# APPROVAL SHEET

MULTILAYER CERAMIC CAPACITORS

Automotive Capacitors Series (MT)

Qualified to AEC-Q200

0201 to 1210 Sizes (10V to 1000V)

NP0, X7R Dielectrics

Halogen Free & RoHS Compliance

*Contents in this sheet are subject to change without prior notice.



Copyright © by Walsin Technology Corporation. | All rights reserved.

sales@prom-elec.com / ООО ПРОМЭЛЕКТРОНИКА

## 1. DESCRIPTION

MLCC consists of a conducting material and electrodes. To manufacture a chip-type SMT and achieve miniaturization, high density and high efficiency, ceramic condensers are used.

WTC's MT series MLCC is made by NP0,X7R dielectrics and which provides product with high electrical precision, stability and reliability. Besides, MT series MLCC is tighten controlling in quality in line to assure quality performance in automotive applications.

## 2. FEATURES

a. A wide selection of sizes is available (0201 to 0805).
b. High capacitance in given case size.
c. Capacitor with lead-free termination (pure Tin).
d. The MT series meet AEC-Q200 requirement.

## 3. APPLICATIONS

a. For Navigation & Information equipments.
b. For entertainment equipments
c. For comfortable equipments.
d. For Automotive electronic equipment.

## 4. HOW TO ORDER

| MT | 18 | N | 102 | J | 500 | C | T |
|---|---|---|---|---|---|---|---|
| **Series** | **Size** | **Dielectric** | **Capacitance** | **Tolerance** | **Rated voltage** | **Termination** | **Packaging style** |
| **MT**= Automotive safe concern (with AEC-Q200 qualification) | **03**=0201 (0603)<br>**15**=0402 (1005)<br>**18**=0603 (1608)<br>**21**=0805 (2012)<br>**31=**1206 (3216)<br>**32**=1210 (3225) | **N**=NP0 (C0G)<br>**B**=X7R | Two significant digits followed by no. of zeros. And R is in place of decimal point.<br><br>eg.:<br>0R5=0.5pF<br>1R0=1.0pF<br>102=10x10$^2$<br>=1000pF | **A**=±0.05pF<br>**B**=±0.1pF<br>**C**=±0.25pF<br>**D**=±0.5pF<br>**F**=±1%<br>**G**=±2%<br>**J**=±5%<br>**K**=±10%<br>**M**=±20% | Two significant digits followed by no. of zeros. And R is in place of decimal point.<br><br>**100**=10 VDC<br>**160**=16 VDC<br>**250**=25 VDC<br>**500**=50 VDC<br>**101**=100 VDC<br>**201**=200 VDC<br>**251**=250 VDC<br>**501**=500 VDC<br>**631**=630 VDC<br>**102**=1000 VDC | **C**=Cu/Ni/Sn | **T**=7" reeled<br>**G**=13" reeled |


Copyright © by Walsin Technology Corporation. | All rights reserved.

## 5. EXTERNAL DIMENSIONS

| Size Inch (mm) | L (mm) | W (mm) | T (mm)/Symbol | | Remark | $M_B$ (mm) |
|---|---|---|---|---|---|---|
| 0201 (0603) | 0.60±0.03 | 0.30±0.03 | 0.30±0.03 | L | # | 0.15±0.05 |
| 0402 (1005) | 1.00±0.05 | 0.50±0.05 | 0.50±0.05 | N | # | 0.25 +0.05/-0.10 |
| 0603 (1608) | 1.60±0.10 | 0.80±0.10 | 0.80±0.07 | S | | 0.40±0.15 |
| | 1.60 +0.15/-0.10 | 0.80 +0.15/-0.10 | 0.80 +0.15/-0.10 | X | | |
| 0805 (2012) | 2.00±0.15 | 1.25±0.10 | 0.60±0.10 | A | | 0.50±0.20 |
| | | | 0.80±0.10 | B | | |
| | | | 1.25±0.10 | D | # | |
| | 2.00±0.20 | 1.25±0.20 | 1.25±0.20 | I | # | |
| 1206 (3216) | 3.20±0.15 | 1.60±0.15 | 0.80±0.10 | B | | 0.60±0.20 |
| | | | 0.95±0.10 | C | | |
| | | | 1.25±0.10 | D | # | |
| | 3.20±0.20 | | 1.15±0.15 | J | # | |
| | | 1.60±0.20 | 1.60±0.20 | G | # | |
| | 3.20+0.3/-0.1 | 1.60+0.3/-0.1 | 1.60+0.30/-0.10 | P | # | |
| 1210 (3225) | 3.20±0.30 | 2.50±0.20 | 0.95±0.10 | C | # | 0.75±0.25 |
| | | | 1.25±0.10 | D | # | |
| | 3.20±0.40 | 2.50±0.30 | 1.60±0.20 | G | # | |
| | | | 2.00±0.20 | K | # | |
| | | | 2.50±0.30 | M | # | |

# Reflow soldering only is recommended.

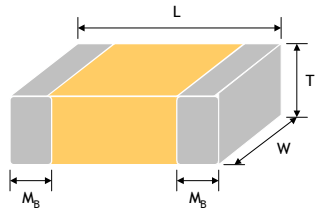


Fig. 1 The outline of MLCC

## 6. GENERAL ELECTRICAL DATA

| | | |
|---|---|---|
| **Dielectric** | NP0 | X7R |
| **Size** | 0201, 0402, 0603, 0805, 1206, 1210 | 0402, 0603, 0805, 1206 |
| **Capacitance range*** | 0.1pF to 0.047uF | 100pF to 2.2μF |
| **Capacitance tolerance**** | Cap≤5pF[#1]: A (±0.05pF ), B (±0.1pF), C (±0.25pF)<br>5pF<Cap<10pF:B (±0.1pF), C (±0.25pF), D (±0.5pF)<br>Cap≥10pF: F (±1%), G (±2%), J (±5%) | J (±5%), K (±10%), M (±20%) |
| **Rated voltage (WVDC)** | 10V, 16V, 25V, 50V, 100V, 200V, 250, 500, 630, 1000 | |
| **Operating temperature** | -55 to +125℃ | |
| **Capacitance characteristic** | ±30ppm/℃ | ±15% |
| **Termination** | Ni/Sn (lead-free termination) | |

#1: NP0, 0.1pF product only provide B tolerance.

* Measured at the condition of 30~70% related humidity.

NP0: Apply 1.0±0.2Vrms, 1.0MHz±10% for Cap≤1000pF and 1.0±0.2Vrms, 1.0kHz±10% for Cap>1000pF, 25℃ at ambient temperature Measured at 1.0±0.2Vrms, 1.0kHz±10% for C≤10μF; 0.5±0.2Vrms, 120Hz±20% for C>10μF, 30~70% related humidity, 25℃ ambient temperature for X7R.

** Preconditioning for Class II MLCC: Perform a heat treatment at 150±10℃ for 1 hour, then leave in a mbient condition for 24±2 hours before measurement.


Copyright © by Walsin Technology Corporation. | All rights reserved.

## 7. CAPACITANCE RANGE

### NP0 Dielectric

| DIELECTRIC | | NP0 | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SIZE | | 0201 | | | | | 0402 | | | | | 0603 | | | | | | |
| RATED VOLTAGE | | 10 | 16 | 25 | 50 | 100 | 10 | 16 | 25 | 50 | 100 | 10 | 16 | 25 | 50 | 100 | 200 | 250 |
| Capacitance | 0.1pF (0R1) | L | L | L | L | L | N | N | N | N | N | | | | | | | |
| | 0.2pF (0R2) | L | L | L | L | L | N | N | N | N | N | | | | | | | |
| | 0.3pF (0R3) | L | L | L | L | L | N | N | N | N | N | | | | | | | |
| | 0.4pF (0R4) | L | L | L | L | L | N | N | N | N | N | | | | | | | |
| | 0.5pF (0R5) | L | L | L | L | L | N | N | N | N | N | S | S | S | S | S | S | S |
| | 0.6pF (0R6) | L | L | L | L | L | N | N | N | N | N | S | S | S | S | S | S | S |
| | 0.7pF (0R7) | L | L | L | L | L | N | N | N | N | N | S | S | S | S | S | S | S |
| | 0.8pF (0R8) | L | L | L | L | L | N | N | N | N | N | S | S | S | S | S | S | S |
| | 0.9pF (0R9) | L | L | L | L | L | N | N | N | N | N | S | S | S | S | S | S | S |
| | 1.0pF (1R0) | L | L | L | L | L | N | N | N | N | N | S | S | S | S | S | S | S |
| | 1.2pF (1R2) | L | L | L | L | L | N | N | N | N | N | S | S | S | S | S | S | S |
| | 1.5pF (1R5) | L | L | L | L | L | N | N | N | N | N | S | S | S | S | S | S | S |
| | 1.8pF (1R8) | L | L | L | L | L | N | N | N | N | N | S | S | S | S | S | S | S |
| | 2.0pF (2R0) | L | L | L | L | L | N | N | N | N | N | S | S | S | S | S | S | S |
| | 2.2pF (2R2) | L | L | L | L | L | N | N | N | N | N | S | S | S | S | S | S | S |
| | 2.7pF (2R7) | L | L | L | L | L | N | N | N | N | N | S | S | S | S | S | S | S |
| | 3.0pF (3R0) | L | L | L | L | L | N | N | N | N | N | S | S | S | S | S | S | S |
| | 3.3pF (3R3) | L | L | L | L | L | N | N | N | N | N | S | S | S | S | S | S | S |
| | 3.9pF (3R9) | L | L | L | L | L | N | N | N | N | N | S | S | S | S | S | S | S |
| | 4.0pF (4R0) | L | L | L | L | L | N | N | N | N | N | S | S | S | S | S | S | S |
| | 4.7pF (4R7) | L | L | L | L | L | N | N | N | N | N | S | S | S | S | S | S | S |
| | 5.0pF (5R0) | L | L | L | L | L | N | N | N | N | N | S | S | S | S | S | S | S |
| | 5.6pF (5R6) | L | L | L | L | L | N | N | N | N | N | S | S | S | S | S | S | S |
| | 6.0pF (6R0) | L | L | L | L | L | N | N | N | N | N | S | S | S | S | S | S | S |
| | 6.8pF (6R8) | L | L | L | L | L | N | N | N | N | N | S | S | S | S | S | S | S |
| | 7.0pF (7R0) | L | L | L | L | L | N | N | N | N | N | S | S | S | S | S | S | S |
| | 8.0pF (8R0) | L | L | L | L | L | N | N | N | N | N | S | S | S | S | S | S | S |
| | 8.2pF (8R2) | L | L | L | L | L | N | N | N | N | N | S | S | S | S | S | S | S |
| | 9.0pF (9R0) | L | L | L | L | L | N | N | N | N | N | S | S | S | S | S | S | S |
| | 10pF (100) | L | L | L | L | L | N | N | N | N | N | S | S | S | S | S | S | S |
| | 12pF (120) | L | L | L | L | L | N | N | N | N | N | S | S | S | S | S | S | S |
| | 15pF (150) | L | L | L | L | L | N | N | N | N | N | S | S | S | S | S | S | S |
| | 18pF (180) | L | L | L | L | L | N | N | N | N | N | S | S | S | S | S | S | S |
| | 22pF (220) | L | L | L | L | L | N | N | N | N | N | S | S | S | S | S | S | S |
| | 27pF (270) | L | L | L | L | L | N | N | N | N | N | S | S | S | S | S | S | S |
| | 33pF (330) | L | L | L | L | L | N | N | N | N | N | S | S | S | S | S | S | S |
| | 39pF (390) | L | L | L | L | L | N | N | N | N | N | S | S | S | S | S | S | S |
| | 47pF (470) | L | L | L | L | L | N | N | N | N | N | S | S | S | S | S | S | S |
| | 56pF (560) | L | L | L | L | L | N | N | N | N | N | S | S | S | S | S | S | S |
| | 68pF (680) | L | L | L | L | | N | N | N | N | N | S | S | S | S | S | S | S |
| | 82pF (820) | L | L | L | L | | N | N | N | N | N | S | S | S | S | S | S | S |
| | 100pF (101) | L | L | L | L | | N | N | N | N | N | S | S | S | S | S | S | S |
| | 120pF (121) | L | L | L | L | | N | N | N | N | N | S | S | S | S | S | S | S |
| | 150pF (151) | | | | | | N | N | N | N | N | S | S | S | S | S | S | S |
| | 180pF (181) | | | | | | N | N | N | N | N | S | S | S | S | S | S | S |
| | 220pF (221) | | | | | | N | N | N | N | N | S | S | S | S | S | S | S |
| | 270pF (271) | | | | | | N | N | N | N | | S | S | S | S | S | X | X |
| | 330pF (331) | | | | | | N | N | N | N | | S | S | S | S | S | X | X |
| | 390pF (391) | | | | | | N | N | N | N | | S | S | S | S | S | X | X |
| | 470pF (471) | | | | | | N | N | N | N | | S | S | S | S | S | X | X |
| | 560pF (561) | | | | | | N | N | N | N | | S | S | S | S | S | | |
| | 680pF (681) | | | | | | N | N | N | N | | S | S | S | S | S | | |
| | 820pF (821) | | | | | | N | N | N | N | | S | S | S | S | S | | |
| | 1,000pF (102) | | | | | | N | N | N | N | | S | S | S | S | S | | |
| | 1,200pF (122) | | | | | | | | | | | X | X | X | X | | | |
| | 1,500pF (152) | | | | | | | | | | | X | X | X | X | | | |
| | 1,800pF (182) | | | | | | | | | | | X | X | X | X | | | |
| | 2,200pF (222) | | | | | | | | | | | X | X | X | X | | | |
| | 2,700pF (272) | | | | | | | | | | | X | X | X | X | | | |
| | 3,300pF (332) | | | | | | | | | | | X | X | X | X | | | |
| | 3,900pF (392) | | | | | | | | | | | | | | | | | |
| | 4,700pF (472) | | | | | | | | | | | | | | | | | |
| | 5,600pF (562) | | | | | | | | | | | | | | | | | |
| | 6,800pF (682) | | | | | | | | | | | | | | | | | |
| | 8,200pF (822) | | | | | | | | | | | | | | | | | |
| | 0.01μF (103) | | | | | | | | | | | | | | | | | |

* NP0, 0.1pF product only provide B tolerance.

1. The letter in cell is expressed the symbol of product thickness.

2. For more information about products with special capacitance or other data, please contact WTC local representative.



Copyright © by Walsin Technology Corporation. | All rights reserved.

