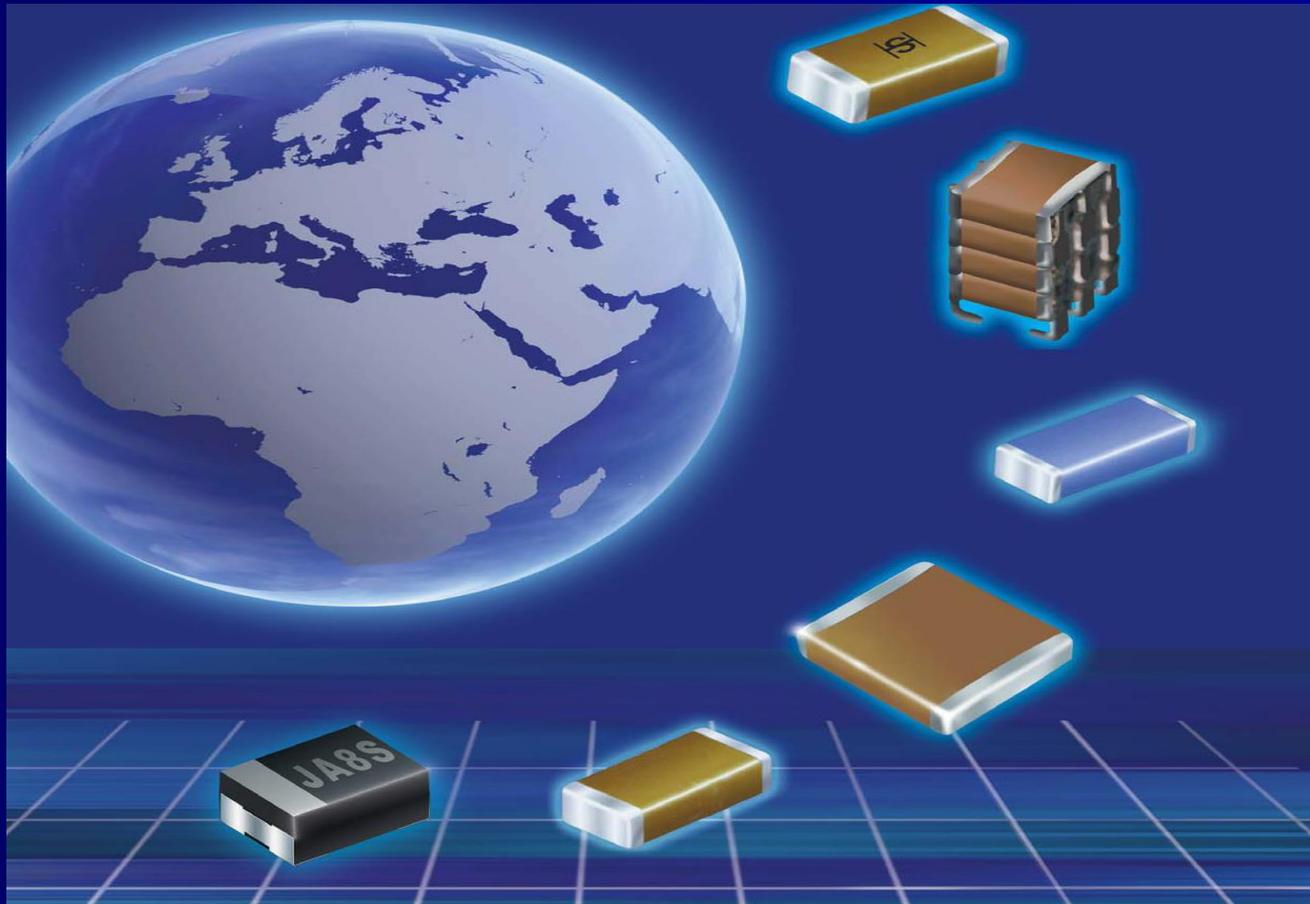


HolyStone Enterprise Company Ltd.



World Class World wide

HolyStone – Product Overview

HolyStone is Taiwanese manufacturer of Multi- Layer Ceramic & Single Layer Disc Capacitors.

The main focus is application specific ceramic components in both Multi - Layer & Single Layer technologies.

