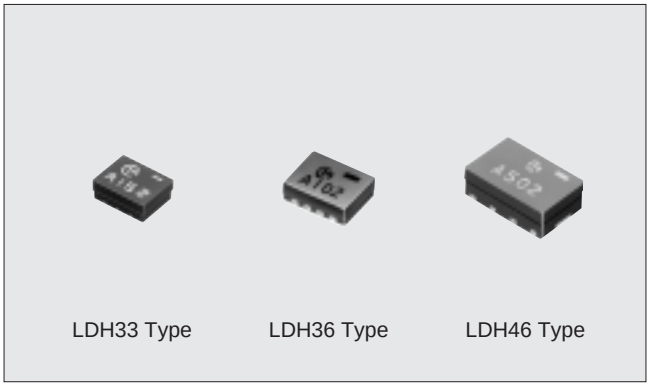
CHIP MULTILAYER DELAY LINE

Chip Multilayer Delay Line **LDH** Series

Delay Line for High-Speed Data Processing Equipment, Computer and High Frequency Measuring Equipment

This Delay Line is developed by applying ceramic multilayering and via hole technology. It consists of copper line and low dielectric constant material and incorporates metal shields. LDH series are very small and match up uses at high frequency.



■FEATURES

1. Small, thin and light, utilizing multilayer construction.
2. Metal shield is built inside chip.
3. Reflow solderable.
4. Supplied on tape.

■PART NUMBERING

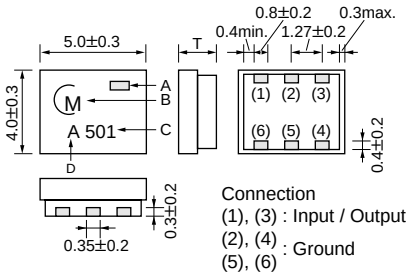
(Please specify the part number when ordering.)

(Ex.) LDH ❶ | 36 ❷ | A ❸ | 101 ❹ | A ❺

❶ LDH Represents Delay Line
❷ Type
❸ Impedance (A : 50Ω, B : 75Ω)
❹ Delay Time (Ex. 100ps → 101)
❺ Delay Time Tolerance (A : ±0.05ns, B : ±0.1ns, C : ±0.2ns, K : ±10%)

■DIMENSIONS

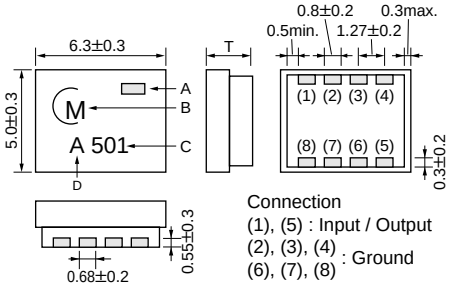
LDH33 Type



Connection
(1), (3) : Input / Output
(2), (4), (5), (6) : Ground

(Thickness : T is mentioned on character table)

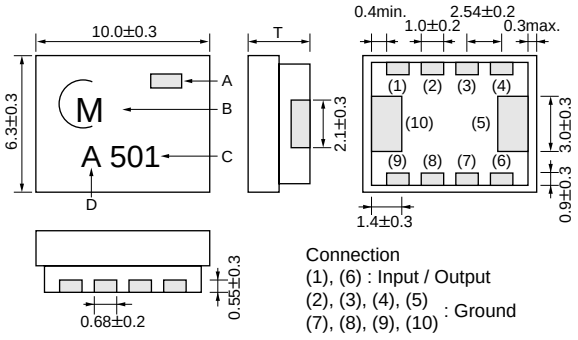
LDH36 Type



Connection
(1), (5) : Input / Output
(2), (3), (4), (6), (7), (8) : Ground

(Thickness : T is mentioned on character table)

LDH46 Type



Connection
(1), (6) : Input / Output
(2), (3), (4), (5), (7), (8), (9), (10) : Ground

(Thickness : T is mentioned on character table)

A : Mark of Input Terminal
B : Symbol Marking
C : Delay Time (Nominal value)
D : Impedance Code

(in mm)

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■ELECTRICAL CHARACTER & THICKNESS TABLE

LDH33 Type

Part Number	Delay Time (ns)	Thickness (mm) max.	Impedance*1 (Ω)	Rising Time (ns) max.	Insulation Resistance (MΩ) min.	Rated Current (mA)	Operating Temperature Range (℃)
LDH33A101A	0.1±0.05	1.1	50±7	0.15	100	50	−25 to+85
LDH33A201A	0.2±0.05						
LDH33A301A	0.3±0.05						
LDH33A401A	0.4±0.05						
LDH33A501A	0.5±0.05						
LDH33A601B	0.6±0.1			0.3			
LDH33A701B	0.7±0.1						
LDH33A801B	0.8±0.1	1.5					
LDH33A901B	0.9±0.1						
LDH33A102B	1.0±0.1	1.6					
LDH33A152B	1.5±0.1	2.1		0.5			
LDH33A202B	2.0±0.1	2.6					
LDH33A252B	2.5±0.1	3.1					
LDH33B302K	3.0±0.3	1.5	75 (nominal)	2.0			
LDH33B402K	4.0±0.4			2.5			
LDH33B502K	5.0±0.5	2.0		2.5			
LDH33B602K	6.0±0.6			3.0			
LDH33B702K	7.0±0.7			3.5			
LDH33B802K	8.0±0.8			3.5			
LDH33B902K	9.0±0.9			4.0			
LDH33B103K	10.0±1.0			4.5			

LDH36 Type

Part Number	Delay Time (ns)	Thickness (mm) max.	Impedance*1 (Ω)	Rising Time (ns) max.	Insulation Resistance (MΩ) min.	Rated Current (mA)	Operating Temperature Range (℃)
LDH36A101A	0.1±0.05	1.9	50±5	0.1	100	100	−25 to+85
LDH36A201A	0.2±0.05						
LDH36A301A	0.3±0.05			0.15			
LDH36A401A	0.4±0.05						
LDH36A501A	0.5±0.05						
LDH36A601B	0.6±0.1						
LDH36A701B	0.7±0.1	2.5		0.2			
LDH36A801B	0.8±0.1						
LDH36A901B	0.9±0.1						
LDH36A102B	1.0±0.1						

*1 Impedance are measured at 100MHz.

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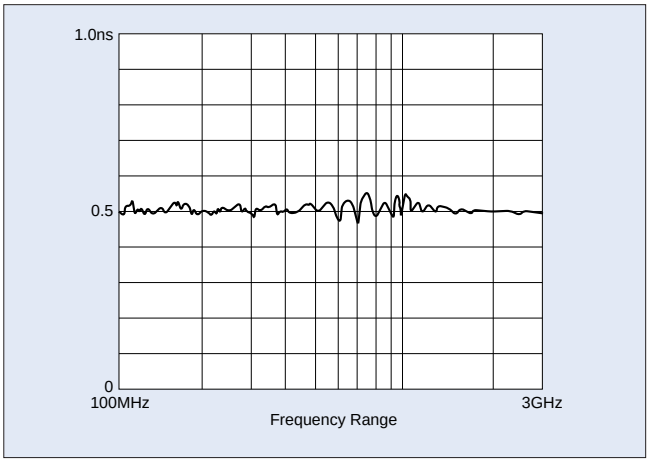
LDH46 Type

Part Number	Delay Time (ns)	Thickness (mm) max.	Impedance*1 (Ω)	Rising Time (ns) max.	Insulation Resistance (MΩ) min.	Rated Current (mA)	Operating Temperature Range (℃)
LDH46A501A	0.5±0.05	1.9	50±5	0.15	100	100	−25 to+85
LDH46A102B	1.0±0.1			0.2			
LDH46A152B	1.5±0.1	2.5		0.3			
LDH46A202B	2.0±0.1	3.1		0.4			
LDH46A252B	2.5±0.1						
LDH46A302B	3.0±0.1		50±10	0.25×DT*2			
LDH46A402B	4.0±0.1						
LDH46A502B	5.0±0.1	3.7					
LDH46A602C	6.0±0.2	3.1					
LDH46A702C	7.0±0.2	3.7					
LDH46A802C	8.0±0.2						
LDH46A902C	9.0±0.2						
LDH46A103C	10.0±0.2						

*1 Impedance are measured at 100MHz.
*2 DT stand for Delay Time.

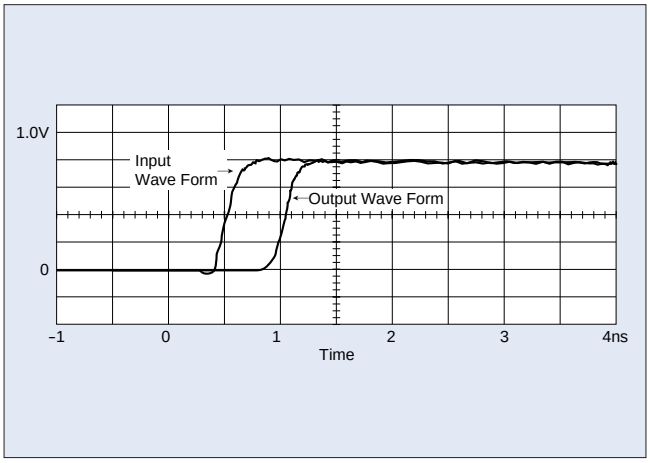
■GROUP DELAY TIME

Test sample : LDH36A501A



■PULSE RESPONSE

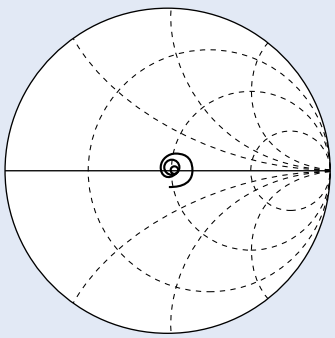
Test sample : LDH36A501A



■IMPEDANCE

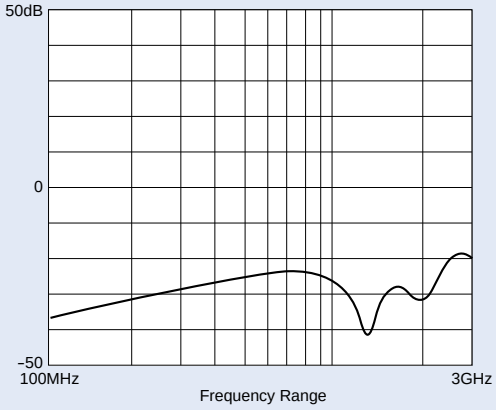
Test sample : LDH36A501A

Frequency Range : 100MHz to 3GHz (Smith Chart)



■RETURN LOSS

Test sample : LDH36A501A



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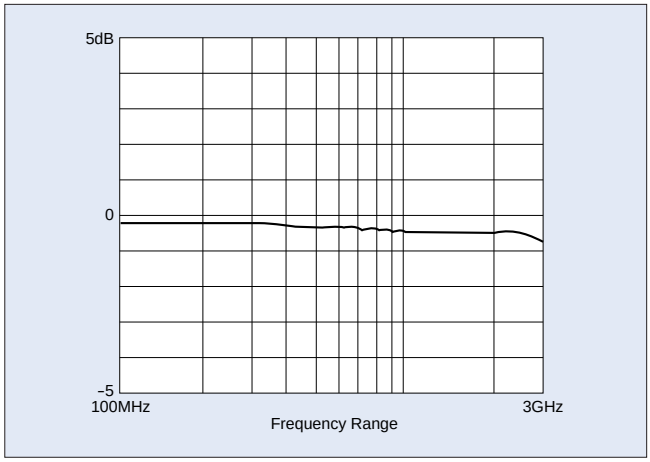
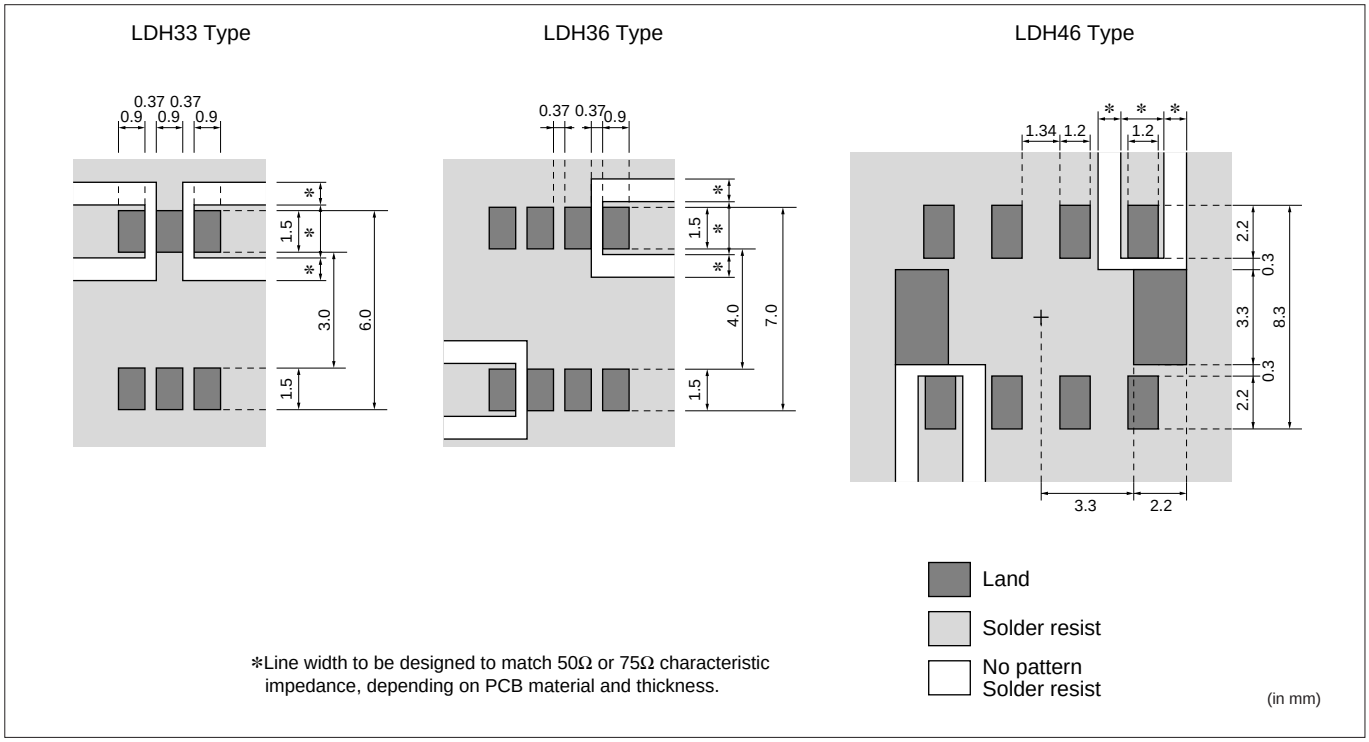
■INSERTION LOSS

Test sample : LDH36A501A



■STANDARD LAND DIMENSIONS

All GND terminals should be fixed to ground patterns.
Standard land dimensions are as follows.



∗Line width to be designed to match 50Ω or 75Ω characteristic impedance, depending on PCB material and thickness.

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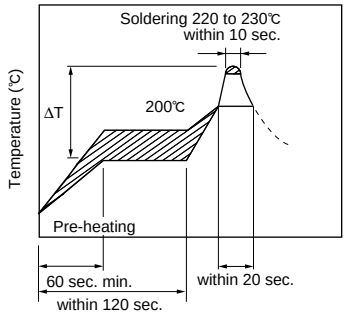
■STANDARD SOLDERING CONDITIONS

Carefully perform pre-heating so that temperature difference (ΔT) between the solder and component surface should be in the following range.
When components are immersed in solvent after mounting, pay special attention to maintain temperature difference within 100℃.

When correcting chips with a soldering iron, the following conditions should be met.

Infrared reflow soldering standard conditions (Example)



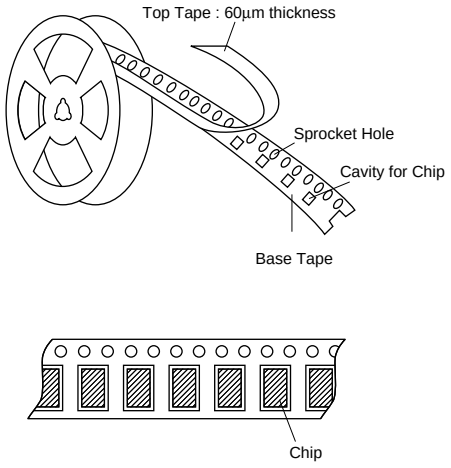
Soldering Method	Temperature
Reflow Method or Soldering Iron Methods	ΔT≦130℃

Item \ Kind of Iron	Nichrome-heater	Ceramic-heater
Soldering Iron Wattage	30W max.	18W max.
Temperature of Iron-trip	280℃ max.	250℃ max.

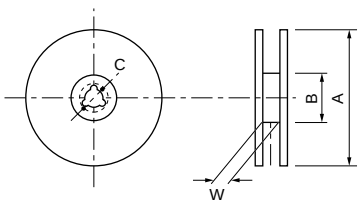
- Diameter of iron -tip : ϕ3.0mm max.
- Do not allow the iron-trip to directly touch the ceramic element.

<Flux and Solder>
- Use rosin type flux or mildly activated flux containing less than 0.2wt% of chlorine.
- Use eutectic solder.

■APPEARANCE OF TAPING



■DIMENSIONS OF REEL



Code	Dimensions (in mm)	
	LDH33·LDH36 Type	LDH46 Type
A	179±2.0	330±2.0
B	50 min.	100 min.
C	13±0.5	
W	12.5±1.5	17.5±1.5

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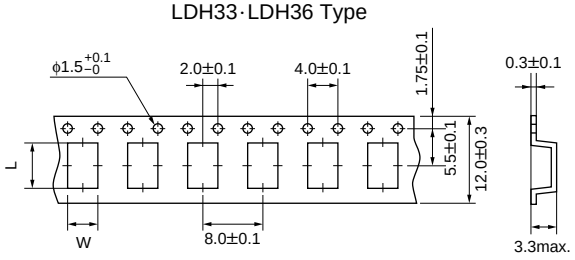
■DIMENSIONS OF TAPE

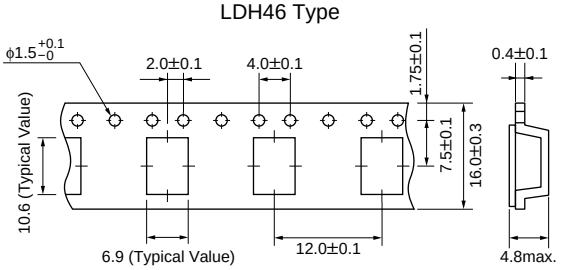
LDH33·LDH36 Type



Type (Delay Time)	L	W
LDH33 (0.1—1.5)	5.5	4.5
(2.0—2.5)	5.9	4.4
LDH36 (0.1—1.0)	6.9	5.6

(Typical Value)

LDH46 Type



(in mm)

■NOTICE

1. Electrical Performance

Electrical characteristics have been obtained according to our own measuring methods and may vary depending on the circuit, in which this component is actually incorporated. Therefore, please test the performance of this component when it is mounted to your product.

2. Storage

To avoid damaging the solderability of the outer electrodes, be sure to observe the following ;

- Store in 15 to 35℃ ambient temperature, and 45 to 75% ambient RH. (In particular, please note that an ambient temperature over 35℃ may deform all the packages.)
- Store where there are no corrosive gases containing sulfur, chlorine, etc.
- Please use within 6 months after you receive the components. When using the components over 6 months, check the solderability before actual use.

3. Cleaning

- Total cleaning time required as a combination of each cleaning method such as dipping, ultrasonic and steam cleanings is 5 minutes or less.
- Please contact Murata concerning the cleaning liquid before use.
  For protection of ozone layer, we also investigate the non-ODC cleaning process for our devices.
  Example of non-ODC cleaning process
  - disuse of cleaning
  - alkali saponification agent
  - water soluble flux
  - semi-aqueous cleaning agent
  - water soluble solder paste

  For more details, please contact Murata before use.
- The following ultrasonic cleaning specifications should be followed.
  Output : 20W/ ℓ max.
  Frequency : 50 to 60 kHz
  Temperature : 40℃ max.
  If the output of the ultrasonic wave is too great, the PCB will oscillate and mounted components will be damaged. Please attention also to this point when fixing your cleaning conditions based on the above conditions, and test the components in your test.
  For other ultrasonic cleaning condition, please contact MURATA before use.
- After cleaning, dry immediately.

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⚠Note:

1. Export Control
   〈For customers outside Japan〉
   Murata products should not be used or sold for use in the development, production, stockpiling or utilization of any conventional weapons or mass-destructive weapons (nuclear weapons, chemical or biological weapons, or missiles), or any other weapons.
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   For products which are controlled items subject to the “Foreign Exchange and Foreign Trade Law” of Japan, the export license specified by the law is required for export.
2. Please contact our sales representatives or product engineers before using our products listed in this catalog for the applications listed below which require especially high reliability for the prevention of defects which might directly cause damage to the third party's life, body or property, or when intending to use one of our products for other applications than specified in this catalog.
   ① Aircraft equipment
   ② Aerospace equipment
   ③ Undersea equipment
   ④ Medical equipment
   ⑤ Transportation equipment (vehicles, trains, ships,etc.)
   ⑥ Traffic signal equipment
   ⑦ Disaster prevention / crime prevention equipment
   ⑧ Data-processing equipment
   ⑨ Application of similar complexity and/or reliability requirements to the applications listed in the above
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6. None of ozone depleting substances (ODS) under the Montreal Protocol is used in manufacturing process of us.