Innovative Service Around the Globe YAGEO

PRODUCT CHANGE NOTIFICATION

Ref Nr: EBR-0176-21002YCC
Date: Jun. 28th, 2021

TO: All Customers **FROM:** Global Marketing MLCC

HEREWITH YOU ARE INFORMED OF OUR INTENTION TO CHANGE THE FOLLOWING PRODUCTS.

DESCRIPTION:

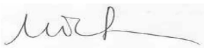
To effectively and flexibly utilize the total capacity, YAGEO adds Suzhou production site and material system for the following product ranges. The affected part numbers are shown as in below:

a. 0201/X5R/4V to 10V/100nF
b. 0402/X5R/4V to 10V/1uF

Yageo part number	Description
CC0201KRX5R4BB104.	X5R, 0201, 4V ,100nF, +-10%
CC0201MRX5R4BB104.	X5R, 0201, 4V ,100nF, +-20%
CC0201KRX5R5BB104.	X5R, 0201, 6.3V ,100nF, +-10%
CC0201MRX5R5BB104.	X5R, 0201, 6.3V ,100nF, +-20%
CC0201KRX5R6BB104.	X5R, 0201, 10V ,100nF, +-10%
CC0201MRX5R6BB104.	X5R, 0201, 10V ,100nF, +-20%
CC0402KRX5R4BB105	X5R, 0402, 4V ,1uF, +-10%
CC0402MRX5R4BB105	X5R, 0402, 4V ,1uF, +-20%
CC0402KRX5R5BB105	X5R, 0402, 6.3V ,1uF, +-10%
CC0402MRX5R5BB105	X5R, 0402, 6.3V ,1uF, +-20%
CC0402KRX5R6BB105	X5R, 0402, 10V ,1uF, +-10%
CC0402MRX5R6BB105	X5R, 0402, 10V ,1uF, +-20%

REASONS:

1. To effectively and flexibly utilize the total capacity.

EXPECTED INFLUENCE ON PERFORMANCE:	Not applicable			
EXPECTED INFLUENCE ON QUALITY AND RELIABILITY:	Not applicable			
CHANGE:			**WITHDRAWAL:**	Not applicable
Quality REPORTS available:	Not applicable			
SAMPLES available:	Not applicable.			
PRODUCTION start:	Not applicable			
Type identification after change:	Not applicable			
SUGGESTION FOR ALTERNATIVE PRODUCTS:	Not applicable			
Quality Director:	***N.J Chen***	**Product Manager:**	***Dennis Hung***	**Sales Manager:**
Signature:		**Signature:**		**Signature:**
Date:	***2021-6-28***	**Date:**	***2021-6-28***	**Date:**
FOR MORE INFORMATION, CONTACT:	Rina.Chuang@yageo.com			
RETURN YOUR COMMENTS BEFORE:	Sep.28th, 2021			
Remarks:	If no comments are made by Sep 28th, 2021, this PCN will be considered accepted with no objection.			
Comments:				

Date:

Function:

Signature:

Reliability Test Report

Product: X5R/0402/1uF/10V

Prepared by: Aria Yu

Aria Yu –QA Engineer / MLCC BU

Approved by: James Wu

James Wu – QA Manager/MLCC BU

1. Purpose

This report shows reliability data of X5R/0402/1uF/10V products, the test items follow international specification IEC60384.

2. Test Sample

	Type	Size	Cap.	Tolerance	Ur
Batch1	X5R	0402	1uF	±10%	10V

3. Conclusion & Summery

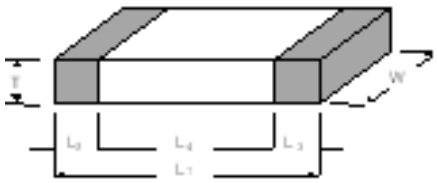
Test item		Test Condition	Batch 1
4.1	Dimension	L1/W/T/L2/L3	0/10
4.2	Voltage proof	2.5Ur for 5 sec	0/10
4.3	Solderability	245℃(Free Lead) ,3S	0/50
4.4	T.C.	-55℃ ~85℃	0/5
4.5	Adhesion	(Size=0402) ：2.5N	0/10
4.6	Bending	Bending 1mm	0/10
4.7	Resistance to soldering heat	260℃ for 10 sec	0/50
4.8	Rapid change of Temperature	-55℃/30min ~ 85℃/30min 5cycle	0/60
4.9	Endurance	85℃ ， Apply 1.5Ur	0/60
4.10	Damp heat with load	40℃/90~95%R.H., Apply Ur	0/60

4. Level measurement

4.1 Dimension

Test item: Dimension

MLCC Single Chip



Size	L	W	T	L2	L3
X5R	0.95~1.05	0.45~0.55	0.45~0.55	0.15~0.35	0.15~0.35

Results: All can meet the requirement.

