

UBEC / BBEC / ULEC - 60+/40/20 GHz

Ultra Broadband Wire Bondable Embedded Silicon Capacitors



Rev 1.3

Key features

- 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
- High stability of capacitance value over temperature, voltage and aging
- High reliability
- Compatible with standard wire bonding assembly (ball and wedge) and embedding.

(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 (100 μm)

UBEC/BBEC/ULEC Capacitors target **optical communication systems** (ROSA/TOSA,SONET and all optoelectronics) as well as **high speed data systems** or products. The UBEC/BBEC/ULEC 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** up to 67 GHz for the UBEC, up to 40 GHz for the BBEC and up to 20 GHz for the ULEC. These deep trench silicon capacitors have been developed with a semiconductor MOS process.

The UBEC/BBEC/ULEC capacitors provide **very high reliability** and capacitance stability over temperature (+60ppm/K) and voltage. They have an 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 Aluminum terminations for wire bonding and on request with thick copper terminations for embedding.



Electrical specifications

Part number	Product description	Case size	Thickness
UBEC.xxx	Ultra BroadBand Embedded/Wire bondable Silicon Capacitor from -55 to 150°C, 60 GHz+ with Al termination		
935157725410-xxA	Ultra BroadBand Embedded/Wire bondable Silicon Capacitor 1 nF, 60 GHz+, BV>30 V	0201M	100 µm
935157725456-xxA	Ultra BroadBand Embedded/Wire bondable Silicon Capacitor 5.6 nF, 60 GHz+, BV>30 V	0201M	100 µm
935157425510-xxA	Ultra BroadBand Embedded/Wire bondable Silicon Capacitor 10 nF, 60 GHz+, BV>11 V	0201M	100 µm
935157421610-xxA	Ultra BroadBand Embedded/Wire bondable Silicon Capacitor 100 nF, 60 GHz+, BV>11 V	0404	100 µm
BBEC.xxx	BroadBand Embedded/Wire bondable Silicon Capacitor, from -55 to 150°C, 40 GHz with Al termination		
939132421610-xxA	BroadBand Embedded/Wire bondable Silicon Capacitor 100 nF, 40 GHz, BV>11 V	0404	100 µm
ULEC.xxx	Ultra Large band Embedded/Wire bondable Silicon Capacitor, from -55 to 150°C, 20 GHz with Al termination		
935158421610-xxA	Ultra Large band Embedded/Wire bondable Silicon Capacitor 100 nF, 20 GHz, BV>11 V	0404	100 µm

Parameter	Value
Capacitance range	1 nF to 100 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 VDC or 30 VDC
Capacitance variation versus RVDC	0.1 % /V (from 0 V to RVDC)
Insertion loss (IL) up to 60 GHz	<0.4 dB(***)
Return Loss (RL) up to 60 GHz	>20 dB(***)
Equivalent Series Inductance (ESL)	Typ. 100 pH(***) @ SRF
Equivalent Series Resistance (ESR)	Typ. 30 mΩ (***)
Insulation resistance	100 GΩ @ RVDC, @25°C, t>120s, for 100nF
Ageing	Negligible, < 0.001% / 1000 h
Reliability	FIT<0.017 parts / billion hours
Capacitor height	Max 100 µm

(*) Other values on request (**) w/o packing
(***) e.g. UBEC 10 nF/0201M/BV 11 V

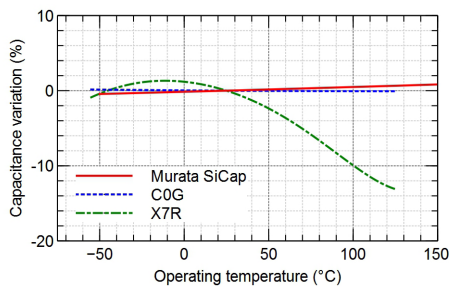


Fig. 1: Capacitance variation vs temperature (for UBEC/BBEC/ULEC and MLCC technologies)

