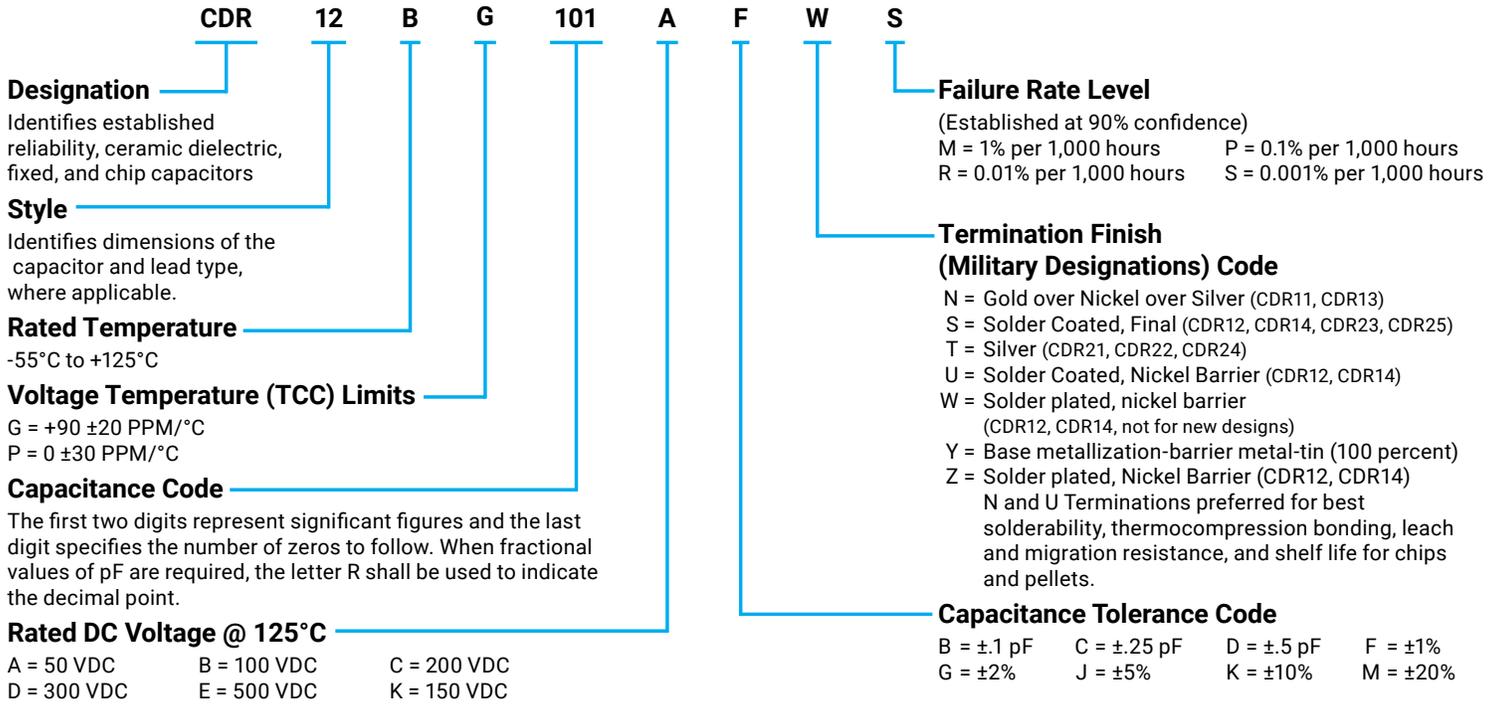


# RF/Microwave Multilayer Capacitors (MLC)

## CDR Series – MIL-PRF-55681/4/5 (RF/Microwave Chips)

### HOW TO ORDER



**TABLE I - STYLES CDR11 AND CDR12 CAPACITOR CHARACTERISTICS**

| Type Designation *                  | Capacitance Range (pF) | Capacitance Tolerance Available | Rated Temp. & Voltage-Temp Limits                                       | Rated DC Voltage  |
|-------------------------------------|------------------------|---------------------------------|---|-------------------|
| CDR1-B-0R1KB-- to CDR1-B-0R2--B--   | 0.1 pF to 0.2 pF       | B                               | Characteristic BG (+90 ±20 PPM/°C) and Characteristic BP (0 ±30 PPM/°C) | A = 50<br>K = 150 |
| CDR1-B-0R3K--- to CDR1-B-0R4---     | 0.3 pF to 0.4 pF       | B, C                            |   |                   |
| CDR1-B-0R5K--- to CDR1-B-2R2---**   | 0.5 pF to 2.2 pF       | B, C, D                         |   |                   |
| CDR1-B-2R4K--- to CDR1-B-6R2---***  | 2.4 pF to 6.2 pF       | B, C, D                         |   |                   |
| CDR1-B-6R8K--- to CDR1-B-9R1---***  | 6.8 pF to 9.1 pF       | B, C, J, K, M                   |   |                   |
| CDR1-B-100K--- to CDR1-B-101K---*** | 10 pF to 100 pF        | F, G, J, K, M                   |   |                   |
| CDR1-BP111K-- to CDR1-BP621---***   | 110 pF to 620 pF       | F, G, J, K, M                   | BP  | A = 50<br>B = 100 |
| CDR1-BP681A-- to CDR1-BP102---***   | 680 pF to 1000 pF      | F, G, J, K, M                   |   |                   |

**TABLE II - STYLES CDR13 AND CDR14 CAPACITOR CHARACTERISTICS**

| Type Designation *                  | Capacitance Range (pF) | Capacitance Tolerance Available | Rated Temp. & Voltage-Temp Limits   | Rated DC Voltage   |
|-------------------------------------|------------------------|---------------------------------|---|--------------------|
