

WBSC / WTSC / WXSC

Wire-bondable vertical Si Capacitors up to 250°C



Rev 2.2

Key features

- Low profile 250 μm .
- Low leakage current.
- High stability (temperature and voltage).
- Negligible capacitance loss through aging.
- Compatible with standard wire bonding assembly (ball and wedge).

(please refer to our Assembly Application Note for more details)

Key applications

- Any demanding applications such as radar, lidar, aerospace, wireless infrastructure communication, data broadcasting, automotive (e.g. Lidar)
- Applicable for standard wire bonding approach (ball and wedge), thanks to a perfect pad flatness.
- Decoupling / DC noise and harmonic filtering / Matching networks (e.g. GaN power amplifier, LDMOS).
- High reliability applications.
- Downsizing.
- Low profile applications (250 μm).

The WBSC / WTSC / WXSC Capacitors are dedicated to applications where **reliability up to 250°C** (for WXSC) is the main parameter. They are suitable for **DC decoupling**. The unique technology of integrated passive devices in silicon developed by Murata Integrated Passive Solutions can **solve most of the problems encountered** in demanding applications. These Si capacitors in **ultra-deep trenches** have been developed with a semiconductor process which enables the integration of **high capacitance** density from 1.55 nF/mm² to 250 nF/mm² (with a breakdown voltage of respectively **450 V** to 11 V).

Our SiCap technology features **high reliability** - up to 10 times better than alternative capacitors technologies - thanks to a full control of the production process with **high temperature** curing (above 900°C) generating a highly pure oxide. This technology provides industry leading performances relative to the **capacitor stability** up to 250°C for WXSC, up to 200°C for WTSC and up to 150°C for WBSC with a **temperature coefficient equals to +60 ppm/K**. In addition, intrinsic properties of the silicon show a low dielectric absorption and a low to zero piezo electric effect resulting **in no memory effect**. This Silicon based technology is ROHS compliant.



Electrical specifications

WBSC.xxx	Wire-bondable vertical Si Capacitors from -55°C to 150°C			
Part number	Capacitance	BV	Case size	Thickness
935142521310-xxT	100 pF	150 V	0202	250 μm
935142521410-xxT	1 nF	150 V	0202	250 μm
935142831510-xxT	10 nF	30 V	0202	250 μm
935142630510-xxT	10 nF	50 V	0303	250 μm
935142634522-xxT	22 nF	50 V	0504	250 μm

WTSC.xxx	High temperature Wire-bondable vertical Si Capacitors from -55°C to 200°C			
Part number	Capacitance	BV	Case size	Thickness
935144521310-xxA	100 pF	150 V	0202	250 μm
935144521410-xxA	1 nF	150 V	0202	250 μm

WXSC.xxx	Extreme temperature Wire-bondable vertical Si Capacitors from -55°C to 250°C			
Part number	Capacitance	BV	Case size	Thickness
935145521310-xxA	100 pF	150 V	0202	250 μm
935145521410-xxA	1 nF	150 V	0202	250 μm

Parameter	Value
Capacitance range	100 pF to 22 nF(*)
Capacitance tolerances	±15 % (*)
Operating temperature range	-55 °C to 250°C for WXSC
Storage temperature range	-70°C to 265°C(**) for WXSC
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 to RVDC)
Equivalent Series Inductance (ESL)	Typ. 50 pH @ SRF (***)
Equivalent Series Resistance (ESR)	Typ. 50 mΩ (***)
Insulation resistance	10 GΩ @ RVDC @ 25°C t>120s for 10 nF
Ageing	Negligible, < 0.001 % / 1000 h
Reliability	FIT<0.017 parts / billions hours
Capacitor thickness	250 μm

