

FEATURES

- Winding type realizes small size and low profile
- Prevention of common mode noise at high frequency
- Excellent solderability
- Operating temperature -40~+125°C (Including self - temperature rise)

**APPLICATIONS**

- For Automotive
- Common mode noise suppression of automotive LAN for Flex Ray, CANBUS

PRODUCT IDENTIFICATION

WCM 3225 L- 2 - 510 T F

(1) (2) (3) (4) (5) (6) (7)

(1) Series Name:Wire Wound Chip Common Mode Filters

(2) Dimensions

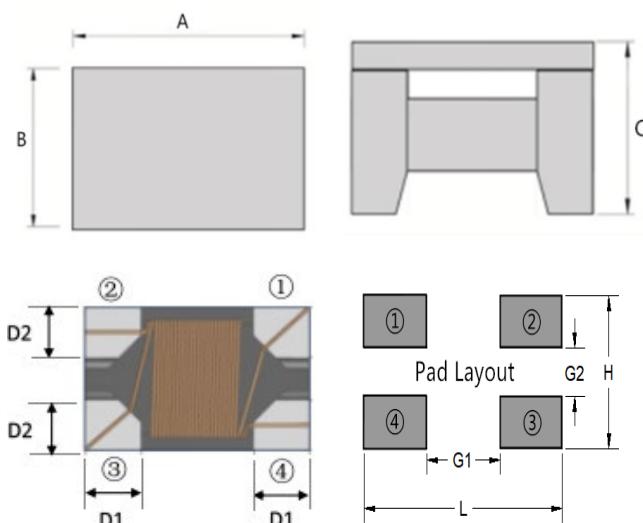
(3) Category:

(4) Number of Lines 2P=2 lines

(5) Inductance : 510 = 51uH

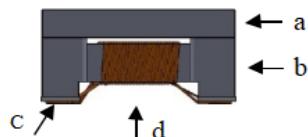
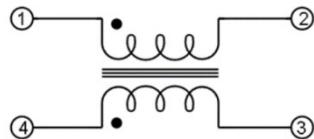
(6) Packing: Tape & Reel

(7) F:Hazardous Substance Free Products

Shapes and Dimensions [Dimensions in mm]

Series:	WCM3225L-2-Series
A(mm)	3.2±0.2
B(mm)	2.5±0.2
C(mm)	2.2±0.2
D1(mm)	0.80±0.1
D2(mm)	0.90±0.1
G1(mm)	1.9
G2(mm)	0.75
H(mm)	2.55
L(mm)	3.7

Equivalent Circuit / Materials

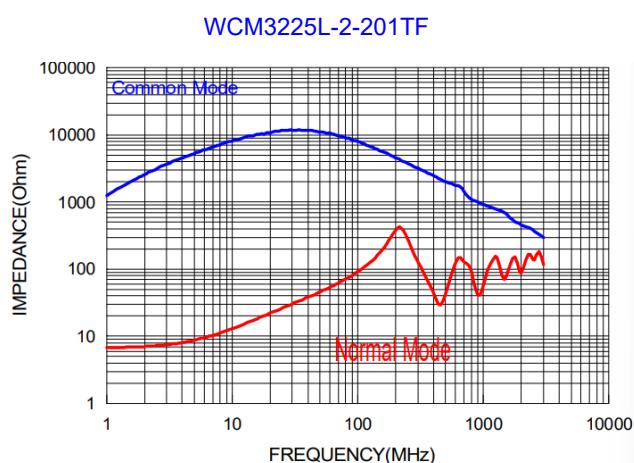
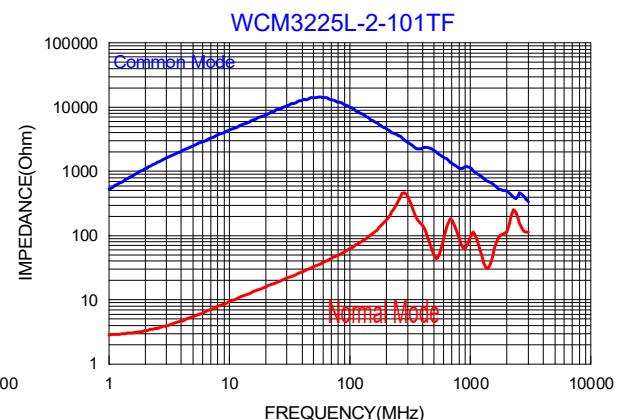
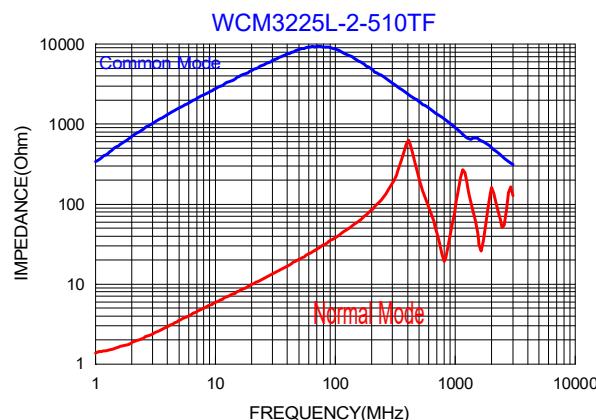
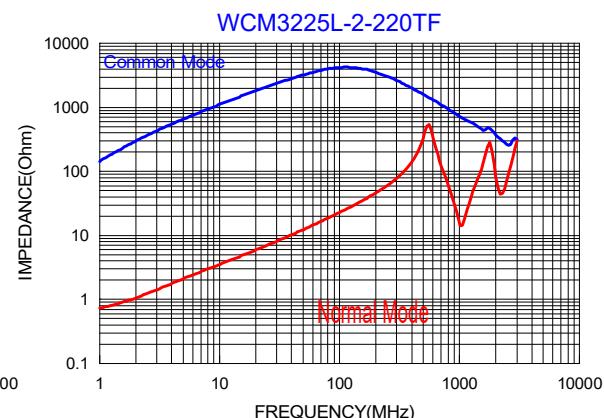
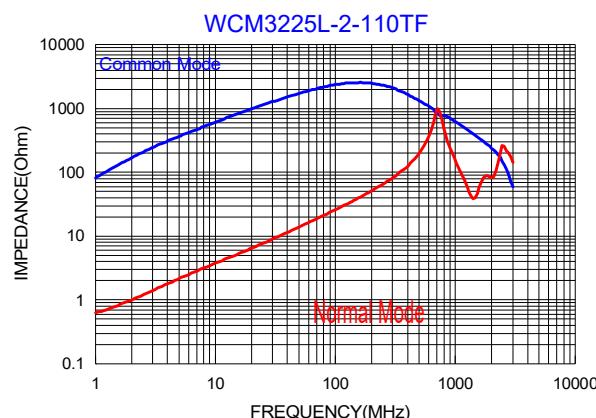


NO.	Description	Specification
a	Upper Plate	Ferrite
b	Core	Ferrite Core
c	Termination	Ag/Ni/Sn
d	Wire	Enameled Copper Wire

Electrical Characteristics:

Part Number	Impedance [10MHz]	Inductance [100kHz/0.1V]	DC Resistance	Rated Current	Rated Volt.	IR
Units	(Ω) Min	(μ H)	(Ω)Max.	(mA)Max.	(Vdc)	(M Ω)min.
WCM3225L-2-110TF	300	11	0.40	300	50	10
		+50%/-30%				
WCM3225L-2-220TF	500	22	0.50	250	50	10
		+50%/-30%				
WCM3225L-2-510TF	1000	51	0.70	200	50	10
		+50%/-30%				
WCM3225L-2-101TF	2000	100	1.50	150	50	10
		+50%/-30%				
WCM3225L-2-201TF	8000	200	4.80	70	50	10
		+50%/-30%				

Curve Frequency (MHz)



Reliability and Test Condition

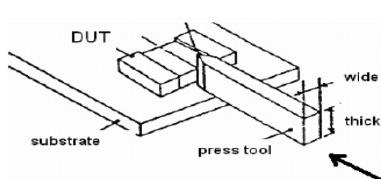
Item	Performance	Test Condition
Operating temperature	-40~+125°C (Including self - temperature rise)	
Storage temperature	-40~+125°C (on board)	

Electrical Performance Test

Impedance	Refer to standard electrical characteristics list.	Keysight E4991B + Keysight 16197A
DCR		Agilent-34420A Agilent-4338B
Insulation Resistance	Test Voltage : Rated Voltage Time : 1 minute max.	Chroma 19073
Temperature Rise Test	Rated Current ΔT 40°C Max	1. Applied the allowed DC current. 2. Temperature measured by digital surface thermometer

Reliability Test

Life Test	<p>Appearance : No damage. Impedance : within±15% of initial value DCR : within±15% of initial value and shall not exceed the specification value</p>	Preconditioning: Run through reflow for 3 times. (IPC/JEDEC J-STD-020F Classification Reflow Profiles) Temperature : 85±2°C Applied current : rated current Duration : 1000±12hrs Measured at room temperature after placing for 24 hrs.
Load Humidity		Preconditioning: Run through reflow for 3 times. (IPC/JEDEC J-STD-020F Classification Reflow Profiles) Humidity : 85±3% RH Temperature : 85°C±2°C Duration : 1000hrs Min. Bead : with 100% rated current Inductance : with 10% rated current Measured at room temperature after placing for 24 hrs.
Moisture Resistance		Preconditioning: Run through reflow for 3 times. (IPC/JEDEC J-STD-020F Classification Reflow Profiles) 1. Baked at 50°C for 25hrs, measured at room temperature after placing for 4 hrs. 2. Raise temperature to 65±2°C 90-100%RH in 2.5hrs, and keep 3 hours, cool down to 25°C in 2.5hrs. 3. Raise temperature to 65±2°C 90-100%RH in 2.5hrs, and keep 3 hours, cool down to 25°C in 2.5hrs, keep at 25°C for 2hrs then keep at -10°C for 3hrs. 4. Keep at 25°C 80-100%RH for 15min and vibrate at the frequency of 10 to 55 Hz to 10 Hz, measured at room temperature after placing for 1~2 hrs.
Thermal Shock		Preconditioning: Run through reflow for 3 times. (IPC/JEDEC J-STD-020F Classification Reflow Profiles) Condition for 1 cycle Step1 : -40±2°C 30±5min Step2 : 85±2°C ≤ 0.5min Step3 : 85±2°C 30±5min Number of cycles : 500 Measured at room temperature after placing for 24 hrs.
Vibration		Preconditioning: Run through reflow for 3 times. (IPC/JEDEC J-STD-020F Classification Reflow Profiles) Oscillation Frequency : 10Hz~2kHz~10Hz for 20 minutes Equipment : Vibration checker Total Amplitude :10g Testing Time : 12 hours (20 minutes, 12 cycles each of 3 orientations)

Item	Performance	Test Condition																		
Bending	Appearance : No damage. Impedance : within $\pm 15\%$ of initial value DCR : within $\pm 15\%$ 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	11.3
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Lead	50	11	Half-sine	11.3																
Solderability	More than 95% of the terminal electrode should be covered with solder	a. Method B, 4hrs @155°C dry heat @235°C $\pm 5\%$ Testing Time : 5 +0/-0.5 seconds b. Method D category 3. (8hours \pm 15 min)@ 260°C $\pm 5\%$ Testing Time : 30 +0/-0.5 seconds																		
Resistance to Soldering Heat		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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Terminal Strength	Appearance : No damage. Impedance : within $\pm 15\%$ of initial value DCR : within $\pm 15\%$ of initial value and shall not exceed the specification value	Preconditioning: Run through reflow for 3 times. (IPC/JEDEC J-STD-020F Classification 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. 																		

Soldering and Mounting

1. Soldering

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

1.1 Soldering Reflow:

Recommended temperature profiles for lead free re-flow soldering in Figure 1. Table 1.1&1.2 (J-STD-020F)

1.2 Soldering Iron:

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. (Figure 2.)

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

Fig.1 Soldering Reflow

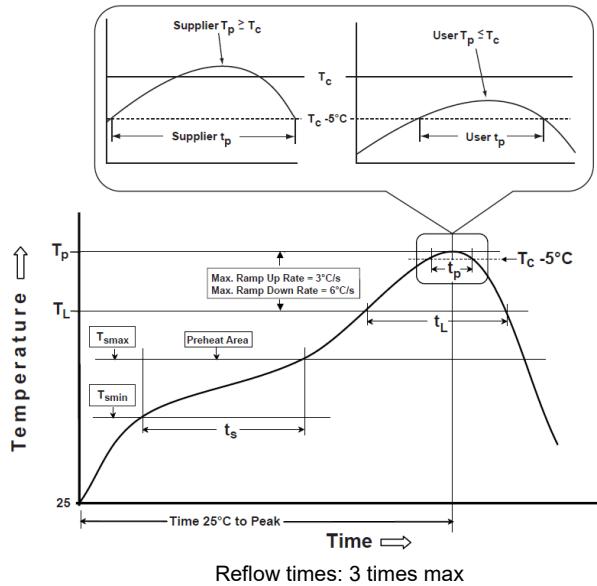


Fig.2 Iron soldering temperature profiles

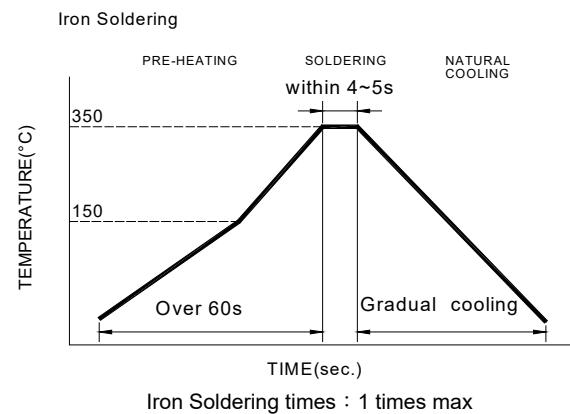


Table (1.1): Reflow Profiles

Profile Type:	Pb-Free Assembly
Preheat	
-Temperature Min(T_{smin})	150°C
-Temperature Max(T_{smax})	200°C
-Time(t_s)from(T_{smin} to T_{smax})	60-120seconds
Ramp-up rate(T_L to T_p)	°C /second max.
Liquidus temperature(T_L)	217°C
Time(t_L)maintained above T_L	60-150 seconds
Classification temperature(T_c)	See Table (1.2)
Time(t_p) at $T_c - 5°C$ (T_p should be equal to or less than T_c)	< 30 seconds
Ramp-down rate(T_p to T_L)	6°C /second max.
Time 25°C to peak temperature	8 minutes max.

T_p: maximum peak package body temperature, **T_c**: the classification temperature.

For user (customer) **T_p** should be equal to or less than **T_c**.

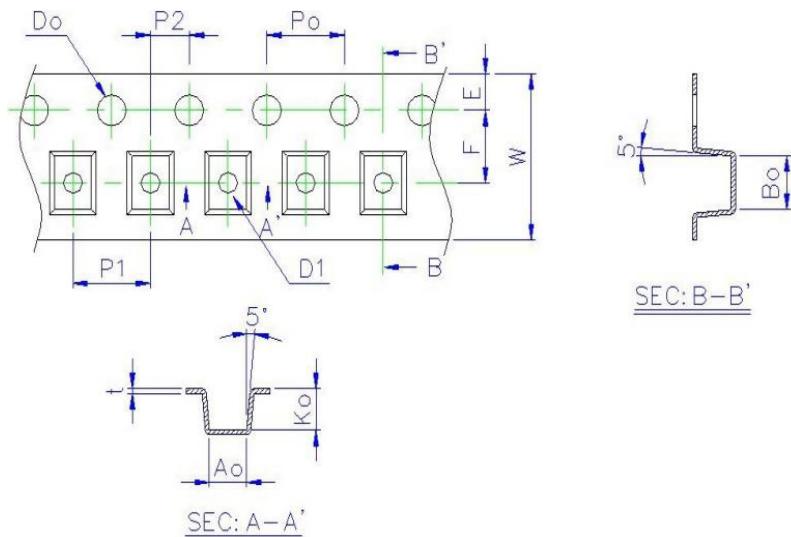
Table (1.2) Package Thickness/Volume and Classification Temperature (T_c)

	Package Thickness	Volume mm ³ <350	Volume mm ³ 350-2000	Volume mm ³ >2000
	<1.6mm	°C	260°C	260°C
PB-Free Assembly	1.6-2.5mm	260°C	250°C	245°C
	≥2.5mm	250°C	245°C	245°C

Reflow is referred to standard IPC/JEDEC J-STD-020F

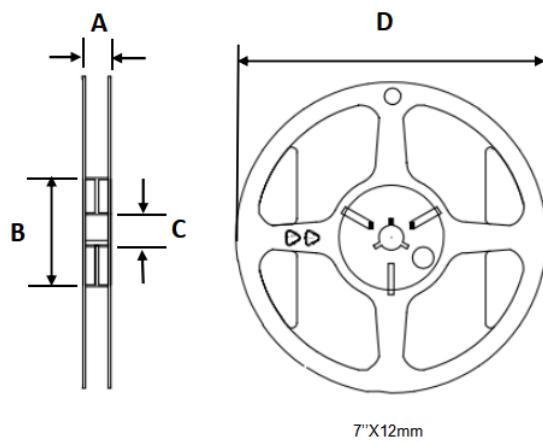
Packaging

(1) Tape Dimensions(Unit:mm)



Size	Ao(mm)	Bo(mm)	Ko(mm)	W(mm)	E(mm)	F(mm)	Po(mm)	P1(mm)	Do(mm)
WCM3225L	2.8±0.10	3.5±0.10	2.65±0.10	12.0±0.10	1.75±0.10	5.50±0.1	4.0±0.05	8.0±0.10	1.5±0.05

(2) Reel



Type	A(mm)	B(mm)	C(mm)	D(mm)
7"x12mm	13.5±0.5	60.0±2	13.5±0.5	178.0±2

Part No.	Tape	MPQ
WCM3225L-2-**	Embossed Tape	2000 Pcs