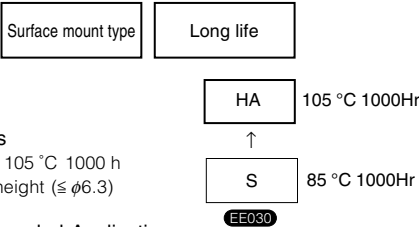


Surface Mount Type Aluminum Electrolytic Capacitors

Japan

Series: **HA**  
Type: **V**



■ Features

- Lifetime: 105 °C 1000 h
- 5.5 mm height (≦ ϕ6.3)

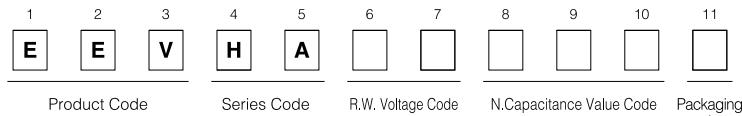
■ Recommended Applications

- AV (TV, Video, Audio), Personal Computer, Home appliance

■ Specifications

|                                    |                                                                                                                                                                  |      |      |                                    |      |      |      |      |      |                                  |
|------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------|------|------|------------------------------------|------|------|------|------|------|----------------------------------|
| Operating Temp. Range              | -40 to +105 °C                                                                                                                                                   |      |      |                                    |      |      |      |      |      |                                  |
| Rated W.V. Range                   | 6.3 to 100 V.DC                                                                                                                                                  |      |      |                                    |      |      |      |      |      |                                  |
| Nominal Cap. Range                 | 0.1 to 470 μF                                                                                                                                                    |      |      |                                    |      |      |      |      |      |                                  |
| Capacitance Tolerance              | ±20 % (120 Hz/+20 °C)                                                                                                                                            |      |      |                                    |      |      |      |      |      |                                  |
| DC Leakage Current                 | I ≤ 0.01 CV or 3 (μA) after 2 minutes ( Whichever, greater )                                                                                                     |      |      |                                    |      |      |      |      |      |                                  |
| Dissipation Factor                 | W.V. (V)                                                                                                                                                         | 6.3  | 10   | 16                                 | 25   | 35   | 50   | 63   | 100  | (120 Hz/+20 °C)<br>(max.)        |
|                                    | D.F. ϕ4~ϕ6.3                                                                                                                                                     | 0.30 | 0.22 | 0.16                               | 0.14 | 0.12 | 0.12 | —    | —    |                                  |
|                                    | ϕ8~ϕ10                                                                                                                                                           | 0.35 | 0.26 | 0.20                               | 0.16 | 0.14 | 0.12 | 0.18 | 0.18 |                                  |
| Characteristics at Low Temperature | W.V. (V)                                                                                                                                                         | 6.3  | 10   | 16                                 | 25   | 35   | 50   | 63   | 100  | ( Impedance ratio )<br>at 120 Hz |
|                                    | -25/+20 °C                                                                                                                                                       | 4    | 3    | 2                                  | 2    | 2    | 2    | 3    | 3    |                                  |
|                                    | -40/+20 °C                                                                                                                                                       | 8    | 6    | 4                                  | 4    | 3    | 3    | 4    | 4    |                                  |
| Endurance                          | After applying rated working voltage for 1000 hours at +105 °C and then being stabilized at +20 °C, capacitors shall meet the following limits                   |      |      |                                    |      |      |      |      |      |                                  |
|                                    | Capacitance change                                                                                                                                               |      |      | ±20 % of initial measured value    |      |      |      |      |      |                                  |
|                                    | D.F.                                                                                                                                                             |      |      | ≤ 200 % of initial specified value |      |      |      |      |      |                                  |
|                                    | DC leakage current                                                                                                                                               |      |      | ≤ Initial specified value          |      |      |      |      |      |                                  |
| Shelf Life                         | After storage for 1000 hours at +105 °C with no voltage applied and then being stabilized at +20 °C, capacitor shall meet the limits specified in “Endurance”.   |      |      |                                    |      |      |      |      |      |                                  |
|                                    | (With voltage treatment)                                                                                                                                         |      |      |                                    |      |      |      |      |      |                                  |
| Resistance to Soldering Heat       | After reflow soldering (Refer to page 20 for recommendable temperature profile.) and then being stabilized at +20 °C, capacitor shall meet the following limits. |      |      |                                    |      |      |      |      |      |                                  |
|                                    | Capacitance change                                                                                                                                               |      |      | ± 10 % of initial measured value   |      |      |      |      |      |                                  |
|                                    | D.F.                                                                                                                                                             |      |      | ≤ Initial specified value          |      |      |      |      |      |                                  |
|                                    | DC leakage current                                                                                                                                               |      |      | ≤ Initial specified value          |      |      |      |      |      |                                  |

