

ERSH

SMD (Chip)
 High temperature resistant system
 Endurance 1.500h to 2.500h at 125°C
 Rated voltage range: 10V to 63V, Rated capacitance range: 6,8µF to 680µF
 Size range: 8,9 x 12,0mm and 10,2 x 12,0mm
 Designed as G-Kap (C_R measured at DC-Load) or bipolar Chip capacitor available
 RoHS compliant
 Special types on request



Specifications

| | Characteristics | | | | | | | | |
|---|---|---|-------|-------|-------|------|-------|-------|------------------|
| Temperature range | -55°C to +125°C | | | | | | | | |
| Rated voltage range | 10V to 63V | | | | | | | | |
| Capacitance tolerance | ±20%, other on request (at 20°C, 100Hz) | | | | | | | | |
| Leakage current I_{ra} | $I_{ra}=0,002 \cdot C_R \cdot V_R + 3\mu A$ or 5µA, whichever is greater (I_{ra} [µA], C_R : Rated capacitance [µF], V_R : Rated voltage [V]) (at 20°C, after 5 minutes) | | | | | | | | |
| Dissipation factor $\tan \delta$ (D.F.) | Rated voltage (V_R) | 10V | 16V | 25V | 35V | 40V | 50V | 63V | (at 20°C, 100Hz) |
| | $\tan \delta_{max}$ | 0,19 | 0,16 | 0,14 | 0,12 | 0,11 | 0,10 | 0,09 | |
| Low temperature characteristics | Rated voltage (V_R) | 10V | 16V | 25V | 35V | 40V | 50V | 63V | (100Hz) |
| | Z(-40°C)/(20°C) | 2 | 2 | 2 | 2 | 2 | 2 | 2 | |
| Z_{max}-factor | | | | | | | | | |
| Endurance | The following specifications shall be satisfied when the capacitors are restored to 20°C after the rated voltage is applied for 1.500 to 2.500 hours at 125°C. | | | | | | | | |
| | Capacitance change | $\Delta C/C_0 \leq \pm 30\%$ | | | | | | | |
| | D.F. ($\tan \delta$) | $\Delta \tan \delta \leq +300\%$ of the initial specification value | | | | | | | |
| | Leakage current (I_{ra}) | $I_{ra} \leq$ the initial specified value | | | | | | | |
| Shelf life | The following specifications shall be satisfied when the capacitors are restored to 20°C after exposing them for 1.000 hours at 125°C without voltage applied. | | | | | | | | |
| | Capacitance change | $\Delta C/C_0 \leq \pm 25\%$ | | | | | | | |
| | D.F. ($\tan \delta$) | $\Delta \tan \delta \leq +200\%$ of the initial specification value | | | | | | | |
| | Leakage current (I_{ra}) | $I_{ra} \leq +200\%$ of the initial specification value | | | | | | | |
| Surge voltage test | The capacitors shall be subjected to 1.000 cycles each consisting of charging with the specified surge voltage for 30±5 seconds through a protective resistor ($R=0,1/C_R$) and open-circuiting for 330 seconds at 125°C. The following specifications shall be satisfied when the capacitors are restored to 20°C. | | | | | | | | |
| | Rated voltage (V_R) | 10V | 16V | 25V | 35V | 40V | 50V | 63V | |
| | Surge voltage (V_S) | 11,5V | 18,4V | 28,8V | 40,3V | 46V | 57,5V | 72,5V | |
| | Appearance | No significant damage | | | | | | | |
| | Capacitance change | $\Delta C/C_0 \leq \pm 10\%$ | | | | | | | |
| | D.F. ($\tan \delta$) | $\tan \delta \leq$ the initial specified value | | | | | | | |
| | Leakage current (I_{ra}) | $I_{ra} \leq$ the initial specified value | | | | | | | |

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ISO 9001

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Aluminum-electrolytic capacitors SMD (Chip) for surface mounting in the special electronics for example automobile industry. Endurance at least 1.500h to 2.500h at +125°C

ERSH

Generic specification:
DIN EN 60384-1

Sectional specification:
DIN EN 60384-18
Whitout quality assessment

Opening temperature range:
-55 to +125°C

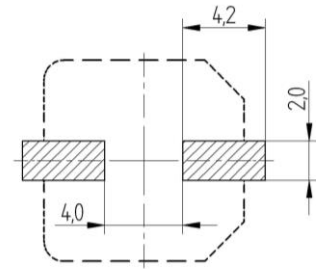
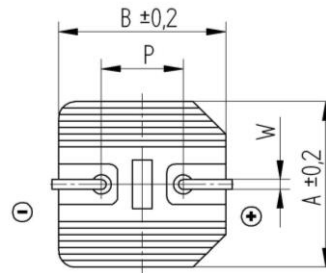
Climatic category:
55/125/56

