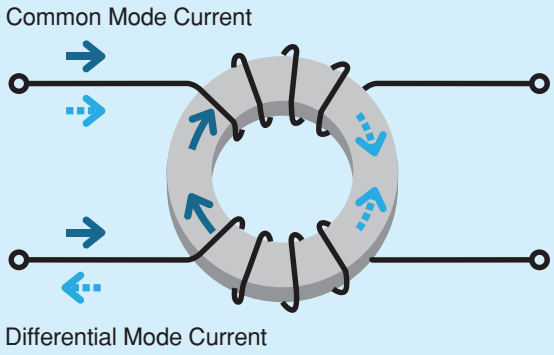
DLM/PLM

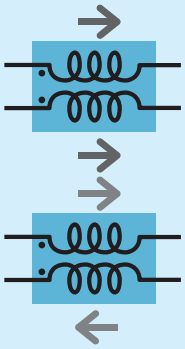
Chip Common Mode Choke Coil
Large Current Common Mode Choke Coil for Automotive Available

C31E.pdf
Jul.27,2012

muRata

DL□ Series Introduction





Magnetic flux by common mode current is added each other and works as an inductor

Magnetic flux by differential mode current is canceled each other and do not works as an inductor

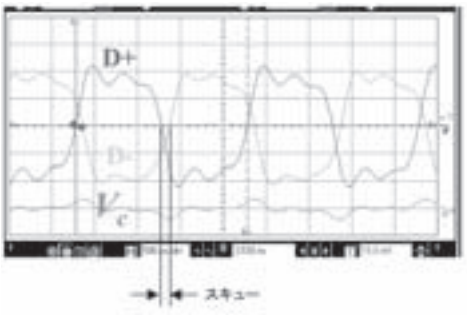
Category	Features, Classification	Structure	Part Number	Comments
High cut-off frequency High Coupling (For high speed differential signal lines)	Ultra high cut-off frequency for high speed differential signal lines	Film type	DLP11SA	· Low profile, small size, suitable for mobile equipments. · Tight terminal pitch enables high density layout. · Ultra high cut-off frequency and its matching to line impedance enables good transmission of high speed signal.
		Wound type	DLW21SN_HQ2	· Ultra high self resonance frequency enables high cut-off frequency. · Its matching to line impedance enables good transmission of high speed signal.
	High cut-off frequency for high speed differential signal lines	Film type	DLP0NS DLP11SN DLP2AD	· Low profile, small size, suitable for mobile equipments. · Tight terminal pitch enables high density layout. · High cut-off frequency enables good transmission of high speed signal.
		Wound type	DLW21SN_SQ2 DLW31S DLW21H	· Ultra high self resonance frequency enables high cut-off frequency. · DLW21H is designed as low profile.
	for general differential signal lines	Film type	DLP31S DLP31D	· Low profile,small size, suitable for mobile equipments. · Tight terminal pitch enables high density layout.
Large current High coupling (For power lines)		Wound type	DLW5AH DLW5BS DLW5AT DLW5BT	· Large current (6A max.), suitable for input connector from an AC adaptor. · DLW5AT/DLW5BT is designed as low profile.
Relative high differential mode impedance Low coupling (For audio lines)		Multilayer type	DLM11G	· Modified its differential mode impedance higher than other common mode choke coils, this feature makes possible to suppress both common mode and differential mode noise. · Ideal to keep low distortion audio signal.
Large current Automotive Available (For power lines)	Available up to 10A	Winding type Cased structure	PLT10HH	· Large current, high reliability, suitable for mortors in automobile.

Skew Improve Effect of Common Mode Choke Coil

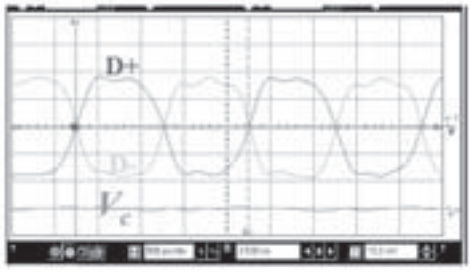
Example of Skew Improvement by Common Mode Choke Coil
(Test using pulse generator waveform)

Waveform is equivalent to 1000Mbps signal

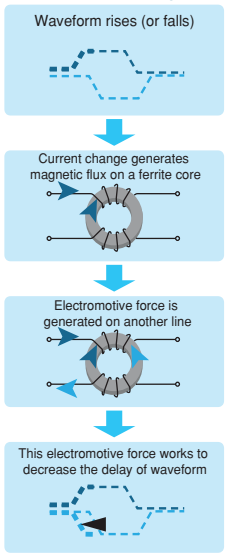
Waveform with intentionally made skew (skew: 100ps)



Skew is improved by common mode choke coil

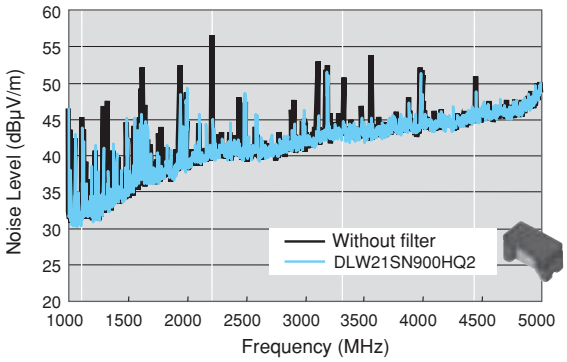


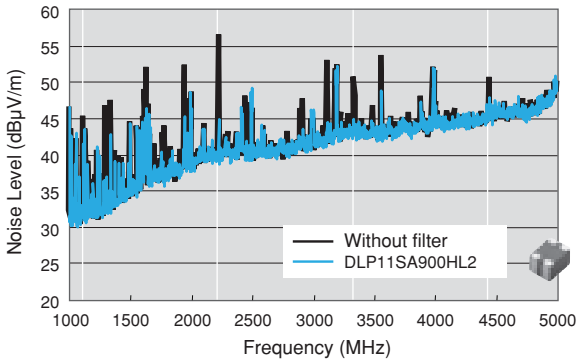
Mechanism of Skew Improvement



Noise Suppression of Common Mode Choke Coil in HDMI Line

Device under test / Transmitter : game machine Receiver : projector
Cable / HDMI categoly2 3m cable
Test resolution / 1080p Deep color 12bit (Data 1.11GHz) DVD play mode

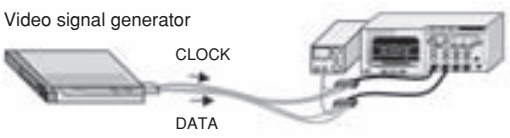


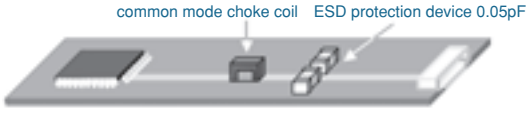


Test Example of HDMI1.3 Waveform Transmission

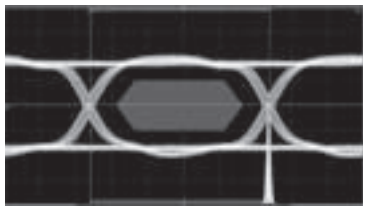
~Using ESD protection device
LXES15AAA1-100 (0.05pF)~

Signal frequency : 1.11GHz (Deep color 12bit)

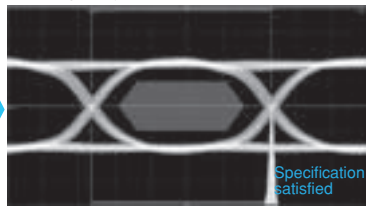




ESD protection device only



Film Type DLP11SN900HL2
(Cut-off frequency is most low in the table below)



	Wound Type DLW21SN900HQ2	Film Type DLP11SA900HL2	Film Type Array DLP2ADN900HL4
Cut-off Frequency	Over 10GHz	Around 6GHz	Around 4GHz
Judge	Specification satisfied	Specification satisfied	Specification satisfied
Transition Time	Rise time: 83.4ps Fall time: 77.4ps	Rise time: 90.4ps Fall time: 85.5ps	Rise time: 100ps Fall time: 97.4ps

Each of common mode choke coil can keep waveform, satisfy the specification.

Part Numbering

(Part Number)

DL	W	21	S	N	371	S	Q	2	L
❶	❷	❸	❹	❺	❻	❼	❽	❾	❿

❶Product ID

Product ID	
DL	Chip Common Mode Choke Coils

❷Structure

Code	Structure
W	Wire Wound Type
M	Multilayer Type
P	Film Type

❸Dimensions (L×W)

Code	Dimensions (L×W)	EIA
0Q	0.65×0.5mm	025020
0N	0.85×0.65mm	03025
11	1.25×1.0mm	0504
1N	1.5×0.65mm	05025
21	2.0×1.2mm	0805
31	3.2×1.6mm	1206
2A	2.0×1.0mm	0804
2H	2.5×2.0mm	1008
5A	5.0×3.6mm	2014
5B	5.0×5.0mm	2020

❹Features (1)

Code	Type
S	Magnetically Shielded One Circuit Type
D	Magnetically Shielded Two Circuit Type
H	Open Magnetic One Circuit Type
G	Magnetically Monolithic Type (sectional winding)
R/T	One Circuit Low Profile Type

❺Category

Code	Category
A	Expressed by a letter.
B	
C	
M	
N	
R	

❻Impedance

Typical impedance at 100MHz is expressed by three figures. The unit is in ohm (Ω). The first and second figures are significant digits, and the third figure expresses the number of zeros which follow the two figures.

❼Circuit

Code	Circuit
S	Expressed by a letter.
M	
H	
U	

❽Features (2)

Code	Features
D	Expressed by a letter.
K	
L	
Q	
Z	

❾Number of Signal Lines

Code	Number of Signal Lines
2	Two Lines
3	Three Lines
4	Four Lines

❿Packaging

Code	Packaging	Series
K	Embossed Taping (ø330mm Reel)	**DLW5AH/DLW5BS/DLW5BT**
L	Embossed Taping (ø180mm Reel)	All Series
B	Bulk	All Series

Part Numbering

(Part Number)

PL	T	10H	H	102	6R0	P	N	B
❶	❷	❸	❹	❺	❻	❼	❽	❾

❶Product ID

Product ID	
PL	Common Mode Choke Coils

❷Type

Code	Type
T	DC Type

❸Applications

Code	Applications
10H	for DC Line High-frequency Type

❹Features

Code	Features
H	for Automotive

❺Impedance

Expressed by three figures. The unit is ohm (Ω). The first and second figures are significant digits, and the third figure expresses the number of zeros which follow the two figures.

❻Rated Current

Expressed by three figures. The unit is ampere (A). The first and second figures are significant digits, and the third figure expresses the number of zeros which follow the two figures.
A decimal point is expressed by the capital letter "R". In this case, all figures are significant digits.

❼Winding Mode

Code	Winding Mode
P	Aligned Winding Type

❽Lead Dimensions

Code	Lead Dimensions
N	No Lead Terminal (SMD)

❾Packaging

Code	Packaging	Series
B	Bulk	PLT10H
L	Embossed Taping (ø178mm/ø180mm Reel)	PLT10H
K	Embossed Taping (ø330mm Reel)	PLT10H

Type	Size Code (Inch)	Thickness (mm)	Part Number	Common Mode Impedance (at 100MHz/20°C)	Rated Current	New	Kit	≧1A ≧3A	HD UD	Zmatch	Flow	ReFlow
Multilayer Type for Audio Lines	0504 p164	0.5	DLM11GN601SD2	600ohm±25%	100mA							ReFlow
Film Type for Differential Signal Lines	025020 p165	0.3	DLP0QSN600HL2	60ohm±25%	50mA	New	Kit			Zmatch		ReFlow
	03025 p166	0.45	DLP0NSN670HL2	67ohm±20%	110mA		Kit		HD	Zmatch		ReFlow
		0.45	DLP0NSN900HL2	90ohm±20%	100mA		Kit		HD	Zmatch		ReFlow
		0.45	DLP0NSN121HL2	120ohm±20%	90mA		Kit		HD	Zmatch		ReFlow
		0.45	DLP0NSA150HL2	15ohm±5ohm	100mA		Kit		UD	Zmatch		ReFlow
		0.45	DLP0NSC280HL2	28ohm±20%	100mA		Kit		HD	Zmatch		ReFlow
	0504 p168	0.82	DLP11SN670SL2	67ohm±20%	180mA		Kit		HD			ReFlow
		0.82	DLP11SN121SL2	120ohm±20%	140mA		Kit		HD			ReFlow
		0.82	DLP11SN161SL2	160ohm±20%	120mA		Kit		HD			ReFlow
		0.82	DLP11SN900HL2	90ohm±20%	150mA		Kit		HD	Zmatch		ReFlow
		0.82	DLP11SN201HL2	200ohm±20%	110mA		Kit		HD	Zmatch		ReFlow
		0.82	DLP11SN241HL2	240ohm±20%	100mA		Kit		HD	Zmatch		ReFlow
		0.82	DLP11SN281HL2	280ohm±20%	90mA		Kit		HD	Zmatch		ReFlow
		0.82	DLP11SN331HL2	330ohm±20%	80mA		Kit		HD	Zmatch		ReFlow
		0.82	DLP11SA350HL2	35ohm±20%	170mA		Kit		UD	Zmatch		ReFlow
		0.82	DLP11SA670HL2	67ohm±20%	150mA		Kit		UD	Zmatch		ReFlow
		0.82	DLP11SA900HL2	90ohm±20%	150mA		Kit		UD	Zmatch		ReFlow
	p169	0.5	DLP11RB150UL2	15ohm±5ohm	100mA	New	Kit			Zmatch		ReFlow
		0.5	DLP11RB400UL2	40ohm±10ohm	100mA	New	Kit			Zmatch		ReFlow
		0.5	DLP11RN450UL2	45ohm±25%	100mA	New	Kit			Zmatch		ReFlow
	p170	0.3	DLP11TB800UL2	80ohm±25%	100mA		Kit		UD	Zmatch		ReFlow
	1206 p171	1.15	DLP31SN121ML2	120ohm±20%	100mA				HD			ReFlow
		1.15	DLP31SN221ML2	220ohm±20%	100mA				HD			ReFlow
		1.15	DLP31SN551ML2	550ohm±20%	100mA				HD			ReFlow
Film Array Type for Differential Signal Lines	05025 p172	0.45	DLP1NDN350HL4	35ohm±20%	100mA		Kit		HD	Zmatch		ReFlow
		0.45	DLP1NDN670HL4	67ohm±20%	80mA		Kit		HD	Zmatch		ReFlow
		0.45	DLP1NDN900HL4	90ohm±20%	60mA		Kit		HD	Zmatch		ReFlow
	0804 p173	0.82	DLP2ADA350HL4	35ohm±20%	150mA		Kit		UD	Zmatch		ReFlow
		0.82	DLP2ADA670HL4	67ohm±20%	130mA		Kit		UD	Zmatch		ReFlow
		0.82	DLP2ADA900HL4	90ohm±20%	120mA		Kit		UD	Zmatch		ReFlow
		0.82	DLP2ADN670HL4	67ohm±20%	140mA		Kit		HD	Zmatch		ReFlow
		0.82	DLP2ADN900HL4	90ohm±20%	130mA		Kit		HD	Zmatch		ReFlow
		0.82	DLP2ADN121HL4	120ohm±20%	120mA		Kit		HD	Zmatch		ReFlow
		0.82	DLP2ADN161HL4	160ohm±20%	100mA		Kit		HD	Zmatch		ReFlow
		0.82	DLP2ADN201HL4	200ohm±20%	90mA		Kit		HD	Zmatch		ReFlow
		0.82	DLP2ADN241HL4	240ohm±20%	80mA		Kit		HD	Zmatch		ReFlow
		0.82	DLP2ADN281HL4	280ohm±20%	80mA		Kit		HD	Zmatch		ReFlow
	1206 p175	1.15	DLP31DN900ML4	90ohm±20%	160mA				HD			ReFlow
		1.15	DLP31DN131ML4	130ohm±20%	120mA				HD			ReFlow
		1.15	DLP31DN201ML4	200ohm±20%	100mA				HD			ReFlow
		1.15	DLP31DN321ML4	320ohm±20%	80mA				HD			ReFlow
		1.15	DLP31DN441ML4	440ohm±20%	70mA				HD			ReFlow

Continued on the following page.

⚠Note • Please read rating and ⚠CAUTION (for storage, operating, rating, soldering, mounting and handling) in this catalog to prevent smoking and/or burning, etc.
• This catalog has only typical specifications. Therefore, please approve our product specifications or transact the approval sheet for product specifications before ordering.

Type	Size Code (Inch)	Thickness (mm)	Part Number	Common Mode Impedance (at 100MHz/20°C)	Rated Current	New	Kit	≧1A ≧3A	HD UD	Zmatch	Flow	ReFlow
Wire Wound Type for Differential Signal Lines	p176 0805	1.2	DLW21SN501SK2	500ohm±25%	250mA	New	Kit					ReFlow
		1.2	DLW21SN670SQ2	67ohm±25%	400mA		Kit		HD			ReFlow
		1.2	DLW21SN900SQ2	90ohm±25%	330mA		Kit		HD			ReFlow
		1.2	DLW21SN121SQ2	120ohm±25%	370mA		Kit		HD			ReFlow
		1.2	DLW21SN181SQ2	180ohm±25%	330mA		Kit		HD			ReFlow
		1.2	DLW21SN261SQ2	260ohm±25%	300mA		Kit		HD			ReFlow
		1.2	DLW21SN371SQ2	370ohm±25%	280mA		Kit		HD			ReFlow
		1.2	DLW21SN670HQ2	67ohm±25%	320mA		Kit		UD	Zmatch		ReFlow
		1.2	DLW21SN900HQ2	90ohm±25%	280mA		Kit		UD	Zmatch		ReFlow
		1.2	DLW21SN121HQ2	120ohm±25%	280mA		Kit		UD	Zmatch		ReFlow
		1.2	DLW21SR670HQ2	67ohm±25%	400mA		Kit		UD	Zmatch		ReFlow
	p178	0.9	DLW21HN670SQ2	67ohm±25%	330mA		Kit		HD			ReFlow
		0.9	DLW21HN900SQ2	90ohm±25%	330mA		Kit		HD			ReFlow
		0.9	DLW21HN121SQ2	120ohm±25%	280mA		Kit		HD			ReFlow
		0.9	DLW21HN181SQ2	180ohm±25%	250mA		Kit		HD			ReFlow
	p179 1206	1.9	DLW31SN900SQ2	90ohm±25%	370mA				HD			ReFlow
		1.9	DLW31SN161SQ2	160ohm±25%	340mA				HD			ReFlow
		1.9	DLW31SN261SQ2	260ohm±25%	310mA				HD			ReFlow
		1.9	DLW31SN601SQ2	600ohm±25%	260mA				HD			ReFlow
		1.9	DLW31SN102SQ2	1000ohm±25%	230mA				HD			ReFlow
		1.9	DLW31SN222SQ2	2200ohm±25%	200mA				HD			ReFlow
Wire Wound Type for Power Lines and Signal Lines	p160 2014	4.3	DLW5AHN402SQ2	4000ohm(Typ.)	200mA		Kit					ReFlow
	p162	2.2	DLW5ATN111SQ2	110ohm(Typ.)	5000mA	New	Kit	≧3A				ReFlow
		2.2	DLW5ATN401SQ2	400ohm(Typ.)	2000mA	New	Kit	≧1A				ReFlow
		2.2	DLW5ATN501SQ2	500ohm(Typ.)	1500mA	New	Kit	≧1A				ReFlow
		2.2	DLW5ATN851SQ2	850ohm(Typ.)	1500mA	New	Kit	≧1A				ReFlow
		2.2	DLW5ATN272SQ2	2700ohm(Typ.)	1000mA	New	Kit	≧1A				ReFlow
	p160 2020 p162	4.5	DLW5BSM191SQ2	190ohm(Typ.)	5000mA		Kit	≧3A				ReFlow
		4.5	DLW5BSM351SQ2	350ohm(Typ.)	2000mA		Kit	≧1A				ReFlow
		4.5	DLW5BSM102SQ2	1000ohm(Typ.)	1500mA		Kit	≧1A				ReFlow
		4.5	DLW5BSM152SQ2	1500ohm(Typ.)	1000mA		Kit	≧1A				ReFlow
		4.5	DLW5BSM302SQ2	3000ohm(Typ.)	500mA		Kit					ReFlow
		2.35	DLW5BTM101SQ2	100ohm(Typ.)	6000mA		Kit	≧3A				ReFlow
		2.35	DLW5BTM251SQ2	250ohm(Typ.)	5000mA		Kit	≧3A				ReFlow
		2.35	DLW5BTM501SQ2	500ohm(Typ.)	4000mA		Kit	≧3A				ReFlow
		2.35	DLW5BTM102SQ2	1000ohm(Typ.)	2000mA		Kit	≧1A				ReFlow
		2.35	DLW5BTM142SQ2	1400ohm(Typ.)	1500mA		Kit	≧1A				ReFlow

PL□ Large Current Common Mode Choke Coil for Automotive Available Series Line Up

Type	Size	Thickness (mm)	Part Number	Common Mode Impedance (at 10MHz/20°C)	Rated Current	New	Kit	≧3A ≧10A	HD UD	Zmatch	Flow	ReFlow
Large Current Common Mode Choke Coil for Automotive Available	p180 12.9x6.6 (mm)	9.4	PLT10HH401100PN	400ohm	10A		Kit	≧10A				ReFlow
		9.4	PLT10HH501100PN	500ohm	10A		Kit	≧10A				ReFlow
		9.4	PLT10HH9016R0PN	900ohm	6A		Kit	≧3A				ReFlow
		9.4	PLT10HH1026R0PN	1000ohm	6A		Kit	≧3A				ReFlow

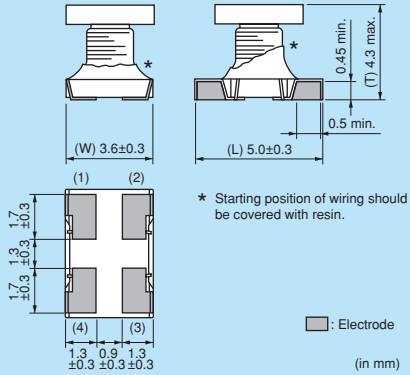
DLW5AH/DLW5BS Series (2014/2020 Size)

Hi Power Reflow OK

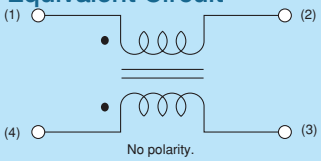
5A max, common mode choke coil for power lines.

DLW5AH

■ Dimensions



■ Equivalent Circuit

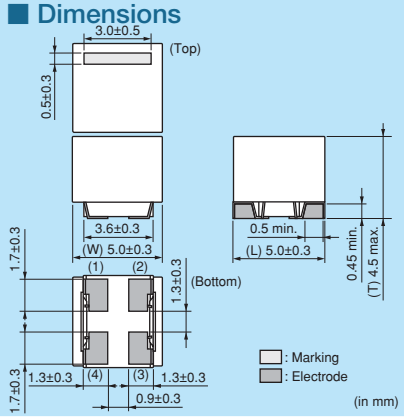


■ Packaging

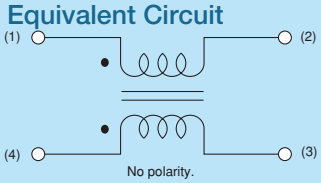
Code	Packaging	Minimum Quantity
L	180mm Reel Embossed Tape	400
K	330mm Reel Embossed Tape	1500
B	Bulk(Bag)	100

DLW5BS

■ Dimensions



■ Equivalent Circuit



■ Packaging

Code	Packaging	Minimum Quantity
L	180mm Reel Embossed Tape	400
K	330mm Reel Embossed Tape	1500
B	Bulk(Bag)	100

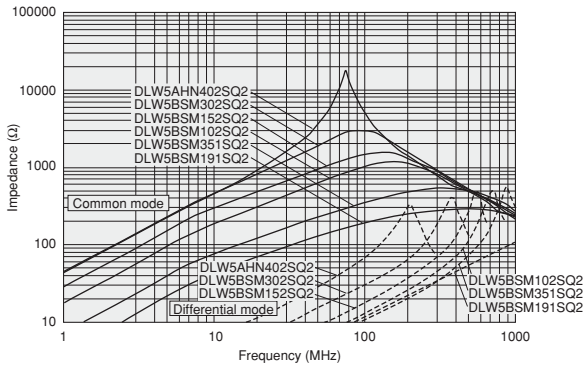
Refer to pages from p.183 to p.186 for mounting information.

■ Rated Value (□: packaging code)

Part Number	Common Mode Impedance (at 100MHz/20°C)	Rated Current	Rated Voltage	Insulation Resistance (min.)	Withstand Voltage	DC Resistance	
DLW5AHN402SQ2□	4000ohm (Typ.)	200mA	50Vdc	10M ohm	125Vdc	3.0ohm max.	Kit
DLW5BSM191SQ2□	190ohm (Typ.)	5000mA	50Vdc	10M ohm	125Vdc	0.02ohm max.	Kit ≧3A
DLW5BSM351SQ2□	350ohm (Typ.)	2000mA	50Vdc	10M ohm	125Vdc	0.04ohm max.	Kit ≧1A
DLW5BSM102SQ2□	1000ohm (Typ.)	1500mA	50Vdc	10M ohm	125Vdc	0.06ohm max.	Kit ≧1A
DLW5BSM152SQ2□	1500ohm (Typ.)	1000mA	50Vdc	10M ohm	125Vdc	0.1ohm max.	Kit ≧1A
DLW5BSM302SQ2□	3000ohm (Typ.)	500mA	50Vdc	10M ohm	125Vdc	0.3ohm max.	Kit

Operating Temperature Range: -25°C to +85°C (DLW5AH), -40°C to +85°C (DLW5BS) Number of Circuit: 1

■ Impedance-Frequency Characteristics (Main Items)



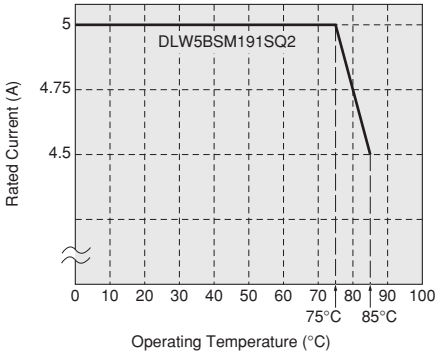
Continued on the following page.

⚠Note • Please read rating and ⚠CAUTION (for storage, operating, rating, soldering, mounting and handling) in this catalog to prevent smoking and/or burning, etc.
• This catalog has only typical specifications. Therefore, please approve our product specifications or transact the approval sheet for product specifications before ordering.

■ Notice (Rating)

In operating temperature exceeding +75°C, derating of current is necessary for DLW5BSM191SQ2 series.
Please apply the derating curve shown in chart according to the operating temperature.

Derating of Rated Current

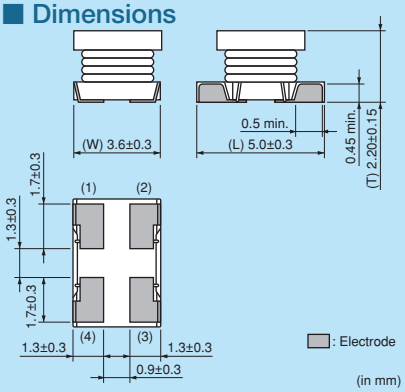


DLW5AT/DLW5BT Series (2014/2020 Size)

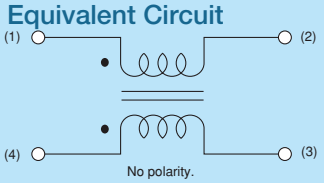
Hi Power Reflow OK

Low profile wire-wound common choke coil for power lines.

■ Dimensions



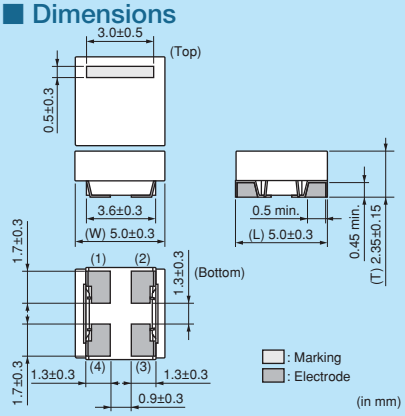
■ Equivalent Circuit



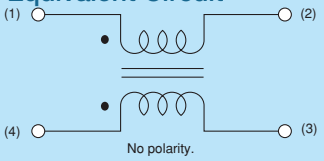
■ Packaging

Code	Packaging	Minimum Quantity
L	180mm Reel Embossed Tape	700
K	330mm Reel Embossed Tape	2500
B	Bulk(Bag)	100

■ Dimensions



■ Equivalent Circuit



■ Packaging

Code	Packaging	Minimum Quantity
L	180mm Reel Embossed Tape	700
K	330mm Reel Embossed Tape	2500
B	Bulk(Bag)	100

Refer to pages from p.183 to p.186 for mounting information.

■ Rated Value (□: packaging code)

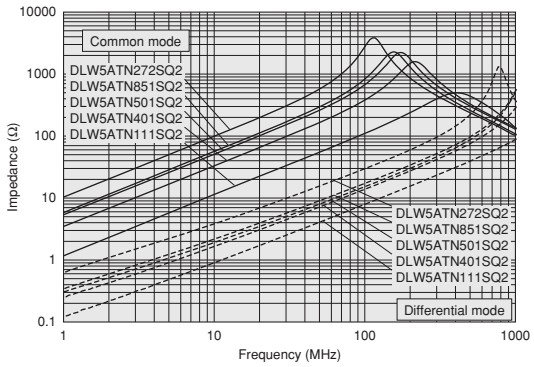
Part Number	Common Mode Impedance (at 100MHz/20°C)	Rated Current	Rated Voltage	Insulation Resistance (min.)	Withstand Voltage	DC Resistance	
DLW5ATN111SQ2□	110ohm (Typ.)	5000mA	50Vdc	10M ohm	125Vdc	0.014ohm±40%	New Kit ≧3A
DLW5ATN401SQ2□	400ohm (Typ.)	2000mA	50Vdc	10M ohm	125Vdc	0.024ohm±40%	New Kit ≧1A
DLW5ATN501SQ2□	500ohm (Typ.)	1500mA	50Vdc	10M ohm	125Vdc	0.040ohm±40%	New Kit ≧1A
DLW5ATN851SQ2□	850ohm (Typ.)	1500mA	50Vdc	10M ohm	125Vdc	0.052ohm±40%	New Kit ≧1A
DLW5ATN272SQ2□	2700ohm (Typ.)	1000mA	50Vdc	10M ohm	125Vdc	0.080ohm±40%	New Kit ≧1A
DLW5BTM101SQ2□	100ohm (Typ.)	6000mA	50Vdc	10M ohm	125Vdc	0.009ohm±40%	Kit ≧3A
DLW5BTM251SQ2□	250ohm (Typ.)	5000mA	50Vdc	10M ohm	125Vdc	0.014ohm±40%	Kit ≧3A
DLW5BTM501SQ2□	500ohm (Typ.)	4000mA	50Vdc	10M ohm	125Vdc	0.019ohm±40%	Kit ≧3A
DLW5BTM102SQ2□	1000ohm (Typ.)	2000mA	50Vdc	10M ohm	125Vdc	0.024ohm±40%	Kit ≧1A
DLW5BTM142SQ2□	1400ohm (Typ.)	1500mA	50Vdc	10M ohm	125Vdc	0.040ohm±40%	Kit ≧1A

Operating Temperature Range: -40°C to +85°C Number of Circuit: 1

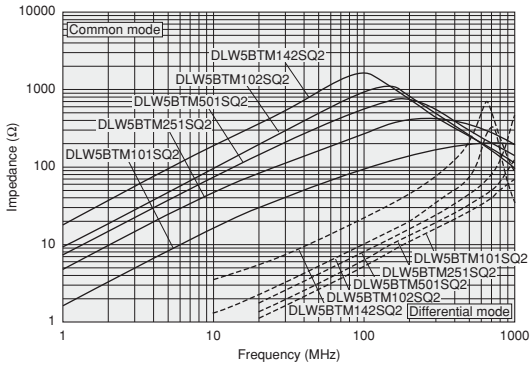
Continued on the following page.

■ Impedance-Frequency Characteristics (Main Items)

DLW5AT Series



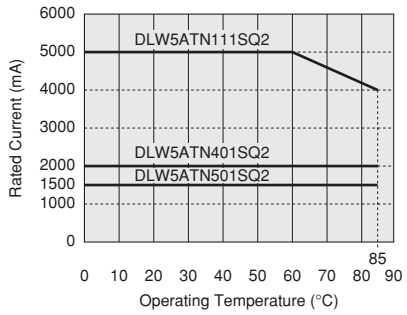
DLW5BT Series

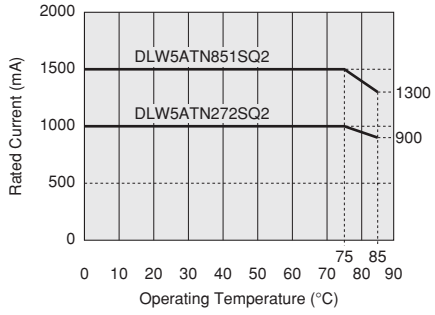


■ Notice (Rating)

In operating temperature exceeding +60°C, derating of current is necessary for DLW5AT series. Please apply the derating curve shown in chart according to the operating temperature.

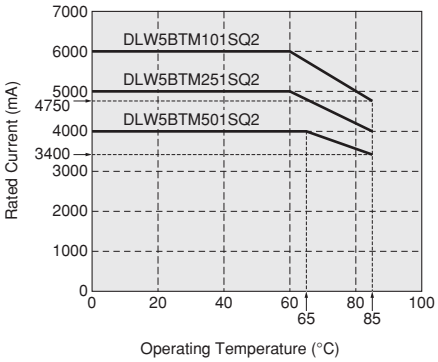
Derating of Rated Current





In operating temperature exceeding +60°C, derating of current is necessary for the following part name of DLW5BT series. Please apply the derating curve shown in chart according to the operating temperature.

Derating of Rated Current

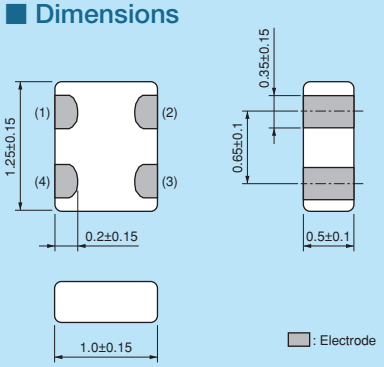


DLM11G Series (0504 Size)

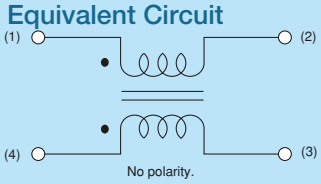
Reflow OK

Audio line common choke also effective to differential mode.

Dimensions



Equivalent Circuit



Packaging

Code	Packaging	Minimum Quantity
D	180mm Reel Paper Tape	10000
B	Bulk(Bag)	1000

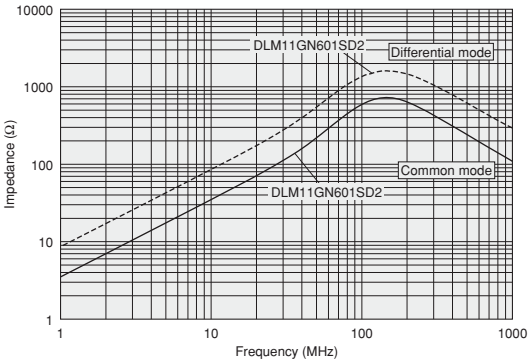
Refer to pages from p.183 to p.186 for mounting information.

Rated Value (□: packaging code)

Part Number	Common Mode Impedance (at 100MHz/20°C)	Rated Current	Rated Voltage	Insulation Resistance (min.)	Withstand Voltage	DC Resistance	Operating Temperature Range
DLM11GN601SD2□	600ohm ±25%	100mA	5Vdc	100M ohm	25Vdc	0.8ohm max.	-40°C to +85°C

Number of Circuit: 1

Impedance-Frequency Characteristics (Main Items)

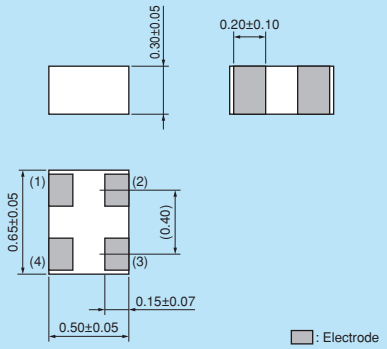


DLP0QS Series (025020 Size)

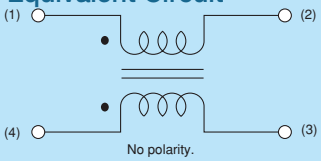
Reflow OK

025020 size, very small chip common mode choke coil, Cut-off frequency 3GHz max.

■ Dimensions



■ Equivalent Circuit



■ Packaging

Code	Packaging	Minimum Quantity
D	180mm Reel Paper Tape	15000
B	Bulk(Bag)	500

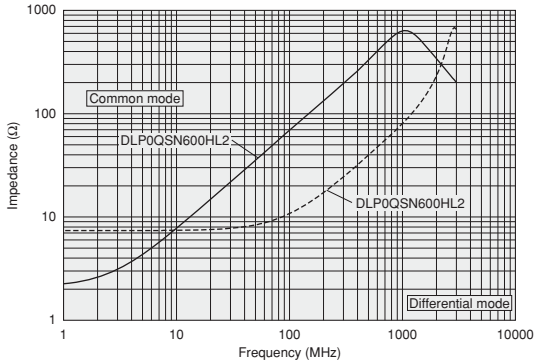
Refer to pages from p.183 to p.186 for mounting information.

■ Rated Value (□: packaging code)

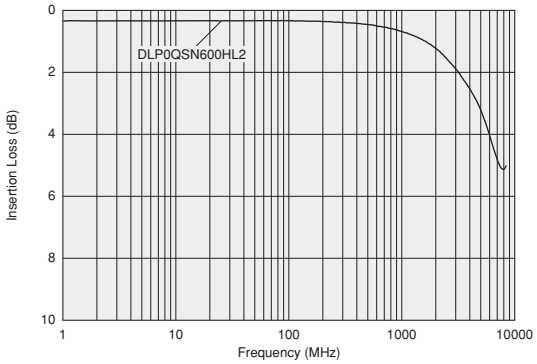
Part Number	Common Mode Impedance (at 100MHz/20°C)	Rated Current	Rated Voltage	Insulation Resistance (min.)	Withstand Voltage	DC Resistance	
DLP0QSN600HL2□	60ohm ±25%	50mA	5Vdc	100M ohm	12.5Vdc	3.8ohm±25%	New Kit HD Imp Match

Operating Temperature Range: -40°C to +85°C Number of Circuit: 1 HD: for high speed differential signal lines UD: for ultra high speed differential signal lines

■ Impedance-Frequency Characteristics (Main Items)



■ Differential Mode Transmission Characteristics (Typ.)

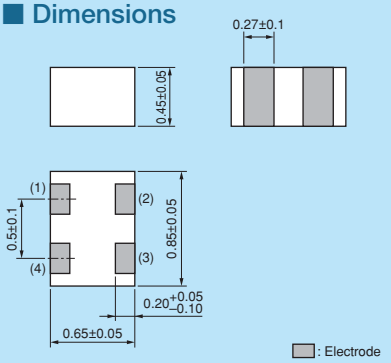


DLP0NS Series (03025 Size)

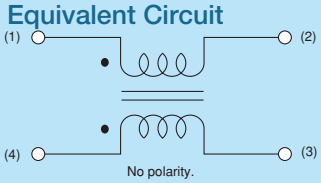
Reflow OK

03025 size, very small chip common mode choke coil, Cut-off frequency 8GHz max. Some of them are ready for mipi or DisplayPort.

Dimensions



Equivalent Circuit



Packaging

Code	Packaging	Minimum Quantity
L	180mm Reel Embossed Tape	10000
B	Bulk(Bag)	500

Refer to pages from p.183 to p.186 for mounting information.

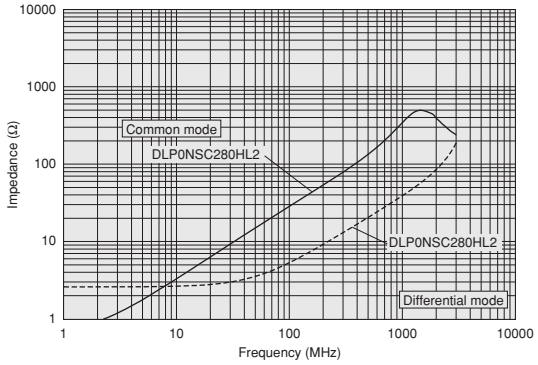
Rated Value (□: packaging code)

Part Number	Common Mode Impedance (at 100MHz/20°C)	Rated Current	Rated Voltage	Insulation Resistance (min.)	Withstand Voltage	DC Resistance	
DLP0NSC280HL2□	28ohm ±20%	100mA	5Vdc	100M ohm	12.5Vdc	1.3ohm±25%	Kit HD Imp Match
DLP0NSN670HL2□	67ohm ±20%	110mA	5Vdc	100M ohm	12.5Vdc	2.4ohm±25%	Kit HD Imp Match
DLP0NSN900HL2□	90ohm ±20%	100mA	5Vdc	100M ohm	12.5Vdc	3.0ohm±25%	Kit HD Imp Match
DLP0NSN121HL2□	120ohm ±20%	90mA	5Vdc	100M ohm	12.5Vdc	3.8ohm±25%	Kit HD Imp Match
DLP0NSA150HL2□	15ohm ±5ohm	100mA	5Vdc	100M ohm	12.5Vdc	0.95ohm±25%	Kit UD Imp Match

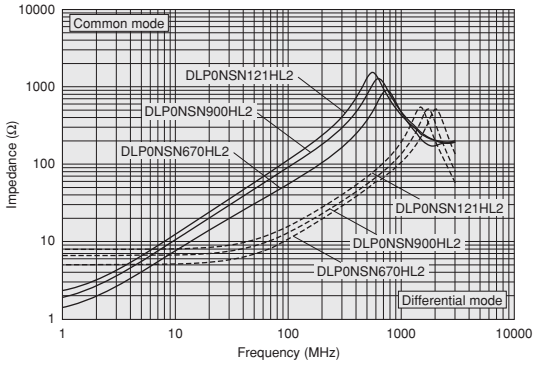
Operating Temperature Range: -40°C to +85°C Number of Circuit: 1 HD: for high speed differential signal lines UD: for ultra high speed differential signal lines

Impedance-Frequency Characteristics (Main Items)

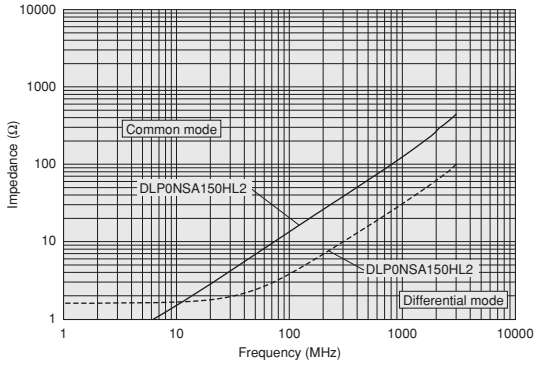
DLP0NSC280HL2



DLP0NSN 670/900/121 HL2



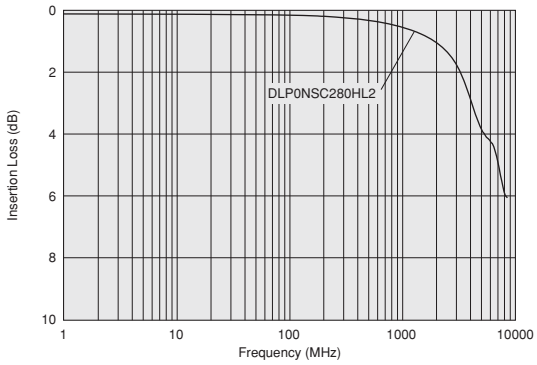
DLP0NSA150HL2



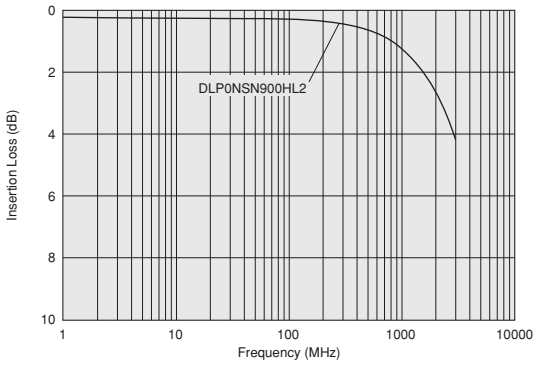
Continued on the following page.

■ Differential Mode Transmission Characteristics (Typ.)

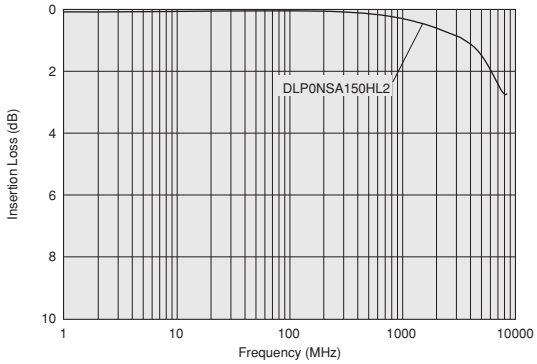
DLP0NSC280HL2



DLP0NSN900HL2



DLP0NSA150HL2

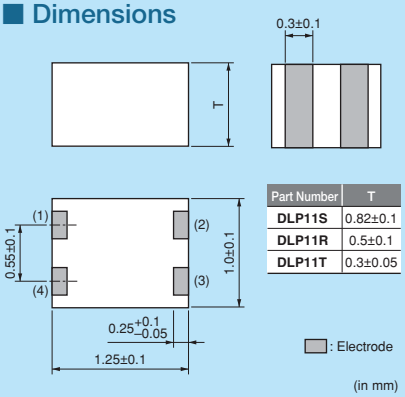


DLP11S/DLP11R/DLP11T Series (0504 Size)

Reflow OK

6GHz cut-off frequency (for HDMI/USB 3.0) is available.

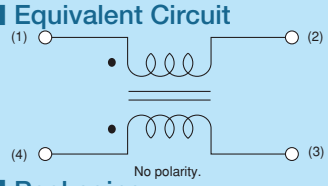
■ Dimensions



Part Number	T
DLP11S	0.82±0.1
DLP11R	0.5±0.1
DLP11T	0.3±0.05

(in mm)

■ Equivalent Circuit



No polarity.

■ Packaging

Code	Packaging	Minimum Quantity
L	180mm Reel Embossed Tape	3000 (DLP11S)
		4000 (DLP11RN/RB)
		5000 (DLP11T)
B	Bulk(Bag)	500

Refer to pages from p.183 to p.186 for mounting information.

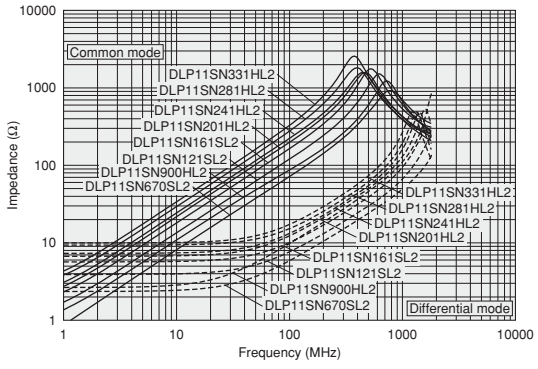
■ Rated Value (□: packaging code)

Part Number	Common Mode Impedance (at 100MHz/20°C)	Rated Current	Rated Voltage	Insulation Resistance (min.)	Withstand Voltage	DC Resistance	
DLP11SN670SL2□	67ohm ±20%	180mA	5Vdc	100M ohm	12.5Vdc	1.3ohm±25%	Kit HD
DLP11SN121SL2□	120ohm ±20%	140mA	5Vdc	100M ohm	12.5Vdc	2.0ohm±25%	Kit HD
DLP11SN161SL2□	160ohm ±20%	120mA	5Vdc	100M ohm	12.5Vdc	2.7ohm±25%	Kit HD
DLP11SN900HL2□	90ohm ±20%	150mA	5Vdc	100M ohm	12.5Vdc	1.5ohm±25%	Kit HD Imp Match
DLP11SN201HL2□	200ohm ±20%	110mA	5Vdc	100M ohm	12.5Vdc	3.1ohm±25%	Kit HD Imp Match
DLP11SN241HL2□	240ohm ±20%	100mA	5Vdc	100M ohm	12.5Vdc	3.5ohm±25%	Kit HD Imp Match
DLP11SN281HL2□	280ohm ±20%	90mA	5Vdc	100M ohm	12.5Vdc	4.2ohm±25%	Kit HD Imp Match
DLP11SN331HL2□	330ohm ±20%	80mA	5Vdc	100M ohm	12.5Vdc	4.9ohm±25%	Kit HD Imp Match
DLP11SA350HL2□	35ohm ±20%	170mA	5Vdc	100M ohm	12.5Vdc	0.9ohm±25%	Kit UD Imp Match
DLP11SA670HL2□	67ohm ±20%	150mA	5Vdc	100M ohm	12.5Vdc	1.2ohm±25%	Kit UD Imp Match
DLP11SA900HL2□	90ohm ±20%	150mA	5Vdc	100M ohm	12.5Vdc	1.4ohm±25%	Kit UD Imp Match

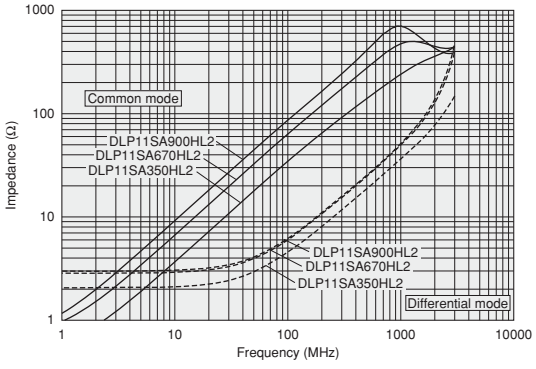
Operating Temperature Range: -40°C to +85°C Number of Circuit: 1 HD: for high speed differential signal lines UD: for ultra high speed differential signal lines

■ Impedance-Frequency Characteristics (Main Items)

DLP11SN Series



DLP11SA Series

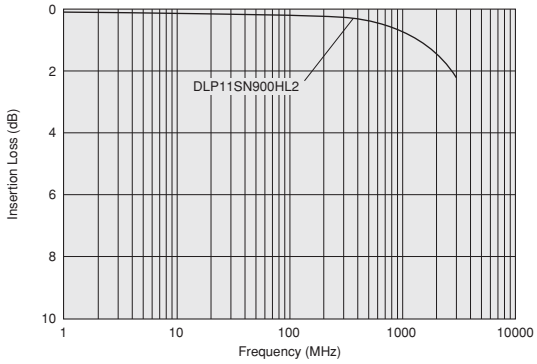


Continued on the following page.

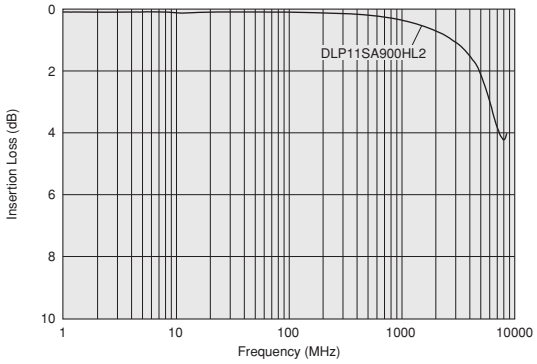
⚠Note • Please read rating and ⚠CAUTION (for storage, operating, rating, soldering, mounting and handling) in this catalog to prevent smoking and/or burning, etc.
• This catalog has only typical specifications. Therefore, please approve our product specifications or transact the approval sheet for product specifications before ordering.

■ Differential Mode Transmission Characteristics (Typ.)

DLP11SNSeries



DLP11SASeries



■ Rated Value (□: packaging code)

Part Number	Common Mode Impedance (at 100MHz/20°C)	Rated Current	Rated Voltage	Insulation Resistance (min.)	Withstand Voltage	DC Resistance	
DLP11RN450UL2□	45ohm ±25%	100mA	5Vdc	100M ohm	12.5Vdc	0.8ohm±25%	New Kit HD Imp Match
DLP11RB150UL2□	15ohm ±5ohm	100mA	5Vdc	100M ohm	12.5Vdc	0.8ohm±25%	New Kit UD Imp Match
DLP11RB400UL2□	40ohm ±10ohm	100mA	5Vdc	100M ohm	12.5Vdc	1.3ohm±25%	New Kit UD Imp Match

Operating Temperature Range: -40°C to +85°C Number of Circuit: 1 HD: for high speed differential signal lines UD: for ultra high speed differential signal lines

Differential mode to common mode conversion characteristic (Scd21) at 2.5GHz

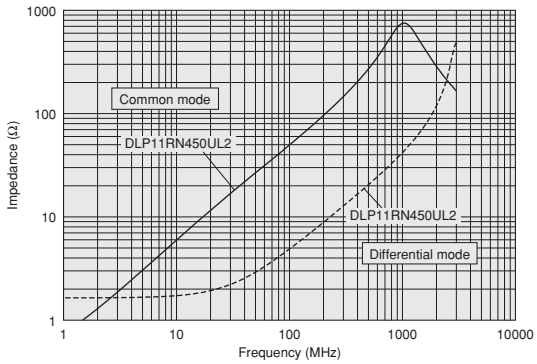
DLP11RB: -40dB

Impedance Characteristics between signal lines Z0 (TDR at 50ps)

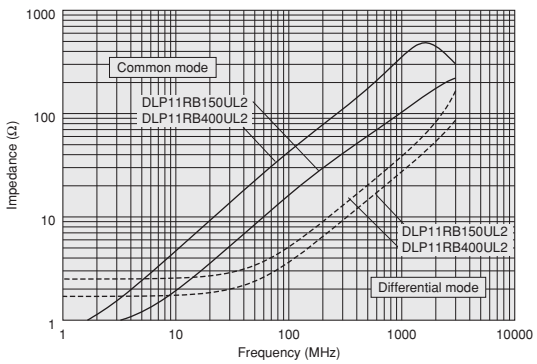
DLP11RB: 90ohm±15ohm

■ Impedance-Frequency Characteristics (Main Items)

DLP11RN Series

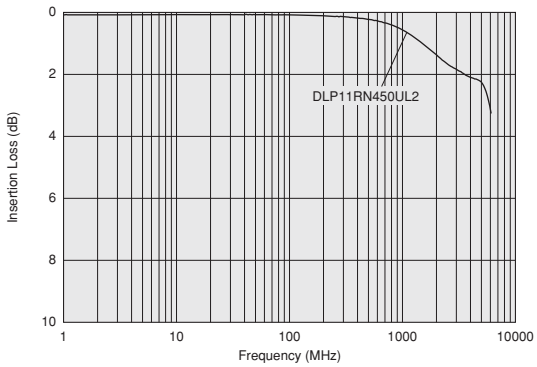


DLP11RB Series

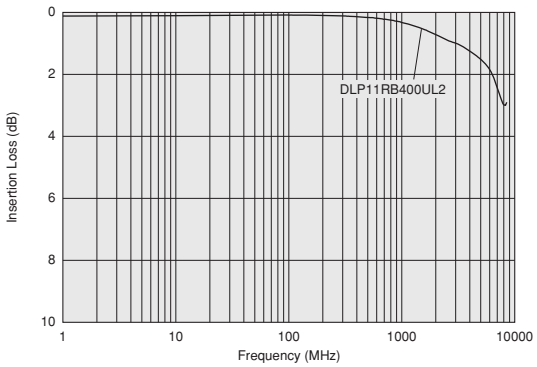


■ Differential Mode Transmission Characteristics (Typ.)

DLP11RN Series



DLP11RB Series



Continued on the following page.

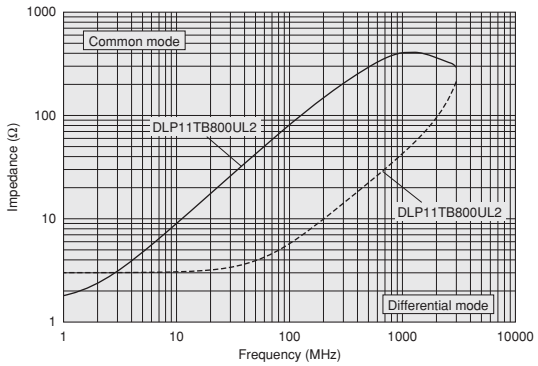
■ Rated Value (□: packaging code)

Part Number	Common Mode Impedance (at 100MHz/20°C)	Rated Current	Rated Voltage	Insulation Resistance (min.)	Withstand Voltage	DC Resistance	
DLP11TB800UL2□	80ohm ±25%	100mA	5Vdc	100M ohm	12.5Vdc	1.5ohm±25%	Kit UD Impedance

Operating Temperature Range: -40°C to +85°C Number of Circuit: 1 HD: for high speed differential signal lines UD: for ultra high speed differential signal lines
Differential mode to common mode conversion characteristic (Scd21) at 2.5GHz
DLP11TB: -40dB
Impedance Characteristics between signal lines Z0 (TDR at 50ps)
DLP11TB: 90ohm±15ohm

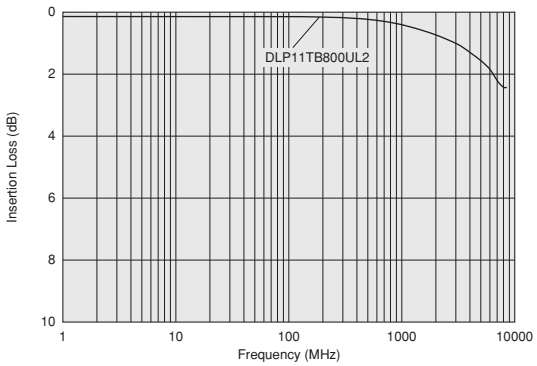
■ Impedance-Frequency Characteristics (Main Items)

DLP11TB Series



■ Differential Mode Transmission Characteristics (Typ.)

DLP11TB Series

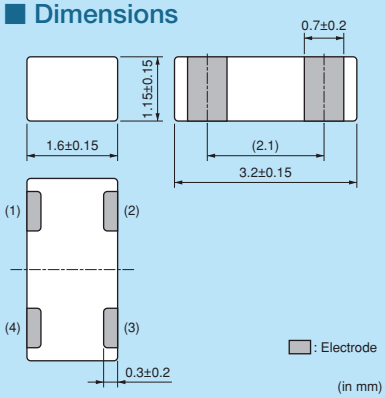


DLP31S Series (1206 Size)

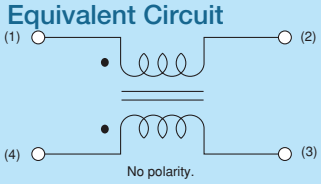
Reflow OK

1206 size film type chip common mode choke coil.

■ Dimensions



■ Equivalent Circuit



■ Packaging

Code	Packaging	Minimum Quantity
L	180mm Reel Embossed Tape	3000
B	Bulk(Bag)	500

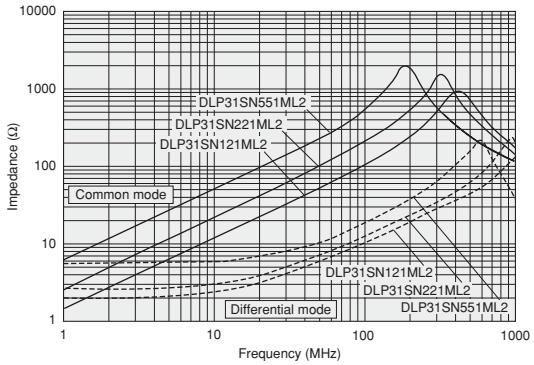
Refer to pages from p.183 to p.186 for mounting information.

■ Rated Value (□: packaging code)

Part Number	Common Mode Impedance (at 100MHz/20°C)	Rated Current	Rated Voltage	Insulation Resistance (min.)	Withstand Voltage	DC Resistance	
DLP31SN121ML2□	120ohm ±20%	100mA	16Vdc	100M ohm	40Vdc	2.0ohm max.	HD
DLP31SN221ML2□	220ohm ±20%	100mA	16Vdc	100M ohm	40Vdc	2.5ohm max.	HD
DLP31SN551ML2□	550ohm ±20%	100mA	16Vdc	100M ohm	40Vdc	3.6ohm max.	HD

Operating Temperature Range: -40°C to +85°C Number of Circuit: 1 HD: for high speed differential signal lines UD: for ultra high speed differential signal lines

■ Impedance-Frequency Characteristics (Main Items)

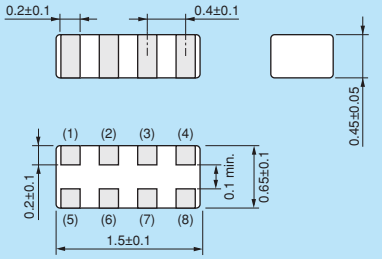


DLP1ND Series (05025 Size)

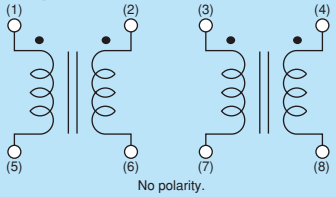
Reflow OK

2 circuits in 05025 size, adapt to HDMI line.

Dimensions



Equivalent Circuit



Packaging

Code	Packaging	Minimum Quantity
L	180mm Reel Embossed Tape	5000
B	Bulk(Bag)	500

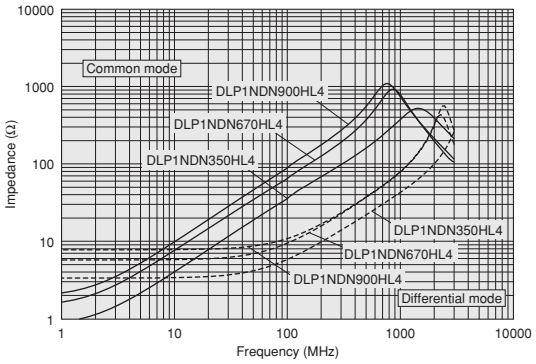
Refer to pages from p.183 to p.186 for mounting information.

Rated Value (□: packaging code)

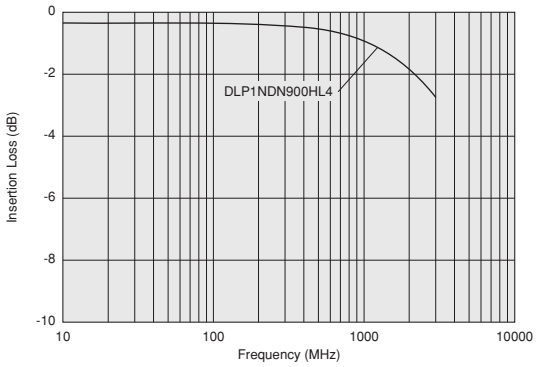
Part Number	Common Mode Impedance (at 100MHz/20°C)	Rated Current	Rated Voltage	Insulation Resistance (min.)	Withstand Voltage	DC Resistance	
DLP1NDN350HL4□	35ohm ±20%	100mA	5Vdc	100M ohm	12.5Vdc	1.8ohm±25%	Kit HD Imp Match
DLP1NDN670HL4□	67ohm ±20%	80mA	5Vdc	100M ohm	12.5Vdc	2.9ohm±25%	Kit HD Imp Match
DLP1NDN900HL4□	90ohm ±20%	60mA	5Vdc	100M ohm	12.5Vdc	3.7ohm±25%	Kit HD Imp Match

Operating Temperature Range: -40°C to +85°C Number of Circuit: 2 HD: for high speed differential signal lines UD: for ultra high speed differential signal lines

Impedance-Frequency Characteristics (Main Items)



Differential Mode Transmission Characteristics (Typ.)

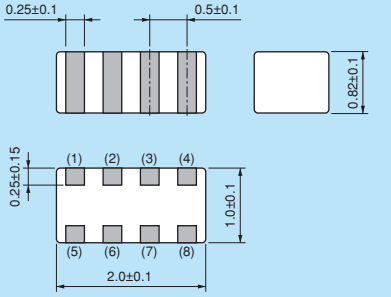


DLP2AD Series (0804 Size)

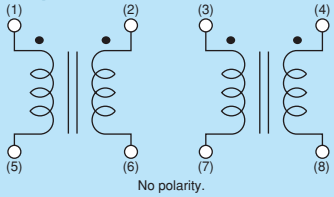
Reflow OK

2 circuit built-in, 0804 size, HDMI adapted type available, cut-off frequency 6GHz max.

Dimensions



Equivalent Circuit



Packaging

Code	Packaging	Minimum Quantity
L	180mm Reel Embossed Tape	3000
B	Bulk(Bag)	500

Refer to pages from p.183 to p.186 for mounting information.

Rated Value (□: packaging code)

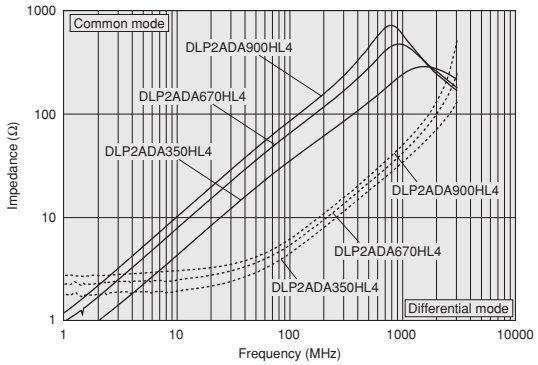
Part Number	Common Mode Impedance (at 100MHz/20°C)	Rated Current	Rated Voltage	Insulation Resistance (min.)	Withstand Voltage	DC Resistance	
DLP2ADA350HL4□	35ohm ±20%	150mA	5Vdc	100M ohm	12.5Vdc	0.8ohm±25%	Kit UD Imp Match
DLP2ADA670HL4□	67ohm ±20%	130mA	5Vdc	100M ohm	12.5Vdc	1.0ohm±25%	Kit UD Imp Match
DLP2ADA900HL4□	90ohm ±20%	120mA	5Vdc	100M ohm	12.5Vdc	1.4ohm±25%	Kit UD Imp Match
DLP2ADN670HL4□	67ohm ±20%	140mA	5Vdc	100M ohm	12.5Vdc	1.3ohm±25%	Kit HD Imp Match
DLP2ADN900HL4□	90ohm ±20%	130mA	5Vdc	100M ohm	12.5Vdc	1.7ohm±25%	Kit HD Imp Match
DLP2ADN121HL4□	120ohm ±20%	120mA	5Vdc	100M ohm	12.5Vdc	2.0ohm±25%	Kit HD Imp Match
DLP2ADN161HL4□	160ohm ±20%	100mA	5Vdc	100M ohm	12.5Vdc	2.5ohm±25%	Kit HD Imp Match
DLP2ADN201HL4□	200ohm ±20%	90mA	5Vdc	100M ohm	12.5Vdc	3.2ohm±25%	Kit HD Imp Match
DLP2ADN241HL4□	240ohm ±20%	80mA	5Vdc	100M ohm	12.5Vdc	3.8ohm±25%	Kit HD Imp Match
DLP2ADN281HL4□	280ohm ±20%	80mA	5Vdc	100M ohm	12.5Vdc	4.6ohm±25%	Kit HD Imp Match

Operating Temperature Range: -40°C to +85°C Number of Circuit: 2

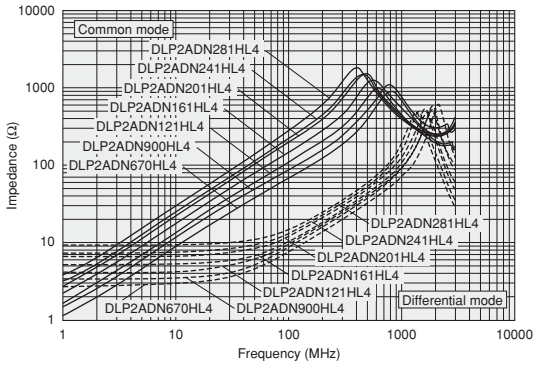
HD: for high speed differential signal lines UD: for ultra high speed differential signal lines

Impedance-Frequency Characteristics (Main Items)

DLP2ADA Series



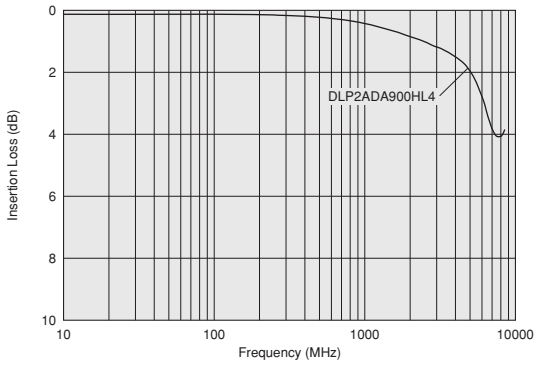
DLP2ADN Series



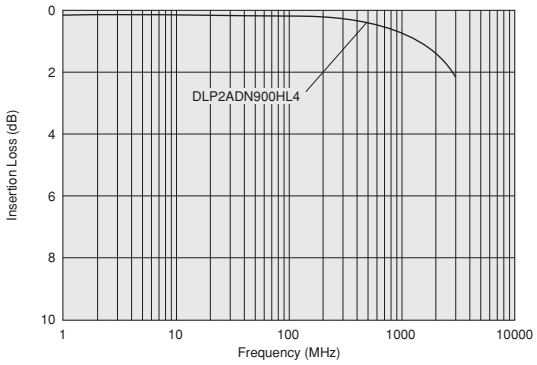
Continued on the following page.

■ Differential Mode Transmission Characteristics (Typ.)

DLP2ADA Series



DLP2ADN Series

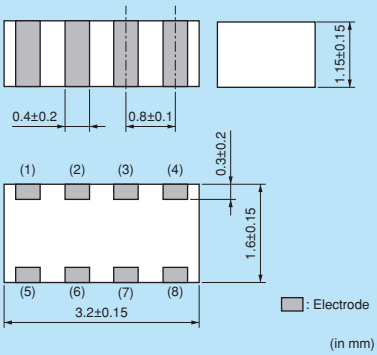


DLP31D Series (1206 Size)

Reflow OK

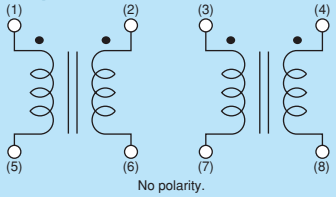
2 circuit built-in, 1206 size, meet IEEE1394,USB,LVDS.

■ Dimensions



(in mm)

■ Equivalent Circuit



No polarity.

■ Packaging

Code	Packaging	Minimum Quantity
L	180mm Reel Embossed Tape	3000
B	Bulk(Bag)	500

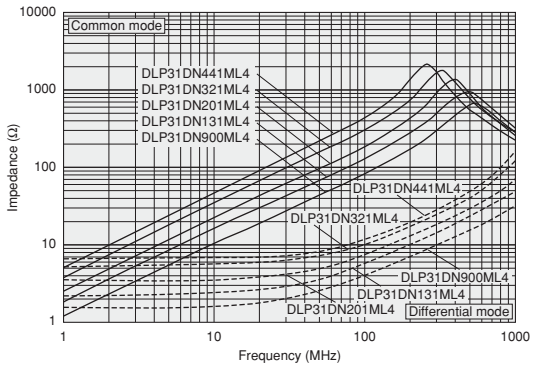
Refer to pages from p.183 to p.186 for mounting information.

■ Rated Value (□: packaging code)

Part Number	Common Mode Impedance (at 100MHz/20°C)	Rated Current	Rated Voltage	Insulation Resistance (min.)	Withstand Voltage	DC Resistance	
DLP31DN900ML4□	90ohm ±20%	160mA	10Vdc	100M ohm	25Vdc	1.1ohm max.	HD
DLP31DN131ML4□	130ohm ±20%	120mA	10Vdc	100M ohm	25Vdc	1.1ohm max.	HD
DLP31DN201ML4□	200ohm ±20%	100mA	10Vdc	100M ohm	25Vdc	2.2ohm max.	HD
DLP31DN321ML4□	320ohm ±20%	80mA	10Vdc	100M ohm	25Vdc	3.5ohm max.	HD
DLP31DN441ML4□	440ohm ±20%	70mA	10Vdc	100M ohm	25Vdc	4.3ohm max.	HD

Operating Temperature Range: -40°C to +85°C Number of Circuit: 2 HD: for high speed differential signal lines UD: for ultra high speed differential signal lines

■ Impedance-Frequency Characteristics (Main Items)

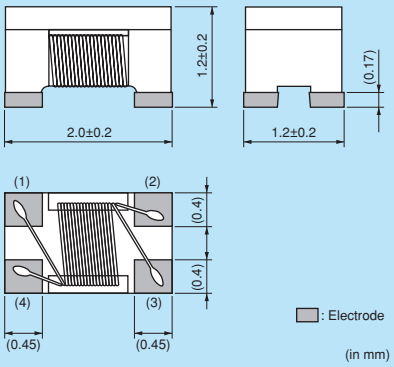


DLW21S Series (0805 Size)

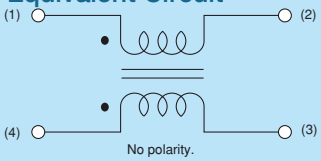
Reflow OK

Wire-wound common choke, HDMI available type prepaird.

Dimensions



Equivalent Circuit



Packaging

Code	Packaging	Minimum Quantity
L	180mm Reel Embossed Tape	2000
B	Bulk(Bag)	500

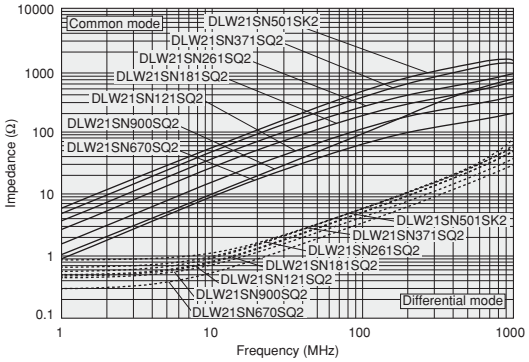
Refer to pages from p.183 to p.186 for mounting information.

Rated Value (□: packaging code)

Part Number	Common Mode Impedance (at 100MHz/20°C)	Rated Current	Rated Voltage	Insulation Resistance (min.)	Withstand Voltage	DC Resistance	
DLW21SN670SQ2□	67ohm ±25%	400mA	50Vdc	10M ohm	125Vdc	0.25ohm max.	Kit HD
DLW21SN900SQ2□	90ohm ±25%	330mA	50Vdc	10M ohm	125Vdc	0.35ohm max.	Kit HD
DLW21SN121SQ2□	120ohm ±25%	370mA	50Vdc	10M ohm	125Vdc	0.30ohm max.	Kit HD
DLW21SN181SQ2□	180ohm ±25%	330mA	50Vdc	10M ohm	125Vdc	0.35ohm max.	Kit HD
DLW21SN261SQ2□	260ohm ±25%	300mA	50Vdc	10M ohm	125Vdc	0.40ohm max.	Kit HD
DLW21SN371SQ2□	370ohm ±25%	280mA	50Vdc	10M ohm	125Vdc	0.45ohm max.	Kit HD
DLW21SN501SK2□	500ohm ±25%	250mA	50Vdc	10M ohm	125Vdc	0.5ohm max.	New Kit HD

Operating Temperature Range: -40°C to +85°C Number of Circuit: 1 HD: for high speed differential signal lines UD: for ultra high speed differential signal lines

Impedance-Frequency Characteristics (Main Items)



Rated Value (□: packaging code)

Part Number	Common Mode Impedance (at 100MHz/20°C)	Rated Current	Rated Voltage	Insulation Resistance (min.)	Withstand Voltage	DC Resistance	
DLW21SN670HQ2□	67ohm ±25%	320mA	20Vdc	10M ohm	50Vdc	0.31ohm max.	Kit UD Imp. Match
DLW21SN900HQ2□	90ohm ±25%	280mA	20Vdc	10M ohm	50Vdc	0.41ohm max.	Kit UD Imp. Match
DLW21SN121HQ2□	120ohm ±25%	280mA	20Vdc	10M ohm	50Vdc	0.41ohm max.	Kit UD Imp. Match
DLW21SR670HQ2□	67ohm ±25%	400mA	20Vdc	10M ohm	50Vdc	0.25ohm max.	Kit UD Imp. Match

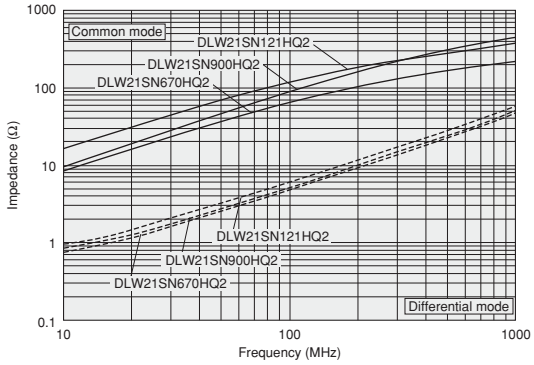
Operating Temperature Range: -40°C to +85°C Number of Circuit: 1 HD: for high speed differential signal lines UD: for ultra high speed differential signal lines

DLW21SR670HQ2 is designed to correct line impedance when ESD protection device is also used.

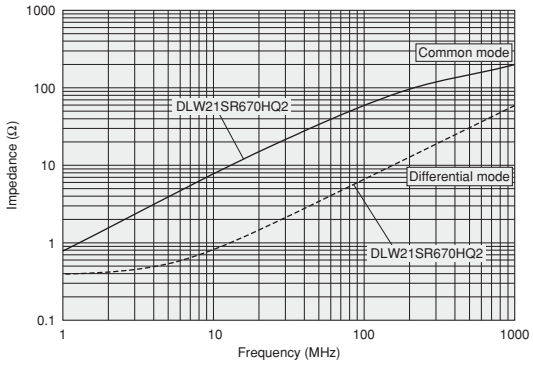
Continued on the following page.

■ Impedance-Frequency Characteristics (Main Items)

DLW21SN_HQ2 Series

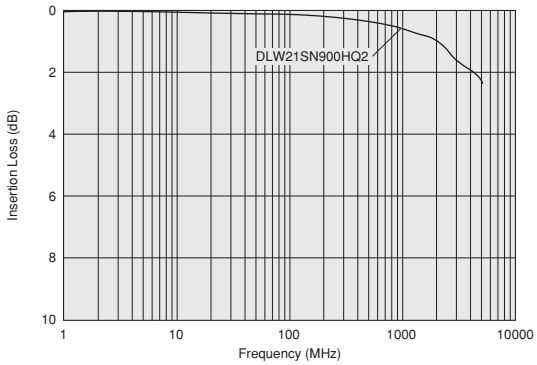


DLW21SR_HQ2 Series



■ Differential Mode Transmission Characteristics (Typ.)

DLW21SN_HQ2 Series

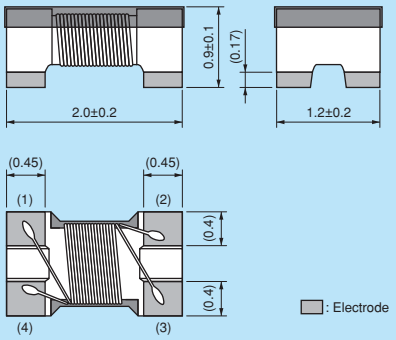


DLW21H Series (0805 Size)

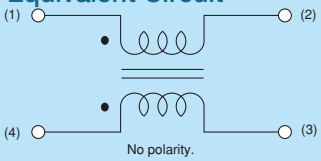
Reflow OK

Low profile wire-wound common choke coil.

■ Dimensions



■ Equivalent Circuit



■ Packaging

Code	Packaging	Minimum Quantity
L	180mm Reel Embossed Tape	3000
B	Bulk(Bag)	500

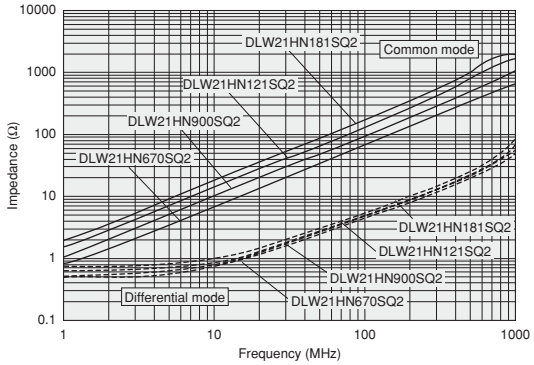
Refer to pages from p.183 to p.186 for mounting information.

■ Rated Value (□: packaging code)

Part Number	Common Mode Impedance (at 100MHz/20°C)	Rated Current	Rated Voltage	Insulation Resistance (min.)	Withstand Voltage	DC Resistance	
DLW21HN670SQ2□	67ohm ±25%	330mA	50Vdc	10M ohm	125Vdc	0.35ohm max.	Kit HD
DLW21HN900SQ2□	90ohm ±25%	330mA	50Vdc	10M ohm	125Vdc	0.35ohm max.	Kit HD
DLW21HN121SQ2□	120ohm ±25%	280mA	50Vdc	10M ohm	125Vdc	0.45ohm max.	Kit HD
DLW21HN181SQ2□	180ohm ±25%	250mA	50Vdc	10M ohm	125Vdc	0.50ohm max.	Kit HD

Operating Temperature Range: -40°C to +85°C Number of Circuit: 1 HD: for high speed differential signal lines UD: for ultra high speed differential signal lines

■ Impedance-Frequency Characteristics (Main Items)

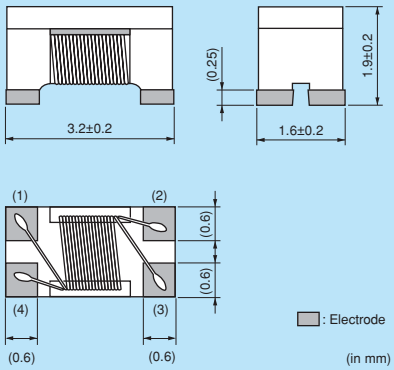


DLW31S Series (1206 Size)

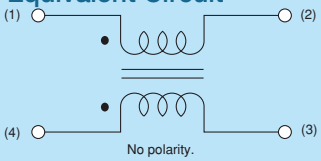
Reflow OK

1206 size wire-wound common mode choke coil.

■ Dimensions



■ Equivalent Circuit



■ Packaging

Code	Packaging	Minimum Quantity
L	180mm Reel Embossed Tape	2000
B	Bulk(Bag)	500

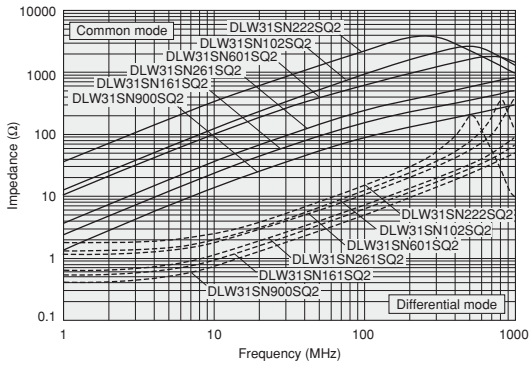
Refer to pages from p.183 to p.186 for mounting information.

■ Rated Value (□: packaging code)

Part Number	Common Mode Impedance (at 100MHz/20°C)	Rated Current	Rated Voltage	Insulation Resistance (min.)	Withstand Voltage	DC Resistance	
DLW31SN900SQ2□	90ohm ±25%	370mA	50Vdc	10M ohm	125Vdc	0.3ohm max.	HD
DLW31SN161SQ2□	160ohm ±25%	340mA	50Vdc	10M ohm	125Vdc	0.4ohm max.	HD
DLW31SN261SQ2□	260ohm ±25%	310mA	50Vdc	10M ohm	125Vdc	0.5ohm max.	HD
DLW31SN601SQ2□	600ohm ±25%	260mA	50Vdc	10M ohm	125Vdc	0.8ohm max.	HD
DLW31SN102SQ2□	1000ohm ±25%	230mA	50Vdc	10M ohm	125Vdc	1.0ohm max.	HD
DLW31SN222SQ2□	2200ohm ±25%	200mA	50Vdc	10M ohm	125Vdc	1.2ohm max.	HD

Operating Temperature Range: -40°C to +85°C Number of Circuit: 1 HD: for high speed differential signal lines UD: for ultra high speed differential signal lines

■ Impedance-Frequency Characteristics (Main Items)

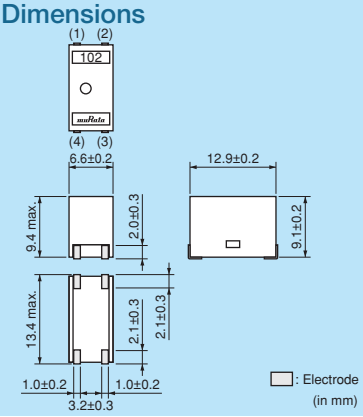


PLT10H Series (12.9x6.6 mm)

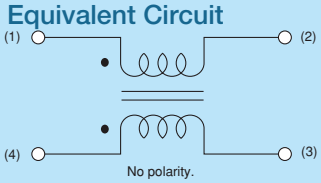
Hi Power Reflow OK

Automotive available, up to 10A.

■ Dimensions



■ Equivalent Circuit



■ Packaging

Code	Packaging	Minimum Quantity
L	180mm Reel Embossed Tape	125
K	330mm Reel Embossed Tape	500
B	Bulk(Bag)	50

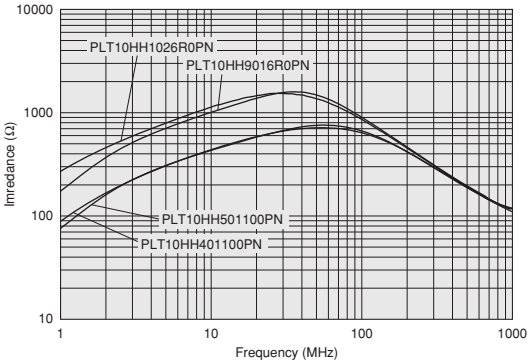
Refer to pages from p.187 to p.188 for mounting information.

■ Rated Value (□: packaging code)

Part Number	Common Mode Impedance (at 10MHz/20°C)	Rated Current	Rated Voltage	Insulation Resistance (min.)	Withstand Voltage	DC Resistance	Common Mode Inductance	
PLT10HH401100PN□	400ohm (Typ.)	10A	100Vdc	10M ohm	250Vdc	3.6m ohm±0.5m ohm	6μH min.	Kit ≧10A
PLT10HH501100PN□	500ohm (Typ.)	10A	100Vdc	10M ohm	250Vdc	3.6m ohm±0.5m ohm	9μH min.	Kit ≧10A
PLT10HH9016R0PN□	900ohm (Typ.)	6A	100Vdc	10M ohm	250Vdc	8.0m ohm±0.5m ohm	14μH min.	Kit ≧3A
PLT10HH1026R0PN□	1000ohm (Typ.)	6A	100Vdc	10M ohm	250Vdc	8.0m ohm±0.5m ohm	20μH min.	Kit ≧3A

Operating Temperature Range (Self-temperature rise is included): -55°C to +105°C (PLT10HH 1026R0/501100 PN), -55°C to +125°C (PLT10HH 401100/9016R0 PN) Number of Circuit: 1

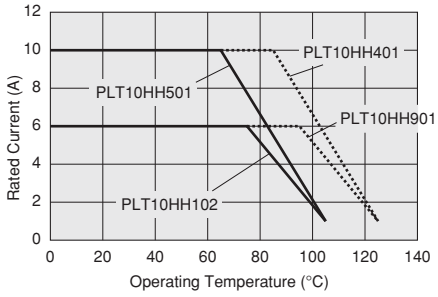
■ Impedance-Frequency Characteristics (Main Items)



■ Notice (Rating)

In operating temperature exceeding +65°C, derating of current is necessary for PLT10H series.
Please apply the derating curve shown in chart according to the operating temperature.

Derating of Rated Current



⚠Note • Please read rating and ⚠CAUTION (for storage, operating, rating, soldering, mounting and handling) in this catalog to prevent smoking and/or burning, etc.
• This catalog has only typical specifications. Therefore, please approve our product specifications or transact the approval sheet for product specifications before ordering.

⚠Caution

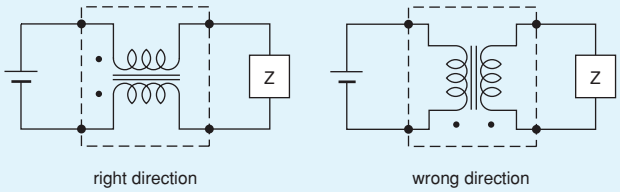
● Rating

Do not use products beyond the rated current and rated voltage as this may create excessive heat and deteriorate the insulation resistance.

● Soldering and Mounting

1. Self-heating
   Please provide special attention when mounting chip common mode choke coils DLW5 series in close proximity to other products that radiate heat.
   The heat generated by other products may deteriorate the insulation resistance and cause excessive heat in this component.

2. Mounting Direction
   Mount Chip Common Mode Choke Coils in right direction. Wrong direction, which is 90 degrees rotated from right direction, causes not only open or short circuit but also flames or other serious trouble.



right direction　　wrong direction

Notice

● Storage and Operating Conditions

<Operating Environment>
Do not use products in a chemical atmosphere such as chlorine gas, acid or sulfide gas.
Do not use products in the environment close to the organic solvent.
<Storage and Handling Requirements>
1. Storage Period
   DLM11G series should be used within 6 months, the other series should be used within 12 months.
   Solderability should be checked if this period is exceeded.
2. Storage Conditions
   (1) Storage temperature: -10 to +40˚C
   Relative humidity: 15 to 85%
   Avoid sudden changes in temperature and humidity.
   (2) Do not store products in a chemical atmosphere such as chlorine gas, acid or sulfide gas.

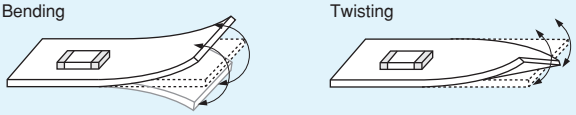
● Notice (Soldering and Mounting)

1. Cleaning
   Failure and degradation of a product are caused by the cleaning method. When you clean in conditions that are not in mounting information, please contact Murata engineering.
2. Soldering
   Reliability decreases with improper soldering methods. Please solder by the standard soldering conditions shown in mounting information.
3. Other
   Noise suppression levels resulting from Murata's EMI suppression filters EMIFIL® may vary, depending on the circuits and ICs used, type of noise, mounting pattern, mounting location, and other operating conditions. Be sure to check and confirm in advance the noise suppression effect of each filter, in actual circuits, etc. before applying the filter in a commercial-purpose equipment design.

● Handling

1. Resin Coating (Except DLW Series.)
   Using resin for coating/molding products may affect the products performance.
   So please pay careful attention in selecting resin.
   Prior to use, please make the reliability evaluation with the product mounted in your application set.
2. Resin Coating (DLW Series)
   The impedance value may change due to high cure-stress of resin to be used for coating/molding products. An open circuit issue may occur by mechanical stress caused by the resin, amount/cured shape of resin, or operating condition etc. Some resin contains some impurities or chloride possible to generate chlorine by hydrolysis under some operating condition may cause corrosion of wire of coil, leading to open circuit.
   So, please pay your careful attention in selecting resin in case of coating/molding the products with the resin.
   Prior to use the coating resin, please make sure no reliability issue is observed by evaluating products mounted on your board.
3. Caution for Use (DLW Series)
   When you hold products with a tweezer, please hold by the sides. Sharp materials, such as a pair of tweezers, should not touch the winding portion to prevent breaking the wire. Mechanical shock should not be applied to the products mounted on the board to prevent breaking the core.
4. Brushing
   When you clean the neighborhood of products such as connector pins, bristles of cleaning brush shall not be touched to the winding portion of this product to prevent the breaking of wire.
5. Handling of a Substrate
   After mounting products on a substrate, do not apply any stress to the product caused by bending or twisting to the substrate when cropping the substrate, inserting and removing a connector from the substrate or tightening screw to the substrate. Excessive mechanical stress may cause cracking in the Product.

Bending　　Twisting



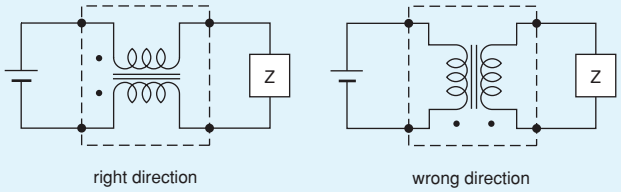
⚠Caution

● Rating

1. Do not use products beyond the rated current and rated voltage as this may create excessive heat and deteriorate the insulation resistance.
2. Be sure to provide an appropriate fail-safe function on your product to prevent a second damage that may be caused by the abnormal function or the failure our product.

● Soldering and Mounting

1. Self-heating
   Please provide special attention when mounting chip common mode choke coils in close proximity to other products that radiate heat.
   The heat generated by other products may deteriorate the insulation resistance and cause excessive heat in this component.
2. Mounting Direction
   Mount Chip Common Mode Choke Coils in right direction. Wrong direction, which is 90 degrees rotated from right direction, causes not only open or short circuit but also flames or other serious trouble.



right direction　　wrong direction

Notice

● Storage and Operating Conditions

<Operating Environment>
Do not use products in a chemical atmosphere such as chlorine gas, acid or sulfide gas.
Do not use products in the environment close to the organic solvent.
<Storage and Handling Requirements>

1. Storage Period
   PLT10H series should be used within 12 months. Solderability should be checked if this period is exceeded.
2. Storage Conditions
   (1) Storage temperature: -10 to +40˚C
   Relative humidity: 15 to 85%
   Avoid sudden changes in temperature and humidity.
   (2) Do not store products in a chemical atmosphere such as chlorine gas, acid or sulfide gas.

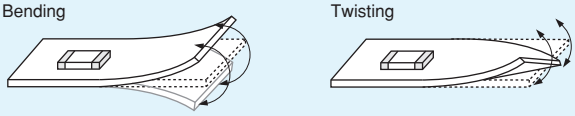
● Notice (Soldering and Mounting)

1. Cleaning
   Failure and degradation of a product are caused by the cleaning method. When you clean in conditions that are not in mounting information, please contact Murata engineering.
2. Soldering
   Reliability decreases with improper soldering methods. Please solder by the standard soldering conditions shown in mounting information.
3. Other
   Noise suppression levels resulting from Murata's EMI suppression filters EMIFIL® may vary, depending on the circuits and ICs used, type of noise, mounting pattern, mounting location, and other operating conditions. Be sure to check and confirm in advance the noise suppression effect of each filter, in actual circuits, etc. before applying the filter in a commercial-purpose equipment design.

● Handling

1. Handling of a Substrate
   After mounting products on a substrate, do not apply any stress to the product caused by bending or twisting to the substrate when cropping the substrate, inserting and removing a connector from the substrate or tightening screw to the substrate.
   Excessive mechanical stress may cause cracking in the Product.

Bending　　Twisting



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• This catalog has only typical specifications. Therefore, please approve our product specifications or transact the approval sheet for product specifications before ordering.

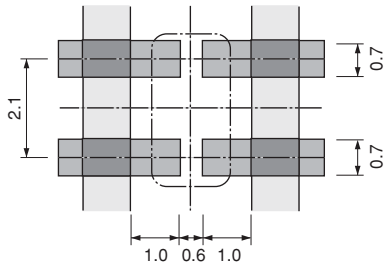
1. Standard Land Pattern Dimensions

Land Pattern + Solder Resist
Land Pattern
Solder Resist
(in mm)

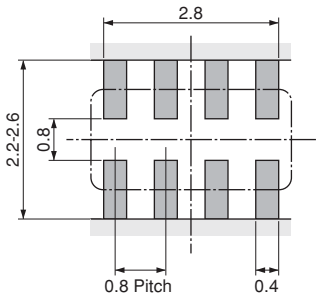
DLM11G
DLP0QS
DLP0NS
DLP11S
DLP11R
DLP11T
DLP1ND
DLP2AD
DLP31S
DLP31D
DLW21S
DLW21H
DLW31SN
DLW5A
DLW5B

●Reflow and Flow

DLP31S

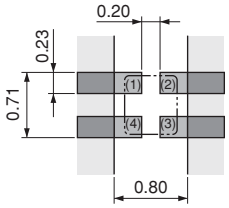


DLP31D

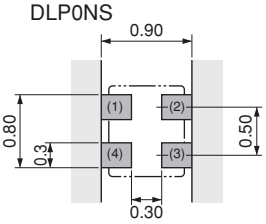


●Reflow Soldering

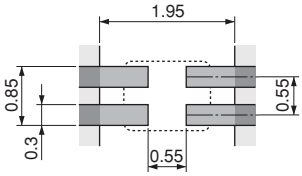
DLP0QS



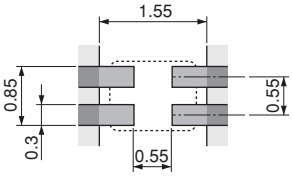
DLP0NS



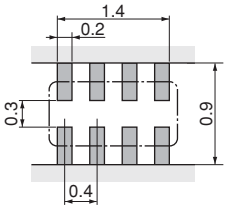
DLP11S



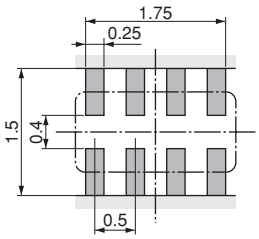
DLP11R/11T



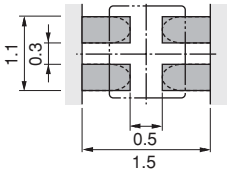
DLP1ND



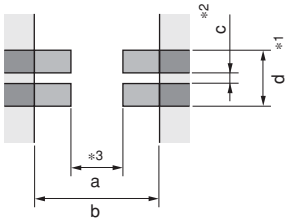
DLP2AD



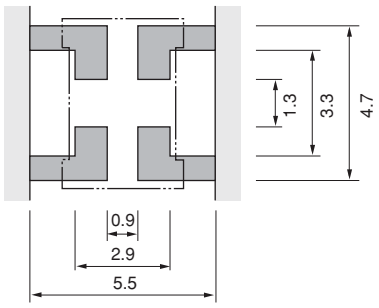
DLM11G



DLW21S/21H/31SN



DLW5A/5B



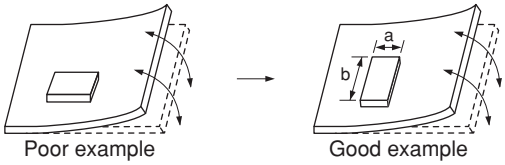
Series	a	b	c	d
DLW21S/H	0.8	2.6	0.4	1.2
DLW31SN	1.6	3.7	0.4	1.6

*1: If the pattern is made with wider than 1.2mm (DLW21) / 1.6mm (DLW31S) it may result in components turning around, because melting speed is different. In the worst case, short circuit between lines may occur.
*2: If the pattern is made with less than 0.4mm, in the worst case, short circuit between lines may occur due to spread of soldering paste or mount placing accuracy.
*3: If the pattern is made with wider than 0.8mm (DLW21) / 1.6mm (DLW31SN), the bending strength will be reduced.
Do not use gild pattern; excess soldering heat may dissolve metal of a copper wire.

● PCB Warping

PCB should be designed so that products are not subjected to the mechanical stress caused by warping the board.

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



2. Solder Paste Printing and Adhesive Application

When reflow soldering the chip common mode choke coils, the printing must be conducted in accordance with the following cream solder printing conditions.
If too much solder is applied, the chip will be prone to damage by mechanical and thermal stress from the PCB and may crack.
Standard land dimensions should be used for resist and copper foil patterns.

When flow soldering the chip common mode choke coils, apply the adhesive in accordance with the following conditions.
If too much adhesive is applied, then it may overflow into the land or termination areas and yield poor solderability. In contrast, if insufficient adhesive is applied, or if the adhesive is not sufficiently hardened, then the chip may become detached during flow soldering process.

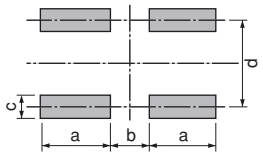
(in mm)

Series: DLP, DLW, DLM

Solder Paste Printing

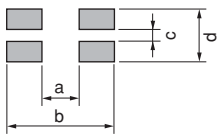
●Guideline of solder paste thickness:
80-100μm: DLP0QS
100-150μm: DLW21S/21H/31S,
DLP0NS/11S/11R/11T/1ND/2AD/DLM11G
150-200μm: DLP31D/31S, DLW5A/5B
*Solderability is subject to reflow conditions and thermal conductivity. Please make sure that your product has been evaluated in view of your specifications with our product being mounted to your product.

DLP0QS/0NS/11S/11R/11T/31S/DLM11G



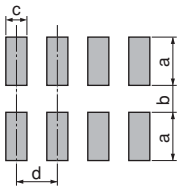
Series	a	b	c	d
DLP0QS	0.3	0.2	0.23	0.48
DLP0NS	0.3	0.3	0.3	0.5
DLP11S	0.7	0.55	0.3	0.55
DLP11R/T	0.5	0.55	0.3	0.55
DLP31S	1.0	0.6	0.7	2.1
DLM11G	0.5	0.5	0.4	0.7

DLW21S/21H/31S



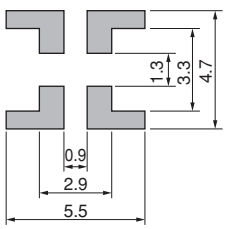
Series	a	b	c	d
DLW21S/H	0.8	2.6	0.5	1.2
DLW31S	1.6	3.7	0.4	1.6

DLP2AD/31D



Series	a	b	c	d
DLP1ND	0.3	0.3	0.2	0.4
DLP2AD	0.55	0.4	0.25	0.5
DLP31D	1.0	0.8	0.4	0.8

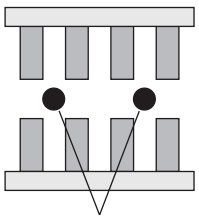
DLW5A/5B



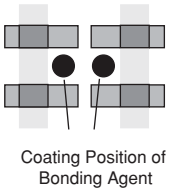
Adhesive Application

■ DLP31S/DLP31D
Apply 0.3mg of bonding agent at each chip.

DLP31D



DLP31S



3. Standard Soldering Conditions

(1) Soldering Methods

Use flow and reflow soldering methods only.
Use standard soldering conditions when soldering chip common mode choke coils.
In cases where several different parts are soldered, each having different soldering conditions, use those conditions requiring the least heat and minimum time.

Solder: Use Sn-3.0Ag-0.5Cu solder. Use of Sn-Zn based solder will deteriorate performance of products.
If using DLP/DLM series with Sn-Zn based solder, please contact Murata in advance.

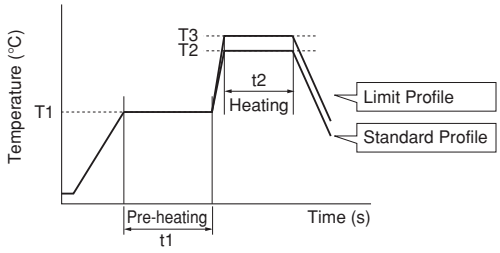
Flux:

- Use Rosin-based flux.
  In case of DLW21/31 series, use Rosin-based flux with converting chlorine content of 0.06 to 0.1wt%.
  In case of using RA type solder, products should be cleaned completely with no residual flux.
- Do not use strong acidic flux (with chlorine content exceeding 0.20wt%)
- Do not use water-soluble flux.

For additional mounting methods, please contact Murata.

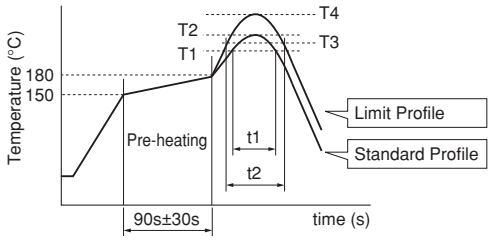
(2) Soldering Profile

●Flow Soldering Profile
(Sn-3.0Ag-0.5Cu Solder)



Series	Pre-heating		Standard Profile			Limit Profile		
			Heating		Cycle of Flow	Heating		Cycle of Flow
	Temp. (T1)	Time. (t1)	Temp. (T2)	Time. (t2)		Temp. (T3)	Time. (t2)	
DLP31D/31S	150°C	60s min.	250°C	4 to 6s	2 times max.	265±3°C	5s max.	2 times max.

●Reflow Soldering Profile
(Sn-3.0Ag-0.5Cu Solder)



Series	Standard Profile				Limit Profile			
	Heating		Peak Temperature (T2)	Cycle of Reflow	Heating		Peak Temperature (T4)	Cycle of Reflow
	Temp. (T1)	Time. (t1)			Temp. (T3)	Time. (t2)		
DLM/DLP DLW21/31	220°C min.	30 to 60s	245±3°C	2 times max.	230°C min.	60s max.	260°C/10s	2 times max.
DLW5A/5B	220°C min.	30 to 60s	250±3°C	2 times max.	230°C min.	60s max.	260°C/10s	2 times max.

(3) Reworking with Solder Iron

The following conditions must be strictly followed when using a soldering iron.

Pre-heating: 150°C 60s min.

Soldering iron power output / Tip diameter:
30W max. / ø3mm max.

Temperature of soldering iron tip / Soldering time / Times:
350°C max. / 3-4s / 2 times*1

*1 DLP0QS, DLP0NS, DLP11S, DLP11T, DLP1ND, DLP2AD: 380°C max. / 3-4s / 2 times

Do not allow the tip of the soldering iron to directly contact the chip.

For additional methods of reworking with a soldering iron, please contact Murata engineering.

4. Cleaning

Following conditions should be observed when cleaning chip EMI filter.

(1) Cleaning Temperature: 60°C max. (40°C max. for alcohol type cleaner)

(2) Ultrasonic
Output: 20W/liter max.
Duration: 5 minutes max.
Frequency: 28 to 40kHz

(3) Cleaning agent
The following list of cleaning agents have been tested on the individual components. Evaluation of final assembly should be completed prior to production.
Do not clean DLW (except DLW21H) series.
Before cleaning, please contact Murata engineering.
(a) Alcohol cleaning agent
Isopropyl alcohol (IPA)
(b) Aqueous cleaning agent
Pine Alpha ST-100S

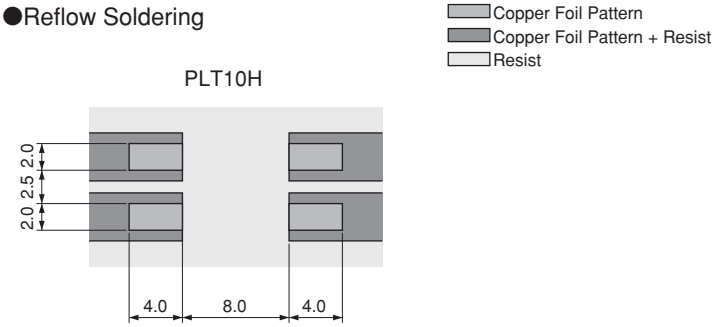
(4) Ensure that flux residue is completely removed.
Component should be thoroughly dried after aqueous agent has been removed with deionized water.

1. Standard Land Pattern Dimensions

(in mm)

PLT10H

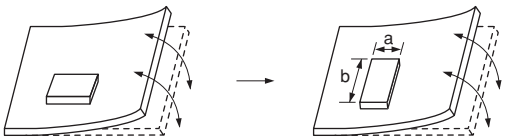
●Reflow Soldering



● PCB Warping

PCB should be designed so that products are not subjected to the mechanical stress caused by warping the board.

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



Poor example　　Good example

2. Solder Paste Printing and Adhesive Application

When reflow soldering the chip common mode choke coils, the printing must be conducted in accordance with the following cream solder printing conditions.
If too much solder is applied, the chip will be prone to damage by mechanical and thermal stress from the PCB and may crack.
Standard land dimensions should be used for resist and copper foil patterns.

When flow soldering the chip common mode choke coils, apply the adhesive in accordance with the following conditions.
If too much adhesive is applied, then it may overflow into the land or termination areas and yield poor solderability. In contrast, if insufficient adhesive is applied, or if the adhesive is not sufficiently hardened, then the chip may become detached during flow soldering process.

Series	Solder Paste Printing
PLT10H	●Guideline of solder paste thickness: 150-200μm: PLT10H For the solder paste printing pattern, use standard land dimensions. *Solderability is subject to reflow conditions and thermal conductivity. Please make sure that your product has been evaluated in view of your specifications with our product being mounted to your product.

3. Standard Soldering Conditions

(1) Soldering Methods

Use reflow soldering methods only.
Use standard soldering conditions when soldering chip common mode choke coils.
In cases where several different parts are soldered, each having different soldering conditions, use those conditions requiring the least heat and minimum time.

Solder: Use Sn-3.0Ag-0.5Cu solder. Use of Sn-Zn based solder will deteriorate performance of products.

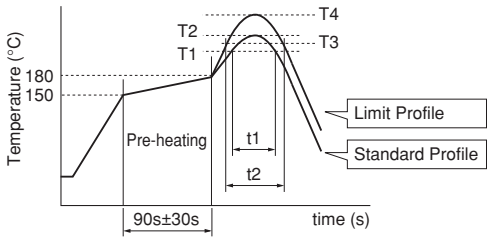
Flux:

- Use Rosin-based flux.
  use Rosin-based flux.
- Do not use strong acidic flux (with chlorine content exceeding 0.20wt%)
- Do not use water-soluble flux.

For additional mounting methods, please contact Murata.

(2) Soldering Profile

●Reflow Soldering Profile
(Sn-3.0Ag-0.5Cu Solder)



Series	Standard Profile				Limit Profile			
	Heating		Peak Temperature (T2)	Cycle of Reflow	Heating		Peak Temperature (T4)	Cycle of Reflow
	Temp. (T1)	Time. (t1)			Temp. (T3)	Time. (t2)		
PLT10H	220°C min.	30 to 60s	250±3°C	2 times max.	230°C min.	60s max.	260°C/10s	2 times max.

(3) Reworking with Solder Iron

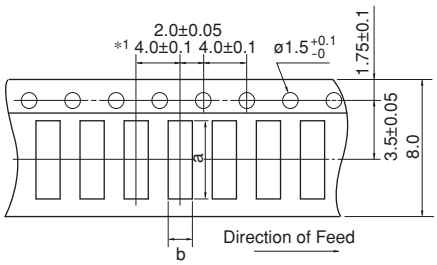
The following conditions must be strictly followed when using a soldering iron.
Pre-heating: 150°C 60s min.
Soldering iron power output / Tip diameter:
80W max. / ø3mm max.
Temperature of soldering iron tip / Soldering time / Times:
400°C max. / 5s / 2 times

Do not allow the tip of the soldering iron to directly contact the chip.
For additional methods of reworking with a soldering iron, please contact Murata engineering.

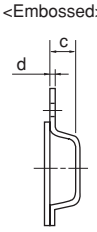
4. Cleaning

Do not clean after soldering. If cleaning, please contact us.

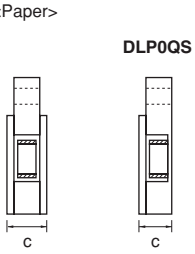
■ Minimum Quantity and Dimensions of 8mm Width Paper / Embossed Tape



*1 DLM11G/DLP0QS: 2.0±0.05
DLP0NS: 2.0±0.1



c: Depth of Cavity
(Embossed Tape)



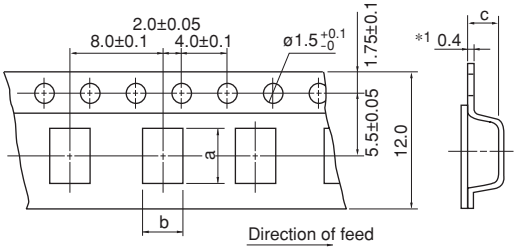
c: Total Thickness of Tape
(Paper Tape)

Dimension of the cavity of embossed tape is measured at the bottom side.

Part Number	Dimensions				Minimum Qty. (pcs.)				
					ø180mm Reel		ø330mm Reel		Bulk
	a	b	c	d	Paper Tape	Embossed Tape	Paper Tape	Embossed Tape	
DLM11G	1.45	1.2	0.8 max.	-	10000	-	-	-	1000
DLP0QS	0.73	0.6	0.55 max.	-	15000	-	-	-	500
DLP0NS	0.95	0.75	0.55	0.25	-	10000	-	-	500
DLP11S	1.4	1.2	0.98	0.25	-	3000	-	-	500
DLP11R	1.4	1.15	0.7	0.25	-	4000	-	-	500
DLP11T	1.35	1.1	0.45	0.25	-	5000	-	-	500
DLP1ND	1.7	0.84	0.57	0.25	-	5000	-	-	500
DLP2AD	2.2	1.2	0.98	0.25	-	3000	-	-	500
DLP31D/31S	3.5	1.9	1.3	0.25	-	3000	-	-	500
DLW21S	2.25	1.45	1.4	0.3	-	2000	-	-	500
DLW21H	2.3	1.55	1.1	0.25	-	3000	-	-	500
DLW31S	3.6	2.0	2.1	0.3	-	2000	-	-	500

(in mm)

■ Minimum Quantity and Dimensions of 12mm Width Embossed Tape



Part Number	Dimensions			Minimum Qty. (pcs.)		
	a	b	c	ø180mm Reel	ø330mm Reel	Bulk
DLW5AH	5.4	4.1	4.4	400	1500	100
DLW5AT	5.4	4.1	2.7	700	2500	100
DLW5BS	5.5	5.4	4.7	400	1500	100
DLW5BT	5.5	5.5	2.7	700	2500	100

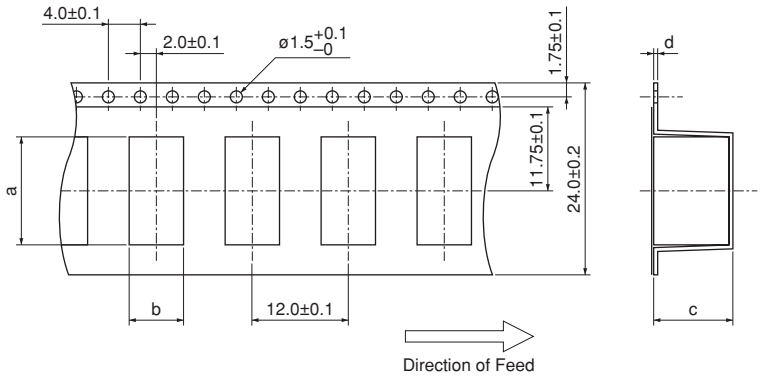
*1 DLW5AT: 0.3 c: Depth of Cavity

Dimension of the cavity is measured at the bottom side.

(in mm)

"Minimum Quantity" means the number of units of each delivery or order. The quantity should be an integral multiple of the "Minimum Quantity".

■ Minimum Quantity and Dimensions of 24mm Width Embossed Tape



Dimension of the cavity is measured at the bottom side.

Part Number	Dimensions				Minimum Qty. (pcs.)		
	a	b	c	d	ø180mm Reel	ø330mm Reel	Bulk
PLT10H	13.5	6.8	9.4	0.5	125	500	50

(in mm)