

# HVH Series 105 C SMD Aluminum Electrolytic Capacitor

Operating with wide temperature range -40~+105°C

Load life of 2000 hours

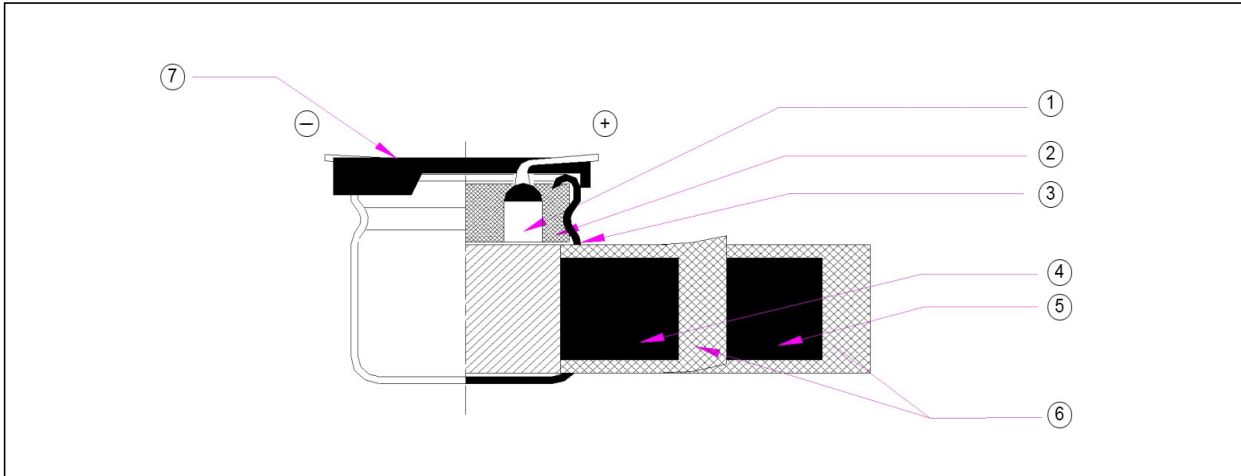
RoHS & REACH compliant, Halogen-free



## How to order

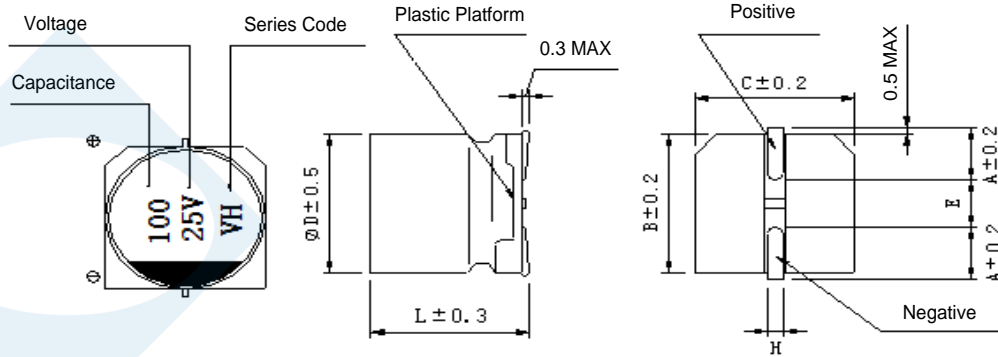
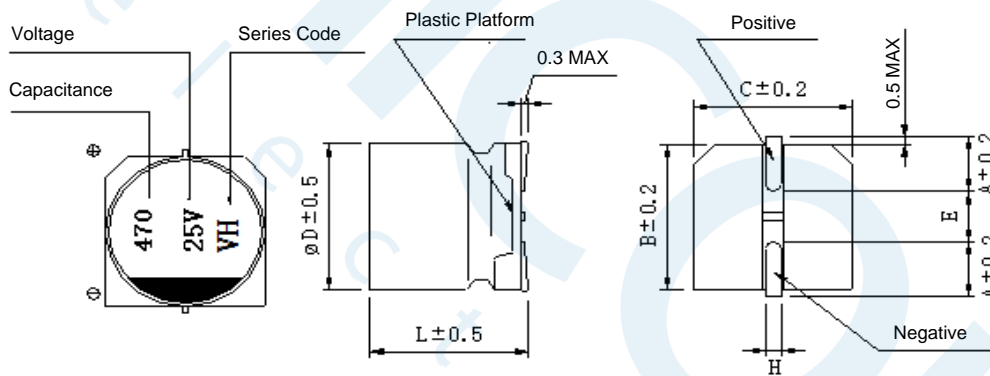
<u>HVH</u>	<u>106</u>	<u>M</u>	<u>0016</u>	<u>0605</u>	<u>R</u>	<u>-</u>
↓	↓	↓	↓	↓	↓	↓
<u>Type</u>	<u>Capacitance code</u>	<u>Tolerance</u>	<u>Rated Voltage</u>	<u>Size Code</u>	<u>Package</u>	<u>Additional characters may be added for special requirements</u>
HVH	pF Code: 1st two digits represent significant figures 3rd digit represents multiplier (number of zeros to follow) 106 = 10uF 476 = 47 uF	M: +/-20%	Code 0035: 35VDC For DC Voltage 0016: 16VDC 0025: 25VDC 0050: 50VDC	Code 0405: Size 4x5.4mm Size for V-chip E-cap 0605: Size 6x5.4mm 1010: Size 10x10.5mm 1818: Size 18x18.5mm	R: Tape & Reel	