### ■ Explanation of Part Numbers

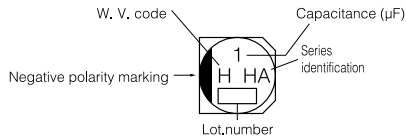


| Taped on reel |         |                           |  |
|---------------|---------|---------------------------|--|
| R             | W=12 mm | φ4, φ5 ( B,C )            |  |
| S             | W=12 mm | φ5 : P1 = 8 mm            |  |
| P             | W=16 mm | φ6.3, φ8x6.2 ( D,E )      |  |
| P             | W=24 mm | φ8x10.2, φ10x10.2 ( F,G ) |  |

P1 : Pitch dimension between capacitors on taping

### ■ Marking

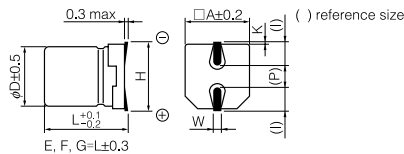
Example:  
50 V 1 μF (Polarized)



W.V. code

| V    | 4 | 6.3 | 10 | 16 | 25 | 35 | 50 | 63 | 100 |
|------|---|-----|----|----|----|----|----|----|-----|
| code | g | j   | A  | C  | E  | V  | H  | J  | 2A  |

### ■ Dimensions in mm (not to scale)



(mm)

|   | D    | L    | A    | H        | I   | W        | P   | K                                      |
|---|------|------|------|----------|-----|----------|-----|----------------------------------------|
| B | 4.0  | 5.4  | 4.3  | 5.5 MAX  | 1.8 | 0.65±0.1 | 1.0 | 0.35 <sup>+0.15</sup> <sub>-0.20</sub> |
| C | 5.0  | 5.4  | 5.3  | 6.5 MAX  | 2.2 | 0.65±0.1 | 1.5 | 0.35 <sup>+0.15</sup> <sub>-0.20</sub> |
| D | 6.3  | 5.4  | 6.6  | 7.8 MAX  | 2.6 | 0.65±0.1 | 1.8 | 0.35 <sup>+0.15</sup> <sub>-0.20</sub> |
| E | 8.0  | 6.2  | 8.3  | 9.5 MAX  | 3.4 | 0.65±0.1 | 2.2 | 0.35 <sup>+0.15</sup> <sub>-0.20</sub> |
| F | 8.0  | 10.2 | 8.3  | 10.0 MAX | 3.4 | 0.90±0.2 | 3.1 | 0.70±0.2                               |
| G | 10.0 | 10.2 | 10.3 | 12.0 MAX | 3.5 | 0.90±0.2 | 4.6 | 0.70±0.2                               |

### ■ Case size/Ripple current

#### ● Polarized

(mA) r.m.s. (120 Hz/+105 °C)

| Cap. (μF) \ W.V. (V) | 6.3 (0J) | 10 (1A) | 16 (1C) | 25 (1E) | 35 (1V) | 50 (1H) | 63 (1J) | 100 (2A) |
|----------------------|----------|---------|---------|---------|---------|---------|---------|----------|
| 0.1 (R10)            |          |         |         |         |         | B 1     |         |          |
| 0.22 (R22)           |          |         |         |         |         | B 2     |         |          |
| 0.33 (R33)           |          |         |         |         |         | B 3     |         |          |
| 0.47 (R47)           |          |         |         |         |         | B 5     |         |          |
| 1.0 (1R0)            |          |         |         |         |         | B 10    |         |          |
| 2.2 (2R2)            |          |         |         |         |         | B 16    |         |          |
| 3.3 (3R3)            |          |         |         |         |         | B 16    |         | E 30     |
| 4.7 (4R7)            |          |         |         | B 22    | B 22    | C 23    |         | F 50     |
| 10 (100)             |          |         | B 28    | C 28    | C 30    | D 35    | E 25    | F 55     |
| 22 (220)             | B 29     |         | C 39    | D 55    | D 60    | E 70    | F 30    | G 60     |
| 33 (330)             |          | C 43    |         | D 65    | E 84    | F 91    | G 45    | G 65     |
| 47 (470)             | C 46     |         | D 70    | E 91    | F 98    | G 100   | G 50    |          |
| 100 (101)            | D 71     | E 110   |         | F 130   | G 160   |         |         |          |
| 220 (221)            |          | F 160   | G 210   | G 190   |         |         |         |          |
| 330 (331)            | F 230    |         | G 230   |         |         |         |         |          |
| 470 (471)            |          | G 270   |         |         |         |         |         |          |

( ) shows W.V. and capacitance code.

