

# PAG Series

- Downsize, high ripple design (φ 10 to 18)
- Rated voltage range : 200 to 450V<sub>dc</sub>, Capacitance range : 18 to 560μF
- Endurance with ripple current : 2,000 hours at 105°C
- Ideal for low profile power supply applications
- Non solvent resistant type
- RoHS2 Compliant

PAG

↑  
Downsized  
Higher ripple  
KMG

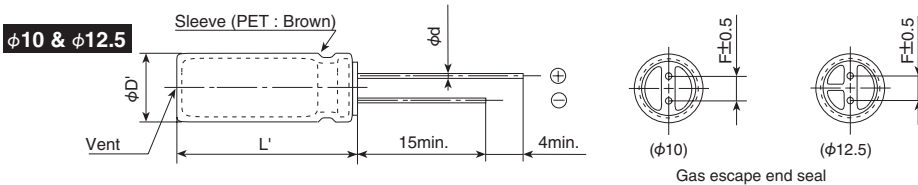


## ◆ SPECIFICATIONS

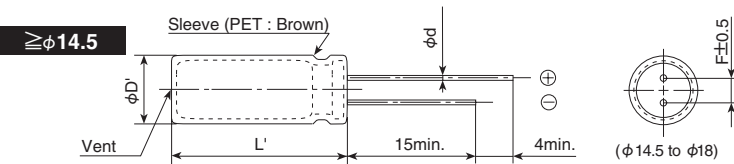
| Items   | Characteristics   |                                       |      |                 |      |
|---|---|---------------------------------------|------|-----------------|------|
| <b>Category</b>   | -40 to +105°C (200, 400V <sub>dc</sub> ) -25 to +105°C (420, 450V <sub>dc</sub> )   |                                       |      |                 |      |
| <b>Temperature Range</b>                                      |   |                                       |      |                 |      |
| <b>Rated Voltage Range</b>                                    | 200 to 450V <sub>dc</sub>   |                                       |      |                 |      |
| <b>Capacitance Tolerance</b>                                  | ±20% (M) (at 20°C, 120Hz)°C   |                                       |      |                 |      |
| <b>Leakage Current</b>  |   | After 1 minute                        |      | After 5 minutes |      |
|   | CV ≤ 1,000  | I = 0.1CV + 40                        |      | I = 0.03CV + 15 |      |
|   | CV > 1,000  | I = 0.04CV + 100                      |      | I = 0.02CV + 25 |      |
|   | Where, I : Max. leakage current (μA), C : Nominal capacitance (μF), V : Rated voltage (V) (at 20°C)°C   |                                       |      |                 |      |
| <b>Dissipation Factor (tan δ)</b>                             | Rated voltage (V <sub>dc</sub> )  | 200V                                  | 400V | 420V            | 450V |
|   | tan δ (Max.)  | 0.12                                  | 0.15 | 0.20            | 0.20 |
| (at 20°C, 120Hz)°C  |   |                                       |      |                 |      |
| <b>Low Temperature Characteristics (Max. Impedance Ratio)</b> | Rated voltage (V <sub>dc</sub> )  | 200V                                  | 400V | 420V            | 450V |
|   | Z(-25°C)/Z(+20°C)   | 3                                     | 5    | 6               | 6    |
|   | Z(-40°C)/Z(+20°C)   | 6                                     | 6    | —               | —    |
| (at 120Hz)  |   |                                       |      |                 |      |
| <b>Endurance</b>  | The following specifications shall be satisfied when the capacitors are restored to 20°C after subjected to DC voltage with the rated ripple current is applied (the peak voltage shall not exceed the rated voltage) for 2,000 hours at 105°C.   |                                       |      |                 |      |
|   | Capacitance change  | ≤ ±20% of the initial value           |      |                 |      |
|   | D.F. (tan δ)  | ≤ 200% of the initial specified value |      |                 |      |
|   | Leakage current   | ≤ The initial specified value         |      |                 |      |
| <b>Shelf Life</b>   | The following specifications shall be satisfied when the capacitors are restored to 20°C after exposing them for 1,000 hours at 105°C without voltage applied. Before the measurement, the capacitor shall be preconditioned by applying voltage according to Item 4.1 of JIS C 5101-4. |                                       |      |                 |      |
|   | Capacitance change  | ≤ ±20% of the initial value           |      |                 |      |
|   | D.F. (tan δ)  | ≤ 200% of the initial specified value |      |                 |      |
|   | Leakage current   | ≤ 500% of the initial specified value |      |                 |      |