| CDR1-B-0R1EB-- to CDR1-B-0R2--B--   | 0.1 pF to 0.2 pF       | B                               | "Characteristic BG (+90 ±20 PPM/°C) and Characteristic BP (0 ±30 PPM/°C)" |                    |
| CDR1-B-0R3E--- to CDR1-B-0R4---     | 0.3 pF to 0.4 pF       | B, C                            |   |                    |
| CDR1-B--0R5E--- to CDR1-B-2R2---**  | 0.5 pF to 2.2 pF       | B, C, D                         |   | C = 200            |
| CDR1-B-2R4E--- to CDR1-B-6R2---***  | 2.4 pF to 6.2 pF       | B, C, D                         |   | E = 500            |
| CDR1-B-6R8E--- to CDR1-B-9R1---***  | 6.8 pF to 9.1 pF       | B, C, J, K, M                   |   |                    |
| CDR1-B-100E--- to CDR1-B-101---***  | 10 pF to 100 pF        | F, G, J, K, M                   |   |                    |
| CDR1-B-111D--- to CDR1-B-201---***  | 110 pF to 200 pF       |                                 |   | C = 200    D = 300 |
| CDR1-B-221C--- to CDR1-B-471C---*** | 220 pF to 470 pF       |                                 |   | C = 200            |
| CDR1-B-511B--- to CDR1-B-621---***  | 510 pF to 620 pF       |                                 |   | A = 50    B = 100  |
| CDR1-B-681A--- to CDR1-B-102A---*** | 680 pF to 1000 pF      |                                 |   |                    |
| CDR1-BP112A-- to CDR1-BP512A---***  | 1100 pF to 5100 pF     |                                 |   | A = 50             |
|                                     |                        |                                 | BP  |                    |

\* Complete type designation will include additional symbols to indicate style, voltage-temperature limits, capacitance tolerance (where applicable), termination finish, and failure rate level.  
 \*\* Intermediate values in this category are in 0.1 pF steps.  
 \*\*\* Intermediate values in each category are given by the RETMA 5% Table.