■ Standard Products

| W.V.<br>(V) | Cap.<br>( $\pm 20\%$ )<br>( $\mu\text{F}$ ) | Case size    |                |              | Specification                        |      | Part No.    | Min. Packaging<br>Qty |
|-------------|---------------------------------------------|--------------|----------------|--------------|--------------------------------------|------|-------------|-----------------------|
|             |                                             | Dia.<br>(mm) | Length<br>(mm) | Size<br>Code | Ripple<br>current<br>(120Hz)<br>(mA) | D.F. |             | Taping<br>(pcs)       |
| 6.3         | 22                                          | 4            | 5.4            | B            | 29                                   | 0.30 | EEVHA0J220R | 2000                  |
|             | 47                                          | 5            | 5.4            | C            | 46                                   | 0.30 | EEVHA0J470R | 1000                  |
|             | 100                                         | 6.3          | 5.4            | D            | 71                                   | 0.30 | EEVHA0J101P | 1000                  |
|             | 330                                         | 8            | 10.2           | F            | 230                                  | 0.35 | EEVHA0J331P | 500                   |
| 10          | 33                                          | 5            | 5.4            | C            | 43                                   | 0.22 | EEVHA1A330R | 1000                  |
|             | 100                                         | 8            | 6.2            | E            | 110                                  | 0.26 | EEVHA1A101P | 1000                  |
|             | 220                                         | 8            | 10.2           | F            | 160                                  | 0.26 | EEVHA1A221P | 500                   |
|             | 470                                         | 10           | 10.2           | G            | 270                                  | 0.26 | EEVHA1A471P | 500                   |
| 16          | 10                                          | 4            | 5.4            | B            | 28                                   | 0.16 | EEVHA1C100R | 2000                  |
|             | 22                                          | 5            | 5.4            | C            | 39                                   | 0.16 | EEVHA1C220R | 1000                  |
|             | 47                                          | 6.3          | 5.4            | D            | 70                                   | 0.16 | EEVHA1C470P | 1000                  |
|             | 220                                         | 10           | 10.2           | D            | 210                                  | 0.20 | EEVHA1C221P | 500                   |
| 25          | 330                                         | 10           | 10.2           | G            | 230                                  | 0.20 | EEVHA1C331P | 500                   |
|             | 4.7                                         | 4            | 5.4            | B            | 22                                   | 0.14 | EEVHA1E4R7R | 2000                  |
|             | 10                                          | 5            | 5.4            | C            | 28                                   | 0.14 | EEVHA1E100R | 1000                  |
|             | 22                                          | 6.3          | 5.4            | D            | 55                                   | 0.14 | EEVHA1E220P | 1000                  |
| 35          | 33                                          | 6.3          | 5.4            | D            | 65                                   | 0.14 | EEVHA1E330P | 1000                  |
|             | 47                                          | 8            | 6.2            | E            | 91                                   | 0.16 | EEVHA1E470P | 1000                  |
|             | 100                                         | 8            | 10.2           | F            | 130                                  | 0.16 | EEVHA1E101P | 500                   |
|             | 220                                         | 10           | 10.2           | G            | 190                                  | 0.16 | EEVHA1E221P | 500                   |
| 50          | 4.7                                         | 4            | 5.4            | B            | 22                                   | 0.12 | EEVHA1V4R7R | 2000                  |
|             | 10                                          | 5            | 5.4            | C            | 30                                   | 0.12 | EEVHA1V100R | 1000                  |
|             | 22                                          | 6.3          | 5.4            | D            | 60                                   | 0.12 | EEVHA1V220P | 1000                  |
|             | 33                                          | 8            | 6.2            | E            | 84                                   | 0.14 | EEVHA1V330P | 1000                  |
| 63          | 47                                          | 8            | 10.2           | F            | 98                                   | 0.14 | EEVHA1V470P | 500                   |
|             | 100                                         | 10           | 10.2           | G            | 160                                  | 0.14 | EEVHA1V101P | 500                   |
|             | 0.1                                         | 4            | 5.4            | B            | 1                                    | 0.12 | EEVHA1HR10R | 2000                  |
|             | 0.22                                        | 4            | 5.4            | B            | 2                                    | 0.12 | EEVHA1HR22R | 2000                  |
| 100         | 0.33                                        | 4            | 5.4            | B            | 3                                    | 0.12 | EEVHA1HR33R | 2000                  |
|             | 0.47                                        | 4            | 5.4            | B            | 5                                    | 0.12 | EEVHA1HR47R | 2000                  |
|             | 1                                           | 4            | 5.4            | B            | 10                                   | 0.12 | EEVHA1H1R0R | 2000                  |
|             | 2.2                                         | 4            | 5.4            | B            | 16                                   | 0.12 | EEVHA1H2R2R | 2000                  |
| 150         | 3.3                                         | 4            | 5.4            | B            | 16                                   | 0.12 | EEVHA1H3R3R | 2000                  |
|             | 4.7                                         | 5            | 5.4            | C            | 23                                   | 0.12 | EEVHA1H4R7R | 1000                  |
|             | 10                                          | 6.3          | 5.4            | D            | 35                                   | 0.12 | EEVHA1H100P | 1000                  |
|             | 22                                          | 8            | 6.2            | E            | 70                                   | 0.12 | EEVHA1H220P | 1000                  |
| 200         | 33                                          | 8            | 10.2           | F            | 91                                   | 0.12 | EEVHA1H330P | 500                   |
|             | 47                                          | 10           | 10.2           | G            | 100                                  | 0.12 | EEVHA1H470P | 500                   |
|             | 10                                          | 8            | 6.2            | E            | 25                                   | 0.18 | EEVHA1J100P | 1000                  |
|             | 22                                          | 8            | 10.2           | F            | 30                                   | 0.18 | EEVHA1J220P | 500                   |
| 250         | 33                                          | 10           | 10.2           | G            | 45                                   | 0.18 | EEVHA1J330P | 500                   |
|             | 47                                          | 10           | 10.2           | G            | 50                                   | 0.18 | EEVHA1J470P | 500                   |
|             | 3.3                                         | 8            | 6.2            | E            | 30                                   | 0.18 | EEVHA2A3R3P | 1000                  |
|             | 4.7                                         | 8            | 10.2           | F            | 50                                   | 0.18 | EEVHA2A4R7P | 500                   |
| 315         | 10                                          | 8            | 10.2           | F            | 55                                   | 0.18 | EEVHA2A100P | 500                   |
|             | 22                                          | 10           | 10.2           | G            | 60                                   | 0.18 | EEVHA2A220P | 500                   |
|             | 33                                          | 10           | 10.2           | G            | 65                                   | 0.18 | EEVHA2A330P | 500                   |

The taping dimension are explained on p. of our Catalog.

Please use it as a reference guide.

High temperature Load Life test : 105°C 1000h