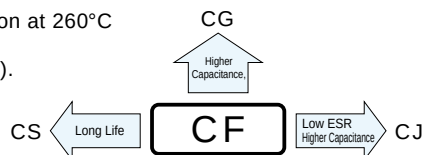


**CF** Chip Type, Standard series



- Low ESR, High ripple current.
- Load life of 2000 hours at 105°C.
- SMD type : Lead free reflow soldering condition at 260°C peak correspondence.
- Compliant to the RoHS directive (2002/95/EC).



## Specifications

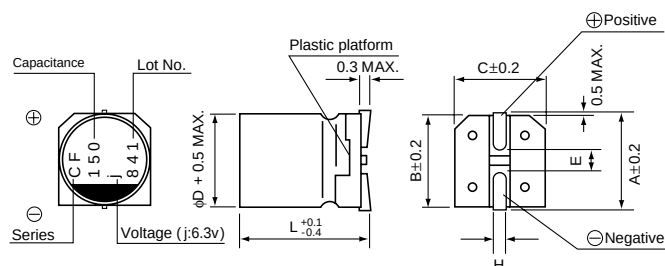
| Item                                                 | Performance Characteristics                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                       |                                                     |
|------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------|-----------------------------------------------------|
| Category Temperature Range                           | -55 to +105°C                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                       |                                                     |
| Rated Voltage Range                                  | 2.5 to 25V                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                       |                                                     |
| Rated Capacitance Range                              | 3.3 to 1500μF                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                       |                                                     |
| Capacitance Tolerance                                | ± 20% at 120Hz, 20°C                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                       |                                                     |
| Tangent of loss angle (tan δ)                        | Less than or equal to the specified value at 120Hz, 20°C                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                       |                                                     |
| ESR (※ 1)                                            | Less than or equal to the specified value at 100kHz, 20°C                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                       |                                                     |
| Leakage Current (※ 2)                                | Less than or equal to the specified value. After 2 minutes' application of rated voltage at 20°C                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                       |                                                     |
| Temperature Characteristics<br>(Max.Impedance Ratio) | Z+105°C / Z+20°C ≤ 1.25 (100kHz)<br>Z-55°C / Z+20°C ≤ 1.25                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                       |                                                     |
| Endurance                                            | The specifications listed at right shall be met when the capacitors are restored to 20°C after the rated voltage is applied for 2000 hours at 105°C                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | Capacitance change    | Within ± 20% of the initial capacitance value (※ 3) |
|                                                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | tan δ                 | 150% or less than the initial specified value       |
|                                                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | ESR (※ 1)             | 150% or less than the initial specified value       |
|                                                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | Leakage current (※ 2) | Less than or equal to the initial specified value   |
|                                                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                       |                                                     |
| Damp Heat<br>(Steady State)                          | The specifications listed at right shall be met when the capacitors are restored to 20°C after the rated voltage is applied for 1000 hours at 60°C, 90% RH.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | Capacitance change    | Within ± 20% of the initial capacitance value (※ 3) |
|                                                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | tan δ                 | 150% or less than the initial specified value       |
|                                                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | ESR (※ 1)             | 150% or less than the initial specified value       |
|                                                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | Leakage current (※ 2) | Less than or equal to the initial specified value   |
|                                                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                       |                                                     |
| Resistance to<br>Soldering Heat                      | After soldering the capacitor under the soldering conditions prescribed here, the capacitor shall meet the specifications listed at right, provided that it's temperature profile is measured at the capacitor top and the terminal.<br>Pre-heating shall be done at 150 to 200°C and for 60 to 180 sec. The duration for over +230°C temperature at capacitor surface shall not exceed 60 seconds.<br>In the case of peak temp, less than 250°C, reflow soldering shall be two times maximum.<br>In the case of peak temp, less than 260°C, reflow soldering shall be once.<br>Measurement for solder temperature profile shall be made at the capacitor top and the terminal. | Capacitance change    | Within ± 10% of the initial capacitance value (※ 3) |
|                                                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | tan δ                 | 130% or less than the initial specified value       |
|                                                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | ESR (※ 1)             | 130% or less than the initial specified value       |
|                                                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | Leakage current (※ 2) | Less than or equal to the initial specified value   |
|                                                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                       |                                                     |
| Marking                                              | Navy blue print on the case top                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                       |                                                     |

※ 1 ESR should be measured at both of the terminal ends closest where the terminals protrude through the plastic platform.

