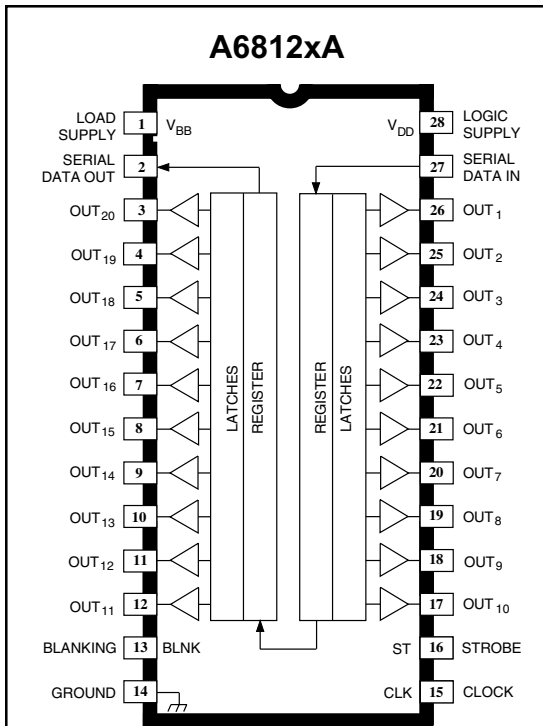


# 6812

## DABiC-IV, 20-BIT SERIAL-INPUT, LATCHED SOURCE DRIVER



Dwg. PP-029-7

### ABSOLUTE MAXIMUM RATINGS at $T_A = 25^\circ\text{C}$

|   |                            |
|---|----------------------------|
| Logic Supply Voltage, $V_{DD}$ .....                      | 7.0 V                      |
| Driver Supply Voltage, $V_{BB}$ .....                     | 60 V                       |
| Continuous Output Current Range,<br>$I_{OUT}$ .....       | -40 mA to +15 mA           |
| Input Voltage Range,<br>$V_{IN}$ .....                    | -0.3 V to $V_{DD} + 0.3$ V |
| Package Power Dissipation,<br>$P_D$ .....                 | See Graph                  |
| Operating Temperature Range, $T_A$<br>(Suffix 'E-') ..... | -40°C to +85°C             |
| (Suffix 'S-') .....                                       | -20°C to +85°C             |
| Storage Temperature Range,<br>$T_S$ .....                 | -55°C to +125°C            |

Caution: These CMOS devices have input static protection (Class 2) but are still susceptible to damage if exposed to extremely high static electrical charges.

The A6812- devices combine a 20-bit CMOS shift register, accompanying data latches and control circuitry with bipolar sourcing outputs and pnp active pull downs. Designed primarily to drive vacuum-fluorescent displays, the 60 V and -40 mA output ratings also allow these devices to be used in many other peripheral power driver applications. The A6812- features an increased data input rate (compared with the older UCN/UCQ5812-F) and a controlled output slew rate.

The CMOS shift register and latches allow direct interfacing with microprocessor-based systems. With a 3.3 V or 5 V logic supply, they will operate to at least 10 MHz.

A CMOS serial data output permits cascade connections in applications requiring additional drive lines. Similar devices are available as the A6809- and A6810- (10 bits), A6811- (12 bits), and A6818- (32 bits).

The A6812- output source drivers are npn Darlington, capable of sourcing up to 40 mA. The controlled output slew rate reduces electromagnetic noise, which is an important consideration in systems that include telecommunications and/or microprocessors and to meet government emissions regulations. For inter-digit blanking, all output drivers can be disabled and all sink drivers turned on with a BLANKING input high. The pnp active pull-downs will sink at least 2.5 mA.

Two temperature ranges are available for optimum performance in commercial (suffix S-) or industrial (suffix E-) applications. Package styles are provided for through-hole DIP (suffix -A), surface-mount SOIC (suffix -LW), or minimum-area surface-mount PLCC (suffix -EP). Copper lead frames, low logic-power dissipation, and low output-saturation voltages allow these drivers to source 25 mA from all outputs continuously to more than +43°C (suffix -LW), +61°C (suffix -EP), or +77°C (suffix -A).

