

# A5821

## *BiMOS II 8-Bit Serial Input Latched Driver*

### **Discontinued Product**

These parts are no longer in production. The device should not be purchased for new design applications. Samples are no longer available.

Date of status change: October 31, 2005

#### **Recommended Substitutions:**

*For new customers or new applications, refer to the [A6821](#).*

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NOTE: For detailed information on purchasing options, contact your local Allegro field applications engineer or sales representative.

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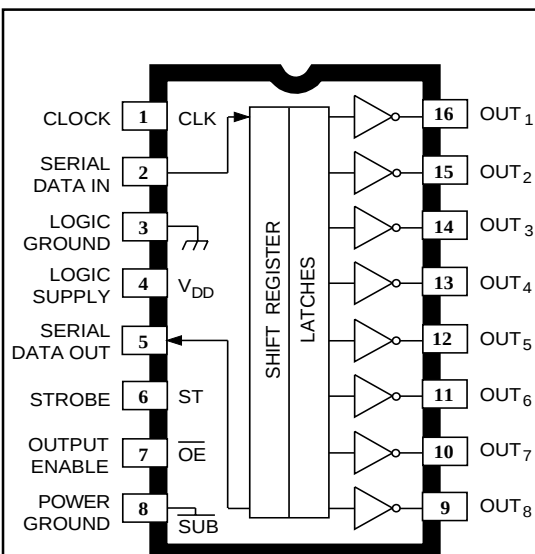
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# 5821

Data Sheet  
26185-12F

## BiMOS II 8-BIT SERIAL-INPUT, LATCHED DRIVERS



Dwg. PP-026A

Note the DIP package and the SOIC package are electrically identical and share common terminal number assignments.

### ABSOLUTE MAXIMUM RATINGS at 25°C Free-Air Temperature

|                                               |                            |
|-----------------------------------------------|----------------------------|
| Output Voltage, $V_{OUT}$ .....               | 50 V                       |
| Logic Supply Voltage, $V_{DD}$ .....          | 15 V                       |
| Input Voltage Range,<br>$V_{IN}$ .....        | -0.3 V to $V_{DD} + 0.3$ V |
| Continuous Output Current,<br>$I_{OUT}$ ..... | 500 mA                     |
| Package Power Dissipation, $P_D$              |                            |
| Package Code 'A' .....                        | 2.1 W                      |
| Package Code 'LW' .....                       | 1.5 W                      |
| Operating Temperature Range,<br>$T_A$ .....   | -20°C to +85°C             |
| Storage Temperature Range,<br>$T_S$ .....     | -55°C to +150°C            |

Caution: CMOS devices have input static protection but are susceptible to damage when exposed to extremely high static electrical charges.

A merged combination of bipolar and MOS technology gives these devices an interface flexibility beyond the reach of standard logic buffers and power driver arrays. The UCN5821A and UCN5821LW each have an eight-bit CMOS shift register and CMOS control circuitry, eight CMOS data latches, and eight bipolar current-sinking Darlington output drivers.

BiMOS II devices have much higher data-input rates than the original BiMOS circuits. With a 5 V logic supply, they will typically operate at better than 5 MHz. With a 12 V supply, significantly higher speeds are obtained. The CMOS inputs are compatible with standard CMOS and NMOS logic levels. TTL circuits may require the use of appropriate pull-up resistors. By using the serial data output, the drivers can be cascaded for interface applications requiring additional drive lines.

The UCN5821A are furnished in a standard 16-pin plastic DIP; the UCN5821LW are in a 16-lead wide-body SOIC for surface-mount applications. The UCN5821A is also available for operation from -40°C to +85°C. To order, change the prefix from 'UCN' to 'UCQ'.

### FEATURES

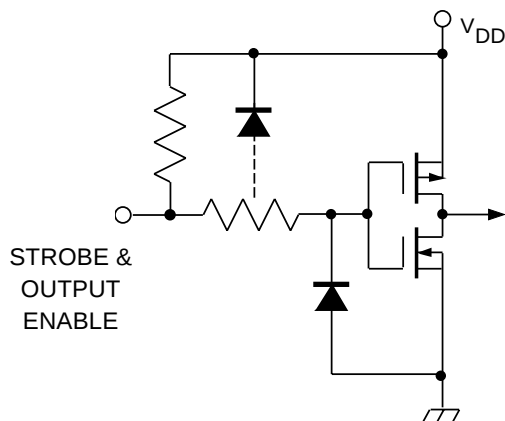
- To 3.3 MHz Data Input Rate
- CMOS, NMOS, TTL Compatible
- Internal Pull-Down Resistors
- Low-Power CMOS Logic & Latches
- High-Voltage Current-Sink Outputs
- Automotive Capable

Always order by complete part number, e.g., **UCN5821A**.

