**Key Features**

- Low current consumption
  - 2.7mA-typ (VDD=1.8V and CL=0)
- 1.7V to 3.65V power supply operation
- 10MHz to 52MHz CLKIN
- Supports LVCMOS and clipped sine wave inputs
- Supports 3 single-ended LVCMOS square wave outputs
- OE1/2/3 functions for each CLKOUT1/2/3 outputs
- OE_OSC control pin to enable external TCXO/XO
- Ultra-Low phase noise
- Ultra low standby current
- 10-pin TDFN package (1.4x2.0x0.75 mm)
- Industrial -40 ºC to 85 ºC temperature range

**Application**

- Smart Mobile Handsets
- Multi-mode RF Clock Distribution
- Baseband Peripheral Clock Distribution

**Description**

The SL18860DC product is a high performance 3 output clock distribution buffer and provides 3 outputs from a single input clock by using SLI proprietary low phase noise and low power dissipation circuit design. The SL18860DC can be used in baseband mobile RF applications including WLAN, Bluetooth and DVB-H as an input clock reference. The product designed to isolate each device driven by their clock outputs to minimize interference between these devices.

Each of the clock buffer outputs can be individually disabled by using OE1/2/3 control pins to reduce the power consumption if the connected device does not need the clock. The device operates from single power supply from 1.7V to 3.65V and from -40 ºC to 85 ºC.

**Benefits**

- Fast Time-to-market
- Cost Reduction
- Low Power Dissipation
- Low Phase Noise

**Block Diagram**

The block diagram shows the control logic and the connections for the CLKIN, OE_OSC, and the three outputs (CLKOUT1, CLKOUT2, and CLKOUT3) of the SL18860DC.
### Pin Configuration

#### 10-Pin TDFN Package Pinout

<table>
<thead>
<tr>
<th>Pin Number</th>
<th>Pin Name</th>
<th>Pin Type</th>
<th>Pin Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>VSS</td>
<td>Power</td>
<td>Power supply ground.</td>
</tr>
<tr>
<td>2</td>
<td>VDD</td>
<td>Power</td>
<td>2.25 to 3.65V or 1.8V +/-5% positive power supply</td>
</tr>
<tr>
<td>3</td>
<td>CLKIN</td>
<td>Input</td>
<td>External clock input pin. VSS to VDD CMOS level.</td>
</tr>
<tr>
<td>4</td>
<td>OE_OSC</td>
<td>Output</td>
<td>Crystal oscillator enable pin. If OE1=OE2=OE3=0 then OE_OSC=0. OE_OSC=1 for all the other OE1/2/3 logic states.</td>
</tr>
<tr>
<td>5</td>
<td>OE3</td>
<td>Input</td>
<td>Output enable pin for CLKOUT3. The input has 150kΩ-typ on-chip pull-down resistor.</td>
</tr>
<tr>
<td>6</td>
<td>OE1</td>
<td>Input</td>
<td>Output enable pin for CLKOUT1. The input has 150kΩ-typ on-chip pull-down resistor.</td>
</tr>
<tr>
<td>7</td>
<td>OE2</td>
<td>Input</td>
<td>Output enable pin for CLKOUT2. The input has 150kΩ-typ on-chip pull-down resistor.</td>
</tr>
<tr>
<td>8</td>
<td>CLKOUT1</td>
<td>Output</td>
<td>Clock output-1. Clock frequency is the same as CLKIN.</td>
</tr>
<tr>
<td>9</td>
<td>CLKOUT2</td>
<td>Output</td>
<td>Clock output-2. Clock frequency is the same as CLKIN.</td>
</tr>
<tr>
<td>10</td>
<td>CLKOUT3</td>
<td>Output</td>
<td>Clock output-3. Clock frequency is the same as CLKIN.</td>
</tr>
</tbody>
</table>

