

DATA SHEET

157 PUM-SI

Aluminum electrolytic capacitors
Power Ultra Miniature Snap-in

Product specification
Supersedes data of 18th January 2000
File under BCcomponents, BC01

2000 Nov 06

Aluminum electrolytic capacitors

Power Ultra Miniature Snap-in

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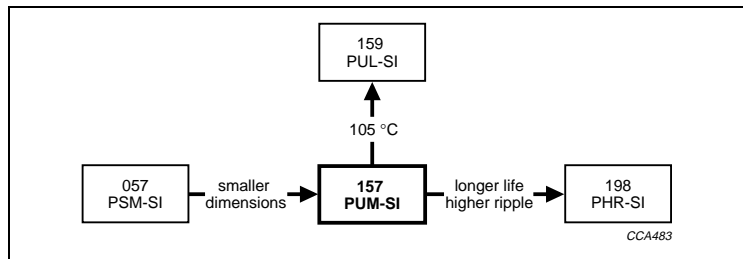
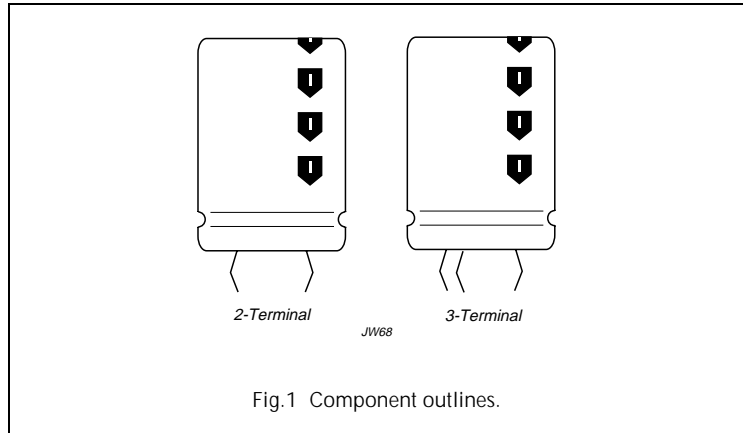
FEATURES

- Polarized aluminum electrolytic capacitors, non-solid electrolyte
- Large types, very small dimensions, cylindrical aluminum case, insulated with a blue sleeve
- Pressure relief on the top of the aluminum case⁽¹⁾
- Charge and discharge proof
- Useful life: 2 500 hours at 85 °C
- Keyed polarity version available.

APPLICATIONS

- General purpose, industrial and audio/video systems
- Smoothing and filtering
- Standard and switched mode power supplies
- Energy storage in pulse systems.

(1)Pressure relief in the side, for case size 35 × 60 mm



QUICK REFERENCE DATA

| DESCRIPTION | VALUE | |
|---|------------------------|---------------|
| Case size ($\varnothing D_{nom} \times L_{nom}$ in mm) | 22 × 25 to 35 × 60 | |
| Rated capacitance range (E6/E12 series), C_R | 56 to 2 200 μF | |
| Tolerance on C_R | ±20% | |
| Rated voltage range, U_R ; note 1 | 200 V, 250 V | 400 V, 450 V |
| Category temperature range | -40 to +85 °C | -25 to +85 °C |
| Endurance test at 85 °C | 2000 hours | |
| Load life at 85 °C | 2000 hours | |
| Useful life at 85 °C | 2500 hours | |
| Useful life at 40 °C and $1.4 \times I_R$ applied | 45000 hours | |
| Shelf life at 0 V, 85 °C | 1000 hours | |
| Based on sectional specification | IEC 60384-4-1/EN130300 | |
| Climatic category IEC 60068 | 40/085/56 | 25/085/56 |

Note

1. 160 volt and 420 V ranges are available on request.

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Selection chart for C_R , U_R and relevant nominal case sizes ($\varnothing D \times L$ in mm); preferred types (2-terminals) in bold

