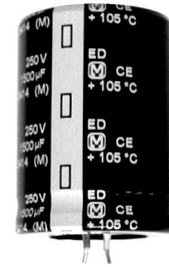


## TS-ED Series 105°C, 3000 hours

- Highest ripple current capability for demanding inverter applications
- 2 and 3 pin versions available
- 3000 hour life at 105°C



| Rated Working Voltage:            | 200 ~ 250 VDC  | 400 ~ 450 VDC |                                  |     |      |   |                      |       |   |      |      |       |  |                |    |    |         |     |    |      |                      |       |      |      |      |       |             |      |      |     |     |      |     |             |     |     |     |     |      |
|-----------------------------------|--|---------------|----------------------------------|-----|------|---|----------------------|-------|---|------|------|-------|--|----------------|----|----|---------|-----|----|------|----------------------|-------|------|------|------|-------|-------------|------|------|-----|-----|------|-----|-------------|-----|-----|-----|-----|------|
| Operating Temperature:            | -40 ~ +105°C   | -25 ~ +105°C  |                                  |     |      |   |                      |       |   |      |      |       |  |                |    |    |         |     |    |      |                      |       |      |      |      |       |             |      |      |     |     |      |     |             |     |     |     |     |      |
| Nominal Capacitance:              | 220~2200 µF  | 56 ~ 560µF    |                                  |     |      |   |                      |       |   |      |      |       |  |                |    |    |         |     |    |      |                      |       |      |      |      |       |             |      |      |     |     |      |     |             |     |     |     |     |      |
| Capacitance Tolerance:            | ± 20%  |               |                                  |     |      |   |                      |       |   |      |      |       |  |                |    |    |         |     |    |      |                      |       |      |      |      |       |             |      |      |     |     |      |     |             |     |     |     |     |      |
| Dissipation Factor (120Hz, 20°C): | 15% maximum (120Hz, +20°C)   |               |                                  |     |      |   |                      |       |   |      |      |       |  |                |    |    |         |     |    |      |                      |       |      |      |      |       |             |      |      |     |     |      |     |             |     |     |     |     |      |
| Leakage Current:                  | 3√CV (µA) max. after 5 minutes; C = Capacitance in µF, V = WV  |               |                                  |     |      |   |                      |       |   |      |      |       |  |                |    |    |         |     |    |      |                      |       |      |      |      |       |             |      |      |     |     |      |     |             |     |     |     |     |      |
| Ripple Current Multipliers:       | <table border="1"> <thead> <tr> <th colspan="6">Ripple Current Frequency Factors</th> <th colspan="5">Ripple Current Ambient Temperature Factors*</th> </tr> <tr> <th>Frequency(Hz):</th> <th>50</th> <th>60</th> <th>100~120</th> <th>500</th> <th>1k</th> <th>10k~</th> <th>Ambient Temperature:</th> <th>105°C</th> <th>85°C</th> <th>70°C</th> <th>60°C</th> <th>≤45°C</th> </tr> </thead> <tbody> <tr> <td>Multiplier:</td> <td>0.71</td> <td>0.78</td> <td>1.0</td> <td>1.2</td> <td>1.25</td> <td>1.4</td> <td>Multiplier:</td> <td>1.0</td> <td>1.7</td> <td>2.0</td> <td>2.2</td> <td>2.35</td> </tr> </tbody> </table> |               | Ripple Current Frequency Factors |     |      |   |                      |       | Ripple Current Ambient Temperature Factors* |      |      |       |  | Frequency(Hz): | 50 | 60 | 100~120 | 500 | 1k | 10k~ | Ambient Temperature: | 105°C | 85°C | 70°C | 60°C | ≤45°C | Multiplier: | 0.71 | 0.78 | 1.0 | 1.2 | 1.25 | 1.4 | Multiplier: | 1.0 | 1.7 | 2.0 | 2.2 | 2.35 |
| Ripple Current Frequency Factors  |  |               |                                  |     |      | Ripple Current Ambient Temperature Factors* |                      |       |   |      |      |       |  |                |    |    |         |     |    |      |                      |       |      |      |      |       |             |      |      |     |     |      |     |             |     |     |     |     |      |
| Frequency(Hz):                    | 50   | 60            | 100~120                          | 500 | 1k   | 10k~  | Ambient Temperature: | 105°C | 85°C  | 70°C | 60°C | ≤45°C |  |                |    |    |         |     |    |      |                      |       |      |      |      |       |             |      |      |     |     |      |     |             |     |     |     |     |      |
| Multiplier:                       | 0.71   | 0.78          | 1.0                              | 1.2 | 1.25 | 1.4   | Multiplier:          | 1.0   | 1.7   | 2.0  | 2.2  | 2.35  |  |                |    |    |         |     |    |      |                      |       |      |      |      |       |             |      |      |     |     |      |     |             |     |     |     |     |      |
| Endurance:                        | 3000 hours at +105°C with maximum specified ripple current (see page 6)  |               |                                  |     |      |   |                      |       |   |      |      |       |  |                |    |    |         |     |    |      |                      |       |      |      |      |       |             |      |      |     |     |      |     |             |     |     |     |     |      |

