DELAY LINES, CHIP MULTILAYER WIRELESS BASE STATION

muRata
Innovator in Electronics

LDH Series

This delay line has been developed by utilizing advanced multilayer technology. It is comprised of a copper line and temperature compensated dielectric NPO (0 ± 60ppm/°C) and includes a metal shield. This results in a very small device that is compatible with high frequency applications and SMD chip processing.

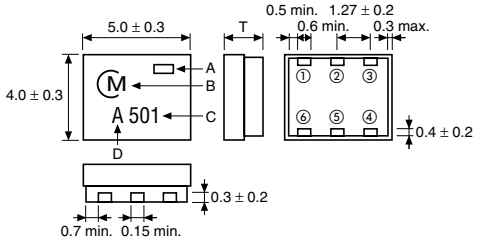
APPLICATIONS

- Wireless base station

FEATURES

- Multilayer construction results in a small, thin and light package
- Metal shield is built inside chip
- Reflow solderable
- Supplied on tape and reel

LDH33 Type



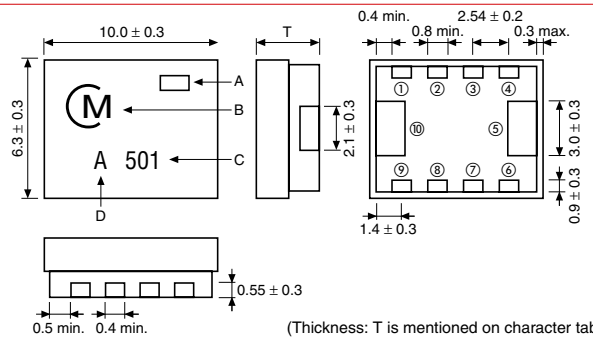
(Thickness: T is mentioned on character table)

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

TERMINALS: LDH33 Type

Terminal No.	Function	Terminal No.	Function
①	IN/OUT	④	GROUND
②	GROUND	⑤	GROUND
③	IN/OUT	⑥	GROUND

LDH46 Type



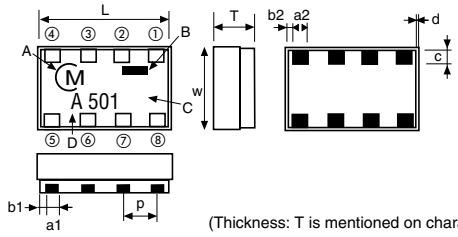
(Thickness: T is mentioned on character table)

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

TERMINALS: LDH46 Type

Terminal No.	Function	Terminal No.	Function
①	IN/OUT	⑤	GROUND
②	GROUND	⑥	IN/OUT
③	GROUND	⑦	GROUND
④	GROUND	⑧	GROUND
⑨	GROUND	⑩	GROUND

LDH36 Type



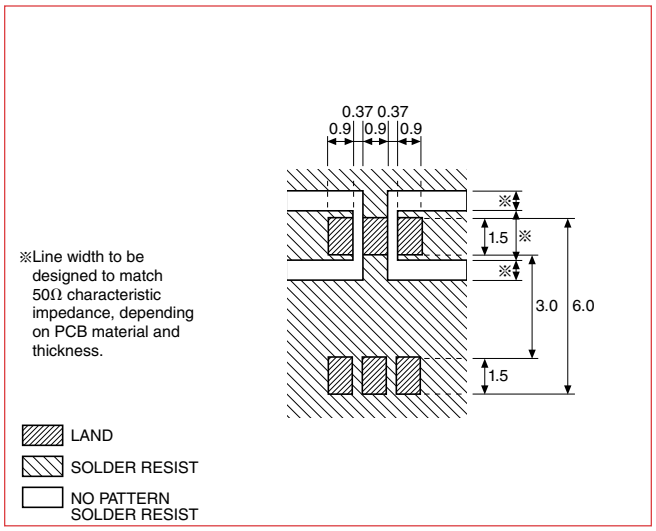
(Thickness: T is mentioned on character table)

Code	Description	Code	Description
A	Manufacturer's Name Code	C	Delay Time (nominal value)
B	Directional Input Mark	D	Impedance Code
Code	**Dimension**	**Code**	**Description**
L	6.3 ± 0.3	b2	0.5 min.
W	5.0 ± 0.3	c	0.3 ± 0.2
a1	0.5 min	d	0.3 max.
a2	0.8 min.	p	1.27 ± 0.20
b1	0.6 min.		

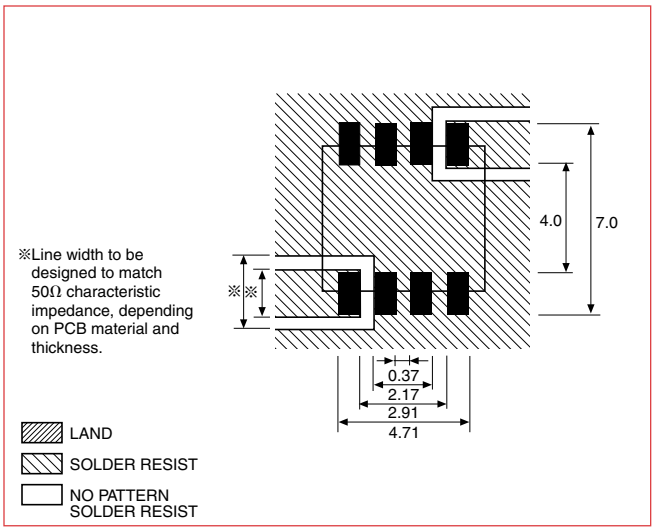
TERMINALS: LDH36 Type

Terminal No.	Function	Terminal No.	Function
①	IN/OUT	⑤	IN/OUT
②	GROUND	⑥	GROUND
③	GROUND	⑦	GROUND
④	GROUND	⑧	GROUND

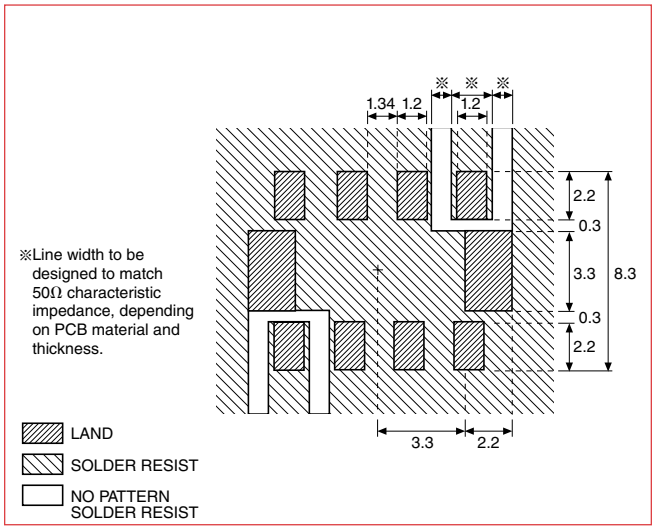
LDH33 TYPE
STANDARD LAND DIMENSIONS: mm



LDH36 TYPE
STANDARD LAND DIMENSIONS: mm



LDH46 TYPE
STANDARD LAND DIMENSIONS: mm



PART NUMBERING

LDH	33	A	101	A
DELAY LINE	**TYPE**	**IMPEDANCE** (A : 50Ω)	**DELAY TIME** (Ex : 100pS →101)	**DELAY TIME TOLERANCE** A : .05nS B : ± .1nS

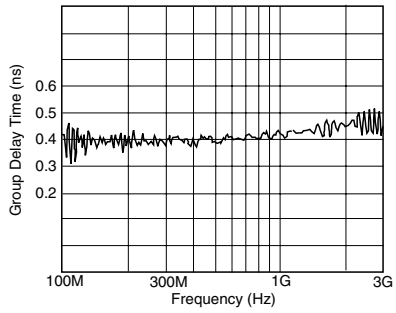
ELECTRICAL CHARACTER & THICKNESS TABLE–LDH33/LDH46

Part Number	Delay Time (ns)	Impedance[1] (Ω)	Thickness (mm) max.	Rising Time (ns) max.	Attenuation Rate % max.)	Distortion % max.)	Insulation Resistance (MΩ) min.	Operating Temperature Range (°C)
LDH33 TYPE								
LDH33A101A	0.1 ± 0.05	50 ± 7	1.1	0.15	10	10	100	–40 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	12	18		
LDH33A202B	2.0 ± 0.1		2.6					
LDH33A252B	2.5 ± 0.1		3.1					
LDH36 TYPE								
LDH36A101A	0.1 ± 0.05	50 ± 5	1.9	0.1	10	10	100	–40 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							
LDH46 TYPE								
LDH46A501A	0.5 ± 0.05	50 ± 5	3.7	0.15	10	10	100	–40 to +85
LDH46A102B	1.0 ± 0.1			0.2				
LDH46A152B	1.5 ± 0.1			0.3				
LDH46A202B	2.0 ± 0.1			0.4				
LDH46A252B	2.5 ± 0.1							
LDH46A302B	3.0 ± 0.1	50 ± 10		0.25 x DT*2				
LDH46A402B	4.0 ± 0.1							
LDH46A502B	5.0 ± 0.1							

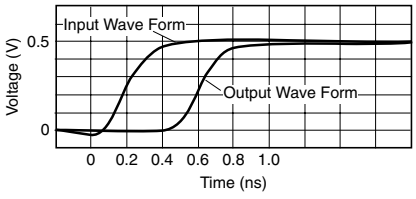
[1]Impedance is measured at 100MHz; [2]DT stands for Delay Time.

TYPICAL RESPONSE CHARACTERISTICS

GROUP DELAY

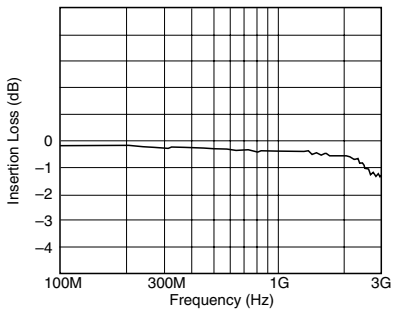


PULSE RESPONSE



Frequency Range: 130MHz to 4GHz
(Smith Chart)
Test sample: LDH36A401A

INSERTION LOSS



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LDH Series

This delay line has been developed by utilizing advanced multilayer technology. It is comprised of a copper line and temperature compensated dielectric NPO (0 ± 60ppm/°C) and includes a metal shield. This results in a very small device that is compatible with high frequency applications and SMD chip processing.

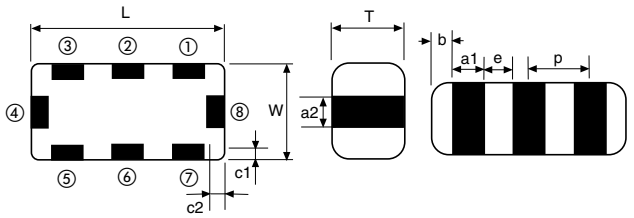
APPLICATIONS

- Communication equipment (optical communication network, microwave communication)
- Measuring instruments
- Broadcasting equipment
- Office equipment
- Computer
- Medical equipment
- High speed data processing equipment

FEATURES

- Multilayer construction results in a small, thin and light package
- Metal shield is built inside chip
- Reflow solderable
- Supplied on tape and reel

LDH20A Type



(Thickness: T is mentioned on character table)

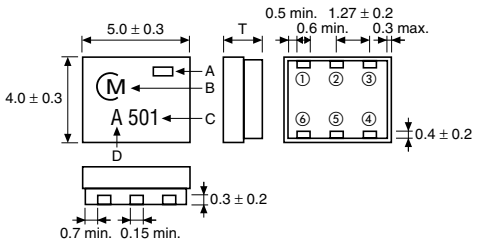
Code	Dimension	Code	Dimension	Code	Dimension
L	3.20 ± 0.2	a2	0.5 ± 0.1	e	0.45 ± 0.15
W	1.60 ± 0.2	b	0.35 ± 0.2	p	1.0 ± 0.1
T	1.1 ± 0.2	c1	0.25 +0.1/–0.15	—	—
a1	0.5 ± 0.1	c2	0.25 +0.1/–0.15	—	—

TERMINALS: LDH20A Type

Terminal No.	Function	Terminal No.	Function
①	NC	⑤	NC
②	GND	⑥	GND
③	NC	⑦	NC
④	IN/OUT	⑧	IN/OUT

Terminal of “NC” should be fixed to the no connected pattern.

LDH33 Type



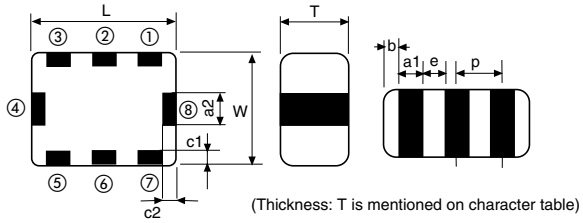
(Thickness: T is mentioned on character table)

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

TERMINALS: LDH33 Type

Terminal No.	Function	Terminal No.	Function
①	IN/OUT	④	GROUND
②	GROUND	⑤	GROUND
③	IN/OUT	⑥	GROUND

LDH25A Type



(Thickness: T is mentioned on character table)

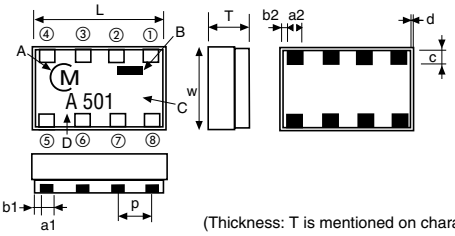
Code	Dimension	Code	Dimension	Code	Dimension
L	3.2 ± 0.2	a2	0.7 ± 0.2	e	0.45 ± 0.15
W	2.5 ± 0.2	b	0.1 min.	p	1.0 ± 0.2
T	1.50 ± 0.15	c1	0.4 ± 0.2	—	—
a1	0.55 ± 0.15	c2	0.4 ± 0.2	—	—

TERMINALS: LDH25A Type

Terminal No.	Function	Terminal No.	Function
①	NC	⑤	NC
②	GND	⑥	GND
③	NC	⑦	NC
④	IN/OUT	⑧	IN/OUT

Terminal of “NC” should be fixed to the no connected pattern.

LDH36 Type



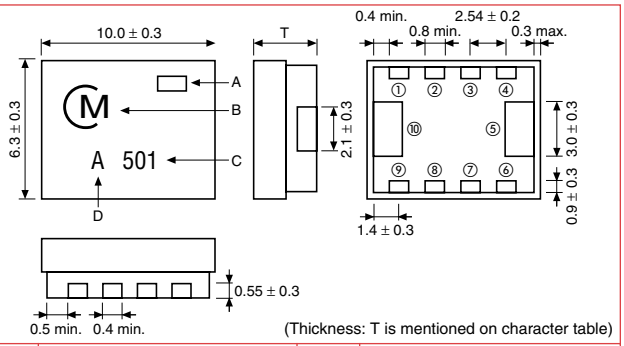
(Thickness: T is mentioned on character table)

Code	Description	Code	Description
A	Manufacturer’s Name Code	C	Delay Time (nominal value)
B	Directional Input Mark	D	Impedance Code
Code	**Dimension**	**Code**	**Description**
L	6.3 ± 0.3	b2	0.5 min.
W	5.0 ± 0.3	c	0.3 ± 0.2
a1	0.5 min	d	0.3 max.
a2	0.8 min.	p	1.27 ± 0.20
b1	0.6 min.		

TERMINALS: LDH36 Type

Terminal No.	Function	Terminal No.	Function
①	IN/OUT	⑤	IN/OUT
②	GROUND	⑥	GROUND
③	GROUND	⑦	GROUND
④	GROUND	⑧	GROUND

LDH46 Type



(Thickness: T is mentioned on character table)

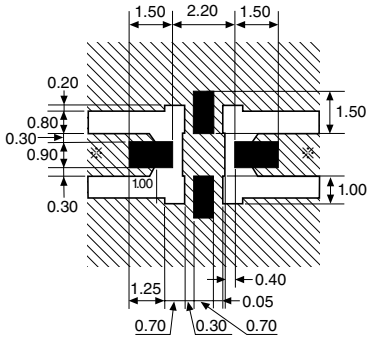
Code	Description	Code	Description
A	Mark of Input Terminal	C	Delay Time (nominal value)
B	Symbol Marking	D	Impedance Code

TERMINALS: LDH46 Type

Terminal No.	Function	Terminal No.	Function
①	IN/OUT	⑤	GROUND
②	GROUND	⑥	IN/OUT
③	GROUND	⑦	GROUND
④	GROUND	⑧	GROUND
⑨	GROUND	⑩	GROUND

LDH25A TYPE
STANDARD LAND DIMENSIONS: mm

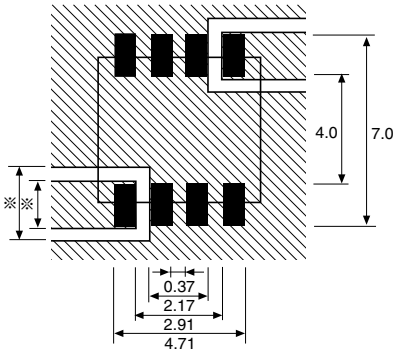
※Line width to be designed to match 50Ω characteristic impedance, depending on PCB material and thickness.



LAND
SOLDER RESIST
NO PATTERN SOLDER RESIST

LDH36 TYPE
STANDARD LAND DIMENSIONS: mm

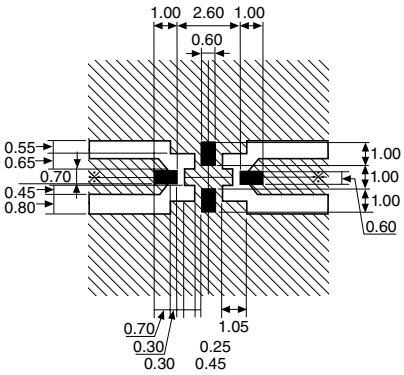
※Line width to be designed to match 50Ω characteristic impedance, depending on PCB material and thickness.



LAND
SOLDER RESIST
NO PATTERN SOLDER RESIST

LDH20 TYPE
STANDARD LAND DIMENSIONS: mm

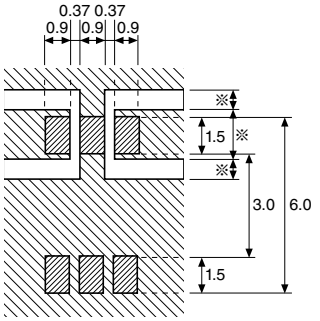
※Line width to be designed to match 50Ω characteristic impedance, depending on PCB material and thickness.



LAND
SOLDER RESIST
NO PATTERN SOLDER RESIST

LDH33 TYPE
STANDARD LAND DIMENSIONS: mm

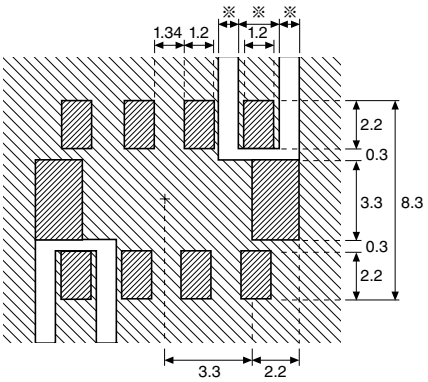
※Line width to be designed to match 50Ω characteristic impedance, depending on PCB material and thickness.



LAND
SOLDER RESIST
NO PATTERN SOLDER RESIST

LDH46 TYPE
STANDARD LAND DIMENSIONS: mm

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



LAND
SOLDER RESIST
NO PATTERN SOLDER RESIST

PART NUMBERING

LDH	33	A	101	A
DELAY LINE	TYPE	IMPEDANCE (A : 50Ω)	DELAY TIME (Ex : 100pS →101)	DELAY TIME TOLERANCE A : .05nS B : ± .1nS

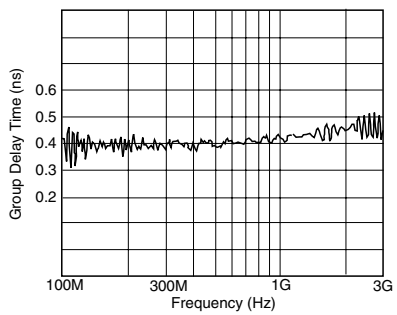
ELECTRICAL CHARACTER & THICKNESS TABLE–LDH33/LDH46

Part Number	Delay Time (ns)	Impedance[1] (Ω)	Thickness (mm) max.	Rising Time (ns) max.	Attenuation Rate % max.)	Distortion % max.)	Insulation Resistance (MΩ) min.	Operating Temperature Range (°C)
LDH20 TYPE								
LDH20A102L	1.0 ± 15%	50 nominal	1.3	0.8	8	8	100	–40 TO +85
LDH20A152L	1.5 ± 15%			1.0				
LDH20A202L	2.0 ± 15%			0.15				
LDH25 TYPE								
LDH25A102L	1.0 ± 15%	50 nominal	1.65	0.8	10	10	100	–40 TO +85
LDH25A152L	1.5 ± 15%			1.0				
LDH25A202L	2.0 ± 15%			1.5				
LDH25A252L	2.5 ± 15%			1.8				
LDH25A302L	3.0 ± 15%			2.0				
LDH33 TYPE								
LDH33A101A	0.1 ± 0.05	50 ± 7	1.1	0.15	10	10	100	–40 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	12	18		
LDH33A202B	2.0 ± 0.1		2.6					
LDH33A252B	2.5 ± 0.1		3.1					
LDH33B302K	3.0 ± 10%	75 nominal	1.5	2	10	10		
LDH33B402K	4.0 ± 10%			2.5				
LDH33B502K	5.0 ± 10%		2					
LDH33B602K	6.0 ± 10%			3				
LDH33B702K	7.0 ± 10%			3.5				
LDH33B802K	8.0 ± 10%							
LDH33B902K	9.0 ± 10%			4				
LDH33B103K	10.0 ± 10%			4.5				
LDH36 TYPE								
LDH36A101A	0.1 ± 0.05	50 ± 5	1.9	0.1	10	10	100	–40 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							
LDH46 TYPE								
LDH46A501A	0.5 ± 0.05	50 ± 5	1.9	0.15	10	10	100	–40 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 x DT[2]				
LDH46A402B	4.0 ± 0.1							
LDH46A502B	5.0 ± 0.1		3.7					
LDH46A602C	6.0 ± 0.2		3.1		15	15		
LDH46A702C	7.0 ± 0.2							
LDH46A802C	8.0 ± 0.2		3.7					
LDH46A902C	9.0 ± 0.2				18			
LDH46A103C	10.0 ± 0.2				20			

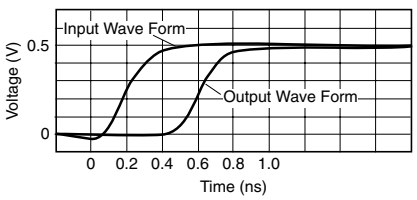
[1]Impedance is measured at 100MHz; [2]DT stands for Delay Time.

TYPICAL RESPONSE CHARACTERISTICS

GROUP DELAY



PULSE RESPONSE



Frequency Range: 130MHz to 4GHz
(Smith Chart)
Test sample: LDH36A401A

INSERTION LOSS