# DATA SHEET

## Super High Voltage Disc Ceramic Capacitor

## Serie: I23001

**Range** 152= 1500pf

**Tolerance** M= ±20%

**Voltage** 4000 Volt

**Material Character.** 5U

**Body Diam.** 11,0mm

**Pitch** 10mm

**Body Thickn.** 6,5mm

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | **Super High Voltage Disc Ceramic Capacitor** |
| | | | | | | | | | | Serie No.: **I23001** |
| DRW: | Jason | CHKD | Wilson | MATL: | Wilson | TOLERANCE | Mason | DATE | 30.04.2011 | Customer: |
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## Features

Wide rated Voltage range, wide nominal capacitance range
Flame retardent, insulating coating applied
Recomended Application
Filter circuit of high voltage power
High voltage circuit of television set and monitor
High voltage circuit of various electronic equipment

| Characteristics | Temp.Char. SL | Temp.Char. Y5P | Temp.Char. Y5U | Temp.Char. Y5V |
|---|---|---|---|---|
| Operating Temperature | . -30°C ~ +85°C | | | |
| Rated Voltage | 4KVDC ~ 6KVDC | 4KVDC ~ 15KVDC | 4KVDC ~ 15KVDC | 4KVDC ~ 15KVDC |
| Withstanding Voltage | 1,5 times related voltage | | | |
| Capacitance | Within the specified tolerance, testing at 25°C, 1Vrms and 1KHz (at 1MHz for SL products) | | | |
| | 10 ~ 330pf | 100 ~ 2200pf | 470 ~ 3300pf | 1000 ~ 10000pf |
| Dissipation Factor | Cr<30pf, Q≥ 400+20Cr<br>Cr≥30pf, Q≥1000 | tg ≤ 2,5% | tg ≤ 3,5% | |
| Insulation Resistance | Charge at 500VDC for 60 seconds, Rj ≥ 1000MΩ | | | |
| Temperature Characteristics | Temperatur Chararcteristics Code | | **SL** / **Y5P** | **Y5U** / **Y5V** |
| | Temperatur Coefficient (10-6 /°C) | | . +100 ~ -1000 10-6/°C / . ± 10% | .+22 ~ +56% / .+22 ~ +82% |

**Rated Capacitance**

The first and second digits identify the first and second significant figures of the capacitance, the third digit identifies the multiplier. The capacitance unit is pf,

**Capacitance Tolerance**

| Letter Symbol | Capacitance Tolerance | Letter Symbol | Capacitance Tolerance |
|---|---|---|---|
| **C** | ±0,25pf | **K** | ±10% |
| **D** | ±0,5pf | **M** | ±20% |
| **J** | ±5% | **Z** | .+80 ~ -20% |

**Super High Voltage Disc Ceramic Capacitor**

Part No.: **I23001**

Customer:

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Standard atmospheric condition
Temperature: 15~35°C
Relative Humidity: 45~75%
Atmospheric pressure: 86~106KPa (860~1060mbar
Operating and storage temperature range
Operating Temperature:

| Temperature Characteristics | Lowest Operating Temperature | Highest Operating Temperature |
|---|---|---|
| SL | . -25°C | .+85°C |
| COH | . -25°C | .+85°C |
| Y5P | . -25°C | .+85°C |
| Y5U | . -25°C | .+85°C |
| Y5U | . -25°C | .+85°C |
| Y5V | . -25°C | .+85°C |
| Z5U | 10°C | .+85°C |
| Z5V | 10°C | .+85°C |
| YR | . -25°C | .+125°C |

Storage Temperature Range: -10 to + 40°C

Characteristics and test methods
Electrical characteristics and test methods

| | | |
|---|---|---|
| Capacitance & tolerance | The Capacitance shall be measured at 25°C with 1Mhz and 1Vrms (Class1), 1KHz and 1Vrms (class II),1KHz and 0,1Vrms (for Calss III) | Refer to individual sheet |
| Quality factor or dissipation factor | The quality factor or dissipation factor shall be measured at the same conditions ab above | Q≥400+20Cr (forCr<30pf)<br>Q≥1000 (forCr<30pf)<br>Cr-rated capacitance in unit of pf<br>2,5% max. (for Y5P,Y5U and Z5U<br>0,5% max. (for YR)<br>3,5% max. (for Y5V and Z5U )<br>5%max. (for SBBLC Y5V and Y5U)<br>3,5%max. (for SBBLC Y5P) |
| Insulation Resistance | The insulation resistance shall be measured with rated voltage (for Vr≤500VDC); 500VDC (for Vr≥500VDC)within 50± 5seconds of charging | 1000M Ω min 1000M Ω min (for SBBLC) |
| Voltage Proof | The Voltage of 300% rated voltage (for rated voltage 540V and 500V) 200% rated voltage (for rated voltage 1000V to 2000V), 175% rated voltage (for rated voltage 3000V), or 150% rated Voltage (for DCG or SBBLC) shall be applied between leads for 1 to 5seconds. The voltages of 250% rated voltage (for 50V capacitors) or 1300V ( fort 500V, 1KV and over) shall be applied between leads connected together and metal foil wrapped on envelope for 1 to 5 seconds. | No breakdown or flashover |