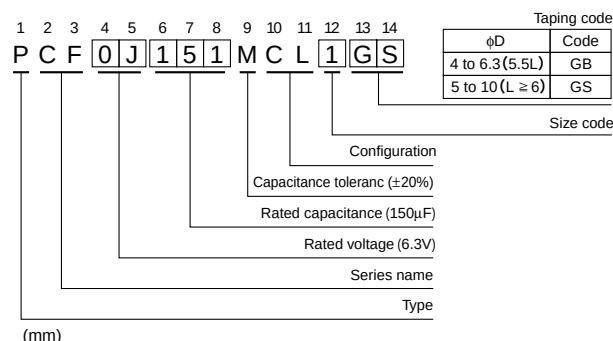
※ 2 Conditioning : If any doubt arises, measure the leakage current after the voltage treatment of applying DC rated voltage continuously to the capacitor for 120 minutes at 105°C.

※ 3 Initial value : The value before test of examination of resistance to soldering.

## Dimensions



## Type numbering system (Example : 6.3V 150μF)



| Size | φ4 × 5.5L  | φ5 × 6L    | φ6.3 × 5.5L | φ6.3 × 6L  | φ8 × 7L    | φ8 × 12L   | φ10 × 8L   | φ10 × 10L  | φ10 × 12.7L |
|------|------------|------------|-------------|------------|------------|------------|------------|------------|-------------|
| φD   | 4.0        | 5.0        | 6.3         | 6.3        | 8.0        | 8.0        | 10.0       | 10.0       | 10.0        |
| L    | 5.4        | 5.9        | 5.4         | 5.9        | 6.9        | 11.9       | 7.9        | 9.9        | 12.6        |
| A    | 5.0        | 6.0        | 7.3         | 7.3        | 9.0        | 9.0        | 11.0       | 11.0       | 11.0        |
| B    | 4.3        | 5.3        | 6.6         | 6.6        | 8.3        | 8.3        | 10.3       | 10.3       | 10.3        |
| C    | 4.3        | 5.3        | 6.6         | 6.6        | 8.3        | 8.3        | 10.3       | 10.3       | 10.3        |
| E    | 1.0        | 1.6        | 2.1         | 2.1        | 3.2        | 3.2        | 4.6        | 4.6        | 4.6         |
| H    | 0.5 to 0.8 | 0.5 to 0.8 | 0.5 to 0.8  | 0.5 to 0.8 | 0.8 to 1.1 | 0.8 to 1.1 | 0.8 to 1.1 | 0.8 to 1.1 | 0.8 to 1.1  |

## Voltage

| V    | 2.5 | 4 | 6.3 | 10 | 16 | 20 | 25 |
|------|-----|---|-----|----|----|----|----|
| Code | e   | g | j   | A  | C  | D  | E  |

● Dimension table in next page.