## Frame drawing



No.	Parts	Material
1	Lead wire	AL- wire LG3+Tin- plating of copper cover steel
2	Rubber stopper	IIR rubber
3	PE- CASE	AL -99.5%
4	AL - foil(+)	Formed AL 99.98% or 99.98%
5	AL - foil(-)	Etched AL 99.7%
6	Separstor paper	Electrolytic Capacitor paper
7	BASE	PPS

**Case size table**

 1.  $\phi 4 \sim \phi 6.3$ 

 2.  $\phi 8 \sim \phi 18$ 


unit:(mm)

	4 × 5.4	5 × 5.4	6.3 × 5.4	6.3 × 7.7	6.3 × 10.5	8 × 10.5	8 × 12.5	10 × 10.5	10 × 12.5	12.5 × 13.5	12.5 × 16.5	16 × 16.5	18 × 16.5	18 × 21.5	
A	1.8	2.1	2.4	2.4	2.4	2.9	2.9	3.2	3.2	4.8	4.8	5.8	6.8	6.8	
B	4.3	5.3	6.6	6.6	6.6	8.3	8.3	10.3	10.3	13	13	17	19	19	
C	4.3	5.3	6.6	6.6	6.6	8.3	8.3	10.3	10.3	13	13	17	19	19	
E	1.0	1.3	2.2	2.2	2.2	3.1	3.1	4.5	4.5	4.4	4.4	6.4	6.4	6.4	
L	5.4	5.4	5.4	7.7	10.5	10.5	12.5	10.5	12.5	13.5	16.5	16.5	16.5	21.5	
H	0.5~0.8					0.8 ~ 1.1					1.1~1.4				

**Specifications**

Items	Characteristics							
Operating Temperature Range	-55°C ~ 105°C							
Rated Voltage Range	4V ~ 400V							
Nominal Capacitance Range	1 ~ 8200 $\mu$ F							
Nominal Capacitance Tolerance	$\pm$ 20% (20°C, 120Hz)							
Leakage Current	$I \leq 0.01CRVR$ or 3( $\mu$ A) Whichever is greater(After 2 minutes' application of rated voltage. CR: Nominal Capacitance ( $\mu$ F) UR: Rated voltages (V)							
tg $\delta$ Dissipation Factor (Max) 20°C, 120Hz	UR (V)	4	6.3	10	16	25	35	50
	tg $\delta$	0.40	0.30	0.24	0.20	0.16	0.14	0.14
	When nominal capacitance exceeds 1000 $\mu$ F, add 0.02 to the value above for each 1000 $\mu$ F increase.							

