

# SMM Series

- Downsize, longer life, and high ripple version of SMH series
- Endurance with ripple current : 85°C 3000 hours
- Non solvent-proof type

SMM

↓  
downsized  
longer life  
higher ripple  
SMH

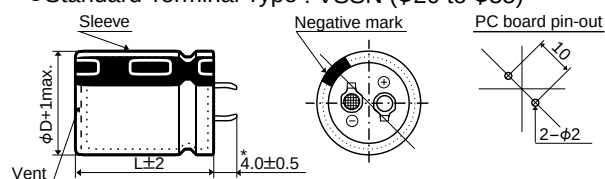


## SPECIFICATIONS

| Items                                                  | Characteristics                                                                                                                                                                         |                                      |            |                  |  |
|--------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------|------------|------------------|--|
| Category                                               | -25 to +85°C                                                                                                                                                                            |                                      |            |                  |  |
| Temperature Range                                      |                                                                                                                                                                                         |                                      |            |                  |  |
| Rated Voltage Range                                    | 160 to 450V <sub>dc</sub>                                                                                                                                                               |                                      |            |                  |  |
| Capacitance Tolerance                                  | ±20% (M)                                                                                                                                                                                |                                      |            | (at 20°C, 120Hz) |  |
| Leakage Current                                        | I≤3√CV<br>Where, I : Max. leakage current (μA), C : Nominal capacitance (μF), V : Rated voltage (V)<br>(at 20°C after 5 minutes)                                                        |                                      |            |                  |  |
| Dissipation Factor (tanδ)                              | Rated voltage (V <sub>dc</sub> )                                                                                                                                                        | 160 to 400V                          | 420 & 450V | (at 20°C, 120Hz) |  |
|                                                        | tanδ (Max.)                                                                                                                                                                             | 0.15                                 | 0.20       |                  |  |
| Low Temperature Characteristics (Max. Impedance Ratio) | Rated voltage (V <sub>dc</sub> )                                                                                                                                                        | 160 to 400V                          | 420 & 450V | (at 120Hz)       |  |
|                                                        | Z(-25°C)/Z(+20°C)                                                                                                                                                                       | 4                                    | 8          |                  |  |
| 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 for 3000 hours at 85°C. |                                      |            |                  |  |
|                                                        | Capacitance change                                                                                                                                                                      | ≤±20% of the initial value           |            |                  |  |
|                                                        | D.F. (tanδ)                                                                                                                                                                             | ≤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 1000 hours at 85°C without voltage applied.                            |                                      |            |                  |  |
|                                                        | Capacitance change                                                                                                                                                                      | ≤±15% of the initial value           |            |                  |  |
|                                                        | D.F. (tanδ)                                                                                                                                                                             | ≤150% of the initial specified value |            |                  |  |
|                                                        | Leakage current                                                                                                                                                                         | ≤The initial specified value         |            |                  |  |

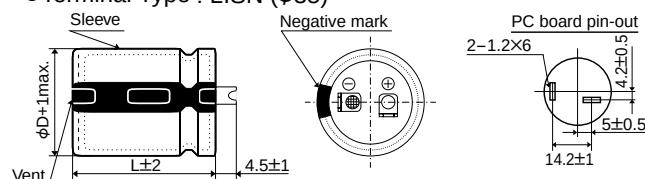
## DIMENSIONS [mm]

### Standard Terminal Type : VSSN (φ20 to φ35)

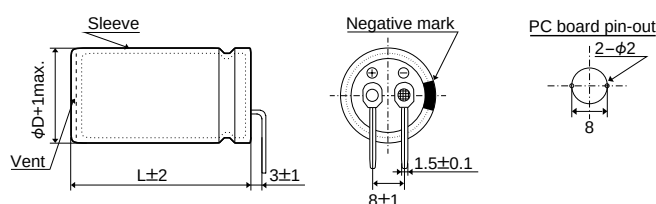


\*φD=35mm : 3.5±0.5mm

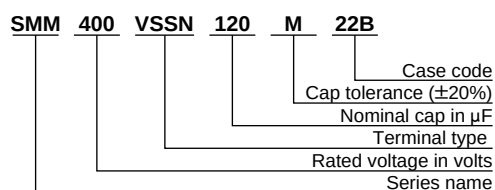
### Terminal Type : LISN (φ35)



