SMD/BLOCK Type
EMI Suppression Filters

EMIFIL®

Murata
Manufacturing Co., Ltd.

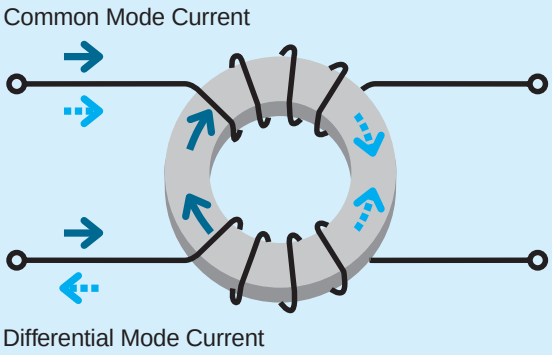
⚠Note • Please read rating and ⚠CAUTION (for storage, operating, rating, soldering, mounting and handling) in this catalog to prevent smoking and/or burning, etc.
• This catalog has only typical specifications because there is no space for detailed specifications. Therefore, please review our product specifications or consult the approval sheet for product specifications before ordering.

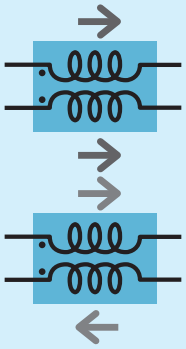
C31E.pdf
Mar.28,2011

DL□/PL□

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

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

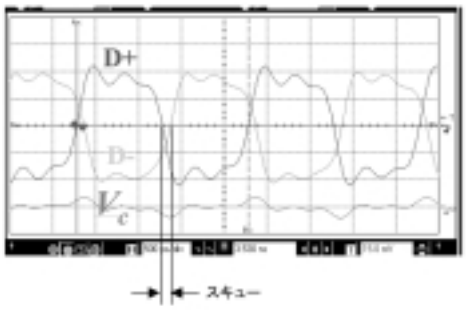
Category	Features, Classification	Structure	Part Number	Comments
High cut-off frequency High Coupling (For high speed differential signal lines)	Ultra high cut-off frequency for high speed differential signal lines	Film type	DLP11SA	· Low profile, small size, suitable for mobile equipments. · Tight terminal 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 DLW5BT	· Large current (6A max.), suitable for input connector from an AC adaptor. · DLW5BT is designed as low profile.
Relative high differential mode impedance Low coupling (For audio lines)		Multilayer type	DLM11G DLM2HG	· 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. · DLM11GN601SD2 is ideal to keep low distortion audio signal. · DLM2HG can meet stereo 3 lines which contain a ground line.
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

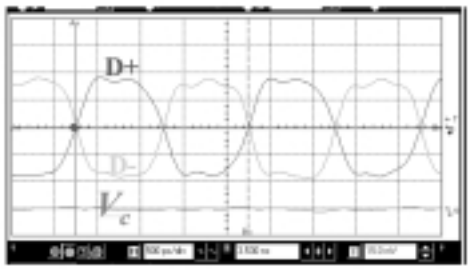
Example of Skew Improvement by Common Mode Choke Coil
(Test using pulse generator waveform)

Waveform is equivalent to 1000Mbps signal

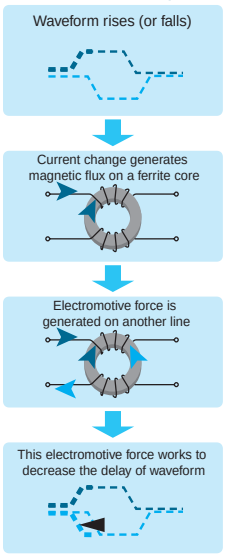
Waveform with intentionally made skew (skew: 100ps)



Skew is improved by common mode choke coil

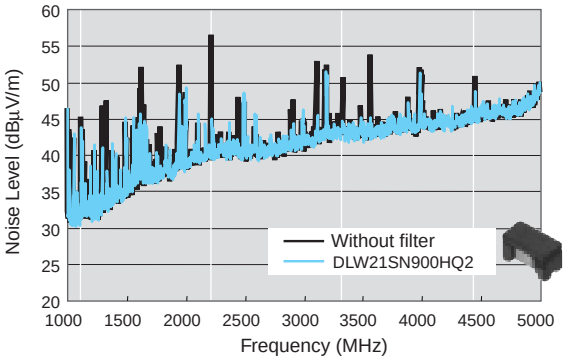


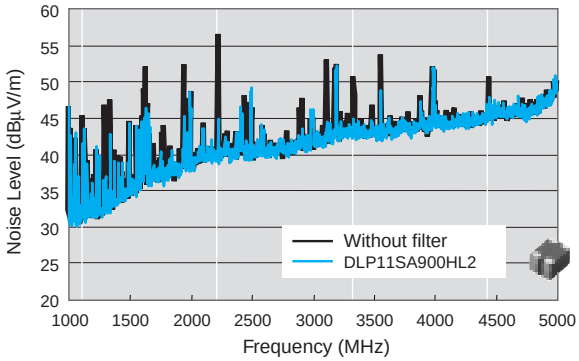
Mechanism of Skew Improvement



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

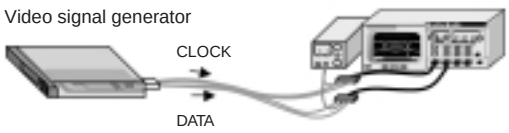


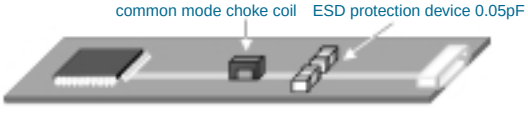


Test Example of HDMI1.3 Waveform Transmission

~Using ESD protection device 0.05pF~

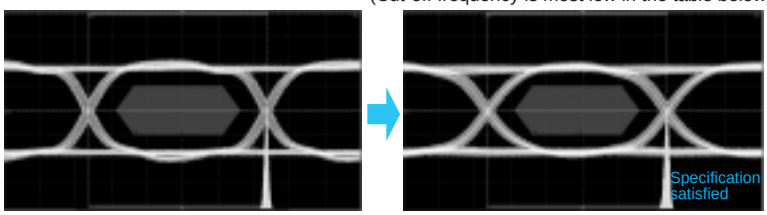
Signal frequency : 1.11GHz (Deep color 12bit)





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
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)
T	Magnetically Shielded One Circuit Low Profile Type

❺Category

Code	Category
A	Expressed by a letter.
B	
C	
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.
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 p158	0.5	DLM11GN601SD2	600ohm±25%	100mA								ReFlow
	1008 p159	1.2	DLM2HGN601SZ3	600ohm±25%	100mA							Flow	ReFlow
Film Type for Differential Signal Lines	03025 p160	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	New	Kit			UD	Zmatch		ReFlow
		0.45	DLP0NSC280HL2	28ohm±20%	100mA		Kit			UD	Zmatch		ReFlow
	0504 p162	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
	p163	0.3	DLP11TB800UL2	80ohm±25%	100mA	New	Kit			UD	Zmatch		ReFlow
	1206 p164	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 p165	0.45	DLP1NDN350HL4	35ohm±20%	100mA	New	Kit			UD	Zmatch		ReFlow
		0.45	DLP1NDN670HL4	67ohm±20%	80mA	New	Kit			UD	Zmatch		ReFlow
		0.45	DLP1NDN900HL4	90ohm±20%	60mA	New	Kit			UD	Zmatch		ReFlow
	0804 p166	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 p168	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
Wire Wound Type for Differential Signal Lines	0805 p169	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
	p171	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
	1206 p172	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

Continued on the following page.

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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 Power Lines and Signal Lines	2014 p156	4.3	DLW5AHN402SQ2	4000ohm(Typ.)	200mA	Kit ReFlow
	2020 p156 p157	4.5	DLW5BSN191SQ2	190ohm(Typ.)	5000mA	Kit ≧3A ReFlow
		4.5	DLW5BSN351SQ2	350ohm(Typ.)	2000mA	Kit ≧1A ReFlow
		4.5	DLW5BSN102SQ2	1000ohm(Typ.)	1500mA	Kit ≧1A ReFlow
		4.5	DLW5BSN152SQ2	1500ohm(Typ.)	1000mA	Kit ≧1A ReFlow
		4.5	DLW5BSN302SQ2	3000ohm(Typ.)	500mA	Kit ReFlow
		2.5	DLW5BTN101SQ2	100ohm(Typ.)	6000mA	Kit ≧3A ReFlow
		2.5	DLW5BTN251SQ2	250ohm(Typ.)	5000mA	Kit ≧3A ReFlow
		2.5	DLW5BTN501SQ2	500ohm(Typ.)	4000mA	Kit ≧3A ReFlow
		2.5	DLW5BTN102SQ2	1000ohm(Typ.)	2000mA	Kit ≧1A ReFlow
		2.5	DLW5BTN142SQ2	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	12.9x6.6 (mm) p173	9.4	PLT10HH401100PN	400ohm	10A	New Kit ≧10A ReFlow
		9.4	PLT10HH501100PN	500ohm	10A	New Kit ≧10A ReFlow
		9.4	PLT10HH9016R0PN	900ohm	6A	New Kit ≧3A ReFlow
		9.4	PLT10HH1026R0PN	1000ohm	6A	New Kit ≧3A ReFlow