### Pin Description

#### Truth Table for OE1/2/3, OE_OSC and CLKOUT1/2/3

<table>
<thead>
<tr>
<th>OE1 (Input)</th>
<th>OE2 (Input)</th>
<th>OE3 (Input)</th>
<th>OE_OSC (Input)</th>
<th>CLKOUT1</th>
<th>CLKOUT2</th>
<th>CLKOUT3</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>Hi-Z</td>
<td>Hi-Z</td>
<td>Hi-Z</td>
</tr>
<tr>
<td>1</td>
<td>0</td>
<td>0</td>
<td>1</td>
<td>CLOCK</td>
<td>Hi-Z</td>
<td>Hi-Z</td>
</tr>
<tr>
<td>1</td>
<td>1</td>
<td>0</td>
<td>1</td>
<td>CLOCK</td>
<td>CLOCK</td>
<td>Hi-Z</td>
</tr>
<tr>
<td>…</td>
<td>…</td>
<td>…</td>
<td>…</td>
<td>…</td>
<td>…</td>
<td>…</td>
</tr>
<tr>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>CLOCK</td>
<td>CLOCK</td>
<td>CLOCK</td>
</tr>
</tbody>
</table>

Table 1. Truth Table for OE1/2/3, OE_OSC and CLKOUT1/2/3
### Absolute Maximum Ratings

<table>
<thead>
<tr>
<th>Description</th>
<th>Condition</th>
<th>Min</th>
<th>Max</th>
<th>Unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Supply voltage, VDD (Absolute)</td>
<td>-0.5</td>
<td>4.6</td>
<td>V</td>
<td></td>
</tr>
<tr>
<td>Supply voltage, VDD (Operation)</td>
<td>1.70</td>
<td>3.65</td>
<td>V</td>
<td></td>
</tr>
<tr>
<td>All Inputs and Outputs</td>
<td>-0.5 VDD+0.5</td>
<td></td>
<td>V</td>
<td></td>
</tr>
<tr>
<td>Ambient Operating Temperature</td>
<td>In operation, C-Grade</td>
<td>-40</td>
<td>85</td>
<td>°C</td>
</tr>
<tr>
<td>Storage Temperature</td>
<td>No power is applied</td>
<td>-65</td>
<td>150</td>
<td>°C</td>
</tr>
<tr>
<td>Junction Temperature</td>
<td>In operation, power is applied</td>
<td>-</td>
<td>125</td>
<td>°C</td>
</tr>
<tr>
<td>Soldering Temperature</td>
<td></td>
<td>-</td>
<td>260</td>
<td>°C</td>
</tr>
<tr>
<td>ESD Rating (Human Body Model)</td>
<td>JEDEC22-A114D</td>
<td>-4,000</td>
<td>4,000</td>
<td>V</td>
</tr>
<tr>
<td>ESD Rating (Charge Device Model)</td>
<td>JEDEC22-C101C</td>
<td>-1,500</td>
<td>1,500</td>
<td>V</td>
</tr>
<tr>
<td>ESD Rating (Machine Model)</td>
<td>JEDEC22-A115D</td>
<td>-200</td>
<td>200</td>
<td>V</td>
</tr>
</tbody>
</table>

### DC Electrical Characteristics (I-Grade)

Unless otherwise stated VDD= 1.8V+/- 5% and Operation Temperature Range -40 to +85°C

