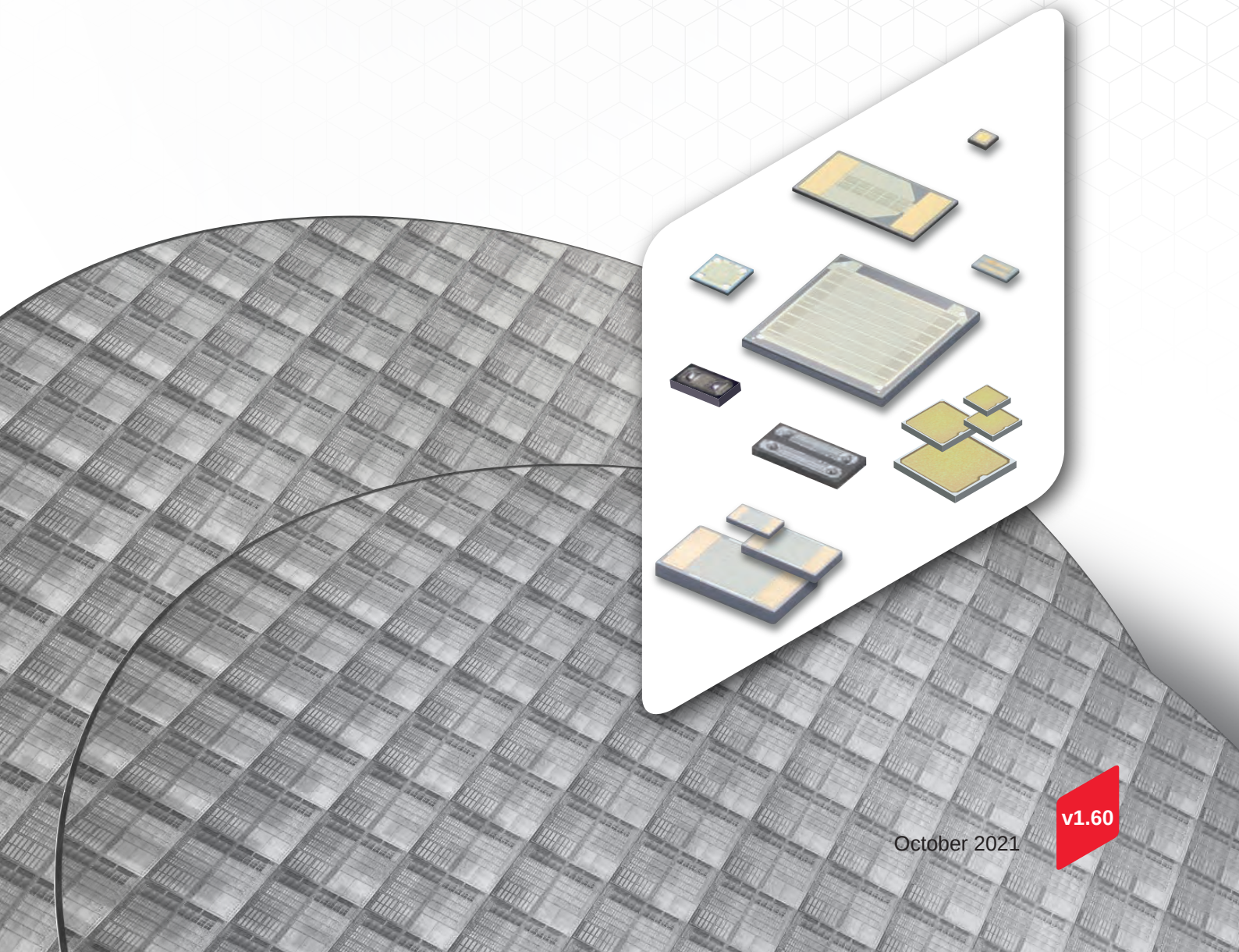
INNOVATOR IN ELECTRONICS

3D Silicon Capacitors

Higher performances in a smaller case size

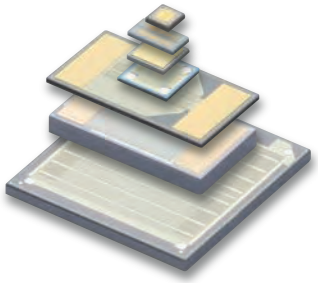


October 2021

v1.60

Silicon capacitors technology overview

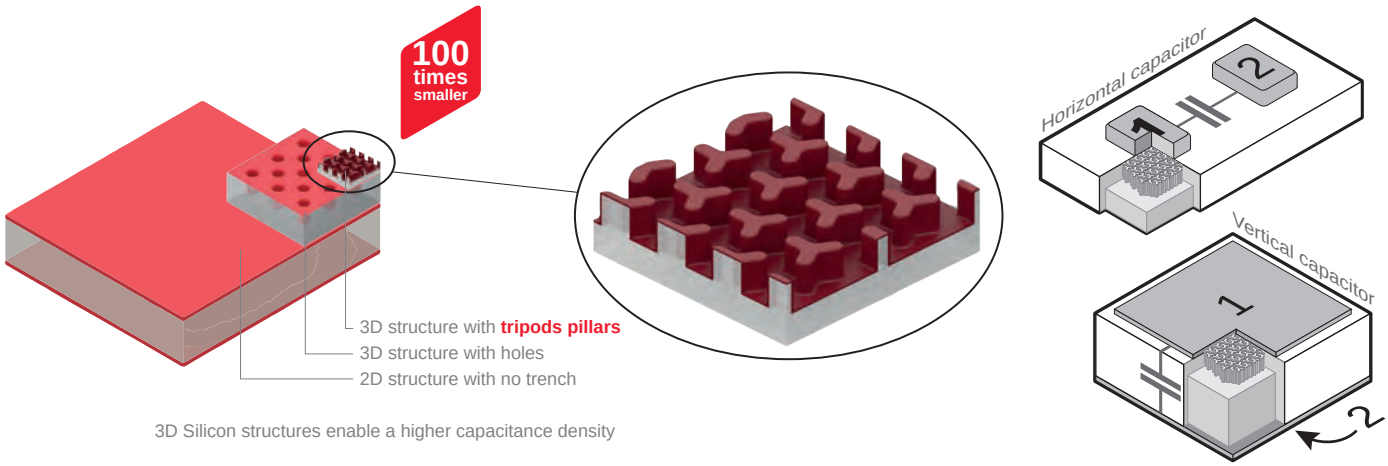
Murata high-density silicon capacitors have been developed with a semiconductor MOS process and are using **3D structures** to substantially increase the electrode surfaces, and therefore increase the capacitance for a given footprint. Murata silicon technology is based on a monolithic structure embedded in a noncrystalline substrate (single MIM and multi-MIM - Metal Insulator Metal).



Murata's portfolio includes capacitors from pF to few µF

This advanced 3D topology gives a developed active capacitance area equivalent to 80 ceramic layers in an amazing 100µm thickness (lower values available on request). Thanks to a very linear and low dispersive dielectric, miniaturization, capacitance value and electrical performances are optimized. This offers to demanding applications **higher performances in smaller packages**.

Coming from the same DNA as the semiconductor MOS process, Murata silicon capacitors have a default mode fully modelized with proven consistent data and offer therefore predictable and exceptional reliable performances. Our silicon capacitors technology features **up to 10 times higher reliability** than alternative capacitors technologies,mainly obtained thanks to the oxide generated during the high temperature curing. Furthermore, all electrical tests are completed at the end of the production steps which avoids early failures.



3D Silicon structures enable a higher capacitance density

High stability over temperature

Up to **250°C** environments

Signal stability over frequency

Up to **220GHz** applications

Stability regarding voltage

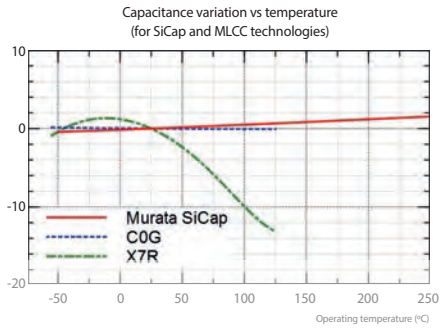
For **1200V** applications

Stability over aging

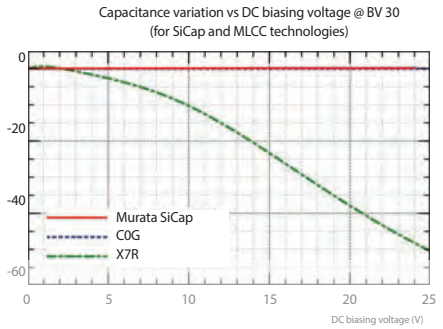
Minimum lifetime of **10 years**

Extreme low thickness

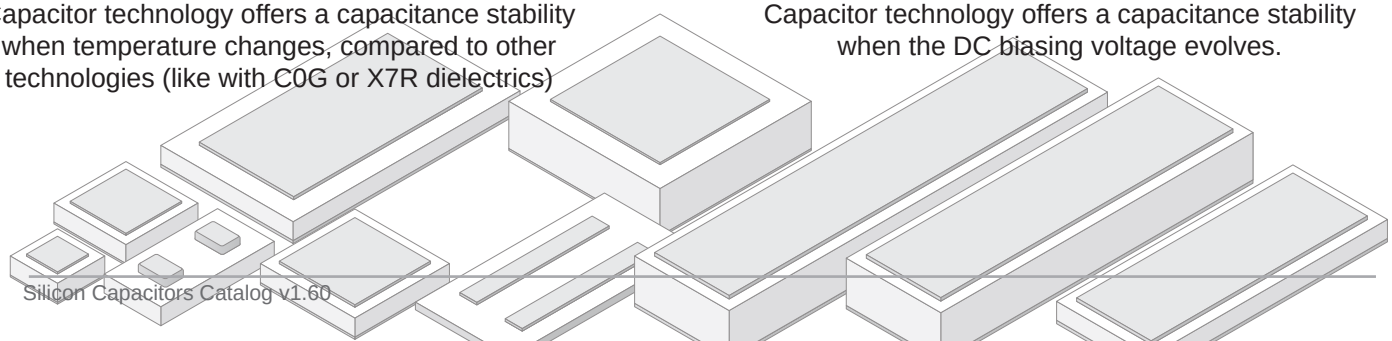
down to **50µm**



The curve here above shows how Murata Silicon Capacitor technology offers a capacitance stability when temperature changes, compared to other technologies (like with C0G or X7R dielectrics)



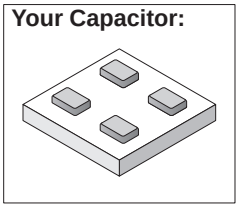
The curve here above shows how Murata Silicon Capacitor technology offers a capacitance stability when the DC biasing voltage evolves.