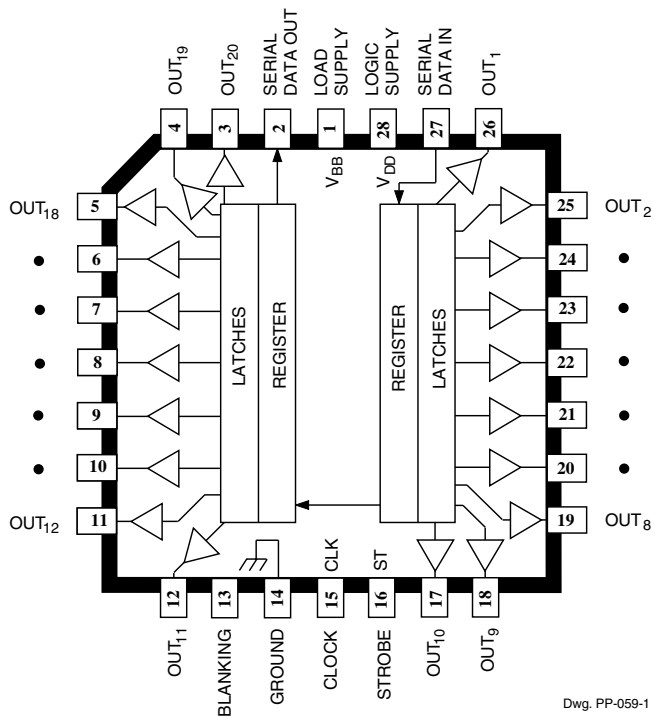
### FEATURES

- Controlled Output Slew Rate
- High-Speed Data Storage
- 60 V Minimum Output Breakdown
- High Data Input Rate
- PNP Active Pull-Downs
- Low Output-Saturation Voltages
- Low-Power CMOS Logic and Latches
- Improved Replacements for TL5812-, UCN5812-, and UCQ5812-

Complete part number includes a suffix to identify operating temperature range (E- or S-) and package type (-A, -EP, or -LW). Always order by complete part number, e.g., **A6812SLW**.

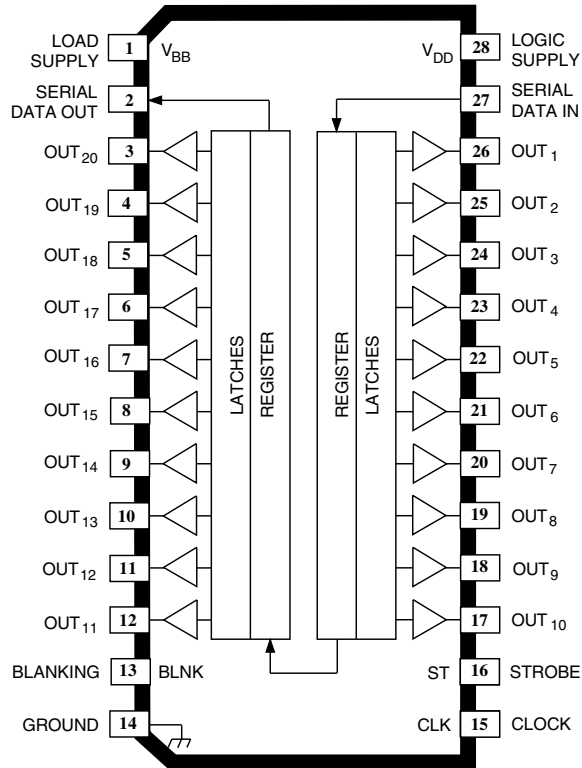
# 6812 20-BIT SERIAL-INPUT, LATCHED SOURCE DRIVER