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| | | |
|---|---|---|
| Temperature Characteristics | The capacitor shall be kept for enough time to reach thermal equilibrium at special temperature of each step in the following table.<br>The capacitance measurement shall be made only at the thermal equilibrium of each step.<br>Step 1: 20 ± 2°C; Step 2: .-25 ± 2°C; Step 3: 20 ± 2°C; Step 4: 85 ±2°C (125±2°C for YR); Step 5: 20 ± 2°C<br>For temperature characteristics SL the steps 1 and step 2 may be omitted.<br>The temperature coeffizient and the capacitance drift shall be calculated by the following formulas.<br>$= \frac{(Cm - Co)}{Co\,(T - To)} \times 10^6$ (ppm/°C)<br>$= \frac{Co - C_1}{Co}$ or $\frac{C_5 - Co}{Co}$ or $\frac{C_5 - C_1}{Co}$<br>Where<br>Co Capacitance at step 3<br>Cm Capacitance at step 2 and/or step 4<br>C1,C5 Capacitance at step 1 and step 5<br>To Measuring temperature at Step 3<br>T Measuring temperature at Step 2 and /or step 4<br>Pre-tratement:<br>The capacitor shall be stored at a temperature of 55 ±2°C and a relative humidity of 20% or less for 16 to 24 hours.<br>And then the capacitor shall be allowed immediately to cool in container using appropriate dryer such as activated carbon, silica gel | Class I<br>Temperature coefficient:<br>Refer to specification sheet<br>Capacitance drift:<br>Within ±1% or ± 0,05pf<br>(Whichever is greater)<br><br>Class II & III<br>Temperature Characteristics / Permitting capacitance change<br>Y5P ± 10%<br>YR ± 15% to -30%<br>Y5U ± 22% to -56%<br>Z5U ± 22% to -56%<br>Y5V ± 22% to -82%<br>Z5V ± 22% to -82% |
| Robustness of Termination | The capacitor body shall be held in such a manner so that axis of the lead is vertical. The tensile force of 10N (for Ø 0,6mm lead) ot 5N ( for Ø 0,5mm lead) shall be applied to the lead in a direction of ist axis and acting in a direction away from the body of the capacitor for 10 ±1 seconds. | The capacitor shal be no broken and the lead shall be no looseneed or cut off. |

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Customer:

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|---|---|---|
| Bending | The capacitor is held in such a manner so that axis of the lead is vertical. As mass applying a force of 5N (for Ø 0,6mm lead ) or 2,5N (for Ø 0,5mm lead) is then suspended from the end of the lead. The body of the capacitor is then inclined within a period of 2 to 3 seconds, through an angle of approximately 90° in the vertical plane and then returned to its initial position over the same period of time. This operation constitutes one bend. The lead shall be subjected to a total of 2 alternating bends in to opposite directions. | The lead shall be no broken. |

Endurance characteristics and test methods.

| | | | |
|---|---|---|---|
| Solderability | Solder temperature: 235 ±5°C<br>Immersion time; 2 ± 0,5 seconds<br>Immersion speed: 25 ± 6mm/s | A new uniform coating of solder shall cover a minimum of 95% of the surface being immersed. | |
| Vibration | Frequency range: 10~55Hz.<br>Amplitutde (total excursion); 1,5mm<br>Total duration: 6hours.<br>This motion shall be aplied for 2 hours in aech of three mutually perpendicular directions. | Apperance | No visible damage |
| | | Capacitance change | Within specified tolerance |
| | | Quality factor or dissipation factor | Refer to clause 5.1.2 |
| Resistance to Soldering Heat | Solder temperature and immersion time: 260 ± 5°C, 10 ± 0,5 seconds.<br>The immersing depth shall be a position 1,27mm from the seating plane.<br>Post treatment: The capacitor shall be preversed at the standard atmospheric condition for 24 ± 2hours. | Apperance | No visible damage |
| | | Capacitance change | ± 2,5% or ± 0,25pf (whichever is greater, for class I).<br>± 5% (for Y5P and YR).<br>±15% (for Y5U and Z5U).<br>±20% (for Y5V and Z5V). |
| | | Voltage Proof ( for between leads only) | |
| Solvent resistance | The capacitor shall be immersed into isopropylalcohol. For 30 ± seconds. | Apperance | No visible damage legible marking |

