

# KMQ Series

- Downsized from current standard KMG series
- Solvent resistant type except 160 to 450V<sub>dc</sub>  
(see PRECAUTIONS AND GUIDELINES)
- RoHS2 Compliant



## SPECIFICATIONS

| Items  | Characteristics   |                                      |      |      |      |      |                           |                                      |                   |             |             |      |      |   |
|--|---|--------------------------------------|------|------|------|------|---------------------------|--------------------------------------|-------------------|-------------|-------------|------|------|---|
| Category   | -55 to +105°C(6.3 to 100V <sub>dc</sub> ) -40 to +105°C(160 to 400V <sub>dc</sub> ) -25 to +105°C(450V <sub>dc</sub> )  |                                      |      |      |      |      |                           |                                      |                   |             |             |      |      |   |
| Temperature Range  |   |                                      |      |      |      |      |                           |                                      |                   |             |             |      |      |   |
| Rated Voltage Range  | 6.3 to 450V <sub>dc</sub>   |                                      |      |      |      |      |                           |                                      |                   |             |             |      |      |   |
| Capacitance Tolerance  | ±20% (M) (at 20°C, 120Hz)   |                                      |      |      |      |      |                           |                                      |                   |             |             |      |      |   |
| Leakage Current  | 6.3 to 100V <sub>dc</sub>   |                                      |      |      |      |      | 160 to 450V <sub>dc</sub> |                                      |                   |             |             |      |      |   |
|  | I=0.03CV or 4μA, whichever is greater.  |                                      |      |      |      |      | CV≤1,000                  |                                      | I=0.1CV+40 max.   |             |             |      |      |   |
|  |   |                                      |      |      |      |      | CV>1,000                  |                                      | I=0.04CV+100 max. |             |             |      |      |   |
| Where, I : Max. leakage current (μA), C : Nominal capacitance (μF), V : Rated voltage (V) (at 20°C after 1 minute) |   |                                      |      |      |      |      |                           |                                      |                   |             |             |      |      |   |
| Dissipation Factor (tan δ)   | Rated voltage (V <sub>dc</sub> )  | 6.3V                                 | 10V  | 16V  | 25V  | 35V  | 50V                       | 63V                                  | 100V              | 160 to 250V | 350 to 400V | 450V |      |   |
|  | tan δ (Max.)  | 0.28                                 | 0.24 | 0.20 | 0.16 | 0.14 | 0.12                      | 0.10                                 | 0.08              | 0.20        | 0.24        | 0.24 |      |   |
| When nominal capacitance exceeds 1,000μF, add 0.02 to the value above for each 1,000μF increase. (at 20°C, 120Hz)  |   |                                      |      |      |      |      |                           |                                      |                   |             |             |      |      |   |
| Low Temperature Characteristics (Max. Impedance Ratio)   | Rated voltage (V <sub>dc</sub> )  | 6.3V                                 | 10V  | 16V  | 25V  | 35V  | 50V                       | 63 to 100V                           | 160 to 200V       | 250V        | 350V        | 400V | 450V |   |
|  | Z(-25°C)/Z(+20°C)   | ≤φ8                                  | 5    | 4    | 3    | 2    | 2                         | 2                                    | 2                 | 3           | 3           | 4    | 4    | 6 |
|  |   | ≥φ10                                 | 5    | 4    | 3    | 2    | 2                         | 2                                    | 2                 | 3           | 3           | 4    | 4    | 6 |
|  | Z(-40°C)/Z(+20°C)   | ≤φ8                                  | 10   | 8    | 6    | 4    | 3                         | 3                                    | 3                 | 8           | 10          | 8    | 8    | — |
| ≥φ10   |   | 10                                   | 8    | 6    | 4    | 3    | 3                         | 3                                    | 4                 | 4           | 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 1,000 hours (2,000 hours for φ 10 and more) 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. |                                      |      |      |      |      |                           |                                      |                   |             |             |      |      |   |
|  | Rated voltage   | 6.3 to 100V <sub>dc</sub>            |      |      |      |      |                           | 160 to 450V <sub>dc</sub>            |                   |             |             |      |      |   |
|  | Capacitance change  | ≤ ±20% of the initial value          |      |      |      |      |                           | ≤ ±20% of the initial value          |                   |             |             |      |      |   |
|  | D.F. (tan δ)  | ≤200% of the initial specified value |      |      |      |      |                           | ≤200% of the initial specified value |                   |             |             |      |      |   |
|  | Leakage current   | ≤The initial specified value         |      |      |      |      |                           | ≤500% of the initial specified value |                   |             |             |      |      |   |

