

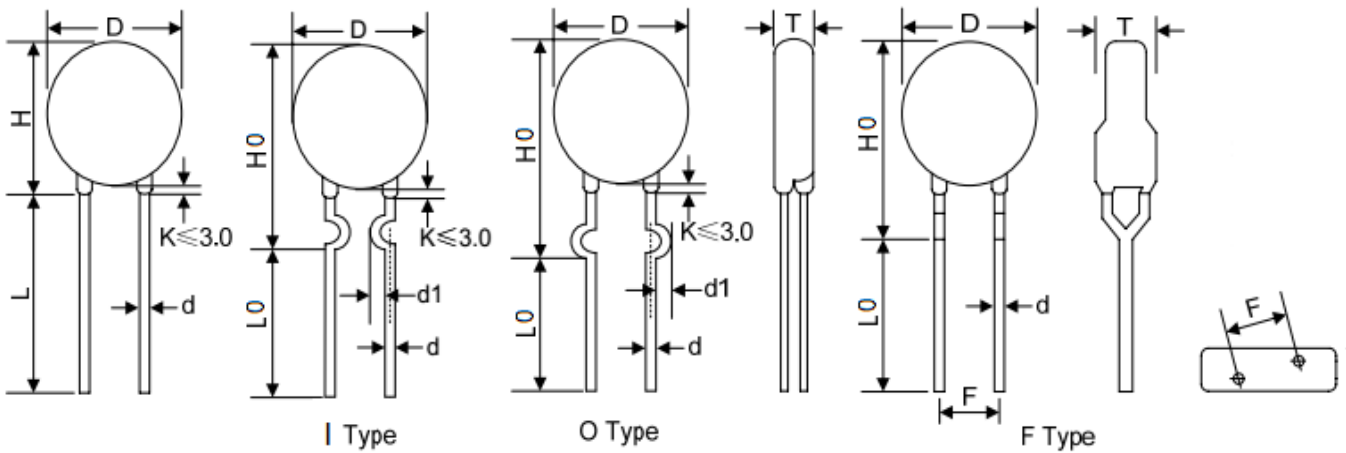
規格承認書

SPECIFICATION FOR APPROVAL

| | | | | | |
|----------|--------------------|-------------------|----------|-----|----------|
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| | | DATE: 2017年10月18日 | | | |
| UL | E315524 | CSA | LR115266 | VDE | 40005858 |

1.OUTLINE

1.1 DIMENSIONS



| Table1 | |
|----------------------|-----------|
| Unit:mm | |
| Symbol | Dimension |
| D(max.) | 12.5 |
| H(max.) | 16.5 |
| H0(max.) | 17.5 |
| F(±0.8) | 7.5 |
| T | Table2 |
| d(±0.05) | 0.8 |
| d1(±0.4) | 1.4 |
| L(min.) | 20.0 |
| L0(min.) | 15.0 |
| Epoxy Colour : Green | |

| Table2 | | | |
|---------|-----------|-------|------------|
| Unit:mm | | | |
| Model | T | Model | T |
| 180K | 2.44-3.77 | 331K | 3.16-4.96 |
| 220K | 2.54-3.91 | 361K | 3.26-5.14 |
| 270K | 2.65-4.11 | 391K | 3.35-5.32 |
| 330K | 2.77-4.29 | 431K | 3.48-5.56 |
| 390K | 2.73-4.08 | 471K | 3.61-5.79 |
| 470K | 2.85-4.30 | 511K | 3.74-6.03 |
| 560K | 2.99-4.54 | 561K | 3.90-6.33 |
| 680K | 3.19-4.82 | 621K | 4.09-6.69 |
| 820K | 2.58-3.80 | 681K | 4.29-7.04 |
| 101K | 2.69-3.97 | 751K | 4.51-7.46 |
| 121K | 2.81-4.17 | 781K | 4.61-7.64 |
| 151K | 2.58-3.89 | 821K | 4.74-7.88 |
| 181K | 2.68-4.07 | 911K | 5.03-8.41 |
| 201K | 2.76-4.22 | 102K | 5.31-8.95 |
| 221K | 2.81-4.31 | 112K | 5.64-9.54 |
| 241K | 2.87-4.43 | 122K | 5.96-10.14 |
| 271K | 2.97-4.61 | 152K | 6.92-11.92 |
| 301K | 3.06-4.78 | | |

