

TS-HA Series 105°C, 3000 hours*

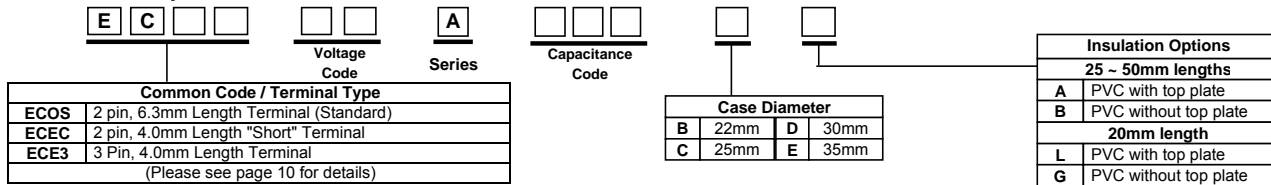
- High ripple current capability
- 20mm lengths for low profile applications
- 2 and 3 pin versions available



| | | |
|---|---|---|
| Rated Working Voltage: | 10 ~ 250 VDC | 385 ~ 450 VDC |
| Operating Temperature: | -40 ~ +105°C | -25 ~ +105°C |
| Nominal Capacitance: | 68 ~ 82000µF (±20% tolerance) | 33 ~ 470µF (±20% tolerance) |
| Dissipation Factor: (120 Hz, +20°C) | Working Voltage [V]: | 10 16 25 35 50 63 80 100 - 450 |
| | Max. D.F. (%): | 55 45 35 30 25 20 17 15 |
| For capacitance values > 33000µF, add the value of: $\frac{\text{rated cap. } [\mu\text{F}] - 33000}{1000}$ | | |
| Leakage Current: | 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- 10-100WV: 0.93 0.95 1.0 1.05 1.08 1.15 160-450WV: 0.75 0.8 1.0 1.2 1.25 1.4 |
| | Ripple Current Ambient Temperature Factors** Ambient Temperature: 105°C 85°C 70°C 60°C ≤45°C Multiplier: 1.0 1.7 2.0 2.2 2.35 | |
| Endurance: | 3000 hours at +105°C with maximum specified ripple current (see page 6) *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



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

| Cap. (µF) | Size (mm) D x L | Max 105°C R.C. (A _{rms}) | | 20°C ESR (Ω, max.) | | Panasonic Part Number | Cap. (µF) | Size (mm) D x L | Max 105°C R.C. (A _{rms}) | | 20°C ESR (Ω, max.) | | Panasonic Part Number |
|-------------------------------------|--------------------|------------------------------------|--------|--------------------|-------|--------------------------|---|--------------------|------------------------------------|-------|--------------------|--------------|--------------------------|
| | | 120Hz | 10kHz- | 120Hz | 20kHz | | | | 120Hz | 10kHz | 120Hz | 20kHz | |
| 10 VDC Working, 13 VDC Surge | | | | | | | 16 VDC Working, 20 VDC Surge (continued) | | | | | | |
| 4700 | 22 x 25 | 0.85 | 0.98 | 0.159 | 0.135 | ECOS1AA472BA | 10000 | 35 x 20 | 2.40 | 2.76 | 0.071 | 0.057 | ECOS1CA103EL |
| 6800 | 22 x 25 | 1.30 | 1.50 | 0.110 | 0.093 | ECOS1AA682BA | 12000 | 22 x 35 | 2.90 | 3.34 | 0.055 | 0.044 | ECOS1CA123BA |
| 10000 | 22 x 25 | 1.80 | 2.07 | 0.075 | 0.063 | ECOS1AA103BA | 25 x 30 | 2.90 | 3.34 | 0.055 | 0.044 | ECOS1CA123CA | |
| 12000 | 22 x 30 | 2.20 | 2.53 | 0.062 | 0.053 | ECOS1AA123BA | 30 x 25 | 2.90 | 3.34 | 0.055 | 0.044 | ECOS1CA123DA | |
| 15000 | 22 x 35 | 2.30 | 2.65 | 0.053 | 0.045 | ECOS1AA153BA | 15000 | 22 x 40 | 3.20 | 3.68 | 0.046 | 0.037 | ECOS1CA153BA |
| | 25 x 25 | 2.30 | 2.65 | 0.053 | 0.045 | ECOS1AA153CA | | 25 x 35 | 3.20 | 3.68 | 0.046 | 0.037 | ECOS1CA153CA |
| 18000 | 22 x 40 | 2.40 | 2.76 | 0.044 | 0.038 | ECOS1AA183BA | 18000 | 30 x 30 | 3.20 | 3.68 | 0.046 | 0.037 | ECOS1CA153DA |
| | 25 x 30 | 2.40 | 2.76 | 0.044 | 0.038 | ECOS1AA183CA | | 22 x 45 | 3.50 | 4.03 | 0.040 | 0.034 | ECOS1CA183BA |
| 22000 | 22 x 45 | 2.60 | 2.99 | 0.038 | 0.032 | ECOS1AA223BA | 25 x 40 | 3.50 | 4.03 | 0.040 | 0.034 | ECOS1CA183CA | |
| | 25 x 35 | 2.60 | 2.99 | 0.038 | 0.032 | ECOS1AA223CA | 30 x 30 | 3.50 | 4.03 | 0.040 | 0.034 | ECOS1CA183DA | |
| | 30 x 25 | 2.60 | 2.99 | 0.038 | 0.032 | ECOS1AA223DA | 35 x 25 | 3.50 | 4.03 | 0.040 | 0.034 | ECOS1CA183EA | |
