HV5812

20-Channel Serial-Input Vacuum Fluorescent Display Driver for Anode or Grid

Features

- HVCMOS® Technology for High Performance
- Operating Voltage of up to 80V
- High-speed Source Driver
- 5V CMOS Logic Circuitry
- Up to 5 MHz Data Input Rate
- Excellent Noise Immunity
- Flexible High-voltage Supplies

Applications

- Display Driver

General Description

The HV5812 is a 20-channel serial-input vacuum fluorescent display driver. It combines a 20-bit CMOS shift register, data latches and control circuitry with high-voltage MOSFET outputs. The HV5812 is primarily designed for vacuum fluorescent displays.

The CMOS shift register and latches allow direct interfacing with microprocessor-based systems. Data input rates are typically over 5 MHz with 5V logic supply. Especially useful for interdigit blanking, the blanking input disables the output source drives and turns on the sink drivers. Using with TTL may require external pull-up resistors to ensure an input logic high.

Package Types

See Table 2-1 for pin information.
HV5812

Functional Block Diagram

```
Functional Block Diagram

20-bit Shift Register
20-bit Latch

BL
STROBE
DATA IN
CLK
DATA OUT
GND

VPP
HVOUT1
HVOUT2
HVOUT3
HVOUT20
GND
VDD

HV5812
DS20005629A-page  2 © 2016 Microchip Technology Inc.
```

Downloaded from Arrow.com.
1.0  ELECTRICAL CHARACTERISTICS

Absolute Maximum Ratings†

Supply Voltage, VDD: -0.5V to +7.5V
Supply Voltage, VPP: -0.5V to +90V
Logic Input Levels: -0.3V to VDD +0.3V
Maximum Operating Junction Temperature: +125°C
Storage Temperature: -55°C to +150°C
Power Dissipation:
- 28-lead PDIP: 2000 mW
- 28-lead PLCC: 1900 mW
- 28-Lead SOW: 1700 mW

† Notice: Stresses above those listed under “Absolute Maximum Ratings” may cause permanent damage to the device. This is a stress rating only, and functional operation of the device at those or any other conditions above those indicated in the operational sections of this specification is not intended. Exposure to maximum rating conditions for extended periods may affect device reliability.

RECOMMENDED OPERATING CONDITIONS

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Sym.</th>
<th>Min.</th>
<th>Typ.</th>
<th>Max.</th>
<th>Unit</th>
<th>Conditions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Supply Voltage</td>
<td>VDD</td>
<td>4.5</td>
<td>—</td>
<td>5.5</td>
<td>V</td>
<td></td>
</tr>
<tr>
<td>Supply Voltage</td>
<td>VPP</td>
<td>20</td>
<td>—</td>
<td>80</td>
<td>V</td>
<td></td>
</tr>
<tr>
<td>Operating Junction Temperature</td>
<td>TJ</td>
<td>-40</td>
<td>—</td>
<td>+125</td>
<td>°C</td>
<td></td>
</tr>
</tbody>
</table>

DC ELECTRICAL CHARACTERISTICS

Electrical Specifications: Over recommended operating conditions; TA = 25°C unless otherwise indicated.