**A6812xEP**



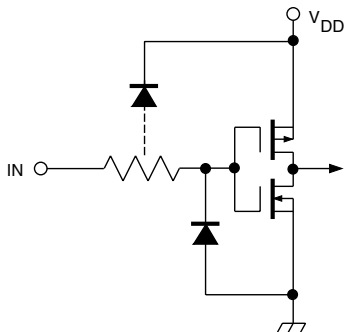
Dwg. PP-059-1

**A6812xLW**



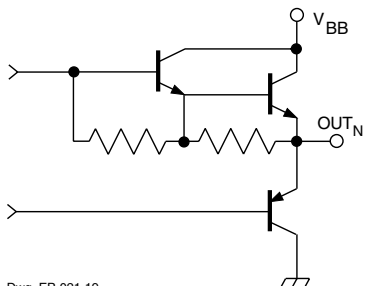
Dwg. PP-029-8

## TYPICAL INPUT CIRCUIT

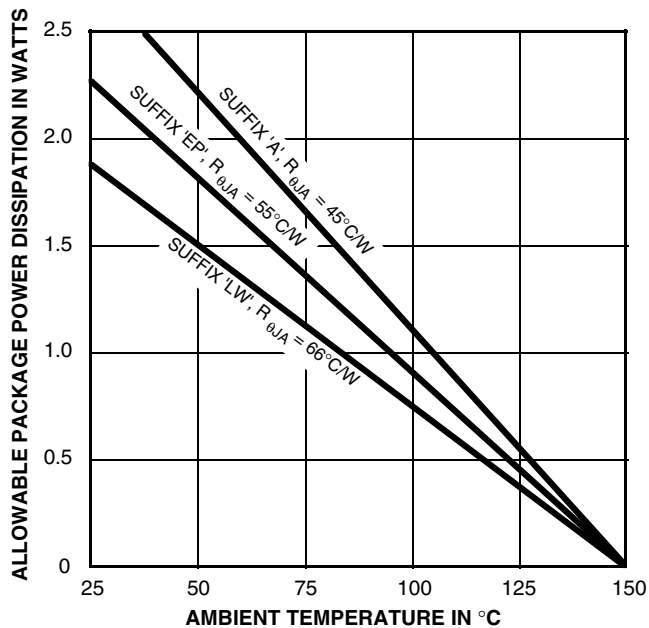


Dwg. EP-010-5

## TYPICAL OUTPUT DRIVER



Dwg. EP-021-19

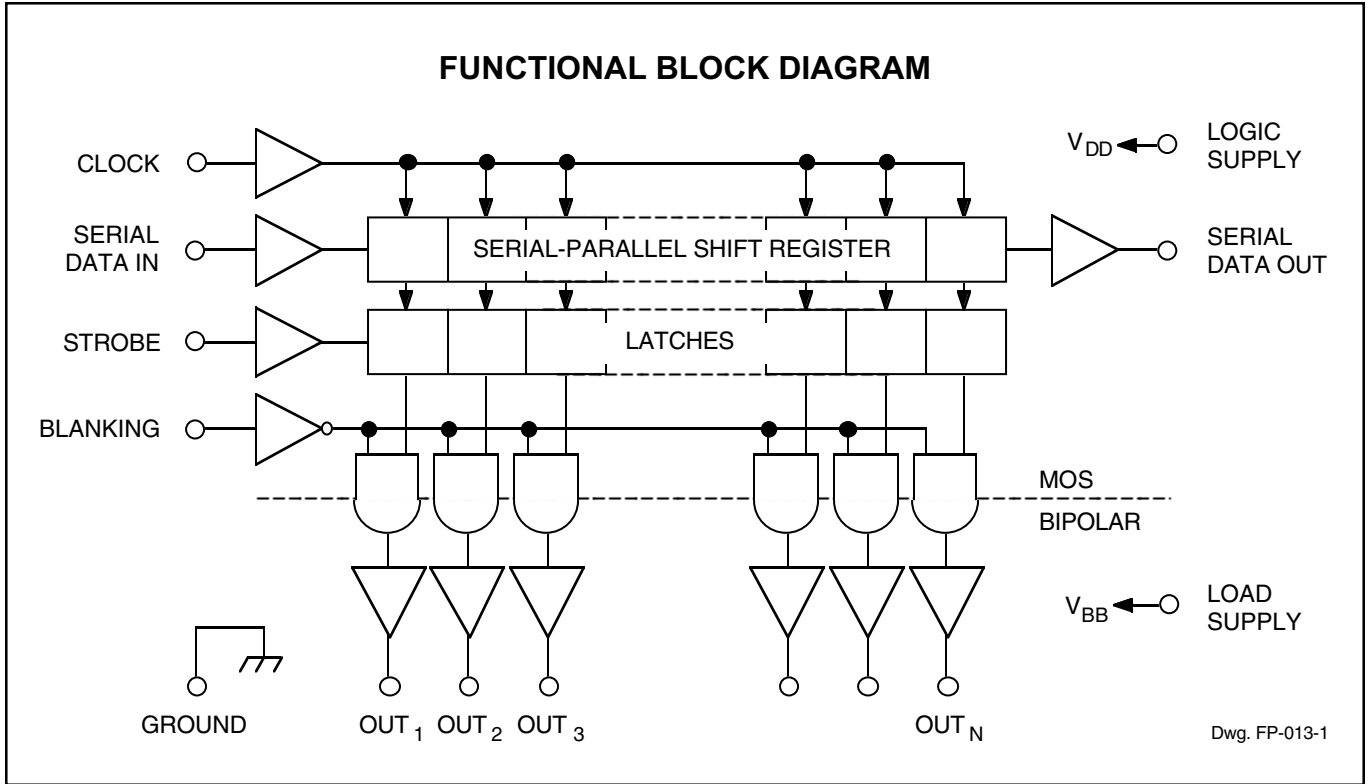


Dwg. GP-024-2



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# 6812 20-BIT SERIAL-INPUT, LATCHED SOURCE DRIVER