| 27000 | 22 x 50 | 3.10 | 3.57 | 0.033 | 0.028 | ECOS1AA273BA | 22000 | 25 x 45 | 3.80 | 4.37 | 0.033 | 0.028 | ECOS1CA223CA |
| | 25 x 40 | 3.10 | 3.57 | 0.033 | 0.028 | ECOS1AA273CA | | 30 x 35 | 3.80 | 4.37 | 0.033 | 0.028 | ECOS1CA223DA |
| | 30 x 30 | 3.10 | 3.57 | 0.033 | 0.028 | ECOS1AA273DA | | 35 x 30 | 3.80 | 4.37 | 0.033 | 0.028 | ECOS1CA223EA |
| | 35 x 25 | 3.10 | 3.57 | 0.033 | 0.028 | ECOS1AA273EA | | 27000 | 25 x 50 | 4.20 | 4.83 | 0.028 | 0.025 |
| 33000 | 25 x 45 | 3.40 | 3.91 | 0.027 | 0.023 | ECOS1AA333CA | 30 x 40 | | 4.20 | 4.83 | 0.028 | 0.025 | ECOS1CA273DA |
| | 30 x 35 | 3.40 | 3.91 | 0.027 | 0.023 | ECOS1AA333DA | 35 x 30 | 4.20 | 4.83 | 0.028 | 0.025 | ECOS1CA273EA | |
| | 35 x 30 | 3.40 | 3.91 | 0.027 | 0.023 | ECOS1AA333EA | 33000 | 30 x 45 | 4.70 | 5.41 | 0.023 | 0.020 | ECOS1CA333DA |
| 39000 | 25 x 50 | 3.70 | 4.26 | 0.025 | 0.021 | ECOS1AA393CA | | 35 x 35 | 4.70 | 5.41 | 0.023 | 0.020 | ECOS1CA333EA |
| | 30 x 40 | 3.70 | 4.26 | 0.025 | 0.021 | ECOS1AA393DA | 39000 | 30 x 50 | 5.10 | 5.87 | 0.022 | 0.020 | ECOS1CA393DA |
| | 35 x 30 | 3.70 | 4.26 | 0.025 | 0.021 | ECOS1AA393EA | | 35 x 40 | 5.10 | 5.87 | 0.022 | 0.020 | ECOS1CA393EA |
| 47000 | 30 x 45 | 4.20 | 4.83 | 0.023 | 0.020 | ECOS1AA473DA | 47000 | 35 x 45 | 5.50 | 6.33 | 0.020 | 0.018 | ECOS1CA473EA |
| | 35 x 35 | 4.20 | 4.83 | 0.023 | 0.020 | ECOS1AA473EA | 56000 | 35 x 50 | 6.00 | 6.90 | 0.019 | 0.017 | ECOS1CA563EA |
| 56000 | 30 x 50 | 5.00 | 5.75 | 0.022 | 0.019 | ECOS1AA563DA | 25 VDC Working, 32 VDC Surge | | | | | | |
| 68000 | 35 x 40 | 5.00 | 5.75 | 0.022 | 0.021 | ECOS1AA563EA | 2200 | 22 x 20 | 1.30 | 1.50 | 0.241 | 0.181 | ECOS1EA222BL |
| | 35 x 50 | 5.50 | 6.33 | 0.021 | 0.020 | ECOS1AA683EA | | 22 x 25 | 1.30 | 1.50 | 0.241 | 0.181 | ECOS1EA222BA |
| 16 VDC Working, 20 VDC Surge | | | | | | | 3300 | 22 x 25 | 1.62 | 1.86 | 0.161 | 0.121 | ECOS1EA332BA |
| 3300 | 22 x 20 | 1.30 | 1.50 | 0.216 | 0.173 | ECOS1CA332BL | | 25 x 20 | 1.60 | 1.84 | 0.161 | 0.121 | ECOS1EA332CL |
| 4700 | 22 x 25 | 1.52 | 1.75 | 0.123 | 0.099 | ECOS1CA472BA | 4700 | 22 x 25 | 2.00 | 2.30 | 0.106 | 0.079 | ECOS1EA472BA |
| | 25 x 20 | 1.60 | 1.84 | 0.152 | 0.121 | ECOS1CA472CL | | 30 x 20 | 1.80 | 2.07 | 0.113 | 0.085 | ECOS1EA472DL |
| 6800 | 22 x 25 | 2.20 | 2.53 | 0.085 | 0.068 | ECOS1CA682BA | 5600 | 22 x 30 | 2.20 | 2.53 | 0.089 | 0.067 | ECOS1EA562BA |
| | 30 x 20 | 1.80 | 2.07 | 0.105 | 0.084 | ECOS1CA682DL | | 6800 | 22 x 30 | 2.40 | 2.76 | 0.073 | 0.055 |
| 8200 | 22 x 30 | 2.40 | 2.76 | 0.071 | 0.057 | ECOS1CA822BA | 25 x 25 | 2.40 | 2.76 | 0.073 | 0.055 | ECOS1EA682CA | |
| | 22 x 30 | 2.60 | 2.99 | 0.066 | 0.053 | ECOS1CA103BA | 35 x 20 | 2.30 | 2.65 | 0.080 | 0.060 | ECOS1EA682EL | |
| 10000 | 25 x 25 | 2.60 | 2.99 | 0.066 | 0.053 | ECOS1CA103CA | 8200 | 22 x 35 | 2.70 | 3.11 | 0.061 | 0.045 | ECOS1EA822BA |
| | | | | | | | | 25 x 30 | 2.70 | 3.11 | 0.061 | 0.045 | ECOS1EA822CA |

TS-HA Standard Ratings (continued)

| Cap. (μ F) | Size (mm) D x L | Max 105°C R.C. (A_{rms}) | | 20°C ESR (Ω , max.) | | Panasonic Part Number |
|---|-------------------------------------|------------------------------|--------|-----------------------------|--------------|--------------------------|
