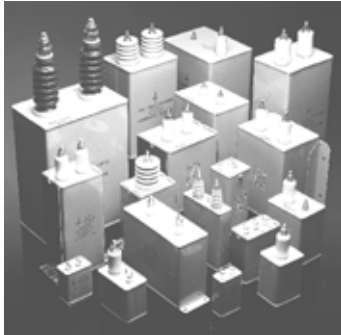


DC Filter Capacitors



TYPE ER

Capacitors offer unusually good electrical characteristics, coupled with very small size. The ER range of capacitors are manufactured using a mixed dielectric material that consists of polyester/polypropylene. The container is a rolled seamed tinplate case that is hermetically sealed. The construction is designed to prevent internal movement when subjected to shock and vibration.

Note

- The impregnant used is a non toxic highly refined, purified and inhibited mineral oil.

APPLICATIONS

The ER range of capacitors are specifically designed for DC applications.

- Audio coupling
- Pulse forming networks
- Oscillator circuits
- Arc and spark suppression
- RF by-pass
- Tuned filters
- Energy storage
- Integrating circuits
- Low and high pass filters
- High voltage smoothing

Capacitors required for AC applications and high discharge rates can also be designed from the ER range.

Consult Vishay Electronic GmbH, Division Roederstein ESTA and Hybrids for your specific requirements.

TEMPERATURE RANGE

Temperature range is - 55 °C to + 85 °C. The nominal voltage rating is applicable from - 55 °C to + 85 °C.

Derating is required for higher operating temperatures.

TEMPERATURE COEFFICIENT

Capacitance will increase by 2 % per 100 °C temperature change.

RIPPLE

The sum of the peak ripple voltage and the DC voltage should not exceed the rated voltage. Refer to graph fig. 1 for permissible peak-to-peak ripple voltage as a percentage of rated voltage for various frequencies.

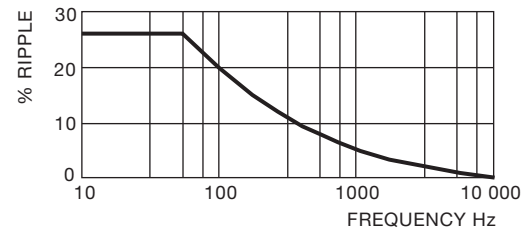


Fig. 1

POWER FACTOR

The power factor is variable, and a function of temperature and frequency. See fig 2. Nominal value < 0.5 % at 20 °C.

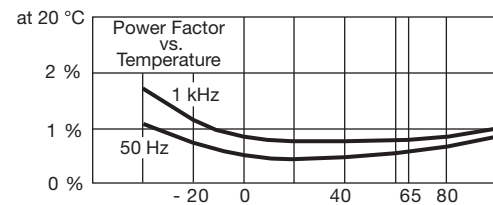


Fig. 2

DIELECTRIC RESISTANCE

(Parallel resistance) is indicated by the graph of insulance ($M\Omega \times \mu F$) vs temperature fig 3. The insulance ($M\Omega \times \mu F$) is nominally 10 000 s at + 20 °C. (Measurements taken after 1 minute with an applied voltage of 500 V).

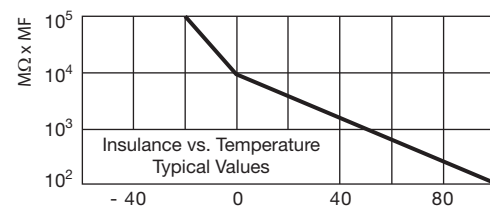


Fig. 3

LIFE EXPECTANCY

ER type capacitors are designed for a life expectancy of 50 000 h at 65 °C. To achieve the same life expectancy at 85 °C derate to 60 % of rated voltage fig 4.

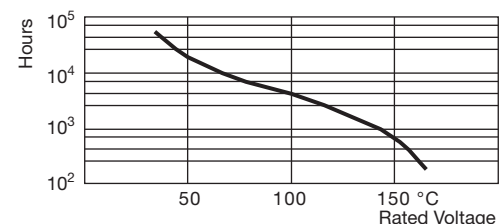


Fig. 4

CAPACITANCE RANGE

0.01 μF to 100 μF . The tolerance is $\pm 10\%$. Other tolerances are available on request. Nominal values measured at 1 kHz.

VOLTAGE RANGE

1000 V_{DC} to 40 000 V_{DC} other values on request.

TEST VOLTAGE

Terminal/terminal (V_t/t)

For DC rating < 20 kV

$V_t/t = 2.0 \times \text{rated voltage } 60 \text{ s}$

For DC rating > 20 kV

$V_t/t = 1.5 \times \text{rated voltage } 60 \text{ s}$

WEIGHT

The approximate weight in kg of capacitors in the ER range can be estimated by multiplying the volume of the capacitor container by $1.45^{(1)} \times 10^{-6}$.

TERMINATIONS

Add suffix W to part No. To indicate wire terminations.

CAPACITANCE

Capacitance tolerance of 20 % is standard with those marked ⁽¹⁾.

FLASHOVER

Up to 5000 V rating, the capacitor terminals will withstand 125 % of the rated voltage without flashover at a pressure of 85 mm Hg., equivalent to 50 000 feet altitude. Above 5000 V rating, the capacitor terminals will withstand 125 % of the rated voltage at a pressure of 500 mg Hg, equivalent to 10 000 feet altitude.

LIFE TESTS

Conducted at 85 °C for 500 h. The voltage applied will be 140 % of the rated voltage.

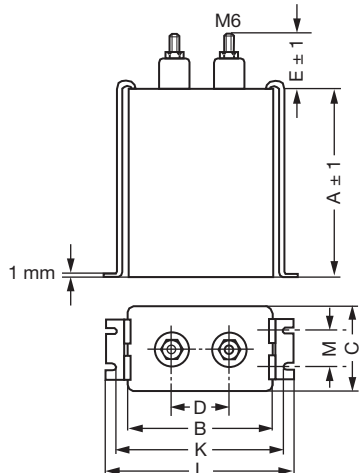


Fig. 5

TYPE DESCRIPTION

| PART NUMBER | CAP. μF | A | B | C | D | E |
|--|--------------------|-----|-----|-----|----|----|
| 1000 V_{DC} WKG | | | | | | |
| ER10-104 | 0.1 | 50 | 48 | 28 | 20 | 20 |
| ER10-504 | 0.5 | 50 | 48 | 28 | 20 | 20 |
| ER10-105 | 1.0 | 75 | 48 | 28 | 20 | 20 |
| ER10-405 | 4.0 | 75 | 60 | 54 | 25 | 35 |
| ER10-605 | 6.0 | 95 | 60 | 54 | 25 | 35 |
| ER10-106 | 10.0 | 115 | 80 | 48 | 40 | 35 |
| ER10-256 | 25.0 | 155 | 85 | 67 | 40 | 35 |
| ER10-506 | 50.0 | 155 | 130 | 100 | 50 | 35 |
| 1500 V_{DC} WKG | | | | | | |
| ER15-104 | 0.1 | 60 | 48 | 28 | 20 | 20 |
| ER15-504 | 0.5 | 60 | 48 | 28 | 20 | 20 |
| ER15-205 | 2.0 | 75 | 54 | 48 | 22 | 35 |
| ER15-405 | 4.0 | 115 | 54 | 48 | 22 | 35 |
| ER15-805 | 8.0 | 95 | 85 | 67 | 40 | 35 |
| ER15-106 | 10.0 | 115 | 85 | 67 | 40 | 35 |
| ER15-126 | 12.0 | 135 | 85 | 67 | 40 | 35 |
| ER15-256 | 25.0 | 115 | 130 | 100 | 50 | 35 |
| ER15-506 | 50.0 | 180 | 130 | 100 | 50 | 35 |
| 2000 V_{DC} WKG | | | | | | |
| ER20-104 | 0.1 | 60 | 48 | 28 | 20 | 20 |
| ER20-254 | 0.25 | 60 | 48 | 28 | 20 | 20 |
| ER20-504 | 0.5 | 60 | 48 | 28 | 20 | 20 |
| ER20-105 | 1.0 | 95 | 48 | 28 | 20 | 20 |
| ER20-205 | 2.0 | 75 | 54 | 48 | 22 | 35 |
| ER20-405 | 4.0 | 115 | 54 | 48 | 22 | 35 |
| ER20-605 | 6.0 | 135 | 60 | 54 | 25 | 35 |
| ER20-106 | 10.0 | 115 | 85 | 67 | 40 | 35 |
| ER20-126 | 12.0 | 135 | 85 | 67 | 40 | 35 |
| ER20-206 | 20.0 | 115 | 130 | 100 | 50 | 35 |
| 3000 V_{DC} WKG | | | | | | |
| ER30-104 | 0.1 | 60 | 48 | 28 | 20 | 20 |
| ER30-504 | 0.5 | 75 | 48 | 28 | 20 | 20 |
| ER30-105 | 1.0 | 115 | 48 | 28 | 20 | 20 |
| ER30-105X | 1.0 | 75 | 54 | 48 | 22 | 35 |
| ER30-205 | 2.0 | 115 | 54 | 48 | 22 | 35 |
| ER30-405 | 4.0 | 155 | 60 | 54 | 25 | 35 |
| ER30-605 | 6.0 | 180 | 80 | 48 | 40 | 35 |
| ER30-805 | 8.0 | 155 | 85 | 67 | 40 | 35 |
| ER30-106 | 10.0 | 95 | 130 | 100 | 50 | 35 |
| ER30-206 | 20.0 | 155 | 130 | 100 | 50 | 35 |
| ER30-256 | 25.0 | 180 | 130 | 100 | 50 | 35 |
| ER30-104 | 0.1 | 60 | 48 | 28 | 20 | 20 |
| 4000 V_{DC} WKG | | | | | | |
| ER40-104 | 0.1 | 60 | 48 | 28 | 20 | 20 |
| ER40-254 | 0.25 | 75 | 48 | 28 | 20 | 20 |
| ER40-504 | 0.5 | 95 | 48 | 28 | 20 | 20 |
| ER40-105 | 1.0 | 95 | 54 | 48 | 22 | 35 |
| ER40-205 | 2.0 | 135 | 54 | 48 | 22 | 35 |
| ER40-405 | 4.0 | 115 | 85 | 67 | 40 | 35 |
| ER40-805 | 8.0 | 115 | 130 | 100 | 50 | 35 |
| ER40-106 | 10.0 | 135 | 130 | 100 | 50 | 35 |
| ER40-206 | 20.0 | 230 | 130 | 100 | 50 | 35 |
| ER40-306 | 30.0 | 320 | 130 | 100 | 50 | 35 |

| TYPE DESCRIPTION | | | | | | |
|----------------------------------|-----------------|-----|-----|-----|-----|----|
| PART NUMBER | CAP. μ F | A | B | C | D | E |
| 5000 V_{DC} WKG | | | | | | |
| ER50-104 | 0.1 | 60 | 48 | 28 | 20 | 20 |
| ER50-254 | 0.25 | 75 | 48 | 28 | 20 | 20 |
| ER50-105 | 1.0 | 115 | 54 | 48 | 22 | 35 |
| ER50-405 | 4.0 | 155 | 85 | 67 | 40 | 35 |
| ER50-805 | 8.0 | 135 | 130 | 100 | 50 | 35 |
| ER50-106 | 10.0 | 155 | 130 | 100 | 50 | 35 |
| ER50-206 | 20.0 | 290 | 130 | 100 | 50 | 35 |
| ER50-506 | 50.0 | 295 | 180 | 180 | 75 | 35 |
| 6000 V_{DC} WKG | | | | | | |
| ER60-104 | 0.1 | 65 | 54 | 48 | (1) | 35 |
| ER60-254 | 0.25 | 80 | 54 | 48 | (1) | 35 |
| ER60-504 | 0.5 | 100 | 80 | 48 | 40 | 35 |
| ER60-105 | 1.0 | 100 | 85 | 67 | 40 | 35 |
| ER60-205 | 2.0 | 100 | 130 | 100 | 50 | 35 |
| ER60-405 | 4.0 | 135 | 130 | 100 | 50 | 35 |
| ER60-605 | 6.0 | 180 | 130 | 100 | 50 | 35 |
| ER60-805 | 8.0 | 250 | 130 | 100 | 50 | 35 |
| ER60-106 | 10.0 | 290 | 130 | 100 | 50 | 35 |
| ER60-126 | 12.0 | 345 | 130 | 100 | 50 | 35 |
| ER60-206 | 20.0 | 180 | 220 | 164 | 125 | 60 |
| 8000 V_{DC} WKG | | | | | | |
| ER80-503 | 0.05 | 58 | 60 | 54 | (1) | 60 |
| ER80-104 | 0.1 | 65 | 60 | 54 | (1) | 60 |
| ER80-254 | 0.25 | 85 | 60 | 54 | (1) | 60 |
| ER80-504 | 0.5 | 140 | 60 | 54 | (1) | 60 |
| ER80-105 | 1.0 | 120 | 85 | 67 | 40 | 60 |
| ER80-205 | 2.0 | 120 | 130 | 100 | 50 | 60 |
| ER80-405 | 4.0 | 200 | 130 | 100 | 50 | 60 |
| ER80-605 | 6.0 | 270 | 130 | 100 | 50 | 60 |
| ER80-805 | 8.0 | 345 | 130 | 100 | 50 | 60 |
| ER80-156 | 15.0 | 280 | 180 | 180 | 75 | 60 |
| 10 000 V_{DC} WKG | | | | | | |
| ER100-503 | 0.05 | 58 | 80 | 48 | 40 | 60 |
| ER100-104 | 0.1 | 65 | 80 | 48 | 54 | 60 |
| ER100-504 | 0.5 | 140 | 80 | 48 | 40 | 60 |
| ER100-105 | 1.0 | 160 | 85 | 67 | 40 | 60 |
| ER100-205 | 2.0 | 140 | 130 | 100 | 50 | 60 |
| ER100-405 | 4.0 | 260 | 130 | 100 | 50 | 60 |
| ER100-605 | 6.0 | 350 | 130 | 100 | 50 | 60 |
| ER100-805 | 8.0 | 300 | 190 | 120 | 75 | 60 |
| ER100-156 | 15.0 | 350 | 180 | 180 | 75 | 60 |

| TYPE DESCRIPTION | | | | | | |
|----------------------------------|-----------------|-----|-----|-----|-----|-----|
| PART NUMBER | CAP. μ F | A | B | C | D | E |
| 12 000 V_{DC} WKG | | | | | | |
| ER120-503 | 0.05 | 75 | 85 | 67 | 40 | 60 |
| ER120-104 | 0.10 | 100 | 85 | 67 | 40 | 60 |
| ER120-254 | 0.25 | 105 | 85 | 67 | 40 | 60 |
| ER120-105 | 1.0 | 145 | 130 | 100 | 75 | 60 |
| ER120-205 | 2.0 | 240 | 130 | 100 | 75 | 60 |
| ER120-405 | 4.0 | 280 | 190 | 120 | 75 | 60 |
| 15 000 V_{DC} WKG | | | | | | |
| ER150-103 | 0.01 | 60 | 60 | 54 | (1) | 60 |
| ER150-203 | 0.02 | 60 | 60 | 54 | (1) | 60 |
| ER150-503 | 0.05 | 85 | 60 | 54 | (1) | 60 |
| ER150-104 | 0.10 | 105 | 80 | 48 | (1) | 60 |
| ER150-254 | 0.25 | 125 | 85 | 67 | 40 | 60 |
| ER150-504 | 0.50 | 190 | 85 | 67 | 40 | 60 |
| ER150-504X | 0.50 | 105 | 130 | 100 | 75 | 60 |
| ER150-105 | 1.0 | 160 | 130 | 100 | 75 | 60 |
| ER150-205 | 2.0 | 190 | 159 | 120 | 75 | 60 |
| 20 000 V_{DC} WKG | | | | | | |
| ER200-103 | 0.01 | 70 | 80 | 48 | (1) | 60 |
| ER200-503X | 0.05 | 85 | 85 | 67 | 40 | 60 |
| ER200-104 | 0.1 | 105 | 85 | 67 | 40 | 60 |
| ER200-254 | 0.25 | 190 | 85 | 67 | 40 | 60 |
| ER200-504 | 0.5 | 160 | 130 | 100 | 75 | 60 |
| ER200-105 | 1.0 | 300 | 130 | 100 | 75 | 60 |
| ER200-205 | 2.0 | 250 | 180 | 180 | 90 | 100 |
| ER200-405 | 4.0 | 305 | 240 | 180 | 100 | 100 |
| 25 000 V_{DC} WKG | | | | | | |
| ER250-503 | 0.05 | 110 | 85 | 67 | (1) | 70 |
| ER250-104X | 0.1 | 95 | 130 | 100 | 65 | 70 |
| ER250-254 | 0.25 | 130 | 130 | 100 | 65 | 70 |
| ER250-504 | 0.5 | 250 | 130 | 100 | 65 | 70 |
| 30 000 V_{DC} WKG | | | | | | |
| ER300-303 | 0.03 | 120 | 85 | 67 | (1) | 70 |
| ER300-104 | 0.1 | 200 | 85 | 67 | (1) | 70 |
| ER300-104X | 0.1 | 120 | 130 | 100 | 65 | 70 |
| ER300-504 | 0.5 | 315 | 130 | 100 | 65 | 70 |
| ER300-105 | 1.0 | 295 | 180 | 180 | 75 | 100 |
| 40 000 V_{DC} WKG | | | | | | |
| ER400-303 | 0.03 | 160 | 85 | 67 | (1) | 70 |
| ER400-503 | 0.05 | 210 | 85 | 67 | (1) | 70 |
| ER400-503X | 0.05 | 125 | 130 | 100 | 65 | 70 |

Note

(1) These capacitors are fitted with one high voltage terminal and case terminal. An additional terminal for connection to case is available as an optional extra. Add suffix M to part number.



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