### TRUTH TABLE

| Serial Data Input | Clock Input | Shift Register Contents |                |                |     |                  | Serial Data Output | Strobe Input | Latch Contents |                |                |                |                  | Blanking       | Output Contents  |                |                |                |                |     |                  |
|-------------------|-------------|-------------------------|----------------|----------------|-----|------------------|--------------------|--------------|----------------|----------------|----------------|----------------|------------------|----------------|------------------|----------------|----------------|----------------|----------------|-----|------------------|
|                   |             | I <sub>1</sub>          | I <sub>2</sub> | I <sub>3</sub> | ... | I <sub>N-1</sub> |                    |              | I <sub>N</sub> | I <sub>1</sub> | I <sub>2</sub> | I <sub>3</sub> | ...              |                | I <sub>N-1</sub> | I <sub>N</sub> | I <sub>1</sub> | I <sub>2</sub> | I <sub>3</sub> | ... | I <sub>N-1</sub> |
| H                 | ⌋           | H                       | R <sub>1</sub> | R <sub>2</sub> | ... | R <sub>N-2</sub> | R <sub>N-1</sub>   |              |                |                |                |                |                  |                |                  |                |                |                |                |     |                  |
| L                 | ⌋           | L                       | R <sub>1</sub> | R <sub>2</sub> | ... | R <sub>N-2</sub> | R <sub>N-1</sub>   |              |                |                |                |                |                  |                |                  |                |                |                |                |     |                  |
| X                 | ⌋           | R <sub>1</sub>          | R <sub>2</sub> | R <sub>3</sub> | ... | R <sub>N-1</sub> | R <sub>N</sub>     |              |                |                |                |                |                  |                |                  |                |                |                |                |     |                  |
|                   |             | X                       | X              | X              | ... | X                | X                  | L            | R <sub>1</sub> | R <sub>2</sub> | R <sub>3</sub> | ...            | R <sub>N-1</sub> | R <sub>N</sub> |                  |                |                |                |                |     |                  |
|                   |             | P <sub>1</sub>          | P <sub>2</sub> | P <sub>3</sub> | ... | P <sub>N-1</sub> | P <sub>N</sub>     | H            | P <sub>1</sub> | P <sub>2</sub> | P <sub>3</sub> | ...            | P <sub>N-1</sub> | P <sub>N</sub> | L                |                |                |                |                |     |                  |
|                   |             |                         |                |                | ... |                  |                    |              | X              | X              | X              | ...            | X                | X              | H                | L              | L              | L              | ...            | L   | L                |

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

# 6812

## 20-BIT SERIAL-INPUT, LATCHED SOURCE DRIVER

**ELECTRICAL CHARACTERISTICS at  $T_A = +25^\circ\text{C}$  (A6812S-) or over operating temperature range (A6812E-),  $V_{BB} = 60\text{ V}$  unless otherwise noted.**

| Characteristic                 | Symbol          | Test Conditions                                      | Limits @ $V_{DD} = 3.3\text{ V}$ |        |      | Limits @ $V_{DD} = 5\text{ V}$ |        |      | Units            |
|--------------------------------|-----------------|--|----------------------------------|--------|------|--------------------------------|--------|------|------------------|
|                                |                 |  | Min.                             | Typ.   | Max. | Min.                           | Typ.   | Max. |                  |
| Output Leakage Current         | $I_{CEX}$       | $V_{OUT} = 0\text{ V}$                               | —                                | <-0.1  | -15  | —                              | <-0.1  | -15  | $\mu\text{A}$    |
| Output Voltage                 | $V_{OUT(1)}$    | $I_{OUT} = -25\text{ mA}$                            | 57.5                             | 58.3   | —    | 57.5                           | 58.3   | —    | V                |
|                                | $V_{OUT(0)}$    | $I_{OUT} = 1\text{ mA}$                              | —                                | 1.0    | 1.5  | —                              | 1.0    | 1.5  | V                |
| Output Pull-Down Current       | $I_{OUT(0)}$    | $V_{OUT} = 5\text{ V}$ to $V_{BB}$                   | 2.5                              | 5.0    | —    | 2.5                            | 5.0    | —    | mA               |
| Input Voltage                  | $V_{IN(1)}$     |  | 2.2                              | —      | —    | 3.3                            | —      | —    | V                |
|                                | $V_{IN(0)}$     |  | —                                | —      | 1.1  | —                              | —      | 1.7  | V                |
| Input Current                  | $I_{IN(1)}$     | $V_{IN} = V_{DD}$                                    | —                                | <0.01  | 1.0  | —                              | <0.01  | 1.0  | $\mu\text{A}$    |
|                                | $I_{IN(0)}$     | $V_{IN} = 0\text{ V}$                                | —                                | <-0.01 | -1.0 | —                              | <-0.01 | -1.0 | $\mu\text{A}$    |
| Input Clamp Voltage            | $V_{IK}$        | $I_{IN} = -200\text{ }\mu\text{A}$                   | —                                | -0.8   | -1.5 | —                              | -0.8   | -1.5 | V                |
| Serial Data Output Voltage     | $V_{OUT(1)}$    | $I_{OUT} = -200\text{ }\mu\text{A}$                  | 2.8                              | 3.05   | —    | 4.5                            | 4.75   | —    | V                |
|                                | $V_{OUT(0)}$    | $I_{OUT} = 200\text{ }\mu\text{A}$                   | —                                | 0.15   | 0.3  | —                              | 0.15   | 0.3  | V                |
| Maximum Clock Frequency        | $f_c$           |  | 10*                              | —      | —    | 10*                            | —      | —    | MHz              |
| Logic Supply Current           | $I_{DD(1)}$     | All Outputs High                                     | —                                | 0.25   | 0.75 | —                              | 0.3    | 1.0  | mA               |
|                                | $I_{DD(0)}$     | All Outputs Low                                      | —                                | 0.25   | 0.75 | —                              | 0.3    | 1.0  | mA               |
| Load Supply Current            | $I_{BB(1)}$     | All Outputs High, No Load                            | —                                | 3.0    | 6.0  | —                              | 3.0    | 6.0  | mA               |
|                                | $I_{BB(0)}$     | All Outputs Low                                      | —                                | 0.2    | 20   | —                              | 0.2    | 20   | $\mu\text{A}$    |
| Blanking-to-Output Delay       | $t_{dis(BQ)}$   | $C_L = 30\text{ pF}$ , 50% to 50%                    | —                                | 0.7    | 2.0  | —                              | 0.7    | 2.0  | $\mu\text{s}$    |
|                                | $t_{en(BQ)}$    | $C_L = 30\text{ pF}$ , 50% to 50%                    | —                                | 1.8    | 3.0  | —                              | 1.8    | 3.0  | $\mu\text{s}$    |
| Strobe-to-Output Delay         | $t_{p(STH-QL)}$ | $R_L = 2.3\text{ k}\Omega$ , $C_L \leq 30\text{ pF}$ | —                                | 0.7    | 2.0  | —                              | 0.7    | 2.0  | $\mu\text{s}$    |
|                                | $t_{p(STH-QH)}$ | $R_L = 2.3\text{ k}\Omega$ , $C_L \leq 30\text{ pF}$ | —                                | 1.8    | 3.0  | —                              | 1.8    | 3.0  | $\mu\text{s}$    |
| Output Fall Time               | $t_f$           | $R_L = 2.3\text{ k}\Omega$ , $C_L \leq 30\text{ pF}$ | 2.4                              | —      | 12   | 2.4                            | —      | 12   | $\mu\text{s}$    |
| Output Rise Time               | $t_r$           | $R_L = 2.3\text{ k}\Omega$ , $C_L \leq 30\text{ pF}$ | 2.4                              | —      | 12   | 2.4                            | —      | 12   | $\mu\text{s}$    |
| Output Slew Rate               | dV/dt           | $R_L = 2.3\text{ k}\Omega$ , $C_L \leq 30\text{ pF}$ | 4.0                              | —      | 20   | 4.0                            | —      | 20   | V/ $\mu\text{s}$ |
| Clock-to-Serial Data Out Delay | $t_{p(CH-SQX)}$ | $I_{OUT} = \pm 200\text{ }\mu\text{A}$               | —                                | 50     | —    | —                              | 50     | —    | ns               |

