

TO : _____

No. : 201511-005

SPECIFICATION FOR APPROVAL

Product Name: (WR SERIES) Low dissipation Factor

Part Number: SERIES

Data : 2015-11-04

APPROVAL SIGNATURE:		
AUTHORIZED BY	CHECK BY	VALIDATED BY

(Please return one copy after approved)



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1. Applications

- 1.This specification is applicable to Welson’s disc ceramic capacitors of rated voltage less then 6300Vdc.
 - 2. Ideal for use as the ballast in back lighting inverters for liquid crystal display.
 - 3. Ideal for use on high frequency pulse circuits such as a horizontal resonance circuit for CTV and snubber circuits for switching power supplies.
- *Do not use these products in any Automotive Power train or Safety equipment including Battery charger for Electric Vehicles and Plug-in Hybrid.

2. Features

- 1.Temperature compensating type ceramics realize low heat dissipation than DEH/DES series.
- 2.Operating temperature range is guaranteed up to 125 degrees C.
- 3.Coated with flame-retardant epoxy resin (equivalent to UL94V-0 standard).
- 4.Taping available for automatic insertion.

3. How to order

This company product coding rules form and meaning represented for example and the following explains:

WR K02 - 331 K B 5 H L
 ① ② ③ ④ ⑤ ⑥ ⑦ ⑧

- ① Type code
WR:Low DF materail& Epoxy coating type
- ② Rated voltage code
V01: 16V V10: 100V K01: 1000V
V02: 25V V50: 500V K02: 2000V
V05: 50V K03: 3000V

- ③ Nominal capacitance code
Expressed by three-digit alphanumeric. The unit is pico-farad (pF). The first and second figures are significant digits, and the third figure expresses the number of zeros which follow the two numbers. If there is a decimal point, it is expressed by the capital letter “P”. In this case, all figures are significant digits.

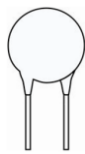



Code	Capacitance	Code	Capacitance	Code	Capacitance
5P1	5.1pF	10P	10pF	472	4700pF
8P0	8.0pF	101	100pF	103	10000pF

- ④ Capacitance tolerance code
- | Code | Tolerance | Code | Tolerance | Code | Tolerance |
|------|-----------|------|-----------|------|-----------|
| C | ±0.25pF | J | ±5% | M | ±20% |
| D | ±0.5pF | K | ±10% | Z | +80/-20% |

Remark : If less than 10pF nominal capacitance, please choose C, D.

- ⑤ Temperature characteristic code
- | Code | Temp. Char. | Code | Temp. Char. |
|------|-------------|------|-------------|
| N | NP0 | B | Y5P |
| 1 | N150 | R | Y5R |
| 2 | N220 | X | X7R |
| 4 | N470 | E | Y5U |
| 7 | N750 | F | Y5V |
| S | SL | U | Z5U |
| | | V | Z5V |

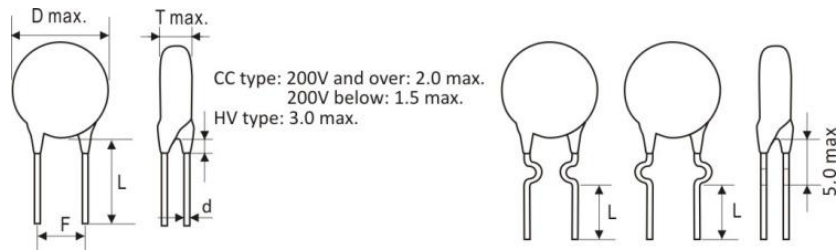
- ⑥ Lead spacing (F) code
- | Code | Lead spacing (F) |
|------|------------------|
| 2 | 2.5mm |
| 3 | 3.5mm |
| 5 | 5.0mm |
| 6 | 6.4mm |
| 7 | 7.5mm |
| 9 | 10.0mm |

- ⑦ Lead style
- | Code | H | X | Y | W |
|------------|---|---|---|---|
| Lead style |  |  |  |  |

- ⑧ Lead length (L) & package style code
- L: Long lead & bulking package
 S: Short lead & bulking package, back length code, such as S03M5 for 3.5mm, S10 for 10mm.
 TB: Taping & ammo package
 TR: Taping & reel package.