HolyStone Europe Ltd

- **Established in 2007 to develop the Holystone MLCC brand name throughout Europe.**
- **To provide local technical and commercial support to OEM's, EMS's, Distributors and Agents.**
- **We are the European Sales and Marketing arm of HEC.**

HolyStone Company History

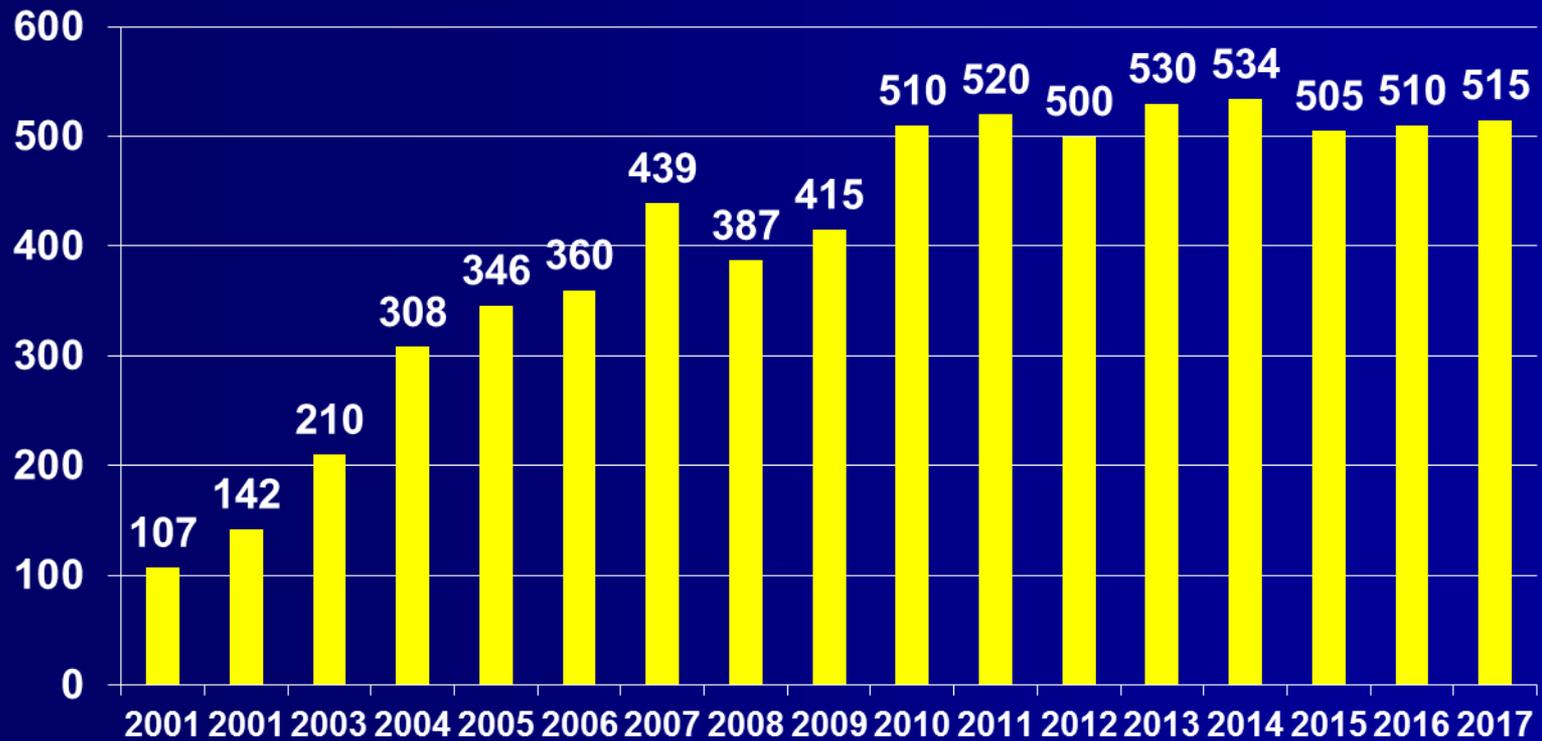
- **1981 Holystone is founded as an Electronics Distribution Company.**
- **1994 Holystone begins manufacturing MLCC.**
- **1999 MLC Materials R&D centre established in Japan.**
- **2000 Holystone launches IPO in Taiwan.**
- **2001 Holystone continues expanding sales offices throughout Asia including Hong Kong & Shanghai**

