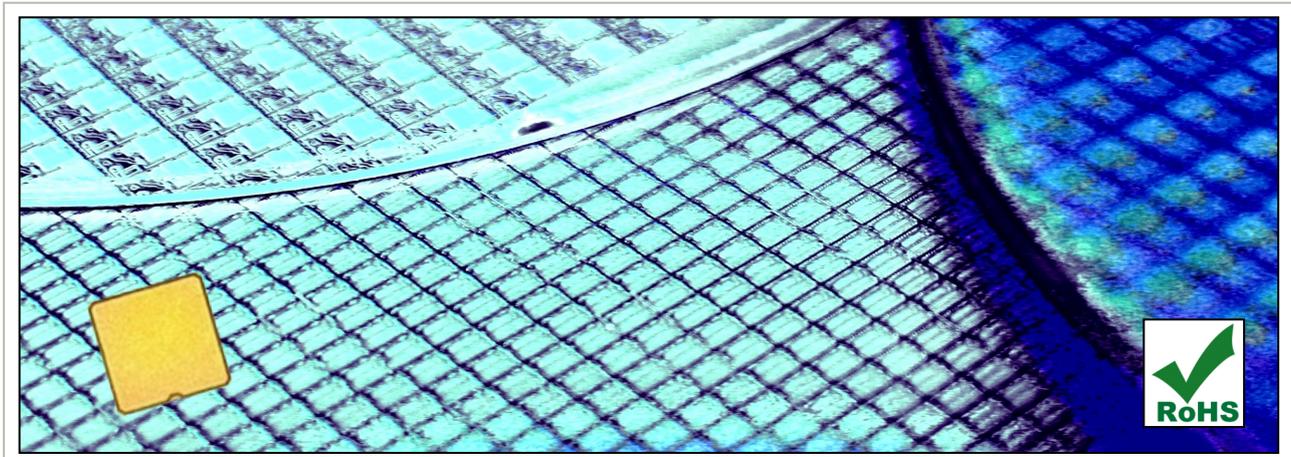


UWSC – 26 GHz+ Ultra large-band Wire bondable Silicon Capacitor – Wire Bondable Vertical

Rev 1.8



Key Features

- Ultra large-band performance up to 26 GHz+
- Resonance free
- Phase stability
- Unique capacitance value of 1 nF in 0101
- Ultra high stability of capacitance value over:
 - Temperature < 50 ppm/°C (-55°C to +150°C)
 - Voltage < 0.02 %/V
 - Aging < 0.001%/1000 hours
- Ultra low ESR and ESL
- High reliability (FIT < 0.017 parts/billion hours)
- Compatible with standard wire bonding assembly (ball and wedge)*

* Please refer to our Assembly Application Note for more details

Key Applications

- Optoelectronics/high-speed data
- Trans-Impedance Amplifiers (TIA)
- Receive-and-Transmit Optical Sub-Assembly (ROSA/TOSA)
- Synchronous Optical Networking (SONET)
- High speed digital logic
- Broadband test equipment
- Broadband microwave/millimeter wave
- Replacement of X7R and NP0 capacitors
- Low profile applications (250 µm, 100 µm on request)

UWSC Capacitors target **optical communication systems** (ROSA/TOSA, SONET and all optoelectronics) as well as **high speed data systems** or products. The UWSC are designed for DC decoupling and bypass applications. The unique technology of integrated passive devices in silicon developed by IPDiA, offers **high rejection at frequencies higher than 26 GHz**. The UWSC capacitors are manufactured with both deep trench and MOS semiconductor processes to cover low and high capacitance requirements.

The UWSC capacitors provide **very high reliability** and capacitance stability over temperature ($\pm 0.5\%$) and voltage. They have an extended operating temperature range from -55 to 150°C. **Reliable and repeatable performances** are obtained thanks to a fully controlled production line with high temperature curing (above 900°C) generating a highly pure oxide. These capacitors are compatible with standard wire bonding assembly (ball and wedge). They are RoHS-compliant and are available with thick gold terminations.