| C_R (μF) | U_R (V) | | | |
|----------------------------|----------------|----------------|----------------|----------------|
| | 200 | 250 | 400 | 450 |
| 56 | – | – | – | 22 × 25 |
| 68 | – | – | 22 × 25 | 22 × 30 |
| 82 | – | – | 22 × 25 | 22 × 30 |
| | – | – | – | 25 × 25 |
| 100 | – | – | 22 × 30 | 22 × 35 |
| | – | – | – | 25 × 30 |
| 120 | – | – | 22 × 30 | 22 × 40 |
| | – | – | – | 25 × 30 |
| | – | – | – | 30 × 25 |
| 150 | – | – | 22 × 35 | 25 × 35 |
| | – | – | 25 × 30 | 25 × 40 |
| | – | – | – | 30 × 30 |
| 180 | – | – | 22 × 40 | 25 × 40 |
| | – | – | 25 × 35 | 30 × 35 |
| | – | – | – | 35 × 25 |
| 220 | – | 22 × 30 | 25 × 40 | 25 × 50 |
| | – | – | 30 × 30 | 30 × 40 |
| | – | – | 35 × 25 | 35 × 30 |
| 270 | 22 × 25 | 22 × 30 | 25 × 45 | 30 × 45 |
| | – | 25 × 25 | 30 × 35 | 35 × 35 |
| | – | – | 35 × 30 | – |
| 330 | 22 × 30 | 22 × 35 | 30 × 40 | 30 × 50 |
| | – | 25 × 30 | 35 × 30 | 35 × 40 |
| 390 | 22 × 30 | 22 × 40 | 30 × 45 | 35 × 45 |
| | – | 30 × 25 | 35 × 35 | – |
| 470 | 22 × 35 | 25 × 35 | 30 × 50 | 35 × 50 |
| | 25 × 30 | 30 × 30 | 35 × 40 | – |
| 560 | 22 × 40 | 25 × 40 | 35 × 45 | – |
| | 25 × 35 | 30 × 30 | – | – |
| | 30 × 25 | 35 × 25 | – | – |
| 680 | 25 × 40 | 25 × 45 | 35 × 50 | 35 × 60 |
| | 30 × 30 | 30 × 35 | – | – |
| | 35 × 25 | 35 × 30 | – | – |
| 820 | 25 × 45 | 30 × 40 | 35 × 60 | – |
| | 30 × 35 | 35 × 35 | – | – |
| | 35 × 30 | – | – | – |
| 1000 | 30 × 40 | 30 × 45 | – | – |
| | 35 × 30 | 35 × 40 | – | – |
| 1200 | 30 × 45 | 35 × 45 | – | – |
| | 35 × 35 | – | – | – |
| 1500 | 30 × 50 | 35 × 50 | – | – |
| | 35 × 40 | – | – | – |
| 1800 | 35 × 45 | – | – | – |
| 2200 | 35 × 50 | – | – | – |