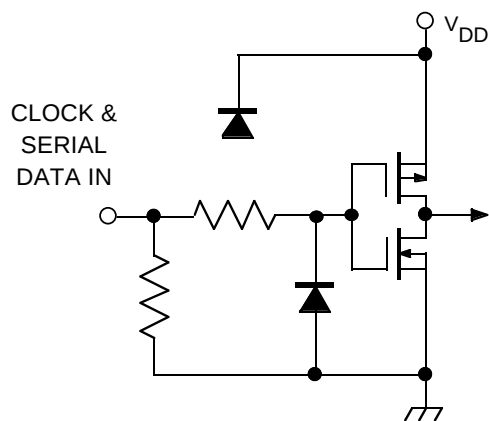
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## 8-BIT SERIAL-INPUT, LATCHED DRIVERS

### TYPICAL INPUT CIRCUITS

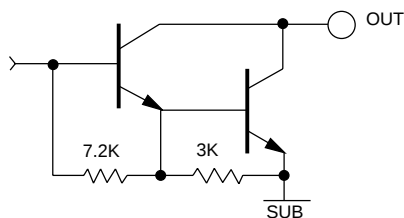


Dwg. EP-010-3



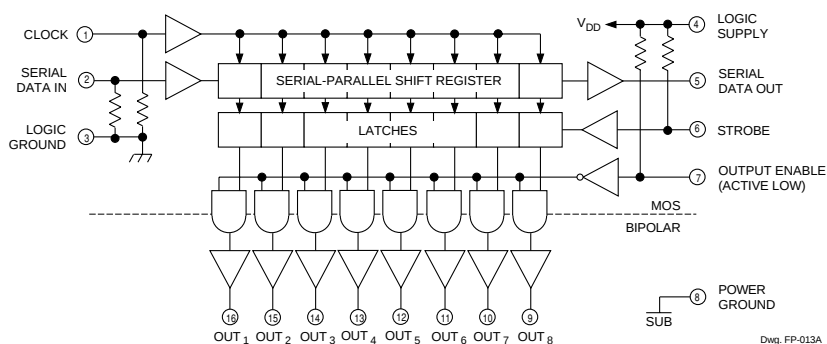
Dwg. EP-010-4A

### TYPICAL OUTPUT DRIVER



Dwg. No. A-14,314

### FUNCTIONAL BLOCK DIAGRAM



Dwg. FP-013A

NOTE — There is an indeterminate resistance between logic ground and power ground. For proper operation, these terminals must be externally connected together.

**Number of Outputs ON** UCN5821A **Max. Allowable Duty Cycle**  
**( $I_{OUT} = 200\text{ mA}$**  **at Ambient Temperature of**  
 **$V_{DD} = 12\text{ V}$ )** **25°C 40°C 50°C 60°C 70°C**

|   |      |      |      |      |      |
|---|------|------|------|------|------|
| 8 | 90%  | 79%  | 72%  | 65%  | 57%  |
| 7 | 100% | 90%  | 82%  | 74%  | 65%  |
| 6 | 100% | 100% | 96%  | 86%  | 76%  |
| 5 | 100% | 100% | 100% | 100% | 91%  |
| 4 | 100% | 100% | 100% | 100% | 100% |
| 3 | 100% | 100% | 100% | 100% | 100% |
| 2 | 100% | 100% | 100% | 100% | 100% |
| 1 | 100% | 100% | 100% | 100% | 100% |