Electrical Specifications

| Part number | Product description | Case Size | Thickness |
|-----------------|--|-----------|-----------|
| UWSC.xxx | Ultra large-band Wire bondable vertical Si Capacitor, from -55 to 150°C, 26 GHz+ with Gold termination | | |
| 935 153 624 522 | UWSC, 22 nF/0504/BV50 250 µm | 0504 | 250 µm |
| 935 153 620 510 | UWSC, 10 nF/0303/BV50 250 µm | 0303 | 250 µm |
| 935 153 821 510 | UWSC, 10 nF/0202/BV30 250 µm | 0202 | 250 µm |
| 935 153 521 410 | UWSC, 1 nF/0202/BV150 250 µm | 0202 | 250 µm |
| 935 153 622 410 | UWSC, 1 nF/0101/BV50 250 µm | 0101 | 250 µm |
| 935 153 822 410 | UWSC, 1 nF/0101/BV30 250 µm | 0101 | 250 µm |
| 935 153 521 310 | UWSC, 100 pF/0202/BV150 250 µm | 0202 | 250 µm |
| 935 153 522 310 | UWSC, 100 pF/0101/BV150 250 µm | 0101 | 250 µm |
| 935 153 528 247 | UWSC, 47 pF/0201/BV150 250 µm | 0201 | 250 µm |
| 935 154 620 510 | Low profile UWSC, 10 nF/0303/BV50 100 µm | 0303 | 100 µm |
| 935 154 821 510 | Low profile UWSC, 10 nF/0202/BV30 100 µm | 0202 | 100 µm |
| 935 154 521 410 | Low profile UWSC, 1 nF/0202/BV150 100 µm | 0202 | 100 µm |
| 935 154 622 410 | Low profile UWSC, 1 nF/0101/BV50 100 µm | 0101 | 100 µm |
| 935 154 822 410 | Low profile UWSC, 1 nF/0101/BV30 100 µm | 0101 | 100 µm |
| 935 154 521 310 | Low profile UWSC, 100 pF/0202/BV150 100 µm | 0202 | 100 µm |
| 935 154 522 310 | Low profile UWSC, 100 pF/0101/BV150 100 µm | 0101 | 100 µm |
| 935 154 528 247 | Low profile UWSC, 47 pF/0201/BV150 100 µm | 0201 | 100 µm |

| Parameters | Value |
|---|--|
| Capacitance range | 10 pF to 100 nF ^(**) |
| Capacitance tolerance | ± 15 % ^(**) |
| Operating temperature range | -55 °C to 150 °C |
| Storage temperature | -70 °C to 165 °C |
| Temperature coefficient | 50 ppm/°C from -55 °C to +150 °C |
| Breakdown voltage (BV) | 11, 30, 50, 150, 450 V ^(**) |
| Capacitance variation versus RVDC | 0.02 %/V (from 0 V to RVDC) |
| Equivalent Series Inductance (ESL) | typ 6 pH ^(**) @SRF |
| Equivalent Series Resistance (ESR) | typ. 14 mΩ ^(**) |
| Insulation resistance | 100 GΩ min @ RVDC & +25 °C |
| Aging | Negligible, < 0.001 % / 1000 h |
| Reliability | FIT<0.017 parts / billion hours |
| Capacitor height | Max 250 µm or 100 µm |

(**) Other values on request

(***) e.g. 10 nF/0303/BV 50 V

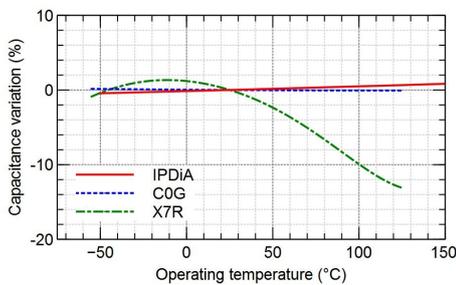


Fig.1: Capacitance variation vs temperature (for UWSC and MLCC technologies)