HolyStone Company History

- **2003 BME production start up.**
- **2003 Significant factory expansion in Lung-Tan.**
- **2004 Holystone International established in California USA.**
- **2006 Ceramic Disc production commenced**
- **2007 Holystone Europe Ltd established in Norwich UK.**
- **2010 HolyStone opens new factory in Yilan, Taiwan**
- **2016 TS16949 Automotive qualification**
- **2018 IATF16949 Automotive qualification**

HolyStone worldwide

Sales Millions USD



Manufacturing Processes/Capabilities

- **Base Metal Electrodes (BME)**
- **Nickel Electrodes (Copper Terminations)**
- **Single Layer Ceramic Technology**
- **Utilised to produce ceramic Disc Capacitors NPO/SL/Y5P/Y5U**

HolyStone Factories

Lung Tan plant

Facility Certified to ISO9001, ISO14000 & IATF16949

Size: 50,000m² - 850 employees, Capacity: 1 billion+ pcs/month

YILAN Plant production started 2010

Facility Certified to ISO9001 & ISO14001

Size: 50,000m² - 50 employees

Manufacturing Locations



Lung Tan plant Taiwan



Yilan Factory Taiwan

Some Major Customer Approvals

Industrial

- Delta
- Emerson
- Osram
- Siemens
- Eltek
- Power One
- GE

Automotive

- Huf
- Lear
- Valeo
- Magneti Marelli

Communications

- Alcatel
- Motorola
- Apple
- Hewlett Packard
- Connexant
- NEC
- Sagemcom

EMS

- Jabil
- Flextronic
- Foxconn
- Sanmina

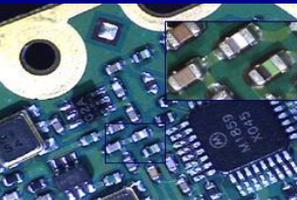
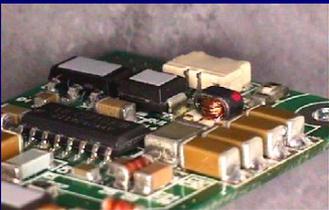
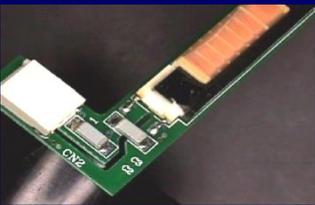
Consumer

- Alcatel
- Dell
- Acer
- Pace
- Sennheiser
- Asus
- Diehl AKO
- Miele

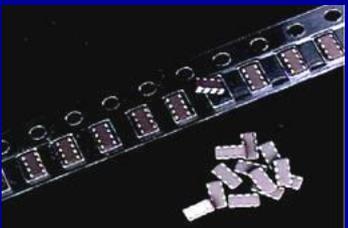
Lighting

- Tridonic
- Osram
- Vossloh-Schwabe

HolyStone Products

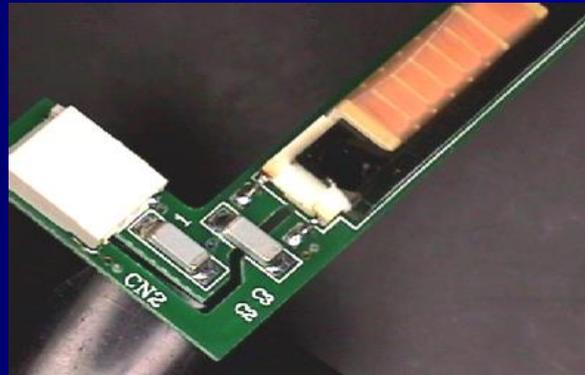


Full range of ceramic capacitors are available, however we focus on...



Focus Products

High Voltage Class I and class II capacitors.



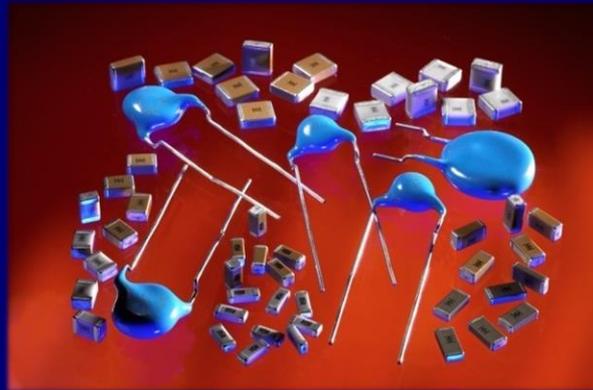
**Available in voltage ratings from 250Vdc to 6KVdc in both
COG/NPO and X7R dielectrics**

