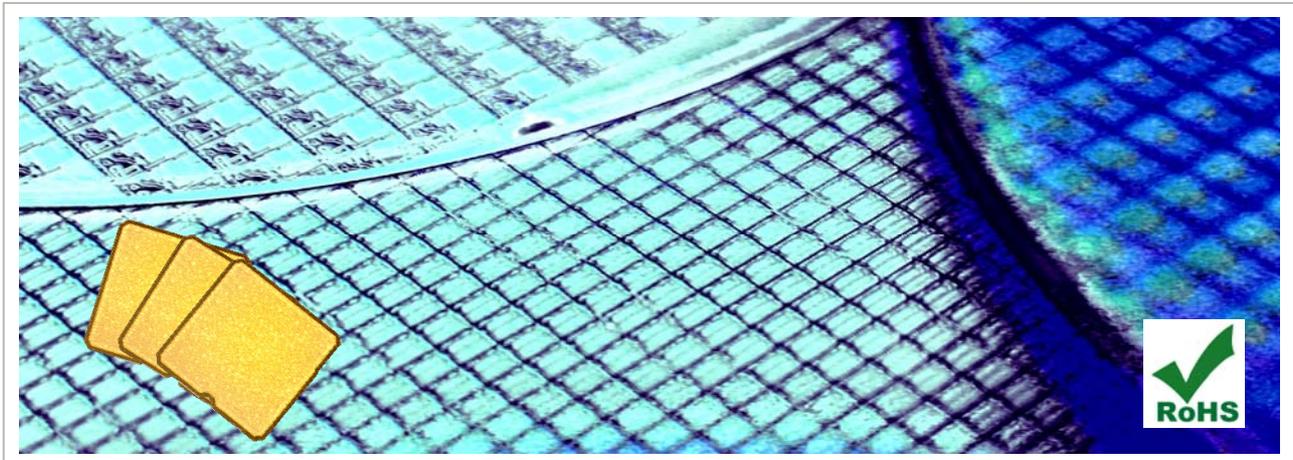




UWSC – Ultra large-band Wire bonding Silicon Capacitor – Wire Bondable Vertical

Rev 1.5



Key Features

- Ultra largeband performance up to 26 GHz
- Resonance free
- Phase stability
- Unique capacitance value of 1nF in 0101
- Ultra high stability of capacitance value
 - Temperature $< \pm 0.5\%$ (-55°C to +150°C)
 - Voltage $< 0.02\%$ /V
 - Negligible aging $< 0.001\%$ /1000 hours
- Ultra low ESR and ESL
- High reliability (FIT < 0.017 parts/billion hours)
- Compatible with standard wire bonding assembly (ball and wedge)*

* 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
- Low profile applications (250 μm , 100 μm on request)

UWSC Capacitors target **optical communication systems** (ROSA/TOSA, SONET and all optoelectronics) as well as **high speed data systems** or products. The UWSC are designed for DC decoupling and bypass applications. The unique technology of integrated passive devices in silicon developed by IPDiA, offers **high rejection up to 26GHz**. The UWSC capacitors are manufactured with both deep trench and MOS semiconductor processes to cover low and high capacitance requirements.

The UWSC capacitors provide **very high reliability** and capacitance stability over temperature ($\pm 0.5\%$) 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 gold terminations.

Electrical Specifications

Part number	Product description	Case Size	Thickness
UWSC.xxx	Ultra largeband Wire bondable vertical Silicon Capacitor, from -55 to 150°C, 26GHz with Au termination		
935 153 622 410	Ultra largeband Wire bondable vertical Si Cap 1nF, BV>50V	0101	250µm
935 153 620 510	Ultra largeband Wire bondable vertical Si Cap 10nF, BV>50V	0303	250µm
935 153 624 522	Ultra largeband Wire bondable vertical Si Cap 22nF, BV>50V	0504	250µm
935 153 821 510	Ultra largeband Wire bondable vertical Si Cap 10nF, BV>30V	0202	250µm
935 154 622 410	Ultra largeband low profile Wire bondable vertical Si Cap 1 nF, BV>50V	0101	100µm
935 154 620 510	Ultra largeband low profile Wire bondable vertical Si Cap 10nF, BV>50V	0303	100µm
935 154 821 510	Ultra largeband low profile Wire bondable vertical Si Cap 10nF, BV>30V	0202	100µm