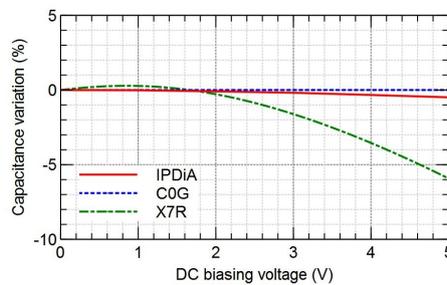


Fig.2: Capacitance variation vs DC biasing voltage (for UWSC and MLCC technologies)

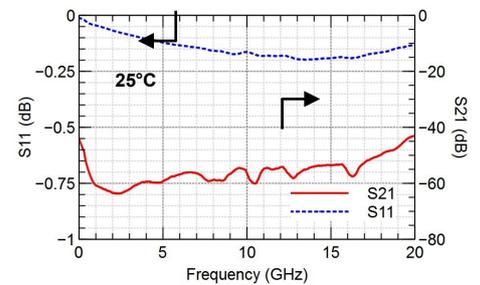
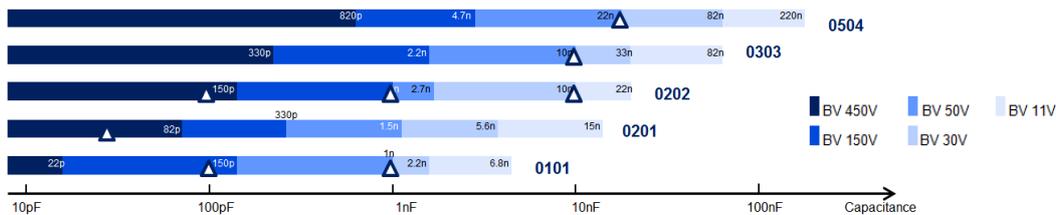


Fig.3: 10 nF/0303 UWSC measurement results (S-parameters in shunt mode)

UWSC Capacitance Range



△ Available parts – see table above. For other values, contact your IPDiA sales representative.

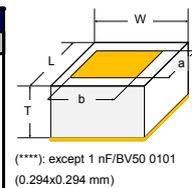
Termination and Outline

Termination

Can be directly mounted on the PCB using die bonding and wire bonding. Bottom electrode in Ti/Ni/Au and top electrode in Gold. Other top finishings available on request (ex: Min 3 µm Al/Si/Cu: 98.96%/1%/0.04%). Compatible with standard wire bonding.

Package Outline

| (mm) | Pad dimension | | Case size (typ. ±0.01 mm) | | |
|------|---------------|-------|---------------------------|------------------------|---|
| | a | b | L | W | T |
| 0101 | >0.15 | >0.15 | 0.25 ^(****) | 0.25 ^(****) | 0.25 (standard profile) or 0.10 (low profile) |
| 0201 | >0.40 | >0.15 | 0.50 | 0.25 | |
| 0202 | >0.40 | >0.40 | 0.50 | 0.50 | |
| 0303 | >0.70 | >0.70 | 0.80 | 0.80 | |
| 0404 | >0.94 | >0.94 | 1.04 | 1.04 | |
| 0503 | >1.17 | >0.72 | 1.27 | 0.82 | |
| 0504 | >1.28 | >0.92 | 1.38 | 1.02 | |



Packaging

Tape and reel, waffle pack, film frame carrier or raw wafer delivery.

Assembly by Wirebonding

The attachment techniques recommended by IPDiA for the UWSC capacitors on the customers substrates are fully detailed in specific documents available on our website. To assure the correct use and proper functioning of IPDiA capacitors **please download the assembly instructions on www.ipdia.com/assembly and read them carefully.**



Please download the assembly instructions
on www.ipdia.com/assembly
and read them carefully before use.

在使用IPDiA电容之前请从
www.ipdia.com/assembly
网站上下载电容安装说明并仔细阅读。

For UWSC assembly instructions,
please go to:
www.ipdia.com/assembly and
download the pdf file called '**UWSC
Capacitors - Assembly by
Wirebonding**'