

### TS-UP Series 85°C, 3000 hours

- Compact size for general purpose and industrial applications
- 2 and 3 pin versions available
- 20mm lengths for low profile applications

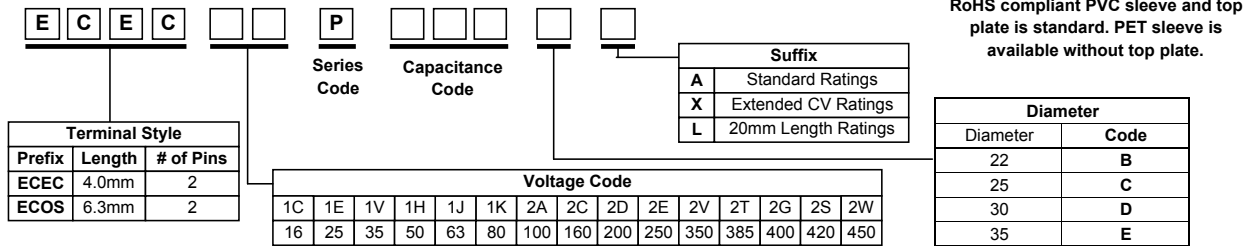
RoHS Compliant



|   |  |               |      |         |      |      |      |  |           |      |      |       |
|---|--|---------------|------|---------|------|------|------|--|-----------|------|------|-------|
| Rated Working Voltage:  | 16 ~ 250 VDC   | 350 ~ 450 VDC |      |         |      |      |      |  |           |      |      |       |
| Operating Temperature:  | -40 ~ +85°C  | -25 ~ +85°C   |      |         |      |      |      |  |           |      |      |       |
| Nominal Capacitance:  | 120 ~ 68000µF  | 33 ~ 820µF    |      |         |      |      |      |  |           |      |      |       |
| Capacitance Tolerance:  | ± 20%  |               |      |         |      |      |      |  |           |      |      |       |
| Dissipation Factor:<br>(120 Hz, +20°C)  | Working Voltage [V]:   | 16            | 25   | 35      | 50   | 63   | 80   | 100  | 160 ~ 450 |      |      |       |
|   | Max. D.F. (%):   | 50            | 40   | 35      | 30   | 25   | 20   | 20   | 15        |      |      |       |
| For capacitance values > 33000µF, add the value of: $\frac{\text{(rated cap. } \mu\text{F)} - 33000}{1000}$ |  |               |      |         |      |      |      |  |           |      |      |       |
| Leakage Current:  | 3√CV (µA) max. after 5 minutes; C = Capacitance in µF, V = WV  |               |      |         |      |      |      |  |           |      |      |       |
| Ripple Current Multipliers:   | Frequency(Hz):   | 50            | 60   | 100-120 | 500  | 1k   | 10k  | Ripple Current Ambient Temperature Factors** |           |      |      |       |
|   | 16-100WV:  | 0.93          | 0.95 | 1.0     | 1.05 | 1.08 | 1.15 | Temperature (°C):                            | 85°C      | 70°C | 60°C | ≤45°C |
|   | 160-450WV:   | 0.75          | 0.8  | 1.0     | 1.2  | 1.25 | 1.4  | Multiplier:                                  | 1.0       | 1.3  | 1.4  | 1.5   |
| Endurance:  | 3000 hours* at +85°C with maximum specified ripple current (see page 4)<br>*2000 hours for 20mm length sizes |               |      |         |      |      |      |  |           |      |      |       |

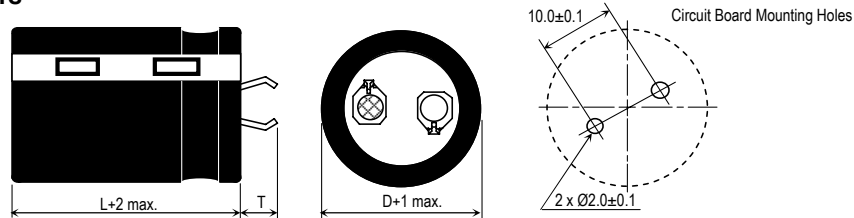
\*\*Use of temperature ripple current multipliers may limit life to the hours specified for the maximum operating temperature.

#### Part Number System



#### Dimensions in millimeters

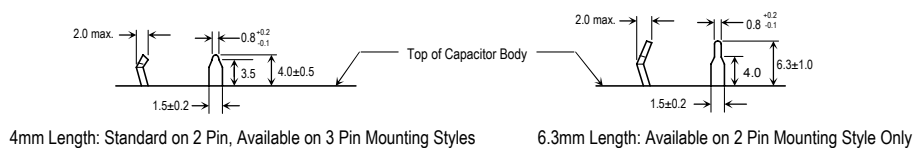
2 Pin Mounting Style



3 Pin Mounting Style (Optional)



Pin Dimensions



**TS-UP Standard Ratings**

Part numbers shown with 2 pins

| Cap.<br>( $\mu$ F)                  | Size (mm)<br>D x L | Max 85°C R.C. ( $A_{rms}$ ) |        | 20°C ESR ( $\Omega$ , max.) |       | Panasonic Part Number (By Terminal Length) |                       |
|-------------------------------------|--------------------|-----------------------------|--------|-----------------------------|-------|--|-----------------------|
|                                     |                    | 120Hz                       | 10kHz~ | 120Hz                       | 20kHz | 6.3mm Length Terminal                      | 4.0mm Length Terminal |
| <b>16 VDC Working, 20 VDC Surge</b> |                    |                             |        |                             |       |  |                       |
| 4700                                | 22 x 20            | 1.60                        | 1.84   | 0.159                       | 0.135 | ECOS1CP472BL                               | ECEC1CP472BL          |
|                                     | 22 x 25            | 1.77                        | 2.04   | 0.159                       | 0.135 | ECOS1CP472BA                               | ECEC1CP472BA          |
| 6800                                | 22 x 25            | 2.57                        | 2.96   | 0.110                       | 0.093 | ECOS1CP682BA                               | ECEC1CP682BA          |
|                                     | 25 x 20            | 1.80                        | 2.07   | 0.110                       | 0.093 | ECOS1CP682CL                               | ECEC1CP682CL          |
| 8200                                | 22 x 25            | 3.10                        | 3.57   | 0.091                       | 0.077 | ECOS1CP822BA                               | ECEC1CP822BA          |
| 10000                               | 22 x 30            | 3.78                        | 4.35   | 0.075                       | 0.063 | ECOS1CP103BA                               | ECEC1CP103BA          |
|                                     | 25 x 25            | 3.78                        | 4.35   | 0.075                       | 0.063 | ECOS1CP103CA                               | ECEC1CP103CA          |
|                                     | 30 x 20            | 2.40                        | 2.76   | 0.083                       | 0.070 | ECOS1CP103DL                               | ECEC1CP103DL          |
| 12000                               | 22 x 30            | 4.52                        | 5.20   | 0.062                       | 0.053 | ECOS1CP123BA                               | ECEC1CP123BA          |
|                                     | 25 x 25            | 4.52                        | 5.20   | 0.062                       | 0.053 | ECOS1CP123CA                               | ECEC1CP123CA          |
| 15000                               | 22 x 35            | 5.26                        | 6.05   | 0.053                       | 0.045 | ECOS1CP153BA                               | ECEC1CP153BA          |
|                                     | 25 x 30            | 5.26                        | 6.05   | 0.053                       | 0.045 | ECOS1CP153CA                               | ECEC1CP153CA          |
|                                     | 35 x 20            | 3.20                        | 3.68   | 0.055                       | 0.047 | ECOS1CP153EL                               | ECEC1CP153EL          |
| 18000                               | 22 x 40            | 5.57                        | 6.41   | 0.046                       | 0.039 | ECOS1CP183BA                               | ECEC1CP183BA          |
|                                     | 25 x 30            | 5.57                        | 6.41   | 0.046                       | 0.039 | ECOS1CP183CA                               | ECEC1CP183CA          |
| 22000                               | 22 x 45            | 6.10                        | 7.02   | 0.038                       | 0.032 | ECOS1CP223BA                               | ECEC1CP223BA          |
|                                     | 25 x 35            | 6.10                        | 7.02   | 0.038                       | 0.032 | ECOS1CP223CA                               | ECEC1CP223CA          |
|                                     | 30 x 30            | 6.10                        | 7.02   | 0.038                       | 0.032 | ECOS1CP223DA                               | ECEC1CP223DA          |
| 27000                               | 25 x 45            | 6.31                        | 7.26   | 0.031                       | 0.026 | ECOS1CP273CA                               | ECEC1CP273CA          |
|                                     | 30 x 35            | 6.31                        | 7.26   | 0.031                       | 0.026 | ECOS1CP273DA                               | ECEC1CP273DA          |
| 33000                               | 25 x 50            | 6.84                        | 7.87   | 0.025                       | 0.021 | ECOS1CP333CA                               | ECEC1CP333CA          |
|                                     | 30 x 40            | 6.84                        | 7.87   | 0.025                       | 0.021 | ECOS1CP333DA                               | ECEC1CP333DA          |
|                                     | 35 x 30            | 6.84                        | 7.87   | 0.025                       | 0.021 | ECOS1CP333EA                               | ECEC1CP333EA          |
| 39000                               | 30 x 45            | 6.94                        | 7.98   | 0.021                       | 0.018 | ECOS1CP393DA                               | ECEC1CP393DA          |
|                                     | 35 x 35            | 6.94                        | 7.98   | 0.021                       | 0.018 | ECOS1CP393EA                               | ECEC1CP393EA          |
| 47000                               | 30 x 50            | 7.47                        | 8.59   | 0.019                       | 0.017 | ECOS1CP473DA                               | ECEC1CP473DA          |
|                                     | 35 x 40            | 7.47                        | 8.59   | 0.021                       | 0.019 | ECOS1CP473EA                               | ECEC1CP473EA          |
| 56000                               | 35 x 45            | 8.73                        | 10.04  | 0.019                       | 0.018 | ECOS1CP563EA                               | ECEC1CP563EA          |
| 68000                               | 35 x 50            | 9.05                        | 10.41  | 0.018                       | 0.017 | ECOS1CP683EA                               | ECEC1CP683EA          |
| <b>25 VDC Working, 32 VDC Surge</b> |                    |                             |        |                             |       |  |                       |
| 3300                                | 22 x 20            | 1.60                        | 1.84   | 0.176                       | 0.141 | ECOS1EP332BL                               | ECEC1EP332BL          |
|                                     | 22 x 25            | 1.68                        | 1.93   | 0.161                       | 0.129 | ECOS1EP332BA                               | ECEC1EP332BA          |
| 4700                                | 22 x 25            | 2.39                        | 2.75   | 0.113                       | 0.090 | ECOS1EP472BA                               | ECEC1EP472BA          |
|                                     | 25 x 20            | 1.80                        | 2.07   | 0.123                       | 0.099 | ECOS1EP472CL                               | ECEC1EP472CL          |
| 5600                                | 22 x 25            | 2.86                        | 3.29   | 0.095                       | 0.076 | ECOS1EP562BA                               | ECEC1EP562BA          |
| 6800                                | 22 x 30            | 3.47                        | 3.99   | 0.078                       | 0.062 | ECOS1EP682BA                               | ECEC1EP682BA          |
|                                     | 25 x 25            | 3.47                        | 3.99   | 0.078                       | 0.062 | ECOS1EP682CA                               | ECEC1EP682CA          |
|                                     | 30 x 20            | 2.30                        | 2.65   | 0.078                       | 0.062 | ECOS1EP682DL                               | ECEC1EP682DL          |
| 8200                                | 22 x 30            | 3.57                        | 4.11   | 0.065                       | 0.052 | ECOS1EP822BA                               | ECEC1EP822BA          |
|                                     | 25 x 25            | 3.57                        | 4.11   | 0.065                       | 0.052 | ECOS1EP822CA                               | ECEC1EP822CA          |
| 10000                               | 22 x 35            | 3.78                        | 4.35   | 0.058                       | 0.046 | ECOS1EP103BA                               | ECEC1EP103BA          |
|                                     | 25 x 30            | 3.78                        | 4.35   | 0.058                       | 0.046 | ECOS1EP103CA                               | ECEC1EP103CA          |
|                                     | 30 x 25            | 3.78                        | 4.35   | 0.058                       | 0.046 | ECOS1EP103DA                               | ECEC1EP103DA          |
|                                     | 35 x 20            | 2.70                        | 3.11   | 0.061                       | 0.049 | ECOS1EP103EL                               | ECEC1EP103EL          |
| 12000                               | 22 x 40            | 4.10                        | 4.72   | 0.048                       | 0.039 | ECOS1EP123BA                               | ECEC1EP123BA          |
|                                     | 25 x 35            | 4.10                        | 4.72   | 0.048                       | 0.039 | ECOS1EP123CA                               | ECEC1EP123CA          |
|                                     | 30 x 30            | 4.10                        | 4.72   | 0.048                       | 0.039 | ECOS1EP123DA                               | ECEC1EP123DA          |
| 15000                               | 22 x 50            | 4.63                        | 5.32   | 0.039                       | 0.031 | ECOS1EP153BA                               | ECEC1EP153BA          |
|                                     | 25 x 40            | 4.63                        | 5.32   | 0.039                       | 0.031 | ECOS1EP153CA                               | ECEC1EP153CA          |
|                                     | 30 x 30            | 4.63                        | 5.32   | 0.039                       | 0.031 | ECOS1EP153DA                               | ECEC1EP153DA          |
| 18000                               | 25 x 45            | 5.47                        | 6.29   | 0.035                       | 0.028 | ECOS1EP183CA                               | ECEC1EP183CA          |
|                                     | 30 x 35            | 5.47                        | 6.29   | 0.035                       | 0.028 | ECOS1EP183DA                               | ECEC1EP183DA          |
| 22000                               | 25 x 50            | 6.10                        | 7.02   | 0.029                       | 0.023 | ECOS1EP223CA                               | ECEC1EP223CA          |
|                                     | 30 x 40            | 6.10                        | 7.02   | 0.029                       | 0.023 | ECOS1EP223DA                               | ECEC1EP223DA          |
| 27000                               | 30 x 45            | 6.21                        | 7.14   | 0.023                       | 0.019 | ECOS1EP273DA                               | ECEC1EP273DA          |
|                                     | 35 x 35            | 6.21                        | 7.14   | 0.025                       | 0.020 | ECOS1EP273EA                               | ECEC1EP273EA          |
| 33000                               | 30 x 50            | 6.84                        | 7.87   | 0.020                       | 0.017 | ECOS1EP333DA                               | ECEC1EP333DA          |
|                                     | 35 x 40            | 6.84                        | 7.87   | 0.020                       | 0.017 | ECOS1EP333EA                               | ECEC1EP333EA          |
| 39000                               | 35 x 45            | 7.36                        | 8.46   | 0.019                       | 0.017 | ECOS1EP393EA                               | ECEC1EP393EA          |
| 47000                               | 35 x 50            | 8.00                        | 9.20   | 0.017                       | 0.015 | ECOS1EP473EA                               | ECEC1EP473EA          |

