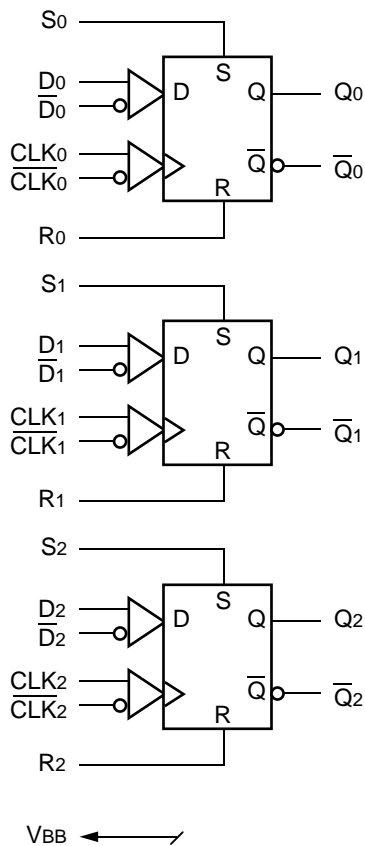


FEATURES

- Differential D, clock and Q
- Extended 100E VEE range of -4.2V to -5.5V
- VBB output for single-ended use
- 1100MHz min. toggle frequency
- Edge-triggered asynchronous set and reset
- Fully compatible with Motorola MC10E/100E431
- Available in 28-pin PLCC package

BLOCK DIAGRAM



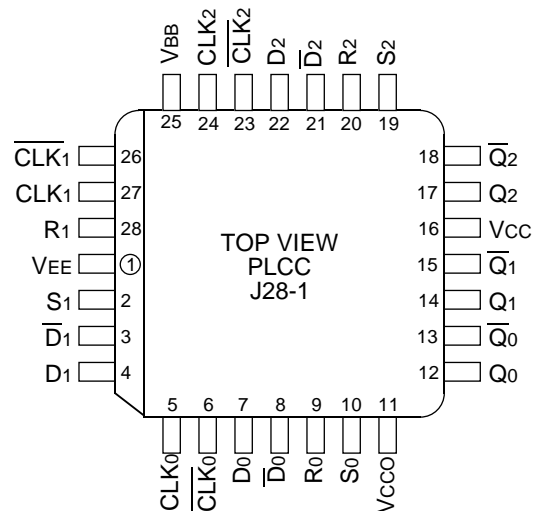
DESCRIPTION

The SY10/100E431 are 3-bit flip-flops with differential clock, data input and data output.

The asynchronous Set and Reset controls are edge-triggered rather than level controlled. This allows the user to rapidly set or reset the flip-flop and then continue clocking at the next clock edge without the necessity of de-asserting the set/reset signal (as would be the case with a level controlled set/reset).

The E431 is also designed with larger internal swings, an approach intended to minimize the time spent crossing the threshold region and thus reduces the metastability susceptibility window.

PIN CONFIGURATION



TRUTH TABLE⁽¹⁾

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

NOTE:

1. Z = LOW-to-HIGH transition.

PIN NAMES

| Pin | Function |
|----------------------------------|-----------------------------|
| D[0:2], \overline{D} [0:2] | Differential Data Inputs |
| CLK[0:2], \overline{CLK} [0:2] | Differential Clock Inputs |
| S[0:2] | Edge Triggered Set Inputs |
| R[0:2] | Edge Triggered Reset Inputs |
| VBB | VBB Reference Output |
| Q[0:2], \overline{Q} [0:2] | Differential Data Outputs |
| VCC ₀ | VCC to Output |

DC ELECTRICAL CHARACTERISTICSV_{EE} = V_{EE} (Min.) to V_{EE} (Max.); V_{CC} = V_{CCO} = GND

| Symbol | Parameter | T _A = 0°C | | | T _A = +25°C | | | T _A = +85°C | | | Unit | Condition |
|------------------|--------------------------|----------------------|------|-------|------------------------|------|-------|------------------------|------|-------|------|-----------|
| | | Min. | Typ. | Max. | Min. | Typ. | Max. | Min. | Typ. | Max. | | |
| V _{BB} | Output Reference Voltage | | | | | | | | | | V | — |
| | 10E | -1.38 | — | -1.27 | -1.35 | — | -1.25 | -1.31 | — | -1.19 | | |
| | 100E | -1.38 | — | -1.26 | -1.38 | — | -1.26 | -1.38 | — | -1.26 | | |
| I _{IH} | Input HIGH Current | — | — | 150 | — | — | 150 | — | — | 150 | μA | — |
| I _{EE} | Power Supply Current | | | | | | | | | | mA | — |
| | 10E | — | 110 | 132 | — | 110 | 132 | — | 110 | 132 | | |
| | 100E | — | 110 | 132 | — | 110 | 132 | — | 127 | 152 | | |
| V _{CMR} | Common Mode Range | -1.5 | — | 0 | -1.5 | — | 0 | -1.5 | — | 0 | V | 1 |

NOTES:

- V_{CMR} is referenced to the most positive side of the differential input signal. Normal operation is obtained when the input signals are within the V_{CMR} range and the input swing is greater than V_{PP} (min.) and <1V.

