

## FEATURES

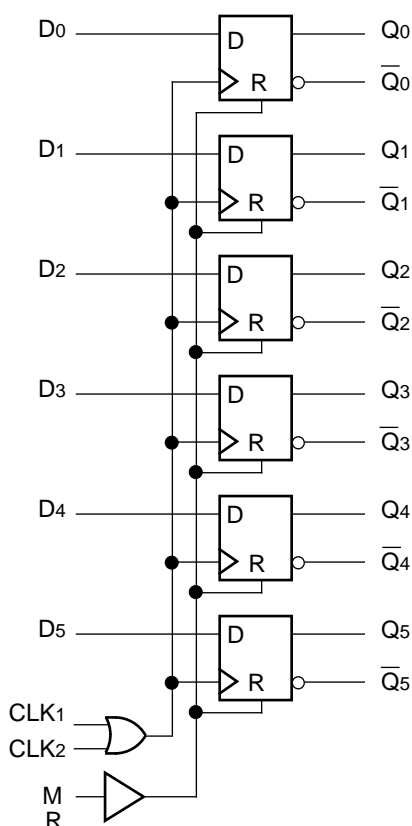
- 1100MHz toggle frequency
- Extended 100E VEE range of -4.2V to -5.46V
- Differential outputs
- Asynchronous Master Reset
- Dual clocks
- Fully compatible with industry standard 10KH, 100K ECL levels
- Internal 75KΩ input pulldown resistors
- Fully compatible with Motorola MC10E/100E151
- Available in 28-pin PLCC package

## DESCRIPTION

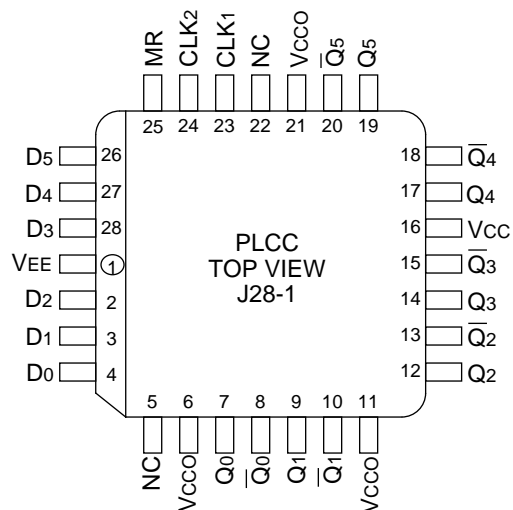
The SY10/100E151 offer 6 edge-triggered, high-speed, master-slave D-type flip-flops with differential outputs, designed for use in new, high-performance ECL systems. The two external clock signals (CLK1, CLK2) are gated through a logical OR operation before use as clocking control for the flip-flops. Data is clocked into the flip-flops on the rising edge of either CLK1 or CLK2 (or both). When both CLK1 and CLK2 are at a logic LOW, data enters the master and is transferred to the slave when either CLK1 or CLK2 (or both) go HIGH.

The MR (Master Reset) signal operates asynchronously to make all Q outputs go to a logic LOW.

## BLOCK DIAGRAM



## PIN CONFIGURATION



## PIN NAMES

| Pin        | Function          |
|------------|-------------------|
| D0-D5      | Data Inputs       |
| CLK1, CLK2 | Clock Inputs      |
| MR         | Master Reset      |
| Q0-Q5      | True Outputs      |
| Q0-Q5      | Inverting Outputs |
| VCC0       | Vcc to Output     |

**TRUTH TABLES<sup>(1)</sup>****Asynchronous Operation**

| Inputs         |                  |                  |    | Output                 |
|----------------|------------------|------------------|----|------------------------|
| D <sub>n</sub> | CLK <sub>1</sub> | CLK <sub>2</sub> | MR | Q <sub>n</sub> (t + 1) |
| X              | X                | X                | H  | L                      |

