

DC Common Mode Choke Coil for Consumer equipment & Industrial equipment PLT09HN2003R0P1B REFERENCE SPECIFICATION

1. Scope

This reference specification applies to DC Common Mode Choke Coil (PLT09HN2003R0P1B).

1.1 Specific applications:

- Power equipment: Products that can be used in power equipment such as renewable energy equipment, energy storage equipment and EV charging equipment and whose functions are not directly related to the protection of human life and property.
- Industrial equipment: Products that can be used in industrial equipment such as base stations, manufacturing equipment, industrial robotics equipment, and measurement equipment, and whose functions do not directly relate to the protection of human life and property.
- Medical equipment (GHTF Class C) *Except for implant/surgery/auto injector: Products that can be used for medical equipment of Class C of the international classification class GHTF and whose malfunction is considered to pose a relatively high risk to the human body.
- Medical equipment (GHTF Class A and B): Products that can be used for medical equipment regulated by Class A and Class B of the international classification class GHTF and whose functions do not directly relate to the protection of human life and property.
- Consumer equipment: Products that can be used in consumer equipment such as home appliances, audio/visual equipment, communication equipment, information equipment, office equipment, and household robotics, and whose functions are not directly related to the protection of human life and property.

1.2 Unsuitable application:

Applications listed in "Limitation of applications" in this reference specification.

WE DISCLAIM ANY LOSS AND DAMAGES ARISING FROM OR IN CONNECTION WITH THE PRODUCTS INCLUDING BUT NOT LIMITED TO THE CASE SUCH LOSS AND DAMAGES CAUSED BY THE UNEXPECTED ACCIDENT, IN EVENT THAT THE PRODUCT IS APPLIED FOR THE PURPOSE WHICH IS SPECIFIED ABOVE AS THE UNSUITABLE APPLICATION FOR THE PRODUCT.

2. Part Numbering

(Ex.)

<u>PL</u>	<u>T</u>	<u>09</u>	<u>H</u>	<u>N</u>	<u>200</u>	<u>3R0</u>	<u>P</u>	<u>1</u>	<u>B</u>
Product ID	Type	Applications	Structure	Safety Standard	Inductance	Rated Current	Winding Mode	Lead Dimensions	Packaging (B: Bulk)
				(N: Not certified)			(P: Aligned Winding)		

3. Rating

Item	Specification
Customer Part Number	
Murata Part Number	PLT09HN2003R0P1B
Rated Voltage	50 V(DC)
Rated Current	3 A
Withstand Voltage	125 V(DC) (1 minute)
Insulation Resistance	10 MΩ min.
Direct Current Resistance	0.03 Ω max.
Inductance L1,L2	20 μH min.
Inductance Difference L1-L2	2 μH max.
Temperature Characteristic (Inductance change)	within $\pm \begin{smallmatrix} 8 \\ 5 \end{smallmatrix} \%$
Temperature Rise	30 °C max.
Operating Temperature Range (Ambient Temperature)	- 40 °C to + 85 °C
Storage Temperature Range	- 40 °C to + 85 °C

4. Standard Testing Conditions

< Unless otherwise specified >

Temperature : Ordinary Temp. 15 °C to 35 °C

Humidity : Ordinary Humidity 25 %(RH) to 85 %(RH)

< In case of doubt >

Temperature : 20 °C ± 2 °C

Humidity : 60 %(RH) to 70 %(RH)

Atmospheric pressure : 86 kPa to 106 kPa

5. Appearance, Dimensions and Equivalent Circuit Diagram

See Fig.1.

6. Marking(1) Inductance : **200**(2) Manufacturer Identification : **muRata****7. Electrical Performance**

No.	Item	Specification	Test Method															
7.1	Inductance L1,L2 L1 - L2	Meet item 3.	Measuring terminal : T1-T2(L1) , T3-T4(L2) Frequency : 1 kHz															
7.2	Insulation Resistance		Measuring terminal : (T1,T2) – (T3,T4) Test Voltage : 100 V(DC) Time : 1 minute															
7.3	Direct Current Resistance		Measuring terminal : T1-T2 , T3-T4															
7.4	Temperature Characteristics		Inductance shall be measured at each step specified in Table 1 after reaching the thermal equilibrium. The inductance change against the inductance at step 3 shall be calculated. <u>Table 1</u> <table border="1"> <tr> <th>Step</th><th>Temperature</th><th>Step</th><th>Temperature</th></tr> <tr> <td>1</td><td>+20 ± 2 °C</td><td>4</td><td>+85 ± 2 °C</td></tr> <tr> <td>2</td><td>-25 ± 2 °C</td><td>5</td><td>+20 ± 2 °C</td></tr> <tr> <td>3</td><td>+20 ± 2 °C</td><td></td><td></td></tr> </table>	Step	Temperature	Step	Temperature	1	+20 ± 2 °C	4	+85 ± 2 °C	2	-25 ± 2 °C	5	+20 ± 2 °C	3	+20 ± 2 °C	
Step	Temperature	Step	Temperature															
1	+20 ± 2 °C	4	+85 ± 2 °C															
2	-25 ± 2 °C	5	+20 ± 2 °C															
3	+20 ± 2 °C																	
7.5	Temperature rise	The surface of coil : 30 °C max.	Applying Current : Rated Current															
7.6	Withstand Voltage	Products shall be no failure.	Measuring terminal : (T1,T2) - (T3,T4) (between terminals) Test Voltage : 125 V(DC) (1 minute)															

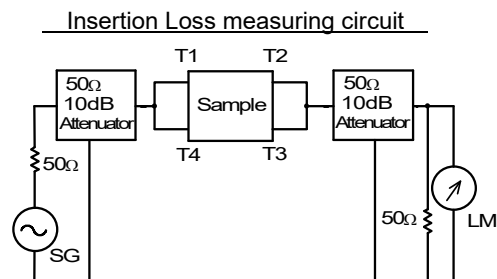
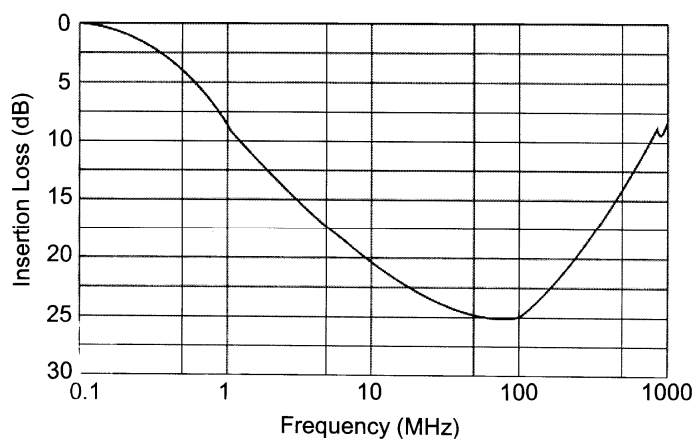
8. Mechanical Performance

No.	Item	Specification	Test Method								
8.1	Appearance and Dimensions	There shall not be a conspicuous dirt, crack,and so on. Dimensions shall be as shown in Fig.1.	Visual Inspection Measured with slide calipers								
8.2	Lead wire Strength	Products shall not be damaged. (cutting of lead wire, missing of pin, etc.)	The body of products shall be fixed, and the force of 5N shall be applied gradually and sustained for 30s to each lead wires in the axial direction of the lead wires.								
8.3	Solderability	The lead wires shall be covered with new solder at least 75% along the circumference of the immersed part.	Flux : Ethanol solution of rosin, 25(wt)% Pre-heat : 150 ± 10 °C, 60 ~ 90 s Solder : Sn-3Ag-0.5Cu Solder Temperature : 245 ± 5 °C Immersion Time : 2 ± 0.5 s Immersion Depth : 2.6 ± 0.8 mm from the root of lead wire								
8.4	Resistance to soldering heat	Meet Table 2. <table border="1"><tr><td colspan="2">Table 2</td></tr><tr><td>Appearance</td><td>No damage</td></tr><tr><td>Inductance Change</td><td>within ± 10 %</td></tr><tr><td>Withstand Voltage</td><td>Meet item 7.6</td></tr></table>	Table 2		Appearance	No damage	Inductance Change	within ± 10 %	Withstand Voltage	Meet item 7.6	Flux : Ethanol solution of rosin, 25(wt)% Pre-heat : 150 ± 10 °C, 60 ~ 90 s Solder : Sn-3Ag-0.5Cu Solder Temperature : 260 ± 5 °C Immersion Time : 10 ± 1 s Immersion Depth : 2.6 ± 0.8 mm from the root of lead wire Then measured after exposure in the room condition for 4 to 24 hours.
Table 2											
Appearance	No damage										
Inductance Change	within ± 10 %										
Withstand Voltage	Meet item 7.6										
8.5	Vibration		Vibration Frequency : 10Hz to 55Hz to 10Hz for 1 minute Amplitude : 1.5 mm Time : A period of 2 hours in each of 3 mutually perpendicular directions. (Total 6 hours)								
8.6	Shock		Maximum Acceleration : 981 m / s ² Normal Duration : 6 ms Wave form : Half-sine wave Velocity Change : 3.75 m / s Direction : along the three mutually perpendicular axes of the product Times : Three shocks in each directions (total 18 times)								

9. Enviromental Performance

No.	Item	Specification	Test Method
9.1	Temperature Cycle	Meet Table 2.	1 cycle : 1 step : - 40 °C (+ 0 °C, - 3 °C) / 30 min. 2 step : Ordinary Temp. / 3 min. max. 3 step : + 85 °C (+ 3 °C, - 0 °C) / 30 min. 4 step : Ordinary Temp. / 3 min. max. Total of 10 cycles Then measured after exposure in the room condition for 4 to 24 hours.
9.2	Humidity		Temperature : 40 °C ± 2 °C Humidity : 90 %(RH) to 95 %(RH) Time : 1000 h (+24h , -0h) Then measured after exposure in the room condition for 4 to 24 hours.
9.3	Cold Resistance		Temperature : - 40 °C ± 2 °C Time : 1000 h (+24h , -0h) Then measured after exposure in the room condition for 4 to 24 hours.
9.4	Heat Resistance		Temperature : 85 °C ± 2 °C Time : 1000 h (+24h , -0h) Then measured after exposure in the room condition for 4 to 24 hours.
9.5	Heat Life		Temperature : 85 °C ± 2 °C Test Voltage : 50 V(DC) Time : 1000 h (+24h , -0h) Then measured after exposure in the room condition for 4 to 24 hours.

10. Insertion Loss (Typical)



Measuring circuit (based on MIL-STD-220)

$$A = 20 \log(E1/E2)$$

A : Insertion Loss (dB)

E1 : Level with Common mode choke coil

E2 : Level without Common mode choke coil

11. Specification of Packaging

11.1. Packing Quantity

Individual packaging
100pcs

11.2. Packing Method

Styrene foam of the stuck products on are placed in an Individual packaging .

A quantity in an Outer packaging is depending on a quantity of an order.

11.3. Marking of packaging

(1) Individual packing

The following items shall be marked on a label and the label is sticked on the Individual packaing.

Customer part number, MURATA part number, Inspection number(*1), RoHS marking(*2), Quantity, etc

*1) « Expression of Inspection No. »	<u>□□</u>	<u>0000</u>	<u>x x x</u>
	(1)	(2)	(3)

(1) Factory Code

(2) Date

First digit : Year / Last digit of year

Second digit : Month / Jan. to Sep. → 1 to 9, Oct. to Dec. → O,N,D

Third, Fourth digit : Day

(3) Serial No.

*2) « Expression of RoHS marking » ROHS – Y (Δ)
(1) (2)

(1) RoHS regulation conformity parts.

(2) MURATA classification number

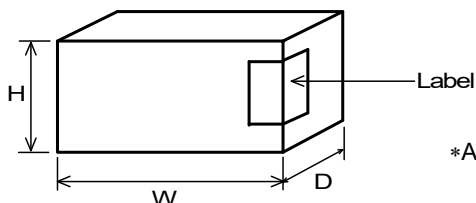
(2) Marking for Outside package

The following items shall be marked on a label and the label is sticked on the outside package.

Customer name, Purchasing Order Number, Customer Part Number, MURATA part number, RoHS marking (*2) , Quantity , etc

11.4 Specification of Outer Case

(ex.)



Outer Case Dimensions (mm)			Standard Individual package Quantity in Outer Case
W	D	H	
265	89	118	5

*Above Outer Case size is typical. It depends on a quantity of an order.

12. ⚠ Caution

12.1 Limitation of Applications

The products listed in the reference specification (hereinafter the product(s) is called as the “Product(s)”) are designed and manufactured for applications specified in the reference specification (hereinafter called as the “Specific Application”).

We shall not warrant anything in connection with the Products including fitness, performance, adequateness, safety, or quality, in the case of applications listed in from (1) to (11) written at the end of this precautions, which may generally require high performance, function, quality, management of production or safety. Therefore, the Product shall be applied in compliance with the specific application.

WE DISCLAIM ANY LOSS AND DAMAGES ARISING FROM OR IN CONNECTION WITH THE PRODUCTS INCLUDING BUT NOT LIMITED TO THE CASE SUCH LOSS AND DAMAGES CAUSED BY THE UNEXPECTED ACCIDENT, IN EVENT THAT (i) THE PRODUCT IS APPLIED FOR THE PURPOSE WHICH IS NOT SPECIFIED AS THE SPECIFIC APPLICATION FOR THE PRODUCT, AND/OR (ii) THE PRODUCT IS APPLIED FOR ANY FOLLOWING APPLICATION PURPOSES FROM (1) TO (11) (EXCEPT THAT SUCH APPLICATION PURPOSE IS UNAMBIGUOUSLY SPECIFIED AS SPECIFIC APPLICATION FOR THE PRODUCT IN OUR CATALOG SPECIFICATION FORMS, DATASHEETS, OR OTHER DOCUMENTS OFFICIALLY ISSUED BY US*).

- (1) Aircraft equipment
- (2) Aerospace equipment
- (3) Undersea equipment
- (4) Power plant control equipment
- (5) Medical equipment
- (6) Transportation equipment
- (7) Traffic control equipment
- (8) Disaster prevention/security equipment
- (9) Industrial data-processing equipment
- (10) Combustion/explosion control equipment
- (11) Equipment with complexity and/or require

For exploring information of the Products which will be compatible with the particular purpose other than those specified in the reference specification, please contact our sales offices, distribution agents, or trading companies with which you make a deal, or via our web contact form.

Contact form: <https://www.murata.com/contactform>

* We may design and manufacture particular Products for applications listed in (1) to (11). Provided that, in such case we shall unambiguously specify such Specific Application in the reference specification without any exception. Therefore, any other documents and/or performances, whether exist or non-exist, shall not be deemed as the evidence to imply that we accept the applications listed in (1) to (11).

12.2 Corrosive gas

Please refrain from use since contact with environments with corrosive gases (sulfur gas [hydrogen sulfide, sulfur dioxide, etc.], chlorine, ammonia, etc.) or oils (cutting oil, silicone oil, etc.) that have come into contact with the previously stated corrosive gas environment will result in deterioration of product quality or an open from deterioration due to corrosion of product electrode, etc. We will not bear any responsibility for use under these environments.

13. Notice

13.1. Soldering conditions

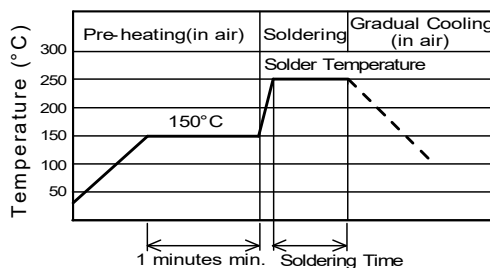
(1) Flux, Solder

- Rosin-based flux should be used.

Do not use strong acidic flux with halide content exceeding 0.2(wt)% (chlorine conversion value.)

- Use Sn-3.0Ag-0.5Cu solder.

(2) Standard flow soldering profile.



Solder Temperature	Soldering Time
250 ~ 260 °C	4 ~ 6 s

- (3) Resistance to soldering iron goes in the following condition that tip temperature is 350 °C max. and soldering time is 3 s max.

Products and the leads should not be subjected to any mechanical stress during soldering process. (and also while subjected to the equivalent high temperature.)

13.2. Cleaning

Avoid cleaning product due to non-waterproof construction.

13.3. Storage and Handling Requirements

(1) Storage period

Use the products within 12 months after delivered.

Solderability should be checked if this period is exceeded.

(2) Storage conditions

- Products should be stored in the warehouse on the following conditions.

Temperature : -10 °C to 40 °C

Humidity : 15 % to 85 % relative humidity No rapid change on temperature and humidity

Don't keep products in corrosive gases such as sulfur, chlorine gas or acid, or it may cause oxidization of lead terminals resulting in poor solderability or corrosion of component windings.

- Products should be stored on the palette for the prevention of the influence from humidity, dust and so on.
- Products should be stored in the warehouse without heat shock, vibration, direct sunlight and so on.

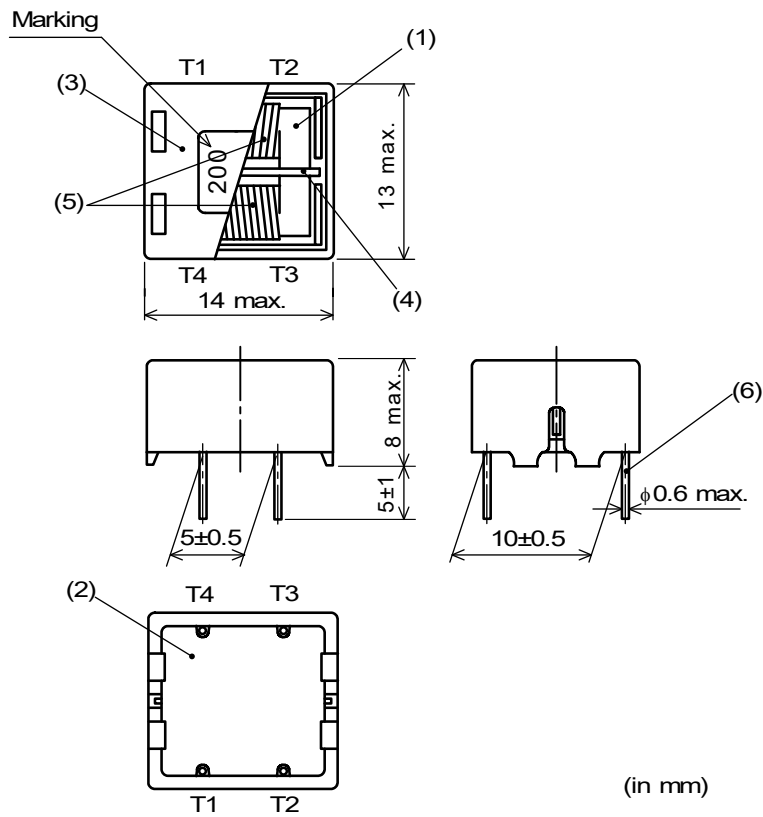
(3) Handling Condition

Care should be taken when transporting or handling product to avoid excessive vibration or mechanical shock.

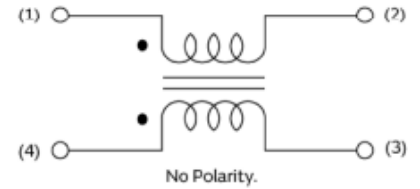
14. Note

- (1) Please make sure that your product has been evaluated in view of your specifications with our product being mounted to your product.
- (2) You are requested not to use our product deviating from the reference specifications.
- (3) The contents of this reference specification are subject to change without advance notice. Please approve our product specifications or transact the approval sheet for product specifications before ordering.

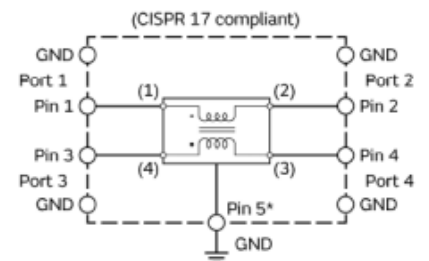
Fig. 1

PLT09H Appearance and Dimensions

■ Equivalent Circuit (Note1)



Note1: The Port/Pin No. of the Simulation Model provided by our company is as follows.



S-parameter: Port□

SPICE model: Pin□ (Pin5* connect to GND)

■ Unit Mass(Typical value)
2.1g

MATERIAL

No.	Item	Material
(1)	Core	Ferrite (Ni-Zn type)
(2)	Base	PET
(3)	Case	6 Nylon
(4)	Spring	Stainless Steel
(5)	Coil	Polyurethane Enameled Copper Wire
(6)	Terminal	(Ni Plating + Sn Plating) Copper Wire