

LTM8065 40V, 2.5A Silent Switcher μModule Regulator

DESCRIPTION

Demonstration circuit 2251A is a 40V, 3.5A peak, 2.5A continuous step-down μModule® regulator featuring the LTM8065. The demo board is designed for 5V output from a 6V to 40V input. The wide input range allows a variety of input sources, such as automotive batteries and industrial supplies. The user adjustable features of the LTM8065 such as output voltage, switching frequency, soft-start and power good can be changed on DC2251A simply by modifying the appropriate resistors and/or capacitors.

The LTM8065 can be programmed to different operation modes. The SYNC pin on the demo board is grounded (JP1 at BURST position) by default for low ripple Burst Mode® operation. Pulse-skipping mode, spread spectrum mode or synchronization mode can be selected respectively by moving JP1 shunt to SYNC position and adding different signals to SYNC terminal. See Quick Start Procedure section for more details.

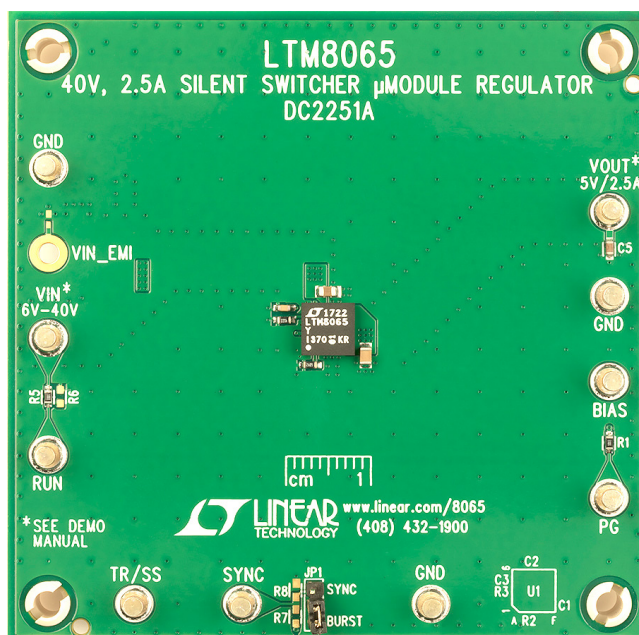
Figure 1 shows the efficiency of the circuit under different input voltages in Burst Mode operation. The rated maximum continuous load current is 2.5A, while derating is necessary for certain input voltage and thermal conditions. Figure 2 shows the LTM8065 derating curve on DC2251A demo board. The demo board has an optional EMI filter. To achieve high EMI/EMC performance, the input EMI filter is required and the input voltage should be applied at VIN_EMI terminal.

The LTM8065 data sheet gives a complete description of the part, operation and application information. The data sheet must be read in conjunction with this demo manual for demo circuit 2251A.

Design files for this circuit board are available at <http://www.linear.com/demo/DC2251A>

LT, LTC, LTM, Linear Technology, Burst Mode, μModule and the Linear logo are registered trademarks of Analog Devices, Inc. All other trademarks are the property of their respective owners.

BOARD PHOTO



DEMO MANUAL DC2251A

PERFORMANCE SUMMARY

Specifications are at $T_A = 25^\circ\text{C}$

SYMBOL	PARAMETER	CONDITIONS	MIN	TYP	MAX	UNITS
V_{IN}^*	Input Supply Range		6		40	V
V_{OUT}	Output Voltage		4.85	5	5.15	V
I_{OUT}^{**}	Maximum Continuous Output Current		2.5			A
f_{SW}	Switching Frequency	$V_{IN} = 12\text{V}$, $I_{OUT} = 2.5\text{A}$		1		MHz
EFE	Efficiency at DC	$V_{IN} = 12\text{V}$, $I_{OUT} = 2.5\text{A}$		91.5		%

* When V_{IN} voltage is low, the LTM8065 may skip switching cycles.

