

# Microwave MLC's

## AQ Series

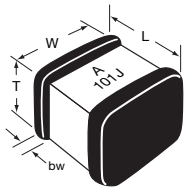


These porcelain and ceramic dielectric multilayer capacitor (MLC) chips are best suited for RF/ Microwave applications typically ranging from 10 MHz to 4.2 GHz. Characteristic is a fine grained, high density, high purity dielectric material impervious to moisture with heavy internal palladium electrodes.

These characteristics lend well to applications requiring:

- 1) high current carrying capabilities;
- 2) high quality factors;
- 3) very low equivalent series resistance;
- 4) very high series resonance;
- 5) excellent stability under stresses of changing voltage, frequency, time and temperature.

### MECHANICAL DIMENSIONS: inches (millimeters)



| Case | Length (L)                                | Width (W)                | Thickness (T)            | Band Width (bw)                         |
|------|-------------------------------------------|--------------------------|--------------------------|-----------------------------------------|
| AQ11 | .055±.015<br>(1.40±.381)                  | .055±.015<br>(1.40±.381) | .020/.057<br>(.508/1.45) | .010 + .010 -.005<br>(.254 +.254 -.127) |
| AQ12 | .055 + .015 - .010<br>(1.40+ .381 - .254) | .055±.015<br>(1.40±.381) | .020/.057<br>(.508/1.45) | .010 + .010 -.005<br>(.254 +.254 -.127) |
| AQ13 | .110±.020<br>(2.79±.508)                  | .110±.020<br>(2.79±.508) | .030/.102<br>(.762/2.59) | .015±.010<br>(.381±.254)                |
| AQ14 | .110 + .020 - .010<br>(2.79 +.889 -.254)  | .110±.010<br>(2.79±.508) | .030/.102<br>(.762/2.59) | .015±.010<br>(.381±.254)                |

### HOW TO ORDER

|                                                     |                                       |                                                                                                 |                                                                                                                                                            |                                                                                                                                                                                                 |                                                                                                                                                        |                                                     |                                                                                                                                                                                   |                                                                                                                                                      |
|-----------------------------------------------------|---------------------------------------|-------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>AQ</b><br>AVX Style<br>AQ11, AQ12,<br>AQ13, AQ14 | <b>11</b><br>Case Size<br>(See Chart) | <b>E</b><br>Voltage Code<br>5 = 50V<br>1 = 100V<br>E = 150V<br>2 = 200V<br>9 = 300V<br>7 = 500V | <b>M</b><br>Temperature Coefficient Code<br>M = +90±20ppm/°C (AQ11/12/13/14)<br>A = 0±30ppm/°C (AQ11/12/13/14)<br>C = 15% ("J" Termination only) (AQ12/14) | <b>100</b><br>Capacitance<br>EIA Capacitance Code in pF.<br>First two digits = significant figures or "R" for decimal place.<br>Third digit = number of zeros or after "R" significant figures. | <b>J</b><br>Capacitance Tolerance Code<br>B = ±.1 pF<br>C = ±.25 pF<br>D = ±.5 pF<br>F = ±1%<br>G = ±2%<br>J = ±5%<br>K = ±10%<br>M = ±20%<br>N = ±30% | <b>A</b><br>Failure Rate Code<br>A = Not Applicable | <b>1</b><br>Termination Style Code<br>1 = Pd/Ag (AQ11/13 only)<br>7 = Ag/Ni/Au (AQ11/13 only)<br>J = Nickel Barrier Sn/Pb (60/40) - (AQ12/14 only)<br>T = 100% Tin (AQ12/14 only) | <b>ME</b><br>Packaging* Code<br>3A = 13" Reel Unmarked<br>ME = 7" Reel Marked<br>RE = 13" Reel Marked<br>WE = Waffle Pack Marked<br>BE = Bulk Marked |
|-----------------------------------------------------|---------------------------------------|-------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------|

### PACKAGING

Standard Packaging = Waffle Pack (maximum quantity is 80)

**TAPE & REEL:** All tape and reel specifications are in compliance with EIA RS481 (equivalent to IEC 286 part 3).

Sizes SQCA through SQCB, CDR11/12 through 13/14.

