

## TS-HB Series 105°C, 3000 hours

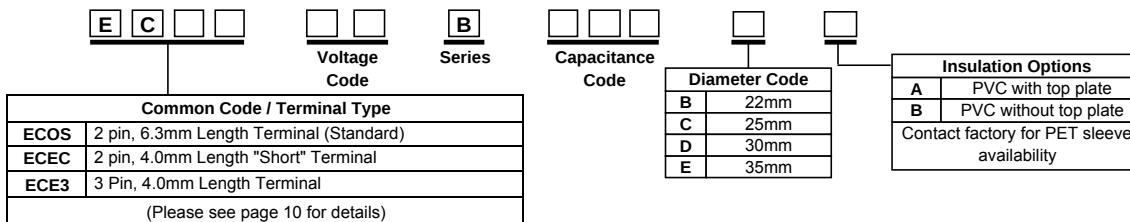
- **Compact size (20 ~ 25% smaller than TS-HA series)**
- **2 and 3 pin versions available**
- **Long 3000 hour life at 105°C with high ripple current capability**
- **Can vent construction**



|                                        |                                                                         |      |     |         |     |      |                   |                                             |       |      |      |      |       |
|----------------------------------------|-------------------------------------------------------------------------|------|-----|---------|-----|------|-------------------|---------------------------------------------|-------|------|------|------|-------|
| Rated Working Voltage:                 | 160 ~ 250 VDC                                                           |      |     |         |     |      | 385 ~ 450 VDC     |                                             |       |      |      |      |       |
| Operating Temperature:                 | -40 ~ +105°C                                                            |      |     |         |     |      | -25 ~ +105°C      |                                             |       |      |      |      |       |
| Nominal Capacitance:                   | 330 ~ 2700μF (±20%)                                                     |      |     |         |     |      | 82 ~ 560μF (±20%) |                                             |       |      |      |      |       |
| Dissipation Factor:<br>(120 Hz, +20°C) | Working Voltage [V]:                                                    |      |     |         |     |      | 160 ~ 450         |                                             |       |      |      |      |       |
|                                        | Max. D.F. (%):                                                          |      |     |         |     |      | 15                |                                             |       |      |      |      |       |
| Leakage Current:                       | 3√CV (μA) max. after 5 minutes; C = Capacitance in μF, V = WV           |      |     |         |     |      |                   |                                             |       |      |      |      |       |
| Ripple Current Multipliers:            | Ripple Current Frequency Factors                                        |      |     |         |     |      |                   | Ripple Current Ambient Temperature Factors* |       |      |      |      |       |
|                                        | Frequency(Hz):                                                          | 50   | 60  | 100~120 | 500 | 1k   | 10k~              | Ambient Temperature:                        | 105°C | 85°C | 70°C | 60°C | ≤45°C |
|                                        | Multiplier:                                                             | 0.75 | 0.8 | 1.0     | 1.2 | 1.25 | 1.4               | Multiplier:                                 | 1.0   | 1.7  | 2.0  | 2.2  | 2.35  |
| Endurance:                             | 3000 hours at +105°C with maximum specified ripple current (see page 6) |      |     |         |     |      |                   |                                             |       |      |      |      |       |

\*Use of temperature ripple current multipliers may limit life to the hours specified for the maximum operating temperature.