Capacitance range:
±20%, other on request

Surge voltage V_S :
 $V_S = 1,15 \cdot V_R$

Leakage current I_{ra} :
measured at V_R at +20°C
 $I_{ra} \leq 0,002 \cdot C_R \cdot V_R + 3\mu A$ or 5μA
(after 5 minutes, whichever is greater)
 C_R : Rated capacitance [μF]
 V_R : Rated voltage [V]

Reverse voltage:
at +20°C to +25°C 2V (briefly)
at -55°C to +105°C 1V (briefly)

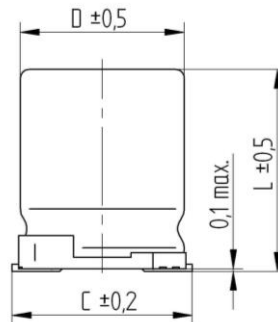


*¹)Soldering on PC board



The marking is done by printing on the case surface (Ink-Jet)

*²)Recommended Soldering area on PC board



| Dimensions [mm] | | |
|-----------------|--------------------------|-------------|
| | Terminal length x Height | |
| | 8,9 x 12,0 | 10,2 x 12,0 |
| A | 8,9 | 10,2 |
| B | 8,9 | 10,2 |
| C | 9,7 | 11,0 |
| D | 8,7 | 10,0 |
| L | 12,0 | 12,0 |
| W | 0,8-1,1 | 0,8-1,1 |
| P | 4,5 | 4,5 |

| Endurance at least (after soldering) | | |
|--------------------------------------|------------|-------------|
| Ambient temperature | 8,9 x 12,0 | 10,2 x 12,0 |
| ≤ +40°C | 600.000h | 1.000.000h |
| +85°C | 24.000h | 40.000h |
| +125°C | 1.500h | 2.500h |

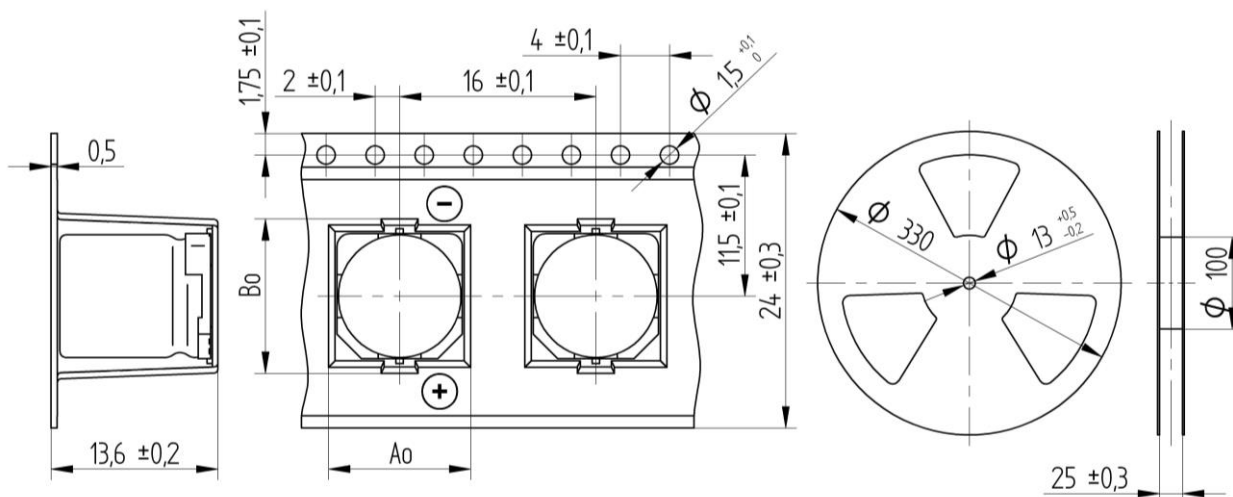
| Dimensions Overview: Terminal length x Height [mm] | | | | | | | |
|--|-------------------------|-------------|-------------|-------------|-------------|-------------|-------------|
| Rated cap. C_R [μF] | Rated voltage V_R [V] | | | | | | |
| | 10 | 16 | 25 | 35 | 40 | 50 | 63 |
| 6,8 | | | | | | | 8,9 x 12,0 |
| 10 | | | | | | 8,9 x 12,0 | 8,9 x 12,0 |
| 15 | | | | | 8,9 x 12,0 | 8,9 x 12,0 | 8,9 x 12,0 |
| 22 | | | | 8,9 x 12,0 | 8,9 x 12,0 | 8,9 x 12,0 | 8,9 x 12,0 |
| 33 | | | 8,9 x 12,0 | 8,9 x 12,0 | 8,9 x 12,0 | 8,9 x 12,0 | 8,9 x 12,0 |
| 47 | | 8,9 x 12,0 | 8,9 x 12,0 | 8,9 x 12,0 | 8,9 x 12,0 | 8,9 x 12,0 | 8,9 x 12,0 |
| 68 | 8,9 x 12,0 | 8,9 x 12,0 | 8,9 x 12,0 | 8,9 x 12,0 | 8,9 x 12,0 | 10,2 x 12,0 | 10,2 x 12,0 |
| 100 | 8,9 x 12,0 | 8,9 x 12,0 | 8,9 x 12,0 | 8,9 x 12,0 | 10,2 x 12,0 | 10,2 x 12,0 | 10,2 x 12,0 |
| 150 | 8,9 x 12,0 | 8,9 x 12,0 | 8,9 x 12,0 | 10,2 x 12,0 | 10,2 x 12,0 | 10,2 x 12,0 | |
| 220 | 8,9 x 12,0 | 8,9 x 12,0 | 10,2 x 12,0 | 10,2 x 12,0 | 10,2 x 12,0 | | |
| 330 | 8,9 x 12,0 | 10,2 x 12,0 | 10,2 x 12,0 | | | | |
| 470 | 10,2 x 12,0 | 10,2 x 12,0 | | | | | |
| 680 | 10,2 x 12,0 | | | | | | |

