



**KEMET Ceramic MLCC Surface Mount Capacitors**  
**High Temperature Product Qualification Test Plan and Results Summary**  
*High Temperature 200°C COG 0603 10nF 25V*

|                       |                       |
|-----------------------|-----------------------|
| KEMET Part Number ==> | <b>C0603H103K3GAC</b> |
| KEMET Lot Number ==>  | 6313312300            |
| Piece Counts ==>      | SS      #Fail         |

| RELIABILITY/ ENVIRONMENTAL TESTS     |                          |  |                   |   |
|--------------------------------------|--------------------------|--|-------------------|---|
| High Temperature Life                | MIL-STD-202, Mthd 108    | 200°C, Rated Voltage, 2000 Hours   | 77                | 0 |
| Load Humidity                        | MIL-STD-202, Mthd 103    | 85°C /85%RH, Rated Voltage, 1000 Hours   | 77                | 0 |
| Low Voltage Humidity                 | MIL-STD-202, Mthd 103    | 85°C /85%RH, 1.5V, 1000 Hours  | 77                | 0 |
| Temperature Cycling                  | JESD22 Method JA-104     | -55°C to +200°C, 50 Cycles   | 77                | 0 |
| Thermal Shock                        | MIL-STD-202, Mthd 107    | -55°C to +150°C, 20s transfer, 15 min dwell, 300 Cycles                                    | 30                | 0 |
| Moisture Resistance                  | MIL-STD-202, Mthd 106    | Cycled Temp / RH. 0V, 10 cycles @ 24 Hrs each  | 77                | 0 |
| PHYSICAL, MECHANICAL & PROCESS TESTS |                          |  |                   |   |
| External Visual                      | MIL-STD-883, Mthd 2009   | Evaluate physical external characteristics of all parts submitted for test                 | All pieces tested | 0 |
| Physical Dimensions                  | JESD22 Method JB-100     | Length, width, and thickness   | 30                | 0 |
| Resistance to Solvents               | MIL-STD-202, Method 215  | Include Aqueous wash chemical - OKEM Clean or equivalent                                   | 5                 | 0 |
| Solderability                        | ANSI / J-STD-002         | a) Method B, 4 hrs @ 155°C dry heat @ 235°C  | 15                | 0 |
|                                      |                          | b) Method B, category 3, 8 hr steam age @ 220 / 260°C dips                                 | 30                | 0 |
|                                      |                          | c) Method D, category 3, Leaching @260°C dip   | 15                | 0 |
| Mechanical Shock and Vibration       | MIL-STD-202 Mthd 213/214 | Method 213: Figure 1, Condition F<br>Method 204: 5 gs for 20 min, 12 cycles                | 30                | 0 |
| Resistance to Soldering Heat         | MIL-STD-202, Mthd 210    | Condition B, no pre-heat of samples, Single Wave Solder                                    | 30                | 0 |
| Terminal Strength                    | JIS-C-6429               | Force of 1.8 kg for 60 seconds   | 30                | 0 |
| Board Flex                           | JIS-C-6429               | 2mm minimum for all except 3 mm min for Class I  |                   |   |
| Electrical Characterization          | KEMET Custom Test        | Parametrically test, show statistics at room as well as min and max operating temperatures | 30                | 0 |
| QUALIFICATION STATUS                 |                          |  | <b>APPROVED</b>   |   |
|                                      |                          |  | 660               | 0 |