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Sym.</th>
<th>Min.</th>
<th>Typ.</th>
<th>Max.</th>
<th>Unit</th>
<th>Conditions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Output Leakage Current</td>
<td>I_DSS</td>
<td>—</td>
<td>-5</td>
<td>-15</td>
<td>µA</td>
<td>VOUT = 0V, TA = +70°C</td>
</tr>
<tr>
<td>High-level Output</td>
<td>V_HVOUT</td>
<td>78</td>
<td>78.5</td>
<td>—</td>
<td>V</td>
<td>IOUT = -25 mA, VPP = 80V, TJ = +25°C</td>
</tr>
<tr>
<td></td>
<td></td>
<td>77</td>
<td>78</td>
<td>—</td>
<td>V</td>
<td>IOUT = -25 mA, VPP = 80V, TJ = +125°C</td>
</tr>
<tr>
<td>Low-level Output</td>
<td>V_VOL</td>
<td>—</td>
<td>1.5</td>
<td>3</td>
<td>V</td>
<td>IOUT = 1 mA, TJ = +25°C, VDD = 5V</td>
</tr>
<tr>
<td></td>
<td></td>
<td>—</td>
<td>2.3</td>
<td>4</td>
<td>V</td>
<td>IOUT = 1 mA, TJ = +125°C, VDD = 5V</td>
</tr>
<tr>
<td></td>
<td></td>
<td>—</td>
<td>200</td>
<td>250</td>
<td>V</td>
<td>IOUT = +200 µA, VDD = 5V</td>
</tr>
<tr>
<td>Output Pull-down Current</td>
<td>I_SINK</td>
<td>2</td>
<td>3.5</td>
<td>—</td>
<td>mA</td>
<td>VOUT = 5V to VPP, VDD = 5V</td>
</tr>
<tr>
<td>High-level Logic Input Voltage</td>
<td>V_HI</td>
<td>3.5</td>
<td>—</td>
<td>5.3</td>
<td>V</td>
<td>VDD = 5V</td>
</tr>
<tr>
<td>Low-level Logic Input Voltage</td>
<td>V_IL</td>
<td>-0.3</td>
<td>—</td>
<td>0.8</td>
<td>V</td>
<td></td>
</tr>
<tr>
<td>High-level Logic Input Current</td>
<td>I_HI</td>
<td>—</td>
<td>0.05</td>
<td>0.5</td>
<td>µA</td>
<td>VIN = VDD, VDD = 5V</td>
</tr>
<tr>
<td>Low-level Logic Input Current</td>
<td>I_IL</td>
<td>—</td>
<td>-0.05</td>
<td>-0.5</td>
<td>µA</td>
<td>VIN = 0.8V, VDD = 5V</td>
</tr>
<tr>
<td>Quiescent VDD Supply Current</td>
<td>I_DDQ</td>
<td>—</td>
<td>100</td>
<td>300</td>
<td>µA</td>
<td>All outputs high, VDD = 5V</td>
</tr>
<tr>
<td>Quiescent VPP Supply Current</td>
<td>I_PPQ</td>
<td>—</td>
<td>10</td>
<td>100</td>
<td>µA</td>
<td>All outputs low, VDD = 5V</td>
</tr>
<tr>
<td></td>
<td></td>
<td>—</td>
<td>100</td>
<td>100</td>
<td>µA</td>
<td>All outputs high, no load</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>All outputs low, no load</td>
</tr>
</tbody>
</table>
### AC ELECTRICAL CHARACTERISTICS

**Electrical Specifications**: Over recommended operating conditions; \( T_A = 25^\circ\text{C} \) unless otherwise indicated.

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Sym.</th>
<th>Min.</th>
<th>Typ.</th>
<th>Max.</th>
<th>Unit</th>
<th>Conditions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Blanking to Output Delay</td>
<td>( t_{\text{PHL}} )</td>
<td>—</td>
<td>2000</td>
<td>—</td>
<td>ns</td>
<td>( C_L = 30 , \text{pF}, 50% \text{ to } 50%, , V_{\text{DD}} = 5, \text{V} )</td>
</tr>
<tr>
<td>Output Fall Time</td>
<td>( t_r )</td>
<td>—</td>
<td>1450</td>
<td>—</td>
<td>ns</td>
<td>( C_L = 30 , \text{pF}, 90% \text{ to } 10%, , V_{\text{DD}} = 5, \text{V} )</td>
</tr>
<tr>
<td>Output Rise Time</td>
<td>( t_f )</td>
<td>—</td>
<td>650</td>
<td>—</td>
<td>ns</td>
<td>( C_L = 30 , \text{pF}, 10% \text{ to } 90%, , V_{\text{DD}} = 5, \text{V} )</td>
</tr>
<tr>
<td>Data Set-up Time</td>
<td>( t_{\text{SU}} )</td>
<td>75</td>
<td>—</td>
<td>—</td>
<td>ns</td>
<td>See <strong>Timing Waveforms</strong>.</td>
</tr>
<tr>
<td>Data Hold Time</td>
<td>( t_H )</td>
<td>75</td>
<td>—</td>
<td>—</td>
<td>ns</td>
<td>See <strong>Timing Waveforms</strong>.</td>
</tr>
<tr>
<td>Minimum Data Pulse Width</td>
<td>( t_{\text{PWD}} )</td>
<td>150</td>
<td>—</td>
<td>—</td>
<td>ns</td>
<td>See <strong>Timing Waveforms</strong>.</td>
</tr>
<tr>
<td>Minimum Clock Pulse Width</td>
<td>( t_{\text{PWCLK}} )</td>
<td>150</td>
<td>—</td>
<td>—</td>
<td>ns</td>
<td>See <strong>Timing Waveforms</strong>.</td>
</tr>
<tr>
<td>Minimum Time between Clock</td>
<td>( t_{\text{CKS}} )</td>
<td>300</td>
<td>—</td>
<td>—</td>
<td>ns</td>
<td>See <strong>Timing Waveforms</strong>.</td>
</tr>
<tr>
<td>Activation and Strobe</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Minimum Strobe Pulse Width</td>
<td>( t_{\text{PWS}} )</td>
<td>100</td>
<td>—</td>
<td>—</td>
<td>ns</td>
<td>See <strong>Timing Waveforms</strong>.</td>
</tr>
<tr>
<td>Typical Time between Strobe</td>
<td>( t_{\text{STO}} )</td>
<td>—</td>
<td>500</td>
<td>—</td>
<td>ns</td>
<td>See <strong>Timing Waveforms</strong>.</td>
</tr>
<tr>
<td>Activation and Output Transition</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Maximum Clock Frequency</td>
<td>( f_{\text{CLK}} )</td>
<td>—</td>
<td>8</td>
<td>—</td>
<td>MHz</td>
<td>( T_J = +25^\circ\text{C}, , V_{\text{DD}} = 5, \text{V} )</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>—</td>
<td>MHz</td>
<td>( T_J = +125^\circ\text{C}, , V_{\text{DD}} = 5, \text{V} )</td>
</tr>
</tbody>
</table>

