# Table of Contents

**Introduction**

1) SCI-101 W/F GSM BAND BALUN  
2) SCI-102 W/F DCS BAND BALUN  
3) SCI-103 W/F WLAN 802.11B/G BAND BALUN  
4) SCI-104 W/F WLAN 802.11A BAND BALUN  
5) SCI-105 W/F GSM BAND BALUN  
6) SCI-106 W/F GSM BAND BALUN  
7) SCI-107 W/F DCS BAND BALUN  
8) SCI-108 W/F DCS BAND BALUN  
9) SCI-109 W/F 802.11b BAND BALUN  
10) SCI-110 W/F 802.11b BAND BALUN  
11) SCI-111 W/F 802.11a BAND BALUN  
12) SCI-112 W/F 802.11a BAND BALUN  
13) SCI-113 W/F UWB BAND BALUN  
14) SCI-114 W/F UWB BAND BALUN  
15) SCI-201 W/F GSM BAND LOW PASS FILTER  
16) SCI-202 W/F DCS BAND LOW PASS FILTER  
17) SCI-203 W/F GSM BAND LOW PASS FILTER  
18) SCI-301 W/F 802.11B/G BAND PASS FILTER  
19) SCI-302 W/F 802.11B/G BAND PASS FILTER  
20) SCI-303 W/F 802.11B/G BAND PASS FILTER  
21) SCI-304 W/F 802.11B/G BAND PASS FILTER  
22) SCI-305 W/F 802.11B/G BAND PASS FILTER  
23) SCI-306 W/F UWB BAND PASS FILTER  
24) SCI-307 F1/F2 UWB BAND PASS FILTER  
25) SCI-401 W/F 802.11A BAND PASS FILTER  
26) SCI-402 W/F 802.11A BAND PASS FILTER  
27) SCI-501 W/F GSM-DCS DIPLEXER  
28) SCI-502 W/F WLAN DIPLEXER  
29) SCI-503 W/F WLAN DIPLEXER  
30) SCI-601 W/F WiMAX BAND BALANCED FILTER  
31) SCI-602 W/F WiMAX BAND BALANCED FILTER  
32) SCI-701 W/F GSM BAND LOSS PASS FILTER WITH COUPLER  
33) SCI-702 W/F DCS BAND LOSS PASS FILTER WITH COUPLER  
34) SCI-801 W/F 802.11b BAND POWER DIVIDER  
35) SCI-802 W/F 802.11a BAND POWER DIVIDER  
36) SCI-901 W/F GSM BAND BALUN WITH COUPLER  
37) SCI-902 W/F DCS BAND BALUN WITH COUPLER  

**Appendix A**

2
3
5
7
9
11
13
15
17
19
21
23
25
27
29
31
33
35
37
39
41
43
45
47
49
51
53
55
57
59
61
63
65
67
69
71
73
75
77
Introduction

In the wireless market where there is intense pressure to optimize size, performance and cost, passive integration technology offers significant advantages for applications such as GSM/DCS and CDMA cellular phones, Wireless LAN 802.11 a/b/g and WiMax systems, primarily in RF power amplifiers and front-end modules (FEM) which make up the critical parts of those radio systems. Individual passive devices, produced using conventional ceramic technology, are often limited in terms of height profiles and form-factors. However, by integrating and fabricating passive devices at the silicon wafer level, we are able to achieve Integrated Passive Devices (IPD), which are significantly smaller, thinner and with higher performance than standard discrete passive devices.

We have implemented copper metallization to achieve superior performance in terms of insertion loss and miniaturization. Our process is capable of depositing 8 microns or more of copper on a silicon wafer. This reduces the loss in the RF signal transmission path, thereby improving battery performance of the wireless system and increasing coverage.

We have a library of standard IPDs, which can be very efficiently used in RF SiP products, along with ICs made from other technologies. Both wirebonding and flip chip version IPDs are available from our process. Custom designs can also be made to optimize performance for specific packages, such as QFN, LFBGA and FLGA. Library elements are now available for low pass filters (LPF), band pass filters (BPF), baluns and diplexers at various frequencies, as shown in this databook.

We provide the highest level integration of wireless systems. With leading edge technology in Fan-out Wafer Level Packaging (FOWLP), System-in-Package (SiP), IPD, 3D packaging and a comprehensive RF solutions portfolio, including wafer sort, design, assembly, RF test and supply chain management, we offer RF semiconductor companies a complete turnkey solution and distinct competitive advantage in their markets.
(1) GSM Band Balun (SCI-101 W/F)

FEATURES
- Passive integration on silicon substrate
- Low insertion loss in pass band
- Small size: 1.1 mm x 1.3 mm (wirebond) 1.2 mm x 1.5 mm (flip chip)
- Pb-free solder bump
- Low profile: 0.25 mm height (wirebond) 0.40 mm height (flip chip)
- Directly attachable on PCB or flipped on PCB
- Operating temperature: -40°C to +85°C
- Storage temperature: -40°C to +85°C

DESCRIPTION
STATS ChipPAC’s SCI-101W/F is a balun for GSM band applications. The balun has low pass-band insertion loss and small size. It is composed of thick copper inductors and Metal-Insulator-Metal capacitors which are fabricated on a silicon substrate using our IPD (Integrated Passive Device) process. The pad or bump size and pitch of the balun are selected so that the device can be mounted directly on a PCB or laminate substrate using conventional wirebonding or surface mount techniques. The low profile and small form-factor of the device make it especially suitable for SiP applications.

ELECTRICAL SPECIFICATIONS

<table>
<thead>
<tr>
<th>Specification</th>
<th>Unit</th>
<th>Min.</th>
<th>Typical</th>
<th>Max.</th>
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<td>824</td>
<td>915</td>
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<tr>
<td>Insertion Loss</td>
<td>dB</td>
<td>1.0</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Return Loss</td>
<td>dB</td>
<td>15</td>
<td>20</td>
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<tr>
<td>Differential Impedance</td>
<td>Ohm</td>
<td>100</td>
<td></td>
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<td>Amplitude Imbalance</td>
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<td>Phase Imbalance</td>
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<td>10.0</td>
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<tr>
<td>Size</td>
<td>mm</td>
<td>1.1 x 1.3 (WB)</td>
<td>1.2 x 1.5 (FC)</td>
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DIMENSIONS
TYPICAL CHARACTERISTICS

![Graphs showing typical characteristics like insertion loss, return loss, phase imbalance, amplitude imbalance, and insertion loss.]

ASSEMBLY DRAWING / MECHANICAL OUTLINE

**SCI-101W (Wirebond)**

<table>
<thead>
<tr>
<th>Pad</th>
<th>SCI-101W Signal</th>
<th>SCI-101F Signal</th>
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<tbody>
<tr>
<td>1</td>
<td>Ground</td>
<td>Bias</td>
</tr>
<tr>
<td>2</td>
<td>Unbalanced</td>
<td>Unbalanced</td>
</tr>
<tr>
<td>3</td>
<td>Bias</td>
<td>Ground</td>
</tr>
<tr>
<td>4</td>
<td>Balanced (-)</td>
<td>Balanced (+)</td>
</tr>
<tr>
<td>5</td>
<td>Balanced (+)</td>
<td>Balanced (-)</td>
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</tbody>
</table>

**SCI-101F (Flip Chip)**

![Assembly drawings for SCI-101F (Flip Chip) with pad and signal connections.]

NOTES

All dimension measurement units are in millimeters (mm). Electrical performance and typical values are measured at room temperature. For best results, ground plane directly beneath the device should be in the top metal layer.

Refer to “Appendix A” for:

- Pad sizes and typical wirebond length used in the wirebonded IPD products.
- Recommended solder thermal profile, landing pattern recommendation and bump specifications used in the flip chip IPD products.
(2) **DCS Band Balun (SCI-102 W/F)**

**FEATURES**
- Passive integration on silicon substrate
- Low insertion loss in pass band
- Small size: 0.8 mm x 1.1 mm (wirebond)
  1.2 mm x 1.1 mm (flip chip)
- Pb-free solder bump
- Low profile: 0.25 mm height (wirebond)
  0.40 mm height (flip chip)
- Directly attachable on PCB or flipped on PCB
- Operating temperature: -40°C to +85°C
- Storage temperature: -40°C to +85°C

**DESCRIPTION**
SCI-102W/F is a balun for DCS band applications. The balun has low pass-band insertion loss and small size. It is composed of thick copper inductors and Metal-Insulator-Metal capacitors which are fabricated on a silicon substrate using our IPD (Integrated Passive Device) process. The pad or bump size and pitch of the balun are selected so that the device can be mounted directly on a PCB or laminate substrate using conventional wirebonding or surface mount techniques. The low profile and small form-factor of the device make it especially suitable for SiP applications.

**ELECTRICAL SPECIFICATIONS**

<table>
<thead>
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<th>Specification</th>
<th>Unit</th>
<th>Min.</th>
<th>Typical</th>
<th>Max.</th>
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<td>0.8</td>
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</tr>
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<td>Return Loss</td>
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<td>10</td>
<td>15</td>
<td></td>
</tr>
<tr>
<td>Differential Impedance</td>
<td>Ohm</td>
<td>100</td>
<td>100</td>
<td></td>
</tr>
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<td>Amplitude Imbalance</td>
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<td>0.65</td>
<td></td>
</tr>
<tr>
<td>Phase Imbalance</td>
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<td>0.8 x 1.1 (WB)</td>
<td>1.2 x 1.1 (FC)</td>
<td></td>
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</table>

**DIMENSIONS**

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TYPICAL CHARACTERISTICS

ASSEMBLY DRAWING / MECHANICAL OUTLINE

SCI-102W (Wirebond)       SCI-102F (Flip Chip)

NOTES

All dimension measurement units are in millimeters (mm). Electrical performance and typical values are measured at room temperature. For best results, ground plane directly beneath the device should be in the top metal layer.

Refer to “Appendix A” for:

- Pad sizes and typical wirebond length used in the wirebonded IPD products.
- Recommended solder thermal profile, landing pattern recommendation and bump specifications used in the flip chip IPD products.
(3) **WLAN 802.11b/g Band Balun (SCI-103 W/F)**

**FEATURES**
- Passive integration on silicon substrate
- Low insertion loss in pass band
- Small size: 0.8 mm x 1.0 mm (wirebond)
  1.2 mm x 1.1 mm (flip chip)
- Pb-free solder bump
- Low profile: 0.25 mm height (wirebond)
  0.40 mm height (flip chip)
- Directly attachable on PCB or flipped on PCB
- Operating temperature: -40°C to +85°C
- Storage temperature: -40°C to +85°C

**DESCRIPTION**

STATS ChipPAC’s SCI-103W/F is a balun for WLAN 802.11b/g band applications. The balun has low-pass band insertion loss and small size. It is composed of thick copper inductors and Metal-Insulator-Metal capacitors which are fabricated on a silicon substrate using our IPD (Integrated Passive Device) process. The pad or bump size and pitch of the balun are selected so that the device can be mounted directly on a PCB or laminate substrate using conventional wirebonding or surface mount techniques. The low profile and small form-factor of the device make it especially suitable for SiP applications.

**ELECTRICAL SPECIFICATIONS**

<table>
<thead>
<tr>
<th>Specification</th>
<th>Unit</th>
<th>Min.</th>
<th>Typical</th>
<th>Max.</th>
</tr>
</thead>
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<td>MHz</td>
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<td>Differential Impedance</td>
<td>Ohm</td>
<td></td>
<td>100</td>
<td></td>
</tr>
<tr>
<td>Amplitude Imbalance</td>
<td>dB</td>
<td>0.5</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Phase Imbalance</td>
<td>deg</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Size</td>
<td>mm</td>
<td>0.8 x 1.0 (WB)</td>
<td>1.2 x 1.1 (FC)</td>
<td></td>
</tr>
</tbody>
</table>

**DIMENSIONS**
TYPICAL CHARACTERISTICS

ASSEMBLY DRAWING / MECHANICAL OUTLINE

SCI-103W (Wirebond)          SCI-103F (Flip Chip)

NOTES

All dimension measurement units are in millimeters (mm). Electrical performance and typical values are measured at room temperature. For best results, ground plane directly beneath the device should be in the top metal layer.

Refer to “Appendix A” for:

- Pad sizes and typical wirebond length used in the wirebonded IPD products.
- Recommended solder thermal profile, landing pattern recommendation and bump specifications used in the flip chip IPD products.
(4) WLAN 802.11a Band Balun (SCI-104 W/F)

FEATURES

- Passive integration on silicon substrate
- Low insertion loss in pass band
- Small size: 0.8 mm x 1.1 mm (wirebond) / 1.2 mm x 1.2 mm (flip chip)
- Pb-free solder bump
- Low profile: 0.25 mm height wirebond / 0.40 mm height (flip chip)
- Directly attachable on PCB or flipped on PCB
- Operating temperature: -40°C to +85°C
- Storage temperature: -40°C to +85°C

DESCRIPTION

STATS ChipPAC’s SCI-104W/F is a balun for WLAN 802.11a band applications. The balun has low pass-band insertion loss and small size. It is composed of thick copper inductors and Metal-Insulator-Metal capacitors which are fabricated on a silicon substrate using our IPD (Integrated Passive Device) process. The pad or bump size and pitch of the balun are selected so that the device can be mounted directly on a PCB or laminate substrate using conventional wirebonding or surface mount techniques. The low profile and small form-factor of the device make it especially suitable for SiP applications.

ELECTRICAL SPECIFICATIONS

<table>
<thead>
<tr>
<th>Specification</th>
<th>Unit</th>
<th>Min.</th>
<th>Typical</th>
<th>Max.</th>
</tr>
</thead>
<tbody>
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<td>5825</td>
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<td>dB</td>
<td>0.7</td>
<td></td>
<td>1.0</td>
</tr>
<tr>
<td>Return Loss</td>
<td>dB</td>
<td></td>
<td></td>
<td>10</td>
</tr>
<tr>
<td>Differential Impedance</td>
<td>Ohm</td>
<td></td>
<td></td>
<td>100</td>
</tr>
<tr>
<td>Amplitude Imbalance</td>
<td>dB</td>
<td>0.5</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Phase Imbalance</td>
<td>deg</td>
<td>5</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Size</td>
<td>mm</td>
<td>0.8 x 1.1 (WB)</td>
<td></td>
<td>1.2 x 1.2 (FC)</td>
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DIMENSIONS

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TYPICAL CHARACTERISTICS

ASSEMBLY DRAWING / MECHANICAL OUTLINE

SCI-104W (Wirebond)          SCI-104F (Flip Chip)

NOTES

All dimension measurement units are in millimeters (mm). Electrical performance and typical values are measured at room temperature. For best results, ground plane directly beneath the device should be in the top metal layer.

