

## FEATURES

- Winding type realizes small size and low profile
- Prevention of common mode noise at high frequency
- Excellent solderability
- Operating temperature  $-40\sim+125^{\circ}\text{C}$  (Including self - temperature rise)



## APPLICATIONS

- USB2.0 of PC, peripheral equipments, small digital AV equipments, etc.
- LVDS lines of Note PC, LCD
- Audio lines

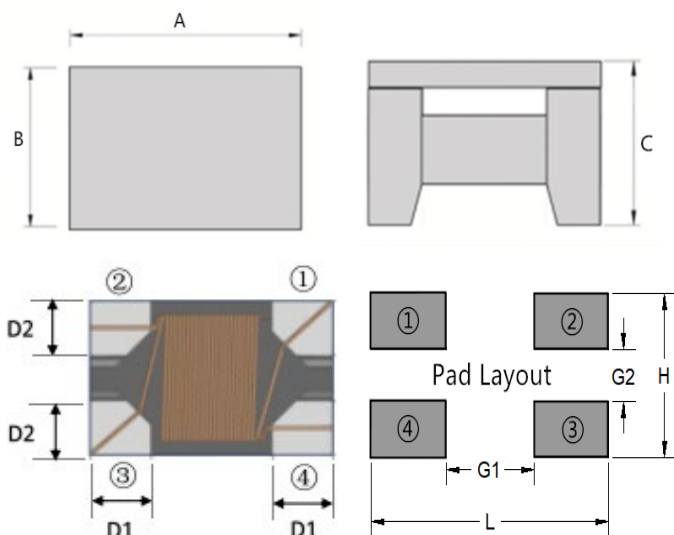
## PRODUCT IDENTIFICATION

WCM 4532 N- 2 - 601 T F

① ② ③ ④ ⑤ ⑥ ⑦

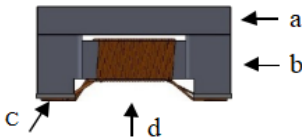
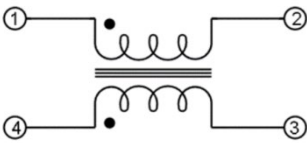
- ① Series Name:Wire Wound Chip Common Mode Filters
- ② Dimensions
- ③ CategoryI
- ④ Number of Lines 2P=2 lines
- ⑤ Common Mode Impedance( $\Omega$ ): 601 = 600 $\Omega$
- ⑥ Packing: Tape & Reel
- ⑦ F:Hazardous Substance Free Products

## Shapes and Dimensions [Dimensions in mm]



Series:	WCM4532N-2**Series
A(mm)	4.5±0.2
B(mm)	3.2±0.2
C(mm)	2.8±0.2
D1(mm)	0.90
D2(mm)	1.10
G1(mm)	2.70
G2(mm)	0.70
L(mm)	5.1
H(mm)	3.8

# Equivalent Circuit / Materials



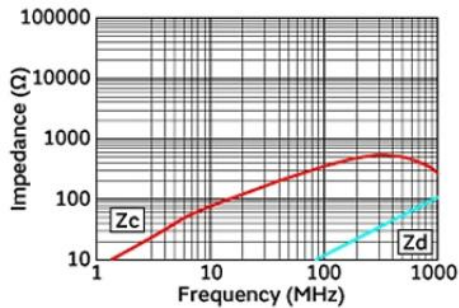
NO.	Description	Specification
a	Upper Plate	Ferrite
b	Core	Ferrite Core
c	Termination	Ag/Ni/Sn
d	Wire	Enameled Copper Wire