### TEMPERATURE SPECIFICATIONS

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Sym.</th>
<th>Min.</th>
<th>Typ.</th>
<th>Max.</th>
<th>Unit</th>
<th>Conditions</th>
</tr>
</thead>
<tbody>
<tr>
<td>TEMPERATURE RANGE</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Operating Junction Temperature</td>
<td>( T_J )</td>
<td>—40</td>
<td>—</td>
<td>+125</td>
<td>( ^\circ\text{C} )</td>
<td></td>
</tr>
<tr>
<td>Storage Temperature</td>
<td>( T_S )</td>
<td>—55</td>
<td>—</td>
<td>+150</td>
<td>( ^\circ\text{C} )</td>
<td></td>
</tr>
<tr>
<td>PACKAGE THERMAL RESISTANCE</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>28-lead PDIP</td>
<td>( \theta_{\text{JA}} )</td>
<td>—</td>
<td>43</td>
<td>—</td>
<td>( ^\circ\text{C/W} )</td>
<td></td>
</tr>
<tr>
<td>28-lead PLCC</td>
<td>( \theta_{\text{JA}} )</td>
<td>—</td>
<td>48</td>
<td>—</td>
<td>( ^\circ\text{C/W} )</td>
<td></td>
</tr>
<tr>
<td>28-lead SOW</td>
<td>( \theta_{\text{JA}} )</td>
<td>—</td>
<td>55</td>
<td>—</td>
<td>( ^\circ\text{C/W} )</td>
<td></td>
</tr>
</tbody>
</table>
Timing Waveforms

CLK
DATA IN
STROBE
BL
HVout

50% 50%
90% 90%
50% 50%
10% 10%
50%
2.0 PIN DESCRIPTION

The details on the pins of HV5812 28-lead PDIP, 28-lead PLCC and 28-lead SOW are listed on Table 2-1. Refer to Package Types for the location of pins.