4. Approval specifications and dimensions

4.1. Drawing



4.2. Capacitance chart

PREFERRED SIZES ARE SHADED

Part Number	DC Rated Voltage (VDC)	Capacitance (PF)	TOL	DIMENSION(mm)		
				D(max)	T(max)	F(±0.8mm)
WRV50-331KR□□□	500V	330PF	±10%	6.0	3.5	5
WRV50-471KR□□□	500V	470PF		6.0	3.5	5
WRV50-681KR□□□	500V	680PF		7.0	3.5	5
WRV50-102KR□□□	500V	1000PF		9.0	3.5	5
WRV50-152KR□□□	500V	1500PF		9.0	3.5	5
WRV50-222KR□□□	500V	2200PF		11.0	3.5	5
WRV50-332KR□□□	500V	3300PF		13.0	3.5	5
WRV50-472KR□□□	500V	4700PF		15.0	3.5	10.0
WRK01-221KR□□□	1000V	220PF		6.0	3.5	5.0
WRK01-331KR□□□	1000V	330PF		6.0	3.5	5.0
WRK01-471KR□□□	1000V	470PF		6.0	3.5	5.0
WRK01-561KR□□□	1000V	560PF		7.0	3.5	5.0
WRK01-681KR□□□	1000V	680PF		8.0	3.5	5.0
WRK01-102KR□□□	1000V	1000PF		9.0	3.5	5.0
WRK01-152KR□□□	1000V	1500PF		11.0	3.5	5.0
WRK01-182KR□□□	1000V	1800PF		11.0	3.5	7.5
WRK01-222KR□□□	1000V	2200PF		13.0	3.5	7.5
WRK01-332KR□□□	1000V	3300PF		15.0	3.5	7.5
WRK01-472KR□□□	1000V	4700PF		17.0	3.5	7.5
WRK02-151KR□□□	2000V	150PF		6.0	4.0	7.5
WRK02-221KR□□□	2000V	220PF		7	4.0	7.5
WRK02-271KR□□□	2000V	270PF		7	4.0	7.5
WRK02-101KR□□□	2000V	100PF		8	4.0	7.5
WRK02-331KR□□□	2000V	330PF		8	4.0	7.5
WRK02-391KR□□□	2000V	390PF		8	4.0	7.5
WRK02-471KR□□□	2000V	470PF		9	4.0	7.5
WRK02-561KR□□□	2000V	560PF		9	4.0	7.5
WRK02-681KR□□□	2000V	680PF		10	4.0	7.5
WRK02-821KR□□□	2000V	820PF		11	4.0	7.5
WRK02-102KR□□□	2000V	1000PF		15	4.0	7.5
WRK02-122KR□□□	2000V	1200PF		16	4.0	7.5

5. Specification and test methods

5.1. Environmental requirements

Test and measurement shall be made at the standard condition. (temperature 15~35°C, relative humidity 45~75% and atmospheric pressure 86~106kPa). Unless otherwise specified herein.

If doubt occurred on the value of measurement, and measurement was requested by customer capacitors shall be measured at the reference condition. (Temperature 25±2°C, Relative humidity 60~70% and Atmospheric pressure 86~106 kPa.)