**TS-UP Standard Ratings (continued)**

Part numbers shown with 2 pins

| Cap.<br>( $\mu$ F)                              | Size (mm)<br>D x L | Max 85°C R.C. ( $A_{rms}$ ) |        | 20°C ESR ( $\Omega$ , max.) |       | Panasonic Part Number (By Terminal Length) |                       |
|---|--------------------|-----------------------------|--------|-----------------------------|-------|--|-----------------------|
|   |                    | 120Hz                       | 10kHz~ | 120Hz                       | 20kHz | 6.3mm Length Terminal                      | 4.0mm Length Terminal |
| <b>35 VDC Working, 44 VDC Surge (continued)</b> |                    |                             |        |                             |       |  |                       |
| 2200  | 22 x 20            | 1.40                        | 1.61   | 0.181                       | 0.136 | ECOS1VP222BL                               | ECEC1VP222BL          |
|   | 22 x 25            | 1.52                        | 1.75   | 0.166                       | 0.124 | ECOS1VP222BA                               | ECEC1VP222BA          |
| 3300  | 22 x 25            | 2.29                        | 2.63   | 0.111                       | 0.083 | ECOS1VP332BA                               | ECEC1VP332BA          |
|   | 25 x 20            | 1.70                        | 1.96   | 0.121                       | 0.090 | ECOS1VP332CL                               | ECEC1VP332CL          |
| 3900  | 22 x 25            | 2.71                        | 3.12   | 0.094                       | 0.070 | ECOS1VP392BA                               | ECEC1VP392BA          |
| 4700  | 22 x 30            | 3.26                        | 3.75   | 0.078                       | 0.058 | ECOS1VP472BA                               | ECEC1VP472BA          |
|   | 25 x 25            | 3.26                        | 3.75   | 0.078                       | 0.058 | ECOS1VP472CA                               | ECEC1VP472CA          |
|   | 30 x 20            | 2.00                        | 2.30   | 0.088                       | 0.066 | ECOS1VP472DL                               | ECEC1VP472DL          |
| 5600  | 22 x 30            | 3.36                        | 3.86   | 0.080                       | 0.060 | ECOS1VP562BA                               | ECEC1VP562BA          |
|   | 25 x 25            | 3.36                        | 3.86   | 0.080                       | 0.060 | ECOS1VP562CA                               | ECEC1VP562CA          |
| 6800  | 22 x 35            | 3.68                        | 4.23   | 0.066                       | 0.049 | ECOS1VP682BA                               | ECEC1VP682BA          |
|   | 25 x 30            | 3.68                        | 4.23   | 0.066                       | 0.049 | ECOS1VP682CA                               | ECEC1VP682CA          |
|   | 35 x 20            | 2.40                        | 2.76   | 0.071                       | 0.053 | ECOS1VP682EL                               | ECEC1VP682EL          |
| 8200  | 22 x 40            | 4.00                        | 4.60   | 0.057                       | 0.042 | ECOS1VP822BA                               | ECEC1VP822BA          |
|   | 25 x 35            | 4.00                        | 4.60   | 0.057                       | 0.042 | ECOS1VP822CA                               | ECEC1VP822CA          |
| 10000   | 22 x 45            | 4.42                        | 5.08   | 0.050                       | 0.037 | ECOS1VP103BA                               | ECEC1VP103BA          |
|   | 25 x 40            | 4.42                        | 5.08   | 0.050                       | 0.037 | ECOS1VP103CA                               | ECEC1VP103CA          |
|   | 30 x 30            | 4.42                        | 5.08   | 0.050                       | 0.037 | ECOS1VP103DA                               | ECEC1VP103DA          |
|   | 35 x 25            | 4.42                        | 5.08   | 0.050                       | 0.037 | ECOS1VP103EA                               | ECEC1VP103EA          |
| 12000   | 25 x 45            | 5.05                        | 5.81   | 0.044                       | 0.033 | ECOS1VP123CA                               | ECEC1VP123CA          |
|   | 30 x 35            | 5.05                        | 5.81   | 0.044                       | 0.033 | ECOS1VP123DA                               | ECEC1VP123DA          |
|   | 35 x 30            | 5.05                        | 5.81   | 0.044                       | 0.033 | ECOS1VP123EA                               | ECEC1VP123EA          |
| 15000   | 25 x 50            | 5.57                        | 6.41   | 0.036                       | 0.027 | ECOS1VP153CA                               | ECEC1VP153CA          |
|   | 30 x 40            | 5.57                        | 6.41   | 0.036                       | 0.027 | ECOS1VP153DA                               | ECEC1VP153DA          |
|   | 35 x 30            | 5.57                        | 6.41   | 0.036                       | 0.027 | ECOS1VP153EA                               | ECEC1VP153EA          |
| 18000   | 30 x 45            | 5.68                        | 6.53   | 0.030                       | 0.023 | ECOS1VP183DA                               | ECEC1VP183DA          |
|   | 35 x 35            | 5.68                        | 6.53   | 0.030                       | 0.023 | ECOS1VP183EA                               | ECEC1VP183EA          |
| 22000   | 30 x 50            | 6.10                        | 7.02   | 0.026                       | 0.020 | ECOS1VP223DA                               | ECEC1VP223DA          |
|   | 35 x 40            | 6.10                        | 7.02   | 0.026                       | 0.020 | ECOS1VP223EA                               | ECEC1VP223EA          |
| 27000   | 35 x 45            | 6.84                        | 7.87   | 0.021                       | 0.017 | ECOS1VP273EA                               | ECEC1VP273EA          |
| 33000   | 35 x 50            | 7.15                        | 8.22   | 0.018                       | 0.014 | ECOS1VP333EA                               | ECEC1VP333EA          |
| <b>50 VDC Working, 63 VDC Surge</b>             |                    |                             |        |                             |       |  |                       |
| 1500  | 22 x 20            | 1.20                        | 1.38   | 0.254                       | 0.191 | ECOS1HP152BL                               | ECEC1HP152BL          |
|   | 22 x 25            | 1.24                        | 1.43   | 0.221                       | 0.166 | ECOS1HP152BA                               | ECEC1HP152BA          |
| 2200  | 22 x 25            | 1.82                        | 2.09   | 0.151                       | 0.113 | ECOS1HP222BA                               | ECEC1HP222BA          |
|   | 25 x 20            | 1.40                        | 1.61   | 0.173                       | 0.130 | ECOS1HP222CL                               | ECEC1HP222CL          |
| 2700  | 22 x 25            | 2.23                        | 2.56   | 0.123                       | 0.092 | ECOS1HP272BA                               | ECEC1HP272BA          |
| 3300  | 22 x 30            | 2.73                        | 3.14   | 0.100                       | 0.075 | ECOS1HP332BA                               | ECEC1HP332BA          |
|   | 25 x 25            | 2.73                        | 3.14   | 0.100                       | 0.075 | ECOS1HP332CA                               | ECEC1HP332CA          |
|   | 30 x 20            | 1.70                        | 1.96   | 0.116                       | 0.087 | ECOS1HP332DL                               | ECEC1HP332DL          |
| 3900  | 22 x 30            | 2.75                        | 3.16   | 0.085                       | 0.064 | ECOS1HP392BA                               | ECEC1HP392BA          |
|   | 25 x 25            | 2.75                        | 3.16   | 0.085                       | 0.064 | ECOS1HP392CA                               | ECEC1HP392CA          |
| 4700  | 22 x 35            | 3.03                        | 3.48   | 0.071                       | 0.053 | ECOS1HP472BA                               | ECEC1HP472BA          |
|   | 25 x 30            | 3.03                        | 3.48   | 0.071                       | 0.053 | ECOS1HP472CA                               | ECEC1HP472CA          |
|   | 30 x 25            | 3.03                        | 3.48   | 0.071                       | 0.053 | ECOS1HP472DA                               | ECEC1HP472DA          |
|   | 35 x 20            | 2.10                        | 2.42   | 0.081                       | 0.061 | ECOS1HP472EL                               | ECEC1HP472EL          |
| 5600  | 22 x 40            | 3.42                        | 3.93   | 0.059                       | 0.044 | ECOS1HP562BA                               | ECEC1HP562BA          |
|   | 25 x 35            | 3.42                        | 3.93   | 0.059                       | 0.044 | ECOS1HP562CA                               | ECEC1HP562CA          |
|   | 30 x 30            | 3.42                        | 3.93   | 0.059                       | 0.044 | ECOS1HP562DA                               | ECEC1HP562DA          |
| 6800  | 22 x 50            | 3.85                        | 4.43   | 0.049                       | 0.037 | ECOS1HP682BA                               | ECEC1HP682BA          |
|   | 25 x 40            | 3.85                        | 4.43   | 0.049                       | 0.037 | ECOS1HP682CA                               | ECEC1HP682CA          |
|   | 30 x 30            | 3.85                        | 4.43   | 0.049                       | 0.037 | ECOS1HP682DA                               | ECEC1HP682DA          |
| 8200  | 25 x 45            | 4.41                        | 5.07   | 0.040                       | 0.030 | ECOS1HP822CA                               | ECEC1HP822CA          |
|   | 30 x 35            | 4.41                        | 5.07   | 0.040                       | 0.030 | ECOS1HP822DA                               | ECEC1HP822DA          |
| 10000   | 25 x 50            | 4.97                        | 5.72   | 0.036                       | 0.027 | ECOS1HP103CA                               | ECEC1HP103CA          |
|   | 30 x 40            | 4.97                        | 5.72   | 0.036                       | 0.027 | ECOS1HP103DA                               | ECEC1HP103DA          |
|   | 35 x 30            | 4.97                        | 5.72   | 0.036                       | 0.027 | ECOS1HP103EA                               | ECEC1HP103EA          |
| 12000   | 30 x 45            | 5.58                        | 6.42   | 0.032                       | 0.024 | ECOS1HP123DA                               | ECEC1HP123DA          |
|   | 35 x 35            | 5.58                        | 6.42   | 0.032                       | 0.024 | ECOS1HP123EA                               | ECEC1HP123EA          |
| 15000   | 30 x 50            | 6.44                        | 7.41   | 0.028                       | 0.021 | ECOS1HP153DA                               | ECEC1HP153DA          |
|   | 35 x 40            | 6.44                        | 7.41   | 0.028                       | 0.021 | ECOS1HP153EA                               | ECEC1HP153EA          |
| 18000   | 35 x 45            | 6.94                        | 7.98   | 0.023                       | 0.018 | ECOS1HP183EA                               | ECEC1HP183EA          |
| 22000   | 35 x 50            | 7.57                        | 8.71   | 0.021                       | 0.017 | ECOS1HP223EA                               | ECEC1HP223EA          |