Custom products

Custom capacitors

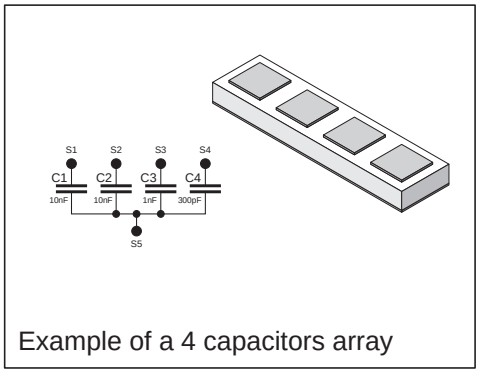
Murata Silicon Capacitors can be adapted to your specific requirements in term of capacitance, dimensions including thickness, finishing or packaging. So let's offer the best to your design and ensure performances and integration.



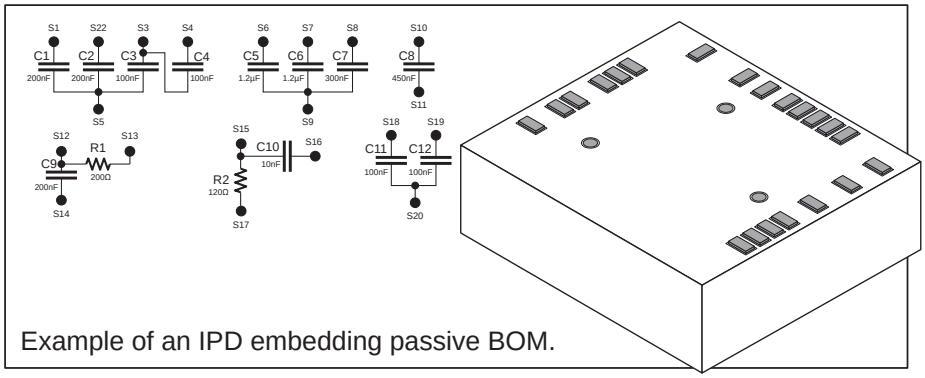
Capacitance	BV	Dimensions	Thickness	Finishing	Packaging
10nF	BV11	0202	400µm	Al	Waffle Pack 400
22nF	BV30	0201	250µm	TiNiAu	Tape & Reel 1000
47nF	BV50	015015	100µm	Cu pillars	Tape & Reel 5000
100nF	BV100	0101+	60µm	NiAu pads	Film Frame Carrier 6"
1µF	BV150	0101	custom thickness	SnAg bumps (SAC)	Film Frame Carrier 8"
3.3µF	BV900	01005M		ENIG	Ext. Grip Ring
custom capacitance	BV1200	custom dimensions		custom finishing	custom packaging

Integrated Passive Devices (IPDs) and capacitors arrays

Murata offers also the integration of multiple passive devices into a single package to even improve the integration of your system. This goes from capacitors arrays to complex Integrated Passive Solutions (IPDs) embedding different types of capacitors, resistors or connections. Thanks to this stackable IPDs, you win space in your design, you avoid the mounting of multiple discrete components, and you improve reliability and performances by shortening the distance between components such as decoupling capacitors of passive filters and the active device.

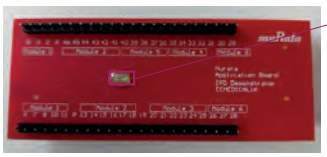


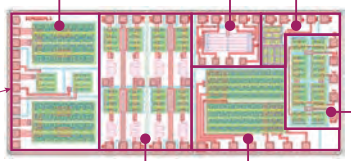
Example of a 4 capacitors array



Example of an IPD embedding passive BOM.

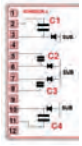
Our **IPD demonstrator** is the best way for you to test and measure our technology easily.





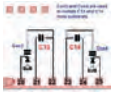
Precision capacitors

Matching resistors circuit



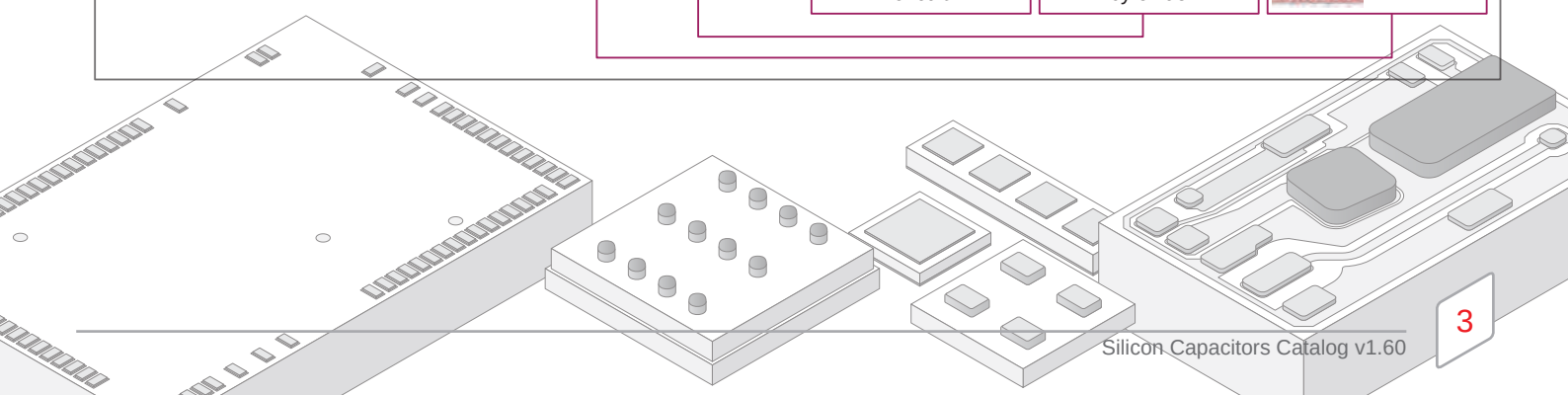
DC blocking capacitors module

Matching capacitors circuit

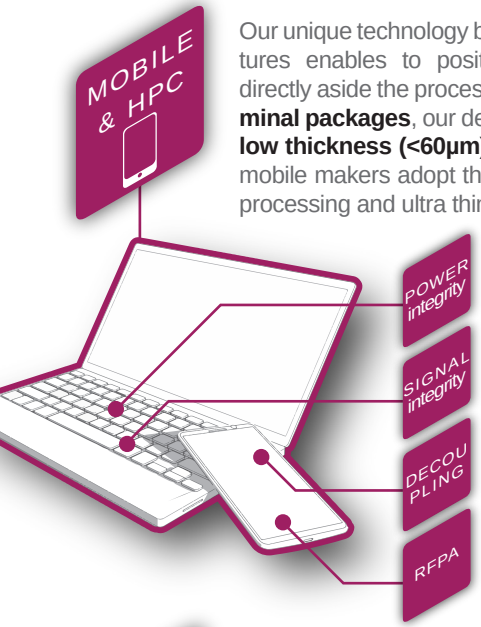


Capacitors isolated by oxide

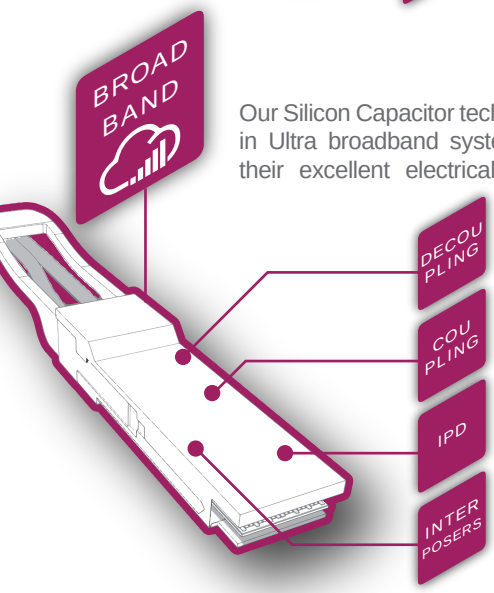
Low Pass filtering module



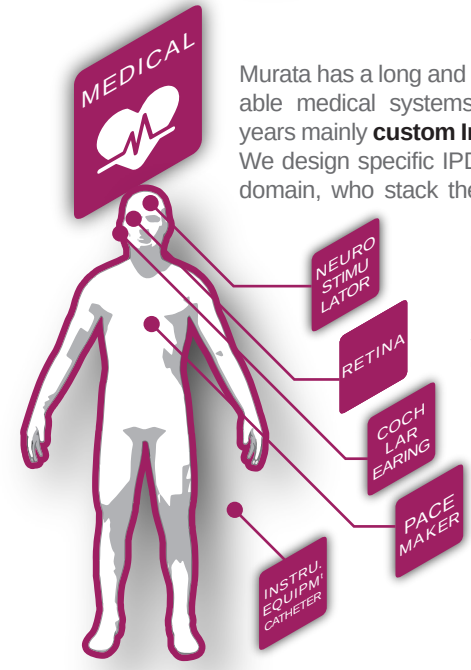
Our Silicon Capacitors technology help actors of very demanding markets integrating further more while improving electrical performances.