5.2. Specification and test methods

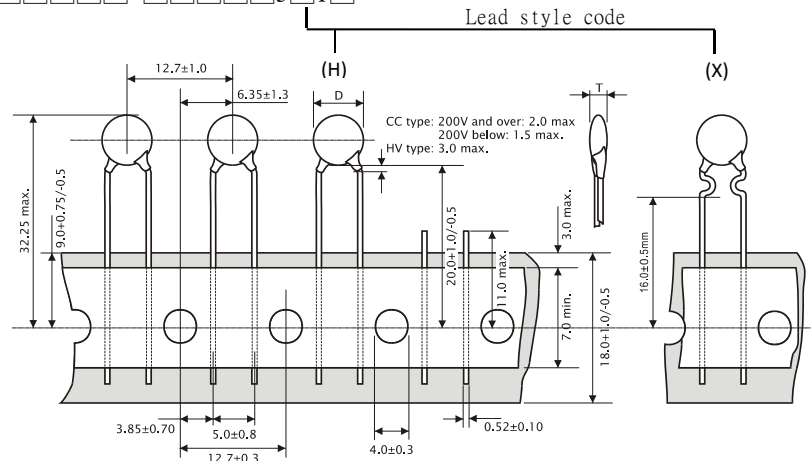
No.	Item	Specifications	Testing Methods																				
1	Operating temperature range	-25°C -+125°C																					
2	Rated voltage	See the previous pages	The rated voltage is defined as the maximum voltage which may be applied continuously to the capacitor. When AC voltage is superimposed on DC voltage, Vp-p or Vo-p, whichever is larger, should be maintained within the rated voltage range.																				
3	Appearance and Dimensions	No marked defect on appearance form and dimensions are within specified range.	The capacitor should be visually inspected for evidence of defect. Dimensions should be measured with slide calipers.																				
4	Marking	To be easily legible.	The capacitor should be visually inspected.																				
5	Dielectric Strength	No failure.	The capacitor (Between Lead Wires) should not be damaged when test voltages of Table are applied between the lead wires for 1 to 5 sec. provided the charge/discharge current is less than 50mA <table border="1"> <tr> <td>Rated voltage</td> <td>≤500V</td> <td>1kV</td> <td>>1kV</td> </tr> <tr> <td>Test voltage</td> <td>2.5 times</td> <td>1.5 times</td> <td>1.25 times</td> </tr> </table>	Rated voltage	≤500V	1kV	>1kV	Test voltage	2.5 times	1.5 times	1.25 times												
Rated voltage	≤500V	1kV	>1kV																				
Test voltage	2.5 times	1.5 times	1.25 times																				
6	Insulation Resistance (I.R.)	10000MΩ min.	The insulation resistance should be measured with rated voltage (above 500V rated voltage tested by 500V) within 1 minutes of charging.																				
7	Capacitance	Within specified tolerance	The Q should be measured at 20°C with 1±0.2MHz and AC5V(r.m.s.) max.																				
8	Dissipation Factor (DF)	0.2% max.																					
9	Temperature Characteristics	Capacitance change: <table border="1"> <tr> <td rowspan="2">T. C.</td> <td colspan="2">Temp. Char.</td> </tr> <tr> <td>-25 to +85°C</td> <td>+85 to +125°C</td> </tr> <tr> <td>R</td> <td>Within ±15%</td> <td>Within +15/-30%</td> </tr> </table>	T. C.	Temp. Char.		-25 to +85°C	+85 to +125°C	R	Within ±15%	Within +15/-30%	The capacitance measurement should be made at each step specified in Table. <table border="1"> <tr> <td>Step</td> <td>Temperature</td> </tr> <tr> <td>1</td> <td>20±2°C</td> </tr> <tr> <td>2</td> <td>-25±3°C</td> </tr> <tr> <td>3</td> <td>20±2°C</td> </tr> <tr> <td>4</td> <td>+125±3°C</td> </tr> <tr> <td>5</td> <td>20±2°C</td> </tr> </table>	Step	Temperature	1	20±2°C	2	-25±3°C	3	20±2°C	4	+125±3°C	5	20±2°C
T. C.	Temp. Char.																						
	-25 to +85°C	+85 to +125°C																					
R	Within ±15%	Within +15/-30%																					
Step	Temperature																						
1	20±2°C																						
2	-25±3°C																						
3	20±2°C																						
4	+125±3°C																						
5	20±2°C																						
10	Solderability of Leads	Lead wire should be soldered with uniform coating on the axial direction over 3/4 of the circumferential direction.	The lead wire of a capacitor should be dipped into molten solder for 2±0.5 sec. The depth of immersion is up to about 1.5 to 2.0mm from the root of lead wires. Temp. of solder: Lead Free Solder (Sn-3Ag-0.5Cu) 245±5°C; H63 Eutectic Solder 235±5°C																				

