

UWSC - 26 GHz+

Ultra large-band Wire bondable vertical Silicon Capacitors



Rev 1.3

Key features

- Ultra large band performance higher than 26 GHz
- Resonance free and phase stability
- Unique capacitance value of 1 nF in 0101
- High stability of capacitance value over temperature, voltage and aging
- Ultra low ESR and ESL and high reliability
- 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 Murata Integrated Passive Solutions, 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 (+60ppm/K) 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 | | |
| 935154528247-xxT | Low profile UWSC, 47 pF BV150 | 0201 | 100 μm |
| 935154522310-xxT | Low profile UWSC, 100 pF BV150 | 0101 | 100 μm |
| 935154521310-xxT | Low profile UWSC, 100 pF BV150 | 0202 | 100 μm |
| 935153521310-xxT | UWSC, 100 pF BV150 | 0202 | 250 μm |
| 935154529315-xxT | Low profile UWSC, 150 pF BV150 | 015015 | 100 μm |
| 935154832410-xxT | Low profile UWSC, 1 nF BV30 | 0101 | 100 μm |
| 935154632410-xxT | Low profile UWSC, 1 nF BV50 | 0101+ | 100 μm |
| 935154521410-xxT | Low profile UWSC, 1 nF BV150 | 0202 | 100 μm |
| 935153521410-xxT | UWSC, 1 nF BV150 | 0202 | 250 μm |
| 935154831510-xxT | Low profile UWSC, 10 nF BV30 | 0202 | 100 μm |
| 935154630510-xxT | Low profile UWSC, 10 nF BV 50 | 0303 | 100 μm |
| 935153831510-xxT | UWSC, 10 nF BV30 | 0202 | 250 μm |
| 935153630510-xxT | Low profile UWSC, 10 nF BV 50 | 0303 | 250 μm |
| 935154634522-xxT | Low profile UWSC, 22nF BV 50 | 0504 | 100 μm |

| Parameter | Value |
|------------------------------------|------------------------------------------|
| Capacitance range | 47 pF to 22 nF(*) |
| Capacitance tolerance | ± 15 %(*) |
| Operating temperature range | -55 °C to 150 °C |
| Storage temperature | - 70 °C to 165 °C(**) |
| Temperature coefficient | +60 ppm/K |
| Breakdown voltage (BV) | 11 V, 30 V, 50 V, 100 V, 150 V, 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 | 100GΩ @ RVDC @ 25°C, t>120s for 100nF |
| Ageing | Negligible, < 0.001% / 1000h |
| Reliability | FIT<0.017 parts / billions hours |
| Capacitor height | 250 μm or 100 μm (*) |

(*) Other values on request (**) w/o packing (****) e.g. 10 nF/0303/BV 50V

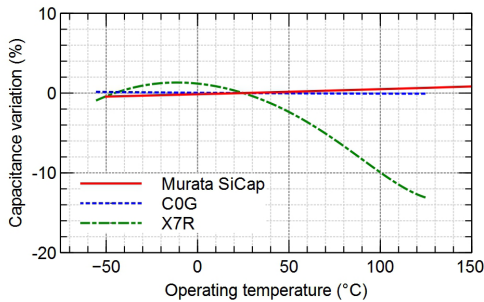


Fig. 1: Capacitance variation vs temperature (for UWSC and MLCC technologies)

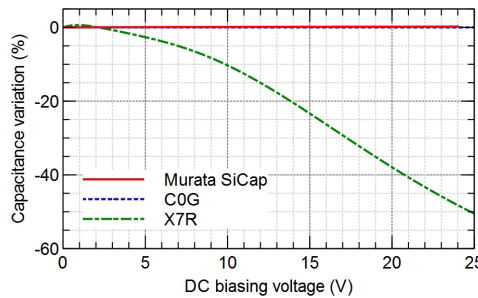


Fig.2: Capacitance variation vs DC biasing voltage @ BV30 (for UWSC and MLCC technologies)