## Part Number System



**TS-HB Standard Ratings** (part numbers shown with 2 pins, 6.3mm length terminal, and top vinyl plate)

| Cap.<br>(μF)                   | Size (mm)<br>D x L | Max 105°C R.C. (A <sub>rms</sub> ) |        | 20°C ESR (Ω, max.) |       | Panasonic<br>Part Number |
|--------------------------------|--------------------|------------------------------------|--------|--------------------|-------|--------------------------|
|                                |                    | 120Hz                              | 10kHz~ | 120Hz              | 20kHz |                          |
| 160 VDC Working, 200 VDC Surge |                    |                                    |        |                    |       |                          |
| 470                            | 22 x 30            | 1.40                               | 1.96   | 0.423              | 0.190 | ECOS2CB471BA             |
| 560                            | 22 x 35            | 1.50                               | 2.10   | 0.355              | 0.160 | ECOS2CB561BA             |
| 680                            | 22 x 40            | 1.70                               | 2.38   | 0.293              | 0.132 | ECOS2CB681BA             |
|                                | 25 x 30            | 1.70                               | 2.38   | 0.293              | 0.132 | ECOS2CB681CA             |
| 820                            | 22 x 45            | 2.00                               | 2.80   | 0.243              | 0.109 | ECOS2CB821BA             |
|                                | 25 x 35            | 2.00                               | 2.80   | 0.243              | 0.109 | ECOS2CB821CA             |
| 1000                           | 22 x 50            | 2.20                               | 3.08   | 0.199              | 0.090 | ECOS2CB102BA             |
|                                | 25 x 40            | 2.20                               | 3.08   | 0.199              | 0.090 | ECOS2CB102CA             |
|                                | 30 x 30            | 2.20                               | 3.08   | 0.199              | 0.090 | ECOS2CB102DA             |
|                                | 35 x 25            | 2.20                               | 3.08   | 0.199              | 0.090 | ECOS2CB102EA             |
| 1200                           | 25 x 45            | 2.30                               | 3.22   | 0.180              | 0.090 | ECOS2CB122CA             |
|                                | 30 x 35            | 2.30                               | 3.22   | 0.180              | 0.090 | ECOS2CB122DA             |
|                                | 35 x 30            | 2.30                               | 3.22   | 0.180              | 0.090 | ECOS2CB122EA             |
| 1500                           | 30 x 40            | 2.50                               | 3.50   | 0.144              | 0.072 | ECOS2CB152DA             |
|                                | 35 x 30            | 2.50                               | 3.50   | 0.144              | 0.072 | ECOS2CB152EA             |
| 1800                           | 30 x 45            | 2.70                               | 3.78   | 0.129              | 0.064 | ECOS2CB182DA             |
|                                | 35 x 35            | 2.70                               | 3.78   | 0.129              | 0.064 | ECOS2CB182EA             |
| 2200                           | 35 x 45            | 2.90                               | 4.06   | 0.105              | 0.063 | ECOS2CB222EA             |
| 2700                           | 35 x 50            | 3.10                               | 4.34   | 0.086              | 0.052 | ECOS2CB272EA             |
| 200 VDC Working, 250 VDC Surge |                    |                                    |        |                    |       |                          |
| 390                            | 22 x 30            | 1.30                               | 1.82   | 0.510              | 0.230 | ECOS2DB391BA             |
|                                | 25 x 25            | 1.30                               | 1.82   | 0.510              | 0.230 | ECOS2DB391CA             |
| 470                            | 22 x 35            | 1.40                               | 1.96   | 0.423              | 0.190 | ECOS2DB471BA             |
|                                | 25 x 30            | 1.40                               | 1.96   | 0.423              | 0.190 | ECOS2DB471CA             |
| 560                            | 22 x 40            | 1.50                               | 2.10   | 0.355              | 0.160 | ECOS2DB561BA             |
|                                | 25 x 30            | 1.50                               | 2.10   | 0.355              | 0.160 | ECOS2DB561CA             |
|                                | 30 x 25            | 1.50                               | 2.10   | 0.355              | 0.160 | ECOS2DB561DA             |
| 680                            | 22 x 45            | 1.70                               | 2.38   | 0.293              | 0.132 | ECOS2DB681BA             |
|                                | 25 x 35            | 1.70                               | 2.38   | 0.293              | 0.132 | ECOS2DB681CA             |
|                                | 30 x 45            | 2.00                               | 2.80   | 0.263              | 0.118 | ECOS2DB821CA             |
| 820                            | 30 x 30            | 2.00                               | 2.80   | 0.263              | 0.118 | ECOS2DB821DA             |
|                                | 35 x 25            | 2.00                               | 2.80   | 0.263              | 0.118 | ECOS2DB821EA             |