**TABLE 2-1: PIN FUNCTION TABLE**

<table>
<thead>
<tr>
<th>Pin Number</th>
<th>Pin Name</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>VPP</td>
<td>High-voltage power rail</td>
</tr>
<tr>
<td>2</td>
<td>Data Out</td>
<td>Serial data output. Data output for cascading to the data input of the next device.</td>
</tr>
<tr>
<td>3</td>
<td>HVOUT20</td>
<td>High-voltage output</td>
</tr>
<tr>
<td>4</td>
<td>HVOUT19</td>
<td>High-voltage output</td>
</tr>
<tr>
<td>5</td>
<td>HVOUT18</td>
<td>High-voltage output</td>
</tr>
<tr>
<td>6</td>
<td>HVOUT17</td>
<td>High-voltage output</td>
</tr>
<tr>
<td>7</td>
<td>HVOUT16</td>
<td>High-voltage output</td>
</tr>
<tr>
<td>8</td>
<td>HVOUT15</td>
<td>High-voltage output</td>
</tr>
<tr>
<td>9</td>
<td>HVOUT14</td>
<td>High-voltage output</td>
</tr>
<tr>
<td>10</td>
<td>HVOUT13</td>
<td>High-voltage output</td>
</tr>
<tr>
<td>11</td>
<td>HVOUT12</td>
<td>High-voltage output</td>
</tr>
<tr>
<td>12</td>
<td>HVOUT11</td>
<td>High-voltage output</td>
</tr>
<tr>
<td>13</td>
<td>BLANKING</td>
<td>Blank</td>
</tr>
<tr>
<td>14</td>
<td>GND</td>
<td>Logic and high-voltage ground</td>
</tr>
<tr>
<td>15</td>
<td>CLOCK</td>
<td>Data shift register clock</td>
</tr>
<tr>
<td>16</td>
<td>STROBE</td>
<td>Strobe</td>
</tr>
<tr>
<td>17</td>
<td>HVOUT10</td>
<td>High-voltage output</td>
</tr>
<tr>
<td>18</td>
<td>HVOUT9</td>
<td>High-voltage output</td>
</tr>
<tr>
<td>19</td>
<td>HVOUT8</td>
<td>High-voltage output</td>
</tr>
<tr>
<td>20</td>
<td>HVOUT7</td>
<td>High-voltage output</td>
</tr>
<tr>
<td>21</td>
<td>HVOUT6</td>
<td>High-voltage output</td>
</tr>
<tr>
<td>22</td>
<td>HVOUT5</td>
<td>High-voltage output</td>
</tr>
<tr>
<td>23</td>
<td>HVOUT4</td>
<td>High-voltage output</td>
</tr>
<tr>
<td>24</td>
<td>HVOUT3</td>
<td>High-voltage output</td>
</tr>
<tr>
<td>25</td>
<td>HVOUT2</td>
<td>High-voltage output</td>
</tr>
<tr>
<td>26</td>
<td>HVOUT1</td>
<td>High-voltage output</td>
</tr>
<tr>
<td>27</td>
<td>Data In</td>
<td>Serial data input</td>
</tr>
<tr>
<td>28</td>
<td>VDD</td>
<td>Low-voltage logic power rail</td>
</tr>
</tbody>
</table>
3.0 FUNCTIONAL DESCRIPTION

Follow the steps below to power up and power down the HV5812:

POWER-UP AND POWER-DOWN SEQUENCE

<table>
<thead>
<tr>
<th>Step</th>
<th>Power-up Description</th>
<th>Step</th>
<th>Power-down Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Connect ground.</td>
<td>1</td>
<td>Remove VPP.</td>
</tr>
<tr>
<td>2</td>
<td>Apply VDD.</td>
<td>2</td>
<td>Remove all inputs.</td>
</tr>
<tr>
<td>3</td>
<td>Set all inputs (Data, CLK, etc.) to a known state</td>
<td>3</td>
<td>Remove VDD.</td>
</tr>
<tr>
<td>4</td>
<td>Apply VPP. (Note 1)</td>
<td>4</td>
<td>Disconnect ground.</td>
</tr>
</tbody>
</table>

**Note 1:** The VPP should not drop below VDD during operation.

FUNCTION TABLE (Note 1)

<table>
<thead>
<tr>
<th>Serial Data Input</th>
<th>Clock Input</th>
<th>Shift Register Contents</th>
<th>Serial Data Output</th>
<th>Strobe Input</th>
<th>Latch Contents</th>
<th>Blanking</th>
<th>Output Contents</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>I₁</td>
<td>I₂</td>
<td>I₃..Iₙ₋₁</td>
<td>Iₙ</td>
<td>I₁</td>
<td>I₂</td>
</tr>
<tr>
<td>H</td>
<td>L to H</td>
<td>H</td>
<td>R₁</td>
<td>R₂..Rₙ₋₂</td>
<td>Rₙ₋₁</td>
<td>Rₙ₋₁</td>
<td>I₁</td>
</tr>
<tr>
<td>L</td>
<td>L to H</td>
<td>L</td>
<td>R₁</td>
<td>R₂..Rₙ₋₂</td>
<td>Rₙ₋₁</td>
<td>Rₙ₋₁</td>
<td>I₁</td>
</tr>
<tr>
<td>X</td>
<td>H to L</td>
<td>R₁</td>
<td>R₂</td>
<td>R₃..Rₙ₋₁</td>
<td>Rₙ</td>
<td>I₁</td>
<td>I₂</td>
</tr>
<tr>
<td></td>
<td></td>
<td>X</td>
<td>X</td>
<td>X..X</td>
<td>X</td>
<td>L</td>
<td>R₁</td>
</tr>
<tr>
<td></td>
<td></td>
<td>P₁</td>
<td>P₂</td>
<td>P₃..Pₙ₋₁</td>
<td>Pₙ</td>
<td>P₁</td>
<td>P₂</td>
</tr>
<tr>
<td></td>
<td></td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>X</td>
<td>X</td>
</tr>
</tbody>
</table>