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| | | | |
|---|---|---|---|
| Temperature Cycle | The capacitor shall be placed in the test chamber at temperature of -25 ± 2°C for 30minutes then at room temperature for 3 minutes at 85 ±2°C (125 ±2°C for YR) for 30minutes and at room temperature for 3 minutes. This operation constitutes one cycle. The capacitor shall be subjected to a total of 5 cycle. Post-treatment: The capacitor shall be preversed at the standard atmospheric condition for 24 ± 2 hours. | Apperance | No visible damage Legible marking |
| | | Capacitance Change | ± 5% or ± 0,5pf (whichever is the greater for class 1)<br>± 10% (Y5P and YR)<br>± 20% (Y5U and Z5U)<br>± 30% (Y5V and Z5V) |
| | | Quality factor or dissipation factor | Q ≥ 200 + 10Cr ( for Cr <10pf<br>Q ≥ 275 + 5/2Cr ( for 10pf ≤ CR<30pf<br>Q ≥ 350 (for Cr ≥ 30pf)<br>5% max. (Y5V & Z5V)<br>3% max. (Y5P, YR, Y5U & Z5U)<br>7,5% max. (SBBLC) |
| | | Insulation Resistance | 1000M Ω min.<br>500M Ω min. (SBBLC) |
| | | Voltage proof | For between leads only. |
| Damp Heat | The capacitor shall be stored for 500 $^{+24}$ hours at a temperature of 40 ± 2°C and a relative humidity of 90 to 95%. Post treatment: The capacitor shall be preseved for 1 to 2 hours at the standard atmospheric condition. | Apperance | No visible damage |
| | | Capacitance Change | As the same |
| | | Q or DF | As the same |
| | | Insulation Resistance | 2500M Ω min (Class I )<br>1000M Ω min (Class II )<br>500M Ω min (Class III ) |
| | | Voltage proof | For between leads only. |
| Endurance | The voltage that is equal to 200% rated voltage (for 50V and 500V capacitors), or 125% rated voltage ( for 1KV~3KV capacitors), or 125% rated voltage for over 4KV or SBBLC) shall be applied continuously to the capacitor at temperature of 85 ± 3°C (125 ± 3°C for YR) for 1000 $^{+48}$ hours. | Apperance | The same us before |
| | | Capacitance Change | |
| | | Quality factor or dissipation factor | |
| | | Insulation Resistance | |
| | | Voltage proof | |

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## Structure and ROHs Materail request

The marking of class I temperature characteristics is the color block on top of the capacitor

| | | |
|---|---|---|
| Temperature Characteristics | C0 Δ | SL |
| | Black | None |

The marking of class II & III temperature characteristics is symbols specified in following table:

| | | | | |
|---|---|---|---|---|
| Temperature Characteristics | Y5P | Y5U / Z5U | Y5V / Z5V | YR |
| | Black | E | F | HRR&R |

Capacitance

When rated capacitcance is under 1ßßpf the capacitance marking is value being rated capacitance in unit pf. When rated capacitance is 100pf or over the capacitance marking is made in third digit method.

Tolerance:

The tolerance marking for Class I is the symbols specified in following table.

| | | | | | |
|---|---|---|---|---|---|
| Tolerance: | ± 0,25pf | ±0,5pf | ±5% | ±10% | ±20% |
| Symbol | C | D | J | K | M |

The tolerance marking for Class II & III is the symbols specified in following table.

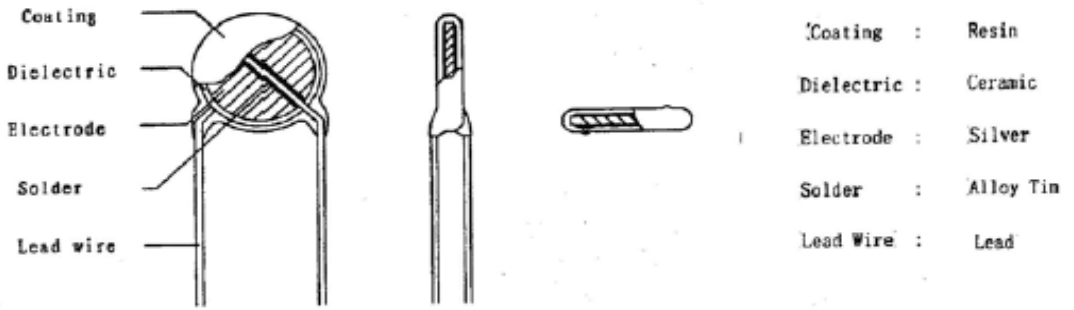
| | | | | | |
|---|---|---|---|---|---|
| Tolerance: | ± 10% | ± 20% | .+50%, -20% | .+100%, 0% | .+80%, -20% |
| Symbol | K | M | SL | P | Z |

Rated Voltage

When rated voltage is 50V the voltage marking is symbol "___" under capcitance marking.