**Number of Outputs ON** UCN5821LW **Max. Allowable Duty Cycle**  
**( $I_{OUT} = 200\text{ mA}$**  **at Ambient Temperature of**  
 **$V_{DD} = 12\text{ V}$ )** **25°C 40°C 50°C 60°C 70°C**

|   |      |      |      |      |      |
|---|------|------|------|------|------|
| 8 | 67%  | 59%  | 54%  | 49%  | 43%  |
| 7 | 77%  | 68%  | 62%  | 56%  | 49%  |
| 6 | 90%  | 79%  | 72%  | 65%  | 57%  |
| 5 | 100% | 95%  | 86%  | 78%  | 68%  |
| 4 | 100% | 100% | 100% | 98%  | 86%  |
| 3 | 100% | 100% | 100% | 100% | 100% |
| 2 | 100% | 100% | 100% | 100% | 100% |
| 1 | 100% | 100% | 100% | 100% | 100% |

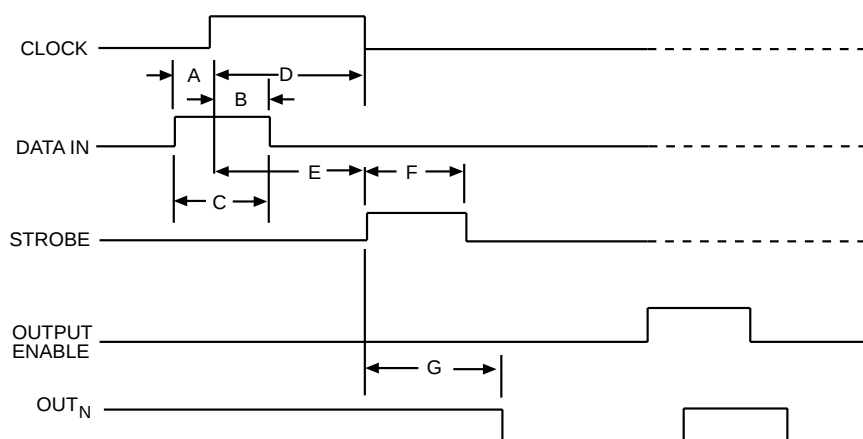
**5821**  
**8-BIT SERIAL-INPUT,**  
**LATCHED DRIVERS**

**ELECTRICAL CHARACTERISTICS at  $T_A = +25^\circ\text{C}$ ,  $V_{DD} = 5\text{ V}$  (unless otherwise specified).**

| Characteristic                       | Symbol        | Test Conditions                                             | Limits |      |                  |
|--------------------------------------|---------------|-------------------------------------------------------------|--------|------|------------------|
|                                      |               |                                                             | Min.   | Max. | Units            |
| Output Leakage Current               | $I_{CEX}$     | $V_{OUT} = 50\text{ V}$                                     | —      | 50   | $\mu\text{A}$    |
|                                      |               | $V_{OUT} = 50\text{ V}$ , $T_A = +70^\circ\text{C}$         | —      | 100  | $\mu\text{A}$    |
| Collector-Emitter Saturation Voltage | $V_{CE(SAT)}$ | $I_{OUT} = 100\text{ mA}$                                   | —      | 1.1  | V                |
|                                      |               | $I_{OUT} = 200\text{ mA}$                                   | —      | 1.3  | V                |
|                                      |               | $I_{OUT} = 350\text{ mA}$ , $V_{DD} = 7.0\text{ V}$         | —      | 1.6  | V                |
| Input Voltage                        | $V_{IN(0)}$   |                                                             | —      | 0.8  | V                |
|                                      | $V_{IN(1)}$   | $V_{DD} = 12\text{ V}$                                      | 10.5   | —    | V                |
|                                      |               | $V_{DD} = 5.0\text{ V}$                                     | 3.5    | —    | V                |
| Input Resistance                     | $r_{IN}$      | $V_{DD} = 12\text{ V}$                                      | 50     | —    | $\text{k}\Omega$ |
|                                      |               | $V_{DD} = 5.0\text{ V}$                                     | 50     | —    | $\text{k}\Omega$ |
| Supply Current                       | $I_{DD(ON)}$  | One Driver ON, $V_{DD} = 12\text{ V}$                       | —      | 4.5  | mA               |
|                                      |               | One Driver ON, $V_{DD} = 10\text{ V}$                       | —      | 3.9  | mA               |
|                                      |               | One Driver ON, $V_{DD} = 5.0\text{ V}$                      | —      | 2.4  | mA               |
|                                      | $I_{DD(OFF)}$ | $V_{DD} = 5.0\text{ V}$ , All Drivers OFF, All Inputs = 0 V | —      | 1.6  | mA               |
|                                      |               | $V_{DD} = 12\text{ V}$ , All Drivers OFF, All Inputs = 0 V  | —      | 2.9  | mA               |

