

# Wire Wound Type Common Mode Filter

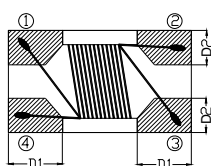
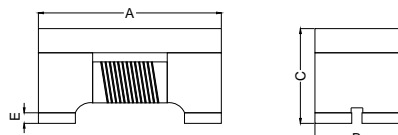
WCM3216F2SF-SERIES

## 1. Features

1. High common mode impedance at high frequency cause excellent noise suppression performance.
2. WCM3216F2SF series realizes small size and low profile. 3.2x1.6x2.0 mm.
3. 100% Lead(Pb) & Halogen-Free and RoHS compliant.
4. Operating temperature-40~+125°C (Including self - temperature rise)



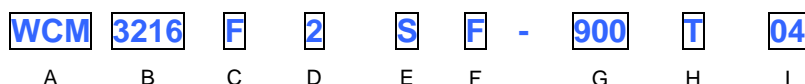
## 2. Dimension



Series	A(mm)	B(mm)	C(mm)	D1(mm)	D2(mm)	E(mm)
3216F2SF	3.2±0.2	1.6±0.2	2.0±0.2	0.5±0.1	0.5±0.1	0.15±0.1

Units: mm

## 3. Part Numbering

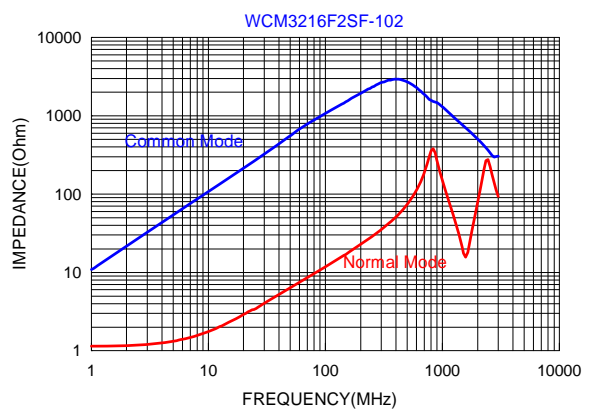
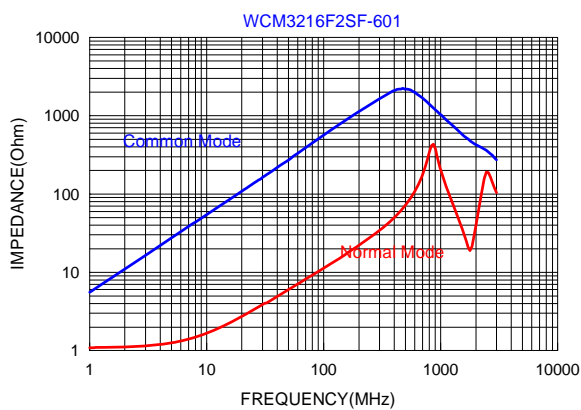
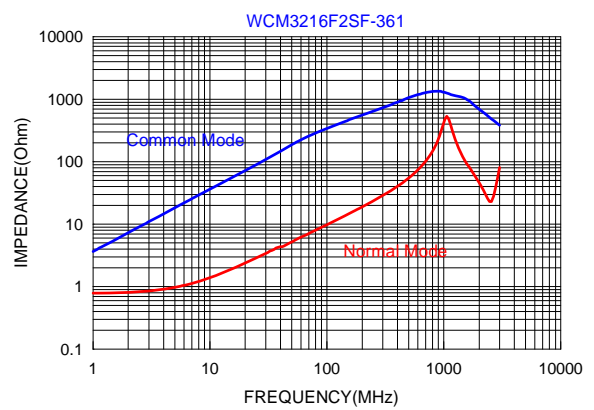
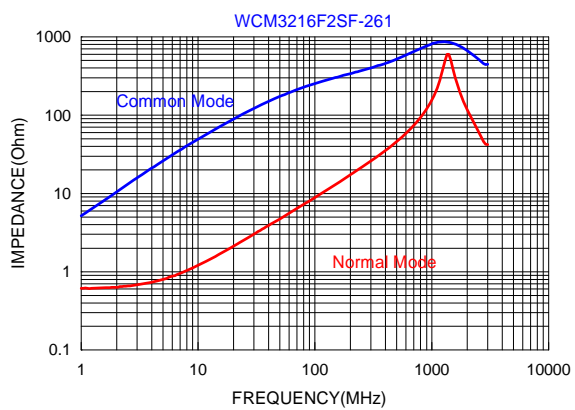
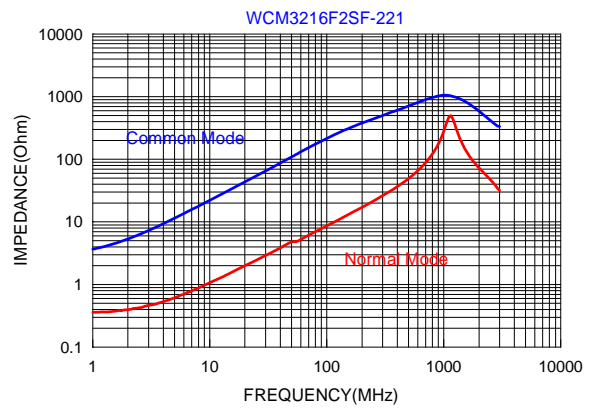
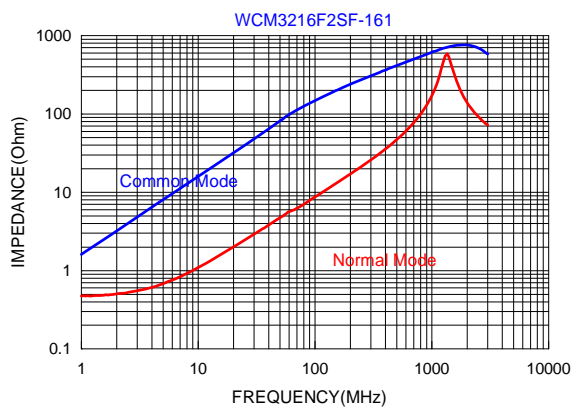
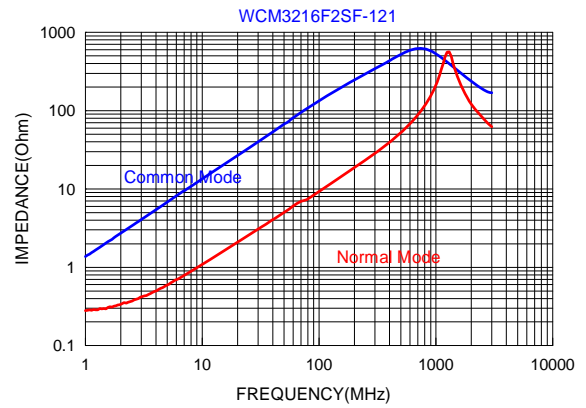
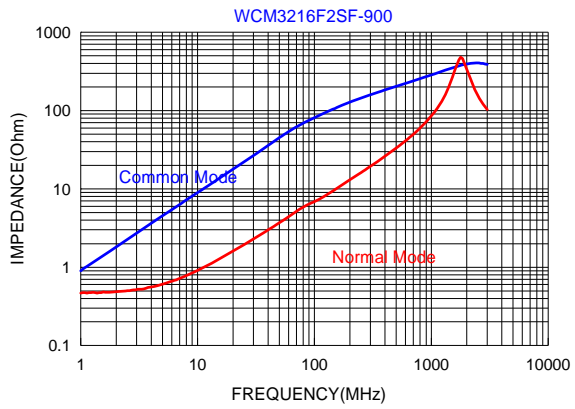


