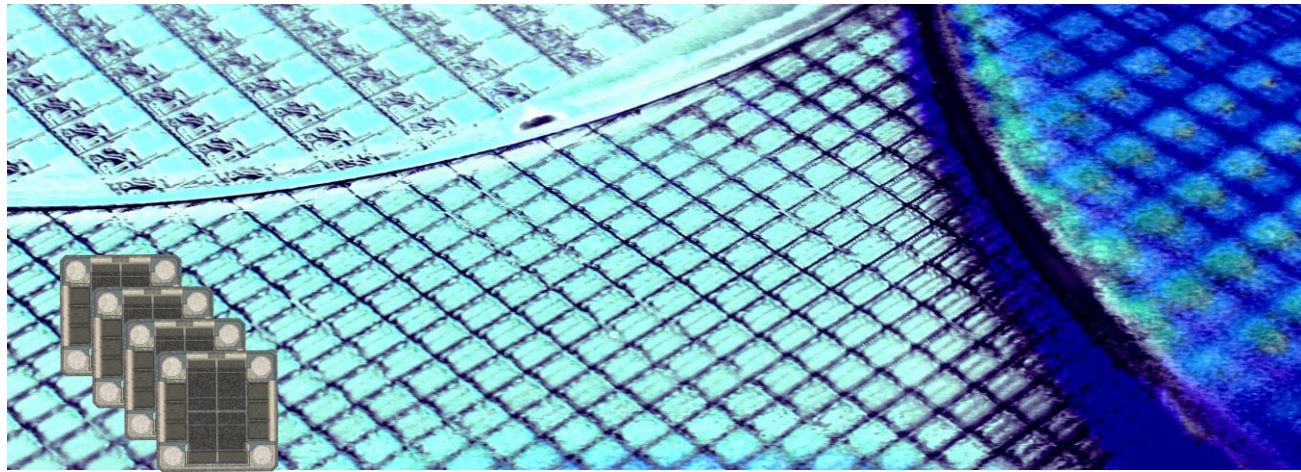


ETSC – Embedded & Wirebond Temperature Silicon Capacitor

Rev 3.6



Key features

- High Operating temperature (200°C)
- Low profile (250µm)
- High stability of capacitance value:
 - ◆ Temperature $\pm 1\%$ (-55°C to +200°C)
 - ◆ Voltage $< 0.1\%$ /Volts
 - ◆ Negligible capacitance loss through ageing
- Low leakage current down to 100pA
- High reliability
- Pad finishing : Aluminum

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

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

ETSC are the most appropriate solution for Chip On Board, Chip On Foil, Chip On Glass, Chip On Ceramic, flip chip and embedded applications.

This technology features a capacitor integration capability (up to 250nF/mm²) which offers capacitance value similar to X7R dielectric, but with better electrical performances than C0G/NP0 dielectrics, up to **200°C**.

Key applications

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

ETSC provides the highest capacitor **stability** over the full -55°C/+200°C temperature range in the market with a **TC<1%**.

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						
		10	15	22	33	39	47	68
Unit	10pF	Contact IPDIA Sales	Contact IPDIA Sales	Contact IPDIA Sales	Contact IPDIA Sales	390pF/0202/30V 935 124 72C 339	470pF/0202/30V 935 124 72C 347	680pF/0202/30V 935 124 72C 368
	0.1nF	1nF/0202/30V 935 124 72C 410	Contact IPDIA Sales	Contact IPDIA Sales	Contact IPDIA Sales	Contact IPDIA Sales	Contact IPDIA Sales	Contact IPDIA Sales
	1nF	10nF/0202/30V 935 124 72C 510	Contact IPDIA Sales	Contact IPDIA Sales	33nF/0404/30V 935 124 72F 533	Contact IPDIA Sales	Contact IPDIA Sales	Contact IPDIA Sales
	10nF	100nF/0404/11V 935 124 42F 610 100nF/0605/30V 935 124 72G 610	Contact IPDIA Sales	220nF/0505/11V 935 124 42H 622	Contact IPDIA Sales	Contact IPDIA Sales	Contact IPDIA Sales	Contact IPDIA Sales
	0.1μF	1μF/1208/11V 935 124 42S 710 1μF/1616/30V 935 124 72Y 710	Contact IPDIA Sales	2.2μF/1612/11V 935 124 42V 722	3.3μF/1616/11V 935 124 42Y 733	Contact IPDIA Sales	4.7μF/2016/11V 935 124 42X 747	

(*) Other values on request

(**) For extended temperature range (up to +250°C), see Embedded Xtreme Temperature Silicon Capacitor product (EXSC).