## ◆ DIMENSIONS [mm]

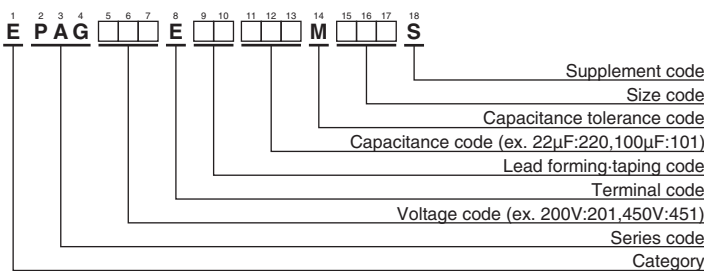
● Terminal Code : E



| φD  | 10          | 12.5 | 14.5 | 16  | 18  |
|-----|-------------|------|------|-----|-----|
| φd  | 0.6         | 0.6  | 0.8  | 0.8 | 0.8 |
| F   | 5.0         | 5.0  | 7.5  | 7.5 | 7.5 |
| φD' | φD+0.5 max. |      |      |     |     |
| L'  | L+2.0 max.  |      |      |     |     |



## ◆ PART NUMBERING SYSTEM



Please refer to "Product code guide (radial lead type)"

◆STANDARD RATINGS

| WV (V <sub>dc</sub> ) | Cap (μF) | Case size φD×L(mm) | tan δ | Rated ripple current (mA <sub>rms</sub> /105°C, 120Hz) | Part No.           | WV (V <sub>dc</sub> ) | Cap (μF) | Case size φD×L(mm) | tan δ              | Rated ripple current (mA <sub>rms</sub> /105°C, 120Hz) | Part No.           |
|-----------------------|----------|--------------------|-------|--|--------------------|-----------------------|----------|--------------------|--------------------|--|--------------------|
| 200                   | 82       | 10×30              | 0.12  | 440  | EPAG201E□□820MJ30S | 420                   | 22       | 10×30              | 0.20               | 230  | EPAG421E□□220MJ30S |
|                       | 100      | 10×35              | 0.12  | 510  | EPAG201E□□101MJ35S |                       | 27       | 10×35              | 0.20               | 270  | EPAG421E□□270MJ35S |
|                       | 120      | 10×40              | 0.12  | 590  | EPAG201E□□121MJ40S |                       | 33       | 10×40              | 0.20               | 310  | EPAG421E□□330MJ40S |
|                       | 150      | 12.5×30            | 0.12  | 650  | EPAG201E□□151MK30S |                       | 39       | 12.5×30            | 0.20               | 330  | EPAG421E□□390MK30S |
|                       | 180      | 12.5×35            | 0.12  | 750  | EPAG201E□□181MK35S |                       | 47       | 12.5×35            | 0.20               | 390  | EPAG421E□□470MK35S |
|                       | 220      | 12.5×40            | 0.12  | 830  | EPAG201E□□221MK40S |                       | 56       | 12.5×40            | 0.20               | 430  | EPAG421E□□560MK40S |
|                       | 220      | 14.5×30            | 0.12  | 830  | EPAG201E□□221MU30S |                       | 56       | 14.5×30            | 0.20               | 430  | EPAG421E□□560MU30S |
|                       | 270      | 14.5×35            | 0.12  | 960  | EPAG201E□□271MU35S |                       | 68       | 14.5×35            | 0.20               | 510  | EPAG421E□□680MU35S |
|                       | 270      | 16×30              | 0.12  | 960  | EPAG201E□□271ML30S |                       | 68       | 16×30              | 0.20               | 510  | EPAG421E□□680ML30S |
|                       | 330      | 16×35              | 0.12  | 1,100  | EPAG201E□□331ML35S |                       | 82       | 14.5×40            | 0.20               | 570  | EPAG421E□□820MK40S |
|                       | 330      | 18×30              | 0.12  | 1,100  | EPAG201E□□331MM30S |                       | 82       | 16×35              | 0.20               | 570  | EPAG421E□□820ML35S |
|                       | 390      | 16×40              | 0.12  | 1,240  | EPAG201E□□391ML40S |                       | 100      | 16×40              | 0.20               | 610  | EPAG421E□□101ML40S |
|                       | 390      | 18×35              | 0.12  | 1,240  | EPAG201E□□391MM35S |                       | 100      | 18×30              | 0.20               | 610  | EPAG421E□□101MM30S |
|                       | 470      | 18×40              | 0.12  | 1,390  | EPAG201E□□471MM40S |                       | 120      | 18×35              | 0.20               | 690  | EPAG421E□□121MM35S |
| 560                   | 18×45    | 0.12               | 1,560 | EPAG201E□□561MM45S                                     | 150                | 18×40                 | 0.20     | 790                | EPAG421E□□151MM40S |  |                    |
| 400                   | 27       | 10×30              | 0.15  | 260  | EPAG401E□□270MJ30S | 450                   | 18       | 10×30              | 0.20               | 210  | EPAG451E□□180MJ30S |
|                       | 33       | 10×35              | 0.15  | 300  | EPAG401E□□330MJ35S |                       | 22       | 10×35              | 0.20               | 240  | EPAG451E□□220MJ35S |
|                       | 39       | 10×40              | 0.15  | 340  | EPAG401E□□390MJ40S |                       | 27       | 10×40              | 0.20               | 280  | EPAG451E□□270MJ40S |
|                       | 47       | 12.5×30            | 0.15  | 370  | EPAG401E□□470MK30S |                       | 33       | 12.5×30            | 0.20               | 310  | EPAG451E□□330MK30S |
|                       | 56       | 12.5×35            | 0.15  | 420  | EPAG401E□□560MK35S |                       | 39       | 12.5×35            | 0.20               | 350  | EPAG451E□□390MK35S |
|                       | 68       | 12.5×40            | 0.15  | 480  | EPAG401E□□680MK40S |                       | 47       | 12.5×40            | 0.20               | 390  | EPAG451E□□470MK40S |
|                       | 68       | 14.5×30            | 0.15  | 480  | EPAG401E□□680MU30S |                       | 47       | 14.5×30            | 0.20               | 390  | EPAG451E□□470MU30S |
|                       | 82       | 14.5×35            | 0.15  | 530  | EPAG401E□□820MU35S |                       | 56       | 14.5×35            | 0.20               | 440  | EPAG451E□□560MU35S |
|                       | 100      | 14.5×40            | 0.15  | 580  | EPAG401E□□101MU40S |                       | 56       | 16×30              | 0.20               | 440  | EPAG451E□□560ML30S |
|                       | 100      | 16×30              | 0.15  | 580  | EPAG401E□□101ML30S |                       | 68       | 14.5×40            | 0.20               | 500  | EPAG451E□□680MU40S |
|                       | 120      | 16×35              | 0.15  | 670  | EPAG401E□□121ML35S |                       | 68       | 16×35              | 0.20               | 500  | EPAG451E□□680ML35S |
|                       | 120      | 18×30              | 0.15  | 670  | EPAG401E□□121MM30S |                       | 82       | 16×40              | 0.20               | 550  | EPAG451E□□820ML40S |
|                       | 150      | 16×40              | 0.15  | 770  | EPAG401E□□151ML40S |                       | 82       | 18×30              | 0.20               | 550  | EPAG451E□□820MM30S |
|                       | 150      | 18×35              | 0.15  | 770  | EPAG401E□□151MM35S |                       | 100      | 18×35              | 0.20               | 650  | EPAG451E□□101MM35S |
| 180                   | 18×40    | 0.15               | 880   | EPAG401E□□181MM40S                                     | 120                | 18×40                 | 0.20     | 740                | EPAG451E□□121MM40S |  |                    |
| 220                   | 18×45    | 0.15               | 1,000 | EPAG401E□□221MM45S                                     | 150                | 18×45                 | 0.20     | 810                | EPAG451E□□151MM45S |  |                    |

□□ : Enter the appropriate lead forming or taping code.

◆RATED RIPPLE CURRENT MULTIPLIERS

●Frequency Multipliers

| Capacitance(μF) | Frequency(Hz) | 120  | 1k   | 10k  | 100k |
|-----------------|---------------|------|------|------|------|
| 18 to 82        |               | 1.00 | 1.50 | 1.75 | 1.80 |
| 100 to 560      |               | 1.00 | 1.30 | 1.40 | 1.50 |

The endurance of capacitors is reduced with internal heating produced by ripple current at the rate of halving the lifetime with every 5°C rise. When long life performance is required in actual use, the rms ripple current has to be reduced.