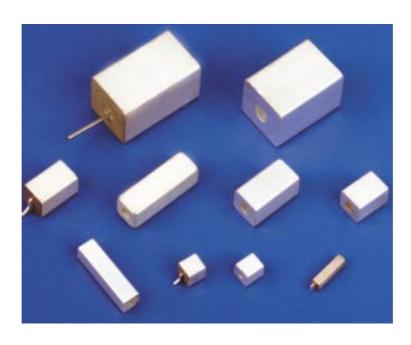
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MAIN FEATURES

Frequency: 300 MHz to 6 GHz Size: 2 to 12mm
Dielectric constant: £21, £37, £90

QUARTER WAVELENGTH
OR HALF WAVELENGTH
WITH OR WITHOUT CONNECTION

DIMENSIONS AND CONFIGURATIONS

The TEMEX coaxial resonators are available over a frequency range of 300 MHz to 6 GHz with four preferred square cross section sizes, having side length of 2, 4, 6 and 12 mm.

Other square section dimensions 3, 8 and 10 mm (S) information can be obtained upon request.

<u>Table 1</u> summarizes the choice of sizes and dielectric materials available.

The length of the component (L) can be determined from the chosen frequency (F) and dielectric constant (er) as follows:

($\lambda/4$ application)

(λ /2 application)

$$L = \frac{\lambda o}{4\sqrt{\epsilon r}}$$

$$L = \frac{\lambda o}{2\sqrt{\epsilon r}}$$

λo in mm L in mm F in GHz

with
$$\lambda o = \frac{300}{F}$$

A simplified formula for λ /4 applications:

| εr = 21 | L = <u>16.37</u> F |
|---------|-----------------------|
| εr = 37 | L = 12.3 F |
| εr = 90 | L = 7.9 |

IMPEDANCE Z

The coaxial resonator impedance used in TEM mode is a direct function of its dimensions and of the dielectric material permittivity.

Table 2 indicates for each standard side length, and for each dielectric constant, the impedance value, independent of the resonator length

APPLICATIONS

TEMEX coaxial ceramic resonators provide the users with "High Q" higher parallel resonant impedance and better temperature characteristics than inductor coils and associated lumped constant elements used in RF amplifiers and oscillators circuits.

These coaxial resonators are perfectly suitable for:

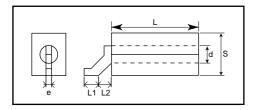
- DRO/VCO oscillators
- · Cellular telephone
- UHF (LC) coupled amplifiers
- Global Positioning Systems (GPS)
- Cordless telephone
- Tuned oscillators
- Narrow band filters
- Duplexers

Table 1: Dimensions

| Section S | 2.0 | 3.0 | 4.0 | 4.0 | 6.0 | 6.0 | 8.0 | 10.0 | 12.0 | 12.0 |
|------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|--------|
| (mm) | ± 0.2 | ± 0.2 | ± 0.2 | ± 0.2 | ± 0.2 | ± 0.2 | ± 0.2 | ± 0.2 | ± 0.2 | ± 0.2 |
| Hole d | 0.65 | 0.95 | 1.5 | 2.0 | 2.0 | 2.5 | 2.7 | 3.3 | 3.55 | 4.0 |
| (mm) | ± 0.1 | ± 0.1 | ± 0.1 | ± 0.1 | ± 0.1 | ± 0.1 | ± 0.2 | ± 0.2 | ± 0.2 | ± 0.5 |
| TEMEX Ref. | CRS02 | CRS03 | CRS04 | CRS24 | CRS06 | CRS26 | CRS08 | CRS10 | CRS12 | CRS412 |

Note: (λ /4 application): all faces but (1) are metallized

(λ /2 application): all faces but (1) and (2) are metallized



| Section (mm) | 2 | 3 | 4 | 6 | 8 | 12 |
|-----------------|-----|-----|-----|-----|-----|-----|
| L1 (mm) | 0.5 | 0.8 | 0.8 | 1.5 | 1.5 | 2.0 |
| L2 (mm) | 1.0 | 1.2 | 1.3 | 1.7 | 2.0 | 2.5 |
| e (mm) | 0.5 | 0.5 | 0.5 | 0.5 | 0.7 | 1.0 |

Table 2: Impedance

| TEMEX Ref. | εr =21 | εr = 37 | ε r = 90 |
|------------|--------|---------|-----------------|
| CRS02 | 16.5 | 12.5 | 8.0 |
| CRS03 | 16.0 | 12.0 | 7.5 |
| CRS04 | 14.0 | 10.5 | 6.5 |
| CRS24 | 10.0 | 7.5 | 5.0 |
| CRS06 | 15.5 | 11.5 | 7.5 |
| CRS26 | 12.5 | 9.5 | 6.0 |
| CRS08 | 15.0 | 11.5 | 7.0 |
| CRS10 | 15.5 | 11.5 | 7.5 |
| CRS12 | 17.0 | 12.5 | 8.0 |
| CRS412 | 15.5 | 11.5 | 7.5 |

Table 3: General characteristics

| Cross section square | | Standard S = 2, 3, 4, 6, 8, 12mm |
|---|----|--|
| Dielectric constant | εr | 21 ± 2 37 ± 1 90 ± 2 |
| Temperature coefficient of the dielectric (Standard values) | τf | 21: 5 ± 5 ppm 37: 0 ± 3 ppm 90: 0 ± 10 ppm |
| Resonant freq. range | Fo | See tables |
| Frequency tolerance | | Standard: ± 1 % (F) ± 0.5 % (D) and other on request |
| Quality factor | Q | See curves |
| Impedance | Z | See table 2 |
| Metallization | | Standard: Silver |



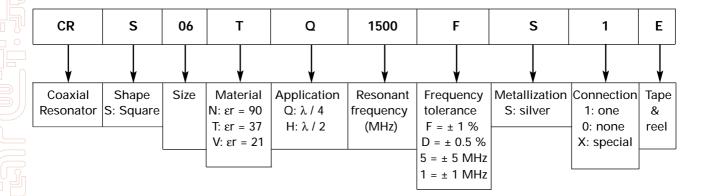
How to order?

Table 4: Standard frequency range $\lambda/4$ in MHz

| | 2 mm | 3 mm | 4 mm | 6 mm | 12 mm |
|-------------|-------------|-------------|-------------|------------|------------|
| ε 21 | 2000 - 4000 | 1500 - 4000 | 1000 - 4000 | 600 - 2500 | 600 - 1250 |
| ε 37 | 1500 - 3000 | 1500 - 3000 | 800 - 3000 | 500 - 2000 | 450 - 1000 |
| ε 90 | 900 - 2000 | 650 - 2000 | 450 - 2000 | 450 - 1000 | 300 - 650 |

For special request, please consult your local Sales Office.

► HOW TO ORDER?



CERAMIC COAXIAL RESONATORS

Application notes



SOLDERING RECOMMENDATIONS

Before any soldering operation is implemented, the coaxial resonator must be preheated in order to avoid a thermal shock and a subsequent mechanical stress liable to initiate failure mechanism. TEMEX recommends a minimum preheating time of 2 minutes at 120° C with a maximum heating rate of 2° C / sec.

FREQUENCY ADJUSTMENT

When the frequency tuning adjustment is needed, two solutions can be adopted:

- a) Mechanical lapping of the ceramic, or mechanical grinding of metallization, depending where metallization will be grinded off.
- b) Using a TEMEX air or sapphire dielectric tuning capacitor ("Air trimmer" or "Gigatrim"): in this case, the frequency will decrease when capacitance will increase.

This provides an additional advantage of mounting / terminating resonator to the assembly by utilizing the leg configuration of the tuning capacitor.

QUALITY FACTOR Q

The Q factor of a coaxial resonator is essentially determined by the metallization.

The dielectric material, having low losses, does not have a direct effect on the "Q" (secondary influence).

The curves show the range of "Q" factor versus resonator size and frequency range.

Curves show that Q min. increases as frequency increases (proportionally to $\sqrt{\text{Fo}}$).

CERAMIC COAXIAL RESONATORS

Application notes