**NOTE:**

1. H = HIGH Voltage Level  
L = LOW Voltage Level  
X = Don't Care  
t = Time before positive CLK transition  
t+1 = Time after positive CLK transition  
u = LOW-to-HIGH transition

**Synchronous Operation**

| Inputs         |                  |                  |    | Output                 |
|----------------|------------------|------------------|----|------------------------|
| D <sub>n</sub> | CLK <sub>1</sub> | CLK <sub>2</sub> | MR | Q <sub>n</sub> (t + 1) |
| L              | u                | L                | L  | L                      |
| H              | u                | L                | L  | H                      |
| L              | L                | u                | L  | L                      |
| H              | L                | u                | L  | H                      |
| X              | H                | u                | L  | Q <sub>n</sub> (t)     |
| X              | u                | H                | L  | Q <sub>n</sub> (t)     |
| X              | L                | L                | L  | Q <sub>n</sub> (t)     |

**DC ELECTRICAL CHARACTERISTICS<sup>(1)</sup>**V<sub>EE</sub> = V<sub>EE</sub> (Min.) to V<sub>EE</sub> (Max.); V<sub>CC</sub> = V<sub>CCO</sub> = GND

| Symbol          | Parameter            | T <sub>A</sub> = 0°C |      |      | T <sub>A</sub> = +25°C |      |      | T <sub>A</sub> = +85°C |      |      | Unit | Condition |
|-----------------|----------------------|----------------------|------|------|------------------------|------|------|------------------------|------|------|------|-----------|
|                 |                      | Min.                 | Typ. | Max. | Min.                   | Typ. | Max. | Min.                   | Typ. | Max. |      |           |
| I <sub>IH</sub> | Input HIGH Current   | —                    | —    | 150  | —                      | —    | 150  | —                      | —    | 150  | μA   | —         |
| I <sub>EE</sub> | Power Supply Current | —                    | 65   | 78   | —                      | 65   | 78   | —                      | 65   | 78   | mA   | —         |
|                 | 10E<br>100E          | —                    | 65   | 78   | —                      | 65   | 78   | —                      | 75   | 90   |      |           |

**NOTE:**

1. Specification for packaged product only.

**AC ELECTRICAL CHARACTERISTICS<sup>(2)</sup>**V<sub>EE</sub> = V<sub>EE</sub> (Min.) to V<sub>EE</sub> (Max.); V<sub>CC</sub> = V<sub>CCO</sub> = GND

| Symbol                               | Parameter                                | T <sub>A</sub> = 0°C |            |            | T <sub>A</sub> = +25°C |            |            | T <sub>A</sub> = +85°C |            |            | Unit | Condition |
|--------------------------------------|--|----------------------|------------|------------|------------------------|------------|------------|------------------------|------------|------------|------|-----------|
|                                      |  | Min.                 | Typ.       | Max.       | Min.                   | Typ.       | Max.       | Min.                   | Typ.       | Max.       |      |           |
| f <sub>MAX</sub>                     | Max. Toggle Frequency                    | 1100                 | 1400       | —          | 1100                   | 1400       | —          | 1100                   | 1400       | —          | MHz  | —         |
| t <sub>PLH</sub><br>t <sub>PHL</sub> | Propagation Delay to Output<br>CLK<br>MR | 475<br>475           | 650<br>650 | 800<br>850 | 475<br>475             | 650<br>650 | 800<br>850 | 475<br>475             | 650<br>650 | 800<br>850 | ps   | —         |
| t <sub>s</sub>                       | Set-up Time, D                           | 0                    | –175       | —          | 0                      | –175       | —          | 0                      | –175       | —          | ps   | —         |
| t <sub>H</sub>                       | Hold Time, D                             | 350                  | 175        | —          | 350                    | 175        | —          | 350                    | 175        | —          | ps   | —         |
| t <sub>RR</sub>                      | Reset Recovery Time                      | 750                  | 550        | —          | 750                    | 550        | —          | 750                    | 550        | —          | ps   | —         |
| t <sub>PW</sub>                      | Minimum Pulse Width<br>CLK, MR           | 400                  | —          | —          | 400                    | —          | —          | 400                    | —          | —          | ps   | —         |
| t <sub>skew</sub>                    | Within-Device Skew                       | —                    | 65         | —          | —                      | 65         | —          | —                      | 65         | —          | ps   | 1         |
| t <sub>r</sub><br>t <sub>f</sub>     | Rise/Fall Time<br>20% to 80%             | 300                  | 450        | 700        | 300                    | 450        | 700        | 300                    | 450        | 700        | ps   | —         |