- 8mm carrier
- 7" reel: ≤0.040" thickness = 2000 pcs  
≤0.075" thickness = 2000 pcs
- 13" reel: ≤0.075" thickness = 10,000 pcs

**Not RoHS Compliant**



For RoHS compliant products, please select correct termination style.



### ELECTRICAL SPECIFICATIONS

| AQ11, AQ12, AQ13, AQ14                |                                                                                                                                                                                                                                                             |                                                                                                         |
|---------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------|
|                                       | M & A                                                                                                                                                                                                                                                       | C                                                                                                       |
| Temperature Coefficient (TCC)         | (M) $+90 \pm 20$ PPM/°C ( -55°C to +125°C)<br>(M) $+90 \pm 30$ PPM/°C ( +125°C to +175°C)<br>(A) $0 \pm 30$ PPM/°C                                                                                                                                          | $\pm 15\%$ (-55°C to 125°C)                                                                             |
| Capacitance Range                     | (M) 0.1 pF to 1000 pF<br>(A) 0.1 pF to 5100 pF                                                                                                                                                                                                              | 0.001 $\mu$ F to 0.1 $\mu$ F                                                                            |
| Operating Temperature                 | 0.1 pF to 330 pF: from -55°C to +175°C<br>360 pF to 5100 pF: from -55°C to +125°C                                                                                                                                                                           | -55°C to +125°C                                                                                         |
| Quality Factor (Q)                    | M Dielectric A & B Case                                                                                                                                                                                                                                     | Greater than 10,000 at 1 MHz                                                                            |
|                                       | A Dielectric B Case                                                                                                                                                                                                                                         | Greater than 10,000 at 1 MHz<br>Greater than 2,000 at 1 MHz<br>Greater than 2,000 at 1 KHz              |
|                                       | A Dielectric A Case                                                                                                                                                                                                                                         | Greater than 10,000 at 1 MHz<br>Greater than 2,000 at 1 MHz                                             |
| Insulation Resistance (IR)            | 0.1 pF to 470 pF<br>10 <sup>6</sup> Megohms min. @ 25°C at rated WVDC<br>10 <sup>6</sup> Megohms min. @ 125°C at rated WVDC<br>510 pF to 5100 pF<br>10 <sup>6</sup> Megohms min. @ 25°C at rated WVDC<br>10 <sup>6</sup> Megohms min. @ 125°C at rated WVDC | 10 <sup>4</sup> Megohms min. @ 25°C at rated WVDC<br>10 <sup>3</sup> Megohms min. @ 125°C at rated WVDC |
| Working Voltage (WVDC)                | See Capacitance Values table                                                                                                                                                                                                                                | See Capacitance Values table                                                                            |
| Dielectric Withstanding Voltage (DWW) | 250% of rated WVDC for 5 secs<br>(for 500V rated 150% of rated voltage)                                                                                                                                                                                     | 250% of rated WVDC for 5 secs                                                                           |
| Aging Effects                         | None                                                                                                                                                                                                                                                        | <3% per decade hour                                                                                     |
| Piezoelectric Effects                 | None                                                                                                                                                                                                                                                        | None                                                                                                    |
| Capacitance Drift                     | $\pm$ (0.02% or 0.02 pF), whichever is greater                                                                                                                                                                                                              | Not Applicable                                                                                          |

### ENVIRONMENTAL CHARACTERISTICS

AVX SQLB will meet and exceed the requirements of EIA-198, MIL-PRF-55681 and MIL-PRF-123

|                           |                                                                                                                                               |
|---------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------|
| Thermal Shock             | Mil-STD-202, Method 107, Condition A                                                                                                          |
| Moisture Resistance       | Mil-STD-202, Method 106                                                                                                                       |
| Low Voltage Humidity      | Mil-STD-202, Method 103, condition A, with 1.5 VDC applied while subjected to an environment of 85°C with 85% relative humidity for 240 hours |
| Life Test                 | Mil-STD-202, Method 108, for 2000 hours at 125°C                                                                                              |
| Shock                     | Mil-STD-202, Method 213, Condition J                                                                                                          |
| Vibration                 | Mil-STD-202, Method 204, Condition B                                                                                                          |
| Immersion                 | Mil-STD-202, Method 104, Condition B                                                                                                          |
| Salt Spray                | Mil-STD-202, Method 101, Condition B                                                                                                          |
| Solderability             | Mil-STD-202, Method 208                                                                                                                       |
| Terminal Strength         | Mil-STD-202, Method 211                                                                                                                       |
| Temperature Cycling       | Mil-STD-202, Method 102, Condition C                                                                                                          |
| Barometric Pressure       | Mil-STD-202, Method 105, Condition B                                                                                                          |
| Resistance to Solder Heat | Mil-STD-202, Method 210, Condition C                                                                                                          |

