



## Common Mode Chokes Coil

### HDC0504ST Series



## INTRODUCTION

The HDC0504ST series is wire wound type Common Mode Choke Coil which provides high effective suppression characteristics without distorting the wave pattern of high speed differential signal interface. It is suitable for super high speed differential signal such as USB 3.0, HDMI and so on.

## FEATURES

- Cut off frequency in differential mode is 8~10GHz.
- Operating temperature -40 to +105°C.
- Excellent solderability and resistance to soldering heat.
- Suitable for flow and reflow soldering.
- Good dimensions, high reliability and easy surface mount assembly.

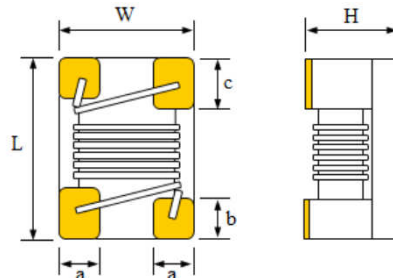
## PART NUMBER

HDC 0504 S T 600 S - □□

1 2 3 taping 4 5 6

1 Product Type

2 Chip Dimension



Unit : m/m

Size	Length (L)	Width (W)	Thickness (H)	Terminal (a)	Terminal (b)	Terminal (c)
HDC0504	1.20 ± 0.20	1.00 ± 0.20	0.90 max.	0.35 ± 0.10	0.30 ± 0.10	0.35 ± 0.10

3 General characteristics

4 Typical Impedance @ 100MHz      600 = 60Ω      900 = 90Ω

5 Application Type      S = USB3.0      H = HDMI

6 Internal Code

## 1 Scope

This specification applies to wire wound 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.

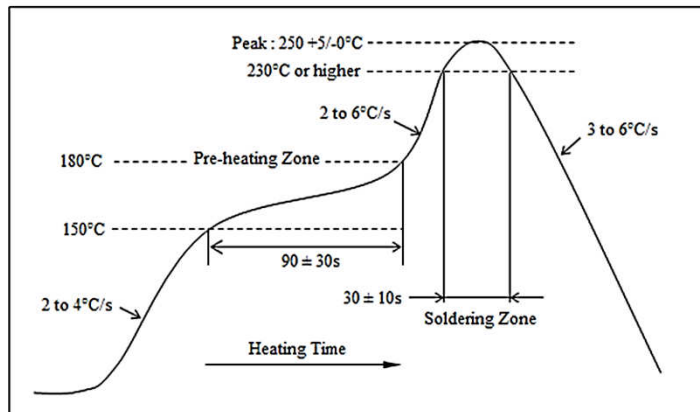
\*Terminals : Consist of Ag alloy followed by Nickel, then Au plating.

## 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 :  $-40^{\circ}\text{C} \sim +105^{\circ}\text{C}$

## 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%

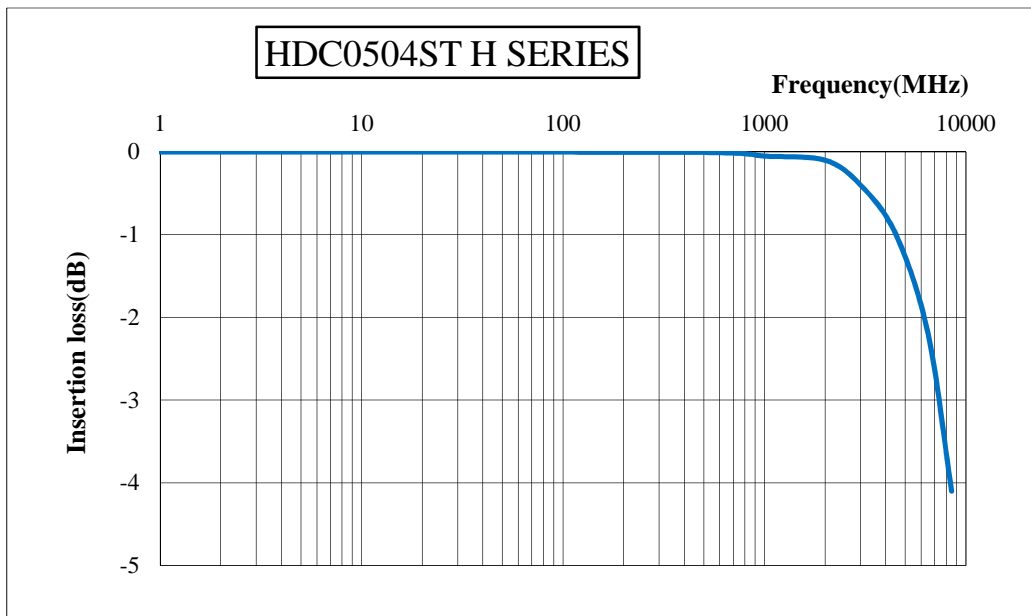
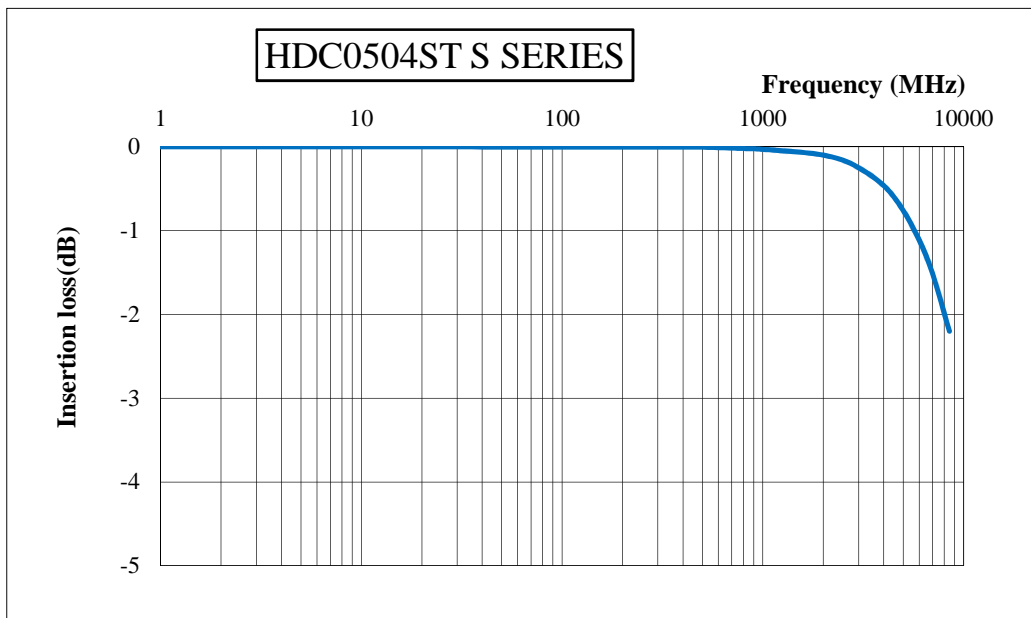
Air Pressure : 86Kpa to 106Kpa



HDC0504ST Series

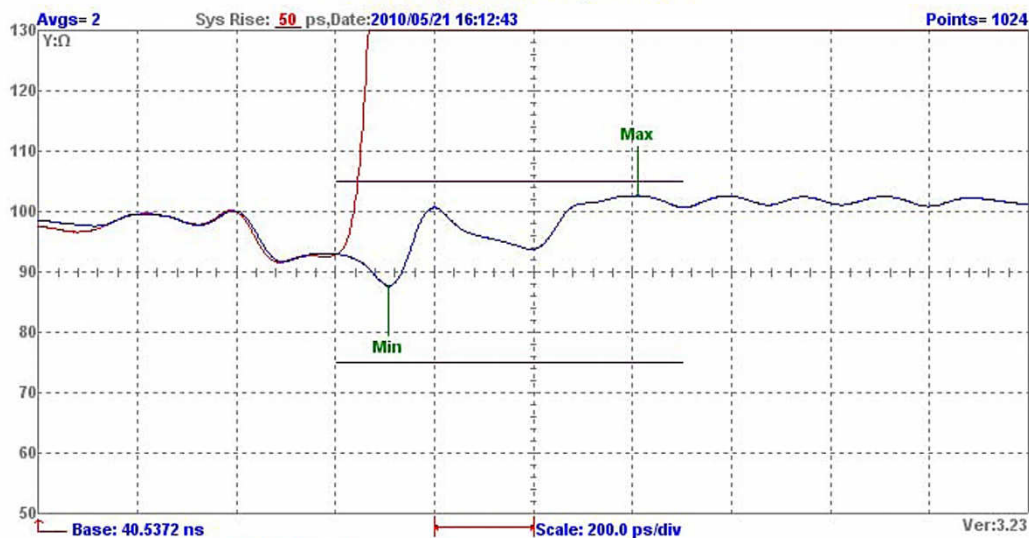
Part No.	Common Mode Impedance <sup>1</sup> (Ω) @ 100MHz	DC Resistance Max. (Ω)	Rated <sup>2</sup> Current (mA)	Rated Voltage Max. (V DC)	Insulation Resistance Min. (MΩ)	Cutoff Frequency (GHz)
HDC0504ST 600S -□□	60 typ. / 43 min.	0.40	300	20	100	10 typ.
HDC0504ST 900H -□□	90 typ. / 65 min.	0.50	280	20	100	8 typ.

1. Impedance is measured in HP4287A (or equivalent) at frequency of 100MHz.
2. For 15 °C Rise.



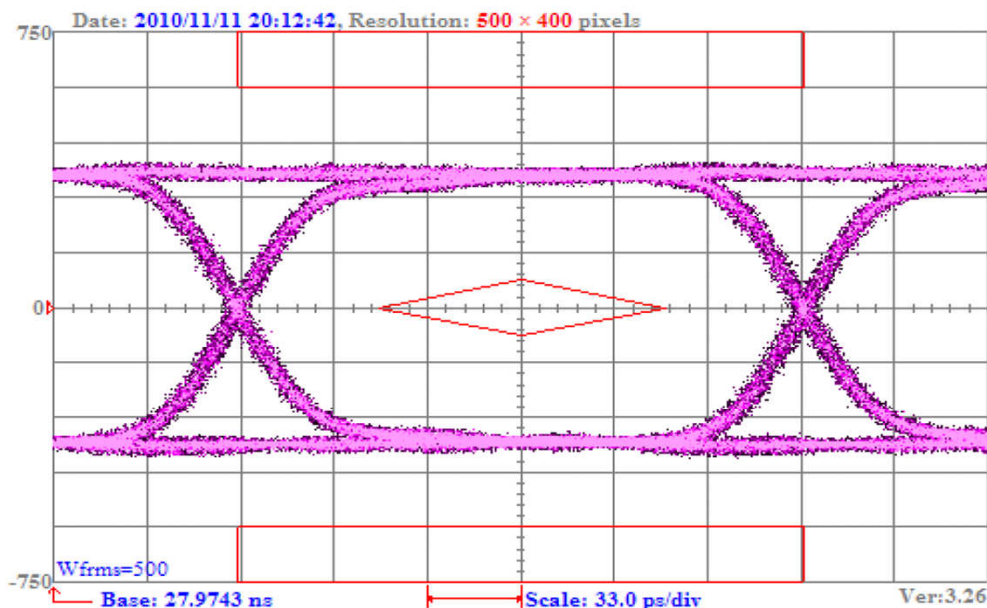


**Choke Impedance Graphic result**

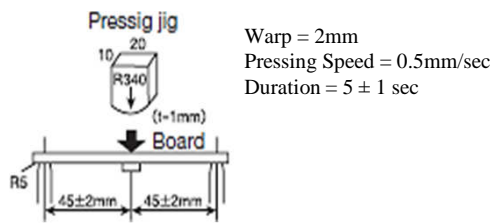


Parameter Name: <b>Choke Impedance C1</b>	
Spc Max: <b>105</b> Ω	Spc Min: <b>75</b> Ω
Max: <b>102.64</b> Ohms at <b>41.7752</b> ns	Min: <b>87.85</b> Ohms at <b>41.2612</b> ns
ΔΩ: <b>14.79</b>	Avg: <b>95.24</b> Ohms
Result: <b>Pass</b>	

**USB3.0 Eye Graphic result**



Parameter Name: <b>USB3.0 Eye Aoba</b>	
Display Mode: <b>USB3.0 5Gpbs</b>	
dRate: <b>5</b> Gbits/s; <b>200.0</b> ps	V: <b>400</b> mV; Gain: <b>0</b> dB; Off: <b>0</b> mV
JGen: <b>OFF</b>	Result: <b>Pass</b>

ITEM		CONDITION	SPECIFICATION
Electrical Characteristics	Common Mode Impedance ( $Z_c$ ) and Tolerance	Measuring Equipment : HP-4287A or equivalent Measuring Frequency : $100 \pm 1$ MHz Measuring Temperature : $25 \pm 5^\circ\text{C}$ (Refer to Measurement Diagram)	600S : Minimum $43\Omega$ Typical $50\sim 60\Omega$ 900H : Minimum $65\Omega$ Typical $80\sim 100\Omega$
	Insulation Resistance	Measuring Voltage : Rated Voltage Measuring Time : 1 minute max. (Refer to Measurement Diagram)	$100\text{M}\Omega$ 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	 <p>Warp = 2mm Pressing Speed = 0.5mm/sec Duration = <math>5 \pm 1</math> sec</p>	Change in Appearance : Without distinct damage  Change in Common Mode : Within $\pm 20\%$  Insulation Resistance : $10\text{M}\Omega$ min.
	Drop Test	Components shall be dropped 3 times on a concrete or steel board at height of 1 M naturally at any directions.	Withstanding Voltage : No damaged
	Vibration (Random)	Components shall be randomly vibrated at amplitude of 1.5mm and frequency of 10-55Hz : 0.04G/Hz, 1 minute at a period of 2 hours in each of the 3 mutually perpendicular directions.	
	Resistance to Soldering Heat	Preheat components at $80$ to $120^\circ\text{C}$ for 1 minute. Dip components into flux and then into a melted solder bath at $255 \pm 5^\circ\text{C}$ for $5 \pm 1$ seconds. Then components are to be tested after 4-48 hours at room temperature.	
	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

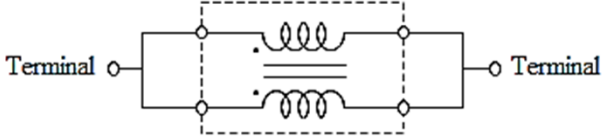
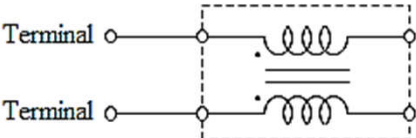
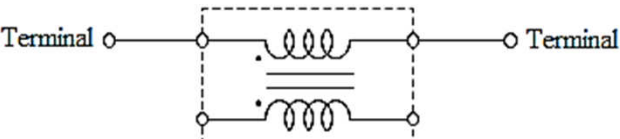
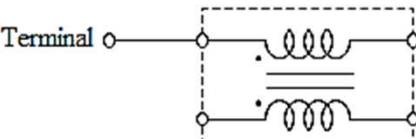
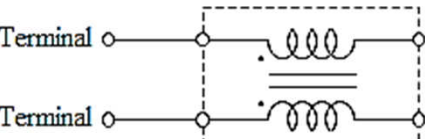


ITEM		CONDITION	SPECIFICATION
Endurance Characteristics	Cold Temperature Storage	Components shall be stored at temperature of $-40\pm 2^{\circ}\text{C}$ for 1000 (+48 hours -0 hour). Then components shall be subjected to standard atmospheric conditions for 4-48 hours. After that measurement shall be made.	Change in Appearance : Without distinct damage  Change in Common Mode : Within $\pm 20\%$
	High Temperature Storage	Components shall be stored at temperature of $+85\pm 2^{\circ}\text{C}$ 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.	Insulation Resistance : $10\text{M}\Omega$ min.  Withstanding Voltage : No damaged
	Moisture Resistance	Components shall be stored in the chamber at $40^{\circ}\text{C}$ at 90-95% R.H. for 1000 (+48 hours -0 hour). Then components are to be tested after 4-48 hours at room temperature.	
	Temperature Cycle	Each cycle shall consist of 30 minutes at $-40^{\circ}\text{C}$ 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.	
	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 hours. After that measurement shall be made.	

Measurement Diagram

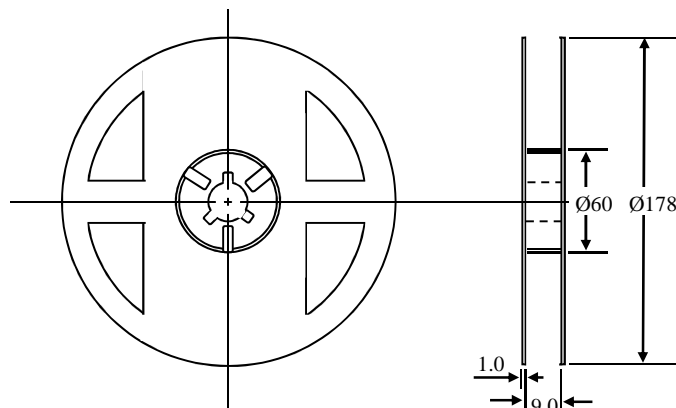
Terminal to be Tested

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

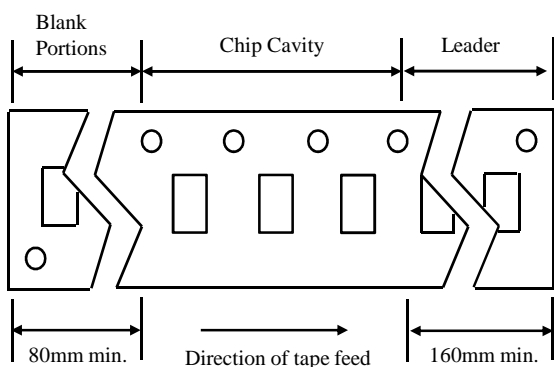
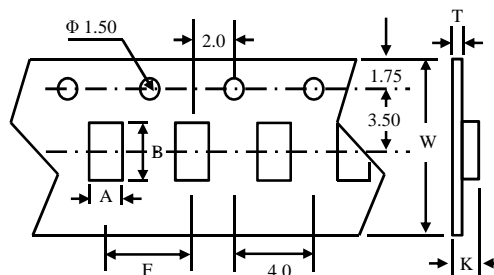
No.	Item	Terminal to be tested
1	Common Mode Impedance (Measurement Terminal)	
2	Withstanding Voltage (Measurement Terminal)	
3	DC Resistance (Measurement Terminal)	
4	Rated Current	
5	Insulation Resistance	

HDC0504ST Series

Type	Pcs/Reel
HDC0504	3,000

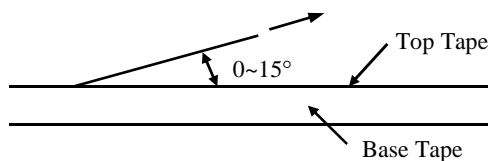


Type	Chip Cavity		Insert Pitch	Tape Thickness		
	A	B		K	T	W
HDC0504	1.12	1.40	4.00	1.05	0.22	8.00



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.



Dimensions (unit : m/m)

Type	A	B	C	D
HDC0504	0.40	0.45	0.65	0.30

Recommended Pattern

