

General Purpose Capacitors

MCRH Series



Features

- For general purpose.
- Wide CV value range.
- Safely vent construction products, RH series are guaranteed 2,000 hours at 105°C.

Specification Table

| Item | Performance | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|--|--|---|----------------------------------|------|------|------|------|------|------|------|------|------|------|------|--------------------|-----|----|----|----|----|----|----|-----|-----|-----|-----|-----|-----|-----|-------------|------|------|------|------|------|-----|-----|------|------|------|------|------|------|------|-------------|---|---|---|---|---|---|---|---|--|--|--|--|--|--|
| Operating Temperature Range | -40°C to +105°C | -25°C to +105°C | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Rated Working Voltage Range | 6.3V DC - 100V DC | 160V DC - 450V DC | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Nominal Capacitance Range | 0.1 - 15,000µF | 0.47 - 330µF | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Capacitance Tolerance | ±20% (at +20°C, 120Hz) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Leakage Current | I ≤ 0.01CV or 3(µA) max | I ≤ 0.03CV + 20(µA) max | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | Whichever is greater after 3 minutes. | I: Leakage Current (µA) C: Rated Capacitance (µF) V: Working Voltage(V) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Dissipation Factor(tanδ) (120Hz/+20°C) | <table border="1"> <tr> <td>Working Voltage V)</td> <td>6.3</td><td>10</td><td>16</td><td>25</td><td>35</td><td>50</td><td>63</td><td>100</td><td>160</td><td>200</td><td>250</td><td>350</td><td>400</td><td>450</td> </tr> <tr> <td>tanδ max.</td> <td>0.22</td><td>0.19</td><td>0.16</td><td>0.14</td><td>0.12</td><td>0.1</td><td>0.1</td><td>0.07</td><td>0.15</td><td>0.15</td><td>0.15</td><td>0.20</td><td>0.24</td><td>0.24</td> </tr> </table> | | | | | | | | | | | | | | Working Voltage V) | 6.3 | 10 | 16 | 25 | 35 | 50 | 63 | 100 | 160 | 200 | 250 | 350 | 400 | 450 | tanδ max. | 0.22 | 0.19 | 0.16 | 0.14 | 0.12 | 0.1 | 0.1 | 0.07 | 0.15 | 0.15 | 0.15 | 0.20 | 0.24 | 0.24 | | | | | | | | | | | | | | | |
| | Working Voltage V) | 6.3 | 10 | 16 | 25 | 35 | 50 | 63 | 100 | 160 | 200 | 250 | 350 | 400 | 450 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| tanδ max. | 0.22 | 0.19 | 0.16 | 0.14 | 0.12 | 0.1 | 0.1 | 0.07 | 0.15 | 0.15 | 0.15 | 0.20 | 0.24 | 0.24 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Add 0.02 per 1000 µF for more than 1000µF. | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Maximum Permissible Ripple Current | Refer to standard products table(120Hz,+105°C) Correction factor for frequency | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | Freq.(Hz) | | 60 | 120 | 1K | 10K | 100K | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | W.V.(V.DC) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | 6.3~50 | 0.1-330 | | 0.85 | 1 | 1.3 | 1.4 | 1.55 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | 470-3300 | | 0.95 | 1 | 1.15 | 1.2 | 1.25 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | ≥4700 | | 0.95 | 1 | 1.1 | 1.2 | 1.2 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | 63~100 | 0.47-33 | | 0.75 | 1 | 1.55 | 1.65 | 1.8 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 47-220 | | 0.75 | 1 | 1.4 | 1.6 | 1.65 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| ≥330 | | 0.8 | 1 | 1.3 | 1.35 | 1.4 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| ≥160 | | 1-220 | 0.7 | 1 | 1.3 | 1.7 | 1.7 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Characteristics at low temperature (stability at 120 Hz) | <table border="1"> <tr> <td>Working Voltage V)</td> <td>6.3</td><td>10</td><td>16</td><td>25</td><td>35</td><td>50</td><td>63</td><td>100</td><td>160</td><td>200</td><td>250</td><td>350</td><td>400</td><td>450</td> </tr> <tr> <td>-25°C/+20°C</td> <td>4</td><td>3</td><td>2</td><td>2</td><td>2</td><td>2</td><td>2</td><td>2</td><td>3</td><td>3</td><td>3</td><td>6</td><td>6</td><td>15</td> </tr> <tr> <td>-40°C/+20°C</td> <td>8</td><td>6</td><td>4</td><td>3</td><td>3</td><td>3</td><td>3</td><td>3</td><td></td><td></td><td></td><td></td><td></td><td></td> </tr> </table> | | | | | | | | | | | | | | Working Voltage V) | 6.3 | 10 | 16 | 25 | 35 | 50 | 63 | 100 | 160 | 200 | 250 | 350 | 400 | 450 | -25°C/+20°C | 4 | 3 | 2 | 2 | 2 | 2 | 2 | 2 | 3 | 3 | 3 | 6 | 6 | 15 | -40°C/+20°C | 8 | 6 | 4 | 3 | 3 | 3 | 3 | 3 | | | | | | |
| | Working Voltage V) | 6.3 | 10 | 16 | 25 | 35 | 50 | 63 | 100 | 160 | 200 | 250 | 350 | 400 | 450 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | -25°C/+20°C | 4 | 3 | 2 | 2 | 2 | 2 | 2 | 2 | 3 | 3 | 3 | 6 | 6 | 15 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| -40°C/+20°C | 8 | 6 | 4 | 3 | 3 | 3 | 3 | 3 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| For capacitance value >1000µF, Add 0.5 per another 1000µF for -25°C /+25°C. Add 1.0 per another 1000µF for -40°C/+20°C. | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| High Temperature Loading | After 2000hrs. Application of DC rated working voltage at +105°C, The capacitor shall meet the following limits: Post test requirements at +20°C. | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | Leakage current | | ≤ the Initial specified value | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | Capacitance change | | ≤±20% of initial measured value | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | Dissipation Factor(tanδ) | | ≤200% of initial specified value | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |



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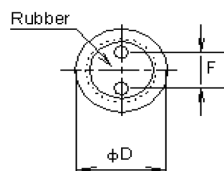
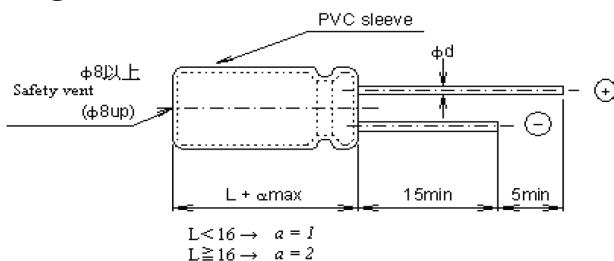
| Item | Performance |
|------------|---|
| Shelf Life | After storage for 500hrs. at +105°C with no voltage applied. Post test requirements at +20°C Same limits as high temperature loading. |

Permissible Ripple Current

Max ripple current: mA (rms) (at 105°C.120Hz)

| W.V(SV) μF | 6.3 (8) | 10 (13) | 16 (20) | 25 (32) | 35 (44) | 50 (63) | 63 (79) | 100 (125) | 160 (200) | 200 (250) | 250 (300) | 350 (400) | 400 (450) | 450 (500) |
|---------------|------------|------------|------------|------------|------------|------------|------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|
| 0.1 | | | | | | 7 | | 8 | 8 | 8 | 8 | 9 | 9 | 10 |
| 0.22 | | | | | | 7 | | 8 | 8 | 8 | 8 | 9 | 9 | 10 |
| 0.33 | | | | | | 7 | | 8 | 8 | 8 | 8 | 9 | 9 | 10 |
| 0.47 | | | | | | 8 | | 10 | 9 | 9 | 9 | 10 | 9 | 18 |
| 1.0 | | | | | | 12 | | 15 | 12 | 12 | 12 | 18 | 18 | 18 |
| 2.2 | | | | | | 17 | | 23 | 19 | 19 | 21 | 30 | 30 | 30 |
| 3.3 | | | | | | 21 | | 29 | 26 | 26 | 30 | 37 | 40 | 43 |
| 4.7 | | | | 26 | 28 | 30 | 32 | 34 | 31 | 36 | 36 | 48 | 52 | 56 |
| 10 | | | 35 | 38 | 41 | 46 | 50 | 56 | 59 | 59 | 64 | 79 | 79 | 79 |
| 22 | | 49 | 54 | 57 | 61 | 68 | 82 | 96 | 95 | 95 | 110 | 130 | 145 | 150 |
| 33 | 54 | 60 | 64 | 69 | 75 | 90 | 100 | 140 | 125 | 140 | 140 | 175 | 185 | 190 |
| 47 | 65 | 70 | 99 | 82 | 100 | 110 | 135 | 180 | 165 | 165 | 180 | 230 | 230 | |
| 100 | 95 | 105 | 125 | 135 | 170 | 180 | 223 | 320 | 270 | 285 | 310 | 350 | | |
| 220 | 160 | 175 | 215 | 230 | 300 | 345 | 400 | 570 | 450 | 550 | | | | |
| 330 | 195 | 245 | 260 | 335 | 400 | 460 | 540 | 700 | 850 | | | | | |
| 470 | 270 | 290 | 370 | 440 | 520 | 610 | 700 | 880 | | | | | | |
| 680 | | | | | 750 | | | | | | | | | |
| 1,000 | 460 | 550 | 640 | 770 | 920 | 1080 | 1210 | | | | | | | |
| 2,200 | 810 | 860 | 1000 | 1170 | 1340 | 1530 | | | | | | | | |
| 3,300 | 960 | 1100 | 1300 | 1460 | 1650 | 1850 | | | | | | | | |
| 4,700 | 1330 | 1400 | 1600 | 1780 | 1900 | | | | | | | | | |
| 6,800 | 1500 | 1690 | 1900 | 1950 | | | | | | | | | | |
| 10,000 | 1765 | 1950 | 2000 | | | | | | | | | | | |
| 15,000 | 2075 | 2100 | | | | | | | | | | | | |

