Innovative Service Around the Globe YAGEO

DATA SHEET

MULTILAYER CERAMIC CAPACITORS

CC Series

Y5V

10 V TO 50 V

YAGEO

Product Specification – June 24, 2005 V.9 Supersedes Date of Jan 14, 2005

SCOPE

This specification describes Yageo CC Y5V series chip capacitors.

ORDERING INFORMATION

Part number is identified by the series, size, tolerance, packing style, temperature coefficient, rated voltage and capacitance value.

CC xxxx x x **Y5V** x **BB** xxx
(1) (2) (3) (4) (5)

(1) SIZE – INCH BASED (METRIC)

0402 (1005)
0603 (1608)
0805 (2012)
1206 (3216)

(2) TOLERANCE

M = ±20%
Z = –20/+80%

(3) PACKING STYLE

R = 7" paper tape
K = 7" blister tape
P = 13" paper tape
F = 13" blister tape
C = Bulk case

(4) RATED VOLTAGE

6 = 10 V
7 = 16 V
8 = 25 V
9 = 50 V

(5) CAPACITANCE VALUE:

First two for significant figures and 3rd for number of zero
Letter "R" for decimal point

CONSTRUCTION

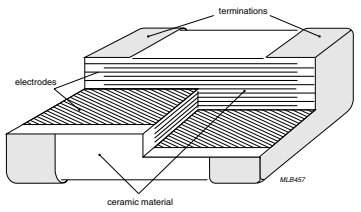

Fig. 1 Surface mounted multilayer ceramic capacitor construction

DIMENSION

For dimension see Table 1

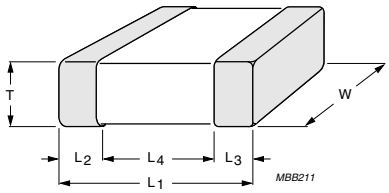

Fig. 2 Surface mounted multilayer ceramic capacitor dimension

Table 1

TYPE		0402	0603	0805	1206
L_1 (mm)		1.0 ±0.05	1.6 ±0.10	2.0 ±0.10	3.2 ±0.15
W (mm)		0.5 ±0.05	0.8 ±0.07	1.25 ±0.10	1.6 ±0.15
T (mm)	min.	0.45	0.73	0.50	0.50
	max.	0.55	0.87	1.35	1.35
L_2/L_3 (mm)	min.	0.15	0.20	0.25	0.25
	max.	0.30	0.60	0.75	0.75
L_4 (mm)	min.	0.40	0.40	0.55	1.40

CAPACITANCE RANGE & THICKNESS FOR 10V & 16V

Table 2

CAPACITANCE (nF)	10V 0603	0805	1206	16V 0402	0603	0805	1206
10				0.5 ±0.05			
22							
47							
100							
220					0.8 ±0.07		
470						0.85 ±0.1	
1,000	0.8 ±0.07	0.85 ±0.1					0.85 ±0.1
2,200							
4,700							1.15 ±0.1
10,000			1.15 ±0.1				

CAPACITANCE RANGE & THICKNESS FOR 25V & 50V

Table 3

CAPACITANCE (nF)	25V 0603	0805	1206	50V 0603	0805	1206
10	0.8 ±0.07			0.8 ±0.07	0.6 ±0.1	
22						
47						
100		0.6 ±0.1	0.6 ±0.1			0.6 ±0.1
220					0.85 ±0.1	
470		0.85 ±0.1	0.85 ±0.1			0.85 ±0.1
1,000			1.15 ±0.1			1.15 ±0.1

THICKNESS CLASSES AND PACKING QUANTITY

Table 4

THICKNESS CLASSIFICATION (mm)	8 mm TAPE WIDTH / AMOUNT PER REEL				AMOUNT PER BULK CASE		
	Ø180 mm, 7"		Ø330 mm, 13"				
	Paper	Blister	Paper	Blister	0402	0603	0805
0.5 ±0.05	10,000	---	50,000	---	50,000	---	---
0.6 ±0.10	4,000	---	20,000	---	---	---	10,000
0.8 ±0.07	4,000	---	15,000	---	---	15,000	---
0.85 ±0.10	4,000	---	15,000	---	---	---	8,000
1.15 ±0.10	---	3,000	---	10,000	---	---	---
1.25 ±0.10	---	3,000	---	10,000	---	---	5,000

