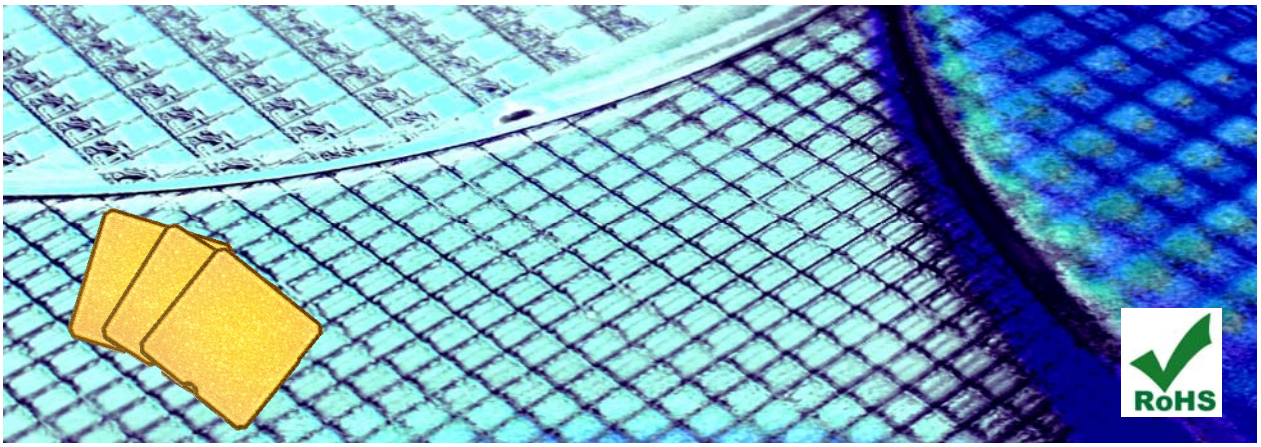
# UWSC – Ultra large-band Wire bonding Silicon Capacitor – Wire Bondable Vertical

Rev 1.5




## Key Features

- Ultra largeband performance up to 26 GHz
- Resonance free
- Phase stability
- Unique capacitance value of 1nF in 0101
- Ultra high stability of capacitance value
  - Temperature < ± 0.5% (-55°C to +150°C)
  - Voltage < 0.02 %/V
  - Negligible 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
- 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 up to 26GHz.** 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 (±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.

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## Electrical Specifications

| Part number | Product description | Case Size | Thickness |
|---|---|---|---|
| **UWSC.xxx** | Ultra largeband Wire bondable vertical Silicon Capacitor, from -55 to 150°C, 26GHz with Au termination | | |
| 935 153 622 410 | Ultra largeband Wire bondable vertical Si Cap 1nF, BV>50V | 0101 | 250µm |
| 935 153 620 510 | Ultra largeband Wire bondable vertical Si Cap 10nF, BV>50V | 0303 | 250µm |
| 935 153 624 522 | Ultra largeband Wire bondable vertical Si Cap 22nF, BV>50V | 0504 | 250µm |
| 935 153 821 510 | Ultra largeband Wire bondable vertical Si Cap 10nF, BV>30V | 0202 | 250µm |
| 935 154 622 410 | Ultra largeband low profile Wire bondable vertical Si Cap 1 nF, BV>50V | 0101 | 100µm |
| 935 154 620 510 | Ultra largeband low profile Wire bondable vertical Si Cap 10nF, BV>50V | 0303 | 100µm |
| 935 154 821 510 | Ultra largeband low profile Wire bondable vertical Si Cap 10nF, BV>30V | 0202 | 100µm |

| Parameters | Value |
|---|---|
| **Capacitance range** | *10pF to 100 nF(**)* |
| **Capacitance tolerance** | *± 15 %(**)* |
| **Operating temperature range** | *-55 °C to 150 °C* |
| **Storage temperature** | *- 70 °C to 165 °C* |
| **Temperature coefficient** | *<±0.5 %, 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 Serial Inductance (ESL)** | *typ 6 pH (***) @SRF* |
| **Equivalent Serial Resistance (ESR)** | *typ. 14 mΩ (***)* |
| **Insulation resistance** | *100 GΩ min @ RVDC & +25°C* |
| **Aging** | *Negligible, < 0.001 % / 1000h* |
| **Reliability** | *FIT<0.017 parts / billion hours,* |
| **Capacitor height** | *Max 250 µm or 100 µm* |