**Chip sizes from 1206 to 2225 with capacitance values up
to 22 μ F**

Focus Products

Safety /Surge Protection Capacitors

**SMD sizes from
1808 to 2825**



**Leaded single layer
discs**

Classifications Y1/X1,Y2/X1

**Safety standard approvals to EN132400, IEC60384-14, UL1414 and
UL60950**

Approvals by TUV and UL

AEC Q200 safety capacitors available



SMD ranges available as Pb free & Superterm

Focus Products

High CV Capacitors (mid-voltage 50/100V)

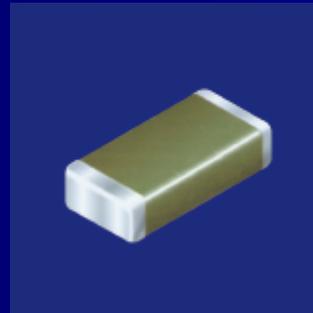


Available in dielectrics X5R/X7R, and in a wide range of case sizes and capacitance values

Suitable for Tantalum replacements & applications such as DC/DC Converters, Power Supplies and Automotive applications

Focus Products

High frequency lighting ballast capacitors



**For use in the snubber circuit of high frequency lighting ballasts.
Specifically designed to have low, stable ESR
Available in COG/NPO with chip sizes 1206 and 1210.
Capacitance values up to 2.7nF in voltage ratings of 500Vdc, 630Vdc
and 1000Vdc**

Focus Products

Automotive Grade Capacitors (AEC-Q200 & IATF16949 Qualified)



The Holy Stone ACC series is AEC-Q200 & IATF16949 qualified and available in voltages up to 1KVdc in NP0/C0G and X7R.

We also offer safety capacitors rated to Y2/X1 to AEC-Q200/IATF16949.

All ranges are available with standard or Polymer/Soft Terminations (Superterm) to prevent mechanical cracking

Focus Products (Cont)

Polymer Termination – Superterm

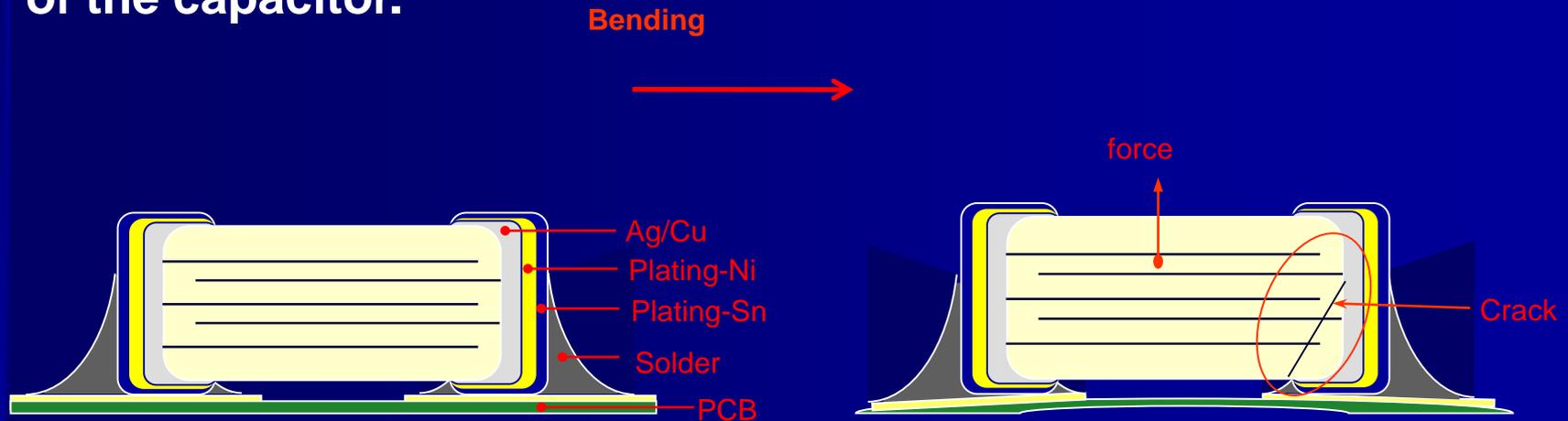
Arc Prevention Coating

Stacked Chip Capacitors (SMC)

Polymer/Soft Terminations - Superterm

Mechanical Cracking

Over time moisture penetration into the crack can cause a reduction in insulation resistance and eventual dielectric breakdown leading to capacitor failure in service and short circuit of the capacitor.