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

### Part Number System

**E E T**  
Common Code

**E D**  
Series Code

**□ □**  
Voltage Code

**□ □ □**  
Capacitance Code

| Diameter / Terminal Code |       |       |       |
|--------------------------|-------|-------|-------|
| # of pins:               | 2     | 2     | 3     |
| pin length:              | 6.3mm | 4.0mm | 4.0mm |
| Diameter                 | 22mm  | B     | H     |
|                          | 25mm  | C     | J     |
|                          | 30mm  | D     | K     |
|                          | 35mm  | E     | L     |

(Please see page 10 for details)

| Insulation Options |                                   |
|--------------------|-----------------------------------|
| A                  | PVC with top plate                |
|                    | PVC without top plate (no suffix) |
| J                  | PET sleeve without plate          |

### TS-ED Standard Ratings (part numbers shown with 6.3mm length terminal and top vinyl plate)

| Cap. (µF)                             | Size (mm) D x L | Max 105°C R.C. (A <sub>ms</sub> ) |        | 20°C ESR (Ω, max.) |              | Panasonic Part Number | Cap. (µF)   | Size (mm) D x L                       | Max 105°C R.C. (A <sub>ms</sub> ) |         | 20°C ESR (Ω, max.) |       | Panasonic Part Number |              |              |
|---------------------------------------|-----------------|-----------------------------------|--------|--------------------|--------------|-----------------------|---|---------------------------------------|-----------------------------------|---------|--------------------|-------|-----------------------|--------------|--------------|
|                                       |                 | 120Hz                             | 10kHz~ | 120Hz              | 20kHz        |                       |   |                                       | 120Hz                             | 10kHz~  | 120Hz              | 20kHz |                       |              |              |
| <b>200 VDC Working, 250 VDC Surge</b> |                 |                                   |        |                    |              |                       | <b>250 VDC Working, 300 VDC Surge (continued)</b> |                                       |                                   |         |                    |       |                       |              |              |
| 270                                   | 22 x 25         | 1.42                              | 2.03   | 0.553              | 0.249        | EETED2D271BA          | 390   | 22 x 40                               | 1.72                              | 2.45    | 0.383              | 0.172 | EETED2E391BA          |              |              |
| 330                                   | 22 x 30         | 1.56                              | 2.23   | 0.452              | 0.203        | EETED2D331BA          |   | 25 x 30                               | 1.71                              | 2.44    | 0.383              | 0.172 | EETED2E391CA          |              |              |
| 390                                   | 22 x 30         | 1.71                              | 2.44   | 0.383              | 0.172        | EETED2D391BA          |   | 30 x 25                               | 1.71                              | 2.44    | 0.383              | 0.172 | EETED2E391DA          |              |              |
|                                       | 25 x 25         | 1.71                              | 2.44   | 0.383              | 0.172        | EETED2D391CA          | 470   | 22 x 45                               | 1.85                              | 2.64    | 0.317              | 0.143 | EETED2E471BA          |              |              |
| 470                                   | 22 x 35         | 1.85                              | 2.64   | 0.317              | 0.143        | EETED2D471BA          |   |                                       | 25 x 35                           | 1.85    | 2.64               | 0.317 | 0.143                 | EETED2E471CA |              |
|                                       |                 | 25 x 30                           | 1.85   | 2.64               | 0.317        | 0.143                 | EETED2D471CA                                      |                                       | 30 x 30                           | 1.85    | 2.64               | 0.317 | 0.143                 | EETED2E471DA |              |