**Note 1:**
- L = Low logic level
- H = High logic level
- X = Irrelevant
- P = Present state
- R = Previous state

FIGURE 3-1: IO Circuits.
4.0 PACKAGE MARKING INFORMATION

4.1 Packaging Information

Legend:
- XX...X Product Code or Customer-specific information
- Y Year code (last digit of calendar year)
- YY Year code (last 2 digits of calendar year)
- WW Week code (week of January 1 is week ‘01’)
- NNN Alphanumeric traceability code
- @3 Pb-free JEDEC® designator for Matte Tin (Sn)
- * This package is Pb-free. The Pb-free JEDEC designator (@3) can be found on the outer packaging for this package.

Note: In the event the full Microchip part number cannot be marked on one line, it will be carried over to the next line, thus limiting the number of available characters for product code or customer-specific information. Package may or not include the corporate logo.
28-Lead PDIP (.600in Row Spacing) Package Outline (P)
1.565x.580in body, .250in height (max), .100in pitch

Note: For the most current package drawings, see the Microchip Packaging Specification at www.microchip.com/packaging.

Note:
1. A Pin 1 identifier must be located in the index area indicated. The Pin 1 identifier can be: a molded mark/identifier; an embedded metal marker; or a printed indicator.

<table>
<thead>
<tr>
<th>Symbol</th>
<th>A</th>
<th>A1</th>
<th>A2</th>
<th>b</th>
<th>b1</th>
<th>D</th>
<th>D1</th>
<th>E</th>
<th>E1</th>
<th>e</th>
<th>eA</th>
<th>eB</th>
<th>L</th>
</tr>
</thead>
<tbody>
<tr>
<td>MIN</td>
<td>.140*</td>
<td>.015</td>
<td>.125</td>
<td>.014</td>
<td>.030</td>
<td>1.380</td>
<td>.065*</td>
<td>.590*</td>
<td>.485</td>
<td>.100</td>
<td>.600*</td>
<td>.115</td>
<td></td>
</tr>
<tr>
<td>NOM</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>.600</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>MAX</td>
<td>.250</td>
<td>.055*</td>
<td>.195</td>
<td>.023*</td>
<td>.070</td>
<td>1.565</td>
<td>.085*</td>
<td>.625</td>
<td>.580</td>
<td>.700</td>
<td>.200</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

* This dimension is not specified in the JEDEC drawing.
† This dimension differs from the JEDEC drawing.

Drawings not to scale.
28-Lead PLCC Package Outline (PJ)
.453x.453in. body, .180in. height (max), .050in. pitch

Note: For the most current package drawings, see the Microchip Packaging Specification at www.microchip.com/packaging.

Notes:
1. A Pin 1 identifier must be located in the index area indicated. The Pin 1 identifier can be: a molded mark/identifier; an embedded metal marker; or a printed indicator.
2. Actual shape of this feature may vary.

<table>
<thead>
<tr>
<th>Symbol</th>
<th>A</th>
<th>A1</th>
<th>A2</th>
<th>b</th>
<th>b1</th>
<th>D</th>
<th>D1</th>
<th>E</th>
<th>E1</th>
<th>e</th>
<th>R</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>MIN</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>.165</td>
<td>.090</td>
<td>.062</td>
<td>.013</td>
<td>.026</td>
<td>.485</td>
<td>.450</td>
<td>.485</td>
<td>.450</td>
<td>.025</td>
<td></td>
</tr>
<tr>
<td></td>
<td>NOM</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>.050</td>
<td>.035</td>
</tr>
<tr>
<td></td>
<td>.172</td>
<td>.105</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>.490</td>
<td>.453</td>
<td>.490</td>
<td>.453</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>MAX</td>
<td>.180</td>
<td>.120</td>
<td>.083</td>
<td>.021</td>
<td>.032</td>
<td>.495</td>
<td>.456</td>
<td>.495</td>
<td>.456</td>
<td>.045</td>
</tr>
</tbody>
</table>

Drawings not to scale.
28-Lead SOW (Wide Body) Package Outline (WG)
17.90x7.50mm body, 2.65mm height (max), 1.27mm pitch

Note: For the most current package drawings, see the Microchip Packaging Specification at www.microchip.com/packaging.