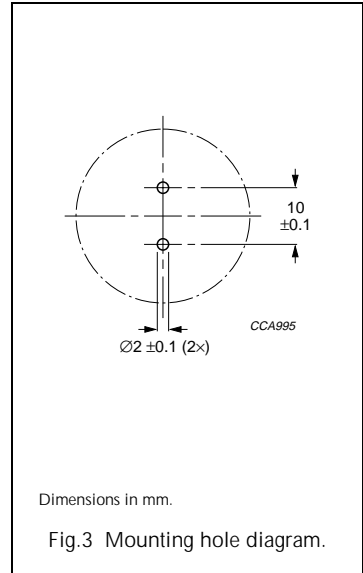
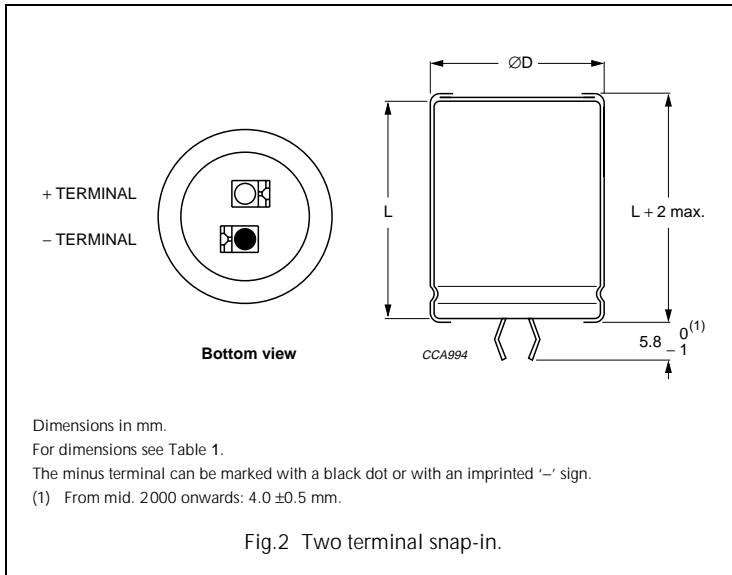
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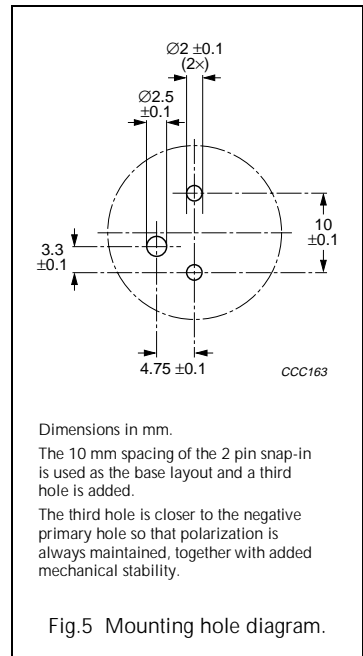
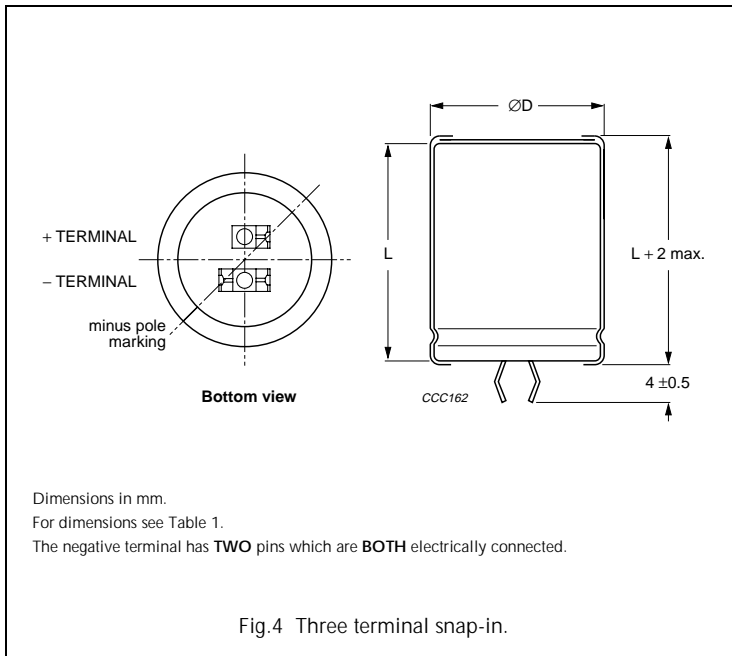
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MECHANICAL DATA AND PACKAGING QUANTITIES

Two terminal snap-in



Three terminal snap-in



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Table 1 Physical dimensions, mass and packaging information; see Figs 2 and 4

| NOMINAL CASE SIZE ∅D × L (mm) | ∅D _{max} (mm) | L _{max} (mm) | MASS (g) | PACKAGING QUANTITIES (units per box) | CARDBOARD BOX DIMENSIONS l × w × h (mm) |
|-------------------------------------|---------------------------|--------------------------|-------------|---|---|
| 22 × 25 | 23 | 27 | ≈12 | 100 | 260 × 250 × 39 |
| 22 × 30 | 23 | 32 | ≈16 | 100 | 260 × 250 × 44 |
| 22 × 35 | 23 | 37 | ≈20 | 100 | 260 × 250 × 49 |
| 22 × 40 | 23 | 42 | ≈23 | 100 | 260 × 250 × 54 |
| 25 × 25 | 26 | 27 | ≈20 | 100 | 290 × 280 × 39 |
| 25 × 30 | 26 | 32 | ≈22 | 100 | 290 × 280 × 44 |
| 25 × 35 | 26 | 37 | ≈24 | 100 | 290 × 280 × 49 |
| 25 × 40 | 26 | 42 | ≈27 | 100 | 290 × 280 × 54 |
| 25 × 45 | 26 | 47 | ≈32 | 100 | 290 × 280 × 59 |
| 25 × 50 | 26 | 52 | ≈38 | 100 | 290 × 280 × 64 |
| 30 × 25 | 31 | 27 | ≈25 | 100 | 340 × 330 × 39 |
| 30 × 30 | 31 | 32 | ≈30 | 100 | 340 × 330 × 44 |
| 30 × 35 | 31 | 37 | ≈35 | 100 | 340 × 330 × 49 |
| 30 × 40 | 31 | 42 | ≈40 | 100 | 340 × 330 × 54 |
| 30 × 45 | 31 | 47 | ≈45 | 100 | 340 × 330 × 59 |
| 30 × 50 | 31 | 52 | ≈50 | 100 | 340 × 330 × 64 |
| 35 × 25 | 36 | 27 | ≈33 | 50 | 390 × 198 × 39 |
| 35 × 30 | 36 | 32 | ≈40 | 50 | 390 × 198 × 44 |
| 35 × 35 | 36 | 37 | ≈48 | 50 | 390 × 198 × 49 |
| 35 × 40 | 36 | 42 | ≈55 | 50 | 390 × 198 × 54 |
| 35 × 45 | 36 | 47 | ≈63 | 50 | 390 × 198 × 59 |
| 35 × 50 | 36 | 52 | ≈72 | 50 | 390 × 198 × 64 |
| 35 × 60 | 36 | 62 | ≈82 | 50 | 390 × 198 × 74 |

