

# Surface Mount Type

Series: HA Type : V

Country of Origin

Japan

Malaysia ( $\phi 4, \phi 5, \phi 6.3$ )



## Features

Endurance : 105°C 1000 h

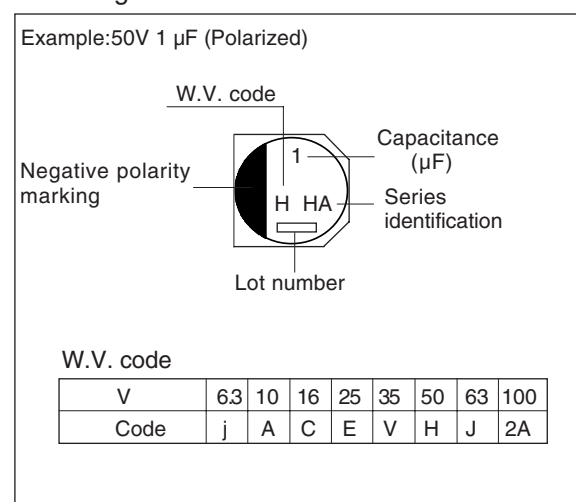
5.4 mm height ( $\leq \phi 6.3$ )

Vibration-proof product is available upon request. ( $\phi 8 \leq$ )

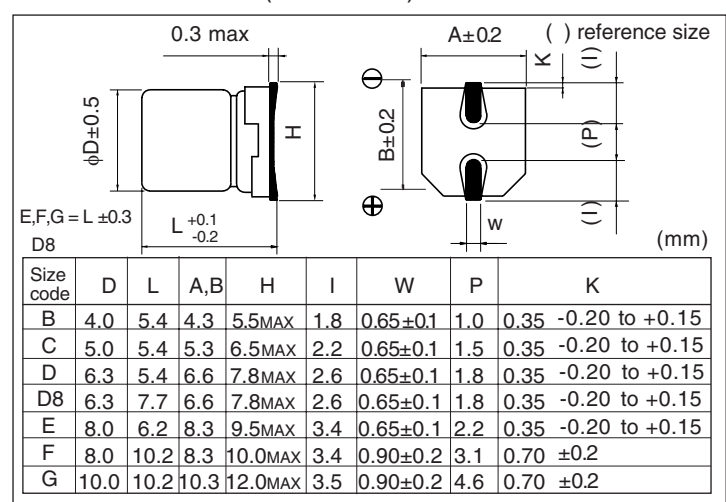
## Specifications

|                                    |                                                                                                                                                                                        |     |                                                            |    |    |    |    |    |     |                             |
|------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----|------------------------------------------------------------|----|----|----|----|----|-----|-----------------------------|
| Category temp. range               | -40 to +105°C                                                                                                                                                                          |     |                                                            |    |    |    |    |    |     |                             |
| Rated W.V. Range                   | 6.3 to 100 V .DC                                                                                                                                                                       |     |                                                            |    |    |    |    |    |     |                             |
| Nominal Cap. Range                 | 0.1 to 1500 μ F                                                                                                                                                                        |     |                                                            |    |    |    |    |    |     |                             |
| Capacitance Tolerance              | ±20 % (120Hz/+20°C)                                                                                                                                                                    |     |                                                            |    |    |    |    |    |     |                             |
| DC Leakage Current                 | I ≤ 0.01 CV or 3(μ A) after 2 minutes (Whichever , greater)                                                                                                                            |     |                                                            |    |    |    |    |    |     |                             |
| tan δ                              | Please see the attached standard products list                                                                                                                                         |     |                                                            |    |    |    |    |    |     |                             |
| Characteristics at Low Temperature | W.V. (V)                                                                                                                                                                               | 6.3 | 10                                                         | 16 | 25 | 35 | 50 | 63 | 100 | (Impedance ratio 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±2°C and then being stabilized at +20°C, capacitors shall meet the following limits.                                        |     |                                                            |    |    |    |    |    |     |                             |
|                                    | Capacitance change                                                                                                                                                                     |     | ±20% of initial measured value(6.3W.V. of minature : ±30%) |    |    |    |    |    |     |                             |
|                                    | tan δ                                                                                                                                                                                  |     | ≤200 % of initial specified value                          |    |    |    |    |    |     |                             |
|                                    | DC leakage current                                                                                                                                                                     |     | ≤initial specified value                                   |    |    |    |    |    |     |                             |
| Shelf Life                         | After storage for 1000 hours at +105±2°C with no voltage applied and then being stabilized at +20°C, capacitors shall meet the limits specified in Endurance. (With voltage treatment) |     |                                                            |    |    |    |    |    |     |                             |
| Resistance to Soldering Heat       | After reflow soldering ( Refer to page 184 for recommendable temperature profile.) and then being stabilized at +20°C, capacitor shall meet the following limits.                      |     |                                                            |    |    |    |    |    |     |                             |
|                                    | Capacitance change                                                                                                                                                                     |     | ±10% of initial measured value                             |    |    |    |    |    |     |                             |
|                                    | tan δ                                                                                                                                                                                  |     | ≤ initial specified value                                  |    |    |    |    |    |     |                             |
|                                    | DC leakage current                                                                                                                                                                     |     | ≤ initial specified value                                  |    |    |    |    |    |     |                             |