Refer to “Appendix A” for:

- Pad sizes and typical wirebond length used in the wirebonded IPD products.
- Recommended solder thermal profile, landing pattern recommendation and bump specifications used in the flip chip IPD products.
(5) **GSM Band Balun (SCI-105 W/F)**

### FEATURES
- Passive integration on silicon substrate
- Low insertion loss in pass band
- Small size: 1.4 mm x 1.2 mm (wirebond)
  1.4 mm x 1.2 mm (flip chip)
- Pb-free solder bump
- Low profile: 0.25 mm height (wirebond)
  0.40 mm height (flip chip)
- Directly attachable on PCB or flipped on PCB
- Operating temperature: -40°C to +85°C
- Storage temperature: -40°C to +85°C

### DESCRIPTION
STATS ChipPAC’s SCI-105W/F is a balun for GSM band applications. The balun has low pass-band insertion loss and small size. It is composed of thick copper inductors and Metal-Insulator-Metal capacitors which are fabricated on a silicon substrate using our IPD (Integrated Passive Device) process. The pad or bump size and pitch of the balun are selected so that the device can be mounted directly on a PCB or laminate substrate using conventional wirebonding or surface mount techniques. The low profile and small form-factor of the device make it especially suitable for SiP applications.

### ELECTRICAL SPECIFICATIONS
(Test board loss 0.04 dB included)

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<th>Specification</th>
<th>Unit</th>
<th>Min.</th>
<th>Typical</th>
<th>Max.</th>
</tr>
</thead>
<tbody>
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<td>Pass Band</td>
<td>MHz</td>
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<td>915</td>
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<tr>
<td>Insertion Loss</td>
<td>dB</td>
<td>1.1</td>
<td></td>
<td></td>
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<td>Return Loss</td>
<td>dB</td>
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<td>Ohm</td>
<td>50</td>
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<td>Amplitude Imbalance</td>
<td>dB</td>
<td>0.5</td>
<td></td>
<td></td>
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<tr>
<td>Phase Imbalance</td>
<td>deg</td>
<td>6.0</td>
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<td></td>
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<tr>
<td>Size</td>
<td>mm</td>
<td>1.4 x 1.2 (WB)</td>
<td>1.4 x 1.2 (FC)</td>
<td></td>
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</tbody>
</table>

### DIMENSIONS
TYPICAL CHARACTERISTICS

![Graphs showing typical characteristics such as insertion loss, return loss, amplitude imbalance, and phase imbalance over frequency.](image)

TEST BOARD DRAWING

**SCI-105W (Wirebond)**

**SCI-105F (Flip Chip)**

NOTES

All dimension measurement units are in millimeters (mm). Electrical performance and typical values are measured at room temperature. For best results, ground plane directly beneath the device should be in the top metal layer.

Refer to “Appendix A” for:

- Pad sizes and typical wirebond length used in the wirebonded IPD products.
- Recommended solder thermal profile, landing pattern recommendation and bump specifications used in the flip chip IPD products.
(6) GSM Band Balun (SCI-106 W/F)

FEATURES

- Passive integration on silicon substrate
- Low insertion loss in pass band
- Small size: 1.4 mm x 1.2 mm (wirebond) 1.6 mm x 1.2 mm (flip chip)
- Pb-free solder bump
- Low profile: 0.25 mm height (wirebond) 0.40 mm height (flip chip)
- Directly attachable on PCB or flipped on PCB
- Operating temperature: -40°C to +85°C
- Storage temperature: -40°C to +85°C

DESCRIPTION

STATS ChipPAC’s SCI-106W/F is a balun for GSM band applications. The balun has low pass-band insertion loss and small size. It is composed of thick copper inductors and Metal-Insulator-Metal capacitors which are fabricated on a silicon substrate using our IPD (Integrated Passive Device) process. The pad or bump size and pitch of the balun are selected so that the device can be mounted directly on a PCB or laminate substrate using conventional wirebonding or surface mount techniques. The low profile and small form-factor of the device make it especially suitable for SiP applications.

ELECTRICAL SPECIFICATIONS

(Test board loss 0.04 dB included)

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<th>Unit</th>
<th>Min.</th>
<th>Typical</th>
<th>Max.</th>
</tr>
</thead>
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<tr>
<td>Pass Band</td>
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<td>824</td>
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<td>915</td>
</tr>
<tr>
<td>Insertion Loss</td>
<td>dB</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Return Loss</td>
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<td>Ohm</td>
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<td>Amplitude Imbalance</td>
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<td></td>
<td></td>
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<td>Phase Imbalance</td>
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<td>mm</td>
<td>1.4 x 1.2 (WB)</td>
<td>1.6 x 1.2 (FC)</td>
<td></td>
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</tbody>
</table>

DIMENSIONS
TYPICAL CHARACTERISTICS

![Graphs showing Insertion Loss, Return Loss, Amplitude Imbalance, and Phase Imbalance against frequency.]

TEST BOARD DRAWING

**SCI-106W (Wirebond)**

**SCI-106F (Flip Chip)**

<table>
<thead>
<tr>
<th>Pad</th>
<th>SCI-106W Signal</th>
<th>SCI-106F Signal</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Balanced (+)</td>
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<td>2</td>
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<td>Balanced (+)</td>
</tr>
<tr>
<td>5</td>
<td>Bias</td>
<td>Balanced (-)</td>
</tr>
</tbody>
</table>

NOTES

All dimension measurement units are in millimeters (mm). Electrical performance and typical values are measured at room temperature. For best results, ground plane directly beneath the device should be in the top metal layer.

Refer to “Appendix A” for:

- Pad sizes and typical wirebond length used in the wirebonded IPD products.
- Recommended solder thermal profile, landing pattern recommendation and bump specifications used in the flip chip IPD products.
(7) **DCS Band Balun (SCI-107 W/F)**

**DESCRIPTION**

STATS ChipPAC's SCI-107W/F is a balun for DCS band applications. The balun has low pass-band insertion loss and small size. It is composed of thick copper inductors and Metal-Insulator-Metal capacitors which are fabricated on a silicon substrate using our IPD (Integrated Passive Device) process. The pad or bump size and pitch of the balun are selected so that the device can be mounted directly on a PCB or laminate substrate using conventional wirebonding or surface mount techniques. The low profile and small form-factor of the device make it especially suitable for SiP applications.

**ELECTRICAL SPECIFICATIONS**

(Test board loss 0.07 dB included)

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<th>Unit</th>
<th>Min.</th>
<th>Typical</th>
<th>Max.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pass Band</td>
<td>MHz</td>
<td>1710</td>
<td>1.0</td>
<td>1980</td>
</tr>
<tr>
<td>Insertion Loss</td>
<td>dB</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Return Loss</td>
<td>dB</td>
<td></td>
<td>15</td>
<td></td>
</tr>
<tr>
<td>Differential Impedance</td>
<td>Ohm</td>
<td></td>
<td>50</td>
<td></td>
</tr>
<tr>
<td>Amplitude Imbalance</td>
<td>dB</td>
<td></td>
<td>0.5</td>
<td></td>
</tr>
<tr>
<td>Phase Imbalance</td>
<td>deg</td>
<td></td>
<td>4.0</td>
<td></td>
</tr>
<tr>
<td>Size</td>
<td>mm</td>
<td>1.2 x 1.2 (WB)</td>
<td>1.4 x 1.2 (FC)</td>
<td></td>
</tr>
</tbody>
</table>

**FEATURES**

- Passive integration on silicon substrate
- Low insertion loss in pass band
- Small size: 1.2 mm x 1.2 mm (wirebond)
  1.4 mm x 1.2 mm (flip chip)
- Pb-free solder bump
- Low profile: 0.25 mm height (wirebond)
  0.40 mm height (flip chip)
- Directly attachable on PCB or flipped on PCB
- Operating temperature: -40°C to +85°C
- Storage temperature: -40°C to +85°C

**DIMENSIONS**

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TYPICAL CHARACTERISTICS

![Graphs showing typical characteristics of a device, including Insertion Loss, Amplitude Imbalance, Return Loss, and Phase Imbalance.]

TEST BOARD DRAWING

SCI-107W (Wirebond)   SCI-107F (Flip Chip)

NOTES

All dimension measurement units are in millimeters (mm). Electrical performance and typical values are measured at room temperature. For best results, ground plane directly beneath the device should be in the top metal layer.

Refer to “Appendix A” for:

- Pad sizes and typical wirebond length used in the wirebonded IPD products.
- Recommended solder thermal profile, landing pattern recommendation and bump specifications used in the flip chip IPD products.
(8) DCS Band Balun (SCI-108 W/F)

FEATURES
- Passive integration on silicon substrate
- Low insertion loss in pass band
- Small size: 1.0 mm x 1.2 mm (wirebond)
  1.4 mm x 1.2 mm (flip chip)
- Pb-free solder bump
- Low profile: 0.25 mm height (wirebond)
  0.40 mm height (flip chip)
- Directly attachable on PCB or flipped on PCB
- Operating temperature: -40°C to +85°C
- Storage temperature: -40°C to +85°C

DESCRIPTION

STATS ChipPAC’s SCI-108W/F is a balun for DCS band applications. The balun has low pass-band insertion loss and small size. It is composed of thick copper inductors and Metal-Insulator-Metal capacitors which are fabricated on a silicon substrate using our IPD (Integrated Passive Device) process. The pad or bump size and pitch of the balun are selected so that the device can be mounted directly on a PCB or laminate substrate using conventional wirebonding or surface mount techniques. The low profile and small form-factor of the device make it especially suitable for SiP applications.

ELECTRICAL SPECIFICATIONS

<table>
<thead>
<tr>
<th>Specification</th>
<th>Unit</th>
<th>Min.</th>
<th>Typical</th>
<th>Max.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pass Band</td>
<td>MHz</td>
<td>1710</td>
<td>1980</td>
<td></td>
</tr>
<tr>
<td>Insertion Loss</td>
<td>dB</td>
<td></td>
<td>0.9</td>
<td></td>
</tr>
<tr>
<td>Return Loss</td>
<td>dB</td>
<td></td>
<td>15</td>
<td></td>
</tr>
<tr>
<td>Differential Impedance</td>
<td>Ohm</td>
<td></td>
<td>200</td>
<td></td>
</tr>
<tr>
<td>Amplitude Imbalance</td>
<td>dB</td>
<td></td>
<td>0.5</td>
<td></td>
</tr>
<tr>
<td>Phase Imbalance</td>
<td>deg</td>
<td></td>
<td>5.0</td>
<td></td>
</tr>
<tr>
<td>Size</td>
<td>mm</td>
<td>1.0 x 1.2 (WB)</td>
<td>1.4 x 1.2 (FC)</td>
<td></td>
</tr>
</tbody>
</table>

(DCS Band Balun (SCI-108 W/F)

SCI-108W (Wirebond)

SCI-108F (Flip Chip)
TYPICAL CHARACTERISTICS

Insertion Loss (dB)

freq, GHz

Amplitude Imbalance (dB)

freq, GHz

Return Loss (dB)

freq, GHz

Phase Imbalance (deg)

freq, GHz

TEST BOARD DRAWING

SCI-108W (Wirebond)  SCI-108F (Flip Chip)

NOTES

All dimension measurement units are in millimeters (mm). Electrical performance and typical values are measured at room temperature. For best results, ground plane directly beneath the device should be in the top metal layer.

Refer to “Appendix A” for:
- Pad sizes and typical wirebond length used in the wirebonded IPD products.
- Recommended solder thermal profile, landing pattern recommendation and bump specifications used in the flip chip IPD products.
(9) 802.11b Band Balun (SCI-109 W/F)

FEATURES

- Passive integration on silicon substrate
- Low insertion loss in pass band
- Small size: 1.0 mm x 1.2 mm (wirebond)
  1.0 mm x 1.2 mm (flip chip)
- Pb-free solder bump
- Low profile: 0.25 mm height (wirebond)
  0.40 mm height (flip chip)
- Directly attachable on PCB or flipped on PCB
- Operating temperature: -40℃ to +85℃
- Storage temperature: -40℃ to +85℃

DESCRIPTION

STATS ChipPAC’s SCI-109W/F is a balun for 802.11b band applications. The balun has low pass-band insertion loss and small size. It is composed of thick copper inductors and Metal-Insulator-Metal capacitors which are fabricated on a silicon substrate using our IPD (Integrated Passive Device) process. The pad or bump size and pitch of the balun are selected so that the device can be mounted directly on a PCB or laminate substrate using conventional wirebonding or surface mount techniques. The low profile and small form-factor of the device make it especially suitable for SiP applications.

ELECTRICAL SPECIFICATIONS

(See board loss 0.1dB included)

<table>
<thead>
<tr>
<th>Specification</th>
<th>Unit</th>
<th>Min.</th>
<th>Typical</th>
<th>Max.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pass Band</td>
<td>MHz</td>
<td>2400</td>
<td></td>
<td>2500</td>
</tr>
<tr>
<td>Insertion Loss</td>
<td>dB</td>
<td>1.0</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Return Loss</td>
<td>dB</td>
<td></td>
<td>20</td>
<td></td>
</tr>
<tr>
<td>Differential Impedance</td>
<td>Ohm</td>
<td>50</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Amplitude Imbalance</td>
<td>dB</td>
<td></td>
<td>0.3</td>
<td></td>
</tr>
<tr>
<td>Phase Imbalance</td>
<td>deg</td>
<td></td>
<td>4.0</td>
<td></td>
</tr>
<tr>
<td>Size</td>
<td>mm</td>
<td>1.0 x 1.2 (WB)</td>
<td>1.0 x 1.2 (FC)</td>
<td></td>
</tr>
</tbody>
</table>

DIMENSIONS

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TYPICAL CHARACTERISTICS

Return Loss (dB)

Insertion Loss (dB)

Amplitude Imbalance (dB)

Phase Imbalance (deg)

TEST BOARD DRAWING

SCI-109W (Wirebond)       SCI-109F (Flip Chip)

NOTES

All dimension measurement units are in millimeters (mm). Electrical performance and typical values are measured at room temperature. For best results, ground plane directly beneath the device should be in the top metal layer.

Refer to “Appendix A” for:
- Pad sizes and typical wirebond length used in the wirebonded IPD products.
- Recommended solder thermal profile, landing pattern recommendation and bump specifications used in the flip chip IPD products.
(10) 802.11b Band Balun (SCI-110 W/F)

FEATURES

- Passive integration on silicon substrate
- Low insertion loss in pass band
- Small size: 1.0 mm x 1.2 mm (wirebond)
  1.2 mm x 1.2 mm (flip chip)
- Pb-free solder bump
- Low profile: 0.25 mm height (wirebond)
  0.40 mm height (flip chip)
- Directly attachable on PCB or flipped on PCB
- Operating temperature: -40°C to +85°C
- Storage temperature: -40°C to +85°C

DESCRIPTION

STATS ChipPAC's SCI-110W/F is a balun for 802.11b band applications. The balun has low pass-band insertion loss and small size. It is composed of thick copper inductors and Metal-Insulator-Metal capacitors which are fabricated on a silicon substrate using our IPD (Integrated Passive Device) process. The pad or bump size and pitch of the balun are selected so that the device can be mounted directly on a PCB or laminate substrate using conventional wirebonding or surface mount techniques. The low profile and small form-factor of the device make it especially suitable for SiP applications.