**TABLE I: TC: M (+90±20PPM/°C)**

**CASE SIZE 11, 12, 13 & 14**

**DIMENSIONS:** inches (millimeters)

| Case | Length                                | Width                 | Thickness             | Band Width                          | Avail. Term. |
|------|---------------------------------------|-----------------------|-----------------------|-------------------------------------|--------------|
| 11   | .055±.015 (1.40±.381)                 | .055±.015 (1.40±.381) | .020/.057 (.508/1.45) | .010 +.010 -.005 (.254 +.254 -.127) | 1 & 7        |
| 12   | .055±.025 (1.40±.635)                 | .055±.015 (1.40±.381) | .020/.057 (.508/1.45) | .010 +.010 -.005 (.254 +.254 -.127) | J            |
| 13   | .110±.020 (2.79±.508)                 | .110±.020 (2.79±.508) | .030/.102 (.762/2.59) | .015±.010 (.381±.254)               | 1 & 7        |
| 14   | .110 +0.035 -0.020 (2.79 +.889 -.508) | .110±.020 (2.79±.508) | .030/.102 (.762/2.59) | .015±.010 (.381±.254)               | J            |

| Case: AQ11, AQ12 |               |      | Case: AQ13, AQ14 |               |      |
|------------------|---------------|------|------------------|---------------|------|
| Cap. pF          | Cap. Tol.     | WVDC | Cap. pF          | Cap. Tol.     | WVDC |
| 0.1              | B             | 150  | 0.1              | B             | 500  |
| 0.2              | B             | 150  | 0.2              | B             | 500  |
| 0.3              | B,C           | 150  | 0.3              | B,C           | 500  |
| 0.4              | B,C           | 150  | 0.4              | B,C           | 500  |
| 0.5              | B, C, D       | 150  | 0.5              | B, C, D       | 500  |
| 0.6              | B, C, D       | 150  | 0.6              | B, C, D       | 500  |
| 0.7              | B, C, D       | 150  | 0.7              | B, C, D       | 500  |
| 0.8              | B, C, D       | 150  | 0.8              | B, C, D       | 500  |
| 0.9              | B, C, D       | 150  | 0.9              | B, C, D       | 500  |
| 1.0              | B, C, D       | 150  | 1.0              | B, C, D       | 500  |
| 1.1              | B, C, D       | 150  | 1.1              | B, C, D       | 500  |
| 1.2              | B, C, D       | 150  | 1.2              | B, C, D       | 500  |
| 1.3              | B, C, D       | 150  | 1.3              | B, C, D       | 500  |
| 1.4              | B, C, D       | 150  | 1.4              | B, C, D       | 500  |
| 1.5              | B, C, D       | 150  | 1.5              | B, C, D       | 500  |
| 1.6              | B, C, D       | 150  | 1.6              | B, C, D       | 500  |
| 1.7              | B, C, D       | 150  | 1.7              | B, C, D       | 500  |
| 1.8              | B, C, D       | 150  | 1.8              | B, C, D       | 500  |
| 1.9              | B, C, D       | 150  | 1.9              | B, C, D       | 500  |
| 2.0              | B, C, D       | 150  | 2.0              | B, C, D       | 500  |
| 2.2              | B, C, D       | 150  | 2.2              | B, C, D       | 500  |
| 2.4              | B, C, D       | 150  | 2.4              | B, C, D       | 500  |
| 2.7              | B, C, D       | 150  | 2.7              | B, C, D       | 500  |
| 3.0              | B, C, D       | 150  | 3.0              | B, C, D       | 500  |
| 3.3              | B, C, D       | 150  | 3.3              | B, C, D       | 500  |
| 3.6              | B, C, D       | 150  | 3.6              | B, C, D       | 500  |
| 3.9              | B, C, D       | 150  | 3.9              | B, C, D       | 500  |
| 4.3              | B, C, D       | 150  | 4.3              | B, C, D       | 500  |
| 4.7              | B, C, D       | 150  | 4.7              | B, C, D       | 500  |