**Nominal capacitance, rated voltage, rated ripple current and case size table**

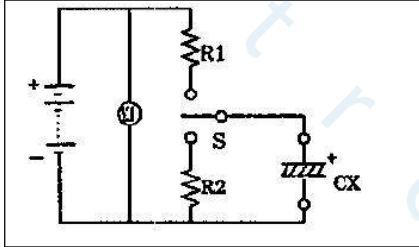
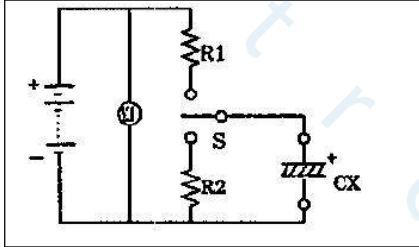
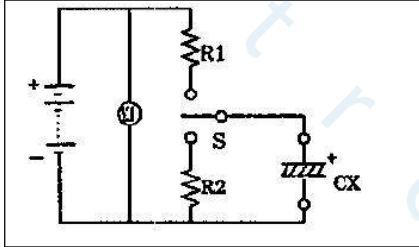
μF	4		6.3		10		16		25		35		50			
	D×L mm	I~ mA	D×L mm	I~ mA	D×L mm	I~ mA	D×L mm	I~ mA	D×L mm	I~ mA	D×L mm	I~ mA	D×L mm	I~ mA		
1.0													4×5.4	6.3		
2.2													4×5.4	11		
3.3													4×5.4	14		
4.7											4×5.4	16	5×5.4	19		
10							4×5.4	18	4×5.4	13	5×5.4	27	6.3×5.4	30		
22	4×5.4	22	4×5.4	22	4×5.4	18	4×5.4	20	5×5.4	23	6.3×5.4	44	6.3×7.7	51		
33	5×5.4	30	5×5.4	30	4×5.4	20	6.3×5.4	40							6.3×5.4	38
47	5×5.4	36	5×5.4	36	4×5.4	22	6.3×5.4	50	6.3×5.4	48	6.3×5.4	44	6.3×7.7	63		
					5×5.4	35										
100	6.3×5.4	60	6.3×5.4	60	6.3×5.4	60	6.3×5.4	60	6.3×7.7	66	6.3×7.7	100	8×10.5	230		
150	6.3×5.4	86	6.3×5.4	86	6.3×7.7	86	6.3×7.7	95	6.3×7.7	91	8×10.5	260			10×10.5	250
220	6.3×5.4	102	6.3×5.4	102	6.3×5.4	105	6.3×7.7	105	6.3×7.7	105	6.3×7.7	105	8×10.5	260	10×10.5	375
											8×10.5	240	10×10.5	450		
330	6.3×7.7	105	8×10.5	290	8×10.5	290	8×10.5	290	8×10.5	320	10×10.5	450	10×10.5	400		
470	8×10.5	210	8×10.5	340	8×10.5	320	8×10.5	320	10×10.5	450	10×10.5	480	12.5×13.5	490		
680	8×10.5	210	8×10.5	340	10×10.5	392	10×10.5	470	10×10.5	490	12.5×13.5	600	16×16.5	700		
1000	8×10.5	230	10×10.5	495	10×10.5	450	10×10.5	550	12.5×16.5	550	16×16.5	800	18×16.5	990		
2200			12.5×13.5	680	12.5×13.5	680	16×16.5	900	16×16.5	900	18×16.5	1050				
3300			12.5×16	850	16×16.5	950	16×16.5	950	18×16.5	1150						
4700			16×16.5	1000	16×16.5	1000	18×16.5	1225	18×21.5	1300						
6800			18×16.5	1290	18×16.5	1290										
8200			18×21.5	1450	18×21.5	1450										

