



SimSurfing Noise Filter Design Support Tool Operation Manual

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Murata Manufacturing Co., Ltd.



	Page
1. About This Tool	
<u>1-1. Outline</u>	3
2. Quick Operation Guide	
<u>2-1. Start of This Tool</u>	4
<u>2-2. Screen Configuration</u>	5
<u>2-3. How to Use Each Component</u>	6
3. Use Cases and Detailed Description	
<u>3-1. Using a Murata-recommended Circuit</u>	10
<u>3-2. Configuring Circuits Without the Use of Recommended Circuits</u>	13
<u>3-3. Configuring a Circuit Based on an Existing Circuit</u>	18
<u>3-4. [Notes] Filter Circuit Configuration Settings</u>	22

1. About This Tool

1-1. Outline

- What can this tool be used for

This tool calculates and graphs insertion loss characteristics for filter circuits based on items selected from the Murata components suitable for automobile use, which form the elements in the filter circuit.

Murata components
Power inductor (L)
Ferrite bead (BEAD)
Common mode choke coil (CMCC)
Multilayer ceramic capacitor (MLCC)
*Only fixed numbers can be selected

- Features
 - ✓ Filter circuits can consist of up to eight elements.
 - ✓ Selecting the frequency range you wish to reduce noise for will display **Murata-recommended filter circuit details** by default. You can also easily select element items by specifying the application and the rated current/rated voltage.

2. Quick Operation Guide

2-1. Start of This Tool

- Click the [Noise Filter Design Support Tool] on the top page of SimSurfing, the screen of this tool is displayed.

The screenshot displays the SimSurfing Design Support Software interface. On the left, the 'Selection Tool' section highlights the 'Noise Filter Design Support Tool'. A red arrow points from this tool to the main settings window. The settings window is divided into 'Settings' and 'Simulation result' tabs. The 'Settings' tab includes fields for Application (Powertrain/safety), Rated current of L/Bead/CMCC (0.05 A), Rated voltage of MLCC/CMCC (6.3 V), and Target frequency range for noise reduction (0.15MHz~10MHz). The 'Simulation result' tab shows 'Differential mode Insertion loss' and 'Common mode Insertion loss'. Below the settings, the 'Simulation circuit' section shows a circuit diagram with components C1, L1, and C2. A table of items lists the components: C1 (MLCC, 10uF), L1 (LQH32PH220MNC), and C2 (MLCC, 10uF). The table also includes a description and grade for each component.

Settings

Application: ☒ Powertrain/safety ☐ Infotainment

Rated current of L/Bead/CMCC: A * Select the rated current required for the part

Rated voltage of MLCC/CMCC: V * Select the rated voltage required for the part

Target frequency range for noise reduction: ☒ 0.15MHz~10MHz ☐ 20MHz~300MHz ☐ 300MHz~1GHz
(L/M/W/SW band, etc.) (FM band/VHF/Band3, etc.) (DAB/GPS band, etc.)

Simulation result

Differential mode Insertion loss *Parameter Port Setting

Common mode Insertion loss *Parameter Port Setting

Simulation circuit **Run**

Recommended

Circuit configuration

	Element1	Element2	Element3	Element4	Element5	Element6	Element7	Element8
Recommended	C	L	C					

Circuit diagram showing components C1, L1, and C2 connected in series between ports P2 and P1.

*The recommended circuit configuration and items cannot be changed.

Items

Item	Description	Grade
C1	MLCC, 10uF	
L1	LQH32PH220MNC	Powertrain/Safety
C2	MLCC, 10uF	

This is the IL calculation for the initial characteristics of a typical MLCC (ambient temp. 25 deg C).
Rated Voltage and Current of selected filter
 V A

2. Quick Operation Guide

2-2. Screen Configuration

- This tool consists of four elements.

Select/Settings	Output
(a) Select conditions	(d) Insertion loss display
(b) Circuit configuration	
(c) Item selection	

The screenshot shows the MuRata IL Calculator software interface. It is divided into several sections:

- Settings (a):** Located at the top left, it includes tabs for Settings, Circuit, Simulation, User manual, Explanation video, and Help. The Settings tab is active, showing options for Application (Powertrain/safety, Infotainment), Rated current of L/Bead/CMCC (0.05 A), Rated voltage of MLCC/CMCC (6.3 V), and Target frequency range for noise reduction (0.15MHz~10MHz, 20MHz~300MHz, 300MHz~1GHz).
- Simulation result (d):** Located at the top right, it shows tabs for Differential mode Insertion loss and Common mode Insertion loss.
- Simulation circuit (b):** Located at the bottom left, it shows a circuit diagram with components C1, L1, and C2. Below the diagram, it states: "The recommended circuit configuration and items cannot be changed."
- Items (c):** Located at the bottom right, it shows a table of recommended items for the circuit configuration.

Item	Description	Grade
C1	MLCC 10uF	
L1	LQH32PH220MNC 22.0uH/550.0mA/0.685ohm/1210/3225(inch/mm)/1.7mm	Powertrain/Safety
C2	MLCC 10uF	

Rated Voltage and Current of selected filter
6.3 V 0.55 A

2. Quick Operation Guide

2-3. How to Use Each Component (1/4)



(a) Select conditions	Select the application, the rated current/rated voltage, and the target frequency range for noise reduction
(b) Circuit configuration	Filter circuit configuration
(c) Item selection	Selecting circuit component element items
(d) Insertion loss display	Graphs showing differential mode insertion loss and common mode insertion loss (if CMCC is selected) are displayed

(a) Select conditions

The assistance feature provided with this tool recommends filter circuit configurations and items meeting the conditions you have selected.

*You do not need to select conditions when opting to not use the recommended circuit.

Settings

Application ?

☒ Powertrain/safety
 ☐ Infotainment

Rated current of L/Bead/CMCC ?

0.05

A

* Select the rated current required for the part

Rated voltage of MLCC/CMCC ?

6.3

V

* Select the rated voltage required for the part

Target frequency range for noise reduction ?

☒ 0.15MHz~10MHz (LW/MW/SW band, etc.)
 ☐ 20MHz~300MHz (FM band/VHF/Band3, etc.)
 ☐ 300MHz~1GHz (DAB/GPS band, etc.)

How to operate	
1	Select an application.
2	Select the L, BEAD, CMCC rated current from the pull-down menu.
3	Select the C and CMCC rated voltage from the pull-down menu.
4	Select the target frequency range for noise reduction (multiple choices allowed).

*Further details on terms, etc. can be found by clicking on ?

2. Quick Operation Guide

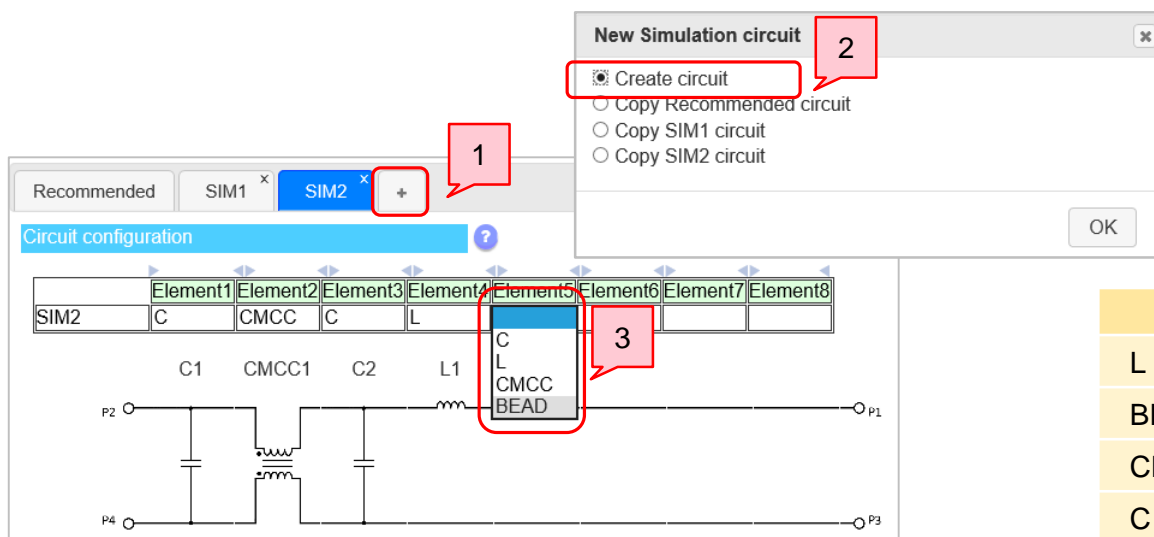
2-3. How to Use Each Component (2/4)

(b) Select the circuit configuration

Select up to eight elements from L, BEAD, CMCC and C to configure a filter circuit to calculate insertion loss for.

*To use the recommended circuit (based on selected conditions), select the Recommended tab to automatically configure the circuit. Note that circuit configurations in the Recommended tab cannot be changed here.

How to operate		
Configuring a new circuit	1	Click the “+” tab.
	2	When the pop-up message appears, select “Create circuit”. (To configure a circuit based on an existing circuit, select the circuit you wish to copy from the pop-up message).
Circuit configuration method	3	Click the “Element” cell, and select from L, BEAD, CMCC and C appearing in the pull-down menu.



Circuit symbol descriptions	
L	Power inductor
BEAD	Ferrite bead
CMCC	Common mode choke coil
C	Multilayer ceramic capacitor

2. Quick Operation Guide

2-3. How to Use Each Component (3/4)

(c) Item selection

Elements items making up a circuit are selected using “mini SimSurfing”. This allows for the selection of items which specify the values and ranges for each electric characteristic item.

* To use the recommended circuit (based on selected conditions), select the Recommended tab to automatically configure the circuit.

Note that circuit configurations in the Recommended tab cannot be changed here.

This is the IL calculation for the initial characteristics of a typical MLCC (ambient temp. 25 deg C).
Rated Voltage and Current of selected filter
25 V 5 A

How to operate

- 1 Click the “Item” cell you wish to set.
- 2 Select items using the mini SimSurfing pop-up.
- 3 Click the Set bar at the bottom of the mini SimSurfing window.
- 4 Close mini SimSurfing and return to the tool screen.

*Only fixed values can be used for MLCC

Select the Part Number, and then click this button.

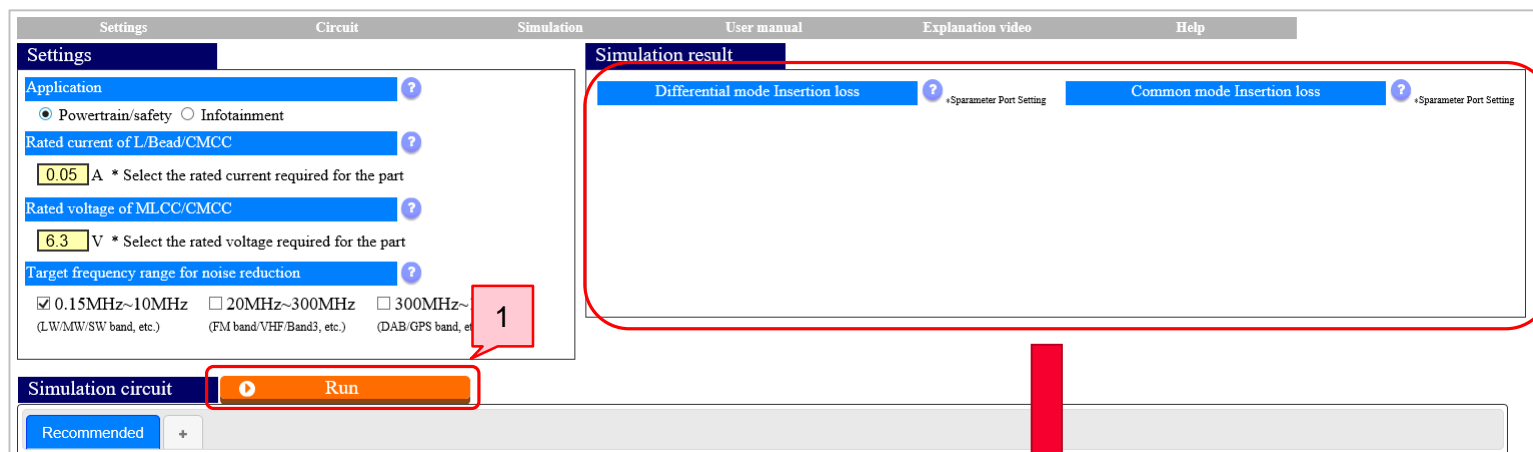
[PLT5BPH1015R6SN] Select the Part Number, and then click this button.

2. Quick Operation Guide

2-3. How to Use Each Component (4/4)

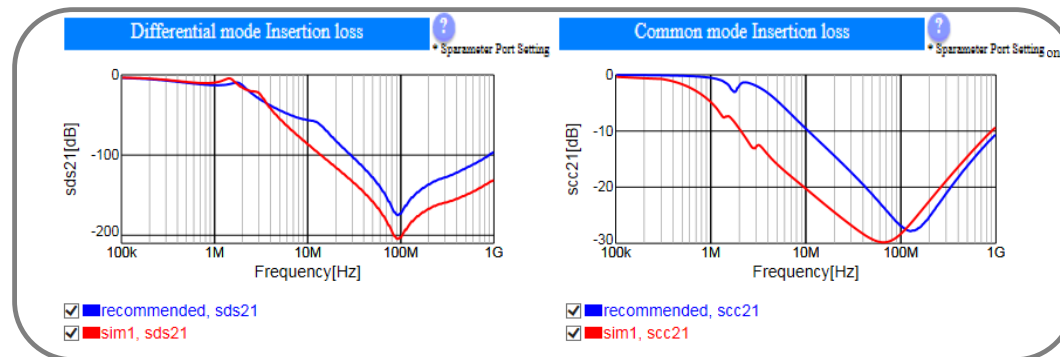
(d) Displaying insertion loss characteristics

Insertion loss is calculated and displayed based on circuit configurations and items set or selected.



How to operate

- 1 Click the “Run” button
- 2 The graph will appear



3. Use Cases and Detailed Description

3-1. Using a Murata-recommended Circuit (1/3)

(Case) A user wishes to reduce noise in the 100 MHz range, for a circuit used for infotainment, with a rated current of 3 A, and a rated voltage of 50 V required for the filter.

[1] Select the conditions

Settings Circuit Simulation User manual Explanation video Help

Settings

Application ?
☒ Powertrain/safety ☐ Infotainment

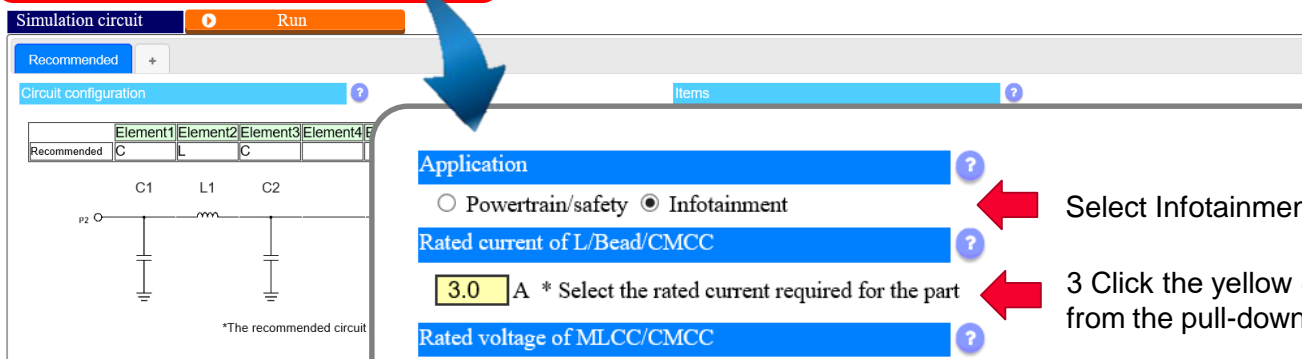
Rated current of L/Bead/CMCC ?
0.05 A * Select the rated current required for the part

Rated voltage of MLCC/CMCC ?
6.3 V * Select the rated voltage required for the part

Target frequency range for noise reduction ?
☒ 0.15MHz~10MHz ☐ 20MHz~300MHz ☐ 300MHz~1GHz
(LW/MW/SW band, etc.) (FM band/VHF/Band3, etc.) (DAB/GPS band, etc.)

Simulation result

Differential mode Insertion loss ? *Parameter Port Setting Common mode Insertion loss ? *Parameter Port Setting



Application ?
☐ Powertrain/safety ☒ Infotainment **Select Infotainment**

Rated current of L/Bead/CMCC ?
3.0 A * Select the rated current required for the part **3 Click the yellow cell, and then select "3.0" from the pull-down menu.**

Rated voltage of MLCC/CMCC ?
50 V * Select the rated voltage required for the part **3 Click the yellow cell, and then select "50" from the pull-down menu.**

Target frequency range for noise reduction ?
☐ 0.15MHz~10MHz ☒ 20MHz~300MHz ☐ 300MHz~1GHz **Select "20 MHz ~ 300 MHz" to include the target frequency range of 100 MHz**
(LW/MW/SW band, etc.) (FM band/VHF/Band3, etc.) (DAB/GPS band, etc.)

3. Use Cases and Detailed Description

3-1. Using a Murata-recommended Circuit (2/3)

[2] Display the circuit configuration and items (automatic)

Settings

Application

☐ Powertrain/safety
 ☒ Infotainment

Rated current of L/Bead/CMCC

3.0

 A
 * Select the rated current required for the part

Rated voltage of MLCC/CMCC

50

 V
 * Select the rated voltage required for the part

Target frequency range for noise reduction

☐ 0.15MHz~10MHz
(LW/MW/SW band, etc.)
☒ 20MHz~300MHz
(FM band/VHF/Band3, etc.)
☐ 300MHz~1GHz
(DAB/GPS band, etc.)

Simulation result

Differential mode Insertion loss

Common mode Insertion loss

Simulation circuit

Run

Recommended

Circuit configuration

	Element1	Element2	Element3	Element4	Element5	Element6	Element7	Element8
Recommended	C	CMCC	C	BEAD	C			

C1

CMCC1

C2

BEAD1

C3

*The recommended circuit configuration and items cannot be changed.

Items

	Item	Description	Grade
C1	MLCC 0.01uF		
CMCC1	DLW5BTZ251TQ2	250.0ohm/3000.0mA/50.0V/0.02ohm/5050mm/2.5mm	Infotainment
C2	MLCC 0.01uF		
BEAD1	BLM18KG121TZ1	120.0ohm/3000.0mA/0.03ohm/1608mm (0603inch)0.75mm	Infotainment
C3	MLCC 0.01uF		

This is the IL calculation for the initial characteristics of a typical MLCC (ambient temp. 25 deg C).
Rated Voltage and Current of selected filter

50

 V

3

 A

The circuit configuration and items will appear automatically when conditions are selected.

3. Use Cases and Detailed Description

3-1. Using a Murata-recommended Circuit (3/3)

[3] Display the insertion loss graphs

Click the “Run” button.

The graph will appear.

The screenshot shows the Murata simulation software interface. The 'Settings' tab is active, showing application settings for 'Infotainment'. The 'Run' button is highlighted with a red box and a red arrow. The 'Simulation result' tab is also visible, showing two graphs: 'Differential mode Insertion loss' and 'Common mode Insertion loss'. Both graphs show insertion loss in dB versus frequency in Hz on a logarithmic scale. The 'Differential mode Insertion loss' graph shows a sharp dip at 100 MHz, while the 'Common mode Insertion loss' graph shows a broader dip at the same frequency. Below the graphs, the 'Simulation circuit' tab is active, showing a circuit configuration with elements C1, CMCC1, C2, BEAD1, and C3. A table of items is also displayed, listing the components and their specifications.

Item	Description	Grade
C1	MLCC 0.01uF	
CMCC1	DLW5BTZ251TQ2	Infotainment
C2	MLCC 0.01uF	
BEAD1	BLM18KG121TZ1	Infotainment
C3	MLCC 0.01uF	

Rated Voltage and Current of selected filter
50 V 3 A

*Recommended circuit configurations and items cannot be changed here.

First copy the Recommended circuit before making changes to Recommended circuit configurations and items.
For more details, see “3-4. [Notes] Filter Circuit Configuration Settings”.

3. Use Cases and Detailed Description

3-2. Configuring Circuits Without the Use of Recommended Circuits (1/5)

(Case) A user wishes to reduce noise in the 100 MHz range for a C-L-C pi-type filter used in powertrain applications, with rated current of 3 A required for the filter.

[1] Bring up the design new circuit tab

* Conditions do not need to be set

(1) Click the "+" tab

(2) When the pop-up message appears, select "Create circuit"

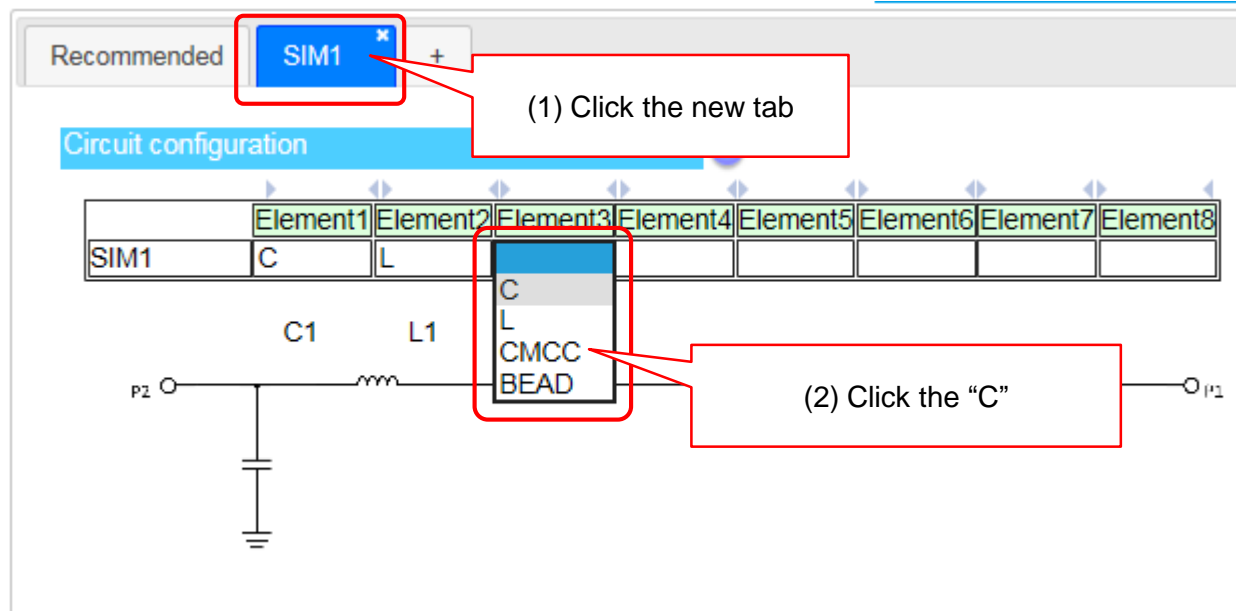
Item	Description	Grade
	This is the IL calculation for the initial characteristics of a typical MLCC (ambient temp. 25 deg C).	
	Rated Voltage and Current of selected filter	
	V	A

-> The "Sim x" tab will appear, allowing you to design a new circuit.

3. Use Cases and Detailed Description

3-2. Configuring Circuits Without the Use of Recommended Circuits (2/5)

[2] Filter circuit configuration



-> Click the "Element" cell in the new tab, and select "C" for Element 1, "L" for Element 2, and "C" for Element 3 from L, BEAD, CMCC and C in the pull-down menu to configure a C-L-C pi-type filter.

3. Use Cases and Detailed Description

3-2. Configuring Circuits Without the Use of Recommended Circuits (3/5)

[3]-1 Select the first item used to configure the circuit

-> For MLCC, select the capacitance.

Items ?

	Item	Description	Grade
C1	MLCC		
L1	Click here to select an item!		
C2	MLCC		
	0.001uF		
	0.0022uF		
	0.0047uF		
	0.01uF		
	0.022uF		
	0.047uF		
	0.1uF		
	0.22uF		
	0.47uF		
	1uF		
	2.2uF		
	4.7uF		
	10uF		

Rated Voltage V A

This is the IL calculation for the initial characteristics of a typical MLCC (ambient temp. 25 deg C).
of selected filter

[3]-2 Select the second element used to configure the circuit

[3]-2-1. To select the inductor (L), click the (“Click here to select a product”) cell in the “Item” column.

Items ?

	Item	Description	Grade
C1	MLCC 4.7uF		
L1	Click here to select an item!		
C2	MLCC 4.7uF		

Rated Voltage and Current of selected filter

V A

This is the IL calculation for the initial characteristics of a typical MLCC (ambient temp. 25 deg C).

3. Use Cases and Detailed Description

3-2. Configuring Circuits Without the Use of Recommended Circuits (4/5)

[3]-2-2. When the mini SimSurfing pop-up appears:

- Select "Powertrain/Safety" under Application.
- Set the minimum indicator value to "3000 mA" under Rated current (I_{temp}).
- Click on the Inductance field to rearrange results in descending order.
- Select items with the largest L value from the sizes permitted
- Click the blue bar on the bottom of the mini SimSurfing window to confirm the selected items. The name of the selected item will appear in the blue bar.

<mini SimSurfing>

Display Part Series

Select P/N : MDH12577C-150MA Items 40 (iv)

☒ General
☒ Automotive

Part Number Search:

Inductance: ≤ 470 uH = uH ≥ 0.24 uH

Size code: ☒ (Select All) ☒ 0805/2012 ☒ 0806/2016 ☒ 1008/2520

T size: ≤ 8 mm = mm ≥ 0.6 mm

I_{temp}: ≤ 5000 mA = mA ≥ 3000 mA (ii)

I_{saturation}: ≤ 19000 mA = mA ≥ 0 mA

DC Resistance: ≤ 7.3 ohm = ohm ≥ 0 ohm

DC Resistance: ≤ 8.76 ohm = ohm ≥ 0 ohm

Application: ☒ (Select All) ☐ General ☐ Infotainment ☒ Powertrain/Safety (i)

Part Number	Inductance(uH)	Size code (inch/mm)	T size (mm Max.)	I _{temp} .(mA)	I _{saturation} (mA)	DCR (ohm Typ.)	DCR (ohm Max.)	Application
DFEH12060D-470M	47	5150/130126	6	3600	3000	0.066	0.079	Powertrain/Safety
DFEG12060D-470M	47	5150/130126	6	3600	3000	0.066	0.079	Powertrain/Safety
DFEH12060D-330M	33	5150/130126	6	4200	3400	0.045	0.054	Powertrain/Safety
DFEH10040D-330M	33	4339/109100	4	3300	3000	0.089	0.107	Powertrain/Safety
DFEG12060D-330M	33	5150/130126	6	4200	3400	0.045	0.054	Powertrain/Safety
DFEG10040D-330M	33	4339/109100	4	3300	3000	0.089	0.107	Powertrain/Safety
MDH12577C-220MA	22	5049/128125	8	3000	4900	0.033	0.0429	Powertrain/Safety
DFEH10040D-220M	22	4339/109100	4	3800	4000	0.058	0.07	Powertrain/Safety
DFEG10040D-220M	22	4339/109100	4	3800	4000	0.058	0.07	Powertrain/Safety
MDH12577C-150MA	15	5049/128125	8	3600	5700	0.022	0.0286	Powertrain/Safety
MDH10060C-150MA	15	4039/101100	6.3	3100	3400	0.027	0.0351	Powertrain/Safety

(iii)

(v) [MDH12577C-150MA] Select the Part Number, and then click this button.

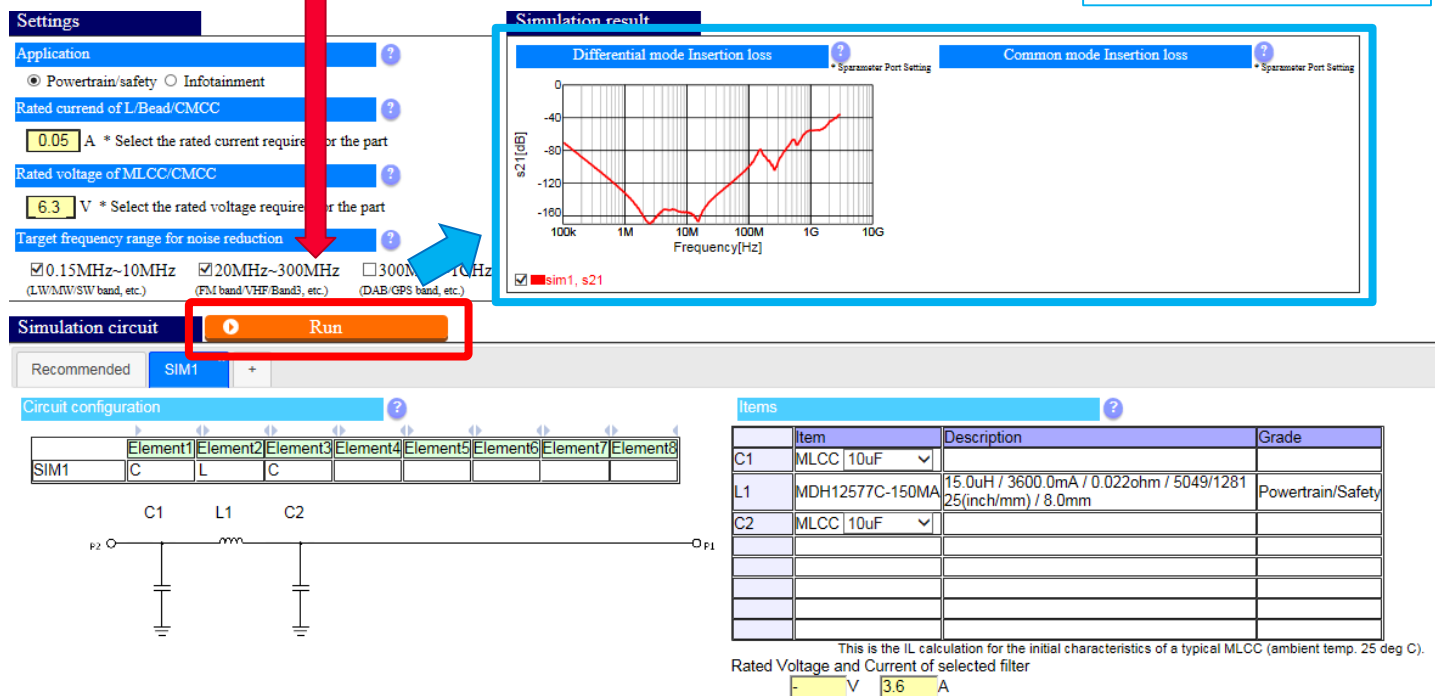
3. Use Cases and Detailed Description

3-2. Configuring Circuits Without the Use of Recommended Circuits (5/5)

[4] Display the insertion loss characteristic graphs

Click the “Run” button.

The graph will appear.



3. Use Cases and Detailed Description

3-3. Configuring a Circuit Based on an Existing Circuit (1/4)

(Case) After displaying a graph where a recommended circuit is used as a filter circuit for reducing noise in the FM band used in powertrain applications, with a rated current/voltage of 2 A/50 V, a user wishes to verify the degree to which insertion loss is improved from enlarging the CMCC and BEAD based on this circuit.

[1] Copy the original circuit

Settings

Application: ☒ Powertrain/safety ☐ Infotainment

Rated current of L/Bead/CMCC: **2.0** A * Select the rated current required for the part

Rated voltage of MLCC/CMCC: **50** V * Select the rated voltage required for the part

Target frequency range for noise reduction:

☐ 0.15MHz~10MHz (LW/MF/SW band, etc.) ☒ 20MHz~300MHz (FM band/VHF/Band3, etc.) ☐ 300MHz~1GHz (DAB/GPS band, etc.)

Simulation circuit **Run**

Recommended: **+**

Simulation result

Differential mode Insertion loss: **sds21[dB]** vs **Frequency[Hz]**

Common mode Insertion loss: **scc21[dB]** vs **Frequency[Hz]**

Copy Filter

☐ Create circuit

☒ Copy Recommended circuit

(1) Click the "+" tab.

(2) When the pop-up message appears, select "Copy recommended circuit".

CMCC1 DI
C2 M
BEAD1 BL
C3 MLCC 0.01uF
Rated Voltage and Current of selected filter: **50** V **2** A

This is the IL calculation for the initial characteristics of a typical MLCC (ambient temp. 25 deg C).

->This will create the "SIM1" tab and copy over the circuit configuration and elements.

3. Use Cases and Detailed Description

3-3. Configuring a Circuit Based on an Existing Circuit (2/4)

[2] Reselect items

[2]-1. Click the Item column for CMCC or BEAD.

Recommended

SIM2

+

Circuit configuration

	Element1	Element2	Element3	Element4	Element5	Element6	Element7	Element8
SIM2	C	CMCC	C	BEAD	C			

C1

CMCC1

C2

BEAD1

C3

Items

	Item	Description	Grade
C1	MLCC 0.01uF		
CMCC1	DLW5BTH102TQ2	1000.0ohm / 2000.0mA / 50.0V / 0.034ohm / 5050 / 2.5mm	Powertrain/Safety
C2	MLCC 0.01uF		
BEAD1	BLM18KG221SH1	220.0ohm / 2200.0mA / 0.05ohm / 1608mm (0603inch) / 0.95mm	Powertrain/Safety
C3	MLCC 0.01uF		

This is the IL calculation for the initial characteristics of a typical MLCC (ambient temp. 25 deg C).
Rated Voltage and Current of selected filter
50 V 2 A

3. Use Cases and Detailed Description

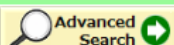
3-3. Configuring a Circuit Based on an Existing Circuit (3/4)

[2]-2. When the mini SimSurfing (item refinement tool) pop-up appears:

(BEAD used for this example)

- Select "Powertrain/Safety" under Application.
- Set the minimum indicator value to "2000 mA" under Rated current.
- Click on the Impedance field to rearrange results in descending order.
- Select items with the largest impedance value from the sizes permitted
- Click the blue bar on the bottom of the mini SimSurfing window to confirm the selected items. The name of the selected item will appear in the blue bar.

<mini SimSurfing>

Select P/N : BLM31KN102SH1 Items 50 (iv) ☒ General ☒ Automotive 

Part Number Search: Clear Conditions

Impedance: ≤ 2700 ohm = ohm ≥ 0 ohm (iii)

Impedance: ≤ 3000 ohm = ohm ≥ 0 ohm

Size Code: (iv) ☒ (Select All) ☒ 0603mm (0201in) ☒ 1005mm (0402in) ☒ 1608mm (0603in)

T size: (mm Max.) ☒ (Select All) ☒ 0.33 ☒ 0.55 ☒ 0.65

DC Resistance: ≤ 3.8 ohm = ohm ≥ 0 ohm

Rated Current: ≤ 12000 mA = mA ≥ 2000 mA (ii)

Target Noise: ☒ (Select All) ☒ 700MHz ☒ GHz ☒ High GHz

Applicable Signal Speed: ☒ (Select All) ☒ - ☒ General ☒ High Speed

Application: (i) ☒ (Select All) ☐ Infotainment ☒ Powertrain/Safety

Part Number	Impedance @100MHz [ohm]	Impedance @1GHz [ohm]	Size Code	T size (mm Max.)	DC Resistance (ohm Max.)	Rated Current (mA)	Target Noise Frequency	Applicable Signal Speed	Application
BLM31KN102SH1	1000		3216mm (1206inch)	1.8	0.075	2000	Normal	General	Powertrain/Safety
BLM31KN801SH1	800		3216mm (1206inch)	1.8	0.05	2500	Normal	General	Powertrain/Safety
BLM31KN601SH1	600		3216mm (1206inch)	1.8	0.038	2900	Normal	General	Powertrain/Safety
BLM31KN601BH1	600		3216mm (1206inch)	1.8	0.038	2000	Normal	General	Powertrain/Safety
BLM41PG471SH1	470		4516mm (1806inch)	1.8	0.05	2000	Normal	General	Powertrain/Safety
BLM31KN471SH1	470		3216mm (1206inch)	1.8	0.02	4000	Normal	General	Powertrain/Safety
BLM31KN471BH1	470		3216mm (1206inch)	1.8	0.02	2700	Normal	General	Powertrain/Safety

(v) [BLM31KN102SH1] Select the Part Number, and then click this button.

3. Use Cases and Detailed Description

3-3. Configuring a Circuit Based on an Existing Circuit (4/4)

[3] Display the insertion loss graphs

Click the "Run" button.

Graphs can be compared.

The screenshot displays the Murata simulation software interface. The 'Settings' panel on the left includes options for Application (Powertrain/safety selected), Rated current of L/Bead/CMCC (2.0 A), Rated voltage of MLCC/CMCC (50 V), and Target frequency range for noise reduction (20MHz~300MHz selected). A red arrow points to the 'Run' button in the 'Simulation circuit' panel. The 'Simulation result' panel shows two graphs: 'Differential mode Insertion loss' and 'Common mode Insertion loss', both plotting sds21[dB] against Frequency[Hz] on a log scale from 100k to 1G. Both graphs compare 'recommended' (blue line) and 'sim1' (red line) results. The 'Circuit configuration' panel shows a schematic with components C1, CMCC1, C2, BEAD1, and C3. The 'Items' table lists the components and their specifications.

Item	Description	Grade	
C1	MLCC [0.01uF]		
CMCC1	PLT5BPH5013R1SN	500.0ohm / 3100.0mA / 80.0V / 0.0221ohm / 6350mm / 5.0mm	Powertrain/Safety
C2	MLCC [0.01uF]		
BEAD1	BLM31KN102SH1	1000.0ohm / 2000.0mA / 0.075ohm / 3216mm (1206inch) / 1.8mm	Powertrain/Safety
C3	MLCC [0.01uF]		

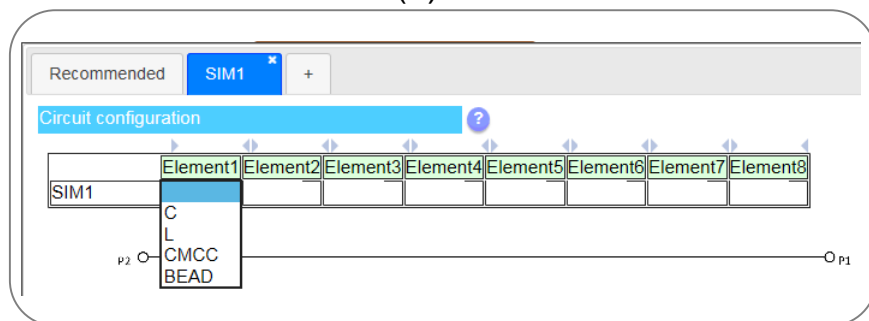
This is the IL calculation for the initial characteristics of a typical MLCC (ambient temp. 25 deg C).
Rated Voltage and Current of selected filter
50 V 2 A

3. Use Cases and Detailed Description

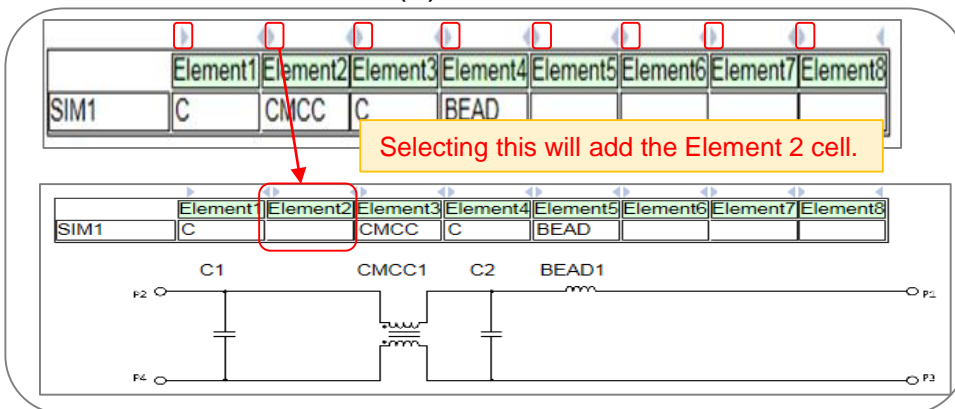
3-4. [Notes] Filter Circuit Configuration Settings

(1)	Changing elements	Click the Element cell, and then select the corresponding element from L, BEAD, CMCC and C.
(2)	Adding elements	Click the right-facing arrow above an Element cell to add a cell, which can be used to select the element to add.
(3)	Deleting elements	Click the left-facing arrow above an Element cell to delete a cell and its element together.

(1)



(2)



(3)