### Terminal type : LCSN (φ20×30 to 50L & φ22×30 to 50L)



## PART NUMBERING SYSTEM



## CASE CODE [mm]

| Case code | Case size φDXL | Case code | Case size φDXL | Case code | Case size φDXL | Case code | Case size φDXL | Case code | Case size φDXL |
|-----------|----------------|-----------|----------------|-----------|----------------|-----------|----------------|-----------|----------------|
| —         | —              | 22S       | 22×20          | 25S       | 25.4×20        | 30S       | 30×20          | 35S       | 35×20          |
| 20A       | 20×25          | 22A       | 22×25          | 25A       | 25.4×25        | 30A       | 30×25          | 35A       | 35×25          |
| 20B       | 20×30          | 22B       | 22×30          | 25B       | 25.4×30        | 30B       | 30×30          | 35B       | 35×30          |
| 20C       | 20×35          | 22C       | 22×35          | 25C       | 25.4×35        | 30C       | 30×35          | 35C       | 35×35          |
| 20D       | 20×40          | 22D       | 22×40          | 25D       | 25.4×40        | 30D       | 30×40          | 35D       | 35×40          |
| 20E       | 20×45          | 22E       | 22×45          | 25E       | 25.4×45        | 30E       | 30×45          | 35E       | 35×45          |
| 20F       | 20×50          | 22F       | 22×50          | 25F       | 25.4×50        | 30F       | 30×50          | 35F       | 35×50          |

## SMM Series

### ◆STANDARD RATINGS

| μF    | V <sub>dc</sub><br>φD |               | 160             |               |               |    |    | 180           |               |                 |               |               |
|-------|-----------------------|---------------|-----------------|---------------|---------------|----|----|---------------|---------------|-----------------|---------------|---------------|
|       |                       |               | 20              | 22            | 25.4          | 30 | 35 | 20            | 22            | 25.4            | 30            | 35            |
| 220   |                       |               |                 |               |               |    |    |               | 22×20<br>1.18 |                 |               |               |
| 270   | 20×25<br>1.28         | 22×20<br>1.30 |                 |               |               |    |    | 20×25<br>1.29 |               |                 |               |               |
| 330   | 20×25<br>1.55         |               |                 |               |               |    |    | 20×30<br>1.77 | 22×25<br>1.77 | 25.4×20<br>1.49 |               |               |
| 390   | 20×30<br>1.63         | 22×25<br>1.63 | 25.4×20<br>1.62 |               |               |    |    | 20×30<br>1.84 | 22×25<br>1.84 |                 |               |               |
| 470   | 20×30<br>1.90         | 22×30<br>1.86 | 25.4×25<br>1.86 |               |               |    |    | 20×35<br>1.91 | 22×30<br>1.91 | 25.4×25<br>2.08 | 30×20<br>1.88 |               |
| 560   | 20×35<br>2.14         | 22×30<br>2.15 | 25.4×25<br>2.15 | 30×20<br>2.05 |               |    |    | 20×40<br>2.15 | 22×35<br>2.25 | 25.4×25<br>2.25 |               |               |
| 680   | 20×40<br>2.35         | 22×35<br>2.35 | 25.4×30<br>2.33 | 30×25<br>2.33 | 35×20<br>2.26 |    |    | 20×45<br>2.41 | 22×35<br>2.48 | 25.4×30<br>2.50 | 30×25<br>2.46 | 35×20<br>2.26 |
| 820   | 20×45<br>2.64         | 22×40<br>2.68 | 25.4×30<br>2.65 | 30×25<br>2.64 | 35×20<br>2.49 |    |    | 20×50<br>2.72 | 22×40<br>2.86 | 25.4×35<br>2.75 | 30×25<br>2.69 |               |
| 1,000 |                       | 22×45<br>3.02 | 25.4×35<br>3.00 | 30×30<br>2.96 | 35×25<br>3.13 |    |    |               | 22×50<br>3.10 | 25.4×40<br>3.06 | 30×30<br>3.10 | 35×25<br>2.98 |
| 1,200 |                       | 22×50<br>3.47 | 25.4×40<br>3.43 | 30×30<br>3.41 | 35×25<br>3.40 |    |    |               |               | 25.4×45<br>3.63 | 30×35<br>3.55 | 35×30<br>3.49 |
| 1,500 |                       |               | 25.4×50<br>3.96 | 30×35<br>3.96 | 35×30<br>3.94 |    |    |               |               |                 | 30×40<br>4.10 | 35×35<br>4.02 |
| 1,800 |                       |               |                 | 30×40<br>4.31 | 35×35<br>4.28 |    |    |               |               |                 | 30×45<br>4.55 | 35×35<br>4.54 |
| 2,200 |                       |               |                 | 30×50<br>4.96 | 35×40<br>4.96 |    |    |               |               |                 |               | 35×40<br>4.83 |
| 2,700 |                       |               |                 |               | 35×45<br>5.57 |    |    |               |               |                 |               | 35×50<br>5.30 |
| 3,300 |                       |               |                 |               | 35×50<br>6.21 |    |    |               |               |                 |               |               |