When rated voltage is 500V the voltage marking is symbol "__" over capcitance marking.

When rated voltage is 1000Vor over, the voltage marking is symbols 1KV, 2KV, 3KV, 6KV…… over capacitance marking.




| Components | Material | ROHS request | Remark |
|---|---|---|---|
| Coating | Resin | Cd <100ppm; | Appendix 1; SGS report (Availbale as customer request or See Appendix 1 |
| Dielectric | Ceramic | Pb <100ppm; | |
| Electrode | Silver | HG, Ctr PBBs, PBDEs, N,D | |
| Solder | Alloy tin | | |
| Lead Wire | Lead | | |

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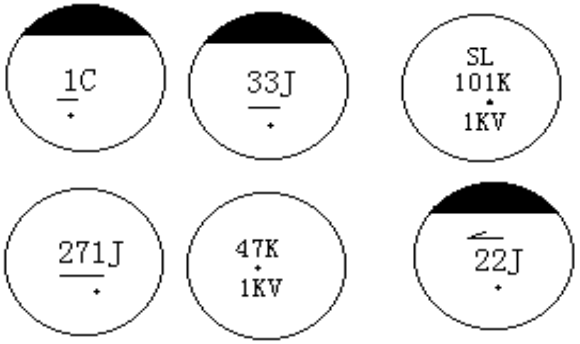
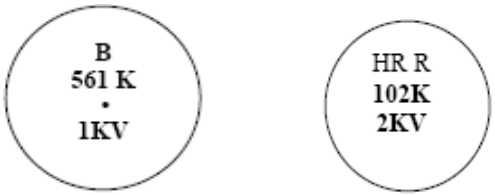
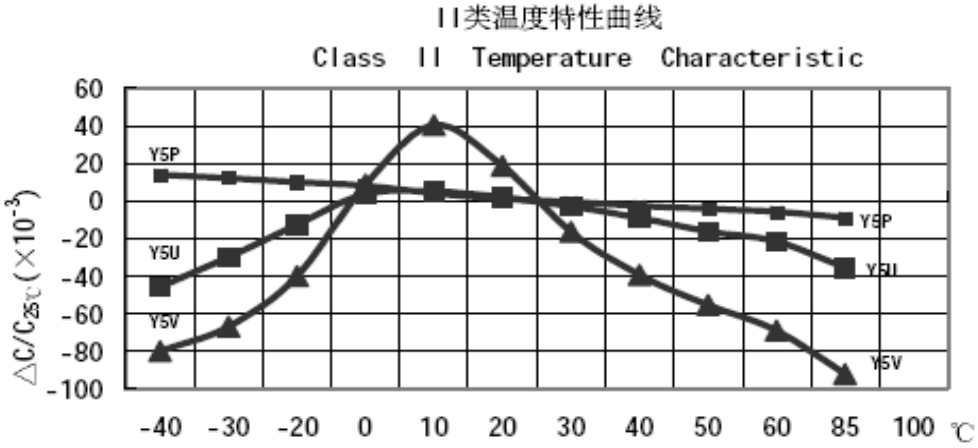
**Example of marking ( Class I )**