# RF/Microwave Multilayer Capacitors (MLC)

## CDR Series – MIL-PRF-55681/4/5 (RF/Microwave Chips)

**TABLE III - STYLES CDR21-CDR25 CAPACITOR CHARACTERISTICS**

| Type Designation *                   | Capacitance Range (pF) | Capacitance Tolerance Available | Rated Temp. & Voltage-Temp Limits  | Rated DC Voltage |
|--------------------------------------|------------------------|---------------------------------|--|------------------|
| CDR2-B-0R1EB-- to CDR2-B-0R2EB--     | 0.1 pF to 0.2 pF       | B                               | Characteristic BG<br>(+90 ±20 PPM/°C)<br>and Characteristic BP<br>(0 ±30 PPM/°C) | 500 = E          |
| CDR2-B-0R3E--- to CDR2-B-0R4E---     | 0.3 pF to 0.4 pF       | B, C                            |  |                  |
| CDR2-B-0R5E--- to CDR2-B-2R2E---**   | 0.5 pF to 2.2 pF       | B, C, D                         |  |                  |
| CDR2-B-2R4E--- to CDR2-B-6R2E---***  | 2.4 pF to 6.2 pF       | B, C, D                         |  |                  |
| CDR2-B-6R8E--- to CDR2-B-9R1E---***  | 6.8 pF to 9.1 pF       | B, C, J, K, M                   |  |                  |
| CDR21-B-100E--- to CDR2-B-101E---*** | 10 pF to 100 pF        | F, G, J, K, M                   |  | 300 = D          |
| CDR2-B-111D--- to CDR2-B-201D---***  | 110 pF to 200 pF       |                                 |  | 200 = C          |
| CDR2-B-221C--- to CDR2-B-471C---***  | 220 pF to 470 pF       |                                 |  | 100 = B          |
| CDR2-B-511B--- to CDR2-B-621B---***  | 510 pF to 620 pF       |                                 |  | 50 = A           |
| CDR2-B-681A--- to CDR2-B-102A---***  | 680 pF to 1000 pF      |                                 |  |                  |
| CDR2-BP112A-- to CDR2-BP512A---***   | 1100 pF to 5100 pF     |                                 | BP   |                  |

\* Complete type designation will include additional symbols to indicate style, voltage-temperature limits, capacitance tolerance (where applicable), termination finish (T for styles CDR21, CDR22 and CDR24, and S for styles CDR23 and CDR25), and failure rate level. Please note: Leaded devices CDR 21 through CDR 25 are available to the R Failure Rate Level only.

\*\* Intermediate values in this category are in 0.1 pF steps.

\*\*\* Intermediate values in each category are given by the RETMA 5% Table as follows: 10, 11, 12, 13, 15, 16, 18, 20, 22, 24, 27, 30, 33, 36, 39, 43, 47, 51, 56, 62, 68, 75, 82, 91.

**TABLE I - STYLES CDR11 AND CDR12 CAPACITOR CHARACTERISTICS**

| MIL-PRF-55681 Styles | Case Size | Type             | Outlines                         | Body Dimensions                        |                            |                            | Lead & Termination Dimensions & Materials |                             |                          |  |
|----------------------|-----------|------------------|----------------------------------|--|----------------------------|----------------------------|---|-----------------------------|--------------------------|--|
|                      |           |                  |                                  | Length                                 | Width                      | Thickness                  |   |                             |                          |  |
| CDR 11               | A         | Chip CA          |                                  | .055 ±.015<br>(1.4 ±0.38)              |                            |                            | .020/.057<br>(0.51/1.45)                  |                             |                          |  |
| CDR 13               | B         | Chip CA          | <br>W/T is a Termination Surface | .110 ±.020<br>(2.79 ±0.51)             |                            |                            | .030/.102<br>(0.76/2.59)                  |                             |                          |  |
| CDE 12               | A         | Pellet P         |                                  | .055 ±.025<br>(1.4 ±0.63)              | .055 ±.015<br>(1.4 ±0.38)  | .020/.057<br>(0.51/1.45)   |   |                             |                          |  |
| CDR 14               | B         | Pellet P         | <br>W/T is a Termination Surface | .110 +.035 -.020<br>(2.79 +0.89 -0.51) |                            | .110 ±.020<br>(2.79 ±0.51) | .030/.102<br>(0.76/2.59)                  |                             |                          |  |
| CDR 12               | A         | Solder Plate W   |                                  | .055 ±.015<br>(1.4 ±0.38)              |                            |                            | .020/.057<br>(0.51/1.45)                  |                             |                          |  |
| CDR 14               | B         | Solder Plate W   | <br>W/T is a Termination Surface | .110 ±.020<br>(2.79 ±0.51)             |                            |                            | .030/.102<br>(0.76/2.59)                  |                             |                          |  |
| CDR 21               | B         | Microstrip MS    |                                  | .135 ±.015<br>(3.43 ±0.38)             | .110 ±.015<br>(2.79 ±0.38) | .060/.100<br>(1.52/2.54)   | Termination T = Silver                    |                             |                          |  |
| CDR 22               | B         | Axial Ribbon AR  |                                  |  |                            |                            | Length                                    | Width                       | Thickness                |  |
| CDR 24               | B         | Radial Ribbon RR |                                  |  |                            |                            | min.                                      | .093±.005<br>(2.36±0.13)    | .004±.001<br>(0.10±0.03) |  |
| CDR 23               | B         | Radial Wire RW   |                                  |  |                            |                            | .250<br>(6.35)                            |                             |                          |  |
| CDR 25               | B         | Axial Wire AW    |                                  |  |                            |                            | Terminations S = Solder Coated            |                             |                          |  |
|                      |           |                  |                                  |  |                            |                            | min.                                      | #26 AWG                     |                          |  |
|                      |           |                  |                                  |  |                            |                            | .50<br>(12.7)                             | .016<br>(.375)<br>dia. nom. |                          |  |