ITEM		L1 (mm)	W (mm)	T (mm)	L2 (mm)	L3 (mm)
Batch1	Min.	0.999	0.529	0.483	0.234	0.261
	Max	1.018	0.541	0.498	0.285	0.293
	Avg.	1.011	0.535	0.490	0.269	0.286
	Std.	0.004	0.002	0.003	0.013	0.012

4.2 Voltage proof

Test condition: Applied 2.5Ur for 1~5 sec.

Requirement: No breakdown or flashover

Result: All can meet the requirement.

4.3 Solderability

Condition: Unmounted chips completely immersed for 3 ± 0.3 sec in a solder bath at 245± 5°C

Requirement: Good tinning (≥95% covered); no visual damage

Result: All can meet the requirement.

4.4 Temperature coefficient

Test condition: At and ref. Temperature is 23°C

Sample size: 5pcs/lot

Requirement: ΔC/C: X5R: ±15%

Results: All can meet the requirement.

ITEM		RESULT			
		MIN.	MAX.	AVG	Std.
Batch1	Low	0.051%	1.397%	0.711%	0.620%
	High	-14.791%	-13.560%	-13.942%	0.496%

4.5 Adhesion

Test condition: A force aplied for 10 seconds to the line joining the terminations and in a plane parallel to the substrate;.

Sample size: 10 pcs

Requirement: 0402: ≧2.5N (≧0.255kg)

Results: All can meet the requirement

4.6 Bending

Condition: Bending at 1mm/s Depth 1.0mm

Sample size: 10pcs/lot

Requirement: At 1mm, X5R: ΔC/C within ±10 %, no visual damage:

Results: All can meet the requirement.

ITEM		RESULT			
		MIN.	MAX.	AVG	Std.
Batch1	ΔC/C%	-0.248%	-0.013%	-0.115%	0.082%

4.7 Resistance to soldering heat

Test condition: Temperature of solder bath: ,260°C for X5R

Immersion time: 10±0.5s

Sample size: 50pcs/lot

Requirements:

Item	ΔC/C (%)	D.F. (%)	IR
X5R	±10	≦10	≧0.1 (GΩ)

Result: All can meet the requirement

ITEM		RESULT			
		MIN.	MAX.	AVG	Std.
Batch1	ΔC/C%	-0.264%	0.573%	0.108%	0.192%
	DF	5.654%	6.809%	6.425%	0.276%
	IR (Re/S.S)	0/50			

4.8 Rapid change of temperature

Test condition: -55 °C/85°C, 5 cycles

30 minutes at Lower category temperature; 30 minutes at Upper category temperature

Sample size: 60pcs/lot

Requirement:

Item	ΔC/C (%)	D.F. (%)	IR
X5R	±15	≦10	≧0.1 (GΩ)

Result: All can meet the requirement

ITEM		RESULT			
		MIN.	MAX.	AVG	Std.
Batch1	ΔC/C%	-3.264%	-1.547%	-2.221%	0.311%
	DF	5.479%	6.884%	6.106%	0.169%
	IR (Re/S.S)	0/60			

4.9 Endurance

Test condition: Applied 1.5Ur at 85±2°C for 1000±12hrs.

Sample size: 60pcs/lot

Requirement:

Item	ΔC/C (%)	D.F. (%)	IR
X5R	±20	≦20	≧0.01(GΩ)

Results: All can meet the requirement.

ITEM		RESULT			
		MIN.	MAX.	AVG	Std.
Batch1	ΔC/C%	-19.979%	-13.052%	-16.116%	1.481%
	DF	5.548%	6.428%	6.151%	0.211%
	IR (Re/S.S)	0/60			

4.10 Damp heat with load

Test condition: Applied Ur at 40±2°C/RH 90%~95% for 500±12hrs.

Sample size: 60pcs/lot

Requirement:

Item	ΔC/C (%)	D.F. (%)	IR
X5R	±20	≦20	≧0.005(GΩ)

Results: All can meet the requirement.

ITEM		RESULT			
		MIN.	MAX.	AVG	Std.
Batch1	ΔC/C%	-16.736%	-9.493%	-12.027%	1.539%
	DF	5.877%	7.176%	6.518%	0.239%
	IR (Re/S.S)	0/60			

Reliability Test Report

Product: X5R/0201/100nF/10V

Prepared by: Aria Yu

Aria Yu –QA Engineer / MLCC BU

Approved by: James Wu

James Wu – QA Manager/MLCC BU

1. Purpose

This report shows reliability data of X5R/0201/100nF/10V products, the test items follow international specification IEC60384.