Technical specifications

| Rated capacitance C_R [μ F] | Rated voltage V_R [V] | Size [mm] Terminal length x Height | $\tan \delta$ 100Hz +20°C (max) | ESR [Ω] 100Hz +20°C (max) | Z [Ω] 10kHz +20°C (max) | Z [Ω] 10kHz -40°C (max) | I~ [mA]* 10/100kHz +125°C (max) | Ordering information for FROLYT SMD/Chip electrolytic capacitors |
|---------------------------------------|----------------------------|---------------------------------------|--|---|---|---|--|---|
| 68 | 10 | 8,9 x 12,0 | 0,19 | 4,45 | 0,90 | 9,9 | 176 | Series • Rated capacitance/ Rated voltage • Capacitance tolerance • Dimensions (Terminal length x Height) • Additional requirements Ordering example: ERSH 47 μ F 63V \pm 20%, 10,2 x 12,0mm, Carrier tape on reel |
| 100 | 10 | 8,9 x 12,0 | 0,19 | 3,02 | 0,53 | 5,8 | 214 | |
| 150 | 10 | 8,9 x 12,0 | 0,19 | 2,02 | 0,53 | 5,8 | 262 | |
| 220 | 10 | 8,9 x 12,0 | 0,19 | 1,37 | 0,53 | 5,8 | 317 | |
| 330 | 10 | 8,9 x 12,0 | 0,19 | 0,92 | 0,53 | 5,8 | 388 | |
| 470 | 10 | 10,2 x 12,0 | 0,19 | 0,64 | 0,42 | 4,6 | 493 | |
| 680 | 10 | 10,2 x 12,0 | 0,19 | 0,44 | 0,39 | 4,3 | 593 | |
| 47 | 16 | 8,9 x 12,0 | 0,16 | 5,42 | 1,05 | 11,6 | 160 | |
| 68 | 16 | 8,9 x 12,0 | 0,16 | 3,74 | 0,80 | 8,8 | 192 | |
| 100 | 16 | 8,9 x 12,0 | 0,16 | 2,55 | 0,53 | 5,8 | 233 | |
| 150 | 16 | 8,9 x 12,0 | 0,16 | 1,70 | 0,53 | 5,8 | 285 | |
| 220 | 16 | 8,9 x 12,0 | 0,16 | 1,16 | 0,53 | 5,8 | 345 | |
| 330 | 16 | 10,2 x 12,0 | 0,16 | 0,77 | 0,42 | 4,6 | 450 | |
| 470 | 16 | 10,2 x 12,0 | 0,16 | 0,54 | 0,42 | 4,6 | 537 | |
| 33 | 25 | 8,9 x 12,0 | 0,14 | 6,75 | 1,10 | 12,1 | 143 | |
| 47 | 25 | 8,9 x 12,0 | 0,14 | 4,74 | 0,90 | 9,9 | 171 | |
| 68 | 25 | 8,9 x 12,0 | 0,14 | 3,28 | 0,70 | 7,7 | 205 | |
| 100 | 25 | 8,9 x 12,0 | 0,14 | 2,23 | 0,53 | 5,8 | 249 | |
| 150 | 25 | 8,9 x 12,0 | 0,14 | 1,49 | 0,53 | 5,8 | 305 | |
| 220 | 25 | 10,2 x 12,0 | 0,14 | 1,01 | 0,42 | 4,6 | 393 | |
| 330 | 25 | 10,2 x 12,0 | 0,14 | 0,68 | 0,42 | 4,6 | 481 | |
| 22 | 35 | 8,9 x 12,0 | 0,12 | 8,68 | 1,15 | 12,7 | 126 | |
| 33 | 35 | 8,9 x 12,0 | 0,12 | 5,79 | 1,05 | 11,6 | 155 | |
| 47 | 35 | 8,9 x 12,0 | 0,12 | 4,06 | 0,80 | 8,8 | 184 | |
| 68 | 35 | 8,9 x 12,0 | 0,12 | 2,81 | 0,65 | 7,2 | 222 | |
| 100 | 35 | 8,9 x 12,0 | 0,12 | 1,91 | 0,60 | 6,6 | 269 | |
| 150 | 35 | 10,2 x 12,0 | 0,12 | 1,27 | 0,42 | 4,6 | 350 | |
| 220 | 35 | 10,2 x 12,0 | 0,12 | 0,87 | 0,42 | 4,6 | 424 | |
