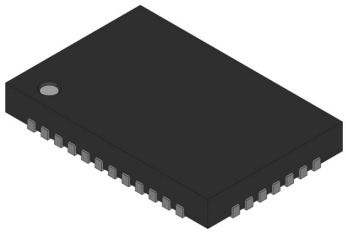


LINEAR TECHNOLOGY LTC3838EUHF-1 High Current Dual Output Synchronous Buck Converter Owner's Manual

DEMO MANUAL
DC1997A-A/DC1997A-B
LTC3838EUHF-1/LTC3838EUHF-2
High Current, Dual Output
Synchronous Buck Converter

Contents

DESCRIPTION

Demonstration circuits DC1997A-A/DC1997A-B are dual output synchronous buck converters featuring the LT C ® 3838EUHF-1/LTC3838EUHF-2. Both assemblies provide two outputs of 1.5V/20A and 1.2V/20A over an input voltage range of 4.5V to 14V at a switching frequency of 300kHz.
Applications requiring the output to be adjusted with an external reference can be implemented with the DC1997A-B assembly. Such applications include adaptive voltage scaling optimization (AVSO) where the processor voltage is adjusted to achieve optimal efficiency, wide output voltage applications controlled by a DAC, or margining. The 2nd channel of the DC1997A-B assembly is regulated to an onboard 1.2V reference in the default setup. The same reference can be set from 0.8V to 1.5V with a potentiometer or the 2nd channel can regulate to a source external to the board. The 1st channel on the DC1997A-B assembly and both channels on the DC1997A-A version are regulated to the internal reference.

The entire converter, excluding the bulk input and output capacitors, fits within a 1.5in2 area on the board. The high density is a result of the compact, 2-sided drop-in layout and the use of dual channel FETs.
Additional features of this demo board include:

- Remote sensing for each output.
- PLLIN and CLKOUT pins.
- PGOOD, RUN and TRK/SS pins for each output.
- Optional resistors to tie the two outputs together.
- Optional footprint for discrete single channel FETs for higher output current.
- Optional footprints to implement DTR (detect transient) to reduce overshoot following a load release.

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

PERFORMANCE SUMMARY

Specifications are at TA = 25°C, No Airflow

PARAMETER	CONDITION	VALUE
Minimum Input Voltage		4.5V
Maximum Input Voltage		14V
Output Voltage VOUT1	IOUT1 = 0A to 20A, VIN = 4.5V to 14V	1.5V ± 2%
Output Voltage VOUT2	IOUT2 = 0A to 20A, VIN = 4.5V to 14V	1.2V ± 2%
VOUT1 Maximum Output Current, IOUT1	VIN = 4.5V to 14V, VOUT1 = 1.5V	20A
VOUT2 Maximum Output Current, IOUT2	VIN = 4.5V to 14V, VOUT2 = 1.2V	20A
Nominal Switching Frequency		300kHz
Efficiency (Measured on DC1997A-B Assembly) See Figure 2	VOUT1 = 1.5V, IOUT1 = 20A, VIN = 12V	90.4% Typical
	VOUT2 = 1.2V, IOUT2 = 20A, VIN = 12V	88.8% Typical

QUICK START PROCEDURE
Demonstration circuit DC1997A-A/DC1997A-B is easy to set up to evaluate the performance of the LTC3838EUHF-1/LTC3838EUHF-2. Please refer to Figure 1 for proper measurement equipment setup and follow the procedure below.

1. With power off, connect the input supply, load and meters as shown in Figure 1. Preset the load to 0A and VIN

supply to be 0V. For both assemblies, place the jumpers in the following positions:

JP4	RUN1	ON
JP1	RUN2	ON
JP2	MODE	FCM

The DC1997A-B assembly has additional jumpers for the reference circuit. Place these jumpers in the following positions:

JP5	ON BD REF	FIXED
JP6	REF	ON BD

2. 2. Adjust the input voltage to be between 4.5V and 14V.
   VOUT1 should be 1.5V ± 2%.
   VOUT2 should be 1.2V ± 2%.
3. Next, apply 20A load to each output and re-measure VOUT.
4. Once the DC regulation is confirmed, observe the output voltage ripple, load step response, efficiency and other parameters.
   Note 1: Use the BNC connectors labeled VOUT1 or VOUT2 to measure the output volt-age ripple.
   Note 2: Do not connect load from the VO1_SNS+ turret to the VO1_SNS- turret or from the VO2_SNS+ turret to the VO2_SNS- turret. This could damage the converter. Only apply load across the stud connectors on the edge of the board.

