     |
| X | L | H | X   | L     |
| X | H | H | X   | Undef |

### NOTE:

1. Z = LOW-to-HIGH transition.

**DC ELECTRICAL CHARACTERISTICS**V<sub>EE</sub> = V<sub>EE</sub> (Min.) to V<sub>EE</sub> (Max.); V<sub>CC</sub> = GND

| Symbol          | Parameter            | T <sub>A</sub> = -40°C |      |      | T <sub>A</sub> = 0°C |      |      | T <sub>A</sub> = +25°C |      |      | T <sub>A</sub> = +85°C |      |      | Unit |
|-----------------|----------------------|------------------------|------|------|----------------------|------|------|------------------------|------|------|------------------------|------|------|------|
|                 |                      | Min.                   | Typ. | Max. | Min.                 | Typ. | Max. | Min.                   | Typ. | Max. | Min.                   | Typ. | Max. |      |
| I <sub>EE</sub> | Power Supply Current |                        |      |      |                      |      |      |                        |      |      |                        |      |      | mA   |
|                 | 10EL                 | —                      | 27   | 32   | 18                   | 27   | 32   | 18                     | 27   | 32   | 18                     | 27   | 32   |      |
|                 | 100EL                | —                      | 27   | 32   | 18                   | 27   | 32   | 18                     | 27   | 32   | 21                     | 31   | 37   |      |
| V <sub>EE</sub> | Power Supply Voltage |                        |      |      |                      |      |      |                        |      |      |                        |      |      | V    |
|                 | 10EL                 | -4.75                  | -5.2 | -5.5 | -4.75                | -5.2 | -5.5 | -4.75                  | -5.2 | -5.5 | -4.75                  | -5.2 | -5.5 |      |
|                 | 100EL                | -4.20                  | -4.5 | -5.5 | -4.20                | -4.5 | -5.5 | -4.20                  | -4.5 | -5.5 | -4.20                  | -4.5 | -5.5 |      |
| I <sub>IH</sub> | Input HIGH Current   | —                      | —    | 150  | —                    | —    | 150  | —                      | —    | 150  | —                      | —    | 150  | μA   |

**AC ELECTRICAL CHARACTERISTICS**V<sub>EE</sub> = V<sub>EE</sub> (Min.) to V<sub>EE</sub> (Max.); V<sub>CC</sub> = GND

| Symbol                               | Parameter                                  | T <sub>A</sub> = -40°C |            |            | T <sub>A</sub> = 0°C |            |            | T <sub>A</sub> = +25°C |            |            | T <sub>A</sub> = +85°C |            |            | Unit |
|--------------------------------------|--------------------------------------------|------------------------|------------|------------|----------------------|------------|------------|------------------------|------------|------------|------------------------|------------|------------|------|
|                                      |                                            | Min.                   | Typ.       | Max.       | Min.                 | Typ.       | Max.       | Min.                   | Typ.       | Max.       | Min.                   | Typ.       | Max.       |      |
| f <sub>MAX</sub>                     | Maximum Toggle Frequency                   | 20                     | 2.5        | —          | 2.2                  | 2.8        | —          | 2.2                    | 2.8        | —          | 2.2                    | 2.8        | —          | GHz  |
| t <sub>PLH</sub><br>t <sub>PHL</sub> | Propagation Delay to Output<br>CLK<br>S, R | 315<br>295             | 465<br>455 | 630<br>630 | 365<br>345           | 465<br>455 | 580<br>580 | 375<br>355             | 475<br>465 | 590<br>590 | 430<br>400             | 530<br>510 | 645<br>645 | ps   |
| t <sub>S</sub>                       | Set-up Time                                | 150                    | 0          | —          | 150                  | 0          | —          | 150                    | 0          | —          | 150                    | 0          | —          | ps   |
| t <sub>H</sub>                       | Hold Time                                  | 250                    | 100        | —          | 250                  | 100        | —          | 250                    | 100        | —          | 250                    | 100        | —          | ps   |
| t <sub>RR</sub>                      | Set/Reset Recovery                         | 400                    | 200        | —          | 400                  | 200        | —          | 400                    | 200        | —          | 400                    | 200        | —          | ps   |
| t <sub>PW</sub>                      | Minimum Pulse Width<br>CLK, Set, Reset     | 400                    | —          | —          | 400                  | —          | —          | 400                    | —          | —          | 400                    | —          | —          | ps   |
| t <sub>r</sub><br>t <sub>f</sub>     | Output Rise/Fall Times Q<br>(20% to 80%)   | 100                    | 225        | 350        | 100                  | 225        | 350        | 100                    | 225        | 350        | 100                    | 225        | 350        | ps   |

