

# SPECIFICATIONS

Customer	
Product Name	Common Mode Chokes
Sunlord Part Number	CWS4520EF-Series
Customer Part Number	

New Released,  Revised]

SPEC No.: **CWS210008**

Rev.	Effective Date	Changed Contents	Change reasons	Approved By
01	Mar.11, 2021	New release	/	Simei Yu

【This SPEC is total 6 pages including specifications and appendix.】

【ROHS Compliant Parts】



## Shenzhen Sunlord Electronics Co., Ltd.

Address: Sunlord Industrial Park, Dafuyuan Industrial Zone, Guanlan, Shenzhen, China 518110

Tel: 0086-755-29832333      Fax: 0086-755-82269029      E-Mail: sunlord@sunlordinc.com

【For Customer approval Only】

Date: \_\_\_\_\_

Qualification Status:  Full  Restricted  Rejected

Approved By	Verified By	Re-checked By	Checked By

Comments:

\_\_\_\_\_

## 1. Scope

This specification applies to CWS4520EF-SERIES Common Mode Chokes

## 2. Product Description and Identification (Part Number)

### 1) Description

Wire Wound SMD Type Power Inductor, CWS4520EF-901T, 300Ω Min@100MHz, 68mΩ, 2.1A

### 2) Product Identification (Part Number)

CWS 4520 EF -901 T  
 (1) (2) (3) (4) (5)

①Type	
CWS	Common Mode Chokes

②External Dimensions (mm)
4520

③Configuration	
EF	EF Type Base

④Nominal Impedance [Ω]	
Example	Example
901	900

⑤Packing	
T	Tape Package

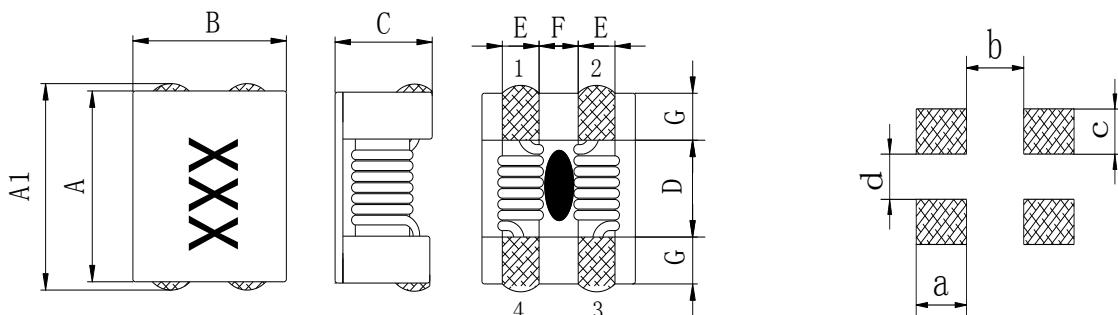
## 3. Electrical Characteristics

Please refer to **Appendix A** (Page 6)

- 1) Operating temperature (Including self-generated heat): -40°C ~ +125°C
- 2) Storage temperature and humidity range (product with packing): 0°C ~ +40°C, RH 70% Max.

## 4. Shape and Dimensions

1. Dimensions and recommended PCB pattern for reflow soldering:



Symbol	A	A1	B	C.	D	E	F	G	a	b	c	d
CWS4520EF	4.7±0.5	5.2±0.6	4.5±0.5	2.4Max	2.7Ref.	1.258Ref.	0.75Ref	1.0 Ref.	1.75	2.0	1.75	0.9

**Marking:** White "XXX".

**Remarks:** A size does not contain solder point.

2. Material List

Symbol	Components	Material
a	Core	Ferrite core
b	Wire	Enamelled copper wire
c	Base	Plastic
d	Adhesive	Epoxy resin
e	Terminal	Sn /Cu

## 5. Test and Measurement Procedures

### 5.1 Test Conditions

5.1.1 Unless otherwise specified, the standard atmospheric conditions for measurement/test as:

- Ambient Temperature: 20±15°C
- Relative Humidity: 65±20%
- Air Pressure: 86 KPa to 106 KPa