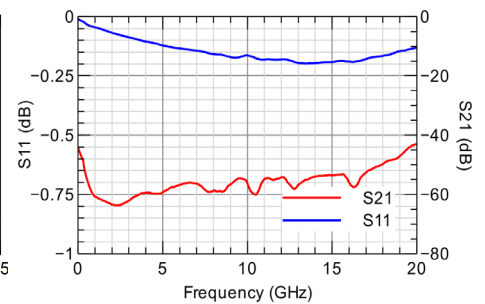
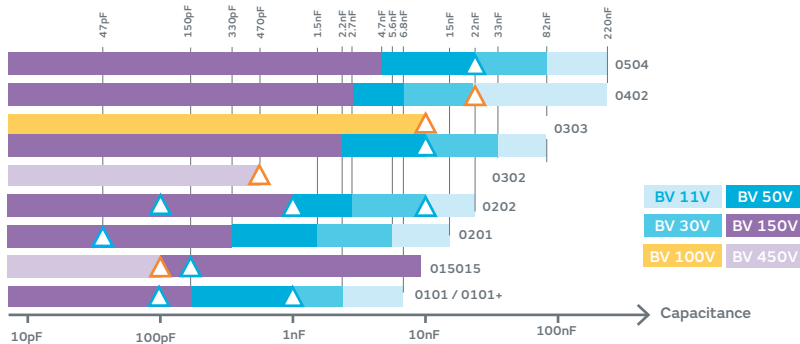


Fig.3: 10 nF / 0303 UWSC @ BV50 measurement results (S-parameters in shunt mode)

Capacitance range



▲ Available parts.
For other values, contact your Murata sales representative.
△ Under development.

0101+ available as 1 nF-BV50 only.

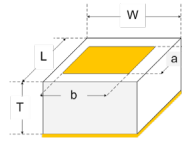
Termination

Can be directly mounted on the PCB using die bonding and wire bonding(s). Bottom electrode is in Ti/Ni/Au and top electrode in Gold (TiWAu). Other top finishings available on request (ex: Aluminum). Compatible with standard wire bonding assembly (ball and wedge).



Package Outline

| | Pad dimension mm | | Case size mm (typ ±0.02 mm) | | |
|--------|------------------|--------|-----------------------------|----------|--------------------|
| | a | b | L | W | T |
| 0101 | >0.15 | >0.15 | 0.25 | 0.25 | 0.10 |
| 0101+ | >0.15 | >0.15 | 0.294(*) | 0.294(*) | |
| 015015 | >0.281 | >0.281 | 0.381 | 0.381 | |
| 0201 | >0.40 | >0.15 | 0.50 | 0.25 | |
| 0202 | >0.40 | >0.40 | 0.50 | 0.50 | 0.25 or 0.10 |
| 0302 | >0.70 | >0.40 | 0.8 | 0.5 | |
| 0303 | >0.70 | >0.70 | 0.80 | 0.80 | |
| 0402 | >0.9 | >0.4 | 1.00 | 0.50 | |
| 0504 | >1.15 | >0.9 | 1.25 | 1.00 | |



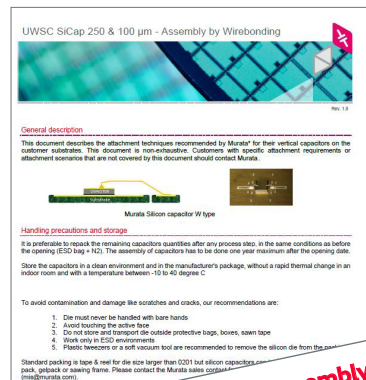
(*) Only for 1nF / BV50 case size = 0.294x0.294mm

Packaging

Tape and reel (up to 0202 case size included), waffle pack, film frame carrier or raw wafer delivery.

Assembly by Wirebonding

The attachment techniques recommended by Murata 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 Murata Silicon capacitors **please download the assembly instructions on www.murata.com and read them carefully.**



Please download the **assembly instructions** on www.murata.com and **read them carefully before use.**
 在使用MURATA电容之前请从 www.murata.com 网站上下载电容安装说明并仔细阅读。

For the assembly instructions, please go to : <https://www.murata.com/> and follow the sections : Products > Capacitor > Silicon Capacitor > UWSC

Download the pdf file called : **"Assembly Note UWSC V1.8_Murata"**

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