ELECTRICAL SPECIFICATIONS

(Test board loss 0.1 dB included)

<table>
<thead>
<tr>
<th>Specification</th>
<th>Unit</th>
<th>Min.</th>
<th>Typical</th>
<th>Max.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pass Band</td>
<td>MHz</td>
<td>2400</td>
<td></td>
<td>2500</td>
</tr>
<tr>
<td>Insertion Loss</td>
<td>dB</td>
<td>0.8</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Return Loss</td>
<td>dB</td>
<td>20</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Differential Impedance</td>
<td>Ohm</td>
<td>200</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Amplitude Imbalance</td>
<td>dB</td>
<td>0.3</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Phase Imbalance</td>
<td>deg</td>
<td>1.0</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Size</td>
<td>mm</td>
<td>1.0 x 1.2 (WB)</td>
<td>1.2 x 1.2 (FC)</td>
<td></td>
</tr>
</tbody>
</table>

DIMENSIONS
TYPICAL CHARACTERISTICS

![Graphs showing typical characteristics: Insertion Loss (dB), Return Loss (dB), Phase Imbalance (deg), Amplitude Imbalance (dB), and Frequency (GHz).]

TEST BOARD DRAWING

SCI-110W (Wirebond)  
SCI-110F (Flip Chip)

<table>
<thead>
<tr>
<th>Pad</th>
<th>SCI-110W Signal</th>
<th>SCI-110F Signal</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Balanced (+)</td>
<td>Balanced (+)</td>
</tr>
<tr>
<td>2</td>
<td>Unbalanced</td>
<td>Bias</td>
</tr>
<tr>
<td>3</td>
<td>GND</td>
<td>GND</td>
</tr>
<tr>
<td>4</td>
<td>Bias</td>
<td>Unbalanced</td>
</tr>
<tr>
<td>5</td>
<td>Balanced (-)</td>
<td>Balanced (-)</td>
</tr>
</tbody>
</table>

NOTES

All dimension measurement units are in millimeters (mm). Electrical performance and typical values are measured at room temperature. For best results, ground plane directly beneath the device should be in the top metal layer.

Refer to “Appendix A” for:

- Pad sizes and typical wirebond length used in the wirebonded IPD products.
- Recommended solder thermal profile, landing pattern recommendation and bump specifications used in the flip chip IPD products.
**(11) 802.11a Band Balun (SCI-111 W/F)**

**FEATURES**
- Passive integration on silicon substrate
- Low insertion loss in pass band
- Small size: 1.0 mm x 1.2 mm (wirebond)
  1.4 mm x 1.2 mm (flip chip)
- Pb-free solder bump
- Low profile: 0.25 mm height (wirebond)
  0.40 mm height (flip chip)
- Directly attachable on PCB or flipped on PCB
- Operating temperature: -40°C to +85°C
- Storage temperature: -40°C to +85°C

**DESCRIPTION**
STATS ChipPAC’s SCI-111W/F is a balun for 802.11a band applications. The balun has low pass-band insertion loss and small size. It is composed of thick copper inductors and Metal-Insulator-Metal capacitors which are fabricated on a silicon substrate using our IPD (Integrated Passive Device) process. The pad or bump size and pitch of the balun are selected so that the device can be mounted directly on a PCB or laminate substrate using conventional wirebonding or surface mount techniques. The low profile and small form-factor of the device make it especially suitable for SiP applications.

**ELECTRICAL SPECIFICATIONS**
*Test board loss 0.25 dB included*

<table>
<thead>
<tr>
<th>Specification</th>
<th>Unit</th>
<th>Min.</th>
<th>Typical</th>
<th>Max.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pass Band</td>
<td>MHz</td>
<td>4900</td>
<td></td>
<td>5900</td>
</tr>
<tr>
<td>Insertion Loss</td>
<td>dB</td>
<td></td>
<td>1.2</td>
<td></td>
</tr>
<tr>
<td>Return Loss</td>
<td>dB</td>
<td></td>
<td>11</td>
<td></td>
</tr>
<tr>
<td>Differential Impedance</td>
<td>Ohm</td>
<td></td>
<td>50</td>
<td></td>
</tr>
<tr>
<td>Amplitude Imbalance</td>
<td>dB</td>
<td></td>
<td>0.5</td>
<td></td>
</tr>
<tr>
<td>Phase Imbalance</td>
<td>deg</td>
<td></td>
<td>2.0</td>
<td></td>
</tr>
<tr>
<td>Size</td>
<td>mm</td>
<td>1.0 x 1.2 (WB)</td>
<td>1.4 x 1.2 (FC)</td>
<td></td>
</tr>
</tbody>
</table>

**DIMENSIONS**

---

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TYPICAL CHARACTERISTICS

![Graphs showing typical characteristics](image)

TEST BOARD DRAWING

**SCI-111W (Wirebond)  SCI-111F (Flip Chip)**

<table>
<thead>
<tr>
<th>Pad</th>
<th>SCI-111W Signal</th>
<th>SCI-111F Signal</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Balanced (+)</td>
<td>Bias</td>
</tr>
<tr>
<td>2</td>
<td>Unbalanced</td>
<td>GND</td>
</tr>
<tr>
<td>3</td>
<td>GND</td>
<td>Unbalanced</td>
</tr>
<tr>
<td>4</td>
<td>Bias</td>
<td>Balanced (+)</td>
</tr>
<tr>
<td>5</td>
<td>Balanced (-)</td>
<td>GND</td>
</tr>
<tr>
<td>6</td>
<td>GND</td>
<td>Balanced (-)</td>
</tr>
</tbody>
</table>

NOTES

All dimension measurement units are in millimeters (mm). Electrical performance and typical values are measured at room temperature. For best results, ground plane directly beneath the device should be in the top metal layer.

Refer to “Appendix A” for:
- Pad sizes and typical wirebond length used in the wirebonded IPD products.
- Recommended solder thermal profile, landing pattern recommendation and bump specifications used in the flip chip IPD products.
(12) 802.11a Band Balun (SCI-112 W/F)

FEATURES
- Passive integration on silicon substrate
- Low insertion loss in pass band
- Small size: 1.0 mm x 1.2 mm (wirebond)
  1.2 mm x 1.2 mm (flip chip)
- Pb-free solder bump
- Low profile: 0.25 mm height (wirebond)
  0.40 mm height (flip chip)
- Directly attachable on PCB or flipped on PCB
- Operating temperature: -40°C to +85°C
- Storage temperature: -40°C to +85°C

DESCRIPTION
STATS ChipPAC’s SCI-112W/F is a balun for 802.11a band applications. The balun has low pass-band insertion loss and small size. It is composed of thick copper inductors and Metal-Insulator-Metal capacitors which are fabricated on a silicon substrate using our IPD (Integrated Passive Device) process. The pad or bump size and pitch of the balun are selected so that the device can be mounted directly on a PCB or laminate substrate using conventional wirebonding or surface mount techniques. The low profile and small form-factor of the device make it especially suitable for SiP applications.

ELECTRICAL SPECIFICATIONS
(Test board loss 0.25 dB included)

<table>
<thead>
<tr>
<th>Specification</th>
<th>Unit</th>
<th>Min.</th>
<th>Typical</th>
<th>Max.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pass Band</td>
<td>MHz</td>
<td>4900</td>
<td></td>
<td>5900</td>
</tr>
<tr>
<td>Insertion Loss</td>
<td>dB</td>
<td>1.0</td>
<td>1.4</td>
<td></td>
</tr>
<tr>
<td>Return Loss</td>
<td>dB</td>
<td>12</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Differential Impedance</td>
<td>Ohm</td>
<td>200</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Amplitude Imbalance</td>
<td>dB</td>
<td>0.5</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Phase Imbalance</td>
<td>deg</td>
<td>3.0</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Size</td>
<td>mm</td>
<td>1.0 x 1.2 (WB)</td>
<td>1.2 x 1.2 (FC)</td>
<td></td>
</tr>
</tbody>
</table>

DIMENSIONS

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TYPICAL CHARACTERISTICS

Amplitude Imbalance (dB)

Insertion Loss (dB)

Return Loss (dB)

Phase Imbalance (deg)

TEST BOARD DRAWING

SCI-112W (Wirebond)  SCI-112F (Flip Chip)

NOTES

All dimension measurement units are in millimeters (mm). Electrical performance and typical values are measured at room temperature. For best results, ground plane directly beneath the device should be in the top metal layer.

Refer to “Appendix A” for:

- Pad sizes and typical wirebond length used in the wirebonded IPD products.
- Recommended solder thermal profile, landing pattern recommendation and bump specifications used in the flip chip IPD products.
(13) UWB Band Balun (SCI-113 W/F)

FEATURES

- Passive integration on silicon substrate
- Low insertion loss in pass band
- Small size: 1.0 mm x 1.2 mm (wirebond) 1.4 mm x 1.2 mm (flip chip)
- Pb-free solder bump
- Low profile: 0.25 mm height (wirebond) 0.40 mm height (flip chip)
- Directly attachable on PCB or flipped on PCB
- Operating temperature: -40°C to +85°C
- Storage temperature: -40°C to +85°C

DESCRIPTION

STATS ChipPAC’s SCI-113W/F is a balun for UWB band applications. The balun has low pass-band insertion loss and small size. It is composed of thick copper inductors and Metal-Insulator-Metal capacitors which are fabricated on a silicon substrate using our IPD (Integrated Passive Device) process. The pad or bump size and pitch of the balun are selected so that the device can be mounted directly on a PCB or laminate substrate using conventional wirebonding or surface mount techniques. The low profile and small form-factor of the device make it especially suitable for SiP applications.

ELECTRICAL SPECIFICATIONS

(Test board loss 0.2 dB included)

<table>
<thead>
<tr>
<th>Specification</th>
<th>Unit</th>
<th>Min.</th>
<th>Typical</th>
<th>Max.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pass Band</td>
<td>MHz</td>
<td>3000</td>
<td></td>
<td>5000</td>
</tr>
<tr>
<td>Insertion Loss</td>
<td>dB</td>
<td>1.3</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Return Loss</td>
<td>dB</td>
<td>10</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Differential Impedance</td>
<td>Ohm</td>
<td>100</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Amplitude Imbalance</td>
<td>dB</td>
<td>0.8</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Phase Imbalance</td>
<td>deg</td>
<td>8.0</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Size</td>
<td>mm</td>
<td>1.0 x 1.2 (WB)</td>
<td>1.4 x 1.2 (FC)</td>
<td></td>
</tr>
</tbody>
</table>

DIMENSIONS
TYPICAL CHARACTERISTICS

![Graphs showing typical characteristics](image)

TEST BOARD DRAWING

**SCI-113W (Wirebond)**

**SCI-113F (Flip Chip)**

![Test board drawings](image)

NOTES

All dimension measurement units are in millimeters (mm). Electrical performance and typical values are measured at room temperature. For best results, ground plane directly beneath the device should be in the top metal layer.

Refer to “Appendix A” for:

- Pad sizes and typical wirebond length used in the wirebonded IPD products.
- Recommended solder thermal profile, landing pattern recommendation and bump specifications used in the flip chip IPD products.
(14) UWB Band Balun (SCI-114 W/F)

FEATURES
- Passive integration on silicon substrate
- Low insertion loss in pass band
- Small size: 1.0 mm x 1.2 mm (wirebond)
  1.4 mm x 1.2 mm (flip chip)
- Pb-free solder bump
- Low profile: 0.25 mm height (wirebond)
  0.40 mm height (flip chip)
- Directly attachable on PCB or flipped on PCB
- Operating temperature: -40°C to +85°C
- Storage temperature: -40°C to +85°C

DESCRIPTION
STATS ChipPAC’s SCI-114W/F is a balun for UWB band applications. The balun has low pass-band insertion loss and small size. It is composed of thick copper inductors and Metal-Insulator-Metal capacitors which are fabricated on a silicon substrate using our IPD (Integrated Passive Device) process. The pad or bump size and pitch of the balun are selected so that the device can be mounted directly on a PCB or laminate substrate using conventional wirebonding or surface mount techniques. The low profile and small form-factor of the device make it especially suitable for SiP applications.

ELECTRICAL SPECIFICATIONS
(Test board loss 0.5 dB included)

<table>
<thead>
<tr>
<th>Specification</th>
<th>Unit</th>
<th>Min.</th>
<th>Typical</th>
<th>Max.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pass Band</td>
<td>MHz</td>
<td>7000</td>
<td>9000</td>
<td></td>
</tr>
<tr>
<td>Insertion Loss</td>
<td>dB</td>
<td>1.0</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Return Loss</td>
<td>dB</td>
<td>15</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Differential Impedance</td>
<td>Ohm</td>
<td>100</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Amplitude Imbalance</td>
<td>dB</td>
<td>0.6</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Phase Imbalance</td>
<td>deg</td>
<td>7.0</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Size</td>
<td>mm</td>
<td>1.0 x 1.2 (WB)</td>
<td>1.4 x 1.2 (FC)</td>
<td></td>
</tr>
</tbody>
</table>

DIMENSIONS
TYPICAL CHARACTERISTICS

![Graphs showing typical characteristics such as Insertion Loss, Return Loss, Amplitude Imbalance, and Phase Imbalance vs. frequency.]

TEST BOARD DRAWING

**SCI-114W (Wirebond)  SCI-114F (Flip Chip)**

![Test board drawing showing pad and signal connections for SCI-114W and SCI-114F.]

NOTES

All dimension measurement units are in millimeters (mm). Electrical performance and typical values are measured at room temperature. For best results, ground plane directly beneath the device should be in the top metal layer.

Refer to “Appendix A” for:
- Pad sizes and typical wirebond length used in the wirebonded IPD products.
- Recommended solder thermal profile, landing pattern recommendation and bump specifications used in the flip chip IPD products.
(15) GSM Band Low Pass Filter (SCI-201 W/F)

FEATURES

- Passive integration on silicon substrate
- Low insertion loss in pass band
- Small size: 1.7 mm x 0.8 mm (wirebond)
  1.8 mm x 1.1 mm (flip chip)
- Pb-free solder bump
- Low profile: 0.25 mm height (wirebond)
  0.40 mm height (flip chip)
- Directly attachable on PCB or flipped on PCB
- Operating temperature: -40°C to +85°C
- Storage temperature: -40°C to +85°C

DESCRIPTION

STATS ChipPAC’s SCI-201W/F is a low pass filter (LPF) for GSM band applications. The LPF has low pass-band insertion loss and small size. It is composed of thick copper inductors and Metal-Insulator-Metal capacitors which are fabricated on a silicon substrate using our IPD (Integrated Passive Device) process. The pad or bump size and pitch of the LPF are selected so that the device can be mounted directly on a PCB or laminate substrate using conventional wirebonding or surface mount techniques. The low profile and small form-factor of the device make it especially suitable for SiP applications.

