

# Surface mount type TH Series

RoHS compliance, Halogen free  
higher thermal resistance: 125°C guaranteed (ambient temperature)  
For the Industrial equipment

## Specifications

| Items  | Condition  | Specifications                               |                                       |    |            |     |    |            |     |     |
|--|--|--|---------------------------------------|----|------------|-----|----|------------|-----|-----|
|  |  | THB  |                                       |    | THC        |     |    | THE        |     |     |
| Series   | -  | THB  |                                       |    | THC        |     |    | THE        |     |     |
| Rated voltage (V)  | -  | 4.0  | 6.3                                   | 10 | 2.5        | 6.3 | 10 | 2.5        | 4.0 | 6.3 |
| Surge voltage (V)  | -  | 4.6  | 7.2                                   | 12 | 2.9        | 7.2 | 12 | 2.9        | 4.6 | 7.2 |
| Category temperature range (°C)                                | -  | -55 to +125                                  |                                       |    |            |     |    |            |     |     |
| Capacitance tolerance (%)                                      | 120Hz/20°C   | M : ±20                                      |                                       |    |            |     |    |            |     |     |
| Rated capacitance range (μF)                                   | 120Hz/20°C   | 220 to 470                                   |                                       |    | 68 to 220  |     |    | 150 to 330 |     |     |
| Dissipation Factor (DF)  | 120Hz/20°C   | Please see the attached characteristics list |                                       |    |            |     |    |            |     |     |
| Leakage current  | Rated voltage applied, after 5 minutes                               | Please see the attached characteristics list |                                       |    |            |     |    |            |     |     |
| Equivalent series resistance (ESR)                             | 100kHz/20°C  | Please see the attached characteristics list |                                       |    |            |     |    |            |     |     |
| Characteristics of impedance ratio at high temp. and low temp. | 100kHz/+20°C   | -55°C  | Z/Z <sub>20°C</sub>                   |    | 0.6 to 2.0 |     |    |            |     |     |
|  |  | +125°C                                       | Z/Z <sub>20°C</sub>                   |    | 0.6 to 2.0 |     |    |            |     |     |
| Endurance  | 125°C, 1,000h, category voltage applied                              | ΔC/C   | Within±20% of the initial value       |    |            |     |    |            |     |     |
|  |  | DF   | ≤ 2 times of the initial limit        |    |            |     |    |            |     |     |
|  |  | LC   | ≤ 2 times of the initial limit        |    |            |     |    |            |     |     |
| Damp heat (Steady State)                                       | 60°C, 90 to 95%RH, 500h, No-applied voltage                          | ΔC/C   | Within+40%, -20% of the initial value |    |            |     |    |            |     |     |
|  |  | DF   | ≤ 1.5 times of the initial limit      |    |            |     |    |            |     |     |
|  |  | LC   | ≤ 3 times of the initial limit        |    |            |     |    |            |     |     |
| Surge  | 105°C, 1,000 cycles, 1kΩ discharge resistance, surge voltage applied | ΔC/C   | Within±5% of the initial value        |    |            |     |    |            |     |     |
|  |  | DF   | Within the initial limit              |    |            |     |    |            |     |     |
|  |  | LC   | ≤ 3 times of the initial limit        |    |            |     |    |            |     |     |

## Marking and dimensions

(unit : mm)

| Size code | L ±0.3※1 | W ±0.2 | H ±0.1※2 | S ±0.2 | W1 ±0.1 |
|-----------|----------|--------|----------|--------|---------|
| D2E       | 7.3      | 4.3    | 1.8      | 1.3    | 2.4     |
| D2        | 7.3      | 4.3    | 1.9      | 1.3    | 2.4     |
| D3L       | 7.3      | 4.3    | 2.8      | 1.3    | 2.4     |
| D4        | 7.3      | 4.3    | 3.8      | 1.3    | 2.4     |

※1 ±0.2: D2 ※2 ±0.2: D3L, D4

※1 The rated voltage is as follows.

| R.V. | 2.5 | 4.0 | 6.3 | 10 |
|------|-----|-----|-----|----|
| Mark | e   | g   | j   | A  |

※2 Lot.No. shows roughly manufacturing date.

