

# TS-HC Series

snap-in style

- **Highly miniaturized version (30% smaller than HB series)**
- **2 and 3 pin versions available**
- **2000 hour life at 105°C**
- **Can vent construction**



|                                                                                                               |                                                                         |                                              |
|---------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------|----------------------------------------------|
| Rated Working Voltage:                                                                                        | 10 ~ 250 VDC                                                            | 350 ~ 450 VDC                                |
| Operating Temperature:                                                                                        | -40 ~ +105°C                                                            | -25 ~ +105°C                                 |
| Nominal Capacitance:                                                                                          | 270~100000 µF                                                           | 100 ~ 820µF                                  |
| Capacitance Tolerance:                                                                                        | ± 20%                                                                   |                                              |
| Dissipation Factor:<br>(120 Hz, +20°C)                                                                        | Working Voltage [V]:                                                    | 10   16   25   35   50   63   80   100 - 450 |
|                                                                                                               | Max. D.F. (%):                                                          | 55   45   35   30   25   20   17   15        |
| For capacitance values > 33000µF, add the value of: $\frac{(\text{rated cap. } [\mu\text{F}] - 33000)}{1000}$ |                                                                         |                                              |
| Leakage Current:                                                                                              | 3vCV (µA) max. after 5 minutes; C = Capacitance in µF, V = WV           |                                              |
| Ripple Current Multipliers:                                                                                   | Frequency(Hz):                                                          | 50   60   100~120   500   1k   10k~          |
|                                                                                                               | 10~100WV:                                                               | 0.93   0.95   1.0   1.05   1.08   1.15       |
|                                                                                                               | 160~500WV:                                                              | 0.75   0.8   1.0   1.2   1.25   1.4          |
| Ripple Current Ambient Temperature Factors*                                                                   |                                                                         |                                              |
| Ambient Temperature: 105°C   85°C   70°C   60°C   =45°C                                                       |                                                                         |                                              |
| Multiplier: 1.0   1.7   2.0   2.2   2.35                                                                      |                                                                         |                                              |
| Endurance:                                                                                                    | 2000 hours at +105°C with maximum specified ripple current (see page 4) |                                              |

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

## Part Number System

**E E T**  
Common Code

**H C**  
Series Code

**□ □**  
Voltage Code

**□ □ □**  
Capacitance Code

| Diameter / Terminal Code        |       |       |       |
|---------------------------------|-------|-------|-------|
| # of pins:                      | 2     | 2     | 3     |
| pin length:                     | 6.3mm | 4.0mm | 4.0mm |
| Diameter                        | 22mm  | B     | H     |
|                                 | 25mm  | C     | J     |
|                                 | 30mm  | D     | K     |
|                                 | 35mm  | E     | L     |
| (Please see page 7 for details) |       |       |       |

| Top Vinyl Plate |                           |
|-----------------|---------------------------|
| A               | with plate                |
|                 | without plate (no suffix) |

## TS-HC 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 |                          |
| 10 VDC Working, 13 VDC Surge |                    |                                    |        |                    |       |                          |
| 12000                        | 22 x 25            | 2.20                               | 2.53   | 0.076              | 0.065 | EETHC1A123BA             |
| 18000                        | 22 x 30            | 2.40                               | 2.76   | 0.051              | 0.043 | EETHC1A183BA             |
|                              | 25 x 25            | 2.40                               | 2.76   | 0.051              | 0.043 | EETHC1A183CA             |
| 22000                        | 22 x 35            | 2.60                               | 2.99   | 0.041              | 0.035 | EETHC1A223BA             |
|                              | 25 x 30            | 2.60                               | 2.99   | 0.041              | 0.035 | EETHC1A223CA             |
| 27000                        | 22 x 40            | 3.10                               | 3.57   | 0.034              | 0.029 | EETHC1A273BA             |
|                              | 25 x 35            | 3.10                               | 3.57   | 0.034              | 0.029 | EETHC1A273CA             |
|                              | 30 x 25            | 3.10                               | 3.57   | 0.034              | 0.029 | EETHC1A273DA             |
| 33000                        | 22 x 45            | 3.40                               | 3.91   | 0.028              | 0.023 | EETHC1A333BA             |
|                              | 25 x 40            | 3.40                               | 3.91   | 0.028              | 0.023 | EETHC1A333CA             |
| 39000                        | 25 x 45            | 3.70                               | 4.26   | 0.026              | 0.022 | EETHC1A393CA             |
|                              | 30 x 30            | 3.70                               | 4.26   | 0.026              | 0.023 | EETHC1A393DA             |
|                              | 35 x 25            | 3.70                               | 4.26   | 0.026              | 0.022 | EETHC1A393EA             |
| 47000                        | 25 x 50            | 4.20                               | 4.83   | 0.024              | 0.021 | EETHC1A473CA             |
|                              | 30 x 35            | 4.20                               | 4.83   | 0.024              | 0.022 | EETHC1A473DA             |
|                              | 35 x 30            | 4.20                               | 4.83   | 0.024              | 0.021 | EETHC1A473EA             |
| 56000                        | 30 x 40            | 5.00                               | 5.75   | 0.023              | 0.021 | EETHC1A563DA             |
|                              | 35 x 35            | 5.00                               | 5.75   | 0.023              | 0.020 | EETHC1A563EA             |
| 68000                        | 30 x 45            | 5.40                               | 6.21   | 0.022              | 0.020 | EETHC1A683DA             |
|                              | 35 x 40            | 5.40                               | 6.21   | 0.022              | 0.019 | EETHC1A683EA             |
| 82000                        | 35 x 45            | 6.10                               | 7.02   | 0.021              | 0.019 | EETHC1A823EA             |
| 100000                       | 35 x 50            | 6.90                               | 7.94   | 0.020              | 0.019 | EETHC1A104EA             |
| 16 VDC Working, 20 VDC Surge |                    |                                    |        |                    |       |                          |
| 10000                        | 22 x 25            | 2.60                               | 2.99   | 0.075              | 0.063 | EETHC1C103BA             |
| 12000                        | 22 x 30            | 2.90                               | 3.34   | 0.062              | 0.053 | EETHC1C123BA             |
|                              | 25 x 25            | 2.90                               | 3.34   | 0.062              | 0.053 | EETHC1C123CA             |
| 15000                        | 22 x 35            | 3.20                               | 3.68   | 0.050              | 0.042 | EETHC1C153BA             |