Negative current is defined as coming out of (sourcing) the specified device terminal.

Typical data is is for design information only and is at  $T_A = +25^\circ\text{C}$ .

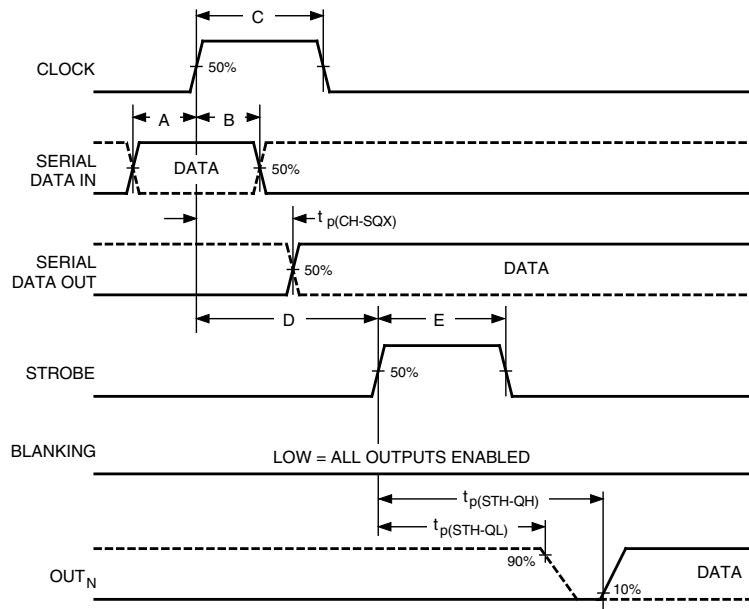
\* Operation at a clock frequency greater than the specified minimum is possible but not warranted.



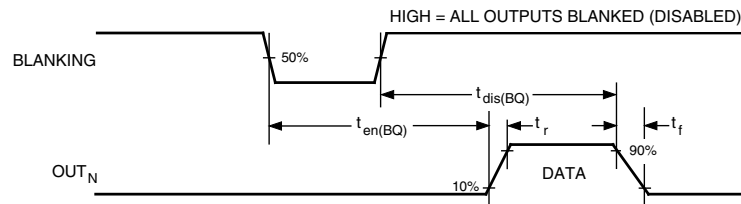
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# 6812 20-BIT SERIAL-INPUT, LATCHED SOURCE DRIVER

## TIMING REQUIREMENTS and SPECIFICATIONS (Logic Levels are $V_{DD}$ and Ground)



Dwg. WP-029



Dwg. WP-030

- A.** Data Active Time Before Clock Pulse  
(Data Set-Up Time),  $t_{su(D)}$  ..... **25 ns**
- B.** Data Active Time After Clock Pulse  
(Data Hold Time),  $t_{h(D)}$  ..... **25 ns**
- C.** Clock Pulse Width,  $t_{w(CH)}$  ..... **50 ns**
- D.** Time Between Clock Activation and Strobe,  $t_{su(C)}$  .... **100 ns**
- E.** Strobe Pulse Width,  $t_{w(STH)}$  ..... **50 ns**

NOTE – Timing is representative of a 10 MHz clock. Higher speeds may be attainable with increased supply voltage; operation at high temperatures will reduce the specified maximum clock frequency.