μF	63		80		100		160		200		250		400	
	D×L mm	I~ mA	D×L mm	I~ mA	D×L mm	I~ mA	D×L mm	I~ mA	D×L mm	I~ mA	D×L mm	I~ mA	D×L mm	I~ mA
1.0	4×5.4	8	5×5.4	30	5×5.4	30	6.3×7.7	70	6.3×10.5	90	6.3×10.5	80	6.3×10.5	70
2.2	4×5.4	12	5×5.4	32	5×5.4	32	6.3×7.7	70	6.3×10.5	95	6.3×10.5	85	6.3×10.5	75
3.3	4×5.4	22	5×5.4	35	5×5.4	35	6.3×7.7	70	6.3×10.5	100	6.3×10.5	90	8×12.5	85
4.7	5×5.4	25	5×5.4	40	5×5.4	40	6.3×7.7	75	8×10.5	120	8×12.5	100	8×12.5	85
6.8	6.3×5.4	30	6.3×5.4	60	6.3×5.4	60	6.3×7.7	80	8×10.5	120	8×12.5	100	10×12.5	95
10	6.3×5.4	40	6.3×5.4	60	6.3×7.7	70	8×10.5	90	10×10.5	150	10×12.5	120	10×12.5	95
22	6.3×7.7	45	6.3×7.7	70	8×10.5	90	10×12.5	180	10×10.5	150	10×12.5	120	10×12.5	95
33	8×10.5	139	8×10.5	139	8×10.5	90	12.5×13.5	290	12.5×16.5	310	12.5×16.5	240	16×16.5	140
47	8×10.5	139	8×10.5	139	10×10.5	160	12.5×16.5	370	16×16.5	420	16×16.5	340	18×16.5	280
68	10×10.5	160	10×10.5	160	12.5×13.5	380	16×16.5	500	16×16.5	420	16×16.5	340	18×21.5	350
100	10×10.5	226	10×10.5	226	12.5×13.5	400	18×16.5	650	16×21.5	590	18×21.5	490		
150	10×12.5	300	10×12.5	300	12.5×16.5	500								
220	12.5×13.5	500	12.5×13.5	500	16×16.5	600								
330	12.5×16.5	600	12.5×16.5	600	18×16.5	780								
470	16×16.5	850	16×16.5	850	18×21.5	850								
680	18×16.5	1100	18×16.5	1100										
1000	18×21.5	1400	18×21.5	1400										

→ I~ = Rated ripple current (mA) (105°C, 120Hz)

**Tests**

1	SERIES	HVH SERIES																			
2	Rated voltage	4V ~ 400V																			
3	Operating temperature range operating	Operating temperature range is the range of ambient temperature at which the capacitor can be operated continuously at rated voltage. SPEC:-55~+105°C																			
4	Capacitance	Measuring circuit equivalent series circuit																			
		20°C	measuring temperature																		
		120HZ	measuring frequency																		
		0.5Vrms	measuring voltage																		
		±20% MAX	Nominal Capacitance Tolerance:±20% MAX																		
5	Tangent of the loss angle	Measurement should be made under the same conditions as those given for the measurement of capacitance. SPEC: <table border="1" data-bbox="518 1220 1449 1310"> <thead> <tr> <th>(tgδ)</th> <th>UR (V)</th> <th>4</th> <th>6.3</th> <th>10</th> <th>16</th> <th>25</th> <th>35</th> <th>50</th> </tr> </thead> <tbody> <tr> <td></td> <td>tgδ</td> <td>0.40</td> <td>0.30</td> <td>0.24</td> <td>0.20</td> <td>0.16</td> <td>0.14</td> <td>0.14</td> </tr> </tbody> </table>		(tgδ)	UR (V)	4	6.3	10	16	25	35	50		tgδ	0.40	0.30	0.24	0.20	0.16	0.14	0.14
(tgδ)	UR (V)	4	6.3	10	16	25	35	50													
	tgδ	0.40	0.30	0.24	0.20	0.16	0.14	0.14													
6	Leakage current	Therated voltage shall be applied across the capacitor and its protective resistor which shall be 1000 ±100Ω.The leakage current shall be then measured after an electrifications period of (A)min. The leakage current shall be calculated by the following equation $I \leq 0.01CV$ or $3\mu A$ Which is greater 20°C SPEC: The following specifications shall be satisfied when the rated voltage is applied for the required time.																			
7	Maximum permissible ripple current	The maximum sinusoidal alternating current of a frequency specified below, at which the capacitor can be operated continuously. This requirement shall be satisfied even after the measurement of clause 16(electrical endurance) Where(DC voltage +peak ripple voltage)≤rated voltage.																			