MARKING

The capacitors are marked (where possible) with the following information:

- Rated capacitance (in μF)
- Tolerance code on rated capacitance (M for $\pm 20\%$)
- Rated voltage (in V)
- Climatic category in accordance with "IEC 60068"
- Date code (year and week) in accordance with "IEC 60062"
- Code for factory of origin
- Name of manufacturer
- '-' sign to indicate the negative terminal, visible from the top and side of the capacitor
- Code number (last 8 digits)
- Code for basic specification in accordance with "IEC 60384-4-1" and "CECC 30301".

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ELECTRICAL DATA AND ORDERING INFORMATION

Unless otherwise specified, all electrical values in Table 2 apply at $T_{amb} = 20\text{ °C}$,
 $P = 86$ to 106 kPa , $RH = 45$ to 75% .

| SYMBOL | DESCRIPTION |
|----------|--|
| C_R | rated capacitance at 100/120 Hz |
| I_R | rated RMS ripple current at 120 Hz, 85 °C |
| I_{L5} | max. leakage current after 5 minutes at U_R |
| ESR | typ./max. equivalent series resistance at 100 Hz; note 1 |
| Z | typ./max. impedance at 10 kHz |

Ordering examples

Electrolytic capacitor 157 series

1000 μF /200 V; $\pm 20\%$

Nominal case size: $\varnothing 30 \times 40\text{ mm}$

2-TERMINAL SNAP-IN:

Catalogue number: 2222 157 52102.

3-TERMINAL SNAP-IN:

Catalogue number: 2222 157 72102.

Note

- ESR at 120 Hz is approximately $0.95 \times \text{ESR } 100\text{ Hz}$.

Table 2 Electrical data and ordering information; preferred types in **bold**

| U_R (V) | C_R 100 Hz (μF) | NOMINAL CASE SIZE $\varnothing D \times L$ (mm) | I_R 120 Hz 85 °C (A) | I_{L5} 5 min (mA) | TYP. ESR 100 Hz ⁽¹⁾ (m Ω) | MAX. ESR 100 Hz ⁽¹⁾ (m Ω) | TYP. Z 10 kHz (m Ω) | MAX. Z 10 kHz (m Ω) | CATALOGUE NUMBER 2222 157 | |
|--------------|--------------------------------------|--|---------------------------------|---------------------------|--|--|-----------------------------------|-----------------------------------|---------------------------------------|---------|
| | | | | | | | | | 2-TERM. | 3-TERM. |
| 200 | 270 | 22 × 25 | 1.15 | 0.54 | 550 | 880 | 420 | 700 | 52271 | 72271 |
| | 330 | 22 × 30 | 1.36 | 0.66 | 430 | 720 | 300 | 500 | 52331 | 72331 |
| | 390 | 22 × 30 | 1.46 | 0.78 | 390 | 650 | 295 | 490 | 52391 | 72391 |
| | 470 | 22 × 35 | 1.68 | 0.94 | 350 | 580 | 240 | 400 | 32471 | 12471 |
| | 470 | 25 × 30 | 1.67 | 0.94 | 350 | 580 | 240 | 400 | 52471 | 72471 |
| | 560 | 22 × 40 | 1.91 | 1.12 | 255 | 425 | 235 | 390 | 42561 | 22561 |
| | 560 | 25 × 35 | 1.91 | 1.12 | 255 | 425 | 235 | 390 | 32561 | 12561 |
| | 560 | 30 × 25 | 1.89 | 1.12 | 255 | 425 | 235 | 390 | 52561 | 72561 |
| | 680 | 25 × 40 | 2.18 | 1.36 | 210 | 350 | 205 | 340 | 42681 | 22681 |
| | 680 | 30 × 30 | 2.04 | 1.36 | 210 | 350 | 205 | 340 | 52681 | 72681 |
| | 680 | 35 × 25 | 2.06 | 1.36 | 210 | 350 | 205 | 340 | 62681 | 82681 |
| | 820 | 25 × 45 | 2.46 | 1.64 | 170 | 290 | 145 | 240 | 62821 | 82821 |
| | 820 | 30 × 35 | 2.35 | 1.64 | 170 | 290 | 145 | 240 | 32821 | 12821 |
| | 820 | 35 × 30 | 2.29 | 1.64 | 170 | 290 | 145 | 240 | 52821 | 72821 |
| | 1000 | 30 × 40 | 2.66 | 2.00 | 140 | 235 | 135 | 225 | 52102 | 72102 |
| | 1000 | 35 × 30 | 2.33 | 2.00 | 140 | 235 | 135 | 225 | 62102 | 82102 |
| | 1200 | 30 × 45 | 2.98 | 2.40 | 120 | 200 | 110 | 190 | 32122 | 12122 |
| | 1200 | 35 × 35 | 2.69 | 2.40 | 120 | 200 | 110 | 190 | 62122 | 82122 |
| | 1500 | 30 × 50 | 3.31 | 3.00 | 110 | 180 | 95 | 155 | 42152 | 22152 |
| | 1500 | 35 × 40 | 3.04 | 3.00 | 110 | 180 | 95 | 155 | 52152 | 72152 |
| | 1800 | 35 × 45 | 3.36 | 3.60 | 100 | 160 | 80 | 130 | 42182 | 22182 |
| | 2200 | 35 × 50 | 3.68 | 4.40 | 90 | 150 | 65 | 105 | 52222 | 72222 |