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 the 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 BLANKING input be high during serial data entry.

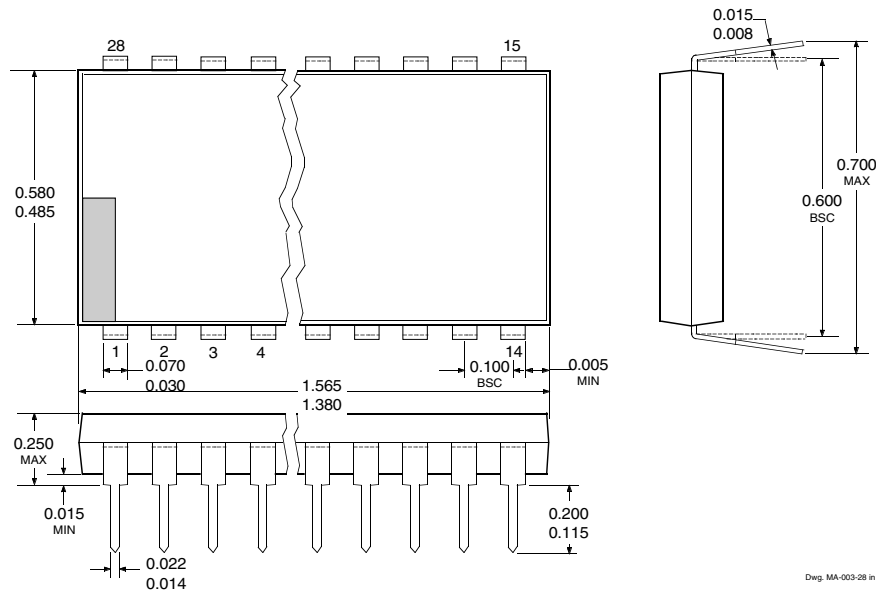
When the BLANKING input is high, the output source drivers are disabled (OFF); the pnp active pull-down sink drivers are ON. The information stored in the latches is not affected by the BLANKING input. With the BLANKING input low, the outputs are controlled by the state of their respective latches.

# 6812

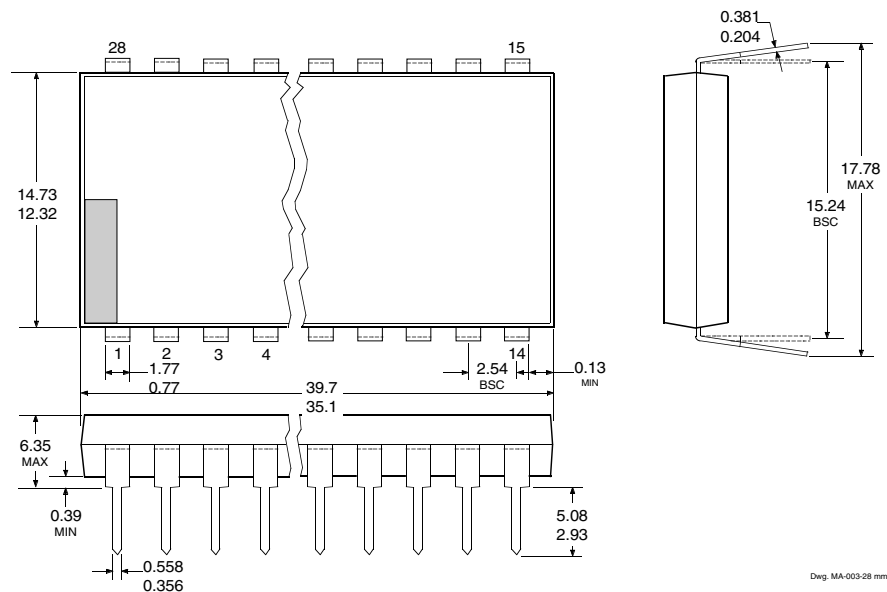
## 20-BIT SERIAL-INPUT, LATCHED SOURCE DRIVER

### A6812EA & A6812SA

Dimensions in Inches  
(controlling dimensions)



Dimensions in Millimeters  
(for reference only)