Upper : Case size φD×L (mm)  
Lower : Rated ripple current (Arms) at 85°C, 120Hz

### ◆RATED RIPPLE CURRENT MULTIPLIERS

#### ●Frequency Multipliers

| Frequency(Hz)             | 50   | 120  | 300  | 1k   | 10k  | 50k  |
|---------------------------|------|------|------|------|------|------|
| 160 to 250V <sub>dc</sub> | 0.81 | 1.00 | 1.17 | 1.32 | 1.45 | 1.50 |
| 315 to 450V <sub>dc</sub> | 0.77 | 1.00 | 1.16 | 1.30 | 1.41 | 1.43 |

## ◆ STANDARD RATINGS

| μF    | V <sub>dc</sub> |  | 200           |               |                 |               |               | 220                                                                               |               |                 |               |               |
|-------|-----------------|--|---------------|---------------|-----------------|---------------|---------------|-----------------------------------------------------------------------------------|---------------|-----------------|---------------|---------------|
|       | φD              |  | 20            | 22            | 25.4            | 30            | 35            | 20                                                                                | 22            | 25.4            | 30            | 35            |
| 180   |                 |  |               |               |                 |               |               |                                                                                   | 22×20<br>1.06 |                 |               |               |
| 220   |                 |  | 20×25<br>1.19 | 22×20<br>1.18 |                 |               |               | 20×25<br>1.25                                                                     |               |                 |               |               |
| 270   |                 |  | 20×25<br>1.39 | 22×25<br>1.37 | 25.4×20<br>1.35 |               |               | 20×30<br>1.46                                                                     | 22×25<br>1.47 | 25.4×20<br>1.35 |               |               |
| 330   |                 |  | 20×30<br>1.56 | 22×25<br>1.51 | 25.4×20<br>1.49 |               |               | 20×35<br>1.64                                                                     | 22×30<br>1.70 | 25.4×25<br>1.69 | 30×20<br>1.58 |               |
| 390   |                 |  | 20×35<br>1.74 | 22×30<br>1.73 | 25.4×25<br>1.71 | 30×20<br>1.71 |               | 20×35<br>1.84                                                                     | 22×30<br>1.89 | 25.4×25<br>1.84 | 30×20<br>1.71 |               |
| 470   |                 |  | 20×35<br>2.03 | 22×30<br>1.97 | 25.4×25<br>1.95 | 30×20<br>1.88 |               | 20×40<br>2.12                                                                     | 22×35<br>2.08 | 25.4×30<br>2.08 | 30×25<br>2.12 | 35×20<br>1.88 |
| 560   |                 |  | 20×40<br>2.18 | 22×35<br>2.18 | 25.4×30<br>2.15 | 30×25<br>2.15 | 35×20<br>2.05 | 20×50<br>2.33                                                                     | 22×40<br>2.33 | 25.4×35<br>2.38 | 30×25<br>2.31 | 35×20<br>2.14 |
| 680   |                 |  | 20×50<br>2.48 | 22×40<br>2.48 | 25.4×30<br>2.48 | 30×25<br>2.48 | 35×20<br>2.36 |                                                                                   | 22×45<br>2.63 | 25.4×35<br>2.68 | 30×30<br>2.62 | 35×25<br>2.58 |
| 820   |                 |  |               | 22×45<br>2.81 | 25.4×35<br>2.79 | 30×30<br>2.80 | 35×25<br>2.83 |                                                                                   |               | 25.4×45<br>3.01 | 30×35<br>2.99 | 35×30<br>2.79 |
| 1,000 |                 |  |               | 22×50<br>3.28 | 25.4×40<br>3.28 | 30×35<br>3.15 | 35×30<br>3.26 |                                                                                   |               | 25.4×50<br>3.40 | 30×35<br>3.42 | 35×30<br>3.29 |
| 1,200 |                 |  |               |               | 25.4×45<br>3.61 | 30×35<br>3.61 | 35×30<br>3.57 |                                                                                   |               |                 | 30×40<br>3.88 | 35×35<br>3.68 |
| 1,500 |                 |  |               |               |                 | 30×45<br>4.13 | 35×35<br>4.06 |                                                                                   |               |                 | 30×50<br>4.44 | 35×40<br>4.10 |
| 1,800 |                 |  |               |               |                 | 30×50<br>4.60 | 35×40<br>4.59 | Upper : Case size φD×L (mm)<br>Lower : Rated ripple current (Arms) at 85°C, 120Hz |               |                 |               |               |
| 2,200 |                 |  |               |               |                 |               | 35×45<br>5.25 |                                                                                   |               |                 |               |               |

