## 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/mm<sup>2</sup> to 250 nF/mm<sup>2</sup> (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.





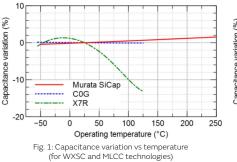
## Electrical specifications

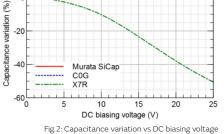
WBSC.xxx	Wire-bondable vertical Si Capacitors from -55°C to 150°C			
Part number	Capacitance	BV	Case size	Thickness
935142521310-xxT	100 pF	150 V	0202	250 µm
935142521410-xxT	1 nF	150 V	0202	250 µm
935142831510-xxT	10 nF	30 V	0202	250 µm
935142630510-xxT	10 nF	50 V	0303	250 µm
935142634522-xxT	22 nF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

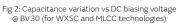
WTSC.xxx	High temperature Wire-bondable vertical Si Capacitors from -55°C to 200°C				
935144521310-xxA	100 pF	150 V	0202	250 µm	
935144521410-xxA	1 nF	150 V	0202	250 µm	

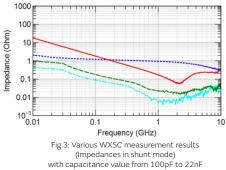
WXSC.xxx	Extreme temperature Wire-bondable vertical Si Capacitors from -55°C to 250°C				
935145521310-xxA	100 pF	150 V	0202	250 µm	
935145521410-xxA	1 nF	150 V	0202	250 µm	

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)	Тур. 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			

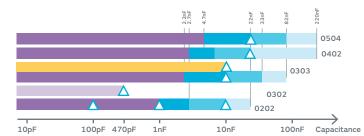








#### Capacitance range



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

0202 - 10nF - BV30 available as WBSC only.

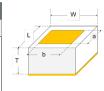
BV 50V	BV 11V	BV 450V
BV 150V	BV 30V	BV 100V

#### **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	т
0202	>0.40	>0.40	0.50	0.50	
0302	>0.7	>0.4	0.8	0.5	
0303	>0.70	>0.70	0.80	0.80	0.25
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.** 

WB/WT/WXSC 250µm/WLSC100µm - Assembly by Wirebonding	
No. 1.3	
General description	
This document describes the attachment techniques recommended by Murata* for their vertical capacitors on the customer substrates. This document is non-exhaustive. Customers with specific attachment requirements or	
attachment scenarios that are not covered by this document should contact Murata.	
Murata Silicon capacitor W type	
Handling precautions and storage It is preferable to repack the remaining capacitors quantities after any process step, in the same conditions as before	
the opening (ESD bag + N2). The assembly of capacitors has to be done one year maximum after the opening date.	
Store the capacitors in a clean environment and in the manufacturer's package, without a rapid thermal change in an indoor room and with a temperature between -10 to 40 degree C	
To avoid contamination and damage like scratches and cracke, our recommendations are:	
<ol> <li>Die must never be handled with bare hands</li> <li>Avoid touching the active face</li> <li>Do not store and transport die outside protective bags, boxes, sawn tape</li> </ol>	
<ol> <li>Work only in ESD environments</li> <li>Plastic tweezers or a soft vacuum tool are recommended to remove the silicon die from the packing.</li> </ol>	
Standard packing is tape 5 reel for die size larger than 1221 but silicon capacitors can be provided within wattle pack, operado or saving frame. Please contact the Murata sales contact for drawing and references (mis@murata.com).	
Pad Finishing The proposed finishing is: • For the detendent: • Autor Please download the <b>assembly instructions</b> on www.murata.com on www.murata.com	
The proposed finishing is:	
Please download the <b>assembly</b> on www.murata.com	
download an murata. So fore use.	
please on www.carefully be.	
Please download the <b>asser</b> ta.com on www.murata.com and <b>read them carefully before use.</b> 在使用MURATA电容之前请从 在使用MURATA电容之前请从	
and TA电容Z即MM	
在使用MUKA mata. com	
www.muratinghtful	
山下载电谷安农市	
在使用MURATA电存之中。 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 / WT	SC
/ WXSC	50
/ WVASC	

Download the pdf file called **"Assembly Note WBSC / WTSC / WXSC / WLSC\_V1.8\_Murata "** 

Reproduction in whole or in part is prohibited without the prior written consent of the copyright owner. The information presented in this document does not form part of any quotation or contract, is believed to be accurate and reliable and may be changed without notice. No liability will be accepted by the publisher for any consequence of its use. Publication thereof does not convey nor imply any license under patent or other industrial or intellectual property rights.



www.murata.com mis@murata.com



# **Mouser Electronics**

Authorized Distributor

Click to View Pricing, Inventory, Delivery & Lifecycle Information:

Murata:

935142521310 935142521410 935142831510