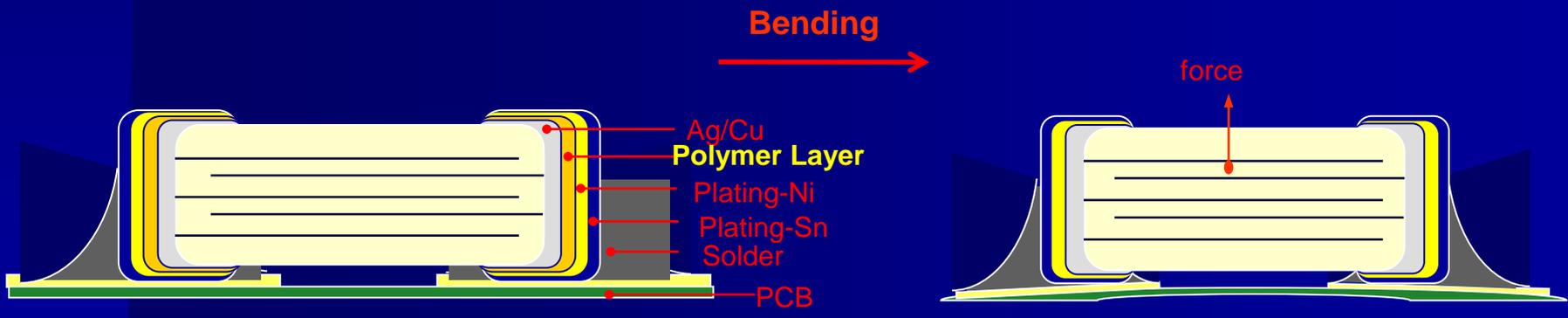
Polymer/Soft Termination - Superterm



HEC SuperTerm Advantages

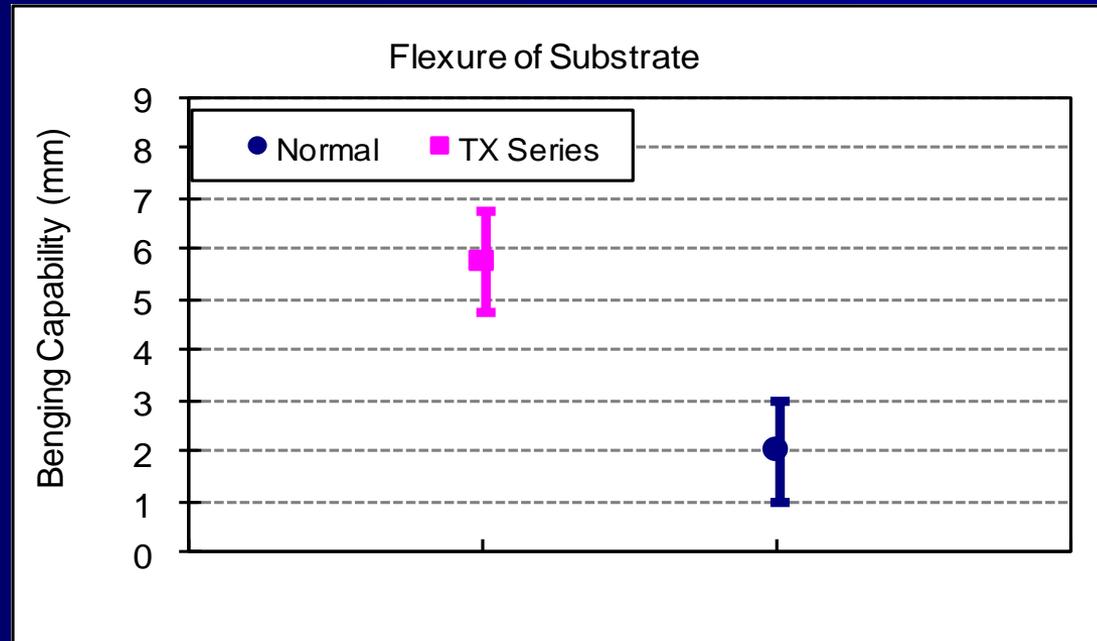
- "Flexible" Termination Layer incorporated
- Reduces Cracking due to Mechanical Stress
- Increases Thermal Shock Resistance