5.1.2 If any doubt on the results, measurements/tests should be made within the following limits:

- Ambient Temperature: 20±2°C

- b. Relative Humidity: 65±5%
- c. Air Pressure: 86KPa to 106 KPa

### 5.2 Visual Examination

- a. Inspection Equipment: 20 X magnifier

### 5.3 Electrical Test

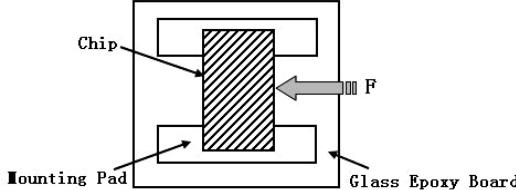
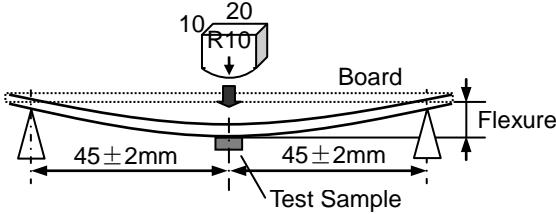
#### 5.3.1 DC Resistance (DCR)

- a. Refer to **Appendix A**.
- b. Test equipment (Analyzer): HIOKI3540 or equivalent.

#### 5.3.2 Rated Current

- a. Refer to Appendix A.
- b. Test equipment: Agilent E3633A, NF ZM2355, R2M-2H3 or equivalent..
- c. DC current (A) that will cause an approximate  $\Delta T$  of 40 °C(reference ambient temperature is 25 °C)

### 5.4 Reliability Test

Item	Requirements	Test Methods and Remarks								
5.4.1 Terminal Strength	No removal or split of the termination or other defects shall occur.	<ul style="list-style-type: none"> <li>① The test samples shall be soldered to the board by the reflow. Then apply force to X and Y directions.</li> <li>② Applied force: 5N .</li> <li>③ Keep time: 5s</li> <li>④ Speed: 1.0 mm/s.</li> </ul> 								
5.4.2 Resistance to Flexure	<ul style="list-style-type: none"> <li>① No visible mechanical damage.</li> <li>② Impedance change: within ±30%.</li> </ul>	<ul style="list-style-type: none"> <li>d. The test samples shall be soldered to the board by the reflow. Then apply force in the direction of the arrow.</li> <li>e. Flexure: 2mm</li> <li>f. Pressurizing Speed: 0.5mm/sec.</li> <li>g. Keep time: ≥ 5 sec.</li> </ul> 								
5.4.3 Vibration	<ul style="list-style-type: none"> <li>① No visible mechanical damage.</li> <li>② Impedance change: within ±30%.</li> </ul>	<ul style="list-style-type: none"> <li>① The test samples shall be soldered to the board by the reflow. Then it shall be submitted to below test conditions.</li> </ul> <table border="1" data-bbox="865 1594 1413 1785"> <tr> <td>Fre. Range</td><td>10~55Hz</td></tr> <tr> <td>Total Amplitude</td><td>1.5mm(May not exceed acceleration 196 m/s<sup>2</sup>)</td></tr> <tr> <td>Sweeping Method</td><td>10Hz to 55Hz to 10Hz for 1 min.</td></tr> <tr> <td>Time</td><td>For 2 hours on each X,Y,Z axis.</td></tr> </table> <ul style="list-style-type: none"> <li>② Recovery: At least 2 hours of recovery under the standard condition after the test, followed by the measurement within 24 hours.</li> </ul>	Fre. Range	10~55Hz	Total Amplitude	1.5mm(May not exceed acceleration 196 m/s <sup>2</sup> )	Sweeping Method	10Hz to 55Hz to 10Hz for 1 min.	Time	For 2 hours on each X,Y,Z axis.
Fre. Range	10~55Hz									
Total Amplitude	1.5mm(May not exceed acceleration 196 m/s <sup>2</sup> )									
Sweeping Method	10Hz to 55Hz to 10Hz for 1 min.									
Time	For 2 hours on each X,Y,Z axis.									
5.4.4 Solderability	95% or more of mounting terminal side shall be covered with fresh solder.	<ul style="list-style-type: none"> <li>① The test samples shall be dipped in flux, and the immersed in molten solder.</li> <li>② Solder Temperature: 240±5°C</li> <li>③ Keep time: 3±0.5s</li> <li>④ Immersion depth: all sides of mounting terminal shall be immersed.</li> <li>⑤ Flux: 25% Rosin and 75% ethanol in weight.</li> </ul>								