<table>
<thead>
<tr>
<th>Description</th>
<th>Symbol</th>
<th>Condition</th>
<th>Min</th>
<th>Typ</th>
<th>Max</th>
<th>Unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Operating Voltage</td>
<td>VDD</td>
<td>Operation range, 1.8V+/−5%</td>
<td>1.70</td>
<td>1.80</td>
<td>1.90</td>
<td>V</td>
</tr>
<tr>
<td>Operating Temperature</td>
<td>TA</td>
<td>I-Grade</td>
<td>-40</td>
<td>25</td>
<td>85</td>
<td>°C</td>
</tr>
<tr>
<td>Input Low Voltage</td>
<td>VIL</td>
<td>CMOS Level, Pins 3, 5, 6 and 7</td>
<td>VSS</td>
<td>-</td>
<td>0.3VDD</td>
<td>V</td>
</tr>
<tr>
<td>Input High Voltage</td>
<td>VIH</td>
<td>CMOS Level, Pins 3, 5, 6 and 7</td>
<td>0.7VDD</td>
<td>-</td>
<td>VDD</td>
<td>V</td>
</tr>
<tr>
<td>Output High Voltage</td>
<td>VOH</td>
<td>IOH=-4mA, Pins 4, 8, 9 and 10</td>
<td>VDD-0.4</td>
<td>-</td>
<td>-</td>
<td>V</td>
</tr>
<tr>
<td>Output Low Voltage</td>
<td>VOL</td>
<td>IOL=-4mA, Pins 4, 8, 9 and 10</td>
<td>-</td>
<td>-</td>
<td>0.4</td>
<td>V</td>
</tr>
<tr>
<td>Input Leakage Current</td>
<td>ILH</td>
<td>VIN=VDD, Pins 5, 6 and 7</td>
<td>-25</td>
<td>-</td>
<td>25</td>
<td>μA</td>
</tr>
<tr>
<td>Input Leakage Current</td>
<td>ILL</td>
<td>VIN=GND, Pins 5, 6 and 7</td>
<td>-10</td>
<td>-</td>
<td>10</td>
<td>μA</td>
</tr>
<tr>
<td>Pull-Down Resistor</td>
<td>RPD</td>
<td>Pins 5, 6 and 7</td>
<td>100</td>
<td>150</td>
<td>250</td>
<td>kΩ</td>
</tr>
<tr>
<td>Operating Supply Current</td>
<td>IDD1</td>
<td>CLKIN=26MHz, OE1=OE2=OE3=1</td>
<td>-</td>
<td>2.7</td>
<td>-</td>
<td>mA</td>
</tr>
<tr>
<td></td>
<td>IDD2</td>
<td>OE1=OE2=OE3=0, CLKIN=Low or High</td>
<td>-</td>
<td>-</td>
<td>1.0</td>
<td>μA</td>
</tr>
<tr>
<td>Input Capacitance</td>
<td>CIN</td>
<td>Pins 5, 6 and 7</td>
<td>-</td>
<td>3</td>
<td>5</td>
<td>pF</td>
</tr>
<tr>
<td>Load Capacitance</td>
<td>CL</td>
<td>CLKOUT1/2/3, Pins 8, 9 and 10</td>
<td>-</td>
<td>10</td>
<td>20</td>
<td>pF</td>
</tr>
</tbody>
</table>
## AC Electrical Characteristics (I-Grade)

Unless otherwise stated VDD= 1.8V+/- 5% and Operation Temperature Range -40 to +85°C

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Symbol</th>
<th>Condition</th>
<th>Min</th>
<th>Typ</th>
<th>Max</th>
<th>Unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Input Clock Range</td>
<td>CLKIN</td>
<td>External Clock, CMOS square wave</td>
<td>10</td>
<td>26.000</td>
<td>52</td>
<td>MHz</td>
</tr>
<tr>
<td>Output Clock Range</td>
<td>CLKOUT</td>
<td>External Clock, CMOS square wave</td>
<td>10</td>
<td>26.000</td>
<td>52</td>
<td>MHz</td>
</tr>
<tr>
<td>Input Clock Voltage Swing Level</td>
<td>VINpp</td>
<td>VDD=1.8V</td>
<td>0.72</td>
<td>1</td>
<td>-</td>
<td>Vpp</td>
</tr>
<tr>
<td>Input Duty Cycle</td>
<td>DCIN</td>
<td>CLKIN, Pin 3</td>
<td>30</td>
<td>50</td>
<td>70</td>
<td>%</td>
</tr>
<tr>
<td>Output Clock Rise Time</td>
<td>tr</td>
<td>VDD=1.8, CL=10pF, measured from 10 to 90% of VDD, Pins 4, 8, 9 and 10</td>
<td>2.0</td>
<td>4.00</td>
<td>ns</td>
<td></td>
</tr>
<tr>
<td>Output Clock Fall Time</td>
<td>tf</td>
<td>VDD=1.8, CL=10pF, measured from 10 to 90% of VDD, Pins 4, 8, 9 and 10</td>
<td>-</td>
<td>2.0</td>
<td>4.00</td>
<td>ns</td>
</tr>
<tr>
<td>Additive Phase Noise</td>
<td>APN-1</td>
<td>CLKIN=26MHz and 1 kHz offset CLKOUT1/2/3</td>
<td>-</td>
<td>-140</td>
<td>-</td>
<td>dBC/Hz</td>
</tr>
<tr>
<td>Additive Phase Noise</td>
<td>APN-2</td>
<td>CLKIN=26MHz and 10 kHz offset CLKOUT1/2/3</td>
<td>-</td>
<td>-150</td>
<td>-</td>
<td>dBC/Hz</td>
</tr>
<tr>
<td>Additive Phase Noise</td>
<td>APN-3</td>
<td>CLKIN=26MHz and 100 kHz offset CLKOUT1/2/3</td>
<td>-</td>
<td>-159</td>
<td>-</td>
<td>dBC/Hz</td>
</tr>
<tr>
<td>Power-up Time</td>
<td>tPU</td>
<td>Time duration until CLKOUT1/2/3 frequency reaches valid frequency after power supply reaches 0.9xVDD value</td>
<td>-</td>
<td>100</td>
<td>200</td>
<td>ns</td>
</tr>
<tr>
<td>Output Enable Time</td>
<td>tOE1</td>
<td>Time from OE raising edge to active at outputs CLKOUT1/2/3 (Asynchronous)</td>
<td>-</td>
<td>25</td>
<td>-</td>
<td>ns</td>
</tr>
<tr>
<td>Output Disable Time</td>
<td>tOD</td>
<td>Time from OE falling edge to Hi-Z at outputs CLKOUT1/2/3 (Asynchronous)</td>
<td>-</td>
<td>25</td>
<td>-</td>
<td>ns</td>
</tr>
<tr>
<td>Output Enable Time</td>
<td>tOE2</td>
<td>Active recovery time from standby (CLKIN=0 or 1) to active at outputs CLKOUT1/2/3</td>
<td>-</td>
<td>100</td>
<td>-</td>
<td>ns</td>
</tr>
</tbody>
</table>
### DC Electrical Characteristics (I-Grade)