All dimensions are in inches, except those in parentheses which are in millimeters.

All leads and ribbon are silver and are attached with high temperature solder.

# RF/Microwave Multilayer Capacitors (MLC)

## CDR Series – MIL-PRF-55681/4/5 (RF/Microwave Chips)

| Style | Equiv. KYOCERA AVX<br>Part No. Characteristics |      |
|-------|--|------|
|       | BG   | BP   |
| CDR11 | 100A   | 700A |
| CDR12 | 100A   | 700A |
| CDR13 | 100B   | 700B |
| CDR14 | 100B   | 700B |

| Style | Equiv. KYOCERA AVX<br>Part No. Characteristics |               |
|-------|--|---------------|
|       | BG   | BP            |
| CDR21 | 100B ----- MS                                  | 700B ----- MS |
| CDR22 | 100B ----- AR                                  | 700B ----- AR |
| CDR23 | 100B ----- RW                                  | 700B ----- RW |
| CDR24 | 100B ----- RR                                  | 700B ----- RR |
| CDR25 | 100B ----- AW                                  | 700B ----- AW |

### PACKAGING

Standard Packaging Quantity  
 CDR11-12 = 100 pcs per waffle pack  
 CDR13-14 = 100 pcs per waffle pack

### TAPE & REEL

All tape and reel specifications are in compliance with EIA RS481 (equivalent to IEC 286 part 3).  
 Sizes CDR11/12 through 13/14.

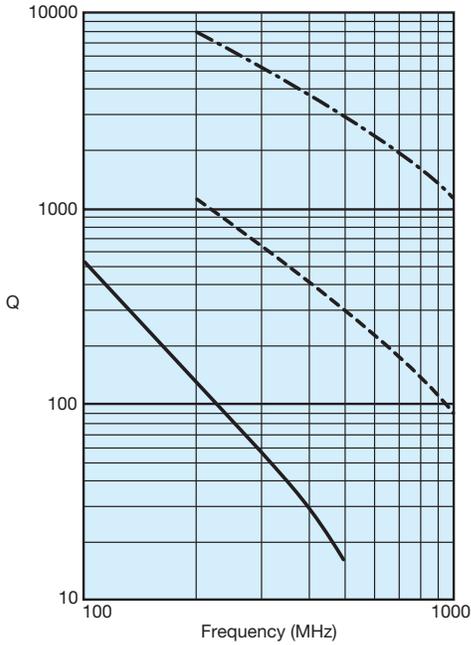
- 8mm carrier
- 7" reel:  $\leq 0.040"$  thickness = 100, 300, 500, 1000, 2000\* pcs
- $\leq 0.075"$  thickness = 100, 300, 500, 1000, 2000\* pcs