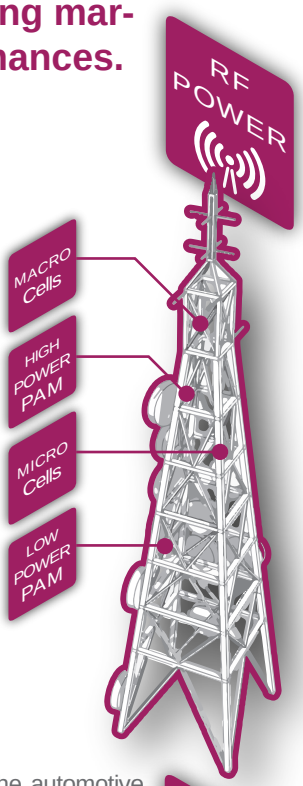
Our unique technology based on 3D silicon architectures enables to position decoupling capacitors directly aside the processors. Added to the **multiterminal packages**, our dedicated solutions offer **ultra low thickness (<60µm) and ultra low ESL**. Major mobile makers adopt these products to ensure fast processing and ultra thin systems.



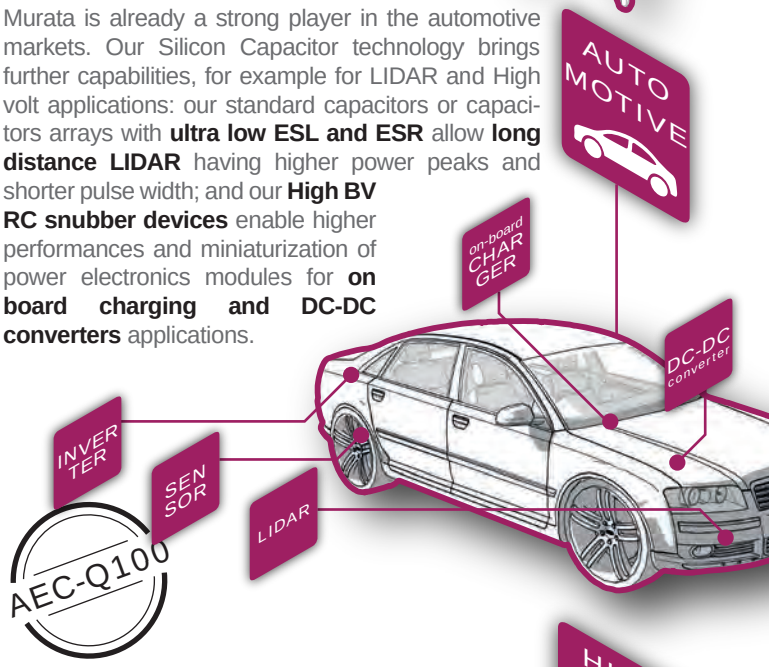
Our Silicon Capacitor technology is well appreciated in Ultra broadband systems, especially thanks to their excellent electrical performances, such as **ESR, ESL, insertion loss**, and also thanks to their **outstanding stability over frequency**, up to 220GHz for the new X2SC series.
Differential pairs, IPDs or Silicon Interposers complete a wide and rich portfolio dedicated to broadband applications.



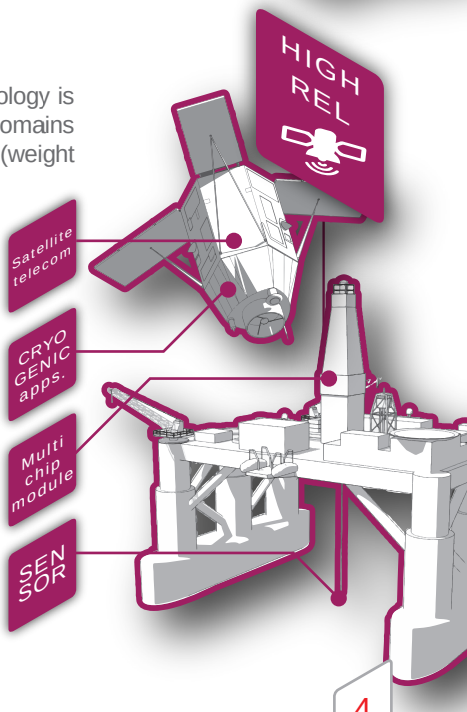
Murata has a long and successful history in implantable medical systems, by providing since many years mainly **custom Integrated Passive Devices**. We design specific IPDs for the main actors of the domain, who stack them with their active components. This is made for example in pacemakers or neurostimulators, in order to integrate even more the systems, to gain both in current consumption and reliability.



The high capacitance capabilities of our technology, with the stability of the capacitance value allow **increasing RFPA applications baseBand performances** and **improving Power Amplifiers linearity**.
In addition, Silicon Caps keep their performances over temperature, even @ 140°C during 20 years!



Murata is already a strong player in the automotive markets. Our Silicon Capacitor technology brings further capabilities, for example for LIDAR and High volt applications: our standard capacitors or capacitors arrays with **ultra low ESL and ESR** allow **long distance LIDAR** having higher power peaks and shorter pulse width; and our **High BV RC snubber devices** enable higher performances and miniaturization of power electronics modules for **on board charging and DC-DC converters** applications.



Our Silicon Capacitors technology is highly appreciated in the domains where **high miniaturization** (weight and space savings), but also **reliability and stability in severe conditions** (chocks and vibrations-stress, temperature from -250°C to +250°C) are key selection factors. This is the case for aero- space architectures and drilling for oil.

Find more details about our products on www.murata.com

Technical Documents

Find our Application Notes, Assembly Notes and other technical documents on Murata's website. Products technical datasheets are available on murata's product pages (links are shared further in this catalog).

Link to Assembly Notes

LINK

Link to other technical documents

LINK

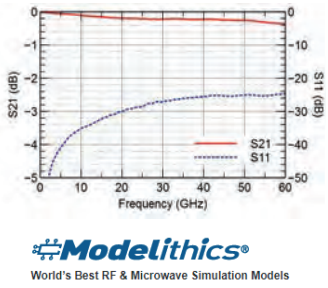
FAQ

Find the answer of most frequently asked questions, and don't hesitate to share with us your own requests through the contact form.

LINK

Modelization

We can provide 3D electromagnetic models of our capacitors with HFFS models, or S parameters to help you during the design phase of your application.
For that purpose, please also use the contact form of Murata's website.
Murata and Modelithics partner to deliver S parameters for some silicon capacitors.



Modelithics®
World's Best RF & Microwave Simulation Models

LINK

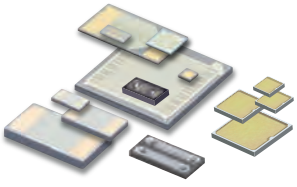
Matching line online tool

We've developed an online tool to help developers designing matching lines properly. You can register for this free tool at www.sicapmatchedline.com

LINK

Free samples

You can ask for free samples for components that are represented with this BV symbol in the tables of this catalog.
To place your sample inquiry, please use the contact form of Murata's web site.



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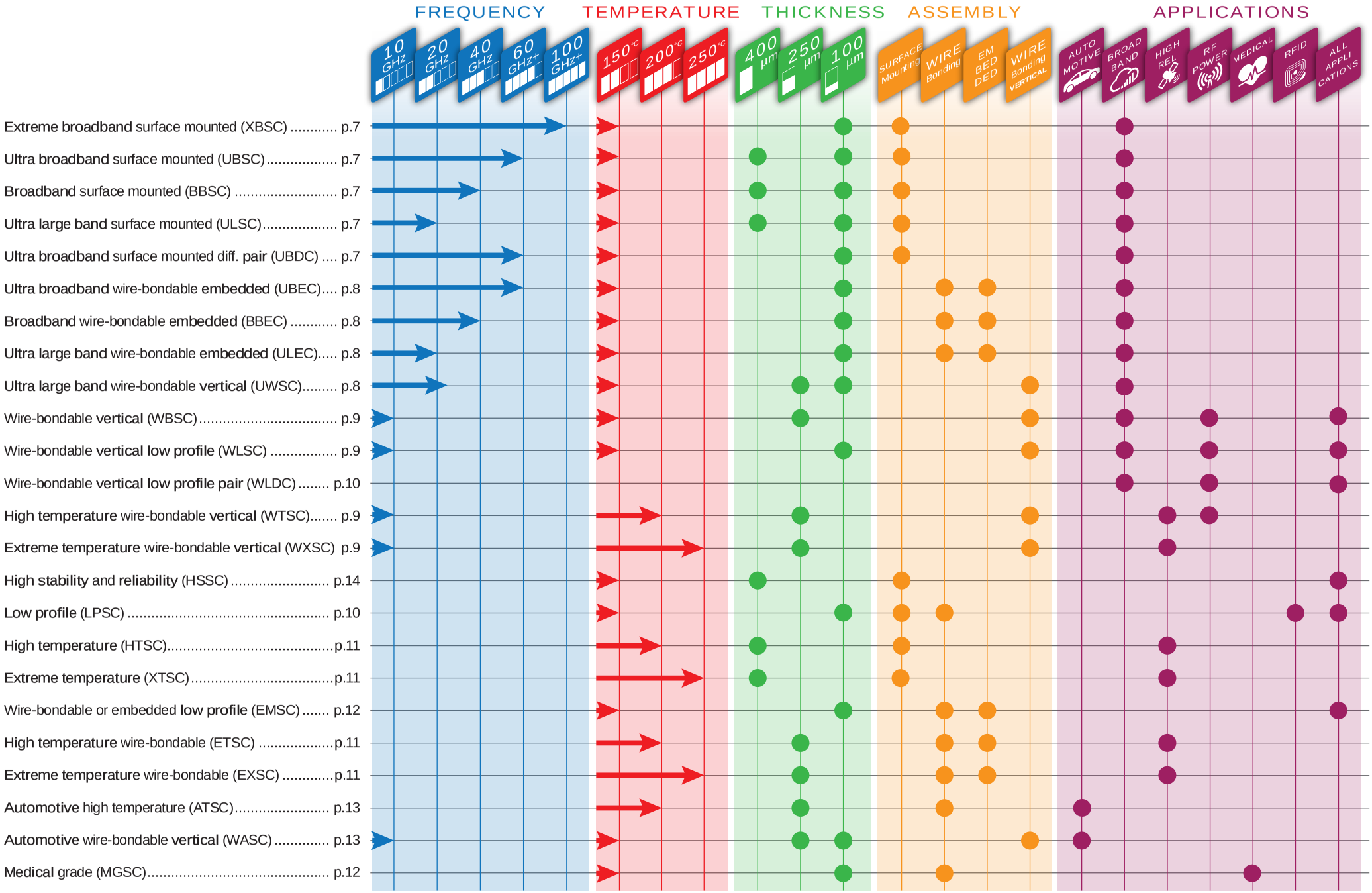
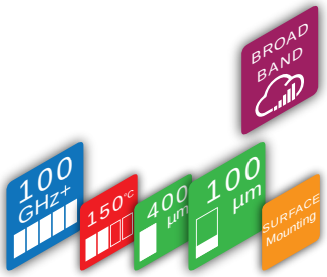