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## 8-BIT SERIAL-INPUT, LATCHED DRIVERS



Dwg. No. A-12,627

### TIMING CONDITIONS

( $V_{DD} = 5.0 \text{ V}$ ,  $T_A = +25^\circ\text{C}$ , Logic Levels are  $V_{DD}$  and Ground)

- A. Minimum Data Active Time Before Clock Pulse  
(Data Set-Up Time) ..... **75 ns**
- B. Minimum Data Active Time After Clock Pulse  
(Data Hold Time) ..... **75 ns**
- C. Minimum Data Pulse Width ..... **150 ns**
- D. Minimum Clock Pulse Width ..... **150 ns**
- E. Minimum Time Between Clock Activation and Strobe ..... **30 ns**
- F. Minimum Strobe Pulse Width ..... **100 ns**
- G. Typical Time Between Strobe Activation and  
Output Transition ..... **1.0  $\mu\text{s}$**

Serial Data present at the input is transferred to the shift register on the logic “0” to logic “1” transition of the CLOCK input pulse. On succeeding CLOCK pulses, the registers shift data information towards the SERIAL DATA OUTPUT. The SERIAL DATA must appear at the input prior to the rising edge of the CLOCK input waveform.

Information present at any register is transferred to its respective latch when the STROBE is high (serial-to-parallel conversion). The latches will continue to accept new data as long as the STROBE is held high. Applications where the latches are bypassed (STROBE tied high) will require that the ENABLE input be high during serial data entry.

When the ENABLE input is high, all of the output buffers are disabled (OFF) without affecting the information stored in the latches or shift register. With the ENABLE input low, the outputs are controlled by the state of the latches.

### TRUTH TABLE

| Serial Data Input | Clock Input | Shift Register Contents |                |                |       |                |                | Serial Data Output | Strobe Input | Latch Contents |                |                |       |                |                | Output Enable | Output Contents |                |                |       |                |                |
|-------------------|-------------|-------------------------|----------------|----------------|-------|----------------|----------------|--------------------|--------------|----------------|----------------|----------------|-------|----------------|----------------|---------------|-----------------|----------------|----------------|-------|----------------|----------------|
|                   |             | I <sub>1</sub>          | I <sub>2</sub> | I <sub>3</sub> | ..... | I <sub>7</sub> | I <sub>8</sub> |                    |              | L <sub>1</sub> | L <sub>2</sub> | L <sub>3</sub> | ..... | L <sub>7</sub> | L <sub>8</sub> |               | O <sub>1</sub>  | O <sub>2</sub> | O <sub>3</sub> | ..... | O <sub>7</sub> | O <sub>8</sub> |
| H                 | ┐           | H                       | R <sub>1</sub> | R <sub>2</sub> | ..... | R <sub>7</sub> | R <sub>7</sub> | R <sub>7</sub>     |              |                |                |                |       |                |                |               |                 |                |                |       |                |                |
| L                 | ┐           | L                       | R <sub>1</sub> | R <sub>2</sub> | ..... | R <sub>7</sub> | R <sub>7</sub> | R <sub>7</sub>     |              |                |                |                |       |                |                |               |                 |                |                |       |                |                |
| X                 | ┐           | R <sub>1</sub>          | R <sub>2</sub> | R <sub>3</sub> | ..... | R <sub>8</sub> | R <sub>8</sub> | R <sub>8</sub>     |              |                |                |                |       |                |                |               |                 |                |                |       |                |                |
|                   |             | X                       | X              | X              | ..... | X              | X              | X                  | L            | R <sub>1</sub> | R <sub>2</sub> | R <sub>3</sub> | ..... | R <sub>8</sub> | R <sub>8</sub> |               |                 |                |                |       |                |                |
|                   |             | P <sub>1</sub>          | P <sub>2</sub> | P <sub>3</sub> | ..... | P <sub>8</sub> | P <sub>8</sub> | P <sub>8</sub>     | H            | P <sub>1</sub> | P <sub>2</sub> | P <sub>3</sub> | ..... | P <sub>8</sub> | P <sub>8</sub> | L             | P <sub>1</sub>  | P <sub>2</sub> | P <sub>3</sub> | ..... | P <sub>8</sub> | P <sub>8</sub> |
|                   |             |                         |                |                | ..... |                |                |                    |              | X              | X              | X              | ..... | X              | X              | H             | H               | H              | H              | ..... | H              | H              |