| 560                                   | 22 x 40         | 2.14                              | 3.05   | 0.266              | 0.120        | EETED2D561BA          | 560   | 25 x 40                               | 2.14                              | 3.05    | 0.266              | 0.120 | EETED2E561CA          |              |              |
|                                       | 25 x 30         | 2.14                              | 3.05   | 0.266              | 0.120        | EETED2D561CA          |   |                                       | 30 x 30                           | 2.14    | 3.05               | 0.266 | 0.120                 | EETED2E561DA |              |
|                                       | 30 x 25         | 2.14                              | 3.05   | 0.266              | 0.120        | EETED2D561DA          |   |                                       | 35 x 25                           | 2.14    | 3.05               | 0.266 | 0.133                 | EETED2E561EA |              |
| 680                                   | 22 x 45         | 2.42                              | 3.45   | 0.219              | 0.099        | EETED2D681BA          | 680   | 25 x 45                               | 2.42                              | 3.45    | 0.219              | 0.099 | EETED2E681CA          |              |              |
|                                       | 25 x 35         | 2.42                              | 3.45   | 0.219              | 0.099        | EETED2D681CA          |   |                                       | 30 x 35                           | 2.42    | 3.45               | 0.219 | 0.099                 | EETED2E681DA |              |
|                                       | 30 x 30         | 2.42                              | 3.45   | 0.219              | 0.099        | EETED2D681DA          |   |                                       | 35 x 30                           | 2.42    | 3.45               | 0.219 | 0.110                 | EETED2E681EA |              |
| 820                                   | 22 x 50         | 2.63                              | 3.76   | 0.182              | 0.082        | EETED2D821BA          | 820   | 30 x 40                               | 2.63                              | 3.76    | 0.182              | 0.082 | EETED2E821DA          |              |              |
|                                       | 25 x 40         | 2.63                              | 3.76   | 0.182              | 0.082        | EETED2D821CA          |   |                                       | 35 x 35                           | 2.63    | 3.76               | 0.182 | 0.091                 | EETED2E821EA |              |
|                                       | 30 x 30         | 2.63                              | 3.76   | 0.182              | 0.082        | EETED2D821DA          |   | 1000                                  | 30 x 50                           | 2.84    | 4.06               | 0.149 | 0.067                 | EETED2E102DA |              |
| 35 x 25                               | 2.63            | 3.76                              | 0.182  | 0.091              | EETED2D821EA |                       | 35 x 40   |                                       | 2.84                              | 4.06    | 0.149              | 0.067 | EETED2E102EA          |              |              |
| 1000                                  | 25 x 45         | 2.84                              | 4.06   | 0.149              | 0.067        | EETED2D102CA          | 1200  | 35 x 45                               | 3.13                              | 4.47    | 0.124              | 0.062 | EETED2E122EA          |              |              |
|                                       | 30 x 35         | 2.84                              | 4.06   | 0.149              | 0.067        | EETED2D102DA          |   |                                       | 1500                              | 35 x 50 | 3.56               | 5.08  | 0.099                 | 0.050        | EETED2E152EA |
|                                       | 35 x 30         | 2.84                              | 4.06   | 0.149              | 0.067        | EETED2D102EA          |   | <b>400 VDC Working, 450 VDC Surge</b> |                                   |         |                    |       |                       |              |              |