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| U _R (V) | C _R 100 Hz (μF) | NOMINAL CASE SIZE ∅D × L (mm) | I _R 120 Hz 85 °C (A) | I _{L5} 5 min (mA) | TYP. ESR 100 Hz ⁽¹⁾ (mΩ) | MAX. ESR 100 Hz ⁽¹⁾ (mΩ) | TYP. Z 10 kHz (mΩ) | MAX. Z 10 kHz (mΩ) | CATALOGUE NUMBER 2222 157 | |
|-----------------------|----------------------------------|--|--|----------------------------------|---|---|--------------------------|--------------------------|---------------------------------------|---------|
| | | | | | | | | | 2-TERM. | 3-TERM. |
| 250 | 220 | 22 × 30 | 1.23 | 0.55 | 600 | 1080 | 420 | 700 | 53221 | 73221 |
| | 270 | 22 × 30 | 1.32 | 0.67 | 490 | 880 | 335 | 560 | 43271 | 23271 |
| | 270 | 25 × 25 | 1.23 | 0.67 | 490 | 880 | 335 | 560 | 53271 | 73271 |
| | 330 | 22 × 35 | 1.53 | 0.82 | 400 | 720 | 255 | 430 | 33331 | 13331 |
| | 330 | 25 × 30 | 1.56 | 0.82 | 400 | 720 | 255 | 430 | 53331 | 73331 |
| | 390 | 22 × 40 | 1.74 | 0.97 | 330 | 610 | 250 | 425 | 43391 | 23391 |
| | 390 | 30 × 25 | 1.58 | 0.97 | 330 | 610 | 250 | 425 | 53391 | 73391 |
| | 470 | 25 × 35 | 1.87 | 1.17 | 280 | 505 | 190 | 320 | 33471 | 13471 |
| | 470 | 30 × 30 | 1.89 | 1.17 | 280 | 505 | 190 | 320 | 53471 | 73471 |
| | 560 | 25 × 40 | 2.12 | 1.40 | 240 | 425 | 185 | 310 | 43561 | 23561 |
| | 560 | 30 × 30 | 1.97 | 1.40 | 240 | 425 | 185 | 310 | 53561 | 73561 |
| | 560 | 35 × 25 | 1.80 | 1.40 | 240 | 425 | 185 | 310 | 63561 | 83561 |
| | 680 | 25 × 45 | 2.29 | 1.70 | 200 | 350 | 155 | 260 | 63681 | 83681 |
| | 680 | 30 × 35 | 2.28 | 1.70 | 200 | 350 | 155 | 260 | 33681 | 13681 |
| | 680 | 35 × 30 | 2.20 | 1.70 | 200 | 350 | 155 | 260 | 53681 | 73681 |
| | 820 | 30 × 40 | 2.57 | 2.05 | 160 | 290 | 125 | 210 | 53821 | 73821 |
| | 820 | 35 × 35 | 2.54 | 2.05 | 160 | 290 | 125 | 210 | 63821 | 83821 |
| | 1000 | 30 × 45 | 2.88 | 2.50 | 140 | 235 | 105 | 180 | 33102 | 13102 |
| | 1000 | 35 × 40 | 2.86 | 2.50 | 140 | 235 | 105 | 180 | 53102 | 73102 |
| | 1200 | 35 × 45 | 3.17 | 3.00 | 120 | 200 | 95 | 160 | 43122 | 23122 |
| 1500 | 35 × 50 | 3.49 | 3.75 | 90 | 160 | 85 | 140 | 53152 | 73152 | |