5.4.5 Resistance to Soldering Heat	No visible mechanical damage. Impedance change : within $\pm$ 30%.	<p>① The test sample shall be exposed to reflow oven as below.</p> <table border="1"> <tr><td>230<math>\pm</math>5°C</td><td>40s</td></tr> <tr><td>Peak tem. at 260<math>\pm</math>5°C</td><td>5s</td></tr> </table> <p>② Reflow time: 2times.</p> <p>③ Recovery: At least 2 hours of recovery under the standard condition after the test , followed by the measurement within 24 hours.</p>	230 $\pm$ 5°C	40s	Peak tem. at 260 $\pm$ 5°C	5s											
230 $\pm$ 5°C	40s																
Peak tem. at 260 $\pm$ 5°C	5s																
5.4.6 Thermal Shock	<p>① No visible mechanical damage.</p> <p>② Impedance change : within <math>\pm</math> 30%.</p>	<p>① The test samples shall be soldered to the board by the reflow. Then it shall be placed at specified temperature for specified time by step 1 to step 4 as shown in below table in sequence.</p> <table border="1"> <thead> <tr> <th>Step</th><th>Temperature(°C)</th><th>Duration(min)</th></tr> </thead> <tbody> <tr><td>1</td><td>-25</td><td>30<math>\pm</math>3</td></tr> <tr><td>2</td><td>Room temperature</td><td>Within 3</td></tr> <tr><td>3</td><td>+85</td><td>30<math>\pm</math>3</td></tr> <tr><td>4</td><td>Room temperature</td><td>Within 3</td></tr> </tbody> </table> <p>② Number of cycle: 100cycles.</p> <p>③ Recovery: At least 2 hours of recovery under the standard condition after the test , followed by the measurement within 24 hours.</p>	Step	Temperature(°C)	Duration(min)	1	-25	30 $\pm$ 3	2	Room temperature	Within 3	3	+85	30 $\pm$ 3	4	Room temperature	Within 3
Step	Temperature(°C)	Duration(min)															
1	-25	30 $\pm$ 3															
2	Room temperature	Within 3															
3	+85	30 $\pm$ 3															
4	Room temperature	Within 3															
5.4.7 Damp heat	<p>① No visible mechanical damage.</p> <p>② Impedance change : within <math>\pm</math> 30%</p>	<p>① The test samples shall be soldered to the board by the reflow. Then it shall be submitted to below test conditions.</p> <table border="1"> <tr><td>Temperature</td><td>60<math>\pm</math>2°C</td></tr> <tr><td>Humidity</td><td>90~95%RH</td></tr> <tr><td>Time</td><td>96hour</td></tr> </table> <p>② Recovery: At least 2 hours of recovery under the standard condition after the test , followed by the measurement within 24 hours.</p>	Temperature	60 $\pm$ 2°C	Humidity	90~95%RH	Time	96hour									
Temperature	60 $\pm$ 2°C																
Humidity	90~95%RH																
Time	96hour																

Item	Requirements	Test Methods and Remarks								
5.4.8 Loading Under Damp Heat	<p>① No visible mechanical damage.</p> <p>② Impedance change : within <math>\pm</math> 30%</p>	<p>① The test samples shall be soldered to the board by the reflow. Then it shall be submitted to below test conditions.</p> <table border="1"> <tr><td>Temperature</td><td>60<math>\pm</math>2°C</td></tr> <tr><td>Humidity</td><td>90~95%RH</td></tr> <tr><td>Applied current</td><td>Rated current</td></tr> <tr><td>Time</td><td>96hour</td></tr> </table> <p>② Recovery: At least 2 hours of recovery under the standard condition after the test , followed by the measurement within 24 hours.</p>	Temperature	60 $\pm$ 2°C	Humidity	90~95%RH	Applied current	Rated current	Time	96hour
Temperature	60 $\pm$ 2°C									
Humidity	90~95%RH									
Applied current	Rated current									
Time	96hour									
5.4.9 Resistance to Low Temperature	<p>① No visible mechanical damage.</p> <p>② Impedance change : within <math>\pm</math> 30%</p>	<p>① The test samples shall be soldered to the board by the reflow. Then it shall be submitted to below test conditions.</p> <table border="1"> <tr><td>Temperature</td><td>-25<math>\pm</math>3°C</td></tr> <tr><td>Time</td><td>96hour</td></tr> </table> <p>② Recovery: At least 2 hours of recovery under the standard condition after the test , followed by the measurement within 24 hours.</p>	Temperature	-25 $\pm$ 3°C	Time	96hour				
Temperature	-25 $\pm$ 3°C									
Time	96hour									
5.4.10 Resistance to High Temperature	<p>① No visible mechanical damage.</p> <p>② Impedance change : within <math>\pm</math> 30%.</p>	<p>① The test samples shall be submitted to below test conditions.</p> <table border="1"> <tr><td>Temperature</td><td>85<math>\pm</math>3°C</td></tr> <tr><td>Time</td><td>96hour</td></tr> </table> <p>② Recovery: At least 2 hours of recovery under the standard condition after the test , followed by the measurement within 24 hours.</p>	Temperature	85 $\pm$ 3°C	Time	96hour				
Temperature	85 $\pm$ 3°C									
Time	96hour									

5.4.11 Loading at High Temperature (Life Test)	<p>① No visible mechanical damage. ② Impedance change : within <math>\pm 30\%</math>.</p>	<p>① The test samples shall be soldered to the board by the reflow. Then it shall be submitted to below test conditions.</p> <table border="1"> <tr> <td>Temperature</td> <td>85<math>\pm 3</math> °C</td> </tr> <tr> <td>Applied current</td> <td>Rated current</td> </tr> <tr> <td>Time</td> <td>96hour</td> </tr> </table> <p>② Recovery: At least 2 hours of recovery under the standard condition after the test , followed by the measurement within 24 hours.</p>	Temperature	85 $\pm 3$ °C	Applied current	Rated current	Time	96hour
Temperature	85 $\pm 3$ °C							
Applied current	Rated current							
Time	96hour							

## 6. Packaging

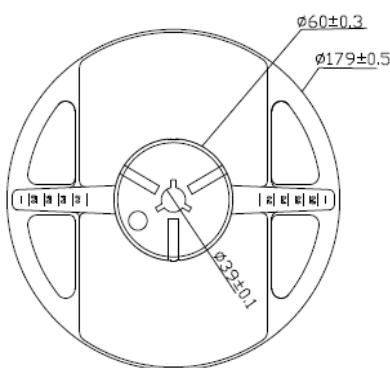
### 6.1 Tape Carrier Packaging:

Packaging code: T

(1) Tape carrier packaging are specified in attached figure **Fig.6.1-1~2**

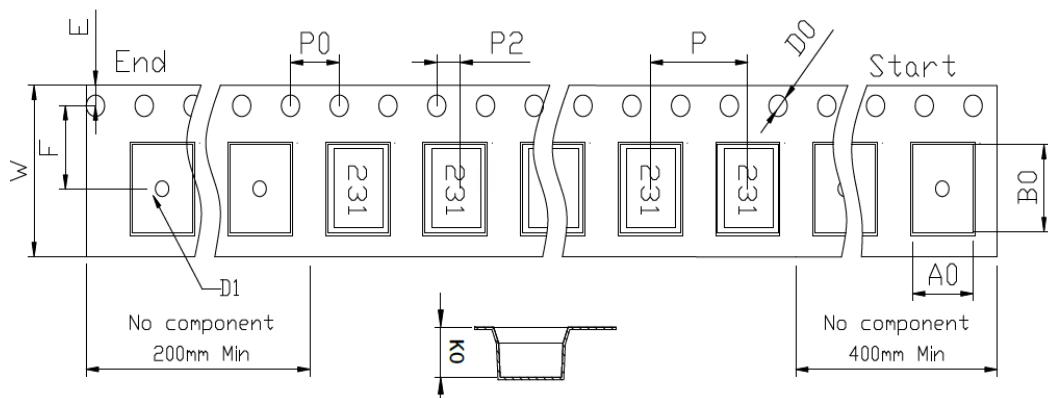
(2) Tape carrier packaging quantity:

a. Reel Drawings (Unit: mm)