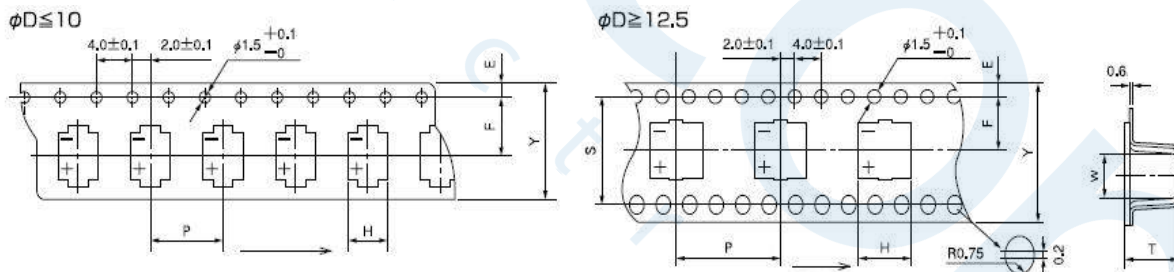
8	Characteristics of temperature	<table border="1"> <thead> <tr> <th>Step</th> <th>Temperature</th> <th>Duration</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>20±2℃</td> <td>15 min</td> </tr> <tr> <td>2</td> <td>minimum operating temperature</td> <td>2hours</td> </tr> <tr> <td>3</td> <td>20±2℃</td> <td>15 min</td> </tr> <tr> <td>4</td> <td>maximum operating temperature</td> <td>2 hours</td> </tr> </tbody> </table> <p>Step1: Capacitance, tangent of the loss angle impedance shall be measured.</p> <p>Step2: After the capacitor being stored for 2hours, Capacitance, tangent of the loss angle and impedance shall be measured.</p> <p>Step3: The capacitor being stored fro 15min at20±2℃.</p> <p>Step4 : After the capacitor being stored for 2hours, capacitance and leakage current shall be measured.</p> <table border="1"> <thead> <tr> <th>Rated voltage</th> <th>4</th> <th>6.3</th> <th>10</th> <th>16</th> <th>25</th> <th>35</th> <th>50</th> </tr> </thead> <tbody> <tr> <td>Z(-25℃/Z(+20℃)</td> <td>7</td> <td>3</td> <td>3</td> <td>2</td> <td>2</td> <td>2</td> <td>2</td> </tr> <tr> <td>Z(-40℃/Z(+20℃)</td> <td>15</td> <td>8</td> <td>8</td> <td>4</td> <td>4</td> <td>3</td> <td>3</td> </tr> </tbody> </table>	Step	Temperature	Duration	1	20±2℃	15 min	2	minimum operating temperature	2hours	3	20±2℃	15 min	4	maximum operating temperature	2 hours	Rated voltage	4	6.3	10	16	25	35	50	Z(-25℃/Z(+20℃)	7	3	3	2	2	2	2	Z(-40℃/Z(+20℃)	15	8	8	4	4	3	3
		Step	Temperature	Duration																																					
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Z(-25℃/Z(+20℃)	7	3	3	2	2	2	2																																		
Z(-40℃/Z(+20℃)	15	8	8	4	4	3	3																																		
9	Surge test	<p>The capacitor shall be subjected to 1000cycles at a temperature specified below, each consisting of a charge period of 30±5sec, followed by a discharge period of approx. 5min30sec. And the capacitor shall be stored under standard conditions thermal to obtain stability,after which measurements shall be made. measurement circuit</p> <table border="1"> <tr> <td rowspan="3">  </td> <td>VS:</td> <td>V1: DC voltmeter</td> </tr> <tr> <td>R1: (1KΩ) Protective series resistor</td> <td>R2: Discharge resistor</td> </tr> <tr> <td>CX: Test capacitor</td> <td>S: Switch</td> </tr> </table> <p>SPEC: 1) ΔC/C ≤ 15%                  2) tgδ                  3) Surge voltage</p> <table border="1"> <thead> <tr> <th>RATED VOLTAGE(VDC)</th> <th>4</th> <th>6.3</th> <th>10</th> <th>16</th> <th>25</th> <th>35</th> <th>50</th> </tr> </thead> <tbody> <tr> <td>SURGE VOLTAGE(VDC)</td> <td>5</td> <td>8</td> <td>13</td> <td>20</td> <td>32</td> <td>44</td> <td>63</td> </tr> </tbody> </table>		VS:	V1: DC voltmeter	R1: (1KΩ) Protective series resistor	R2: Discharge resistor	CX: Test capacitor	S: Switch	RATED VOLTAGE(VDC)	4	6.3	10	16	25	35	50	SURGE VOLTAGE(VDC)	5	8	13	20	32	44	63																