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| U _R (V) | C _R 100 Hz (μF) | NOMINAL CASE SIZE ∅D × L (mm) | I _R 120 Hz 85 °C (A) | I _{L5} 5 min (mA) | TYP. ESR 100 Hz ⁽¹⁾ (mΩ) | MAX. ESR 100 Hz ⁽¹⁾ (mΩ) | TYP. Z 10 kHz (mΩ) | MAX. Z 10 kHz (mΩ) | CATALOGUE NUMBER 2222 157 | |
|-----------------------|----------------------------------|--|--|----------------------------------|---|---|--------------------------|--------------------------|---------------------------------------|---------|
| | | | | | | | | | 2-TERM. | 3-TERM. |
| 400 | 68 | 22 × 25 | 0.71 | 0.27 | 1400 | 2800 | 1170 | 1950 | 56689 | 76689 |
| | 82 | 22 × 25 | 0.77 | 0.33 | 1250 | 2500 | 970 | 1620 | 56829 | 76829 |
| | 100 | 22 × 30 | 0.94 | 0.40 | 1125 | 2250 | 750 | 1220 | 56101 | 76101 |
| | 120 | 22 × 30 | 0.97 | 0.48 | 990 | 1980 | 700 | 1140 | 56121 | 76121 |
| | 150 | 22 × 35 | 1.13 | 0.60 | 750 | 1500 | 540 | 900 | 36151 | 16151 |
| | 150 | 25 × 30 | 1.16 | 0.60 | 750 | 1500 | 540 | 900 | 56151 | 76151 |
| | 180 | 22 × 40 | 1.29 | 0.72 | 630 | 1260 | 435 | 725 | 46181 | 26181 |
| | 180 | 25 × 35 | 1.35 | 0.72 | 630 | 1260 | 435 | 725 | 36181 | 16181 |
| | 220 | 25 × 40 | 1.54 | 0.88 | 520 | 1040 | 355 | 590 | 46221 | 26221 |
| | 220 | 30 × 30 | 1.50 | 0.88 | 520 | 1040 | 355 | 590 | 56221 | 76221 |
| | 220 | 35 × 25 | 1.42 | 0.88 | 520 | 1040 | 355 | 590 | 66221 | 86221 |
| | 270 | 25 × 45 | 1.72 | 1.08 | 430 | 860 | 335 | 560 | 66271 | 86271 |
| | 270 | 30 × 35 | 1.74 | 1.08 | 430 | 860 | 335 | 560 | 36271 | 16271 |
| | 270 | 35 × 30 | 1.71 | 1.08 | 430 | 860 | 335 | 560 | 56271 | 76271 |
| | 330 | 30 × 40 | 1.97 | 1.32 | 350 | 700 | 315 | 525 | 56331 | 76331 |
| | 330 | 35 × 30 | 1.76 | 1.32 | 350 | 700 | 315 | 525 | 66331 | 86331 |
| | 390 | 30 × 45 | 2.19 | 1.56 | 300 | 610 | 250 | 420 | 56391 | 76391 |
| | 390 | 35 × 35 | 2.04 | 1.56 | 300 | 610 | 250 | 420 | 36391 | 16391 |
| | 470 | 30 × 50 | 2.40 | 1.88 | 250 | 505 | 210 | 350 | 46471 | 26471 |
| | 470 | 35 × 40 | 2.30 | 1.88 | 250 | 505 | 210 | 350 | 56471 | 76471 |
| 560 | 35 × 45 | 2.55 | 2.24 | 210 | 425 | 180 | 305 | 46561 | 26561 | |
| 680 | 35 × 50 | 2.79 | 2.72 | 190 | 380 | 160 | 265 | 56681 | 76681 | |
| 820 | 35 × 60 | 3.33 | 3.28 | 155 | 315 | 115 | 215 | 56821 | 76821 | |

