

WH series

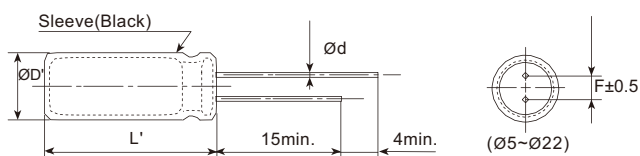
- Standard series for general purpose
- Wide temperature range from -40 °C to +105 °C
- Endurance: 2,000 hours at 105 °C
- RoHS Compliant



SPECIFICATIONS

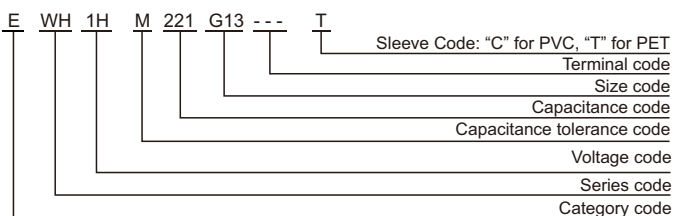
| Items | Characteristics | |
|--|---|---|
| Category Temperature Range | -40~+105 °C (6.3~100 V _{dc}) | -25~+105°C(160~500 V _{dc}) |
| Rated Voltage Range | 6.3~500 V _{dc} | |
| Capacitance Tolerance | ±20%(M) (at 20°C, 120Hz) | |
| Leakage Current | 6.3~100 V _{dc} | |
| | 160~500 V _{dc} | |
| | I: leakage current(μA), C: Nominal capacitance(μF) V: Rated voltage(V) (at 20°C) | |
| | I≤0.03CV or 4μA (at 1 minute) I≤0.01CV or 3μA (at 2 minutes) Whichever is greater | CV After 1 minute After 5 minutes CV≤1,000: I≤0.1CV+40μA I≤0.03CV+15μA CV>1,000: I≤0.04CV+100μA I≤0.02CV+25μA |
| Dissipation Factor (tanδ) | Rated Voltage(V _{dc}) | 6.3 10 16 25 35 50 63 100 160~250 350~500 |
| | Dissipation Factor (Max.) | 0.28 0.24 0.20 0.16 0.14 0.12 0.10 0.08 0.20 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 _{dc}) | 6.3 10 16 25 35 50 63 100 160~250 350~450 500 |
| | Z(-25°C)/Z(+20°C) | 5 4 3 2 3 6 8 |
| | Z(-40°C)/Z(+20°C) | 12 10 8 5 4 3 - (at 120Hz) |
| Endurance | The specifications listed below shall be satisfied when the capacitors are restored to 20°C after DC voltage plus rated ripple current is applied for 2,000 hours at 105°C. | |
| | Capacitance Change | ≤±20% of the initial value |
| | Dissipation Factor | ≤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 leaving them under no load at 105°C for 1,000 hours. | |
| | Capacitance Change | ≤±20% of the initial value |
| | Dissipation Factor | ≤200% of the initial specified value |
| | Leakage Current | ≤200% of the initial specified value |

DIMENSIONS[mm]



| ØD | 5 | 6.3 | 8 | 10 | 12.5/13 | 16/18 | 22 |
|-----|------------|-----|-----|-----|---------|-------|------|
| Ød | 0.5 | 0.5 | 0.5 | 0.6 | 0.6 | 0.8 | 0.8 |
| F | 2.0 | 2.5 | 3.5 | 5.0 | 5.0 | 7.5 | 10.0 |
| ØD' | ØD+0.5max. | | | | | | |
| L' | L+2max. | | | | | | |

PART NUMBERING SYSTEM



RATED RIPPLE CURRENT MULTIPLIERS

Frequency correction factor for ripple current

| Cap.(μF) \ Freq.(Hz) | 50 | 120 | 300 | 1k | 10k | 100k |
|----------------------|------|------|------|------|------|------|
| Cap.<10 | 0.65 | 1.00 | 1.35 | 1.75 | 2.30 | 2.50 |
| 10≤Cap.<100 | 0.75 | 1.00 | 1.25 | 1.50 | 1.75 | 1.80 |
| 100≤Cap.<1000 | 0.80 | 1.00 | 1.15 | 1.30 | 1.40 | 1.50 |
| Cap.≥1000 | 0.85 | 1.00 | 1.03 | 1.05 | 1.08 | 1.08 |