| μF    | V <sub>dc</sub> |  | 250           |               |                 |               |               | 315                                                                               |               |                 |               |               |
|-------|-----------------|--|---------------|---------------|-----------------|---------------|---------------|-----------------------------------------------------------------------------------|---------------|-----------------|---------------|---------------|
|       | φD              |  | 20            | 22            | 25.4            | 30            | 35            | 20                                                                                | 22            | 25.4            | 30            | 35            |
| 100   |                 |  |               |               |                 |               |               |                                                                                   | 22×20<br>0.79 |                 |               |               |
| 120   |                 |  |               |               |                 |               |               | 20×25<br>0.89                                                                     |               | 25.4×20<br>0.90 |               |               |
| 150   |                 |  |               | 22×20<br>0.97 |                 |               |               | 20×30<br>1.05                                                                     | 22×25<br>1.06 | 25.4×20<br>1.00 |               |               |
| 180   |                 |  | 20×25<br>1.20 | 22×20<br>1.06 |                 |               |               | 20×35<br>1.18                                                                     | 22×30<br>1.29 | 25.4×25<br>1.38 | 30×20<br>1.16 |               |
| 220   |                 |  | 20×25<br>1.26 | 22×25<br>1.24 | 25.4×20<br>1.22 |               |               | 20×35<br>1.30                                                                     | 22×30<br>1.41 | 25.4×25<br>1.47 | 30×20<br>1.28 |               |
| 270   |                 |  | 20×30<br>1.42 | 22×25<br>1.50 |                 |               |               | 20×45<br>1.52                                                                     | 22×35<br>1.68 | 25.4×30<br>1.70 | 30×25<br>1.55 | 35×20<br>1.43 |
| 330   |                 |  | 20×35<br>1.68 | 22×30<br>1.66 | 25.4×25<br>1.61 | 30×20<br>1.58 |               | 20×50<br>1.73                                                                     | 22×40<br>1.91 | 25.4×35<br>1.94 | 30×25<br>1.98 |               |
| 390   |                 |  | 20×40<br>1.92 | 22×35<br>1.88 | 25.4×30<br>1.88 | 30×25<br>1.86 | 35×20<br>1.71 |                                                                                   | 22×45<br>2.07 | 25.4×40<br>2.11 | 30×30<br>2.15 | 35×25<br>1.95 |
| 470   |                 |  | 20×50<br>2.06 | 22×35<br>2.15 | 25.4×35<br>2.15 | 30×25<br>2.05 | 35×20<br>1.88 |                                                                                   |               | 25.4×45<br>2.31 | 30×35<br>2.38 | 35×30<br>2.46 |
| 560   |                 |  |               | 22×40<br>2.48 | 25.4×35<br>2.35 | 30×25<br>2.35 |               |                                                                                   |               | 25.4×50<br>2.46 | 30×35<br>2.63 | 35×30<br>2.69 |
| 680   |                 |  |               | 22×50<br>2.61 | 25.4×40<br>2.67 | 30×30<br>2.71 | 35×25<br>2.58 |                                                                                   |               |                 | 30×45<br>2.82 | 35×35<br>3.05 |
| 820   |                 |  |               |               | 25.4×45<br>3.01 | 30×35<br>2.98 | 35×30<br>2.96 |                                                                                   |               |                 | 30×50<br>3.28 | 35×40<br>3.45 |
| 1,000 |                 |  |               |               |                 | 30×40<br>3.56 | 35×35<br>3.48 |                                                                                   |               |                 |               | 35×45<br>3.59 |
| 1,200 |                 |  |               |               |                 | 30×45<br>3.99 | 35×35<br>3.84 |                                                                                   |               |                 |               |               |
| 1,500 |                 |  |               |               |                 |               | 35×40<br>4.33 | Upper : Case size φD×L (mm)<br>Lower : Rated ripple current (Arms) at 85°C, 120Hz |               |                 |               |               |
| 1,800 |                 |  |               |               |                 |               | 35×50<br>4.54 |                                                                                   |               |                 |               |               |