Reference Circuit for Channel 2 of DC1997A-B Assembly
Channel 2 of the DC1997A-B assembly is configured by default to regulate to the fixed 1.2V reference generated by the LT® 6650 reference circuit. If desired, this reference can be set with a potentiometer, or an external source such as a DAC or another source. See the following instructions to set the board for either:

Adjusting the Onboard Reference:

1. Remove power from the input of the board.
2. Place these jumpers in the following positions:

JP5	ON BD REF	ADJ
JP6	REF	ON BD

3. Apply power to the input of the board.
4. Adjust reference with potentiometer at R52.

Connecting a Reference External to the Board:

1. Remove power from the input of the board.
2. Place JP6 in the EXT position.
3. Connect the external reference between the EXTREF2+ and EXTREF2- turrets.

4. Apply power to the input of the board.
5. Turn-on the external reference.

   Note 3: For accurate efficiency measurements in DCM at light load at VIN greater than 5V, remove R51 and apply an external reference to the board as mentioned above.

Single Output/Dual Phase Operation

A single output/dual phase converter may be preferred for higher output current applications. The optional components required to tie the phases together are found on the top middle of the first sheet. To tie the two outputs together, make the following modifications:

1. Tie the two VOUT shapes together with a piece of copper at the edge of the board where the copper is exposed.
2. Tie the VOUT SENSE1+ pin to INTVCC with a 0Ω jumper at R8. This will tie ITH1 to ITH2 inside the chip.
3. Tie RUN1 to RUN2 by stuffing a 0Ω jumper at R15.
4. If DTR is implemented, then stuff 0Ω jumper at R9 to tie the two DTR pins together.

Dynamic Load Circuit (Optional)

Demonstration circuit DC1997A-A/DC1997A-B provides a simple load-step circuit consisting of a MOSFET and sense resistor for each rail. To apply a load step, follow the steps below.

1. Pre-set the amplitude of a pulse generator to 0.0V and the duty cycle to 5% or less.
2. Connect the scope to the VOUT BNC connectors for the rail under test with a coax cable. To monitor the load-step current, connect the scope probe across the ISTEP+/- turrets for that rail.
3. Connect the output of the pulse generator to the PULSE turret for the rail under test and connect the return to the adjacent GND turret.
4. With the converter running, slowly increase the amplitude of the pulse generator output to provide the desired load step pulse height. The scaling for the load step signal is 5mV/Amp.