## NP0 Dielectric

| DIELECTRIC | | NP0 | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| SIZE | | 0805 | | | | | | | | |
| RATED VOLTAGE | | 10 | 16 | 25 | 50 | 100 | 200 | 250 | 500 | 630 |
| Capacitance | 0.5pF (0R5) | A | A | A | A | A | A | A | A | A |
| | 0.6pF (0R6) | A | A | A | A | A | A | A | A | A |
| | 0.7pF (0R7) | A | A | A | A | A | A | A | A | A |
| | 0.8pF (0R8) | A | A | A | A | A | A | A | A | A |
| | 0.9pF (0R9) | A | A | A | A | A | A | A | A | A |
| | 1.0pF (1R0) | A | A | A | A | A | A | A | A | A |
| | 1.2pF (1R2) | A | A | A | A | A | A | A | A | A |
| | 1.5pF (1R5) | A | A | A | A | A | A | A | A | A |
| | 1.8pF (1R8) | A | A | A | A | A | A | A | A | A |
| | 2.2pF (2R2) | A | A | A | A | A | A | A | A | A |
| | 2.7pF (2R7) | A | A | A | A | A | A | A | A | A |
| | 3.3pF (3R3) | A | A | A | A | A | A | A | A | A |
| | 3.9pF (3R9) | A | A | A | A | A | A | A | A | A |
| | 4.7pF (4R7) | A | A | A | A | A | A | A | A | A |
| | 5.6pF (5R6) | A | A | A | A | A | A | A | A | A |
| | 6.8pF (6R8) | A | A | A | A | A | A | A | A | A |
| | 8.2pF (8R2) | A | A | A | A | A | A | A | A | A |
| | 10pF (100) | A | A | A | A | A | A | A | A | A |
| | 12pF (120) | A | A | A | A | A | A | A | A | A |
| | 15pF (150) | A | A | A | A | A | A | A | A | A |
| | 18pF (180) | A | A | A | A | A | A | A | A | A |
| | 22pF (220) | A | A | A | A | A | A | A | A | A |
| | 27pF (270) | A | A | A | A | A | A | A | A | A |
| | 33pF (330) | A | A | A | A | A | A | A | A | A |
| | 39pF (390) | A | A | A | A | A | A | A | A | A |
| | 47pF (470) | A | A | A | A | A | A | A | A | A |
| | 56pF (560) | A | A | A | A | A | A | A | A | A |
| | 68pF (680) | A | A | A | A | A | A | A | A | A |
| | 82pF (820) | A | A | A | A | A | A | A | B | B |
| | 100pF (101) | A | A | A | A | A | B | B | B | B |
| | 120pF (121) | A | A | A | A | A | B | B | D | D |
| | 150pF (151) | A | A | A | A | A | D | D | D | D |
| | 180pF (181) | A | A | A | A | A | D | D | D | D |
| | 220pF (221) | A | A | A | A | A | D | D | D | D |
| | 270pF (271) | A | A | A | A | A | D | D | D | D |
| | 330pF (331) | A | A | A | A | A | D | D | D | D |
| | 390pF (391) | B | B | B | B | B | D | D | D | D |
| | 470pF (471) | B | B | B | B | B | D | D | I | I |
| | 560pF (561) | B | B | B | B | B | D | D | I | I |
| | 680pF (681) | B | B | B | B | B | D | D | I | I |
| | 820pF (821) | B | B | B | B | B | D | D | I | I |
| | 1,000pF (102) | B | B | B | B | B | D | D | I | I |
| | 1,200pF (122) | B | B | B | B | B | D | D | | |
| | 1,500pF (152) | B | B | B | B | B | D | D | | |
| | 1,800pF (182) | B | B | B | B | B | D | D | | |
| | 2,200pF (222) | B | B | B | B | B | D | D | | |
| | 2,700pF (272) | D | D | D | D | D | | | | |
| | 3,300pF (332) | D | D | D | D | D | | | | |
| | 3,900pF (392) | D | D | D | D | D | | | | |
| | 4,700pF (472) | D | D | D | D | D | | | | |
| | 5,600pF (562) | D | D | D | D | D | | | | |
| | 6,800pF (682) | D | D | D | D | D | | | | |
| | 8,200pF (822) | D | D | D | D | | | | | |
| | 0.01μF (103) | D | D | D | D | | | | | |

1. The letter in cell is expressed the symbol of product thickness.
2. For more information about products with special capacitance or other data, please contact WTC local representative.


Copyright © by Walsin Technology Corporation. | All rights reserved.

## NP0 Dielectric

| DIELECTRIC | | NP0 | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| SIZE | | 1206 | | | | | | | | | |
| RATED VOLTAGE | | 10 | 16 | 25 | 50 | 100 | 200 | 250 | 500 | 630 | 1000 |
| Capacitance | 1.0pF (1R0) | | | | | | | | | | |
| | 1.2pF (1R2) | B | B | B | B | B | B | B | B | B | |
| | 1.5pF (1R5) | B | B | B | B | B | B | B | B | B | B |
| | 1.8pF (1R8) | B | B | B | B | B | B | B | B | B | B |
| | 2.2pF (2R2) | B | B | B | B | B | B | B | B | B | B |
| | 2.7pF (2R7) | B | B | B | B | B | B | B | B | B | B |
| | 3.3pF (3R3) | B | B | B | B | B | B | B | B | B | B |
| | 3.9pF (3R9) | B | B | B | B | B | B | B | B | B | B |
| | 4.7pF (4R7) | B | B | B | B | B | B | B | B | B | B |
| | 5.6pF (5R6) | B | B | B | B | B | B | B | B | B | B |
| | 6.8pF (6R8) | B | B | B | B | B | B | B | B | B | B |
| | 8.2pF (8R2) | B | B | B | B | B | B | B | B | B | B |
| | 10pF (100) | B | B | B | B | B | B | B | B | B | B |
| | 12pF (120) | B | B | B | B | B | B | B | B | B | B |
| | 15pF (150) | B | B | B | B | B | B | B | B | B | B |
| | 18pF (180) | B | B | B | B | B | B | B | B | B | B |
| | 22pF (220) | B | B | B | B | B | B | B | B | B | D |
| | 27pF (270) | B | B | B | B | B | B | B | B | B | D |
| | 33pF (330) | B | B | B | B | B | B | B | B | B | D |
| | 39pF (390) | B | B | B | B | B | B | B | B | B | D |
| | 47pF (470) | B | B | B | B | B | B | B | B | B | D |
| | 56pF (560) | B | B | B | B | B | B | B | B | B | D |
| | 68pF (680) | B | B | B | B | B | B | B | B | B | D |
| | 82pF (820) | B | B | B | B | B | B | B | B | B | D |
| | 100pF (101) | B | B | B | B | B | B | B | B | B | D |
| | 120pF (121) | B | B | B | B | B | B | B | B | B | D |
| | 150pF (151) | B | B | B | B | B | B | B | B | B | D |
| | 180pF (181) | B | B | B | B | B | B | B | B | B | G |
| | 220pF (221) | B | B | B | B | B | B | B | B | B | G |
| | 270pF (271) | B | B | B | B | B | B | C | C | C | G |
| | 330pF (331) | B | B | B | B | B | B | C | C | C | G |
| | 390pF (391) | B | B | B | B | B | B | C | C | C | G |
| | 470pF (471) | B | B | B | B | B | C | C | C | C | G |
| | 560pF (561) | B | B | B | B | B | C | D | D | D | G |
| | 680pF (681) | B | B | B | B | B | C | D | D | D | G |
| | 820pF (821) | B | B | B | B | B | C | G | G | G | G |
| | 1,000pF (102) | B | B | B | B | B | C | G | G | G | G |
| | 1,200pF (122) | B | B | B | B | B | C | G | G | G | |
| | 1,500pF (152) | B | B | B | B | B | D | G | G | G | |
| | 1,800pF (182) | B | B | B | B | B | D | G | G | G | |
| | 2,200pF (222) | B | B | B | B | B | D | G | G | G | |
| | 2,700pF (272) | B | B | B | B | B | D | G | G | G | |
| | 3,300pF (332) | B | B | B | B | B | D | G | G | G | |
| | 3,900pF (392) | B | B | B | B | B | D | G | G | G | |
| | 4,700pF (472) | B | B | B | B | B | D | G | G | G | |
| | 5,600pF (562) | B | B | B | B | B | | | | | |
| | 6,800pF (682) | C | C | C | C | C | | | | | |
| | 8,200pF (822) | D | D | D | D | D | | | | | |
| | 0.01μF (103) | D | D | D | D | D | | | | | |

1. The letter in cell is expressed the symbol of product thickness.

2. For more information about products with special capacitance or other data, please contact WTC local representative.



Copyright © by Walsin Technology Corporation. | All rights reserved.

## NP0 Dielectric

| DIELECTRIC | | NP0 | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| SIZE | | 1210 | | | | | | | | | |
| RATED VOLTAGE | | 10 | 16 | 25 | 50 | 100 | 200 | 250 | 500 | 630 | 1000 |
| Capacitance | 10pF (100) | C | C | C | C | C | C | C | C | C | C |
| | 12pF (120) | C | C | C | C | C | C | C | C | C | C |
| | 15pF (150) | C | C | C | C | C | C | C | C | C | C |
| | 18pF (180) | C | C | C | C | C | C | C | C | C | C |
| | 22pF (220) | C | C | C | C | C | C | C | C | C | C |
| | 27pF (270) | C | C | C | C | C | C | C | C | C | C |
| | 33pF (330) | C | C | C | C | C | C | C | C | C | C |
| | 39pF (390) | C | C | C | C | C | C | C | C | C | C |
| | 47pF (470) | C | C | C | C | C | C | C | C | C | C |
| | 56pF (560) | C | C | C | C | C | C | C | C | C | C |
| | 68pF (680) | C | C | C | C | C | C | C | C | C | C |
| | 82pF (820) | C | C | C | C | C | C | C | C | C | C |
| | 100pF (101) | C | C | C | C | C | C | C | C | C | D |
| | 120pF (121) | C | C | C | C | C | C | C | C | C | D |
| | 150pF (151) | C | C | C | C | C | C | C | C | C | D |
| | 180pF (181) | C | C | C | C | C | C | C | C | C | D |
| | 220pF (221) | C | C | C | C | C | C | C | C | C | G |
| | 270pF (271) | C | C | C | C | C | C | C | C | C | G |
| | 330pF (331) | C | C | C | C | C | C | C | C | C | G |
| | 390pF (391) | C | C | C | C | C | C | C | C | C | G |
| | 470pF (471) | C | C | C | C | C | C | C | C | C | G |
| | 560pF (561) | C | C | C | C | C | C | C | C | C | G |
| | 680pF (681) | C | C | C | C | C | C | C | C | C | G |
| | 820pF (821) | C | C | C | C | C | C | C | C | C | G |
| | 1,000pF (102) | C | C | C | C | C | D | D | D | D | G |
| | 1,200pF (122) | C | C | C | C | C | D | D | D | D | |
| | 1,500pF (152) | C | C | C | C | C | D | D | D | D | |
| | 1,800pF (182) | C | C | C | C | C | D | D | D | D | |
| | 2,200pF (222) | C | C | C | C | C | D | D | D | D | |
| | 2,700pF (272) | C | C | C | C | C | D | D | D | D | |
| | 3,300pF (332) | C | C | C | C | C | D | D | D | D | |
| | 3,900pF (392) | C | C | C | C | C | D | D | D | D | |
| | 4,700pF (472) | C | C | C | C | C | G | G | | | |
| | 5,600pF (562) | C | C | C | C | C | G | G | | | |
| | 6,800pF (682) | C | C | C | C | C | G | G | | | |
| | 8,200pF (822) | C | C | C | C | C | G | G | | | |
| | 0.010μF (103) | C | C | C | C | C | G | G | | | |
| | 0.012μF (123) | D | D | D | D | D | | | | | |
| | 0.015μF (153) | D | D | D | D | D | | | | | |
| | 0.018μF (183) | K | K | K | K | K | | | | | |
| | 0.022μF (223) | K | K | K | K | K | | | | | |
| | 0.027μF (273) | K | K | K | K | K | | | | | |
| | 0.033μF (333) | K | K | K | K | K | | | | | |
| | 0.039μF (393) | K | K | K | K | K | | | | | |
| | 0.047μF (473) | K | K | K | K | K | | | | | |

1. The letter in cell is expressed the symbol of product thickness.

2. For more information about products with special capacitance or other data, please contact WTC local representative.



Copyright © by Walsin Technology Corporation. | All rights reserved.