## Recommended land pattern dimension of PWB

| Size code | a   | b   | c   |
|-----------|-----|-----|-----|
| D2E       | 2.4 | 2.9 | 3.7 |
| D2        | 2.4 | 2.9 | 3.7 |
| D3L       | 2.4 | 2.9 | 3.7 |
| D4        | 2.4 | 2.9 | 3.7 |

(unit : mm)

## Size list

RV: Rated voltage

| μF  | Series | RV  |     |     |      |
|-----|--------|-----|-----|-----|------|
|     |        | 2.5 | 4.0 | 6.3 | 10.0 |
| 68  | THC    |     |     |     | D2   |
|     | THE    |     |     | D2E |      |
| 150 | THB    |     |     | D3L | D4   |
|     | THC    | D2  |     |     |      |
| 220 | THE    |     | D2E |     |      |
|     | THB    |     | D3L | D4  | D4   |
| 330 | THE    | D2E |     |     |      |
|     | THB    |     |     | D4  |      |
| 470 | THB    |     |     | D4  |      |

## TH series characteristics list

| Series | Size code | Part number | Rated voltage (V) | Rated temperature (°C) | Rated capacitance (μF) | Category voltage (V) | Category temperature (°C) | DF (% max) | LC (μA) max/5min. | ESR (mΩ max) 100kHz/20°C | Maximum allowable ripple current (mA rms) 100kHz※1 | MSL                  |                      |
|--------|-----------|-------------|-------------------|------------------------|------------------------|----------------------|---------------------------|------------|-------------------|--------------------------|--|----------------------|----------------------|
|        |           |             |                   |                        |                        |                      |                           |            |                   |                          |  | Reflow temp. ≤ 260°C | Reflow temp. ≤ 250°C |
| THB    | D3L       | 6THB220ML   | 6.3               | 105                    | 220                    | 4.0                  | 125                       | 10         | 138.6             | 40                       | 2000   | —                    | 5                    |
|        |           | 4THB330ML   | 4.0               | 105                    | 330                    | 2.5                  | 125                       | 10         | 132.0             | 40                       | 2000   | —                    | 5                    |
|        | D4        | 10THB330M   | 10                | 105                    | 330                    | 6.3                  | 125                       | 10         | 330.0             | 35                       | 3000   | —                    | 5                    |
|        |           | 10THB220M   | 10                | 105                    | 220                    | 6.3                  | 125                       | 10         | 220.0             | 40                       | 3000   | —                    | 5                    |
|        |           | 6THB470M    | 6.3               | 105                    | 470                    | 4.0                  | 125                       | 15         | 296.1             | 35                       | 3000   | —                    | 5                    |
|        |           | 6THB330M    | 6.3               | 105                    | 330                    | 4.0                  | 125                       | 10         | 207.9             | 40                       | 3000   | —                    | 5                    |
| THC    | D2        | 10THC68M    | 10                | 105                    | 68                     | 6.3                  | 125                       | 10         | 68.0              | 45                       | 1700   | —                    | 5                    |
|        |           | 6THC150M    | 6.3               | 105                    | 150                    | 4.0                  | 125                       | 10         | 94.5              | 40                       | 1900   | —                    | 5                    |
|        |           | 2R5THC220M  | 2.5               | 105                    | 220                    | 1.6                  | 125                       | 10         | 55.0              | 45                       | 1700   | —                    | 5                    |
| THE    | D2E       | 6THE150M    | 6.3               | 105                    | 150                    | 4.0                  | 125                       | 10         | 94.5              | 25                       | 2400   | —                    | 5                    |
|        |           | 6THE150MI   | 6.3               | 105                    | 150                    | 4.0                  | 125                       | 10         | 94.5              | 18                       | 2800   | —                    | 5                    |
|        |           | 4THE220M    | 4.0               | 105                    | 220                    | 2.5                  | 125                       | 10         | 88.0              | 25                       | 2400   | —                    | 5                    |
|        |           | 4THE220MI   | 4.0               | 105                    | 220                    | 2.5                  | 125                       | 10         | 88.0              | 18                       | 2800   | —                    | 5                    |
|        |           | 4THE220MF   | 4.0               | 105                    | 220                    | 2.5                  | 125                       | 10         | 88.0              | 15                       | 3100   | —                    | 5                    |
|        |           | 2R5THE330M  | 2.5               | 105                    | 330                    | 1.6                  | 125                       | 10         | 82.5              | 25                       | 2400   | —                    | 5                    |
|        |           | 2R5THE330MI | 2.5               | 105                    | 330                    | 1.6                  | 125                       | 10         | 82.5              | 18                       | 2800   | —                    | 5                    |
|        |           | 2R5THE330MF | 2.5               | 105                    | 330                    | 1.6                  | 125                       | 10         | 82.5              | 15                       | 3100   | —                    | 5                    |

※1 100k to 500kHz,45°C