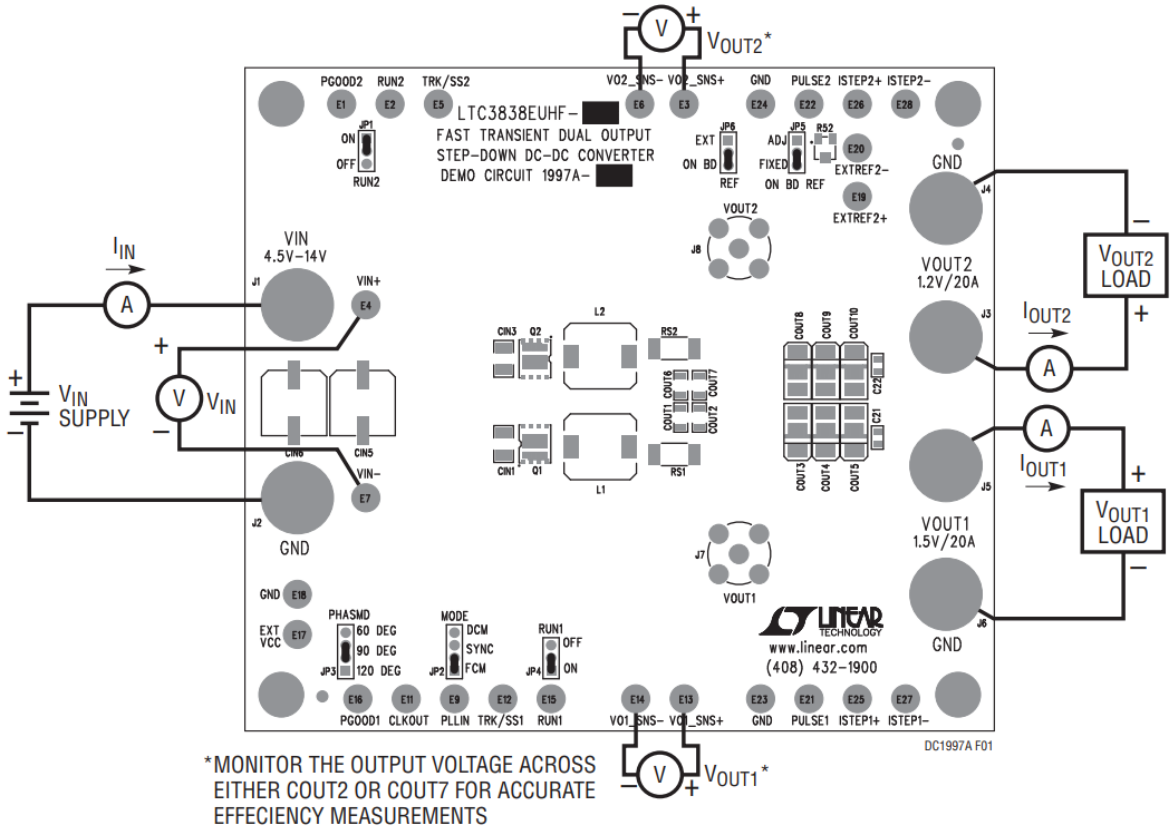


Figure 1. Proper Measurement Equipment Setup

LTC3838-2 1.5V/20A and 1.2V/20A Converter

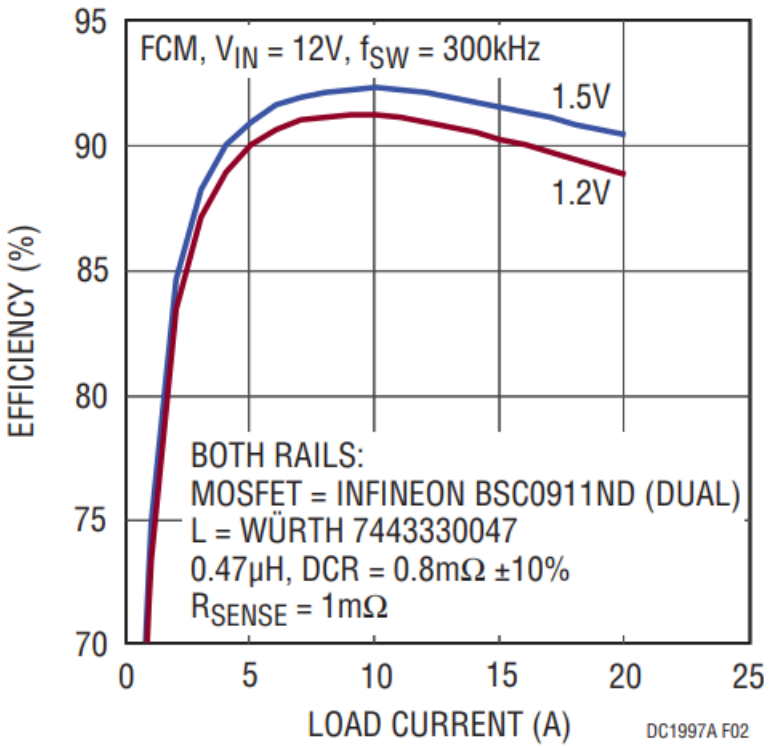


Figure 2. Efficiency Curves for the 1.5V Rail and 1.2V Rail of the DC1997A-B Assembly in FCM at VIN = 12V

LTC3838-2 1.5V/20A and 1.2V/20A Converter

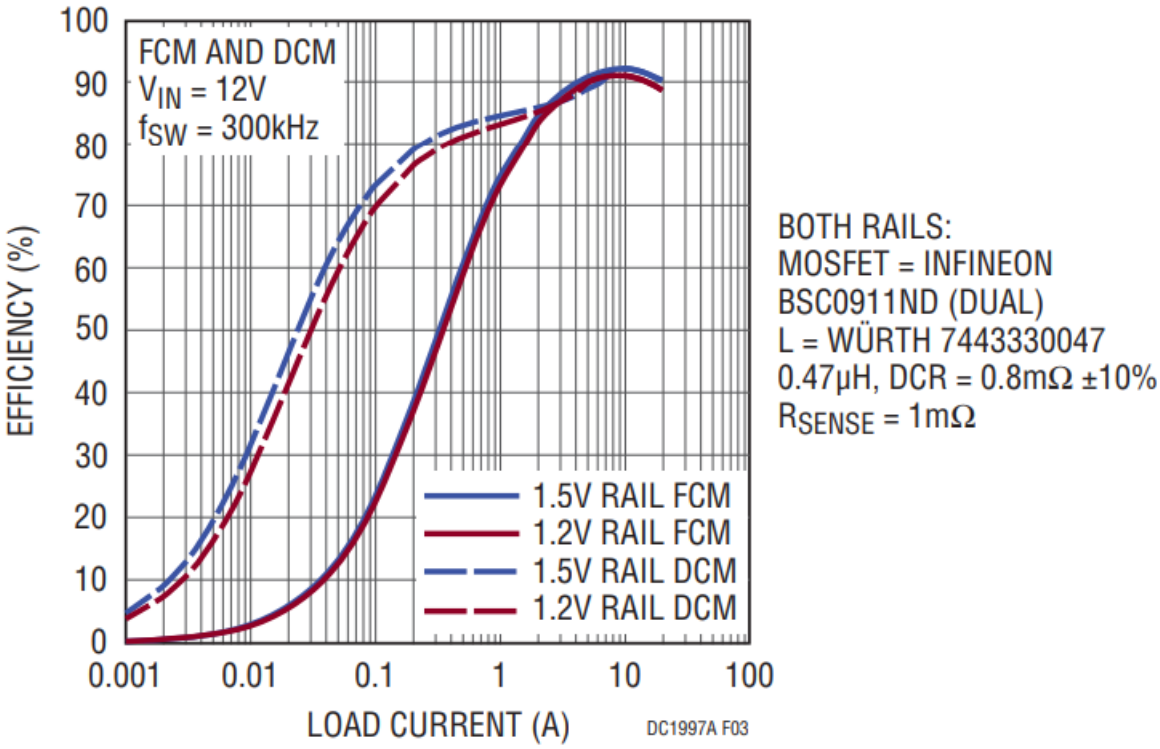


Figure 3. Efficiency Curves for the 1.5V Rail and 1.2V Rail of the DC1997A-B Assembly in FCM and DCM at VIN = 12V

VOUT2 of the LTC3838-2 Demo Board Adjusted with External Reference

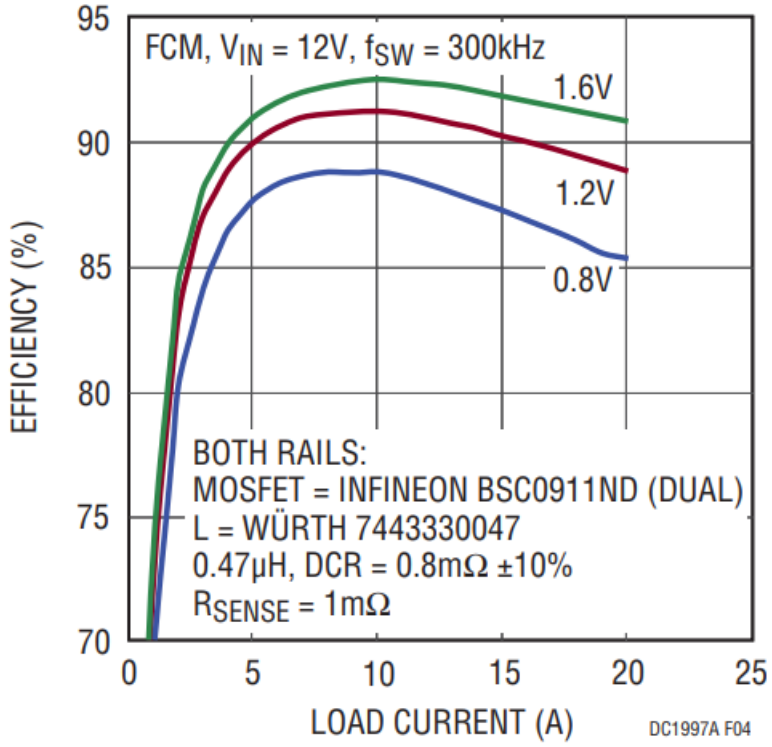


Figure 4. Efficiency Curves for VOUT2 on the DC1997A-B Assembly at Different Output Voltage Settings

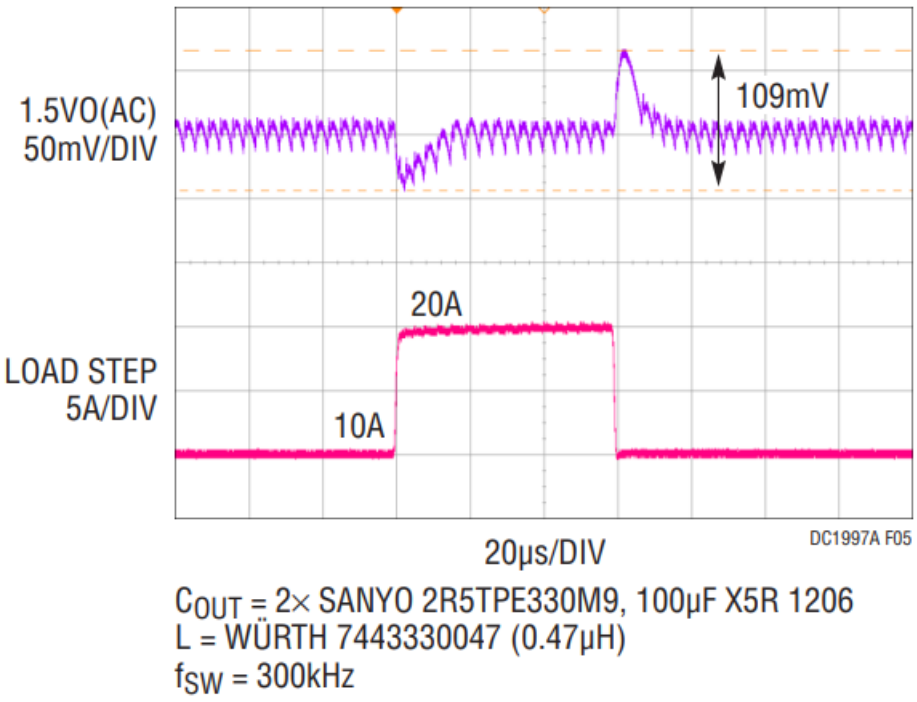


Figure 5. 50% to 100% to 50% Load Step Response of the 1.5V Rail on the DC1997A-A Assembly

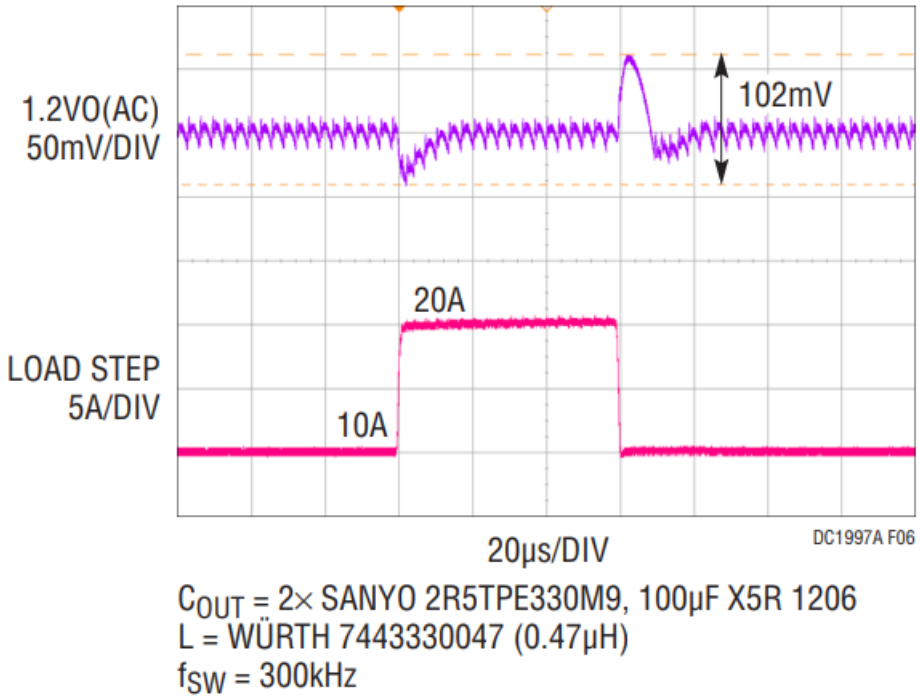


Figure 6. 50% to 100% to 50% Load Step Response of the 1.2V Rail on the DC1997A-A Assembly

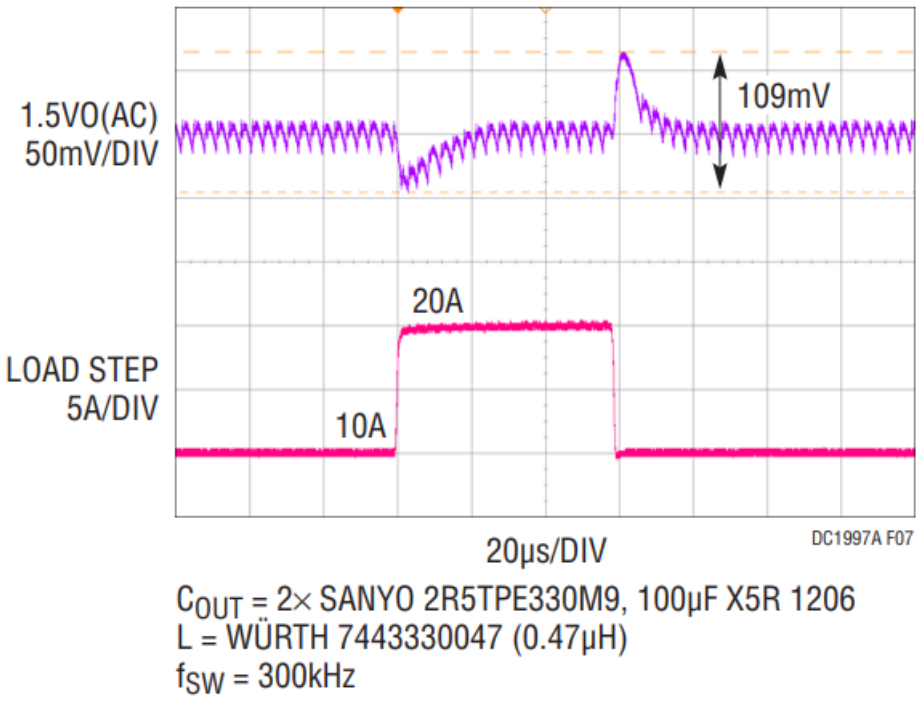


Figure 7. 50% to 100% to 50% Load Step Response of the 1.5V Rail on the DC1997A-B Assembly

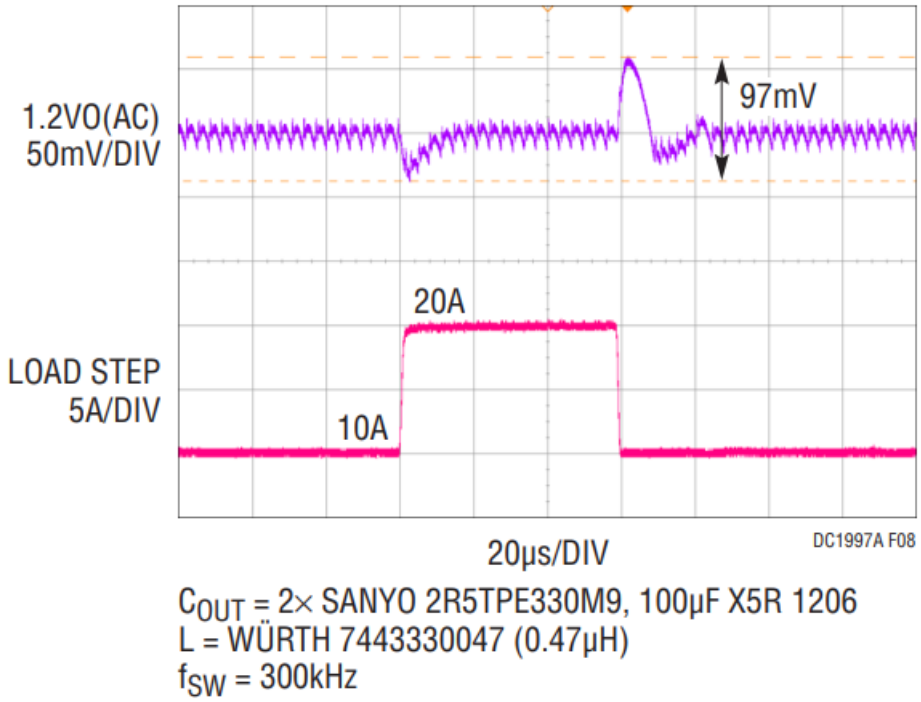


Figure 8. 50% to 100% to 50% Load Step Response of the 1.2V Rail on the DC1997A-B Assembly

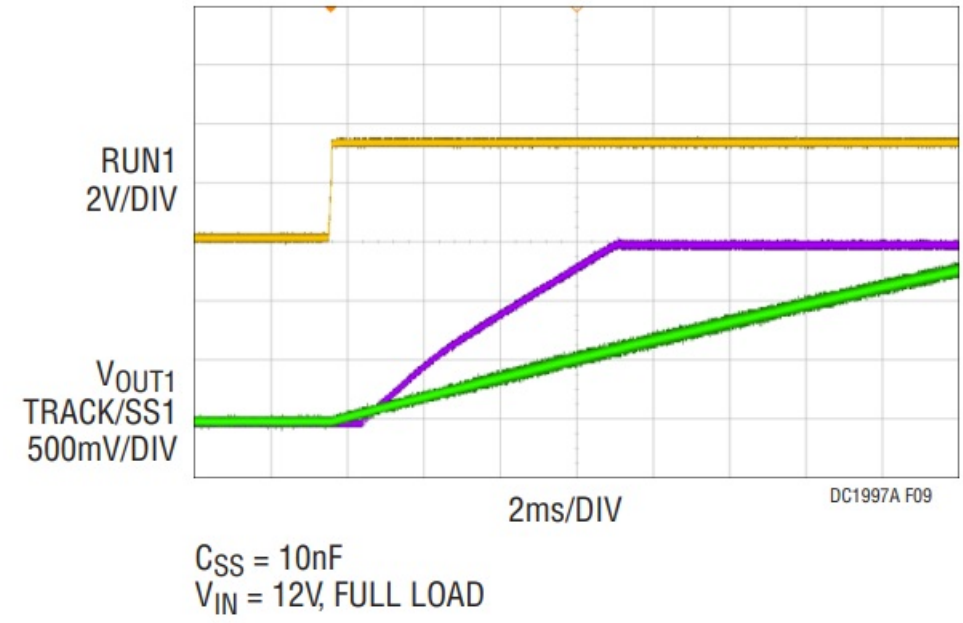


Figure 9. Turn-On of the 1.5V Rail of the DC1997A-A Assembly. RUN Pin Released from Ground