CAT.8100B

CF series

## ■Standard Ratings

| Rated Voltage<br>(V)(code) | Surge Voltage<br>(V) | Rated Capacitance<br>(μF) | Case Size<br>φD × L (mm) | tan δ | Leakage Current<br>(μA) | ESR (mΩ)<br>(at 100kHz 20°C) | Rated Ripple<br>(mA <sub>rms</sub> ) | Part Number    |
|----------------------------|----------------------|---------------------------|--------------------------|-------|-------------------------|------------------------------|--------------------------------------|----------------|
| 2.5<br>(0E)                | 2.8                  | 100                       | 6.3 × 6                  | 0.12  | 100                     | 22                           | 2600                                 | PCF0E101MCL1GS |
|                            |                      | 220                       | ■ 6.3 × 5.5              | 0.12  | 110                     | 20                           | 2800                                 | PCF0E221MCL4GB |
|                            |                      | 220                       | 6.3 × 6                  | 0.12  | 110                     | 20                           | 2800                                 | PCF0E221MCL1GS |
|                            |                      | 470                       | 8 × 7                    | 0.12  | 235                     | 20                           | 3300                                 | PCF0E471MCL1GS |
|                            |                      | 820                       | 10 × 8                   | 0.12  | 410                     | 17                           | 4400                                 | PCF0E821MCL1GS |
|                            |                      | 1500                      | 10 × 10                  | 0.12  | 750                     | 13                           | 4700                                 | PCF0E152MCL1GS |
|                            |                      | 1500                      | ● 10 × 12.7              | 0.12  | 750                     | 12                           | 5440                                 | PCF0E152MCL9GS |
| 4<br>(0G)                  | 4.6                  | 33                        | 4 × 5.5                  | 0.12  | 100                     | 200                          | 700                                  | PCF0G330MCL1GB |
|                            |                      | 100                       | ■ 6.3 × 5.5              | 0.12  | 100                     | 22                           | 2600                                 | PCF0G101MCL4GB |
|                            |                      | 100                       | 6.3 × 6                  | 0.12  | 80                      | 22                           | 2600                                 | PCF0G101MCL1GS |
|                            |                      | 150                       | ■ 6.3 × 5.5              | 0.12  | 120                     | 22                           | 2800                                 | PCF0G151MCL4GB |
|                            |                      | 150                       | ▲ 5 × 6                  | 0.12  | 300                     | 30                           | 2000                                 | PCF0G151MCL6GS |
|                            |                      | 150                       | 6.3 × 6                  | 0.12  | 120                     | 22                           | 2800                                 | PCF0G151MCL1GS |
|                            |                      | 220                       | 8 × 7                    | 0.12  | 176                     | 21                           | 3200                                 | PCF0G221MCL1GS |
|                            |                      | 330                       | 8 × 7                    | 0.12  | 264                     | 21                           | 3400                                 | PCF0G331MCL1GS |
|                            |                      | 470                       | 10 × 8                   | 0.12  | 376                     | 17                           | 4200                                 | PCF0G471MCL1GS |
|                            |                      | 560                       | ■ 8 × 12                 | 0.12  | 448                     | 13                           | 4520                                 | PCF0G561MCL4GS |
|                            |                      | 680                       | 10 × 8                   | 0.12  | 544                     | 17                           | 4400                                 | PCF0G681MCL1GS |
|                            |                      | 820                       | 10 × 10                  | 0.12  | 656                     | 13                           | 4800                                 | PCF0G821MCL1GS |
|                            |                      | 1200                      | 10 × 12.7                | 0.12  | 960                     | 10                           | 5500                                 | PCF0G122MCL1GS |
|                            |                      | 22                        | 4 × 5.5                  | 0.12  | 100                     | 200                          | 700                                  | PCF0J220MCL1GB |
| 6.3<br>(0J)                | 7.2                  | 47                        | 5 × 6                    | 0.12  | 148                     | 35                           | 1600                                 | PCF0J470MCL1GS |
|                            |                      | 82                        | ■ 6.3 × 5.5              | 0.12  | 103                     | 23                           | 2600                                 | PCF0J820MCL4GB |
|                            |                      | 82                        | 6.3 × 6                  | 0.12  | 103                     | 23                           | 2600                                 | PCF0J820MCL1GS |
|                            |                      | 100                       | ■ 6.3 × 5.5              | 0.12  | 126                     | 23                           | 2800                                 | PCF0J101MCL4GB |
|                            |                      | 100                       | ▲ 5 × 6                  | 0.12  | 315                     | 25                           | 2200                                 | PCF0J101MCL6GS |
|                            |                      | 100                       | 6.3 × 6                  | 0.12  | 126                     | 23                           | 2800                                 | PCF0J101MCL1GS |
