

# KHE Series

- Downsized from KMZ series
- Endurance with ripple current : 2,000 hours at 105°C
- Rated voltage range : 400 to 450V<sub>dc</sub>, Capacitance range : 200 to 1,300μF
- Non solvent resistant type
- RoHS2 Compliant

KHE

↓  
Downsized  
KMZ

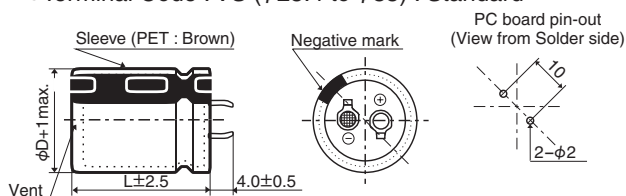


## SPECIFICATIONS

| Items                                                  | Characteristics                                                                                                                                                                                                                                                                       |                                             |                 |
|--------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------|-----------------|
| Category                                               | -40 to +105℃                                                                                                                                                                                                                                                                          |                                             |                 |
| Temperature Range                                      |                                                                                                                                                                                                                                                                                       |                                             |                 |
| Rated Voltage Range                                    | 400 to 450V <sub>dc</sub>                                                                                                                                                                                                                                                             |                                             |                 |
| Capacitance Tolerance                                  | ± 20% (M) (at 20℃, 120Hz)                                                                                                                                                                                                                                                             |                                             |                 |
| Leakage Current                                        | $I \leq 3\sqrt{CV}$<br>Where, I : Max. leakage current (μA), C : Nominal capacitance (μF), V : Rated voltage (V) (at 20℃ after 5 minutes)                                                                                                                                             |                                             |                 |
| Dissipation Factor (tan δ)                             | Rated voltage (V <sub>dc</sub> )                                                                                                                                                                                                                                                      | 400 to 450V                                 | (at 20℃, 120Hz) |
|                                                        | tan δ (Max.)                                                                                                                                                                                                                                                                          | 0.20                                        |                 |
| Low Temperature Characteristics (Max. Impedance Ratio) | Rated voltage (V <sub>dc</sub> )                                                                                                                                                                                                                                                      | 400 to 450V                                 | (at 120Hz)      |
|                                                        | Z(-25℃)/Z(+20℃)                                                                                                                                                                                                                                                                       | 8                                           |                 |
|                                                        |                                                                                                                                                                                                                                                                                       |                                             |                 |
| Endurance                                              | The following specifications shall be satisfied when the capacitors are restored to 20℃ 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℃.                                         |                                             |                 |
|                                                        | Capacitance change                                                                                                                                                                                                                                                                    | $\leq \pm 20\%$ of the initial value        |                 |
|                                                        | D.F. (tan δ)                                                                                                                                                                                                                                                                          | $\leq 200\%$ of the initial specified value |                 |
|                                                        | Leakage current                                                                                                                                                                                                                                                                       | $\leq$ The initial specified value          |                 |
| Shelf Life                                             | The following specifications shall be satisfied when the capacitors are restored to 20℃ after exposing them for 1,000 hours at 105℃ 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                                                                                                                                                                                                                                                                    | $\leq \pm 15\%$ of the initial value        |                 |
|                                                        | D.F. (tan δ)                                                                                                                                                                                                                                                                          | $\leq 150\%$ of the initial specified value |                 |
|                                                        | Leakage current                                                                                                                                                                                                                                                                       | $\leq$ The initial specified value          |                 |

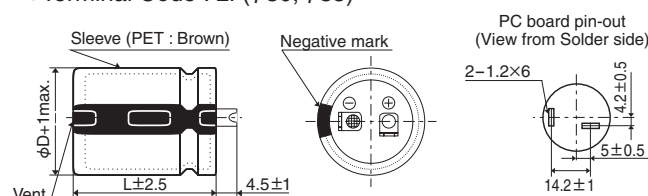
## DIMENSIONS [mm]

- Terminal Code : VS (φ25.4 to φ35) : Standard

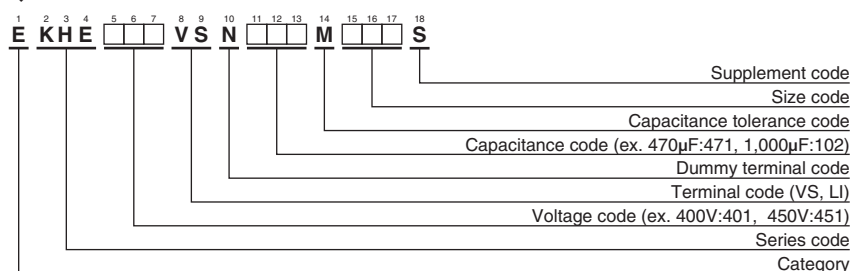


The standard design has no plastic disc.

- Terminal Code : LI (φ30, φ35)



## PART NUMBERING SYSTEM



Please refer to "Product code guide (snap-in 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>(Arms/<br>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>(Arms/<br>105°C, 120Hz) | Part No.           |
|--------------------------|-------------|-----------------------|-------|----------------------------------------------------|--------------------|--------------------------|-------------|-----------------------|-------|----------------------------------------------------|--------------------|
| 400                      | 220         | 25.4 × 25             | 0.20  | 1.13                                               | EKHE401VSN221MQ25S | 420                      | 620         | 30 × 40               | 0.20  | 2.06                                               | EKHE421VSN621MR40S |
|                          | 300         | 25.4 × 30             | 0.20  | 1.35                                               | EKHE401VSN301MQ30S |                          | 680         | 25.4 × 60             | 0.20  | 2.35                                               | EKHE421VSN681MQ60S |
|                          | 330         | 30 × 25               | 0.20  | 1.41                                               | EKHE401VSN331MR25S |                          | 680         | 30 × 45               | 0.20  | 2.21                                               | EKHE421VSN681MR45S |
|                          | 360         | 25.4 × 35             | 0.20  | 1.54                                               | EKHE401VSN361MQ35S |                          | 680         | 35 × 35               | 0.20  | 1.95                                               | EKHE421VSN681MA35S |
|                          | 430         | 25.4 × 40             | 0.20  | 1.72                                               | EKHE401VSN431MQ40S |                          | 820         | 30 × 50               | 0.20  | 2.47                                               | EKHE421VSN821MR50S |
|                          | 430         | 30 × 30               | 0.20  | 1.63                                               | EKHE401VSN431MR30S |                          | 820         | 35 × 40               | 0.20  | 2.22                                               | EKHE421VSN821MA40S |
|                          | 430         | 35 × 25               | 0.20  | 1.51                                               | EKHE401VSN431MA25S |                          | 910         | 30 × 55               | 0.20  | 2.65                                               | EKHE421VSN911MR55S |
|                          | 510         | 25.4 × 45             | 0.20  | 1.91                                               | EKHE401VSN511MQ45S |                          | 910         | 35 × 45               | 0.20  | 2.40                                               | EKHE421VSN911MA45S |
|                          | 510         | 30 × 35               | 0.20  | 1.82                                               | EKHE401VSN511MR35S |                          | 1,000       | 30 × 60               | 0.20  | 2.83                                               | EKHE421VSN102MR60S |
|                          | 560         | 25.4 × 50             | 0.20  | 2.03                                               | EKHE401VSN561MQ50S |                          | 1,100       | 35 × 50               | 0.20  | 2.69                                               | EKHE421VSN112MA50S |
|                          | 560         | 35 × 30               | 0.20  | 1.75                                               | EKHE401VSN561MA30S | 450                      | 1,200       | 35 × 55               | 0.20  | 2.86                                               | EKHE421VSN122MA55S |
|                          | 620         | 25.4 × 55             | 0.20  | 2.20                                               | EKHE401VSN621MQ55S |                          | 1,300       | 35 × 60               | 0.20  | 3.03                                               | EKHE421VSN132MA60S |
|                          | 620         | 30 × 40               | 0.20  | 2.06                                               | EKHE401VSN621MR40S |                          | 200         | 25.4 × 25             | 0.20  | 1.07                                               | EKHE451VSN201MQ25S |
|                          | 680         | 25.4 × 60             | 0.20  | 2.35                                               | EKHE401VSN681MQ60S |                          | 240         | 25.4 × 30             | 0.20  | 1.21                                               | EKHE451VSN241MQ30S |
|                          | 680         | 30 × 45               | 0.20  | 2.21                                               | EKHE401VSN681MR45S |                          | 270         | 30 × 25               | 0.20  | 1.28                                               | EKHE451VSN271MR25S |
|                          | 680         | 35 × 35               | 0.20  | 1.95                                               | EKHE401VSN681MA35S |                          | 330         | 25.4 × 35             | 0.20  | 1.48                                               | EKHE451VSN331MQ35S |
|                          | 820         | 30 × 50               | 0.20  | 2.47                                               | EKHE401VSN821MR50S |                          | 390         | 25.4 × 40             | 0.20  | 1.64                                               | EKHE451VSN391MQ40S |
|                          | 820         | 35 × 40               | 0.20  | 2.22                                               | EKHE401VSN821MA40S |                          | 390         | 30 × 30               | 0.20  | 1.55                                               | EKHE451VSN391MR30S |
|                          | 910         | 30 × 55               | 0.20  | 2.65                                               | EKHE401VSN911MR55S |                          | 390         | 35 × 25               | 0.20  | 1.43                                               | EKHE451VSN391MA25S |
|                          | 1,000       | 30 × 60               | 0.20  | 2.83                                               | EKHE401VSN102MR60S |                          | 430         | 25.4 × 45             | 0.20  | 1.75                                               | EKHE451VSN431MQ45S |
| 420                      | 1,000       | 35 × 45               | 0.20  | 2.51                                               | EKHE401VSN102MA45S |                          | 470         | 25.4 × 50             | 0.20  | 1.86                                               | EKHE451VSN471MQ50S |
|                          | 1,100       | 35 × 50               | 0.20  | 2.69                                               | EKHE401VSN112MA50S |                          | 470         | 30 × 35               | 0.20  | 1.74                                               | EKHE451VSN471MR35S |
|                          | 1,200       | 35 × 55               | 0.20  | 2.86                                               | EKHE401VSN122MA55S |                          | 510         | 35 × 30               | 0.20  | 1.67                                               | EKHE451VSN511MA30S |
|                          | 1,300       | 35 × 60               | 0.20  | 3.03                                               | EKHE401VSN132MA60S |                          | 560         | 25.4 × 55             | 0.20  | 2.09                                               | EKHE451VSN561MQ55S |
|                          | 220         | 25.4 × 25             | 0.20  | 1.13                                               | EKHE421VSN221MQ25S |                          | 560         | 30 × 40               | 0.20  | 1.96                                               | EKHE451VSN561MR40S |
|                          | 270         | 25.4 × 30             | 0.20  | 1.28                                               | EKHE421VSN271MQ30S |                          | 620         | 25.4 × 60             | 0.20  | 2.25                                               | EKHE451VSN621MQ60S |
|                          | 330         | 30 × 25               | 0.20  | 1.41                                               | EKHE421VSN331MR25S |                          | 620         | 30 × 45               | 0.20  | 2.11                                               | EKHE451VSN621MR45S |
|                          | 360         | 25.4 × 35             | 0.20  | 1.54                                               | EKHE421VSN361MQ35S |                          | 620         | 35 × 35               | 0.20  | 1.86                                               | EKHE451VSN621MA35S |
|                          | 390         | 25.4 × 40             | 0.20  | 1.64                                               | EKHE421VSN391MQ40S |                          | 680         | 30 × 50               | 0.20  | 2.25                                               | EKHE451VSN681MR50S |
|                          | 390         | 30 × 30               | 0.20  | 1.55                                               | EKHE421VSN391MR30S |                          | 750         | 35 × 40               | 0.20  | 2.13                                               | EKHE451VSN751MA40S |
|                          | 430         | 35 × 25               | 0.20  | 1.51                                               | EKHE421VSN431MA25S |                          | 820         | 30 × 55               | 0.20  | 2.52                                               | EKHE451VSN821MR55S |
|                          | 470         | 25.4 × 45             | 0.20  | 1.83                                               | EKHE421VSN471MQ45S |                          | 820         | 35 × 45               | 0.20  | 2.27                                               | EKHE451VSN821MA45S |
|                          | 510         | 30 × 35               | 0.20  | 1.82                                               | EKHE421VSN511MR35S |                          | 910         | 30 × 60               | 0.20  | 2.70                                               | EKHE451VSN911MR60S |
|                          | 560         | 25.4 × 50             | 0.20  | 2.03                                               | EKHE421VSN561MQ50S |                          | 1,000       | 35 × 50               | 0.20  | 2.56                                               | EKHE451VSN102MA50S |
|                          | 560         | 35 × 30               | 0.20  | 1.75                                               | EKHE421VSN561MA30S |                          | 1,100       | 35 × 55               | 0.20  | 2.74                                               | EKHE451VSN112MA55S |
|                          | 620         | 25.4 × 55             | 0.20  | 2.20                                               | EKHE421VSN621MQ55S |                          | 1,200       | 35 × 60               | 0.20  | 2.92                                               | EKHE451VSN122MA60S |

◆RATED RIPPLE CURRENT MULTIPLIERS

●Frequency Multipliers

| Frequency(Hz) | 50   | 120  | 300  | 1k   | 10k  | 50k  |
|---------------|------|------|------|------|------|------|
| Multipliers   | 0.77 | 1.00 | 1.10 | 1.21 | 1.32 | 1.33 |

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.