**PRODUCT ORDERING CODE**

| Ordering Code  | Package Type | Operating Range | Marking Code |
|----------------|--------------|-----------------|--------------|
| SY10EL31ZC     | Z8-1         | Commercial      | HEL31        |
| SY10EL31ZCTR*  | Z8-1         | Commercial      | HEL31        |
| SY100EL31ZC    | Z8-1         | Commercial      | XEL31        |
| SY100EL31ZCTR* | Z8-1         | Commercial      | XEL31        |

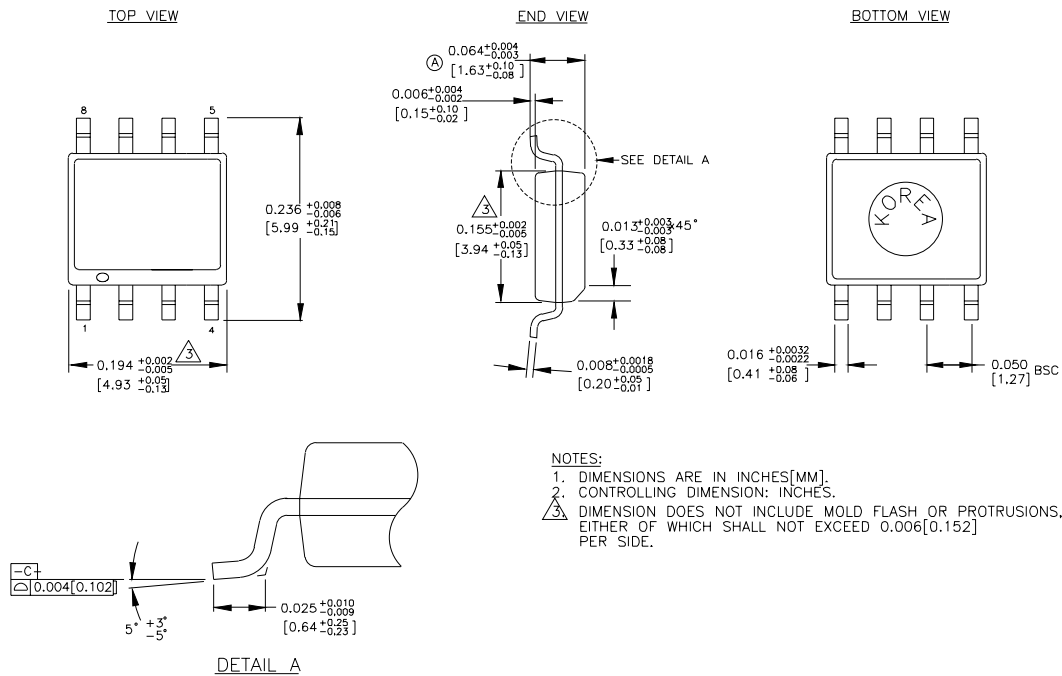
\*Tape and Reel

**Note 1.** Recommended for new designs.

| Ordering Code                 | Package Type | Operating Range | Marking Code |
|-------------------------------|--------------|-----------------|--------------|
| SY10EL31Z <sup>(1)</sup>      | Z8-1         | Industrial      | HEL31        |
| SY10EL31ZITR <sup>*(1)</sup>  | Z8-1         | Industrial      | HEL31        |
| SY100EL31Z <sup>(1)</sup>     | Z8-1         | Industrial      | XEL31        |
| SY100EL31ZITR <sup>*(1)</sup> | Z8-1         | Industrial      | XEL31        |

\*Tape and Reel

## 8 LEAD SOIC .150" WIDE (Z8-1)



Rev. 03

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