| | | 120Hz | 10kHz- | 120Hz | 20kHz | |
| 25 VDC Working, 32 VDC Surge (continued) | | | | | | |
| 8200 | 30 x 25 | 2.70 | 3.11 | 0.061 | 0.045 | ECOS1EA822DA |
| 10000 | 22 x 40 | 3.00 | 3.45 | 0.051 | 0.039 | ECOS1EA103BA |
| | 25 x 35 | 3.00 | 3.45 | 0.051 | 0.039 | ECOS1EA103CA |
| | 30 x 30 | 3.00 | 3.45 | 0.051 | 0.039 | ECOS1EA103DA |
| 12000 | 22 x 45 | 3.20 | 3.68 | 0.044 | 0.033 | ECOS1EA123BA |
| | 25 x 40 | 3.20 | 3.68 | 0.044 | 0.035 | ECOS1EA123CA |
| | 30 x 30 | 3.20 | 3.68 | 0.044 | 0.035 | ECOS1EA123DA |
| | 35 x 25 | 3.20 | 3.68 | 0.044 | 0.035 | ECOS1EA123EA |
| 15000 | 25 x 45 | 3.60 | 4.14 | 0.036 | 0.031 | ECOS1EA153CA |
| | 30 x 35 | 3.60 | 4.14 | 0.036 | 0.031 | ECOS1EA153DA |
| | 35 x 30 | 3.60 | 4.14 | 0.036 | 0.031 | ECOS1EA153EA |
| 18000 | 25 x 50 | 3.90 | 4.49 | 0.030 | 0.027 | ECOS1EA183CA |
| | 30 x 40 | 3.90 | 4.49 | 0.030 | 0.027 | ECOS1EA183DA |
| | 35 x 35 | 3.90 | 4.49 | 0.030 | 0.027 | ECOS1EA183EA |
| 22000 | 30 x 45 | 4.30 | 4.95 | 0.025 | 0.022 | ECOS1EA223DA |
| | 35 x 35 | 4.30 | 4.95 | 0.025 | 0.022 | ECOS1EA223EA |
| 27000 | 35 x 45 | 4.80 | 5.52 | 0.021 | 0.019 | ECOS1EA273EA |
| 33000 | 35 x 50 | 5.50 | 6.33 | 0.018 | 0.016 | ECOS1EA333EA |
| 35 VDC Working, 44 VDC Surge | | | | | | |
| 1500 | 22 x 20 | 1.10 | 1.27 | 0.287 | 0.216 | ECOS1VA152BL |
| | 22 x 25 | 1.10 | 1.27 | 0.287 | 0.216 | ECOS1VA152BA |
| 2200 | 22 x 25 | 1.48 | 1.70 | 0.196 | 0.147 | ECOS1VA222BA |
| | 25 x 20 | 1.40 | 1.61 | 0.196 | 0.147 | ECOS1VA222CL |
| 3300 | 22 x 25 | 1.90 | 2.19 | 0.121 | 0.090 | ECOS1VA332BA |
| | 30 x 20 | 1.70 | 1.96 | 0.131 | 0.098 | ECOS1VA332DL |
| 3900 | 22 x 30 | 2.00 | 2.30 | 0.111 | 0.083 | ECOS1VA392BA |
| 4700 | 22 x 35 | 2.20 | 2.53 | 0.088 | 0.066 | ECOS1VA472BA |
| | 25 x 25 | 2.20 | 2.53 | 0.088 | 0.066 | ECOS1VA472CA |
| | 35 x 20 | 2.00 | 2.30 | 0.095 | 0.071 | ECOS1VA472EL |
| 5600 | 22 x 35 | 2.40 | 2.76 | 0.074 | 0.056 | ECOS1VA562BA |
| | 25 x 30 | 2.40 | 2.76 | 0.074 | 0.056 | ECOS1VA562CA |
| | 30 x 25 | 2.40 | 2.76 | 0.074 | 0.056 | ECOS1VA562DA |
| 6800 | 22 x 40 | 2.60 | 2.99 | 0.061 | 0.046 | ECOS1VA682BA |
| | 25 x 35 | 2.60 | 2.99 | 0.061 | 0.046 | ECOS1VA682CA |
| | 30 x 30 | 2.60 | 2.99 | 0.061 | 0.046 | ECOS1VA682DA |
| 8200 | 22 x 50 | 2.90 | 3.34 | 0.051 | 0.038 | ECOS1VA822BA |
| | 25 x 40 | 2.90 | 3.34 | 0.051 | 0.038 | ECOS1VA822CA |
| | 30 x 30 | 2.90 | 3.34 | 0.051 | 0.038 | ECOS1VA822DA |
| | 35 x 25 | 2.90 | 3.34 | 0.051 | 0.038 | ECOS1VA822EA |
| 10000 | 25 x 45 | 3.20 | 3.68 | 0.041 | 0.031 | ECOS1VA103CA |
| | 30 x 35 | 3.20 | 3.68 | 0.041 | 0.031 | ECOS1VA103DA |
| | 35 x 30 | 3.20 | 3.68 | 0.041 | 0.031 | ECOS1VA103EA |
| 12000 | 25 x 50 | 3.50 | 4.03 | 0.035 | 0.026 | ECOS1VA123CA |
| | 30 x 40 | 3.50 | 4.03 | 0.035 | 0.026 | ECOS1VA123DA |
| | 35 x 30 | 3.50 | 4.03 | 0.035 | 0.026 | ECOS1VA123EA |
| 15000 | 30 x 45 | 3.90 | 4.49 | 0.030 | 0.022 | ECOS1VA153DA |
| | 35 x 35 | 3.90 | 4.49 | 0.030 | 0.022 | ECOS1VA153EA |
| 18000 | 35 x 40 | 4.30 | 4.95 | 0.028 | 0.021 | ECOS1VA183EA |
| 22000 | 35 x 50 | 5.00 | 5.75 | 0.023 | 0.017 | ECOS1VA223EA |
| 50 VDC Working, 63 VDC Surge | | | | | | |
| 1000 | 22 x 20 | 0.90 | 1.04 | 0.265 | 0.199 | ECOS1HA102BL |
| | 22 x 25 | 0.90 | 1.04 | 0.232 | 0.174 | ECOS1HA102BA |
| 1500 | 22 x 25 | 1.25 | 1.44 | 0.155 | 0.116 | ECOS1HA152BA |
| | 25 x 20 | 1.20 | 1.38 | 0.177 | 0.133 | ECOS1HA152CL |
| 1800 | 22 x 25 | 1.50 | 1.73 | 0.129 | 0.097 | ECOS1HA182BA |
| 2200 | 22 x 30 | 1.70 | 1.96 | 0.105 | 0.079 | ECOS1HA222BA |
| | 30 x 20 | 1.40 | 1.61 | 0.121 | 0.090 | ECOS1HA222DL |
| 2700 | 22 x 30 | 1.80 | 2.07 | 0.086 | 0.064 | ECOS1HA272BA |
| | 25 x 25 | 1.80 | 2.07 | 0.086 | 0.064 | ECOS1HA272CA |
| 3300 | 22 x 35 | 2.00 | 2.30 | 0.070 | 0.053 | ECOS1HA332BA |
| | 25 x 30 | 2.00 | 2.30 | 0.070 | 0.053 | ECOS1HA332CA |
| | 35 x 20 | 1.70 | 1.96 | 0.085 | 0.064 | ECOS1HA332EL |
| 3900 | 22 x 40 | 2.20 | 2.53 | 0.064 | 0.048 | ECOS1HA392BA |
| | 25 x 35 | 2.20 | 2.53 | 0.064 | 0.048 | ECOS1HA392CA |
| | 30 x 25 | 2.20 | 2.53 | 0.064 | 0.048 | ECOS1HA392DA |
| 4700 | 22 x 45 | 2.50 | 2.88 | 0.053 | 0.040 | ECOS1HA472BA |
| | 25 x 40 | 2.50 | 2.88 | 0.053 | 0.040 | ECOS1HA472CA |
| | 30 x 30 | 2.50 | 2.88 | 0.053 | 0.040 | ECOS1HA472DA |
| | 35 x 25 | 2.50 | 2.88 | 0.053 | 0.040 | ECOS1HA472EA |
| 5600 | 22 x 50 | 2.80 | 3.22 | 0.050 | 0.038 | ECOS1HA562BA |
| | 25 x 40 | 2.80 | 3.22 | 0.050 | 0.038 | ECOS1HA562CA |
| | 30 x 35 | 2.80 | 3.22 | 0.050 | 0.038 | ECOS1HA562DA |
| 6800 | 35 x 30 | 2.80 | 3.22 | 0.050 | 0.038 | ECOS1HA562EA |
| | 25 x 50 | 3.30 | 3.80 | 0.046 | 0.035 | ECOS1HA682CA |
| 30 x 40 | 3.30 | 3.80 | 0.046 | 0.035 | ECOS1HA682DA | |
| | 50 VDC Working, 63 VDC Surge | | | | | |
| 6800 | 35 x 30 | 3.30 | 3.80 | 0.046 | 0.035 | ECOS1HA682CA |
| | 30 x 40 | 3.30 | 3.80 | 0.046 | 0.035 | ECOS1HA682DA |
| 80 VDC Working, 100 VDC Surge | | | | | | |
| 470 | 22 x 20 | 0.80 | 0.92 | 0.459 | 0.298 | ECOS1KA471BL |
| | 22 x 25 | 0.80 | 0.92 | 0.388 | 0.272 | ECOS1KA471BA |
| 680 | 22 x 25 | 1.00 | 1.15 | 0.268 | 0.188 | ECOS1KA681BA |
| | 25 x 20 | 1.00 | 1.15 | 0.317 | 0.206 | ECOS1KA681CL |
| 820 | 22 x 25 | 1.20 | 1.38 | 0.222 | 0.145 | ECOS1KA821BA |
| 1000 | 22 x 30 | 1.30 | 1.50 | 0.182 | 0.119 | ECOS1KA102BA |
| | 25 x 25 | 1.30 | 1.50 | 0.182 | 0.119 | ECOS1KA102CA |
| | 30 x 20 | 1.20 | 1.38 | 0.216 | 0.140 | ECOS1KA102DL |
| 1200 | 22 x 30 | 1.50 | 1.73 | 0.166 | 0.116 | ECOS1KA122BA |
| | 25 x 25 | 1.50 | 1.73 | 0.166 | 0.116 | ECOS1KA122CA |
| 1500 | 22 x 35 | 1.70 | 1.96 | 0.133 | 0.093 | ECOS1KA152BA |
| | 25 x 30 | 1.70 | 1.96 | 0.133 | 0.093 | ECOS1KA152CA |
| | 35 x 20 | 1.40 | 1.61 | 0.155 | 0.108 | ECOS1KA152EL |
| 1800 | 22 x 40 | 1.80 | 2.07 | 0.111 | 0.077 | ECOS1KA182BA |
| | 25 x 35 | 1.80 | 2.07 | 0.111 | 0.077 | ECOS1KA182CA |
| | 30 x 25 | 1.80 | 2.07 | 0.111 | 0.077 | ECOS1KA182DA |
| 2200 | 22 x 45 | 2.10 | 2.42 | 0.090 | 0.063 | ECOS1KA222BA |
| | 25 x 35 | 2.10 | 2.42 | 0.090 | 0.063 | ECOS1KA222CA |
| | 30 x 30 | 2.10 | 2.42 | 0.090 | 0.063 | ECOS1KA222DA |
| | 35 x 25 | 2.10 | 2.42 | 0.090 | 0.063 | ECOS1KA222EA |
| 2700 | 25 x 45 | 2.40 | 2.76 | 0.074 | 0.055 | ECOS1KA272CA |
| | 30 x 35 | 2.40 | 2.76 | 0.074 | 0.055 | ECOS1KA272DA |
| | 35 x 30 | 2.40 | 2.76 | 0.074 | 0.055 | ECOS1KA272EA |
| 3300 | 25 x 50 | 2.60 | 2.99 | 0.065 | 0.049 | ECOS1KA332CA |