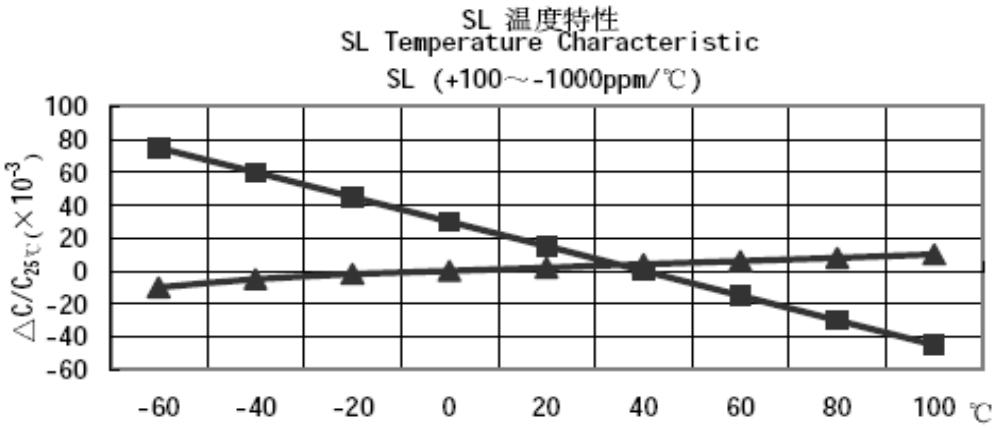



**Example of marking ( Class II & III ) over 1000 Volt**




**Typical Characteristics Graph**

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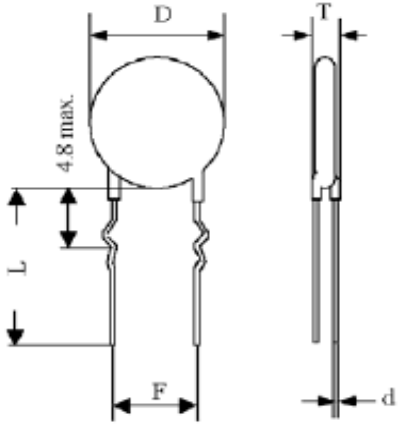
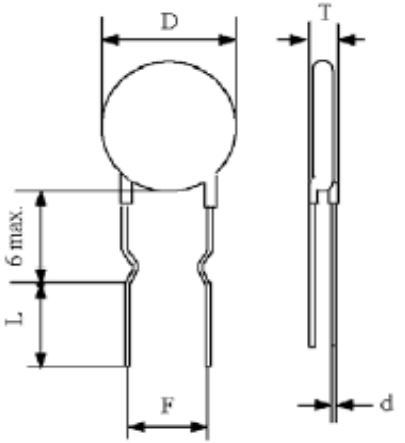
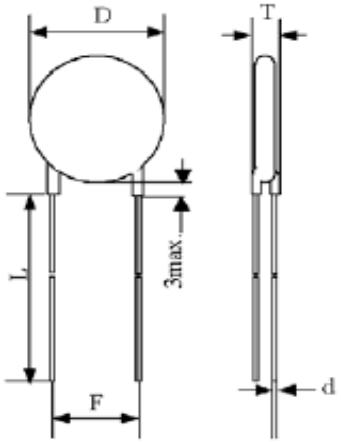
## Lead Style



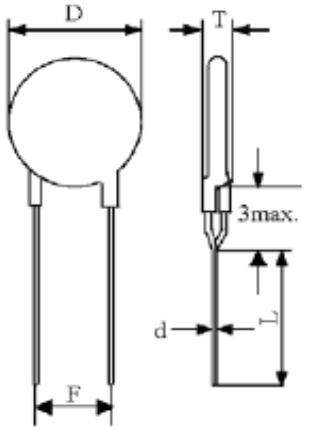

Lead Style W



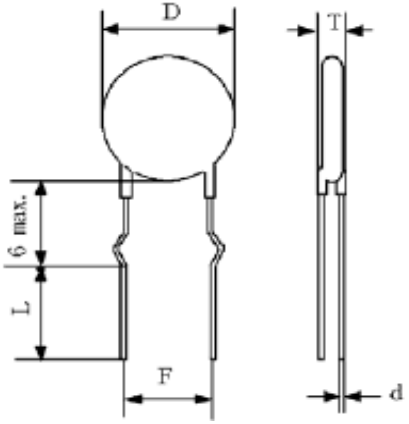

Lead Style J




Lead Style L




Lead Style P




Lead Style K

**Super High Voltage Disc Ceramic Capacitor**

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|---|---|---|---|---|---|---|---|---|---|
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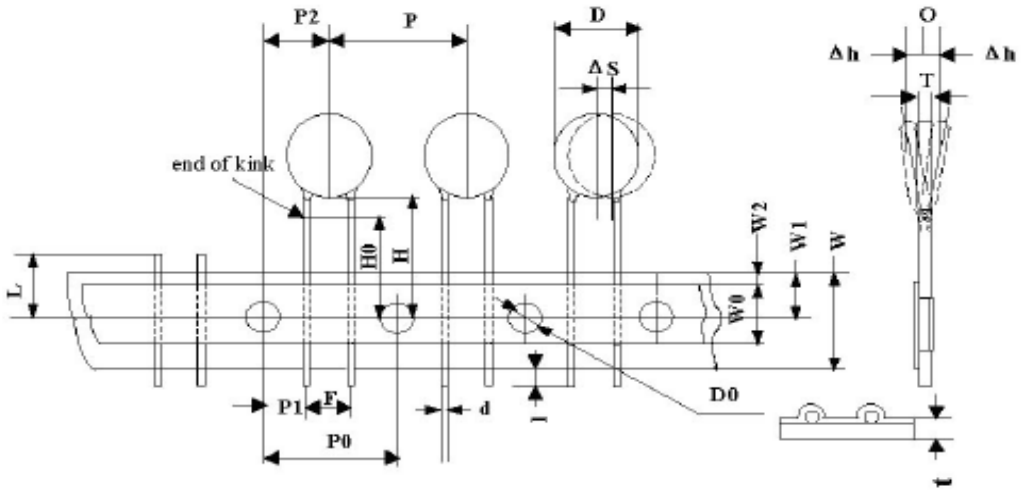
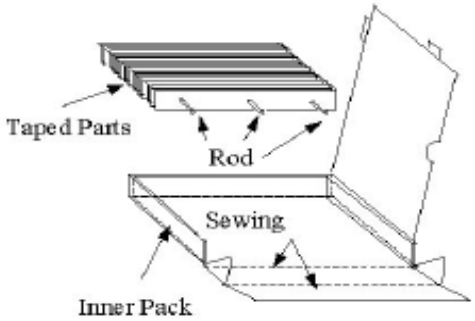
## Packing Style F