(**) Other values on request

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

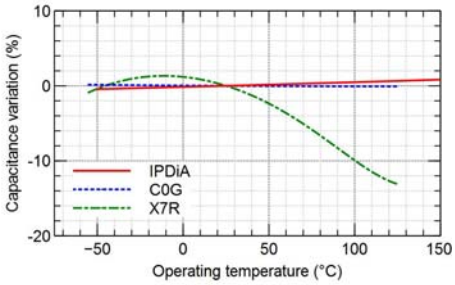



**Fig.1: Capacitance variation vs temperature (for UWSC and MLCC technologies)**

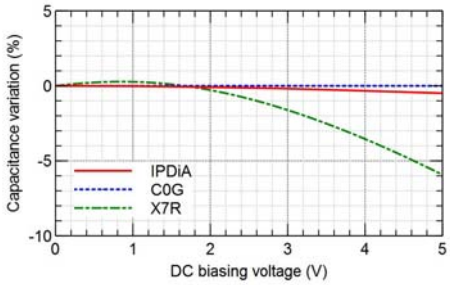



**Fig.2: Capacitance variation vs DC biasing voltage (for UWSC and MLCC technologies)**

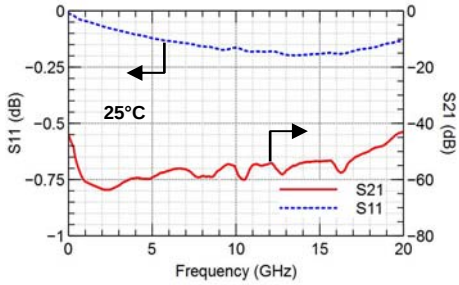
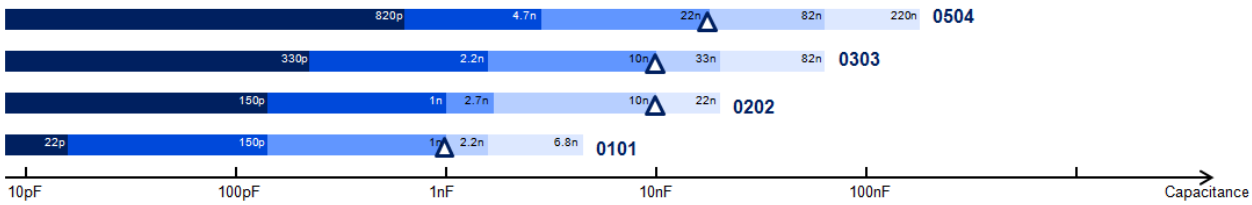



**Fig.3: 10 nF/0303 UWSC measurement results (S-parameters in shunt mode)**

## UWSC Capacitance Range




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

BV 450V BV 50V BV 11V
BV 150V BV 30V

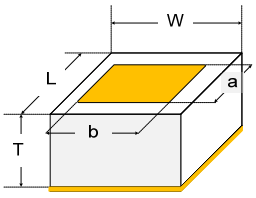
## Termination and Outline

### Termination

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

### Package Outline

| ( mm ) | Pad dimension | | Case size (typ. ±0.01mm) | | |
|---|---|---|---|---|---|
| | 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 | |




## Packing

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



For more information, please visit: http://www.ipdia.com
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Система менеджмента качества компании отвечает требованиям в соответствии с ГОСТ Р ИСО 9001, ГОСТ РВ 0015-002 и ЭС РД 009

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