## Marking



## Dimensions in mm (not to scale)



## Case size

| Cap. ( $\mu$ F) | W.V.(V) | 6.3 (0J) | 10 (1A)  | 16 (1C)  | 25 (1E)  | 35 (1V) | 50 (1H)  | 63 (1J) | 100 (2A) |
|-----------------|---------|----------|----------|----------|----------|---------|----------|---------|----------|
| 0.1 to 2.2      |         |          |          |          |          |         | B        |         |          |
| 3.3             |         |          |          |          |          |         | B        |         | E        |
| 4.7             |         |          |          |          | B        | B       | C        |         | F(E)     |
| 10              |         |          |          | B        | C(B)     | C(B)    | D        | E       | F        |
| 22              | B       | (B)      | C(B)     | C(B)     | D(C)     | D(C)    | E        | F(E)    | G(F)     |
| 33              | (B)     | C(B)     | (C)      | (C)      | D(C)     | E(D)    | (E)F, D8 | G       | G        |
| 47              | C(B)    | (C)      | D(C)     | E(D)     | F(E)     | G(F)    | G(F), D8 | G(F)    | (G)      |
| 100             | D(C)    | E(D)     | (D)      | F, D8(E) | G(F), D8 | G(F)    |          |         |          |
| 220             | (D)     | F, D8    | G(F), D8 | G(F)     | G(F)     | G(F)    |          |         |          |
| 330             | F, D8   |          | G(F)     | G(F)     | G        |         |          |         |          |
| 470             | (F)     | G(F)     | G(F)     | G        |          |         |          |         |          |
| 680             |         |          |          |          |          |         |          |         |          |
| 1000            | G(F)    | G        |          |          |          |         |          |         |          |
| 1500            | G       |          |          |          |          |         |          |         |          |

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## ■ Standard Products

| W.V.<br>(V) | Cap.<br>(±20%)<br>(μF) | Case size    |                |           | Specification                                 |                             | Part No.     | Min. Packaging Qty |
|-------------|------------------------|--------------|----------------|-----------|-----------------------------------------------|-----------------------------|--------------|--------------------|
|             |                        | Dia.<br>(mm) | Length<br>(mm) | Size Code | Ripple current<br>(120Hz)<br>(+105°C)<br>(mA) | tan δ<br>(120Hz)<br>(+20°C) |              | Taping<br>(pcs)    |
| 6.3         | 22                     | 4            | 5.4            | B         | 29                                            | 0.30                        | EEVHA0J220R  | 2000               |
|             | 33                     | 4            | 5.4            | B         | 29                                            | 0.35                        | EEVHA0J330WR | 2000               |
|             | 47                     | 4            | 5.4            | B         | 36                                            | 0.35                        | EEVHA0J470WR | 2000               |
|             |                        | 5            | 5.4            | C         | 46                                            | 0.30                        | EEVHA0J470R  | 1000               |
|             | 100                    | 5            | 5.4            | C         | 47                                            | 0.35                        | EEVHA0J101WR | 1000               |
|             |                        | 6.3          | 5.4            | D         | 71                                            | 0.30                        | EEVHA0J101P  | 1000               |
|             | 220                    | 6.3          | 5.4            | D         | 74                                            | 0.35                        | EEVHA0J221WP | 1000               |
|             | 330                    | 6.3          | 7.7            | D8        | 105                                           | 0.30                        | EEVHA0J331XP | 900                |
|             |                        | 8            | 10.2           | F         | 230                                           | 0.35                        | EEVHA0J331P  | 500                |
|             | 470                    | 8            | 10.2           | F         | 300                                           | 0.35                        | EEVHA0J471UP | 500                |
|             | 1000                   | 8            | 10.2           | F         | 300                                           | 0.35                        | EEVHA0J102UP | 500                |
|             |                        | 10           | 10.2           | G         | 400                                           | 0.35                        | EEVHA0J102P  | 500                |
| 10          | 1500                   | 10           | 10.2           | G         | 480                                           | 0.35                        | EEVHA0J152P  | 500                |
|             | 22                     | 4            | 5.4            | B         | 28                                            | 0.30                        | EEVHA1A220WR | 2000               |
|             | 33                     | 4            | 5.4            | B         | 29                                            | 0.30                        | EEVHA1A330WR | 2000               |
|             |                        | 5            | 5.4            | C         | 43                                            | 0.22                        | EEVHA1A330R  | 1000               |
|             | 47                     | 5            | 5.4            | C         | 43                                            | 0.30                        | EEVHA1A470WR | 1000               |
|             | 100                    | 6.3          | 5.4            | D         | 71                                            | 0.30                        | EEVHA1A101WP | 1000               |
|             |                        | 8            | 6.2            | E         | 110                                           | 0.26                        | EEVHA1A101P  | 1000               |
|             | 220                    | 6.3          | 7.7            | D8        | 105                                           | 0.22                        | EEVHA1A221XP | 900                |
|             |                        | 8            | 10.2           | F         | 160                                           | 0.26                        | EEVHA1A221P  | 500                |
|             | 470                    | 8            | 10.2           | F         | 200                                           | 0.26                        | EEVHA1A471UP | 500                |
|             |                        | 10           | 10.2           | G         | 270                                           | 0.26                        | EEVHA1A471P  | 500                |
|             | 1000                   | 10           | 10.2           | G         | 400                                           | 0.26                        | EEVHA1A102P  | 500                |
| 16          | 10                     | 4            | 5.4            | B         | 28                                            | 0.16                        | EEVHA1C100R  | 2000               |
|             | 22                     | 4            | 5.4            | B         | 28                                            | 0.26                        | EEVHA1C220WR | 2000               |
|             | 33                     | 5            | 5.4            | C         | 39                                            | 0.16                        | EEVHA1C220R  | 1000               |
|             |                        | 5            | 5.4            | C         | 35                                            | 0.26                        | EEVHA1C330WR | 1000               |
|             | 47                     | 5            | 5.4            | C         | 39                                            | 0.26                        | EEVHA1C470WR | 1000               |
|             | 100                    | 6.3          | 5.4            | D         | 70                                            | 0.16                        | EEVHA1C470P  | 1000               |
|             |                        | 6.3          | 5.4            | D         | 70                                            | 0.26                        | EEVHA1C101WP | 1000               |
|             |                        | 6.3          | 7.7            | D8        | 105                                           | 0.16                        | EEVHA1C221XP | 900                |
|             | 220                    | 8            | 10.2           | F         | 150                                           | 0.20                        | EEVHA1C221UP | 500                |
|             |                        | 10           | 10.2           | G         | 210                                           | 0.20                        | EEVHA1C221P  | 500                |
|             | 330                    | 8            | 10.2           | F         | 170                                           | 0.20                        | EEVHA1C331UP | 500                |
|             |                        | 10           | 10.2           | G         | 230                                           | 0.20                        | EEVHA1C331P  | 500                |
|             | 470                    | 8            | 10.2           | F         | 340                                           | 0.20                        | EEVHA1C471UP | 500                |
|             |                        | 10           | 10.2           | G         | 340                                           | 0.20                        | EEVHA1C471P  | 500                |
|             | 680                    | 10           | 10.2           | G         | 380                                           | 0.20                        | EEVHA1C681P  | 500                |
| 25          | 4.7                    | 4            | 5.4            | B         | 22                                            | 0.14                        | EEVHA1E4R7R  | 2000               |
|             | 10                     | 4            | 5.4            | B         | 22                                            | 0.20                        | EEVHA1E100WR | 2000               |
|             |                        | 5            | 5.4            | C         | 28                                            | 0.14                        | EEVHA1E100R  | 1000               |
|             | 22                     | 5            | 5.4            | C         | 35                                            | 0.20                        | EEVHA1E220WR | 1000               |

The taping dimension are explained on p.187 of our Catalog.  
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Endurance: 105°C 1000h

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■ Standard Products

| W.V.<br>(V) | Cap.<br>(±20%)<br>(μF) | Case size    |                |              | Specification                                    |                             | Part No.     | Min.Packaging<br>Qty |
|-------------|------------------------|--------------|----------------|--------------|--------------------------------------------------|-----------------------------|--------------|----------------------|
|             |                        | Dia.<br>(mm) | Length<br>(mm) | Size<br>Code | Ripple<br>current<br>(120Hz)<br>(+105°C)<br>(mA) | tan δ<br>(120Hz)<br>(+20°C) |              | Taping<br>(pcs)      |
| 25          | 22                     | 6.3          | 5.4            | D            | 55                                               | 0.14                        | EEVHA1E220P  | 1000                 |
|             | 33                     | 5            | 5.4            | C            | 45                                               | 0.20                        | EEVHA1E330WR | 1000                 |
|             |                        | 6.3          | 5.4            | D            | 65                                               | 0.14                        | EEVHA1E330P  | 1000                 |
|             | 47                     | 6.3          | 5.4            | D            | 70                                               | 0.20                        | EEVHA1E470WP | 1000                 |
|             |                        | 8            | 6.2            | E            | 91                                               | 0.16                        | EEVHA1E470P  | 1000                 |
|             | 100                    | 6.3          | 7.7            | D8           | 91                                               | 0.14                        | EEVHA1E101XP | 900                  |
|             |                        | 8            | 6.2            | E            | 91                                               | 0.16                        | EEVHA1E101UP | 1000                 |
|             |                        | 8            | 10.2           | F            | 130                                              | 0.16                        | EEVHA1E101P  | 500                  |
|             | 220                    | 8            | 10.2           | F            | 160                                              | 0.16                        | EEVHA1E221UP | 500                  |
|             |                        | 10           | 10.2           | G            | 190                                              | 0.16                        | EEVHA1E221P  | 500                  |
|             | 330                    | 8            | 10.2           | F            | 180                                              | 0.16                        | EEVHA1E331UP | 500                  |
|             |                        | 10           | 10.2           | G            | 340                                              | 0.16                        | EEVHA1E331P  | 500                  |
| 35          | 470                    | 10           | 10.2           | G            | 360                                              | 0.16                        | EEVHA1E471P  | 500                  |
|             | 4.7                    | 4            | 5.4            | B            | 22                                               | 0.12                        | EEVHA1V4R7R  | 2000                 |
|             | 10                     | 4            | 5.4            | B            | 22                                               | 0.16                        | EEVHA1V100WR | 2000                 |
|             |                        | 5            | 5.4            | C            | 30                                               | 0.12                        | EEVHA1V100R  | 1000                 |
|             | 22                     | 5            | 5.4            | C            | 35                                               | 0.16                        | EEVHA1V220WR | 1000                 |
|             |                        | 6.3          | 5.4            | D            | 60                                               | 0.12                        | EEVHA1V220P  | 1000                 |
|             | 33                     | 6.3          | 5.4            | D            | 42                                               | 0.16                        | EEVHA1V330WP | 1000                 |
|             |                        | 8            | 6.2            | E            | 84                                               | 0.14                        | EEVHA1V330P  | 1000                 |
|             | 47                     | 8            | 6.2            | E            | 84                                               | 0.14                        | EEVHA1V470UP | 1000                 |
|             |                        | 8            | 10.2           | F            | 98                                               | 0.14                        | EEVHA1V470P  | 500                  |
|             | 100                    | 6.3          | 7.7            | D8           | 84                                               | 0.12                        | EEVHA1V101XP | 900                  |
|             |                        | 8            | 10.2           | F            | 120                                              | 0.14                        | EEVHA1V101UP | 500                  |
|             |                        | 10           | 10.2           | G            | 160                                              | 0.14                        | EEVHA1V101P  | 500                  |
|             | 220                    | 8            | 10.2           | F            | 170                                              | 0.14                        | EEVHA1V221UP | 500                  |
|             |                        | 10           | 10.2           | G            | 210                                              | 0.14                        | EEVHA1V221P  | 500                  |
|             | 330                    | 10           | 10.2           | G            | 250                                              | 0.14                        | EEVHA1V331P  | 500                  |
| 50          | 0.1                    | 4            | 5.4            | B            | 1                                                | 0.12                        | EEVHA1HR10R  | 2000                 |
|             | 0.22                   | 4            | 5.4            | B            | 2                                                | 0.12                        | EEVHA1HR22R  | 2000                 |
|             | 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                 |
|             | 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                 |
|             | 33                     | 6.3          | 7.7            | D8           | 70                                               | 0.12                        | EEVHA1H330XP | 900                  |
|             |                        | 8            | 6.2            | E            | 70                                               | 0.12                        | EEVHA1H330UP | 1000                 |
|             |                        | 8            | 10.2           | F            | 91                                               | 0.12                        | EEVHA1H330P  | 500                  |
|             | 47                     | 6.3          | 7.7            | D8           | 63                                               | 0.12                        | EEVHA1H470XP | 900                  |
|             |                        | 8            | 10.2           | F            | 95                                               | 0.12                        | EEVHA1H470UP | 500                  |
|             |                        | 10           | 10.2           | G            | 100                                              | 0.12                        | EEVHA1H470P  | 500                  |