ELECTRICAL SPECIFICATIONS

<table>
<thead>
<tr>
<th>Specification</th>
<th>Unit</th>
<th>Min.</th>
<th>Typical</th>
<th>Max.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pass Band</td>
<td>MHz</td>
<td>824</td>
<td></td>
<td>915</td>
</tr>
<tr>
<td>Insertion Loss</td>
<td>dB</td>
<td></td>
<td>0.5</td>
<td></td>
</tr>
<tr>
<td>Return Loss</td>
<td>dB</td>
<td></td>
<td>20</td>
<td></td>
</tr>
<tr>
<td>Attenuation, 2f0</td>
<td>dB</td>
<td>20</td>
<td></td>
<td>30</td>
</tr>
<tr>
<td>Attenuation, 3f0</td>
<td>dB</td>
<td></td>
<td>25</td>
<td></td>
</tr>
<tr>
<td>Size</td>
<td>mm</td>
<td>1.7 x 0.8</td>
<td></td>
<td>1.8 x 1.1</td>
</tr>
</tbody>
</table>

DIMENSIONS

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TYPICAL CHARACTERISTICS

ASSEMBLY DRAWING / MECHANICAL OUTLINE

SCI-201W (Wirebond)  
SCI-201F (Flip Chip)

NOTES

All dimension measurement units are in millimeters (mm). Electrical performance and typical values are measured at room temperature. For best results, ground plane directly beneath the device should be in the top metal layer.

Refer to “Appendix A” for:

- Pad sizes and typical wirebond length used in the wirebonded IPD products.
- Recommended solder thermal profile, landing pattern recommendation and bump specifications used in the flip chip IPD products.
(16) DCS Band Low Pass Filter (SCI-202 W/F)

FEATURES

- Passive integration on silicon substrate
- Low insertion loss in pass band
- Small size: 1.5 mm x 0.8 mm (wirebond)
  1.6 mm x 1.0 mm (flip chip)
- Pb-free solder bump
- Low profile: 0.25 mm height (wirebond)
  0.40 mm height (flip chip)
- Directly attachable on PCB or flipped on PCB
- Operating temperature: -40°C to +85°C
- Storage temperature: -40°C to +85°C

DESCRIPTION

STATS ChipPAC's SCI-202W/F is a low pass filter (LPF) for DCS band applications. The LPF has low pass-band insertion loss and small size. It is composed of thick copper inductors and Metal-Insulator-Metal capacitors which are fabricated on a silicon substrate using our IPD (Integrated Passive Device) process. The pad or bump size and pitch of the LPF are selected so that the device can be mounted directly on a PCB or laminate substrate using conventional wire-bonding or surface mount techniques. The low profile and small form-factor of the device make it especially suitable for SiP applications.

ELECTRICAL SPECIFICATIONS

<table>
<thead>
<tr>
<th>Specification</th>
<th>Unit</th>
<th>Min.</th>
<th>Typical</th>
<th>Max.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pass Band</td>
<td>MHz</td>
<td>1710</td>
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<td>1980</td>
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<tr>
<td>Insertion Loss</td>
<td>dB</td>
<td>0.4</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Return Loss</td>
<td>dB</td>
<td>15</td>
<td></td>
<td>20</td>
</tr>
<tr>
<td>Attenuation, 2f0</td>
<td>dB</td>
<td>30</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Attenuation, 3f0</td>
<td>dB</td>
<td>30</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Size</td>
<td>mm</td>
<td>1.5 x 0.8 (WB)</td>
<td>1.6 x 1.0 (FC)</td>
<td></td>
</tr>
</tbody>
</table>

DIMENSIONS

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TYPICAL CHARACTERISTICS

ASSEMBLY DRAWING / MECHANICAL OUTLINE

SCI-202W (Wirebond) | SCI-202F (Flip Chip)

NOTES

All dimension measurement units are in millimeters (mm). Electrical performance and typical values are measured at room temperature. For best results, ground plane directly beneath the device should be in the top metal layer.

Refer to “Appendix A” for:
- Pad sizes and typical wirebond length used in the wirebonded IPD products.
- Recommended solder thermal profile, landing pattern recommendation and bump specifications used in the flip chip IPD products.
FEATURES

- Passive integration on silicon substrate
- Low insertion loss in pass band
- Small size: 1.0 mm x 1.2 mm (wirebond) 1.0 mm x 1.2 mm (flip chip)
- Eutectic Sn/Pb or lead-free solder bump
- Low profile, 0.40 mm height
- Directly attachable on PCB or flipped on PCB
- Operating temperature: -40 to +85 °C
- Storage temperature: -40 to +85 °C

DESCRIPTION

STATS ChipPAC’s SCI-203W/F is a low pass filter (LPF) for GSM band applications. The LPF has low pass-band insertion loss and small size. It is composed of 8.0 um Cu-plated inductors and Metal-Insulator-Metal capacitors which are fabricated on a silicon substrate using our IPD (Integrated Passive Device) process. The pad or bump size and pitch of the LPF are selected so that the device can be mounted directly on a PCB or laminate substrate using conventional wire-bonding or surface mount techniques. The low profile and small form-factor of the device make it especially suitable for SiP applications.

ELECTRICAL SPECIFICATIONS

(Test board loss 0.04 dB included)

<table>
<thead>
<tr>
<th>Specification</th>
<th>Unit</th>
<th>Minimum</th>
<th>Typical</th>
<th>Maximum</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pass Band</td>
<td>MHz</td>
<td>824</td>
<td></td>
<td>915</td>
</tr>
<tr>
<td>Insertion Loss</td>
<td>dB</td>
<td></td>
<td>0.6</td>
<td></td>
</tr>
<tr>
<td>Return Loss</td>
<td>dB</td>
<td>20</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Attenuation, 2f0</td>
<td>dB</td>
<td></td>
<td>20</td>
<td></td>
</tr>
<tr>
<td>Attenuation, 3f0</td>
<td>dB</td>
<td></td>
<td>20</td>
<td></td>
</tr>
<tr>
<td>Size</td>
<td>mm</td>
<td>1.0 x 1.2 (WB)</td>
<td>1.0 x 1.2 (FC)</td>
<td></td>
</tr>
</tbody>
</table>

DIMENSIONS

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TYPICAL CHARACTERISTICS

![Graphs of insertion and return loss vs. frequency.](image)

TEST BOARD DRAWING

**SCI-203W (Wirebond)**

**SCI-203F (Flip Chip)**

<table>
<thead>
<tr>
<th>Pad</th>
<th>SCI-203W Signal</th>
<th>SCI-203F Signal</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Input</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>GND</td>
<td>GND</td>
</tr>
<tr>
<td>3</td>
<td>Output</td>
<td>Input</td>
</tr>
<tr>
<td>4</td>
<td>GND</td>
<td>GND</td>
</tr>
<tr>
<td>5</td>
<td>GND</td>
<td>Output</td>
</tr>
</tbody>
</table>

NOTES

All dimension measurement units are in millimeters (mm). Electrical performance and typical values are measured at room temperature. For best results, ground plane directly beneath the device should be in the top metal layer.

Refer to “Appendix A” for:
- Pad sizes and typical wirebond length used in the wirebonded IPD products.
- Recommended solder thermal profile, landing pattern recommendation and bump specifications used in the flip chip IPD products.
(18) 802.11b/g Band Pass Filter (SCI-301 W/F)

FEATURES

- Passive integration on silicon substrate
- Low insertion loss in pass band
- Small size: 1.5 mm x 0.9 mm (wirebond)
  1.5 mm x 0.9 mm (flip chip)
- Pb-free solder bump
- Low profile: 0.25 mm height (wirebond)
  0.40 mm height (flip chip)
- Directly attachable on PCB or flipped on PCB
- Operating temperature: -40°C to +85°C
- Storage temperature: -40°C to +85°C

DESCRIPTION

STATS ChipPAC's SCI-301W/F is a band pass filter (BPF) for 802.11b/g band applications. The BPF has low pass–band insertion loss and small size. It is composed of thick copper inductors and Metal–Insulator–Metal capacitors which are fabricated on a silicon substrate using our IPD (Integrated Passive Device) process. The pad or bump size and pitch of the BPF are selected so that the device can be mounted directly on a PCB or laminate substrate using conventional wirebonding or surface mount techniques. The low profile and small form-factor of the device make it especially suitable for SiP applications.

ELECTRICAL SPECIFICATIONS

<table>
<thead>
<tr>
<th>Specification</th>
<th>Unit</th>
<th>Min.</th>
<th>Typical</th>
<th>Max.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pass Band</td>
<td>MHz</td>
<td>2400</td>
<td></td>
<td>2500</td>
</tr>
<tr>
<td>Insertion Loss</td>
<td>dB</td>
<td>2.0</td>
<td>2.2</td>
<td>2.4</td>
</tr>
<tr>
<td>Return Loss</td>
<td>dB</td>
<td>10</td>
<td></td>
<td>15</td>
</tr>
<tr>
<td>Attenuation, 900 MHz</td>
<td>dB</td>
<td></td>
<td>50</td>
<td></td>
</tr>
<tr>
<td>Attenuation, 1900 MHz</td>
<td>dB</td>
<td></td>
<td>30</td>
<td></td>
</tr>
<tr>
<td>Attenuation, 4800 MHz</td>
<td>dB</td>
<td></td>
<td>60</td>
<td></td>
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<td>Size</td>
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<td>1.5 x 0.9</td>
<td></td>
<td>1.5 x 0.90</td>
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</table>

DIMENSIONS

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TYPICAL CHARACTERISTICS

ASSEMBLY DRAWING / MECHANICAL OUTLINE

**SCI-301W (Wirebond)**

**SCI-301F (Flip Chip)**

<table>
<thead>
<tr>
<th>Pad</th>
<th>SCI-301W Signal</th>
<th>SCI-301F Signal</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Ground</td>
<td>Ground</td>
</tr>
<tr>
<td>2</td>
<td>Input</td>
<td>Output</td>
</tr>
<tr>
<td>3</td>
<td>Output</td>
<td>Input</td>
</tr>
<tr>
<td>4</td>
<td>Ground</td>
<td>Ground</td>
</tr>
</tbody>
</table>

NOTES

All dimension measurement units are in millimeters (mm). Electrical performance and typical values are measured at room temperature. For best results, ground plane directly beneath the device should be in the top metal layer.

Refer to “Appendix A” for:
- Pad sizes and typical wirebond length used in the wirebonded IPD products.
- Recommended solder thermal profile, landing pattern recommendation and bump specifications used in the flip chip IPD products.
FEATURES

- Passive integration on silicon substrate
- Low insertion loss in pass band
- Small size: 1.5 mm x 1.1 mm (wirebond)
  1.7 mm x 1.2 mm (flip chip)
- Pb-free solder bump
- Low profile: 0.25 mm height (wirebond)
  0.40 mm height (flip chip)
- Directly attachable on PCB or flipped on PCB
- Operating temperature: -40°C to +85°C
- Storage temperature: -40°C to +85°C

DESCRIPTION

STATS ChipPAC’s SCI-302W/F is a band pass filter (BPF) for 802.11b/g band applications. The BPF has low pass-band insertion loss and small size. It is composed of thick copper inductors and Metal-Insulator-Metal capacitors which are fabricated on a silicon substrate using our IPD (Integrated Passive Device) process. The pad or bump size and pitch of the BPF are selected so that the device can be mounted directly on a PCB or laminate substrate using conventional wirebonding or surface mount techniques. The low profile and small form-factor of the device make it especially suitable for SiP applications.

ELECTRICAL SPECIFICATIONS

<table>
<thead>
<tr>
<th>Specification</th>
<th>Unit</th>
<th>Min.</th>
<th>Typical</th>
<th>Max.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pass Band</td>
<td>MHz</td>
<td>2400</td>
<td>2500</td>
<td></td>
</tr>
<tr>
<td>Insertion Loss</td>
<td>dB</td>
<td>1.5</td>
<td>1.7</td>
<td></td>
</tr>
<tr>
<td>Return Loss</td>
<td>dB</td>
<td>20</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Attenuation, 900 MHz</td>
<td>dB</td>
<td>45</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Attenuation, 1900 MHz</td>
<td>dB</td>
<td>30</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Attenuation, 4800 MHz</td>
<td>dB</td>
<td>18</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Size</td>
<td>mm</td>
<td>1.5 x 1.1 (WB)</td>
<td>1.7 x 1.2 (FC)</td>
<td></td>
</tr>
</tbody>
</table>

DIMENSIONS

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TYPICAL CHARACTERISTICS

ASSEMBLY DRAWING / MECHANICAL OUTLINE

SCI-302W (Wirebond)  

SCI-302F (Flip Chip)

NOTES

All dimension measurement units are in millimeters (mm). Electrical performance and typical values are measured at room temperature. For best results, ground plane directly beneath the device should be in the top metal layer.

Refer to “Appendix A” for:
- Pad sizes and typical wirebond length used in the wirebonded IPD products.
- Recommended solder thermal profile, landing pattern recommendation and bump specifications used in the flip chip IPD products.
FEATURES

- Passive integration on silicon substrate
- Low insertion loss in pass band
- Small size: 1.3 mm x 0.9 mm (wirebond) 1.4 mm x 1.1 mm (flip chip)
- Pb-free solder bump
- Low profile: 0.25 mm height (wirebond) 0.40 mm height (flip chip)
- Directly attachable on PCB or flipped on PCB
- Operating temperature: -40°C to +85°C
- Storage temperature: -40°C to +85°C

DESCRIPTION

STATS ChipPAC’s SCI-303W/F is a band pass filter (BPF) for 802.11b/g band applications. The BPF has low pass–band insertion loss and small size. It is composed of thick copper inductors and Metal–Insulator–Metal capacitors which are fabricated on a silicon substrate using our IPD (Integrated Passive Device) process. The pad or bump size and pitch of the BPF are selected so that the device can be mounted directly on a PCB or laminate substrate using conventional wirebonding or surface mount techniques. The low profile and small form-factor of the device make it especially suitable for SiP applications.