Labels: Sn Plating, Ni Plating, Super Term, Ag/Cu



Polymer/Soft Termination - Superterm

Polymer Termination – Bend strength

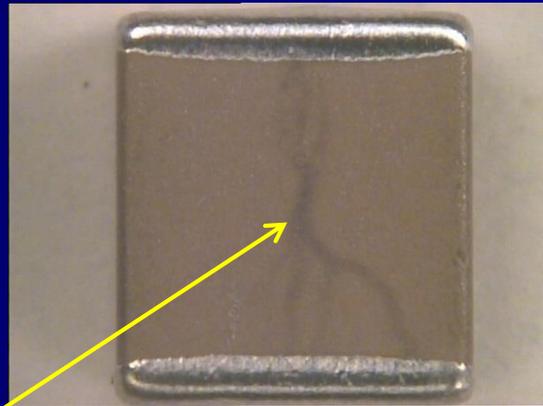


Bending test on Superterm shows an improvement of about 5.0 mm bend vs. an average of about 2.0 mm. for standard termination.

Arc Prevention Coating

Surface Arcing

This occurs predominantly on High Voltage X7R parts. Arcing occurs across the surface, between the terminations.



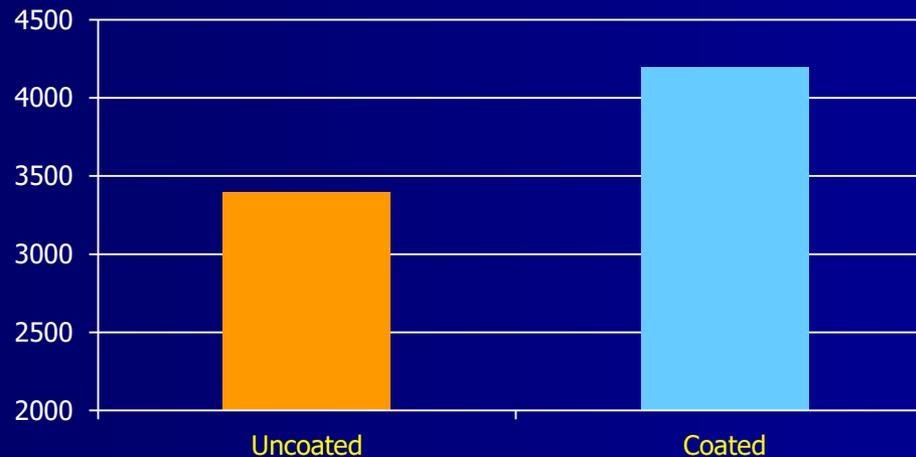
Carbon track left on the surface caused by surface arcing. This can be a potential cause of failure.

Arc Prevention Coating

Surface Arcing

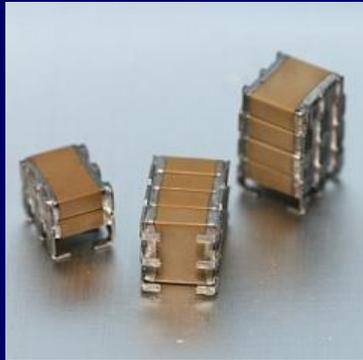
HolyStone has developed a surface coating material which is applied to the dielectric surface which greatly increases the voltage level where surface arcing occurs.

Flashover Voltage Volts dc



Results based on X7R 1808 Y2/X1 safety capacitor.

Stacked Chip Capacitors



**Surface Mount Stacked Capacitors
For Power supplies, DC-DC converters,
Industrial control circuits, Automotive applications
& Harsh Environments**

Rated Voltage : 25V to 1000V dc

Various Sizes, Capacitance & Voltage Ratings

Dielectrics: NP0/C0G and X7R

AEC-Q200 Qualifications pending

New Developments 2018

X7T – Ideal for applications where capacitance at working voltage is critical to the circuit design.

Benefits

Available in rated voltages of 250Vdc, 450Vdc and 630Vdc

Good DC bias characteristics

Low Acoustic noise

IATF16949: – Lung Tan factory - certificate approval awarded in Q3 2018, No – 3222006

New Developments 2018

X7P – Ideal for applications where capacitance at working voltage is critical to the circuit design.

