

NO. _____

承認書

客戶： 佳葳企業有限公司

品名： HV SL 3P3D ~ 82PK DC6KV

日期： 2012年06月18日

Approval signature:		
Authorized by	Checked by	Validated by

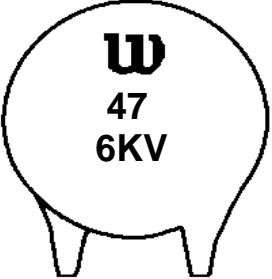
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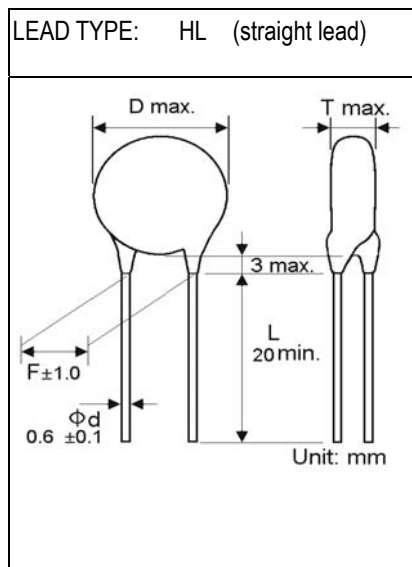
承認後請寄回一份(Please return one copy after approved)

1. Feature

- 1.1、 Small size and high capacitance.
- 1.2、 Disc ceramic capacitors with epoxy coating (blue color).
- 1.3、 Flame-resistant outer insulation (UL 94V-0).
- 1.4、 RoHS compliance.

2. Marking & Mechanical Drawing

	Trade mark: W
	Capacitance: 47 (47PF)
	Tolerance: K ($\pm 10\%$)
	Rated Voltage: 6KV-

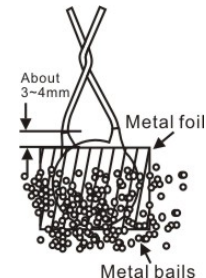


3. Product List and dimensions

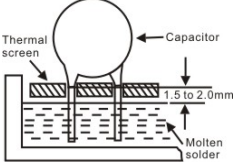
Welson Part Number	T.C.	Capacitance (PF) & Tolerance		Operating Voltage	D max	T max	F ±1.0	Remark for customer approval	
								Lead Spec. & Packing	Customer part number
HV SL 3P3D DC6KV	SL	3.3pF	±0.5pF	DC6KV	7	5	10	HL	
HV SL 3P9D DC6KV	SL	3.9pF	±0.5pF	DC6KV	7	5	10	HL	
HV SL 4P7D DC6KV	SL	4.7pF	±0.5pF	DC6KV	9	5	10	HL	
HV SL 5P6D DC6KV	SL	5.6pF	±0.5pF	DC6KV	9	5	10	HL	
HV SL 6P8D DC6KV	SL	6.8pF	±0.5pF	DC6KV	8	5	10	HL	
HV SL 8P2D DC6KV	SL	8.2pF	±0.5pF	DC6KV	9	5	10	HL	
HV SL 10PK DC6KV	SL	10pF	± 10%	DC6KV	7	5	10	HL	
HV SL 12PK DC6KV	SL	12pF	± 10%	DC6KV	7	5	10	HL	
HV SL 15PK DC6KV	SL	15pF	± 10%	DC6KV	7	5	10	HL	
HV SL 18PK DC6KV	SL	18pF	± 10%	DC6KV	8	5	10	HL	
HV SL 22PK DC6KV	SL	22pF	± 10%	DC6KV	8	5	10	HL	
HV SL 27PK DC6KV	SL	27pF	± 10%	DC6KV	8	5	10	HL	
HV SL 47PK DC6KV	SL	47pF	± 10%	DC6KV	7	5	10	HL	
HV SL 68PK DC6KV	SL	68pF	± 10%	DC6KV	9	5	10	HL	
HV SL 82PK DC6KV	SL	82pF	± 10%	DC6KV	9	5	10	HL	