ELECTRICAL SPECIFICATIONS

<table>
<thead>
<tr>
<th>Specification</th>
<th>Unit</th>
<th>Min.</th>
<th>Typical</th>
<th>Max.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pass Band</td>
<td>MHz</td>
<td>2400</td>
<td></td>
<td>2500</td>
</tr>
<tr>
<td>Insertion Loss</td>
<td>dB</td>
<td>1.9</td>
<td></td>
<td>2.3</td>
</tr>
<tr>
<td>Return Loss</td>
<td>dB</td>
<td>15</td>
<td></td>
<td>20</td>
</tr>
<tr>
<td>Attenuation, 900 MHz</td>
<td>dB</td>
<td></td>
<td>50</td>
<td></td>
</tr>
<tr>
<td>Attenuation, 1900 MHz</td>
<td>dB</td>
<td></td>
<td>35</td>
<td></td>
</tr>
<tr>
<td>Attenuation, 4800 MHz</td>
<td>dB</td>
<td></td>
<td>30</td>
<td></td>
</tr>
<tr>
<td>Size</td>
<td>mm</td>
<td>1.3 x 0.9 (WB)</td>
<td>1.4 x 1.1 (FC)</td>
<td></td>
</tr>
</tbody>
</table>

DIMENSIONS

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TYPICAL CHARACTERISTICS

![Insertion Loss Graph](image1)
![Return Loss Graph](image2)

ASSEMBLY DRAWING / MECHANICAL OUTLINE

**SCI-303W (Wirebond)**

- Pad 1: Ground
- Pad 2: Ground
- Pad 3: Ground
- Pad 4: Input
- Pad 5: Output

**SCI-303F (Flip Chip)**

- Pad 1: Ground
- Pad 2: Ground
- Pad 3: Ground
- Pad 4: Input
- Pad 5: Output

NOTES

All dimension measurement units are in millimeters (mm). Electrical performance and typical values are measured at room temperature. For best results, ground plane directly beneath the device should be in the top metal layer.

Refer to “Appendix A” for:

- Pad sizes and typical wirebond length used in the wirebonded IPD products.
- Recommended solder thermal profile, landing pattern recommendation and bump specifications used in the flip chip IPD products.
(21) 802.11b/g Band Pass Filter (SCI-304 W/F)

FEATURES

- Passive integration on silicon substrate
- Low insertion loss in pass band
- Small size: 1.5 mm x 1.0 mm (wirebond)
  1.6 mm x 1.2 mm (flip chip)
- Pb-free solder bump
- Low profile: 0.25 mm height (wirebond)
  0.40 mm height (flip chip)
- Directly attachable on PCB or flipped on PCB
- Operating temperature: -40°C to +85°C
- Storage temperature: -40°C to +85°C

DESCRIPTION

STATS ChipPAC's SCI-304W/F is a band pass filter (BPF) for 802.11b/g band applications. The BPF has low pass–band insertion loss and small size. It is composed of thick copper inductors and Metal–Insulator–Metal capacitors which are fabricated on a silicon substrate using our IPD (Integrated Passive Device) process. The pad or bump size and pitch of the BPF are selected so that the device can be mounted directly on a PCB or laminate substrate using conventional wirebonding or surface mount techniques. The low profile and small form-factor of the device make it especially suitable for SiP applications.

ELECTRICAL SPECIFICATIONS

<table>
<thead>
<tr>
<th>Specification</th>
<th>Unit</th>
<th>Min.</th>
<th>Typical</th>
<th>Max.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pass Band</td>
<td>MHz</td>
<td>2400</td>
<td>2500</td>
<td></td>
</tr>
<tr>
<td>Insertion Loss</td>
<td>dB</td>
<td>1.8</td>
<td>2.0</td>
<td>2.3</td>
</tr>
<tr>
<td>Return Loss</td>
<td>dB</td>
<td></td>
<td>10</td>
<td></td>
</tr>
<tr>
<td>Attenuation, 900 MHz</td>
<td>dB</td>
<td></td>
<td>35</td>
<td></td>
</tr>
<tr>
<td>Attenuation, 1900 MHz</td>
<td></td>
<td></td>
<td>30</td>
<td></td>
</tr>
<tr>
<td>Attenuation, 4800 MHz</td>
<td></td>
<td></td>
<td>30</td>
<td></td>
</tr>
<tr>
<td>Size</td>
<td>mm</td>
<td>1.5 x 1.0 (WB)</td>
<td>1.6 x 1.2 (FC)</td>
<td></td>
</tr>
</tbody>
</table>

DIMENSIONS

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TYPICAL CHARACTERISTICS

ASSEMBLY DRAWING / MECHANICAL OUTLINE

SCI-304W (Wirebond)          SCI-304F (Flip Chip)

<table>
<thead>
<tr>
<th>Pad</th>
<th>SCI-304W Signal</th>
<th>SCI-304F Signal</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Ground</td>
<td>Ground</td>
</tr>
<tr>
<td>2</td>
<td>Input</td>
<td>Output</td>
</tr>
<tr>
<td>3</td>
<td>Output</td>
<td>Input</td>
</tr>
<tr>
<td>4</td>
<td>Ground</td>
<td>Ground</td>
</tr>
</tbody>
</table>

NOTES

All dimension measurement units are in millimeters (mm). Electrical performance and typical values are measured at room temperature. For best results, ground plane directly beneath the device should be in the top metal layer.

Refer to “Appendix A” for:

- Pad sizes and typical wirebond length used in the wirebonded IPD products.
- Recommended solder thermal profile, landing pattern recommendation and bump specifications used in the flip chip IPD products.
FEATURES

- Passive integration on silicon substrate
- Low insertion loss in pass band
- Small size: 1.5 mm x 1.1 mm (wirebond)
  1.7 mm x 1.2 mm (flip chip)
- Pb-free solder bump
- Low profile: 0.25 mm height (wirebond)
  0.40 mm height (flip chip)
- Directly attachable on PCB or flipped on PCB
- Operating temperature: -40°C to +85°C
- Storage temperature: -40°C to +85°C

DESCRIPTION

STATS ChipPAC’s SCI-305W/F is a band pass filter (BPF) for 802.11b/g band applications. The BPF has low pass-band insertion loss and small size. It is composed of thick copper inductors and Metal-Insulator-Metal capacitors which are fabricated on a silicon substrate using our IPD (Integrated Passive Device) process. The pad or bump size and pitch of the BPF are selected so that the device can be mounted directly on a PCB or laminate substrate using conventional wirebonding or surface mount techniques. The low profile and small form-factor of the device make it especially suitable for SiP applications.

ELECTRICAL SPECIFICATIONS

<table>
<thead>
<tr>
<th>Specification</th>
<th>Unit</th>
<th>Min.</th>
<th>Typical</th>
<th>Max.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pass Band</td>
<td>MHz</td>
<td>2400</td>
<td></td>
<td>2500</td>
</tr>
<tr>
<td>Insertion Loss</td>
<td>dB</td>
<td>1.2</td>
<td></td>
<td>1.4</td>
</tr>
<tr>
<td>Return Loss</td>
<td>dB</td>
<td></td>
<td>20</td>
<td></td>
</tr>
<tr>
<td>Attenuation, 900 MHz</td>
<td>dB</td>
<td></td>
<td>60</td>
<td></td>
</tr>
<tr>
<td>Attenuation, 1900 MHz</td>
<td>dB</td>
<td></td>
<td>20</td>
<td></td>
</tr>
<tr>
<td>Attenuation, 4800 MHz</td>
<td>dB</td>
<td></td>
<td>20</td>
<td></td>
</tr>
<tr>
<td>Size</td>
<td>mm</td>
<td>1.5 x 1.1 (WB)</td>
<td>1.7 x 1.2 (FC)</td>
<td></td>
</tr>
</tbody>
</table>

DIMENSIONS

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TYPICAL CHARACTERISTICS

ASSEMBLY DRAWING / MECHANICAL OUTLINE

**SCI-305W (Wirebond)**

```
1  Input
2  Ground
3  Ground
4  Output
```

**SCI-305F (Flip Chip)**

```
1  Output
2  Input
3  Ground
```

NOTES

All dimension measurement units are in millimeters (mm). Electrical performance and typical values are measured at room temperature. For best results, ground plane directly beneath the device should be in the top metal layer.

Refer to “Appendix A” for:
- Pad sizes and typical wirebond length used in the wirebonded IPD products.
- Recommended solder thermal profile, landing pattern recommendation and bump specifications used in the flip chip IPD products.
(23) UWB Band Pass Filter (SCI-306W/F)

FEATURES
- Passive integration on silicon substrate
- Low insertion loss in pass band
- Small size: 1.4 mm x 1.2 mm (wirebond) 1.6 mm x 1.2 mm (flip chip)
- Eutectic Sn/Pb or lead-free solder bump
- Low profile, 0.4 mm height
- Directly attachable on PCB or flipped on PCB
- Operating temperature: -40 to +85 °C
- Storage temperature: -40 to +85 °C

DESCRIPTION
STATS ChipPAC’s SCI-306W/F is a band pass filter (BPF) for UWB band applications. The BPF has low pass–band insertion loss and small size. It is composed of 8.0 um Cu-plated inductors and Metal-Insulator-Metal capacitors which are fabricated on a silicon substrate using our IPD (Integrated Passive Device) process. The pad or bump size and pitch of the BPF are selected so that the device can be mounted directly on a PCB or laminate substrate using conventional wirebonding or surface mount techniques. The low profile and small form-factor of the device make it especially suitable for SiP applications.

ELECTRICAL SPECIFICATIONS
(Test board loss 0.2 dB included)

<table>
<thead>
<tr>
<th>Specification</th>
<th>Unit</th>
<th>Minimum</th>
<th>Wirebonding Typical (Bumped Typical)</th>
<th>Maximum</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pass Band</td>
<td>MHz</td>
<td>3000</td>
<td></td>
<td>5000</td>
</tr>
<tr>
<td>Insertion Loss</td>
<td>dB</td>
<td>2.5 (2.0)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Return Loss</td>
<td>dB</td>
<td>10 (12)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Attenuation, 900 MHz</td>
<td>dB</td>
<td>55 (45)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Attenuation, 1900 MHz</td>
<td>dB</td>
<td>25 (23)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Attenuation, 8000 - 20000 MHz</td>
<td>dB</td>
<td>10 (30)</td>
<td></td>
<td>50</td>
</tr>
<tr>
<td>Size</td>
<td>mm</td>
<td>1.4 x 1.2 (WB)</td>
<td>1.6 x 1.2 (FC)</td>
<td></td>
</tr>
</tbody>
</table>

DIMENSIONS

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TYPICAL CHARACTERISTICS

Insertion Loss (dB) vs. freq, GHz for Wire-bondable and Bumped configurations.

TEST BOARD DRAWING

SCI-306W (Wirebond)  SCI-306F (Flip Chip)

NOTES

All dimension measurement units are in millimeters (mm). Electrical performance and typical values are measured at room temperature. For best results, ground plane directly beneath the device should be in the top metal layer.

Refer to "Appendix A" for:

- Pad sizes and typical wirebond length used in the wirebonded IPD products.
- Recommended solder thermal profile, landing pattern recommendation and bump specifications used in the flip chip IPD products.
(24) **UWB Band Pass Filter (SCI-307F1/F2)**

**FEATURES**
- Passive integration on silicon substrate
- Low insertion loss in pass band
- Small size: 1.4 mm x 1.2 mm (wirebond) 1.6 mm x 1.2 mm (flip chip)
- Eutectic Sn/Pb or lead-free solder bump
- Low profile, 0.40 mm height
- Directly attachable on PCB or flipped on PCB
- Operating temperature: -40 to +85 °C
- Storage temperature: -40 to +85 °C

**DESCRIPTION**
STATS ChipPAC’s SCI-307F1/F2 is a band pass filter (BPF) for UWB band applications. The BPF has low pass–band insertion loss and small size. It is composed of 8.0 um Cu-plated inductors and Metal-Insulator-Metal capacitors which are fabricated on a silicon substrate using our IPD (Integrated Passive Device) process. The pad or bump size and pitch of the BPF are selected so that the device can be mounted directly on a PCB or laminate substrate using conventional wirebonding or surface mount techniques. The low profile and small form-factor of the device make it especially suitable for SiP applications.

**ELECTRICAL SPECIFICATIONS**

(Test board loss 0.5 dB included)

<table>
<thead>
<tr>
<th>Specification</th>
<th>Unit</th>
<th>Min.</th>
<th>Design #1 (Design #2)</th>
<th>Max.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pass Band</td>
<td>MHz</td>
<td>7000</td>
<td>9000</td>
<td></td>
</tr>
<tr>
<td>Insertion Loss</td>
<td>dB</td>
<td>1.7 (2.0)</td>
<td>2.4 (2.8)</td>
<td></td>
</tr>
<tr>
<td>Return Loss</td>
<td>dB</td>
<td>15 (12)</td>
<td>25</td>
<td></td>
</tr>
<tr>
<td>Attenuation, 900 MHz</td>
<td>dB</td>
<td>50 (30)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Attenuation, 1900 MHz</td>
<td>dB</td>
<td>50 (30)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Attenuation, 5500 MHz</td>
<td>dB</td>
<td>25 (38)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Attenuation, 12000-20000 MHz</td>
<td>dB</td>
<td>22 (20)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Size</td>
<td>mm</td>
<td>1.4 x 1.2</td>
<td>(1.6 x 1.2)</td>
<td></td>
</tr>
</tbody>
</table>

**DIMENSIONS**

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TYPICAL CHARACTERISTICS

![Graphs showing insertion loss and return loss for Bumped Design 1 and Bumped Design 2.](image)

TEST BOARD DRAWING

**SCI-307F1 (Flip Chip)**

<table>
<thead>
<tr>
<th>Pad</th>
<th>SCI-307F1 Signal</th>
<th>SCI-307F2 Signal</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>GND</td>
<td>GND</td>
</tr>
<tr>
<td>2</td>
<td>Input</td>
<td>Input</td>
</tr>
<tr>
<td>3</td>
<td>GND</td>
<td>NC</td>
</tr>
<tr>
<td>4</td>
<td>GND</td>
<td>GND</td>
</tr>
<tr>
<td>5</td>
<td>Output</td>
<td>Output</td>
</tr>
</tbody>
</table>

**SCI-307F2 (Flip Chip)**

NOTES

All dimension measurement units are in millimeters (mm). Electrical performance and typical values are measured at room temperature. For best results, ground plane directly beneath the device should be in the top metal layer.

Refer to “Appendix A” for:
- Pad sizes and typical wirebond length used in the wirebonded IPD products.
- Recommended solder thermal profile, landing pattern recommendation and bump specifications used in the flip chip IPD products.
(25) 802.11a Band Pass Filter (SCI-401 W/F)

**FEATURES**
- Passive integration on silicon substrate
- Low insertion loss in pass band
- Small size: 1.4 mm x 0.8 mm (wirebond)
  1.4 mm x 1.0 mm (flip chip)
- Pb-free solder bump
- Low profile: 0.25 mm height (wirebond)
  0.40 mm height (flip chip)
- Directly attachable on PCB or flipped on PCB
- Operating temperature: -40°C to +85°C
- Storage temperature: -40°C to +85°C

**DESCRIPTION**
STATS ChipPAC's SCI-401W/F is a band pass filter (BPF) for 802.11a band applications. The BPF has low pass-band insertion loss and small size. It is composed of thick copper inductors and Metal-Insulator-Metal capacitors which are fabricated on a silicon substrate using our IPD (Integrated Passive Device) process. The pad or bump size and pitch of the BPF are selected so that the device can be mounted directly on a PCB or laminate substrate using conventional wirebonding or surface mount techniques. The low profile and small form-factor of the device make it especially suitable for SiP applications.