Benefits

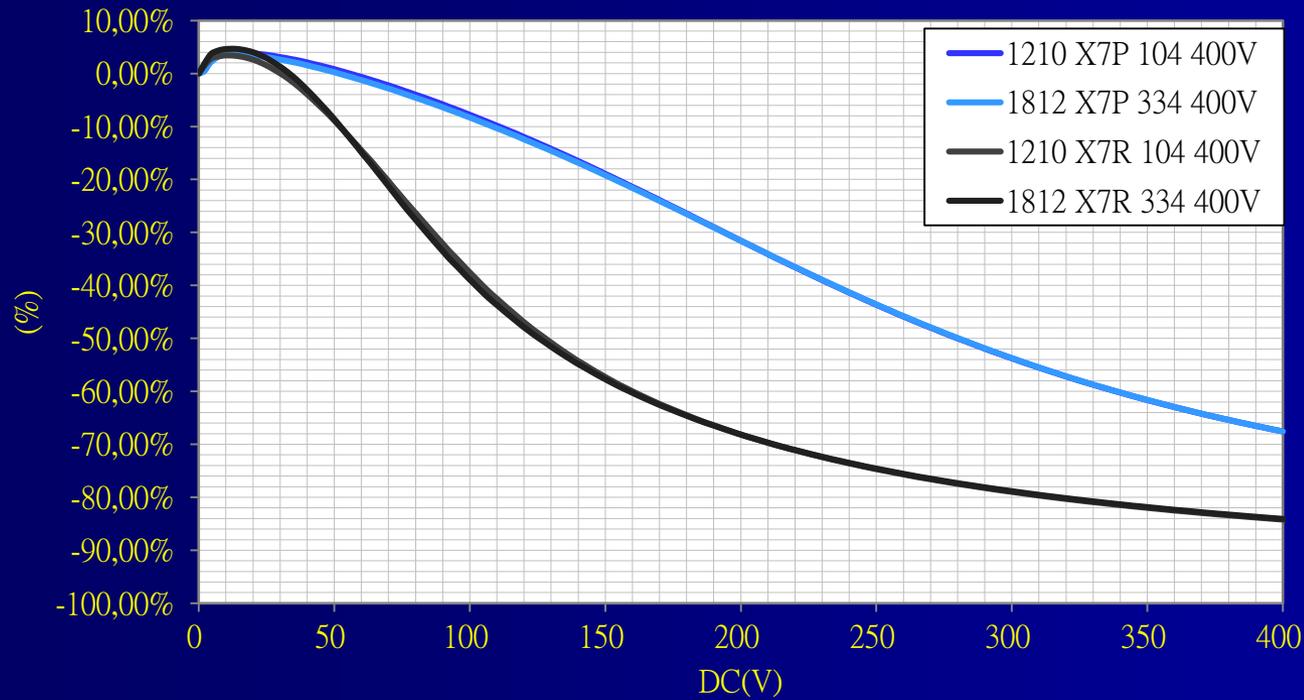
Thermal stability over the full working temperature range of -55°C to +125°C of $\pm 10\%$

Available in rated voltages of 250Vdc, 400Vdc, 450Vdc and 630Vdc

Good DC bias characteristics

Low Acoustic noise

X7P vs X7R DC BIAS CHARACTERISTICS



Capacity Plans/Roadmap 2018-2020

- **30% Capacity increased in 2018**
- **Additional ceramic tape casting machines already installed & commissioned (high layer count capabilities)**
- **New 'Class 1000' clean room installed**
- **Additional manufacturing equipment already on order**

Capacity Plans/Roadmap (Cont)

2018-2020

- **New 20,000sqm factory building completion planned for Q4 2019**
- **Completely operational in Q2 2020 with 2um green sheet capability.**
- **Product Focus for new plant – High Cap/Mid Voltage (16V – 100V) for automotive applications, Case Sizes 0805 & above**
- **New production plant will double current capacity to 2 billion parts per month**

HolyStone Strengths

- **Local support both technically and commercially**
- **Fast response times to design and Quality issues**
- **Wide product offering**
- **Commercial competitiveness and viability**

HolyStone Strengths (cont)

- **Low cost manufacturing sites together with ‘state of the art ‘ production equipment.**
- **Global Sales offices supporting local customers**
- **Financial strength**
- **Revenues of over \$500 million**
- **Well capitalised public company traded on Taiwan stock exchange**

Summary

OUR AIM.....

To become the world market leader in application specific ceramic capacitors, offering both single and multi layer products.

WE CAN.....

offer customers a complete & competitive range of ceramic capacitors (SMD & LEADED) in both application specific and commodity products.