ABSTRACT

This user's guide provides information on the correct usage of the test board and an explanation of the test points and the parts on the board. The test board features of the MYMGK00510ERSR is configured for fixed frequency synchronous operation. The test board operates over the entire input voltage range of the MYMGK00510ERSR. The minimum input and the output capacitors are included on the board.

Table of Contents

Description

This EVM features the MYMGK00510ERSR fixed frequency synchronous buck converter switching topology with 8V to 15V input voltage range. The output voltage is fixed 5.0V but it is possible to change output voltage by external resistors. The full output current rating of the device can be supplied by the EVM.

Input and output capacitors are mounted on the board to accommodate the entire range of input and output voltages. Monitoring test points are provided to allow measurement of voltage, efficiency, power dissipation and load regulation.

The control switch and component footprints are provided for use of the ON/OFF, PWGOOD(Power good signal output), and Remote Sensing(+) features of the module.

The EVM uses a recommended PCB layout that minimizes output ripple and noise.
Detailed application information for MYMGK00510ERSR is available in the datasheet.

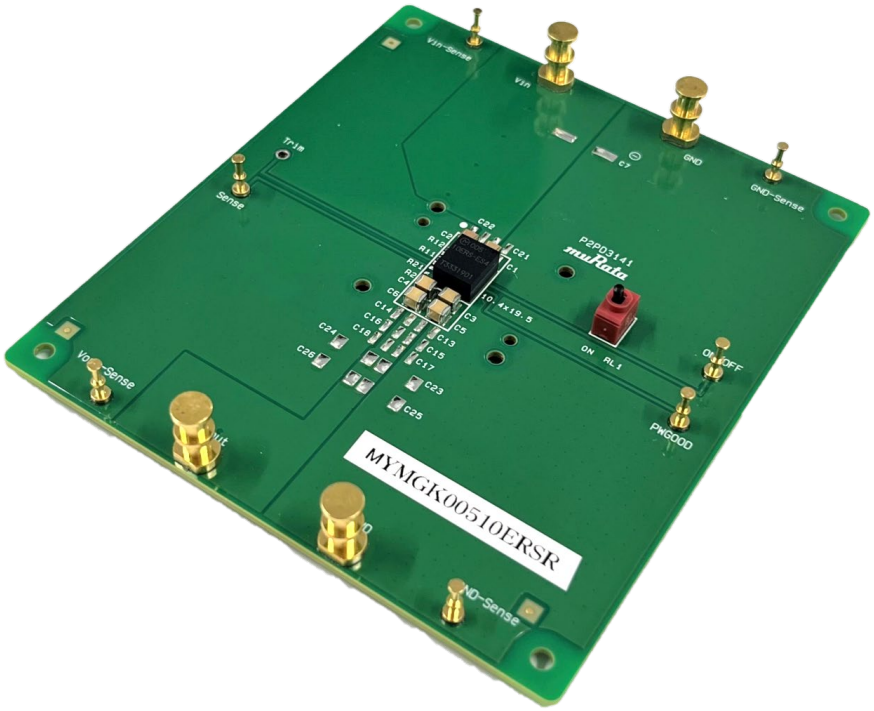

Figure 1. Evaluation Board

Performance Summary

Table 1. Performance Summary

Parameter	Symbol	Conditions	Min	Typical	Max	Units
INPUT SUPPLY						
Input Voltage Range	V_{IN}	MYMGK00510ERSR	8	-	15	V
ON/OFF pin Low Voltage		OFF state	-0.3	-	1.1	V
ON/OFF pin High Voltage		ON state	1.5	-	6.3	V
OUTPUT						
Output Voltage Adjustable Range	V_{OUT}	I_{OUT}=0 to 10A	0.7	-	5.0	V
Output Current	I_{OUT}		0	-	10	A
Efficiency	EFF	V_{IN}=12V, V_{OUT}=5V, I_{OUT}=10A	-	92.6	-	%
Short Circuit Protection	SCP	If the output is shorted to GND, DC-DC converter shall operate in a hiccup mode. After the short circuit event has cleared, the output is automatically brought back into regulation.	-	15	-	A

Quick Start Guide

Figure 2. highlights the user interface items associated with the EVM.

The VIN power terminals are used for connection to the host input supply and the VOUT power terminals are used for connection to the load. Sense (+/-) test points for both VIN and VOUT, located near the power terminals are intended to be used as voltage monitoring points where voltmeters can be connected to measure VIN and VOUT. **Do not connect these S+ and S- monitoring test points as the input supply or output load connection points.**

The Remote ON/OFF control switch located to the center of the device makes available to test the features of the device. The Power-Good signal can be used with the PWGOOD Pin (The PWGOOD pin is pulled up internally). The remote sensing function can be used by connecting the Sense pin to the load point and rejecting R1 resistor.

About the initial EVM, sense pin is connected to the VOUT in the EVM with R21 resistor.

Evaluation Overview

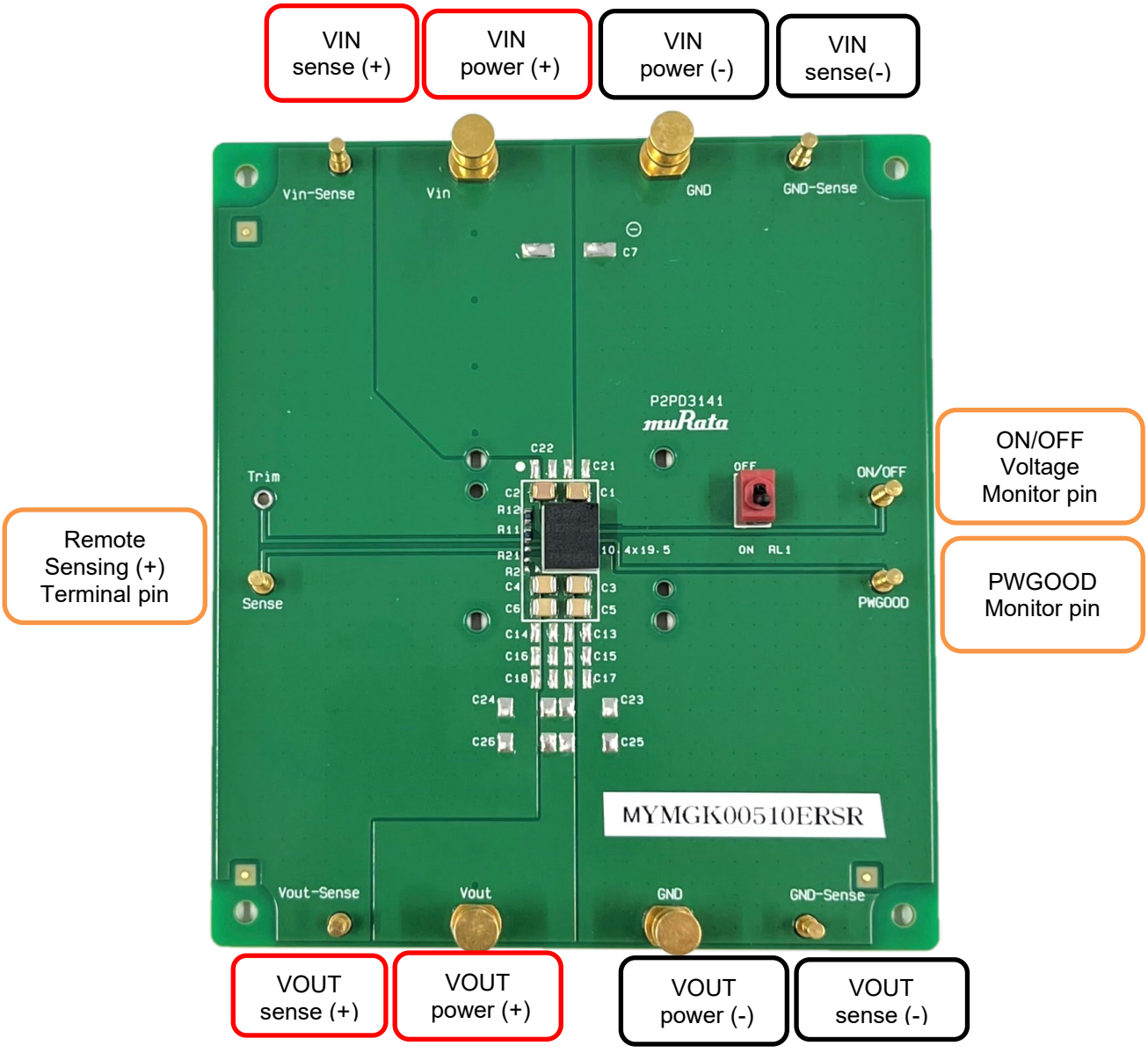

Figure.2 EVM Overview

Terminal Functions

Table 2. Terminal Functions

Function/Terminal	I/O	Description
VIN Power (+/-)	I	Power input pin and input ground pin
VOUT Power (+/-)	O	Power output pin and output ground pin
ON/OFF	-	ON/OFF connection. If this is high level, the module operates. (This pin is pulled up internally)
VIN sense (+/-)	I	Sensing pin for measuring the input voltage
VOUT sense (+/-)	O	Sensing pin for measuring the output voltage
Sense	-	Output Voltage Sensing pin. (It is not a problem to be left open about this pin because it is connected to VOUT internally with 10ohm resistor)
PWGOOD	-	Power good output. (The pin is open drain, whose sink current is limited up to 1mA)

Power Input and Output Descriptions

The VIN power terminals are used to connect to the input supply, and the VOUT power terminal is used to connect to the load.

Caution: Do not use sense (+) and sense (-) terminals as the input supply or output load connection points. The PCB traces connecting to these sense terminals are not designed to support high currents. High currents may cause damage the PCB traces.

Test Point Descriptions

The sense (+) and sense (-) test points for both VIN and VOUT, located near the power terminal are intended to be used as voltage monitoring points where voltmeters can be connected to measure VIN and VOUT.

EVM Connection

Remote Sensing (Option)

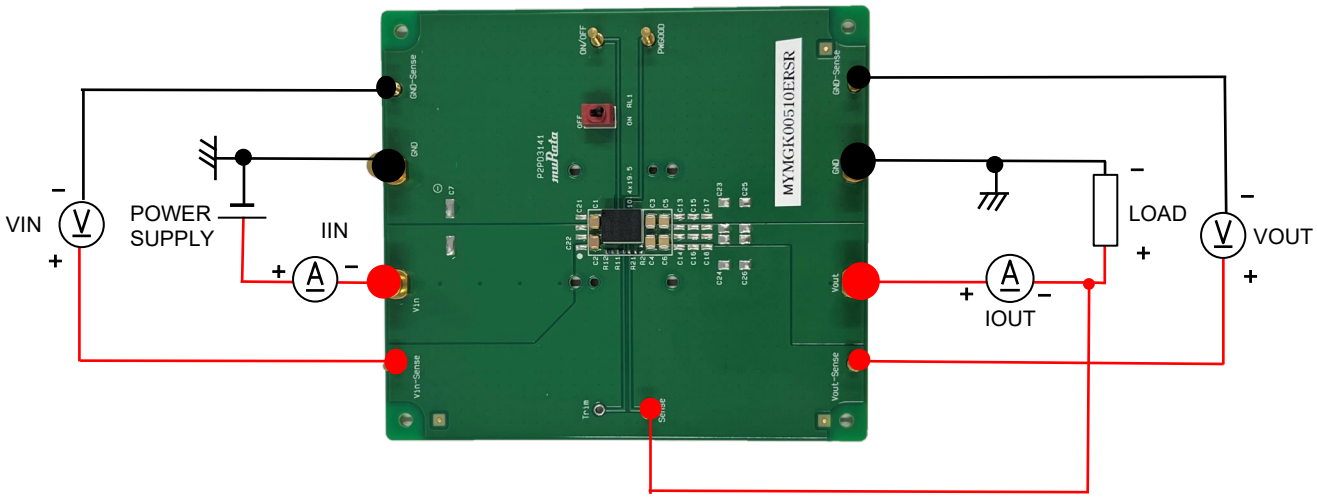

Figure.3

Start-Up Procedure

1. Set the power supply current limit to at least 10A. Connect the power supply to VIN power (+) and VIN power (-).
2. Connect one electronic load with more than 10A capacity between VOUT power (+) and VOUT power (-).
3. Set ON/OFF switch off, then turn the load switch off. (Recommend)
4. Set Input voltage to 12V and turn it on.
5. Set ON/OFF switch on, then turn the load switch on. (Recommend)
6. If you need to change the output voltage, please change the R11 and R12 according to the following table.

Output Voltage Adjustment

The output voltage may be adjusted over a limited range by connecting an external trim resistor (Rtrim) between the Trim pin and GND pin. The Rtrim resistor must be a 1/10W precision metal film type,±0.5% accuracy (or better) with low temperature coefficient, ±100 ppm/degC or better. Mount the resistor close to the converter with very short leads or use a surface mount trim resistor.

Output Voltage [V]	Estimated Rtrim [kΩ]
0.7	33 + 27
1	15
1.2	10
1.5	4.7 + 2.0
1.8	4.7 + 0.3
2.5	3.0 + 0.16
3.3	2.2 + 0.022
5	1.2 + 0.16

Performance Data of MYMGK00510ERSR

Figure 4. through Figure 9. demonstrate the MYMGK00510ERSR performance.
The following test results show the typical performance of the evaluation board.

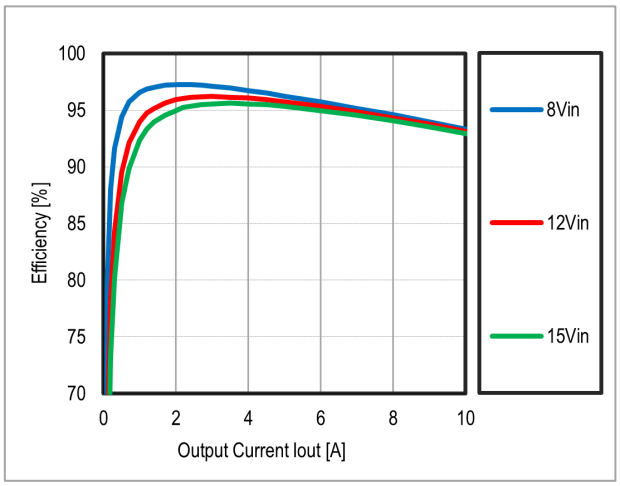

Figure 4. MYMGK00510ERSR* Efficiency
(V_{OUT}=5.0V, Ta=25degC)

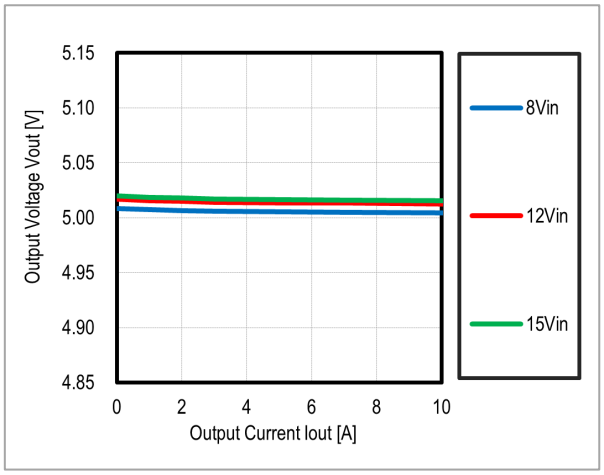

Figure 5. MYMGK00510ERSR* Output Voltage
(V_{OUT}=5.0V, Ta=25degC)

Figure 6. Start-up Waveform
(V_{IN}=12V, V_{OUT}=5.0V, I_{OUT}=10A, C_{OUT}=400uF)

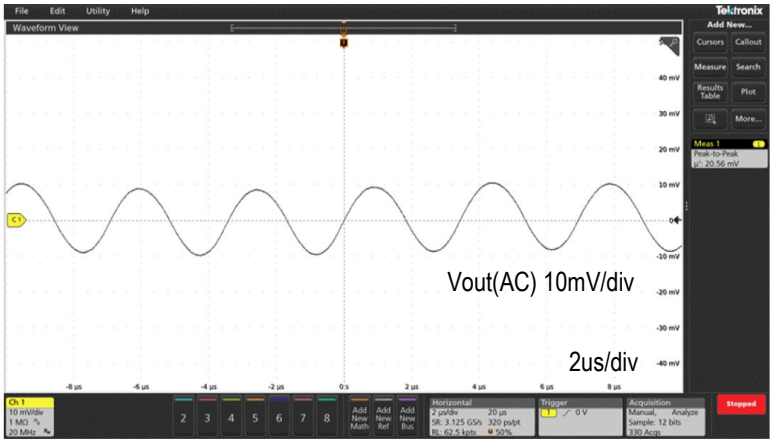

Figure 7. Output Ripple Waveform
(V_{IN}=12V, V_{OUT}=5.0V, I_{OUT}=10A, C_{OUT}=400uF)

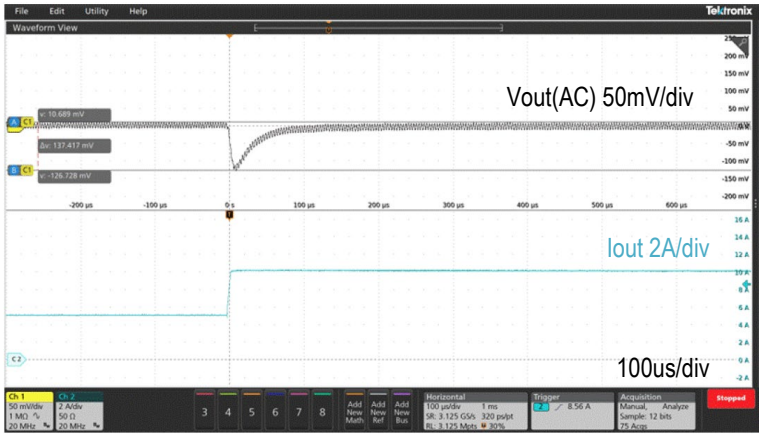

Figure 8. Load Transient Response Waveform
(V_{IN}=12V, V_{OUT}=5.0V, C_{OUT}=400uF, I_{OUT}=5 to 10A (1.0A/us))

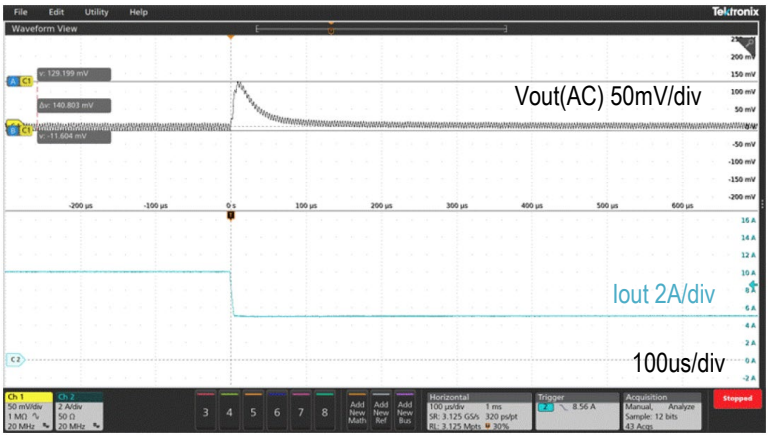

Figure 9. Load Transient Response Waveform
(V_{IN}=12V, V_{OUT}=5.0V, C_{OUT}=400uF, I_{OUT}=5 to 10A (1.0A/us))

MYMGK00510ERSR EVM Bill of Materials (BOM)

Table 3. MYMGK00510ERSR EVM Bill of Materials

Reference	Qty	Value	Description	Size	Part Number	Manufacturer
MYMGK00510ERSR* (Vin=8.0-15.0V)						
C1, C2	2	22uF	Input capacitor 22uF, 25V, +/-10%, X7R	3225M	GRM32ER71E226KE15	Murata
C3, C4, C5, C6	4	100uF	Output capacitor 100uF, 6.3V, +/-20%, X7U	3225M	GRM32EE70J107ME15	Murata
R11, R12	2	Total 1.36kohm (reference)	Output voltage trimming resistor 0.5%, 1/10W	1608M		KOA
R21	1	0ohm	For short the circuit	1608M	RK73Z1JTTD	KOA

MYMGK00510ERSR EVM Schematic

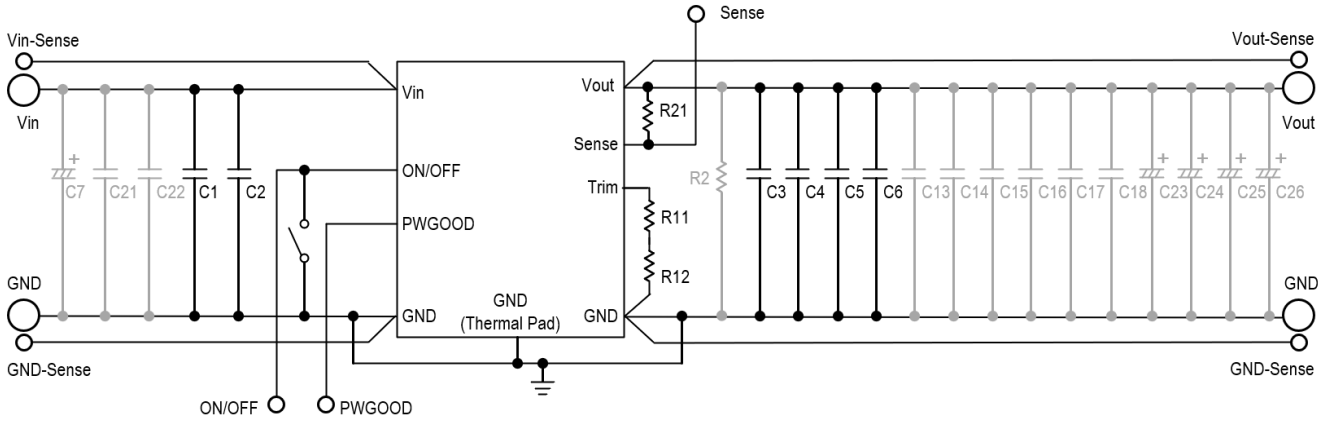

Figure 10. MYMGK00510ERSR EVM schematic

EVM PCB Layout

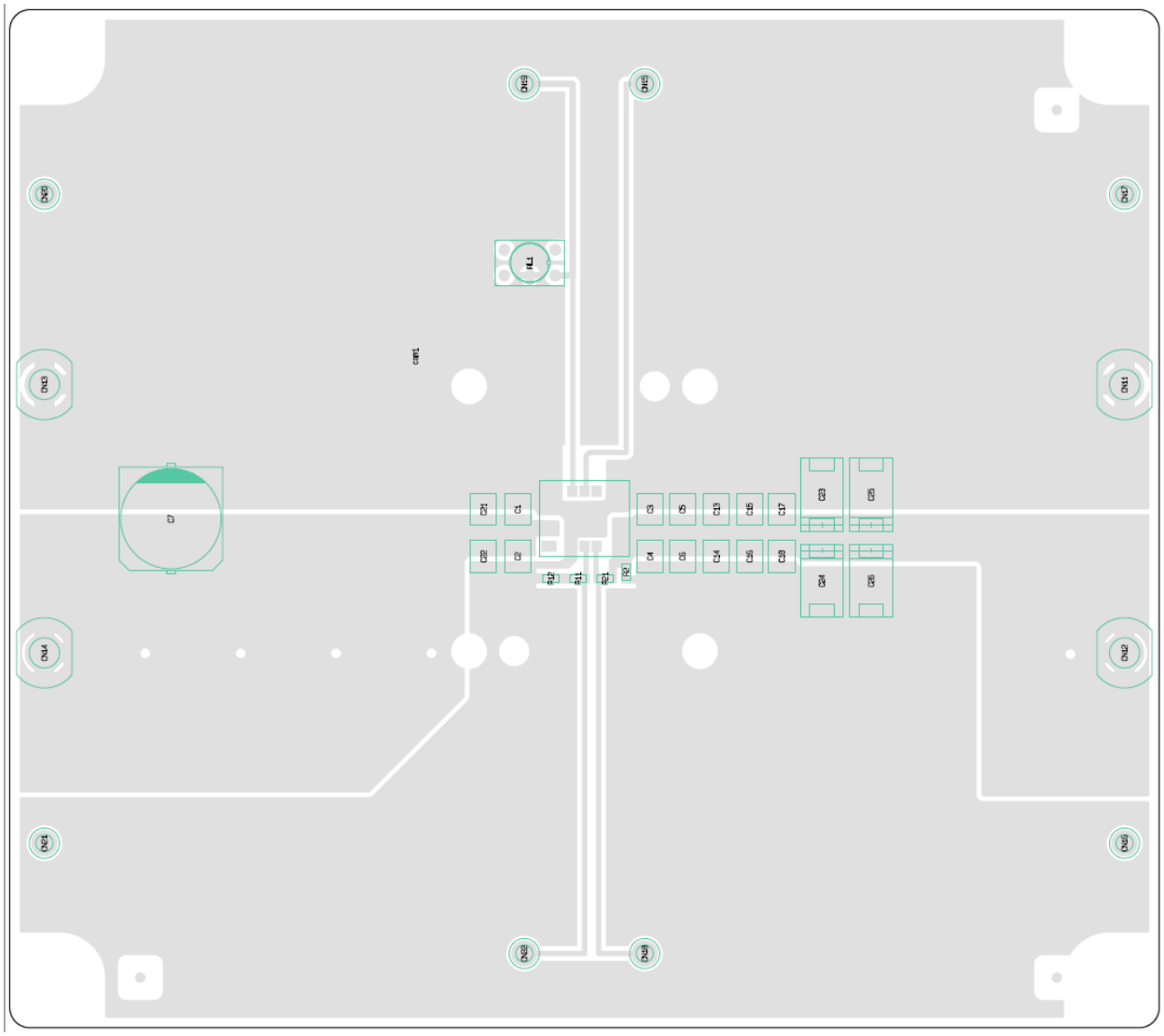

Figure 11. Evaluation Board Layout (Top) Size : mm

Notices

⚠ CAUTION

1. EVMs are not finished products. Murata delivers EVM for use in a research and development evaluation purpose only.
2. Please make sure that your product has been evaluated and confirmed to your specifications when our product is used in your product.
3. All the items and parameters in this approval sheet for product specification are based on the premise that our product is used for the purpose, under the condition and in the environment agreed upon between you and us. You are requested not to use our product in a manner deviating from such agreement.
4. If you have any concerns about materials other than those listed in the RoHS directive, please contact us.
5. Be sure to provide an appropriate fail-safe functionality in your product to prevent secondary damage that could be caused by the abnormal function or failure of our product.
6. Do not allow our product to be exposed to excess moisture under any circumstances.

Contact form

https://www.murata.com/contactform?Product=Power%20Device

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