



# Aluminum Electrolytic Capacitors, Vishay BCcomponents

## INTRODUCTION

For unambiguous processing of customer orders, a component supplier defines a system of product codes to uniquely identify a component, including its packaging. Two systems can be used:

1. Cleartext type
2. Index type

### Cleartext Type

In this system the letters/digits in the product code are grouped. Each group has a predefined interpretation. This could be something like “positions number 6 and 7 describe product dimensions”. The accompanying table provides the reserved codes, e.g. “CF” for a radial product corresponds to dimensions 8.5 mm x 22 mm. The predefined interpretations give a direct link between the product code and the component’s parameters.

### Index Type

In this system the product code is the index or sequence number of a record in a database. This record contains all information describing and uniquely identifying the component. Therefore this system does not require a relation between the product code and the component’s parameters.

## VISHAY BCCOMPONENTS PRODUCT CODE

The Vishay BCcomponents Product Code, formerly known as 12NC, is an Index Type product code. Although this system allows to use random product codes, a systematic approach is used to generate the bulk of the code numbers. Unfortunately, the number of component variations is larger than the number of variations possible in this system. Therefore the interpretation described below covers about 80 % of the aluminum capacitor product codes found in the datasheets.

GROUP	PRODUCT CODE													
	1				2			3	4	5			6	
DIGIT	1	2	3	4	5	6	7	8	9	10	11	12	13	14
ORDER CODE	M	A	L	2	0	3	8	3	1	4	7	9	E	3
FORMER 12NC	2	2	2	2	0	3	8	3	1	4	7	9		

### Note

- The order code (MAL....) was introduced in 2007 to accommodate a change in the logistic system. To minimize errors when converting from the former 12NC to the new order code, or vice versa, only six conversion schemes are used:

ORDER CODE	FORMER 12NC	COMMENT
MAL2xxxxxyyyyE3	2222 xxx yyyyy	
MAL2xxxxxyyyy	2222 xxx yyyyy	For non lead (Pb)-free versions, e.g. 123 SAL-A
MAL2xxxxxyyyyE3	2281 xxx yyyyy	See explanation of Group 1
MAL2xxxxxyyyyE6	2222 xxx yyyyy	See explanation of Group 6
MAL5xxxxxyyyyE3	2215 xxx yyyyy	See explanation of Group 1
MAL8xxxxxyyyy	4322 xxx yyyyy	For accessories

### Group 1

This group consists of 4 digits, positions 1 to 4. It can have the following values:

ORDER CODE	FORMER 12NC	COMMENT
MAL2	2222	Most common. No special meaning
MAL2	2281	Lead (Pb)-free, RoHS compliant product. Only used for specific series.
MAL5	2215	Lead (Pb)-free, RoHS compliant product. Only used for specific series.
MAL8	4322	Accessories



### Group 2

This group consists of 3 digits, positions 5 to 7. This group identifies the series.

The digits are the same as those in the series name. In some cases a series name contains two groups of three digits. In that case the first group in the series name identifies components with rated voltage ≤ 100 V and the second group the components with rated voltage > 100 V.

#### Examples

038	Component from 038 RSU series
056	≤ 100 V rated component from 056/057 PSM-SI series
057	> 100 V rated component from 056/057 PSM-SI series

### Group 3

This group consists of 1 digit, position 8. This group describes packaging, termination type, case size and tolerance. Due to its many functions, there is no single interpretation.

#### Example, for radial products

3	Form TFA, taped, wide lead pitch, in ammopack
5	Form CA, bulk packaging, long leads
6	Form CB, bulk packaging, short leads
7	Form TNA, taped, narrow lead pitch, in ammopack

For a non-catalog component, a.k.a. "special", the digits for Group 3 and Group 4 are "90", as in e.g. MAL203890012E3

### Group 4

This group consists of 1 digit, position 9. This group describes the rated voltage. The interpretation of the digit is linked to the coding of Group 2.

#### ≤ 100 V

0	35 V	5	16 V
1	50 V	6	25 V
2	4.0 V/80 V	7	40 V
3	6.3 V	8	63 V
4	10 V	9	100 V

#### > 100 V

0	Reserved	5	350 V
1	160 V	6	400 V
2	200 V	7	450 V
3	250 V	8	385 V
4	420 V	9	500 V

For a non-catalog component, a.k.a. "special", the digits for Group 3 and Group 4 are "90", as in e.g. MAL203890012E3

### Group 5

This group consists of 3 digits, positions 10 to 12. This group reflects the capacitance value in µF. The first two digits represent the value, the third digit represents the multiplier, e.g. 479 means 47 x 1 = 47 µF.

#### Multiplier (position 12)

0	Not used	5	x 100 000
1	x 10	6	x 1 000 000
2	x 100	7	x 0.01
3	x 1000	8	x 0.1
4	x 10 000	9	x 1

For a non-catalogue component, a.k.a. "special", the digits for Group 5 are sequential numbers.

### Group 6

This group consists of 2 alphanumeric characters, positions 13 to 14. It enables to differentiate, between a lead (Pb)-free, RoHS compliant version and non lead (Pb)-free, non RoHS compliant version, when both could exist. It can have following values:

	Non lead (Pb)-free, non RoHS compliant product.
E3	Lead (Pb)-free, RoHS compliant product.
E6	Lead (Pb)-free, RoHS compliant product. Bismuth, Bi, containing solder finish.