

# LPSC ESD Enhanced

## RFID Low profile Si capacitors down to 100 $\mu\text{m}$



Rev 1.7

### Key features

- Ultra low profile (100  $\mu\text{m}$ , 80  $\mu\text{m}$  on request)
- High Q
- Voltage stability
- High ESD capabilities (ESD enhanced series):  
>1 kV for 47 pF, >2 kV for 100 pF, >8 kV for 330 pF
- Low leakage current down to 100 pA
- Low ESL and low ESR
- SRF up to 3 GHz
- Suitable for all RFID assembly technologies  
(please refer to our Assembly Application Note for more details)

### Key applications

- Standard ID1 antenna
- Dual Interface or Pure Contactless
- Smart cards
- RFID stickers for class 4-5-6 antenna
- Telecom SIM
- Wireless energy harvesting
- Personal Medical, Health & Sport
- Smart Sensors
- Industrial Tags
- Automotive TPMS/Car immobilizer

The LPSC Murata\* 3D Silicon Capacitor targets **antenna matching, RF filtering and decoupling of active dies**, in applications with height and volume constraints. Based on Murata Silicon technology, the single 0402 offers **low profile** (<100  $\mu\text{m}$  thin), with **very high stability** upon applied voltage, up to 150°C, with very low leakage current and high level performances dedicated to industries such as Smart Card, RFID tags and others where integration as well as excellent antenna matching play a key role. The RFID capacitors range goes from 47 pF up to 330 pF, and works efficiently and durably in RFID environments.

Murata's MOS capacitor technology combined with capacitor cells in a unique distribution design drives electrical performance to an unprecedented level compared with any existing capacitor technology. Thanks to the full modeling of the elementary cell, the ESD capabilities have been optimized **up to 8 kV** (depending on capacitance value). Furthermore, our RFID Silicon capacitor range has been fine tuned in order to reach SRF higher than 3 GHz, hence allowing **unique fine tuning of the antenna**, from 13.56 MHz up to UHF (800/900 MHz) applications.

\*Murata Integrated Passive Solutions



## Electrical specifications

LPSC.xxx	Low profile Si capacitors ESD Enhanced down to 100 μm from -55°C to 150°C			
Part number	Capacitance	BV	Case size	Thickness
935121714310-xxN	100 pF	30 V	0402	100 μm
935121714333-xxN	330 pF	30 V	0402	100 μm

Parameter	Value
Capacitance range	47 pF to 330 μF(*)
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)	30 VDC
Capacitance variation versus RVDC	0.1%/V (from 0 to RVDC)
Insulation resistance	50 GΩ @ 10 V, @ 25°C, t>120s, for 100 pF
Aging	Negligible, < 0.001 % / 1000 h
Reliability	FIT<0.017 parts / billions hours
Capacitor height	100 μm(*)
(*) Other values on request	

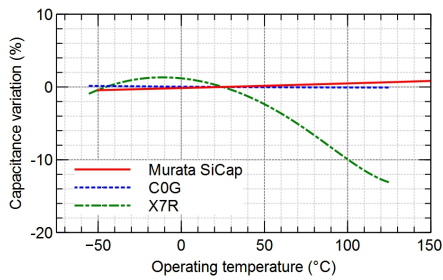


Fig. 1: Capacitance variation vs temperature (for LPSC ESD and MLCC technologies)

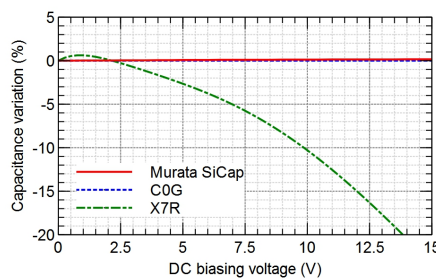


Fig.2: Capacitance variation vs DC biasing voltage @ BV30 (for LPSC ESD and MLCC technologies)

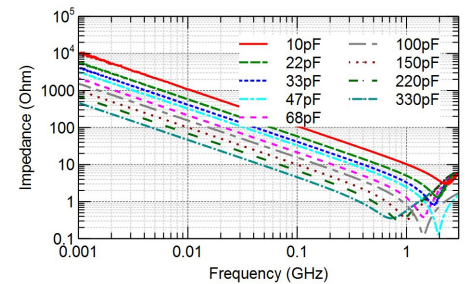
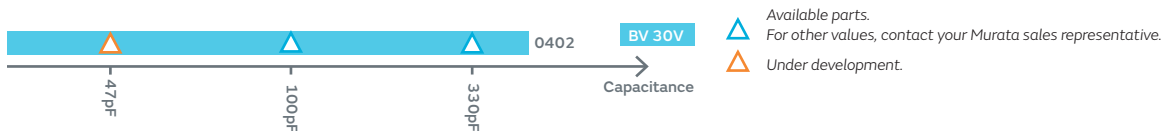


Fig.3: Impedance variation vs Frequency for the full 0402 Murata LPSC/ESD Enhanced range

## Capacitance range

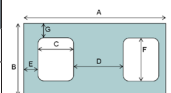


## Termination

Lead-free NiAu finishing compatible with wirebonding or automatic soldering technologies. Aluminum pads on request.

## Package Outline

Case size	Pad dimensions (±0.02 μm)						
	A	B	C	D	E	F	G
0402	1.20	0.70	0.3	0.4	0.1	0.5	0.1



## Packaging

Wafers, on foil, sawn and grinded. Raw wafers. Tape & reel.



## Assembly by Wirebonding

The attachment techniques recommended by Murata for the LPSC ESD 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.ipdia.com/assembly](http://www.ipdia.com/assembly) and read them carefully.**

LPSC SiCap 100µm – NiAu finishing - Assembly by soldering



Rev. 1.7

**General description**

This document describes the attachment techniques recommended by Murata\* for their LPSC silicon capacitors on the customer substrates. This document is non-revokable. Customers with specific attachment requirements or attachment scenarios that are not covered by this document should contact Murata. The solder printing is described in this document but other processes like solder jetting, pre-sprayed capacitors... can also be used with the same recommendations.



Murata Silicon capacitor  
(1206)

→



The silicon capacitor  
mounted on PCB board

**Handling precautions and storage**

Silicon die must always be handled in a clean room environment (usually class 1000 (ISO 6)) but the assembled devices don't need to be handled in such an environment as the product is already well packed. The remaining guidelines have to be repeated immediately after any process step, in the same conditions as before the opening (ESD bag + N2).

Store the capacitors in the manufacturer's package in the following conditions without a rapid thermal change in an indoor room:

- Temperature: -10 to 40 degree C
- Humidity: 30 to 70%RH

Avoid storing the capacitors in the following conditions:

- (a) Ambient air containing corrosive gas (Chlorine, Hydrogen sulfide, Ammonia, Sulfuric acid, Nitric oxide, etc.)
- (b) Ambient air containing volatile or combustible gas
- (c) In environments with a high concentration of airborne particles
- (d) In liquid, water, oil, chemical solution, organic solvent
- (e) In direct sunlight
- (f) In freezing environments

Please download the **assembly instructions**  
on [www.ipdia.com/assembly](http://www.ipdia.com/assembly)  
and **read them carefully before use.**

在使用IPDIA电容之前请从  
[www.ipdia.com/assembly](http://www.ipdia.com/assembly)  
网站上下载电容安装说明并仔细阅读。

For LPSC ESD assembly instructions, please go to :  
[www.ipdia.com/assembly](http://www.ipdia.com/assembly) and  
download the pdf file called  
**“LPSC Capacitors 100 µm - Assembly by Soldering”**

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