| 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 |                          |
| 16 VDC Working, 20 VDC Surge (continued) |                    |                                    |        |                    |       |                          |
| 18000                                    | 22 x 40            | 3.50                               | 4.03   | 0.041              | 0.035 | EETHC1C183BA             |
|                                          | 25 x 30            | 3.50                               | 4.03   | 0.041              | 0.035 | EETHC1C183CA             |
| 22000                                    | 22 x 45            | 3.80                               | 4.37   | 0.034              | 0.029 | EETHC1C223BA             |
|                                          | 25 x 35            | 3.80                               | 4.37   | 0.034              | 0.029 | EETHC1C223CA             |
|                                          | 30 x 25            | 3.80                               | 4.37   | 0.034              | 0.029 | EETHC1C223DA             |
| 27000                                    | 22 x 50            | 4.20                               | 4.83   | 0.028              | 0.023 | EETHC1C273BA             |
|                                          | 25 x 40            | 4.20                               | 4.83   | 0.028              | 0.023 | EETHC1C273CA             |
|                                          | 30 x 30            | 4.20                               | 4.83   | 0.028              | 0.023 | EETHC1C273DA             |
|                                          | 35 x 25            | 4.20                               | 4.83   | 0.028              | 0.023 | EETHC1C273EA             |
| 33000                                    | 25 x 45            | 4.70                               | 5.41   | 0.023              | 0.019 | EETHC1C333CA             |
|                                          | 30 x 35            | 4.70                               | 5.41   | 0.023              | 0.019 | EETHC1C333DA             |
|                                          | 35 x 30            | 4.70                               | 5.41   | 0.023              | 0.020 | EETHC1C333EA             |
| 39000                                    | 30 x 40            | 5.10                               | 5.87   | 0.022              | 0.018 | EETHC1C393DA             |
|                                          | 35 x 35            | 5.10                               | 5.87   | 0.022              | 0.020 | EETHC1C393EA             |
| 47000                                    | 30 x 45            | 5.50                               | 6.33   | 0.016              | 0.014 | EETHC1C473DA             |
|                                          | 35 x 40            | 5.50                               | 6.33   | 0.021              | 0.019 | EETHC1C473EA             |
| 56000                                    | 30 x 50            | 6.00                               | 6.90   | 0.020              | 0.018 | EETHC1C563DA             |
|                                          | 35 x 45            | 6.00                               | 6.90   | 0.020              | 0.018 | EETHC1C563EA             |
| 25 VDC Working, 32 VDC Surge             |                    |                                    |        |                    |       |                          |
| 6800                                     | 22 x 25            | 2.40                               | 2.76   | 0.085              | 0.064 | EETHC1E682BA             |
| 8200                                     | 22 x 30            | 2.70                               | 3.11   | 0.071              | 0.053 | EETHC1E822BA             |
|                                          | 25 x 25            | 2.70                               | 3.11   | 0.071              | 0.053 | EETHC1E822CA             |
| 10000                                    | 22 x 35            | 3.00                               | 3.45   | 0.058              | 0.044 | EETHC1E103BA             |
| 12000                                    | 22 x 40            | 3.20                               | 3.68   | 0.048              | 0.036 | EETHC1E123BA             |
|                                          | 25 x 30            | 3.20                               | 3.68   | 0.048              | 0.036 | EETHC1E123CA             |
| 15000                                    | 22 x 45            | 3.60                               | 4.14   | 0.039              | 0.029 | EETHC1E153BA             |
|                                          | 25 x 35            | 3.60                               | 4.14   | 0.039              | 0.029 | EETHC1E153CA             |