WH series

■ STANDARD RATINGS

| WV (Vdc) | Cap (μF) | Size ΦDxL(mm) | Rated ripple current (mA _{rms} /105°C, 120Hz) | Part Number |
|----------|----------|---------------|--|--------------------|
| 6.3 | 33 | 5×11 | 54 | EWHOJM330D11---T |
| | 47 | 5×11 | 64 | EWHOJM470D11---T |
| | 100 | 5×11 | 94 | EWHOJM101D11---T |
| | 220 | 5×11 | 140 | EWHOJM221D11---T |
| | 330 | 6.3×11 | 190 | EWHOJM331E11---T |
| | 470 | 6.3×11 | 230 | EWHOJM471E11---T |
| | 1000 | 8×12 | 380 | EWHOJM102F12---T |
| | 2200 | 10×20 | 710 | EWHOJM222G20---T |
| | 3300 | 10×20 | 840 | EWHOJM332G20---T |
| | 4700 | 12.5×20 | 1090 | EWHOJM472W20---T |
| | 6800 | 12.5×25 | 1350 | EWHOJM682W25---T |
| | 10000 | 16×25 | 1650 | EWHOJM103L25---T |
| | 15000 | 16×35 | 2010 | EWHOJM153L35---T |
| | 22000 | 18×40 | 2350 | EWHOJM223M40---T |
| 10 | 22 | 5×11 | 46 | EWHA1AM220D11---T |
| | 33 | 5×11 | 57 | EWHA1AM330D11---T |
| | 47 | 5×11 | 68 | EWHA1AM470D11---T |
| | 100 | 5×11 | 100 | EWHA1AM101D11---T |
| | 220 | 6.3×11 | 170 | EWHA1AM221E11---T |
| | 330 | 6.3×11 | 200 | EWHA1AM331E11---T |
| | 470 | 8×11 | 250 | EWHA1AM471F11---T |
| | 1000 | 10×13 | 460 | EWHA1AM102G13---T |
| | 2200 | 10×20 | 760 | EWHA1AM222G20---T |
| | 3300 | 12.5×20 | 1000 | EWHA1AM332W20---T |
| | 4700 | 12.5×25 | 1260 | EWHA1AM472W25---T |
| | 6800 | 16×25 | 1570 | EWHA1AM682L25---T |
| | 10000 | 16×35 | 1890 | EWHA1AM103L35---T |
| | 15000 | 18×35 | 2180 | EWHA1AM153M35---T |
| 16 | 10 | 5×11 | 34 | EWHA1CM100D11---T |
| | 22 | 5×11 | 51 | EWHA1CM220D11---T |
| | 33 | 5×11 | 63 | EWHA1CM330D11---T |
| | 47 | 5×11 | 75 | EWHA1CM470D11---T |
| | 100 | 5×11 | 110 | EWHA1CM101D11---T |
| | 220 | 6.3×11 | 180 | EWHA1CM221E11---T |
| | 330 | 8×11 | 260 | EWHA1CM331F11---T |
| | 470 | 8×12 | 310 | EWHA1CM471F12---T |
| | 1000 | 10×16 | 560 | EWHA1CM102G16---T |
| | 2200 | 12.5×20 | 920 | EWHA1CM222W20---T |
| | 3300 | 12.5×25 | 1170 | EWHA1CM332W25---T |
| | 4700 | 16×25 | 1480 | EWHA1CM472L25---T |
| | 6800 | 16×30 | 1780 | EWHA1CM682L30---T |
| | 10000 | 18×35 | 2060 | EWHA1CM103M35---T |
| 25 | 4.7 | 5×11 | 25 | EWHA1EM47R7D11---T |
| | 10 | 5×11 | 36 | EWHA1EM100D11---T |
| | 22 | 5×11 | 54 | EWHA1EM220D11---T |
| | 33 | 5×11 | 67 | EWHA1EM330D11---T |
| | 47 | 5×11 | 80 | EWHA1EM470D11---T |
| | 100 | 6.3×11 | 130 | EWHA1EM101E11---T |
| | 220 | 8×11 | 230 | EWHA1EM221F11---T |
| | 330 | 8×12 | 310 | EWHA1EM331F12---T |
| | 470 | 10×13 | 380 | EWHA1EM471G13---T |
| | 1000 | 10×20 | 680 | EWHA1EM102G20---T |
| | 2200 | 12.5×25 | 1090 | EWHA1EM222W25---T |
| | 3300 | 16×25 | 1400 | EWHA1EM332L25---T |
| | 4700 | 16×30 | 1710 | EWHA1EM472L30---T |
| | 6800 | 18×35 | 2040 | EWHA1EM682M35---T |
| 35 | 4.7 | 5×11 | 28 | EWHA1VM47R7D11---T |
| | 10 | 5×11 | 41 | EWHA1VM100D11---T |
| | 22 | 5×11 | 61 | EWHA1VM220D11---T |
| | 33 | 5×11 | 75 | EWHA1VM330D11---T |
| | 47 | 5×11 | 90 | EWHA1VM470D11---T |
| | 100 | 6.3×11 | 150 | EWHA1VM101E11---T |
| | 220 | 8×12 | 270 | EWHA1VM221F12---T |
| | 330 | 10×13 | 350 | EWHA1VM331G13---T |
| | 470 | 10×16 | 460 | EWHA1VM471G16---T |
| | 1000 | 12.5×20 | 810 | EWHA1VM102W20---T |
| | 2200 | 16×25 | 1260 | EWHA1VM222L25---T |
| | 3300 | 16×35 | 1610 | EWHA1VM332L35---T |
| | 4700 | 18×35 | 1910 | EWHA1VM472M35---T |

| WV (Vdc) | Cap (μF) | Size ΦDxL(mm) | Rated ripple current (mA _{rms} /105°C, 120Hz) | Part Number |
|----------|----------|---------------|--|-------------------|
| 50 | 0.1 | 5×11 | 1.3 | EWHA1HMR10D11---T |
| | 0.22 | 5×11 | 2.9 | EWHA1HMR22D11---T |
| | 0.33 | 5×11 | 4.3 | EWHA1HMR33D11---T |
| | 0.47 | 5×11 | 6.2 | EWHA1HMR47D11---T |
| | 1 | 5×11 | 13 | EWHA1HM010D11---T |
| | 2.2 | 5×11 | 20 | EWHA1HM2R2D11---T |
| | 3.3 | 5×11 | 25 | EWHA1HM3R3D11---T |
| | 4.7 | 5×11 | 30 | EWHA1HM4R7D11---T |
| | 10 | 5×11 | 40 | EWHA1HM100D11---T |
| | 22 | 5×11 | 65 | EWHA1HM220D11---T |
| | 33 | 6.3×11 | 90 | EWHA1HM330E11---T |
| | 47 | 6.3×11 | 110 | EWHA1HM470E11---T |
| | 100 | 8×11 | 180 | EWHA1HM101F11---T |
| | 220 | 10×13 | 300 | EWHA1HM221G13---T |
| 330 | 10×16 | 410 | EWHA1HM331G16---T | |
| 470 | 10×20 | 530 | EWHA1HM471G20---T | |
| 1000 | 12.5×25 | 950 | EWHA1HM102W25---T | |
| 2200 | 16×35 | 1470 | EWHA1HM222L35---T | |
| 3300 | 18×35 | 1770 | EWHA1HM332M35---T | |
| 63 | 10 | 5×11 | 46 | EWHA1JM100D11---T |
| | 22 | 5×11 | 71 | EWHA1JM220D11---T |
| | 33 | 6.3×11 | 100 | EWHA1JM330E11---T |
| | 47 | 6.3×11 | 120 | EWHA1JM470E11---T |
| | 100 | 10×13 | 215 | EWHA1JM101G13---T |
| | 220 | 10×16 | 335 | EWHA1JM221G16---T |
| | 330 | 10×20 | 510 | EWHA1JM331G20---T |
| | 470 | 12.5×20 | 640 | EWHA1JM471W20---T |
| | 1000 | 16×25 | 930 | EWHA1JM102L25---T |
| | 0.1 | 5×11 | 1.5 | EWHA1KMR10D11---T |
| | 0.22 | 5×11 | 3.4 | EWHA1KMR22D11---T |
| | 0.33 | 5×11 | 5 | EWHA1KMR33D11---T |
| | 0.47 | 5×11 | 7.1 | EWHA1KMR47D11---T |
| | 1 | 5×11 | 15 | EWHA1KM010D11---T |
| 2.2 | 5×11 | 21 | EWHA1KM2R2D11---T | |
| 3.3 | 5×11 | 29 | EWHA1KM3R3D11---T | |
| 4.7 | 5×11 | 32 | EWHA1KM4R7D11---T | |
| 10 | 6.3×11 | 54 | EWHA1KM100E11---T | |
| 22 | 8×11 | 93 | EWHA1KM220F11---T | |
| 33 | 8×12 | 130 | EWHA1KM330F12---T | |
| 47 | 10×13 | 165 | EWHA1KM470G13---T | |
| 100 | 10×20 | 265 | EWHA1KM101G20---T | |
| 220 | 12.5×25 | 440 | EWHA1KM221W25---T | |
| 330 | 16×25 | 540 | EWHA1KM331L25---T | |
| 470 | 16×30 | 715 | EWHA1KM471L30---T | |
| 1000 | 18×40 | 985 | EWHA1KM102M40---T | |
| 100 | 3.3 | 6.3×9 | 28 | EWHA2CM3R3E09---T |
| | 4.7 | 6.3×9 | 34 | EWHA2CM4R7E09---T |
| | 10 | 6.3×12 | 60 | EWHA2CM100E12---T |
| | 10 | 8×9 | 60 | EWHA2CM100F09---T |
| | 22 | 8×12 | 88 | EWHA2CM220F12---T |
| | 22 | 10×12 | 98 | EWHA2CM220G12---T |
| | 33 | 10×12 | 140 | EWHA2CM330G12---T |
| | 33 | 10×16 | 158 | EWHA2CM330G16---T |
| | 47 | 10×14 | 142 | EWHA2CM470G14---T |
| | 47 | 10×20 | 182 | EWHA2CM470G20---T |
| | 68 | 10×20 | 240 | EWHA2CM680G20---T |
| | 100 | 12.5×20 | 300 | EWHA2CM101W20---T |
| | 100 | 16×20 | 316 | EWHA2CM101L20---T |
| | 220 | 16×25 | 530 | EWHA2CM221L25---T |
| 330 | 18×25 | 600 | EWHA2CM331M25---T | |
| 470 | 18×35 | 820 | EWHA2CM471M35---T | |
| 160 | 1 | 6.3×7 | 12 | EWHA2DM010E07---T |
| | 2.2 | 6.3×7 | 18 | EWHA2DM2R2E07---T |
| | 3.3 | 6.3×9 | 28 | EWHA2DM3R3E09---T |
| | 4.7 | 6.3×9 | 40 | EWHA2DM4R7E09---T |
| | 10 | 8×12 | 78 | EWHA2DM100F12---T |
| | 22 | 8×16 | 110 | EWHA2DM220F16---T |
| | 22 | 10×12 | 110 | EWHA2DM220G12---T |
| | 33 | 10×16 | 166 | EWHA2DM330G16---T |

WH series

■ STANDARD RATINGS

| WV (V _{dc}) | Cap (μF) | Size ΦDxL(mm) | Rated ripple current (mA _{RMS} /105°C, 120Hz) | Part Number |
|-----------------------|----------|---------------|--|------------------|
| 200 | 33 | 10×20 | 185 | EWH2DM330G20---T |
| | 47 | 10×20 | 200 | EWH2DM470G20---T |
| | 68 | 12.5×20 | 290 | EWH2DM680W20---T |
| | 82 | 12.5×20 | 300 | EWH2DM820W20---T |
| | 100 | 13×20 | 305 | EWH2DM101K20---T |
| | 100 | 16×20 | 325 | EWH2DM101L20---T |
| | 150 | 16×25 | 446 | EWH2DM151L25---T |
| | 180 | 16×25 | 530 | EWH2DM181L25---T |
| | 220 | 18×25 | 620 | EWH2DM221M25---T |
| | 330 | 18×30 | 720 | EWH2DM331M30---T |
| 470 | 18×40 | 840 | EWH2DM471M40---T | |
| 250 | 2.2 | 6.3×9 | 21 | EWH2EM2R2E09---T |
| | 3.3 | 6.3×9 | 30 | EWH2EM3R3E09---T |
| | 4.7 | 6.3×12 | 38 | EWH2EM4R7E12---T |
| | 4.7 | 8×9 | 45 | EWH2EM4R7F09---T |
| | 10 | 8×12 | 70 | EWH2EM100F12---T |
| | 10 | 10×12 | 75 | EWH2EM100G12---T |
| | 22 | 8×16 | 100 | EWH2EM220F16---T |
| | 22 | 10×16 | 116 | EWH2EM220G16---T |
| | 33 | 10×20 | 150 | EWH2EM330G20---T |
| | 33 | 12.5×16 | 165 | EWH2EM330W16---T |
| | 47 | 12.5×20 | 232 | EWH2EM470W20---T |
| | 100 | 16×25 | 370 | EWH2EM101L25---T |
| | 150 | 18×25 | 455 | EWH2EM151M25---T |
| | 220 | 18×30 | 600 | EWH2EM221M30---T |
| 330 | 18×35 | 705 | EWH2EM331M35---T | |
| 350 | 1 | 6.3×9 | 13 | EWH2VM010E09---T |
| | 2.2 | 6.3×9 | 23 | EWH2VM2R2E09---T |
| | 3.3 | 8×9 | 31 | EWH2VM3R3F09---T |
| | 4.7 | 8×9 | 45 | EWH2VM4R7F09---T |
| | 10 | 10×12 | 68 | EWH2VM100G12---T |
| | 22 | 10×20 | 135 | EWH2VM220G20---T |
| | 33 | 12.5×20 | 184 | EWH2VM330W20---T |
| | 47 | 16×20 | 225 | EWH2VM470L20---T |
| | 68 | 16×25 | 336 | EWH2VM680L25---T |
| 100 | 18×30 | 398 | EWH2VM101M30---T | |
| 400 | 1 | 6.3×9 | 14 | EWH2GM010E09---T |
| | 2.2 | 6.3×9 | 25 | EWH2GM2R2E09---T |
| | 2.2 | 8×9 | 30 | EWH2GM2R2F09---T |
| | 3.3 | 6.3×12 | 33 | EWH2GM3R3E12---T |
| | 3.3 | 8×9 | 34 | EWH2GM3R3F09---T |
| | 4.7 | 8×9 | 45 | EWH2GM4R7F09---T |
| | 4.7 | 8×12 | 48 | EWH2GM4R7F12---T |
| | 10 | 8×16 | 92 | EWH2GM100F16---T |
| | 10 | 10×12 | 92 | EWH2GM100G12---T |
| | 22 | 10×20 | 160 | EWH2GM220G20---T |
| | 33 | 16×20 | 258 | EWH2GM330L20---T |
| | 47 | 16×20 | 290 | EWH2GM470L20---T |
| | 68 | 16×25 | 420 | EWH2GM680L25---T |
| | 68 | 18×20 | 420 | EWH2GM680M20---T |
| | 82 | 18×25 | 474 | EWH2GM820M25---T |
| | 100 | 18×30 | 532 | EWH2GM101M30---T |
| 120 | 18×35 | 588 | EWH2GM121M35---T | |
| 150 | 18×35 | 610 | EWH2GM151M35---T | |
| 450 | 1 | 6.3×9 | 14 | EWH2WM010E09---T |
| | 1 | 6.3×12 | 16 | EWH2WM010E12---T |
| | 2.2 | 8×9 | 22 | EWH2WM2R2F09---T |
| | 2.2 | 8×12 | 25 | EWH2WM2R2F12---T |
| | 3.3 | 8×12 | 32 | EWH2WM3R3F12---T |
| | 4.7 | 10×12 | 48 | EWH2WM4R7G12---T |
| | 10 | 10×16 | 85 | EWH2WM100G16---T |
| | 10 | 10×20 | 90 | EWH2WM100G20---T |
| | 22 | 12.5×20 | 150 | EWH2WM220W20---T |
| | 22 | 16×20 | 185 | EWH2WM220L20---T |
| | 33 | 16×20 | 200 | EWH2WM330L20---T |
| | 47 | 16×25 | 335 | EWH2WM470L25---T |
| | 68 | 18×25 | 400 | EWH2WM680M25---T |
| 82 | 18×30 | 472 | EWH2WM820M30---T | |

| WV (V _{dc}) | Cap (μF) | Size ΦDxL(mm) | Rated ripple current (mA _{RMS} /105°C, 120Hz) | Part Number |
|-----------------------|----------|---------------|--|------------------|
| 450 | 100 | 18×35 | 530 | EWH2WM101M35---T |
| | 120 | 18×40 | 582 | EWH2WM121M40---T |
| | 150 | 18×45 | 610 | EWH2WM151M45---T |
| 500 | 4.7 | 10×16 | 50 | EWH2HM4R7G16---T |
| | 10 | 12.5×20 | 115 | EWH2HM100W20---T |
| | 15 | 12.5×25 | 140 | EWH2HM150W25---T |
| | 22 | 16×25 | 185 | EWH2HM220L25---T |
| | 33 | 18×25 | 215 | EWH2HM330M25---T |
| | 47 | 18×35 | 345 | EWH2HM470M35---T |
| | 68 | 18×35 | 390 | EWH2HM680M35---T |
| | 82 | 18×40 | 490 | EWH2HM820M40---T |
| | 100 | 22×35 | 535 | EWH2HM101O35---T |
| | 120 | 22×40 | 550 | EWH2HM121O40---T |

※ Specifications subject to change without notice.

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