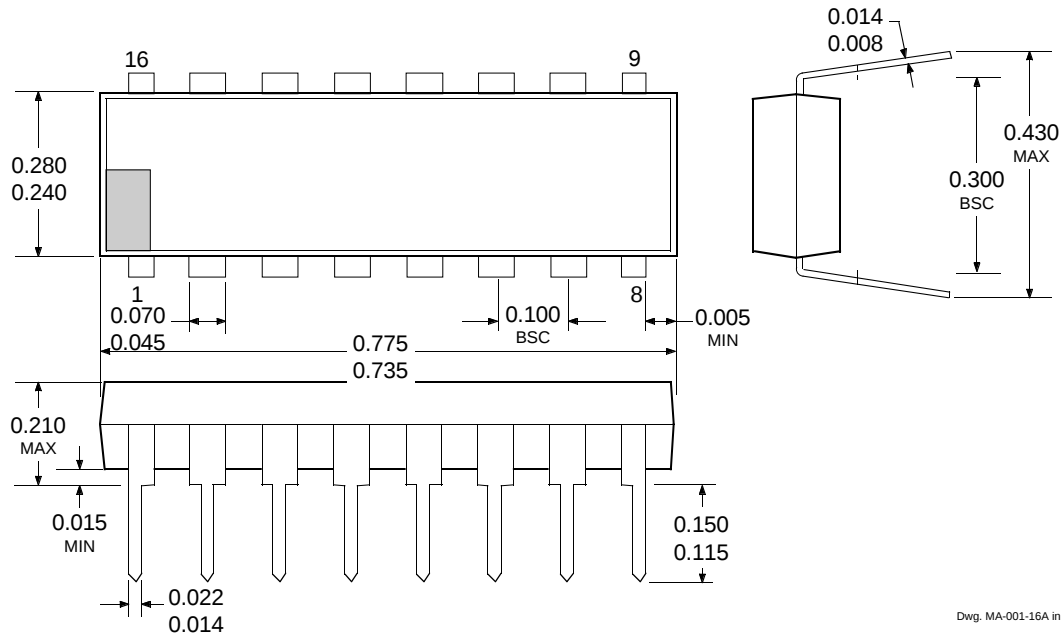
L = Low Logic Level H = High Logic Level X = Irrelevant P = Present State R = Previous State

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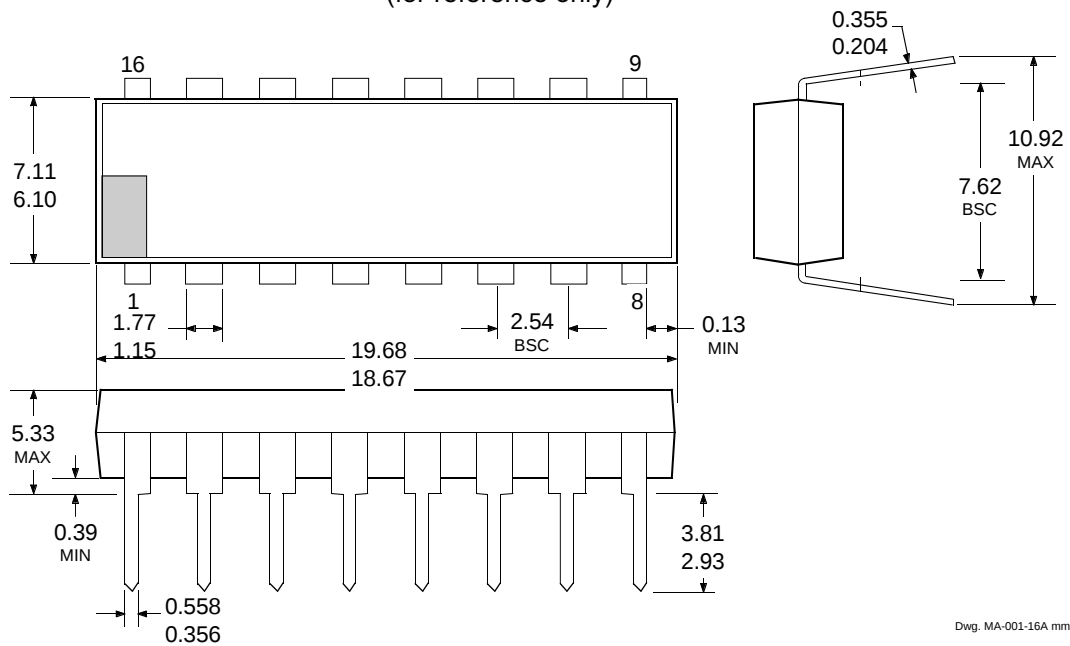
## 8-BIT SERIAL-INPUT, LATCHED DRIVERS