Unless otherwise stated VDD= 2.5V+/−10% and Operation Temperature Range -40 to +85°C

<table>
<thead>
<tr>
<th>Description</th>
<th>Symbol</th>
<th>Condition</th>
<th>Min</th>
<th>Typ</th>
<th>Max</th>
<th>Unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Operating Voltage</td>
<td>VDD</td>
<td>Operation range, 2.5V+/−10%</td>
<td>2.25</td>
<td>2.50</td>
<td>2.75</td>
<td>V</td>
</tr>
<tr>
<td>Operating Temperature</td>
<td>TA</td>
<td>I-Grade</td>
<td>-40</td>
<td>25</td>
<td>85</td>
<td>°C</td>
</tr>
<tr>
<td>Input Low Voltage</td>
<td>VIL</td>
<td>CMOS Level, Pins 3, 5, 6 and 7</td>
<td>VSS</td>
<td>-</td>
<td>0.3VDD</td>
<td>V</td>
</tr>
<tr>
<td>Input High Voltage</td>
<td>VIH</td>
<td>CMOS Level, Pins 3, 5, 6 and 7</td>
<td>0.7VDD</td>
<td>-</td>
<td>V</td>
<td>V</td>
</tr>
<tr>
<td>Output High Voltage</td>
<td>VOH</td>
<td>IOH=-4mA, Pins 4, 8, 9 and 10</td>
<td>VDD-0.4</td>
<td>-</td>
<td>-</td>
<td>V</td>
</tr>
<tr>
<td>Output Low Voltage</td>
<td>VOL</td>
<td>IOL=-4mA, Pins 4, 8, 9 and 10</td>
<td>-</td>
<td>-</td>
<td>0.4</td>
<td>V</td>
</tr>
<tr>
<td>Input Leakage Current</td>
<td>ILH</td>
<td>VIN=VDD, Pins 5, 6 and 7</td>
<td>-30</td>
<td>-</td>
<td>30</td>
<td>μA</td>
</tr>
<tr>
<td>Input Leakage Current</td>
<td>ILL</td>
<td>VIN=GND, Pins 5, 6 and 7</td>
<td>-15</td>
<td>-</td>
<td>15</td>
<td>μA</td>
</tr>
<tr>
<td>Pull-Down Resistor</td>
<td>RPD</td>
<td>Pins 5, 6 and 7</td>
<td>100</td>
<td>150</td>
<td>250</td>
<td>kΩ</td>
</tr>
<tr>
<td>Operating Supply Current</td>
<td>IDD1</td>
<td>CLKin=26MHz, OE1=OE2=OE3=1</td>
<td>-</td>
<td>3.0</td>
<td>-</td>
<td>mA</td>
</tr>
<tr>
<td>Operating Supply Current</td>
<td>IDD2</td>
<td>VDD=2.5V, connect to CLKin directly</td>
<td>-</td>
<td>-</td>
<td>1.5</td>
<td>μA</td>
</tr>
<tr>
<td>Input Capacitance</td>
<td>CIN</td>
<td>Pins 5, 6 and 7</td>
<td>-</td>
<td>3</td>
<td>5</td>
<td>pF</td>
</tr>
<tr>
<td>Load Capacitance</td>
<td>CL</td>
<td>CLKOUT1/2/3, Pins 8, 9 and 10</td>
<td>-</td>
<td>10</td>
<td>20</td>
<td>pF</td>
</tr>
</tbody>
</table>