| 5.1              | B, C, D       | 150  | 5.1              | B, C, D       | 500  |
| 5.6              | B, C, D       | 150  | 5.6              | B, C, D       | 500  |
| 6.2              | B, C, D       | 150  | 6.2              | B, C, D       | 500  |
| 6.8              | B, C, J, K, M | 150  | 6.8              | B, C, J, K, M | 500  |
| 7.5              | B, C, J, K, M | 150  | 7.5              | B, C, J, K, M | 500  |
| 8.2              | B, C, J, K, M | 150  | 8.2              | B, C, J, K, M | 500  |
| 9.1              | B, C, J, K, M | 150  | 9.1              | B, C, J, K, M | 500  |
| 10               | F, G, J, K, M | 150  | 10               | F, G, J, K, M | 500  |
| 11               | F, G, J, K, M | 150  | 11               | F, G, J, K, M | 500  |
| 12               | F, G, J, K, M | 150  | 12               | F, G, J, K, M | 500  |
| 13               | F, G, J, K, M | 150  | 13               | F, G, J, K, M | 500  |
| 15               | F, G, J, K, M | 150  | 15               | F, G, J, K, M | 500  |
| 16               | F, G, J, K, M | 150  | 16               | F, G, J, K, M | 500  |
| 18               | F, G, J, K, M | 150  | 18               | F, G, J, K, M | 500  |
| 20               | F, G, J, K, M | 150  | 20               | F, G, J, K, M | 500  |
| 22               | F, G, J, K, M | 150  | 22               | F, G, J, K, M | 500  |
| 24               | F, G, J, K, M | 150  | 24               | F, G, J, K, M | 500  |
| 27               | F, G, J, K, M | 150  | 27               | F, G, J, K, M | 500  |
| 30               | F, G, J, K, M | 150  | 30               | F, G, J, K, M | 500  |
| 33               | F, G, J, K, M | 150  | 33               | F, G, J, K, M | 500  |
| 36               | F, G, J, K, M | 150  | 36               | F, G, J, K, M | 500  |
| 39               | F, G, J, K, M | 150  | 39               | F, G, J, K, M | 500  |
| 43               | F, G, J, K, M | 150  | 43               | F, G, J, K, M | 500  |
| 47               | F, G, J, K, M | 150  | 47               | F, G, J, K, M | 500  |
| 51               | F, G, J, K, M | 150  | 51               | F, G, J, K, M | 500  |
| 56               | F, G, J, K, M | 150  | 56               | F, G, J, K, M | 500  |
| 62               | F, G, J, K, M | 150  | 62               | F, G, J, K, M | 500  |
| 68               | F, G, J, K, M | 150  | 68               | F, G, J, K, M | 500  |
| 75               | F, G, J, K, M | 150  | 75               | F, G, J, K, M | 500  |
| 82               | F, G, J, K, M | 150  | 82               | F, G, J, K, M | 500  |
| 91               | F, G, J, K, M | 150  | 91               | F, G, J, K, M | 500  |
| 100              | F, G, J, K, M | 150  |                  |               |      |

| Cap. pF | Cap. Tol.     | WVDC |
|---------|---------------|------|
| 100     | F, G, J, K, M | 500  |
| 110     | F, G, J, K, M | 300  |
| 120     | F, G, J, K, M | 300  |
| 130     | F, G, J, K, M | 300  |
| 150     | F, G, J, K, M | 300  |
| 160     | F, G, J, K, M | 300  |
| 180     | F, G, J, K, M | 300  |
| 200     | F, G, J, K, M | 300  |
| 220     | F, G, J, K, M | 200  |
| 240     | F, G, J, K, M | 200  |
| 270     | F, G, J, K, M | 200  |
| 300     | F, G, J, K, M | 200  |
| 330     | F, G, J, K, M | 200  |
| 360     | F, G, J, K, M | 200  |
| 390     | F, G, J, K, M | 200  |
| 430     | F, G, J, K, M | 200  |
| 470     | F, G, J, K, M | 200  |
| 510     | F, G, J, K, M | 150  |
| 560     | F, G, J, K, M | 150  |
| 620     | F, G, J, K, M | 150  |
| 680     | F, G, J, K, M | 150  |
| 750     | F, G, J, K, M | 150  |
| 820     | F, G, J, K, M | 150  |
| 910     | F, G, J, K, M | 150  |
| 1000    | F, G, J, K, M | 150  |

