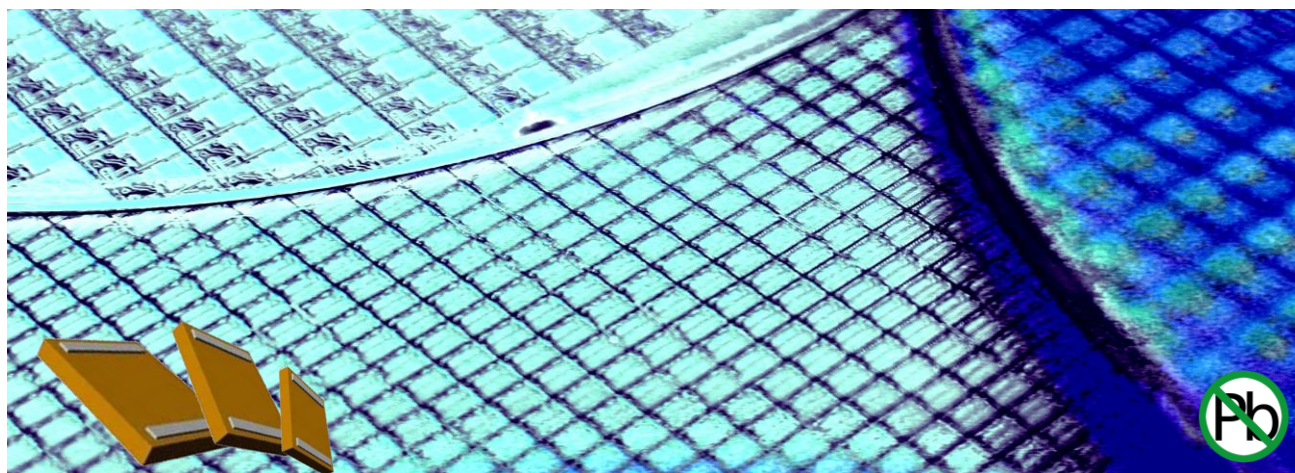


# HTSC424.xxx - 0402 High Temperature Silicon Capacitor

Rev 3.1



## Key features

- High stability up to 200°C:
  - ◆ Temperature  $\leq \pm 1\%$  (-55 °C to +200 °C)
  - ◆ Voltage  $< 0.1\%$  /V
  - ◆ Negligible capacitance loss through aging
- Unique high capacitance in EIA/0402 package size, up to 47 nF
- High reliability (FIT  $< 0.017$  parts / billion hours)
- Low leakage current down to 100 pA
- Low ESL and Low ESR
- Suitable for lead free reflow-soldering \*Please refer to our assembly Application Note for further recommendations

Thanks to the unique IPDiA Silicon capacitor technology, most of the problems encountered in demanding applications can be solved.

High Temperature Silicon Capacitors are dedicated to applications where **reliability** up to **200°C** is the main parameter.

This technology features a capacitor integration capability (up to 250nF/mm<sup>2</sup>) which offers capacitance value similar to X7R dielectric, but with better electrical performances than C0G/NP0 dielectrics, up to **200°C**.

HTSC provides the highest capacitor **stability** over the full -55°C/+200°C temperature range in the market with a **Temperature coefficient Lower than  $\pm 1\%$** .

## Key applications

- All applications up to 200°C, such as military, aerospace and automotive industries
- High reliability applications
- Replacement of X7R and C0G dielectrics
- Decoupling / Filtering / Charge pump (i.e.: motor management, temperature sensors)
- Downsizing

The IPDiA technology offers industry leading performances relative to **Failure rate** with a FIT $<0.017$ .

This technology also offers **high reliability**, up to 10 times better than alternative capacitor technologies, such as Tantalum or MLCC, and eliminates cracking phenomena.

This Silicon based technology is RoHS compliant and compatible with lead free reflow soldering process.