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10	Terminal strength	<p>1) Tensile</p> <table border="1" data-bbox="478 297 1422 465"> <thead> <tr> <th>d(mm)</th> <th>[N]</th> <th>Duration time</th> </tr> </thead> <tbody> <tr> <td>0.3&lt;d≤0.5</td> <td>5</td> <td rowspan="3">10±2sec</td> </tr> <tr> <td>0.5&lt;d≤0.8</td> <td>10</td> </tr> <tr> <td>0.8&lt;d≤1.25</td> <td>20</td> </tr> </tbody> </table> <p>2) Bending</p> <p>The terminal shall be subjected to 1 bend in each direction to give a total 2 bends.</p> <table border="1" data-bbox="478 566 1422 734"> <thead> <tr> <th>d(mm)</th> <th>[N]</th> </tr> </thead> <tbody> <tr> <td>0.3&lt;d≤0.5</td> <td>2.5 (0.25KG)</td> </tr> <tr> <td>0.5&lt;d≤0.8</td> <td>5.0 (0.51KG)</td> </tr> <tr> <td>0.8&lt;d≤1.25</td> <td>10.0(1.0KG)</td> </tr> </tbody> </table> <p>SPEC: No breaking and loosening of terminal</p>	d(mm)	[N]	Duration time	0.3<d≤0.5	5	10±2sec	0.5<d≤0.8	10	0.8<d≤1.25	20	d(mm)	[N]	0.3<d≤0.5	2.5 (0.25KG)	0.5<d≤0.8	5.0 (0.51KG)	0.8<d≤1.25	10.0(1.0KG)
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0.8<d≤1.25	10.0(1.0KG)																			
11	Solderabilit	<p>Solder: H60A, H60S or H63A</p> <p>Solder temperature: 245±2℃</p> <p>Immersion time: 3±0.5sec</p> <p>Immersion depth: 2mm</p> <p>Flux: 25% by weight of rosin in ethanol</p> <p>SPEC:1)3/4 of the circumference of the surface up to the immersed shall be covered with new solder.</p>																		
12	Resistance to soldering heat	<p>Solder : H60A, H60S or H63A</p> <p>Solder temperature : 260±5℃ or 350±10℃</p> <p>Immersion time : 10±1sec (or 3.5±0.5sec)</p> <p>Thickness of heat shunt:1.6mm : 1.6mm</p> <p>SPEC:1) Change in capacitance: Within±10% of the initial value;</p> <p>2) tangent of the loss angle: The initial specified value or less;</p> <p>3) leakage current : The initial specified value or less.</p>																		
13	Vibration	<p>Only endurance conditioning by sweeping shall be made. The entire frequency range, from 10 to 55Hz and return to 10Hz, shall be transversed in 1min. Amplitude(total excursion)1.5mm,</p> <p>This motion shall be applied for a period of 2hours in each of 3 mutually perpendicular directions (a total of 6 hours)</p> <p>SPEC:1) change in capacitance : ±5% within ±5%of the initial value;</p> <p>2) No visible damage.</p>																		
14	Damp heat	<p>The capacitor shall be stored at a temperature of 40±2℃ and relative huidity of 90 to 95% for 240 ±8hours . And then the capacitor shall be subjected to standard atmospheric conditions for 1 to 2hours, after which measurements shall be made.</p> <p>SPEC:1) change in capacitance: within ±15%of the initial value;</p> <p>2) tangent of loss angle: The initial specified value or less;</p> <p>3) leakage current: The initial specified value or less.</p>																		