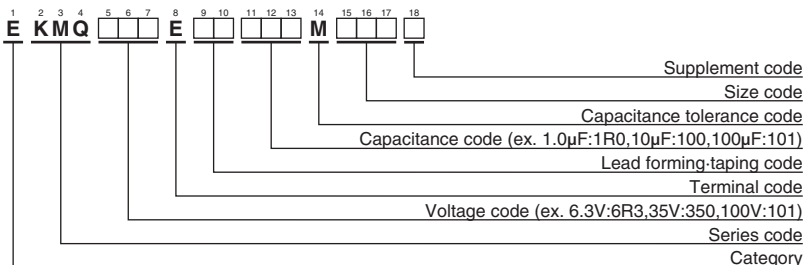
## DIMENSIONS [mm]

- Terminal Code : E



| φD  | 5          | 6.3 | 8   | 10  | 12.5 | 16  | 18  |
|-----|------------|-----|-----|-----|------|-----|-----|
| φd  | 0.5        | 0.5 | 0.6 | 0.6 | 0.6  | 0.8 | 0.8 |
| F   | 2.0        | 2.5 | 3.5 | 5.0 | 5.0  | 7.5 | 7.5 |
| φD' | φD+0.5max. |     |     |     |      |     |     |
| L'  | L+1.5max.  |     |     |     |      |     |     |

## PART NUMBERING SYSTEM



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

◆ STANDARD RATINGS

□ is not solvent resistant.