|                            |                      | 120                       | 6.3 × 6                  | 0.12  | 151                     | 23                           | 3000                                 | PCF0J121MCL1GS |
|                            |                      | 150                       | 8 × 7                    | 0.12  | 189                     | 22                           | 3200                                 | PCF0J151MCL1GS |
|                            |                      | 220                       | 8 × 7                    | 0.12  | 277                     | 22                           | 3400                                 | PCF0J221MCL1GS |
|                            |                      | 330                       | 10 × 8                   | 0.12  | 416                     | 18                           | 4200                                 | PCF0J331MCL1GS |
|                            |                      | 470                       | ■ 8 × 12                 | 0.12  | 592                     | 12                           | 5300                                 | PCF0J471MCL4GS |
|                            |                      | 470                       | ▲ 10 × 8                 | 0.12  | 592                     | 18                           | 4300                                 | PCF0J471MCL6GS |
|                            |                      | 470                       | 10 × 10                  | 0.12  | 592                     | 16                           | 4600                                 | PCF0J471MCL1GS |
|                            |                      | 680                       | 10 × 10                  | 0.12  | 857                     | 14                           | 5000                                 | PCF0J681MCL1GS |
|                            |                      | 680                       | ● 10 × 12.7              | 0.12  | 857                     | 10                           | 5500                                 | PCF0J681MCL9GS |
|                            |                      | 820                       | 10 × 12.7                | 0.12  | 1033                    | 10                           | 5800                                 | PCF0J821MCL1GS |
| 10<br>(1A)                 | 11.5                 | 4.7                       | 4 × 5.5                  | 0.12  | 100                     | 240                          | 670                                  | PCF1A4R7MCL1GB |
|                            |                      | 6.8                       | 4 × 5.5                  | 0.12  | 100                     | 240                          | 670                                  | PCF1A6R8MCL1GB |
|                            |                      | 10                        | 4 × 5.5                  | 0.12  | 100                     | 220                          | 700                                  | PCF1A100MCL1GB |
|                            |                      | 15                        | 4 × 5.5                  | 0.12  | 100                     | 200                          | 700                                  | PCF1A150MCL1GB |
|                            |                      | 33                        | 5 × 6                    | 0.12  | 165                     | 35                           | 1500                                 | PCF1A330MCL1GS |
|                            |                      | 47                        | ▲ 5 × 6                  | 0.12  | 235                     | 26                           | 2600                                 | PCF1A470MCL6GS |
|                            |                      | 47                        | 6.3 × 6                  | 0.12  | 94                      | 26                           | 2600                                 | PCF1A470MCL1GS |
|                            |                      | 56                        | ■ 6.3 × 5.5              | 0.12  | 112                     | 25                           | 2500                                 | PCF1A560MCL4GB |
|                            |                      | 56                        | 6.3 × 6                  | 0.12  | 112                     | 25                           | 2500                                 | PCF1A560MCL1GS |
|                            |                      | 120                       | 8 × 7                    | 0.12  | 240                     | 23                           | 3000                                 | PCF1A121MCL1GS |
|                            |                      | 150                       | ▲ 8 × 7                  | 0.12  | 300                     | 23                           | 3200                                 | PCF1A151MCL6GS |
|                            |                      | 150                       | 10 × 8                   | 0.12  | 300                     | 21                           | 3300                                 | PCF1A151MCL1GS |
|                            |                      | 270                       | ■ 8 × 12                 | 0.12  | 540                     | 13                           | 4500                                 | PCF1A271MCL4GS |
|                            |                      | 270                       | 10 × 8                   | 0.12  | 540                     | 20                           | 3600                                 | PCF1A271MCL1GS |
|                            |                      | 330                       | ■ 8 × 12                 | 0.12  | 660                     | 14                           | 4000                                 | PCF1A331MCL4GS |
|                            |                      | 330                       | 10 × 8                   | 0.12  | 660                     | 20                           | 3700                                 | PCF1A331MCL1GS |
|                            |                      | 470                       | 10 × 10                  | 0.12  | 940                     | 16                           | 4600                                 | PCF1A471MCL1GS |
|                            |                      | 470                       | ● 10 × 12.7              | 0.12  | 940                     | 12                           | 5300                                 | PCF1A471MCL9GS |
|                            |                      | 560                       | 10 × 10                  | 0.12  | 1120                    | 15                           | 4800                                 | PCF1A561MCL1GS |
|                            |                      | 560                       | ● 10 × 12.7              | 0.12  | 1120                    | 13                           | 5230                                 | PCF1A561MCL9GS |

