

# 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



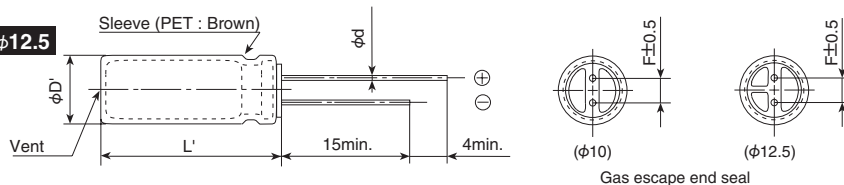
## SPECIFICATIONS

| Items                                                  | Characteristics                                                                                                                                                                                                                                                                         |                                      |                 |      |                         |
|--------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------|-----------------|------|-------------------------|
| Category                                               | -40 to +105°C (200, 400V <sub>dc</sub> ) -25 to+105°C (420, 450V <sub>dc</sub> )                                                                                                                                                                                                        |                                      |                 |      |                         |
| Temperature Range                                      |                                                                                                                                                                                                                                                                                         |                                      |                 |      |                         |
| Rated Voltage Range                                    | 200 to 450V <sub>dc</sub>                                                                                                                                                                                                                                                               |                                      |                 |      |                         |
| Capacitance Tolerance                                  | ±20% (M) (at 20°C, 120Hz)°C                                                                                                                                                                                                                                                             |                                      |                 |      |                         |
| Leakage Current                                        |                                                                                                                                                                                                                                                                                         | 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                                                                                                                                                                                    |                                      |                 |      |                         |
| Dissipation Factor (tan δ )                            | 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 |
| Low Temperature Characteristics (Max. Impedance Ratio) | 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)            |
| Endurance                                              | 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         |                 |      |                         |
| Shelf Life                                             | 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

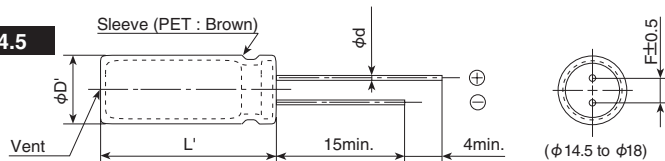
φ10 & φ12.5



| 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.  |      |      |     |     |

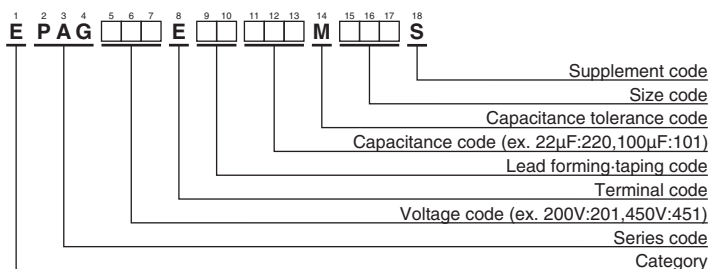
Gas escape end seal

≥φ14.5



(φ 14.5 to φ18)

## PART NUMBERING SYSTEM



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

◆STANDARD RATINGS

| WV<br>(V <sub>dc</sub> ) | Cap<br>(μF) | Case size<br>φD×L(mm) | tan δ | Rated ripple<br>current<br>(mA <sub>rms</sub> /105°C, 120Hz) | Part No.           | WV<br>(V <sub>dc</sub> ) | Cap<br>(μF) | Case size<br>φD×L(mm) | tan δ | Rated ripple<br>current<br>(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□□820MU40S |
|                          | 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.