| Symbol | Dimension (mm) |
|---|---|
| P0 | 12,7 ±0,2 |
| P0 | 12,7 ±1,0 |
| F | 5,0 +0,5/-0,2 |
| P1 | 3,85 ±0,4 |
| P2 | 6,35 ±0,4 |
| H0 | 16,0 ±0,5 |
| H | 20,0 ±0,5 |
| W | 18,0 ±0,5 |
| W0 | 8,0 min |
| W1 | 9,0 ±0,3 |
| W2 | 3,0max. |
| t | 0,7 ±0,2 |
| D | To comply with individual sheet |
| D0 | 4,0 ±0,2 |
| d | To comply with individual sheet |
| l | 2,0 max. |
| L | 11 max. |
| T | To comply with individual sheet |
| Δ S | 0,5 max |
| Δ H | 0,5 max |

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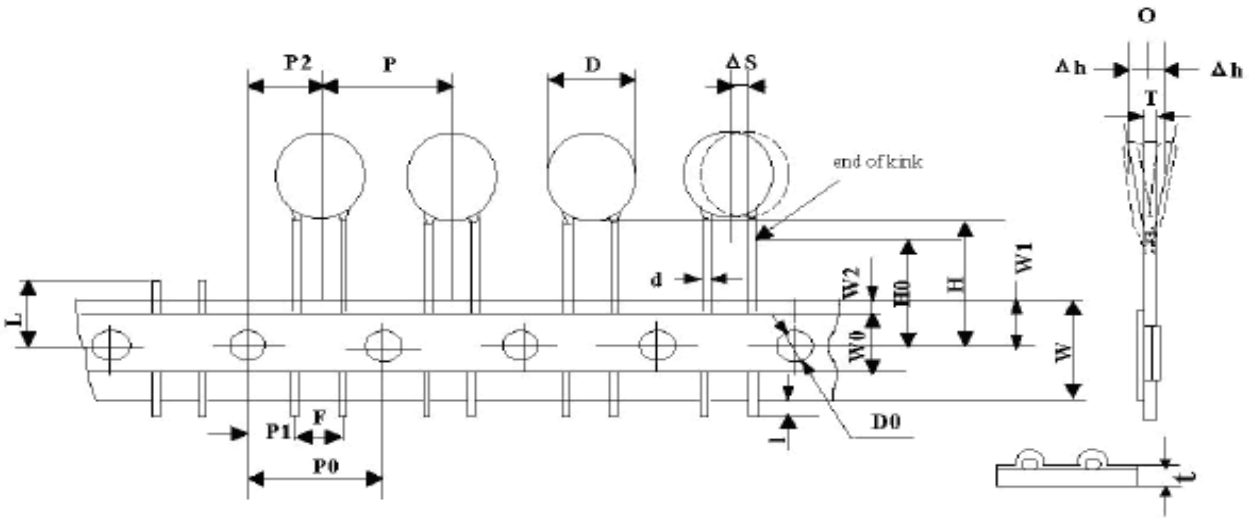
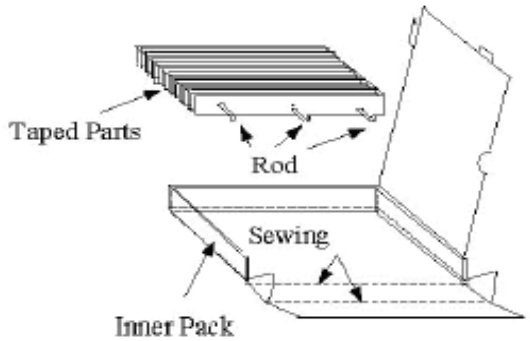
## Packing Style V




| Symbol | Dimension (mm) |
|---|---|
| P0 | 15,0 ±0,2 |
| P0 | 15,0 ±1,0 |
| F | 7,5 +0,5/-0,2 |
| P1 | 3,75 ±0,4 |
| P2 | 7,5 ±0,4 |
| H0 | 16,0 ±0,5 |
| H | 20,0 ±0,5 |
| W | 18,0 ±0,5 |
| W0 | 11,5 min |
| W1 | 9,0 ±0,3 |
| W2 | 3,0max. |
| t | 0,7 ±0,2 |
| D | To comply with individual sheet |
| D0 | 4,0 ±0,2 |
| d | To comply with individual sheet |
| l | 2,0 max. |
| L | 11 max. |
| T | To comply with individual sheet |
| Δ S | 0,5 max |
| Δ H | 0,5 max |