FREQUENCY
TEMPERATURE
THICKNESS
ASSEMBLY
APPLICATIONS
10 GHz
20 GHz
40 GHz
60 GHz+
100 GHz+
150 °C
200 °C
250 °C
400 µm
250 µm
100 µm
SURFACE Mounting
WIRE Bonding
EM BED DED
WIRE Bonding VERTICAL
AUTO MOTIVE
BROAD BAND
HIGH REL
RF POWER
MEDICAL
RFID
ALL APPLI CATIONS
Extreme broadband surface mounted (XBSC) p.7
Ultra broadband surface mounted (UBSC) p.7
Broadband surface mounted (BBSC) p.7
Ultra large band surface mounted (ULSC) p.7
Ultra broadband surface mounted diff. pair (UBDC) p.7
Ultra broadband wire-bondable embedded (UBEC) p.8
Broadband wire-bondable embedded (BBEC) p.8
Ultra large band wire-bondable embedded (ULEC) p.8
Ultra large band wire-bondable vertical (UWSC) p.8
Wire-bondable vertical (WBSC) p.9
Wire-bondable vertical low profile (WLSC) p.9
Wire-bondable vertical low profile pair (WLDC) p.10
High temperature wire-bondable vertical (WTSC) p.9
Extreme temperature wire-bondable vertical (WXSC) p.9
High stability and reliability (HSSC) p.14
Low profile (LPSC) p.10
High temperature (HTSC) p.11
Extreme temperature (XTSC) p.11
Wire-bondable or embedded low profile (EMSC) p.12
High temperature wire-bondable (ETSC) p.11
Extreme temperature wire-bondable (EXSC) p.11
Automotive high temperature (ATSC) p.13
Automotive wire-bondable vertical (WASC) p.13
Medical grade (MGSC) p.12

BBSC
UBSC
ULSC
XBSC

Ultra broadband surface mounted Silicon Capacitors up to 100GHz+

XBSC 100GHZ+, UBSC 60GHz+, BBSC 40GHz, ULSC 20GHz

LINK

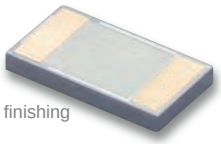


Applications: target **optical communication systems** (ROSA/-TOSA, SONET and all optoelectronics) as well as **high speed data systems** or products. Optimized for DC decoupling, feedback coupling and bypass applications in ultra broadband applications.

Features:

- Low insertion loss
- Low reflection
- Unique phase stability from 16kHz to 100GHz (for XBSC).
- Resonance free allowing ultra low group delay variation
- Low ESL and ESR in bypass grounding mode

Finishing & assembly: Lead-free Nickel solder coating compatible with automatic soldering technologies (reflow or manual)

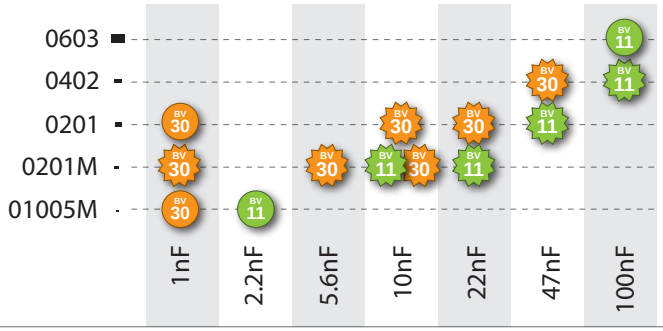


Gold finishing

pre-bumped finishing

Parameter	Value
Operating temperature range	-55°C to 150°C
Temperature coefficient	70 ppm/K
Capacitance variation versus RVDC	-0.1% /V
Equivalent Series Inductance (ESL)	Typ 100pH@SRF
Equivalent Series Resistance (ESR)	Typ 300mΩ
Insulation resistance	100GΩ @RVDC@25°C t>120s for 100nF
Aging	Negligible <0.001% /1000h
Reliability	FIT<0.017 parts / billions hours

X2SC available in 01005M and 0201M package sizes only, XBSC availble in 01005M, 0201M and 0201 package sizes, UBSC, BBS and ULSC available in all following package sizes



BV XX Free samples available on demand

BV XX Manufacturing on request or under development

UBDC

Ultra broadband surface mounted differential Silicon Capacitors pairs

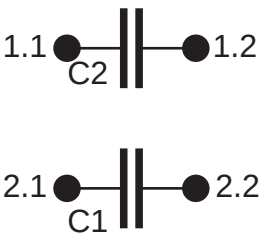
LINK

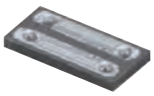
Applications: targets **optical communication applications** requiring miniaturization and improved performances for d**ifferential capacitor pair** , match termination...

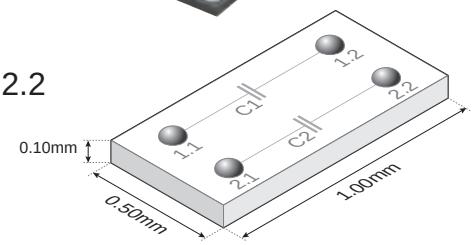
Features:

- Ultra broadband performances up to 67GHz
- High integration
- Low insertion loss
- Low reflection
- Phase stability up to 67GHz
- Resonance free allowing ultra low group delay variation
- Low ESL and low ESR in bypass grounding mode for UBB matched termination

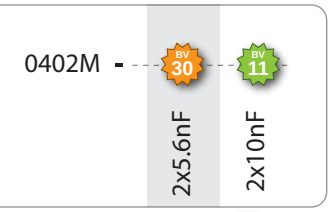
Finishing & assembly: Lead-free nickel/solder coating compatible with automatic soldering technologies (reflow and manual).







Parameter	Value
Operating temperature range	-55°C to 150°C
Temperature coefficient	70 ppm/K
Capacitance variation versus RVDC	-0.1% /V
Thickness	100µm
Diff. characteristic impedance	100Ω
Insulation resistance	10GΩ @RVDC@25°C t>120s for 10nF
Aging	Negligible <0.001% /1000h
Reliability	FIT<0.017 parts / billions hours



BV XX Free samples available on demand

BV XX Manufacturing on request or under development

BBEC UBEC ULEC

Ultra broadband wire-bondable embedded Silicon Capacitors up to 60GHz+

UBEC 60GHz+, BBEC 40GHz, ULEC 20GHz

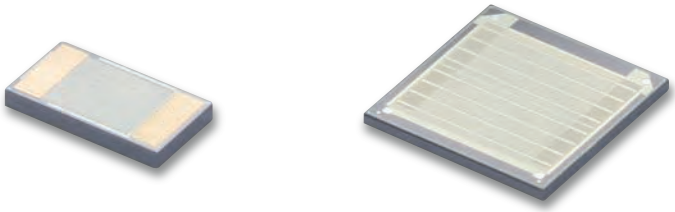
LINK

Applications: target **optical communication systems** (ROSA/-TOSA, SONET and all optoelectronics) as well as high speed data systems or products. **Optimized for DC decoupling and bypass applications.**

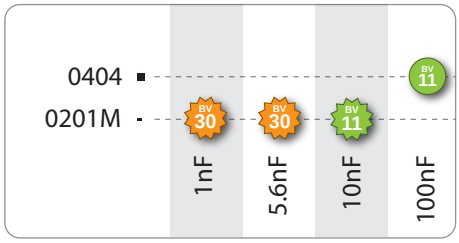
Features:

- High rejection up to 60 GHz+ (UBEC)
- Ultra broadband performance up to 67 GHz.
- Resonance free allowing ultra group delay variation
- Ultra low insertion loss thanks to an excellent impedance matching in transmission mode
- Low ESL and low ESR in bypass grounding mode

Finishing & assembly: Can be directly mounted on the PCB using die bonding and wire bonding(s). Capacitors with top electrodes in Aluminum. Other top finishings available on request. Compatible with standard wire bonding (ball and wedge) and embedding.