| WV (V <sub>dc</sub> ) | Cap (μF)  | Case size φD×L(mm) | tan δ | Rated ripple current (mA rms/105°C, 120Hz) | Part No.          | WV (V <sub>dc</sub> ) | Cap (μF)  | Case size φD×L(mm) | tan δ | Rated ripple current (mA rms/105°C, 120Hz) | Part No.          |
|-----------------------|-----------|--------------------|-------|--|-------------------|-----------------------|-----------|--------------------|-------|--|-------------------|
| 6.3                   | 1,000     | 8 × 11.5           | 0.28  | 390  | EKMQR3E□□102MHB5D | 63                    | 33        | 6.3 × 11           | 0.10  | 100  | EKMQR3E□□330MF11D |
|                       | 2,200     | 10 × 16            | 0.30  | 635  | EKMQR3E□□222MJ16S |                       | 47        | 6.3 × 11           | 0.10  | 120  | EKMQR3E□□470MF11D |
|                       | 3,300     | 10 × 20            | 0.32  | 840  | EKMQR3E□□332MJ20S |                       | 68        | 8 × 11.5           | 0.10  | 155  | EKMQR3E□□680MHB5D |
|                       | 4,700     | 12.5 × 20          | 0.34  | 1,090                                      | EKMQR3E□□472MK20S |                       | 100       | 8 × 11.5           | 0.10  | 200  | EKMQR3E□□101MHB5D |
|                       | 6,800     | 12.5 × 25          | 0.38  | 1,350                                      | EKMQR3E□□682MK25S |                       | 220       | 10 × 16            | 0.10  | 335  | EKMQR3E□□221MJ16S |
|                       | 10,000    | 16 × 25            | 0.46  | 1,650                                      | EKMQR3E□□103ML25S |                       | 330       | 10 × 20            | 0.10  | 510  | EKMQR3E□□331MJ20S |
|                       | 15,000    | 16 × 31.5          | 0.56  | 1,820                                      | EKMQR3E□□153MLN3S |                       | 470       | 12.5 × 20          | 0.10  | 640  | EKMQR3E□□471MK20S |
|                       | 22,000    | 18 × 35.5          | 0.70  | 2,280                                      | EKMQR3E□□223MMP1S |                       | 1,000     | 16 × 25            | 0.10  | 930  | EKMQR3E□□102ML25S |
| 10                    | 220       | 5 × 11             | 0.24  | 155  | EKMQR3E□□221ME11D | 2,200                 | 18 × 35.5 | 0.12               | 1,650 | EKMQR3E□□222MMP1S                          |                   |
|                       | 330       | 6.3 × 11           | 0.24  | 210  | EKMQR3E□□331MF11D | 100                   | 1.0       | 5 × 11             | 0.08  | 15   | EKMQR3E□□1R0ME11D |
|                       | 470       | 6.3 × 11           | 0.24  | 250  | EKMQR3E□□471MF11D |                       | 2.2       | 5 × 11             | 0.08  | 21   | EKMQR3E□□2R2ME11D |
|                       | 1,000     | 10 × 12.5          | 0.24  | 460  | EKMQR3E□□102MJC5S |                       | 3.3       | 5 × 11             | 0.08  | 29   | EKMQR3E□□3R3ME11D |
|                       | 2,200     | 10 × 16            | 0.26  | 705  | EKMQR3E□□222MJ16S |                       | 4.7       | 5 × 11             | 0.08  | 32   | EKMQR3E□□4R7ME11D |
|                       | 3,300     | 12.5 × 20          | 0.28  | 1,000                                      | EKMQR3E□□332MK20S |                       | 10        | 5 × 11             | 0.08  | 50   | EKMQR3E□□100ME11D |
|                       | 4,700     | 12.5 × 25          | 0.30  | 1,260                                      | EKMQR3E□□472MK25S |                       | 22        | 6.3 × 11           | 0.08  | 93   | EKMQR3E□□220MF11D |
|                       | 6,800     | 16 × 25            | 0.34  | 1,570                                      | EKMQR3E□□682ML25S |                       | 33        | 8 × 11.5           | 0.08  | 130  | EKMQR3E□□330MHB5D |
| 10,000                | 16 × 31.5 | 0.42               | 1,820 | EKMQR3E□□103MLN3S                          | 47                |                       | 8 × 11.5  | 0.08               | 140   | EKMQR3E□□470MHB5D                          |                   |
| 16                    | 15,000    | 16 × 35.5          | 0.52  | 2,050                                      | EKMQR3E□□153MLP1S | 68                    | 10 × 12.5 | 0.08               | 190   | EKMQR3E□□680MJC5S                          |                   |
|                       | 22,000    | 18 × 40            | 0.66  | 2,420                                      | EKMQR3E□□223MM40S | 100                   | 10 × 16   | 0.08               | 240   | EKMQR3E□□101MJ16S                          |                   |
|                       | 220       | 6.3 × 11           | 0.20  | 190  | EKMQR3E□□221MF11D | 220                   | 12.5 × 20 | 0.08               | 390   | EKMQR3E□□221MK20S                          |                   |
|                       | 330       | 6.3 × 11           | 0.20  | 225  | EKMQR3E□□331MF11D | 330                   | 12.5 × 25 | 0.08               | 540   | EKMQR3E□□331MK25S                          |                   |