\* QTY 2000 only applies to CDR11-12

# RF/Microwave Multilayer Capacitors (MLC) Performance Curves

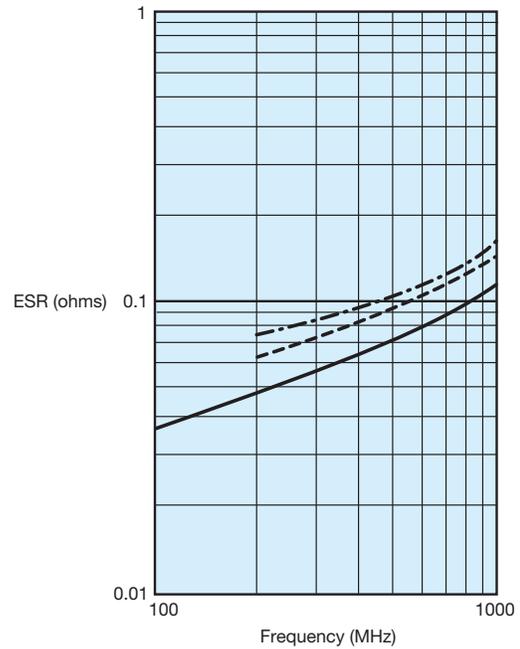


**TYPICAL Q vs. FREQUENCY**  
MIL-PRF-55681E - BG



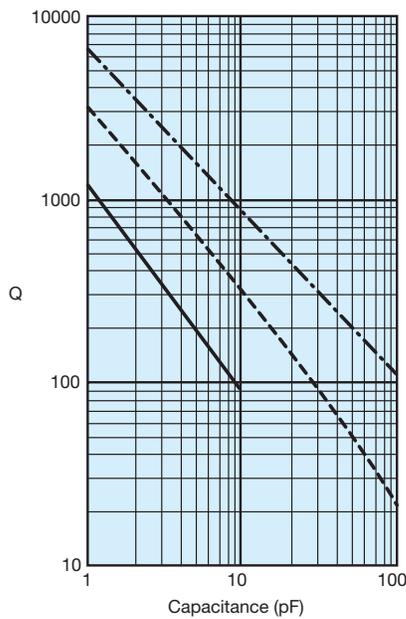
--- 1 Picofarad --- 10 Picofarad — 100 Picofarad

**TYPICAL ESR vs. FREQUENCY**  
MIL-PRF-55681E - BG



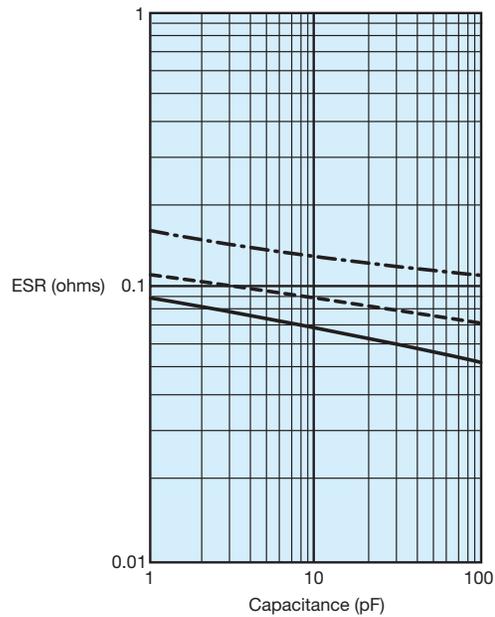
--- 3.3 Picofarad --- 10 Picofarad — 100 Picofarad

**TYPICAL Q vs. CAPACITANCE**  
MIL-PRF-55681E - BG



--- 250 MHz --- 500 MHz — 1000 MHz

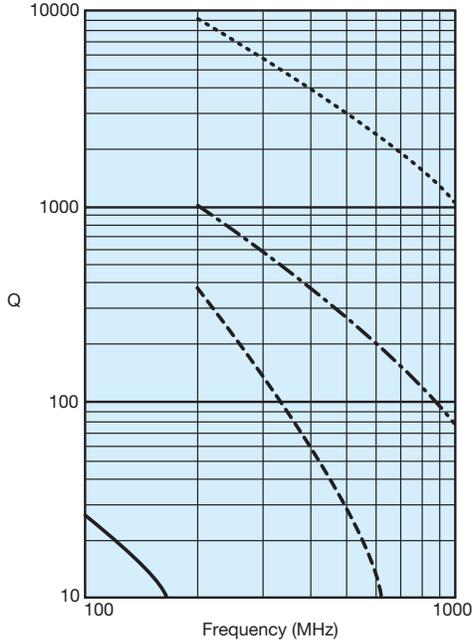
**TYPICAL ESR vs. CAPACITANCE**  
MIL-PRF-55681E - BG