## KEMET Ceramic SMD Product

### High Temperature 200°C COG 0603 10nF 25 Volt Product

#### High Temperature Qualification Test Results

| Lot Number   | Results | Test Point | Capacitance, nF  |      |       |       | Delta Cap, % |       |       |        | DF, 1 KHz, % |       |       |       | IR, 25°C, Gohm |       |       |      |
|--|---------|------------|------------------|------|-------|-------|--------------|-------|-------|--------|--------------|-------|-------|-------|----------------|-------|-------|------|
|  |         |            | AVG              | STD  | Max   | Min   | AVG          | STD   | Max   | Min    | AVG          | STD   | Max   | Min   | AVG            | STD   | Max   | Min  |
| <b>High Temperature Life, 200°C, Rated Voltage, 2000 Hours</b> |         |            |                  |      |       |       |              |       |       |        |              |       |       |       |                |       |       |      |
|  |         |            | Pre Test Limits  |      | 11.0  | 9.0   | N/A          |       | N/A   |        | 0.1          |       | N/A   |       | N/A            |       | 100.0 |      |
|  |         |            | Post Test Limits |      | ---   | ---   | 0.3          |       | -0.3  |        | 0.5          |       | N/A   |       | N/A            |       | 10.0  |      |
| 7032030215   | 0/77    | 0 hours    | 9.96             | 0.20 | 10.38 | 9.56  | -            | -     | -     | -      | 0.009        | 0.010 | 0.046 | 0.004 | 3035           | 1.38  | 4662  | 1098 |
|  | 0/77    | 1000 hours | 9.96             | 0.20 | 10.38 | 9.56  | 0.027        | 0.003 | 0.041 | 0.022  | 0.008        | 0.010 | 0.055 | 0.005 | 3281           | 1.15  | 4647  | 2475 |
| <b>Storage Life, 150°C, 0 Volts, 1000 Hours</b>                |         |            |                  |      |       |       |              |       |       |        |              |       |       |       |                |       |       |      |
|  |         |            | Pre Test Limits  |      | 11.0  | 9.0   | N/A          |       | N/A   |        | 0.1          |       | N/A   |       | N/A            |       | 100.0 |      |
|  |         |            | Post Test Limits |      | ---   | ---   | 0.3          |       | -0.3  |        | 0.5          |       | N/A   |       | N/A            |       | 10.0  |      |
| 7143143305   | 0/77    | 0 hours    | 10.33            | 0.09 | 10.60 | 10.10 | -            | -     | -     | -      | 0.003        | 0.000 | 0.003 | 0.003 | 14929          | 1.176 | 25000 | 3711 |
|  | 0/77    | 1000 hours | 10.33            | 0.09 | 10.60 | 10.10 | -0.013       | 0.110 | 0.000 | -0.971 | 0.003        | 0.000 | 0.004 | 0.002 | 15247          | 1.177 | 25000 | 4112 |

| Lot Number  | Results | Test Point | Capacitance, nF  |      |       |       | Delta Cap, % |       |       |        | DF, 1 KHz, % |       |       |       | IR, 25°C, Gohm |       |       |      |
|---|---------|------------|------------------|------|-------|-------|--------------|-------|-------|--------|--------------|-------|-------|-------|----------------|-------|-------|------|
|   |         |            | AVG              | STD  | Max   | Min   | AVG          | STD   | Max   | Min    | AVG          | STD   | Max   | Min   | AVG            | STD   | Max   | Min  |
| <b>Load Humidity, 85°C, Rated Voltage, 1000 Hours</b> |         |            |                  |      |       |       |              |       |       |        |              |       |       |       |                |       |       |      |
|   |         |            | Pre Test Limits  |      | 11.0  | 9.0   | N/A          |       | N/A   |        | 0.1          |       | N/A   |       | N/A            |       | 100.0 |      |
|   |         |            | Post Test Limits |      | ---   | ---   | 0.3          |       | -0.3  |        | 0.5          |       | N/A   |       | N/A            |       | 10.0  |      |
| 6313312300  | 0/77    | 0 hours    | 10.34            | 0.08 | 10.50 | 10.20 | -            | -     | -     | -      | 0.003        | 0.000 | 0.004 | 0.003 | 11306          | 1.180 | 25000 | 396  |
|   | 0/77    | 1000 hours | 10.33            | 0.08 | 10.50 | 10.20 | -0.013       | 0.109 | 0.000 | -0.962 | 0.003        | 0.000 | 0.004 | 0.002 | 6602           | 1.280 | 54828 | 2292 |
| <b>Low Volt Humidity, 85°C, 1.5 Volts, 1000 Hours</b> |         |            |                  |      |       |       |              |       |       |        |              |       |       |       |                |       |       |      |
|   |         |            | Pre Test Limits  |      | 11.0  | 9.0   | N/A          |       | N/A   |        | 0.1          |       | N/A   |       | N/A            |       | 100.0 |      |
|   |         |            | Post Test Limits |      | ---   | ---   | 0.3          |       | -0.3  |        | 0.5          |       | N/A   |       | N/A            |       | 10.0  |      |
| 6313312300  | 0/77    | 0 hours    | 10.33            | 0.08 | 10.50 | 1.01  | -            | -     | -     | -      | 0.003        | 0.000 | 0.003 | 0.003 | 12842          | 1.938 | 25000 | 583  |
|   | 0/77    | 1000 hours | 10.33            | 0.08 | 10.50 | 10.10 | 0.000        | 0.000 | 0.000 | 0.000  | 0.003        | 0.000 | 0.004 | 0.003 | 683            | 1.177 | 1500  | 190  |

