



SimSurfing: Operation Manual for Medium Voltage Capacitor Selection Tool

Ver.1.03

Murata Manufacturing Co., Ltd



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1. About This Software

1-1. Overview

The SimSurfing medium voltage capacitor selection tool (simply called "this software" below) is a program for selecting the recommended capacitor suitable for your usage conditions from Murata's temperature-compensating capacitors having a rated voltage of 250 V or more (some exclusions).

Displays the recommended values for the allowable voltage, allowable current, number of series, number of parallel, total number of parts, and mounting area of the target Murata product for the usage conditions (capacitance, sinusoidal voltage, sinusoidal frequency, capacitor surface temperature, mounting interval). In the default settings, capacitors are displayed starting from the smallest mounting area.

Please Choose:
English

Search/View Window Help Link←Click here for Products with U2J temperature characteristics

Selection

Operation manual
Precautions for use

▶ **Calculation**

Clear

Capacitance of the resonant circuit: 100.00 [nF]
Frequency: 200.00 [kHz]
Voltage applied to the resonant circuit: 700 [V(p-p)]
Current of the resonant circuit: 31.10 [A(r.m.s.)]
Capacitor surface temperature: 105.00 [°C]
Mounting interval in the L direction: 1 [mm]
Mounting interval in the W direction: 1 [mm]

☐ Mission profile
☐ Arbitrary voltage waveform

Select file Not selected

Upload Clear

☒ Search Function On/Off
Select P/N : GCM32E5C2J333JX0AL

Save as CSV

☒ General
☒ Automotive ☐ Multiple Graphs

Allow. V(p-p)-Freq.

Allow. A(r.m.s.)-Freq.

Temp.rise

Product Detail

Items 409

Part Number	Status	Capacitance	Rated	Maximum	Temperature	Size Code	T	Capacitance	Allowable	Allowable	Number	Number	Total count	Total	Mounting area
Part Number Search	(Select All)	≤ 54 nF	≤ 1000 V	≤ 125	(Select All)	(Select All)	≤ 6.2	≤ 5 %	≤ 1000 V	≤ 7.8 A	≤ 3	≤ 30000	≤ 90000	≤ 110	≤ 121680
Clear Conditions	<input checked="" type="checkbox"/> Under development <input checked="" type="checkbox"/> In Production	= 54 nF ≥ 0.01 nF	= V ≥ 250 V	= ≥ 125	<input checked="" type="checkbox"/> COG	<input checked="" type="checkbox"/> 1608M/0603 <input checked="" type="checkbox"/> 2012M/0805	= ≥ 0.8	= % ≥ 5 %	= ≥ 250 V	= ≥ 0.001 A	= ≥ 1	= ≥ 5	= ≥ 10	= ≥ 94.5	= ≥ 244
Part Number	Status	Capacitance [nF](Nominal value)	Rated voltage [V]	Maximum operating temperature [°C]	Temperature Characteristics	Size Code [mm]/[inch]	T size [mm]	Capacitance tolerance [%]	Allowable voltage [V(p-p)]	Allowable current [A(r.m.s.)]	Number of series	Number of parallel	Total count	Total capacity [nF]	Mounting area [mm ²]
GCM32E5C2J333JX0AL	In Production	33	630	125	COG	3225M/1210	2.5	5	431.4	6.3	2	6	12	99	244
GRM32E5C2J333JWAAL	In Production	33	630	125	COG	3225M/1210	2.5	5	431.4	6.3	2	6	12	99	244
GCM32E5C2J273JX03L	In Production	27	630	125	COG	3225M/1210	2.5	5	441.5	5.3	2	7	14	94.5	284

1. About This Software

1-2. Main Features

1. Displays the recommended values for the allowable voltage, allowable current, number of series, number of parallel, total number of parts, mounting area of the target Murata product for the usage conditions (capacitance, sinusoidal voltage, sinusoidal frequency, capacitor surface temperature, mounting interval). In the default settings, capacitors are displayed starting from the smallest mounting area.
2. Displays the allowable voltage characteristics graph, allowable current characteristics graph, and self-heating characteristics graph for the target Murata product.
3. The above calculations and data display can also be performed for mission profiles and arbitrary voltage waveforms by importing a CSV file.

Please Choose:
English

Search/View Window Help Link←Click here for Products with U2J temperature characteristics

Selection

Operation manual
Precautions for use

▶ **Calculation**

Clear

Capacitance of the resonant circuit 100.00 [nF]
Frequency 200.00 [kHz]
Voltage applied to the resonant circuit 700 [V(p-p)]
Current of the resonant circuit 31.10 [A(r.m.s.)]
Capacitor surface temperature 105.00 [°C]
Mounting interval in the L direction 1 [mm]
Mounting interval in the W direction 1 [mm]

☐ Mission profile
☐ Arbitrary voltage waveform

Select file Not selected

Upload Clear

☒ Search Function On/Off
Select P/N : GCM32E5C2J333JX0AL

Save as CSV

☒ General
☒ Automotive ☐ Multiple Graphs

Allow. V(p-p)-Freq.

Allow. A(r.m.s.)-Freq.

Temp.rise

Product Detail

Part Number
Part Number Search
Clear Conditions

Status
☒ (Select All)
☒ Under development
☒ In Production

Capacitance
≤ 54 nF
= nF
≥ 0.01 nF

Rated
≤ 1000 V
= V
≥ 250 V

Maximum
≤ 125
= °C
≥ 125

Temperature
☒ (Select All)
☒ COG

Size Code
☒ (Select All)
☒ 1608M/0603
☒ 2012M/0805

T
≤ 6.2
= mm
≥ 0.8

Capacitance
≤ 5 %
= %
≥ 5 %

Allowable
≤ 1000 V
= V
≥ 250 V

Allowable
≤ 7.8 A
= A
≥ 0.001 A

Number
≤ 3
= 1
≥ 5

Number
≤ 30000
= 10
≥ 10

Total count
≤ 90000
= 110
≥ 94.5

Total
≤ 121680
= 244
≥ 244

2. Quick Operation Guide

2-1. Entering the Usage Conditions

Start this software, and

- (1) Enter the total electrostatic capacitance of the resonant circuit, sinusoidal frequency, voltage applied to the resonant circuit, capacitor surface temperature (including self-heating). Enter the capacitor mounting interval.

*The current flowing in the resonant circuit is automatically calculated.

*For the units of the voltage applied to the resonant circuit, select V (p-p) or V (r.m.s.).

*If the capacitor temperature (including self-heating) in your device is unknown, (2) refer to the self-heating characteristics that were measured by Murata.

Please Choose:

English

Search/View Window Help Link←Click here for Products with U2J temperature characteristics

Operation manual

Precautions for use

▶ Calculation

Clear

Capacitance of the resonant circuit

Frequency

Voltage applied to the resonant circuit

Current of the resonant circuit

Capacitor surface temperature

Mounting interval in the L direction

Mounting interval in the W direction

100.00 [nF]

200.00 [kHz]

700 [V(p-p)]

31.10 [A(r.m.s.)]

105.00 [°C]

1 [mm]

1 [mm]

☐ Mission profile
☐ Arbitrary voltage waveform

Select file

Not selected

Upload

Clear

☒ Search Function On/Off
Select P/N : GCM32E5C2J333JX0AL

Save as CSV

Items 409

☒ General
☒ Automotive ☐ Multiple Graphs

☒ Allow. V(p-p)-Freq.

☒ Allow. A(r.m.s.)-Freq.

☒ Temp.rise

Product Detail

Part Number	Status	Capacitance	Rated	Maximum	Temperature	Size Code	T	Capacitance	Allowable	Allowable	Number	Number	Total count	Total	Mounting area
Part Number Search	(Select All)	≤ 54 nF	≤ 1000 V	≤ 125	(Select All)	(Select All)	≤ 6.2	≤ 5 %	≤ 1000 V	≤ 7.8 A	≤ 3	≤ 30000	≤ 90000	≤ 110	≤ 121680
	<input checked="" type="checkbox"/> Under development	= nF	= V	=	<input checked="" type="checkbox"/> COG	<input checked="" type="checkbox"/> 1608M/0603	=	= %	= V	= A	=	=	=	=	=
	<input checked="" type="checkbox"/> In Production	≥ 0.01 nF	≥ 250 V	≥ 125		<input checked="" type="checkbox"/> 2012M/0805	≥ 0.8	≥ 5 %	≥ 250 V	≥ 0.001 A	≥ 1	≥ 5	≥ 10	≥ 94.5	≥ 244
Part Number	Status	Capacitance [nF](Nominal value)	Rated voltage [V]	Maximum operating temperature [°C]	Temperature Characteristics	Size Code [mm]/[inch]	T size [mm]	Capacitance tolerance [%]	Allowable voltage [V(p-p)]	Allowable current [A(r.m.s.)]	Number of series	Number of parallel	Total count	Total capacity [nF]	Mounting area [mm ²]
GCM32E5C2J333JX0AL	In Production	33	630	125	COG	3225M/1210	2.5	5	431.4	6.3	2	6	12	99	244
GRM32E5C2J333JWAAL	In Production	33	630	125	COG	3225M/1210	2.5	5	431.4	6.3	2	6	12	99	244
GCM32E5C2J273JX03L	In Production	27	630	125	COG	3225M/1210	2.5	5	441.5	5.3	2	7	14	94.5	284

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2. Quick Operation Guide

2-2. Displaying the Calculation Results

- (3) Click the Calculation button.
- (4) The recommended values for the allowable voltage, allowable current, number of series, number of parallel, number of parts, mounting area are calculated for each capacitor.

*In the default settings, capacitors are displayed starting from the smallest mounting area.
They can be sorted by item.

Selection

Operation manual
Precautions for use
Calculation
Clear

Capacitance of the resonant circuit: 100.00 [nF]
Frequency: 200.00 [kHz]
Voltage applied to the resonant circuit: 700 [V(p-p)]
Current of the resonant circuit: 31.10 [A(r.m.s.)]
Capacitor surface temperature: 105.00 [°C]
Mounting interval in the L direction: 1 [mm]
Mounting interval in the W direction: 1 [mm]

Mission profile
Arbitrary voltage waveform
Select file Not selected
Upload Clear

Search Function On/Off
Select P/N : GCM32E5C2J333JX0AL
Items 409
Save as CSV
General
Automotive
Multiple Graphs
Allow. V(p-p)-Freq.
Allow. A(r.m.s.)-Freq.
Temp.rise
Product Detail

Part Number	Status	Capacitance [nF](Nominal value)	Rated voltage [V]	Maximum operating temperature [°C]	Temperature Characteristics	Size Code [mm]/[inch]	T size [mm]	Capacitance tolerance [%]	Allowable voltage [V(p-p)]	Allowable current [A(r.m.s.)]	Number of series	Number of parallel	Total count	Total capacity [nF]	Mounting area [mm ²]
GCM32E5C2J333JX0AL	In Production	33	630	125	COG	3225M/1210	2.5	5	431.4	6.3	2	6	12	99	244
GRM32E5C2J333JWAAL	In Production	33	630	125	COG	3225M/1210	2.5	5	431.4	6.3	2	6	12	99	244
GCM32E5C2J273JX03L	In Production	27	630	125	COG	3225M/1210	2.5	5	441.5	5.3	2	6	12	94.5	284

Sort Ascending
Sort Descending
Remove Sort

2. Quick Operation Guide

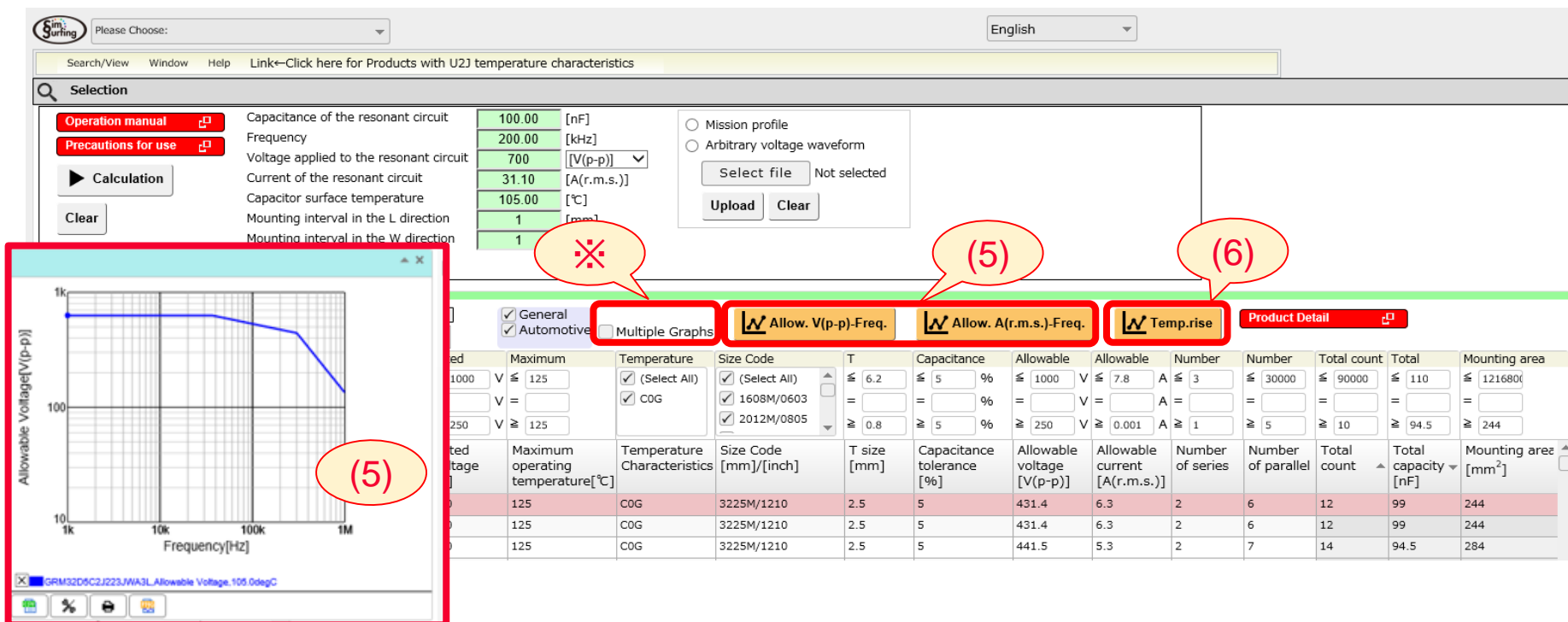
2-3. Displaying the Allowable Voltage, Allowable Current, and Temperature Rise ΔT Graphs

(5) Select the product name, and click the Allow.V(p-p)-Freq or Allow.A(r.m.s.)-Freq button to display the allowable voltage or allowable current-frequency characteristics.

*If you perform the operation in step (5) before clicking the Calculation button, the characteristics for an individual capacitor will be displayed.

(6) Clicking the Temp.rise button displays the temperature rise ΔT characteristics.

*If you insert a check mark for Multiple Graphs in steps (5) or (6), the graphs will be overlaid. Also, if you move the marker over a graph line, the numerical calculation result appears.



2. Quick Operation Guide

2-4. Optional Function: Support for Mission Profiles

The same calculations can also be performed by importing a CSV file where the mission profile was input.

(7) Enter the capacitance of the resonant circuit.

(8) Select the mission file.

(9) Select the voltage units of the imported CSV file, and click the OK button.

*You can download a sample CSV file by clicking the Sample Data button.

(10) Click the Select file button, and select the prepared CSV file.

(11) Click the Upload button to upload the CSV file.

(12) Clicking the Calculation button will calculate the recommended values for the allowable voltage, allowable current, number of series, number of parallel, number of parts, total capacitance, and mounting area for each capacitor.

The screenshot shows the muRata simulation software interface. The top bar includes a language dropdown set to 'English'. Below it is a menu bar with 'Search/View', 'Window', and 'Help'. A 'Link' button is also present. The main area is divided into several sections:

- Selection Section:** Contains a 'Please Choose:' dropdown, a 'Search/View' button, and a 'Link' button. Below this is a 'Selection' section with a search bar and a list of items. A red box highlights the 'Calculation' button, labeled (12).
- Operation manual / Precautions for use:** A sidebar on the left with a 'Calculation' button, labeled (12).
- Input Fields:** A table of input parameters with values and units. A red box highlights the 'Capacitance of the resonant circuit' field, labeled (7). Another red box highlights the 'Mission profile' radio button, labeled (8).
- Buttons:** A red box highlights the 'Select file' button, labeled (10). Another red box highlights the 'Upload' button, labeled (11).
- Output Section:** A table of calculated values. A red box highlights the 'Calculation' button, labeled (12).
- Bottom Section:** A table of search results. A red box highlights the 'Sample Data' button, labeled (9).

The bottom section also includes a 'the form of the mission profile' dialog box with a table of mission profile data and instructions on how to prepare the data in CSV format.

condition_No	freq	circuit_vol	sur_temp	ope_time
1	100	100	90	1000
2	100	120	91	900
3	100	140	92	800

Please prepare the data in csv format.
 • Column A is condition No., column B is frequency [kHz], column C is voltage [V], column D is temperature [°C], column E is operation time [hr].
 ※The voltage in column C is a selection formula of V (p-p) and V(r.m.s.).

<<Voltage axis unit>>
☒ V(p-p) ☐ V(r.m.s.)

OK Sample Data

2. Quick Operation Guide

2-5. Optional Function:

Support for Arbitrary Voltage Waveforms

The same calculations can also be performed by importing a CSV file where arbitrary voltage waveform was input (example: data obtained from an oscilloscope).

(13) Enter the capacitance of the resonant circuit and the capacitor surface temperature.

(14) Select the arbitrary voltage waveform.

(15) Select the the time axis unit of the imported CSV file, and click the OK button.

*You can download a sample CSV file by clicking the Sample Data button.

(16) Click the Select file button, and select the prepared CSV file.

(17) Click the Upload button to upload the CSV file.

(18) Clicking the Calculation button will calculate the recommended values for the allowable voltage, allowable current, number of series, number of parallel, number of parts, total capacitance, and mounting area for each capacitor.

The screenshot shows the Murata simulation software interface. The top menu bar includes 'Please Choose:', 'Search/View', 'Window', 'Help', and a language dropdown set to 'English'. Below the menu is a 'Selection' bar. The main area contains a 'Calculation' button (18) and a table of input parameters (13):

Capacitance of the resonant circuit	100.00	[nF]
Frequency	200.00	[kHz]
Voltage applied to the resonant circuit	700	[V(p-p)]
Current of the resonant circuit	31.10	[A(r.m.s.)]
Capacitor surface temperature	105.00	[°C]
Mounting interval in the L direction	1	[mm]
Mounting interval in the W direction	1	[mm]

Below the table are 'Upload' (17) and 'Clear' buttons. To the right, there are radio buttons for 'Mission profile' and 'Arbitrary voltage waveform' (14), and a 'Select file' button (16). A 'Designation of the format in read-in waveform' dialog box (15) is open, showing a table with columns A and B:

	A	B
1	time	circuit_vol
2		0
3	0.001221	700.8111
4	0.002441	700.5455

The dialog box includes instructions: 'Please prepare the data in csv format. Column A is time, and the unit is a selection formula of s and ms and μs. Column B is voltage and unit is V. Prepare csv data for exactly one cycle. Time (column A) does not have the same value.' It also has a '<<Time axis unit>>' section with radio buttons for [s] (selected), [ms], and [us], and 'OK' and 'Sample Data' buttons.

3. Version Check and Contact Information

(19) You can check the version information from the Help tab.

(19)

The screenshot shows the SimSurfing software interface. The 'Help' menu is open, and the 'Version' option is selected. A dialog box titled 'SimSurfing 2.0.21' is displayed, showing the software version and copyright information. The dialog box also lists data versions for various components: MLCCs Data: 20191001_01, Lead Type Ceramic Capacitors Data: 20191001_01, Medium Voltage Capacitors Data: 20161003_01, Polymer Capacitors Data: 20190806_01, Three-Terminal Capacitors Data: 20181004_01, Moldingsmd Capacitors Data: 20190227_01, Ferrite Beads Data: 20190917_01, and Common Mode Chokes Data: 20190905_01. The background interface shows a search bar, a selection list, and a table of product details.

SimSurfing 2.0.21
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Data Version

- MLCCs Data: 20191001_01
- Lead Type Ceramic Capacitors Data: 20191001_01
- Medium Voltage Capacitors Data: 20161003_01
- Polymer Capacitors Data: 20190806_01
- Three-Terminal Capacitors Data: 20181004_01
- Moldingsmd Capacitors Data: 20190227_01
- Ferrite Beads Data: 20190917_01
- Common Mode Chokes Data: 20190905_01

[Inquiry \(Click here\)](#)

Capacitance	Allowable	Allowable	Number	Number	Total count	Total	Mounting area
≤ 5 %	≤ 1000 V	≤ 7.8 A	≤ 3	≤ 30000	≤ 90000	≤ 110	≤ 121680
≤ 5 %	≤ 250 V	≤ 0.001 A	≤ 1	≤ 5	≤ 10	≤ 94.5	≤ 244
Capacitance tolerance [%]	Allowable voltage [V(p-p)]	Allowable current [A(r.m.s.)]	Number of series	Number of parallel	Total count	Total capacity [nF]	Mounting area [mm ²]
5	431.4	6.3	2	6	12	99	244
5	431.4	6.3	2	6	12	99	244
5	441.5	5.3	2	7	14	94.5	284

4. Troubleshooting

If the screen does not appear normal, try clearing the cache in your browser by using the following procedure.

■ Internet Explorer

1. Select Tools > "Internet Options."
2. The "Internet Options" window opens. Select the "General" tab, and under "Browsing history," click the "Delete" button.
3. In the Delete Browsing History window, insert a check mark for all options except "Preserve Favorites website data," and click the "Delete" button.

■ Microsoft Edge

1. Click the ellipsis icon at the top right of the window, and then click "Settings."
2. In the Settings window, click "Choose what to clear."
3. In the Clear browsing data window, insert a check mark for "Cached data and files," and click the "Clear" button.

■ Firefox

1. Click the three lines (Settings) icon at the top right of the window, and then click "Options."
2. In the Options window, select "Privacy & Security," and in the "Cookies and Site Data" section, click "Clear Data."
3. In the Clear Data window, insert a check mark for "Cached Web Content," and click the "Clear" button.

■ Chrome

1. From the menu button at the top right of the window, select "History" > "History."
2. This opens the "History" tab, and so click "Clear browsing data" on the left side of the screen.
3. A Settings tab is added, and a "Clear browsing data" window is opened. For Time range, select "All time," insert a check mark for "Cached images and files," and click the "Clear data" button.

Reference: How to Clear Your Browser Cache;<https://helpx.adobe.com/jp/legacy/kb/222659.html>