(*) Other values on request (**) w/o packing

(***) with wire-bonding de-embedded

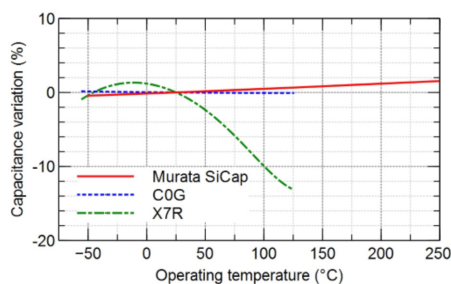


Fig. 1: Capacitance variation vs temperature
(for WXSC and MLCC technologies)

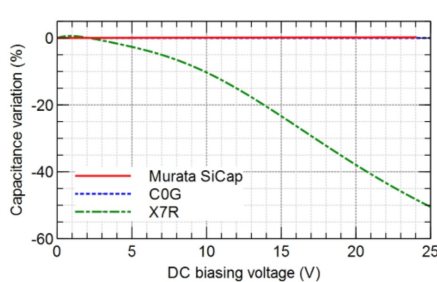


Fig. 2: Capacitance variation vs DC biasing voltage
@ BV30 (for WXSC and MLCC technologies)

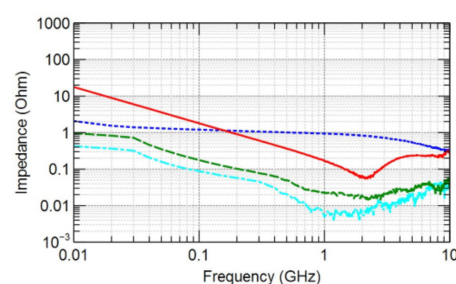
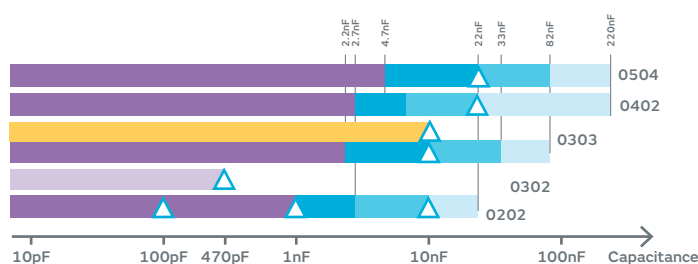


Fig. 3: Various WXSC measurement results
(Impedances in shunt mode)
with capacitance value from 100pF to 22nF

Capacitance range



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

0202 - 10nF - BV30 available as WBSC only.

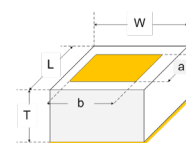
BV 50V	BV 11V	BV 450V
BV 150V	BV 30V	BV 100V

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) for WBSC and in Aluminum for WTSC/WXSC. Other top finishings available on request. 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
0202	>0.40	>0.40	0.50	0.50	0.25
0302	>0.7	>0.4	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	



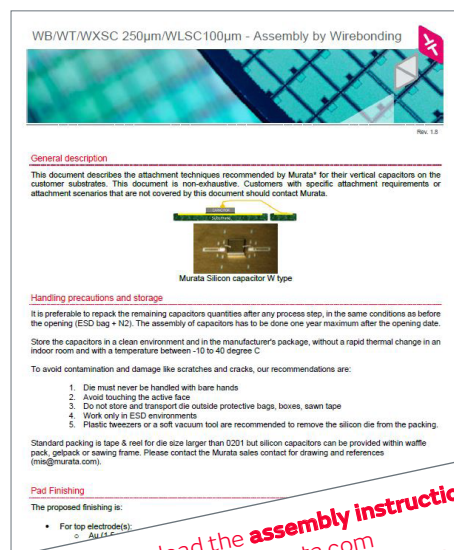


Packaging

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

Assembly by Soldering

The attachment techniques recommended by Murata for the WBSC/WTSC/WXSC 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 > WBSC / WTSC
/ WXSC

Download the pdf file called **"Assembly Note WBSC /
WTSC / WXSC / WLSC_V1.8_Murata "**

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