Note:
1. A Pin 1 identifier must be located in the index area indicated. The Pin 1 identifier can be: a molded mark/identifier; an embedded metal marker; or a printed indicator.

<table>
<thead>
<tr>
<th>Symbol</th>
<th>A</th>
<th>A1</th>
<th>A2</th>
<th>b</th>
<th>D</th>
<th>E</th>
<th>E1</th>
<th>e</th>
<th>h</th>
<th>L</th>
<th>L1</th>
<th>L2</th>
<th>θ</th>
<th>θ1</th>
</tr>
</thead>
<tbody>
<tr>
<td>MIN</td>
<td>2.15°</td>
<td>0.10</td>
<td>2.05</td>
<td>0.31</td>
<td>17.70°</td>
<td>9.97°</td>
<td>7.40°</td>
<td>1.27</td>
<td>-</td>
<td>-</td>
<td>0.25</td>
<td>0.40</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>NOM</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>17.90</td>
<td>10.30</td>
<td>7.50</td>
<td>1.40</td>
<td>-</td>
<td>-</td>
<td>0.25</td>
<td>1.40</td>
<td>0.25</td>
<td>5°</td>
</tr>
<tr>
<td>MAX</td>
<td>2.65</td>
<td>0.30</td>
<td>2.55°</td>
<td>0.51</td>
<td>18.10°</td>
<td>10.63°</td>
<td>7.60°</td>
<td>0.75</td>
<td>1.27</td>
<td>8°</td>
<td>15°</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

* This dimension is not specified in the JEDEC drawing.

Drawings are not to scale.
APPENDIX A: REVISION HISTORY

Revision A (October 2016)

• Converted Supertex Doc# DSFP-HV5812 to Microchip DS20005629A
• Changed the packaging quantity of 28-lead PLCC (PJ M904) from 500/Reel to 750/Reel and 28-lead SOW (WG) from 1000/Reel to 1600/Reel
• Made minor text changes throughout the document
### PRODUCT IDENTIFICATION SYSTEM

To order or obtain information, e.g., on pricing or delivery, contact your local Microchip representative or sales office.

<table>
<thead>
<tr>
<th>PART NO.</th>
<th>XX</th>
<th>Package Options</th>
<th>Environmental</th>
<th>Media Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>Device</td>
<td>HV5812</td>
<td>20-Channel Serial-Input Vacuum Fluorescent Display Driver for Anode or Grid</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Packages:</td>
<td>PJ = 28-lead PLCC</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>WG = 28-lead SOW</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Environmental:</td>
<td>G = Lead (Pb)-free/RoHS-compliant Package</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Media Types:</td>
<td>(blank) = 13/Tube for a P Package</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>= 38/Tube for a PJ Package</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>= 1600/Reel for a WG Package</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>M904 = 750/Reel for a PJ Package</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

#### Examples:

a) HV5812P-G: 20-Channel Serial-Input Vacuum Fluorescent Display Driver for Anode or Grid, 28-lead PDIP, 13/Tube

b) HV5812PJ-G: 20-Channel Serial-Input Vacuum Fluorescent Display Driver for Anode or Grid, 28-lead PLCC, 38/Tube

c) HV5812PJ-G-M904: 20-Channel Serial-Input Vacuum Fluorescent Display Driver for Anode or Grid, 28-lead PLCC, 750/Reel

d) HV5812WG-G: 20-Channel Serial-Input Vacuum Fluorescent Display Driver for Anode or Grid, 28-lead SOW, 1600/Reel
Note the following details of the code protection feature on Microchip devices:

- Microchip products meet the specification contained in their particular Microchip Data Sheet.
- Microchip believes that its family of products is one of the most secure families of its kind on the market today, when used in the intended manner and under normal conditions.
- There are dishonest and possibly illegal methods used to breach the code protection feature. All of these methods, to our knowledge, require using the Microchip products in a manner outside the operating specifications contained in Microchip’s Data Sheets. Most likely, the person doing so is engaged in theft of intellectual property.
- Microchip is willing to work with the customer who is concerned about the integrity of their code.
- Neither Microchip nor any other semiconductor manufacturer can guarantee the security of their code. Code protection does not mean that we are guaranteeing the product as “unbreakable.”

Code protection is constantly evolving. We at Microchip are committed to continuously improving the code protection features of our products. Attempts to break Microchip’s code protection feature may be a violation of the Digital Millennium Copyright Act. If such acts allow unauthorized access to your software or other copyrighted work, you may have a right to sue for relief under that Act.