# Electrical Characterisitcs:

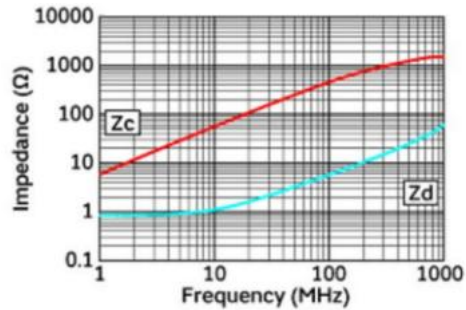
Part No.	Common mode Impedance (Ω) ± 25%	DC Resistance (Ω)	Test Frequency (MHz)	Rated Volt. (Vdc)max.	Rated Current (mA)	Withstand Volt. (Vdc)max.	IR (MΩ)min.
WCM4532N-2-331TF	330	0.11	100	50	1100	125	10
WCM4532N-2-601TF	600	0.12	100	50	1000	125	10
WCM4532N-2-801TF	800	0.16	100	50	900	125	10
WCM4532N-2-102TF	1000	0.18	100	50	800	125	10
WCM4532N-2-122TF	1200	0.20	100	50	700	125	10

## Curve Frequency (MHz)

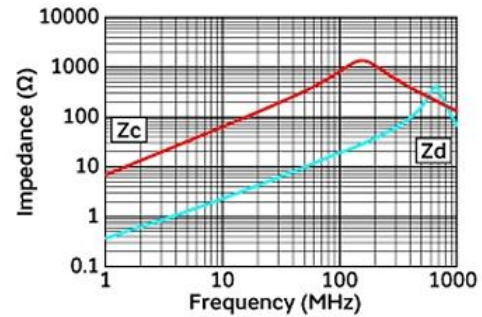
WCM4532N-2-331TF



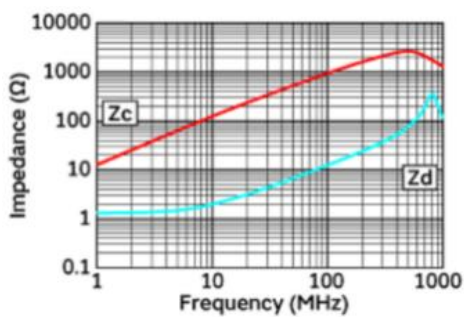
WCM4532N-2-601TF



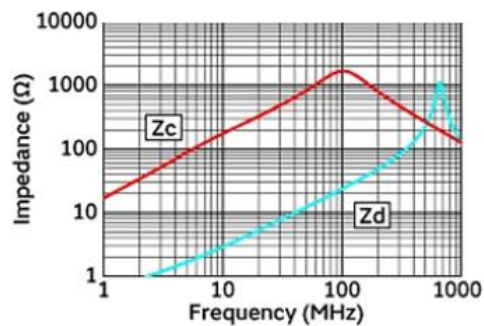
WCM4532N-2-801TF



WCM4532N-2-102TF



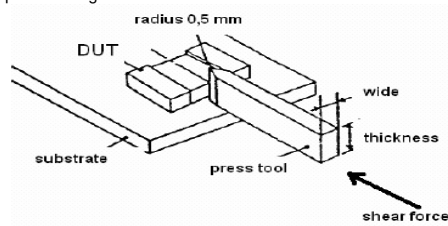
WCM4532N-2-122TF



## 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>		
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
Withstand Volt	Test Voltage : Rated Voltage*2.5 times. Time : 1 ~ 5 s. Charge Current : 1 mA 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		Preconditioning: Run through reflow for 3 times. (IPC/JEDEC J-STD-020F Classification Reflow Profiles) Temperature : 125±2℃ 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℃±2℃ Duration : 1000hrs Min. Bead : with 100% rated current Inductance : with 10% rated current Measured at room temperature after placing for 24 hrs.															
Moisture Resistance	Appearance : No damage. Impedance : within±15% of initial value DCR : within±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) 1. . Ba d at 50℃ for 25hrs, measured at room temperature after placing for 4 hrs. 2. . aise temperature to 65±2℃ 90-100%RH in 2.5hrs, and keep 3 hours, cool down to 25℃ in 2.5hrs. 3. . aise temperature to 65±2℃ 90-100%RH in 2.5hrs, and keep 3 hours, cool down to 25℃ in 2.5hrs, keep at 25℃ for 2hrs then keep at -10℃ for 3hrs. 4. . eep at 25℃ 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℃ 30±5min Step2 : 125±2℃ ≤0.5min Step3 : 125±2℃ 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)															