| Lot Number                                    | Results | Test Point | Capacitance, nF  |      |       |       | Delta Cap, % |       |       |       | DF, 1 KHz, % |       |       |       | IR, 25°C, Gohm |       |       |      |
|---|---------|------------|------------------|------|-------|-------|--------------|-------|-------|-------|--------------|-------|-------|-------|----------------|-------|-------|------|
|   |         |            | AVG              | STD  | Max   | Min   | AVG          | STD   | Max   | Min   | AVG          | STD   | Max   | Min   | AVG            | STD   | Max   | Min  |
| <b>Temperature Cycle, 50 Cycles</b>           |         |            |                  |      |       |       |              |       |       |       |              |       |       |       |                |       |       |      |
|   |         |            | Pre Test Limits  |      | 11.0  | 9.0   | N/A          |       | N/A   |       | 0.1          |       | N/A   |       | N/A            |       | 100.0 |      |
|   |         |            | Post Test Limits |      | ---   | ---   | 0.3          |       | -0.3  |       | 0.5          |       | N/A   |       | N/A            |       | 10.0  |      |
| 7032030215                                    | 0/77    | Initial    | 10.00            | 0.19 | 10.30 | 9.60  | ---          | ---   | ---   | ---   | 0.005        | 0.001 | 0.006 | 0.004 | 3660           | 1.29  | 7197  | 1904 |
|   | 0/77    | 50 Cycles  | 10.00            | 0.19 | 10.30 | 9.60  | 0.010        | 0.002 | 0.014 | 0.007 | 0.007        | 0.007 | 0.049 | 0.004 | 4058           | 1.24  | 7875  | 2448 |
| <b>Thermal Shock, 300 Cycles</b>              |         |            |                  |      |       |       |              |       |       |       |              |       |       |       |                |       |       |      |
|   |         |            | Pre Test Limits  |      | 11.0  | 9.0   | N/A          |       | N/A   |       | 0.1          |       | N/A   |       | N/A            |       | 100.0 |      |
|   |         |            | Post Test Limits |      | ---   | ---   | 0.3          |       | -0.3  |       | 0.5          |       | N/A   |       | N/A            |       | 10.0  |      |
| 6313312300                                    | 0/30    | Initial    | 10.31            | 0.07 | 10.50 | 10.20 | ---          | ---   | ---   | ---   | 0.003        | 0.000 | 0.005 | 0.003 | 7439           | 6.862 | 25000 | 105  |
|   | 0/30    | 300 Cycles | 10.31            | 0.07 | 10.50 | 10.20 | 0.000        | 0.000 | 0.000 | 0.000 | 0.004        | 0.002 | 0.017 | 0.003 | 14053          | 1.346 | 25000 | 2068 |
| <b>Moisture Resistance, 0 V DC, 10 Cycles</b> |         |            |                  |      |       |       |              |       |       |       |              |       |       |       |                |       |       |      |
|   |         |            | Pre Test Limits  |      | 11.0  | 9.0   | N/A          |       | N/A   |       | 0.1          |       | N/A   |       | N/A            |       | 100.0 |      |
|   |         |            | Post Test Limits |      | ---   | ---   | 0.3          |       | -0.3  |       | 0.5          |       | N/A   |       | N/A            |       | 10.0  |      |
| 6313312300                                    | 0/77    | Initial    | 10.34            | 0.08 | 10.50 | 10.10 | ---          | ---   | ---   | ---   | 0.003        | 0.000 | 0.004 | 0.003 | 11697          | 2.305 | 25000 | 398  |
|   | 0/77    | 300 Cycles | 10.34            | 0.08 | 10.50 | 1.01  | 0.000        | 0.000 | 0.000 | 0.000 | 0.004        | 0.001 | 0.006 | 0.003 | 12994          | 1.312 | 71770 | 256  |