**Fig.6.1-1**

c. Taping Dimensions (Unit: mm)



Type	Tape dimensions (mm)										
	W	P	P0	P2	D0	D1	E	F	A0	B0	K0
CWS4520EF	12	8.0	4.0	2.0	1.5	1.5	1.75	5.5	5.0	5.2	2.5

Type	Standard Quantity		
	Reel(Pcs)	Middle Carton(Pcs)	Big Carton(Pcs)
CWS4520EF	1000	4000	40000

c. Peeling off force: 10gf to 130gf in the direction show below.

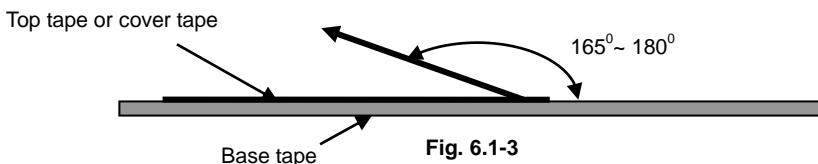
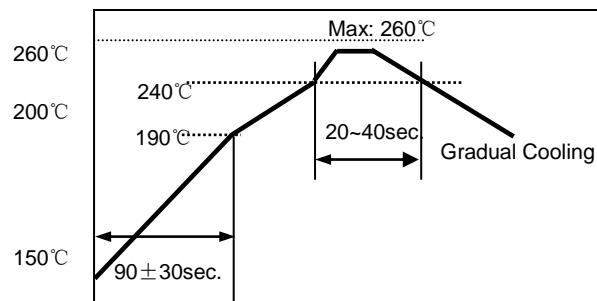


Fig. 6.1-3

## 7. Recommended Soldering Technologies

### 7.1 Re-flowing Profile:

- △ 1~2 °C/sec. Ramp
- △ Pre-heating: 150~190°C/90±30 sec.
- △ Time above 240°C: 20~40sec
- △ Peak temperature: 260°C Max./5sec;
- △ Solder paste: Sn/3.0Ag/0.5Cu
- △ Max.2 times for Re-flowing



## 8. Supplier Information

- a) Supplier:  
**Shenzhen Sunlord Electronics Co., Ltd.**
- b) Manufacturer:  
**Shenzhen Sunlord Electronics Co., Ltd.**
- c) Manufacturing Address:  
**Sunlord Industrial Park, Dafuyuan Industrial Zone, Guanlan, Shenzhen, China**  
**Zip: 518110**

## Appendix A: Electrical Characteristics(@ 25°C)

Part Number	Impedance	Max. DC Resistance	Rated Current Typ.	Rated Voltage Max	Insulation Resistance Min
Units	Ω	mΩ	A	V	MΩ
Symbol	$Z_{com}$	-			
Test Condition	100MHz	-			
CWS4520EF-900T	30Min / 90Typ	35	3.2	50	10
CWS4520EF-151T	80 Min / 150Typ	38	3.1	50	10
CWS4520EF-231T	180Min / 230Typ	39	3.0	50	10
CWS4520EF-301T	180Min / 300Typ	39	3.0	50	10
CWS4520EF-401T	200 Min / 400Typ	50	2.5	50	10
CWS4520EF-501T	300Min / 500Typ	55	2.4	50	10
CWS4520EF-701T	500Min / 700Typ	59	2.2	50	10
<b>CWS4520EF-901T</b>	<b>700 Min / 900Typ</b>	<b>68</b>	<b>2.1</b>	<b>50</b>	<b>10</b>
CWS4520EF-102T	800Min / 1000Typ	68	2.1	50	10
CWS4520EF-122T	1000Min / 1200Typ	74	2.0	50	10
CWS4520EF-142T	1200 Min / 1400Typ	81	1.9	50	10

## Curve:

