# MRC series

Downsize | High Ripple | RoHS Compliant

- ●105℃ 2,000Hrs assured.
- Downsized, High ripple
- For SMPS, IP-Board, Adaptor
- RoHS compliant
- Halogen-free capacitors are also available.

MLH ⟹ MRC

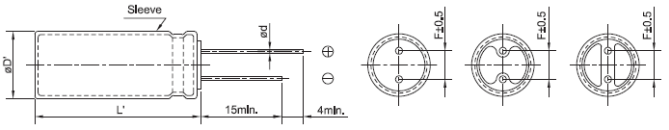
Downsized

## ■ Specifications

| Item | Characteristics | |
|---|---|---|
| Rated Voltage Range | 160 ~ 400 Vdc | 450 ~ 500 Vdc |
| Operating Temperature Range | -40 ~ +105℃ | -25 ~ +105℃ |
| Capacitance Tolerance | ±20% (M) | (at 20℃, 120Hz) |
| Leakage Current | I=0.01CV+40(μA) at CV ≤ 1,000, I=0.04CV+100(μA) at CV › 1,000 (at 20℃, 1min)<br>I=0.03CV+15(μA) at CV ≤ 1,000, I=0.02CV+25(μA) at CV › 1,000 (at 20℃, 5min)<br>Where, I:Max. Leakage current(μA), C:Nominal capacitance(μF), V:Rated voltage(Vdc) | |
| Dissipation Factor(Tanδ) | Rated voltage (Vdc): 160 ~ 250 / 350 ~ 500<br>Tanδ (max.): 0.20 / 0.24 | (at 20℃, 120Hz) |
| Temperature characteristics (Max,impedance ratio) | Rated voltage (Vdc): 160 ~ 250 / 350 ~ 400 / 450 ~ 500<br>Z(-25℃)/Z(20℃): 3 / 5 / 6<br>Z(-40℃)/Z(20℃): 6 / 6 / - | (at 120Hz) |
| Load life | The following specifications shall be satisfied when the capacitors are restored to 20℃ after the rated voltage is applied for specified life times at 105℃ 2,000hrs.<br>Capacitance change ≤±20% of the initial value<br>Tan δ ≤200% of the initial specified value<br>Leakage current ≤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. The rated voltage shall be applied to the capacitors for a minimum of 30 minutes at least 24 hours and not more than 48 hours before the measurements.<br>Capacitance change ≤±20% of the initial value<br>Tanδ ≤200% of the initial specified value<br>Leakage current ≤500%The initial specified value | |

## ■ Dimensions

Unit(mm)




| ØD | 6.3 | 8 | | 10 | 12.5 | 16 | 18 | 20 | 22 |
|---|---|---|---|---|---|---|---|---|---|
| Ød | 0.5 | 0.5 | 0.6 | 0.6 | 0.6 | 0.8 | 0.8 | 0.8 | 0.8 |
| F | 2.5 | 3.5 | | 5.0 | 5.0 | 7.5 | 7.5 | 7.5 | 7.5 |
| ØD' | ØD+0.5 max. | | | | | | | | |
| L' | L+1.5 max | | | L+2.0 max | | | | | |

- Printed white color letter on PET brown sleeve

## ■ Code numbering system

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18

M R C □□□ M □□□ □□□ □□ □□□

- Taping, Cutting
- Terminal type
- Size (10X20: G20)
- Capacitance
- Capacitance tolerance (M:±20%, K:±10%, V :-10~20%)
- Working voltage (ex. 160V→160)
- Series name