### AC Electrical Characteristics (I-Grade)

Unless otherwise stated VDD= 2.5V+/−10% and Operation Temperature Range -40 to +85°C

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Symbol</th>
<th>Condition</th>
<th>Min</th>
<th>Typ</th>
<th>Max</th>
<th>Unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Input Clock Range</td>
<td>CLKin</td>
<td>External Clock, CMOS square wave</td>
<td>10</td>
<td>26.000</td>
<td>52</td>
<td>MHz</td>
</tr>
<tr>
<td>Output Clock Range</td>
<td>CLKOUT</td>
<td>External Clock, CMOS square wave</td>
<td>10</td>
<td>26.000</td>
<td>52</td>
<td>MHz</td>
</tr>
<tr>
<td>Input Clock Voltage Swing Level</td>
<td>VINpp</td>
<td>VDD=2.5V, connect to CLKin directly</td>
<td>1.0</td>
<td>1.2</td>
<td>-</td>
<td>V</td>
</tr>
<tr>
<td>Input Duty Cycle</td>
<td>DCIN</td>
<td>CLKin, Pin 3</td>
<td>30</td>
<td>50</td>
<td>70</td>
<td>%</td>
</tr>
<tr>
<td>Output Clock Rise Time</td>
<td>tr</td>
<td>VDD=1.8, CL=10pF, measured from 10 to 90% of VDD, Pins 4, 8, 9 and 10</td>
<td>-</td>
<td>2.0</td>
<td>4.00</td>
<td>ns</td>
</tr>
<tr>
<td>Output Clock Fall Time</td>
<td>tf</td>
<td>VDD=1.8, CL=10pF, measured from 10 to 90% of VDD, Pins 4, 8, 9 and 10</td>
<td>-</td>
<td>2.0</td>
<td>4.00</td>
<td>ns</td>
</tr>
<tr>
<td>Additive Phase Noise</td>
<td>APN-1</td>
<td>CLKin=26MHz and 1 kHz offset CLKOUT1/2/3</td>
<td>-</td>
<td>-142</td>
<td>-</td>
<td>dBC/Hz</td>
</tr>
</tbody>
</table>
## Additive Phase Noise

<table>
<thead>
<tr>
<th>Description</th>
<th>Symbol</th>
<th>Condition</th>
<th>Min</th>
<th>Typ</th>
<th>Max</th>
<th>Unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Additive Phase Noise</td>
<td>APN-2</td>
<td>CLKN=26MHz and 10 kHz offset CLKOUT1/2/3</td>
<td>-</td>
<td>-156</td>
<td>-</td>
<td>dBC/Hz</td>
</tr>
<tr>
<td>Additive Phase Noise</td>
<td>APN-3</td>
<td>CLKN=26MHz and 100 kHz offset CLKOUT1/2/3</td>
<td>-</td>
<td>-164</td>
<td>-</td>
<td>dBC/Hz</td>
</tr>
</tbody>
</table>

## Power-up Time

<table>
<thead>
<tr>
<th>Description</th>
<th>Symbol</th>
<th>Condition</th>
<th>Min</th>
<th>Typ</th>
<th>Max</th>
<th>Unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Power-up Time</td>
<td>tPU</td>
<td>Time for CLKOUT1/2/3 frequency to reach valid frequency after power supply reaches 0.9xVDDvalue</td>
<td>-</td>
<td>100</td>
<td>200</td>
<td>ns</td>
</tr>
</tbody>
</table>

## Output Enable Time

<table>
<thead>
<tr>
<th>Description</th>
<th>Symbol</th>
<th>Condition</th>
<th>Min</th>
<th>Typ</th>
<th>Max</th>
<th>Unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Output Enable Time</td>
<td>tOE1</td>
<td>Time from OE raising edge to active at outputs CLKOUT1/2/3 (Asynchronous)</td>
<td>-</td>
<td>25</td>
<td>-</td>
<td>ns</td>
</tr>
<tr>
<td>Output Disable Time</td>
<td>tOD</td>
<td>Time from OE falling edge to Hi-Z at outputs CLKOUT1/2/3 (Asynchronous)</td>
<td>-</td>
<td>25</td>
<td>-</td>
<td>ns</td>
</tr>
<tr>
<td>Output Enable Time</td>
<td>tOE2</td>
<td>Active recovery time from standby (CLKIN=0 or 1) to active at outputs CLKOUT1/2/3</td>
<td>-</td>
<td>100</td>
<td>-</td>
<td>ns</td>
</tr>
</tbody>
</table>