Information contained in this publication regarding device applications and the like is provided only for your convenience and may be superseded by updates. It is your responsibility to ensure that your application meets with your specifications. MICROCHIP MAKES NO REPRESENTATIONS OR WARRANTIES OF ANY KIND WHETHER EXPRESS OR IMPLIED, WRITTEN OR ORAL, STATUTORY OR OTHERWISE, RELATED TO THE INFORMATION, INCLUDING BUT NOT LIMITED TO ITS CONDITION, QUALITY, PERFORMANCE, MERCHANTABILITY OR FITNESS FOR PURPOSE. Microchip disclaims all liability arising from this information and its use. Use of Microchip devices in life support and/or safety applications is entirely at the buyer’s risk, and the buyer agrees to defend, indemnify and hold harmless Microchip from any and all damages, claims, suits, or expenses resulting from such use. No licenses are conveyed, implicitly or otherwise, under any Microchip intellectual property rights unless otherwise stated.

Trademarks

The Microchip name and logo, the Microchip logo, AnyRate, dsPIC, FlashFlex, flexPWR, Helda, JukeBlox, KeeLoq, KeeLoq logo, Kleer, LANcheck, LINK MD, MediaLB, MOST, MOST logo, MPLAB, OptoLyzer, PIC, PICSTART, PIC32 logo, RightTouch, SpyNIC, SST, SST logo, SuperFlash and UNI/O are registered trademarks of Microchip Technology Incorporated in the U.S.A. and other countries.

ClockWorks, The Embedded Control Solutions Company, ETHERSYNCH, Hyper Speed Control, HyperLight Load, IntelliMOS, mTouch, Precision Edge, and QUIET-WIRE are registered trademarks of Microchip Technology Incorporated in the U.S.A.


SQTP is a service mark of Microchip Technology Incorporated in the U.S.A.

Silicon Storage Technology is a registered trademark of Microchip Technology Inc. in other countries.

GestIC is a registered trademarks of Microchip Technology Germany II GmbH & Co. KG, a subsidiary of Microchip Technology Inc., in other countries.

All other trademarks mentioned herein are property of their respective companies.

© 2016, Microchip Technology Incorporated, Printed in the U.S.A., All Rights Reserved.

ISBN: 978-1-5224-0999-1
## Worldwide Sales and Service

### AMERICAS

**Corporate Office**  
2355 West Chandler Blvd.  
Chandler, AZ 85224-6199  
Tel: 480-792-7200  
Fax: 480-792-7277  
Technical Support: http://www.microchip.com/support  
Web Address: www.microchip.com

- **Atlanta**  
  Duluth, GA  
  Tel: 678-957-9614  
  Fax: 678-957-1455

- **Austin, TX**  
  Tel: 512-257-3370

- **Boston**  
  Westborough, MA  
  Tel: 774-760-0087  
  Fax: 774-760-0088

- **Chicago**  
  Itasca, IL  
  Tel: 630-285-0071  
  Fax: 630-285-0075

- **Cleveland**  
  Independence, OH  
  Tel: 216-447-0464  
  Fax: 216-447-0643

- **Dallas**  
  Addison, TX  
  Tel: 972-818-7423  
  Fax: 972-818-2924

- **Detroit**  
  Novi, MI  
  Tel: 248-848-4000

- **Houston, TX**  
  Tel: 281-894-5983

- **Indianapolis**  
  Noblesville, IN  
  Tel: 317-773-8323  
  Fax: 317-773-5453

- **Los Angeles**  
  Mission Viejo, CA  
  Tel: 949-462-9523  
  Fax: 949-462-9608

- **New York, NY**  
  Tel: 631-435-6000

- **San Jose, CA**  
  Tel: 408-735-9110

- **Canada - Toronto**  
  Tel: 905-695-1980  
  Fax: 905-695-2078

### ASIA/PACIFIC

- **Asia Pacific Office**  
  Suites 3707-14, 37th Floor  
  Tower 6, The Gateway  
  Harbour City, Kowloon  
  Hong Kong  
  Tel: 852-2943-5100  
  Fax: 852-2401-3431