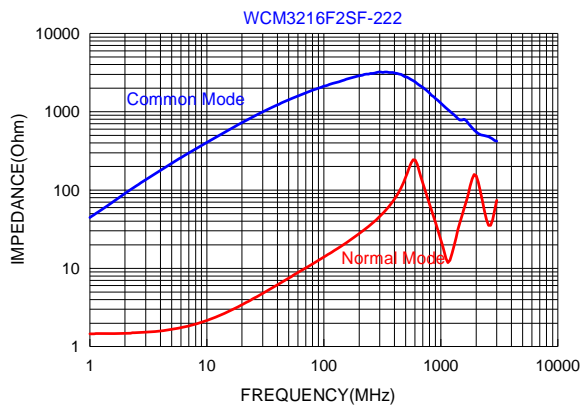
- A: Series  
 B: Dimension  
 C: Material Ferrite Core  
 D: Number of Lines 2=2 lines  
 E: Type S=Shielded , N=Unshielded  
 F: Lead free type  
 G: Impedance 900=90Ω  
 H: Packaging T=Taping and Reel  
 I: Rated Current 04=400mA

## 4. Specification

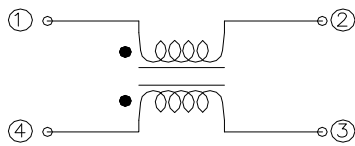
TAI-TECH Part Number	Common mode Impedance (Ω)	Test Frequency (MHz)	DC Resistance (Ω) max.	Rated Current (mA)max.	Rated Volt. (Vdc)max.	Withstand Volt. (Vdc) Max.	IR (Ω) min.
WCM3216F2SF-900T04	90±25%	100	0.30	400	50	125	10M
WCM3216F2SF-121T03	120±25%	100	0.30	350	50	125	10M
WCM3216F2SF-161T03	160±25%	100	0.40	350	50	125	10M
WCM3216F2SF-221T03	220±25%	100	0.45	300	50	125	10M
WCM3216F2SF-261T03	260±25%	100	0.50	300	50	125	10M
WCM3216F2SF-361T03	360±25%	100	0.60	300	50	125	10M
WCM3216F2SF-601T03	600±25%	100	0.80	300	50	125	10M
WCM3216F2SF-102T04	1000±25%	100	1.00	400	50	125	10M
WCM3216F2SF-222T02	2200±25%	100	1.20	200	50	125	10M

### Typical Impedance v.s. Frequency Curve



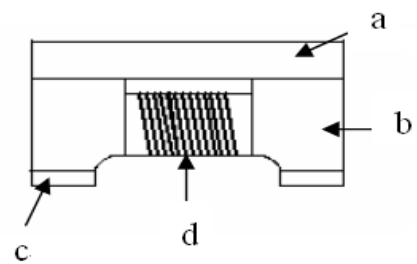


### 5. Schematic Diagram



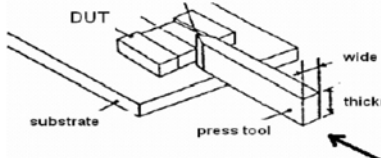
### 6. Materials

No.	Description	Specification
a.	Upper Plate	Ferrite
b.	Core	Ferrite Core
c.	Termination	Ag/Ni/Sn
d.	Wire	Enameled Copper Wire



## 7. Reliability and Test Condition

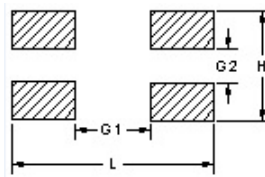
Item	Performance	Test Condition
Operating temperature	-40~+125°C (Including self - temperature rise)	
Storage temperature	-40~+125°C (on board)	
<b>Electrical Performance Test</b>		
Z(common mode)	Refer to standard electrical characteristics list.	Agilent-4291A+ Agilent -16197A
DCR		Agilent-4338B
I.R.		Agilent4339
Temperature Rise Test	$\Delta T=40^{\circ}\text{C}$ MAX	1.Applied the allowed DC current. 2.Temperature measured by digital surface thermometer
<b>Reliability Test</b>		
Life Test	Appearance : No damage. Impedance : within $\pm 15\%$ of initial value RDC : within $\pm 15\%$ of initial value and shall not exceed the specification value	Preconditioning: Run through IR reflow for 2 times.( IPC/JEDEC J-STD-020DCClassification Reflow Profiles) Temperature : $125\pm 2^{\circ}\text{C}$ Applied current : rated current Duration : $1000\pm 12$ hrs Measured at room temperature after placing for $24\pm 2$ hrs
Load Humidity		Preconditioning: Run through IR reflow for 2 times.( IPC/JEDEC J-STD-020DCClassification Reflow Profiles) Humidity : $85\pm 2\%$ R.H, Temperature : $85^{\circ}\text{C}\pm 2^{\circ}\text{C}$ Duration : 1000hrs Min. with 100% rated current Measured at room temperature after placing for $24\pm 2$ hrs
Moisture Resistance		Preconditioning: Run through IR reflow for 2 times.( IPC/JEDEC J-STD-020DCClassification Reflow Profiles 1. Baked at $50^{\circ}\text{C}$ for 25hrs, measured at room temperature after placing for 4 hrs. 2. Raise temperature to $65\pm 2^{\circ}\text{C}$ 90-100%RH in 2.5hrs, and keep 3 hours, cool down to $25^{\circ}\text{C}$ in 2.5hrs. 3. Raise temperature to $65\pm 2^{\circ}\text{C}$ 90-100%RH in 2.5hrs, and keep 3 hours, cool down to $25^{\circ}\text{C}$ in 2.5hrs,keep at $25^{\circ}\text{C}$ for 2 hrs then keep at $-10^{\circ}\text{C}$ for 3 hrs 4. Keep at $25^{\circ}\text{C}$ 80-100%RH for 15min and vibrate at the frequency of 10 to 55 Hz to 10 Hz, measure at room temperature after placing for 1~2 hrs.
Thermal shock		Preconditioning: Run through IR reflow for 2 times.( IPC/JEDEC J-STD-020DCClassification Reflow Profiles Condition for 1 cycle Step1 : $-40\pm 2^{\circ}\text{C}$ 30 $\pm$ 5min Step2 : $25\pm 2^{\circ}\text{C}$ $\leq 0.5$ min Step3 : $125\pm 2^{\circ}\text{C}$ 30 $\pm$ 5min Number of cycles : 500 Measured at room temperature after placing for $24\pm 2$ hrs
Vibration		Oscillation Frequency: 10 ~ 2K ~ 10Hz for 20 minutes Equipment : Vibration checker Total Amplitude:1.52mm $\pm 10\%$ Testing Time : 12 hours(20 minutes, 12 cycles each of 3 orientations).

Item	Performance	Test Condition														
Bending	Appearance : No damage. Impedance : within±15% of initial value RDC : within ±15% of initial value and shall not exceed the specification value	Shall be mounted on a FR4 substrate of the following dimensions: >=0805 inch(2012mm):40x100x1.2mm <0805 inch(2012mm):40x100x0.8mm Bending depth: >=0805 inch(2012mm):1.2mm <0805 inch(2012mm):0.8mm duration of 10 sec.														
Shock		<table border="1"> <thead> <tr> <th>Type</th> <th>Peak value (g's)</th> <th>Normal duration (D) (ms)</th> <th>Wave form</th> <th>Velocity change (Vi)ft/sec</th> </tr> </thead> <tbody> <tr> <td>SMD</td> <td>50</td> <td>11</td> <td>Half-sine</td> <td>11.3</td> </tr> <tr> <td>Lead</td> <td>50</td> <td>11</td> <td>Half-sine</td> <td>11.3</td> </tr> </tbody> </table>	Type	Peak value (g's)	Normal duration (D) (ms)	Wave form	Velocity change (Vi)ft/sec	SMD	50	11	Half-sine	11.3	Lead	50	11	Half-sine
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SMD	50	11	Half-sine	11.3												
Lead	50	11	Half-sine	11.3												
Solder ability	More than 95% of the terminal electrode should be covered with solder.	Preheat: 150°C,60sec.◦ Solder: Sn96.5% Ag3% Cu0.5% Temperature: 245±5°C ◦ Flux for lead free: Rosin. 9.5% ◦ Dip time: 4±1sec ◦ Depth: completely cover the termination														
Resistance to Soldering Heat	Appearance : No damage. Impedance : within±15% of initial value RDC : within ±15% of initial value and shall not exceed the specification value	Depth: completely cover the termination <table border="1"> <thead> <tr> <th>Temperature(°C)</th> <th>Time(s)</th> <th>Temperature ramp/immersion and emersion rate</th> <th>Number of heat cycles</th> </tr> </thead> <tbody> <tr> <td>260 ±5 (solder temp)</td> <td>10 ±1</td> <td>25mm/s ±6 mm/s</td> <td>1</td> </tr> </tbody> </table>	Temperature(°C)	Time(s)	Temperature ramp/immersion and emersion rate	Number of heat cycles	260 ±5 (solder temp)	10 ±1	25mm/s ±6 mm/s	1						
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260 ±5 (solder temp)	10 ±1	25mm/s ±6 mm/s	1													
Terminal Strength		Preconditioning: Run through IR reflow for 2 times.( IPC/JEDEC J-STD-020DClassification Reflow Profiles With the component mounted on a PCB with the device to be tested, apply a force(>0805:1kg , <=0805:0.5kg)to the side of a device being tested. This force shall be applied for 60 +1 seconds. Also the force shall be applied gradually as not to apply a shock to the component being tested. 														

## 8. Soldering and Mounting

### 8-1. Recommended PC Board Pattern

	WCM3216F2S/F2N
L(mm)	3.70
H(mm)	1.60
G1(mm)	1.90
G2(mm)	0.40



### 8-2. Soldering

Mildly activated rosin fluxes are preferred. TAI-TECH terminations are suitable for all wave and re-flow soldering systems. If hand soldering cannot be avoided, the preferred technique is the utilization of hot air soldering tools.

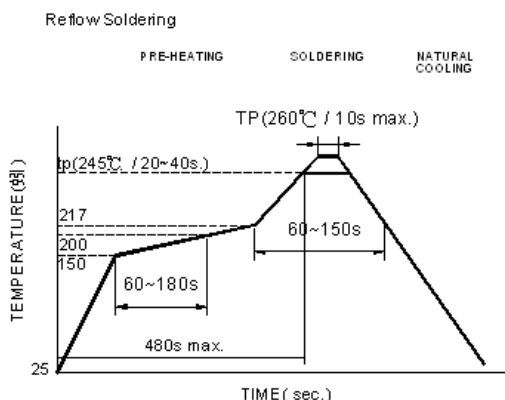
#### 8-2.1 Lead Free Solder re-flow:

Recommended temperature profiles for re-flow soldering in Figure 1.

#### 8-2.2 Soldering Iron(Figure 2):

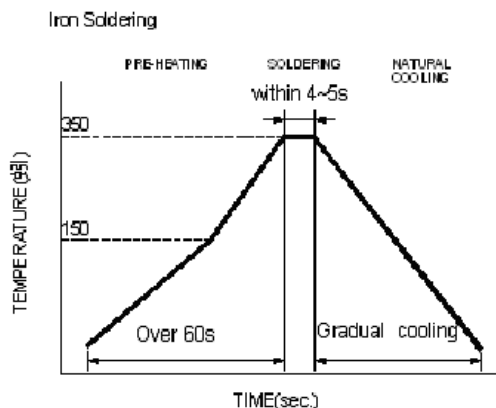
Products attachment with a soldering iron is discouraged due to the inherent process control limitations. In the event that a soldering iron must be employed the following precautions are recommended.

- Preheat circuit and products to 150°C
- Never contact the ceramic with the iron tip
- Use a 20 watt soldering iron with tip diameter of 1.0mm
- 350°C tip temperature (max)
- 1.0mm tip diameter (max)
- Limit soldering time to 4~5 sec.



Reflow times: 3 times max.

Fig.1

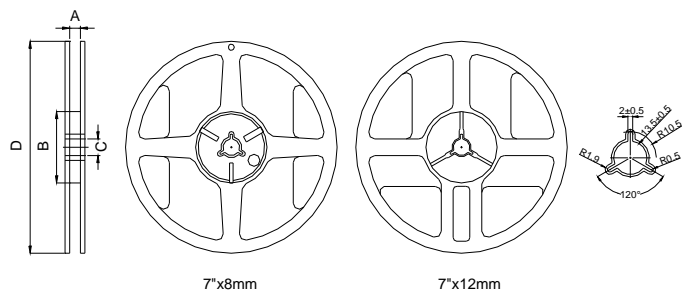


Iron Soldering times: 1 times max.

Fig.2

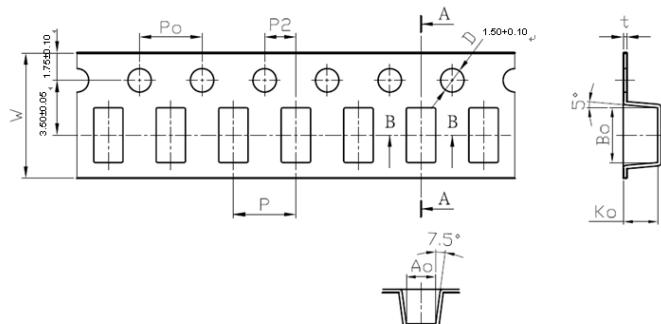
## 9. Packaging Information

### 9-1. Reel Dimension



Type	A(mm)	B(mm)	C(mm)	D(mm)
7"x8mm	9.0±0.5	60±2	13.5±0.5	178±2

### 9-2. Tape Dimension / 8mm

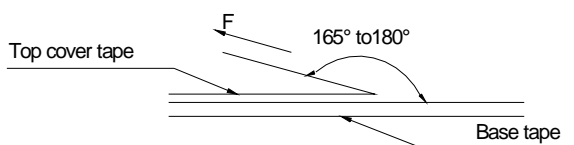


Series	P(mm)	Po(mm)	P2(mm)	Bo(mm)	Ao(mm)	Ko(mm)	W(mm)	t(mm)
WCM3216	4.00±0.10	4.00±0.10	2.00±0.05	3.50±0.10	1.88±0.10	2.20±0.10	8.00±0.10	0.26±0.05

### 9-3. Packaging Quantity

Chip size	Chip/Reel	Inner Box	Middle Box	Carton
WCM3216F2S/F2N	2000	10000	50000	100000

### 9-4. Tearing Off Force



The force for tearing off cover tape is 15 to 80 grams in the arrow direction under the following conditions.

Room Temp. (°C)	Room Humidity (%)	Room atm (hPa)	Tearing Speed mm/min
5-35	45-85	860-1060	300

#### Application Notice

- Storage Conditions(component level)
  - To maintain the solderability of terminal electrodes:
    1. TAI-TECH products meet IPC/JEDEC J-STD-020D standard-MSL, level 1.
    2. Temperature and humidity conditions: Less than 40°C and 60% RH.
    3. Recommended products should be used within 12 months form the time of delivery.
    4. The packaging material should be kept where no chlorine or sulfur exists in the air.
- Transportation
  1. Products should be handled with care to avoid damage or contamination from perspiration and skin oils.
  2. The use of tweezers or vacuum pick up is strongly recommended for individual components.
  3. Bulk handling should ensure that abrasion and mechanical shock are minimized.

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