## Electrical specification

		Capacitance value					
Unit	1 pF	Contact IPDIA Sales	Contact IPDIA Sales	Contact IPDIA Sales	Contact IPDIA Sales	Contact IPDIA Sales	Contact IPDIA Sales
	10 pF	100 pF: 935.132.424.310	150 pF: 935.132.424.315	220 pF: 935.132.424.322	330 pF: 935.132.424.333	470 pF: 935.132.424.347	680 pF: 935.132.424.368
	0.1 nF	1 nF: 935.132.424.410	1.5 nF: 935.132.424.415	2.2 nF: 935.132.424.422	3.3 nF: 935.132.424.433	4.7 nF: 935.132.424.447	6.8 nF: 935.132.424.468
	1 nF	10 nF: 935.132.424.510	15 nF: 935.132.424.515	22 nF: 935.132.424.522	33 nF: 935.132.424.533	47 nF: 935.132.424.547	Contact IPDIA Sales
	10 nF	100 nF: 935.132.424.610					

(\*) Thinner thickness (as low as 100 µm thick) available, see Low Profile Silicon Capacitor product: LPSC

(\*\*) Extended temperature range (up to +250 °C) available, see Xtreme Temperature Silicon Capacitor product: XTSC

(\*\*\*) Other values on request.

Parameters	Value
Capacitance range	100 pF to 100 nF <sup>(***)</sup>
Capacitance tolerances	±15 % <sup>(***)</sup>
Operating temperature range	-55 °C to 200 °C <sup>(**)</sup>
Storage temperatures	-70 °C to 215 °C
Temperature coefficient	<±1 %, from -55 °C to +200 °C
Breakdown voltage (BV)	11 VDC, 30VDC
Capacitance variation versus RVDC	0.1 % / V (from 0 V to RVDC)
Equivalent Serial Inductor (ESL)	Max 100 pH
Equivalent Serial Resistor (ESR)	Max 400mΩ <sup>(***)</sup>
Insulation resistance	50GΩ min @ 3V, 25°C 20GΩ min @ 3V, 200°C
Ageing	Negligible, < 0.001 % / 1000 h
Reliability	FIT < 0.017 parts / billion hours,
Capacitor height	Max 400 µm <sup>(*)</sup>

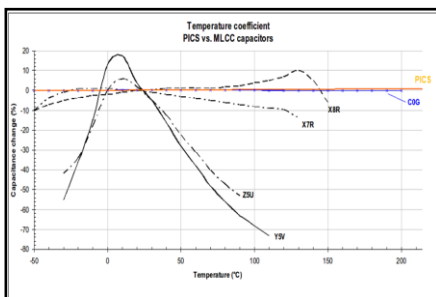


Fig.1 Capacitance change versus temperature variation compared with alternative dielectrics

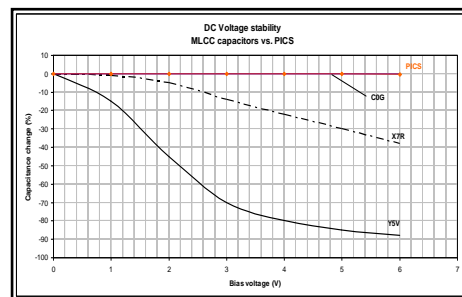


Fig.2 Capacitance change versus voltage variation compared with alternative dielectrics

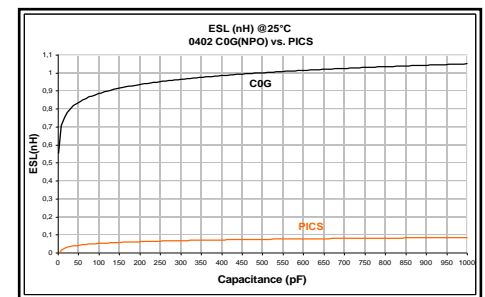


Fig.3 ESL versus capacitance value compared with alternative dielectrics

## Part Number

<b>935.132.</b>	<b>B.2</b>	<b>S.</b>	<b>U</b>	<b>XX</b>	<b>Value</b>
	Breakdown Voltage	Size	Unit		
	4 = 11V	4 = 0402	0 = 10 f		10
	7 = 30V		1 = 0.1 p	5 = 1 n	15
			2 = 1 p	6 = 10 n	22
			3 = 10 p	7 = 0.1 µ	33
			4 = 0.1 n	8 = 1 µ	47
				9 = 10 µ	68

i.e.: 47 nF/0402 case (HTSC type)  
→ 935.132.424.547

## Termination and Outline

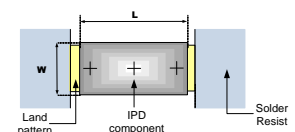
## Termination

Lead-free nickel/solder coating compatible with automatic soldering technologies: reflow and manual.

Typical dimensions, all dimensions in mm.

## Package outline

Typ.		0402
Comp. size	L	1.20±0.05
	W	0.70±0.05



(0402 PCB footprint)

## Packaging

Tape and reel, tray, waffle pack or wafer delivery.

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