Parameter	Value
Operating temperature range	-55°C to 150°C
Temperature coefficient	70 ppm/K
Capacitance variation versus RVDC	-0.1% /V
Equivalent Series Inductance (ESL)	Typ 100pH@SRF
Equivalent Series Resistance (ESR)	Typ 300mΩ
Insulation resistance	100GΩ @RVDC@25°C t>120s for 100nF
Aging	Negligible <0.001% /1000h
Reliability	FIT<0.017 parts / billions hours



BV XX Free samples available on demand

BV XX Manufacturing on request or under development

UWSC

Ultra large band wire-bondable vertical Silicon Capacitors

LINK

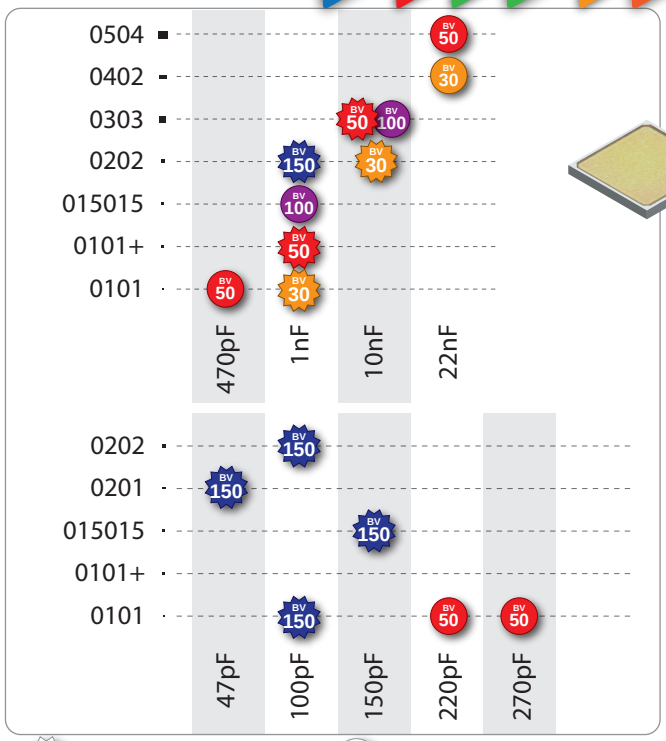
Applications: target **optical communication systems** (ROSA/-TOSA, SONET and all optoelectronics) as well as high speed data systems or products. **Optimized for DC decoupling and bypass applications.**

Features:

- high rejection at > 26 GHz
- Ultra large band performance higher than 26 GHz
- Resonance free and phase stability
- Ultra low ESR and ESL

Finishing & assembly: compatible with standard wire bonding assembly (ball and wedge). The bottom electrode is in Ti/Ni/Au and the top electrode is in Gold (TiWAu). Other top finishings available on request. Compatible with standard wire bonding assembly (ball and wedge).

Parameter	Value
Operating temperature range	-55°C to 150°C
Temperature coefficient	70 ppm/K
Capacitance variation versus RVDC	-0.02% /V
Equivalent Series Inductance (ESL)	Typ 6pH@SRF
Equivalent Series Resistance (ESR)	Typ 14mΩ
Insulation resistance	10GΩ @RVDC@25°C t>120s for 10nF
Aging	Negligible <0.001% /1000h
Reliability	FIT<0.017 parts / billions hours



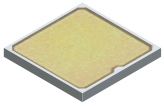
BV XX Free samples available on demand

BV XX Manufacturing on request or under development

WTSC WXSC

Wire-bondable vertical Silicon Capacitors up to 250°C

LINK



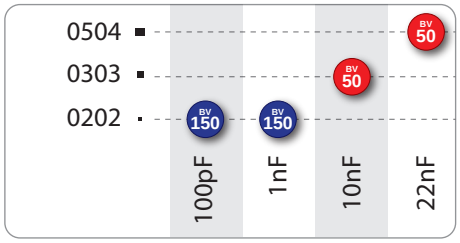
Applications: target **RF High Power applications for wireless space communication,** radar, lidar and data broadcasting systems. **Suitable for DC decoupling, matching network, and harmonic / noise filtering functions**.

Features:

- Ultra high stability of capacitance value with temperature, voltage, and aging.
- Low leakage current.

Finishing & assembly: 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 Aluminum. Other top finishings available on request.

Parameter	Value
Operating temperature range	-55°C to 250°C (for WXSC)
Temperature coefficient	70 ppm/K
Capacitance variation versus RVDC	-0.02% /V
Equivalent Series Inductance (ESL)	Typ 50pH@SRF
Equivalent Series Resistance (ESR)	Typ 50mΩ
Insulation resistance	10GΩ @RVDC@25°C t>120s for 10nF
Aging	Negligible <0.001% /1000h
Reliability	FIT<0.017 parts / billions hours



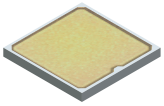
BV XX Free samples available on demand

BV XX Manufacturing on request or under development

WBSC WLSC

Wire-bondable vertical low profile Silicon Capacitors down to 100µm

LINK



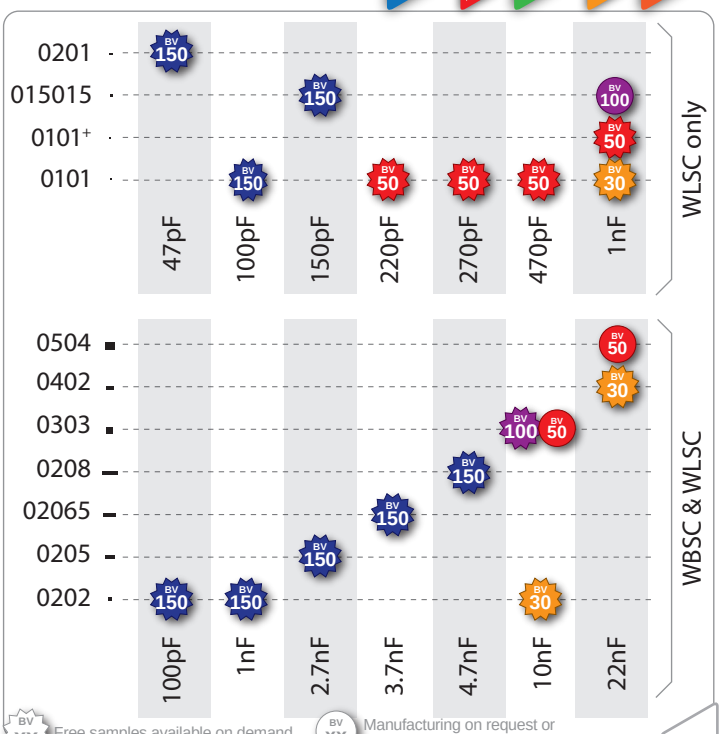
Applications: target **RF High Power applications** and can address wireless communication, radar and **high-end industrial LIDAR applications**. Suitable for **DC decoupling, matching network, and harmonic / noise filtering functions**. WLSC offers **low profile** package for applications with height and volume constraints.

Features:

- Ultra low profile 100 µm (WLSC)
- Low leakage current.

Finishing & assembly: Can be directly mounted on the PCB using die bonding and wire bonding(s). Bottom electrode in Ti/Ni/Au and top electrode in Gold (TiWAu). Other top finishings available on request.

Parameter	Value
Operating temperature range	-55°C to 150°C
Temperature coefficient	70 ppm/K
Capacitance variation versus RVDC	-0.02% /V
Equivalent Series Inductance (ESL)	Typ 50pH@SRF
Equivalent Series Resistance (ESR)	Typ 50mΩ
Insulation resistance	10GΩ @RVDC@25°C t>120s for 10nF
Aging	Negligible <0.001% /1000h
Reliability	FIT<0.017 parts / billions hours



BV XX Free samples available on demand

BV XX Manufacturing on request or under development

WLDC

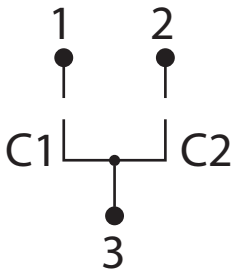
Vertical Wirebond low profile Silicon Dual capacitor

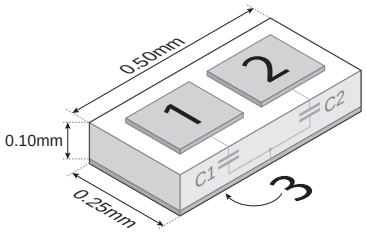
Applications: WLDC Capacitors targets **power supplies decoupling and filtering** of active devices

Features:

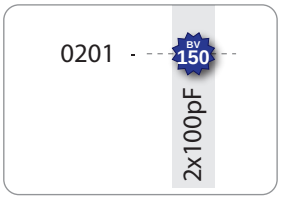
- Compatible with MLCC footprint
- Ultra low profile 100 µm (WLSC)
- Low leakage current.

Finishing & assembly: Can be directly mounted on the PCB using die bonding and wire bonding(s). Bottom electrode in Ti/Ni/Au and top electrode in Gold (TiWAu). Other top finishings available on request.