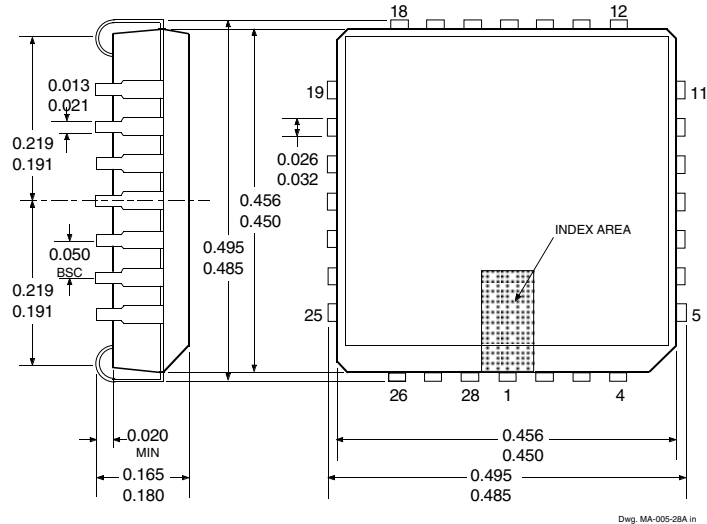
- NOTES: 1. Exact body and lead configuration at vendor's option within limits shown.  
 2. Lead spacing tolerance is non-cumulative.  
 3. Lead thickness is measured at seating plane or below.  
 4. Supplied in standard sticks/tubes of 12 devices.



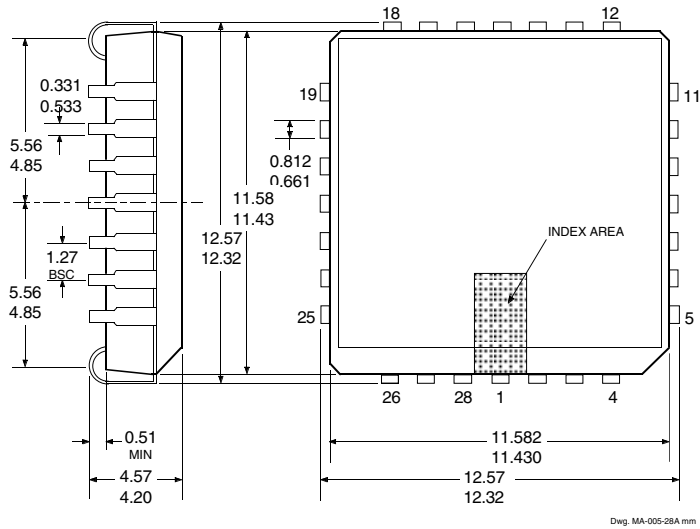
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# 6812 20-BIT SERIAL-INPUT, LATCHED SOURCE DRIVER

## A6812EEP & A6812SEP (add "TR" to part number for tape and reel) Dimensions in Inches (controlling dimensions)



## Dimensions in Millimeters (for reference only))



- NOTES: 1. Exact body and lead configuration at vendor's option within limits shown.  
 2. Lead spacing tolerance is non-cumulative.  
 3. Supplied in standard sticks/tubes of 38 devices or add "TR" to part number for tape and reel.

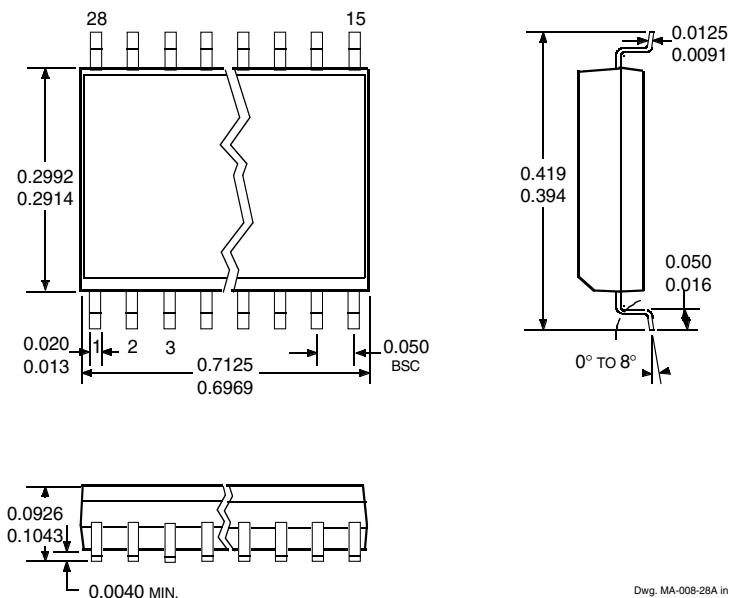
# 6812 20-BIT SERIAL-INPUT, LATCHED SOURCE DRIVER