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Electrical characteristics

| ZOV Part Number | Maximum Allowable Voltage | | Varistor voltage V _{1.0mA} | IR3 @ μA | Clamping voltage | | Maximum Peak Current (8/20μs) | | Maximum Ebergt 10/1000μs | | Reted Power (w) | Typical Capacitance (Reference) @1KHz (pf) | |
|-----------------|---------------------------|-----------|--|----------------|------------------|-----------|-------------------------------|-------------------|--------------------------|-----------------------|--------------------|--|------|
| | Ac.rms (V) | DC (V) | | | VC (V) | IP (A) | Standard (A) | High Surge (A) | Standard (Joule) | High Surge (Joule) | | | |
| | | | (V) | | | | | | | | | | |
| 10D180KP/Z | 11 | 14 | 18(15-21.6) | 50 | 10 | 36 | 5 | 500/250*2 | 1000/500*2 | 2.1 | 3 | 0.05 | 5600 |
| 10D220KP/Z | 14 | 18 | 22(19.5-26) | | 10 | 43 | | | | 4500 | | | |
| 10D270KP/Z | 17 | 22 | 27(24-31) | | 10 | 53 | | | | 3700 | | | |
| 10D330KP/Z | 20 | 26 | 33(29.5-36.5) | | 10 | 65 | | | | 3000 | | | |
| 10D390KP/Z | 25 | 31 | 39(35-43) | | 15 | 77 | | | | 2400 | | | |
| 10D470KP/Z | 30 | 38 | 47(42-52) | | 15 | 93 | | | | 2100 | | | |
| 10D560KP/Z | 35 | 45 | 56(50-62) | | 15 | 110 | | | | 1800 | | | |
| 10D680KP/Z | 40 | 56 | 68(61-75) | | 15 | 135 | | | | 1500 | | | |
| 10D820KP/Z | 50 | 65 | 82(74-90) | 24 | 28 | 135 | 25 | 2500/1250*2 | 3500/2500*2 | 12 | 17 | 0.4 | 1200 |
| 10D101KP/Z | 60 | 85 | 100(90-110) | | 28 | 165 | | | | 1000 | | | |
| 10D121KP/Z | 75 | 100 | 120(108-132) | | 28 | 200 | | | | 830 | | | |
| 10D151KP/Z | 95 | 125 | 150(135-165) | | 28 | 250 | | | | 670 | | | |
| 10D181KP/Z | 115 | 150 | 180(162-198) | | 38 | 300 | | | | 560 | | | |
| 10D201KP/Z | 130 | 170 | 200(185-225) | | 38 | 340 | | | | 500 | | | |
| 10D221KP/Z | 140 | 180 | 220(198-242) | | 38 | 360 | | | | 450 | | | |
| 10D241KP/Z | 150 | 200 | 240(216-264) | | 38 | 395 | | | | 420 | | | |
| 10D271KP/Z | 175 | 225 | 270(243-297) | | 38 | 455 | | | | 370 | | | |
| 10D301KP/Z | 190 | 250 | 300(270-330) | | 38 | 500 | | | | 330 | | | |
| 10D331KP/Z | 210 | 275 | 330(297-363) | | 38 | 550 | | | | 300 | | | |
| 10D361KP/Z | 230 | 300 | 360(324-396) | | 38 | 595 | | | | 280 | | | |
| 10D391KP/Z | 250 | 320 | 390(351-429) | | 38 | 650 | | | | 260 | | | |
| 10D431KP/Z | 275 | 350 | 430(387-473) | | 38 | 710 | | | | 230 | | | |
| 10D471KP/Z | 300 | 385 | 470(423-517) | | 38 | 775 | | | | 210 | | | |
| 10D511KP/Z | 320 | 415 | 510(459-561) | | 38 | 845 | | | | 200 | | | |
| 10D561KP/Z | 350 | 460 | 560(504-616) | | 38 | 925 | | | | 180 | | | |
| 10D621KP/Z | 385 | 505 | 620(558-682) | | 35 | 1025 | | | | 160 | | | |
| 10D681KP/Z | 420 | 560 | 680(612-748) | | 35 | 1120 | | | | 150 | | | |
| 10D751KP/Z | 460 | 615 | 750(675-825) | | 35 | 1240 | | | | 130 | | | |
| 10D781KP/Z | 485 | 640 | 780(702-858) | | 35 | 1290 | | | | 125 | | | |
| 10D821KP/Z | 510 | 670 | 820(738-902) | | 30 | 1355 | | | | 120 | | | |
| 10D911KP/Z | 550 | 745 | 910(819-1001) | | 30 | 1500 | | | | 110 | | | |
| 10D102KP/Z | 625 | 825 | 1000(900-1100) | | 30 | 1650 | | | | 100 | | | |
| 10D112KP/Z | 680 | 895 | 1100(990-1210) | 30 | 1815 | 90 | | | | | | | |
| 10D122KP/Z | 750 | 990 | 1200(1080-1320) | 30 | 1980 | 80 | | | | | | | |
| 10D152KP/Z | 930 | 1200 | 1500(1350-1650) | 30 | 2475 | 70 | | | | | | | |