**TS-UP Standard Ratings (continued)**

Part numbers shown with 2 pins

| Cap.<br>( $\mu$ F)                   | Size (mm)<br>D x L | Max 85°C R.C. ( $A_{rms}$ ) |        | 20°C ESR ( $\Omega$ , max.) |       | Panasonic Part Number (By Terminal Length) |                       |
|--------------------------------------|--------------------|-----------------------------|--------|-----------------------------|-------|--|-----------------------|
|                                      |                    | 120Hz                       | 10kHz~ | 120Hz                       | 20kHz | 6.3mm Length Terminal                      | 4.0mm Length Terminal |
| <b>63 VDC Working, 79 VDC Surge</b>  |                    |                             |        |                             |       |  |                       |
| 1000                                 | 22 x 20            | 1.20                        | 1.38   | 0.381                       | 0.286 | ECOS1JP102BL                               | ECEC1JP102BL          |
|                                      | 22 x 25            | 1.20                        | 1.38   | 0.332                       | 0.249 | ECOS1JP102BA                               | ECEC1JP102BA          |
| 1500                                 | 22 x 25            | 1.72                        | 1.98   | 0.221                       | 0.166 | ECOS1JP152BA                               | ECEC1JP152BA          |
|                                      | 25 x 20            | 1.30                        | 1.50   | 0.254                       | 0.191 | ECOS1JP152CL                               | ECEC1JP152CL          |
| 1800                                 | 22 x 25            | 2.06                        | 2.37   | 0.184                       | 0.138 | ECOS1JP182BA                               | ECEC1JP182BA          |
| 2200                                 | 22 x 30            | 2.52                        | 2.90   | 0.151                       | 0.113 | ECOS1JP222BA                               | ECEC1JP222BA          |
|                                      | 25 x 25            | 2.52                        | 2.90   | 0.151                       | 0.113 | ECOS1JP222CA                               | ECEC1JP222CA          |
|                                      | 30 x 20            | 1.50                        | 1.73   | 0.173                       | 0.130 | ECOS1JP222DL                               | ECEC1JP222DL          |
| 2700                                 | 22 x 35            | 3.73                        | 4.29   | 0.123                       | 0.092 | ECOS1JP272BA                               | ECEC1JP272BA          |
|                                      | 25 x 30            | 3.73                        | 4.29   | 0.123                       | 0.092 | ECOS1JP272CA                               | ECEC1JP272CA          |
| 3300                                 | 22 x 40            | 4.10                        | 4.72   | 0.105                       | 0.079 | ECOS1JP332BA                               | ECEC1JP332BA          |
|                                      | 25 x 30            | 4.10                        | 4.72   | 0.105                       | 0.079 | ECOS1JP332CA                               | ECEC1JP332CA          |
|                                      | 30 x 25            | 4.10                        | 4.72   | 0.105                       | 0.079 | ECOS1JP332DA                               | ECEC1JP332DA          |
|                                      | 35 x 20            | 1.70                        | 1.96   | 0.126                       | 0.094 | ECOS1JP332EL                               | ECEC1JP332EL          |
| 3900                                 | 22 x 45            | 4.44                        | 5.11   | 0.098                       | 0.073 | ECOS1JP392BA                               | ECEC1JP392BA          |
|                                      | 25 x 35            | 4.44                        | 5.11   | 0.098                       | 0.073 | ECOS1JP392CA                               | ECEC1JP392CA          |
|                                      | 30 x 30            | 4.44                        | 5.11   | 0.098                       | 0.073 | ECOS1JP392DA                               | ECEC1JP392DA          |
| 4700                                 | 22 x 50            | 4.86                        | 5.59   | 0.081                       | 0.061 | ECOS1JP472BA                               | ECEC1JP472BA          |
|                                      | 25 x 40            | 4.86                        | 5.59   | 0.081                       | 0.061 | ECOS1JP472CA                               | ECEC1JP472CA          |
|                                      | 30 x 30            | 4.86                        | 5.59   | 0.081                       | 0.061 | ECOS1JP472DA                               | ECEC1JP472DA          |
|                                      | 35 x 25            | 4.86                        | 5.59   | 0.081                       | 0.061 | ECOS1JP472EA                               | ECEC1JP472EA          |
| 5600                                 | 25 x 45            | 5.36                        | 6.16   | 0.068                       | 0.051 | ECOS1JP562CA                               | ECEC1JP562CA          |
|                                      | 30 x 35            | 5.36                        | 6.16   | 0.068                       | 0.051 | ECOS1JP562DA                               | ECEC1JP562DA          |
|                                      | 35 x 30            | 5.36                        | 6.16   | 0.068                       | 0.051 | ECOS1JP562EA                               | ECEC1JP562EA          |
| 6800                                 | 25 x 50            | 5.84                        | 6.72   | 0.061                       | 0.046 | ECOS1JP682CA                               | ECEC1JP682CA          |
|                                      | 30 x 40            | 5.84                        | 6.72   | 0.061                       | 0.046 | ECOS1JP682DA                               | ECEC1JP682DA          |
|                                      | 35 x 30            | 5.84                        | 6.72   | 0.061                       | 0.046 | ECOS1JP682EA                               | ECEC1JP682EA          |
| 8200                                 | 30 x 45            | 6.00                        | 6.90   | 0.051                       | 0.038 | ECOS1JP822DA                               | ECEC1JP822DA          |
|                                      | 35 x 35            | 6.00                        | 6.90   | 0.051                       | 0.038 | ECOS1JP822EA                               | ECEC1JP822EA          |
| 10000                                | 35 x 40            | 6.52                        | 7.50   | 0.041                       | 0.033 | ECOS1JP103EA                               | ECEC1JP103EA          |
| 12000                                | 35 x 50            | 7.15                        | 8.22   | 0.035                       | 0.028 | ECOS1JP123EA                               | ECEC1JP123EA          |
| <b>80 VDC Working, 100 VDC Surge</b> |                    |                             |        |                             |       |  |                       |
| 680                                  | 22 x 20            | 1.00                        | 1.15   | 0.439                       | 0.329 | ECOS1KP681BL                               | ECEC1KP681BL          |
|                                      | 22 x 25            | 1.02                        | 1.17   | 0.390                       | 0.293 | ECOS1KP681BA                               | ECEC1KP681BA          |
| 1000                                 | 22 x 25            | 1.51                        | 1.74   | 0.265                       | 0.199 | ECOS1KP102BA                               | ECEC1KP102BA          |
|                                      | 25 x 20            | 1.20                        | 1.38   | 0.298                       | 0.224 | ECOS1KP102CL                               | ECEC1KP102CL          |
| 1200                                 | 22 x 25            | 1.81                        | 2.08   | 0.221                       | 0.166 | ECOS1KP122BA                               | ECEC1KP122BA          |
| 1500                                 | 22 x 30            | 2.26                        | 2.60   | 0.177                       | 0.133 | ECOS1KP152BA                               | ECEC1KP152BA          |
|                                      | 25 x 25            | 2.26                        | 2.60   | 0.177                       | 0.133 | ECOS1KP152CA                               | ECEC1KP152CA          |
|                                      | 30 x 20            | 1.40                        | 1.61   | 0.199                       | 0.149 | ECOS1KP152DL                               | ECEC1KP152DL          |
| 1800                                 | 22 x 35            | 2.52                        | 2.90   | 0.147                       | 0.111 | ECOS1KP182BA                               | ECEC1KP182BA          |
|                                      | 25 x 30            | 2.52                        | 2.90   | 0.147                       | 0.111 | ECOS1KP182CA                               | ECEC1KP182CA          |
| 2200                                 | 22 x 40            | 2.73                        | 3.14   | 0.121                       | 0.090 | ECOS1KP222BA                               | ECEC1KP222BA          |
|                                      | 25 x 30            | 2.73                        | 3.14   | 0.121                       | 0.090 | ECOS1KP222CA                               | ECEC1KP222CA          |
|                                      | 30 x 25            | 2.73                        | 3.14   | 0.121                       | 0.090 | ECOS1KP222DA                               | ECEC1KP222DA          |
|                                      | 35 x 20            | 1.70                        | 1.96   | 0.136                       | 0.102 | ECOS1KP222EL                               | ECEC1KP222EL          |
| 2700                                 | 22 x 45            | 2.78                        | 3.20   | 0.098                       | 0.074 | ECOS1KP272BA                               | ECEC1KP272BA          |
|                                      | 25 x 35            | 2.78                        | 3.20   | 0.098                       | 0.074 | ECOS1KP272CA                               | ECEC1KP272CA          |
|                                      | 30 x 30            | 2.78                        | 3.20   | 0.098                       | 0.074 | ECOS1KP272DA                               | ECEC1KP272DA          |
| 3300                                 | 22 x 50            | 3.21                        | 3.69   | 0.085                       | 0.064 | ECOS1KP332BA                               | ECEC1KP332BA          |
|                                      | 25 x 40            | 3.21                        | 3.69   | 0.085                       | 0.064 | ECOS1KP332CA                               | ECEC1KP332CA          |
|                                      | 30 x 30            | 3.21                        | 3.69   | 0.085                       | 0.064 | ECOS1KP332DA                               | ECEC1KP332DA          |
| 3900                                 | 25 x 45            | 3.59                        | 4.13   | 0.077                       | 0.057 | ECOS1KP392CA                               | ECEC1KP392CA          |
|                                      | 30 x 35            | 3.59                        | 4.13   | 0.077                       | 0.057 | ECOS1KP392DA                               | ECEC1KP392DA          |
| 4700                                 | 25 x 50            | 4.09                        | 4.70   | 0.063                       | 0.048 | ECOS1KP472CA                               | ECEC1KP472CA          |
|                                      | 30 x 40            | 4.09                        | 4.70   | 0.063                       | 0.048 | ECOS1KP472DA                               | ECEC1KP472DA          |
| 5600                                 | 30 x 45            | 4.55                        | 5.23   | 0.056                       | 0.042 | ECOS1KP562DA                               | ECEC1KP562DA          |
|                                      | 35 x 35            | 4.55                        | 5.23   | 0.056                       | 0.042 | ECOS1KP562EA                               | ECEC1KP562EA          |
| 6800                                 | 30 x 50            | 5.16                        | 5.93   | 0.046                       | 0.035 | ECOS1KP682DA                               | ECEC1KP682DA          |
|                                      | 35 x 40            | 5.16                        | 5.93   | 0.046                       | 0.035 | ECOS1KP682EA                               | ECEC1KP682EA          |
| 8200                                 | 35 x 50            | 5.83                        | 6.70   | 0.038                       | 0.029 | ECOS1KP822EA                               | ECEC1KP822EA          |