** Derating is necessary for certain V_{IN} and thermal conditions.

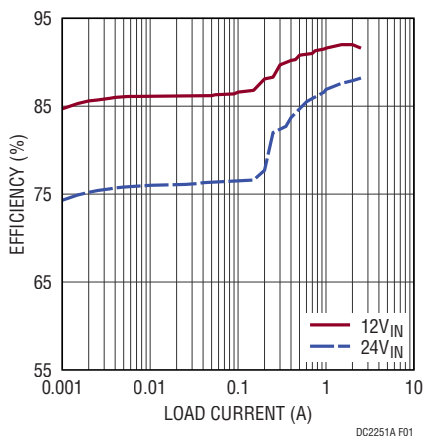


Figure 1. LTM8065 Demo Circuit DC2251A Efficiency vs. Load Current ($f_{SW} = 1\text{MHz}$, $V_{OUT} = 5\text{V}$, Burst Mode Operation)

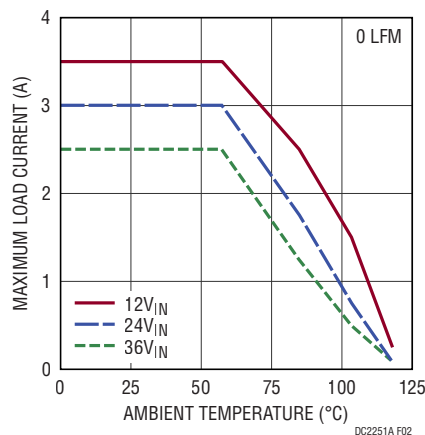


Figure 2. LTM8065 Demo Circuit DC2251A Maximum Load Current Derating

QUICK START PROCEDURE

Demonstration circuit 2251A is easy to set up to evaluate the performance of the LTM8065. Refer to Figure 3 for proper measurement equipment setup and follow the procedure below:

NOTE. When measuring the input or output voltage ripple, care must be taken to avoid a long ground lead on the oscilloscope probe. Measure the output voltage ripple by touching the probe tip directly across the output capacitor. See Figure 4 for the proper scope technique.

1. Place JP1 on BURST position.
2. With power off, connect the input power supply to V_{IN} and GND. If the input EMI filter is desired, install the filter and connect the input power supply to V_{IN_EMI} and GND.

3. With power off, connect the load from V_{OUT} to GND.
4. Turn on the power at the input.

NOTE. Make sure that the input voltage does not exceed 40V.

5. Check for the proper output voltage ($V_{OUT} = 5\text{V}$).

NOTE. If there is no output, temporarily disconnect the load to make sure that the load is not set too high or is shorted.

6. Once the proper output voltage is established, adjust the load within the operating ranges and observe the output voltage regulation, ripple voltage, efficiency and other parameters.

QUICK START PROCEDURE

- JP1 is placed on BURST position by default, for the low ripple Burst Mode operation. When JP1 is placed on SYNC position, LTM8065 can operate in pulse-skipping mode, spread spectrum mode or synchronization mode respectively, based on the different SYNC terminal inputs. If SYNC terminal is floating, LTM8065 is in pulse-skipping mode. If an external clock is driving the SYNC terminal, LTM8065 is in synchronization mode.

Please make sure that RT should be chosen to set the LTM8065 switching frequency equal to or below the lowest SYNC frequency. If a 2.9V to 4.2V DC voltage is tied to the SYNC terminal, LTM8065 is in spread spectrum mode. This DC voltage can also be added through a voltage divider (R7 and R8) from the output. The recommended divider bottom resistor (R8) is 200k.