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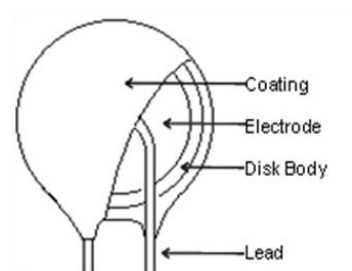
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| 2.ELETRICAL PARAMETER | | | | | |
| 2.1 | Max. Allowable Voltage | Reference p2* | At 1.0mA DC | | |
| 2.2 | Varistor Voltage(Test Time For 30ms) | | V0.1mA □ | V1mA ■ | |
| 2.3 | Rated Wattage | | | | |
| 2.4 | Max. Clamping Voltage | | Test Current Waveform 8/20μs | | |
| 2.5 | Withstanding Surge Current | | Test Current Waveform 8/20μs | | |
| 2.6 | Max. Energy | | Test Current Waveform 10/1000μs | | |
| 2.7 | Typical Capacitance | | @1KHz | | |
| 2.8 | Leakage Current | | At 80% of Varistor Voltage | | |
| 2.9 | Nonlinear Exponent (α) | | $\alpha = \log \frac{I_1^\alpha}{I_2^\alpha} / \log \frac{V_1^\alpha}{V_2^\alpha}$ | | |
| 2.10 | Temperature Coefficient of Varistor Voltage | -0.05≤Tc≤0.05(% °C) | $\left \frac{V_{1mA@85^\circ C} - V_{1mA@25^\circ C}}{V_{1mA@25^\circ C}} \times \frac{1}{60} \times 100\% (\%/^\circ C) \right $ | | |
| | | | $\left \frac{V_{1mA@-40^\circ C} - V_{1mA@25^\circ C}}{V_{1mA@25^\circ C}} \times \frac{1}{65} \times 100\% (\%/^\circ C) \right $ | | |
| 2.11 | Impulse Life | ≒ ±10%(V1mA) | Test Current Waveform 8/20μs | | |

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3.MATERIAL LIST

| | | | | | |
|-----|---------------------|--|--------------------------|---|--|
| 3.1 | Drawing |  | | | |
| 3.2 | Material Chart RoHs | Item | Composition | Manufacturer | |
| | | Coating | Epoxy Resin | Made in China, and in line with the UL 94-V0 testing, meet the environmental requirements | |
| | | Lead | Cp/Cu wire | Made in China, meet the environmental requirements | |
| | | Electrode | Silver | Made in China, meet the environmental requirements | |
| | | Disk | Zinc Oxide | Made in China, meet the environmental requirements | |
| | | Solder | Sn:96.5%CU 0.5%Ag3.0% | Made in China, meet the environmental requirements | |