## X7R Dielectric

| DIELECTRIC | | X7R | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SIZE | | 0201 | | | | 0402 | | | | 0603 | | | | |
| RATED VOLTAGE | | 10 | 16 | 25 | 50 | 10 | 16 | 25 | 50 | 10 | 16 | 25 | 50 | 100 |
| Capacitance | 100pF (101) | L | L | L | L | N | N | N | N | S | S | S | S | S |
| | 120pF (121) | L | L | L | L | N | N | N | N | S | S | S | S | S |
| | 150pF (151) | L | L | L | L | N | N | N | N | S | S | S | S | S |
| | 180pF (181) | L | L | L | L | N | N | N | N | S | S | S | S | S |
| | 220pF (221) | L | L | L | L | N | N | N | N | S | S | S | S | S |
| | 270pF (271) | L | L | L | L | N | N | N | N | S | S | S | S | S |
| | 330pF (331) | L | L | L | L | N | N | N | N | S | S | S | S | S |
| | 390pF (391) | L | L | L | L | N | N | N | N | S | S | S | S | S |
| | 470pF (471) | L | L | L | L | N | N | N | N | S | S | S | S | S |
| | 560pF (561) | L | L | L | L | N | N | N | N | S | S | S | S | S |
| | 680pF (681) | L | L | L | L | N | N | N | N | S | S | S | S | S |
| | 820pF (821) | L | L | L | L | N | N | N | N | S | S | S | S | S |
| | 1,000pF (102) | L | L | L | L | N | N | N | N | S | S | S | S | S |
| | 1,200pF (122) | L | L | L | | N | N | N | N | S | S | S | S | S |
| | 1,500pF (152) | L | L | L | | N | N | N | N | S | S | S | S | S |
| | 1,800pF (182) | L | L | L | | N | N | N | N | S | S | S | S | S |
| | 2,200pF (222) | L | L | L | | N | N | N | N | S | S | S | S | S |
| | 2,700pF (272) | L | L | L | | N | N | N | N | S | S | S | S | S |
| | 3,300pF (332) | L | L | L | | N | N | N | N | S | S | S | S | S |
| | 3,900pF (392) | L | L | L | | N | N | N | N | S | S | S | S | S |
| | 4,700pF (472) | L | L | L | | N | N | N | N | S | S | S | S | S |
| | 5,600pF (562) | L | L | L | | N | N | N | N | S | S | S | S | S |
| | 6,800pF (682) | L | | | | N | N | N | N | S | S | S | S | S |
| | 8,200pF (822) | L | | | | N | N | N | N | S | S | S | S | S |
| | 0.010μF (103) | L | | | | N | N | N | N | S | S | S | S | S |
| | 0.012μF (123) | | | | | N | N | N | | S | S | S | S | X |
| | 0.015μF (153) | | | | | N | N | N | | S | S | S | S | X |
| | 0.018μF (183) | | | | | N | N | N | | S | S | S | S | X |
| | 0.022μF (223) | | | | | N | N | N | | S | S | S | S | X |
| | 0.027μF (273) | | | | | N | N | N | | S | S | S | S | X |
| | 0.033μF (333) | | | | | N | N | N | | S | S | S | X | X |
| | 0.039μF (393) | | | | | N | N | N | | S | S | S | X | X |
| | 0.047μF (473) | | | | | N | N | N | | S | S | S | X | X |
| | 0.056μF (563) | | | | | N | N | N | | S | S | S | X | |
| | 0.068μF (683) | | | | | N | N | N | | S | S | S | X | |
| | 0.082μF (823) | | | | | N | N | N | | S | S | S | X | |
| | 0.10μF (104) | | | | | N | N | N | | S | S | S | X | |
| | 0.12μF (124) | | | | | | | | | X | X | X | | |
| | 0.15μF (154) | | | | | | | | | X | X | X | X | |
| | 0.18μF (184) | | | | | | | | | X | X | X | | |
| | 0.22μF (224) | | | | | | | | | X | X | X | X | |
| | 0.33μF (334) | | | | | | | | | X | X | X | X | |

1. The letter in cell is expressed the symbol of product thickness.

2. For more information about products with special capacitance or other data, please contact WTC local representative.



Copyright © by Walsin Technology Corporation. | All rights reserved.

## X7R Dielectric

| DIELECTRIC | | X7R | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SIZE | | 0805 | | | | | | | | | 1206 | | | | | | | | |
| RATED VOLTAGE (VDC) | | 10 | 16 | 25 | 50 | 100 | 200 | 250 | 500 | 630 | 10 | 16 | 25 | 50 | 100 | 200 | 250 | 500 | 630 |
| Capacitance | 100pF (101) | B | B | B | B | B | B | B | B | B | | | | | | D | D | D | D |
| | 120pF (121) | B | B | B | B | B | B | B | B | B | | | | | | D | D | D | D |
| | 150pF (151) | B | B | B | B | B | B | B | B | B | B | B | B | B | B | D | D | D | D |
| | 180pF (181) | B | B | B | B | B | B | B | B | B | B | B | B | B | B | D | D | D | D |
| | 220pF (221) | B | B | B | B | B | B | B | B | B | B | B | B | B | B | D | D | D | D |
| | 270pF (271) | B | B | B | B | B | B | B | B | B | B | B | B | B | B | D | D | D | D |
| | 330pF (331) | B | B | B | B | B | B | B | B | B | B | B | B | B | B | D | D | D | D |
| | 390pF (391) | B | B | B | B | B | B | B | B | B | B | B | B | B | B | D | D | D | D |
| | 470pF (471) | B | B | B | B | B | B | B | B | B | B | B | B | B | B | D | D | D | D |
| | 560pF (561) | B | B | B | B | B | B | B | B | B | B | B | B | B | B | D | D | D | D |
| | 680pF (681) | B | B | B | B | B | B | B | B | B | B | B | B | B | B | D | D | D | D |
| | 820pF (821) | B | B | B | B | B | B | B | B | B | B | B | B | B | B | D | D | D | D |
| | 1,000pF (102) | B | B | B | B | B | B | B | B | B | B | B | B | B | B | D | D | D | D |
| | 1,200pF (122) | B | B | B | B | B | B | B | B | B | B | B | B | B | B | D | D | D | D |
| | 1,500pF (152) | B | B | B | B | B | B | B | B | B | B | B | B | B | B | D | D | D | D |
| | 1,800pF (182) | B | B | B | B | B | B | B | B | B | B | B | B | B | B | D | D | D | D |
| | 2,200pF (222) | B | B | B | B | B | B | B | B | B | B | B | B | B | B | D | D | D | D |
| | 2,700pF (272) | B | B | B | B | B | B | B | B | B | B | B | B | B | B | D | D | D | D |
| | 3,300pF (332) | B | B | B | B | B | B | B | B | B | B | B | B | B | B | D | D | D | D |
| | 3,900pF (392) | B | B | B | B | B | B | B | B | B | B | B | B | B | B | D | D | D | D |
| | 4,700pF (472) | B | B | B | B | B | B | B | D | D | B | B | B | B | B | D | D | D | D |
| | 5,600pF (562) | B | B | B | B | B | B | B | D | D | B | B | B | B | B | D | D | D | D |
| | 6,800pF (682) | B | B | B | B | B | B | B | D | D | B | B | B | B | B | D | D | D | D |
| | 8,200pF (822) | B | B | B | B | B | B | B | D | D | B | B | B | B | B | D | D | D | D |
| | 0.010μF (103) | B | B | B | B | B | D | D | D | D | B | B | B | B | B | D | D | D | D |
| | 0.012μF (123) | B | B | B | B | B | D | D | | | B | B | B | B | B | D | D | | |
| | 0.015μF (153) | B | B | B | B | B | D | D | | | B | B | B | B | B | D | D | | |
| | 0.018μF (183) | B | B | B | B | B | D | D | | | B | B | B | B | B | D | D | | |
| | 0.022μF (223) | B | B | B | B | B | D | D | | | B | B | B | B | B | D | D | | |
| | 0.027μF (273) | B | B | B | B | D | | | | | B | B | B | B | B | | | | |
| | 0.033μF (333) | B | B | B | B | D | | | | | B | B | B | B | B | | | | |
| | 0.039μF (393) | B | B | B | B | D | | | | | B | B | B | B | B | | | | |
| | 0.047μF (473) | B | B | B | B | D | | | | | B | B | B | B | B | | | | |
| | 0.056μF (563) | B | B | B | B | D | | | | | B | B | B | B | B | | | | |
| | 0.068μF (683) | B | B | B | B | D | | | | | B | B | B | B | B | | | | |
| | 0.082μF (823) | B | B | B | B | D | | | | | B | B | B | B | D | | | | |
| | 0.10μF (104) | B | B | B | B | D | | | | | B | B | B | B | D | | | | |
| | 0.12μF (124) | B | B | B | D | | | | | | B | B | B | B | D | | | | |
| | 0.15μF (154) | D | D | D | D | | | | | | C | C | C | C | G | | | | |
| | 0.18μF (184) | D | D | D | D | | | | | | C | C | C | C | G | | | | |
| | 0.22μF (224) | D | D | D | D | | | | | | C | C | C | C | G | | | | |
| | 0.27μF (274) | D | D | D | I | | | | | | C | C | C | D | | | | | |
| | 0.33μF (334) | D | D | D | I | | | | | | C | C | C | D | | | | | |
| | 0.39μF (394) | D | D | D | I | | | | | | C | C | J | P | | | | | |
| | 0.47μF (474) | D | D | D | I | | | | | | J | J | J | P | | | | | |
| | 0.56μF (564) | D | D | D | | | | | | | J | J | J | P | | | | | |
| | 0.68μF (684) | D | D | D | I | | | | | | J | J | J | P | | | | | |
| | 0.82μF (824) | D | D | D | | | | | | | J | J | J | P | | | | | |
| | 1.0μF (105) | D | D | D | I | | | | | | J | J | J | P | | | | | |
| | 2.2μF (225) | | | | | | | | | | | | | | | | | | |
| | 4.7μF (475) | | | | | | | | | | | | | | | | | | |
| | 10μF (106) | | | | | | | | | | | | | | | | | | |

1. The letter in cell is expressed the symbol of product thickness.

2. For more information about products with special capacitance or other data, please contact WTC local representative.



Copyright © by Walsin Technology Corporation. | All rights reserved.

## X7R Dielectric

| DIELECTRIC | | X7R | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| SIZE | | 1210 | | | | | | | |
| RATED VOLTAGE (VDC) | | 10 | 16 | 25 | 50 | 100 | 250 | 500 | 1000 |
| Capacitance | 100pF (101) | | | | | | D | D | D |
| | 120pF (121) | | | | | | D | D | D |
| | 150pF (151) | | | | | | D | D | D |
| | 180pF (181) | | | | | | D | D | D |
| | 220pF (221) | | | | | | D | D | D |
| | 270pF (271) | | | | | | D | D | D |
| | 330pF (331) | | | | | | D | D | D |
| | 390pF (391) | | | | | | D | D | D |
| | 470pF (471) | | | | | | D | D | D |
| | 560pF (561) | | | | | | D | D | D |
| | 680pF (681) | | | | | | C | D | D |
| | 820pF (821) | | | | | | C | D | D |
| | 1,000pF (102) | C | C | C | C | C | C | D | D |
| | 1,200pF (122) | C | C | C | C | C | C | D | D |
| | 1,500pF (152) | C | C | C | C | C | C | D | D |
| | 1,800pF (182) | C | C | C | C | C | C | D | D |
| | 2,200pF (222) | C | C | C | C | C | C | D | D |
| | 2,700pF (272) | C | C | C | C | C | C | D | D |
| | 3,300pF (332) | C | C | C | C | C | C | D | D |
| | 3,900pF (392) | C | C | C | C | C | C | D | G |
| | 4,700pF (472) | C | C | C | C | C | C | D | G |
| | 5,600pF (562) | C | C | C | C | C | C | D | G |
| | 6,800pF (682) | C | C | C | C | C | C | D | G |
| | 8,200pF (822) | C | C | C | C | C | C | D | G |
| | 0.010μF (103) | C | C | C | C | C | C | D | G |
| | 0.012μF (123) | C | C | C | C | C | C | D | |
| | 0.015μF (153) | C | C | C | C | C | C | D | |
| | 0.018μF (183) | C | C | C | C | C | C | D | |
| | 0.022μF (223) | C | C | C | C | C | C | D | |
| | 0.027μF (273) | C | C | C | C | C | C | | |
| | 0.033μF (333) | C | C | C | C | C | C | | |
| | 0.039μF (393) | C | C | C | C | C | C | | |
| | 0.047μF (473) | C | C | C | C | C | D | | |
| | 0.056μF (563) | C | C | C | C | C | | | |
| | 0.068μF (683) | C | C | C | C | C | | | |
| | 0.082μF (823) | C | C | C | C | C | | | |
| | 0.10μF (104) | C | C | C | C | C | | | |
| | 0.12μF (124) | C | C | C | C | | | | |
| | 0.15μF (154) | C | C | C | C | | | | |
| | 0.18μF (184) | C | C | C | C | | | | |
| | 0.22μF (224) | C | C | C | C | | | | |
| | 0.27μF (274) | C | C | C | C | | | | |
| | 0.33μF (334) | C | C | C | D | | | | |
| | 0.39μF (394) | C | C | C | D | | | | |
| | 0.47μF (474) | C | C | C | D | | | | |
| | 0.56μF (564) | D | D | D | D | | | | |
| | 0.68μF (684) | D | D | D | D | | | | |
| | 0.82μF (824) | D | D | D | D | | | | |
| | 1.0μF (105) | D | D | D | D | | | | |
| | 1.5μF (155) | | K | | | | | | |
| | 2.2μF (225) | | K | | | | | | |
| | 4.7μF (475) | | | | | | | | |
| | 10μF (106) | | | | | | | | |

1. The letter in cell is expressed the symbol of product thickness.

2. For more information about products with special capacitance or other data, please contact WTC local representative.



Copyright © by Walsin Technology Corporation. | All rights reserved.

## 8. PACKAGING STYLE AND QUANTITY

| Size | Thickness (mm)/Symbol | | Paper tape | | Plastic tape | |
|---|---|---|---|---|---|---|
| | | | 7" reel | 13" reel | 7" reel | 13" reel |
| 0201 (0603) | 0.30±0.03 | L | 15k | 70k | - | - |
| 0402 (1005) | 0.50±0.05 | N | 10k | 50k | - | - |
| 0603 (1608) | 0.80±0.07 | S | 4k | 15k | - | - |
| | 0.80+0.15/-0.10 | X | 4k | 15k | - | - |
| 0805 (2012) | 0.60±0.10 | A | 4k | 15k | - | - |
| | 0.80±0.10 | B | 4k | 15k | - | - |
| | 1.25±0.10 | D | - | - | 3k | 10k |
| | 1.25±0.20 | I | - | - | 3k | 10k |
| 1206 (3216) | 0.80±0.10 | B | 4k | 15k | - | - |
| | 0.95±0.10 | C | - | - | 3k | 10k |
| | 1.15±0.15 | J | - | - | 3k | 10k |
| | 1.25±0.10 | D | - | - | 3k | 10k |
| | 1.60±0.20 | G | - | - | 2k | 10k |
| | 1.60+0.30/-0.10 | P | - | - | 2k | 9k |
| 1210 (3225) | 0.95±0.10 | C | - | - | 3k | 10k |
| | 1.25±0.10 | D | - | - | 3k | 10k |
| | 1.60±0.20 | G | - | - | 2k | - |
| | 2.00±0.20 | K | - | - | 1k | 6k |
| | 2.50±0.30 | M | - | - | 1k | 6k |

Unit: pieces

著作權所有 侵害必究
華新科技股份有限公司
PSA
PASSIVE SYSTEM ALLIANCE
Walsin Technology Corporation
COPYRIGHT © WALSIN TECHNOLOGY CORPORATION, ALL RIGHTS RESERVED.



Copyright © by Walsin Technology Corporation. | All rights reserved.