**TS-UP Standard Ratings (continued)**

Part numbers shown with 2 pins

| Cap.<br>( $\mu$ F)                    | Size (mm)<br>D x L | Max 85°C R.C. ( $A_{rms}$ ) |        | 20°C ESR ( $\Omega$ , max.) |       | Panasonic Part Number (By Terminal Length) |                       |
|---------------------------------------|--------------------|-----------------------------|--------|-----------------------------|-------|--|-----------------------|
|                                       |                    | 120Hz                       | 10kHz~ | 120Hz                       | 20kHz | 6.3mm Length Terminal                      | 4.0mm Length Terminal |
| <b>100 VDC Working, 125 VDC Surge</b> |                    |                             |        |                             |       |  |                       |
| 470                                   | 22 x 20            | 1.00                        | 1.15   | 0.459                       | 0.298 | ECOS2AP471BL                               | ECEC2AP471BL          |
|                                       | 22 x 25            | 1.11                        | 1.28   | 0.459                       | 0.298 | ECOS2AP471BA                               | ECEC2AP471BA          |
| 560                                   | 22 x 25            | 1.32                        | 1.52   | 0.385                       | 0.250 | ECOS2AP561BA                               | ECEC2AP561BA          |
| 680                                   | 22 x 25            | 1.61                        | 1.85   | 0.317                       | 0.206 | ECOS2AP681BA                               | ECEC2AP681BA          |
|                                       | 25 x 20            | 1.10                        | 1.27   | 0.366                       | 0.238 | ECOS2AP681CL                               | ECEC2AP681CL          |
| 1000                                  | 22 x 30            | 1.96                        | 2.25   | 0.216                       | 0.140 | ECOS2AP102BA                               | ECEC2AP102BA          |
|                                       | 25 x 25            | 1.96                        | 2.25   | 0.216                       | 0.140 | ECOS2AP102CA                               | ECEC2AP102CA          |
|                                       | 30 x 20            | 1.20                        | 1.38   | 0.249                       | 0.162 | ECOS2AP102DL                               | ECEC2AP102DL          |
| 1200                                  | 22 x 35            | 2.31                        | 2.66   | 0.193                       | 0.126 | ECOS2AP122BA                               | ECEC2AP122BA          |
|                                       | 25 x 30            | 2.31                        | 2.66   | 0.180                       | 0.117 | ECOS2AP122CA                               | ECEC2AP122CA          |
| 1500                                  | 22 x 40            | 2.57                        | 2.96   | 0.155                       | 0.101 | ECOS2AP152BA                               | ECEC2AP152BA          |
|                                       | 25 x 30            | 2.57                        | 2.96   | 0.155                       | 0.101 | ECOS2AP152CA                               | ECEC2AP152CA          |
|                                       | 30 x 25            | 2.57                        | 2.96   | 0.155                       | 0.101 | ECOS2AP152DA                               | ECEC2AP152DA          |
|                                       | 35 x 20            | 1.50                        | 1.73   | 0.177                       | 0.115 | ECOS2AP152EL                               | ECEC2AP152EL          |
| 1800                                  | 22 x 45            | 2.84                        | 3.27   | 0.129                       | 0.084 | ECOS2AP182BA                               | ECEC2AP182BA          |
|                                       | 25 x 35            | 2.84                        | 3.27   | 0.138                       | 0.090 | ECOS2AP182CA                               | ECEC2AP182CA          |
|                                       | 30 x 30            | 2.84                        | 3.27   | 0.138                       | 0.090 | ECOS2AP182DA                               | ECEC2AP182DA          |
| 2200                                  | 22 x 50            | 3.14                        | 3.61   | 0.121                       | 0.078 | ECOS2AP222BA                               | ECEC2AP222BA          |
|                                       | 25 x 40            | 3.14                        | 3.61   | 0.121                       | 0.078 | ECOS2AP222CA                               | ECEC2AP222CA          |
|                                       | 30 x 30            | 3.14                        | 3.61   | 0.121                       | 0.078 | ECOS2AP222DA                               | ECEC2AP222DA          |
|                                       | 35 x 25            | 3.14                        | 3.61   | 0.121                       | 0.078 | ECOS2AP222EA                               | ECEC2AP222EA          |
| 2700                                  | 25 x 45            | 3.71                        | 4.27   | 0.104                       | 0.068 | ECOS2AP272CA                               | ECEC2AP272CA          |
|                                       | 30 x 35            | 3.71                        | 4.27   | 0.104                       | 0.068 | ECOS2AP272DA                               | ECEC2AP272DA          |
|                                       | 35 x 30            | 3.71                        | 4.27   | 0.104                       | 0.068 | ECOS2AP272EA                               | ECEC2AP272EA          |
| 3300                                  | 25 x 50            | 4.06                        | 4.67   | 0.090                       | 0.059 | ECOS2AP332CA                               | ECEC2AP332CA          |
|                                       | 30 x 40            | 4.06                        | 4.67   | 0.090                       | 0.059 | ECOS2AP332DA                               | ECEC2AP332DA          |
| 3900                                  | 30 x 45            | 4.54                        | 5.22   | 0.077                       | 0.050 | ECOS2AP392DA                               | ECEC2AP392DA          |
|                                       | 35 x 35            | 4.54                        | 5.22   | 0.081                       | 0.052 | ECOS2AP392EA                               | ECEC2AP392EA          |
| 4700                                  | 30 x 50            | 5.13                        | 5.90   | 0.071                       | 0.049 | ECOS2AP472DA                               | ECEC2AP472DA          |
|                                       | 35 x 40            | 5.13                        | 5.90   | 0.071                       | 0.049 | ECOS2AP472EA                               | ECEC2AP472EA          |
| 5600                                  | 35 x 45            | 5.75                        | 6.61   | 0.059                       | 0.041 | ECOS2AP562EA                               | ECEC2AP562EA          |
| 6800                                  | 35 x 50            | 6.60                        | 7.59   | 0.049                       | 0.037 | ECOS2AP682EA                               | ECEC2AP682EA          |
| <b>160 VDC Working, 200 VDC Surge</b> |                    |                             |        |                             |       |  |                       |
| 220                                   | 22 x 25            | 0.91                        | 1.27   | 0.829                       | 0.414 | ECOS2CP221BA                               | ECEC2CP221BA          |
| 270                                   | 22 x 25            | 1.19                        | 1.67   | 0.675                       | 0.338 | ECOS2CP271BA                               | ECEC2CP271BA          |
| 330                                   | 22 x 25            | 1.45                        | 2.03   | 0.553                       | 0.276 | ECOS2CP331BA                               | ECEC2CP331BA          |
| 390                                   | 22 x 25            | 1.62                        | 2.27   | 0.468                       | 0.234 | ECOS2CP391BX                               | ECEC2CP391BX          |
|                                       | 25 x 25            | 1.62                        | 2.27   | 0.468                       | 0.234 | ECOS2CP391CA                               | ECEC2CP391CA          |
| 470                                   | 22 x 30            | 2.11                        | 2.95   | 0.423                       | 0.212 | ECOS2CP471BA                               | ECEC2CP471BA          |
|                                       | 25 x 25            | 2.11                        | 2.95   | 0.423                       | 0.212 | ECOS2CP471CA                               | ECEC2CP471CA          |
| 560                                   | 22 x 35            | 2.25                        | 3.15   | 0.355                       | 0.178 | ECOS2CP561BA                               | ECEC2CP561BA          |
|                                       | 25 x 25            | 2.25                        | 3.15   | 0.355                       | 0.178 | ECOS2CP561CX                               | ECEC2CP561CX          |
| 680                                   | 22 x 40            | 2.50                        | 3.50   | 0.293                       | 0.146 | ECOS2CP681BA                               | ECEC2CP681BA          |
|                                       | 25 x 30            | 2.50                        | 3.50   | 0.293                       | 0.146 | ECOS2CP681CX                               | ECEC2CP681CX          |
|                                       | 30 x 25            | 2.50                        | 3.50   | 0.293                       | 0.146 | ECOS2CP681DA                               | ECEC2CP681DA          |
| 820                                   | 22 x 45            | 2.75                        | 3.85   | 0.263                       | 0.131 | ECOS2CP821BA                               | ECEC2CP821BA          |
|                                       | 25 x 35            | 2.75                        | 3.85   | 0.263                       | 0.131 | ECOS2CP821CA                               | ECEC2CP821CA          |
|                                       | 30 x 30            | 2.75                        | 3.85   | 0.263                       | 0.131 | ECOS2CP821DA                               | ECEC2CP821DA          |
| 1000                                  | 25 x 40            | 3.00                        | 4.20   | 0.216                       | 0.108 | ECOS2CP102CX                               | ECEC2CP102CX          |
|                                       | 35 x 30            | 3.00                        | 4.20   | 0.232                       | 0.128 | ECOS2CP102EA                               | ECEC2CP102EA          |
| 1200                                  | 25 x 50            | 3.25                        | 4.55   | 0.207                       | 0.114 | ECOS2CP122CA                               | ECEC2CP122CA          |
|                                       | 30 x 35            | 3.25                        | 4.55   | 0.207                       | 0.114 | ECOS2CP122DA                               | ECEC2CP122DA          |
|                                       | 35 x 30            | 3.25                        | 4.55   | 0.207                       | 0.114 | ECOS2CP122EA                               | ECEC2CP122EA          |
| 1500                                  | 25 x 50            | 3.73                        | 5.22   | 0.166                       | 0.091 | ECOS2CP152CX                               | ECEC2CP152CX          |
|                                       | 30 x 45            | 3.73                        | 5.22   | 0.166                       | 0.091 | ECOS2CP152DA                               | ECEC2CP152DA          |
|                                       | 35 x 35            | 3.73                        | 5.22   | 0.166                       | 0.091 | ECOS2CP152EA                               | ECEC2CP152EA          |
| 1800                                  | 30 x 50            | 4.20                        | 5.88   | 0.138                       | 0.083 | ECOS2CP182DA                               | ECEC2CP182DA          |
|                                       | 35 x 35            | 4.20                        | 5.88   | 0.138                       | 0.083 | ECOS2CP182EX                               | ECEC2CP182EX          |
| 2200                                  | 30 x 50            | 4.78                        | 6.69   | 0.105                       | 0.053 | ECOS2CP222DX                               | ECEC2CP222DX          |
|                                       | 35 x 40            | 4.78                        | 6.69   | 0.113                       | 0.073 | ECOS2CP222EX                               | ECEC2CP222EX          |
|                                       | 35 x 45            | 4.78                        | 6.69   | 0.113                       | 0.073 | ECOS2CP222EA                               | ECEC2CP222EA          |
| 2700                                  | 35 x 50            | 5.45                        | 7.63   | 0.092                       | 0.060 | ECOS2CP272EA                               | ECEC2CP272EA          |