◆STANDARD RATINGS

| $\mu\text{F}$ | $V_{\text{dc}}$<br>$\phi\text{D}$ | 350           |               |                 |               |               | 400                                                                                                           |               |                 |               |               |
|---------------|-----------------------------------|---------------|---------------|-----------------|---------------|---------------|---------------------------------------------------------------------------------------------------------------|---------------|-----------------|---------------|---------------|
|               |                                   | 20            | 22            | 25.4            | 30            | 35            | 20                                                                                                            | 22            | 25.4            | 30            | 35            |
| 68            |                                   |               |               |                 |               |               | 20×25<br>0.75                                                                                                 | 22×20<br>0.65 |                 |               |               |
| 82            |                                   |               | 22×20<br>0.72 |                 |               |               | 20×25<br>0.82                                                                                                 | 22×25<br>0.84 | 25.4×20<br>0.74 |               |               |
| 100           |                                   | 20×25<br>0.81 |               |                 |               |               | 20×30<br>0.95                                                                                                 | 22×25<br>0.99 | 25.4×20<br>0.82 |               |               |
| 120           |                                   | 20×30<br>0.96 | 22×25<br>1.04 | 25.4×20<br>0.90 |               |               | 20×35<br>1.07                                                                                                 | 22×30<br>1.09 | 25.4×25<br>1.13 | 30×20<br>0.95 |               |
| 150           |                                   | 20×30<br>1.10 | 22×30<br>1.20 | 25.4×25<br>1.22 | 30×20<br>1.06 |               | 20×40<br>1.22                                                                                                 | 22×35<br>1.24 | 25.4×30<br>1.27 | 30×25<br>1.20 |               |
| 180           |                                   | 20×35<br>1.24 | 22×30<br>1.34 | 25.4×25<br>1.37 | 30×20<br>1.16 |               | 20×45<br>1.28                                                                                                 | 22×40<br>1.41 | 25.4×30<br>1.44 | 30×25<br>1.52 | 35×20<br>1.16 |
| 220           |                                   | 20×45<br>1.37 | 22×35<br>1.47 | 25.4×30<br>1.53 | 30×25<br>1.54 | 35×20<br>1.29 | 20×50<br>1.41                                                                                                 | 22×45<br>1.58 | 25.4×35<br>1.64 | 30×30<br>1.66 | 35×25<br>1.47 |
| 270           |                                   | 20×50<br>1.56 | 22×40<br>1.70 | 25.4×35<br>1.73 | 30×25<br>1.80 | 35×20<br>1.49 |                                                                                                               | 22×50<br>1.65 | 25.4×40<br>1.79 | 30×30<br>1.82 | 35×25<br>1.63 |
| 330           |                                   |               | 22×45<br>1.87 | 25.4×35<br>1.97 | 30×30<br>2.03 | 35×25<br>1.80 |                                                                                                               |               | 25.4×45<br>2.00 | 30×35<br>2.05 | 35×30<br>2.05 |
| 390           |                                   |               |               | 25.4×40<br>2.14 | 30×35<br>2.23 | 35×30<br>2.30 |                                                                                                               |               | 25.4×50<br>2.12 | 30×40<br>2.26 | 35×35<br>2.28 |
| 470           |                                   |               |               | 25.4×50<br>2.55 | 30×35<br>2.53 | 35×30<br>2.55 |                                                                                                               |               |                 | 30×45<br>2.51 | 35×35<br>2.54 |
| 560           |                                   |               |               |                 | 30×40<br>2.73 | 35×35<br>2.75 |                                                                                                               |               |                 | 30×50<br>2.85 | 35×40<br>2.85 |
| 680           |                                   |               |               |                 | 30×50<br>3.15 | 35×40<br>3.15 |                                                                                                               |               |                 |               | 35×50<br>3.10 |
| 820           |                                   |               |               |                 |               | 35×45<br>3.47 | ← Upper : Case size $\phi\text{D}\times\text{L}$ (mm)<br>← Lower : Rated ripple current (Arms) at 85°C, 120Hz |               |                 |               |               |
| 1,000         |                                   |               |               |                 |               | 35×50<br>3.60 |                                                                                                               |               |                 |               |               |