| 15 | 40 | 8,9 x 12,0 | 0,11 | 11,67 | 1,49 | 16,4 | 109 | |
| 22 | 40 | 8,9 x 12,0 | 0,11 | 7,96 | 1,05 | 11,6 | 132 | |
| 33 | 40 | 8,9 x 12,0 | 0,11 | 5,31 | 1,05 | 11,6 | 161 | |
| 47 | 40 | 8,9 x 12,0 | 0,11 | 3,72 | 0,90 | 9,9 | 193 | |
| 68 | 40 | 8,9 x 12,0 | 0,11 | 2,57 | 0,60 | 6,6 | 232 | |
| 100 | 40 | 10,2 x 12,0 | 0,11 | 1,75 | 0,60 | 6,6 | 299 | |
| 150 | 40 | 10,2 x 12,0 | 0,11 | 1,17 | 0,46 | 5,1 | 366 | |
| 220 | 40 | 10,2 x 12,0 | 0,11 | 0,80 | 0,31 | 3,4 | 443 | |
| 10 | 50 | 8,9 x 12,0 | 0,10 | 15,92 | 1,80 | 19,8 | 93 | |
| 15 | 50 | 8,9 x 12,0 | 0,10 | 10,61 | 1,26 | 13,9 | 114 | |
| 22 | 50 | 8,9 x 12,0 | 0,10 | 7,23 | 1,10 | 12,1 | 138 | |
| 33 | 50 | 8,9 x 12,0 | 0,10 | 4,82 | 1,10 | 12,1 | 169 | |
| 47 | 50 | 8,9 x 12,0 | 0,10 | 3,39 | 0,90 | 9,9 | 202 | |
| 68 | 50 | 10,2 x 12,0 | 0,10 | 2,34 | 0,60 | 6,6 | 258 | |
| 100 | 50 | 10,2 x 12,0 | 0,10 | 1,59 | 0,60 | 6,6 | 313 | |
| 150 | 50 | 10,2 x 12,0 | 0,10 | 1,06 | 0,42 | 4,6 | 384 | |
| 6,8 | 63 | 8,9 x 12,0 | 0,09 | 21,06 | 3,50 | 39,2 | 81 | |
| 10 | 63 | 8,9 x 12,0 | 0,09 | 14,32 | 2,50 | 28,0 | 98 | |
| 15 | 63 | 8,9 x 12,0 | 0,09 | 9,55 | 1,20 | 13,2 | 120 | |
| 22 | 63 | 8,9 x 12,0 | 0,09 | 6,51 | 1,10 | 12,1 | 146 | |
| 33 | 63 | 8,9 x 12,0 | 0,09 | 4,34 | 1,00 | 11,0 | 178 | |
| 47 | 63 | 10,2 x 12,0 | 0,09 | 3,05 | 0,90 | 9,9 | 227 | |
| 68 | 63 | 10,2 x 12,0 | 0,09 | 2,11 | 0,85 | 9,4 | 272 | |

* I~ (Rated ripple current) refers to an increase in temperature of 3K, special requirements or special types on request

- Packaging:
- Blister tapes on reel
 - 300 components / reel (one packaging unit)
 - 2700 Chips = 9 reels (minimum order quantity)



| Terminal length x Height | Dimensions [mm] | |
|--------------------------|-----------------|----------------|
| | A ₀ | B ₀ |
| 8,9 x 12,0 | 10,4±0,2 | 11,1±0,2 |
| 10,2 x 12,0 | 11,7±0,2 | 12,1±0,2 |

Soldering:

Recommended soldering conditions: https://www.frolyt.de/wp-content/uploads/Soldering_profils.pdf.

FROLYT-SMD-capacitors the size 10,2 x 12,0 are also suitable for vapor phase soldering.

All information provided in printed form requires a written confirmation in order to be legally binding within the meaning of §§463 and 480 II BGB (German Civil Code). Hence, the given data imply exclusively a product description and are not to be understood as assured qualities.