2. Test Sample

	Type	Size	Cap.	Tolerance	Ur
Batch1	X5R	0201	100nF	±10%	10V

3. Conclusion & Summery

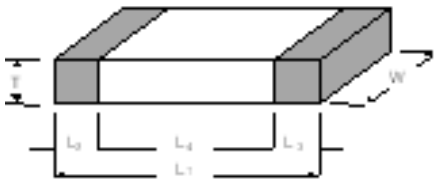
Test item		Test Condition	Batch 1
4.1	Dimension	L1/W/T/L2/L3	0/10
4.2	Voltage proof	2.5Ur for 5 sec	0/10
4.3	Solderability	245℃(Free Lead) ,3S	0/50
4.4	T.C.	-55℃ ~85℃	0/5
4.5	Adhesion	(Size=0201) ：1N	0/10
4.6	Bending	Bending 1mm	0/10
4.7	Resistance to soldering heat	260℃ for 10 sec	0/50
4.8	Rapid change of Temperature	-55℃/30min ~ 85℃/30min 5cycle	0/60
4.9	Endurance	85℃ Apply 1.5*Ur	0/60
4.10	Damp heat with load	40℃/90~95%R.H., Apply Ur	0/60

4. Level measurement

4.1 Dimension

Test item: Dimension

MLCC Single Chip



Size	L	W	T	L2	L3
X7R	0.57~0.63	0.27~0.33	0.27~0.33	0.10~0.20	0.10~0.20

Results: All can meet the requirement.

ITEM		L1 (mm)	W (mm)	T (mm)	L2 (mm)	L3 (mm)
Batch1	Min.	0.589	0.294	0.288	0.114	0.128
	Max	0.601	0.298	0.297	0.143	0.146
	Avg.	0.594	0.296	0.293	0.123	0.132
	Std.	0.003	0.002	0.002	0.010	0.005

4.2 Voltage proof

Test condition: Applied 2.5Ur for 1~5 sec.

Requirement: No breakdown or flashover

Result: All can meet the requirement.

4.3 Solderability

Condition: Unmounted chips completely immersed for 3 ± 0.3 sec in a solder bath at 245± 5°C

Requirement: Good tinning (≥95% covered); no visual damage

Result: All can meet the requirement.

4.4 Temperature coefficient

Test condition: At and ref. Temperature is 23°C

Sample size: 5pcs/lot

Requirement: ΔC/C: X5R: ±15%

Results: All can meet the requirement.

ITEM		RESULT			
		MIN.	MAX.	AVG	Std.
Batch1	Low	1.434%	2.887%	1.987%	0.593%
	High	-14.503%	-13.167%	-13.590%	0.548%

4.5 Adhesion

Test condition: A force aplied for 10 seconds to the line joining the terminations and in a plane parallel to the substrate;.

Sample size: 10 pcs

Requirement: 0201: ≧1N (≧0.102kg)

Results: All can meet the requirement

4.6 Bending

Condition: Bending at 1mm/s Depth 1.0mm

Sample size: 10pcs/lot

Requirement: At 1mm, X5R: ΔC/C within ±10 %, no visual damage:

Results: All can meet the requirement.

ITEM		RESULT			
		MIN.	MAX.	AVG	Std.
Batch1	ΔC/C%	-1.050%	-0.007%	-0.450%	0.408%

4.7 Resistance to soldering heat

Test condition: Temperature of solder bath: ,260°C for X5R

Immersion time: 10±0.5s

Sample size: 50pcs/lot

Requirements:

Item	ΔC/C (%)	D.F. (%)	IR
X5R	±10	≦10	≧1 (GΩ)

Result: All can meet the requirement

ITEM		RESULT			
		MIN.	MAX.	AVG	Std.
Batch1	ΔC/C%	0.747%	3.012%	1.881%	0.548%
	DF	6.339%	7.139%	6.702%	0.188%
	IR (Re/S.S)	0/50			

4.8 Rapid change of temperature

Test condition: -55 °C/85°C, 5 cycles

30 minutes at Lower category temperature; 30 minutes at Upper category temperature

Sample size: 60pcs/lot

Requirement:

Item	ΔC/C (%)	D.F. (%)	IR
X5R	±15	≦10	≧1 (GΩ)

Result: All can meet the requirement

ITEM		RESULT			
		MIN.	MAX.	AVG	Std.
Batch1	ΔC/C%	-3.135%	-0.178%	-1.951%	0.408%
	DF	6.025%	6.770%	6.260%	0.153%
	IR (Re/S.S)	0/60			

4.9 Endurance

Test condition: Applied 1.5Ur at 85±2°C for 1000±12hrs.

Sample size: 60pcs/lot

Requirement:

Item	ΔC/C (%)	D.F. (%)	IR
X5R	±20	≦20	≧0.1(GΩ)

Results: All can meet the requirement.

ITEM		RESULT			
		MIN.	MAX.	AVG	Std.
Batch1	ΔC/C%	-16.498%	-13.105%	-14.939%	0.802%
	DF	5.910%	7.361%	6.947%	0.293%
	IR (Re/S.S)	0/60			

4.10 Damp heat with load

Test condition: Applied Ur at 40±2°C/RH 90%~95% for 500±12hrs.

Sample size: 60pcs/lot

Requirement:

Item	ΔC/C (%)	D.F. (%)	IR
X5R	±20	≦20	≧0.05(GΩ)

Results: All can meet the requirement.

ITEM		RESULT			
		MIN.	MAX.	AVG	Std.
Batch1	ΔC/C%	-14.215%	-11.565%	-12.727%	0.636%
	DF	6.038%	7.641%	7.228%	0.222%
	IR (Re/S.S)	0/60			