|                       | 470       | 8 × 11.5           | 0.20  | 315  | EKMQR3E□□471MHB5D | 470                   | 16 × 25   | 0.08               | 715   | EKMQR3E□□471ML25S                          |                   |
|                       | 1,000     | 10 × 12.5          | 0.20  | 500  | EKMQR3E□□102MJC5S | 1,000                 | 18 × 35.5 | 0.08               | 960   | EKMQR3E□□102MMP1S                          |                   |
|                       | 2,200     | 10 × 20            | 0.22  | 710  | EKMQR3E□□222MJ20S | 160                   | 10        | 8 × 11.5           | 0.20  | 41   | EKMQR3E□□100MHB5D |
|                       | 3,300     | 12.5 × 25          | 0.24  | 1,170                                      | EKMQR3E□□332MK25S |                       | 22        | 10 × 12.5          | 0.20  | 92   | EKMQR3E□□220MJC5S |
| 4,700                 | 16 × 25   | 0.26               | 1,500 | EKMQR3E□□472ML25S                          | 33                |                       | 10 × 16   | 0.20               | 125   | EKMQR3E□□330MJ16S                          |                   |
| 6,800                 | 16 × 25   | 0.30               | 1,600 | EKMQR3E□□682ML25S                          | 47                |                       | 10 × 20   | 0.20               | 150   | EKMQR3E□□470MJ20S                          |                   |
| 10,000                | 16 × 35.5 | 0.38               | 1,930 | EKMQR3E□□103MLP1S                          | 68                |                       | 12.5 × 20 | 0.20               | 250   | EKMQR3E□□680MK20S                          |                   |
| 15,000                | 18 × 40   | 0.48               | 2,210 | EKMQR3E□□153MM40S                          | 100               |                       | 12.5 × 25 | 0.20               | 310   | EKMQR3E□□101MK25S                          |                   |
| 25                    | 100       | 5 × 11             | 0.16  | 125  | EKMQR3E□□101ME11D |                       | 220       | 16 × 31.5          | 0.20  | 540  | EKMQR3E□□221MLN3S |
|                       | 220       | 6.3 × 11           | 0.16  | 200  | EKMQR3E□□221MF11D |                       | 330       | 18 × 35.5          | 0.20  | 705  | EKMQR3E□□331MMP1S |
|                       | 330       | 8 × 11.5           | 0.16  | 310  | EKMQR3E□□331MHB5D | 470                   | 18 × 40   | 0.20               | 855   | EKMQR3E□□471MM40S                          |                   |
|                       | 470       | 10 × 12.5          | 0.16  | 380  | EKMQR3E□□471MJC5S | 200                   | 1.0       | 6.3 × 11           | 0.20  | 16   | EKMQR3E□□1R0MF11D |
|                       | 1,000     | 10 × 16            | 0.16  | 610  | EKMQR3E□□102MJ16S |                       | 2.2       | 6.3 × 11           | 0.20  | 25   | EKMQR3E□□2R2MF11D |
|                       | 2,200     | 12.5 × 25          | 0.18  | 1,090                                      | EKMQR3E□□222MK25S |                       | 3.3       | 6.3 × 11           | 0.20  | 30   | EKMQR3E□□3R3MF11D |
|                       | 3,300     | 16 × 25            | 0.20  | 1,400                                      | EKMQR3E□□332ML25S |                       | 4.7       | 6.3 × 11           | 0.20  | 35   | EKMQR3E□□4R7MF11D |
|                       | 4,700     | 16 × 25            | 0.22  | 1,570                                      | EKMQR3E□□472ML25S |                       | 10        | 8 × 11.5           | 0.20  | 57   | EKMQR3E□□100MHB5D |
| 6,800                 | 16 × 35.5 | 0.26               | 1,850 | EKMQR3E□□682MLP1S                          | 22                |                       | 10 × 16   | 0.20               | 105   | EKMQR3E□□220MJ16S                          |                   |
| 10,000                | 18 × 40   | 0.34               | 2,000 | EKMQR3E□□103MM40S                          | 33                |                       | 10 × 20   | 0.20               | 140   | EKMQR3E□□330MJ20S                          |                   |
| 35                    | 47        | 5 × 11             | 0.14  | 93   | EKMQR3E□□470ME11D |                       | 47        | 12.5 × 20          | 0.20  | 195  | EKMQR3E□□470MK20S |
|                       | 68        | 6.3 × 11           | 0.14  | 110  | EKMQR3E□□680MF11D | 68                    | 12.5 × 25 | 0.20               | 250   | EKMQR3E□□680MK25S                          |                   |
|                       | 100       | 6.3 × 11           | 0.14  | 150  | EKMQR3E□□101MF11D | 100                   | 16 × 25   | 0.20               | 335   | EKMQR3E□□101ML25S                          |                   |
|                       | 220       | 8 × 11.5           | 0.14  | 270  | EKMQR3E□□221MHB5D | 220                   | 16 × 35.5 | 0.20               | 500   | EKMQR3E□□221MLP1S                          |                   |
|                       | 330       | 10 × 12.5          | 0.14  | 350  | EKMQR3E□□331MJC5S | 330                   | 18 × 40   | 0.20               | 675   | EKMQR3E□□331MM40S                          |                   |