**TABLE II: TC: A ( $0 \pm 30 \text{PPM}/^\circ\text{C}$ )  
CASE SIZE 11, 12, 13 & 14**

**DIMENSIONS:** inches (millimeters)

| Case | Length                                | Width                 | Thickness             | Band Width                          | Avail. Term. |
|------|---------------------------------------|-----------------------|-----------------------|-------------------------------------|--------------|
| 11   | .055±.015 (1.40±.381)                 | .055±.015 (1.40±.381) | .020/.057 (.508/1.45) | .010 +.010 -.005 (.254 +.254 -.127) | 1 & 7        |
| 12   | .055±.025 (1.40±.635)                 | .055±.015 (1.40±.381) | .020/.057 (.508/1.45) | .010 +.010 -.005 (.254 +.254 -.127) | J            |
| 13   | .110±.020 (2.79±.508)                 | .110±.020 (2.79±.508) | .030/.102 (.762/2.59) | .015±.010 (.381±.254)               | 1 & 7        |
| 14   | .110 +0.035 -0.020 (2.79 +.889 -.508) | .110±.020 (2.79±.508) | .030/.102 (.762/2.59) | .015±.010 (.381±.254)               | J            |

| Case: AQ11, AQ12 |               |      |         |               |      |
|------------------|---------------|------|---------|---------------|------|
| Cap. pF          | Cap. Tol.     | WVDC | Cap. pF | Cap. Tol.     | WVDC |
| 0.1              | B             | 150  | 24      | F, G, J, K, M | 150  |
| 0.2              | B             | 150  | 27      | F, G, J, K, M | 150  |
| 0.3              | B,C           | 150  | 30      | F, G, J, K, M | 150  |
| 0.4              | B,C           | 150  | 33      | F, G, J, K, M | 150  |
| 0.5              | B, C, D       | 150  | 36      | F, G, J, K, M | 150  |
| 0.6              | B, C, D       | 150  | 39      | F, G, J, K, M | 150  |
| 0.7              | B, C, D       | 150  | 43      | F, G, J, K, M | 150  |
| 0.8              | B, C, D       | 150  | 47      | F, G, J, K, M | 150  |
| 0.9              | B, C, D       | 150  | 51      | F, G, J, K, M | 150  |
| 1.0              | B, C, D       | 150  | 56      | F, G, J, K, M | 150  |
| 1.1              | B, C, D       | 150  | 62      | F, G, J, K, M | 150  |
| 1.2              | B, C, D       | 150  | 68      | F, G, J, K, M | 150  |
| 1.3              | B, C, D       | 150  | 75      | F, G, J, K, M | 150  |
| 1.4              | B, C, D       | 150  | 82      | F, G, J, K, M | 150  |
| 1.5              | B, C, D       | 150  | 91      | F, G, J, K, M | 150  |
| 1.6              | B, C, D       | 150  | 100     | F, G, J, K, M | 150  |
| 1.7              | B, C, D       | 150  | 110     | F, G, J, K, M | 50   |
| 1.8              | B, C, D       | 150  | 120     | F, G, J, K, M | 50   |
| 1.9              | B, C, D       | 150  | 130     | F, G, J, K, M | 50   |
| 2.0              | B, C, D       | 150  | 150     | F, G, J, K, M | 50   |
| 2.2              | B, C, D       | 150  | 160     | F, G, J, K, M | 50   |
| 2.4              | B, C, D       | 150  | 180     | F, G, J, K, M | 50   |
| 2.7              | B, C, D       | 150  | 200     | F, G, J, K, M | 50   |
| 3.0              | B, C, D       | 150  | 220     | F, G, J, K, M | 50   |
| 3.3              | B, C, D       | 150  | 240     | F, G, J, K, M | 50   |
| 3.6              | B, C, D       | 150  | 270     | F, G, J, K, M | 50   |
| 3.9              | B, C, D       | 150  | 300     | F, G, J, K, M | 50   |
| 4.3              | B, C, D       | 150  | 330     | F, G, J, K, M | 50   |
| 4.7              | B, C, D       | 150  | 360     | F, G, J, K, M | 50   |
| 5.1              | B, C, D       | 150  | 390     | F, G, J, K, M | 50   |
| 5.6              | B, C, D       | 150  | 430     | F, G, J, K, M | 50   |
| 6.2              | B, C, D       | 150  | 470     | F, G, J, K, M | 50   |
| 6.8              | B, C, J, K, M | 150  | 510     | F, G, J, K, M | 50   |
| 7.5              | B, C, J, K, M | 150  | 560     | F, G, J, K, M | 50   |
| 8.2              | B, C, J, K, M | 150  | 620     | F, G, J, K, M | 50   |
| 9.1              | B, C, J, K, M | 150  | 680     | F, G, J, K, M | 50   |
| 10               | F, G, J, K, M | 150  | 750     | F, G, J, K, M | 50   |
| 11               | F, G, J, K, M | 150  | 820     | F, G, J, K, M | 50   |
| 12               | F, G, J, K, M | 150  | 910     | F, G, J, K, M | 50   |
| 13               | F, G, J, K, M | 150  | 1000    | F, G, J, K, M | 50   |
| 15               | F, G, J, K, M | 150  |         |               |      |
| 16               | F, G, J, K, M | 150  |         |               |      |
| 18               | F, G, J, K, M | 150  |         |               |      |
| 20               | F, G, J, K, M | 150  |         |               |      |
| 22               | F, G, J, K, M | 150  |         |               |      |