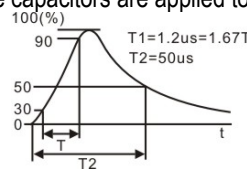
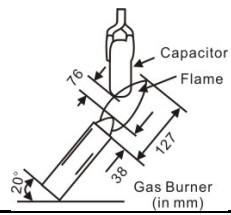
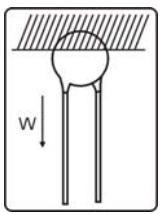
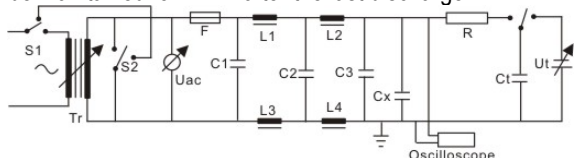
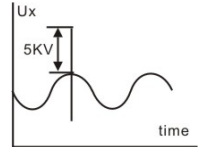
4. Performance

No.	Item	Specification	Testing Method																						
1	Appearance and Dimensions	No marked defect on appearance form and dimensions are within specified range.	The capacitor shall be visually inspected by for evidence of defect. Dimensions shall be measured with slide calipers.																						
2	Operating temperature	-25°C to +85°C																							
3	Capacitance	Within specified tolerance.	The capacitance and dissipation factor shall be measured at 25°C with 1±0.1KHz and AC1V(rms).																						
4	Dissipation Factor (D. F.)	<table border="1"> <thead> <tr> <th>Char.</th> <th>Specification</th> </tr> </thead> <tbody> <tr> <td>NPO, B, E, X7R,</td> <td>DF ≤ 2.5%</td> </tr> <tr> <td>F</td> <td>DF ≤ 5.0%</td> </tr> </tbody> </table>		Char.	Specification	NPO, B, E, X7R,	DF ≤ 2.5%	F	DF ≤ 5.0%																
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5	Insulation Resistance (I. R.)	10,000MΩ min.	The insulation resistance between lead wires shall be measured with DC500±50V within 60±5 s of charging. The voltage shall be applied to the capacitor through a resistor of 1MΩ.																						
6	Dielectric Strength	Between lead Wires	The capacitor shall not be damaged when the test voltage is applied between the lead wires for 1-5 s. (Charge/discharge current ≤ 50mA)																						
		Body Insulation	<table border="1"> <thead> <tr> <th>Rated voltage</th> <th>Test voltage</th> </tr> </thead> <tbody> <tr> <td>≤ DC3KV</td> <td>200% of rated voltage</td> </tr> <tr> <td>> DC3KV</td> <td>150% of rated voltage</td> </tr> </tbody> </table> <p>No failure</p>	Rated voltage	Test voltage	≤ DC3KV	200% of rated voltage	> DC3KV	150% of rated voltage																
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7	Temperature Characteristics	<table border="1"> <thead> <tr> <th>Char.</th> <th>Capacitance change</th> </tr> </thead> <tbody> <tr> <td>B,</td> <td>Within ±10%</td> </tr> <tr> <td>X7R</td> <td>Within ±15%</td> </tr> <tr> <td>E</td> <td>Within +20/-55%</td> </tr> <tr> <td>F</td> <td>Within +30/-80%</td> </tr> </tbody> </table> <p>Temperature range is -55 to +125°C for X7R, -25 to +85°C for others.</p>	Char.	Capacitance change	B,	Within ±10%	X7R	Within ±15%	E	Within +20/-55%	F	Within +30/-80%	<p>The capacitance measurement shall be made at each step specified Table 1.</p> <p style="text-align: center;"><Table. 1></p> <table border="1"> <thead> <tr> <th>Step</th> <th>1</th> <th>2</th> <th>3</th> <th>4</th> <th>5</th> </tr> </thead> <tbody> <tr> <td>Temp. (°C)</td> <td>+20±2</td> <td>-25±2</td> <td>+20±2</td> <td>+85±2</td> <td>+20±2</td> </tr> </tbody> </table>	Step	1	2	3	4	5	Temp. (°C)	+20±2	-25±2	+20±2	+85±2	+20±2
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8	Solderability of Leads	Lead wire shall be soldered with uniformly coated on the axial direction over 3/4 of the circumferential direction.	The lead wire of a capacitor shall be dipped into molten solder of 235±5°C for 2±0.5 s. The depth of immersion is up to about 1.5 to 2.0mm from the root of lead wires.																						