Parameter	Value
Operating temperature range	-55°C to 150°C
Temperature coefficient	70 ppm/K
Capacitance variation versus RVDC	-0.02% /V
Equivalent Series Inductance (ESL)	Typ 20pH@SRF
Equivalent Series Resistance (ESR)	Typ 150mΩ
Insulation resistance	10GΩ @RVDC@25°C t>120s for 10nF
Aging	Negligible <0.001% /1000h
Reliability	FIT<0.017 parts / billions hours



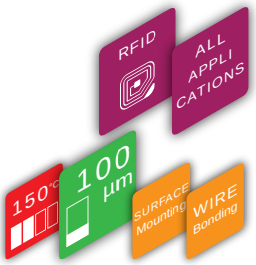
BV XX Free samples available on demand

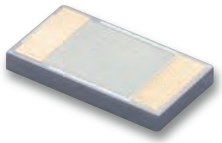
BV XX Manufacturing on request or under development

LPSC

Low profile Silicon Capacitors down to 100µm

LINK





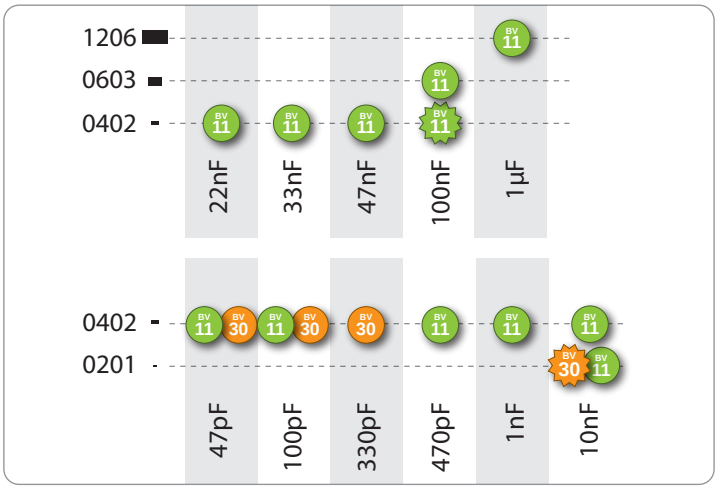
Applications: target **antenna matching, RF filtering and decoupling** of active dies, in applications with height and volume constraints such as **Smart Card, RFID tags, medical**...

Features:

- Ultra low profile (100 µm thin, 80 µm on request)
- Very low leakage current
- ESD Enhanced range (especially for RFID environments)
- High Q
- Low leakage current down to 100 pA
- Low ESL and low ESR
- SRF > 1.2GHz for 100 pF

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

Parameter	Value
Operating temperature range	-55°C to 150°C
Temperature coefficient	70 ppm/K
Capacitance variation versus RVDC	-0.02% /V
Insulation resistance	100GΩ @RVDC@25°C t>120s for 100nF
Aging	Negligible <0.001% /1000h
Reliability	FIT<0.017 parts / billions hours



BV XX Free samples available on demand

BV XX Manufacturing on request or under development

HTSC XTSC

Extreme temperature Silicon Capacitors up to 250°C

LINK

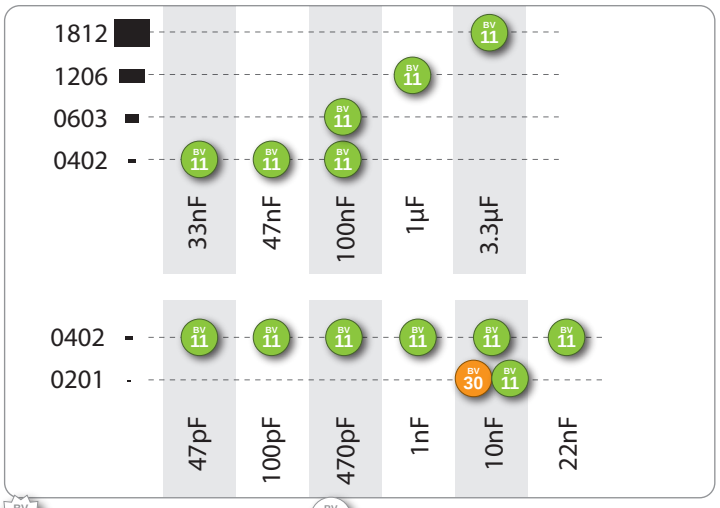
Applications: JEDEC compatible capacitor ranges targeting applications in **extreme conditions**, like **Hi Rel applications**, the high temperature range apacitors HTSC up to 200°C and the extreme temperature range capacitors XTSC **from -250°C for cryogenic applications up to 250°C**.

Features:

- Extended operating temperature range (up to 250°C) with low capacitance variation.
- High stability.
- High reliability.
- Low leakage current.
- Very low ESR and ESL

Finishing & assembly: Lead-free NiAu finishing compatible with wirebonding or leadframe soldering. Aluminum pads on request.

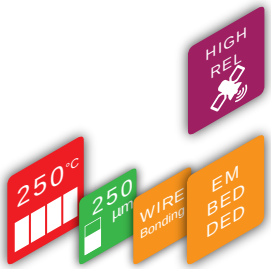
Parameter	Value
Operating temperature range	-55°C to 250°C (for XTSC)
Temperature coefficient	70 ppm/K
Capacitance variation versus RVDC	-0.1% /V
Insulation resistance	100GΩ @RVDC@25°C t>120s for 100nF
Aging	Negligible <0.001% /1000h
Reliability	FIT<0.017 parts / billions hours



ETSC EXSC

Extreme temperature wire-bondable Silicon Capacitors up to 250°C

LINK



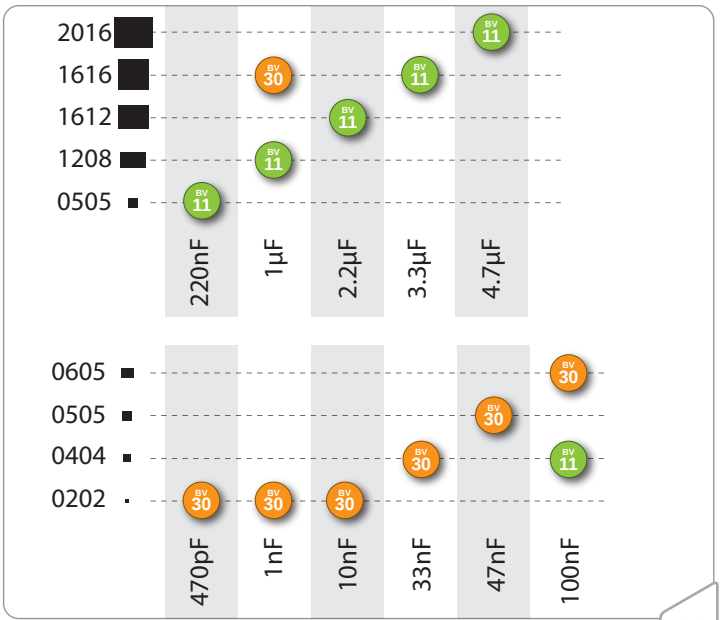
Applications: designed to be compliant with **high temperature wire bond technologies**. Applications include downhole industries, decoupling, filtering, charge pump, replacement of X8R and C0G dielectrics, and **high reliability applications, mainly for Multi-Chip Module assemblies**.

Features:

- Low leakage current
- High operating temperature
- High stability (temperature, voltage and aging)
- High reliability

Finishing & assembly: Pad finishing in Aluminum. Other finishing available such as copper, nickel or gold.

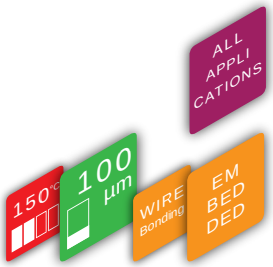
Parameter	Value
Operating temperature range	-55°C to 250°C (for EXSC)
Temperature coefficient	70 ppm/K
Capacitance variation versus RVDC	-0.1% /V
Insulation resistance	100GΩ @RVDC@25°C t>120s for 100nF
Aging	Negligible <0.001% /1000h
Reliability	FIT<0.017 parts / billions hours

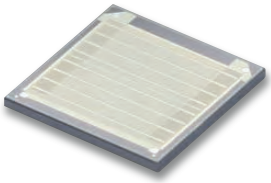


EMSC

Wire-bondable or embedded low profile Silicon Capacitors down to 100µm

LINK





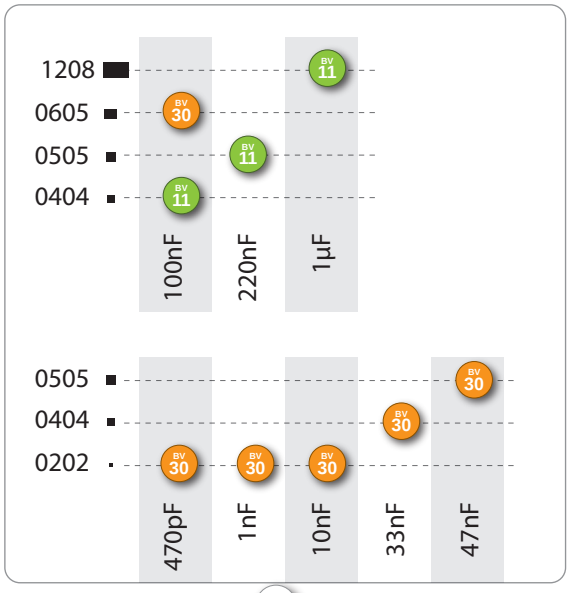
Applications: designed to be compliant with the **embedding process for printed circuit board and laminates**. Can also be used with wire bond technologies. Targets Chip On Board, Chip On Foil, Chip On Glass, Chip On Ceramic, flip chip and embedded applications.

Features:

- Ultra Low profile 100 µm (80 µm on request).
- High stability (temperature, voltage and aging).
- Low ESL and ESR.
- Low leakage current.
- High reliability.

Finishing & assembly: Pad finishing in Aluminum. Other finishing available such as copper, nickel or gold. Applicable for almost all embedded applications.