- **Australia - Sydney**  
  Tel: 61-2-9868-6733  
  Fax: 61-2-9868-6755

- **China - Beijing**  
  Tel: 86-10-8569-7000  
  Fax: 86-10-8528-2104

- **China - Chengdu**  
  Tel: 86-28-8665-5511  
  Fax: 86-28-8665-7889

- **China - Chongqing**  
  Tel: 86-23-8960-9588  
  Fax: 86-23-8960-9500

- **China - Dongguan**  
  Tel: 86-769-8702-9880

- **China - Guangzhou**  
  Tel: 86-20-8755-8029

- **China - Hangzhou**  
  Tel: 86-571-8792-8115  
  Fax: 86-571-8792-8116

- **China - Hong Kong SAR**  
  Tel: 852-2943-5100  
  Fax: 852-2401-3431

- **China - Nanjing**  
  Tel: 86-25-8473-2460  
  Fax: 86-25-8473-2470

- **China - Qingdao**  
  Tel: 86-532-8502-7355  
  Fax: 86-532-8502-7205

- **China - Shanghai**  
  Tel: 86-21-5407-5533  
  Fax: 86-21-5407-5066

- **China - Shenyang**  
  Tel: 86-24-2334-2829  
  Fax: 86-24-2334-2393

- **China - Shenzhen**  
  Tel: 86-755-8664-2200  
  Fax: 86-755-8203-1760

- **China - Wuhan**  
  Tel: 86-27-5980-5300  
  Fax: 86-27-5980-5118

- **China - Xian**  
  Tel: 86-29-8833-7252  
  Fax: 86-29-8833-7256

### ASIA/PACIFIC

- **China - Xiamen**  
  Tel: 86-592-2388138  
  Fax: 86-592-2388130

- **China - Zuhai**  
  Tel: 86-756-3210040  
  Fax: 86-756-3210049

- **India - Bangalore**  
  Tel: 91-80-3090-4444  
  Fax: 91-80-3090-4123

- **India - New Delhi**  
  Tel: 91-11-4160-8631  
  Fax: 91-11-4160-8632

- **India - Pune**  
  Tel: 91-20-3019-1500

- **Japan - Osaka**  
  Tel: 81-6-6152-7160  
  Fax: 81-6-6152-9310

- **Japan - Tokyo**  
  Tel: 81-3-6880-3770  
  Fax: 81-3-6880-3771

- **Korea - Daegu**  
  Tel: 82-53-744-4301  
  Fax: 82-53-744-4302

- **Korea - Seoul**  
  Tel: 82-2-554-7200  
  Fax: 82-2-558-5932 or 82-2-558-5934

- **Malaysia - Kuala Lumpur**  
  Tel: 60-3-6201-9857  
  Fax: 60-3-6201-9859

- **Malaysia - Penang**  
  Tel: 60-4-227-8870  
  Fax: 60-4-227-4068

- **Philippines - Manila**  
  Tel: 63-2-634-9065  
  Fax: 63-2-634-9069

- **Singapore**  
  Tel: 65-6334-8870  
  Fax: 65-6334-8850

- **Taiwan - Hsin Chu**  
  Tel: 886-6-4919586  
  Fax: 886-6-4919590

- **Taiwan - Kaohsiung**  
  Tel: 886-7-213-7828

- **Taiwan - Taipei**  
  Tel: 886-2-2508-8600  
  Fax: 886-2-2508-0102

- **Thailand - Bangkok**  
  Tel: 66-2-694-1351  
  Fax: 66-2-694-1350

### EUROPE

- **Austria - Wels**  
  Tel: 43-7242-2244-39  
  Fax: 43-7242-2244-393

- **Denmark - Copenhagen**  
  Tel: 45-4450-2828  
  Fax: 45-4485-2829

- **France - Paris**  
  Tel: 33-1-69-53-63-20  
  Fax: 33-1-69-39-90-79

- **Germany - Dusseldorf**  
  Tel: 49-211-3766400

- **Germany - Karlsruhe**  
  Tel: 49-721-625370

- **Germany - Munich**  
  Tel: 49-89-627-144-0  
  Fax: 49-89-627-144-44

- **Italy - Milan**  
  Tel: 39-0331-742611  
  Fax: 39-0331-466781

- **Italy - Venice**  
  Tel: 39-049-7625286

- **Netherlands - Drunen**  
  Tel: 31-416-690399  
  Fax: 31-416-690340

- **Poland - Warsaw**  
  Tel: 48-22-332-5737

- **Spain - Madrid**  
  Tel: 34-91-708-08-90  
  Fax: 34-91-708-08-91

- **Sweden - Stockholm**  
  Tel: 46-8-5090-4654

- **UK - Wokingham**  
  Tel: 44-118-921-5800  
  Fax: 44-118-921-5820

06/23/16