CF series

## ■ Standard Ratings

| Rated Voltage<br>(V)(code) | Surge Voltage<br>(V) | Rated Capacitance<br>( $\mu$ F) | Case Size<br>$\phi$ D $\times$ L (mm) | $\tan \delta$ | Leakage Current<br>( $\mu$ A) | ESR (m $\Omega$ )<br>(at 100kHz 20°C) | Rated Ripple<br>(mAmps) | Part Number    |
|----------------------------|----------------------|---------------------------------|---------------------------------------|---------------|-------------------------------|---------------------------------------|-------------------------|----------------|
| 16<br>(1C)                 | 18.4                 | 3.3                             | 4 $\times$ 5.5                        | 0.12          | 100                           | 260                                   | 660                     | PCF1C3R3MCL1GB |
|                            |                      | 22                              | 5 $\times$ 6                          | 0.12          | 176                           | 45                                    | 1210                    | PCF1C220MCL1GS |
|                            |                      | 33                              | 6.3 $\times$ 6                        | 0.12          | 106                           | 31                                    | 2400                    | PCF1C330MCL1GS |
|                            |                      | 39                              | ■ 6.3 $\times$ 5.5                    | 0.12          | 125                           | 31                                    | 2400                    | PCF1C390MCL4GB |
|                            |                      | 39                              | 6.3 $\times$ 6                        | 0.12          | 125                           | 31                                    | 2400                    | PCF1C390MCL1GS |
|                            |                      | 56                              | 8 $\times$ 7                          | 0.12          | 179                           | 30                                    | 2900                    | PCF1C560MCL1GS |
|                            |                      | 82                              | 8 $\times$ 7                          | 0.12          | 262                           | 28                                    | 3200                    | PCF1C820MCL1GS |
|                            |                      | 100                             | 10 $\times$ 8                         | 0.12          | 320                           | 27                                    | 3300                    | PCF1C101MCL1GS |
|                            |                      | 150                             | 10 $\times$ 8                         | 0.12          | 480                           | 25                                    | 3500                    | PCF1C151MCL1GS |
|                            |                      | 180                             | ■ 8 $\times$ 12                       | 0.12          | 576                           | 16                                    | 4400                    | PCF1C181MCL4GS |
|                            |                      | 180                             | 10 $\times$ 8                         | 0.12          | 576                           | 25                                    | 3600                    | PCF1C181MCL1GS |
|                            |                      | 220                             | 10 $\times$ 10                        | 0.12          | 704                           | 20                                    | 3900                    | PCF1C221MCL1GS |
|                            |                      | 220                             | ● 10 $\times$ 12.7                    | 0.12          | 704                           | 14                                    | 5050                    | PCF1C221MCL9GS |
|                            |                      | 330                             | 10 $\times$ 12.7                      | 0.12          | 1056                          | 14                                    | 5000                    | PCF1C331MCL1GS |
| 20<br>(1D)                 | 23                   | 10                              | 5 $\times$ 6                          | 0.12          | 100                           | 120                                   | 900                     | PCF1D100MCL1GS |
|                            |                      | 22                              | ■ 6.3 $\times$ 5.5                    | 0.12          | 100                           | 50                                    | 1700                    | PCF1D220MCL4GB |
|                            |                      | 22                              | 6.3 $\times$ 6                        | 0.12          | 88                            | 50                                    | 1700                    | PCF1D220MCL1GS |
|                            |                      | 39                              | 8 $\times$ 7                          | 0.12          | 156                           | 45                                    | 2000                    | PCF1D390MCL1GS |
|                            |                      | 47                              | 8 $\times$ 7                          | 0.12          | 188                           | 45                                    | 2000                    | PCF1D470MCL1GS |
|                            |                      | 56                              | 10 $\times$ 8                         | 0.12          | 224                           | 40                                    | 2400                    | PCF1D560MCL1GS |
|                            |                      | 68                              | 10 $\times$ 8                         | 0.12          | 272                           | 40                                    | 2600                    | PCF1D680MCL1GS |
|                            |                      | 82                              | 10 $\times$ 8                         | 0.12          | 328                           | 40                                    | 2600                    | PCF1D820MCL1GS |
|                            |                      | 100                             | 8 $\times$ 12                         | 0.12          | 400                           | 22                                    | 3200                    | PCF1D101MCL1GS |
|                            |                      | 120                             | 10 $\times$ 10                        | 0.12          | 480                           | 35                                    | 2800                    | PCF1D121MCL1GS |
|                            |                      | 150                             | 10 $\times$ 12.7                      | 0.12          | 600                           | 20                                    | 4320                    | PCF1D151MCL1GS |
| 25<br>(1E)                 | 28.7                 | 6.8                             | 6.3 $\times$ 6                        | 0.12          | 85                            | 80                                    | 1200                    | PCF1E6R8MCL1GS |
|                            |                      | 10                              | 8 $\times$ 7                          | 0.12          | 125                           | 60                                    | 1600                    | PCF1E100MCL1GS |
|                            |                      | 22                              | 10 $\times$ 8                         | 0.12          | 275                           | 50                                    | 2200                    | PCF1E220MCL1GS |
|                            |                      | 33                              | 8 $\times$ 12                         | 0.12          | 413                           | 30                                    | 2800                    | PCF1E330MCL1GS |
|                            |                      | 47                              | ■ 8 $\times$ 12                       | 0.12          | 588                           | 30                                    | 3000                    | PCF1E470MCL4GS |
|                            |                      | 47                              | 10 $\times$ 10                        | 0.12          | 588                           | 45                                    | 2400                    | PCF1E470MCL1GS |
|                            |                      | 56                              | 10 $\times$ 12.7                      | 0.12          | 700                           | 28                                    | 3800                    | PCF1E560MCL1GS |