## TS-HC 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 |                          |
| 25 VDC Working, 32 VDC Surge (continued) |                    |                                    |        |                    |       |                          |
| 15000                                    | 30 x 25            | 3.60                               | 4.14   | 0.039              | 0.029 | EETHC1E153DA             |
| 18000                                    | 22 x 50            | 3.90                               | 4.49   | 0.032              | 0.024 | EETHC1E183BA             |
|                                          | 25 x 40            | 3.90                               | 4.49   | 0.032              | 0.024 | EETHC1E183CA             |
|                                          | 30 x 30            | 3.90                               | 4.49   | 0.032              | 0.024 | EETHC1E183DA             |
|                                          | 35 x 25            | 3.90                               | 4.49   | 0.032              | 0.024 | EETHC1E183EA             |
| 22000                                    | 25 x 45            | 4.30                               | 4.95   | 0.026              | 0.020 | EETHC1E223CA             |
|                                          | 30 x 35            | 4.30                               | 4.95   | 0.026              | 0.020 | EETHC1E223DA             |
|                                          | 35 x 30            | 4.30                               | 4.95   | 0.026              | 0.020 | EETHC1E223EA             |
| 27000                                    | 30 x 40            | 4.80                               | 5.52   | 0.021              | 0.016 | EETHC1E273DA             |
|                                          | 35 x 35            | 4.80                               | 5.52   | 0.021              | 0.016 | EETHC1E273EA             |
| 33000                                    | 30 x 45            | 5.50                               | 6.33   | 0.018              | 0.013 | EETHC1E333DA             |
|                                          | 35 x 40            | 5.50                               | 6.33   | 0.018              | 0.014 | EETHC1E333EA             |
| 39000                                    | 30 x 50            | 5.80                               | 6.67   | 0.017              | 0.013 | EETHC1E393DA             |
|                                          | 35 x 45            | 5.80                               | 6.67   | 0.017              | 0.014 | EETHC1E393EA             |
| 47000                                    | 35 x 50            | 6.30                               | 7.25   | 0.017              | 0.014 | EETHC1E473EA             |
| 35 VDC Working, 44 VDC Surge             |                    |                                    |        |                    |       |                          |
| 4700                                     | 22 x 25            | 2.20                               | 2.53   | 0.106              | 0.079 | EETHC1V472BA             |
| 5600                                     | 22 x 30            | 2.40                               | 2.76   | 0.089              | 0.067 | EETHC1V562BA             |
|                                          | 25 x 25            | 2.40                               | 2.76   | 0.089              | 0.067 | EETHC1V562CA             |
| 6800                                     | 22 x 35            | 2.60                               | 2.99   | 0.073              | 0.055 | EETHC1V682BA             |
| 8200                                     | 22 x 40            | 2.90                               | 3.34   | 0.061              | 0.045 | EETHC1V822BA             |
|                                          | 25 x 30            | 2.90                               | 3.34   | 0.061              | 0.045 | EETHC1V822CA             |
| 10000                                    | 22 x 45            | 3.20                               | 3.68   | 0.050              | 0.037 | EETHC1V103BA             |
|                                          | 25 x 35            | 3.20                               | 3.68   | 0.050              | 0.037 | EETHC1V103CA             |
|                                          | 30 x 25            | 3.20                               | 3.68   | 0.050              | 0.037 | EETHC1V103DA             |
| 12000                                    | 25 x 40            | 3.50                               | 4.03   | 0.041              | 0.031 | EETHC1V123CA             |
|                                          | 30 x 30            | 3.50                               | 4.03   | 0.041              | 0.031 | EETHC1V123DA             |
|                                          | 35 x 25            | 3.50                               | 4.03   | 0.041              | 0.031 | EETHC1V123EA             |
| 15000                                    | 25 x 45            | 3.90                               | 4.49   | 0.033              | 0.025 | EETHC1V153CA             |
|                                          | 30 x 35            | 3.90                               | 4.49   | 0.033              | 0.025 | EETHC1V153DA             |
|                                          | 35 x 30            | 3.90                               | 4.49   | 0.033              | 0.025 | EETHC1V153EA             |
| 18000                                    | 30 x 40            | 4.30                               | 4.95   | 0.028              | 0.021 | EETHC1V183DA             |
|                                          | 35 x 35            | 4.30                               | 4.95   | 0.028              | 0.021 | EETHC1V183EA             |
| 22000                                    | 30 x 45            | 5.00                               | 5.75   | 0.023              | 0.017 | EETHC1V223DA             |
|                                          | 35 x 40            | 5.00                               | 5.75   | 0.023              | 0.017 | EETHC1V223EA             |
| 27000                                    | 30 x 50            | 5.30                               | 6.10   | 0.018              | 0.014 | EETHC1V273DA             |
|                                          | 35 x 45            | 5.30                               | 6.10   | 0.018              | 0.014 | EETHC1V273EA             |
| 33000                                    | 35 x 50            | 5.90                               | 6.79   | 0.015              | 0.012 | EETHC1V333EA             |
| 50 VDC Working, 63 VDC Surge             |                    |                                    |        |                    |       |                          |
| 2700                                     | 22 x 25            | 1.80                               | 2.07   | 0.154              | 0.115 | EETHC1H272BA             |
| 3300                                     | 22 x 30            | 2.00                               | 2.30   | 0.126              | 0.094 | EETHC1H332BA             |
| 3900                                     | 22 x 35            | 2.20                               | 2.53   | 0.106              | 0.080 | EETHC1H392BA             |
|                                          | 25 x 25            | 2.20                               | 2.53   | 0.106              | 0.080 | EETHC1H392CA             |
| 4700                                     | 22 x 40            | 2.50                               | 2.88   | 0.088              | 0.066 | EETHC1H472BA             |
|                                          | 25 x 30            | 2.50                               | 2.88   | 0.088              | 0.066 | EETHC1H472CA             |
| 5600                                     | 22 x 45            | 2.80                               | 3.22   | 0.074              | 0.056 | EETHC1H562BA             |
|                                          | 25 x 35            | 2.80                               | 3.22   | 0.074              | 0.056 | EETHC1H562CA             |