Bending	Appearance : No damage. Impedance : within±15% of initial value DCR : 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><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><tr><td>SMD</td><td>0</td><td>11</td><td>Half-sine</td><td>11.3</td></tr><tr><td>Lead</td><td>0</td><td>11</td><td>Half-sine</td><td>11.3</td></tr></table> 3 shocks in each direction along 3 perpendicular axes. (18 shocks).	Type	Peak value (g's)	Normal duration (D) (ms)	Wave form	Velocity change (Vi)ft/sec	SMD	0	11	Half-sine	11.3	Lead	0	11	Half-sine	11.3
Type	Peak value (g's)	Normal duration (D) (ms)	Wave form	Velocity change (Vi)ft/sec													
SMD	0	11	Half-sine	11.3													
Lead	0	11	Half-sine	11.3													
Solderability	More than 95% of the terminal electrode should be covered with solder	a. Method B, 4hrs @155℃ dry heat @235℃±5℃ Testing Time : 5 +0/-0.5 seconds b. Method D category 3. (8hours ± 15 min)@ 260℃±5℃ Testing Time : 30 +0/-0.5 seconds															
Resistance to Soldering Heat		Depth: completely cover the termination <table><tr><th>Temperature(℃)</th><th>Time(s)</th><th>Temperature ramp/immersion and emersion rate</th><th>Number of heat cycles</th></tr><tr><td>260 ±5 (solder temp)</td><td>10 ±1</td><td>25mm/s ±6 mm/s</td><td>1</td></tr></table>	Temperature(℃)	Time(s)	Temperature ramp/immersion and emersion rate	Number of heat cycles	260 ±5 (solder temp)	10 ±1	25mm/s ±6 mm/s	1							
Temperature(℃)	Time(s)	Temperature ramp/immersion and emersion rate	Number of heat cycles														
260 ±5 (solder temp)	10 ±1	25mm/s ±6 mm/s	1														
Terminal Strength	Appearance : No damage. Impedance : within±15% of initial value DCR : within±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. Magnetsys 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:

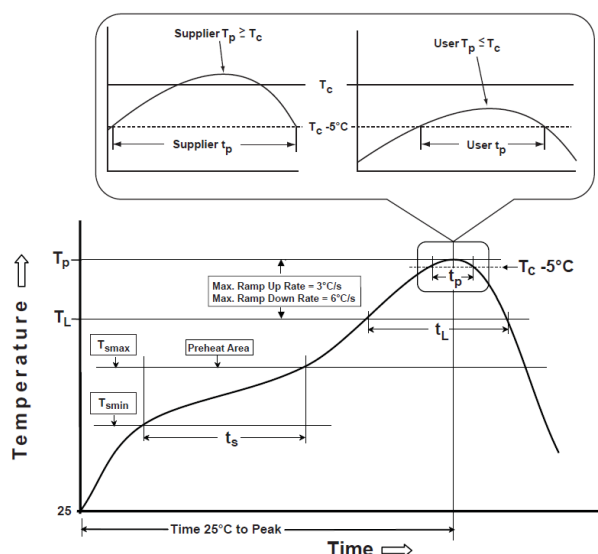
Recommended temperature profiles for lead free re-flow soldering in Figure 1. Table 1.1&1.2 (J-STD-020F)

#### 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.)

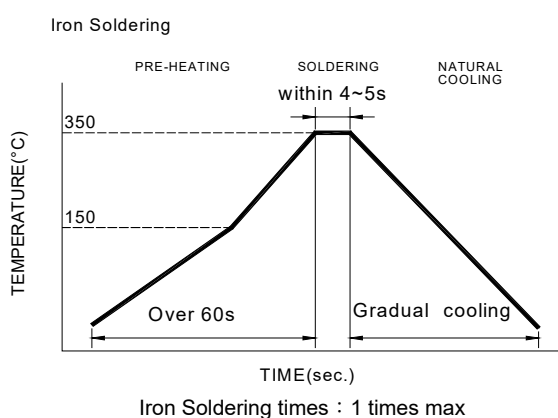
- Preheat circuit and products to 150°C
- Never contact the ceramic with the iron tip
- Use a 20 watt soldering iron with tip diameter of 1.0mm
- 350°C tip temperature (max)
- 1.0mm tip diameter (max)
- Limit soldering time to 4~5sec.