## DC Electrical Characteristics (I-Grade)

Unless otherwise stated VDD= 3.3V+/- 10% and Operation Temperature Range -40 to +85°C

<table>
<thead>
<tr>
<th>Description</th>
<th>Symbol</th>
<th>Condition</th>
<th>Min</th>
<th>Typ</th>
<th>Max</th>
<th>Unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Operating Voltage</td>
<td>VDD</td>
<td>Operation range , 3.3V+/-10%</td>
<td>2.95</td>
<td>3.3</td>
<td>3.65</td>
<td>V</td>
</tr>
<tr>
<td>Operating Temperature</td>
<td>TA</td>
<td>I-Grade</td>
<td>-40</td>
<td>25</td>
<td>85</td>
<td>°C</td>
</tr>
<tr>
<td>Input Low Voltage</td>
<td>VIL</td>
<td>CMOS Level, Pins 3, 5, 6 and 7</td>
<td>VSS</td>
<td>-</td>
<td>0.3VDD</td>
<td>V</td>
</tr>
<tr>
<td>Input High Voltage</td>
<td>VIH</td>
<td>CMOS Level, Pins 3, 5, 6 and 7</td>
<td>-</td>
<td>0.7VDD</td>
<td>-</td>
<td>V</td>
</tr>
<tr>
<td>Output High Voltage</td>
<td>VOH</td>
<td>IOH=-4mA, Pins 4, 8, 9 and 10</td>
<td>VDD-0.4</td>
<td>-</td>
<td>-</td>
<td>V</td>
</tr>
<tr>
<td>Output Low Voltage</td>
<td>VOL</td>
<td>IOL=-4mA, Pins 4, 8, 9 and 10</td>
<td>-</td>
<td>-</td>
<td>0.5</td>
<td>V</td>
</tr>
<tr>
<td>Input Leakage Current</td>
<td>ILH</td>
<td>VIN=VDD, Pins 5, 6 and 7</td>
<td>-35</td>
<td>-</td>
<td>35</td>
<td>μA</td>
</tr>
<tr>
<td>Input Leakage Current</td>
<td>ILL</td>
<td>VIN=GND, Pins 5, 6 and 7</td>
<td>-20</td>
<td>-</td>
<td>20</td>
<td>μA</td>
</tr>
<tr>
<td>Pull-Down Resistor</td>
<td>RPD</td>
<td>Pins 5, 6 and 7</td>
<td>100</td>
<td>150</td>
<td>250</td>
<td>kΩ</td>
</tr>
<tr>
<td>Operating Supply Current</td>
<td>IDD1</td>
<td>CLKN=26MHz, OE1=OE2=OE3=1</td>
<td>-</td>
<td>3.4</td>
<td>-</td>
<td>mA</td>
</tr>
<tr>
<td>Operating Supply Current</td>
<td>IDD2</td>
<td>OE1=OE2=OE3=0 CLKN=Low or High</td>
<td>-</td>
<td>-</td>
<td>2.0</td>
<td>μA</td>
</tr>
<tr>
<td>Input Capacitance</td>
<td>CIN</td>
<td>Pins 5, 6 and 7</td>
<td>-</td>
<td>3</td>
<td>5</td>
<td>pF</td>
</tr>
<tr>
<td>Load Capacitance</td>
<td>CL</td>
<td>CLKOUT1/2/3, Pins 8, 9 and 10</td>
<td>-</td>
<td>10</td>
<td>25</td>
<td>pF</td>
</tr>
</tbody>
</table>
# AC Electrical Characteristics (I-Grade)

Unless otherwise stated VDD= 3.3V+/−10% and Operation Temperature Range -40 to +85°C

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Symbol</th>
<th>Condition</th>
<th>Min</th>
<th>Typ</th>
<th>Max</th>
<th>Unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Input Clock Range</td>
<td>CLKIN</td>
<td>External Clock, CMOS square wave</td>
<td>10</td>
<td>26.000</td>
<td>52</td>
<td>MHz</td>
</tr>
<tr>
<td></td>
<td>CLKOUT</td>
<td>External Clock, CMOS square wave CLKOUT1/2/3</td>
<td>10</td>
<td>26.000</td>
<td>52</td>
<td>MHz</td>
</tr>
<tr>
<td>Input Clock Voltage Swing Level</td>
<td>VINpp</td>
<td>VDD=3.3V, connect to CLKIN directly</td>
<td>1.32</td>
<td>1.4</td>
<td>-</td>
<td>V</td>
</tr>
<tr>
<td></td>
<td></td>
<td>VDD=3.3V, connect to CLKIN through AC coupling and bias circuit</td>
<td>0.6</td>
<td>-</td>
<td>-</td>
<td>V</td>
</tr>
<tr>
<td>Input Duty Cycle</td>
<td>DCIN</td>
<td>CLKin, Pin 3</td>
<td>30</td>
<td>50</td>
<td>70</td>
<td>%</td>
</tr>
<tr>
<td>Output Clock Rise Time</td>
<td>tr</td>
<td>VDD=1.8, CL=10pF, measured from 10 to 90% of VDD, Pins 4, 8, 9 and 10</td>
<td>-</td>
<td>1.2</td>
<td>2.2</td>
<td>ns</td>
</tr>
<tr>
<td>Output Clock Fall Time</td>
<td>tf</td>
<td>VDD=1.8, CL=10pF, measured from 10 to 90% of VDD, Pins 4, 8, 9 and 10</td>
<td>-</td>
<td>1.2</td>
<td>2.2</td>
<td>ns</td>
</tr>
<tr>
<td>Additive Phase Noise</td>
<td>APN-1</td>
<td>CLKin=26MHz and 1 kHz offset CLKOUT1/2/3</td>
<td>-</td>
<td>-138</td>
<td>-</td>
<td>dBc/Hz</td>
</tr>
<tr>
<td>Additive Phase Noise</td>
<td>APN-2</td>
<td>CLKin=26MHz and 10 kHz offset CLKOUT1/2/3</td>
<td>-</td>
<td>-157</td>
<td>-</td>
<td>dBc/Hz</td>
</tr>
<tr>
<td>Additive Phase Noise</td>
<td>APN-3</td>
<td>CLKin=26MHz and 100 kHz offset CLKOUT1/2/3</td>
<td>-</td>
<td>-165</td>
<td>-</td>
<td>dBc/Hz</td>
</tr>
<tr>
<td>Power-up Time</td>
<td>tPU</td>
<td>Time duration until CLKOUT1/2/3 frequency reaches valid after power supply reaches 0.9xVDD value</td>
<td>-</td>
<td>100</td>
<td>200</td>
<td>ns</td>
</tr>
<tr>
<td>Output Enable Time</td>
<td>tOE1</td>
<td>Time from OE raising edge to active at outputs CLKOUT1/2/3 (Asynchronous)</td>
<td>-</td>
<td>25</td>
<td>-</td>
<td>ns</td>
</tr>
<tr>
<td>Output Disable Time</td>
<td>tOD</td>
<td>Time from OE falling edge to Hi-Z at outputs CLKOUT1/2/3 (Asynchronous)</td>
<td>-</td>
<td>25</td>
<td>-</td>
<td>ns</td>
</tr>
<tr>
<td>Output Enable Time</td>
<td>tOE2</td>
<td>Active recovery time from standby (CLKIN=0 or 1) to active at outputs CLKOUT1/2/3</td>
<td>-</td>
<td>100</td>
<td>-</td>
<td>ns</td>
</tr>
</tbody>
</table>
**Table 2. Output Phase Noise Summary Table**

<table>
<thead>
<tr>
<th>VDD(V)</th>
<th>100hz</th>
<th>1Khz</th>
<th>10Khz</th>
<th>100Khz</th>
<th>1Mhz</th>
<th>5Mhz</th>
<th>Fig #</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.8</td>
<td>-115.52</td>
<td>-139.85</td>
<td>-150.79</td>
<td>-159.31</td>
<td>-160.52</td>
<td>-162.52</td>
<td>1</td>
</tr>
<tr>
<td>2.5</td>
<td>-125.16</td>
<td>-142.67</td>
<td>-156.37</td>
<td>-164.02</td>
<td>-166.45</td>
<td>-167.02</td>
<td>2</td>
</tr>
<tr>
<td>3.3</td>
<td>-116.60</td>
<td>-138.06</td>
<td>157.41</td>
<td>-164.88</td>
<td>-167.21</td>
<td>-168.57</td>
<td>3</td>
</tr>
</tbody>
</table>