# 9. RELIABILITY TEST CONDITIONS AND REQUIREMENTS

<table>
<tr><th>No.</th><th>AEC-Q200 Test Item</th><th>AEC-Q200 Test Condition</th><th>Requirements</th></tr>
<tr><td>1.</td><td>Pre-and<br>Post-Stress<br>Electrical Test</td><td>---</td><td></td></tr>
<tr><td>2.</td><td>High Temperature<br>Exposure (Storage)<br>MIL-STD-202<br>Method 108</td><td>* Test temp.: 150±3℃<br>* Unpowered.<br>* Test time: 1000+24/-0 hrs.<br>* Measurement to be made after keeping at room temp. for 24±2 hrs.</td><td>* No remarkable damage.<br>* Cap change：NPO: within ±2.5% or ±0.25pF whichever is larger.<br>X7R: within ±10.00%.<br>* Q/D.F. value:<br>NPO: Cap≥30pF, Q≥1000 ; Cap<30pF, Q≥400+20C.<br>X7R:
<table>
<tr><th>Rated vol.</th><th>D.F.≦</th><th colspan="2">Exception of D.F.≦</th></tr>
<tr><td rowspan="3">≧ 100V</td><td rowspan="3">≦3%</td><td>≦6%</td><td>1206≧0.47μF</td></tr>
<tr><td>≦7.5%</td><td>0603≧0.068μF;0805＞0.1μF;1206≧1μF;1210≧2.2μF</td></tr>
<tr><td>≦20%</td><td>0805＞0.22μF;1210≧3.3μF</td></tr>
<tr><td rowspan="3">50V</td><td rowspan="3">≦3%</td><td>≦6%</td><td>0201(50V);0603≧0.047μF;0805≧0.18μF;1206≧0.47μF</td></tr>
<tr><td>≦10%</td><td>0201≧0.01uF;1210≧3.3μF</td></tr>
<tr><td>≦20%</td><td>0402≧0.012μF;0603>0.1μF; 0805/X7R>0.47μF;<br>1206≧2.2μF;1210≧10μF</td></tr>
<tr><td>35V</td><td>≦5%</td><td>≦20%</td><td>0603≧1μF;0805≥2.2μF;1206≧2.2μF;1210≧10μF</td></tr>
<tr><td rowspan="4">25V</td><td rowspan="4">≦5%</td><td>≦10%</td><td>0201≧0.01μF;0805≧1μF;1210≧10μF</td></tr>
<tr><td>≦14%</td><td>0603≧0.33μF</td></tr>
<tr><td>≦15%</td><td>0201≧0.1μF; 0402≧0.056μF;0603≧0.47μF;<br>0805≧2.2μF;1206≧4.7μF;1210≧22μF</td></tr>
<tr><td>≦20%</td><td>0402≧0.47μF</td></tr>
<tr><td rowspan="2">16V</td><td rowspan="2">≦5%</td><td>≦10%</td><td>0603≧0.15μF;0805≧0.68μF;1206≧2.2μF;1210≧4.7μF</td></tr>
<tr><td>≦15%</td><td>0201≧0.022μF;0402≧0.033μF;<br>0603>0.47μF;0805≧2.2μF;1206≧4.7μF;1210≧22μF</td></tr>
<tr><td rowspan="2">10V</td><td rowspan="2">≦7.5%</td><td>≦15%</td><td>0201≧0.012μF;0402≧0.22μF;<br>0603≧0.33μF;0805≧2.2μF;1206≧2.2μF;1210≧22μF</td></tr>
<tr><td>≦20%</td><td>0201≧0.1μF;0402≧1μF</td></tr>
<tr><td>6.3V</td><td>≦15%</td><td>≦30%</td><td>0201≧0.1μF;0402≧1μF;0603≧10μF;<br>0805≧4.7μF;1206≧47μF;1210≧100μF</td></tr>
<tr><td>4V</td><td>≦20%</td><td>---</td><td>---</td></tr>
</table>
* I.R.: ≥10GΩ or RxC≥500Ω-F whichever is smaller.<br>Class II (X7R)
<table>
<tr><th>Rated voltage</th><th>Insulation Resistance</th></tr>
<tr><td>100V: All X7R;1210≥3.3μF</td><td rowspan="7">1GΩ or RxC≧10 Ω-F whichever is smaller.</td></tr>
<tr><td>50V: 0402>0.01μF;0603≥1μF;0805≥1μF;1206≥4.7μF;1210≥4.7μF</td></tr>
<tr><td>35V: 0603≥1μF;0805≥2.2μF;1206≥2.2μF;1210≥10μF</td></tr>
<tr><td>25V: 0201≥0.1uF;0402≥0.22μF;0603≥2.2μF;0805≥2.2μF;<br>1206≥10μF;1210≥10μF</td></tr>
<tr><td>16V: 0201≥0.1uF;0402≥0.22μF;0603≥1μF;0805≥2.2μF;<br>1206≥10μF;1210≥47μF</td></tr>
<tr><td>10V: 0201≥47nF;0402≥0.47μF;0603≥0.47μF;0805≥2.2μF;<br>1206≥4.7μF;1210≥47μF</td></tr>
<tr><td>6.3V; 4V; Size≥1812</td></tr>
</table>
</td></tr>
</table>


Copyright © by Walsin Technology Corporation. | All rights reserved.

| No. | AEC-Q200 Test Item | AEC-Q200 Test Condition | Requirements |
|---|---|---|---|
| 3. | **Temperature Cycling**<br>JESD22<br>Method JA-104 | * Conduct 1000 cycles according to the temperatures and time.<br>* Before initial measurement (X7R only): Perform 150+0/-10℃ for 1 hr and then set for 24±2 hrs at room temp.<br>*Measurement to be made after keeping at room temp.<br>for 24±2 hrs. | * No remarkable damage.<br>* Cap change：NPO: within ±2.5% or 0.25pF whichever is larger.<br>X7R: within ±10.0%.<br>* Q/D.F. value:<br>NPO: Cap≥30pF, Q≥1000 ; Cap<30pF, Q≥400+20C.<br>X7R: |

| Step | Temp. (℃) | Time (min.) |
|---|---|---|
| 1 | -55℃ +0/-3 | 5±1 |
| 2 | +125℃ +3/-0 | 5±1 |

| Rated vol. | D.F.≦ | Exception of D.F.≦ | |
|---|---|---|---|
| ≧100V | ≦3% | ≦6% | 1206≧0.47μF |
| | | ≦7.5% | 0603≧0.068μF;0805＞0.1μF;1206≧1μF;1210≧2.2μF |
| | | ≦20% | 0805＞0.22μF;1210≧3.3μF |
| 50V | ≦3% | ≦6% | 0201(50V);0603≧0.047μF;0805≧0.18μF;1206≧0.47μF |
| | | ≦10% | 0201≧0.01uF;1210≧3.3μF |
| | | ≦20% | 0402≧0.012μF;0603>0.1μF; 0805/X7R>0.47μF;<br>1206≧2.2μF;1210≧10μF |
| 35V | ≦5% | ≦20% | 0603≧1μF;0805≥2.2μF;1206≧2.2μF;1210≧10μF |
| 25V | ≦5% | ≦10% | 0201≧0.01μF;0805≧1μF;1210≧10μF |
| | | ≦14% | 0603≧0.33μF |
| | | ≦15% | 0201≧0.1μF; 0402≧0.056μF;0603≧0.47μF;<br>0805≧2.2μF;1206≧4.7μF;1210≧22μF |
| | | ≦20% | 0402≧0.47μF |
| 16V | ≦5% | ≦10% | 0603≧0.15μF;0805≧0.68μF;1206≧2.2μF;1210≧4.7μF |
| | | ≦15% | 0201≧0.022μF;0402≧0.033μF;<br>0603>0.47μF;0805≧2.2μF;1206≧4.7μF;1210≧22μF |
| 10V | ≦7.5% | ≦15% | 0201≧0.012μF;0402≧0.22μF;<br>0603≧0.33μF;0805≧2.2μF;1206≧2.2μF;1210≧22μF |
| | | ≦20% | 0201≧0.1μF;0402≧1μF |
| 6.3V | ≦15% | ≦30% | 0201≧0.1μF;0402≧1μF;0603≧10μF;<br>0805≧4.7μF;1206≧47μF;1210≧100μF |
| 4V | ≦20% | --- | --- |

* I.R.: ≥10GΩ or RxC≥500Ω-F whichever is smaller.

Class II (X7R)

| Rated voltage | Insulation Resistance |
|---|---|
| 100V: All X7R;1210≥3.3μF | 1GΩ or RxC≧10 Ω-F whichever is smaller. |
| 50V: 0402>0.01μF;0603≥1μF;0805≥1μF;1206≥4.7μF;1210≥4.7μF | |
| 35V: 0603≥1μF;0805≥2.2μF;1206≥2.2μF;1210≥10μF | |
| 25V: 0201≥0.1uF;0402≥0.22μF;0603≥2.2μF;0805≥2.2μF;<br>1206≥10μF;1210≥10μF | |
| 16V: 0201≥0.1uF;0402≥0.22μF;0603≥1μF;0805≥2.2μF;<br>1206≥10μF;1210≥47μF | |
| 10V: 0201≥47nF;0402≥0.47μF;0603≥0.47μF;0805≥2.2μF;<br>1206≥4.7μF;1210≥47μF | |
| 6.3V; 4V; Size≥1812 | |


Copyright © by Walsin Technology Corporation. | All rights reserved.

| No. | AEC-Q200 Test Item | AEC-Q200 Test Condition | Requirements |
|---|---|---|---|
| 4. | **Destructive Physical Analysis**<br>EIA-469 | Per EIA-469 | No defects or abnormalities |
| 5. | **Moisture Resistance**<br>MIL-STD-202<br>Method 106 | * Test temp.: 25~65℃<br>* Humidity: 80~100% RH<br>* Test time: 10 cycles, t=24hrs/cycle.<br>* Measurement to be made after keeping at room temp. for 24±2 hrs. | * No remarkable damage.<br>* Cap change : NPO: within ±3.0% or 0.30pF whichever is larger<br>X7R: within ±12.5%.<br>* Q/D.F. value:<br>NPO: More than 30pF Q≥350 ; 10pF≤C≤30pF, Q≥275+2.5C<br>Less than 10pF Q≥200+10C<br>X7R: |

| Rated vol. | D.F.≦ | Exception of D.F.≦ | |
|---|---|---|---|
| ≧100V | ≦3% | ≦6% | 1206≧0.47μF |
| | | ≦7.5% | 0603≧0.068μF;0805＞0.1μF;1206≧1μF;1210≧2.2μF |
| | | ≦20% | 0805＞0.22μF;1210≧3.3μF |
| 50V | ≦3% | ≦6% | 0201(50V);0603≧0.047μF;0805≧0.18μF;1206≧0.47μF |
| | | ≦10% | 0201≧0.01uF;1210≧3.3μF |
| | | ≦20% | 0402≧0.012μF;0603>0.1μF; 0805/X7R>0.47μF;<br>1206≧2.2μF;1210≧10μF |
| 35V | ≦5% | ≦20% | 0603≧1μF;0805≥2.2μF;1206≧2.2μF;1210≧10μF |
| 25V | ≦5% | ≦10% | 0201≧0.01μF;0805≧1μF;1210≧10μF |
| | | ≦14% | 0603≧0.33μF |
| | | ≦15% | 0201≧0.1μF; 0402≧0.056μF;0603≧0.47μF;<br>0805≧2.2μF;1206≧4.7μF;1210≧22μF |
| | | ≦20% | 0402≧0.47μF |
| 16V | ≦5% | ≦10% | 0603≧0.15μF;0805≧0.68μF;1206≧2.2μF;1210≧4.7μF |
| | | ≦15% | 0201≧0.022μF;0402≧0.033μF;<br>0603>0.47μF;0805≧2.2μF;1206≧4.7μF;1210≧22μF |
| 10V | ≦7.5% | ≦15% | 0201≧0.012μF;0402≧0.22μF;<br>0603≧0.33μF;0805≧2.2μF;1206≧2.2μF;1210≧22μF |
| | | ≦20% | 0201≧0.1μF;0402≧1μF |
| 6.3V | ≦15% | ≦30% | 0201≧0.1μF;0402≧1μF;0603≧10μF;<br>0805≧4.7μF;1206≧47μF;1210≧100μF |
| 4V | ≦20% | --- | --- |

* I.R.: ≥10GΩ or RxC≥500Ω-F whichever is smaller.

Class II (X7R)

| Rated voltage | Insulation Resistance |
|---|---|
| 100V: All X7R;1210≥3.3μF | 1GΩ or RxC≧10 Ω-F whichever is smaller. |
| 50V: 0402>0.01μF;0603≥1μF;0805≥1μF;1206≥4.7μF;1210≥4.7μF | |
| 35V: 0603≥1μF;0805≥2.2μF;1206≥2.2μF;1210≥10μF | |
| 25V: 0201≥0.1uF;0402≥0.22μF;0603≥2.2μF;0805≥2.2μF;<br>1206≥10μF;1210≥10μF | |
| 16V: 0201≥0.1uF;0402≥0.22μF;0603≥1μF;0805≥2.2μF;<br>1206≥10μF;1210≥47μF | |
| 10V: 0201≥47nF;0402≥0.47μF;0603≥0.47μF;0805≥2.2μF;<br>1206≥4.7μF;1210≥47μF | |
| 6.3V; 4V; Size≥1812 | |


Copyright © by Walsin Technology Corporation. | All rights reserved.

| No. | AEC-Q200 Test Item | AEC-Q200 Test Condition | Requirements |
|---|---|---|---|
| 6. | **Biased Humidity**<br>MIL-STD-202<br>Method 103 | * Test temp.: 85±3℃<br>* Humidity: 85%RH<br>* Test time: 1000+24/-0 hrs.<br>* To apply voltage：rated voltage and 1.3~1.5Vdc.<br>(add 100k ohm resistor)<br>* Before initial measurement (Class II only) : To apply test voltage for 1hr at test temp. and then set for 24±2 hrs at room temp.<br>* Measurement to be made after keeping at room temp. for 24±2 hrs. | * No remarkable damage.<br>* Cap change: NPO: within ±3.0% or 0.30pF whichever is larger.<br>X7R: within ±12.5%<br>* Q/D.F. value:<br>NPO: C≥30pF , Q≥200 ; C<30pF , Q≥100+10/3C<br>X7R: |

| Rated vol. | D.F.≦ | Exception of D.F.≦ | |
|---|---|---|---|
| ≧100V | ≦3% | ≦6% | 1206≧0.47μF |
| | | ≦7.5% | 0603≧0.068μF;0805＞0.1μF;1206≧1μF;1210≧2.2μF |
| | | ≦20% | 0805＞0.22μF;1210≧3.3μF |
| 50V | ≦3% | ≦6% | 0201(50V);0603≧0.047μF;0805≧0.18μF;1206≧0.47μF |
| | | ≦10% | 0201≧0.01uF;1210≧3.3μF |
| | | ≦20% | 0402≧0.012μF;0603>0.1μF; 0805/X7R>0.47μF;<br>1206≧2.2μF;1210≧10μF |
| 35V | ≦5% | ≦20% | 0603≧1μF;0805≥2.2μF;1206≧2.2μF;1210≧10μF |
| 25V | ≦5% | ≦10% | 0201≧0.01μF;0805≧1μF;1210≧10μF |
| | | ≦14% | 0603≧0.33μF |
| | | ≦15% | 0201≧0.1μF; 0402≧0.056μF;0603≧0.47μF;<br>0805≧2.2μF;1206≧4.7μF;1210≧22μF |
| | | ≦20% | 0402≧0.47μF |
| 16V | ≦5% | ≦10% | 0603≧0.15μF;0805≧0.68μF;1206≧2.2μF;1210≧4.7μF |
| | | ≦15% | 0201≧0.022μF;0402≧0.033μF;<br>0603>0.47μF;0805≧2.2μF;1206≧4.7μF;1210≧22μF |
| 10V | ≦7.5% | ≦15% | 0201≧0.012μF;0402≧0.22μF;<br>0603≧0.33μF;0805≧2.2μF;1206≧2.2μF;1210≧22μF |
| | | ≦20% | 0201≧0.1μF;0402≧1μF |
| 6.3V | ≦15% | ≦30% | 0201≧0.1μF;0402≧1μF;0603≧10μF;<br>0805≧4.7μF;1206≧47μF;1210≧100μF |
| 4V | ≦20% | --- | --- |