ELECTRICAL CHARACTERISTICS

Table 5

CHARACTERISTICS	TEST CONDITIONS	REQUIREMENT
Operation temperature range	---	–30 °C to +85 °C
Temperature characteristic/coefficient (TC)	With respect to 25 °C within operation temperature range	+22% to –82%
Capacitance tolerance	1Vrms/1KHz at 25 °C	±20%, –20%~+80%
Dissipation factor (D.F.)	1Vrms/1KHz at 25 °C	See table 6
Insulation resistance (IR)	At U_r (rated voltage) for 1 minute	$R_{ins} \geq 10$ GΩ or $R_{ins} \times C \geq 100$ seconds whichever is less
Dielectric withstanding Voltage	At 2.5 x U_r for 5 seconds	No breakdown

Table 6 D.F. specification for 0402 to 1206 sizes

DISSIPATION FACTOR (D.F.)	RATED VOLTAGE (U_r)	CAPACITANCE VALUE OF SIZES 0402	0603	0805	1206
≤ 5%	25 V	---	< 100 nF	≤ 270 nF	< 1 µF
	50 V	---	< 100 nF	≤ 270 nF	< 1 µF
≤ 7%	25 V	---	≥ 100 nF	270 nF < Cap. Range < 470 nF	≥ 1 µF
	50 V	---	≥ 100 nF	> 270 nF	≥ 1 µF
≤ 9%	10 V	---	≤ 270 nF	≤ 1 µF	≤ 2.2µF
	16 V	---	≤ 270 nF	≤ 1 µF	≤ 2.2µF
	25 V	---	---	≥ 470 nF	---
≤ 12.5%	10 V	all	> 270 nF	> 1 µF	> 2.2µF
	16 V	all	> 270 nF	> 1 µF	> 2.2µF

TAPING REEL

Table 7

TAPE WIDE	8 mm	8 mm	12 mm
ØA (mm)	180	330	180
ØB (mm)	62±1.5	62±1.5	62±1.5
ØD (mm)	20.5	20.5	20.5
ØC (mm)	12.75±0.15/–0	12.75±0.15/–0	12.75±0.15/–0
W (mm)	8.4+1.5/–0	8.4+1.5/–0	12.4+2/–0
T_{max} (mm)	14.4	14.4	18.4

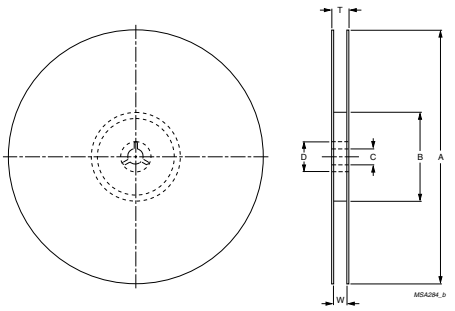

Fig. 3 Reel dimension

For dimension see Table 7

PAPER TAPE SPECIFICATION

Table 8

DIMENSION	0402	0603	0805	1206
A (mm)	0.62±0.05	1.10±0.05	1.65±0.05	2.0±0.1
B (mm)	1.12±0.05	1.90±0.05	2.4±0.05	3.5±0.1
W (mm)	8.0±0.2	8.0±0.2	8.0±0.2	8.0±0.2
E (mm)	1.75±0.1	1.75±0.1	1.75±0.1	1.75±0.1
F (mm)	3.5±0.05	3.5±0.05	3.5±0.05	3.5±0.05
P_0 (mm)	4±0.05	4±0.05	4±0.05	4±0.05
P_1 (mm)	2±0.05	4±0.1	4±0.1	4±0.1
P_2 (mm)	2±0.05	2±0.05	2±0.05	2±0.05
ØD_0 (mm)	1.5+0.1	1.5+0.1	1.5+0.1/–0	1.5+0.1/–0
T (mm)	0.6±0.05	0.95±0.05	0.95±0.05	0.95±0.05