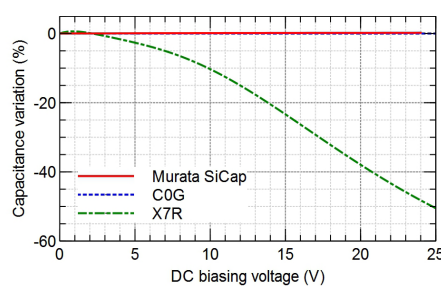


Fig. 2: Capacitance variation vs DC biasing voltage @ BV 30 (for UBEC/BBEC/ULEC and MLCC technologies)

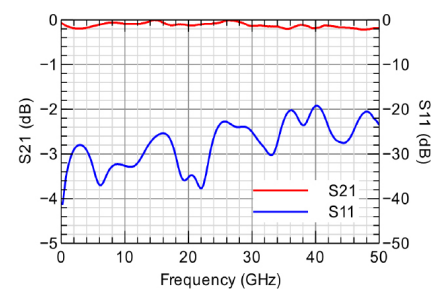
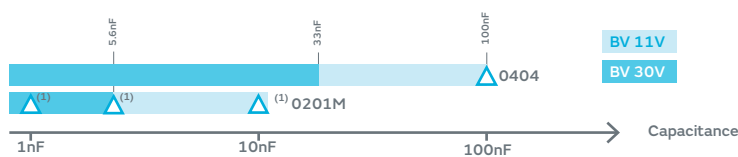


Fig. 3: 5.6 nF/0201M UBEC BV30 measurement results (S-parameters in transmission mode with wire bonding de-embedded)

Modelithics® FREE S-Parameters-Based Linear Simulation Models for ADS: <http://www.modelithics.com>

Capacitance range



(1) 0201M-1nF and 5.6nF-BV30 available as UBEC only.

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

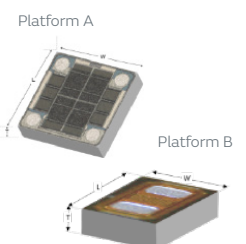
Termination

Can be directly mounted on the PCB using die bonding and wire bonding(s). Capacitors with top electrodes in 3 µm Aluminum (Al/Si/Cu). Other top finishings available on request (ex: Gold - TiW/Au). Compatible with standard wire bonding assembly (ball and wedge) and embedding.

Package Outline

	Case size (typ. +/-0.02mm)			Platform
	L	W	T(****)	
0201M	0.60	0.30	0.10	B
0404	1.06	1.06		A
01005M	0.40	0.20		B

(****) thickness excluding bump height
For landing pad dimensions on your PCB layout, please refer to our assembly application note



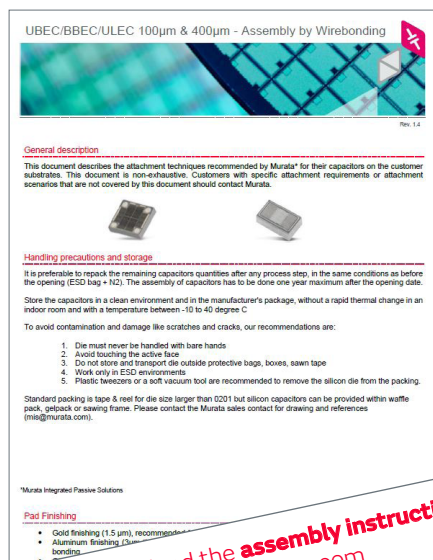
Packaging

Tape & reel (except for 0201M and 01005M), wafer pack, film frame carrier or raw wafer delivery.



Assembly by Wirebonding

The attachment techniques recommended by Murata for the UBEC/BBEC/ULEC 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 > UBEC / BBEC /
ULEC Series

**Download the pdf files called “Assembly Note UBEC / BBEC
/ ULEC V1.4_Murata ”**

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