**TS-UP Standard Ratings (continued)**

Part numbers shown with 2 pins

| Cap.<br>( $\mu$ F)                    | Size (mm)<br>D x L | Max 85°C R.C. ( $A_{rms}$ ) |        | 20°C ESR ( $\Omega$ , max.) |       | Panasonic Part Number (By Terminal Length) |                       |
|---------------------------------------|--------------------|-----------------------------|--------|-----------------------------|-------|--|-----------------------|
|                                       |                    | 120Hz                       | 10kHz~ | 120Hz                       | 20kHz | 6.3mm Length Terminal                      | 4.0mm Length Terminal |
| <b>200 VDC Working, 250 VDC Surge</b> |                    |                             |        |                             |       |  |                       |
| 150                                   | 22 x 20            | 0.65                        | 0.91   | 1.326                       | 0.597 | ECOS2DP151BL                               | ECEC2DP151BL          |
|                                       | 22 x 25            | 0.71                        | 0.99   | 1.216                       | 0.547 | ECOS2DP151BA                               | ECEC2DP151BA          |
| 220                                   | 22 x 25            | 1.04                        | 1.46   | 0.829                       | 0.373 | ECOS2DP221BA                               | ECEC2DP221BA          |
|                                       | 25 x 20            | 0.87                        | 1.22   | 0.904                       | 0.407 | ECOS2DP221CL                               | ECEC2DP221CL          |
| 270                                   | 22 x 25            | 1.41                        | 1.97   | 0.614                       | 0.276 | ECOS2DP271BA                               | ECEC2DP271BA          |
| 330                                   | 22 x 25            | 1.56                        | 2.18   | 0.553                       | 0.249 | ECOS2DP331BX                               | ECEC2DP331BX          |
|                                       | 30 x 20            | 1.00                        | 1.40   | 0.603                       | 0.271 | ECOS2DP331DL                               | ECEC2DP331DL          |
| 390                                   | 22 x 30            | 1.68                        | 2.35   | 0.468                       | 0.210 | ECOS2DP391BA                               | ECEC2DP391BA          |
|                                       | 25 x 25            | 1.68                        | 2.35   | 0.468                       | 0.210 | ECOS2DP391CA                               | ECEC2DP391CA          |
| 470                                   | 22 x 35            | 1.85                        | 2.59   | 0.388                       | 0.175 | ECOS2DP471BA                               | ECEC2DP471BA          |
|                                       | 25 x 30            | 1.85                        | 2.59   | 0.388                       | 0.175 | ECOS2DP471CA                               | ECEC2DP471CA          |
|                                       | 35 x 20            | 1.30                        | 1.82   | 0.459                       | 0.206 | ECOS2DP471EL                               | ECEC2DP471EL          |
| 560                                   | 22 x 40            | 2.43                        | 3.40   | 0.326                       | 0.147 | ECOS2DP561BA                               | ECEC2DP561BA          |
|                                       | 25 x 30            | 2.43                        | 3.40   | 0.326                       | 0.147 | ECOS2DP561CX                               | ECEC2DP561CX          |
|                                       | 30 x 25            | 2.43                        | 3.40   | 0.326                       | 0.147 | ECOS2DP561DA                               | ECEC2DP561DA          |
| 680                                   | 22 x 45            | 2.68                        | 3.75   | 0.268                       | 0.121 | ECOS2DP681BA                               | ECEC2DP681BA          |
|                                       | 25 x 35            | 2.68                        | 3.75   | 0.268                       | 0.121 | ECOS2DP681CA                               | ECEC2DP681CA          |
|                                       | 30 x 30            | 2.68                        | 3.75   | 0.268                       | 0.121 | ECOS2DP681DA                               | ECEC2DP681DA          |
| 820                                   | 25 x 45            | 2.93                        | 4.10   | 0.222                       | 0.100 | ECOS2DP821CA                               | ECEC2DP821CA          |
|                                       | 30 x 30            | 2.93                        | 4.10   | 0.222                       | 0.100 | ECOS2DP821DX                               | ECEC2DP821DX          |
|                                       | 30 x 35            | 2.93                        | 4.10   | 0.222                       | 0.100 | ECOS2DP821DA                               | ECEC2DP821DA          |
|                                       | 35 x 25            | 2.93                        | 4.10   | 0.222                       | 0.100 | ECOS2DP821EA                               | ECEC2DP821EA          |
| 1000                                  | 25 x 45            | 3.25                        | 4.55   | 0.199                       | 0.090 | ECOS2DP102CX                               | ECEC2DP102CX          |
|                                       | 25 x 50            | 3.25                        | 4.55   | 0.199                       | 0.090 | ECOS2DP102CA                               | ECEC2DP102CA          |
|                                       | 30 x 35            | 3.25                        | 4.55   | 0.199                       | 0.090 | ECOS2DP102DX                               | ECEC2DP102DX          |
|                                       | 30 x 40            | 3.25                        | 4.55   | 0.199                       | 0.090 | ECOS2DP102DA                               | ECEC2DP102DA          |
|                                       | 35 x 30            | 3.25                        | 4.55   | 0.199                       | 0.090 | ECOS2DP102EA                               | ECEC2DP102EA          |
| 1200                                  | 30 x 40            | 3.50                        | 4.90   | 0.166                       | 0.075 | ECOS2DP122DX                               | ECEC2DP122DX          |
|                                       | 30 x 45            | 3.50                        | 4.90   | 0.166                       | 0.075 | ECOS2DP122DA                               | ECEC2DP122DA          |
|                                       | 35 x 30            | 3.50                        | 4.90   | 0.166                       | 0.075 | ECOS2DP122EX                               | ECEC2DP122EX          |
|                                       | 35 x 35            | 3.50                        | 4.90   | 0.166                       | 0.075 | ECOS2DP122EA                               | ECEC2DP122EA          |
| 1500                                  | 30 x 45            | 3.87                        | 5.42   | 0.144                       | 0.072 | ECOS2DP152DX                               | ECEC2DP152DX          |
|                                       | 30 x 50            | 3.87                        | 5.42   | 0.144                       | 0.072 | ECOS2DP152DA                               | ECEC2DP152DA          |
|                                       | 35 x 35            | 3.87                        | 5.42   | 0.144                       | 0.072 | ECOS2DP152EX                               | ECEC2DP152EX          |
|                                       | 35 x 40            | 3.87                        | 5.42   | 0.144                       | 0.072 | ECOS2DP152EA                               | ECEC2DP152EA          |
| 1800                                  | 30 x 50            | 4.32                        | 6.05   | 0.120                       | 0.060 | ECOS2DP182DX                               | ECEC2DP182DX          |
|                                       | 35 x 40            | 4.32                        | 6.05   | 0.120                       | 0.060 | ECOS2DP182EX                               | ECEC2DP182EX          |
|                                       | 35 x 45            | 4.32                        | 6.05   | 0.120                       | 0.060 | ECOS2DP182EA                               | ECEC2DP182EA          |
| 2200                                  | 35 x 45            | 4.92                        | 6.89   | 0.098                       | 0.054 | ECOS2DP222EX                               | ECEC2DP222EX          |
|                                       | 35 x 50            | 4.92                        | 6.89   | 0.098                       | 0.054 | ECOS2DP222EA                               | ECEC2DP222EA          |
| <b>250 VDC Working, 300 VDC Surge</b> |                    |                             |        |                             |       |  |                       |
| 120                                   | 22 x 20            | 0.45                        | 0.63   | 1.658                       | 0.663 | ECOS2EP121BL                               | ECEC2EP121BL          |
|                                       | 22 x 25            | 0.71                        | 0.99   | 1.520                       | 0.608 | ECOS2EP121BA                               | ECEC2EP121BA          |
| 150                                   | 22 x 25            | 0.89                        | 1.25   | 1.216                       | 0.486 | ECOS2EP151BA                               | ECEC2EP151BA          |
|                                       | 25 x 20            | 0.65                        | 0.91   | 1.326                       | 0.531 | ECOS2EP151CL                               | ECEC2EP151CL          |
| 180                                   | 22 x 25            | 1.07                        | 1.50   | 0.921                       | 0.368 | ECOS2EP181BA                               | ECEC2EP181BA          |
| 220                                   | 22 x 25            | 1.17                        | 1.64   | 0.754                       | 0.301 | ECOS2EP221BX                               | ECEC2EP221BX          |
|                                       | 30 x 20            | 0.87                        | 1.22   | 0.829                       | 0.332 | ECOS2EP221DL                               | ECEC2EP221DL          |
| 270                                   | 22 x 30            | 1.31                        | 1.83   | 0.614                       | 0.246 | ECOS2EP271BA                               | ECEC2EP271BA          |
|                                       | 25 x 25            | 1.31                        | 1.83   | 0.614                       | 0.246 | ECOS2EP271CA                               | ECEC2EP271CA          |
| 330                                   | 22 x 35            | 1.75                        | 2.45   | 0.553                       | 0.221 | ECOS2EP331BA                               | ECEC2EP331BA          |
|                                       | 25 x 30            | 1.75                        | 2.45   | 0.502                       | 0.201 | ECOS2EP331CA                               | ECEC2EP331CA          |
|                                       | 35 x 20            | 1.10                        | 1.54   | 0.553                       | 0.221 | ECOS2EP331EL                               | ECEC2EP331EL          |
| 390                                   | 22 x 40            | 1.91                        | 2.67   | 0.468                       | 0.187 | ECOS2EP391BA                               | ECEC2EP391BA          |
|                                       | 25 x 30            | 1.91                        | 2.67   | 0.468                       | 0.187 | ECOS2EP391CX                               | ECEC2EP391CX          |
|                                       | 25 x 35            | 1.91                        | 2.67   | 0.468                       | 0.187 | ECOS2EP391CA                               | ECEC2EP391CA          |
|                                       | 30 x 25            | 1.91                        | 2.67   | 0.425                       | 0.170 | ECOS2EP391DA                               | ECEC2EP391DA          |
| 470                                   | 22 x 45            | 2.11                        | 2.95   | 0.388                       | 0.155 | ECOS2EP471BA                               | ECEC2EP471BA          |
|                                       | 25 x 35            | 2.11                        | 2.95   | 0.388                       | 0.155 | ECOS2EP471CX                               | ECEC2EP471CX          |
|                                       | 25 x 40            | 2.11                        | 2.95   | 0.388                       | 0.155 | ECOS2EP471CA                               | ECEC2EP471CA          |
|                                       | 30 x 25            | 2.11                        | 2.95   | 0.353                       | 0.141 | ECOS2EP471DX                               | ECEC2EP471DX          |
|                                       | 30 x 30            | 2.11                        | 2.95   | 0.388                       | 0.155 | ECOS2EP471DA                               | ECEC2EP471DA          |