For dimension see Table 8

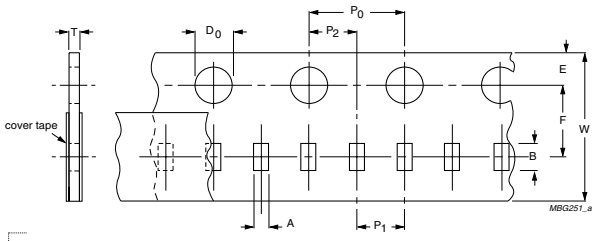

Fig. 4 Paper tape dimension

BLISTER TAPE SPECIFICATION

Table 9

DIMENSION	0805	1206	1210	1812
A (mm)	0.20	0.30	0.30	0.40
B (mm)	0.20	0.30	0.30	0.40
W (mm)	8.1±0.2	8.1±0.2	8.1±0.2	12.0±0.2
E (mm)	1.75±0.1	1.75±0.1	1.75±0.1	1.75±0.1
F (mm)	3.5±0.05	3.5±0.05	3.5±0.05	5.5±0.05
P_0 (mm)	4±0.1	4±0.1	4±0.1	4±0.1
P_1 (mm)	4±0.1	4±0.1	4±0.1	8±0.1
P_2 (mm)	2±0.05	2±0.05	2±0.05	2±0.05
ØD_0 (mm)	1.5+0.1/–0	1.5+0.1/–0	1.5+0.1/–0	1.5+0.1/–0
T_{max} (mm)	3.5	3.5	3.5	3.5

For dimension see Table 9

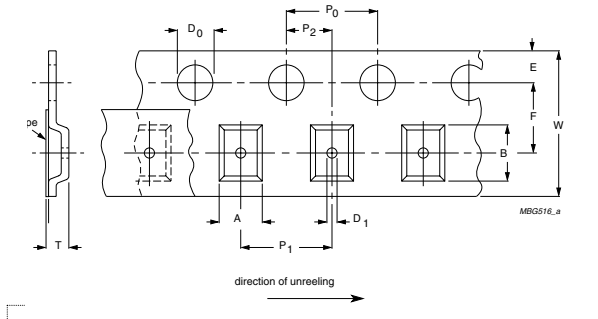

Fig. 5 Leader/trailer tape dimension

PACKING METHOD

LEADER/TRAILER TAPE SPECIFICATION

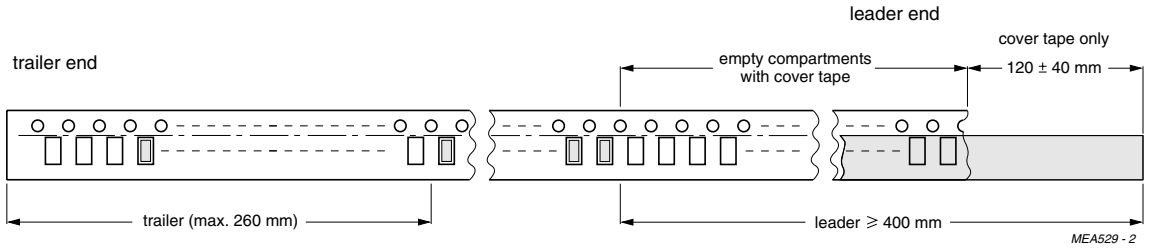

Fig. 6 Leader and trailer tape dimension

METHOD OF MOUNTING

For normal use the capacitors may be mounted on printed-circuit boards or ceramic substrates by applying wave soldering, reflow soldering (including vapor phase soldering) or conductive adhesive in accordance with CECC 00802 classification A.