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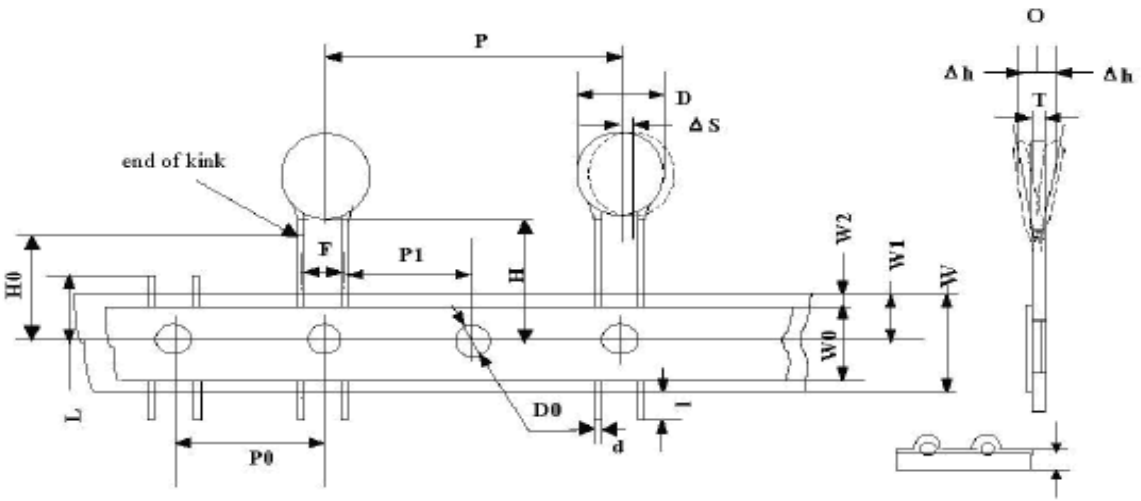
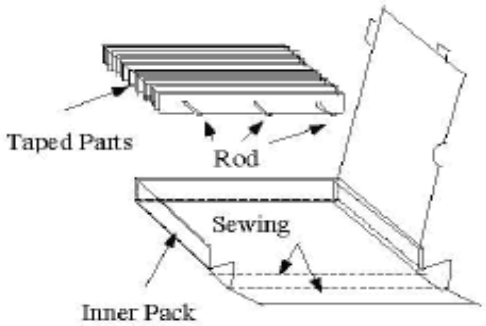
## Packing Style U




| Symbol | Dimension (mm) |
|---|---|
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| P0 | 25,4 ±1,0 |
| F | 10,0 +0,5/-0,2 |
| P1 | 7,7 ±0,4 |
| P2 | |
| H0 | 16,0 ±0,5 |
| H | 20,0 ±0,5 |
| W | 18,0 ±0,5 |
| W0 | 11,5 min |
| W1 | 9,0 ±0,3 |
| W2 | 3,0max. |
| t | 0,7 ±0,2 |
| D | To comply with individual sheet |
| D0 | 4,0 ±0,2 |
| d | To comply with individual sheet |
| l | 2,0 max. |
| L | 11 max. |
| T | To comply with individual sheet |
| Δ S | 0,5 max |
| Δ H | 0,5 max |

**Super High Voltage Disc Ceramic Capacitor**

Part No.: **I23001**

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| DRW: | Jason | CHKD | Wilson | MATL: | Wilson | TOLERANCE | Mason | DATE | 30.04.2011 | Customer: |
| APPD: | Schumi | | | FINISH | Jamy | | Sheet No. | | 12 from 14 | |

# EDCON-COMPONENTS

EDCON COMPONENTS
A MEMBER OF EDCON-GROUP

## Ordering Informations

| Serie | | Range | Tolerance Code | Material Code | Voltage Code | Lead Length | Lead Style | Lead Pitch | Lead Diameter | ROHS | Packing Code |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **I23001** | **-** | **152** | **M** | **5U** | **U** | **11** | **L** | **D** | **7** | **R** | **BU** |
| | | **152=** 1500pf | **M=** ±20% | **5U=** Y5U | **U=** 4KV | **11=** 11mm | **L=** Style L | **D=** Pitch 10mm | **7=** 0,65mm | **R=** ROHS Conform | **BU=** Bulk Ware |
| | | | | | | **25=** 25mm | **P=** Style P | | | **N=** NON ROHS Conform | **TF=** Tape Style F |
| | | | | | | | **W=** Style W | | | | **TV=** Tape Style U |
| | | | | | | | **J=** Style J | | | | **TU=** Tape Style U |
| | | | | | | | **K=** Style K | | | | |