|                                          | 30 x 25            | 2.80                               | 3.22   | 0.074              | 0.056 | EETHC1H562DA             |
| 6800                                     | 22 x 50            | 3.30                               | 3.80   | 0.061              | 0.046 | EETHC1H682BA             |
|                                          | 25 x 40            | 3.30                               | 3.80   | 0.061              | 0.046 | EETHC1H682CA             |
|                                          | 30 x 30            | 3.30                               | 3.80   | 0.061              | 0.046 | EETHC1H682DA             |
|                                          | 35 x 25            | 3.30                               | 3.80   | 0.061              | 0.046 | EETHC1H682EA             |
| 8200                                     | 25 x 45            | 3.60                               | 4.14   | 0.051              | 0.038 | EETHC1H822CA             |
|                                          | 30 x 35            | 3.60                               | 4.14   | 0.051              | 0.038 | EETHC1H822DA             |
| 10000                                    | 25 x 50            | 4.00                               | 4.60   | 0.041              | 0.031 | EETHC1H103CA             |
|                                          | 30 x 40            | 4.00                               | 4.60   | 0.041              | 0.031 | EETHC1H103DA             |
|                                          | 35 x 30            | 4.00                               | 4.60   | 0.041              | 0.031 | EETHC1H103EA             |
| 12000                                    | 30 x 45            | 4.50                               | 5.18   | 0.035              | 0.026 | EETHC1H123DA             |
|                                          | 35 x 35            | 4.50                               | 5.18   | 0.035              | 0.028 | EETHC1H123EA             |
| 15000                                    | 30 x 50            | 4.80                               | 5.52   | 0.028              | 0.021 | EETHC1H153DA             |
|                                          | 35 x 40            | 4.80                               | 5.52   | 0.028              | 0.022 | EETHC1H153EA             |
| 18000                                    | 35 x 45            | 5.60                               | 6.44   | 0.023              | 0.018 | EETHC1H183EA             |
| 63 VDC Working, 79 VDC Surge             |                    |                                    |        |                    |       |                          |
| 2200                                     | 22 x 25            | 2.00                               | 2.30   | 0.151              | 0.113 | EETHC1J222BA             |
| 2700                                     | 22 x 30            | 2.20                               | 2.53   | 0.123              | 0.092 | EETHC1J272BA             |
|                                          | 25 x 25            | 2.20                               | 2.53   | 0.123              | 0.092 | EETHC1J272CA             |
| 3300                                     | 22 x 35            | 2.50                               | 2.88   | 0.100              | 0.075 | EETHC1J332BA             |
| 3900                                     | 22 x 40            | 2.70                               | 3.11   | 0.085              | 0.064 | EETHC1J392BA             |
|                                          | 25 x 30            | 2.70                               | 3.11   | 0.085              | 0.064 | EETHC1J392CA             |
|                                          | 30 x 25            | 2.70                               | 3.11   | 0.085              | 0.064 | EETHC1J392DA             |
| 4700                                     | 22 x 45            | 3.00                               | 3.45   | 0.071              | 0.053 | EETHC1J472BA             |
| 63 VDC Working, 79 VDC Surge (continued) |                    |                                    |        |                    |       |                          |
| 4700                                     | 25 x 35            | 3.00                               | 3.45   | 0.071              | 0.053 | EETHC1J472CA             |
| 5600                                     | 22 x 50            | 3.30                               | 3.80   | 0.059              | 0.044 | EETHC1J562BA             |
|                                          | 25 x 40            | 3.30                               | 3.80   | 0.059              | 0.044 | EETHC1J562CA             |
|                                          | 30 x 30            | 3.30                               | 3.80   | 0.059              | 0.044 | EETHC1J562DA             |
|                                          | 35 x 25            | 3.30                               | 3.80   | 0.059              | 0.044 | EETHC1J562EA             |
| 6800                                     | 25 x 45            | 3.60                               | 4.14   | 0.049              | 0.037 | EETHC1J682CA             |
|                                          | 30 x 35            | 3.60                               | 4.14   | 0.049              | 0.037 | EETHC1J682DA             |
|                                          | 35 x 30            | 3.60                               | 4.14   | 0.049              | 0.037 | EETHC1J682EA             |
| 8200                                     | 30 x 40            | 3.90                               | 4.49   | 0.040              | 0.030 | EETHC1J822DA             |
|                                          | 35 x 35            | 3.90                               | 4.49   | 0.040              | 0.030 | EETHC1J822EA             |
| 10000                                    | 30 x 45            | 4.40                               | 5.06   | 0.033              | 0.025 | EETHC1J103DA             |
|                                          | 35 x 40            | 4.40                               | 5.06   | 0.033              | 0.025 | EETHC1J103EA             |
| 12000                                    | 30 x 50            | 4.80                               | 5.52   | 0.028              | 0.021 | EETHC1J123DA             |
|                                          | 35 x 45            | 4.80                               | 5.52   | 0.028              | 0.022 | EETHC1J123EA             |
| 15000                                    | 35 x 50            | 5.40                               | 6.21   | 0.022              | 0.018 | EETHC1J153EA             |
| 80 VDC Working, 100 VDC Surge            |                    |                                    |        |                    |       |                          |
| 1200                                     | 22 x 25            | 1.50                               | 1.73   | 0.235              | 0.176 | EETHC1K122BA             |
| 1500                                     | 22 x 30            | 1.70                               | 1.96   | 0.188              | 0.141 | EETHC1K152BA             |
|                                          | 25 x 25            | 1.70                               | 1.96   | 0.188              | 0.141 | EETHC1K152CA             |
| 1800                                     | 22 x 35            | 1.80                               | 2.07   | 0.157              | 0.117 | EETHC1K182BA             |
| 2200                                     | 22 x 40            | 2.10                               | 2.42   | 0.128              | 0.096 | EETHC1K222BA             |
|                                          | 25 x 30            | 2.10                               | 2.42   | 0.128              | 0.096 | EETHC1K222CA             |
| 2700                                     | 22 x 45            | 2.40                               | 2.76   | 0.104              | 0.078 | EETHC1K272BA             |
|                                          | 25 x 35            | 2.40                               | 2.76   | 0.104              | 0.078 | EETHC1K272CA             |
|                                          | 30 x 25            | 2.40                               | 2.76   | 0.104              | 0.078 | EETHC1K272DA             |
| 3300                                     | 22 x 50            | 2.60                               | 2.99   | 0.085              | 0.064 | EETHC1K332BA             |
|                                          | 25 x 40            | 2.60                               | 2.99   | 0.085              | 0.064 | EETHC1K332CA             |
|                                          | 30 x 30            | 2.60                               | 2.99   | 0.085              | 0.064 | EETHC1K332DA             |
|                                          | 35 x 25            | 2.60                               | 2.99   | 0.085              | 0.064 | EETHC1K332EA             |
| 3900                                     | 25 x 45            | 3.00                               | 3.45   | 0.072              | 0.054 | EETHC1K392CA             |
|                                          | 30 x 35            | 3.00                               | 3.45   | 0.072              | 0.054 | EETHC1K392DA             |
| 4700                                     | 25 x 50            | 3.30                               | 3.80   | 0.060              | 0.045 | EETHC1K472CA             |
|                                          | 30 x 40            | 3.30                               | 3.80   | 0.060              | 0.045 | EETHC1K472DA             |
|                                          | 35 x 30            | 3.30                               | 3.80   | 0.060              | 0.045 | EETHC1K472EA             |
| 5600                                     | 30 x 45            | 3.70                               | 4.26   | 0.050              | 0.038 | EETHC1K562DA             |
|                                          | 35 x 35            | 3.70                               | 4.26   | 0.050              | 0.038 | EETHC1K562EA             |
| 6800                                     | 30 x 50            | 3.90                               | 4.49   | 0.041              | 0.031 | EETHC1K682DA             |
|                                          | 35 x 40            | 3.90                               | 4.49   | 0.041              | 0.032 | EETHC1K682EA             |
| 8200                                     | 35 x 45            | 4.50                               | 5.18   | 0.034              | 0.027 | EETHC1K822EA             |
| 100 VDC Working, 125 VDC Surge           |                    |                                    |        |                    |       |                          |
| 820                                      | 22 x 25            | 1.40                               | 1.61   | 0.303              | 0.197 | EETHC2A821BA             |
| 1200                                     | 22 x 30            | 1.80                               | 2.07   | 0.207              | 0.135 | EETHC2A122BA             |
|                                          | 25 x 25            | 1.80                               | 2.07   | 0.207              | 0.135 | EETHC2A122CA             |
| 1500                                     | 22 x 35            | 2.10                               | 2.42   | 0.166              | 0.108 | EETHC2A152BA             |
|                                          | 25 x 30            | 2.10                               | 2.42   | 0.166              | 0.108 | EETHC2A152CA             |
| 1800                                     | 22 x 40            | 2.30                               | 2.65   | 0.138              | 0.090 | EETHC2A182BA             |
|                                          | 25 x 35            | 2.30                               | 2.65   | 0.138              | 0.090 | EETHC2A182CA             |
|                                          | 30 x 25            | 2.30                               | 2.65   | 0.138              | 0.090 | EETHC2A182DA             |
| 2200                                     | 22 x 45            | 2.60                               | 2.99   | 0.113              | 0.073 | EETHC2A222BA             |
|                                          | 25 x 40            | 2.60                               | 2.99   | 0.113              | 0.073 | EETHC2A222CA             |
|                                          | 30 x 30            | 2.60                               | 2.99   | 0.113              | 0.073 | EETHC2A222DA             |
|                                          | 35 x 25            | 2.60                               | 2.99   | 0.113              | 0.073 | EETHC2A222EA             |
| 2700                                     | 25 x 45            | 2.90                               | 3.34   | 0.092              | 0.060 | EETHC2A272CA             |
|                                          | 30 x 35            | 2.90                               | 3.34   | 0.092              | 0.060 | EETHC2A272DA             |
| 3300                                     | 25 x 50            | 3.20                               | 3.68   | 0.075              | 0.049 | EETHC2A332CA             |
|                                          | 30 x 40            | 3.20                               | 3.68   | 0.075              | 0.049 | EETHC2A332DA             |
|                                          | 35 x 30            | 3.20                               | 3.68   | 0.075              | 0.049 | EETHC2A332EA             |
| 3900                                     | 30 x 45            | 3.60                               | 4.14   | 0.064              | 0.043 | EETHC2A392DA             |
|                                          | 35 x 35            | 3.60                               | 4.14   | 0.064              | 0.043 | EETHC2A392EA             |
| 4700                                     | 30 x 50            | 3.80                               | 4.37   | 0.053              | 0.038 | EETHC2A472DA             |
|                                          | 35 x 40            | 3.80                               | 4.37   | 0.053              | 0.037 | EETHC2A472EA             |
| 5600                                     | 35 x 45            | 4.20                               | 4.83   | 0.044              | 0.031 | EETHC2A562EA             |
| 6800                                     | 35 x 50            | 4.70                               | 5.41   | 0.037              | 0.027 | EETHC2A682EA             |
| 160 VDC Working, 200 VDC Surge           |                    |                                    |        |                    |       |                          |
| 470                                      | 22 x 25            | 1.40                               | 1.96   | 0.423              | 0.190 | EETHC2C471BA             |
| 560                                      | 22 x 30            | 1.50                               | 2.10   | 0.355              | 0.160 | EETHC2C561BA             |
| 680                                      | 22 x 30            | 1.70                               | 2.38   | 0.293              | 0.132 | EETHC2C681BA             |
|                                          | 25 x 25            | 1.70                               | 2.38   | 0.293              | 0.132 | EETHC2C681CA             |
| 820                                      | 22 x 35            | 2.00                               | 2.80   | 0.243              | 0.109 | EETHC2C821BA             |
|                                          | 25 x 30            | 2.00                               | 2.80   | 0.243              | 0.109 | EETHC2C821CA             |
| 1000                                     | 22 x 40            | 2.20                               | 3.08   | 0.199              | 0.090 | EETHC2C102BA             |

## TS-HC 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 |                          |
| 160 VDC Working, 200 VDC Surge (continued) |                    |                                    |        |                    |       |                          |
| 1000                                       | 25 x 35            | 2.20                               | 3.08   | 0.199              | 0.090 | EETHC2C102CA             |
|                                            | 30 x 25            | 2.20                               | 3.08   | 0.216              | 0.108 | EETHC2C102DA             |
| 1200                                       | 22 x 45            | 2.30                               | 3.22   | 0.166              | 0.075 | EETHC2C122BA             |
|                                            | 25 x 40            | 2.30                               | 3.22   | 0.166              | 0.075 | EETHC2C122CA             |
|                                            | 30 x 30            | 2.30                               | 3.22   | 0.166              | 0.075 | EETHC2C122DA             |
|                                            | 35 x 25            | 2.30                               | 3.22   | 0.180              | 0.090 | EETHC2C122EA             |
| 1500                                       | 25 x 45            | 2.50                               | 3.50   | 0.133              | 0.060 | EETHC2C152CA             |
|                                            | 30 x 35            | 2.50                               | 3.50   | 0.133              | 0.060 | EETHC2C152DA             |
|                                            | 35 x 30            | 2.50                               | 3.50   | 0.155              | 0.077 | EETHC2C152EA             |
| 1800                                       | 25 x 50            | 2.70                               | 3.78   | 0.111              | 0.050 | EETHC2C182CA             |
|                                            | 30 x 40            | 2.70                               | 3.78   | 0.111              | 0.050 | EETHC2C182DA             |
|                                            | 35 x 30            | 2.70                               | 3.78   | 0.120              | 0.060 | EETHC2C182EA             |
| 2200                                       | 30 x 45            | 2.90                               | 4.06   | 0.090              | 0.041 | EETHC2C222DA             |
|                                            | 35 x 35            | 2.90                               | 4.06   | 0.098              | 0.049 | EETHC2C222EA             |
| 2700                                       | 30 x 50            | 3.10                               | 4.34   | 0.080              | 0.040 | EETHC2C272DA             |
|                                            | 35 x 40            | 3.10                               | 4.34   | 0.086              | 0.043 | EETHC2C272EA             |
| 3300                                       | 35 x 50            | 3.30                               | 4.62   | 0.070              | 0.042 | EETHC2C332EA             |
| 200 VDC Working, 250 VDC Surge             |                    |                                    |        |                    |       |                          |
| 390                                        | 22 x 25            | 1.31                               | 1.83   | 0.510              | 0.230 | EETHC2D391BA             |
| 470                                        | 22 x 30            | 1.45                               | 2.03   | 0.423              | 0.190 | EETHC2D471BA             |
| 560                                        | 22 x 30            | 1.67                               | 2.34   | 0.355              | 0.160 | EETHC2D561BA             |
| 680                                        | 22 x 40            | 1.75                               | 2.45   | 0.293              | 0.132 | EETHC2D681BA             |
|                                            | 25 x 30            | 1.75                               | 2.45   | 0.293              | 0.132 | EETHC2D681CA             |
| 820                                        | 22 x 45            | 2.04                               | 2.86   | 0.243              | 0.109 | EETHC2D821BA             |
|                                            | 25 x 35            | 2.04                               | 2.86   | 0.243              | 0.109 | EETHC2D821CA             |
|                                            | 30 x 25            | 2.04                               | 2.86   | 0.243              | 0.109 | EETHC2D821DA             |
| 1000                                       | 22 x 50            | 2.30                               | 3.22   | 0.199              | 0.090 | EETHC2D102BA             |
|                                            | 25 x 45            | 2.30                               | 3.22   | 0.199              | 0.090 | EETHC2D102CA             |
|                                            | 30 x 30            | 2.30                               | 3.22   | 0.199              | 0.090 | EETHC2D102DA             |
|                                            | 35 x 25            | 2.30                               | 3.22   | 0.216              | 0.097 | EETHC2D102EA             |
| 1200                                       | 25 x 50            | 2.65                               | 3.71   | 0.166              | 0.075 | EETHC2D122CA             |
|                                            | 30 x 35            | 2.65                               | 3.71   | 0.166              | 0.075 | EETHC2D122DA             |
|                                            | 35 x 30            | 2.65                               | 3.71   | 0.180              | 0.090 | EETHC2D122EA             |
| 1500                                       | 30 x 40            | 2.80                               | 3.92   | 0.133              | 0.060 | EETHC2D152DA             |
|                                            | 35 x 30            | 2.80                               | 3.92   | 0.144              | 0.072 | EETHC2D152EA             |
| 1800                                       | 30 x 45            | 3.08                               | 4.31   | 0.111              | 0.050 | EETHC2D182DA             |
|                                            | 35 x 40            | 3.08                               | 4.31   | 0.129              | 0.064 | EETHC2D182EA             |
| 2200                                       | 30 x 50            | 3.48                               | 4.87   | 0.090              | 0.041 | EETHC2D222DA             |
|                                            | 35 x 45            | 3.48                               | 4.87   | 0.098              | 0.044 | EETHC2D222EA             |
| 250 VDC Working, 300 VDC Surge             |                    |                                    |        |                    |       |                          |
| 270                                        | 22 x 25            | 1.10                               | 1.54   | 0.614              | 0.276 | EETHC2E271BA             |
| 330                                        | 22 x 30            | 1.20                               | 1.68   | 0.502              | 0.226 | EETHC2E331BA             |
|                                            | 25 x 25            | 1.20                               | 1.68   | 0.502              | 0.226 | EETHC2E331CA             |
| 390                                        | 22 x 35            | 1.30                               | 1.82   | 0.425              | 0.191 | EETHC2E391BA             |
|                                            | 25 x 25            | 1.30                               | 1.82   | 0.425              | 0.191 | EETHC2E391CA             |
| 470                                        | 22 x 40            | 1.40                               | 1.96   | 0.353              | 0.159 | EETHC2E471BA             |
|                                            | 25 x 30            | 1.40                               | 1.96   | 0.353              | 0.159 | EETHC2E471CA             |
|                                            | 30 x 25            | 1.40                               | 1.96   | 0.353              | 0.159 | EETHC2E471DA             |
| 560                                        | 22 x 45            | 1.50                               | 2.10   | 0.296              | 0.133 | EETHC2E561BA             |
|                                            | 25 x 35            | 1.50                               | 2.10   | 0.296              | 0.133 | EETHC2E561CA             |
|                                            | 30 x 25            | 1.50                               | 2.10   | 0.296              | 0.133 | EETHC2E561DA             |
| 680                                        | 22 x 50            | 1.70                               | 2.38   | 0.244              | 0.110 | EETHC2E681BA             |
|                                            | 25 x 40            | 1.70                               | 2.38   | 0.244              | 0.110 | EETHC2E681CA             |
|                                            | 30 x 30            | 1.70                               | 2.38   | 0.244              | 0.110 | EETHC2E681DA             |
|                                            | 35 x 25            | 1.70                               | 2.38   | 0.244              | 0.110 | EETHC2E681EA             |
| 820                                        | 25 x 45            | 2.00                               | 2.80   | 0.202              | 0.091 | EETHC2E821CA             |
|                                            | 30 x 35            | 2.00                               | 2.80   | 0.202              | 0.091 | EETHC2E821DA             |
|                                            | 35 x 30            | 2.00                               | 2.80   | 0.202              | 0.091 | EETHC2E821EA             |
| 1000                                       | 30 x 40            | 2.20                               | 3.08   | 0.166              | 0.075 | EETHC2E102DA             |
| 1200                                       | 30 x 45            | 2.30                               | 3.22   | 0.138              | 0.062 | EETHC2E122DA             |
| 1500                                       | 35 x 45            | 2.50                               | 3.50   | 0.111              | 0.050 | EETHC2E152EA             |
| 1800                                       | 35 x 50            | 2.70                               | 3.78   | 0.092              | 0.041 | EETHC2E182EA             |
| 350 VDC Working, 400 VDC Surge             |                    |                                    |        |                    |       |                          |
| 120                                        | 22 x 25            | 0.75                               | 1.05   | 1.382              | 0.622 | EETHC2V121BA             |
| 150                                        | 22 x 30            | 0.82                               | 1.15   | 1.105              | 0.497 | EETHC2V151BA             |
| 180                                        | 22 x 30            | 0.90                               | 1.26   | 0.921              | 0.414 | EETHC2V181BA             |
|                                            | 25 x 25            | 0.90                               | 1.26   | 0.921              | 0.414 | EETHC2V181CA             |
| 220                                        | 22 x 35            | 1.00                               | 1.40   | 0.754              | 0.339 | EETHC2V221BA             |
|                                            | 25 x 30            | 1.00                               | 1.40   | 0.754              | 0.339 | EETHC2V221CA             |
| 270                                        | 25 x 35            | 1.10                               | 1.54   | 0.614              | 0.276 | EETHC2V271CA             |
|                                            | 30 x 25            | 1.10                               | 1.54   | 0.614              | 0.276 | EETHC2V271DA             |