* I.R.: ≥1GΩ or RxC≥50Ω-F whichever is smaller.
Class II (X7R) for rated voltage test

| Rated voltage | Insulation Resistance |
|---|---|
| 100V: All X7R;1210≥3.3μF | 500MΩ or RxC≧5 Ω-F whichever is smaller. |
| 50V: 0402>0.01μF;0603≥1μF;0805≥1μF;1206≥4.7μF;1210≥4.7μF | |
| 35V: 0603≥1μF;0805≥2.2μF;1206≥2.2μF;1210≥10μF | |
| 25V: 0201≥0.1uF;0402≥0.22μF;0603≥2.2μF;0805≥2.2μF;<br>1206≥10μF;1210≥10μF | |
| 16V: 0201≥0.1uF;0402≥0.22μF;0603≥1μF;0805≥2.2μF;<br>1206≥10μF;1210≥47μF | |
| 10V: 0201≥47nF;0402≥0.47μF;0603≥0.47μF;0805≥2.2μF;<br>1206≥4.7μF;1210≥47μF | |
| 6.3V; 4V; Size≥1812 | |

Class II (X7R) for 1.3~1.5Vdc

| Rated voltage | Insulation Resistance |
|---|---|
| 100V: All X7R;1210≥3.3μF | 1GΩ or RxC≧10 Ω-F whichever is smaller. |
| 50V: 0402>0.01μF;0603≥1μF;0805≥1μF;1206≥4.7μF;1210≥4.7μF | |
| 35V: 0603≥1μF;0805≥2.2μF;1206≥2.2μF;1210≥10μF | |
| 25V: 0201≥0.1uF;0402≥0.22μF;0603≥2.2μF;0805≥2.2μF;<br>1206≥10μF;1210≥10μF | |
| 16V: 0201≥0.1uF;0402≥0.22μF;0603≥1μF;0805≥2.2μF;<br>1206≥10μF;1210≥47μF | |
| 10V: 0201≥47nF;0402≥0.47μF;0603≥0.47μF;0805≥2.2μF;<br>1206≥4.7μF;1210≥47μF | |
| 6.3V; 4V; Size≥1812 | |


Copyright © by Walsin Technology Corporation. | All rights reserved.

| No. | AEC-Q200 Test Item | AEC-Q200 Test Condition | Requirements |
|---|---|---|---|
| 7. | **Operational Life**<br>MIL-STD-202<br>Method 108 | * Test temp.: 125±3℃<br>* To apply voltage:<br>(1) 10V≤Ur≤250V:200% of rated voltage.<br>(2) 150% of rated voltage:<br>a) 500V<br>b) 0603/X7R/50V/Cap.>0.1μF<br>c) 0805/X7R/50V/Cap.≥0.68μF<br>(3) 630V≤Ur≤1000V:120% of rated voltage.<br>* Test time: 1000+24/-0 hrs.<br>* Before initial measurement (X7R only): Apply test voltage for 1 hr at 125℃. Remove and let set for 24±2 hrs at room temp.<br>* Measurement to be made after keeping at room temp. for 24±2 hrs. | * No remarkable damage.<br>* Cap change: NPO: within ±3.0% or ±0.3pF whichever is larger<br>X7R: within ±12.5%.<br>* Q/D.F. value:<br>NPO: More than 30pF, Q≥350 ; 10pF≤C<30pF, Q≥275+2.5C<br>Less than 10pF, Q≥200+10C<br>X7R: |

| Rated vol. | D.F.≦ | Exception of D.F.≦ | |
|---|---|---|---|
| ≧100V | ≦3% | ≦6% | 1206≧0.47μF |
| | | ≦7.5% | 0603≧0.068μF;0805＞0.1μF;1206≧1μF;1210≧2.2μF |
| | | ≦20% | 0805＞0.22μF;1210≧3.3μF |
| 50V | ≦3% | ≦6% | 0201(50V);0603≧0.047μF;0805≧0.18μF;1206≧0.47μF |
| | | ≦10% | 0201≧0.01uF;1210≧3.3μF |
| | | ≦20% | 0402≧0.012μF;0603>0.1μF; 0805/X7R>0.47μF; 1206≧2.2μF;1210≧10μF |
| 35V | ≦5% | ≦20% | 0603≧1μF;0805≥2.2μF;1206≧2.2μF;1210≧10μF |
| 25V | ≦5% | ≦10% | 0201≧0.01μF;0805≧1μF;1210≧10μF |
| | | ≦14% | 0603≧0.33μF |
| | | ≦15% | 0201≧0.1μF; 0402≧0.056μF;0603≧0.47μF; 0805≧2.2μF;1206≧4.7μF;1210≧22μF |
| | | ≦20% | 0402≧0.47μF |
| 16V | ≦5% | ≦10% | 0603≧0.15μF;0805≧0.68μF;1206≧2.2μF;1210≧4.7μF |
| | | ≦15% | 0201≧0.022μF;0402≧0.033μF; 0603>0.47μF;0805≧2.2μF;1206≧4.7μF;1210≧22μF |
| 10V | ≦7.5% | ≦15% | 0201≧0.012μF;0402≧0.22μF; 0603≧0.33μF;0805≧2.2μF;1206≧2.2μF;1210≧22μF |
| | | ≦20% | 0201≧0.1μF;0402≧1μF |
| 6.3V | ≦15% | ≦30% | 0201≧0.1μF;0402≧1μF;0603≧10μF; 0805≧4.7μF;1206≧47μF;1210≧100μF |
| 4V | ≦20% | --- | --- |

* I.R.: ≥1GΩ or RxC≥50Ω-F whichever is smaller.

Class II (X7R)

| Rated voltage | Insulation Resistance |
|---|---|
| 100V: All X7R;1210≥3.3μF | 1GΩ or RxC≧10 Ω-F whichever is smaller. |
| 50V: 0402>0.01μF;0603≥1μF;0805≥1μF;1206≥4.7μF;1210≥4.7μF | |
| 35V: 0603≥1μF;0805≥2.2μF;1206≥2.2μF;1210≥10μF | |
| 25V: 0201≥0.1uF;0402≥0.22μF;0603≥2.2μF;0805≥2.2μF; 1206≥10μF;1210≥10μF | |
| 16V: 0201≥0.1uF;0402≥0.22μF;0603≥1μF;0805≥2.2μF; 1206≥10μF;1210≥47μF | |
| 10V: 0201≥47nF;0402≥0.47μF;0603≥0.47μF;0805≥2.2μF; 1206≥4.7μF;1210≥47μF | |
| 6.3V; 4V; Size≥1812 | |

| | | | |
|---|---|---|---|
| 8. | **External Visual**<br>MIL-STD-883<br>Method 2009 | Visual inspection | No remarkable defect. |
| 9. | **Physical Dimension**<br>JESD22<br>Method JB-100 | Using by calipers | Within the specified dimensions |


Copyright © by Walsin Technology Corporation. | All rights reserved.

| No. | AEC-Q200 Test Item | AEC-Q200 Test Condition | Requirements |
|---|---|---|---|
| 10. | **Resistance to Solvents**<br>MIL-STD-202<br>Method 215 | * Temperature: 25±5℃<br>* Time: 3+0.5/-0 min.<br>* Solvent: Iso-propyl alcohol. | * No remarkable damage.<br>* Cap.: within the specified tolerance.<br>* Q/D.F. value:<br>NPO: Cap≥30pF, Q≥1000 ; Cap<30pF, Q≥400+20C.<br>X7R: |

| Rated vol. | D.F.≦ | Exception of D.F. ≦ | |
|---|---|---|---|
| ≧100V | ≦2.5% | ≦3% | 1206≧0.47μF |
| | | ≦5% | 0603≧0.068μF;0805＞0.1μF;1206≧1μF;1210≧2.2μF |
| | | ≦10% | 0805＞0.22μF;1210≧3.3μF |
| 50V | ≦2.5% | ≦3% | 0201(50V);0603≧0.047μF; 0805≧0.18μF;1206≧0.47μF |
| | | ≦5% | 0201≧0.01uF;1210≧3.3μF |
| | | ≦10% | 0402≧0.012μF;0603>0.1μF; 0805>0.47μF;<br>1206≧2.2μF;1210≧10μF |
| 35V | ≦3.5% | ≦10% | 0603≧1μF;0805≥2.2μF;1206≧2.2μF;1210≧10μF |
| 25V | ≦3.5% | ≦5% | 0201≧0.01μF;0805≧1μF;1210≧10μF |
| | | ≦7% | 0603≧0.33μF |
| | | ≦10% | 0201≧0.1μF;0402≧0.056μF;0603≧0.47μF;<br>0805≧2.2μF;1206≧4.7μF; 1210≧22μF |
| | | ≦12.5% | 0402≧0.47μF |
| 16V | ≦3.5% | ≦5% | 0201≧0.01μF;0402≧0.033μF;0603≧0.15μF;<br>0805≧0.68μF;1206≧2.2μF;1210≧4.7μF |
| | | ≦10% | 0201≧0.022μF; 0402≧0.22uF;0603>0.47μF;<br>0805≧2.2μF;1206≧4.7μF;1210≧22μF |
| 10V | ≦5% | ≦10% | 0201≧0.012μF;0402≧0.22μF;0603≧0.33μF;<br>0805≧2.2μF;1206≧2.2μF;1210≧22μF |
| | | ≦15% | 0201≧0.1μF; 0402≧1μF |
| 6.3V | ≦10% | ≦15% | 0201≧0.1μF;0402≧1μF;0603≧10μF;<br>0805≧4.7μF;1206≧47μF;1210≧100μF |
| | | ≦20% | 0402≧2.2μF |
| 4V | ≦15% | --- | --- |

* I.R.: ≥10GΩ or RxC≥500Ω-F whichever is smaller.

Class II (X7R)

| Rated voltage | Insulation Resistance |
|---|---|
| 100V: All X7R | 10GΩ or RxC≥100 Ω-F whichever is smaller. |
| 50V: 0402>0.01μF;0603≥1μF;0805≥1μF;1206≥4.7μF;1210≥4.7μF | |
| 35V: 0805≥2.2μF;1206≥2.2μF;1210≥10μF | |
| 25V: 0402≥1μF;0603≥2.2μF;0805≥2.2μF;1206≥10μF;1210≥10μF | |
| 16V: 0201≥0.1μF,0402≥0.22μF;0603≥1μF;<br>0805≥2.2μF;1206≥10μF;1210≥47μF | |
| 10V: 0201≥47nF;0402≥0.47μF;0603≥0.47μF;0805≥2.2μF;<br>1206≥4.7μF;1210≥47μF | |
| 6.3V; 4V; Size≥1812 | |

| Rated voltage | Insulation Resistance |
|---|---|
| | RxC≥50 Ω-F. |
| 100V: 1210≥3.3μF | |
| 50V: 0402≥0.1μF;0603≥2.2μF;0805≥10μF;1206≥10μF | |
| 35V: 0603≥1μF; | |
| 25V: 0201≥0.1μF;0402≥2.2μF;0603≥10μF;0805≥10μF;1206≥22μF | |
| 16V: 0603≥10μF;0402≥1μF;0201≥0.22μF | |
| 10V: 0201>0.1μF;0402≥1μF;0603≥10μF;0805≥47μF | |
| 6.3V: 0201≥0.1μF;0402≥1μF;0603>4.7μF;0805≥47μF;1206≥10μF | |
| 4V: 0603≥22μF;0805≥47μF;1206≥100μF | |


Copyright © by Walsin Technology Corporation. | All rights reserved.

| No. | AEC-Q200 Test Item | AEC-Q200 Test Condition | Requirements |
|---|---|---|---|
| 11. | **Mechanical Shock**<br>MIL-STD-202<br>Method 213 | * Peak value: 1500g's.<br>* Wave: 1/2 sine.<br>* Velocity: 15.4 ft/sec<br>* Three shocks in each direction should be applied along<br>3 mutually perpendicular axes of the test specimen<br>(18 shocks) | * No remarkable damage.<br>* Cap.: within the specified tolerance.<br>* Q/D.F. value:<br>NPO: Cap≥30pF, Q≥1000 ; Cap<30pF, Q≥400+20C.<br>X7R: |

| Rated vol. | D.F.≦ | Exception of D.F. ≦ | |
|---|---|---|---|
| ≧100V | ≦2.5% | ≦3% | 1206≧0.47μF |
| | | ≦5% | 0603≧0.068μF;0805＞0.1μF;1206≧1μF;1210≧2.2μF |
| | | ≦10% | 0805＞0.22μF;1210≧3.3μF |
| 50V | ≦2.5% | ≦3% | 0201(50V);0603≧0.047μF; 0805≧0.18μF;1206≧0.47μF |
| | | ≦5% | 0201≧0.01uF;1210≧3.3μF |
| | | ≦10% | 0402≧0.012μF;0603>0.1μF; 0805>0.47μF;<br>1206≧2.2μF;1210≧10μF |
| 35V | ≦3.5% | ≦10% | 0603≧1μF;0805≥2.2μF;1206≧2.2μF;1210≧10μF |
| 25V | ≦3.5% | ≦5% | 0201≧0.01μF;0805≧1μF;1210≧10μF |
| | | ≦7% | 0603≧0.33μF |
| | | ≦10% | 0201≧0.1μF;0402≧0.056μF;0603≧0.47μF;<br>0805≧2.2μF;1206≧4.7μF; 1210≧22μF |
| | | ≦12.5% | 0402≧0.47μF |
| 16V | ≦3.5% | ≦5% | 0201≧0.01μF;0402≧0.033μF;0603≧0.15μF;<br>0805≧0.68μF;1206≧2.2μF;1210≧4.7μF |
| | | ≦10% | 0201≧0.022μF; 0402≧0.22uF;0603>0.47μF;<br>0805≧2.2μF;1206≧4.7μF;1210≧22μF |
| 10V | ≦5% | ≦10% | 0201≧0.012μF;0402≧0.22μF;0603≧0.33μF;<br>0805≧2.2μF;1206≧2.2μF;1210≧22μF |
| | | ≦15% | 0201≧0.1μF; 0402≧1μF |
| 6.3V | ≦10% | ≦15% | 0201≧0.1μF;0402≧1μF;0603≧10μF;<br>0805≧4.7μF;1206≧47μF;1210≧100μF |
| | | ≦20% | 0402≧2.2μF |
| 4V | ≦15% | --- | --- |

* I.R.: ≥10GΩ or RxC≥500Ω-F whichever is smaller.