**Super High Voltage Disc Ceramic Capacitor**

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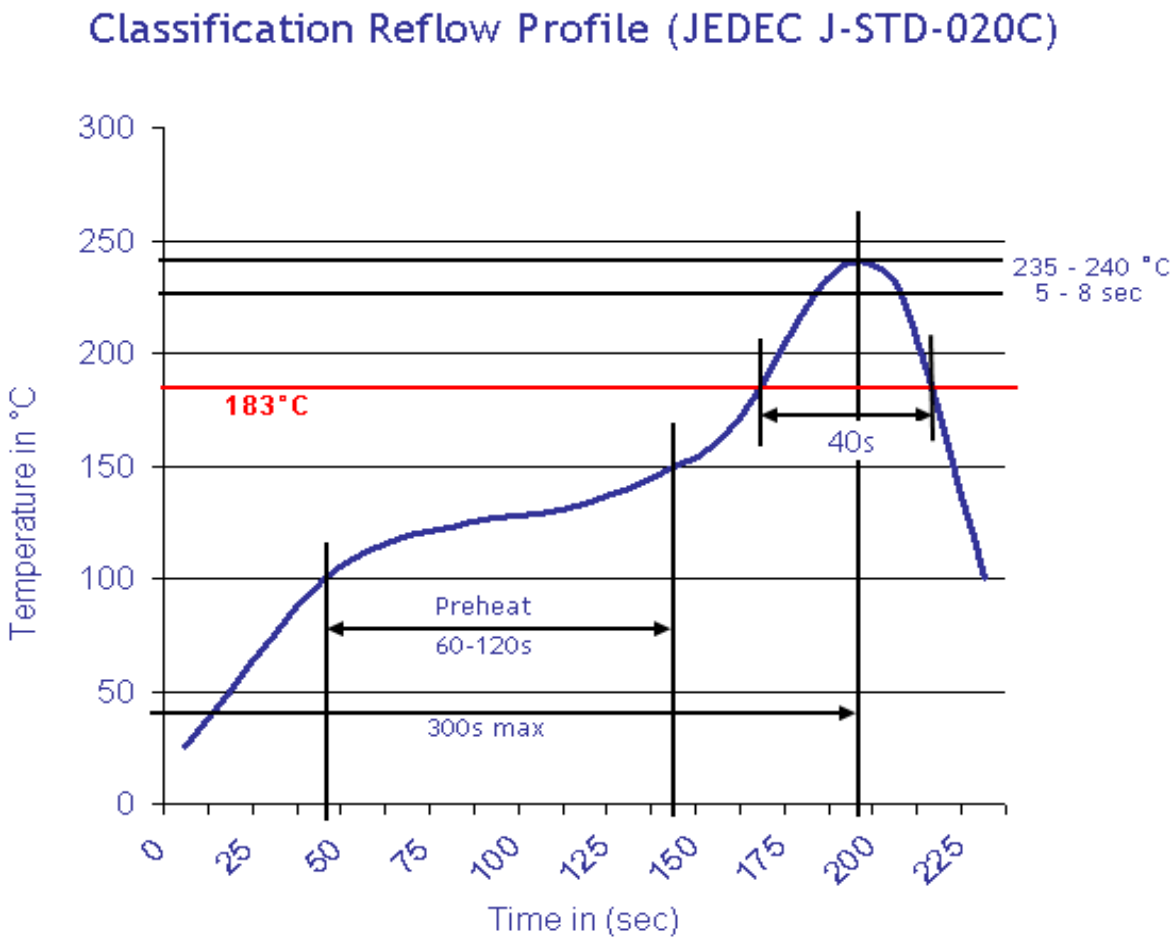
| APPD: | Schumi | | | FINISH | Jamy | | Sheet No. | | 13 from 14 |

Customer:

EDCON COMPONENTS
A MEMBER OF EDCON-GROUP

**Soldering Profile Curve**




**Super High Voltage Disc Ceramic Capacitor**

Part No.: **I23001**

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| DRW: | Jason | CHKD | Wilson | MATL: | Wilson | TOLERANCE | Mason | DATE | 30.04.2011 |
| APPD: | Schumi | | | FINISH | Jamy | | Sheet No. | | 14 from 14 |

Customer: