

### Surface Mount Type

Series: **HD** Type: **V**

※6.3V to 35V : High temperature Lead-Free reflow (suffix:A※)

50V to 100V : Standard Lead-Free reflow



#### ■ Features

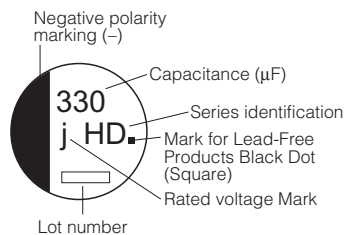
- Endurance: 105 °C 5000 h
- Vibration-proof product is available upon request.(φ8 ≤)
- RoHS directive compliant

#### ■ Specifications

|                                    |   |                                    |    |    |    |    |    |    |     |                             |
|------------------------------------|---|------------------------------------|----|----|----|----|----|----|-----|-----------------------------|
| Category Temp. Range               | -40 °C to +105 °C   |                                    |    |    |    |    |    |    |     |                             |
| Rated W.V. Range                   | 6.3 V.DC to 100 V.DC  |                                    |    |    |    |    |    |    |     |                             |
| Nominal Cap. Range                 | 0.47 μF to 1000 μF  |                                    |    |    |    |    |    |    |     |                             |
| Capacitance Tolerance              | ±20 % (120 Hz/+20 °C)   |                                    |    |    |    |    |    |    |     |                             |
| DC Leakage Current                 | I ≤ 0.01 CV or 3 (μA) After 2 minutes (Whichever is greater)  |                                    |    |    |    |    |    |    |     |                             |
| tan δ                              | Please see the attached High temperature lead-free reflow products list.  |                                    |    |    |    |    |    |    |     |                             |
| Characteristics at Low Temperature | W.V. (V)  | 6.3                                | 10 | 16 | 25 | 35 | 50 | 63 | 100 | (Impedance ratio at 120 Hz) |
|                                    | Z(-25 °C)/Z(+20 °C)   | 3                                  | 3  | 2  | 2  | 2  | 2  | 2  | 2   |                             |
|                                    | Z(-40 °C)/Z(+20 °C)   | 4                                  | 4  | 3  | 3  | 3  | 3  | 3  | 3   |                             |
| Endurance                          | After applying rated working voltage for 5000 hours at +105 °C±2 °C and then being stabilized at +20 °C, capacitors shall meet the following limits.  |                                    |    |    |    |    |    |    |     |                             |
|                                    | Capacitance change  | ±30 % of initial measured value    |    |    |    |    |    |    |     |                             |
|                                    | tan δ   | ≤ 300 % of initial specified value |    |    |    |    |    |    |     |                             |
|                                    | DC leakage current  | ≤ initial specified value          |    |    |    |    |    |    |     |                             |
| Shelf Life                         | After storage for 1000 hours at +105 °C±2 °C with no voltage applied and then being stabilized at +20 °C, capacitors shall meet the limits specified in Endurance. (With voltage treatment) |                                    |    |    |    |    |    |    |     |                             |
|                                    | Capacitance change  | ±20 % of initial measured value    |    |    |    |    |    |    |     |                             |
|                                    | tan δ   | ≤ 200 % of initial specified value |    |    |    |    |    |    |     |                             |
|                                    | DC leakage current  | ≤ initial specified value          |    |    |    |    |    |    |     |                             |
| Resistance to Soldering Heat       | After reflow soldering and then being stabilized at +20 °C, capacitors shall meet the following limits.   |                                    |    |    |    |    |    |    |     |                             |
|                                    | Capacitance change  | ±10 % of initial measured value    |    |    |    |    |    |    |     |                             |
|                                    | tan δ   | ≤ initial specified value          |    |    |    |    |    |    |     |                             |
|                                    | DC leakage current  | ≤ initial specified value          |    |    |    |    |    |    |     |                             |

#### ■ Marking

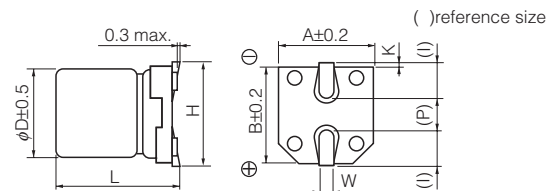
Example: 6.3 V 330 μF  
Marking color: BLACK



#### Rated Voltage Mark

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

#### ■ Dimensions in mm (not to scale)



| Size code | D    | L        | A, B | H         | I   | W        | P   | K                                      |
|-----------|------|----------|------|-----------|-----|----------|-----|--|
| B         | 4.0  | 5.8±0.3  | 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  | 5.8±0.3  | 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  | 5.8±0.3  | 6.6  | 7.8 max.  | 2.6 | 0.65±0.1 | 1.8 | 0.35 <sup>+0.15</sup> <sub>-0.20</sub> |
| D8        | 6.3  | 7.7±0.3  | 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±0.3  | 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±0.3 | 8.3  | 10.0 max. | 3.4 | 0.90±0.2 | 3.1 | 0.70±0.20                              |
| G         | 10.0 | 10.2±0.3 | 10.3 | 12.0 max. | 3.5 | 0.90±0.2 | 4.6 | 0.70±0.20                              |

Design and specifications are each subject to change without notice. Ask factory for the current technical specifications before purchase and/or use. Should a safety concern arise regarding this product, please be sure to contact us immediately.

00 Sep. 2010

■ High temperature Lead-Free reflow Products(6.3V to 35V)

Endurance : 105 °C 5000 h

| W.V. | Cap.<br>(±20 %) | Case size |        |           | Specification   |                                    |                               | Part No.<br>(RoHS:compliant) | Reflow | Min.<br>Packaging Q'ty |
|------|-----------------|-----------|--------|-----------|---|------------------------------------|-------------------------------|------------------------------|--------|------------------------|
|      |                 | Dia.      | Length | Size Code | Ripple Current<br>(120 Hz)<br>(+105°C)<br>(mA r.m.s.) | Impedance<br>(100 kHz)<br>(+20 °C) | tan δ<br>(120 Hz)<br>(+20 °C) |                              |        | Taping<br><br>(pcs)    |
| (V)  | (μF)            | (mm)      | (mm)   |           |   |                                    |                               |                              |        |                        |
| 6.3  | 330             | 8.0       | 10.2   | F         | 230   | 1.5                                | 0.30                          | EEEHD0J331AP                 | (7)    | 500                    |
|      | 1000            | 10.0      | 10.2   | G         | 313   | 0.8                                | 0.50                          | EEEHD0J102AP                 | (7)    | 500                    |
| 10   | 100             | 8.0       | 6.2    | E         | 62  | 2.0                                | 0.30                          | EEEHD1A101AP                 | (7)    | 1000                   |
|      | 220             | 8.0       | 10.2   | F         | 160   | 1.5                                | 0.30                          | EEEHD1A221AP                 | (7)    | 500                    |
|      | 330             | 10.0      | 10.2   | G         | 238   | 0.8                                | 0.30                          | EEEHD1A331AP                 | (7)    | 500                    |
| 16   | 10              | 4.0       | 5.8    | B         | 28  | 12.0                               | 0.20                          | EEEHD1C100AR                 | (5)    | 2000                   |
|      | 22              | 5.0       | 5.8    | C         | 39  | 7.2                                | 0.20                          | EEEHD1C220AR                 | (5)    | 1000                   |
|      | 47              | 6.3       | 5.8    | D         | 70  | 4.0                                | 0.20                          | EEEHD1C470AP                 | (5)    | 1000                   |
|      | 100             | 8.0       | 10.2   | F         | 130   | 1.5                                | 0.20                          | EEEHD1C101AP                 | (7)    | 500                    |
|      | 220             | 10.0      | 10.2   | G         | 220   | 0.8                                | 0.20                          | EEEHD1C221AP                 | (7)    | 500                    |
|      | 470             | 10.0      | 10.2   | G         | 340   | 0.8                                | 0.20                          | EEEHD1C471AP                 | (7)    | 500                    |
|      | 470             | 10.0      | 10.2   | G         | 340   | 0.8                                | 0.20                          | EEEHD1C471AP                 | (7)    | 500                    |
| 25   | 4.7             | 4.0       | 5.8    | B         | 17  | 12.0                               | 0.16                          | EEEHD1E4R7AR                 | (5)    | 2000                   |
|      | 10              | 5.0       | 5.8    | C         | 28  | 7.2                                | 0.16                          | EEEHD1E100AR                 | (5)    | 1000                   |
|      | 22              | 6.3       | 5.8    | D         | 55  | 4.0                                | 0.16                          | EEEHD1E220AP                 | (5)    | 1000                   |
|      | 33              | 6.3       | 5.8    | D         | 55  | 4.0                                | 0.16                          | EEEHD1E330AP                 | (5)    | 1000                   |
|      | 47              | 8.0       | 6.2    | E         | 56  | 2.0                                | 0.18                          | EEEHD1E470AP                 | (7)    | 1000                   |
|      | 100             | 8.0       | 10.2   | F         | 130   | 1.5                                | 0.16                          | EEEHD1E101AP                 | (7)    | 500                    |
|      | 330             | 10.0      | 10.2   | G         | 238   | 0.8                                | 0.16                          | EEEHD1E331AP                 | (7)    | 500                    |
| 35   | 4.7             | 4.0       | 5.8    | B         | 17  | 12.0                               | 0.13                          | EEEHD1V4R7AR                 | (5)    | 2000                   |
|      | 10              | 5.0       | 5.8    | C         | 28  | 7.2                                | 0.13                          | EEEHD1V100AR                 | (5)    | 1000                   |
|      | 22              | 6.3       | 5.8    | D         | 55  | 4.0                                | 0.13                          | EEEHD1V220AP                 | (5)    | 1000                   |
|      | 33              | 8.0       | 6.2    | E         | 53  | 2.0                                | 0.16                          | EEEHD1V330AP                 | (7)    | 1000                   |
|      |                 | 6.3       | 7.7    | D8        | 57  | 2.0                                | 0.13                          | EEEHDV330XAP                 | (5)    | 900                    |
|      | 47              | 6.3       | 7.7    | D8        | 57  | 2.0                                | 0.14                          | EEEHDV470XAP                 | (5)    | 900                    |
|      | 47              | 8.0       | 10.2   | F         | 79  | 1.5                                | 0.14                          | EEEHD1V470AP                 | (7)    | 500                    |
|      | 100             | 10.0      | 10.2   | G         | 101   | 0.8                                | 0.14                          | EEEHD1V101AP                 | (7)    | 500                    |
|      | 220             | 10.0      | 10.2   | G         | 220   | 0.8                                | 0.14                          | EEEHD1V221AP                 | (7)    | 500                    |

■ Standard Lead-Free reflow Products(50V to 100V)

Endurance : 105 °C 5000 h

| W.V. | Cap.<br>(±20 %) | Case size |        |           | Specification   |                                    |                               | Part No.<br>(RoHS:compliant) | Reflow | Min.<br>Packaging Q'ty |
|------|-----------------|-----------|--------|-----------|---|------------------------------------|-------------------------------|------------------------------|--------|------------------------|
|      |                 | Dia.      | Length | Size Code | Ripple Current<br>(120 Hz)<br>(+105°C)<br>(mA r.m.s.) | Impedance<br>(100 kHz)<br>(+20 °C) | tan δ<br>(120 Hz)<br>(+20 °C) |                              |        | Taping<br><br>(pcs)    |
| (V)  | (μF)            | (mm)      | (mm)   |           |   |                                    |                               |                              |        |                        |
| 50   | 0.47            | 4.0       | 5.8    | B         | 5   | 12.0                               | 0.12                          | EEEHD1HR47R                  | (1)    | 2000                   |
|      | 1               | 4.0       | 5.8    | B         | 7   | 12.0                               | 0.12                          | EEEHD1H1R0R                  | (1)    | 2000                   |
|      | 2.2             | 4.0       | 5.8    | B         | 12  | 12.0                               | 0.12                          | EEEHD1H2R2R                  | (1)    | 2000                   |
|      | 3.3             | 4.0       | 5.8    | B         | 16  | 12.0                               | 0.12                          | EEEHD1H3R3R                  | (1)    | 2000                   |
|      | 4.7             | 5.0       | 5.8    | C         | 21  | 7.2                                | 0.12                          | EEEHD1H4R7R                  | (1)    | 1000                   |
|      | 10              | 6.3       | 5.8    | D         | 33  | 4.0                                | 0.12                          | EEEHD1H100P                  | (1)    | 1000                   |
|      | 22              | 8.0       | 6.2    | E         | 50  | 2.0                                | 0.14                          | EEEHD1H220P                  | (2)    | 1000                   |
|      | 33              | 8.0       | 10.2   | F         | 74  | 1.5                                | 0.14                          | EEEHD1H330P                  | (2)    | 500                    |
|      | 47              | 10.0      | 10.2   | G         | 94  | 0.8                                | 0.14                          | EEEHD1H470P                  | (2)    | 500                    |
| 63   | 100             | 10.0      | 10.2   | G         | 94  | 0.8                                | 0.14                          | EEEHD1H101P                  | (2)    | 500                    |
|      | 10              | 8.0       | 6.2    | E         | 45  | 2.0                                | 0.18                          | EEEHD1J100P                  | (2)    | 1000                   |
|      | 22              | 8.0       | 10.2   | F         | 65  | 1.5                                | 0.18                          | EEEHD1J220P                  | (2)    | 500                    |
| 100  | 33              | 10.0      | 10.2   | G         | 80  | 0.8                                | 0.18                          | EEEHD1J330P                  | (2)    | 500                    |
|      | 3.3             | 8.0       | 6.2    | E         | 30  | 2.0                                | 0.18                          | EEEHD2A3R3P                  | (2)    | 1000                   |
|      | 4.7             | 8.0       | 10.2   | F         | 50  | 1.5                                | 0.18                          | EEEHD2A4R7P                  | (2)    | 500                    |
|      | 10              | 8.0       | 10.2   | F         | 55  | 1.5                                | 0.18                          | EEEHD2A100P                  | (2)    | 500                    |
|      | 22              | 10.0      | 10.2   | G         | 70  | 0.8                                | 0.18                          | EEEHD2A220P                  | (2)    | 500                    |

If Part number exceeds 12 digits, voltage code is abbreviated as follows; 0J→J, 1A→A, 1C→C, 1E→E, 1V→V  
 The taping dimensions are explained on EE188 of our Catalog. Please use it as a reference guide.  
 Reflow Profile(Fig-1 to Fig-11) listed on EE186 of our Catalog.

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