| Cap.<br>(μF)                               | Size (mm)<br>D x L | Max 105°C R.C. (A <sub>rms</sub> ) |        | 20°C ESR (Ω, max.) |       | Panasonic<br>Part Number |
|--------------------------------------------|--------------------|------------------------------------|--------|--------------------|-------|--------------------------|
|                                            |                    | 120Hz                              | 10kHz~ | 120Hz              | 20kHz |                          |
| 200 VDC Working, 250 VDC Surge (continued) |                    |                                    |        |                    |       |                          |
| 1000                                       | 25 x 50            | 2.20                               | 3.08   | 0.216              | 0.108 | ECOS2DB102CA             |
|                                            | 30 x 35            | 2.20                               | 3.08   | 0.216              | 0.108 | ECOS2DB102DA             |
|                                            | 35 x 30            | 2.20                               | 3.08   | 0.216              | 0.108 | ECOS2DB102EA             |
| 1200                                       | 30 x 40            | 2.30                               | 3.22   | 0.193              | 0.097 | ECOS2DB122DA             |
|                                            | 35 x 35            | 2.30                               | 3.22   | 0.193              | 0.097 | ECOS2DB122EA             |
| 1500                                       | 30 x 50            | 2.50                               | 3.50   | 0.155              | 0.077 | ECOS2DB152DA             |
|                                            | 35 x 40            | 2.50                               | 3.50   | 0.155              | 0.077 | ECOS2DB152EA             |
| 1800                                       | 35 x 45            | 2.70                               | 3.78   | 0.129              | 0.077 | ECOS2DB182EA             |
| 2200                                       | 35 x 50            | 2.90                               | 4.06   | 0.105              | 0.063 | ECOS2DB222EA             |
| 250 VDC Working, 300 VDC Surge             |                    |                                    |        |                    |       |                          |
| 180                                        | 22 x 25            | 0.90                               | 1.26   | 0.921              | 0.461 | ECOS2EB181BA             |
| 220                                        | 22 x 30            | 1.00                               | 1.40   | 0.754              | 0.377 | ECOS2EB221BA             |
| 270                                        | 22 x 35            | 1.10                               | 1.54   | 0.614              | 0.307 | ECOS2EB271BA             |
| 330                                        | 22 x 40            | 1.20                               | 1.68   | 0.502              | 0.251 | ECOS2EB331BA             |
|                                            | 25 x 30            | 1.20                               | 1.68   | 0.502              | 0.251 | ECOS2EB331CA             |
| 390                                        | 22 x 45            | 1.30                               | 1.82   | 0.425              | 0.213 | ECOS2EB391BA             |
|                                            | 20 x 25            | 1.30                               | 1.82   | 0.425              | 0.213 | ECOS2EB391DA             |
| 470                                        | 22 x 50            | 1.40                               | 1.96   | 0.353              | 0.176 | ECOS2EB471BA             |
|                                            | 25 x 40            | 1.40                               | 1.96   | 0.353              | 0.176 | ECOS2EB471CA             |
|                                            | 30 x 30            | 1.40                               | 1.96   | 0.353              | 0.176 | ECOS2EB471DA             |
| 560                                        | 25 x 45            | 1.50                               | 2.10   | 0.296              | 0.148 | ECOS2EB561CA             |
|                                            | 25 x 25            | 1.50                               | 2.10   | 0.296              | 0.148 | ECOS2EB561EA             |
| 680                                        | 25 x 50            | 1.70                               | 2.38   | 0.244              | 0.134 | ECOS2EB681CA             |
|                                            | 30 x 40            | 1.70                               | 2.38   | 0.244              | 0.134 | ECOS2EB681DA             |
|                                            | 35 x 30            | 1.70                               | 2.38   | 0.244              | 0.134 | ECOS2EB681EA             |
| 820                                        | 30 x 45            | 2.00                               | 2.80   | 0.202              | 0.111 | ECOS2EB821DA             |
|                                            | 35 x 35            | 2.00                               | 2.80   | 0.202              | 0.111 | ECOS2EB821EA             |
| 1000                                       | 30 x 50            | 2.20                               | 3.08   | 0.199              | 0.109 | ECOS2EB102DA             |
|                                            | 35 x 40            | 2.20                               | 3.08   | 0.199              | 0.109 | ECOS2EB102EA             |
| 1200                                       | 35 x 45            | 2.30                               | 3.22   | 0.166              | 0.099 | ECOS2EB122EA             |
| 1500                                       | 35 x 50            | 2.50                               | 3.50   | 0.144              | 0.093 | ECOS2EB152EA             |