**ELECTRICAL SPECIFICATIONS**

<table>
<thead>
<tr>
<th>Specification</th>
<th>Unit</th>
<th>Min.</th>
<th>Typical</th>
<th>Max.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pass Band</td>
<td>MHz</td>
<td>5115</td>
<td></td>
<td>5825</td>
</tr>
<tr>
<td>Insertion Loss</td>
<td>dB</td>
<td>1.4</td>
<td>2.0</td>
<td></td>
</tr>
<tr>
<td>Return Loss</td>
<td>dB</td>
<td></td>
<td>10.0</td>
<td></td>
</tr>
<tr>
<td>Attenuation, 2450 MHz</td>
<td>dB</td>
<td></td>
<td>35</td>
<td></td>
</tr>
<tr>
<td>Attenuation, 1100 MHz</td>
<td>dB</td>
<td></td>
<td>40</td>
<td></td>
</tr>
<tr>
<td>Size</td>
<td>mm</td>
<td>1.4 x 0.8 (WB)</td>
<td>1.4 x 1.0 (FC)</td>
<td></td>
</tr>
</tbody>
</table>

**DIMENSIONS**

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TYPICAL CHARACTERISTICS

ASSEMBLY DRAWING / MECHANICAL OUTLINE

SCI-401W (Wirebond)  SCI-401F (Flip Chip)

<table>
<thead>
<tr>
<th>Pad</th>
<th>SCI-401W Signal</th>
<th>SCI-401F Signal</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Ground</td>
<td>Ground</td>
</tr>
<tr>
<td>2</td>
<td>Input</td>
<td>Output</td>
</tr>
<tr>
<td>3</td>
<td>Output</td>
<td>Input</td>
</tr>
<tr>
<td>4</td>
<td>Ground</td>
<td>Ground</td>
</tr>
</tbody>
</table>

NOTES

All dimension measurement units are in millimeters (mm). Electrical performance and typical values are measured at room temperature. For best results, ground plane directly beneath the device should be in the top metal layer.

Refer to “Appendix A” for:
- Pad sizes and typical wirebond length used in the wirebonded IPD products.
- Recommended solder thermal profile, landing pattern recommendation and bump specifications used in the flip chip IPD products.
(26) 802.11a Band Pass Filter (SCI-402 W/F)

FEATURES
- Passive integration on silicon substrate
- Low insertion loss in pass band
- Small size: 1.4 mm x 1.1 mm (wirebond)
  1.5 mm x 1.2 mm (flip chip)
- Pb-free solder bump
- Low profile: 0.25 mm height (wirebond)
  0.40 mm height (flip chip)
- Directly attachable on PCB or flipped on PCB
- Operating temperature: -40°C to +85°C
- Storage temperature: -40°C to +85°C

DESCRIPTION
STATS ChipPAC's SCI-402W/F is a band pass filter (BPF) for 802.11a band applications. The BPF has low pass-band insertion loss and small size. It is composed of thick copper inductors and Metal-Insulator-Metal capacitors which are fabricated on a silicon substrate using our IPD (Integrated Passive Device) process. The pad or bump size and pitch of the BPF are selected so that the device can be mounted directly on a PCB or laminate substrate using conventional wirebonding or surface mount techniques. The low profile and small form-factor of the device make it especially suitable for SiP applications.

ELECTRICAL SPECIFICATIONS

<table>
<thead>
<tr>
<th>Specification</th>
<th>Unit</th>
<th>Min.</th>
<th>Typical</th>
<th>Max.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pass Band</td>
<td>MHz</td>
<td>5115</td>
<td></td>
<td>5825</td>
</tr>
<tr>
<td>Insertion Loss</td>
<td>dB</td>
<td>1.0</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Return Loss</td>
<td>dB</td>
<td></td>
<td>15</td>
<td></td>
</tr>
<tr>
<td>Attenuation, 2450 MHz</td>
<td>dB</td>
<td></td>
<td>40</td>
<td></td>
</tr>
<tr>
<td>Attenuation, 1100 MHz</td>
<td>dB</td>
<td></td>
<td>40</td>
<td></td>
</tr>
<tr>
<td>Size</td>
<td>mm</td>
<td>1.4 x 1.1 (WB)</td>
<td>1.5 x 1.2 (FC)</td>
<td></td>
</tr>
</tbody>
</table>

DIMENSIONS

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TYPICAL CHARACTERISTICS

ASSEMBLY DRAWING / MECHANICAL OUTLINE

SCI-402W (Wirebond)  
SCI-402F (Flip Chip)

NOTES

All dimension measurement units are in millimeters (mm). Electrical performance and typical values are measured at room temperature. For best results, ground plane directly beneath the device should be in the top metal layer.

Refer to “Appendix A” for:

- Pad sizes and typical wirebond length used in the wirebonded IPD products.
- Recommended solder thermal profile, landing pattern recommendation and bump specifications used in the flip chip IPD products.
(27) GSM-DCS Diplexer (SCI-501 W/F)

FEATURES

- Passive integration on silicon substrate
- Low insertion loss in pass band
- Small size: 2.1 mm x 1.0 mm (wirebond)
  2.0 mm x 1.3 mm (flip chip)
- Pb-free solder bump
- Low profile: 0.25 mm height (wirebond)
  0.40 mm height (flip chip)
- Directly attachable on PCB or flipped on PCB
- Operating temperature: -40°C to +85°C
- Storage temperature: -40°C to +85°C

DESCRIPTION

STATS ChipPAC's SCI-501W/F is a diplexer for GSM/DCS band applications. The diplexer has low pass-band insertion loss and small size. It is composed of thick copper inductors and Metal-Insulator-Metal capacitors which are fabricated on a silicon substrate using our IPD (Integrated Passive Device) process. The pad or bump size and pitch of the diplexer are selected so that the device can be mounted directly on a PCB or laminate substrate using conventional wirebonding or surface mount techniques. The low profile and small form-factor of the device make it especially suitable for SiP applications.

ELECTRICAL SPECIFICATIONS

<table>
<thead>
<tr>
<th>Specification</th>
<th>Unit</th>
<th>Min.</th>
<th>Typical</th>
<th>Max.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pass Band 1</td>
<td>MHz</td>
<td>824</td>
<td></td>
<td>915</td>
</tr>
<tr>
<td>Pass Band 2</td>
<td>MHz</td>
<td>1710</td>
<td></td>
<td>1980</td>
</tr>
<tr>
<td>Insertion Loss, Band 1</td>
<td>dB</td>
<td>0.5</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Insertion Loss, Band 2</td>
<td>dB</td>
<td>0.8</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Return Loss, Band 1</td>
<td>dB</td>
<td>20</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Return Loss, Band 2</td>
<td>dB</td>
<td>15</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Isolation, Band 1 at Band 2</td>
<td>dB</td>
<td>20</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Isolation, Band 2 at Band 1</td>
<td>dB</td>
<td>25</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Size</td>
<td>mm</td>
<td>2.1 x 1.0 (WB)</td>
<td>2.0 x 1.3 (FC)</td>
<td></td>
</tr>
</tbody>
</table>

DIMENSIONS
TYPICAL CHARACTERISTICS

ASSEMBLY DRAWING / MECHANICAL OUTLINE

SCI-501W (Wirebond)  
SCI-501F (Flip Chip)

NOTES

All dimension measurement units are in millimeters (mm). Electrical performance and typical values are measured at room temperature. For best results, ground plane directly beneath the device should be in the top metal layer.

Refer to “Appendix A” for:

- Pad sizes and typical wirebond length used in the wirebonded IPD products.
- Recommended solder thermal profile, landing pattern recommendation and bump specifications used in the flip chip IPD products.
FEATURES

- Passive integration on silicon substrate
- Low insertion loss in pass band
- Small size: 1.2 mm x 1.0 mm (wirebond)
  1.2 mm x 1.3 mm (flip chip)
- Pb-free solder bump
- Low profile: 0.25 mm height (wirebond)
  0.40 mm height (flip chip)
- Directly attachable on PCB or flipped on PCB
- Operating temperature: -40°C to +85°C
- Storage temperature: -40°C to +85°C

DESCRIPTION

STATS ChipPAC’s SCI-502W/F is a diplexer for WiFi band applications. The diplexer has low pass–band insertion loss and small size. It is composed of thick copper inductors and Metal-Insulator-Metal capacitors which are fabricated on a silicon substrate using our IPD (Integrated Passive Device) process. The pad or bump size and pitch of the diplexer are selected so that the device can be mounted directly on a PCB or laminate substrate using conventional wirebonding or surface mount techniques. The low profile and small form-factor of the device make it especially suitable for SiP applications.

ELECTRICAL SPECIFICATIONS

<table>
<thead>
<tr>
<th>Specification</th>
<th>Unit</th>
<th>Min.</th>
<th>Typical</th>
<th>Max.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pass Band 1</td>
<td>MHz</td>
<td>2400</td>
<td>2500</td>
<td></td>
</tr>
<tr>
<td>Pass Band 2</td>
<td>MHz</td>
<td>5115</td>
<td>5825</td>
<td></td>
</tr>
<tr>
<td>Insertion Loss, Band 1</td>
<td>dB</td>
<td>0.5</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Insertion Loss, Band 2</td>
<td>dB</td>
<td>0.5</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Return Loss, Band 1</td>
<td>dB</td>
<td>15</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Return Loss, Band 2</td>
<td>dB</td>
<td>15</td>
<td>20</td>
<td></td>
</tr>
<tr>
<td>Isolation, Band 1 at Band 2</td>
<td>dB</td>
<td>18</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Isolation, Band 2 at Band 1</td>
<td>dB</td>
<td>25</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Size</td>
<td>mm</td>
<td>1.2 x 1.0 (WB)</td>
<td>1.2 x 1.3 (FC)</td>
<td></td>
</tr>
</tbody>
</table>

DIMENSIONS

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## TYPICAL CHARACTERISTICS

![Graphs showing Insertion Loss and Return Loss over Frequency](image)

## ASSEMBLY DRAWING / MECHANICAL OUTLINE

### SCI-502W (Wirebond)

![Assembly drawing for SCI-502W](image)

### SCI-502F (Flip Chip)

![Assembly drawing for SCI-502F](image)

### Pad Table

<table>
<thead>
<tr>
<th>Pad</th>
<th>SCI-502W Signal</th>
<th>SCI-502F Signal</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Output-2 (Pass Band 2)</td>
<td>Output-1 (Pass Band 1)</td>
</tr>
<tr>
<td>2</td>
<td>Ground</td>
<td>Ground</td>
</tr>
<tr>
<td>3</td>
<td>Output-1 (Pass Band 1)</td>
<td>Output-2 (Pass Band 2)</td>
</tr>
<tr>
<td>4</td>
<td>Input</td>
<td>Ground</td>
</tr>
<tr>
<td>5</td>
<td>Ground</td>
<td>Input</td>
</tr>
<tr>
<td>6</td>
<td></td>
<td>Ground</td>
</tr>
</tbody>
</table>

## NOTES

All dimension measurement units are in millimeters (mm). Electrical performance and typical values are measured at room temperature. For best results, ground plane directly beneath the device should be in the top metal layer.

Refer to “Appendix A” for:

- Pad sizes and typical wirebond length used in the wirebonded IPD products.
- Recommended solder thermal profile, landing pattern recommendation and bump specifications used in the flip chip IPD products.
(29) WLAN Diplexer (SCI-503W/F)

FEATURES

- Passive integration on silicon substrate
- Low insertion loss in pass band
- Small size: 1.4 mm x 1.2 mm (wirebond)
  1.6 mm x 1.2 mm (flip chip)
- Eutectic Sn/Pb or lead-free solder bump
- Low profile, 0.40 mm height
- Directly attachable on PCB or flipped on PCB
- Operating temperature: -40 to +85 °C
- Storage temperature: -40 to +85 °C

DESCRIPTION

STATS ChipPAC’s SCI-503W/F is a diplexer for WiFi band applications. The diplexer has low pass-band insertion loss and small size. It is composed of 8.0 um Cu-plated inductors and Metal-Insulator-Metal capacitors which are fabricated on a silicon substrate using our IPD (Integrated Passive Device) process. The pad or bump size and pitch of the diplexer are selected so that the device can be mounted directly on a PCB or laminate substrate using conventional wirebonding or surface mount techniques. The low profile and small form-factor of the device make it especially suitable for SiP applications.

ELECTRICAL SPECIFICATIONS

(Test board loss 0.1 dB and 0.25 dB included)

<table>
<thead>
<tr>
<th>Specification</th>
<th>Unit</th>
<th>Minimum</th>
<th>Typical</th>
<th>Maximum</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pass Band 1</td>
<td>MHz</td>
<td>2400</td>
<td>2500</td>
<td></td>
</tr>
<tr>
<td>Pass Band 2</td>
<td>MHz</td>
<td>5115</td>
<td>5825</td>
<td></td>
</tr>
<tr>
<td>Insertion Loss, Band 1</td>
<td>dB</td>
<td>5.1</td>
<td>2.1</td>
<td></td>
</tr>
<tr>
<td>Insertion Loss, Band 2</td>
<td>dB</td>
<td>1.9</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Return Loss, Band 1</td>
<td>dB</td>
<td>15</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Return Loss, Band 2</td>
<td>dB</td>
<td>15</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Isolation, Band 1 at Band 2</td>
<td>dB</td>
<td>35</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Isolation, DC-1.7 GHz</td>
<td>dB</td>
<td>15</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Isolation, Band 2 at Band 1</td>
<td>dB</td>
<td>50</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Isolation, 6.9-10.0 GHz</td>
<td>dB</td>
<td>12</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Size</td>
<td>mm</td>
<td>1.4 x 1.2 (WB)</td>
<td></td>
<td>1.6 x 1.2 (FC)</td>
</tr>
</tbody>
</table>

DIMENSIONS

STATS ChipPAC makes no guarantee or warranty of its accuracy in the information given or that the use of such information will not infringe on the intellectual rights of third parties. Under no circumstances shall STATS ChipPAC be liable for any damages whatsoever arising out of the use of or inability to use the materials in this document. STATS ChipPAC reserves the right to change the information at any time and without notice.
TYPICAL CHARACTERISTICS

TEST BOARD DRAWING

**SCI-503W (Wirebond)**

**SCI-503F (Flip Chip)**

<table>
<thead>
<tr>
<th>Pad</th>
<th>SCI-503W Signal</th>
<th>SCI-503F Signal</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>GND</td>
<td>GND</td>
</tr>
<tr>
<td>2</td>
<td>2G Output</td>
<td>GND</td>
</tr>
<tr>
<td>3</td>
<td>GND</td>
<td>5G Output</td>
</tr>
<tr>
<td>4</td>
<td>GND</td>
<td>GND</td>
</tr>
<tr>
<td>5</td>
<td>5G Output</td>
<td>2G Output</td>
</tr>
<tr>
<td>6</td>
<td>GND</td>
<td>GND</td>
</tr>
<tr>
<td>7</td>
<td>GND</td>
<td>GND</td>
</tr>
<tr>
<td>8</td>
<td>Common Input</td>
<td>Common Input</td>
</tr>
</tbody>
</table>

NOTES

All dimension measurement units are in millimeters (mm). Electrical performance and typical values are measured at room temperature. For best results, ground plane directly beneath the device should be in the top metal layer.