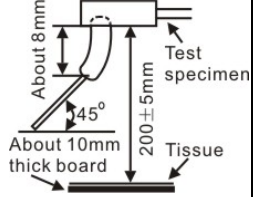


High Voltage Ceramic Capacitors

No.	Item	Specification	Testing Method	
9	Soldering Effect	Appearance	No marked defect.	
		Capacitance Change	Within $\pm 10\%$	
		I. R.	1000M Ω min.	
		Dielectric Strength	Per Item 6.	
<p>As in figure, the lead wires shall be immersed solder or $350\pm 10^{\circ}\text{C}$ or $260\pm 5^{\circ}\text{C}$ up to 1.5 to 2.0mm from root of terminal for 3.5 ± 0.5 s (10 ± 1 s for $260\pm 5^{\circ}\text{C}$).</p>  <p>Pre-treatment: Capacitor shall be stored at $85\pm 2^{\circ}\text{C}$ for 1 h, then placed at room condition for 24 ± 2 h before initial measurements.</p> <p>Post-treatment: Capacitor shall be stored for 1 to 2 h at room condition.</p>				
10	Vibration Resistance	Appearance	No marked defect.	
		Capacitance	Within the specified tolerance.	
		D.F.	Char.	Specification
			B, E, SL X7R, COG,	$DF \leq 2.5\%$
F	$DF \leq 5.0\%$			
<p>The capacitor shall firmly be soldered to the supporting lead wire and vibration which is 10 to 55Hz in the vibration frequency range, 1.5mm in total amplitude, and about 1 min in the rate of vibration change from 10 to 55Hz and back to 10Hz is applied for a total of 6 h; 2h each in 3 mutually perpendicular directions.</p>				
11	Humidity (Under steady state)	Appearance	No marked defect.	
		Capacitance Change	Char.	Capacitance change
			SL, COG, B	Within $\pm 10\%$
			X7R E, F	Within $\pm 15\%$
		D.F.	Char.	Specification
			B, E, SL X7R, COG,	$DF \leq 5\%$
F	$DF \leq 7.5\%$			
I. R.	3000M Ω min.			
Dielectric Strength	Per Item 6.			
<p>Set the capacitor for 500 ± 12 h at $40\pm 2^{\circ}\text{C}$ in 90 to 95% relative humidity.</p> <p>Post-treatment: Capacitor shall be stored for 1 to 2 h at room condition.</p>				
12	Humidity Loading	Appearance	No marked defect.	
		Capacitance Change	Char.	Capacitance change
			SL, COG, B	Within $\pm 10\%$
			X7R E, F	Within $\pm 15\%$
		D.F.	Char.	Specification
			B, E, SL X7R, COG,	$DF \leq 5\%$
F	$DF \leq 7.5\%$			
I. R.	3000M Ω min.			
Dielectric Strength	Per Item 6.			
<p>Apply the rated voltage for 500 ± 12 h at $40\pm 2^{\circ}\text{C}$ in 90 to 95% relative humidity.</p> <p>Post-treatment: Capacitor shall be stored for 1 to 2 h at room condition.</p>				

No.	Item	Specification	Testing Method
13	Life	Appearance	No marked defect.
		Capacitance Change	Within $\pm 20\%$
		I. R.	3000M Ω min.
		Dielectric Strength	Per Item 6.
			<p>Impulse Voltage</p> <p>Each individual capacitor shall be subjected to a 8kV impulses for three times. After, the capacitors are applied to life test.</p>  <p>Apply a voltage of table 2 for 1000 hrs at $125 \pm 2/0^\circ\text{C}$, and relative humidity of 50% max..</p> <p style="text-align: right;"><Table. 2></p> <p style="text-align: center;">Applied voltage</p> <p>AC425V (rms), except that once each hour the voltage is increased to AC1000V (rms) for 0.1 s.</p> <p>Post-treatment: Capacitor shall be stored for 1 to 2 h at room condition.</p>
14	Flame Test	The capacitor flame discontinues as follows.	<p>The capacitor shall be subjected to applied flame for 15 s and removed for 15 s until 5 cycles.</p> 
15	Robustness of terminations	Tensile	<p>As a figure, fix the body of capacitor, apply a tensile weight gradually to each lead wire in the radial direction of capacitor up to 10N and keep it for 10 ± 1 s.</p> <p>Each lead wire shall be subjected to 5N weight and then a 90° bend, at the point of egress, in one direction, return to original position, and then a 90° bend in the opposite direction at the rate of one bend in 2 to 3 s.</p> 
		Bending	
16	Active Flammability	The cheesecloth shall not be on fire.	<p>The capacitor shall be individually wrapped in at least one but more than two complete layers of cheesecloth. The capacitor shall be subjected to 20 discharges. The interval between successive discharges. The interval between successive shall be 5 s. The UAC shall be maintained for 2 min after the last discharge.</p>  <p>C1, 2: $1\mu\text{F} \pm 10\%$ C3: $0.033\mu\text{F} \pm 5\%$ 10KV L1 to 4: $1.5\text{mH} \pm 20\%$ 16A Rod core choke Ct: $3\mu\text{F} \pm 5\%$ 10KV Cx: Capacitor under test F: Fuse, Rated 10A R: $100\Omega \pm 5\%$ Ur: Rated Voltage Ut: Voltage applied to Ct.</p> 