|                       | 470       | 10 × 16            | 0.14  | 460  | EKMQR3E□□471MJ16S | 250                   | 3.3       | 6.3 × 11           | 0.20  | 28   | EKMQR3E□□3R3MF11D |
|                       | 1,000     | 12.5 × 20          | 0.14  | 810  | EKMQR3E□□102MK20S |                       | 4.7       | 6.3 × 11           | 0.20  | 35   | EKMQR3E□□4R7MF11D |
|                       | 2,200     | 16 × 25            | 0.16  | 1,260                                      | EKMQR3E□□222ML25S |                       | 10        | 10 × 12.5          | 0.20  | 71   | EKMQR3E□□100MJC5S |
| 3,300                 | 16 × 31.5 | 0.18               | 1,500 | EKMQR3E□□332MLN3S                          | 22                |                       | 10 × 20   | 0.20               | 105   | EKMQR3E□□220MJ20S                          |                   |
| 4,700                 | 16 × 35.5 | 0.20               | 1,780 | EKMQR3E□□472MLP1S                          | 33                |                       | 10 × 20   | 0.20               | 140   | EKMQR3E□□330MJ20S                          |                   |
| 6,800                 | 18 × 40   | 0.24               | 2,000 | EKMQR3E□□682MM40S                          | 47                |                       | 12.5 × 20 | 0.20               | 190   | EKMQR3E□□470MK20S                          |                   |
| 50                    | 1.0       | 5 × 11             | 0.12  | 13   | EKMQR3E□□1R0ME11D |                       | 68        | 16 × 25            | 0.20  | 270  | EKMQR3E□□680ML25S |
|                       | 2.2       | 5 × 11             | 0.12  | 20   | EKMQR3E□□2R2ME11D |                       | 100       | 16 × 25            | 0.20  | 310  | EKMQR3E□□101ML25S |
|                       | 3.3       | 5 × 11             | 0.12  | 25   | EKMQR3E□□3R3ME11D | 220                   | 18 × 35.5 | 0.20               | 485   | EKMQR3E□□221MMP1S                          |                   |
|                       | 4.7       | 5 × 11             | 0.12  | 30   | EKMQR3E□□4R7ME11D | 350                   | 2.2       | 6.3 × 11           | 0.24  | 21   | EKMQR3E□□2R2MF11D |
|                       | 10        | 5 × 11             | 0.12  | 46   | EKMQR3E□□100ME11D |                       | 3.3       | 8 × 11.5           | 0.24  | 30   | EKMQR3E□□3R3MHB5D |
|                       | 22        | 5 × 11             | 0.12  | 68   | EKMQR3E□□220ME11D |                       | 4.7       | 8 × 11.5           | 0.24  | 39   | EKMQR3E□□4R7MHB5D |
|                       | 33        | 5 × 11             | 0.12  | 90   | EKMQR3E□□330ME11D |                       | 10        | 10 × 12.5          | 0.24  | 64   | EKMQR3E□□100MJC5S |
|                       | 47        | 6.3 × 11           | 0.12  | 115  | EKMQR3E□□470MF11D |                       | 22        | 12.5 × 20          | 0.24  | 130  | EKMQR3E□□220MK20S |
| 68                    | 6.3 × 11  | 0.12               | 150   | EKMQR3E□□680MF11D                          | 33                |                       | 12.5 × 25 | 0.24               | 170   | EKMQR3E□□330MK25S                          |                   |
| 100                   | 8 × 11.5  | 0.12               | 190   | EKMQR3E□□101MHB5D                          | 47                |                       | 16 × 25   | 0.24               | 230   | EKMQR3E□□470ML25S                          |                   |
| 220                   | 10 × 12.5 | 0.12               | 300   | EKMQR3E□□221MJC5S                          | 68                |                       | 16 × 25   | 0.24               | 285   | EKMQR3E□□680ML25S                          |                   |
| 63                    | 330       | 10 × 16            | 0.12  | 410  | EKMQR3E□□331MJ16S | 100                   | 18 × 31.5 | 0.24               | 375   | EKMQR3E□□101MMN3S                          |                   |
|                       | 470       | 10 × 20            | 0.12  | 540  | EKMQR3E□□471MJ20S | 400                   | 1.0       | 6.3 × 11           | 0.24  | 15   | EKMQR3E□□1R0MF11D |
|                       | 1,000     | 12.5 × 25          | 0.12  | 950  | EKMQR3E□□102MK25S |                       | 2.2       | 8 × 11.5           | 0.24  | 27   | EKMQR3E□□2R2MHB5D |
|                       | 2,200     | 16 × 31.5          | 0.14  | 1,410                                      | EKMQR3E□□222MLN3S |                       | 3.3       | 8 × 11.5           | 0.24  | 34   | EKMQR3E□□3R3MHB5D |
|                       | 3,300     | 18 × 35.5          | 0.16  | 1,770                                      | EKMQR3E□□332MMP1S |                       | 4.7       | 10 × 12.5          | 0.24  | 42   | EKMQR3E□□4R7MJC5S |
|                       | 22        | 5 × 11             | 0.10  | 71   | EKMQR3E□□220ME11D |                       | 10        | 10 × 16            | 0.24  | 64   | EKMQR3E□□100MJ16S |