## KEMET Ceramic SMD Product

### High Temperature 200°C COG 0603 10nF 25 Volt Product

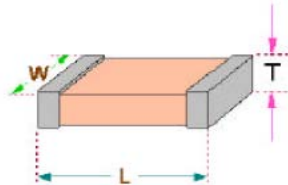
#### High Temperature Qualification Test Results

| Lot Number                            | Results | Test Point | Capacitance, nF  |       |        |        | Delta Cap, % |       |       |       | DF, 1 KHz, % |       |         |       | IR, 25°C, Gohm |       |       |      |
|---------------------------------------|---------|------------|------------------|-------|--------|--------|--------------|-------|-------|-------|--------------|-------|---------|-------|----------------|-------|-------|------|
|                                       |         |            | AVG              | STD   | Max    | Min    | AVG          | STD   | Max   | Min   | AVG          | STD   | Max     | Min   | AVG            | STD   | Max   | Min  |
| <b>Mechanical Shock and Vibration</b> |         |            | Pre Test Limits  |       | 11.0   | 9.0    | N/A          | N/A   | 0.1   | N/A   | N/A          | 100.0 |         |       |                |       |       |      |
| C0603H103K3GAC                        |         |            | Post Test Limits |       | ---    | ---    | 0.3          | -0.3  | 0.5   | N/A   | N/A          | 10.0  |         |       |                |       |       |      |
| 6313312300                            | 0/30    | Initial    | 10.326           | 0.078 | 10.469 | 10.054 | ---          | ---   | 0.003 | 0.000 | 0.003        | 0.003 | 19892.0 | 1.163 | 25000          | 5092  |       |      |
|                                       | 0/30    | Post       | 10.326           | 0.101 | 10.469 | 10.054 | 0.001        | 0.002 | 0.010 | 0.000 | 0.003        | 0.000 | 0.004   | 0.003 | 15722.0        | 1.478 | 25096 | 1630 |
| <b>Resistance to Soldering Heat</b>   |         |            | Pre Test Limits  |       | 11.0   | 9.0    | N/A          | N/A   | 0.1   | N/A   | N/A          | 100.0 |         |       |                |       |       |      |
| C0603H103K3GAC                        |         |            | Post Test Limits |       | ---    | ---    | 0.3          | -0.3  | 0.5   | N/A   | N/A          | 10.0  |         |       |                |       |       |      |
| 6313312300                            | 0/30    | Initial    | 10.31            | 0.07  | 10.44  | 10.18  | ---          | ---   | 0.003 | 0.000 | 0.004        | 0.003 | 22430.0 | 1.08  | 25000          | 8197  |       |      |
|                                       | 0/30    | Post       | 10.31            | 0.07  | 10.44  | 10.18  | 0.003        | 0.004 | 0.010 | 0.000 | 0.004        | 0.001 | 0.006   | 0.003 | 14655.0        | 1.47  | 25000 | 1531 |

| Electrical Characterization | Results | Test Point  | -55°C Delta Cap, PPM/°C |      |       |       | Reference Capacitance @ 25°C, nF |      |       |       | + 200°C Delta Cap, PPM/°C |      |       |       | IR, 200°C, Gohm |      |     |     |
|-----------------------------|---------|-------------|-------------------------|------|-------|-------|----------------------------------|------|-------|-------|---------------------------|------|-------|-------|-----------------|------|-----|-----|
|                             |         |             | AVG                     | STD  | Max   | Min   | AVG                              | STD  | Max   | Min   | AVG                       | STD  | Max   | Min   | AVG             | STD  | Max | Min |
| C0603H103K3GAC              |         |             | Post Test Limits        |      | ---   | ---   | 0.3                              | -0.3 | 0.5   | N/A   | N/A                       | 10.0 |       |       |                 |      |     |     |
| 6313312300                  | 0/30    | ± 30 PPM/°C | -7.02                   | 0.17 | -7.36 | -6.76 | 21.05                            | 0.13 | 21.18 | 20.87 | 15.34                     | 0.14 | 15.87 | 14.25 | 242             | 1.15 | 350 | 97  |

#### Physical Dimension

| Dimension     | Results | Limits, mm  | AVG  | STD   | Max  | Min  |
|---------------|---------|-------------|------|-------|------|------|
| Length (L)    | 0/30    | 1.45 - 1.75 | 1.66 | 0.009 | 1.68 | 1.64 |
| Thickness (T) | 0/30    | 0.70 - 0.90 | 0.84 | 0.007 | 0.85 | 0.83 |
| Width (T)     | 0/30    | 0.65 - 0.95 | 0.85 | 0.007 | 0.86 | 0.84 |



#### Other Mechanical / Performance Results

| ESD              | Limits Reference | C0603H103K3GAC   |     |     |     |
|------------------|------------------|------------------|-----|-----|-----|
|                  |                  | AVG              | STD | Max | Min |
| per AEC-Q200-002 |                  | Classification 6 |     |     |     |
| Beam Load        | per AEC-Q200-003 | 586              | 76  | 694 | 467 |