No.	Item	Specifications	Testing Methods															
11	Soldering Effect	The measured and observed characteristics should satisfy the specifications in the following table.	The lead wires should be immersed in solder of 260±5°C up to 1.5 to 2.0mm from the root of terminal for 3.5±0.5 sec. Pre-treatment: Capacitor should be stored at 125±3°C for 1 hr., then placed at room condition for 24±2 hrs. before initial measurements. Post-treatment: Capacitor should be stored for 1 to 2 hrs. at room condition.															
		Appearance		No marked defect.														
		Capacitance Change		Within ±10%														
		Dielectric Strength		Per Item 5.														
12	Humidity (Under Steady State)	The measured and observed characteristics should satisfy the specifications in the following table.	Set the capacitor for 500+24/-0 hrs. at 40±2°C in 90 to 95% relative humidity. Pre-treatment: Capacitor should be stored at 125±3°C for 1 hr. then placed at room condition for 24±2 hrs. before initial measurements. Post-treatment: Capacitor should be stored for 1 to 2 hrs. at room condition.															
		Appearance		No marked defect.														
		Capacitance Change		Within ±10%														
		(DF)		0.4% max.														
	I.R.	1000MΩ min.																
13	Humidity Loading	The measured and observed characteristics should satisfy the specifications in the following table.	Apply the rated voltage for 500±12 hrs. at 40±2°C in 90 to 95% relative humidity. Post-treatment: Capacitor should be stored for 1 to 2 hrs. at room condition															
		Appearance		No marked defect.														
		Capacitance Change		Within ±10%														
		(DF)		0.4% max.														
	I.R.	1000MΩ min.																
14	Life	The measured and observed characteristics should satisfy the specifications in the following table.	Apply the rated voltage for 1000 +48/-0 hrs. at 125±2°C (Charge/Discharge current less than 50mA). Pre-treatment: Capacitor should be stored at 125±3°C for 1 hr., then placed at room condition for 24±2 hrs. before initial measurements. Post-treatment: Capacitor should be stored at 125±3°C for 1 hr., then placed at room condition for 24±2 hrs.															
		Appearance		No marked defect.														
		Capacitance Change		Within ±10%														
		(DF)		0.4% max.														
	I.R.	2000MΩ min.																
15	Temp. Cycle	The measured and observed characteristics should satisfy the specifications in the following table.	The capacitor should be subjected to 5 temperature cycles. <table border="1" data-bbox="949 1355 1412 1579"> <thead> <tr> <th>Step</th> <th>1</th> <th>2</th> <th>3</th> <th>4</th> </tr> </thead> <tbody> <tr> <td>Temp. (°C)</td> <td>-25±3</td> <td>Room temp.</td> <td>+125±3</td> <td>Room temp.</td> </tr> <tr> <td>Time (min)</td> <td>30±3</td> <td>3</td> <td>30±3</td> <td>3</td> </tr> </tbody> </table> Pre-treatment: Capacitor should be stored at 125±3°C for 1 hr., then placed at room condition for 24±2 hrs. before initial measurements. Post-treatment: Capacitor should be stored for 24±2 hrs. at room condition	Step	1	2	3	4	Temp. (°C)	-25±3	Room temp.	+125±3	Room temp.	Time (min)	30±3	3	30±3	3
		Step		1	2	3	4											
		Temp. (°C)		-25±3	Room temp.	+125±3	Room temp.											
		Time (min)		30±3	3	30±3	3											
		Appearance		No marked defect.														
		Capacitance Change		Within ±10%														
(DF)	0.4% max.																	
I.R.	1000MΩ min.																	
Dielectric Strength	Per Item 5.																	

Annex 1 : Taping specifications

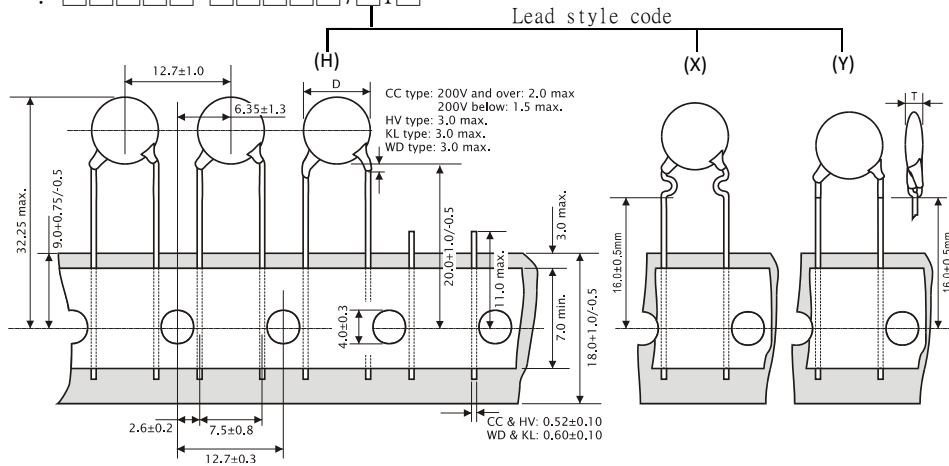
- Lead spacing (F): 5mm

P/N : -5T



- Lead spacing (F): 7.5mm

P/N : -7T



- Lead spacing (F): 10.0mm

P/N : -9T

