

COMMON MODE CHOKES PWC0603ST SERIES

Introduction

This specification is applicable to chip type wire wounded common mode chokes. The PWC series are widely used in USB 2.0, IEEE 1394, LVDS and etc. The wire wound features advance in lower DC resistance and higher current tolerance, and much stable performance.

Features

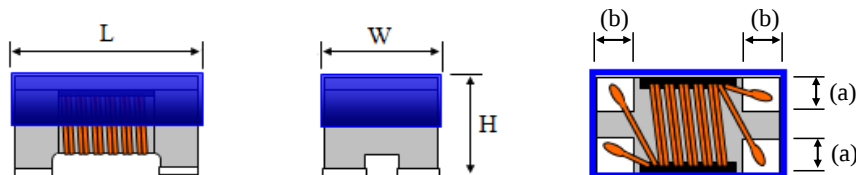
- * Operating temperature -40°C to +85°C.
- * Excellent solderability and resistance to soldering heat.
- * Suitable for flow and reflow soldering.
- * Good dimensions, high reliability, and easy surface mount assembly.

Part Number Code

PWC 0603 S T 900 S - □□

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

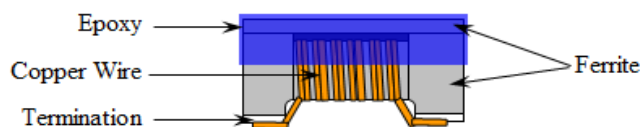
- (1) Chip Common Mode Choke Coil
(2) Chip Size



CODE	Length (L)	Width (W)	Thickness (H)	(a) ref.	(b) ref.	UNIT
EIA	0.063 ± 0.004	0.033 ± 0.004	0.043 ± 0.004	0.010	0.013	Inch
JIS	1.60 ± 0.10	0.85 ± 0.10	1.10 ± 0.10	0.25	0.33	mm

- (3) General Characteristics
(4) Taped in reel
(5) Impedance
900 = 90Ω 181 = 180Ω
(6) Tolerance
S = $\pm 25\%$
(7) Internal Code

Material Structure



CHIP INDUCTOR SPECIFICATIONS

1. Scope

This specification applies to wired wounded chip common mode choke of the following types used in electronic equipment.

Material : Ferrite

2. Construction

Configuration

& Dimension : Please refer to the attached figures and tables.

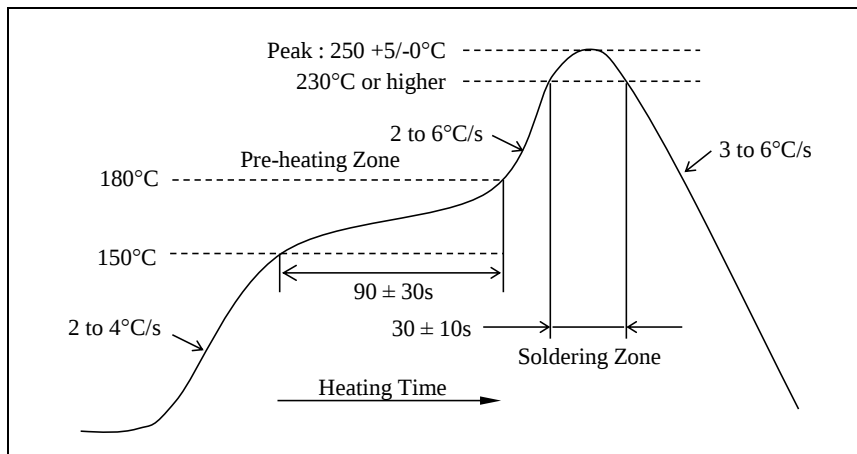
Terminals : Consist of Ag alloy followed by Nickel, then Au plating.

3. Operating Temperature Range

Operating Temperature Range is the scope of ambient temperature at which the common mode choke can be operated continuously at rated current.

Temp. Range : -40°C to $+85^{\circ}\text{C}$

4. Recommended Soldering Conditions



5. Characteristics

Standard Atmospheric Conditions

Unless otherwise specified, the standard range of atmospheric conditions for making measurements and tests are as follows :

Ambient Temperature : $25^{\circ}\text{C} \pm 2^{\circ}\text{C}$

Relative Humidity : 60% to 70%

Air Pressure : 86 kPa to 106 kPa

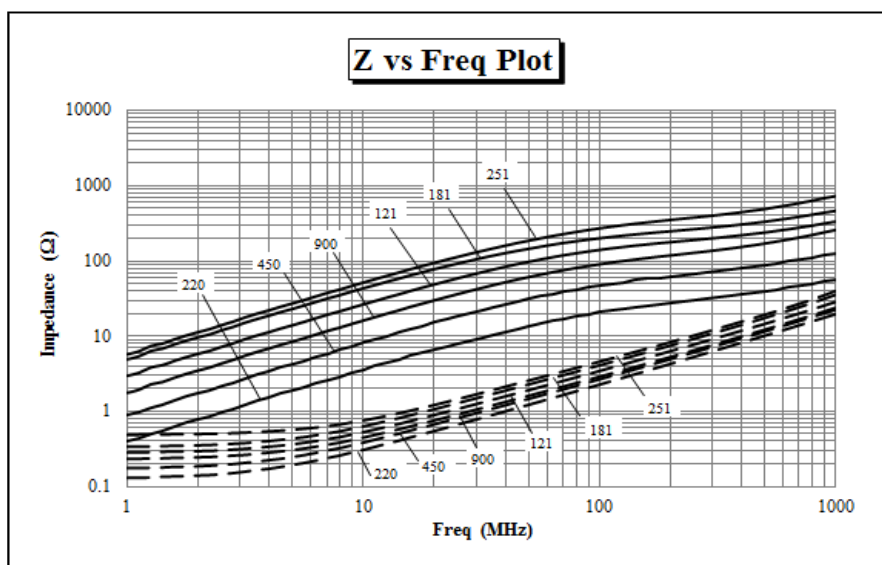
COMMON MODE CHOKE
WIRE WOUND TYPE

PWC0603ST (1608) SERIES

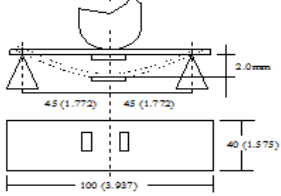
Specification

Part Number	Common Mode ¹ Impedance (Ω) at 100MHz	Rated Voltage V (DC)	Withstanding Voltage V (DC)	Rated ² Current max (mA)	DC Resistance max (Ω)	Insulation Resistance min (M Ω)
PWC0603ST220S-□□	22	50	125	500	0.080	10
PWC0603ST450S-□□	45	50	125	500	0.110	10
PWC0603ST900S-□□	90	50	125	500	0.145	10
PWC0603ST121S-□□	120	50	125	500	0.175	10
PWC0603ST181S-□□	180	50	125	500	0.210	10
PWC0603ST251S-□□	250	50	125	400	0.280	10

1. Impedance is measured in HP4287A or equivalent.
2. For 15°C rise.



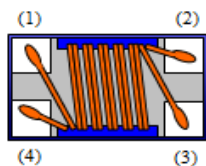
RELIABILITY TEST

ITEM		CONDITION	SPECIFICATION
Electrical Characteristics	Common Mode Impedance (Zc) and Tolerance	Measuring Equipment : HP-4287A or equivalent. Measuring Frequency : $100 \pm 1\text{MHz}$ Measuring Temperature : $25 \pm 5^\circ\text{C}$ (Refer to Measurement Diagram)	Within $\pm 25\%$
	Insulation Resistance	Measuring Voltage : Rated Voltage Measuring Time : 1 minute max. (Refer to Measurement Diagram)	10 megaohms minimum
	Dielectric Withstanding Voltage	Test Voltage : 2.5 times to Rated Voltage Time : 1 to 5 seconds. Charge current : 1mA max. (Refer to Measurement Diagram)	No damage occurs when the test voltage is applied.
	Rated Current	Test Current : Rated Current (Refer to Measurement Diagram)	Temperature Rise : $\leq 15^\circ\text{C}$
	DC Resistance (RDC)	Measured with current of 100mA max. In case of doubt, measured by four terminal method. (Refer to Measurement Diagram)	Within Specified Tolerance.
Mechanical Characteristics	Flexure Strength		Change In Appearance Without distinct damage
	Drop Test	Components shall be dropped three times on a concrete or steel board at height of 1m naturally at any directions.	Change In Common Mode Impedance: Within $\pm 20\%$
	Vibration (Random)	Components shall be randomly vibrated at amplitude of 1.5mm and frequency of 10 - 55 Hz: 0.04 G / Hz, 1 minute at a period of 2 hours in each of the three mutually perpendicular directions.	Insulation Resistance: 10M Ω min
	Resistance to Soldering Heat	Preheat components at 80 to 120°C for 1 minute. Dip components into flux and then into a melted solder bath at $260 \pm 5^\circ\text{C}$ for 5 ± 1 seconds. Then components are to be tested after 4-48 hours at room temperature.	Withstanding Voltage: No damaged
	Solderability	Dip pads in flux and then in a solder bath at $240 \pm 5^\circ\text{C}$ for 5 seconds.	A minimum of 80% of the metalized area must be covered with new solder.
	Component Adhesion (Push Test)	Components shall be reflow solder onto a P.C. Board ($240 \pm 5^\circ\text{C}$ for 20 seconds). Then a dynamometer force gauge shall be applied to any side of the component.	Components must withstand a minimum force of 0.5kg without any failure of the termination to component attachment.

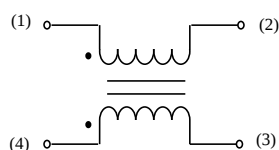
RELIABILITY TEST

ITEM		CONDITION	SPECIFICATION
Endurance Characteristics	Cold Temperature Storage	Components shall be stored at temperature of $-40 \pm 2^{\circ}\text{C}$ for 1000 (+48 hours -0 hour). Then components shall be subjected to standard atmospheric conditions for 4-48 hours. After that, measurement shall be made.	Change In Appearance Without distinct damage
	High Temperature Storage	Components shall be stored at temperature $+85 \pm 2^{\circ}\text{C}$ for 1000 (+48 hours -0 hour). Then components shall be subjected to standard atmospheric conditions for 4-48 hours. After that, measurement shall be made.	Change In Common Mode Impedance: Within $\pm 20\%$
	Moisture Resistance	Components shall be stored in the chamber at 40°C at 90-95% R. H. for 1000 (+48 hours -0 hour). Then components are to be tested after 4-48 hours at room temperature.	Insulation Resistance: 10M Ω min
	Temperature Cycle	Each cycle shall consist of 30 minutes at -40°C followed by 30 minutes at $+85^{\circ}\text{C}$ with a 10-15 minutes maximum transition time between temperature extremes. Test duration is 100 cycles, then components are to be tested after 4-48 hours at room temperature.	Withstanding Voltage: No damaged
	High Temperature With Loaded (Rated Current)	Components shall be stored at temperature of $+85 \pm 2^{\circ}\text{C}$ for 1000 (+48 hours -0 hour). with rated current applied. Then components shall be subjected to standard atmospheric conditions for 4-48 hour. After that, measurement shall be made.	

MEASUREMENT DIAGRAM



EQUIVALENT CIRCUIT



No polarity

Terminal to be Tested

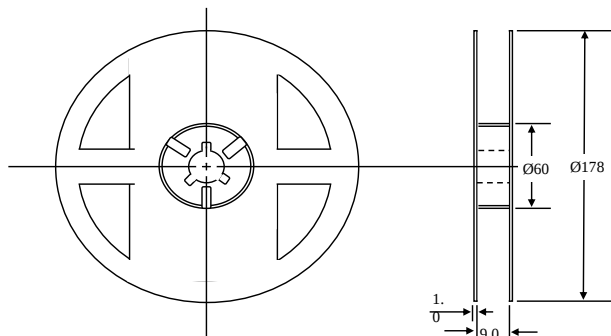
When measuring and supplying the voltage, the following terminal is applied.

No.	Item	Terminal to be Tested
1	Common Mode Impedance (Measurement Terminal)	Terminal ○ — [Dashed box containing two coupled inductors] — ○ Terminal
2	Withstanding Voltage (Measurement Terminal)	Terminal ○ — [Dashed box containing two coupled inductors] — ○ Terminal
3	DC Resistance (Measurement Terminal	Terminal ○ — [Dashed box containing two coupled inductors] — ○ Terminal
4	Rated Current	
5	Insulation Resistance	Terminal ○ — [Dashed box containing two coupled inductors] — ○ Terminal

PACKING INFORMATION

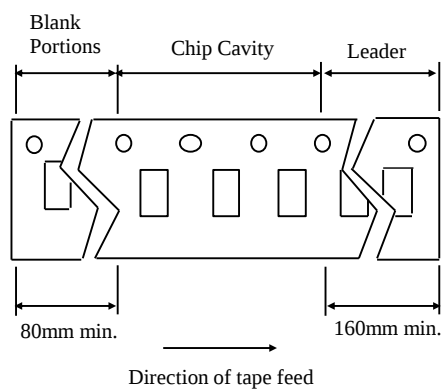
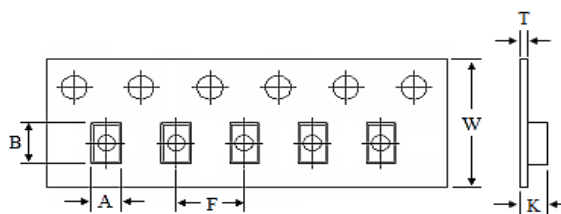
Packing Quantity

Type	Pcs / Reel
PWC0603	2,000



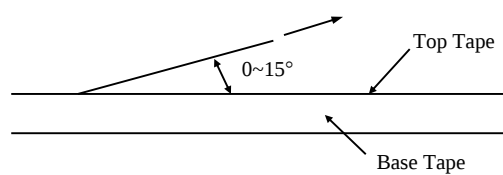
Dimensions (unit : mm)

Type	Chip Cavity		Insert Pitch	Tape Thickness		W
	A	B	F	K	T	
PWC0603	1.05	1.85	4.00	1.15	0.23	8.00

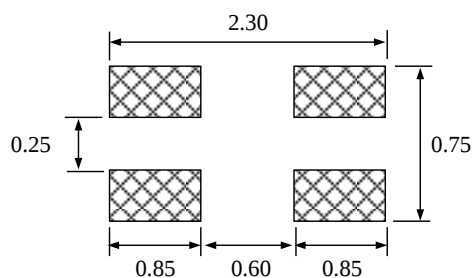


Top Tape Strength

The top tape requires a peel-off force of 0.2 to 0.7N in the direction of the arrow as illustrated below.



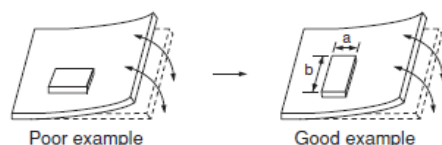
Recommended PCB Pattern (unit : mm)



SAFETY NOTES & PRECAUTION

1. Products may not be used in applications that directly affect the personal safety or cause significant impacts and losses to society. If you apply to these applications, please be sure to contact us at first to confirm.
2. The storage period is less than 12 months. Ensure to follow the storage conditions (Temperature: 5 to 30°C, Humidity: 10 to 60% RH or less). If the storage period is exceeded the limit, the electrodes might be deteriorate/oxidized and affect soldering. Solderability should be checked if this period is exceeded.
Other storage precaution:
 - a) Products should be stored on the pallet for the prevention of the influence from humidity, dust and so on.
 - b) Products should be stored in the warehouse without heat shock, vibration, direct sunlight and so on.
 - c) Do not unpack the minimum package until immediately before use. After unpacking, re-seal promptly or store in desiccator with a desiccant.
 - d) Do not store product in bulk to prevent coils and parts being damaged.
3. Do not use or store in locations where there are corrosive gases (salt, acid, alkali, etc.).
4. Soldering condition for mounting should be within the specification range.
If overheated, a short circuit, performance deterioration, or lifespan shortening may occur.
5. When using, try to avoid excessive mechanical impact on the product such as collision / drop...etc.
6. When assembling a printed circuit board with a new mounted chip, be careful to avoid assembly deformation of the circuit board that may cause the overall or partial distortion of the circuit board such as at screw tightening position.
7. Self heating (temperature increase) occurs when the power is turned ON, so the tolerance should be sufficient for the thermal design.
8. Do not expose the products to magnets or magnetic fields.
9. If you would like to use this products for more stringent safety or reliability of performance and/or quality requirements, or its failure, malfunction or trouble may cause serious damage to society, individuals or property, or you have special requirement beyond the specification or condition in the catalogue, please contact us.
10. PCB should be designed so that products are not subjected to the mechanical stress caused by warping of the board as shown below. Bending and twisting of PCB will cause excessive mechanical stress and lead to crack in the product as well.

Products should be located in the sideways direction
(Length: $a < b$) to the mechanical stress.



11. Cleaning brush shall not touch the winding portion of the product to prevent the breaking of wire. Cleaning could cause failure and degradation of a product.
12. Care should be taken when transporting or handling product to avoid excessive vibration or mechanical shock. Product could be damaged by external mechanical pressure, stacked under heavy object, as well as strong shaking and drop.