| Case: AQ13, AQ14 |               |      |         |               |      |
|------------------|---------------|------|---------|---------------|------|
| Cap. pF          | Cap. Tol.     | WVDC | Cap. pF | Cap. Tol.     | WVDC |
| 0.1              | B             | 500  | 51      | F, G, J, K, M | 500  |
| 0.2              | B             | 500  | 56      | F, G, J, K, M | 500  |
| 0.3              | B,C           | 500  | 62      | F, G, J, K, M | 500  |
| 0.4              | B,C           | 500  | 68      | F, G, J, K, M | 500  |
| 0.5              | B, C, D       | 500  | 75      | F, G, J, K, M | 500  |
| 0.6              | B, C, D       | 500  | 82      | F, G, J, K, M | 500  |
| 0.7              | B, C, D       | 500  | 91      | F, G, J, K, M | 500  |
| 0.8              | B, C, D       | 500  | 100     | F, G, J, K, M | 500  |
| 0.9              | B, C, D       | 500  | 110     | F, G, J, K, M | 300  |
| 1.0              | B, C, D       | 500  | 120     | F, G, J, K, M | 300  |
| 1.1              | B, C, D       | 500  | 130     | F, G, J, K, M | 300  |
| 1.2              | B, C, D       | 500  | 150     | F, G, J, K, M | 300  |
| 1.3              | B, C, D       | 500  | 160     | F, G, J, K, M | 300  |
| 1.4              | B, C, D       | 500  | 180     | F, G, J, K, M | 300  |
| 1.5              | B, C, D       | 500  | 200     | F, G, J, K, M | 300  |
| 1.6              | B, C, D       | 500  | 220     | F, G, J, K, M | 200  |
| 1.7              | B, C, D       | 500  | 240     | F, G, J, K, M | 200  |
| 1.8              | B, C, D       | 500  | 270     | F, G, J, K, M | 200  |
| 1.9              | B, C, D       | 500  | 300     | F, G, J, K, M | 200  |
| 2.0              | B, C, D       | 500  | 330     | F, G, J, K, M | 200  |
| 2.2              | B, C, D       | 500  | 360     | F, G, J, K, M | 200  |
| 2.4              | B, C, D       | 500  | 390     | F, G, J, K, M | 200  |
| 2.7              | B, C, D       | 500  | 430     | F, G, J, K, M | 200  |
| 3.0              | B, C, D       | 500  | 470     | F, G, J, K, M | 200  |
| 3.3              | B, C, D       | 500  | 510     | F, G, J, K, M | 150  |
| 3.6              | B, C, D       | 500  | 560     | F, G, J, K, M | 150  |
| 3.9              | B, C, D       | 500  | 620     | F, G, J, K, M | 150  |
| 4.3              | B, C, D       | 500  | 680     | F, G, J, K, M | 150  |
| 4.7              | B, C, D       | 500  | 750     | F, G, J, K, M | 150  |
| 5.1              | B, C, D       | 500  | 820     | F, G, J, K, M | 150  |
| 5.6              | B, C, D       | 500  | 910     | F, G, J, K, M | 150  |
| 6.2              | B, C, D       | 500  | 1000    | F, G, J, K, M | 150  |
| 6.8              | B, C, J, K, M | 500  | 1100    | F, G, J, K, M | 50   |
| 7.5              | B, C, J, K, M | 500  | 1200    | F, G, J, K, M | 50   |
| 8.2              | B, C, J, K, M | 500  | 1300    | F, G, J, K, M | 50   |
| 9.1              | B, C, J, K, M | 500  | 1500    | F, G, J, K, M | 50   |
| 10               | F, G, J, K, M | 500  | 1600    | F, G, J, K, M | 50   |
| 11               | F, G, J, K, M | 500  | 1800    | F, G, J, K, M | 50   |
| 12               | F, G, J, K, M | 500  | 2000    | F, G, J, K, M | 50   |
| 13               | F, G, J, K, M | 500  | 2200    | F, G, J, K, M | 50   |
| 15               | F, G, J, K, M | 500  | 2400    | F, G, J, K, M | 50   |
| 16               | F, G, J, K, M | 500  | 2700    | F, G, J, K, M | 50   |
| 18               | F, G, J, K, M | 500  | 3000    | F, G, J, K, M | 50   |
| 20               | F, G, J, K, M | 500  | 3300    | F, G, J, K, M | 50   |
| 22               | F, G, J, K, M | 500  | 3600    | F, G, J, K, M | 50   |
| 24               | F, G, J, K, M | 500  | 3900    | F, G, J, K, M | 50   |
| 27               | F, G, J, K, M | 500  | 4300    | F, G, J, K, M | 50   |
| 30               | F, G, J, K, M | 500  | 4700    | F, G, J, K, M | 50   |
| 33               | F, G, J, K, M | 500  | 5000    | F, G, J, K, M | 50   |
| 36               | F, G, J, K, M | 500  | 5100    | F, G, J, K, M | 50   |
| 39               | F, G, J, K, M | 500  |         |               |      |
| 43               | F, G, J, K, M | 500  |         |               |      |
| 47               | F, G, J, K, M | 500  |         |               |      |