Refer to “Appendix A” for:

- Pad sizes and typical wirebond length used in the wirebonded IPD products.
- Recommended solder thermal profile, landing pattern recommendation and bump specifications used in the flip chip IPD products.
**(30) WiMax Band Balanced Filter (SCI-601 W/F)**

**FEATURES**
- Passive integration on silicon substrate
- Low insertion loss in pass band
- Small size: 2.0 mm x 1.2 mm (wirebond)  
  2.0 mm x 1.2 mm (flip chip)
- Pb-free solder bump
- Low profile: 0.25 mm height (wirebond)  
  0.40 mm height (flip chip)
- Directly attachable on PCB or flipped on PCB
- Operating temperature: -40°C to +85°C
- Storage temperature: -40°C to +85°C

**DESCRIPTION**
STATS ChipPAC’s SCI-601W/F is a balanced filter for WiMax band applications. The IPD has low pass-band insertion loss and small size. It is composed of thick copper inductors and Metal-Insulator-Metal capacitors which are fabricated on a silicon substrate using our IPD (Integrated Passive Device) process. The pad or bump size and pitch of the IPD are selected so that the device can be mounted directly on a PCB or laminate substrate using conventional wirebonding or surface mount techniques. The low profile and small form-factor of the device make it especially suitable for SiP applications.

**ELECTRICAL SPECIFICATIONS**
*(Test board loss 0.1 dB included)*

<table>
<thead>
<tr>
<th>Specification</th>
<th>Unit</th>
<th>Min.</th>
<th>Typical</th>
<th>Max.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pass Band</td>
<td>MHz</td>
<td>2300</td>
<td>2700</td>
<td></td>
</tr>
<tr>
<td>Insertion Loss</td>
<td>dB</td>
<td>2.3</td>
<td>2.8</td>
<td></td>
</tr>
<tr>
<td>Return Loss</td>
<td>dB</td>
<td></td>
<td>15</td>
<td></td>
</tr>
<tr>
<td>Differential Impedance</td>
<td>Ohm</td>
<td></td>
<td>100</td>
<td></td>
</tr>
<tr>
<td>Amplitude Imbalance</td>
<td>dB</td>
<td></td>
<td>1.0</td>
<td></td>
</tr>
<tr>
<td>Phase Imbalance</td>
<td>deg</td>
<td></td>
<td>8.0</td>
<td></td>
</tr>
<tr>
<td>Attenuation, DC-1700 MHz</td>
<td>dB</td>
<td></td>
<td>29</td>
<td></td>
</tr>
<tr>
<td>Attenuation, 4000-10000 MHz</td>
<td>dB</td>
<td></td>
<td>19</td>
<td></td>
</tr>
<tr>
<td>Size</td>
<td>mm</td>
<td>2.0 x 1.2 (WB)</td>
<td>2.0 x 1.2 (FC)</td>
<td></td>
</tr>
</tbody>
</table>

**DIMENSIONS**

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TYPICAL CHARACTERISTICS

![Graphs of Insertion Loss, Return Loss, Amplitude Imbalance, and Phase Imbalance vs. Frequency.]

TEST BOARD DRAWING

**SCI-601W (Wirebond)**

- Pad 1: GND, Signal
- Pad 2: Unbalanced, GND
- Pad 3: GND, Balanced (-)
- Pad 4: Balanced (+), GND
- Pad 5: GND, Unbalanced
- Pad 6: Balanced (-), GND

**SCI-601F (Flip Chip)**

NOTES

All dimension measurement units are in millimeters (mm). Electrical performance and typical values are measured at room temperature. For best results, ground plane directly beneath the device should be in the top metal layer.

Refer to “Appendix A” for:
- Pad sizes and typical wirebond length used in the wirebonded IPD products.
- Recommended solder thermal profile, landing pattern recommendation and bump specifications used in the flip chip IPD products.
(31) **WiMax Band Balanced Filter (SCI-602 W/F)**

**FEATURES**
- Passive integration on silicon substrate
- Low insertion loss in pass band
- Small size: 1.6 mm x 1.2 mm (wirebond) 2.0 mm x 1.2 mm (flip chip)
- Pb-free solder bump
- Low profile: 0.25 mm height (wirebond) 0.40 mm height (flip chip)
- Directly attachable on PCB or flipped on PCB
- Operating temperature: -40°C to +85°C
- Storage temperature: -40°C to +85°C

**DESCRIPTION**

STATS ChipPAC’s SCI-602W/F is a balanced filter for WiMax band applications. The IPD has low pass-band insertion loss and small size. It is composed of thick copper inductors and Metal-Insulator-Metal capacitors which are fabricated on a silicon substrate using our IPD (Integrated Passive Device) process. The pad or bump size and pitch of the IPD are selected so that the device can be mounted directly on a PCB or laminate substrate using conventional wirebonding or surface mount techniques. The low profile and small form-factor of the device make it especially suitable for SiP applications.

**ELECTRICAL SPECIFICATIONS**

(Tests board loss 0.2 dB included)

<table>
<thead>
<tr>
<th>Specification</th>
<th>Unit</th>
<th>Min.</th>
<th>Typical</th>
<th>Max.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pass Band</td>
<td>MHz</td>
<td>3300</td>
<td>3900</td>
<td></td>
</tr>
<tr>
<td>Insertion Loss</td>
<td>dB</td>
<td></td>
<td>2.6</td>
<td></td>
</tr>
<tr>
<td>Return Loss</td>
<td>dB</td>
<td>15</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Differential Impedance</td>
<td>Ohm</td>
<td>100</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Amplitude Imbalance</td>
<td>dB</td>
<td></td>
<td>0.4</td>
<td></td>
</tr>
<tr>
<td>Phase Imbalance</td>
<td>deg</td>
<td></td>
<td>1.0</td>
<td></td>
</tr>
<tr>
<td>Attenuation, DC-2450 MHz</td>
<td>dB</td>
<td>30</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Attenuation, 4900-10000 MHz</td>
<td>dB</td>
<td>20</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Size</td>
<td>mm</td>
<td>1.6 x 1.2 (WB)</td>
<td>2.0 x 1.2 (FC)</td>
<td></td>
</tr>
</tbody>
</table>

**DIMENSIONS**

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TYPICAL CHARACTERISTICS

![Graphs showing Insertion Loss, Return Loss, Amplitude Imbalance, and Phase Imbalance vs. frequency.]

TEST BOARD DRAWING

**SCI-602W (Wirebond)**

- Pad 1: GND
- Pad 2: Unbalanced
- Pad 3: GND
- Pad 4: GND
- Pad 5: Balanced (+)
- Pad 6: Balanced (-)
- Pad 7: GND

**SCI-602F (Flip Chip)**

- Pad 1: GND
- Pad 2: Balanced (+)
- Pad 3: Balanced (-)
- Pad 4: Balanced (+)
- Pad 5: Unbalanced
- Pad 6: GND
- Pad 7: GND

NOTES

All dimension measurement units are in millimeters (mm). Electrical performance and typical values are measured at room temperature. For best results, ground plane directly beneath the device should be in the top metal layer.

Refer to “Appendix A” for:
- Pad sizes and typical wirebond length used in the wirebonded IPD products.
- Recommended solder thermal profile, landing pattern recommendation and bump specifications used in the flip chip IPD products.
(32) GSM Band Loss Pass Filter with Coupler (SCI-701 W/F)

FEATURES
- Passive integration on silicon substrate
- Low insertion loss in pass band
- Small size: 1.4 mm x 1.2 mm (wirebond)
  1.6 mm x 1.2 mm (flip chip)
- Pb-free solder bump
- Low profile: 0.25 mm height (wirebond)
  0.40 mm height (flip chip)
- Directly attachable on PCB or flipped on PCB
- Operating temperature: -40°C to +85°C
- Storage temperature: -40°C to +85°C

DESCRIPTION
STATS ChipPAC’s SCI-701W/F is a low pass filter with coupler for WiMax band applications. The IPD has low pass-band insertion loss and small size. It is composed of thick copper inductors and Metal-Insulator-Metal capacitors which are fabricated on a silicon substrate using our IPD (Integrated Passive Device) process. The pad or bump size and pitch of the IPD are selected so that the device can be mounted directly on a PCB or laminate substrate using conventional wirebonding or surface mount techniques. The low profile and small form-factor of the device make it especially suitable for SiP applications.

ELECTRICAL SPECIFICATIONS
(Test board loss 0.04 dB included)

<table>
<thead>
<tr>
<th>Specification</th>
<th>Unit</th>
<th>Min.</th>
<th>Typical</th>
<th>Max.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pass Band</td>
<td>MHz</td>
<td>824</td>
<td>915</td>
<td></td>
</tr>
<tr>
<td>Insertion Loss</td>
<td>dB</td>
<td>1.0</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Return Loss</td>
<td>dB</td>
<td>20</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Attenuation, 2f0</td>
<td>dB</td>
<td>30</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Attenuation, 3f0</td>
<td>dB</td>
<td>20</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Coupling Coefficient</td>
<td>dB</td>
<td>-20</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Directivity (S31-S32)</td>
<td>dB</td>
<td>20</td>
<td></td>
<td>30</td>
</tr>
<tr>
<td>Size</td>
<td>mm</td>
<td>1.4 x 1.2 (WB)</td>
<td>1.6 x 1.2 (FC)</td>
<td></td>
</tr>
</tbody>
</table>

DIMENSIONS

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TYPICAL CHARACTERISTICS

Insertion Loss (dB) vs. freq, GHz

Return Loss (dB) vs. freq, GHz

Coupling Coefficient (dB) vs. freq, MHz

Directivity (dB) vs. freq, MHz

TEST BOARD DRAWING

SCI-701W (Wirebond)  
SCI-701F (Flip Chip)

NOTES

All dimension measurement units are in millimeters (mm). Electrical performance and typical values are measured at room temperature. For best results, ground plane directly beneath the device should be in the top metal layer.

Refer to “Appendix A” for:
- Pad sizes and typical wirebond length used in the wirebonded IPD products.
- Recommended solder thermal profile, landing pattern recommendation and bump specifications used in the flip chip IPD products.
**DESCRIPTION**

STATS ChipPAC’s SCI-702W/F is a low pass filter with coupler for WiMax band applications. The IPD has low pass-band insertion loss and small size. It is composed of thick copper inductors and Metal-Insulator-Metal capacitors which are fabricated on a silicon substrate using our IPD (Integrated Passive Device) process. The pad or bump size and pitch of the IPD are selected so that the device can be mounted directly on a PCB or laminate substrate using conventional wirebonding or surface mount techniques. The low profile and small form-factor of the device make it especially suitable for SiP applications.

**FEATURES**

- Passive integration on silicon substrate
- Low insertion loss in pass band
- Small size: 1.0 mm x 1.2 mm (wirebond)
  1.4 mm x 1.2 mm (flip chip)
- Pb-free solder bump
- Low profile: 0.25 mm height (wirebond)
  0.4 mm height (flip chip)
- Directly attachable on PCB or flipped on PCB
- Operating temperature: -40°C to +85°C
- Storage temperature: -40°C to +85°C

**ELECTRICAL SPECIFICATIONS**

*(Test board loss 0.07 dB included)*

<table>
<thead>
<tr>
<th>Specification</th>
<th>Unit</th>
<th>Min.</th>
<th>Typical</th>
<th>Max.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pass Band</td>
<td>MHz</td>
<td>1710</td>
<td></td>
<td>1980</td>
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<tr>
<td>Insertion Loss</td>
<td>dB</td>
<td></td>
<td>0.9</td>
<td></td>
</tr>
<tr>
<td>Return Loss</td>
<td>dB</td>
<td>20</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Attenuation, 2f0</td>
<td>dB</td>
<td>25</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Attenuation, 3f0</td>
<td>dB</td>
<td>25</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Coupling Coefficient</td>
<td>dB</td>
<td>-20</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Directivity (S31-S32)</td>
<td>dB</td>
<td>12</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Size</td>
<td>mm</td>
<td>1.0 x 1.2 (WB)</td>
<td>1.4 x 1.2 (FC)</td>
<td></td>
</tr>
</tbody>
</table>

**DIMENSIONS**
TYPICAL CHARACTERISTICS

![Graphs showing Insertion Loss, Return Loss, Directivity, and Coupling Coefficient over frequency range.]

TEST BOARD DRAWING

**SCI-702W (Wirebond)**

**SCI-702F (Flip Chip)**

<table>
<thead>
<tr>
<th>Pad</th>
<th>SCI-702W Signal</th>
<th>SCI-702F Signal</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>GND</td>
<td>Coupling</td>
</tr>
<tr>
<td>2</td>
<td>GND</td>
<td>Output</td>
</tr>
<tr>
<td>3</td>
<td>GND</td>
<td>GND</td>
</tr>
<tr>
<td>4</td>
<td>Output</td>
<td>GND</td>
</tr>
<tr>
<td>5</td>
<td>Coupling</td>
<td>NC</td>
</tr>
<tr>
<td>6</td>
<td>GND</td>
<td>Input</td>
</tr>
<tr>
<td>7</td>
<td>GND</td>
<td>GND</td>
</tr>
<tr>
<td>8</td>
<td>Input</td>
<td>GND</td>
</tr>
</tbody>
</table>

NOTES

All dimension measurement units are in millimeters (mm). Electrical performance and typical values are measured at room temperature. For best results, ground plane directly beneath the device should be in the top metal layer.