### UCN5821A

#### Dimensions in Inches (controlling dimensions)



#### Dimensions in Millimeters (for reference only)



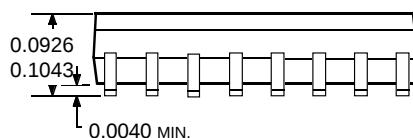
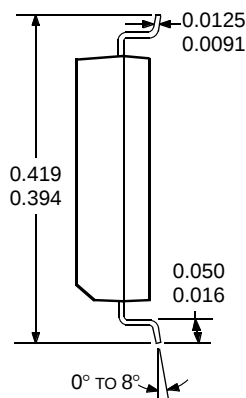
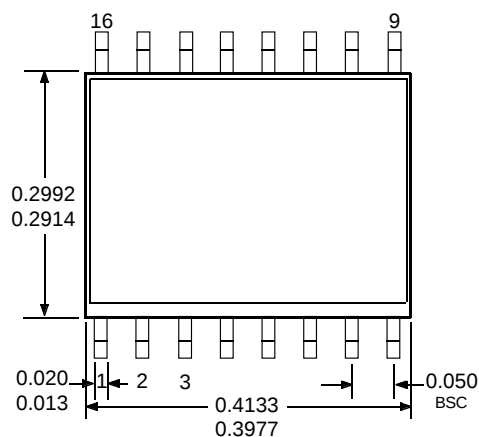
- NOTES:
1. Lead thickness is measured at seating plane or below.
  2. Lead spacing tolerance is non-cumulative.
  3. Exact body and lead configuration at vendor's option within limits shown.

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## 8-BIT SERIAL-INPUT, LATCHED DRIVERS

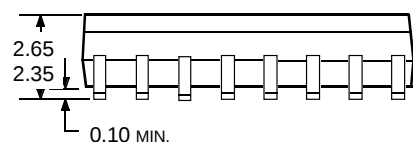
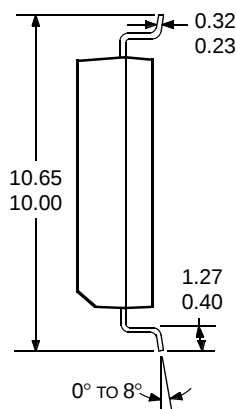
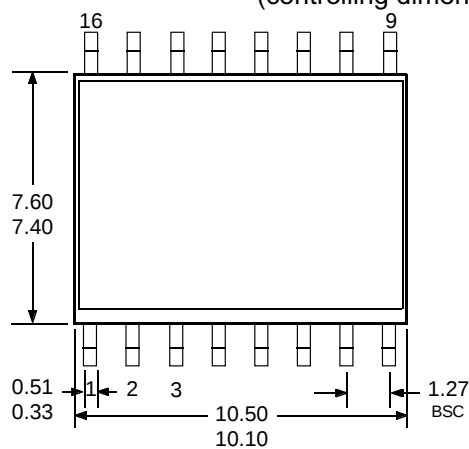
### UCN5821LW

#### Dimensions in Inches (for reference only)



Dwg. MA-008-16A in

#### Dimensions in Millimeters (controlling dimensions)



Dwg. MA-008-16A mm

- NOTES: 1. Lead spacing tolerance is non-cumulative.  
2. Exact body and lead configuration at vendor's option within limits shown.

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8-BIT SERIAL-INPUT,  
LATCHED DRIVERS

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