**TABLE III: TC: C ( $\pm 15\%$ ) CASE SIZE 12 & 14**

| Case: AQ12 |           |      |         |           |      |         |           |      | Case: AQ14 |           |      |         |           |      |         |           |      |
|------------|-----------|------|---------|-----------|------|---------|-----------|------|------------|-----------|------|---------|-----------|------|---------|-----------|------|
| Cap. pF    | Cap. Tol. | WVDC | Cap. pF | Cap. Tol. | WVDC | Cap. pF | Cap. Tol. | WVDC | Cap. pF    | Cap. Tol. | WVDC | Cap. pF | Cap. Tol. | WVDC | Cap. pF | Cap. Tol. | WVDC |
| 1000       | K, M, N   | 50   | 2200    | K, M, N   | 50   | 5100    | K, M, N   | 50   | 5000       | K, M, N   | 50   | 15000   | K, M, N   | 50   | 47000   | K, M, N   | 50   |
| 1200       | K, M, N   | 50   | 2700    | K, M, N   | 50   | 5600    | K, M, N   | 50   | 6800       | K, M, N   | 50   | 18000   | K, M, N   | 50   | 68000   | K, M, N   | 50   |
| 1500       | K, M, N   | 50   | 3300    | K, M, N   | 50   | 6800    | K, M, N   | 50   | 8200       | K, M, N   | 50   | 27000   | K, M, N   | 50   | 82000   | K, M, N   | 50   |
| 1800       | K, M, N   | 50   | 3900    | K, M, N   | 50   | 8200    | K, M, N   | 50   | 10000      | K, M, N   | 50   | 33000   | K, M, N   | 50   | 100000  | K, M, N   | 50   |
| 2000       | K, M, N   | 50   | 4700    | K, M, N   | 50   | 10000   | K, M, N   | 50   | 12000      | K, M, N   | 50   | 39000   | K, M, N   | 50   |         |           |      |