**Figure 1. Output Phase Noise VDD=1.8V, CL=15pF**
Figure 2. Output Phase Noise VDD=2.5V, CL=15pF

Figure 3. Output Phase Noise VDD=3.3V, CL=15pF
Typical Application Circuit

VDD=1.9V to 3.3V

C1 (10μF)  R1 (50Ω)  C2 (0.1μF)

CLKIN  SL18860DC  CLKOUT1 (26.000MHz-typ)
OE_OSC  CLKOUT2 (26.000MHz-typ)
OE1  CLKOUT3 (26.000MHz-typ)
OE2  8  9  10
OE3

AC coupling and bias circuit

Vcc  C1

22nF  R  SL18860

TCXO

Not Recommended for New Designs
Package Outline and Package Dimensions

10-Pin TDFN Package (1.4x2.0x0.75 mm)

Top View

Side View

Bottom View

Not Recommended for New Designs

Pin 1 Corner
Ordering Information

<table>
<thead>
<tr>
<th>Ordering Number</th>
<th>Shipping Package</th>
<th>Package</th>
<th>Temperature</th>
</tr>
</thead>
<tbody>
<tr>
<td>SL18860DC</td>
<td>Tube</td>
<td>10-pin TDFN</td>
<td>-40 to 85°C</td>
</tr>
<tr>
<td>SL18860DCT</td>
<td>Tape and Reel</td>
<td>10-pin TDFN</td>
<td>-40 to 85°C</td>
</tr>
</tbody>
</table>

Note:

The SL18860 is RoHS compliant

Pin 1

<table>
<thead>
<tr>
<th>Line</th>
<th>Characters</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>TTTT</td>
<td>Manufacturing Trace Code</td>
</tr>
<tr>
<td>2</td>
<td>YWW</td>
<td>Characters corresponding to the last digit of year (Y) and work week (WW) of package assembly</td>
</tr>
</tbody>
</table>
ClockBuilder Pro

One-click access to Timing tools, documentation, software, source code libraries & more. Available for Windows and iOS (CBGo only).

www.silabs.com/CBPro

Disclaimer

Silicon Labs intends to provide customers with the latest, accurate, and in-depth documentation of all peripherals and modules available for system and software implementers using or intending to use the Silicon Labs products. Characterization data, available modules and peripherals, memory sizes and memory addresses refer to each specific device, and “Typical” parameters provided can and do vary in different applications. Application examples described herein are for illustrative purposes only. Silicon Labs reserves the right to make changes without further notice and limitation to product information, specifications, and descriptions herein, and does not give warranties as to the accuracy or completeness of the included information. Silicon Labs shall have no liability for the consequences of use of the information supplied herein. This document does not imply or express copyright licenses granted hereunder to design or fabricate any integrated circuits. The products are not designed or authorized to be used within any Life Support System without the specific written consent of Silicon Labs. A "Life Support System" is any product or system intended to support or sustain life and/or health, which, if it fails, can be reasonably expected to result in significant personal injury or death. Silicon Labs products are not designed or authorized for military applications. Silicon Labs products shall under no circumstances be used in weapons of mass destruction including (but not limited to) nuclear, biological or chemical weapons, or missiles capable of delivering such weapons.

Trademark Information

Silicon Laboratories Inc.®, Silicon Laboratories®, Silicon Labs®, SiLabs® and the Silicon Labs logo®, Bluegiga®, Bluegiga Logo®, Clockbuilder®, CMEMS®, DSPLL®, EFM®, EFM32®, EFR, Ember®, Energy Micro®. Energy Micro logo and combinations thereof, “the world’s most energy friendly microcontrollers”, Ember®, EZLink®, EZRadio®, EZRadioPRO®, Gecko®, ISOModem®, Micrium, Precision32®, ProSLIC®, Simplicity Studio®, SiPHY®, Telegesis, the Telegesis Logo®, USBXpress®, Zentri and others are trademarks or registered trademarks of Silicon Labs. ARM, CORTEX, Cortex-M3 and THUMB are trademarks or registered trademarks of ARM Holdings. Keil is a registered trademark of ARM Limited. All other products or brand names mentioned herein are trademarks of their respective holders.