--- 250 MHz --- 500 MHz --- 1000 MHz

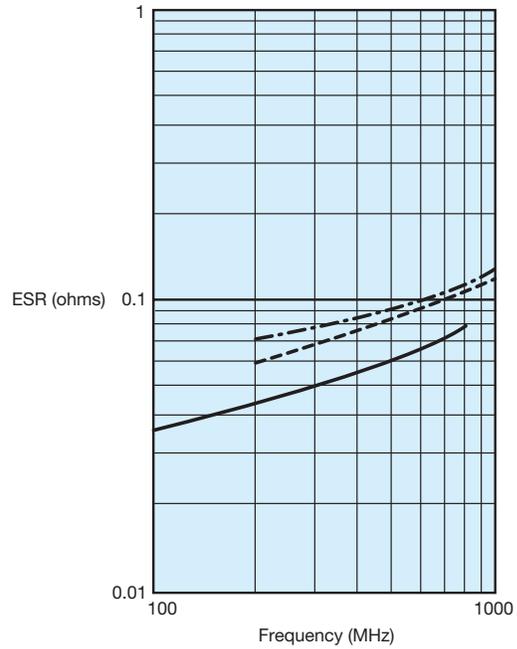
# RF/Microwave Multilayer Capacitors (MLC) Performance Curves

**TYPICAL Q vs. FREQUENCY**  
MIL-PRF-55681E - BG



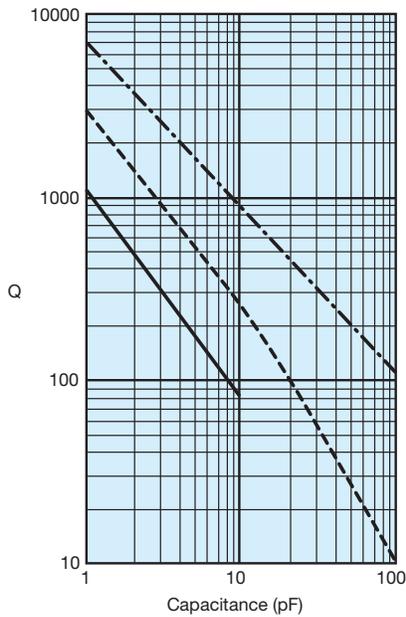
----- 1 Picofarad    - - - - 10 Picofarad    - - - - 47 Picofarad    ——— 330 Picofarad

**TYPICAL ESR vs. FREQUENCY**  
MIL-PRF-55681E - BG



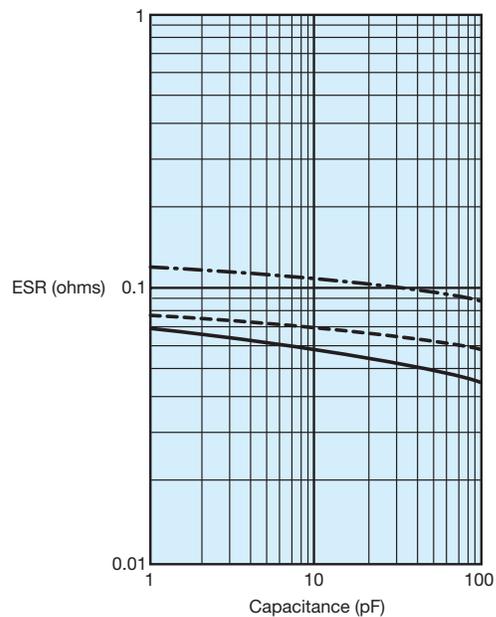
----- 1 Picofarad    - - - - 15 Picofarad    ——— 100 Picofarad

**TYPICAL Q vs. CAPACITANCE**  
MIL-PRF-55681E - BG



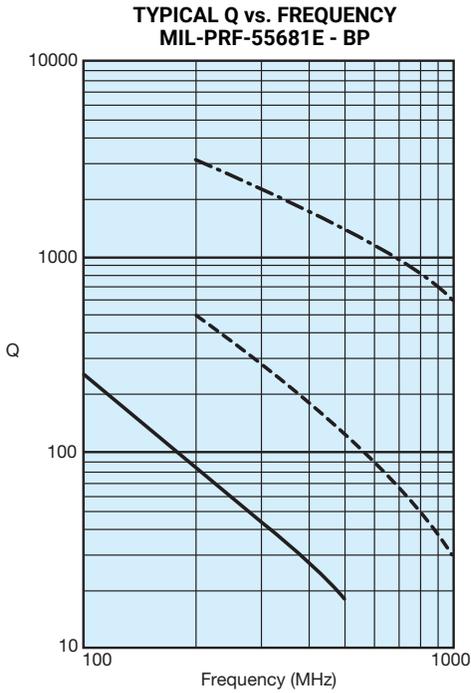
----- 250 MHz    - - - - 500 MHz    ——— 1000 MHz