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| U _R (V) | C _R 100 Hz (μF) | NOMINAL CASE SIZE ∅D × L (mm) | I _R 120 Hz 85 °C (A) | I _{L5} 5 min (mA) | TYP. ESR 100 Hz ⁽¹⁾ (mΩ) | MAX. ESR 100 Hz ⁽¹⁾ (mΩ) | TYP. Z 10 kHz (mΩ) | MAX. Z 10 kHz (mΩ) | CATALOGUE NUMBER 2222 157 | |
|-----------------------|----------------------------------|--|--|----------------------------------|---|---|--------------------------|--------------------------|---------------------------------------|---------|
| | | | | | | | | | 2-TERM. | 3-TERM. |
| 450 | 56 | 22 × 25 | 0.68 | 0.25 | 1650 | 3300 | 1120 | 1880 | 57569 | 77569 |
| | 68 | 22 × 30 | 0.80 | 0.30 | 1400 | 2800 | 920 | 1530 | 57689 | 77689 |
| | 82 | 22 × 30 | 0.87 | 0.36 | 1200 | 2400 | 780 | 1290 | 47829 | 27829 |
| | 82 | 25 × 25 | 0.85 | 0.36 | 1200 | 2400 | 780 | 1290 | 57829 | 77829 |
| | 100 | 22 × 35 | 1.00 | 0.45 | 1000 | 2000 | 630 | 1050 | 37101 | 17101 |
| | 100 | 25 × 30 | 1.02 | 0.45 | 1000 | 2000 | 630 | 1050 | 57101 | 77101 |
| | 120 | 22 × 40 | 1.15 | 0.54 | 800 | 1600 | 530 | 885 | 47121 | 27121 |
| | 120 | 25 × 30 | 1.09 | 0.54 | 800 | 1600 | 530 | 885 | 57121 | 77121 |
| | 120 | 30 × 25 | 1.10 | 0.54 | 800 | 1600 | 530 | 885 | 67121 | 87121 |
| | 150 | 25 × 40 | 1.35 | 0.67 | 650 | 1300 | 420 | 705 | 47151 | 27151 |
| | 150 | 25 × 35 | 1.27 | 0.67 | 650 | 1300 | 420 | 705 | 67151 | 87151 |
| | 150 | 30 × 30 | 1.32 | 0.67 | 650 | 1300 | 420 | 705 | 57151 | 77151 |
| | 180 | 25 × 40 | 1.45 | 0.81 | 570 | 1150 | 360 | 605 | 47181 | 27181 |
| | 180 | 30 × 35 | 1.49 | 0.81 | 570 | 1150 | 360 | 605 | 57181 | 77181 |
| | 180 | 35 × 25 | 1.35 | 0.81 | 570 | 1150 | 360 | 605 | 67181 | 87181 |
| | 220 | 25 × 50 | 1.73 | 0.99 | 450 | 900 | 315 | 525 | 47221 | 27221 |
| | 220 | 30 × 40 | 1.72 | 0.99 | 450 | 900 | 315 | 525 | 57221 | 77221 |
| | 220 | 35 × 30 | 1.61 | 0.99 | 450 | 900 | 315 | 525 | 67221 | 87221 |
| | 270 | 30 × 45 | 1.95 | 1.21 | 380 | 770 | 270 | 450 | 37271 | 17271 |
| | 270 | 35 × 35 | 1.86 | 1.21 | 380 | 770 | 270 | 450 | 67271 | 87271 |
| 330 | 30 × 50 | 2.19 | 1.48 | 300 | 600 | 230 | 390 | 47331 | 27331 | |
| 330 | 35 × 40 | 2.10 | 1.48 | 300 | 600 | 230 | 390 | 57331 | 77331 | |
| 390 | 35 × 45 | 2.34 | 1.75 | 250 | 500 | 190 | 340 | 47391 | 27391 | |
| 470 | 35 × 50 | 2.60 | 2.11 | 210 | 420 | 170 | 290 | 57471 | 77471 | |
| 680 | 35 × 60 | 3.15 | 3.06 | 150 | 300 | 110 | 200 | 57681 | 77681 | |

Note

1. ESR at 120 Hz is approximately $0.95 \times$ ESR 100 Hz.

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Additional electrical data

| PARAMETER | CONDITIONS | VALUE |
|------------------------------------|--------------------------|-----------------------------------|
| Voltage | | |
| Surge voltage | ≥400 V versions | $U_s = 1.1 \times U_R$ |
| | ≤250 V versions | $U_s = 1.15 \times U_R$ |
| Reverse voltage | | ≤1 V |
| Current | | |
| Leakage current | after 5 minutes at U_R | $I_{L5} \leq 0.01 C_R \times U_R$ |
| Inductance | | |
| Equivalent series inductance (ESL) | all case sizes | typ. 19 nH |
| | | max. 25 nH |

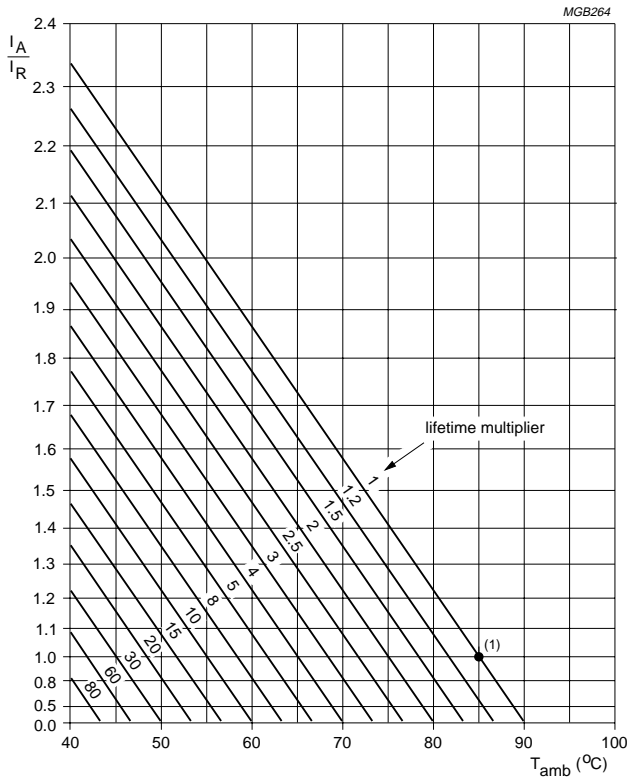
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RIPPLE CURRENT AND USEFUL LIFE

Table 3 Multiplier of ripple current (I_R) as a function of frequency

| FREQUENCY (Hz) | I_R MULTIPLIER |
|----------------|------------------|
| 50 | 0.9 |
| 100 | 0.95 |
| 120 | 1.0 |
| 200 | 1.15 |
| 1000 | 1.3 |
| ≥ 10000 | 1.4 |



I_A = actual ripple current at 120 Hz and 85 °C.
 I_R = rated ripple current at 120 Hz and 85 °C.
 (1) Useful life at 85 °C and I_R applied: 2500 hours.

Fig.6 Multiplier of useful life as a function of ambient temperature and ripple current load.

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SPECIFIC TESTS AND REQUIREMENTS

General tests and requirements are specified in this handbook, section "Tests and Requirements".

Table 4 Test procedures and requirements

| TEST | | PROCEDURE (quick reference) | REQUIREMENTS |
|--|--|--|--|
| NAME OF TEST | REFERENCE | | |
| Endurance | IEC 60384-4/ EN130300 subclause 4.13 | $T_{amb} = 85\text{ °C}$; U_R applied; 2000 hours | $\Delta C/C: \pm 10\%$ $ESR \leq 2 \times \text{spec. limit}$ $I_{L5} \leq \text{spec. limit}$ |
| Load life | | $T_{amb} = 85\text{ °C}$; U_R and I_R applied; 2000 hours | $\Delta C/C: \pm 20\%$ $ESR \leq 2 \times \text{spec. limit}$ $I_{L5} \leq \text{spec. limit}$ |
| Useful life | CECC 30301 subclause 1.8.1 | $T_{amb} = 85\text{ °C}$; U_R and I_R applied; 2500 hours | $\Delta C/C: \pm 30\%$ $ESR \leq 3 \times \text{spec. limit}$ $I_{L5} \leq \text{spec. limit}$ no short or open circuit, no visible damage total failure percentage: $\leq 3\%$ |
| Shelf life (storage at high temperature) | IEC 60384-4/ EN130300 subclause 4.17 | $T_{amb} = 85\text{ °C}$; no voltage applied; 1000 hours after test: U_R to be applied for 30 minutes, 24 to 48 hours before measurement | $\Delta C/C: \pm 15\%$ $ESR \leq 1.5 \times \text{spec. limit}$ $I_{L5} \leq 1 \times \text{spec. limit}$ |