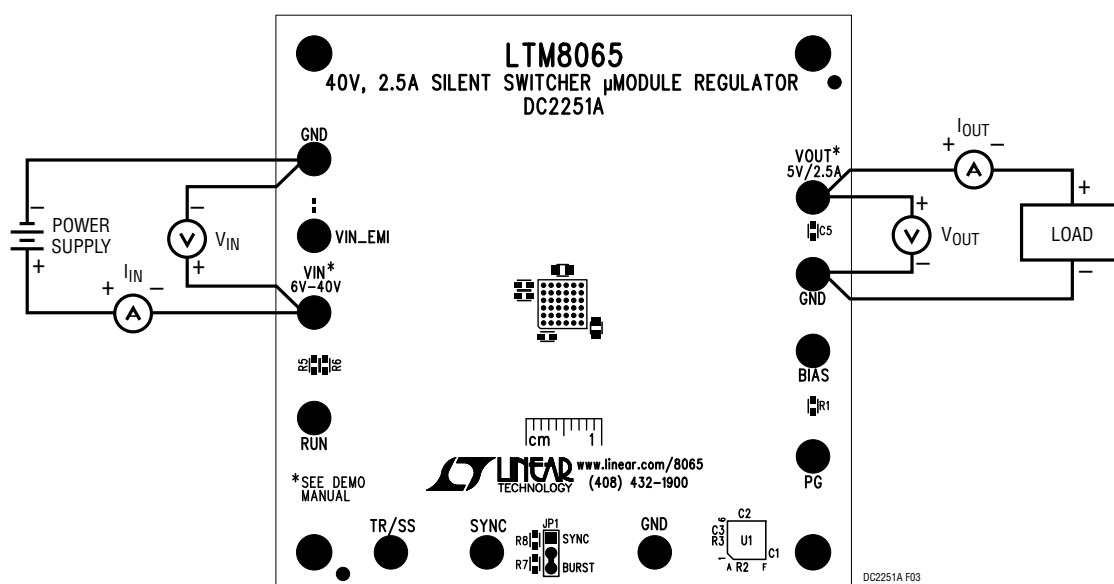


Figure 4. Proper Measurement Equipment Setup

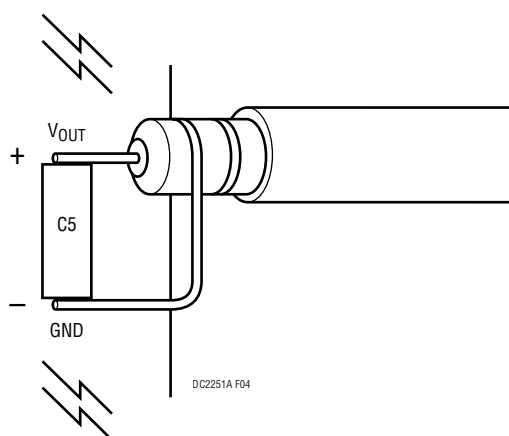


Figure 3. Measuring Output Ripple

DEMO MANUAL DC2251A

QUICK START PROCEDURE

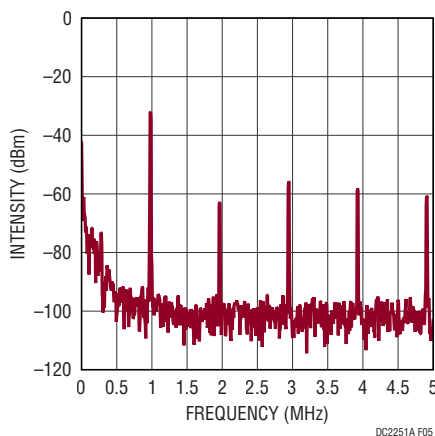
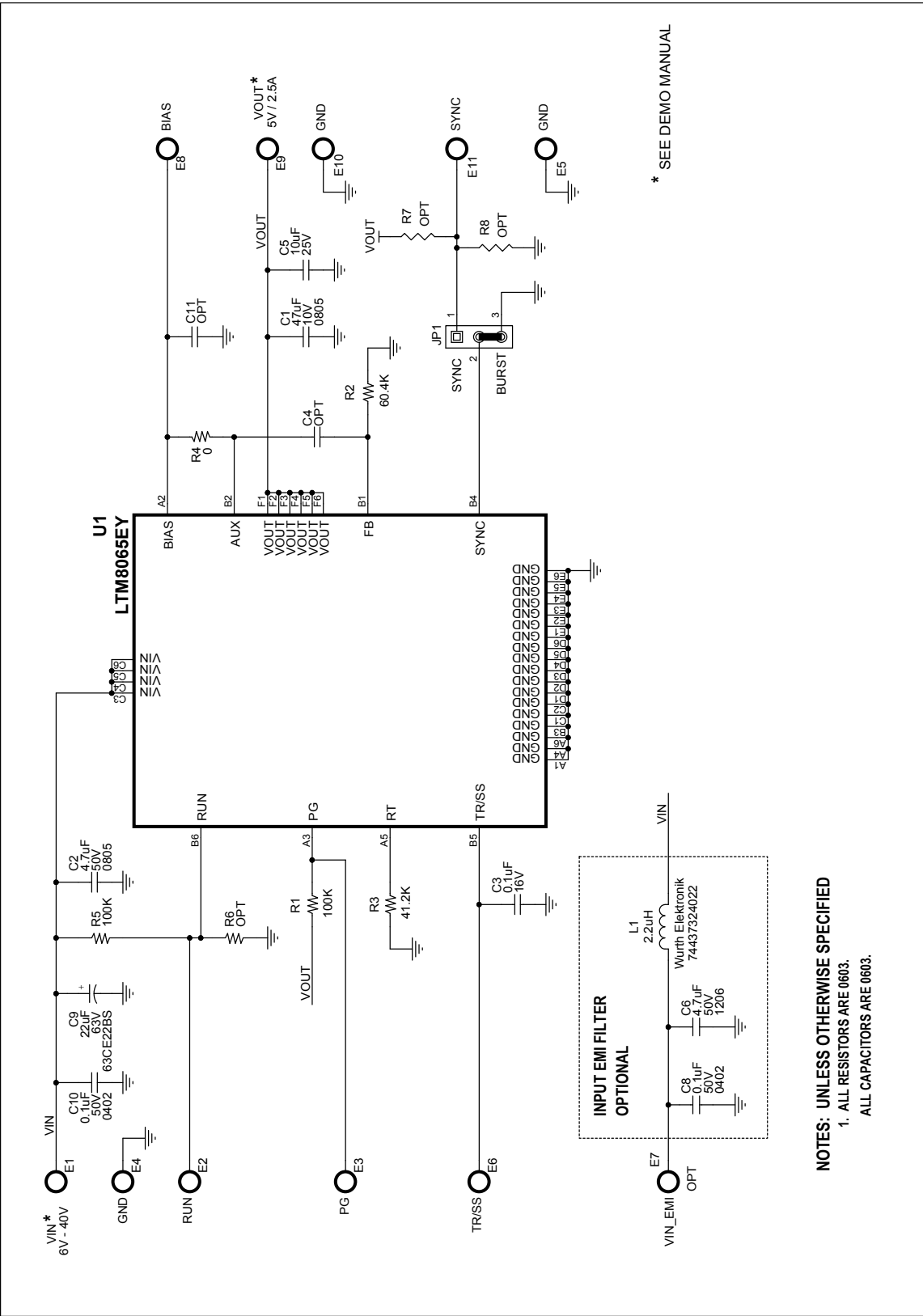


Figure 5. DC2251A Output Noise Spectrum, $V_{IN} = 12V$, $V_{OUT} = 5V$, $I_{OUT} = 2.5A$, $f_{SW} = 1MHz$

PARTS LIST

ITEM	QTY	REFERENCE	PART DESCRIPTION	MANUFACTURER/PART NUMBER
Required Circuit Components				
1	1	C1	CAP, X5R, 47 μ F, 10V, 20%, 0805	MURATA, GRM21BR61A476ME15L
2	1	C2	CAP, X5R, 4.7 μ F, 50V, 10%, 0805	MURATA, GRM21BR61H475KE51L
3	1	C3	CAP, X7R, 0.1 μ F, 16V, 10%, 0603	MURATA, GRM188R71C104KA01D
4	1	C5	CAP, X5R, 10 μ F, 25V, 20%, 0603	MURATA, GRM188R61E106MA73D
5	1	C10	CAP, X7R, 0.1 μ F, 50V, 10%, 0402	TDK, CGA2B3X7R1H104K050BB
6	2	R1, R5	RES., CHIP, 100k, 1/10W, 1%, 0603	VISHAY, CRCW0603100KFKEA
7	1	R2	RES., CHIP, 60.4k, 1/10W, 1%, 0603	VISHAY, CRCW060360K4FKEA
8	1	R3	RES., CHIP, 41.2k, 1/10W, 1%, 0603	VISHAY, CRCW060341K2FKEA
9	1	U1	IC., BGA, 36L, 6.25mm $\times$ 6.25mm $\times$ 2.32mm	LINEAR TECH., LTM8065EY#PBF
Additional Demo Board Circuit Components				
1	0	C4, C11 (OPT)	CAP, 0603	
2	0	C6 (OPT)	CAP, X7R, 4.7 μ F, 50V, 10%, 1206	
3	0	C8 (OPT)	CAP, X7R, 0.1 μ F, 50V, 10%, 0402	
4	1	C9	CAP, ALUM, 22 μ F, 63V, 20%	SUN ELECTRONIC INDUSTRIES CORP., 63CE22BS
5	0	L1 (OPT)	IND, 2.2 μ H, 4.45mm $\times$ 4.06mm	WURTH ELEKTRONIK, 74437324022
6	1	R4	RES., CHIP, 0, 1/10W, 0603	VISHAY, CRCW06030000Z0EA
7	0	R6, R7, R8 (OPT)	RES., 0603	
Hardware: For Demo Board Only				
1	10	E1-E6, E8-E11	TESTPOINT, TURRET, 0.094" PBF	MILL-MAX, 2501-2-00-80-00-00-07-0
2	0	E7 (OPT)	TESTPOINT, TURRET, 0.094" PBF	MILL-MAX, 2501-2-00-80-00-00-07-0
3	1	JP1	HEADER 3 PIN 0.079 SINGLE ROW	WURTH ELEKTRONIK, 62000311121
4	1	XJP1	SHUNT, 0.079" CENTER	WURTH ELEKTRONIK, 60800213421
5	4	MH1-MH4	STAND-OFF, NYLON, 0.375" SNAP ON	KEYSTONE, 8832

SCHEMATIC DIAGRAM



DEMO MANUAL DC2251A

DEMONSTRATION BOARD IMPORTANT NOTICE

Linear Technology Corporation (LTC) provides the enclosed product(s) under the following **AS IS** conditions:

This demonstration board (DEMO BOARD) kit being sold or provided by Linear Technology is intended for use for **ENGINEERING DEVELOPMENT OR EVALUATION PURPOSES ONLY** and is not provided by LTC for commercial use. As such, the DEMO BOARD herein may not be complete in terms of required design-, marketing-, and/or manufacturing-related protective considerations, including but not limited to product safety measures typically found in finished commercial goods. As a prototype, this product does not fall within the scope of the European Union directive on electromagnetic compatibility and therefore may or may not meet the technical requirements of the directive, or other regulations.

If this evaluation kit does not meet the specifications recited in the DEMO BOARD manual the kit may be returned within 30 days from the date of delivery for a full refund. THE FOREGOING WARRANTY IS THE EXCLUSIVE WARRANTY MADE BY THE SELLER TO BUYER AND IS IN LIEU OF ALL OTHER WARRANTIES, EXPRESSED, IMPLIED, OR STATUTORY, INCLUDING ANY WARRANTY OF MERCHANTABILITY OR FITNESS FOR ANY PARTICULAR PURPOSE. EXCEPT TO THE EXTENT OF THIS INDEMNITY, NEITHER PARTY SHALL BE LIABLE TO THE OTHER FOR ANY INDIRECT, SPECIAL, INCIDENTAL, OR CONSEQUENTIAL DAMAGES.

The user assumes all responsibility and liability for proper and safe handling of the goods. Further, the user releases LTC from all claims arising from the handling or use of the goods. Due to the open construction of the product, it is the user's responsibility to take any and all appropriate precautions with regard to electrostatic discharge. Also be aware that the products herein may not be regulatory compliant or agency certified (FCC, UL, CE, etc.).

No License is granted under any patent right or other intellectual property whatsoever. **LTC assumes no liability for applications assistance, customer product design, software performance, or infringement of patents or any other intellectual property rights of any kind.**

LTC currently services a variety of customers for products around the world, and therefore this transaction **is not exclusive**.

Please read the DEMO BOARD manual prior to handling the product. Persons handling this product must have electronics training and observe good laboratory practice standards. **Common sense is encouraged.**

This notice contains important safety information about temperatures and voltages. For further safety concerns, please contact a LTC application engineer.

Mailing Address:

Linear Technology
1630 McCarthy Blvd.
Milpitas, CA 95035

Copyright © 2004, Linear Technology Corporation

Данный компонент на территории Российской Федерации

Вы можете приобрести в компании MosChip.

Для оперативного оформления запроса Вам необходимо перейти по данной ссылке:

<http://moschip.ru/get-element>

Вы можете разместить у нас заказ для любого Вашего проекта, будь то серийное производство или разработка единичного прибора.

В нашем ассортименте представлены ведущие мировые производители активных и пассивных электронных компонентов.

Нашей специализацией является поставка электронной компонентной базы двойного назначения, продукции таких производителей как XILINX, Intel (ex.ALTERA), Vicor, Microchip, Texas Instruments, Analog Devices, Mini-Circuits, Amphenol, Glenair.

Сотрудничество с глобальными дистрибьюторами электронных компонентов, предоставляет возможность заказывать и получать с международных складов практически любой перечень компонентов в оптимальные для Вас сроки.

На всех этапах разработки и производства наши партнеры могут получить квалифицированную поддержку опытных инженеров.

Система менеджмента качества компании отвечает требованиям в соответствии с ГОСТ Р ИСО 9001, ГОСТ РВ 0015-002 и ЭС РД 009

Офис по работе с юридическими лицами:

105318, г.Москва, ул.Щербаковская д.3, офис 1107, 1118, ДЦ «Щербаковский»

Телефон: +7 495 668-12-70 (многоканальный)

Факс: +7 495 668-12-70 (доб.304)

E-mail: info@moschip.ru

Skype отдела продаж:

moschip.ru

moschip.ru_4

moschip.ru_6

moschip.ru_9