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### ■ Standard Products

| W.V.<br>(V) | Cap.<br>(±20%)<br>(μF) | Case size    |                |              | Specification                                    |                             | Part No.     | Min.Packaging<br>Q'ty |
|-------------|------------------------|--------------|----------------|--------------|--------------------------------------------------|-----------------------------|--------------|-----------------------|
|             |                        | Dia.<br>(mm) | Length<br>(mm) | Size<br>Code | Ripple<br>current<br>(120Hz)<br>(+105°C)<br>(mA) | tan δ<br>(120Hz)<br>(+20°C) |              | Taping                |
| 50          | 100                    | 8            | 10.2           | F            | 110                                              | 0.12                        | EEVHA1H101UP | 500                   |
|             |                        | 10           | 10.2           | G            | 120                                              | 0.12                        | EEVHA1H101P  | 500                   |
|             | 220                    | 10           | 10.2           | G            | 150                                              | 0.12                        | EEVHA1H221P  | 500                   |
| 63          | 10                     | 8            | 6.2            | E            | 25                                               | 0.18                        | EEVHA1J100P  | 1000                  |
|             | 22                     | 8            | 6.2            | E            | 25                                               | 0.18                        | EEVHA1J220UP | 500                   |
|             |                        | 8            | 10.2           | F            | 30                                               | 0.18                        | EEVHA1J220P  | 500                   |
|             | 33                     | 10           | 10.2           | G            | 45                                               | 0.18                        | EEVHA1J330P  | 500                   |
|             | 47                     | 8            | 10.2           | F            | 45                                               | 0.18                        | EEVHA1J470UP | 500                   |
|             |                        | 10           | 10.2           | G            | 50                                               | 0.18                        | EEVHA1J470P  | 500                   |
| 100         | 3.3                    | 8            | 6.2            | E            | 30                                               | 0.18                        | EEVHA2A3R3P  | 1000                  |
|             | 4.7                    | 8            | 6.2            | E            | 30                                               | 0.18                        | EEVHA2A4R7UP | 1000                  |
|             |                        | 8            | 10.2           | F            | 50                                               | 0.18                        | EEVHA2A4R7P  | 500                   |
|             | 10                     | 8            | 10.2           | F            | 55                                               | 0.18                        | EEVHA2A100P  | 500                   |
|             | 22                     | 8            | 10.2           | F            | 55                                               | 0.18                        | EEVHA2A220UP | 500                   |
|             |                        | 10           | 10.2           | G            | 60                                               | 0.18                        | EEVHA2A220P  | 500                   |
|             | 33                     | 10           | 10.2           | G            | 65                                               | 0.18                        | EEVHA2A330P  | 500                   |
|             | 47                     | 10           | 10.2           | G            | 65                                               | 0.18                        | EEVHA2A470UP | 500                   |

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