High Voltage Ceramic Capacitors

No.	Item	Specification	Testing Method																																							
17	Passive Flammability	The burning time shall not be exceeded the time 30 s. The tissue paper shall not ignite.	<p>The capacitor under test shall be held in the flame in the position which best promotes burning. Each specimen shall only be exposed once to the flame. Time of exposure to flame: 30 s.</p> <p>Length of flame: 12 ± 1 mm Gas burner: Length 35 mm min. Inside Dia.: 0.5 ± 0.1 mm Outside Dia.: 0.9 mm max. Gas: Butane gas Purity 95% min.</p> 																																							
18	Temperature and Immersion Cycle	<p>Appearance: No marked defect.</p> <table border="1"> <thead> <tr> <th>Char.</th> <th>Capacitance change</th> </tr> </thead> <tbody> <tr> <td>SL, COG, B</td> <td>Within $\pm 10\%$</td> </tr> <tr> <td>X7R, E, F</td> <td>Within $\pm 15\%$</td> </tr> </tbody> </table> <table border="1"> <thead> <tr> <th>Char.</th> <th>Specification</th> </tr> </thead> <tbody> <tr> <td>B, E, SL, X7R, COG,</td> <td>$DF \leq 5\%$</td> </tr> <tr> <td>F</td> <td>$DF \leq 7.5\%$</td> </tr> </tbody> </table> <p>I. R. 3000MΩ min.</p> <p>Dielectric Strength Per Item 6.</p>	Char.	Capacitance change	SL, COG, B	Within $\pm 10\%$	X7R, E, F	Within $\pm 15\%$	Char.	Specification	B, E, SL, X7R, COG,	$DF \leq 5\%$	F	$DF \leq 7.5\%$	<p>The capacitor shall be subjected to 5 temperature cycles, then consecutively to 2 immersion cycles.</p> <p style="text-align: center;"><Temperature cycle></p> <table border="1"> <thead> <tr> <th>Step</th> <th>1</th> <th>2</th> <th>3</th> <th>4</th> </tr> </thead> <tbody> <tr> <td>Temp. ($^{\circ}\text{C}$)</td> <td>-25+0/-3</td> <td>Room temp.</td> <td>+125+3/-0</td> <td>Room temp.</td> </tr> <tr> <td>Time</td> <td>30 min</td> <td>3 min</td> <td>30 min</td> <td>3 min</td> </tr> </tbody> </table> <p style="text-align: right;">Cycle time: 5 cycle</p> <p style="text-align: center;"><Immersion cycle></p> <table border="1"> <thead> <tr> <th>Step</th> <th>Temp. ($^{\circ}\text{C}$)</th> <th>Time</th> <th>Immersion water</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>+60+5/-0</td> <td>15 min</td> <td>Clean water</td> </tr> <tr> <td>2</td> <td>0\pm3</td> <td>15 min</td> <td>Salt water</td> </tr> </tbody> </table> <p style="text-align: right;">Cycle time: 2 cycle</p> <p>Pre-treatment: Capacitor shall be stored at $85 \pm 2^{\circ}\text{C}$ for 1 h, then placed at room condition for 24 ± 2 h before initial measurements Post-treatment: Capacitor shall be stored for 24 ± 2 h at room condition.</p>	Step	1	2	3	4	Temp. ($^{\circ}\text{C}$)	-25+0/-3	Room temp.	+125+3/-0	Room temp.	Time	30 min	3 min	30 min	3 min	Step	Temp. ($^{\circ}\text{C}$)	Time	Immersion water	1	+60+5/-0	15 min	Clean water	2	0 \pm 3	15 min	Salt water
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Notice: "room condition" temperature: 15 to 35 $^{\circ}\text{C}$, relative humidity: 45 to 75%, atmospheric pressure: 860 to 106kPa