Parameter	Value
Operating temperature range	-55°C to 150°C
Temperature coefficient	70 ppm/K
Capacitance variation versus RVDC	-0.1% /V
Insulation resistance	100GΩ @RVDC@25°C t>120s for 100nF
Aging	Negligible <0.001% /1000h
Reliability	FIT<0.017 parts / billions hours



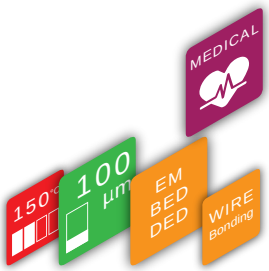
BV XX Free samples available on demand

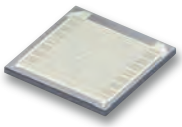
BV XX Manufacturing on request or under development

MGSC

Medical grade Silicon Capacitors

LINK





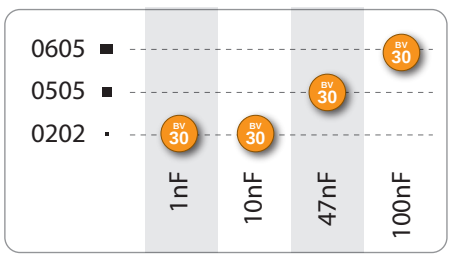
Applications: targets **high reliability medical applications** such as implantable devices (pacemaker, defibrillator...). Optimized in terms of reliability to avoid any burning test and to ensure that the initial failure rate is drastically lower than other ceramic types.
The **very low leakage current** enables to improve the performances of battery based applications and increase their lifetime.

Features:

- High reliability.
- Extreme low profile.
- High stability over voltage, temperature and aging.
- Die to die stacking

Finishing & assembly: Aluminum pads suitable for wirebonding assembly. Copper finishing option for embedded technology.

Parameter	Value
Operating temperature range	-55°C to 150°C
Temperature coefficient	70 ppm/K
Capacitance variation versus RVDC	-0.1% /V
Insulation resistance	50GΩ @10V@25°C t>120s for 100nF
Aging	Negligible <0.001% /1000h
Reliability	FIT<0.017 parts / billions hours



Free samples available on demand BV XX

Manufacturing on request or under development BV XX

ATSC

Automotive high temperature Silicon Capacitors up to 200°C

LINK

AEC-Q100

AUTO MOTIVE

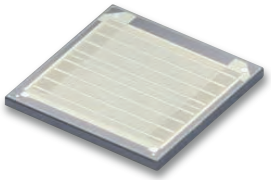
200°C | 250 µm | WIRE Bonding

Applications: target under-the-Hood electronics and all sensors exposed to harsh conditions in the **automotive market segment**. Optimized for decoupling functions.

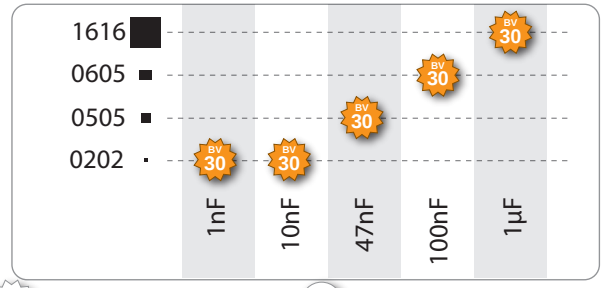
Features:

- Qualified according to AEC-Q100
- High stability
- 16 V operating voltage
- Load dump
- 8 kV HBM ESD

Finishing & assembly: Pad finishing in Aluminum. Suitable for high temperature wirebonding, leadframe mounting and other mountings. Other finishings available such as nickel or gold.



Parameter	Value
Operating temperature range	-55°C to 200°C
Temperature coefficient	70 ppm/K
Capacitance variation versus RVDC	-0.1% /V
Insulation resistance	50GΩ @RVDC@25°C t>120s for 100nF
Aging	Negligible <0.001% /1000h
Reliability	FIT<0.017 parts / billions hours



BV XX Free samples available on demand

BV XX Manufacturing on request or under development

WASC

Automotive wire-bondable vertical Silicon Capacitors

LINK

AEC-Q100

AUTO MOTIVE

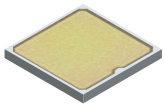
150°C | 100 µm | 250 µm | WIRE Bonding VERTICAL | Vert.

Applications: Targets any demanding **automotive applications**, such as ADAS sensors (Lidars, Radars) as well as all Automotive SiP devices (Mems sensors, TPMS...). Optimized for supply decoupling / filtering of active devices requiring **ultra low ESL**.

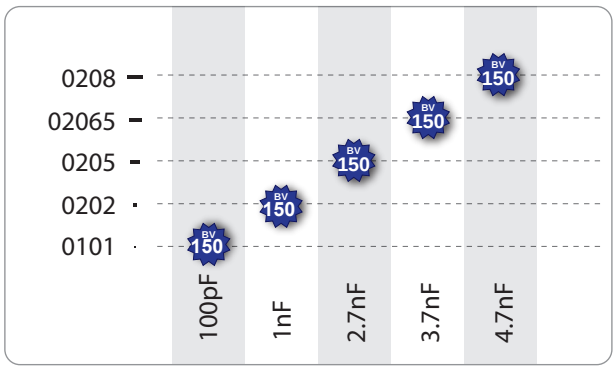
Features:

- AECQ-100 Qualification
- Ultra-high stability of capacitance value
- Low leakage current
- Compatible with high temperature cycling during manufacturing operations (exceeding 300 °C

Finishing & assembly: directly mounted on the PCB using die bonding and wire bonding(s). Bottom electrode is in TiNiAu and top electrode in Gold (TiWAu). Other top finishings available on request (thick Gold or Aluminum). Compatible with standard wire bonding assembly (ball and wedge).



Parameter	Value
Operating temperature range	-55°C to 150°C
Temperature coefficient	70 ppm/K
Capacitance variation versus RVDC	-0.02% /V
Equivalent Series Inductance (ESL)	Typ 6pH@SRF
Equivalent Series Resistance (ESR)	Typ 14mΩ
Insulation resistance	100GΩ @RVDC@25°C t>120s for 100nF
Aging	Negligible <0.001% /1000h
Reliability	FIT<0.017 parts / billions hours



BV XX Free samples available on demand

BV XX Manufacturing on request or under development

HSSC

High stability & reliability Silicon Capacitors

LINK

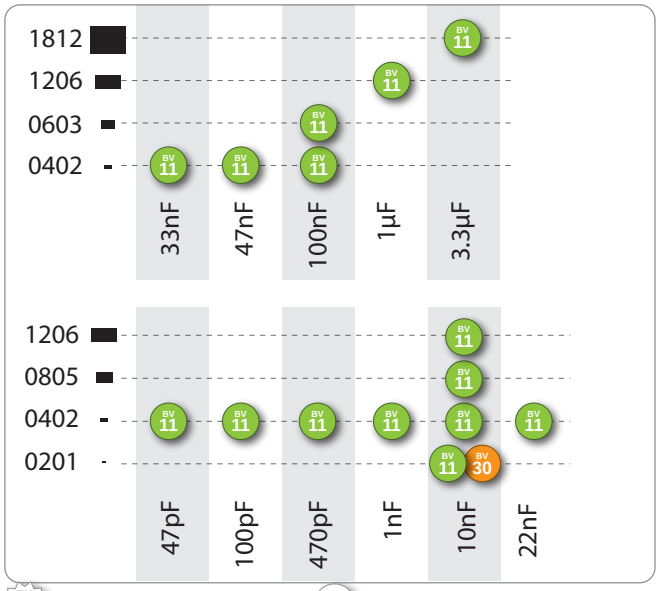
Applications: avoids the need to oversize the capacitor value for **sensitive capacitive circuitry.** Offers higher DC voltage stability. Provides **outstanding capacitor stability** over the full operating voltage & temperature ranges. Improve battery lifetime up to 30% in mobile applications thanks to **very high and stable insulation resistance**.

Features:

- Ultra high stability (temperature, voltage, aging).
- Low leakage current (high insulation resistance).
- Very low ESR and ESL.
- Negligible capacitance change with temperature variation.
- Low profile