## A6812ELW & A6812SLW

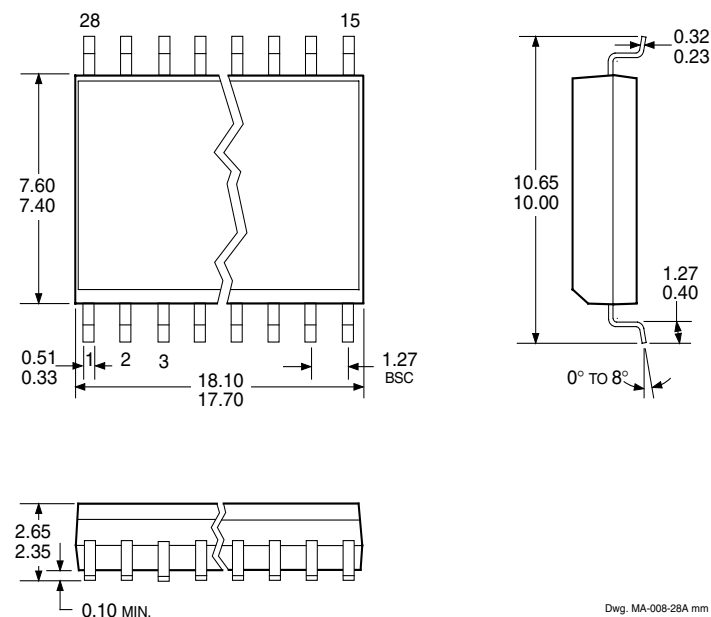
(add "TR" to part number for tape and reel)

Dimensions in Inches

(for reference only)



Dimensions in Millimeters  
(controlling dimensions)



- NOTES: 1. Exact body and lead configuration at vendor's option within limits shown.  
2. Lead spacing tolerance is non-cumulative.  
3. Supplied in standard sticks/tubes of 27 devices or add "TR" to part number for tape and reel.



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**6812**  
**20-BIT SERIAL-INPUT,  
LATCHED SOURCE DRIVER**

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# 6812 20-BIT SERIAL-INPUT, LATCHED SOURCE DRIVER

## POWER INTERFACE DRIVERS

| Function                                 | Output Ratings* |       | Part Number†       |
|--|-----------------|-------|--------------------|
| <b>SERIAL-INPUT LATCHED DRIVERS</b>      |                 |       |                    |
| 8-Bit (saturated drivers)                | -120 mA         | 50 V‡ | 5895               |
| 8-Bit                                    | 350 mA          | 50 V  | 5821               |
| 8-Bit                                    | 350 mA          | 80 V  | 5822               |
| 8-Bit                                    | 350 mA          | 50 V‡ | 5841               |
| 8-Bit                                    | 350 mA          | 80 V‡ | 5842               |
| 8-Bit (constant-current LED driver)      | 75 mA           | 17 V  | 6275               |
| 8-Bit (DMOS drivers)                     | 250 mA          | 50 V  | 6595               |
| 8-Bit (DMOS drivers)                     | 350 mA          | 50 V‡ | 6A595              |
| 8-Bit (DMOS drivers)                     | 100 mA          | 50 V  | 6B595              |
| 10-Bit (active pull-downs)               | -25 mA          | 60 V  | 5810-F and 6809/10 |
| 12-Bit (active pull-downs)               | -25 mA          | 60 V  | 5811 and 6811      |
| 16-Bit (constant-current LED driver)     | 75 mA           | 17 V  | 6276               |
| 20-Bit (active pull-downs)               | -25 mA          | 60 V  | 5812-F and 6812    |
| 32-Bit (active pull-downs)               | -25 mA          | 60 V  | 5818-F and 6818    |
| 32-Bit                                   | 100 mA          | 30 V  | 5833               |
| 32-Bit (saturated drivers)               | 100 mA          | 40 V  | 5832               |
| <b>PARALLEL-INPUT LATCHED DRIVERS</b>    |                 |       |                    |
| 4-Bit                                    | 350 mA          | 50 V‡ | 5800               |
| 8-Bit                                    | -25 mA          | 60 V  | 5815               |
| 8-Bit                                    | 350 mA          | 50 V‡ | 5801               |
| 8-Bit (DMOS drivers)                     | 100 mA          | 50 V  | 6B273              |
| 8-Bit (DMOS drivers)                     | 250 mA          | 50 V  | 6273               |
| <b>SPECIAL-PURPOSE DEVICES</b>           |                 |       |                    |
| Unipolar Stepper Motor Translator/Driver | 1.25 A          | 50 V‡ | 5804               |
| Addressable 8-Bit Decoder/DMOS Driver    | 250 mA          | 50 V  | 6259               |
| Addressable 8-Bit Decoder/DMOS Driver    | 350 mA          | 50 V‡ | 6A259              |
| Addressable 8-Bit Decoder/DMOS Driver    | 100 mA          | 50 V  | 6B259              |
| Addressable 28-Line Decoder/Driver       | 450 mA          | 30 V  | 6817               |

\* Current is maximum specified test condition, voltage is maximum rating. See specification for sustaining voltage limits. Negative current is defined as coming out of (sourcing) the output.

† Complete part number includes additional characters to indicate operating temperature range and package style.

‡ Internal transient-suppression diodes included for inductive-load protection.



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