Diagram of Dimensions



| | | | | | | | | |
|---------------|-----|-----|-----|-----|-----|-----|-----|-----|
| Dø (+ 0.5Max) | 5 | 6.3 | 8 | 10 | 13 | 16 | 18 | 22 |
| F (±0.5) | 2 | 2.5 | 3.5 | 5 | 5 | 7.5 | 7.5 | 10 |
| dø (±0.02) | 0.5 | 0.5 | 0.5 | 0.6 | 0.6 | 0.8 | 0.8 | 0.8 |

Dimensions : Millimetres

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Case Size Table

D×L(mm)

| W.V. (SV) μF | 6.3 (8) | 10 (13) | 16 (20) | 25 (32) | 35 (44) | 50 (63) | 63 (79) | 100 (125) |
|-----------------|------------|------------|------------|------------|------------|------------|------------|--------------|
| 0.1 | | | | | → | 5×11 | 5×11 | 5×11 |
| 0.22 | | | | | → | 5×11 | 5×11 | 5×11 |
| 0.33 | | | | | → | 5×11 | 5×11 | 5×11 |
| 0.47 | | | | | → | 5×11 | 5×11 | 5×11 |
| 1.0 | | | | | → | 5×11 | 5×11 | 5×11 |
| 2.2 | | | | | → | 5×11 | 5×11 | 5×11 |
| 3.3 | | | | | → | 5×11 | 5×11 | 5×11 |
| 4.7 | | | | | → | 5×11 | 5×11 | 5×11 |
| 10 | | | → | 5×11 | 5×11 | 5×11 | 5×11 | 6.3×11 |
| 22 | | | → | 5×11 | 5×11 | 5×11 | 6.3×11 | 8×11 |
| 33 | | → | 5×11 | 5×11 | 5×11 | 6.3×11 | 6.3×11 | 8×11 |
| 47 | → | 5×11 | 5×11 | 5×11 | 6.3×11 | 6.3×11 | 8×11 | 10×16 |
| 100 | → | 5×11 | 6.3×11 | 6.3×11 | 8×11 | 8×11 | 10×13 | 13×21 |
| 220 | → | 6.3×11 | 8×11 | 8×11 | 10×13 | 10×16 | 10×21 | 16×26 |
| 330 | 6.3×11 | 8×11 | 8×11 | 10×13 | 10×16 | 10×20 | 13×21 | 16×26 |
| 470 | 8×11 | 8×11 | 10×13 | 10×16 | 10×21 | 13×21 | 13×26 | 16×26 |
| 680 | | | | | 13×21 | | | |
| 1,000 | 10×13 | 10×16 | 10×21 | 13×21 | 13×21 | 16×26 | 16×32 | |
| 2,200 | 10×21 | 13×21 | 13×21 | 13×26 | 16×32 | 18×36 | | |
| 3,300 | 13×21 | 13×21 | 13×26 | 16×32 | 18×36 | 18×42 | | |
| 4,700 | 13×26 | 16×26 | 16×32 | 16×36 | 18×36 | | | |
| 6,800 | 16×26 | 16×32 | 18×36 | 18×42 | | | | |
| 10000 | 16×32 | 18×36 | 18×42 | | | | | |
| 15000 | 18×36 | 18×42 | | | | | | |

All blank voltage on sleeve marking is the same voltage as “→” point to.

Case Size Table

D×L(mm)

| WV(SV) μF | 160 (200) | 200 (250) | 250 (300) | 350 (400) | 400 (450) | 450 (500) |
|--------------|--------------|--------------|--------------|--------------|--------------|--------------|
| 0.47 | 6.3×11 | 6.3×11 | 6.3×11 | 8×11 | 8×11 | 8×11 |
| 1.0 | 6.3×11 | 6.3×11 | 6.3×11 | 8×11 | 8×11 | 10×16 |
| 2.2 | 6.3×11 | 6.3×11 | 6.3×11 | 8×11 | 10×13 | 10×21 |
| 3.3 | 6.3×11 | 6.3×11 | 8×11 | 10×13 | 10×13 | 13×21 |
| 4.7 | 6.3×11 | 8×11 | 8×11 | 10×13 | 10×16 | 13×21 |
| 10 | 8×11 | 10×13 | 10×16 | 10×21 | 13×21 | 16×26 |
| 22 | 10×16 | 10×21 | 13×21 | 13×26 | 13×26 | 16×32 |



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| WW(SV) μF | 160 (200) | 200 (250) | 250 (300) | 350 (400) | 400 (450) | 450 (500) |
|--------------|--------------|--------------|--------------|--------------|--------------|--------------|
| 33 | 10×21 | 13×21 | 13×21 | 16×26 | 16×32 | 18×32 |
| 47 | 13×21 | 13×21 | 13×26 | 16×36 | 18×36 | |
| 100 | 13×26 | 16×26 | 16×32 | 18×42 | | |
| 220 | 16×36 | 18×42 | | | | |
| 330 | 18×42 | | | | | |

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