| 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 |                          |
| 350 VDC Working, 400 VDC Surge (continued) |                    |                                    |        |                    |       |                          |
| 330                                        | 25 x 40            | 1.20                               | 1.68   | 0.502              | 0.226 | EETHC2V331CA             |
|                                            | 30 x 30            | 1.20                               | 1.68   | 0.502              | 0.226 | EETHC2V331DA             |
| 390                                        | 25 x 45            | 1.30                               | 1.82   | 0.425              | 0.191 | EETHC2V391CA             |
|                                            | 30 x 35            | 1.30                               | 1.82   | 0.425              | 0.191 | EETHC2V391DA             |
| 470                                        | 25 x 50            | 1.40                               | 1.96   | 0.353              | 0.159 | EETHC2V471CA             |
|                                            | 35 x 30            | 1.40                               | 1.96   | 0.353              | 0.159 | EETHC2V471EA             |
| 560                                        | 30 x 45            | 1.50                               | 2.10   | 0.296              | 0.133 | EETHC2V561DA             |
|                                            | 35 x 35            | 1.50                               | 2.10   | 0.296              | 0.133 | EETHC2V561EA             |
| 680                                        | 30 x 50            | 1.70                               | 2.38   | 0.244              | 0.110 | EETHC2V681DA             |
|                                            | 35 x 40            | 1.70                               | 2.38   | 0.244              | 0.110 | EETHC2V681EA             |
| 820                                        | 35 x 45            | 1.90                               | 2.66   | 0.202              | 0.091 | EETHC2V821EA             |
| 400 VDC Working, 450 VDC Surge             |                    |                                    |        |                    |       |                          |
| 100                                        | 22 x 25            | 0.70                               | 0.98   | 1.824              | 0.821 | EETHC2G101BA             |
| 120                                        | 22 x 30            | 0.75                               | 1.05   | 1.520              | 0.684 | EETHC2G121BA             |
| 150                                        | 22 x 30            | 0.88                               | 1.23   | 1.216              | 0.547 | EETHC2G151BA             |
| 180                                        | 22 x 35            | 0.95                               | 1.33   | 1.013              | 0.456 | EETHC2G181BA             |
|                                            | 25 x 30            | 0.95                               | 1.33   | 1.013              | 0.456 | EETHC2G181CA             |
| 220                                        | 22 x 45            | 1.10                               | 1.54   | 0.829              | 0.373 | EETHC2G221BA             |
|                                            | 25 x 35            | 1.10                               | 1.54   | 0.829              | 0.373 | EETHC2G221CA             |
|                                            | 30 x 25            | 1.10                               | 1.54   | 0.829              | 0.373 | EETHC2G221DA             |
| 270                                        | 22 x 50            | 1.22                               | 1.71   | 0.675              | 0.304 | EETHC2G271BA             |
|                                            | 25 x 40            | 1.22                               | 1.71   | 0.675              | 0.304 | EETHC2G271CA             |
|                                            | 30 x 30            | 1.22                               | 1.71   | 0.675              | 0.304 | EETHC2G271DA             |
|                                            | 35 x 25            | 1.22                               | 1.71   | 0.675              | 0.304 | EETHC2G271EA             |
| 330                                        | 25 x 45            | 1.44                               | 2.02   | 0.553              | 0.249 | EETHC2G331CA             |
|                                            | 30 x 35            | 1.44                               | 2.02   | 0.553              | 0.249 | EETHC2G331DA             |
|                                            | 35 x 30            | 1.44                               | 2.02   | 0.553              | 0.249 | EETHC2G331EA             |
| 390                                        | 25 x 50            | 1.55                               | 2.17   | 0.468              | 0.210 | EETHC2G391CA             |
|                                            | 30 x 40            | 1.55                               | 2.17   | 0.468              | 0.210 | EETHC2G391DA             |
| 470                                        | 30 x 45            | 1.68                               | 2.35   | 0.388              | 0.175 | EETHC2G471DA             |
|                                            | 35 x 35            | 1.68                               | 2.35   | 0.388              | 0.175 | EETHC2G471EA             |
| 560                                        | 30 x 50            | 1.90                               | 2.66   | 0.326              | 0.147 | EETHC2G561DA             |
|                                            | 35 x 40            | 1.90                               | 2.66   | 0.326              | 0.147 | EETHC2G561EA             |
| 680                                        | 35 x 45            | 2.12                               | 2.97   | 0.268              | 0.121 | EETHC2G681EA             |
| 450 VDC Working, 500 VDC Surge             |                    |                                    |        |                    |       |                          |
| 100                                        | 22 x 30            | 0.64                               | 0.90   | 1.824              | 0.821 | EETHC2W101BA             |
|                                            | 25 x 25            | 0.64                               | 0.90   | 1.824              | 0.821 | EETHC2W101CA             |
| 120                                        | 22 x 35            | 0.72                               | 1.01   | 1.520              | 0.684 | EETHC2W121BA             |
|                                            | 25 x 30            | 0.72                               | 1.01   | 1.520              | 0.684 | EETHC2W121CA             |
| 150                                        | 22 x 40            | 0.79                               | 1.11   | 1.216              | 0.547 | EETHC2W151BA             |
|                                            | 25 x 30            | 0.79                               | 1.11   | 1.216              | 0.547 | EETHC2W151CA             |
|                                            | 30 x 25            | 0.79                               | 1.11   | 1.216              | 0.547 | EETHC2W151DA             |
| 180                                        | 22 x 45            | 0.87                               | 1.22   | 1.013              | 0.456 | EETHC2W181BA             |
|                                            | 25 x 40            | 0.87                               | 1.22   | 1.013              | 0.456 | EETHC2W181CA             |
|                                            | 30 x 30            | 0.87                               | 1.22   | 1.013              | 0.456 | EETHC2W181DA             |
| 220                                        | 25 x 45            | 1.00                               | 1.40   | 0.829              | 0.373 | EETHC2W221CA             |
|                                            | 30 x 30            | 1.00                               | 1.40   | 0.829              | 0.373 | EETHC2W221DA             |
| 220                                        | 35 x 25            | 1.00                               | 1.40   | 0.829              | 0.373 | EETHC2W221EA             |
| 270                                        | 25 x 50            | 1.19                               | 1.67   | 0.675              | 0.304 | EETHC2W271CA             |
|                                            | 30 x 40            | 1.19                               | 1.67   | 0.675              | 0.304 | EETHC2W271DA             |
|                                            | 35 x 30            | 1.19                               | 1.67   | 0.675              | 0.304 | EETHC2W271EA             |
| 330                                        | 30 x 45            | 1.38                               | 1.93   | 0.553              | 0.249 | EETHC2W331DA             |
|                                            | 35 x 35            | 1.38                               | 1.93   | 0.553              | 0.249 | EETHC2W331EA             |
| 390                                        | 30 x 50            | 1.55                               | 2.17   | 0.468              | 0.210 | EETHC2W391DA             |
|                                            | 35 x 40            | 1.55                               | 2.17   | 0.468              | 0.210 | EETHC2W391EA             |
| 470                                        | 35 x 45            | 1.74                               | 2.44   | 0.388              | 0.175 | EETHC2W471EA             |
| 560                                        | 35 x 50            | 1.90                               | 2.66   | 0.326              | 0.147 | EETHC2W561EA             |