Parameters	Value
Capacitance range	10pF to 100 nF ^(**)
Capacitance tolerance	± 15 % ^(**)
Operating temperature range	-55 °C to 150 °C
Storage temperature	- 70 °C to 165 °C
Temperature coefficient	<±0.5 %, from -55 °C to +150 °C
Breakdown voltage (BV)	11, 30, 50, 150, 450 V ^(**)
Capacitance variation versus RVDC	0.02 %/V (from 0 V to RVDC)
Equivalent Serial Inductance (ESL)	typ 6 pH ^(**) @SRF
Equivalent Serial Resistance (ESR)	typ. 14 mΩ ^(**)
Insulation resistance	100 GΩ min @ RVDC & +25°C
Aging	Negligible, < 0.001 % / 1000h
Reliability	FIT<0.017 parts / billion hours,
Capacitor height	Max 250 µm or 100 µm

(**) Other values on request

(**) e.g. 10nF/0303/BV 50V

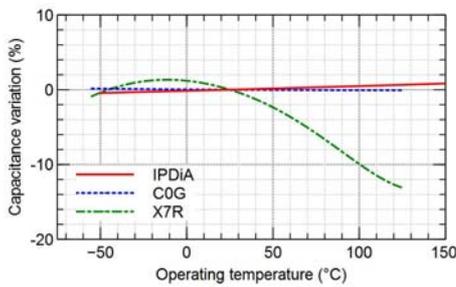


Fig.1: Capacitance variation vs temperature (for UWSC and MLCC technologies)

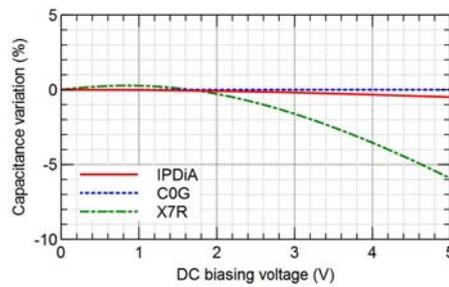


Fig.2: Capacitance variation vs DC biasing voltage (for UWSC and MLCC technologies)

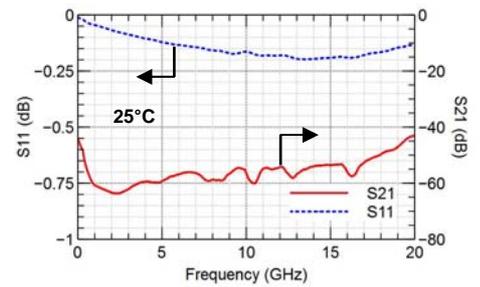
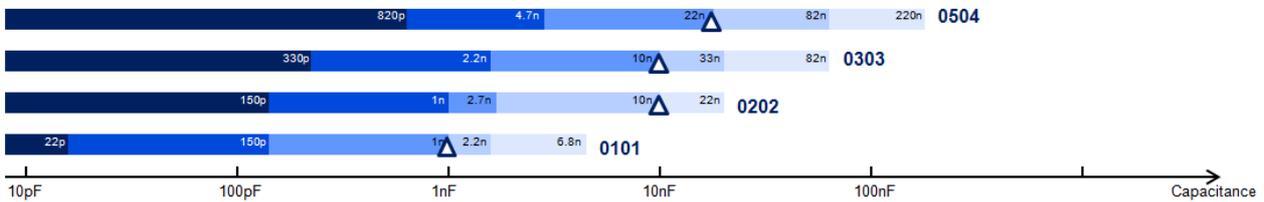


Fig.3: 10 nF/0303 UWSC measurement results (S-parameters in shunt mode)

UWSC Capacitance Range



△ Available parts – see table above

For other values, contact your IPDiA sales representative

■ BV 450V ■ BV 50V ■ BV 11V
■ BV 150V ■ BV 30V

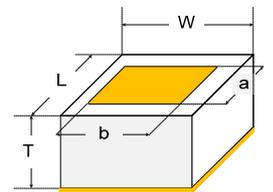
Termination and Outline

Termination

Can be directly mounted on the PCB using die bonding and wire bonding. Bottom electrode in Ti/Ni/Au and top electrode in Ti/Cu/Ni/Au. Other top finishings available on request (ex: 3µm Al/Si/Cu). Compatible with standard wire bonding assembly (ball and wedge).

Package Outline

(mm)	Pad dimension		Case size (typ. ±0.01mm)		
	a	b	L	W	T
0101	>0.15	>0.15	0.25 ⁽¹⁾	0.25 ⁽¹⁾	0.25 (standard profile) or 0.10 (low profile)
0201	>0.40	>0.15	0.50	0.25	
0202	>0.40	>0.40	0.50	0.50	
0303	>0.70	>0.70	0.80	0.80	
0404	>0.94	>0.94	1.04	1.04	
0503	>1.17	>0.72	1.27	0.82	
0504	>1.28	>0.92	1.38	1.02	



Packing

Tape and reel, waffle pack, film frame carrier or raw wafer delivery.

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