## TS-HB Standard Ratings (continued)

| Cap.<br>(μF)                   | Size (mm)<br>D x L | Max 105°C R.C. (A <sub>rms</sub> ) |        | 20°C ESR (Ω, max.) |       | Panasonic<br>Part Number |
|--------------------------------|--------------------|------------------------------------|--------|--------------------|-------|--------------------------|
|                                |                    | 120Hz                              | 10kHz~ | 120Hz              | 20kHz |                          |
| 385 VDC Working, 435 VDC Surge |                    |                                    |        |                    |       |                          |
| 82                             | 22 x 30            | 0.64                               | 0.90   | 2.022              | 0.809 | ECOS2TB820BA             |
| 100                            | 22 x 30            | 0.69                               | 0.97   | 1.658              | 0.663 | ECOS2TB101BA             |
|                                | 25 x 25            | 0.69                               | 0.97   | 1.658              | 0.663 | ECOS2TB101CA             |
| 120                            | 22 x 35            | 0.75                               | 1.05   | 1.382              | 0.553 | ECOS2TB121BA             |
|                                | 25 x 30            | 0.75                               | 1.05   | 1.382              | 0.553 | ECOS2TB121CA             |
| 150                            | 22 x 40            | 0.82                               | 1.15   | 1.105              | 0.442 | ECOS2TB151BA             |
|                                | 25 x 30            | 0.82                               | 1.15   | 1.105              | 0.442 | ECOS2TB151CA             |
|                                | 30 x 25            | 0.82                               | 1.15   | 1.105              | 0.442 | ECOS2TB151DA             |
| 180                            | 22 x 45            | 0.95                               | 1.33   | 0.921              | 0.368 | ECOS2TB181BA             |
|                                | 25 x 35            | 0.95                               | 1.33   | 0.921              | 0.368 | ECOS2TB181CA             |
|                                | 30 x 30            | 0.95                               | 1.33   | 0.921              | 0.368 | ECOS2TB181DA             |
| 220                            | 25 x 45            | 1.10                               | 1.54   | 0.754              | 0.301 | ECOS2TB221CA             |
|                                | 30 x 30            | 1.10                               | 1.54   | 0.829              | 0.332 | ECOS2TB221DA             |
|                                | 35 x 25            | 1.10                               | 1.54   | 0.829              | 0.332 | ECOS2TB221EA             |
| 270                            | 25 x 50            | 1.20                               | 1.68   | 0.675              | 0.270 | ECOS2TB271CA             |
|                                | 35 x 30            | 1.20                               | 1.68   | 0.675              | 0.270 | ECOS2TB271EA             |
| 330                            | 30 x 45            | 1.35                               | 1.89   | 0.553              | 0.221 | ECOS2TB331DA             |
|                                | 35 x 35            | 1.35                               | 1.89   | 0.553              | 0.221 | ECOS2TB331EA             |
| 390                            | 30 x 50            | 1.55                               | 2.17   | 0.510              | 0.204 | ECOS2TB391DA             |
| 470                            | 35 x 45            | 1.75                               | 2.45   | 0.423              | 0.212 | ECOS2TB471EA             |
| 560                            | 35 x 50            | 1.80                               | 2.52   | 0.355              | 0.178 | ECOS2TB561EA             |
| 400 VDC Working, 450 VDC Surge |                    |                                    |        |                    |       |                          |
| 82                             | 22 x 30            | 0.64                               | 0.90   | 2.022              | 0.708 | ECOS2GB820BA             |
| 100                            | 22 x 30            | 0.69                               | 0.97   | 1.658              | 0.580 | ECOS2GB101BA             |
|                                | 25 x 25            | 0.69                               | 0.97   | 1.658              | 0.580 | ECOS2GB101CA             |
| 120                            | 22 x 35            | 0.75                               | 1.05   | 1.382              | 0.484 | ECOS2GB121BA             |
|                                | 25 x 30            | 0.75                               | 1.05   | 1.382              | 0.484 | ECOS2GB121CA             |
| 150                            | 22 x 40            | 0.82                               | 1.15   | 1.105              | 0.387 | ECOS2GB151BA             |
|                                | 25 x 30            | 0.82                               | 1.15   | 1.105              | 0.387 | ECOS2GB151CA             |
|                                | 30 x 25            | 0.82                               | 1.15   | 1.105              | 0.387 | ECOS2GB151DA             |
| 180                            | 22 x 45            | 0.95                               | 1.33   | 0.921              | 0.322 | ECOS2GB181BA             |
|                                | 25 x 35            | 0.95                               | 1.33   | 0.921              | 0.322 | ECOS2GB181CA             |