| $\mu\text{F}$ | $V_{\text{dc}}$<br>$\phi\text{D}$ | 420           |               |                 |               |               | 450                                                                                                           |               |                 |               |               |
|---------------|-----------------------------------|---------------|---------------|-----------------|---------------|---------------|---------------------------------------------------------------------------------------------------------------|---------------|-----------------|---------------|---------------|
|               |                                   | 20            | 22            | 25.4            | 30            | 35            | 20                                                                                                            | 22            | 25.4            | 30            | 35            |
| 47            |                                   |               | 22×20<br>0.54 |                 |               |               |                                                                                                               | 22×20<br>0.54 |                 |               |               |
| 56            |                                   | 20×25<br>0.58 | 22×20<br>0.59 |                 |               |               | 20×25<br>0.61                                                                                                 | 22×20<br>0.59 |                 |               |               |
| 68            |                                   | 20×25<br>0.70 |               | 25.4×20<br>0.68 |               |               | 20×30<br>0.71                                                                                                 | 22×25<br>0.71 | 25.4×20<br>0.68 |               |               |
| 82            |                                   | 20×30<br>0.80 | 22×25<br>0.85 | 25.4×20<br>0.74 |               |               | 20×35<br>0.80                                                                                                 | 22×25<br>0.86 | 25.4×20<br>0.74 | 30×20<br>0.79 |               |
| 100           |                                   | 20×35<br>0.90 | 22×30<br>0.97 | 25.4×25<br>0.98 | 30×20<br>0.87 |               | 20×35<br>0.88                                                                                                 | 22×30<br>0.95 | 25.4×25<br>0.97 | 30×20<br>0.87 |               |
| 120           |                                   | 20×35<br>1.04 | 22×30<br>1.07 | 25.4×25<br>1.08 | 30×20<br>0.95 |               | 20×40<br>0.99                                                                                                 | 22×35<br>1.07 | 25.4×30<br>1.09 | 30×25<br>1.12 | 35×20<br>0.99 |
| 150           |                                   | 20×40<br>1.17 | 22×35<br>1.21 | 25.4×30<br>1.26 | 30×25<br>1.30 | 35×20<br>1.11 | 20×45<br>1.13                                                                                                 | 22×40<br>1.18 | 25.4×30<br>1.25 | 30×25<br>1.29 | 35×20<br>1.06 |
| 180           |                                   | 20×50<br>1.27 | 22×40<br>1.33 | 25.4×35<br>1.42 | 30×25<br>1.48 | 35×20<br>1.16 |                                                                                                               | 22×45<br>1.32 | 25.4×35<br>1.40 | 30×30<br>1.45 | 35×25<br>1.33 |
| 220           |                                   |               | 22×45<br>1.55 | 25.4×35<br>1.58 | 30×30<br>1.65 | 35×25<br>1.47 |                                                                                                               | 22×50<br>1.48 | 25.4×40<br>1.59 | 30×30<br>1.64 | 35×25<br>1.66 |
| 270           |                                   |               |               | 25.4×40<br>1.74 | 30×35<br>1.90 | 35×30<br>1.94 |                                                                                                               |               | 25.4×45<br>1.73 | 30×35<br>1.89 | 35×30<br>1.90 |
| 330           |                                   |               |               | 25.4×50<br>2.20 | 30×35<br>1.98 | 35×35<br>2.17 |                                                                                                               |               | 25.4×50<br>2.12 | 30×40<br>2.12 | 35×35<br>2.15 |
| 390           |                                   |               |               |                 | 30×40<br>2.22 | 35×35<br>2.27 |                                                                                                               |               |                 | 30×45<br>2.35 | 35×40<br>2.38 |
| 470           |                                   |               |               |                 | 30×45<br>2.50 | 35×40<br>2.61 |                                                                                                               |               |                 | 30×50<br>2.65 | 35×45<br>2.68 |
| 560           |                                   |               |               |                 |               | 35×45<br>2.95 | ← Upper : Case size $\phi\text{D}\times\text{L}$ (mm)<br>← Lower : Rated ripple current (Arms) at 85°C, 120Hz |               |                 |               |               |
| 680           |                                   |               |               |                 |               | 35×50<br>3.15 |                                                                                                               |               |                 |               | 35×50<br>2.88 |