| | |
|---|---|
| Ø6.3 | E |
| Ø8 | F |
| Ø10 | G |
| Ø12.5 | X |
| Ø16 | J |
| Ø18 | K |
| Ø20 | L |
| Ø22 | M |

# MRC series

## ■ Standard Ratings

Note 1) Ripple current = mArms/105℃,120Hz

| WV (Vdc) | Cap (uF) | Size ØxL (mm) | Tan δ | Ripple 1) | Code No |
|---|---|---|---|---|---|
| 160 | 22 | 10 x 20 | 0.20 | 192 | MRC160□220G20CS□□□ |
| | 33 | 10 x 20 | 0.20 | 236 | MRC160□330G20CS□□□ |
| | 47 | 10 x 25 | 0.20 | 307 | MRC160□470G25CS□□□ |
| | 68 | 12.5 x 20 | 0.20 | 375 | MRC160□680X20CS□□□ |
| | 82 | 12.5 x 25 | 0.20 | 449 | MRC160□820X25CS□□□ |
| | 100 | 12.5 x 30 | 0.20 | 535 | MRC160□101X30CS□□□ |
| | 120 | 16 x 20 | 0.20 | 559 | MRC160□121J20CS□□□ |
| | 150 | 12.5 x 35 | 0.20 | 645 | MRC160□151X35CS□□□ |
| | | 16 x 25 | 0.20 | 671 | MRC160□151J25CS□□□ |
| | 180 | 16 x 25 | 0.20 | 735 | MRC160□181J25CS□□□ |
| | 220 | 16 x 31.5 | 0.20 | 876 | MRC160□221J32CS□□□ |
| | 270 | 16 x 35.5 | 0.20 | 992 | MRC160□271J36CS□□□ |
| | 330 | 18 x 31.5 | 0.20 | 1,110 | MRC160□331K32CS□□□ |
| | 390 | 18 x 35.5 | 0.20 | 1,246 | MRC160□391K36CS□□□ |
| 200 | 3.3 | 6.3 x 11 | 0.20 | 36 | MRC200□3R3E11CS□□□ |
| | 4.7 | 8 x 11.5 | 0.20 | 51 | MRC200□4R7F11CS□□□ |
| | 6.8 | 8 x 11.5 | 0.20 | 62 | MRC200□6R8F11CS□□□ |
| | 10 | 8 x 11.5 | 0.20 | 75 | MRC200□100F11CS□□□ |
| | 22 | 8 x 20 | 0.20 | 135 | MRC200□220F20CS□□□ |
| | 33 | 10 x 20 | 0.20 | 236 | MRC200□330G20CS□□□ |
| | 47 | 10 x 25 | 0.20 | 307 | MRC200□470G25CS□□□ |
| | 68 | 12.5 x 25 | 0.20 | 375 | MRC200□680X25CS□□□ |
| | 82 | 12.5 x 25 | 0.20 | 449 | MRC200□820X25CS□□□ |
| | 100 | 12.5 x 30 | 0.20 | 535 | MRC200□101X30CS□□□ |
| | 120 | 16 x 25 | 0.20 | 600 | MRC200□121J25CS□□□ |
| | 150 | 16 x 25 | 0.20 | 671 | MRC200□151J25CS□□□ |
| | 180 | 16 x 31.5 | 0.20 | 793 | MRC200□181J32CS□□□ |
| | 220 | 16 x 31.5 | 0.20 | 876 | MRC200□221J32CS□□□ |
| | 270 | 16 x 35.5 | 0.20 | 992 | MRC200□271J36CS□□□ |
| | | 18 x 31.5 | 0.20 | 1,004 | MRC200□271K32CS□□□ |
| | 330 | 16 x 40 | 0.20 | 1,132 | MRC200□331J40CS□□□ |
| | | 18 x 35.5 | 0.20 | 1,146 | MRC200□331K36CS□□□ |
| | 390 | 18 x 40 | 0.20 | 1,266 | MRC200□391K40CS□□□ |
| 250 | 4.7 | 8 x 11.5 | 0.20 | 58 | MRC250□4R7F12CS□□□ |
| | 6.8 | 8 x 11.5 | 0.20 | 70 | MRC250□6R8F12CS□□□ |
| | 10 | 8 x 15 | 0.20 | 86 | MRC250□100F15CS□□□ |
| | 22 | 10 x 20 | 0.20 | 192 | MRC250□220G20CS□□□ |
| | 33 | 10 x 25 | 0.20 | 258 | MRC250□330G25CS□□□ |
| | 47 | 12.5 x 20 | 0.20 | 312 | MRC250□470X20CS□□□ |
| | 68 | 12.5 x 30 | 0.20 | 444 | MRC250□680X30CS□□□ |
| | 82 | 16 x 25 | 0.20 | 496 | MRC250□820J25CS□□□ |
| | 100 | 16 x 25 | 0.20 | 548 | MRC250□101J25CS□□□ |
| | 120 | 16 x 25 | 0.20 | 600 | MRC250□121J25CS□□□ |
| | 150 | 16 x 31.5 | 0.20 | 724 | MRC250□151J32CS□□□ |
| | 180 | 16 x 35.5 | 0.20 | 810 | MRC250□181J36CS□□□ |
| | | 18 x 31.5 | 0.20 | 819 | MRC250□181K32CS□□□ |
| | 220 | 16 x 40 | 0.20 | 924 | MRC250□221J40CS□□□ |
| | | 18 x 35.5 | 0.20 | 936 | MRC250□221K36CS□□□ |
| | 270 | 18 x 40 | 0.20 | 1,053 | MRC250□271K40CS□□□ |
| 350 | 10 | 10 x 16 | 0.24 | 116 | MRC350□100G16CS□□□ |
| | 15 | 10 x 20 | 0.24 | 154 | MRC350□150G20CS□□□ |
| | 22 | 10 x 25 | 0.24 | 207 | MRC350□220G25CS□□□ |
| | 33 | 12.5 x 25 | 0.24 | 276 | MRC350□330X25CS□□□ |
| | 39 | 10 x 40 | 0.24 | 340 | MRC350□390G40CS□□□ |
| | 47 | 16 x 25 | 0.24 | 364 | MRC350□470J25CS□□□ |
| | 56 | 16 x 25 | 0.24 | 397 | MRC350□560J25CS□□□ |
| | 68 | 16 x 31.5 | 0.24 | 472 | MRC350□680J32CS□□□ |
| | | 18 x 25 | 0.24 | 456 | MRC350□680K25CS□□□ |
| | 82 | 16 x 35.5 | 0.24 | 529 | MRC350□820J36CS□□□ |
| | | 18 x 31.5 | 0.24 | 536 | MRC350□820K32CS□□□ |