Fig.1 Soldering Reflow



Reflow times: 3 times max

Fig.2 Iron soldering temperature profiles



Iron Soldering times : 1 times max

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 $T_c - 5^\circ\text{C}$ ( $T_p$ 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  $T_c$ .

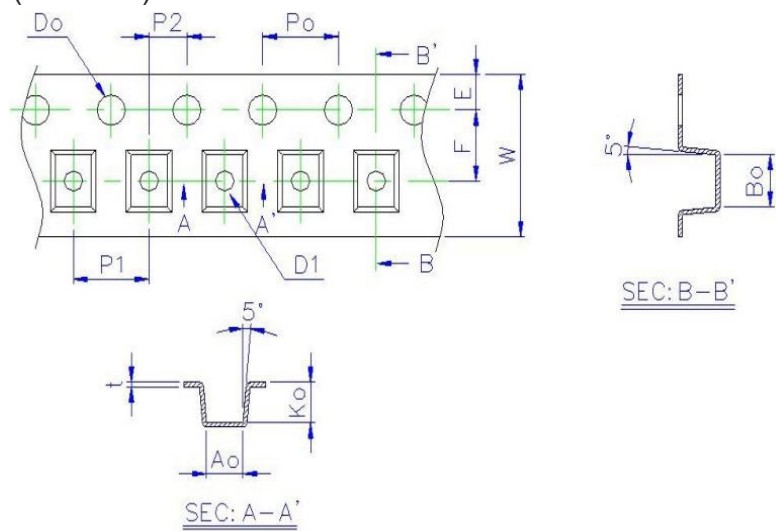
Table (1.2) Package Thickness/Volume and Classification Temperature ( $T_c$ )

	Package Thickness	Volume mm <sup>3</sup>	Volume mm <sup>3</sup>	Volume mm <sup>3</sup>
		<350	350-2000	>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

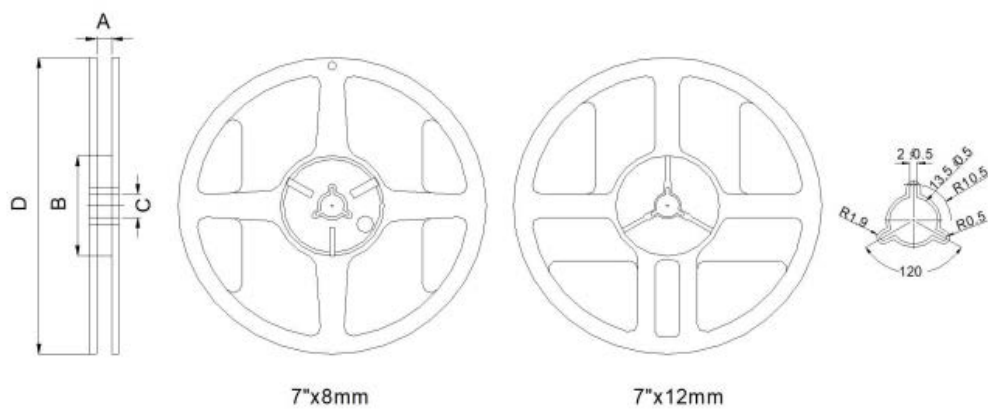
# Packaging

## (1) Tape Dimensions(Unit:mm)



Size	Ao(mm)	Bo(mm)	Ko(mm)	W(mm)	E(mm)	F(mm)	Po(mm)	P1(mm)	Do(mm)
WCM4532N	3.6±0.10	4.9±0.10	3.0±0.10	12.0±0.10	1.75±0.10	5.50±0.05	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
WCM4532N-2-**	Embossed Tape	500PCS