**TS-UP Standard Ratings (continued)**

Part numbers shown with 2 pins

| Cap.<br>( $\mu$ F)                                | Size (mm)<br>D x L | Max 85°C R.C. ( $A_{rms}$ ) |        | 20°C ESR ( $\Omega$ , max.) |       | Panasonic Part Number (By Terminal Length) |                       |
|---|--------------------|-----------------------------|--------|-----------------------------|-------|--|-----------------------|
|   |                    | 120Hz                       | 10kHz~ | 120Hz                       | 20kHz | 6.3mm Length Terminal                      | 4.0mm Length Terminal |
| <b>250 VDC Working, 300 VDC Surge (continued)</b> |                    |                             |        |                             |       |  |                       |
| 560   | 25 x 40            | 2.25                        | 3.15   | 0.326                       | 0.130 | ECOS2EP561CX                               | ECEC2EP561CX          |
|   | 25 x 45            | 2.25                        | 3.15   | 0.326                       | 0.130 | ECOS2EP561CA                               | ECEC2EP561CA          |
|   | 30 x 30            | 2.25                        | 3.15   | 0.326                       | 0.130 | ECOS2EP561DX                               | ECEC2EP561DX          |
|   | 30 x 35            | 2.25                        | 3.15   | 0.326                       | 0.130 | ECOS2EP561DA                               | ECEC2EP561DA          |
|   | 35 x 25            | 2.25                        | 3.15   | 0.326                       | 0.130 | ECOS2EP561EA                               | ECEC2EP561EA          |
| 680   | 25 x 45            | 2.50                        | 3.50   | 0.268                       | 0.107 | ECOS2EP681CX                               | ECEC2EP681CX          |
|   | 25 x 50            | 2.50                        | 3.50   | 0.268                       | 0.107 | ECOS2EP681CA                               | ECEC2EP681CA          |
|   | 30 x 35            | 2.50                        | 3.50   | 0.268                       | 0.107 | ECOS2EP681DX                               | ECEC2EP681DX          |
|   | 30 x 40            | 2.50                        | 3.50   | 0.268                       | 0.107 | ECOS2EP681DA                               | ECEC2EP681DA          |
|   | 35 x 30            | 2.50                        | 3.50   | 0.268                       | 0.107 | ECOS2EP681EA                               | ECEC2EP681EA          |
| 820   | 30 x 40            | 2.50                        | 3.50   | 0.222                       | 0.089 | ECOS2EP821DX                               | ECEC2EP821DX          |
|   | 30 x 45            | 2.77                        | 3.88   | 0.222                       | 0.089 | ECOS2EP821DA                               | ECEC2EP821DA          |
|   | 35 x 30            | 2.77                        | 3.88   | 0.222                       | 0.089 | ECOS2EP821EX                               | ECEC2EP821EX          |
|   | 35 x 35            | 2.77                        | 3.88   | 0.243                       | 0.109 | ECOS2EP821EA                               | ECEC2EP821EA          |
| 1000  | 30 x 45            | 3.32                        | 4.65   | 0.182                       | 0.073 | ECOS2EP102DX                               | ECEC2EP102DX          |
|   | 30 x 50            | 3.32                        | 4.65   | 0.199                       | 0.090 | ECOS2EP102DA                               | ECEC2EP102DA          |
|   | 35 x 35            | 3.32                        | 4.65   | 0.199                       | 0.090 | ECOS2EP102EX                               | ECEC2EP102EX          |
|   | 35 x 40            | 3.32                        | 4.65   | 0.199                       | 0.099 | ECOS2EP102EA                               | ECEC2EP102EA          |
| 1200  | 35 x 40            | 3.53                        | 4.94   | 0.166                       | 0.083 | ECOS2EP122EX                               | ECEC2EP122EX          |
|   | 35 x 45            | 3.53                        | 4.94   | 0.166                       | 0.083 | ECOS2EP122EA                               | ECEC2EP122EA          |
| 1500  | 35 x 50            | 4.04                        | 5.66   | 0.133                       | 0.066 | ECOS2EP152EA                               | ECEC2EP152EA          |
| <b>350 VDC Working, 400 VDC Surge</b>             |                    |                             |        |                             |       |  |                       |
| 82  | 22 x 25            | 0.83                        | 1.16   | 2.022                       | 0.708 | ECOS2VP820BA                               | ECEC2VP820BA          |
| 100   | 22 x 30            | 0.91                        | 1.27   | 1.658                       | 0.580 | ECOS2VP101BA                               | ECEC2VP101BA          |
| 120   | 22 x 30            | 1.00                        | 1.40   | 1.382                       | 0.484 | ECOS2VP121BA                               | ECEC2VP121BA          |
|   | 25 x 25            | 1.00                        | 1.40   | 1.382                       | 0.484 | ECOS2VP121CA                               | ECEC2VP121CA          |
| 150   | 22 x 35            | 1.12                        | 1.57   | 1.105                       | 0.387 | ECOS2VP151BA                               | ECEC2VP151BA          |
|   | 25 x 25            | 1.12                        | 1.57   | 1.105                       | 0.387 | ECOS2VP151CX                               | ECEC2VP151CX          |
|   | 25 x 30            | 1.12                        | 1.57   | 1.105                       | 0.387 | ECOS2VP151CA                               | ECEC2VP151CA          |
|   | 30 x 25            | 1.12                        | 1.57   | 1.105                       | 0.387 | ECOS2VP151DA                               | ECEC2VP151DA          |
| 180   | 22 x 40            | 1.22                        | 1.71   | 0.921                       | 0.322 | ECOS2VP181BA                               | ECEC2VP181BA          |
|   | 25 x 30            | 1.22                        | 1.71   | 0.921                       | 0.322 | ECOS2VP181CX                               | ECEC2VP181CX          |
|   | 25 x 35            | 1.22                        | 1.71   | 0.921                       | 0.322 | ECOS2VP181CA                               | ECEC2VP181CA          |
|   | 30 x 25            | 1.22                        | 1.71   | 0.921                       | 0.322 | ECOS2VP181DA                               | ECEC2VP181DA          |
| 220   | 22 x 45            | 1.44                        | 2.02   | 0.754                       | 0.264 | ECOS2VP221BA                               | ECEC2VP221BA          |
|   | 25 x 40            | 1.44                        | 2.02   | 0.754                       | 0.264 | ECOS2VP221CA                               | ECEC2VP221CA          |
|   | 30 x 25            | 1.44                        | 2.02   | 0.754                       | 0.264 | ECOS2VP221DX                               | ECEC2VP221DX          |
|   | 30 x 30            | 1.44                        | 2.02   | 0.754                       | 0.264 | ECOS2VP221DA                               | ECEC2VP221DA          |
|   | 35 x 25            | 1.44                        | 2.02   | 0.754                       | 0.264 | ECOS2VP221EA                               | ECEC2VP221EA          |
| 270   | 25 x 40            | 1.66                        | 2.32   | 0.614                       | 0.215 | ECOS2VP271CX                               | ECEC2VP271CX          |
|   | 30 x 30            | 1.66                        | 2.32   | 0.614                       | 0.215 | ECOS2VP271DX                               | ECEC2VP271DX          |
|   | 30 x 35            | 1.66                        | 2.32   | 0.614                       | 0.215 | ECOS2VP271DA                               | ECEC2VP271DA          |
|   | 35 x 25            | 1.66                        | 2.32   | 0.614                       | 0.215 | ECOS2VP271EX                               | ECEC2VP271EX          |
|   | 35 x 30            | 1.66                        | 2.32   | 0.614                       | 0.215 | ECOS2VP271EA                               | ECEC2VP271EA          |
| 330   | 25 x 50            | 1.88                        | 2.63   | 0.502                       | 0.176 | ECOS2VP331CA                               | ECEC2VP331CA          |
|   | 30 x 35            | 1.88                        | 2.63   | 0.502                       | 0.176 | ECOS2VP331DX                               | ECEC2VP331DX          |
|   | 30 x 40            | 1.88                        | 2.63   | 0.502                       | 0.176 | ECOS2VP331DA                               | ECEC2VP331DA          |
|   | 35 x 30            | 1.88                        | 2.63   | 0.502                       | 0.176 | ECOS2VP331EA                               | ECEC2VP331EA          |
| 390   | 25 x 50            | 2.06                        | 2.88   | 0.425                       | 0.149 | ECOS2VP391CX                               | ECEC2VP391CX          |
|   | 30 x 40            | 2.06                        | 2.88   | 0.425                       | 0.149 | ECOS2VP391DX                               | ECEC2VP391DX          |
|   | 30 x 45            | 2.06                        | 2.88   | 0.468                       | 0.164 | ECOS2VP391DA                               | ECEC2VP391DA          |
|   | 35 x 30            | 2.06                        | 2.88   | 0.425                       | 0.149 | ECOS2VP391EX                               | ECEC2VP391EX          |
|   | 35 x 35            | 2.06                        | 2.88   | 0.425                       | 0.149 | ECOS2VP391EA                               | ECEC2VP391EA          |
| 470   | 30 x 50            | 2.40                        | 3.36   | 0.388                       | 0.136 | ECOS2VP471DA                               | ECEC2VP471DA          |
|   | 35 x 35            | 2.40                        | 3.36   | 0.353                       | 0.123 | ECOS2VP471EX                               | ECEC2VP471EX          |
|   | 35 x 40            | 2.40                        | 3.36   | 0.353                       | 0.123 | ECOS2VP471EA                               | ECEC2VP471EA          |
| 560   | 30 x 50            | 2.60                        | 3.64   | 0.326                       | 0.114 | ECOS2VP561DX                               | ECEC2VP561DX          |
|   | 35 x 40            | 2.60                        | 3.64   | 0.296                       | 0.104 | ECOS2VP561EX                               | ECEC2VP561EX          |
|   | 35 x 45            | 2.60                        | 3.64   | 0.296                       | 0.104 | ECOS2VP561EA                               | ECEC2VP561EA          |
| 680   | 35 x 45            | 2.96                        | 4.14   | 0.293                       | 0.117 | ECOS2VP681EX                               | ECEC2VP681EX          |
|   | 35 x 50            | 2.96                        | 4.14   | 0.293                       | 0.117 | ECOS2VP681EA                               | ECEC2VP681EA          |
| 820   | 35 x 50            | 3.55                        | 4.97   | 0.243                       | 0.097 | ECOS2VP821EX                               | ECEC2VP821EX          |

**TS-UP Standard Ratings (continued)**

Part numbers shown with 2 pins

| Cap.<br>( $\mu$ F)                    | Size (mm)<br>D x L | Max 85°C R.C. ( $A_{rms}$ ) |        | 20°C ESR ( $\Omega$ , max.) |       | Panasonic Part Number (By Terminal Length) |                       |
|---------------------------------------|--------------------|-----------------------------|--------|-----------------------------|-------|--|-----------------------|
|                                       |                    | 120Hz                       | 10kHz~ | 120Hz                       | 20kHz | 6.3mm Length Terminal                      | 4.0mm Length Terminal |
| <b>385 VDC Working, 435 VDC Surge</b> |                    |                             |        |                             |       |  |                       |
| 68                                    | 22 x 25            | 0.76                        | 1.06   | 2.438                       | 0.853 | ECOS2TP680BA                               | ECEC2TP680BA          |
|                                       | 25 x 20            | 0.35                        | 0.49   | 2.926                       | 1.024 | ECOS2TP680CL                               | ECEC2TP680CL          |
| 82                                    | 22 x 25            | 0.83                        | 1.16   | 2.022                       | 0.708 | ECOS2TP820BA                               | ECEC2TP820BA          |
|                                       | 25 x 25            | 0.92                        | 1.29   | 1.658                       | 0.580 | ECOS2TP101BA                               | ECEC2TP101BA          |
| 100                                   | 22 x 30            | 0.92                        | 1.29   | 1.658                       | 0.580 | ECOS2TP101CA                               | ECEC2TP101CA          |
|                                       | 25 x 25            | 1.02                        | 1.43   | 1.382                       | 0.553 | ECOS2TP121BA                               | ECEC2TP121BA          |
| 120                                   | 22 x 35            | 1.02                        | 1.43   | 1.382                       | 0.553 | ECOS2TP121CA                               | ECEC2TP121CA          |
|                                       | 25 x 30            | 1.16                        | 1.62   | 1.105                       | 0.442 | ECOS2TP151BA                               | ECEC2TP151BA          |
| 150                                   | 25 x 30            | 1.16                        | 1.62   | 1.105                       | 0.442 | ECOS2TP151CA                               | ECEC2TP151CA          |
|                                       | 30 x 25            | 1.16                        | 1.62   | 1.105                       | 0.442 | ECOS2TP151DA                               | ECEC2TP151DA          |
| 180                                   | 22 x 45            | 1.44                        | 2.02   | 0.921                       | 0.368 | ECOS2TP181BA                               | ECEC2TP181BA          |
|                                       | 25 x 35            | 1.44                        | 2.02   | 0.921                       | 0.368 | ECOS2TP181CA                               | ECEC2TP181CA          |
| 220                                   | 30 x 30            | 1.44                        | 2.02   | 0.921                       | 0.368 | ECOS2TP181DA                               | ECEC2TP181DA          |
|                                       | 22 x 50            | 1.49                        | 2.09   | 0.829                       | 0.373 | ECOS2TP221BA                               | ECEC2TP221BA          |
| 270                                   | 25 x 45            | 1.67                        | 2.34   | 0.675                       | 0.304 | ECOS2TP221CA                               | ECEC2TP221CA          |
|                                       | 30 x 40            | 1.49                        | 2.09   | 0.829                       | 0.373 | ECOS2TP221DA                               | ECEC2TP221DA          |
| 330                                   | 30 x 30            | 1.49                        | 2.09   | 0.829                       | 0.373 | ECOS2TP221EA                               | ECEC2TP221EA          |
|                                       | 25 x 35            | 1.67                        | 2.34   | 0.675                       | 0.304 | ECOS2TP271CA                               | ECEC2TP271CA          |
| 390                                   | 30 x 35            | 1.67                        | 2.34   | 0.675                       | 0.304 | ECOS2TP271DA                               | ECEC2TP271DA          |
|                                       | 35 x 30            | 1.67                        | 2.34   | 0.675                       | 0.304 | ECOS2TP271EA                               | ECEC2TP271EA          |
| 470                                   | 30 x 40            | 1.90                        | 2.66   | 0.553                       | 0.249 | ECOS2TP331DA                               | ECEC2TP331DA          |
|                                       | 35 x 35            | 1.90                        | 2.66   | 0.553                       | 0.249 | ECOS2TP331EA                               | ECEC2TP331EA          |
| 560                                   | 30 x 45            | 2.13                        | 2.98   | 0.468                       | 0.210 | ECOS2TP391DA                               | ECEC2TP391DA          |
|                                       | 35 x 40            | 2.13                        | 2.98   | 0.468                       | 0.210 | ECOS2TP391EA                               | ECEC2TP391EA          |
| 680                                   | 30 x 50            | 2.39                        | 3.35   | 0.388                       | 0.175 | ECOS2TP471DA                               | ECEC2TP471DA          |
|                                       | 35 x 45            | 2.39                        | 3.35   | 0.388                       | 0.175 | ECOS2TP471EA                               | ECEC2TP471EA          |
| 800                                   | 35 x 50            | 2.69                        | 3.77   | 0.326                       | 0.147 | ECOS2TP561EA                               | ECEC2TP561EA          |
|                                       |                    |                             |        |                             |       |  |                       |
| <b>400 VDC Working, 450 VDC Surge</b> |                    |                             |        |                             |       |  |                       |
| 47                                    | 22 x 20            | 0.25                        | 0.35   | 3.527                       | 1.235 | ECOS2GP470BL                               | ECEC2GP470BL          |
|                                       | 22 x 25            | 0.47                        | 0.66   | 3.527                       | 1.235 | ECOS2GP470BA                               | ECEC2GP470BA          |
| 68                                    | 22 x 25            | 0.69                        | 0.97   | 2.438                       | 0.853 | ECOS2GP680BA                               | ECEC2GP680BA          |
|                                       | 25 x 20            | 0.35                        | 0.49   | 2.926                       | 1.024 | ECOS2GP680CL                               | ECEC2GP680CL          |
| 82                                    | 22 x 25            | 0.83                        | 1.16   | 2.022                       | 0.708 | ECOS2GP820BA                               | ECEC2GP820BA          |
|                                       | 22 x 30            | 0.92                        | 1.29   | 1.658                       | 0.580 | ECOS2GP101BA                               | ECEC2GP101BA          |
| 100                                   | 25 x 25            | 0.92                        | 1.29   | 1.658                       | 0.580 | ECOS2GP101CA                               | ECEC2GP101CA          |
|                                       | 30 x 20            | 0.47                        | 0.66   | 1.989                       | 0.696 | ECOS2GP101DL                               | ECEC2GP101DL          |
| 120                                   | 22 x 35            | 1.02                        | 1.43   | 1.382                       | 0.484 | ECOS2GP121BA                               | ECEC2GP121BA          |
|                                       | 25 x 25            | 1.02                        | 1.43   | 1.382                       | 0.484 | ECOS2GP121CX                               | ECEC2GP121CX          |
| 150                                   | 22 x 40            | 1.16                        | 1.62   | 1.105                       | 0.387 | ECOS2GP151BA                               | ECEC2GP151BA          |
|                                       | 25 x 30            | 1.16                        | 1.62   | 1.105                       | 0.387 | ECOS2GP151CA                               | ECEC2GP151CA          |
| 180                                   | 30 x 25            | 1.16                        | 1.62   | 1.105                       | 0.387 | ECOS2GP151DA                               | ECEC2GP151DA          |
|                                       | 35 x 20            | 0.60                        | 0.84   | 1.326                       | 0.464 | ECOS2GP151EL                               | ECEC2GP151EL          |
| 220                                   | 22 x 45            | 1.44                        | 2.02   | 0.921                       | 0.322 | ECOS2GP181BA                               | ECEC2GP181BA          |
|                                       | 25 x 30            | 1.44                        | 2.02   | 0.921                       | 0.322 | ECOS2GP181CX                               | ECEC2GP181CX          |
| 270                                   | 25 x 35            | 1.44                        | 2.02   | 0.921                       | 0.322 | ECOS2GP181CA                               | ECEC2GP181CA          |
|                                       | 22 x 50            | 1.49                        | 2.09   | 0.754                       | 0.264 | ECOS2GP221BA                               | ECEC2GP221BA          |
| 330                                   | 25 x 40            | 1.49                        | 2.09   | 0.754                       | 0.264 | ECOS2GP221CA                               | ECEC2GP221CA          |
|                                       | 30 x 30            | 1.49                        | 2.09   | 0.754                       | 0.264 | ECOS2GP221DA                               | ECEC2GP221DA          |
| 390                                   | 25 x 45            | 1.67                        | 2.34   | 0.675                       | 0.236 | ECOS2GP271CA                               | ECEC2GP271CA          |
|                                       | 30 x 35            | 1.67                        | 2.34   | 0.675                       | 0.236 | ECOS2GP271DA                               | ECEC2GP271DA          |
| 470                                   | 35 x 30            | 1.67                        | 2.34   | 0.675                       | 0.236 | ECOS2GP271EA                               | ECEC2GP271EA          |
|                                       | 30 x 40            | 1.90                        | 2.66   | 0.553                       | 0.193 | ECOS2GP331DA                               | ECEC2GP331DA          |
| 560                                   | 35 x 30            | 1.90                        | 2.66   | 0.553                       | 0.193 | ECOS2GP331EX                               | ECEC2GP331EX          |
|                                       | 35 x 35            | 1.90                        | 2.66   | 0.553                       | 0.193 | ECOS2GP331EA                               | ECEC2GP331EA          |
| 680                                   | 30 x 45            | 2.13                        | 2.98   | 0.468                       | 0.164 | ECOS2GP391DA                               | ECEC2GP391DA          |
|                                       | 35 x 35            | 2.13                        | 2.98   | 0.468                       | 0.164 | ECOS2GP391EX                               | ECEC2GP391EX          |
| 800                                   | 35 x 40            | 2.13                        | 2.98   | 0.468                       | 0.164 | ECOS2GP391EA                               | ECEC2GP391EA          |
|                                       | 35 x 40            | 2.39                        | 3.35   | 0.388                       | 0.136 | ECOS2GP471EX                               | ECEC2GP471EX          |
| 900                                   | 35 x 45            | 2.39                        | 3.35   | 0.388                       | 0.136 | ECOS2GP471EA                               | ECEC2GP471EA          |
|                                       | 35 x 45            | 2.69                        | 3.77   | 0.326                       | 0.114 | ECOS2GP561EX                               | ECEC2GP561EX          |
| 1000                                  | 35 x 50            | 2.69                        | 3.77   | 0.326                       | 0.114 | ECOS2GP561EA                               | ECEC2GP561EA          |
|                                       | 35 x 50            | 3.00                        | 4.20   | 0.268                       | 0.094 | ECOS2GP681EX                               | ECEC2GP681EX          |