**NOTE:**

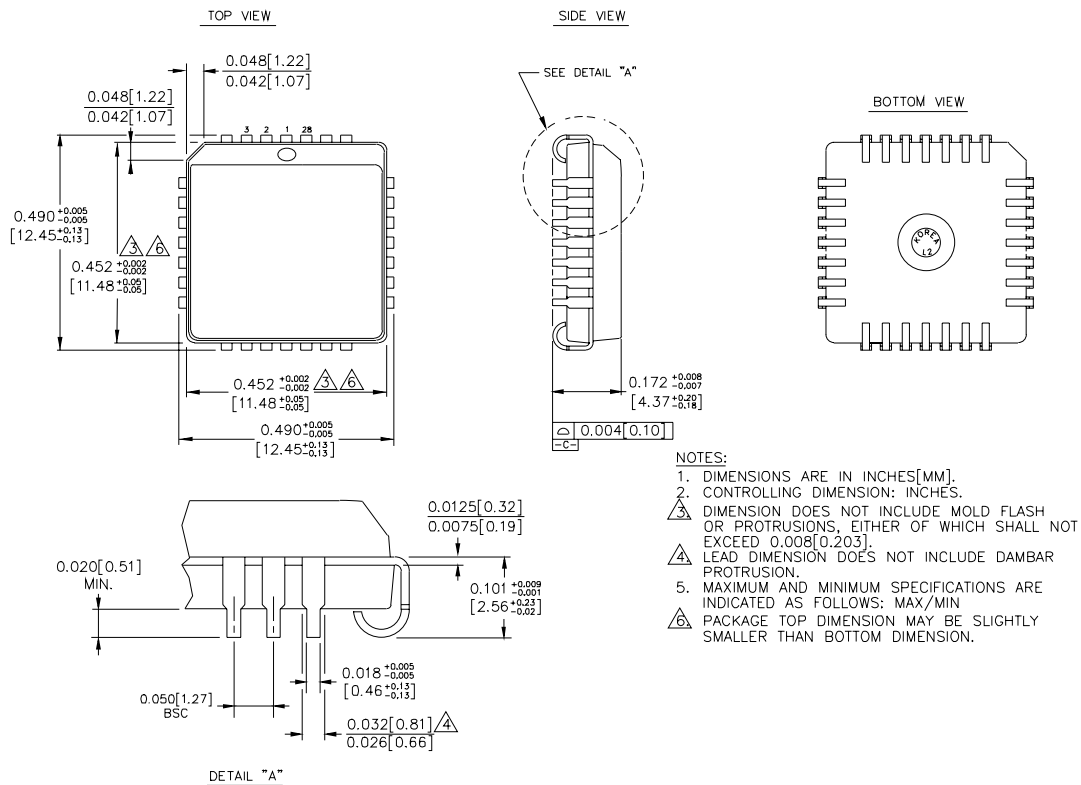
1. Within-device skew is defined as identical transitions on similar paths through a device.
2. Specification for packaged product only.

**PRODUCT ORDERING CODE**

| Ordering Code  | Package Type | Operating Range |
|----------------|--------------|-----------------|
| SY10E151JI     | J28-1        | Industrial      |
| SY10E151JITR*  | J28-1        | Industrial      |
| SY100E151JI    | J28-1        | Industrial      |
| SY100E151JITR* | J28-1        | Industrial      |

\*Tape and Reel

## 28 LEAD PLCC (J28-1)



Rev. 03

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