| 1200                                  | 30 x 40         | 3.13                              | 4.47   | 0.124              | 0.062        | EETED2D122DA          | 82  | 22 x 25                               | 0.80                              | 1.14    | 1.617              | 0.728 | EETED2G820BA          |              |              |
|                                       | 35 x 35         | 3.13                              | 4.47   | 0.124              | 0.062        | EETED2D122EA          | 100   | 22 x 30                               | 0.91                              | 1.30    | 1.326              | 0.597 | EETED2G101BA          |              |              |
| 1500                                  | 30 x 50         | 3.56                              | 5.08   | 0.099              | 0.050        | EETED2D152DA          |   |                                       | 25 x 25                           | 0.91    | 1.30               | 1.326 | 0.597                 | EETED2G101CA |              |
|                                       |                 | 35 x 40                           | 3.56   | 5.08               | 0.099        | 0.050                 | EETED2D152EA                                      | 120                                   | 22 x 35                           | 1.02    | 1.46               | 1.105 | 0.497                 | EETED2G121BA |              |
| 1800                                  | 35 x 45         | 3.84                              | 5.48   | 0.083              | 0.041        | EETED2D182EA          |   |                                       | 25 x 30                           | 1.02    | 1.46               | 1.105 | 0.497                 | EETED2G121CA |              |
|                                       | 2200            | 35 x 50                           | 4.12   | 5.89               | 0.068        | 0.033                 | EETED2D222EA                                      | 150                                   | 22 x 40                           | 1.07    | 1.53               | 0.884 | 0.398                 | EETED2G151BA |              |
| <b>250 VDC Working, 300 VDC Surge</b> |                 |                                   |        |                    |              |                       | 25 x 30   |                                       | 1.07                              | 1.53    | 0.884              | 0.398 | EETED2G151CA          |              |              |
| 220                                   |                 | 22 x 30                           | 1.28   | 1.83               | 0.678        | 0.305                 | EETED2E221BA                                      |                                       |                                   | 30 x 25 | 1.07               | 1.53  | 0.884                 | 0.398        | EETED2G151DA |
| 270                                   | 22 x 30         | 1.42                              | 2.03   | 0.553              | 0.249        | EETED2E271BA          | 180   | 22 x 45                               | 1.12                              | 1.60    | 0.737              | 0.332 | EETED2G181BA          |              |              |
|                                       | 25 x 25         | 1.42                              | 2.03   | 0.553              | 0.249        | EETED2E271CA          |   |                                       | 25 x 35                           | 1.12    | 1.60               | 0.737 | 0.332                 | EETED2G181CA |              |
| 330                                   | 22 x 35         | 1.64                              | 2.34   | 0.452              | 0.203        | EETED2E331BA          |   | 30 x 30                               | 1.12                              | 1.60    | 0.737              | 0.332 | EETED2G181DA          |              |              |
|                                       | 25 x 30         | 1.56                              | 2.23   | 0.452              | 0.203        | EETED2E331CA          | 220   | 22 x 50                               | 1.42                              | 2.03    | 0.603              | 0.271 | EETED2G221BA          |              |              |

### TS-ED Standard Ratings (continued)

| Cap.<br>( $\mu$ F)                                | Size (mm)<br>D x L | Max 105°C R.C. ( $A_{rms}$ ) |        | 20°C ESR ( $\Omega$ , max.) |       | Panasonic<br>Part Number |
|---|--------------------|------------------------------|--------|-----------------------------|-------|--------------------------|
|   |                    | 120Hz                        | 10kHz~ | 120Hz                       | 20kHz |                          |
| <b>400 VDC Working, 450 VDC Surge (continued)</b> |                    |                              |        |                             |       |                          |
| 220   | 25 x 40            | 1.42                         | 2.03   | 0.603                       | 0.271 | EETED2G221CA             |
|   | 30 x 30            | 1.42                         | 2.03   | 0.603                       | 0.271 | EETED2G221DA             |
|   | 35 x 25            | 1.42                         | 2.03   | 0.603                       | 0.271 | EETED2G221EA             |
| 270   | 25 x 45            | 1.56                         | 2.23   | 0.491                       | 0.221 | EETED2G271CA             |
|   | 30 x 35            | 1.56                         | 2.23   | 0.491                       | 0.221 | EETED2G271DA             |
|   | 35 x 30            | 1.56                         | 2.23   | 0.491                       | 0.221 | EETED2G271EA             |
| 330   | 30 x 40            | 1.71                         | 2.44   | 0.402                       | 0.181 | EETED2G331DA             |
|   | 35 x 30            | 1.71                         | 2.44   | 0.402                       | 0.181 | EETED2G331EA             |
| 390   | 30 x 45            | 1.85                         | 2.64   | 0.340                       | 0.153 | EETED2G391DA             |
|   | 35 x 35            | 1.85                         | 2.64   | 0.340                       | 0.153 | EETED2G391EA             |
| 470   | 35 x 40            | 2.01                         | 2.87   | 0.282                       | 0.127 | EETED2G471EA             |
| 560   | 35 x 45            | 2.35                         | 3.36   | 0.237                       | 0.107 | EETED2G561EA             |
| <b>420 VDC Working, 470 VDC Surge</b>             |                    |                              |        |                             |       |                          |
| 68  | 22 x 25            | 1.08                         | 0.95   | 1.950                       | 0.878 | EETED2S680BA             |
| 82  | 22 x 30            | 1.14                         | 1.08   | 1.617                       | 0.728 | EETED2S820BA             |
|   | 25 x 25            | 1.14                         | 1.08   | 1.617                       | 0.728 | EETED2S820CA             |
| 100   | 22 x 30            | 1.30                         | 1.14   | 1.326                       | 0.597 | EETED2S101BA             |
|   | 25 x 25            | 1.30                         | 1.14   | 1.326                       | 0.597 | EETED2S101CA             |
| 120   | 22 x 35            | 1.46                         | 1.30   | 1.105                       | 0.497 | EETED2S121BA             |
|   | 25 x 30            | 1.46                         | 1.30   | 1.105                       | 0.497 | EETED2S121CA             |
| 150   | 22 x 40            | 1.53                         | 1.46   | 0.884                       | 0.398 | EETED2S151BA             |
|   | 25 x 35            | 1.53                         | 1.46   | 0.884                       | 0.398 | EETED2S151CA             |
|   | 30 x 25            | 1.53                         | 1.46   | 0.884                       | 0.398 | EETED2S151DA             |
| 180   | 22 x 45            | 1.60                         | 1.53   | 0.737                       | 0.332 | EETED2S181BA             |
|   | 25 x 40            | 1.60                         | 1.53   | 0.737                       | 0.332 | EETED2S181CA             |
|   | 30 x 30            | 1.60                         | 1.53   | 0.737                       | 0.332 | EETED2S181DA             |
|   | 35 x 25            | 1.60                         | 1.53   | 0.737                       | 0.332 | EETED2S181EA             |
| 220   | 25 x 45            | 2.03                         | 1.60   | 0.603                       | 0.271 | EETED2S221CA             |
|   | 30 x 35            | 2.03                         | 1.60   | 0.603                       | 0.271 | EETED2S221DA             |
|   | 35 x 30            | 2.03                         | 1.60   | 0.603                       | 0.271 | EETED2S221EA             |
| 270   | 25 x 50            | 2.40                         | 2.03   | 0.491                       | 0.221 | EETED2S271CA             |