4.MECHANICAL REQUIREMENTS

| | | | |
|-----|------------------------------|--|--|
| 4.1 | Tensile of Terminations | No Outstanding Damage | 1.0Kgf; 10Sec. |
| 4.2 | Bending of Terminations | No Outstanding Damage | 0.5Kgf; 90° ,3 Times |
| 4.3 | Vibration | No Outstanding Damage | Freq:10-55hz;Amp:0.75mm,1Min |
| 4.4 | Solderability | Min. 95% of The Terminal Should Be Covered With Solder Uniformly | Solder Temp:245±5℃ Immersed Time: ≤5Sec. |
| 4.5 | Resistance of soldering heat | Δ V1mA/V1mA ≅ ±5% | Solder Temp: 260±5℃ Immersed Time: 10±1Sec. |

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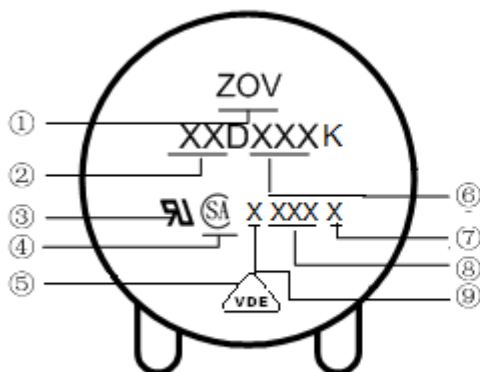
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5.ENVIRONMENTAL REQUIREMENTS

| | | | | | |
|-----|---------------------------------|--|--|------------------|--------------|
| 5.1 | High Temperature Storage | $\Delta V1mA/V1mA$ $\cong \pm 5\%$ | Ambient Temp: 125±2°C Duration:1000h | | |
| 5.2 | Low Temperature Storage | $\Delta V1mA/V1mA$ $\cong \pm 5\%$ | Ambient Temp: -40±2°C Duration:1000h | | |
| 5.3 | High Humidity Storage/Damp Heat | $\Delta V1mA/V1mA$ $\cong \pm 5\%$ | Ambient Temp: 40±2°C 90-95% R.H. Duration:1000h | | |
| 5.4 | Temperature Cycle | $\Delta V1mA/V1mA$ $\cong \pm 5\%$ | Step | Temperature (°C) | Period (min) |
| | | | 1 | -40±3 | 30 ±3 |
| | | | 2 | Room Temp | 15 ±3 |
| | | | 3 | 85±3 | 30 ±3 |
| 4 | Room Temp | 15 ±3 | | | |
| 5.5 | High Temperature Load | $\Delta V1mA/V1mA$ $\cong \pm 10\%$ | Ambient temp:85±2°C Duration:1000h Load: MAX. Allowable Voltage | | |
| 5.6 | High Humidity Load | $\Delta V1mA/V1mA$ $\cong \pm 10\%$ | Ambient Temp: 40±2°C 90-95%R.H.Duration:1000H Load: MAX. Allowable Voltage | | |
| 5.7 | Operating Temperature Range | -40°C ~ +85°C | | | |
| 5.8 | Storage Temperature Range | -40°C ~ +125°C | | | |