Typical values (sold line)
Process limits (dotted lines)

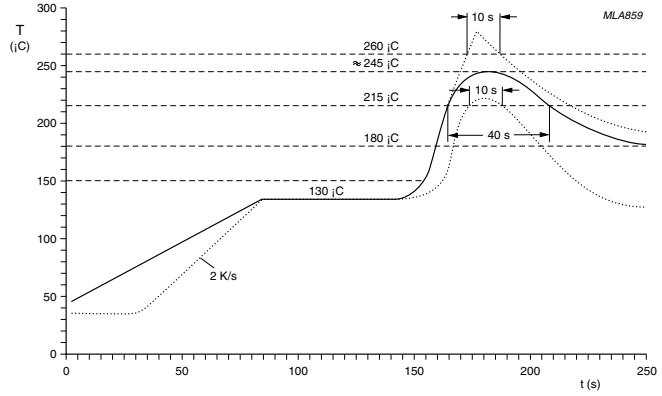

Fig. 7 Recommended reflow soldering profile

Typical values (sold line)
Process limits (dotted lines)
The capacitors may be soldered twice in accordance with this method if desired

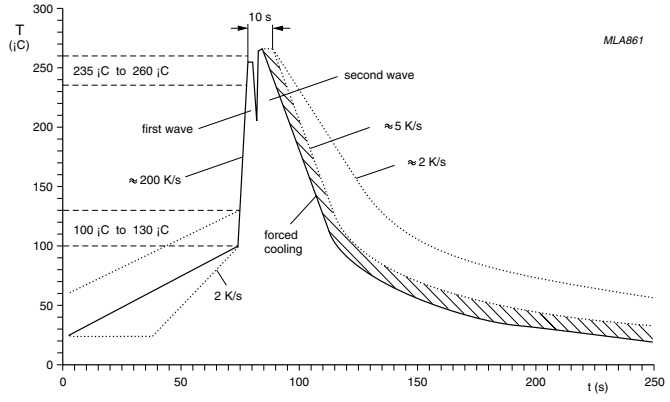

Fig. 8 Recommended wave soldering profile

TEST AND REQUIREMENT

Table 10

IEC384-10	TEST ITEMS	CONDITIONS	REQUIREMENTS
4.9	Bending	Bending rate 1 mm/s, jig. radius 340 mm	$\|\Delta C/C\| \leq 20\%$
4.10	Resistance to soldering heat	260±5 °C for 10±0.5 s in static solder bath	$-10\% \leq \|\Delta C/C\| \leq 20\%$
4.11	Solderability	235±5 °C for 2±0.5 s in a static solder bath	The termination shall be well tinned
4.12	Rapid change of temperature	Y5V: –30 °C to +85 °C, 5 cycles	$\|\Delta C/C\| \leq 20\%$
4.14	Damp heat	Preconditioning At 40 °C, 90 to 95% RH and U_r applied for 500 hours	$\|\Delta C/C\|$ within ±30% or –40% to +30% D.F. ≤ 7%, 12.5%, 15% (depending on capacitance value) IR ≥ 500 MΩ or R × C ≥ 25 s whichever is less
4.15	Endurance	Preconditioning 2 × U_r applied for 1,000 hours, at upper category temperature	D.F. ≤ 7%, 12.5%, 15% (depending on capacitance value) IR ≥ 1,000 MΩ or R × C ≥ 50 s whichever is less

REVISION HISTORY

REVISION	DATE	CHANGE NOTIFICATION	DESCRIPTION
Version 9	June 24, 2005	-	- Revised thickness of Y5V 1206 16 V 4.7 µF to 10µF
Version 8	Jan 14, 2005	-	- Revised thickness of Y5V 0805 16/25 V 1 µF
Version 7	Aug 16, 2004	-	- D.F. value added
Version 6	Mar 12, 2004	-	- Thickness and packing quantity amending
Version 5	Aug. 13, 2003	-	- Taping drawing amended