| | 30 x 40 | 2.60 | 2.99 | 0.065 | 0.049 | ECOS1KA332DA |
| | 35 x 30 | 2.60 | 2.99 | 0.065 | 0.049 | ECOS1KA332EA |
| 3900 | 30 x 45 | 3.00 | 3.45 | 0.060 | 0.045 | ECOS1KA392DA |
| | 35 x 35 | 3.00 | 3.45 | 0.060 | 0.045 | ECOS1KA392EA |
| | 30 x 50 | 3.30 | 3.80 | 0.049 | 0.037 | ECOS1KA472DA |
| 4700 | 35 x 40 | 3.30 | 3.80 | 0.049 | 0.037 | ECOS1KA472EA |
| | 35 x 45 | 3.70 | 4.26 | 0.050 | 0.038 | ECOS1KA562EA |
| 6800 | 35 x 50 | 3.90 | 4.49 | 0.041 | 0.031 | ECOS1KA682EA |
| 100 VDC Working, 125 VDC Surge | | | | | | |
| 330 | 22 x 20 | 0.80 | 1.20 | 0.653 | 0.392 | ECOS2AA331BL |
| | 22 x 25 | 0.80 | 1.20 | 0.553 | 0.332 | ECOS2AA331BA |

TS-HA Standard Ratings (continued)

| Cap. (μF) | Size (mm) D x L | Max 105°C R.C. (A _{rms}) | | 20°C ESR (Ω, max.) | | Panasonic Part Number |
|---|--|------------------------------------|------------------------------|----------------------------------|----------------------------------|--|
| | | 120Hz | 10kHz- | 120Hz | 20kHz | |
| 100 VDC Working, 125 VDC Surge (continued) | | | | | | |
| 470 | 22 x 25 25 x 20 | 0.92 1.00 | 1.38 1.50 | 0.388 0.459 | 0.233 0.275 | ECOS2AA471BA ECOS2AA471CL |
| 560 | 22 x 25 | 1.10 | 1.65 | 0.296 | 0.178 | ECOS2AA561BA |
| 680 | 30 x 20 | 1.10 | 1.65 | 0.317 | 0.190 | ECOS2AA681DL |
| 820 | 22 x 30 25 x 25 | 1.40 1.40 | 2.10 2.10 | 0.202 0.202 | 0.121 0.121 | ECOS2AA821BA ECOS2AA821CA |
| 1000 | 22 x 35 25 x 30 35 x 20 | 1.70 1.70 1.20 | 2.55 2.55 1.80 | 0.182 0.182 0.216 | 0.109 0.109 0.129 | ECOS2AA102BA ECOS2AA102CA ECOS2AA102EL |
| 1200 | 22 x 40 25 x 35 30 x 25 | 1.80 1.80 1.80 | 2.70 2.70 2.70 | 0.152 0.152 0.152 | 0.091 0.091 0.091 | ECOS2AA122BA ECOS2AA122CA ECOS2AA122DA |
| 1500 | 22 x 45 25 x 40 30 x 30 35 x 25 | 2.10 2.10 2.10 2.10 | 3.15 3.15 3.15 3.15 | 0.122 0.122 0.122 0.122 | 0.073 0.079 0.079 0.079 | ECOS2AA152BA ECOS2AA152CA ECOS2AA152DA ECOS2AA152EA |
| 1800 | 25 x 45 30 x 35 35 x 30 | 2.30 2.30 2.30 | 3.45 3.45 3.45 | 0.111 0.111 0.111 | 0.072 0.072 0.072 | ECOS2AA182CA ECOS2AA182DA ECOS2AA182EA |
| 2200 | 25 x 50 30 x 40 35 x 30 | 2.60 2.60 2.60 | 3.90 3.90 3.90 | 0.090 0.090 0.090 | 0.059 0.059 0.059 | ECOS2AA222CA ECOS2AA222DA ECOS2AA222EA |
| 2700 | 30 x 45 35 x 35 | 2.90 2.90 | 4.35 4.35 | 0.080 0.080 | 0.052 0.052 | ECOS2AA272DA ECOS2AA272EA |
| 3300 | 30 x 50 35 x 40 | 3.20 3.20 | 4.80 4.80 | 0.075 0.075 | 0.053 0.053 | ECOS2AA332DA ECOS2AA332EA |
| 3900 | 35 x 45 | 3.60 | 5.40 | 0.064 | 0.045 | ECOS2AA392EA |
| 4700 | 35 x 50 | 3.80 | 5.70 | 0.053 | 0.040 | ECOS2AA472EA |
| 160 VDC Working, 200 VDC Surge | | | | | | |
| 150 | 22 x 20 22 x 25 | 0.55 0.61 | 0.77 0.85 | 1.437 1.216 | 0.647 0.547 | ECOS2CA151BL ECOS2CA151BA |
| 220 | 22 x 25 25 x 20 | 0.90 0.75 | 1.26 1.05 | 0.829 0.980 | 0.373 0.441 | ECOS2CA221BA ECOS2CA221CL |
| 270 | 22 x 25 | 1.10 | 1.54 | 0.675 | 0.304 | ECOS2CA271BA |
| 330 | 22 x 30 30 x 20 | 1.20 1.00 | 1.68 1.40 | 0.553 0.553 | 0.249 0.249 | ECOS2CA331BA ECOS2CA331DL |
| 390 | 22 x 30 25 x 25 | 1.30 1.30 | 1.82 1.82 | 0.553 0.553 | 0.249 0.249 | ECOS2CA391BA ECOS2CA391CA |
| 470 | 22 x 35 25 x 30 35 x 20 | 1.40 1.40 1.15 | 1.96 1.96 1.61 | 0.529 0.459 0.459 | 0.238 0.206 0.206 | ECOS2CA471BA ECOS2CA471CA ECOS2CA471EL |
| 560 | 22 x 40 25 x 30 30 x 25 | 1.50 1.50 1.50 | 2.10 2.10 2.10 | 0.385 0.385 0.385 | 0.173 0.173 0.173 | ECOS2CA561BA ECOS2CA561CA ECOS2CA561DA |
| 680 | 22 x 45 25 x 35 30 x 30 | 1.70 1.70 1.70 | 2.38 2.38 2.38 | 0.317 0.317 0.317 | 0.143 0.143 0.143 | ECOS2CA681BA ECOS2CA681CA ECOS2CA681DA |
| 820 | 25 x 40 30 x 30 | 2.00 2.00 | 2.80 2.80 | 0.263 0.263 | 0.118 0.118 | ECOS2CA821CA ECOS2CA821DA |
| 1000 | 25 x 45 30 x 35 | 2.20 2.20 | 3.08 3.08 | 0.216 0.216 | 0.108 0.108 | ECOS2CA102CA ECOS2CA102DA |
| 1200 | 25 x 50 30 x 40 | 2.30 2.30 | 3.22 3.22 | 0.180 0.180 | 0.090 0.090 | ECOS2CA122CA ECOS2CA122DA |
| 1500 | 30 x 45 35 x 35 | 2.50 2.50 | 3.50 3.50 | 0.166 0.166 | 0.083 0.083 | ECOS2CA152DA ECOS2CA152EA |
| 1800 | 30 x 50 35 x 40 | 2.70 2.70 | 3.78 3.78 | 0.138 0.138 | 0.083 0.069 | ECOS2CA182DA ECOS2CA182EA |
| 2200 | 35 x 50 | 2.90 | 4.06 | 0.113 | 0.057 | ECOS2CA222EA |
| 200 VDC Working, 250 VDC Surge | | | | | | |
| 100 | 22 x 20 22 x 25 | 0.50 0.50 | 0.70 0.70 | 1.989 1.658 | 0.895 0.746 | ECOS2DA101BL ECOS2DA101BA |
| 150 | 22 x 25 25 x 20 | 0.68 0.65 | 0.95 0.91 | 1.105 1.326 | 0.497 0.597 | ECOS2DA151BA ECOS2DA151CL |
| 220 | 22 x 25 30 x 20 | 1.00 0.87 | 1.40 1.22 | 0.754 0.904 | 0.339 0.407 | ECOS2DA221BA ECOS2DA221DL |
| 270 | 22 x 30 25 x 25 | 1.10 1.10 | 1.54 1.54 | 0.614 0.614 | 0.276 0.276 | ECOS2DA271BA ECOS2DA271CA |
| 330 | 22 x 30 25 x 25 35 x 20 | 1.20 1.20 1.10 | 1.68 1.68 1.54 | 0.502 0.502 0.603 | 0.226 0.226 0.271 | ECOS2DA331BA ECOS2DA331CA ECOS2DA331EL |
| 390 | 22 x 35 25 x 30 30 x 25 | 1.30 1.30 1.30 | 1.82 1.82 1.82 | 0.425 0.425 0.425 | 0.191 0.191 0.191 | ECOS2DA391BA ECOS2DA391CA ECOS2DA391DA |
| 470 | 22 x 40 25 x 35 30 x 25 | 1.40 1.40 1.40 | 1.96 1.96 1.96 | 0.353 0.353 0.353 | 0.159 0.159 0.159 | ECOS2DA471BA ECOS2DA471CA ECOS2DA471DA |
| 200 VDC Working, 250 VDC Surge (continued) | | | | | | |
| 560 | 22 x 45 25 x 35 30 x 30 | 1.50 1.50 1.50 | 2.10 2.10 2.10 | 0.296 0.296 0.296 | 0.133 0.133 0.133 | ECOS2DA561BA ECOS2DA561CA ECOS2DA561DA |
| 680 | 25 x 40 30 x 30 | 1.70 1.70 | 2.38 2.38 | 0.244 0.244 | 0.110 0.110 | ECOS2DA681CA ECOS2DA681DA |
| 820 | 25 x 50 30 x 35 35 x 30 | 2.00 2.00 2.00 | 2.80 2.80 2.80 | 0.222 0.222 0.222 | 0.111 0.111 0.111 | ECOS2DA821CA ECOS2DA821DA ECOS2DA821EA |
| 1000 | 30 x 45 35 x 35 | 2.20 2.20 | 3.08 3.08 | 0.199 0.199 | 0.099 0.099 | ECOS2DA102DA ECOS2DA102EA |
| 1200 | 30 x 50 35 x 40 | 2.30 2.30 | 3.22 3.22 | 0.166 0.166 | 0.083 0.083 | ECOS2DA122DA ECOS2DA122EA |
| 1500 | 35 x 50 | 2.50 | 3.50 | 0.144 | 0.072 | ECOS2DA152EA |
| 250 VDC Working, 300 VDC Surge | | | | | | |
| 68 | 22 x 20 22 x 25 | 0.40 0.40 | 0.56 0.56 | 2.926 2.438 | 1.463 1.219 | ECOS2EA680BL ECOS2EA680BA |
| 100 | 22 x 25 25 x 20 | 0.55 0.50 | 0.77 0.70 | 1.658 1.989 | 0.829 0.995 | ECOS2EA101BA ECOS2EA101CL |
| 150 | 22 x 25 30 x 20 | 0.75 0.65 | 1.05 0.91 | 1.105 1.326 | 0.553 0.663 | ECOS2EA151BA ECOS2EA151DL |
| 180 | 22 x 30 25 x 25 | 0.90 0.90 | 1.26 1.26 | 0.921 0.921 | 0.461 0.461 | ECOS2EA181BA ECOS2EA181CA |
| 220 | 22 x 30 25 x 25 35 x 20 | 1.00 1.00 0.87 | 1.40 1.40 1.22 | 0.754 0.754 0.904 | 0.377 0.377 0.452 | ECOS2EA221BA ECOS2EA221CA ECOS2EA221EL |
| 270 | 22 x 35 25 x 30 30 x 25 | 1.10 1.10 1.10 | 1.54 1.54 1.54 | 0.614 0.614 0.614 | 0.307 0.307 0.307 | ECOS2EA271BA ECOS2EA271CA ECOS2EA271DA |
| 330 | 22 x 40 25 x 35 30 x 25 | 1.20 1.20 1.20 | 1.68 1.68 1.68 | 0.502 0.502 0.502 | 0.251 0.251 0.251 | ECOS2EA331BA ECOS2EA331CA ECOS2EA331DA |
| 390 | 22 x 45 25 x 35 30 x 30 | 1.30 1.30 1.30 | 1.82 1.82 1.82 | 0.425 0.425 0.425 | 0.213 0.213 0.213 | ECOS2EA391BA ECOS2EA391CA ECOS2EA391DA |
| 470 | 25 x 45 30 x 35 35 x 30 | 1.40 1.40 1.40 | 1.96 1.96 1.96 | 0.353 0.353 0.353 | 0.176 0.176 0.176 | ECOS2EA471CA ECOS2EA471DA ECOS2EA471EA |
| 560 | 25 x 50 30 x 35 35 x 30 | 1.50 1.50 1.50 | 2.10 2.10 2.10 | 0.296 0.296 0.296 | 0.148 0.148 0.148 | ECOS2EA561CA ECOS2EA561DA ECOS2EA561EA |
| 680 | 30 x 45 35 x 35 | 1.70 1.70 | 2.38 2.38 | 0.244 0.244 | 0.122 0.122 | ECOS2EA681DA ECOS2EA681EA |
| 820 | 30 x 50 35 x 40 | 2.00 2.00 | 2.80 2.80 | 0.202 0.202 | 0.101 0.101 | ECOS2EA821DA ECOS2EA821EA |
| 1000 | 35 x 45 | 2.20 | 3.08 | 0.199 | 0.099 | ECOS2EA102EA |
| 1200 | 35 x 50 | 2.30 | 3.22 | 0.166 | 0.083 | ECOS2EA122EA |
| 385 VDC Working, 435 VDC Surge | | | | | | |
| 33 | 22 x 20 | 0.20 | 0.28 | 5.024 | 1.758 | ECOS2TA330BL |
| 47 | 25 x 20 | 0.25 | 0.35 | 3.527 | 1.235 | ECOS2TA470CL |
| 56 | 22 x 25 | 0.51 | 0.71 | 2.368 | 0.829 | ECOS2TA560BA |
| 68 | 22 x 30 25 x 25 30 x 20 | 0.56 0.56 0.35 | 0.78 0.78 0.49 | 1.950 1.950 2.438 | 0.683 0.683 0.853 | ECOS2TA680BA ECOS2TA680CA ECOS2TA680DL |
| 82 | 22 x 35 25 x 25 | 0.64 0.64 | 0.90 0.90 | 1.617 1.617 | 0.566 0.566 | ECOS2TA820BA ECOS2TA820CA |
| 100 | 22 x 35 25 x 30 35 x 20 | 0.69 0.69 0.47 | 0.97 0.97 0.66 | 1.326 1.326 1.658 | 0.464 0.464 0.580 | ECOS2TA101BA ECOS2TA101CA ECOS2TA101EL |
| 120 | 22 x 35 25 x 30 | 0.75 0.75 | 1.05 1.05 | 1.105 1.105 | 0.387 0.387 | ECOS2TA121BA ECOS2TA121CA |
| 150 | 22 x 50 25 x 40 30 x 30 | 0.82 0.82 0.82 | 1.15 1.15 1.15 | 0.884 0.884 0.884 | 0.309 0.309 0.309 | ECOS2TA151BA ECOS2TA151CA ECOS2TA151DA |
| 180 | 25 x 45 30 x 35 35 x 25 | 0.95 0.95 0.95 | 1.33 1.33 1.33 | 0.737 0.737 0.737 | 0.258 0.258 0.258 | ECOS2TA181CA ECOS2TA181DA ECOS2TA181EA |
| 220 | 25 x 50 30 x 40 35 x 30 | 1.10 1.10 1.10 | 1.54 1.54 1.54 | 0.603 0.603 0.603 | 0.211 0.211 0.211 | ECOS2TA221CA ECOS2TA221DA ECOS2TA221EA |
| 270 | 30 x 45 35 x 35 | 1.20 1.20 | 1.68 1.68 | 0.491 0.491 | 0.172 0.172 | ECOS2TA271DA ECOS2TA271EA |
| 330 | 30 x 50 35 x 40 | 1.35 1.35 | 1.89 1.89 | 0.402 0.402 | 0.161 0.161 | ECOS2TA331DA ECOS2TA331EA |
| 390 | 35 x 45 | 1.55 | 2.17 | 0.340 | 0.136 | ECOS2TA391EA |
| 470 | 35 x 50 | 1.75 | 2.45 | 0.282 | 0.127 | ECOS2TA471EA |

TS-HA Standard Ratings (continued)

| Cap. (μ F) | Size (mm) D x L | Max 105°C R.C. (A_{rms}) | | 20°C ESR (Ω , max.) | | Panasonic Part Number |
|---------------------------------------|--------------------|------------------------------|--------|-----------------------------|-------|--------------------------|
| | | 120Hz | 10kHz- | 120Hz | 20kHz | |
| 400 VDC Working, 450 VDC Surge | | | | | | |
| 33 | 22 x 20 | 0.20 | 0.28 | 5.024 | 1.758 | ECOS2GA330BL |
| | 22 x 25 | 0.30 | 0.42 | 4.521 | 1.582 | ECOS2GA330BA |