|                                | 30 x 30            | 0.95                               | 1.33   | 0.921              | 0.322 | ECOS2GB181DA             |
| 220                            | 25 x 45            | 1.10                               | 1.54   | 0.754              | 0.264 | ECOS2GB221CA             |
|                                | 30 x 30            | 1.10                               | 1.54   | 0.754              | 0.264 | ECOS2GB221DA             |
|                                | 35 x 25            | 1.10                               | 1.54   | 0.754              | 0.264 | ECOS2GB221EA             |
| 270                            | 25 x 50            | 1.20                               | 1.68   | 0.614              | 0.215 | ECOS2GB271CA             |
|                                | 30 x 35            | 1.20                               | 1.68   | 0.614              | 0.215 | ECOS2GB271DA             |
|                                | 35 x 30            | 1.20                               | 1.68   | 0.614              | 0.215 | ECOS2GB271EA             |
| 330                            | 30 x 45            | 1.35                               | 1.89   | 0.502              | 0.201 | ECOS2GB331DA             |
|                                | 35 x 35            | 1.35                               | 1.89   | 0.502              | 0.201 | ECOS2GB331EA             |
| 390                            | 30 x 50            | 1.55                               | 2.17   | 0.425              | 0.170 | ECOS2GB391DA             |
|                                | 35 x 40            | 1.55                               | 2.17   | 0.425              | 0.170 | ECOS2GB391EA             |
| 470                            | 35 x 45            | 1.75                               | 2.45   | 0.353              | 0.141 | ECOS2GB471EA             |
| 560                            | 35 x 50            | 1.80                               | 2.52   | 0.296              | 0.118 | ECOS2GB561EA             |
| 420 VDC Working, 470 VDC Surge |                    |                                    |        |                    |       |                          |
| 100                            | 22 x 30            | 0.64                               | 0.90   | 1.824              | 0.821 | ECOS2SB101BA             |
|                                | 25 x 25            | 0.64                               | 0.90   | 1.824              | 0.821 | ECOS2SB101CA             |
| 120                            | 22 x 35            | 0.72                               | 1.01   | 1.520              | 0.684 | ECOS2SB121BA             |
|                                | 25 x 30            | 0.72                               | 1.01   | 1.520              | 0.684 | ECOS2SB121CA             |
| 150                            | 22 x 40            | 0.79                               | 1.11   | 1.216              | 0.547 | ECOS2SB151BA             |
|                                | 25 x 30            | 0.79                               | 1.11   | 1.216              | 0.547 | ECOS2SB151CA             |
|                                | 30 x 25            | 0.79                               | 1.11   | 1.216              | 0.547 | ECOS2SB151DA             |
| 180                            | 22 x 45            | 0.87                               | 1.22   | 1.013              | 0.456 | ECOS2SB181BA             |
|                                | 25 x 40            | 0.87                               | 1.22   | 1.013              | 0.456 | ECOS2SB181CA             |
|                                | 30 x 30            | 0.87                               | 1.22   | 1.013              | 0.456 | ECOS2SB181DA             |
| 220                            | 25 x 45            | 1.00                               | 1.40   | 0.829              | 0.373 | ECOS2SB221CA             |
|                                | 30 x 30            | 1.00                               | 1.40   | 0.829              | 0.373 | ECOS2SB221DA             |
|                                | 35 x 25            | 1.00                               | 1.40   | 0.829              | 0.373 | ECOS2SB221EA             |
| 270                            | 25 x 50            | 1.19                               | 1.67   | 0.675              | 0.304 | ECOS2SB271CA             |
|                                | 30 x 40            | 1.19                               | 1.67   | 0.675              | 0.304 | ECOS2SB271DA             |
|                                | 35 x 30            | 1.19                               | 1.67   | 0.675              | 0.304 | ECOS2SB271EA             |
| 330                            | 30 x 45            | 1.38                               | 1.93   | 0.553              | 0.249 | ECOS2SB331DA             |
|                                | 35 x 35            | 1.38                               | 1.93   | 0.553              | 0.249 | ECOS2SB331EA             |
| 390                            | 30 x 50            | 1.55                               | 2.17   | 0.468              | 0.210 | ECOS2SB391DA             |
|                                | 35 x 40            | 1.55                               | 2.17   | 0.468              | 0.210 | ECOS2SB391EA             |
| 470                            | 35 x 45            | 1.74                               | 2.44   | 0.388              | 0.175 | ECOS2SB471EA             |
| 560                            | 35 x 50            | 1.90                               | 2.66   | 0.326              | 0.147 | ECOS2SB561EA             |