AC ELECTRICAL CHARACTERISTICSV_{EE} = V_{EE} (Min.) to V_{EE} (Max.); V_{CC} = V_{CCO} = GND

| Symbol | Parameter | T _A = 0°C | | | T _A = +25°C | | | T _A = +85°C | | | Unit | Condition |
|--------------------------------------|---|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|------|-----------|
| | | Min. | Typ. | Max. | Min. | Typ. | Max. | Min. | Typ. | Max. | | |
| f _{MAX} | Max. Toggle Frequency | 1100 | 1400 | — | 1100 | 1400 | — | 1100 | 1400 | — | MHz | — |
| t _{PLH} t _{PHL} | Propagation Delay to Output CLK (Diff) CLK (SE) R S | 450 400 550 550 | 600 600 725 725 | 750 800 925 925 | 450 400 550 550 | 600 600 725 725 | 750 800 925 925 | 450 400 550 550 | 600 600 725 725 | 750 800 925 925 | ps | — |
| t _S | Set-up Time | | | | | | | | | | ps | 1 1 |
| | D | 200 | 0 | — | 200 | 0 | — | 200 | 0 | — | | |
| | R S | 1000 1000 | 700 700 | — — | 1000 1000 | 700 700 | — — | 1000 1000 | 700 700 | — — | | |
| t _H | Hold Time, D | 200 | 0 | — | 200 | 0 | — | 200 | 0 | — | ps | — |
| t _{PW} | Minimum Pulse Width, CLK | 400 | — | — | 400 | — | — | 400 | — | — | ps | — |
| t _{skew} | Within-Device Skew | — | 50 | — | — | 50 | — | — | 50 | — | ps | 2 |
| V _{PP} (AC) | Minimum Input Swing | 150 | — | — | 150 | — | — | 150 | — | — | mV | 3 |
| t _r t _f | Rise/Fall Time 20% to 80% | 275 | 450 | 650 | 275 | 450 | 650 | 275 | 450 | 650 | ps | — |

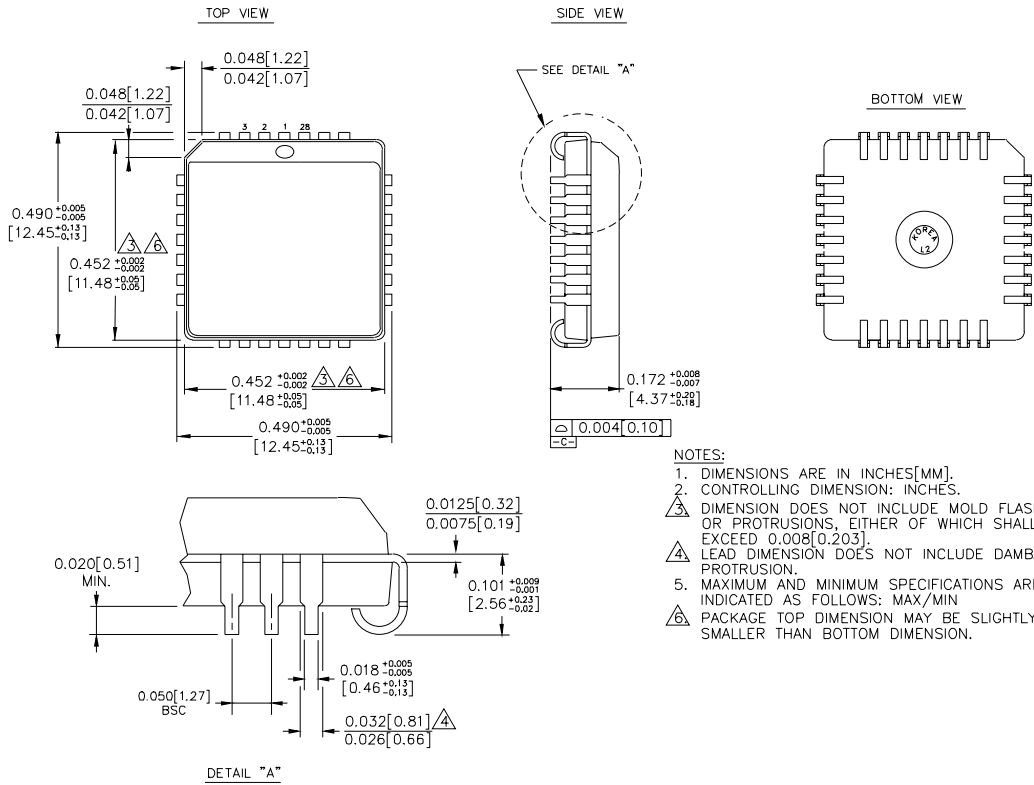
NOTES:

- These set-up times define the minimum time the CLK or SET/RESET input must wait after the assertion of the RESET/SET input to assure the proper operation of the flip-flop.
- Within-device skew is defined as identical transitions on similar paths through a device.
- Minimum input swing for which AC parameters are guaranteed.

PRODUCT ORDERING CODE

| Ordering Code | Package Type | Operating Range |
|---------------|--------------|-----------------|
| SY10E431JC | J28-1 | Commercial |
| SY10E431JCTR | J28-1 | Commercial |
| SY100E431JC | J28-1 | Commercial |
| SY100E431JCTR | J28-1 | Commercial |

28 LEAD PLCC (J28-1)



- NOTES:
1. DIMENSIONS ARE IN INCHES[MM].
 2. CONTROLLING DIMENSION: INCHES.
 3. DIMENSION DOES NOT INCLUDE MOLD FLASH OR PROTRUSIONS, EITHER OF WHICH SHALL NOT EXCEED 0.008[0.203].
 4. LEAD DIMENSION DOES NOT INCLUDE DAMBAR PROTRUSION.
 5. MAXIMUM AND MINIMUM SPECIFICATIONS ARE INDICATED AS FOLLOWS: MAX/MIN
 6. PACKAGE TOP DIMENSION MAY BE SLIGHTLY SMALLER THAN BOTTOM DIMENSION.

Rev. 03

MICREL-SYNERGY 3250 SCOTT BOULEVARD SANTA CLARA CA 95054 USA

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