

User's Guide

**LMZ21700 and LMZ21701 Power Module Evaluation
Module User's Guide**



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1 Introduction

The LMZ21701 and LMZ21700 SIMPLE SWITCHER® nano modules are easy-to-use DC-DC solutions optimized for space constrained applications. The LMZ21701 is capable of driving up to 1-A load with excellent power conversion efficiency, output voltage accuracy, line and load regulation, and load transient response. The LMZ21700 is a 650-mA load current version module, pin-to-pin compatible with the LMZ21701. The evaluation board is configured for 3.3-V output voltage from 5-V to 17-V input. The resistor voltage dividers, R_{FBT} and R_{FBB} , set the output voltage. The external capacitor C_{SS} sets the soft-start time for V_{OUT} . See the [LMZ21701 1-A Nano Module With 17-V Maximum Input Voltage](#) or [LMZ21700 650-mA Nano Module With 17-V Maximum Input Voltage](#) data sheets for component selection and device details. The board features turret terminals for easy connection to input supply, load, EN input, as well as soft start voltage and power-good flag monitoring.

2 Board Specifications

- V_{IN} = 5 V to 17 V
- V_{OUT} = 3.3 V
- 1-A max load (LMZ21701)
- 650-mA max load (LMZ21700)
- 4-layer PCB
- 4.2-cm × 4.2-cm PCB size

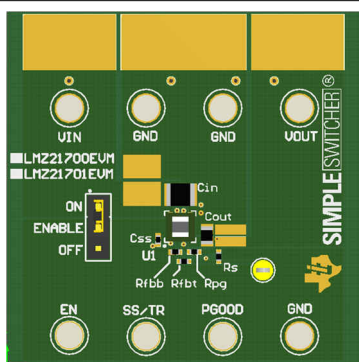


Figure 2-1. Board Top View

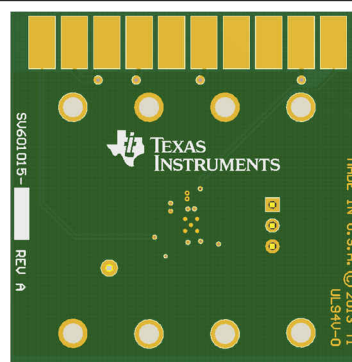


Figure 2-2. Board Top View


$$I_{OUT(MAX)} = 1000 \text{ mA (LMZ21701)}, 650 \text{ mA (LMZ21700)}$$

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**Table 3-1. Bill of Materials, $V_{IN} = 5\text{ V}$ to 17 V , $V_{OUT} = 3.3\text{ V}$,
 $I_{OUT}(\text{MAX}) = 1000\text{ mA}$ (LMZ21701), 650 mA (LMZ21700) (continued)**

Designator	Description	Case Size	Manufacturer	Manufacturer P/N	Quantity
C _{IN}	CAP, CERM, 22 μF , 25 V, $\pm 10\%$, X7R	1210	MuRata	GRM32ER71E226KE15L	1
C _{OUT}	CAP, CERM, 22 μF , 10 V, $\pm 20\%$, X5R	0805	Taiyo Yuden	LMK212BJ226MG-T	1
C _{SS}	CAP, CERM, 3300 pF, 50 V, $\pm 10\%$, X7R	0402	MuRata	GRM155R71H332KA01D	1
J1	Header, TH, 100 mil, 1x3, Gold plated		Samtec, Inc	TSW-103-07-G-S	1
R _{fbb}	RES, 383 k Ω , 1%, 0.063 W	0402	Vishay-Dale	CRCW0402383KFKED	1
R _{fbt}	RES, 1.21 M Ω , 1%, 0.063 W	0402	Vishay-Dale	CRCW04021M21FKED	1
R _{pg}	RES, 10.0 k Ω , 1%, 0.063 W	0402	Vishay-Dale	CRCW040210K0FKED	1
R _s	RES, 10.0 Ω , 1%, 0.063 W	0402	Vishay-Dale	CRCW040210R0FKED	1
SH-J1	Shunt, 100 mil, Gold plated, Black		Samtec, Inc	SNT-100-BK-G	1
TT1-12	Terminal, Turret, TH, Double		Keystone Electronics	1502-2	8
Vout S+	Test Point, TH, Miniature, Yellow		Keystone Electronics	5004	1

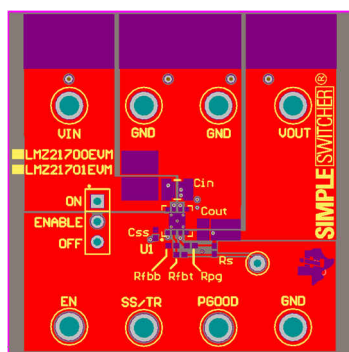


Figure 3-2. Evaluation Board Top Layer

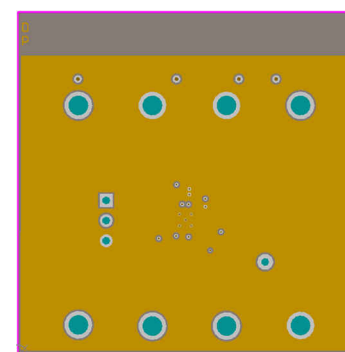


Figure 3-3. Evaluation Board Mid Layer 1

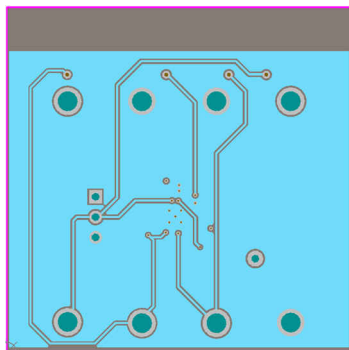


Figure 3-4. Evaluation Board Mid Layer 2

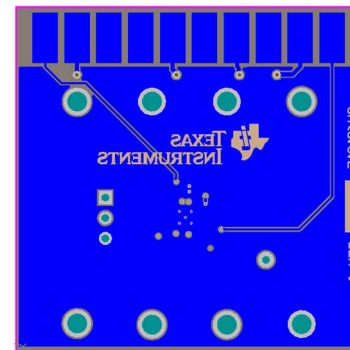


Figure 3-5. Evaluation Board Bottom Layer

4 Typical Performance

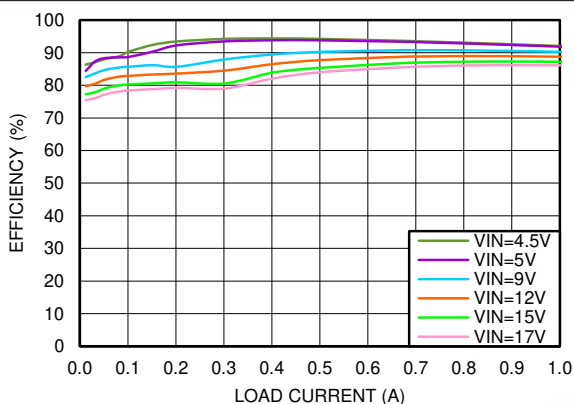


Figure 4-1. Efficiency

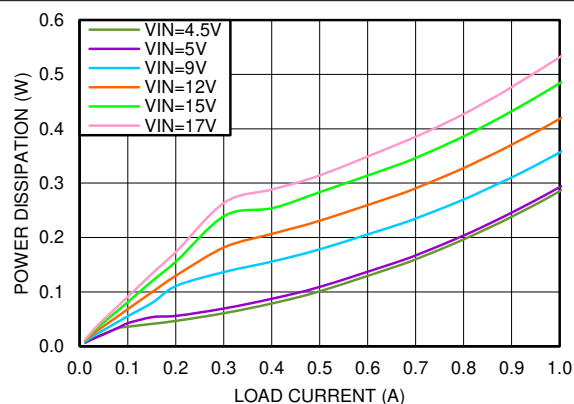


Figure 4-2. Power Dissipation

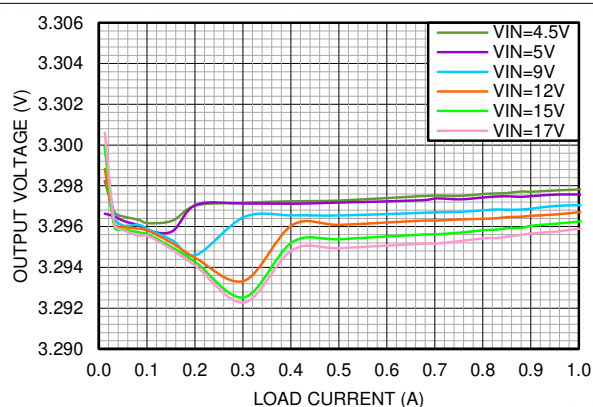


Figure 4-3. Line and Load Regulation



Figure 4-4. Load Transient

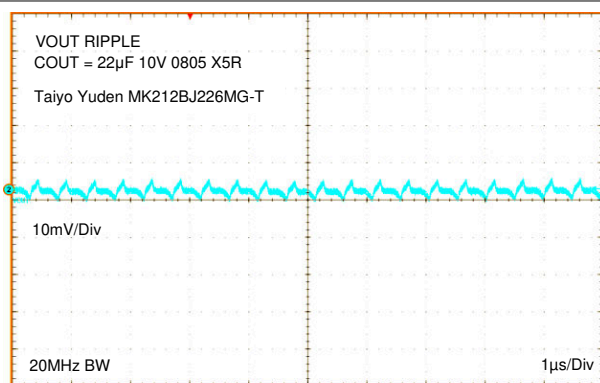


Figure 4-5. Output Voltage Ripple (20-MHz Scope BW)

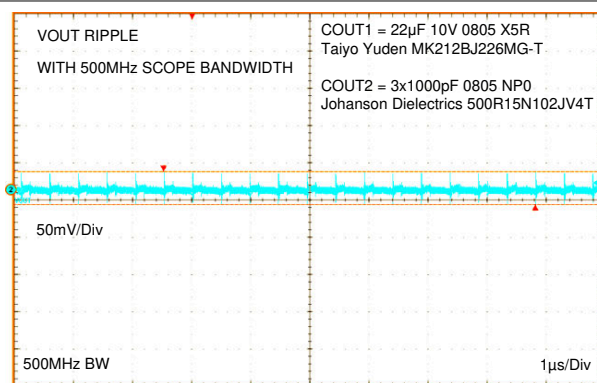


Figure 4-6. Output Voltage Ripple and HF Noise (500-MHz Scope BW)

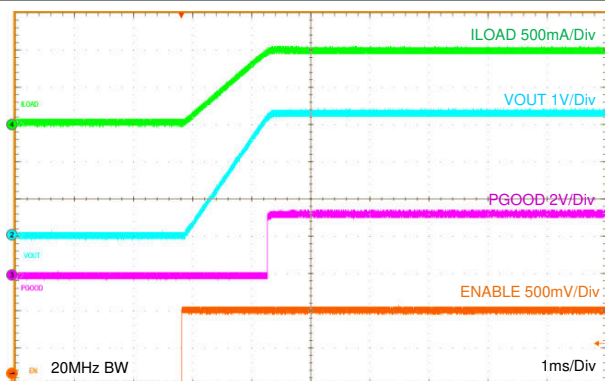
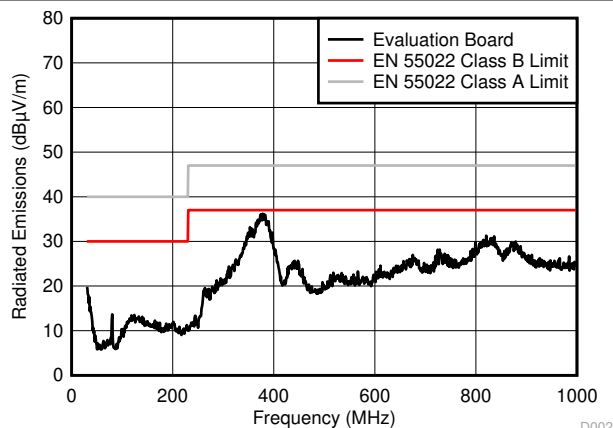
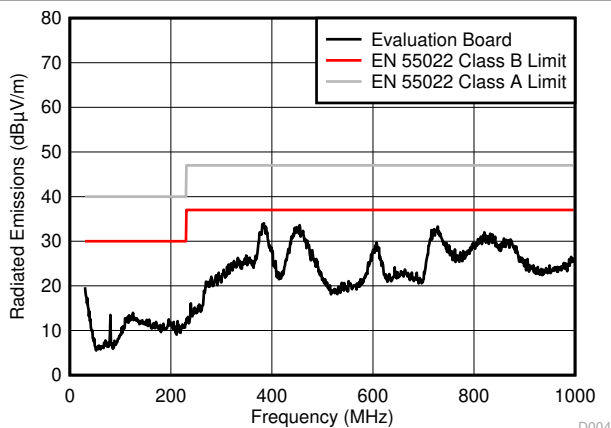


Figure 4-7. Start-Up



**Figure 4-8. LMZ21700 Radiated EMI (Default BOM),
 $V_{IN} = 12\text{ V}$, $V_{OUT} = 3.3\text{ V}$, $I_{OUT} = 650\text{ mA}$**



**Figure 4-9. LMZ21701 Radiated EMI (Default BOM),
 $V_{IN} = 12\text{ V}$, $V_{OUT} = 3.3\text{ V}$, $I_{OUT} = 1000\text{ mA}$**

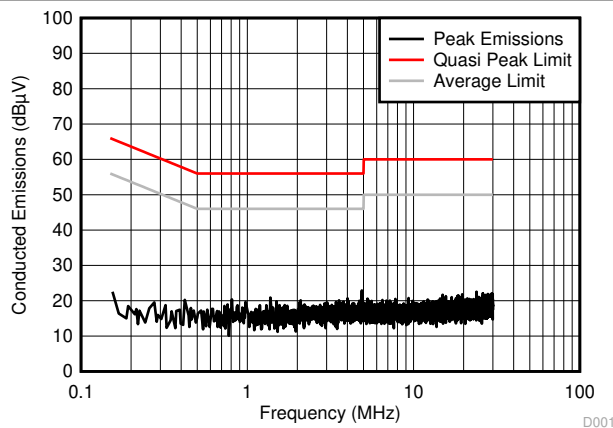


Figure 4-10. LMZ21700 Conducted EMI (1 μF , 2.2 μH Input Filter), $V_{IN} = 12\text{ V}$, $V_{OUT} = 3.3\text{ V}$, $I_{OUT} = 650\text{ mA}$

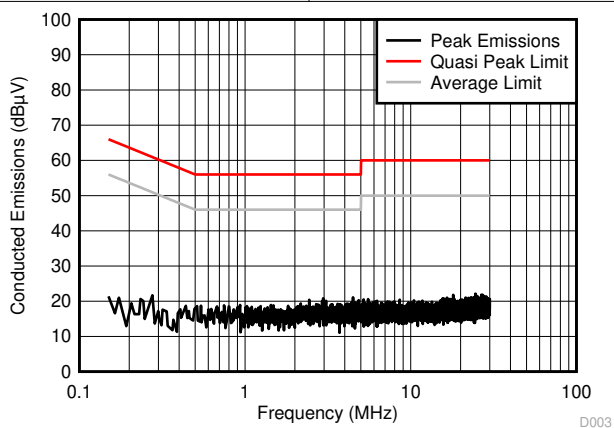


Figure 4-11. LMZ21701 Conducted EMI (1 μF , 2.2 μH Additional Input Filter), $V_{IN} = 12\text{ V}$, $V_{OUT} = 3.3\text{ V}$, $I_{OUT} = 1000\text{ mA}$

5 Revision History

NOTE: Page numbers for previous revisions may differ from page numbers in the current version.

Changes from Revision A (October 2014) to Revision B (January 2022)	Page
• Updated the numbering format for tables, figures, and cross-references throughout the document.	2
• Updated the user's guide title	2
Changes from Revision * (April 2014) to Revision A (October 2014)	Page
• Added SVA cleanup and editing.....	6

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