Parameters	Value
Capacitance range	390pF to 4.7μF ^(*)
Capacitance tolerances	±15% ^(*)
Operating temperature range	-55 to 200 °C ^(**)
Storage temperatures	-70 to 215 °C
Temperature coefficient	±1%, from -55 to +200°C
Breakdown Voltage (BV)	30, 11V
Capacitance variation versus RVDC	0.1 % /V (from 0 V to RVDC)
Equivalent Serial Inductor (ESL)	Max 100 pH
Equivalent Serial Resistor (ESR)	Max 0.1Ω
Insulation resistance	50GΩ min @ RVDC, 25°C 20GΩ min @ RVDC, 200°C
Aging	Negligible, < 0.001% / 10000h
Reliability	FIT<0.017 parts / billions hours
Capacitor height	Max 250μm ^(*)

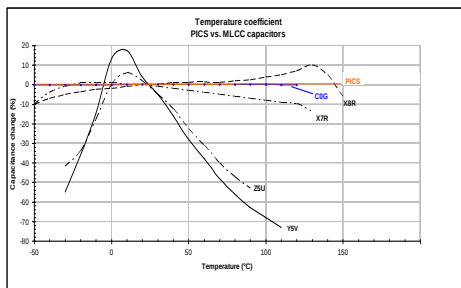


Fig.1 Capacitance change versus temperature variation compared to alternative technologies

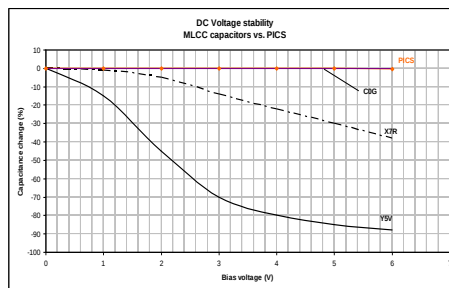


Fig.2 Capacitance change versus voltage variation compared to alternative

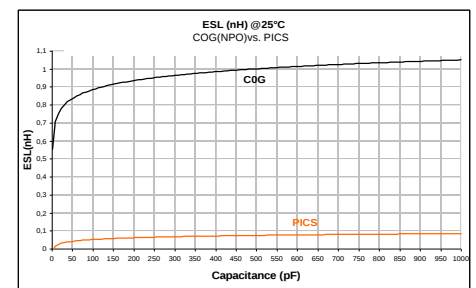


Fig.3 ESL versus capacitance value compared to alternative technologies

Part Number

<u>935.124.</u>	<u>B.2.</u>	<u>S.</u>	<u>U</u>	<u>XX</u>	<u>Value</u>
i.e: 100nF/0404 → 935 124 42F 610	<u>Breakdown Voltage</u> 4 = 11V 1 = 20V 7 = 30V 6 = 50V	<u>Size</u> F = 0404 H = 0505 I = 0302 S = 1208 V = 1216 G = 0605 C = 0202 V = 1612 Y = 1616 X = 2016	<u>Unit</u> 0 = 10 f 1 = 0.1 p 2 = 1 p 3 = 10 p 4 = 0.1 n 5 = 1 n 6 = 10 n 7 = 0.1 μ 8 = 1 μ 9 = 10 μ		10 15 22 33 39 47 68

Termination

Pad finishing in Aluminum (3μm thickness +/-10%)

Applicable for almost all embedded applications.

Parts should be glued with non conductive paste. If conductive glue is used on the backside of the silicon cap, it is strongly recommended to connect the backside and pads 3&4 to the same level (GND preferred).

Pinning definition & Outline

pin #	Symbol	Description
1, 2	Signal	Signal
3, 4	GND	Ground

Typ.	0202	0302	0303	0404	0505	0605	1208	1612	1616	2016
Comp. size	A	0.58 ±0.05	0.80 ±0.05	0.80 ±0.05	1.00 ±0.05	1.25 ±0.05	1.50 ±0.05	3.00 ±0.05	4.00 ±0.05	5.00 ±0.05
	B	0.58 ±0.05	0.64 ±0.05	0.80 ±0.05	1.00 ±0.05	1.25 ±0.05	1.25 ±0.05	2.00 ±0.05	3.00 ±0.05	4.00 ±0.05
	C	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15
	d	0.3	0.52	0.52	0.72	0.97	1.22	2.72	3.72	4.72
	e	0.3	0.36	0.52	0.72	0.97	1.22	1.72	2.72	3.72

Packaging

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

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