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

◆STANDARD RATINGS

is not solvent resistant.

| 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.           |
|-----------------------|----------|--------------------|-------|--|--------------------|-----------------------|----------|--------------------|-------|--|--------------------|
| 400                   | 22       | 12.5 × 25          | 0.24  | 145  | EKMQ401E□□220MK25S | 450                   | 4.7      | 10 × 12.5          | 0.24  | 32   | EKMQ451E□□4R7MJC5S |
|                       | 33       | 16 × 25            | 0.24  | 195  | EKMQ401E□□330ML25S |                       | 10       | 10 × 20            | 0.24  | 56   | EKMQ451E□□100MJ20S |
|                       | 47       | 16 × 25            | 0.24  | 200  | EKMQ401E□□470ML25S |                       | 22       | 12.5 × 25          | 0.24  | 100  | EKMQ451E□□220MK25S |
|                       | 68       | 16 × 31.5          | 0.24  | 240  | EKMQ401E□□680MLN3S |                       | 33       | 16 × 25            | 0.24  | 125  | EKMQ451E□□330ML25S |
|                       | 100      | 18 × 35.5          | 0.24  | 310  | EKMQ401E□□101MMP1S |                       | 47       | 16 × 31.5          | 0.24  | 155  | EKMQ451E□□470MLN3S |
| 450                   | 2.2      | 8 × 11.5           | 0.24  | 20   | EKMQ451E□□2R2MHB5D |                       | 68       | 18 × 35.5          | 0.24  | 185  | EKMQ451E□□680MMP1S |
|                       | 3.3      | 10 × 12.5          | 0.24  | 28   | EKMQ451E□□3R3MJC5S |                       | 100      | 18 × 40            | 0.24  | 200  | EKMQ451E□□101MM40S |

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

◆RATED RIPPLE CURRENT MULTIPLIERS

● Frequency Multipliers

| Capacitance(μF) | Frequency(Hz) | 50   | 120  | 300  | 1k   | 10k  | 100k |
|-----------------|---------------|------|------|------|------|------|------|
| 1.0 to 4.7      |               | 0.65 | 1.00 | 1.35 | 1.75 | 2.30 | 2.50 |
| 10 to 68        |               | 0.75 | 1.00 | 1.25 | 1.50 | 1.75 | 1.80 |
| 100 to 1,000    |               | 0.80 | 1.00 | 1.15 | 1.30 | 1.40 | 1.50 |
| 2,200 to        |               | 0.85 | 1.00 | 1.03 | 1.05 | 1.08 | 1.08 |

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.