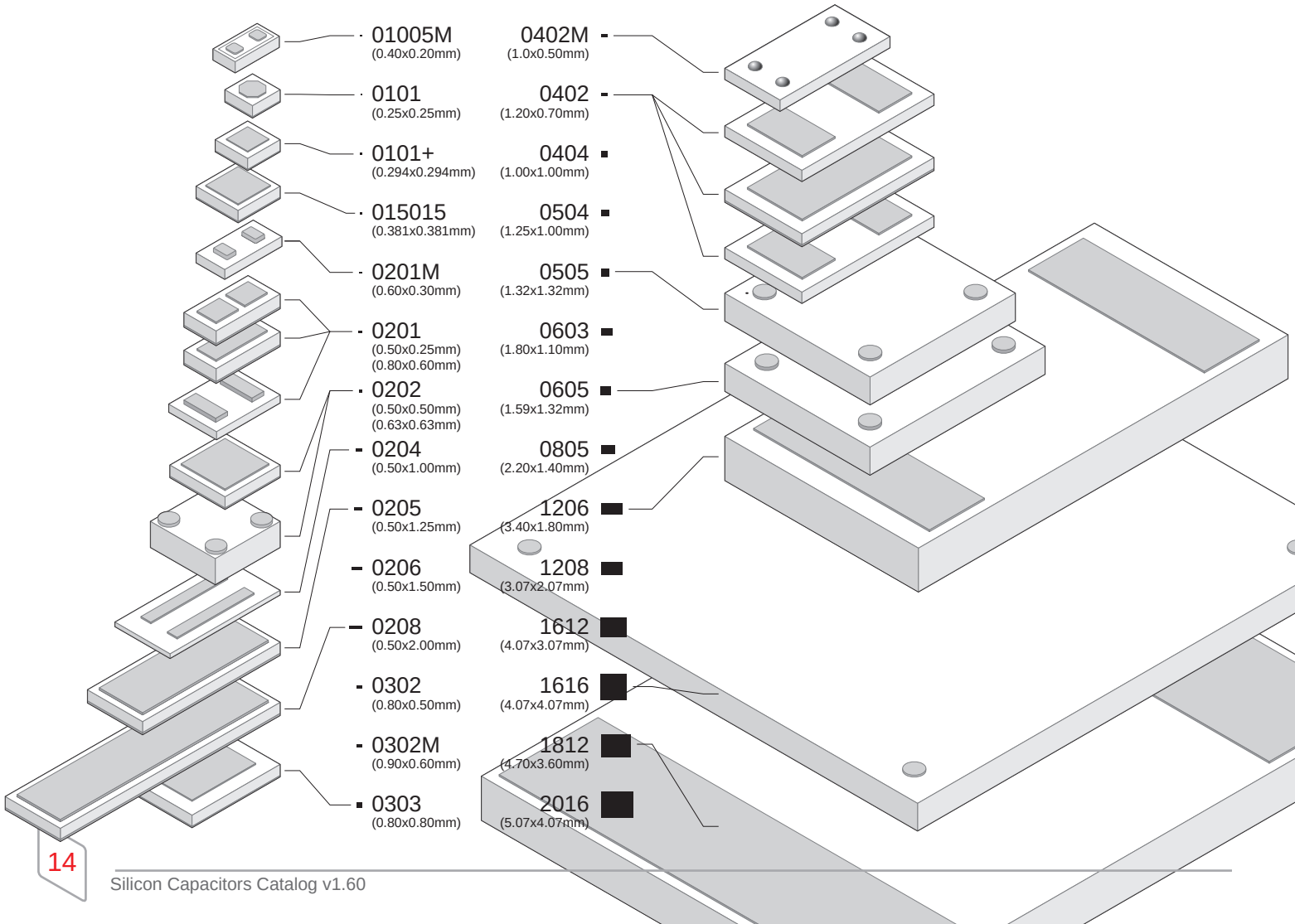
Finishing & assembly: Lead-free NiAu compatible with automatic soldering technologies (reflow and manual). Other terminations available on request.

Parameter	Value
Operating temperature range	-55°C to 150°C
Temperature coefficient	70 ppm/K
Capacitance variation versus RVDC	-0.1% /V
Insulation resistance	100GΩ @RVDC@25°C t>120s for 100nF
Aging	Negligible <0.001% /1000h
Reliability	FIT<0.017 parts / billions hours



BV XX Free samples available on demand

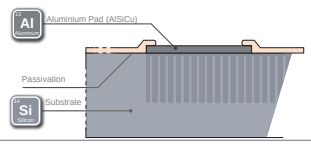
BV XX Manufacturing on request or under development



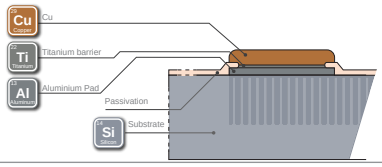
Finishing

Sillicon Capacitors are proposed with different finishings depending on series and options. For custom products, finishing can be adapted to the meet the customers requirements.

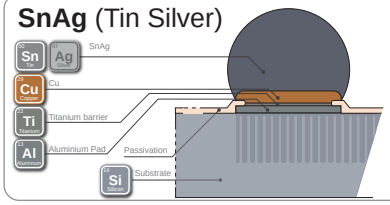
Al (Aluminum)



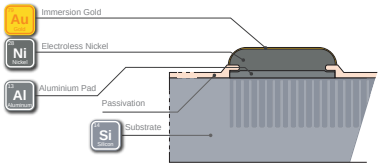
Cu (Copper)

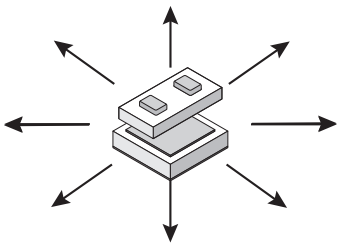


SnAg (Tin Silver)

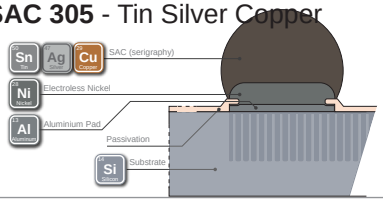


NiAu (Nickel Gold) - ENIG

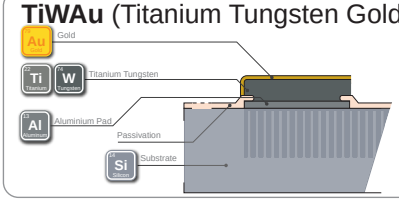




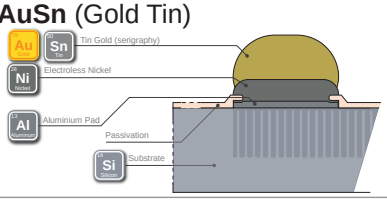
SAC 305 - Tin Silver Copper



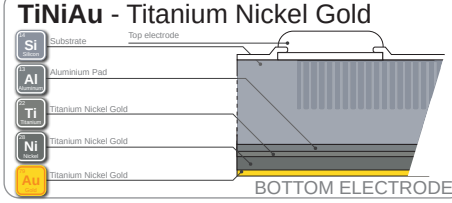
TiWAu (Titanium Tungsten Gold)



AuSn (Gold Tin)

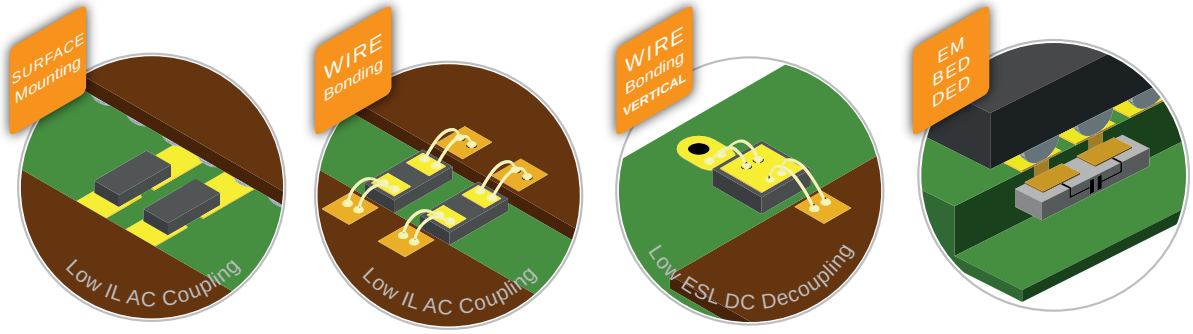


TiNiAu - Titanium Nickel Gold



Assembly

Sillicon Capacitors are mainly applicable for soldering or wire-bonding. Depending on finishing, some can also be embedded. Custom capacitors and IPD are also available with bumps.



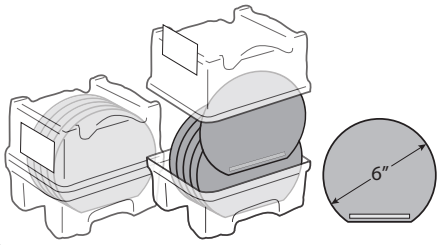
Link to Assembly Notes

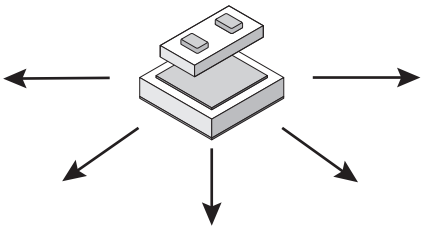
LINK

Packaging

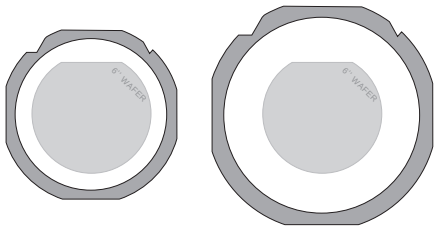
Silicon Capacitors are delivered in different packaging, depending on availability and customer needs.

Raw Wafers

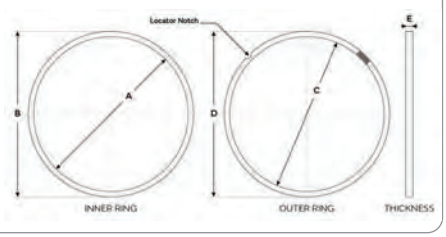




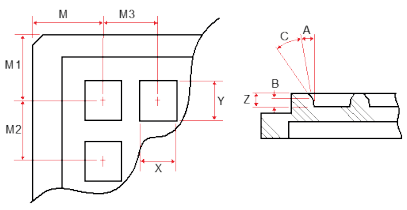
Film Frame Carrier



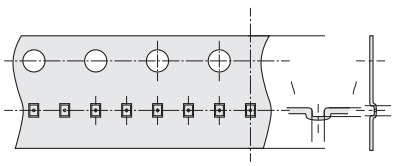
Grip Ring



Waffle Pack



Tape & Reel



Silicon Capacitors

Global locations

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⚠Note

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② Aerospace equipment
③ Undersea equipment
④ Power plant equipment
⑤ Medical equipment
⑥ Transportation equipment (vehicles, trains, ships, etc.)
⑦ *Traffic signal equipment*
⑧ Disaster prevention / crime prevention equipment
⑨ Data-processing equipment
⑩ Application of similar complexity and/or reliability requirements to the applications listed above

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