FEATURES:

• High Gain:
  – Typically 28 dB gain across 2.4–2.5 GHz over temperatures 0–85°C

• High linear output power:
  – >24 dBm P1dB

• High power-added efficiency/low operating current for Bluetooth applications
  – ~50% PAE or 115 mA total current consumption @ Pout = 23 dBm for Vcc = 3.3V and GCTL = 3.0V

• Low idle current
  – ~10 mA Ico

• Simple input/output matching

• Packages available
  – 6-contact VQFN and UQFN (3 x 1.6mm²)

APPLICATIONS:

• Bluetooth
• USB Dongles
• 2.4 GHz Cordless phones

PRODUCT DESCRIPTION

The SST12LP00 is a high-power and high-gain power amplifier based on the highly reliable InGaP/GaAs HBT technology. SST12LP00 is easily configured for high-power and high-efficiency applications while operating over the 2.4–2.5 GHz frequency band. This device typically provides 30 dB gain with better than 50% power added efficiency @ Pout = 23 dBm.

The SST12LP00’s excellent linearity is well suited for Class 1 Bluetooth operation. The power amplifier IC also features easy board-level usage along with high speed power up/down control. A low reference current makes SST12LP00 ideal for the final stage power amplification in battery-powered Bluetooth, USB Dongle, or cordless phone transmitter applications.

The SST12LP00 is offered in both 6-contact VQFN and UQFN packages. See Figure 2 for pin assignments and Table 1 for pin descriptions.
FUNCTIONAL BLOCKS

FIGURE 1: Functional Block Diagram

PIN ASSIGNMENTS

FIGURE 2: Pin Assignments for 6-contact VQFN and UQFN

PIN DESCRIPTIONS

TABLE 1: Pin Description

<table>
<thead>
<tr>
<th>Symbol</th>
<th>Pin No.</th>
<th>Pin Name</th>
<th>Type</th>
<th>Function</th>
</tr>
</thead>
<tbody>
<tr>
<td>GND</td>
<td>0</td>
<td>Ground</td>
<td></td>
<td>The center pad should be connected to RF ground with several low inductance, low resistance vias.</td>
</tr>
<tr>
<td>G_CTL</td>
<td>1</td>
<td>Power Amplifier Gain Control</td>
<td></td>
<td></td>
</tr>
<tr>
<td>PDC</td>
<td>2</td>
<td>Power-down Control</td>
<td></td>
<td></td>
</tr>
<tr>
<td>RF_IN</td>
<td>3</td>
<td>I</td>
<td>RF input, DC decoupled</td>
<td></td>
</tr>
<tr>
<td>VCCb</td>
<td>4</td>
<td>Power Supply</td>
<td>PWR</td>
<td>Vcc power supply, bias circuit</td>
</tr>
<tr>
<td>VCC1</td>
<td>5</td>
<td>Power Supply</td>
<td>PWR</td>
<td>Vcc power supply, 1st stage</td>
</tr>
<tr>
<td>RF_OUT/</td>
<td>6</td>
<td>O/PWR</td>
<td></td>
<td>Vcc power supply, 2nd stage</td>
</tr>
</tbody>
</table>

1. I=Input, O=Output

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ELECTRICAL SPECIFICATIONS

The AC and DC specifications for the power amplifier interface signals. Refer to Table 2 for the DC voltage and current specifications. Refer to Figure 3 for the RF performance.

Absolute Maximum Stress Ratings (Applied conditions greater than those listed under “Absolute Maximum Stress Ratings” may cause permanent damage to the device. This is a stress rating only and functional operation of the device at these conditions or conditions greater than those defined in the operational sections of this data sheet is not implied. Exposure to absolute maximum stress rating conditions may affect device reliability.)

Supply Voltage at pins 4, 5, and 6 (VCC) .................................................. -0.3V to +3.6V
Power-down Control Voltage (PDC) .................................................. -0.3V to VCC
Gain Control Voltage (GCTL) .................................................. -0.3V to VCC
Radio Frequency Input Power (RFIN) .................................................. +10 dBm
Operating Temperature (TA) .................................................. -40ºC to +85ºC
Storage Temperature (TSTG) .................................................. -40ºC to +120ºC
Maximum Junction Temperature (TJ) .................................................. +150ºC
Surface Mount Solder Reflow Temperature .................................................. 260ºC for 10 seconds

Operating Range

<table>
<thead>
<tr>
<th>Range</th>
<th>Ambient Temp</th>
<th>VCC</th>
</tr>
</thead>
<tbody>
<tr>
<td>Industrial</td>
<td>-40°C to +85°C</td>
<td>3.3V</td>
</tr>
</tbody>
</table>

