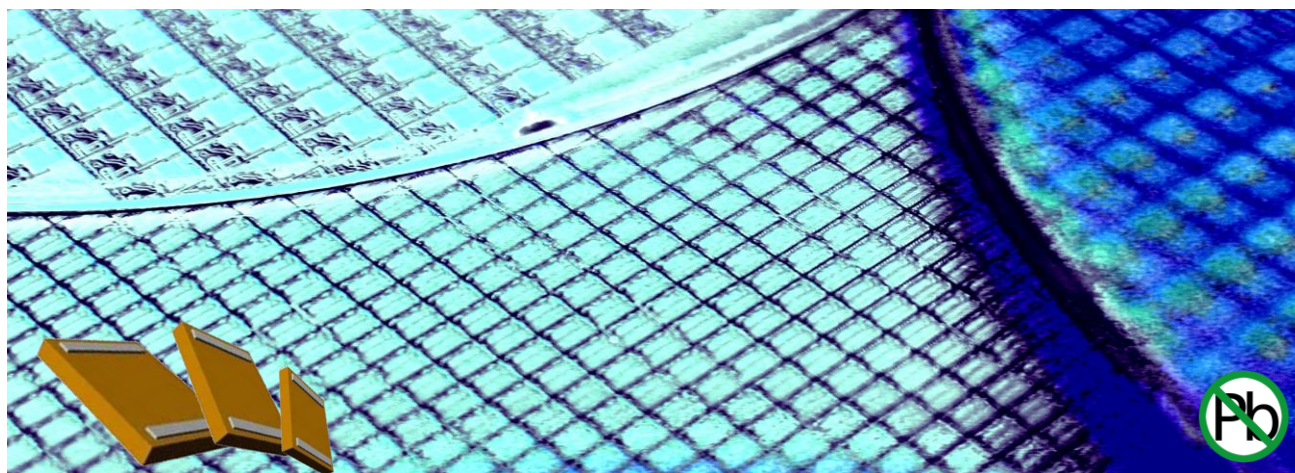


XTSC424.xxx - 0402 Extreme Temperature Silicon Capacitor

Rev 3.1



Key features

- Ultra High temperature up to 250°C:
 - ◆ Temperature Coeff : $<\pm 1.5\%$ (-55 °C to +250°C)
 - ◆ Voltage $<0.1\%$ /V
 - ◆ Negligible capacitance loss through aging
- Unique high capacitance in EIA/0402 package size, up to 100 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.

EXtreme Temperature Silicon Capacitors are appropriate for applications used in extreme operating temperature range (up to **250°C**).

XTSC industry leading performances allow to propose a **100nF in 0402** with a **TC $\leq\pm 1.5\%$** over the full -55°C/+250°C temperature range.

This technology also offers a **negligible ageing** and a stable insulation resistance, even at very high temperature, as well as a stable capacitor value over the full operating.

Key applications

- 250°C requirements, High temperature applications, such as military, aerospace, automotive and downhole industries.
- High reliability applications
- Replacement of X8R and C0G dielectrics
- Decoupling / Filtering / Charge pump (i.e.: pressure sensor, motor management)
- Downsizing

The IPDiA technology features a capacitor integration capability (up to 250nF/mm²) which allows a capacitance value similar to X8R dielectric, but with better electrical performances than C0G/NP0 dielectrics.

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: 935.133.424.310 | 150 pF: 935.133.424.315 | 220 pF: 935.133.424.322 | 330 pF: 935.133.424.333 | 470 pF: 935.133.424.347 | 680 pF: 935.133.424.368 |
| | 0.1 nF | 1 nF: 935.133.424.410 | 1.5 nF: 935.133.424.415 | 2.2 nF: 935.133.424.422 | 3.3 nF: 935.133.424.433 | 4.7 nF: 935.133.424.447 | 6.8 nF: 935.133.424.468 |
| | 1 nF | 10 nF: 935.133.424.510 | 15 nF: 935.133.424.515 | 22 nF: 935.133.424.522 | 33 nF: 935.133.424.533 | 47 nF: 935.133.424.547 | Contact IPDIA Sales |
| | 10 nF | 100 nF: 935.133.424.610 | | | | | |

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

(**) Other values on request.

| Parameters | Value |
|-----------------------------------|---|
| Capacitance range | 100pF to 100 nF ^(*) |
| Capacitance tolerances | ±15 % ^(*) |
| Operating temperature range | -55 °C to 250 °C |
| Storage temperatures | -70 °C to 265 °C |
| Temperature coefficient | ≤±1.5 %, from -55 °C to +250 °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 ^(*) |
| Insulation resistance | 50GΩ min @ 3V,25°C 10GΩ min @ 3V,250°C |
| Ageing | Negligible, < 0.001 % / 1000 h |
| Reliability | FIT<0.017 parts / billion hours, |
| Capacitor height | Max 400 µm ^(*) |

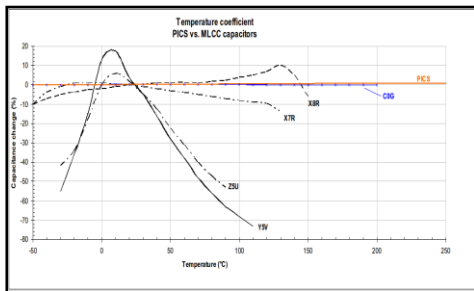


Fig.1 Capacitance change versus temperature variation compared with alternative dielectrics

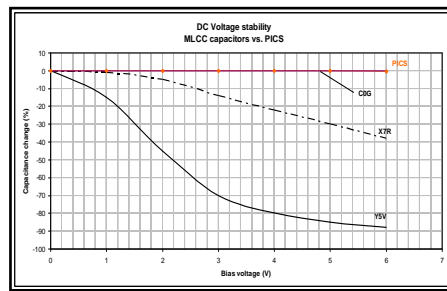


Fig.2 Capacitance change versus voltage variation compared with alternative dielectrics

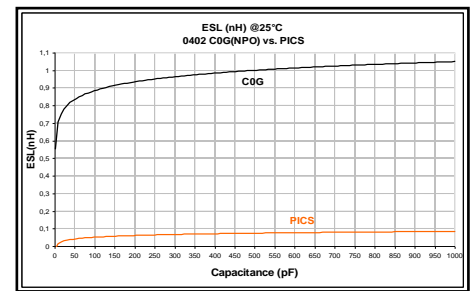


Fig.3 ESL versus capacitance value compared with alternative dielectrics

Part Number

935.133.

B.2 → Breakdown
Voltage
4 = 11V
7 = 30V

S. → Size
4 = 0402

U → Unit
0 = 10 f 5 = 1 n
1 = 0.1 p 6 = 10 n
2 = 1 p 7 = 0.1 µ
3 = 10 p 8 = 1 µ
4 = 0.1 n 9 = 10 µ

XX → Value (E6)
10
15
22
33
47
68

i.e.: 47 nF/0402 case (XTSC type)
→ 935.133.424.547

Termination and Outline

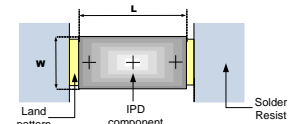
Termination

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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