Class II (X7R)

| Rated voltage | Insulation Resistance |
|---|---|
| 100V: All X7R | 10GΩ or RxC≥100 Ω-F whichever is smaller. |
| 50V: 0402>0.01μF;0603≥1μF;0805≥1μF;1206≥4.7μF;1210≥4.7μF | |
| 35V: 0805≥2.2μF;1206≥2.2μF;1210≥10μF | |
| 25V: 0402≥1μF;0603≥2.2μF;0805≥2.2μF;1206≥10μF;1210≥10μF | |
| 16V: 0201≥0.1μF,0402≥0.22μF;0603≥1μF;<br>0805≥2.2μF;1206≥10μF;1210≥47μF | |
| 10V: 0201≥47nF;0402≥0.47μF;0603≥0.47μF;0805≥2.2μF;<br>1206≥4.7μF;1210≥47μF | |
| 6.3V; 4V; Size≥1812 | |

| Rated voltage | Insulation Resistance |
|---|---|
| | RxC≥50 Ω-F. |
| 100V: 1210≥3.3μF | |
| 50V: 0402≥0.1μF;0603≥2.2μF;0805≥10μF;1206≥10μF | |
| 35V: 0603≥1μF; | |
| 25V: 0201≥0.1μF;0402≥2.2μF;0603≥10μF;0805≥10μF;1206≥22μF | |
| 16V: 0603≥10μF;0402≥1μF;0201≥0.22μF | |
| 10V: 0201>0.1μF;0402≥1μF;0603≥10μF;0805≥47μF | |
| 6.3V: 0201≥0.1μF;0402≥1μF;0603>4.7μF;0805≥47μF;1206≥10μF | |
| 4V: 0603≥22μF;0805≥47μF;1206≥100μF | |


Copyright © by Walsin Technology Corporation. | All rights reserved.

| No. | AEC-Q200 Test Item | AEC-Q200 Test Condition | Requirements |
|---|---|---|---|
| 12. | **Vibration**<br>MIL-STD-202<br>Method 204 | * Vibration frequency: 10~2000 Hz/min.<br>(5g's for 20 min)<br>* Total amplitude: 1.5mm<br>* 12 cycles each of 3 orientations (36 times) | * No remarkable damage.<br>* Cap.: within the specified tolerance.<br>* Q/D.F. value:<br>NPO:Cap≥30pF, Q≥1000 ; Cap<30pF, Q≥400+20C.<br>X7R: |

| Rated vol. | D.F.≦ | Exception of D.F. ≦ | |
|---|---|---|---|
| ≧100V | ≦2.5% | ≦3% | 1206≧0.47μF |
| | | ≦5% | 0603≧0.068μF;0805＞0.1μF;1206≧1μF;1210≧2.2μF |
| | | ≦10% | 0805＞0.22μF;1210≧3.3μF |
| 50V | ≦2.5% | ≦3% | 0201(50V);0603≧0.047μF; 0805≧0.18μF;1206≧0.47μF |
| | | ≦5% | 0201≧0.01uF;1210≧3.3μF |
| | | ≦10% | 0402≧0.012μF;0603>0.1μF; 0805>0.47μF;<br>1206≧2.2μF;1210≧10μF |
| 35V | ≦3.5% | ≦10% | 0603≧1μF;0805≥2.2μF;1206≧2.2μF;1210≧10μF |
| 25V | ≦3.5% | ≦5% | 0201≧0.01μF;0805≧1μF;1210≧10μF |
| | | ≦7% | 0603≧0.33μF |
| | | ≦10% | 0201≧0.1μF;0402≧0.056μF;0603≧0.47μF;<br>0805≧2.2μF;1206≧4.7μF; 1210≧22μF |
| | | ≦12.5% | 0402≧0.47μF |
| 16V | ≦3.5% | ≦5% | 0201≧0.01μF;0402≧0.033μF;0603≧0.15μF;<br>0805≧0.68μF;1206≧2.2μF;1210≧4.7μF |
| | | ≦10% | 0201≧0.022μF; 0402≧0.22uF;0603>0.47μF;<br>0805≧2.2μF;1206≧4.7μF;1210≧22μF |
| 10V | ≦5% | ≦10% | 0201≧0.012μF;0402≧0.22μF;0603≧0.33μF;<br>0805≧2.2μF;1206≧2.2μF;1210≧22μF |
| | | ≦15% | 0201≧0.1μF; 0402≧1μF |
| 6.3V | ≦10% | ≦15% | 0201≧0.1μF;0402≧1μF;0603≧10μF;<br>0805≧4.7μF;1206≧47μF;1210≧100μF |
| | | ≦20% | 0402≧2.2μF |
| 4V | ≦15% | --- | --- |

* I.R.: ≥10GΩ or RxC≥500Ω-F whichever is smaller.

Class II (X7R)

| Rated voltage | Insulation Resistance |
|---|---|
| 100V: All X7R | 10GΩ or RxC≥100 Ω-F whichever is smaller. |
| 50V: 0402>0.01μF;0603≥1μF;0805≥1μF;1206≥4.7μF;1210≥4.7μF | |
| 35V: 0805≥2.2μF;1206≥2.2μF;1210≥10μF | |
| 25V: 0402≥1μF;0603≥2.2μF;0805≥2.2μF;1206≥10μF;1210≥10μF | |
| 16V: 0201≥0.1μF,0402≥0.22μF;0603≥1μF;<br>0805≥2.2μF;1206≥10μF;1210≥47μF | |
| 10V: 0201≥47nF;0402≥0.47μF;0603≥0.47μF;0805≥2.2μF;<br>1206≥4.7μF;1210≥47μF | |
| 6.3V; 4V; Size≥1812 | |

| Rated voltage | Insulation Resistance |
|---|---|
| | RxC≥50 Ω-F. |
| 100V: 1210≥3.3μF | |
| 50V: 0402≥0.1μF;0603≥2.2μF;0805≥10μF;1206≥10μF | |
| 35V: 0603≥1μF; | |
| 25V: 0201≥0.1μF;0402≥2.2μF;0603≥10μF;0805≥10μF;1206≥22μF | |
| 16V: 0603≥10μF;0402≥1μF;0201≥0.22μF | |
| 10V: 0201>0.1μF;0402≥1μF;0603≥10μF;0805≥47μF | |
| 6.3V: 0201≥0.1μF;0402≥1μF;0603>4.7μF;0805≥47μF;1206≥10μF | |
| 4V: 0603≥22μF;0805≥47μF;1206≥100μF | |


Copyright © by Walsin Technology Corporation. | All rights reserved.

| No. | AEC-Q200 Test Item | AEC-Q200 Test Condition | Requirements |
|---|---|---|---|
| 13. | **Resistance to Soldering Heat**<br>MIL-STD-202<br>Method 210 | * Solder temperature: 270±5℃<br>* Dipping time: 10±1 sec<br>* Before initial measurement (X7R only): Perform 150+0/-10℃ for 1 hr and then set for 24±2 hrs at room temp.<br>* Measurement to be made after keeping at room temp. for 24±2 hrs. | * No remarkable damage.<br>* Cap change: NPO: within ±2.5% or 0.25pF whichever is larger<br>X7R: within ±7.5%<br>* Q/D.F. value:<br>NPO: Cap≥30pF, Q≥1000 ; Cap<30pF, Q≥400+20C.<br>X7R: |

| Rated vol. | D.F.≦ | Exception of D.F. ≦ | |
|---|---|---|---|
| ≧100V | ≦2.5% | ≦3% | 1206≧0.47μF |
| | | ≦5% | 0603≧0.068μF;0805＞0.1μF;1206≧1μF;1210≧2.2μF |
| | | ≦10% | 0805＞0.22μF;1210≧3.3μF |
| 50V | ≦2.5% | ≦3% | 0201(50V);0603≧0.047μF; 0805≧0.18μF;1206≧0.47μF |
| | | ≦5% | 0201≧0.01uF;1210≧3.3μF |
| | | ≦10% | 0402≧0.012μF;0603>0.1μF; 0805>0.47μF;<br>1206≧2.2μF;1210≧10μF |
| 35V | ≦3.5% | ≦10% | 0603≧1μF;0805≥2.2μF;1206≧2.2μF;1210≧10μF |
| 25V | ≦3.5% | ≦5% | 0201≧0.01μF;0805≧1μF;1210≧10μF |
| | | ≦7% | 0603≧0.33μF |
| | | ≦10% | 0201≧0.1μF;0402≧0.056μF;0603≧0.47μF;<br>0805≧2.2μF;1206≧4.7μF; 1210≧22μF |
| | | ≦12.5% | 0402≧0.47μF |
| 16V | ≦3.5% | ≦5% | 0201≧0.01μF;0402≧0.033μF;0603≧0.15μF;<br>0805≧0.68μF;1206≧2.2μF;1210≧4.7μF |
| | | ≦10% | 0201≧0.022μF; 0402≧0.22uF;0603>0.47μF;<br>0805≧2.2μF;1206≧4.7μF;1210≧22μF |
| 10V | ≦5% | ≦10% | 0201≧0.012μF;0402≧0.22μF;0603≧0.33μF;<br>0805≧2.2μF;1206≧2.2μF;1210≧22μF |
| | | ≦15% | 0201≧0.1μF; 0402≧1μF |
| 6.3V | ≦10% | ≦15% | 0201≧0.1μF;0402≧1μF;0603≧10μF;<br>0805≧4.7μF;1206≧47μF;1210≧100μF |
| | | ≦20% | 0402≧2.2μF |
| 4V | ≦15% | --- | --- |

* I.R.: ≥10GΩ or RxC≥500Ω-F whichever is smaller.

Class II (X7R)

| Rated voltage | Insulation Resistance |
|---|---|
| 100V: All X7R | 10GΩ or RxC≥100 Ω-F whichever is smaller. |
| 50V: 0402>0.01μF;0603≥1μF;0805≥1μF;1206≥4.7μF;1210≥4.7μF | |
| 35V: 0805≥2.2μF;1206≥2.2μF;1210≥10μF | |
| 25V: 0402≥1μF;0603≥2.2μF;0805≥2.2μF;1206≥10μF;1210≥10μF | |
| 16V: 0201≥0.1μF,0402≥0.22μF;0603≥1μF;<br>0805≥2.2μF;1206≥10μF;1210≥47μF | |
| 10V: 0201≥47nF;0402≥0.47μF;0603≥0.47μF;0805≥2.2μF;<br>1206≥4.7μF;1210≥47μF | |
| 6.3V; 4V; Size≥1812 | |

| Rated voltage | Insulation Resistance |
|---|---|
| | RxC≥50 Ω-F. |
| 100V: 1210≥3.3μF | |
| 50V: 0402≥0.1μF;0603≥2.2μF;0805≥10μF;1206≥10μF | |
| 35V: 0603≥1μF; | |
| 25V: 0201≥0.1μF;0402≥2.2μF;0603≥10μF;0805≥10μF;1206≥22μF | |
| 16V: 0603≥10μF;0402≥1μF;0201≥0.22μF | |
| 10V: 0201>0.1μF;0402≥1μF;0603≥10μF;0805≥47μF | |
| 6.3V: 0201≥0.1μF;0402≥1μF;0603>4.7μF;0805≥47μF;1206≥10μF | |
| 4V: 0603≥22μF;0805≥47μF;1206≥100μF | |


Copyright © by Walsin Technology Corporation. | All rights reserved.

| No. | AEC-Q200 Test Item | AEC-Q200 Test Condition | Requirements |
|---|---|---|---|
| 14 | **Thermal Shock**<br>MIL-STD-202<br>Method 107 | * Conduct 300 cycles according to the temperatures and time.<br>* Max. transfer time: 20 sec.<br>* Before initial measurement (X7R only): Perform 150+0/-10℃ for 1 hr and then set for 24±2 hrs at room temp.<br>* Measurement to be made after keeping at room temp. for 24±2 hrs. | * No remarkable damage.<br>* Cap change：NPO: within ±2.5% or 0.25pF whichever is larger<br>X7R: within ±10.0%<br>* Q/D.F. value:<br>NPO: Cap≥30pF, Q≥1000 ; Cap<30pF, Q≥400+20C.<br>X7R: |

| Step | Temp. (℃) | Time (min.) |
|---|---|---|
| 1 | -55℃ +0/-3 | 15±3 |
| 2 | +125℃ +3/-0 | 15±3 |

| Rated vol. | D.F.≦ | Exception of D.F.≦ | |
|---|---|---|---|
| ≧100V | ≦3% | ≦6% | 1206≧0.47μF |
| | | ≦7.5% | 0603≧0.068μF;0805＞0.1μF;1206≧1μF;1210≧2.2μF |
| | | ≦20% | 0805＞0.22μF;1210≧3.3μF |
| 50V | ≦3% | ≦6% | 0201(50V);0603≧0.047μF;0805≧0.18μF;1206≧0.47μF |
| | | ≦10% | 0201≧0.01uF;1210≧3.3μF |
| | | ≦20% | 0402≧0.012μF;0603>0.1μF; 0805/X7R>0.47μF; 1206≧2.2μF;1210≧10μF |
| 35V | ≦5% | ≦20% | 0603≧1μF;0805≥2.2μF;1206≧2.2μF;1210≧10μF |
| 25V | ≦5% | ≦10% | 0201≧0.01μF;0805≧1μF;1210≧10μF |
| | | ≦14% | 0603≧0.33μF |
| | | ≦15% | 0201≧0.1μF; 0402≧0.056μF;0603≧0.47μF; 0805≧2.2μF;1206≧4.7μF;1210≧22μF |
| | | ≦20% | 0402≧0.47μF |
| 16V | ≦5% | ≦10% | 0603≧0.15μF;0805≧0.68μF;1206≧2.2μF;1210≧4.7μF |
| | | ≦15% | 0201≧0.022μF;0402≧0.033μF; 0603>0.47μF;0805≧2.2μF;1206≧4.7μF;1210≧22μF |
| 10V | ≦7.5% | ≦15% | 0201≧0.012μF;0402≧0.22μF; 0603≧0.33μF;0805≧2.2μF;1206≧2.2μF;1210≧22μF |
| | | ≦20% | 0201≧0.1μF;0402≧1μF |
| 6.3V | ≦15% | ≦30% | 0201≧0.1μF;0402≧1μF;0603≧10μF; 0805≧4.7μF;1206≧47μF;1210≧100μF |
| 4V | ≦20% | --- | --- |

* I.R.: ≥10GΩ or RxC≥500Ω-F whichever is smaller.