|   | 30 x 40            | 2.40                         | 2.03   | 0.491                       | 0.221 | EETED2S271DA             |
|   | 35 x 30            | 2.40                         | 2.03   | 0.491                       | 0.221 | EETED2S271EA             |
| 330   | 30 x 45            | 2.54                         | 2.45   | 0.402                       | 0.181 | EETED2S331DA             |
|   | 35 x 35            | 2.54                         | 2.45   | 0.402                       | 0.181 | EETED2S331EA             |
| 390   | 30 x 50            | 2.73                         | 2.64   | 0.340                       | 0.153 | EETED2S391DA             |
|   | 35 x 40            | 2.73                         | 2.64   | 0.340                       | 0.153 | EETED2S391EA             |
| 470   | 35 x 45            | 3.18                         | 2.82   | 0.282                       | 0.127 | EETED2S471EA             |
| <b>450 VDC Working, 500 VDC Surge</b>             |                    |                              |        |                             |       |                          |
| 56  | 22 x 25            | 0.67                         | 0.95   | 2.368                       | 1.066 | EETED2W560BA             |
| 68  | 22 x 30            | 0.76                         | 1.08   | 1.950                       | 0.878 | EETED2W680BA             |
|   | 25 x 25            | 0.76                         | 1.08   | 1.950                       | 0.878 | EETED2W680CA             |
| 82  | 22 x 30            | 0.80                         | 1.14   | 1.617                       | 0.728 | EETED2W820BA             |
|   | 25 x 25            | 0.80                         | 1.14   | 1.617                       | 0.728 | EETED2W820CA             |
| 100   | 22 x 35            | 0.91                         | 1.30   | 1.326                       | 0.597 | EETED2W101BA             |
|   | 25 x 30            | 0.91                         | 1.30   | 1.326                       | 0.597 | EETED2W101CA             |
| 120   | 22 x 40            | 1.02                         | 1.46   | 1.105                       | 0.497 | EETED2W121BA             |
|   | 25 x 35            | 1.02                         | 1.46   | 1.105                       | 0.497 | EETED2W121CA             |
|   | 30 x 25            | 1.02                         | 1.46   | 1.105                       | 0.497 | EETED2W121DA             |
| 150   | 22 x 45            | 1.07                         | 1.53   | 0.884                       | 0.398 | EETED2W151BA             |
|   | 25 x 40            | 1.07                         | 1.53   | 0.884                       | 0.398 | EETED2W151CA             |
|   | 30 x 30            | 1.07                         | 1.53   | 0.884                       | 0.398 | EETED2W151DA             |
|   | 35 x 25            | 1.07                         | 1.53   | 0.884                       | 0.398 | EETED2W151EA             |
| 180   | 22 x 50            | 1.12                         | 1.60   | 0.737                       | 0.332 | EETED2W181BA             |
|   | 25 x 40            | 1.12                         | 1.60   | 0.737                       | 0.332 | EETED2W181CA             |
|   | 30 x 30            | 1.12                         | 1.60   | 0.737                       | 0.332 | EETED2W181DA             |
|   | 35 x 25            | 1.12                         | 1.60   | 0.737                       | 0.332 | EETED2W181EA             |
| 220   | 25 x 45            | 1.42                         | 2.03   | 0.603                       | 0.271 | EETED2W221CA             |
|   | 30 x 35            | 1.42                         | 2.03   | 0.603                       | 0.271 | EETED2W221DA             |
|   | 35 x 30            | 1.42                         | 2.03   | 0.603                       | 0.271 | EETED2W221EA             |
| 270   | 30 x 40            | 1.72                         | 2.45   | 0.491                       | 0.221 | EETED2W271DA             |
|   | 35 x 35            | 1.72                         | 2.45   | 0.491                       | 0.221 | EETED2W271EA             |
| 330   | 30 x 50            | 1.85                         | 2.64   | 0.402                       | 0.181 | EETED2W331DA             |
|   | 35 x 40            | 1.85                         | 2.64   | 0.402                       | 0.181 | EETED2W331EA             |
| 390   | 35 x 40            | 1.97                         | 2.82   | 0.340                       | 0.153 | EETED2W391EA             |
| 470   | 35 x 50            | 2.47                         | 3.53   | 0.282                       | 0.127 | EETED2W471EA             |

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