6.MARKING CODE



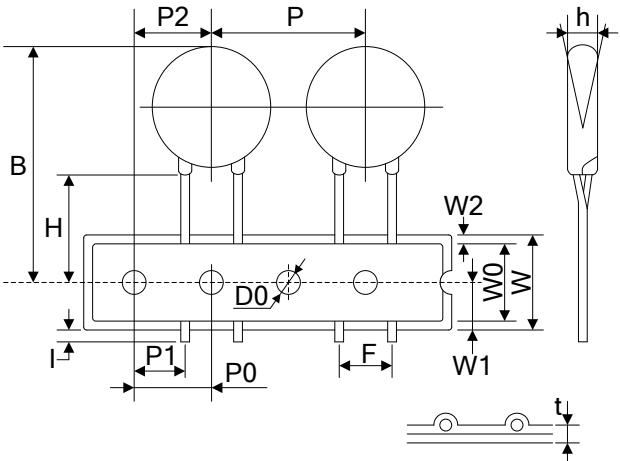
- ① ZOV Logo
- ② Disk Size
- ③ UL Accreditation Logo
- ④ CSA Accreditation Logo
- ⑤ VDE Accreditation Logo
- ⑥ Varistor Voltage
- ⑦ Special standard P: Normal code Z: High surge code
- ⑧ Date Code
- ⑨ c: cp line; copper wire: no print (space)

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7. TAPING DIMENSIONS

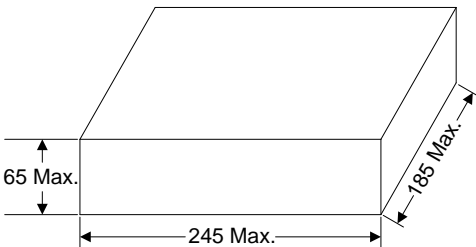
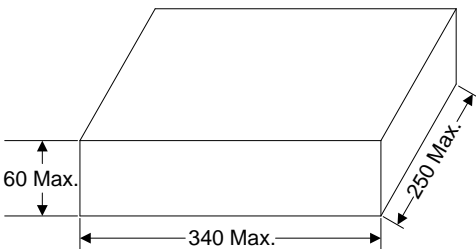
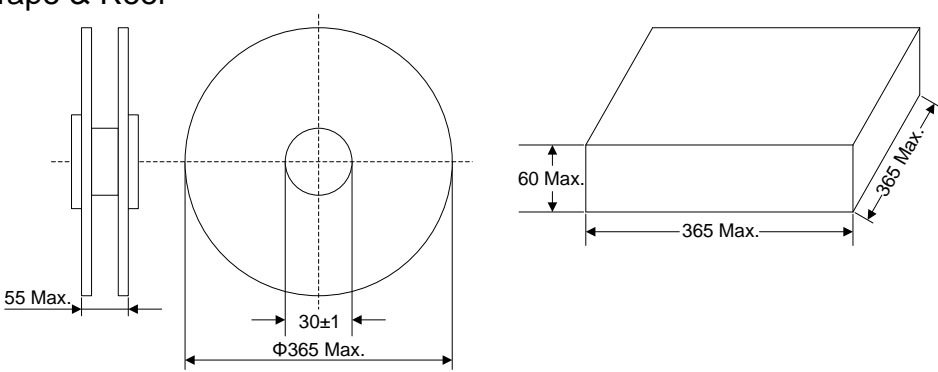
|  | Symbol | Dimension (mm) |
|---|--------|----------------|
| | | P |
| | P0 | 12.7±1.0 |
| | P1 | 8.95±0.7 |
| | P2 | 12.7±1.3 |
| | F | 7.5±0.8 |
| | h | 0±2 |
| | W | 18.0±1.0 |
| | W0 | 12.0±1.0 |
| | W1 | 9.0±0.5 |
| | W2 | 3.0max |
| | H | 20.0±2.0 |
| | I | 1.0max |
| | D0 | 4.0±0.2 |
| | t | 0.6±0.3 |
| | B | 36max |

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8. QUANTITY

| Packaging Dimensions (Unit: mm) | Quantity |
|--|--|
| Bulk  | 500pcs/bag 2bags/box (180K~621K) |
| | 400pcs/bag 2bags/box (681K~112K) |
| | 300pcs/bag 2bags/box (122K~152K) |
| Tape & Box  | 750pcs/box (180K~331K) |
| | 500pcs/box (361K~621K) |
| | 300pcs/box (681K~152K) |
| Tape & Reel  | 1000pcs/reel (180K~331K) |
| | 750pcs/reel (361K~621K) |
| | 500pcs/reel (681K~152K) |