Rated ripple current (mAmps) at 105°C 100kHz

- Taping specifications are given in page 23.
- Recommended land size, soldering by reflow are given in page 18, 19.
- Please refer to page 3 for the minimum order quantity.

No marked, [1] will be put at 12th digit of type numbering system.  
 ■ : In this case, [4] will be put at 12th digit of type numbering system.  
 ▲ : In this case, [6] will be put at 12th digit of type numbering system.  
 ● : In this case, [9] will be put at 12th digit of type numbering system.

Компания «Life Electronics» занимается поставками электронных компонентов импортного и отечественного производства от производителей и со складов крупных дистрибьюторов Европы, Америки и Азии.

С конца 2013 года компания активно расширяет линейку поставок компонентов по направлению коаксиальный кабель, кварцевые генераторы и конденсаторы (керамические, пленочные, электролитические), за счёт заключения дистрибьюторских договоров

Мы предлагаем:

- Конкурентоспособные цены и скидки постоянным клиентам.
- Специальные условия для постоянных клиентов.
- Подбор аналогов.
- Поставку компонентов в любых объемах, удовлетворяющих вашим потребностям.
- Приемлемые сроки поставки, возможна ускоренная поставка.
- Доставку товара в любую точку России и стран СНГ.
- Комплексную поставку.
- Работу по проектам и поставку образцов.
- Формирование склада под заказчика.
- Сертификаты соответствия на поставляемую продукцию (по желанию клиента).
- Тестирование поставляемой продукции.
- Поставку компонентов, требующих военную и космическую приемку.
- Входной контроль качества.
- Наличие сертификата ISO.

В составе нашей компании организован Конструкторский отдел, призванный помогать разработчикам, и инженерам.

Конструкторский отдел помогает осуществить:

- Регистрацию проекта у производителя компонентов.
- Техническую поддержку проекта.
- Защиту от снятия компонента с производства.
- Оценку стоимости проекта по компонентам.
- Изготовление тестовой платы монтаж и пусконаладочные работы.



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