| 47 | 22 x 25 | 0.43 | 0.60 | 2.822 | 0.988 | ECOS2GA470BA |
| | 25 x 20 | 0.25 | 0.35 | 3.527 | 1.235 | ECOS2GA470CL |
| 56 | 22 x 25 | 0.51 | 0.71 | 2.368 | 0.829 | ECOS2GA560BA |
| 68 | 22 x 30 | 0.56 | 0.78 | 1.950 | 0.683 | ECOS2GA680BA |
| | 25 x 25 | 0.56 | 0.78 | 1.950 | 0.683 | ECOS2GA680CA |
| | 30 x 20 | 0.35 | 0.49 | 2.438 | 0.853 | ECOS2GA680DL |
| 82 | 22 x 35 | 0.64 | 0.90 | 1.617 | 0.566 | ECOS2GA820BA |
| | 25 x 25 | 0.64 | 0.90 | 1.617 | 0.566 | ECOS2GA820CA |
| 100 | 22 x 35 | 0.69 | 0.97 | 1.326 | 0.464 | ECOS2GA101BA |
| | 25 x 30 | 0.69 | 0.97 | 1.326 | 0.464 | ECOS2GA101CA |
| | 35 x 20 | 0.47 | 0.66 | 1.658 | 0.580 | ECOS2GA101EL |
| 120 | 22 x 40 | 0.75 | 1.05 | 1.105 | 0.387 | ECOS2GA121BA |
| | 25 x 35 | 0.75 | 1.05 | 1.105 | 0.387 | ECOS2GA121CA |
| | 30 x 25 | 0.75 | 1.05 | 1.105 | 0.387 | ECOS2GA121DA |
| 150 | 22 x 50 | 0.82 | 1.15 | 0.884 | 0.309 | ECOS2GA151BA |
| | 25 x 40 | 0.82 | 1.15 | 0.884 | 0.309 | ECOS2GA151CA |
| | 30 x 30 | 0.82 | 1.15 | 0.884 | 0.309 | ECOS2GA151DA |
| 180 | 25 x 45 | 0.95 | 1.33 | 0.737 | 0.258 | ECOS2GA181CA |
| | 30 x 35 | 0.95 | 1.33 | 0.737 | 0.258 | ECOS2GA181DA |
| | 35 x 25 | 0.95 | 1.33 | 0.737 | 0.258 | ECOS2GA181EA |
| 220 | 25 x 50 | 1.10 | 1.54 | 0.603 | 0.211 | ECOS2GA221CA |
| | 30 x 40 | 1.10 | 1.54 | 0.603 | 0.211 | ECOS2GA221DA |
| | 35 x 30 | 1.10 | 1.54 | 0.603 | 0.211 | ECOS2GA221EA |
| 270 | 30 x 45 | 1.20 | 1.68 | 0.491 | 0.172 | ECOS2GA271DA |
| | 35 x 35 | 1.20 | 1.68 | 0.491 | 0.172 | ECOS2GA271EA |
| 330 | 30 x 50 | 1.35 | 1.89 | 0.402 | 0.161 | ECOS2GA331DA |
| | 35 x 40 | 1.35 | 1.89 | 0.402 | 0.161 | ECOS2GA331EA |
| 390 | 35 x 45 | 1.55 | 2.17 | 0.340 | 0.136 | ECOS2GA391EA |
| 470 | 35 x 50 | 1.75 | 2.45 | 0.282 | 0.127 | ECOS2GA471EA |
| 450 VDC Working, 500 VDC Surge | | | | | | |
| 56 | 22 x 25 | 0.40 | 0.56 | 2.368 | 0.947 | ECOS2WA560BA |
| 68 | 22 x 30 | 0.50 | 0.70 | 1.950 | 0.780 | ECOS2WA680BA |
| | 25 x 25 | 0.50 | 0.70 | 1.950 | 0.780 | ECOS2WA680CA |
| 82 | 22 x 35 | 0.56 | 0.78 | 1.617 | 0.647 | ECOS2WA820BA |
| 100 | 22 x 40 | 0.64 | 0.90 | 1.326 | 0.531 | ECOS2WA101BA |
| | 25 x 30 | 0.64 | 0.90 | 1.326 | 0.531 | ECOS2WA101CA |
| | 30 x 25 | 0.64 | 0.90 | 1.326 | 0.531 | ECOS2WA101DA |
| 120 | 22 x 45 | 0.72 | 1.01 | 1.105 | 0.442 | ECOS2WA121BA |
| | 25 x 35 | 0.72 | 1.01 | 1.105 | 0.442 | ECOS2WA121CA |
| 150 | 22 x 50 | 0.79 | 1.11 | 0.884 | 0.354 | ECOS2WA151BA |
| | 25 x 40 | 0.79 | 1.11 | 0.884 | 0.354 | ECOS2WA151CA |
| | 30 x 30 | 0.79 | 1.11 | 0.884 | 0.354 | ECOS2WA151DA |
| | 35 x 25 | 0.79 | 1.11 | 0.884 | 0.354 | ECOS2WA151EA |
| 180 | 25 x 45 | 0.87 | 1.22 | 0.737 | 0.295 | ECOS2WA181CA |
| | 30 x 35 | 0.87 | 1.22 | 0.737 | 0.295 | ECOS2WA181DA |
| 220 | 25 x 50 | 1.00 | 1.40 | 0.678 | 0.271 | ECOS2WA221CA |
| | 30 x 40 | 1.00 | 1.40 | 0.678 | 0.271 | ECOS2WA221DA |
| | 35 x 30 | 1.00 | 1.40 | 0.678 | 0.271 | ECOS2WA221EA |
| 270 | 30 x 45 | 1.17 | 1.64 | 0.614 | 0.246 | ECOS2WA271DA |
| | 35 x 35 | 1.17 | 1.64 | 0.614 | 0.246 | ECOS2WA271EA |
| 330 | 30 x 50 | 1.38 | 1.93 | 0.502 | 0.201 | ECOS2WA331DA |
| | 35 x 40 | 1.38 | 1.93 | 0.502 | 0.201 | ECOS2WA331EA |
| 390 | 35 x 50 | 1.55 | 2.17 | 0.425 | 0.170 | ECOS2WA391EA |