**TS-UP Standard Ratings (continued)**

Part numbers shown with 2 pins

| Cap.<br>( $\mu$ F)                    | Size (mm)<br>D x L | Max 85°C R.C. ( $A_{rms}$ ) |        | 20°C ESR ( $\Omega$ , max.) |       | Panasonic Part Number (By Terminal Length) |                       |
|---------------------------------------|--------------------|-----------------------------|--------|-----------------------------|-------|--|-----------------------|
|                                       |                    | 120Hz                       | 10kHz~ | 120Hz                       | 20kHz | 6.3mm Length Terminal                      | 4.0mm Length Terminal |
| <b>420 VDC Working, 470 VDC Surge</b> |                    |                             |        |                             |       |  |                       |
| 82                                    | 22 x 30            | 0.83                        | 1.16   | 2.426                       | 0.849 | ECOS2SP820BA                               | ECEC2SP820BA          |
| 100                                   | 22 x 30            | 0.92                        | 1.29   | 1.989                       | 0.696 | ECOS2SP101BA                               | ECEC2SP101BA          |
|                                       | 25 x 25            | 0.92                        | 1.29   | 1.989                       | 0.696 | ECOS2SP101CA                               | ECEC2SP101CA          |
| 120                                   | 22 x 35            | 1.02                        | 1.43   | 1.658                       | 0.580 | ECOS2SP121BA                               | ECEC2SP121BA          |
|                                       | 25 x 30            | 1.02                        | 1.43   | 1.658                       | 0.580 | ECOS2SP121CA                               | ECEC2SP121CA          |
| 150                                   | 22 x 40            | 1.16                        | 1.62   | 1.326                       | 0.464 | ECOS2SP151BA                               | ECEC2SP151BA          |
|                                       | 25 x 30            | 1.16                        | 1.62   | 1.326                       | 0.464 | ECOS2SP151CA                               | ECEC2SP151CA          |
|                                       | 30 x 25            | 1.16                        | 1.62   | 1.326                       | 0.464 | ECOS2SP151DA                               | ECEC2SP151DA          |
| 180                                   | 22 x 45            | 1.44                        | 2.02   | 1.105                       | 0.387 | ECOS2SP181BA                               | ECEC2SP181BA          |
|                                       | 25 x 35            | 1.44                        | 2.02   | 1.105                       | 0.387 | ECOS2SP181CA                               | ECEC2SP181CA          |
|                                       | 30 x 30            | 1.44                        | 2.02   | 1.105                       | 0.387 | ECOS2SP181DA                               | ECEC2SP181DA          |
| 220                                   | 25 x 45            | 1.49                        | 2.09   | 0.904                       | 0.316 | ECOS2SP221CA                               | ECEC2SP221CA          |
|                                       | 30 x 30            | 1.49                        | 2.09   | 0.904                       | 0.316 | ECOS2SP221DA                               | ECEC2SP221DA          |
|                                       | 35 x 25            | 1.49                        | 2.09   | 0.904                       | 0.316 | ECOS2SP221EA                               | ECEC2SP221EA          |
| 270                                   | 25 x 50            | 1.67                        | 2.34   | 0.737                       | 0.258 | ECOS2SP271CA                               | ECEC2SP271CA          |
|                                       | 30 x 35            | 1.67                        | 2.34   | 0.737                       | 0.258 | ECOS2SP271DA                               | ECEC2SP271DA          |
|                                       | 35 x 30            | 1.67                        | 2.34   | 0.737                       | 0.258 | ECOS2SP271EA                               | ECEC2SP271EA          |
| 330                                   | 30 x 45            | 1.90                        | 2.66   | 0.603                       | 0.211 | ECOS2SP331DA                               | ECEC2SP331DA          |
|                                       | 35 x 35            | 1.90                        | 2.66   | 0.603                       | 0.211 | ECOS2SP331EA                               | ECEC2SP331EA          |
| 390                                   | 30 x 50            | 2.13                        | 2.98   | 0.510                       | 0.179 | ECOS2SP391DA                               | ECEC2SP391DA          |
|                                       | 35 x 40            | 2.13                        | 2.98   | 0.510                       | 0.179 | ECOS2SP391EA                               | ECEC2SP391EA          |
| 470                                   | 35 x 45            | 2.39                        | 3.35   | 0.423                       | 0.148 | ECOS2SP471EA                               | ECEC2SP471EA          |
| 560                                   | 35 x 50            | 2.69                        | 3.77   | 0.355                       | 0.124 | ECOS2SP561EA                               | ECEC2SP561EA          |
| <b>450 VDC Working, 500 VDC Surge</b> |                    |                             |        |                             |       |  |                       |
| 33                                    | 22 x 20            | 0.20                        | 0.28   | 6.028                       | 2.411 | ECOS2WP330BL                               | ECEC2WP330BL          |
|                                       | 22 x 25            | 0.41                        | 0.57   | 6.028                       | 2.411 | ECOS2WP330BA                               | ECEC2WP330BA          |
| 47                                    | 22 x 25            | 0.59                        | 0.83   | 4.233                       | 1.693 | ECOS2WP470BA                               | ECEC2WP470BA          |
|                                       | 25 x 20            | 0.29                        | 0.41   | 4.233                       | 1.693 | ECOS2WP470CL                               | ECEC2WP470CL          |
| 56                                    | 22 x 25            | 0.70                        | 0.98   | 2.960                       | 1.184 | ECOS2WP560BA                               | ECEC2WP560BA          |
| 68                                    | 30 x 20            | 0.38                        | 0.53   | 2.926                       | 1.170 | ECOS2WP680DL                               | ECEC2WP680DL          |
| 82                                    | 22 x 30            | 0.83                        | 1.16   | 2.022                       | 0.809 | ECOS2WP820BA                               | ECEC2WP820BA          |
|                                       | 25 x 25            | 0.83                        | 1.16   | 2.022                       | 0.809 | ECOS2WP820CA                               | ECEC2WP820CA          |
| 100                                   | 22 x 35            | 0.93                        | 1.30   | 1.658                       | 0.663 | ECOS2WP101BA                               | ECEC2WP101BA          |
|                                       | 35 x 20            | 0.52                        | 0.73   | 1.989                       | 0.796 | ECOS2WP101EL                               | ECEC2WP101EL          |
| 120                                   | 22 x 40            | 1.04                        | 1.46   | 1.382                       | 0.553 | ECOS2WP121BA                               | ECEC2WP121BA          |
|                                       | 25 x 30            | 1.04                        | 1.46   | 1.382                       | 0.553 | ECOS2WP121CA                               | ECEC2WP121CA          |
|                                       | 30 x 25            | 1.04                        | 1.46   | 1.382                       | 0.553 | ECOS2WP121DA                               | ECEC2WP121DA          |
| 150                                   | 22 x 50            | 1.19                        | 1.67   | 1.105                       | 0.442 | ECOS2WP151BA                               | ECEC2WP151BA          |
|                                       | 25 x 40            | 1.19                        | 1.67   | 1.105                       | 0.442 | ECOS2WP151CA                               | ECEC2WP151CA          |
|                                       | 30 x 30            | 1.19                        | 1.67   | 1.105                       | 0.442 | ECOS2WP151DA                               | ECEC2WP151DA          |
| 180                                   | 25 x 40            | 1.35                        | 1.89   | 0.921                       | 0.368 | ECOS2WP181CX                               | ECEC2WP181CX          |
|                                       | 25 x 45            | 1.35                        | 1.89   | 0.921                       | 0.368 | ECOS2WP181CA                               | ECEC2WP181CA          |
|                                       | 30 x 30            | 1.35                        | 1.89   | 0.921                       | 0.368 | ECOS2WP181DX                               | ECEC2WP181DX          |
|                                       | 30 x 35            | 1.35                        | 1.89   | 0.921                       | 0.368 | ECOS2WP181DA                               | ECEC2WP181DA          |
|                                       | 35 x 25            | 1.35                        | 1.89   | 0.921                       | 0.368 | ECOS2WP181EA                               | ECEC2WP181EA          |
| 220                                   | 25 x 45            | 1.55                        | 2.17   | 0.754                       | 0.301 | ECOS2WP221CX                               | ECEC2WP221CX          |
|                                       | 25 x 50            | 1.55                        | 2.17   | 0.754                       | 0.301 | ECOS2WP221CA                               | ECEC2WP221CA          |
|                                       | 30 x 35            | 1.55                        | 2.17   | 0.754                       | 0.301 | ECOS2WP221DX                               | ECEC2WP221DX          |
|                                       | 30 x 40            | 1.55                        | 2.17   | 0.754                       | 0.301 | ECOS2WP221DA                               | ECEC2WP221DA          |
|                                       | 35 x 30            | 1.55                        | 2.17   | 0.754                       | 0.301 | ECOS2WP221EA                               | ECEC2WP221EA          |
| 270                                   | 30 x 45            | 1.78                        | 2.49   | 0.675                       | 0.270 | ECOS2WP271DA                               | ECEC2WP271DA          |
|                                       | 35 x 30            | 1.78                        | 2.49   | 0.614                       | 0.246 | ECOS2WP271EX                               | ECEC2WP271EX          |
| 270                                   | 35 x 35            | 1.78                        | 2.49   | 0.675                       | 0.270 | ECOS2WP271EA                               | ECEC2WP271EA          |
| 330                                   | 30 x 50            | 2.01                        | 2.81   | 0.553                       | 0.249 | ECOS2WP331DA                               | ECEC2WP331DA          |
|                                       | 35 x 35            | 2.01                        | 2.81   | 0.553                       | 0.221 | ECOS2WP331EX                               | ECEC2WP331EX          |
|                                       | 35 x 40            | 2.01                        | 2.81   | 0.553                       | 0.249 | ECOS2WP331EA                               | ECEC2WP331EA          |
| 390                                   | 35 x 45            | 2.24                        | 3.14   | 0.510                       | 0.255 | ECOS2WP391EA                               | ECEC2WP391EA          |
| 470                                   | 35 x 45            | 2.53                        | 3.54   | 0.423                       | 0.233 | ECOS2WP471EX                               | ECEC2WP471EX          |
|                                       | 35 x 50            | 2.53                        | 3.54   | 0.423                       | 0.233 | ECOS2WP471EA                               | ECEC2WP471EA          |