UWSC - 26 GHz+

Ultra large-band Wire bondable vertical Silicon Capacitors

Rev 1.4

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 and 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	Capacitance	BV	Case size	Thickness
935154528247-xxT	47 pF	150 V	0201	100 µm
935154522310-xxT	100 pF	150 V	0101	100 µm
935154521310-xxT	100 pF	150 V	0202	100 µm
935153521310-xxT	100 pF	150 V	0202	250 µm
935154049310-xxT	100 pF	450 V	015015	100 µm
935154529315-xxT	150 pF	150 V	015015	100 µm
935154632322-xxT	220 pF	50 V	0101	100 µm
935154632327-xxT	270 pF	50 V	0101	100 µm
935154632347-xxT	470 pF	50 V	0101	100 µm
935154045347-xxT	470 pF	450 V	0302	100 µm
935153045347-xxT	470 pF	450 V	0302	250 µm
935154832410-xxT	1 nF	30 V	0101	100 µm
935154632410-xxT	1 nF	50 V	0101+	100µm
935154521410-xxT	1 nF	150 V	0202	100 µm
935153521410-xxT	1 nF	150 V	0202	250 µm
935154831510-xxT	10 nF	30 V	0202	100 µm
935153831510-xxT	10 nF	30 V	0202	250 µm
935154630510-xxT	10 nF	50 V	0303	100 µm
935153630510-xxT	10 nF	50 V	0303	250 µm
935154050510-xxT	10 nF	100 V	0303	100 µm
935153050510-xxT	10 nF	100 V	0303	250 µm
935154837522-xxT	22 nF	30 V	0402	100 µm
935153837522-xxT	22 nF	30 V	0402	250 µm
935154634522-xxT	22 nF	50 V	0504	100 µm
935153634522-xxT	22 nF	50 V	0504	250 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	

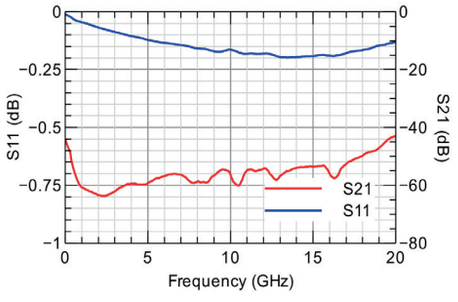


Fig.3: 10 nF / 0303 UWSC @ BV50 measurement results (S-parameters in shunt mode)

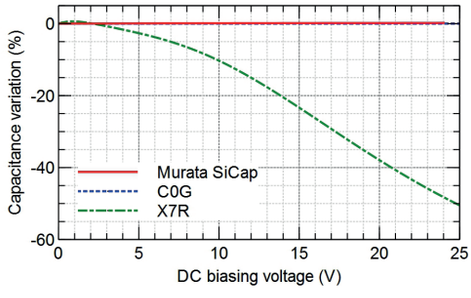
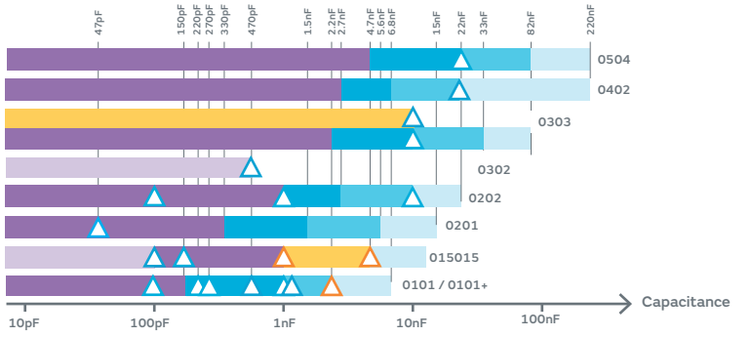


Fig.2: Capacitance variation vs DC biasing voltage @ BV30 (for UWSC and MLCC technologies)

Capacitance range



Available parts.
For other values, contact your Murata sales representative.

Under development.

BV 11V | BV 50V | BV 30V | BV 150V | BV 100V | BV 450V

0101+ available as 1 nF-BV50 only.

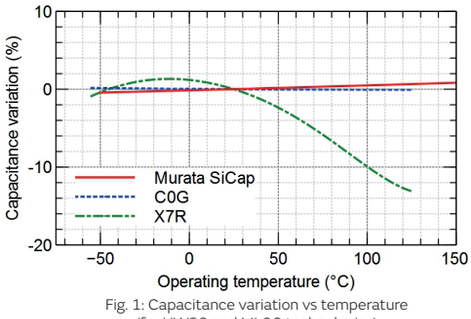


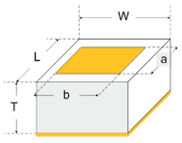
Fig. 1: Capacitance variation vs temperature (for UWSC and MLCC technologies)

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.**

For the assembly instructions, please go to :

www.murata.com/ and follow the sections :
- ➲Products
  - ➲Capacitor
    - ➲Silicon Capacitor
      - ➲**UWSC Series**

Download the pdf file called :
'Assembly Note 'UWSC'

Scan us, and visit our official Website to get more details:

https://www.murata.com/en-eu/products/capacitor/siliconcapacitors/uwsc

Application Notes references

For the application instructions, please refer to our documents:

- Storage and Shelf Life Conditions
- Recommendation to handle bare dies
- Nozzle recommendation

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