| WV (Vdc) | Cap (uF) | Size ØxL (mm) | Tan δ | Ripple 1) | Code No |
|---|---|---|---|---|---|
| 350 | 100 | 18 x 31.5 | 0.24 | 591 | MRC350□101K32CS□□□ |
| | 120 | 18 x 35.5 | 0.24 | 669 | MRC350□121K36CS□□□ |
| 400 | 4.7 | 6.3 x 15 | 0.24 | 35 | MRC400□4R7E15CS□□□ |
| | 6.8 | 8 x 11.5 | 0.24 | 92 | MRC400□6R8F12CS□□□ |
| | | 8 x 15 | 0.24 | 85 | MRC400□6R8F15CS□□□ |
| | 8.2 | 8 x 15 | 0.24 | 95 | MRC400□8R2F15CS□□□ |
| | | 8 x 20 | 0.24 | 100 | MRC400□8R2F20CS□□□ |
| | 10 | 8 x 20 | 0.24 | 105 | MRC400□100F20CS□□□ |
| | | 10 x 16 | 0.24 | 116 | MRC400□100G16CS□□□ |
| | 15 | 10 x 20 | 0.24 | 154 | MRC400□150G20CS□□□ |
| | 22 | 10 x 25 | 0.24 | 207 | MRC400□220G25CS□□□ |
| | 33 | 12.5 x 25 | 0.24 | 276 | MRC400□330X25CS□□□ |
| | 39 | 12.5 x 30 | 0.24 | 323 | MRC400□390X30CS□□□ |
| | 47 | 16 x 25 | 0.24 | 364 | MRC400□470J25CS□□□ |
| | 56 | 16 x 25 | 0.24 | 397 | MRC400□560J25CS□□□ |
| | 68 | 16 x 31.5 | 0.24 | 472 | MRC400□680J32CS□□□ |
| | 82 | 16 x 35.5 | 0.24 | 570 | MRC400□820J36CS□□□ |
| | | 18 x 31.5 | 0.24 | 585 | MRC400□820K32CS□□□ |
| | 100 | 16 x 40 | 0.24 | 603 | MRC400□101J40CS□□□ |
| | | 18 x 35.5 | 0.24 | 735 | MRC400□101K36CS□□□ |
| | 120 | 18 x 40 | 0.24 | 749 | MRC400□121K40CS□□□ |
| | 150 | 18 x 40 | 0.24 | 815 | MRC400□151K40CS□□□ |
| 420 | 68 | 18 x 31.5 | 0.24 | 500 | MRC420□680K32CS□□□ |
| | 82 | 18 x 31.5 | 0.24 | 560 | MRC420□820K32CS□□□ |
| | 100 | 18 x 35.5 | 0.24 | 720 | MRC420□101K36CS□□□ |
| | 120 | 18 x 40 | 0.24 | 740 | MRC420□121K40CS□□□ |
| | 150 | 18 x 45 | 0.24 | 753 | MRC420□151K45CS□□□ |
| | | 20 x 40 | 0.24 | 757 | MRC420□151L40CS□□□ |
| 450 | 4.7 | 8 x 20 | 0.24 | 71 | MRC450□4R7F20CS□□□ |
| | 8.2 | 10 x 16 | 0.24 | 102 | MRC450□8R2G16CS□□□ |
| | 10 | 10 x 20 | 0.24 | 122 | MRC450□100G20CS□□□ |
| | 15 | 12.5 x 20 | 0.24 | 163 | MRC450□150X20CS□□□ |
| | 22 | 12.5 x 25 | 0.24 | 219 | MRC450□220X25CS□□□ |
| | 33 | 16 x 25 | 0.24 | 289 | MRC450□330J25CS□□□ |
| | 39 | 12.5 x 31.5 | 0.24 | 358 | MRC450□390X32CS□□□ |
| | 47 | 16 x 25 | 0.24 | 353 | MRC450□470J25CS□□□ |
| | 53 | 10 x 50 | 0.24 | 400 | MRC450□530G50CS□□□ |
| | 56 | 16 x 31.5 | 0.24 | 415 | MRC450□560J32CS□□□ |
| | 68 | 16 x 35.5 | 0.24 | 467 | MRC450□680J36CS□□□ |
| | | 18 x 31.5 | 0.24 | 500 | MRC450□680K32CS□□□ |
| | 82 | 12.5 x 50 | 0.24 | 670 | MRC450□820X50CS□□□ |
| | | 16 x 40 | 0.24 | 530 | MRC450□820J40CS□□□ |
| | | 18 x 31.5 | 0.24 | 560 | MRC450□820K32CS□□□ |
| | 100 | 12.5 x 60 | 0.24 | 790 | MRC450□101X60CS□□□ |
| | | 18 x 35.5 | 0.24 | 720 | MRC450□101K36CS□□□ |
| | 120 | 18 x 40 | 0.24 | 740 | MRC450□121K40CS□□□ |
| | 150 | 18 x 45 | 0.24 | 753 | MRC450□151K45CS□□□ |
| | | 20 x 40 | 0.24 | 757 | MRC450□151L40CS□□□ |
| 500 | 22 | 12.5 x 30 | 0.24 | 238 | MRC500□220X30CS□□□ |
| | 33 | 12.5 x 45 | 0.24 | 327 | MRC500□330X45CS□□□ |
| | 47 | 16 x 35.5 | 0.24 | 367 | MRC500□470J36CS□□□ |
| | | 18 x 31.5 | 0.24 | 370 | MRC500□470K32CS□□□ |
| | 56 | 16 x 40 | 0.24 | 430 | MRC500□560J40CS□□□ |
| | | 12.5 x 60 | 0.24 | 450 | MRC500□560X60CS□□□ |
| | 68 | 18 x 35.5 | 0.24 | 489 | MRC500□680K36CS□□□ |
| | 82 | 18 x 40 | 0.24 | 560 | MRC500□820K40CS□□□ |
| | 100 | 18 x 45 | 0.24 | 620 | MRC500□101K45CS□□□ |
| | | 20 x 40 | 0.24 | 603 | MRC500□101L40CS□□□ |
| | 120 | 22 x 45 | 0.24 | 702 | MRC500□121M45CS□□□ |
| | 150 | 22 x 50 | 0.24 | 827 | MRC500□151M50CS□□□ |

# MRC series

■ **Rated ripple current multipliers**

| Frequency (Hz) | 120 | 1K | 10K | 50K | 100K |
|---|---|---|---|---|---|
| Factor | 1.00 | 1.25 | 1.50 | 1.60 | 1.75 |