**TYPICAL ESR vs. CAPACITANCE**  
MIL-PRF-55681E - BG

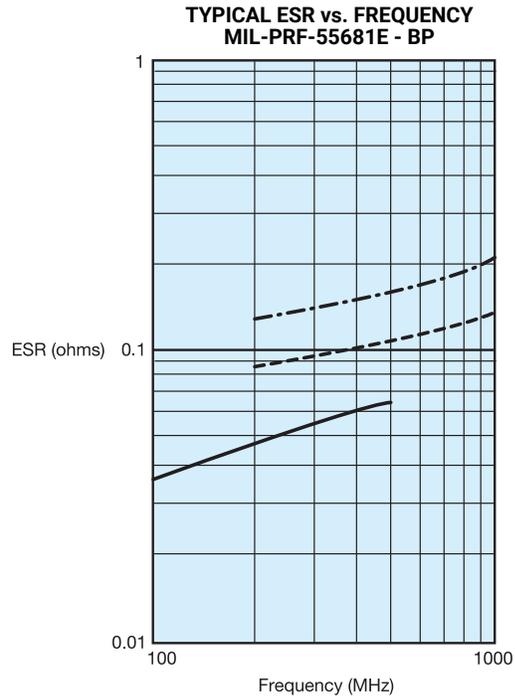


----- 250 MHz    - - - - 500 MHz    - - - - 1000 MHz

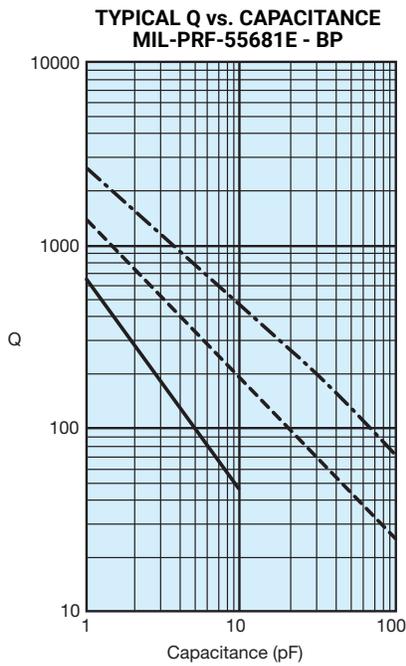
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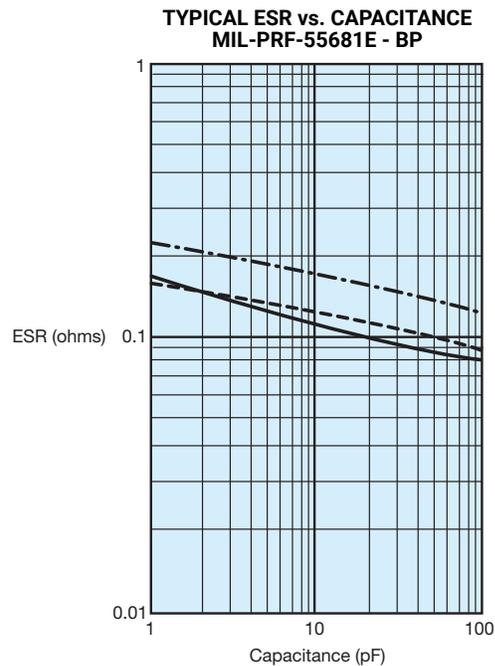
--- 1 Picofarad    - - - 15 Picofarad    — 100 Picofarad



--- 15 Picofarad    - - - 47 Picofarad    — 100 Picofarad

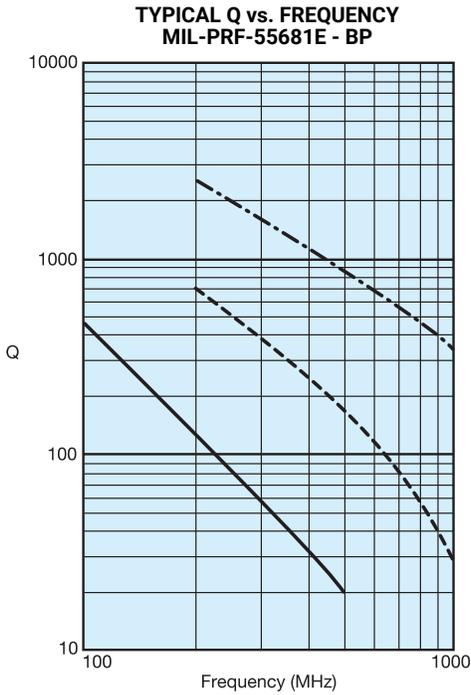


--- 250 MHz    - - - 500 MHz    — 1000 MHz

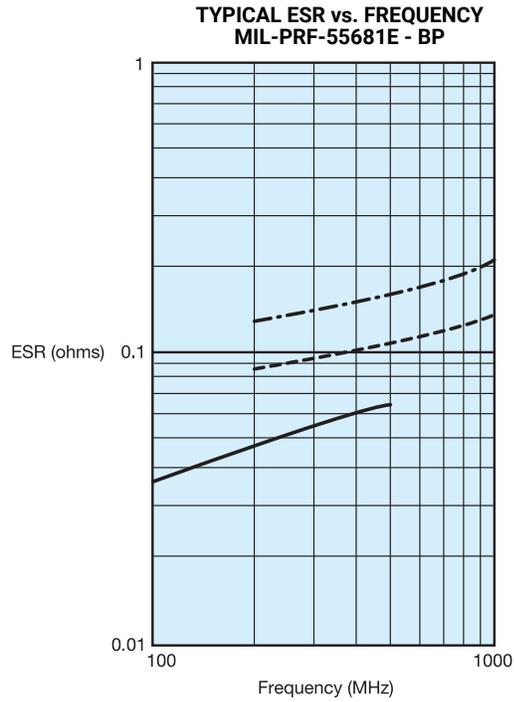


--- 250 MHz    - - - 500 MHz    — 1000 MHz

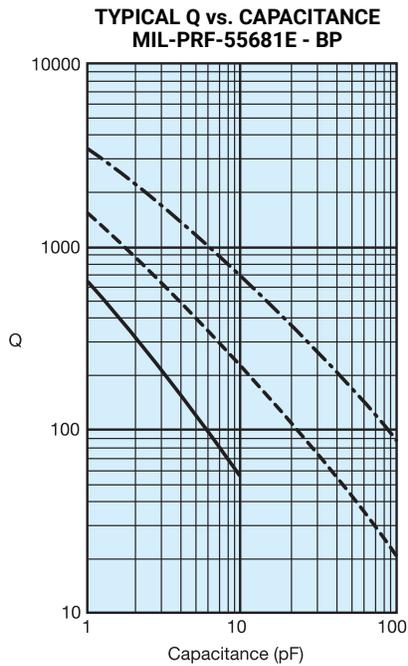
# RF/Microwave Multilayer Capacitors (MLC) Performance Curves



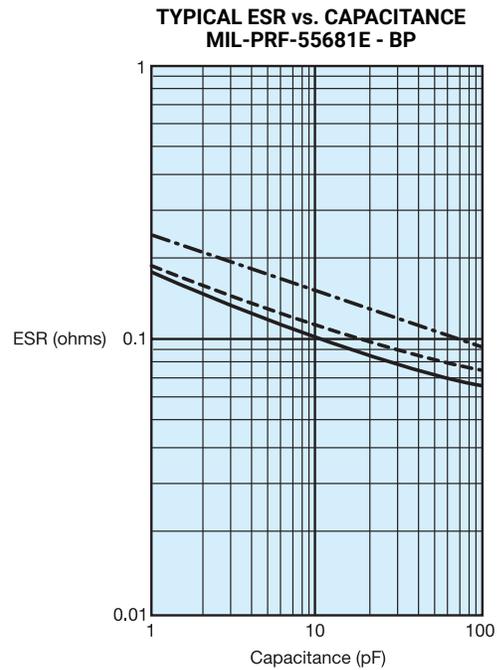
--- 2 Picofarad    - - - 15 Picofarad    — 100 Picofarad



--- 15 Picofarad    - - - 47 Picofarad    — 100 Picofarad



--- 250 MHz    - - - 500 MHz    — 1000 MHz



--- 250 MHz    - - - 500 MHz    — 1000 MHz

# RF/Microwave Multilayer Capacitors (MLC) Performance Curves



TYPICAL RESONANT FREQUENCY vs. CAPACITANCE  
(CDR11-14)

