

## CERAMIC SECURITY CAPACITORS

The two main failure modes which can affect capacitors over their life time and endanger an electronic circuits operation are open circuit and short circuit.

While short circuits are generally easily detected, open circuits however can be extremely difficult. This failure mode can also be dangerous because in this case the capacitor no longer assures its function.

In certain equipment such as security systems for automatic pilot it is necessary to be able to detect any change in the capacitor which suggests that the capacitor could become open circuit. The standard NF F 62-102, which applies to signalling equipment for rail networks, requires the use of “controllable” capacitors

4 terminal security capacitors are specially designed to control any deterioration in their own performance which could suggest a tendency towards an open circuit during the life cycle of the equipment concerned.

Their internal configuration (crossed electrodes) with 2 terminals for each polarity assures that the capacitor will continue to function if one of the terminals loses contact. This also permits the equipment to detect the anomaly so preventive maintenance can take place.

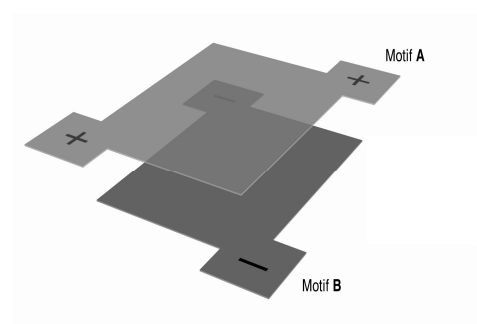
They can also avoid problems related to short circuits cracks caused when soldering which makes this range of components the most reliable on the market today.

This range (see data sheet attached) is composed of:

- NPO (Type 1) capacitors for applications requiring precise and stable capacitance values
- 2C1 or X7R (Type 2) capacitors where high capacitance values are necessary

These capacitors are designed for surface mount use and can be mounted as follows:

- Directly on the PCB
- Using mini ribbon terminals which absorb thermo mechanical constraints when soldering and in operation so guaranteeing an even higher level of reliability.



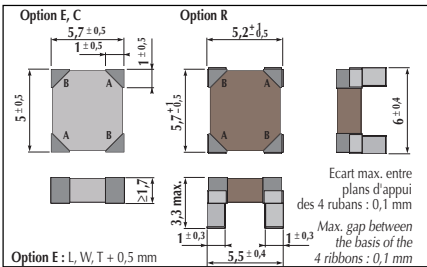
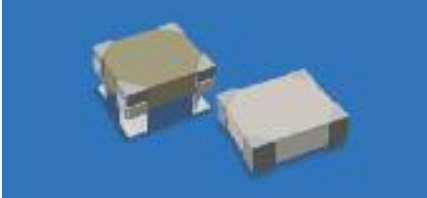
**RoHS = W**  
Voir / See Page 9

**1 30 S 4 (E,C,R)**  
**2 30 S 4 (E,C,R)**

**CONDENSATEURS CHIPS CERAMIQUE CLASSE 1 & 2**

**CERAMIC CHIP CAPACITORS CLASS 1 & 2**

**CONDENSATEURS DE SECURITE**  
**SAFETY CAPACITORS**



**CARACTERISTIQUES GENERALES**

Diélectrique	Céramique classe 1 et 2
Technologie	Chips multicouches à 4 sorties Terminaisons soudables Ag-Pd Option étamée 62 A 2 (E) Étamage électrolytique (C) Sorties par rubans soudables CMS (R)
Température d'utilisation	-55°C + 125°C
Coef. de température (1 30 S 4) CB	
Coef. de température (2 30 S 4)	
Sous 0 Vcc	$\Delta C/C \leq \pm 20\%$
Sous $U_{RC}$	$-30\% \leq \Delta C/C \leq +20\%$
Tension nominale $U_{RC}$	63 V - 100 V
Tension de tenue	2,5 $U_{RC}$
Tangente $\delta$ à 1 MHz (1 30 S 4)	
$C_R < 1\ 000\ pF$	$\leq 15 \cdot 10^{-4}$
Tangente $\delta$ à 1 kHz (1 30 S 4)	
$C_R \geq 1\ 000\ pF$	$\leq 15 \cdot 10^{-4}$
Tang. $\delta$ à 1 kHz 1 Veff (2 30 S 4)	$\leq 250 \cdot 10^{-4}$
Résistance d'isolement (1 30 S 4)	$\geq 100\ 000\ M\Omega$
Résistance d'isolement (2 30 S 4)	
$C_R \leq 25\ 000\ pF$	$\geq 20\ 000\ M\Omega$
$C_R > 25\ 000\ pF$	$R_i \times C_R$ 500 s

**MAIN CHARACTERISTICS**

Dielectric	Ceramic class 1 and 2
Technology	Multilayer chips with 4 connections Weldable terminations Ag-Pd Tinned leads 62 A 2 option (E) Electrolytic tinning (C) Solderable ribbons for SMD (R)
Operating temperature	-55°C + 125°C
Temperature coef. (1 30 S 4) CB	
Temperature coef. (2 30 S 4)	
Under 0 Vcc	$\Delta C/C \leq \pm 20\%$
Under $U_{RC}$	$-30\% \leq \Delta C/C \leq +20\%$
Rated voltage $U_{RC}$	63 V - 100 V
Test voltage	2,5 $U_{RC}$
Tangent $\delta$ at 1 MHz (1 30 S 4)	
$C_R < 1\ 000\ pF$	$\leq 15 \cdot 10^{-4}$
Tangent $\delta$ at 1 kHz (1 30 S 4)	
$C_R \geq 1\ 000\ pF$	$\leq 15 \cdot 10^{-4}$
Tang. $\delta$ at 1 kHz 1 Veff (2 30 S 4)	$\leq 250 \cdot 10^{-4}$
Insulation resistance (1 30 S 4)	$\geq 100\ 000\ M\Omega$
Insulation resistance (2 30 S 4)	
$C_R \leq 25\ 000\ pF$	$\geq 20\ 000\ M\Omega$
$C_R > 25\ 000\ pF$	$R_i \times C_R$ 500 s

**MARKING**

<b>On packaging</b>	<b>On chips (on request)</b>
Model	Capacitance
Capacitance / tolerance	Tolerance
Rated voltage	Ribbons (R)
Date - code	

	Appellation commerciale Commercial type		Tolérances sur capacité Tolerance on capacitance					Appellation commerciale Commercial type		Code des valeurs de $C_R$ Capacitance value coded	Tolérances sur capacité Tolerance on capacitance	
	1 30 S 4 classe 1 / class 1							2 30 S 4 classe 2 / class 2				
	Tension nominale / Rated voltage						Tension nominale / Rated voltage					
$U_{RC}$ (V)	63	100	E6	E12	E24	E48	E96	63	100		E6	E12
470 pF												471
560												561
680												681
820												821
1000												102
1200												122
1500												152
1800												182
2200												222
2700												272
3300												332
3900												392
4700												472
5600												562
6800												682
8200												822
10000												103
12000												123
15000												153
18000												183
22000												223
27000												273
33000												333
39000												393
47000												473
56000												563
68000												683
82000												823
100 nF												104
120												124
150												154
180												184
220												224
270												274
330												334
470												474
560												564

**Exemple de codification à la commande / How to order**

E,C,R : Terminaisons E,C,R : Terminations	M : Marquage M : Marking	Tolérance Tolerance	Tension nominale Rated voltage
1 30 S 4	—	820 pF	10 % 63 V
Appel. commerciale Commercial type	W : RoHS W : RoHS	Capacité Capacitance	Conditionnement (voir p. 9-10) Packaging (see p. 9-10)