Refer to “Appendix A” for:

- Pad sizes and typical wirebond length used in the wirebonded IPD products.
- Recommended solder thermal profile, landing pattern recommendation and bump specifications used in the flip chip IPD products.
**(34) 802.11b Band Power Divider (SCI-801 W/F)**

**FEATURES**
- Passive integration on silicon substrate
- Low insertion loss in pass band
- Small size: 1.4 mm x 1.2 mm (wirebond)
  1.4 mm x 1.2 mm (flip chip)
- Pb-free solder bump
- Low profile: 0.25 mm height (wirebond)
  0.40 mm height (flip chip)
- Directly attachable on PCB or flipped on PCB
- Operating temperature: -40°C to +85°C
- Storage temperature: -40°C to +85°C

**DESCRIPTION**
STATS ChipPAC’s SCI-801W/F is a power divider for 802.11b band applications. The IPD has low pass-band insertion loss and small size. It is composed of thick copper inductors and Metal-Insulator-Metal capacitors which are fabricated on a silicon substrate using our IPD (Integrated Passive Device) process. The pad or bump size and pitch of the IPD are selected so that the device can be mounted directly on a PCB or laminate substrate using conventional wirebonding or surface mount techniques. The low profile and small form-factor of the device make it especially suitable for SiP applications.

**ELECTRICAL SPECIFICATIONS**
*(Test board loss 0.1 dB included)*

<table>
<thead>
<tr>
<th>Specification</th>
<th>Unit</th>
<th>Min.</th>
<th>Typical</th>
<th>Max.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pass Band</td>
<td>MHz</td>
<td>2400</td>
<td></td>
<td>2500</td>
</tr>
<tr>
<td>Insertion Loss</td>
<td>dB</td>
<td></td>
<td>0.5</td>
<td></td>
</tr>
<tr>
<td>Return Loss</td>
<td>dB</td>
<td>15</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Isolation (S23)</td>
<td>dB</td>
<td></td>
<td>-30</td>
<td></td>
</tr>
<tr>
<td>Amplitude Imbalance (S21-S31)</td>
<td>dB</td>
<td></td>
<td>0.1</td>
<td></td>
</tr>
<tr>
<td>Size</td>
<td>mm</td>
<td>1.4 x 1.2 (WB)</td>
<td>1.4 x 1.2 (FC)</td>
<td></td>
</tr>
</tbody>
</table>

**DIMENSIONS**
TYPICAL CHARACTERISTICS

![Graphs showing typical characteristics such as insertion loss, return loss, isolation, and imbalance.]

TEST BOARD DRAWING

**SCI-801W (Wirebond)**
![Test board diagram for SCI-801W (Wirebond)]

**SCI-801F (Flip Chip)**
![Test board diagram for SCI-801F (Flip Chip)]

<table>
<thead>
<tr>
<th>Pad</th>
<th>SCI-801W Signal</th>
<th>SCI-801F Signal</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Output 1</td>
<td>Output 1</td>
</tr>
<tr>
<td>2</td>
<td>GND</td>
<td>GND</td>
</tr>
<tr>
<td>3</td>
<td>Input</td>
<td>Input</td>
</tr>
<tr>
<td>4</td>
<td>GND</td>
<td>GND</td>
</tr>
<tr>
<td>5</td>
<td>Output 2</td>
<td>Output 2</td>
</tr>
<tr>
<td>6</td>
<td>GND</td>
<td></td>
</tr>
</tbody>
</table>

NOTES

All dimension measurement units are in millimeters (mm). Electrical performance and typical values are measured at room temperature. For best results, ground plane directly beneath the device should be in the top metal layer.

Refer to “Appendix A” for:
- Pad sizes and typical wirebond length used in the wirebonded IPD products.
- Recommended solder thermal profile, landing pattern recommendation and bump specifications used in the flip chip IPD products.
(35) 802.11a Band Power Divider (SCI-802 W/F)

FEATURES
- Passive integration on silicon substrate
- Low insertion loss in pass band
- Small size: 1.0 mm x 1.2 mm (wirebond)
  1.2 mm x 1.2 mm (flip chip)
- Pb-free solder bump
- Low profile: 0.25 mm height (wirebond)
  0.40 mm height (flip chip)
- Directly attachable on PCB or flipped on PCB
- Operating temperature: -40°C to +85°C
- Storage temperature: -40°C to +85°C

DESCRIPTION
STATS ChipPAC’s SCI-802W/F is a power divider for 802.11a band applications. The IPD has low pass-band insertion loss and small size. It is composed of thick copper inductors and Metal-Insulator-Metal capacitors which are fabricated on a silicon substrate using our IPD (Integrated Passive Device) process. The pad or bump size and pitch of the IPD are selected so that the device can be mounted directly on a PCB or laminate substrate using conventional wirebonding or surface mount techniques. The low profile and small form factor of the device make it especially suitable for SiP applications.

ELECTRICAL SPECIFICATIONS
(Test board loss 0.25 dB included)

<table>
<thead>
<tr>
<th>Specification</th>
<th>Unit</th>
<th>Min.</th>
<th>Typical</th>
<th>Max.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pass Band</td>
<td>MHz</td>
<td>4900</td>
<td>5900</td>
<td></td>
</tr>
<tr>
<td>Insertion Loss</td>
<td>dB</td>
<td>0.7</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Return Loss</td>
<td>dB</td>
<td>12</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Isolation (S23)</td>
<td>dB</td>
<td>20</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Amplitude Imbalance (S21-S31)</td>
<td>dB</td>
<td></td>
<td>0.1</td>
<td></td>
</tr>
<tr>
<td>Size</td>
<td>mm</td>
<td>1.0 x 1.2 (WB)</td>
<td>1.2 x 1.2 (FC)</td>
<td></td>
</tr>
</tbody>
</table>

DIMENSIONS

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TYPICAL CHARACTERISTICS

![Graphs showing typical characteristics](image)

TEST BOARD DRAWING

**SCI-802W (Wirebond)**

**SCI-802F (Flip Chip)**

<table>
<thead>
<tr>
<th>Pad</th>
<th>SCI-802W Signal</th>
<th>SCI-802F Signal</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>GND</td>
<td>Output 1</td>
</tr>
<tr>
<td>2</td>
<td>Input</td>
<td>GND</td>
</tr>
<tr>
<td>3</td>
<td>GND</td>
<td>GND</td>
</tr>
<tr>
<td>4</td>
<td>GND</td>
<td>Input</td>
</tr>
<tr>
<td>5</td>
<td>Output 1</td>
<td>GND</td>
</tr>
<tr>
<td>6</td>
<td>Output 2</td>
<td>GND</td>
</tr>
<tr>
<td>7</td>
<td>GND</td>
<td>Output 2</td>
</tr>
</tbody>
</table>

NOTES

All dimension measurement units are in millimeters (mm). Electrical performance and typical values are measured at room temperature. For best results, ground plane directly beneath the device should be in the top metal layer.

Refer to “Appendix A” for:
- Pad sizes and typical wirebond length used in the wirebonded IPD products.
- Recommended solder thermal profile, landing pattern recommendation and bump specifications used in the flip chip IPD products.
**STATS ChipPAC’s SCI-901W/F is a balun with coupler for GSM band applications. The IPD has low pass-band insertion loss and small size. It is composed of thick copper inductors and Metal-Insulator-Metal capacitors which are fabricated on a silicon substrate using our IPD (Integrated Passive Device) process. The pad or bump size and pitch of the IPD are selected so that the device can be mounted directly on a PCB or laminate substrate using conventional wirebonding or surface mount techniques. The low profile and small form-factor of the device make it especially suitable for SiP applications.**

**DESCRIPTION**

**FEATURES**

- Passive integration on silicon substrate
- Low insertion loss in pass band
- Small size: 1.6 mm x 1.2 mm (wirebond)
  2.0 mm x 1.2 mm (flip chip)
- Pb-free solder bump
- Low profile: 0.25 mm height (wirebond)
  0.40 mm height (flip chip)
- Directly attachable on PCB or flipped on PCB
- Operating temperature: -40°C to +85°C
- Storage temperature: -40°C to +85°C

**ELECTRICAL SPECIFICATIONS**

*Test board loss 0.04 dB included*

<table>
<thead>
<tr>
<th>Specification</th>
<th>Unit</th>
<th>Min.</th>
<th>Typical</th>
<th>Max.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pass Band</td>
<td>MHz</td>
<td>824</td>
<td>915</td>
<td></td>
</tr>
<tr>
<td>Insertion Loss</td>
<td>dB</td>
<td>1.1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Return Loss</td>
<td>dB</td>
<td>15</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Differential Impedance</td>
<td>Ohm</td>
<td>100</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Amplitude Imbalance</td>
<td>dB</td>
<td>0.3</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Phase Imbalance</td>
<td>deg</td>
<td>6.0</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Coupling Coefficient</td>
<td>dB</td>
<td>.20</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Directivity</td>
<td>dB</td>
<td>20</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Size</td>
<td>mm</td>
<td>1.6 x 1.2 (WB)</td>
<td>2.0 x 1.2 (FC)</td>
<td></td>
</tr>
</tbody>
</table>

**DIMENSIONS**

---

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TYPICAL CHARACTERISTICS

Insertion Loss (dB) vs. freq, GHz

Return Loss (dB) vs. freq, GHz

Phase Imbalance (dB) vs. freq, MHz

Amplitude Imbalance (dB) vs. freq, MHz

Coupling Coefficient (dB) vs. freq, MHz

Directivity (dB) vs. freq, MHz

TEST BOARD DRAWING

SCI-901W (Wirebond)      SCI-901F (Flip Chip)

NOTES

All dimension measurement units are in millimeters (mm). Electrical performance and typical values are measured at room temperature. For best results, ground plane directly beneath the device should be in the top metal layer.

Refer to “Appendix A” for:
- Pad sizes and typical wirebond length used in the wirebonded IPD products.
- Recommended solder thermal profile, landing pattern recommendation and bump specifications used in the flip chip IPD products.
(37) DCS Band Balun with Coupler (SCI-902 W/F)

FEATURES
- Passive integration on silicon substrate
- Low insertion loss in pass band
- Small size: 1.4 mm x 1.2 mm (wirebond)
  1.6 mm x 1.2 mm (flip chip)
- Pb-free solder bump
- Low profile: 0.25 mm height (wirebond)
  0.40 mm height (flip chip)
- Directly attachable on PCB or flipped on PCB
- Operating temperature: -40°C to +85°C
- Storage temperature: -40°C to +85°C

DESCRIPTION
STATS ChipPAC’s SCI-902W/F is a balun with coupler for DCS band applications. The IPD has low pass-band insertion loss and small size. It is composed of thick copper inductors and Metal-Insulator-Metal capacitors which are fabricated on a silicon substrate using our IPD (Integrated Passive Device) process. The pad or bump size and pitch of the IPD are selected so that the device can be mounted directly on a PCB or laminate substrate using conventional wirebonding or surface mount techniques. The low profile and small form factor of the device make it especially suitable for SiP applications.

ELECTRICAL SPECIFICATIONS
(Test board loss 0.07 dB included)

<table>
<thead>
<tr>
<th>Specification</th>
<th>Unit</th>
<th>Min.</th>
<th>Typical</th>
<th>Max.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pass Band</td>
<td>MHz</td>
<td>1710</td>
<td>1980</td>
<td></td>
</tr>
<tr>
<td>Insertion Loss</td>
<td>dB</td>
<td>1.7</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Return Loss</td>
<td>dB</td>
<td>10</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Differential Impedance</td>
<td>Ohm</td>
<td>100</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Amplitude Imbalance</td>
<td>dB</td>
<td>0.2</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Phase Imbalance</td>
<td>deg</td>
<td>4.0</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Coupling Coefficient</td>
<td>dB</td>
<td>-22</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Directivity</td>
<td>dB</td>
<td>12</td>
<td>28</td>
<td></td>
</tr>
<tr>
<td>Size</td>
<td>mm</td>
<td>1.4 x 1.2 (WB)</td>
<td>1.6 x 1.2 (FC)</td>
<td></td>
</tr>
</tbody>
</table>

DIMENSIONS

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TYPICAL CHARACTERISTICS

**Insertion Loss (dB)**

**Return Loss (dB)**

**Amplitude Imbalance (dB)**

**Phase Imbalance (dB)**

**Coupling Coefficient (dB)**

**Directivity (dB)**

**TEST BOARD DRAWING**

**SCI-902W (Wirebond)**

**SCI-902F (Flip Chip)**

<table>
<thead>
<tr>
<th>Pad</th>
<th>SCI-902W Signal</th>
<th>SCI-902F Signal</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>GND</td>
<td>Balanced (+)</td>
</tr>
<tr>
<td>2</td>
<td>GND</td>
<td>GND</td>
</tr>
<tr>
<td>3</td>
<td>Unbalanced</td>
<td>Balanced (-)</td>
</tr>
<tr>
<td>4</td>
<td>Coupling</td>
<td>Coupling</td>
</tr>
<tr>
<td>5</td>
<td>Balanced (+)</td>
<td>Unbalanced</td>
</tr>
<tr>
<td>6</td>
<td>GND</td>
<td>GND</td>
</tr>
<tr>
<td>7</td>
<td>Balanced (-)</td>
<td></td>
</tr>
</tbody>
</table>

**NOTES**

All dimension measurement units are in millimeters (mm). Electrical performance and typical values are measured at room temperature. For best results, ground plane directly beneath the device should be in the top metal layer.

Refer to “Appendix A” for:

- Pad sizes and typical wirebond length used in the wirebonded IPD products.
- Recommended solder thermal profile, landing pattern recommendation and bump specifications used in the flip chip IPD products.
APPENDIX A

WIREBONDED IPD PRODUCTS

<table>
<thead>
<tr>
<th>Pad Type</th>
<th>Pad</th>
<th>Area (mm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Square</td>
<td></td>
<td>0.09 x 0.09</td>
</tr>
<tr>
<td>3 wirebond rectangular - type A</td>
<td></td>
<td>0.09 x 0.29</td>
</tr>
<tr>
<td>3 wirebond rectangular - type B</td>
<td></td>
<td>0.29 x 0.09</td>
</tr>
<tr>
<td>2 wirebond rectangular - type A (for SCI-5xx W only)</td>
<td></td>
<td>0.16 x 0.07</td>
</tr>
<tr>
<td>2 wirebond rectangular - type B</td>
<td></td>
<td>0.19 x 0.09</td>
</tr>
</tbody>
</table>

Note: Typical wirebond length is 0.700 mm.

FLIP CHIP IPD PRODUCTS

For bumped IPD products, typical solder thermal reflow profile, landing pattern and nominal bump dimensions are listed below.

Solder Reflow Thermal Profile

Landing Pattern Recommendation (for bump diameter of 0.210 mm)

<table>
<thead>
<tr>
<th>Pad Definition</th>
<th>SMD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Copper Pad Diameter (d1)</td>
<td>0.280 mm</td>
</tr>
<tr>
<td>Solder Mask Opening (d2)</td>
<td>0.180 mm</td>
</tr>
</tbody>
</table>

Nominal Bump Dimensions

<table>
<thead>
<tr>
<th>Diameter</th>
<th>0.210 mm</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bump Standoff Height</td>
<td>0.130 mm</td>
</tr>
</tbody>
</table>