15	Shelf life	<p>The capacitor shall be stored at 105°C temperature specified below for 1000hours. During which time no voltage shall be applied. And then the capacitor shall be subjected to standard atmospheric conditions for 1 to 2 hours, after which measurements shall be made, Prior to the measurement of leakage current, following conditioning may be made.</p> <p>SPEC: 1) change in capacitance: within ±30% of the initial value;                  2) tangent of loss angle: within ±300% of the initial value;                  3) leakage current: The initial specified value or less.</p>
16	Load life	<p>The rated voltage shall be applied continuously to the capacitor at maximum operating temperature 105 ±2°C for 2000 hours. And then the capacitor shall be subjected to standard atmospheric conditions for 1 to 2 hours, after which measurement shall be made.</p> <p>SPEC: 1) change in capacitance: within ±30% of the initial value;                  2) tangent of loss angle: within ±300% of the initial value;                  3) leakage current: The initial specified value or less.</p>

### HVH SMD Aluminum Electrolytic Capacitors

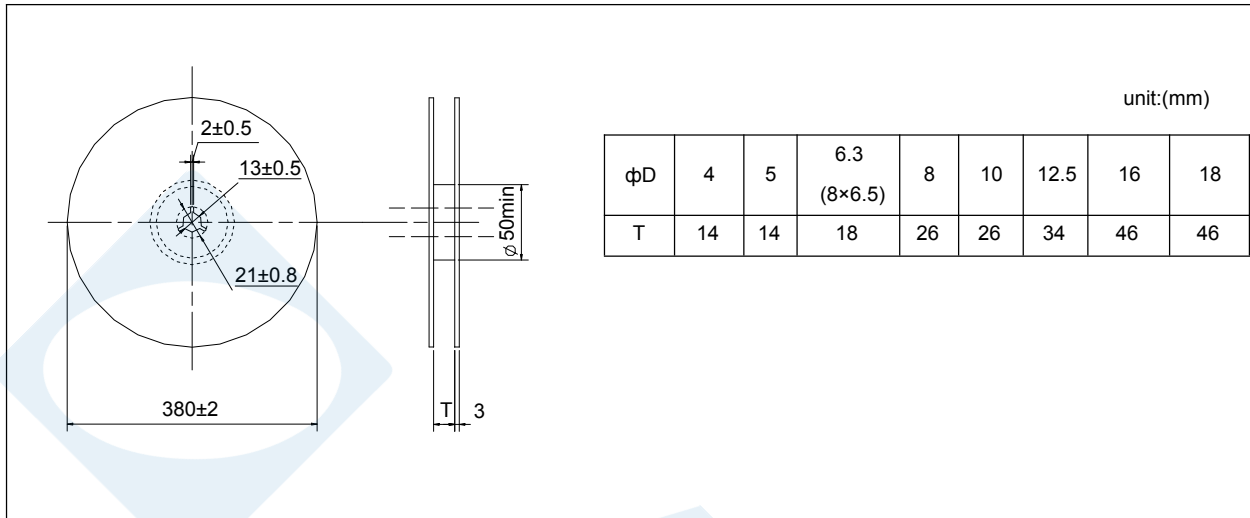
Carrier tape



unit:(mm)

$\Phi D \times L$	4×5.4	5×5.4	6.3× 5.4	6.3× 7.7	6.3× 10.5	8× 10.5	8× 12.5	10× 10.5	10× 12.5	12.5× 13.5	12.5× 16.5	16× 16.5	18× 16.5	18× 21.5
W	12.0	12.0	16.0	16.0	16.0	24.0	24.0	24.0	24.0	32.0	32.0	44.0	44.0	44.0
P	8.0	12.0	12.0	12.0	12.0	16.0	16.0	16.0	16.0	24.0	24.0	28.0	32.0	32.0
F	5.5	5.5	7.5	7.5	7.5	11.5	11.5	11.5	11.5	14.2	14.2	20.2	20.2	20.2
A0	5.0	6.0	7.0	7.0	7.0	8.7	8.7	10.7	10.7	13.2	13.2	17.5	19.5	19.5
B0	5.0	6.0	7.0	7.0	7.0	8.7	8.7	10.7	10.7	13.2	13.2	17.5	19.5	19.5
T2	5.8	5.8	5.8	8.0	11.0	11.0	13.3	11.0	13.3	14.3	17.3	17.3	17.8	22.5



**Reel**

**Package quantity**

$\phi D \times L$	Quantity / Reel	pcs/ Small packing box	pcs/Large packing box
4×5.4	2000pcs	24000pcs	48000pcs
5×5.4	1000pcs	12000pcs	24000pcs
6.3×5.4、6.3×7.7、8×6.5	1000pcs	10000pcs	20000pcs
8×10.5、10×10.5	500pcs	3500pcs	7000pcs
6.3×10.5	800pcs	8000pcs	16000pcs
8×12.5	400pcs	2800pcs	5600pcs
10×12.5	400pcs	2800pcs	5600pcs
12.5×13.5	250pcs	2500pcs	5000pcs
12.5×16.5	200pcs	800pcs	1600pcs
16×16.5	200pcs	800pcs	1600pcs
18×16.5	175pcs	700pcs	1400pcs
18×21.5	125pcs	500pcs	1000pcs

Note: Specification is subject to change without further notice. For more details and updates, please visit our website.