Class II (X7R)

| Rated voltage | Insulation Resistance |
|---|---|
| 100V: All X7R;1210≥3.3μF | 1GΩ or RxC≧10 Ω-F whichever is smaller. |
| 50V: 0402>0.01μF;0603≥1μF;0805≥1μF;1206≥4.7μF;1210≥4.7μF | |
| 35V: 0603≥1μF;0805≥2.2μF;1206≥2.2μF;1210≥10μF | |
| 25V: 0201≥0.1uF;0402≥0.22μF;0603≥2.2μF;0805≥2.2μF; 1206≥10μF;1210≥10μF | |
| 16V: 0201≥0.1uF;0402≥0.22μF;0603≥1μF;0805≥2.2μF; 1206≥10μF;1210≥47μF | |
| 10V: 0201≥47nF;0402≥0.47μF;0603≥0.47μF;0805≥2.2μF; 1206≥4.7μF;1210≥47μF | |
| 6.3V; 4V; Size≥1812 | |


Copyright © by Walsin Technology Corporation. | All rights reserved.

| No. | AEC-Q200 Test Item | AEC-Q200 Test Condition | Requirements |
|---|---|---|---|
| 15. | **ESD**<br>AEC-Q200-002 | Per AEC-Q200-002 | * No remarkable damage.<br>* Cap.: within the specified tolerance.<br>* Q/D.F. value:<br>NPO: Cap≥30pF, Q≥1000 ; Cap<30pF, Q≥400+20C.<br>X7R: |

| Rated vol. | D.F.≦ | Exception of D.F. ≦ | |
|---|---|---|---|
| ≧100V | ≦2.5% | ≦3% | 1206≧0.47μF |
| | | ≦5% | 0603≧0.068μF;0805＞0.1μF;1206≧1μF;1210≧2.2μF |
| | | ≦10% | 0805＞0.22μF;1210≧3.3μF |
| 50V | ≦2.5% | ≦3% | 0201(50V);0603≧0.047μF; 0805≧0.18μF;1206≧0.47μF |
| | | ≦5% | 0201≧0.01uF;1210≧3.3μF |
| | | ≦10% | 0402≧0.012μF;0603>0.1μF; 0805>0.47μF;<br>1206≧2.2μF;1210≧10μF |
| 35V | ≦3.5% | ≦10% | 0603≧1μF;0805≥2.2μF;1206≧2.2μF;1210≧10μF |
| 25V | ≦3.5% | ≦5% | 0201≧0.01μF;0805≧1μF;1210≧10μF |
| | | ≦7% | 0603≧0.33μF |
| | | ≦10% | 0201≧0.1μF;0402≧0.056μF;0603≧0.47μF;<br>0805≧2.2μF;1206≧4.7μF; 1210≧22μF |
| | | ≦12.5% | 0402≧0.47μF |
| 16V | ≦3.5% | ≦5% | 0201≧0.01μF;0402≧0.033μF;0603≧0.15μF;<br>0805≧0.68μF;1206≧2.2μF;1210≧4.7μF |
| | | ≦10% | 0201≧0.022μF; 0402≧0.22uF;0603>0.47μF;<br>0805≧2.2μF;1206≧4.7μF;1210≧22μF |
| 10V | ≦5% | ≦10% | 0201≧0.012μF;0402≧0.22μF;0603≧0.33μF;<br>0805≧2.2μF;1206≧2.2μF;1210≧22μF |
| | | ≦15% | 0201≧0.1μF; 0402≧1μF |
| 6.3V | ≦10% | ≦15% | 0201≧0.1μF;0402≧1μF;0603≧10μF;<br>0805≧4.7μF;1206≧47μF;1210≧100μF |
| | | ≦20% | 0402≧2.2μF |
| 4V | ≦15% | --- | --- |

* I.R.: ≥10GΩ or RxC≥500Ω-F whichever is smaller.

Class II (X7R)

| Rated voltage | Insulation Resistance |
|---|---|
| 100V: All X7R | 10GΩ or RxC≥100 Ω-F whichever is smaller. |
| 50V: 0402>0.01μF;0603≥1μF;0805≥1μF;1206≥4.7μF;1210≥4.7μF | |
| 35V: 0805≥2.2μF;1206≥2.2μF;1210≥10μF | |
| 25V: 0402≥1μF;0603≥2.2μF;0805≥2.2μF;1206≥10μF;1210≥10μF | |
| 16V: 0201≥0.1μF,0402≥0.22μF;0603≥1μF;<br>0805≥2.2μF;1206≥10μF;1210≥47μF | |
| 10V: 0201≥47nF;0402≥0.47μF;0603≥0.47μF;0805≥2.2μF;<br>1206≥4.7μF;1210≥47μF | |
| 6.3V; 4V; Size≥1812 | |

| Rated voltage | Insulation Resistance |
|---|---|
| | RxC≥50 Ω-F. |
| 100V: 1210≥3.3μF | |
| 50V: 0402≥0.1μF;0603≥2.2μF;0805≥10μF;1206≥10μF | |
| 35V: 0603≥1μF; | |
| 25V: 0201≥0.1μF;0402≥2.2μF;0603≥10μF;0805≥10μF;1206≥22μF | |
| 16V: 0603≥10μF;0402≥1μF;0201≥0.22μF | |
| 10V: 0201>0.1μF;0402≥1μF;0603≥10μF;0805≥47μF | |
| 6.3V: 0201≥0.1μF;0402≥1μF;0603>4.7μF;0805≥47μF;1206≥10μF | |
| 4V: 0603≥22μF;0805≥47μF;1206≥100μF | |

| | | | |
|---|---|---|---|
| 16. | **Solderability**<br>J-STD-002<br>JESD22-B102E | * Condition A<br>Un-mounted chips 4hrs / 155°C*dry then completely immersed for 5±0.5 sec in solder bath at 235±5°C.<br>* Condition B<br>Un-mounted chips steam 8 hrs then completely immersed for 10±1sec in solder bath at 215+5/-0°C.<br>* Condition C<br>Un-mounted chips steam 8 hrs then completely immersed for 10±1 sec. in solder bath at 260+0/-5°C. | All terminations shall exhibit a continuous solder coating free from defects from a minimum of 95% of the critical surface area of any individual termination. |


Copyright © by Walsin Technology Corporation. | All rights reserved.

| No. | AEC-Q200 Test Item | AEC-Q200 Test Condition | Requirements |
|---|---|---|---|
| 17. | **Electrical Characterization** | * Capacitance<br>* Q/ D.F. (Dissipation Factor)<br>Class I: (NP0)<br>Cap≤1000pF 1.0±0.2Vrms, 1MHz±10%<br>Cap>1000pF 1.0±0.2Vrms, 1KHz±10%<br>Class II: (X7R)<br>Cap ≤10μF, 1.0±0.2Vrms，1KHz±10%<br>Cap＞10μF, 0.5±0.2Vrms，120Hz±20% | * Capacitance within the specified tolerance.<br>* Q/D.F. value:<br>NPO: Cap≥30pF, Q≥1000 ; Cap<30pF, Q≥400+20C.<br>X7R: |

| Rated vol. | D.F.≦ | Exception of D.F. ≦ | |
|---|---|---|---|
| ≧100V | ≦2.5% | ≦3% | 1206≧0.47μF |
| | | ≦5% | 0603≧0.068μF;0805＞0.1μF;1206≧1μF;1210≧2.2μF |
| | | ≦10% | 0805＞0.22μF;1210≧3.3μF |
| 50V | ≦2.5% | ≦3% | 0201(50V);0603≧0.047μF; 0805≧0.18μF;1206≧0.47μF |
| | | ≦5% | 0201≧0.01uF;1210≧3.3μF |
| | | ≦10% | 0402≧0.012μF;0603>0.1μF; 0805>0.47μF;<br>1206≧2.2μF;1210≧10μF |
| 35V | ≦3.5% | ≦10% | 0603≧1μF;0805≥2.2μF;1206≧2.2μF;1210≧10μF |
| 25V | ≦3.5% | ≦5% | 0201≧0.01μF;0805≧1μF;1210≧10μF |
| | | ≦7% | 0603≧0.33μF |
| | | ≦10% | 0201≧0.1μF;0402≧0.056μF;0603≧0.47μF;<br>0805≧2.2μF;1206≧4.7μF; 1210≧22μF |
| | | ≦12.5% | 0402≧0.47μF |
| 16V | ≦3.5% | ≦5% | 0201≧0.01μF;0402≧0.033μF;0603≧0.15μF;<br>0805≧0.68μF;1206≧2.2μF;1210≧4.7μF |
| | | ≦10% | 0201≧0.022μF; 0402≧0.22uF;0603>0.47μF;<br>0805≧2.2μF;1206≧4.7μF;1210≧22μF |
| 10V | ≦5% | ≦10% | 0201≧0.012μF;0402≧0.22μF;0603≧0.33μF;<br>0805≧2.2μF;1206≧2.2μF;1210≧22μF |
| | | ≦15% | 0201≧0.1μF; 0402≧1μF |
| 6.3V | ≦10% | ≦15% | 0201≧0.1μF;0402≧1μF;0603≧10μF;<br>0805≧4.7μF;1206≧47μF;1210≧100μF |
| | | ≦20% | 0402≧2.2μF |
| 4V | ≦15% | --- | --- |

| | |
|---|---|
| * Insulation Resistance<br>To apply rated voltage(500V max.) for max. 120 sec. | * IR. ≥10GΩ or RxC≥500Ω-F whichever is smaller.<br>Class II (X7R) |

| Rated voltage | Insulation Resistance |
|---|---|
| 100V: All X7R | 10GΩ or RxC≥100 Ω-F whichever is smaller. |
| 50V: 0402>0.01μF;0603≥1μF;0805≥1μF;1206≥4.7μF;1210≥4.7μF | |
| 35V: 0805≥2.2μF;1206≥2.2μF;1210≥10μF | |
| 25V: 0402≥1μF;0603≥2.2μF;0805≥2.2μF;1206≥10μF;1210≥10μF | |
| 16V: 0201≥0.1μF,0402≥0.22μF;0603≥1μF;<br>0805≥2.2μF;1206≥10μF;1210≥47μF | |
| 10V: 0201≥47nF;0402≥0.47μF;0603≥0.47μF;0805≥2.2μF;<br>1206≥4.7μF;1210≥47μF | |
| 6.3V; 4V; Size≥1812 | |

| Rated voltage | Insulation Resistance |
|---|---|
| 100V: 1210≥3.3μF | RxC≥50 Ω-F. |
| 50V: 0402≥0.1μF;0603≥2.2μF;0805≥10μF;1206≥10μF | |
| 35V: 0603≥1μF; | |
| 25V: 0201≥0.1μF;0402≥2.2μF;0603≥10μF;0805≥10μF;1206≥22μF | |
| 16V: 0603≥10μF;0402≥1μF;0201≥0.22μF | |
| 10V: 0201>0.1μF;0402≥1μF;0603≥10μF;0805≥47μF | |
| 6.3V: 0201≥0.1μF;0402≥1μF;0603>4.7μF;0805≥47μF;1206≥10μF | |
| 4V: 0603≥22μF;0805≥47μF;1206≥100μF | |

| | |
|---|---|
| * Dielectric Strength<br>To apply voltage:<br>≦100 ≥2.5 times VDC<br>200V~300V ≥2 times VDC<br>400V~450V ≥1.2 times VDC<br>500V~999V ≥1.5 times VDC<br>1000V~3000V ≥1.2 times VDC<br>, duration 1~5 sec,<br>charge and discharge current less than 50mA. | * Dielectric strength<br>No evidence of damage or flash over during test. |
| * Temperature Coefficient (with no electrical load)<br>Operation temperature: -55~125℃ at 25℃ | * Temperature Coefficient<br>Capacitance Change: NPO: Within ±30ppm/℃<br>X7R: Within ±15% |


Copyright © by Walsin Technology Corporation. | All rights reserved.

| No. | AEC-Q200 Test Item | AEC-Q200 Test Condition | Requirements |
|---|---|---|---|
| 18. | **Board Flex**<br>AEC-Q200-005 | * The middle part of substrate shall be pressurized by means of the pressurizing rod at a rate of about 1 mm per second until the deflection becomes 3mm (2mm for X7R) and then the pressure shall be maintained for 60±1 sec.<br>* Measurement to be made after keeping at room temp. for 24±2 hrs. | * No remarkable damage.<br>* Cap change： NPO: within ±5% or 0.5pF whichever is larger<br>X7R: within ±12.5%<br>(This capacitance change means the change of capacitance under specified flexure of substrate from the capacitance measured before the test.) |
| 19. | **Terminal Strength**<br>AEC-Q200-006 | * Pressurizing force：2N (0201 & 0402), 10N(0603), 18N(≥0805).<br>* Test time: 60±1 sec. | * No remarkable damage or removal of the terminations.<br>* Capacitance within the specified tolerance.<br>* Q/D.F. value:<br>NPO: Cap≥30pF, Q≥1000 ; Cap<30pF, Q≥400+20C.<br>X7R: |

| Rated vol. | D.F.≦ | Exception of D.F. ≦ | |
|---|---|---|---|
| ≧100V | ≦2.5% | ≦3% | 1206≧0.47μF |
| | | ≦5% | 0603≧0.068μF;0805＞0.1μF;1206≧1μF;1210≧2.2μF |
| | | ≦10% | 0805＞0.22μF;1210≧3.3μF |
| 50V | ≦2.5% | ≦3% | 0201(50V);0603≧0.047μF; 0805≧0.18μF;1206≧0.47μF |
| | | ≦5% | 0201≧0.01uF;1210≧3.3μF |
| | | ≦10% | 0402≧0.012μF;0603>0.1μF; 0805>0.47μF;<br>1206≧2.2μF;1210≧10μF |
| 35V | ≦3.5% | ≦10% | 0603≧1μF;0805≥2.2μF;1206≧2.2μF;1210≧10μF |
| 25V | ≦3.5% | ≦5% | 0201≧0.01μF;0805≧1μF;1210≧10μF |
| | | ≦7% | 0603≧0.33μF |
| | | ≦10% | 0201≧0.1μF;0402≧0.056μF;0603≧0.47μF;<br>0805≧2.2μF;1206≧4.7μF; 1210≧22μF |
| | | ≦12.5% | 0402≧0.47μF |
| 16V | ≦3.5% | ≦5% | 0201≧0.01μF;0402≧0.033μF;0603≧0.15μF;<br>0805≧0.68μF;1206≧2.2μF;1210≧4.7μF |
| | | ≦10% | 0201≧0.022μF; 0402≧0.22uF;0603>0.47μF;<br>0805≧2.2μF;1206≧4.7μF;1210≧22μF |
| 10V | ≦5% | ≦10% | 0201≧0.012μF;0402≧0.22μF;0603≧0.33μF;<br>0805≧2.2μF;1206≧2.2μF;1210≧22μF |
| | | ≦15% | 0201≧0.1μF; 0402≧1μF |
| 6.3V | ≦10% | ≦15% | 0201≧0.1μF;0402≧1μF;0603≧10μF;<br>0805≧4.7μF;1206≧47μF;1210≧100μF |
| | | ≦20% | 0402≧2.2μF |
| 4V | ≦15% | --- | --- |

| | | | |
|---|---|---|---|
| 20 | **Beam Load Test**<br>AEC-Q200-003 | * Break strength test<br>* Beam speed: 2.5±0.25 mm/sec | The chip endure following force<br>* Chip length ≤2.5mm: Thickness >0.5mm (20N), ≤0.5mm (8N)<br>* Chip length ≥3.2mm: Thickness ≥1.25mm (54.5N), <1.25mm (15N) |


Copyright © by Walsin Technology Corporation. | All rights reserved.

# APPENDIXES

## ◙ Tape & reel dimensions

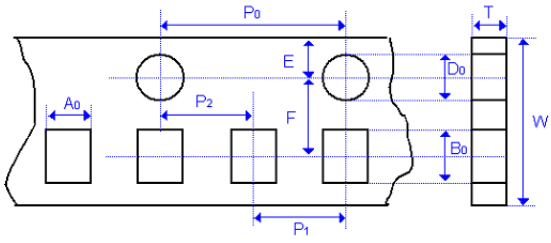



Fig. 2 The dimension of paper tape

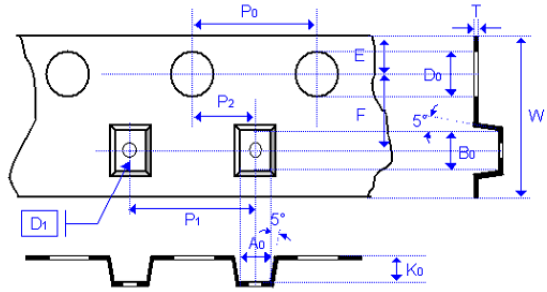



Fig. 3 The dimension of plastic tape

| Size | 0201 | 0402 | 0603 | 0805 | | | 1206 | | | 1210 | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Thickness | L | N,E | S,H,X | A,H | B,T | D,I | B,T | C,J,D | G,P | T | C,D,G,K | M |
| $A_0$ | 0.40 +/-0.10 | 0.70 +/-0.20 | 1.05 +/-0.30 | 1.50 +/-0.20 | 1.50 +/-0.20 | < 1.80 | 1.90 +/-0.50 | < 2.00 | <2.30 | < 3.05 | < 3.05 | < 3.20 |
| $B_0$ | 0.70 +/-0.10 | 1.20 +/-0.20 | 1.80 +/-0.30 | 2.30 +/-0.20 | 2.30 +/-0.20 | < 2.70 | 3.50 +/-0.50 | < 3.70 | < 4.00 | < 3.80 | < 3.80 | <4.00 |
| T | ≦0.55 | ≦0.80 | ≦1.20 | ≦1.15 | ≦1.20 | 0.23 +/-0.1 | ≦1.20 | 0.23 +/-0.1 | 0.23 +/-0.1 | 0.23 +/-0.1 | 0.23 +/-0.1 | 0.23 +/-0.1 |
| $K_0$ | - | - | - | - | - | < 2.50 | - | < 2.50 | < 2.50 | < 1.50 | < 2.50 | < 3.20 |
| W | 8.00 +/-0.30 | 8.00 +/-0.30 | 8.00 +/-0.30 | 8.00 +/-0.30 | 8.00 +/-0.30 | 8.00 +/-0.30 | 8.00 +/-0.30 | 8.00 +/-0.30 | 8.00 +/-0.30 | 8.00 +/-0.30 | 8.00 +/-0.30 | 8.00 +/-0.30 |
| $P_0$ | 4.00 +/-0.10 | 4.00 +/-0.10 | 4.00 +/-0.10 | 4.00 +/-0.10 | 4.00 +/-0.10 | 4.00 +/-0.10 | 4.00 +/-0.10 | 4.00 +/-0.10 | 4.00 +/-0.10 | 4.00 +/-0.10 | 4.00 +/-0.10 | 4.00 +/-0.10 |
| $10xP_0$ | 40.00 +/-0.10 | 40.00 +/-0.10 | 40.00 +/-0.20 | 40.00 +/-0.20 | 40.00 +/-0.20 | 40.00 +/-0.20 | 40.00 +/-0.20 | 40.00 +/-0.20 | 40.00 +/-0.20 | 40.00 +/-0.20 | 40.00 +/-0.20 | 40.00 +/-0.20 |
| $P_1$ | 2.00 +/-0.05 | 2.00 +/-0.05 | 4.00 +/-0.10 | 4.00 +/-0.10 | 4.00 +/-0.10 | 4.00 +/-0.10 | 4.00 +/-0.10 | 4.00 +/-0.10 | 4.00 +/-0.10 | 4.00 +/-0.10 | 4.00 +/-0.10 | 4.00 +/-0.10 |
| $P_2$ | 2.00 +/-0.05 | 2.00 +/-0.05 | 2.00 +/-0.05 | 2.00 +/-0.05 | 2.00 +/-0.05 | 2.00 +/-0.05 | 2.00 +/-0.05 | 2.00 +/-0.05 | 2.00 +/-0.05 | 2.00 +/-0.05 | 2.00 +/-0.05 | 2.00 +/-0.05 |
| $D_0$ | 1.50 +0.1/-0 | 1.50 +0.1/-0 | 1.50 +0.1/-0 | 1.50 +0.1/-0 | 1.50 +0.1/-0 | 1.50 +0.1/-0 | 1.50 +0.1/-0 | 1.50 +0.1/-0 | 1.50 +0.1/-0 | 1.50 +0.1/-0 | 1.50 +0.1/-0 | 1.50 +0.1/-0 |
| $D_1$ | - | - | - | - | - | 1.00 +/-0.10 | - | 1.00 +/-0.10 | 1.00 +/-0.10 | 1.00 +/-0.10 | 1.00 +/-0.10 | 1.00 +/-0.10 |
| E | 1.75 +/-0.10 | 1.75 +/-0.10 | 1.75 +/-0.10 | 1.75 +/-0.10 | 1.75 +/-0.10 | 1.75 +/-0.10 | 1.75 +/-0.10 | 1.75 +/-0.10 | 1.75 +/-0.10 | 1.75 +/-0.10 | 1.75 +/-0.10 | 1.75 +/-0.10 |
| F | 3.50 +/-0.05 | 3.50 +/-0.05 | 3.50 +/-0.05 | 3.50 +/-0.05 | 3.50 +/-0.05 | 3.50 +/-0.05 | 3.50 +/-0.05 | 3.50 +/-0.05 | 3.50 +/-0.05 | 3.50 +/-0.05 | 3.50 +/-0.05 | 3.50 +/-0.05 |

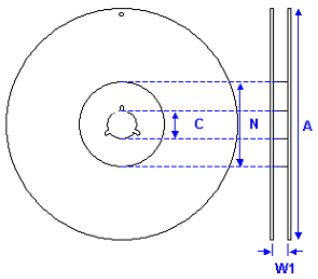
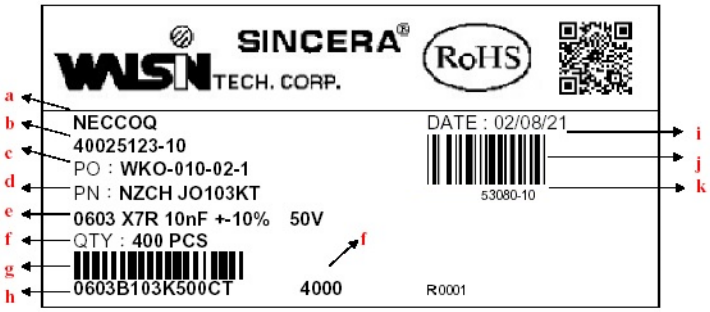



Fig. 4 The dimension of reel

| Size | 0201, 0402, 0603, 0805, 1206, 1210 | | |
|---|---|---|---|
| Reel size | 7” | 10” | 13” |
| C | 13.0±0.5 | 13.0±0.5 | 13.0±0.5 |
| $W_1$ | 10.0±1.5 | 10.0±1.5 | 10.0±1.5 |
| A | 178.0±2.0 | 250.0±2.0 | 330.0±2.0 |
| N | 60.0+1.0/-0 | 50 min | 50 min |


Copyright © by Walsin Technology Corporation. | All rights reserved.

## ◙ Example of customer label




*Customized label is available upon request

a. Customer name
b. WTC order series and item number
c. Customer P/O
d. Customer P/N
e. Description of product
f. Quantity
g. Bar code including quantity & WTC P/N or customer
h. WTC P/N
i. Shipping date
j. Order bar code including series and item numbers
k. Serial number of label

## ◙ Constructions

| No. | Name | | NP0, | X7R |
|---|---|---|---|---|
| ① | Ceramic material | | $CaZrO_3$ based | $BaTiO_3$ based |
| ② | Inner electrode | | Ni | |
| ③ | Termination | Inner layer | Cu | |
| ④ | | Middle layer | Ni | |
| ⑤ | | Outer layer | Sn (Matt) | |

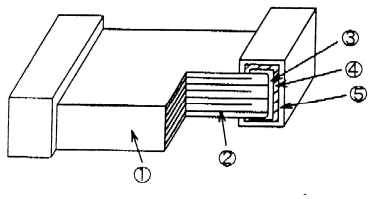



Fig. 5 The construction of MLCC

華新科技股份有限公司 PSA PASSIVE SYSTEM ALLIANCE Walsin Technology Corporation COPYRIGHT © WALSIN TECHNOLOGY CORPORATION. ALL RIGHTS RESERVED.

## ◙ Storage and handling conditions

(1) To store products at 5 to 40°C ambient temperature and 20 to 70%. related humidity conditions; MSL Level 1.
(2) The product is recommended to be used within one year after shipment. Check solderability in case of shelf life extension is needed.

Cautions:

a. The corrosive gas reacts on the terminal electrodes of capacitors, and results in the poor solderability. Do not store the capacitors in the ambience of corrosive gas (e.g., hydrogen sulfide, sulfur dioxide, chlorine, ammonia gas etc.)
b. In corrosive atmosphere, solderability might be degraded, and silver migration might occur to cause low reliability.
c. Due to the dewing by rapid humidity change, or the photochemical change of the terminal electrode by direct sunlight,the solderability and electrical performance may deteriorate. Do not store capacitors under direct sunlight or dewing condition. To store products on the shelf and avoid exposure to moisture.


Copyright © by Walsin Technology Corporation. | All rights reserved.

## ◙ Recommended soldering conditions

The lead-free termination MLCCs are not only to be used on SMT against lead-free solder paste, but also suitable against lead-containing solder paste. If the optimized solder joint is requested, increasing soldering time, temperature and concentration of $N_2$ within oven are recommended.

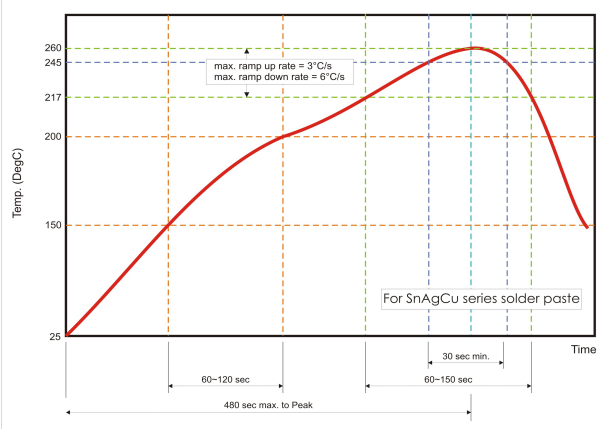



Fig. 5 Recommended reflow soldering profile for SMT process with SnAgCu series solder paste.

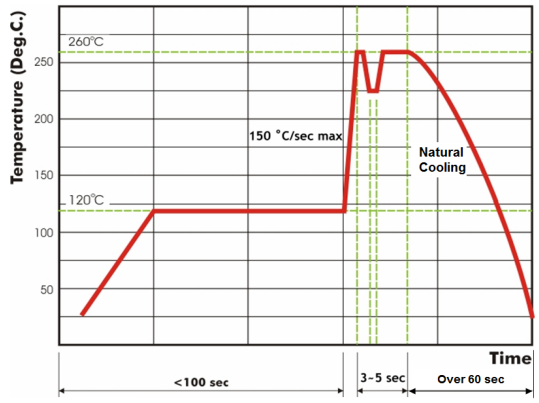



Fig. 6 Recommended wave soldering profile for SMT process with SnAgCu series solder.

著作權所有 華新科技股份有限公司 PSA PASSIVE SYSTEM ALLIANCE Walsin Technology Corporation COPYRIGHT © WALSIN TECHNOLOGY CORPORATION. ALL RIGHTS RESERVED.



Copyright © by Walsin Technology Corporation. | All rights reserved.