| Cap.<br>(μF)                               | Size (mm)<br>D x L | Max 105°C R.C. (A <sub>rms</sub> ) |        | 20°C ESR (Ω, max.) |       | Panasonic<br>Part Number |
|--------------------------------------------|--------------------|------------------------------------|--------|--------------------|-------|--------------------------|
|                                            |                    | 120Hz                              | 10kHz~ | 120Hz              | 20kHz |                          |
| 450 VDC Working, 500 VDC Surge (continued) |                    |                                    |        |                    |       |                          |
| 82                                         | 22 x 30            | 0.56                               | 0.78   | 2.022              | 0.708 | ECOS2WB820BA             |
| 100                                        | 25 x 25            | 0.56                               | 0.78   | 2.022              | 0.708 | ECOS2WB820CA             |
|                                            | 22 x 35            | 0.64                               | 0.90   | 1.658              | 0.580 | ECOS2WB101BA             |
| 120                                        | 25 x 30            | 0.64                               | 0.90   | 1.658              | 0.580 | ECOS2WB101CA             |
|                                            | 22 x 40            | 0.72                               | 1.01   | 1.382              | 0.484 | ECOS2WB121BA             |
| 150                                        | 25 x 35            | 0.72                               | 1.01   | 1.382              | 0.484 | ECOS2WB121CA             |
|                                            | 30 x 25            | 0.72                               | 1.01   | 1.382              | 0.484 | ECOS2WB121DA             |
|                                            | 22 x 50            | 0.79                               | 1.11   | 1.105              | 0.387 | ECOS2WB151BA             |
| 180                                        | 25 x 40            | 0.79                               | 1.11   | 1.105              | 0.387 | ECOS2WB151CA             |
|                                            | 30 x 30            | 0.79                               | 1.11   | 1.105              | 0.387 | ECOS2WB151DA             |
|                                            | 35 x 25            | 0.79                               | 1.11   | 1.105              | 0.387 | ECOS2WB151EA             |
| 220                                        | 25 x 45            | 0.87                               | 1.22   | 0.921              | 0.322 | ECOS2WB181CA             |
|                                            | 30 x 35            | 0.87                               | 1.22   | 0.921              | 0.322 | ECOS2WB181DA             |
| 270                                        | 25 x 50            | 1.00                               | 1.40   | 0.754              | 0.264 | ECOS2WB221CA             |
|                                            | 30 x 40            | 1.00                               | 1.40   | 0.754              | 0.264 | ECOS2WB221DA             |
|                                            | 35 x 30            | 1.00                               | 1.40   | 0.754              | 0.264 | ECOS2WB221EA             |
| 330                                        | 30 x 45            | 1.19                               | 1.67   | 0.614              | 0.215 | ECOS2WB271DA             |
|                                            | 35 x 35            | 1.19                               | 1.67   | 0.614              | 0.215 | ECOS2WB271EA             |
| 390                                        | 30 x 50            | 1.38                               | 1.93   | 0.502              | 0.176 | ECOS2WB331DA             |
|                                            | 35 x 40            | 1.38                               | 1.93   | 0.502              | 0.176 | ECOS2WB331EA             |
| 470                                        | 35 x 45            | 1.55                               | 2.17   | 0.425              | 0.149 | ECOS2WB391EA             |
| 470                                        | 35 x 50            | 1.74                               | 2.44   | 0.353              | 0.123 | ECOS2WB471EA             |