TABLE 2: DC Electrical Characteristics

<table>
<thead>
<tr>
<th>Symbol</th>
<th>Parameter</th>
<th>Min.</th>
<th>Typ</th>
<th>Max.</th>
<th>Unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>VCC</td>
<td>Supply Voltage at pins 4, 5, and 6</td>
<td>2.7</td>
<td>3.3</td>
<td>3.6</td>
<td>V</td>
</tr>
<tr>
<td>ICC</td>
<td>Supply Current @ POUT = 23 dBm</td>
<td>115</td>
<td></td>
<td></td>
<td>mA</td>
</tr>
<tr>
<td>GCTL</td>
<td>Power Amplifier Gain Control Voltage</td>
<td>0.1</td>
<td>3.0</td>
<td>3.3</td>
<td>V</td>
</tr>
<tr>
<td>IGCTL</td>
<td>Current through GCTL pin</td>
<td>55</td>
<td>100</td>
<td></td>
<td>µA</td>
</tr>
<tr>
<td>PDC</td>
<td>Logic High Voltage</td>
<td>2.6</td>
<td></td>
<td></td>
<td>V</td>
</tr>
<tr>
<td></td>
<td>Logic Low Voltage</td>
<td></td>
<td>0.8</td>
<td></td>
<td>V</td>
</tr>
<tr>
<td>ICQ</td>
<td>Idle Current (GCTL = 3.0V)</td>
<td>10</td>
<td></td>
<td></td>
<td>mA</td>
</tr>
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TABLE 3: AC Electrical Characteristics

<table>
<thead>
<tr>
<th>Symbol</th>
<th>Parameter</th>
<th>Min.</th>
<th>Typ</th>
<th>Max.</th>
<th>Unit</th>
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</thead>
<tbody>
<tr>
<td>FL-U</td>
<td>Frequency range</td>
<td>2402</td>
<td></td>
<td>2480</td>
<td>MHz</td>
</tr>
<tr>
<td>POUT</td>
<td>Output power @ PIN = -7 dBm, VCC = 3.3V, GCTL = 3.0V</td>
<td>23</td>
<td></td>
<td></td>
<td>dBm</td>
</tr>
<tr>
<td>G</td>
<td>Small signal gain</td>
<td>27</td>
<td></td>
<td></td>
<td>dB</td>
</tr>
<tr>
<td>GVAR</td>
<td>Gain variation over band (2400~2485 MHz)</td>
<td>0.2</td>
<td>0.5</td>
<td></td>
<td>dB</td>
</tr>
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TYPICAL PERFORMANCE CHARACTERISTICS

FIGURE 3: S-parameters for SST12LP00
2.4-2.5 GHz Power Amplifier
SST12LP00

FIGURE 4: Power Gain versus Output Power

FIGURE 5: Output Power versus Input Power
FIGURE 6: Supply Current versus Output Power

FIGURE 7: PAE versus Output Power
Figure 8: 2nd Harmonic versus Output Power

Figure 9: 3rd Harmonic versus Output Power
FIGURE 10: 4th Harmonic versus Output Power

FIGURE 11: 5th Harmonic versus Output Power
FIGURE 12: IMD3 versus Output Power
TYPICAL APPLICATION

1. Optional and only necessary for achieving high input return loss.
2. Replaceable by 1 nH (0402) inductor for compactness.
3. Shunt capacitor can be added to the inductor to lower the 2nd harmonic.
4. LC low-pass filter can be added to lower the 2nd harmonic.

FIGURE 13: Typical Application Schematic (Top View)
PRODUCT ORDERING INFORMATION

Valid combinations for SST12LP00
SST12LP00-QV6E    SST12LP00-QU6F

SST12LP00 Evaluation Kits
SST12LP00-QV6E-K    SST12LP00-QU6F-K

Note: Valid combinations are those products in mass production or will be in mass production. Consult your SST sales representative to confirm availability of valid combinations and to determine availability of new combinations.
Note: 1. Although many dimensions are similar to those of JEDEC JEP95 MO-220I, this specific package is not registered.
2. The external paddle is electrically connected to the die back-side and possibly to certain VSS leads. This paddle can be soldered to the PC board; it is suggested to connect this paddle to the VSS of the unit. Connection of this paddle to any other voltage potential can result in shorts and/or electrical malfunction of the device.
3. Untoleranced dimensions are nominal target dimensions.
4. All linear dimensions are in millimeters (max/min).

FIGURE 14: 6-contact Very-thin Quad Flat No-lead (VQFN)
SST Package Code: QV6
FIGURE 15: 6-Contact Ultra-thin Quad Flat No-lead (UQFN)
SST Package Code: QU6

TABLE 4: Revision History

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<th>Revision</th>
<th>Description</th>
<th>Date</th>
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<tr>
<td>00</td>
<td>• S71283: SST conversion of data sheet GP1200</td>
<td>Jan 2005</td>
</tr>
<tr>
<td>01</td>
<td>• Made various changes to include UQFN package</td>
<td></td>
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<tr>
<td></td>
<td>• Updated Information in “Features:” on page 1</td>
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<td>• Updated “Product Description” on page 1</td>
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<td></td>
<td>• Updated Table 1 on page 2</td>
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<tr>
<td></td>
<td>• Updated “Electrical Specifications” on page 3</td>
<td></td>
</tr>
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<td>• Updated Table 2 on page 3</td>
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</tr>
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<td>• Updated Table 3 on page 3</td>
<td></td>
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<tr>
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<td>• Updated Figure 13 on page 10</td>
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<tr>
<td></td>
<td>• Applied new formatting styles.</td>
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<tr>
<td>02</td>
<td>• Updated document status from Preliminary Specification to Data Sheet</td>
<td>Apr 2008</td>
</tr>
<tr>
<td>03</td>
<td>• Updated “Contact Information” on page 14.</td>
<td>Feb 2009</td>
</tr>
<tr>
<td>04</td>
<td>• End of Life all valid combinations in this data sheet</td>
<td>Apr 2009</td>
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</table>
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