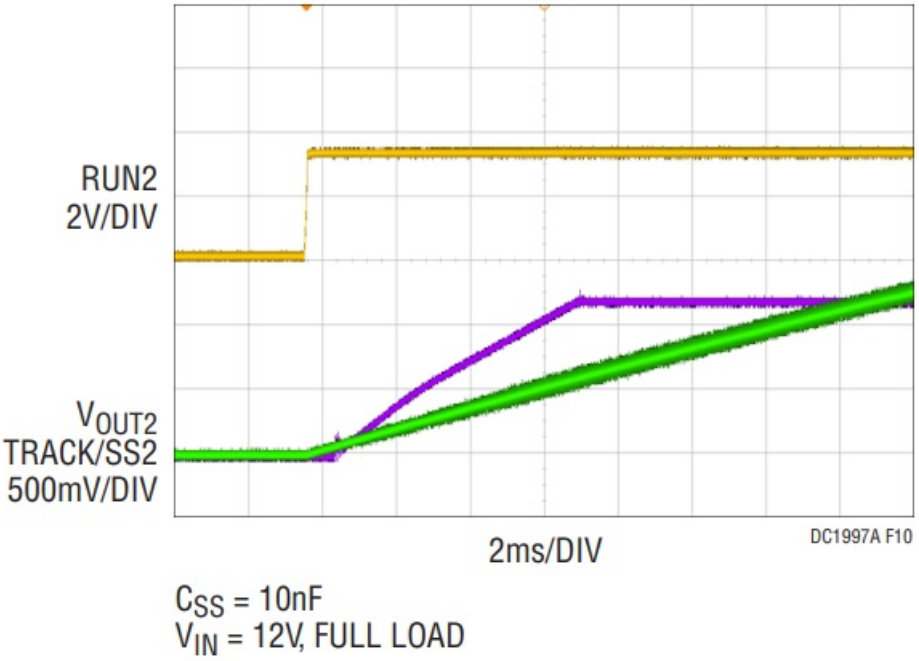


Figure 10. Turn-On of the 1.2V Rail of the DC1997A-A Assembly. RUN Pin Released from Ground

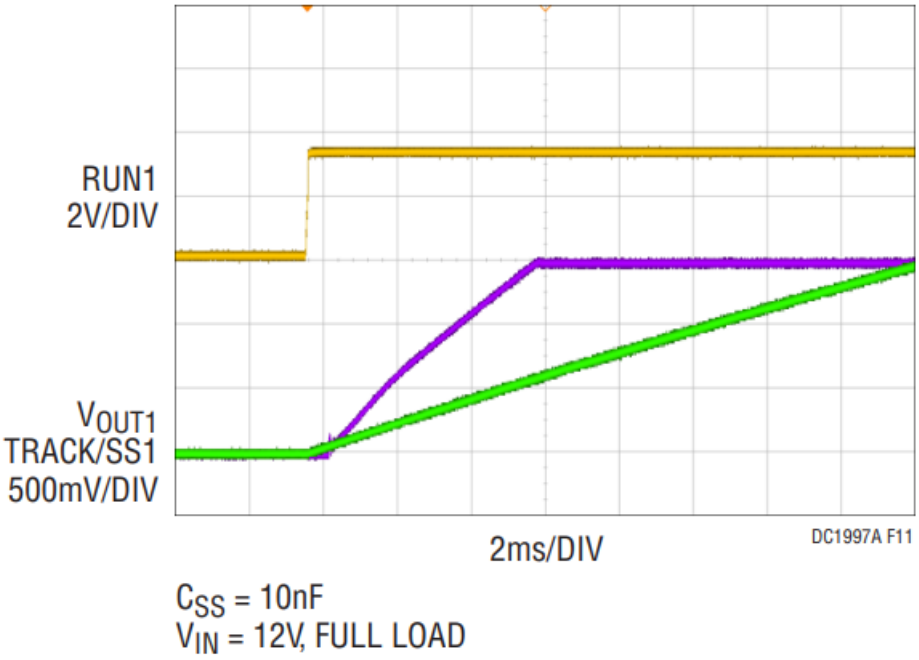


Figure 11. Turn-On of the 1.5V Rail of the DC1997A-B Assembly. RUN Pin Released from Ground

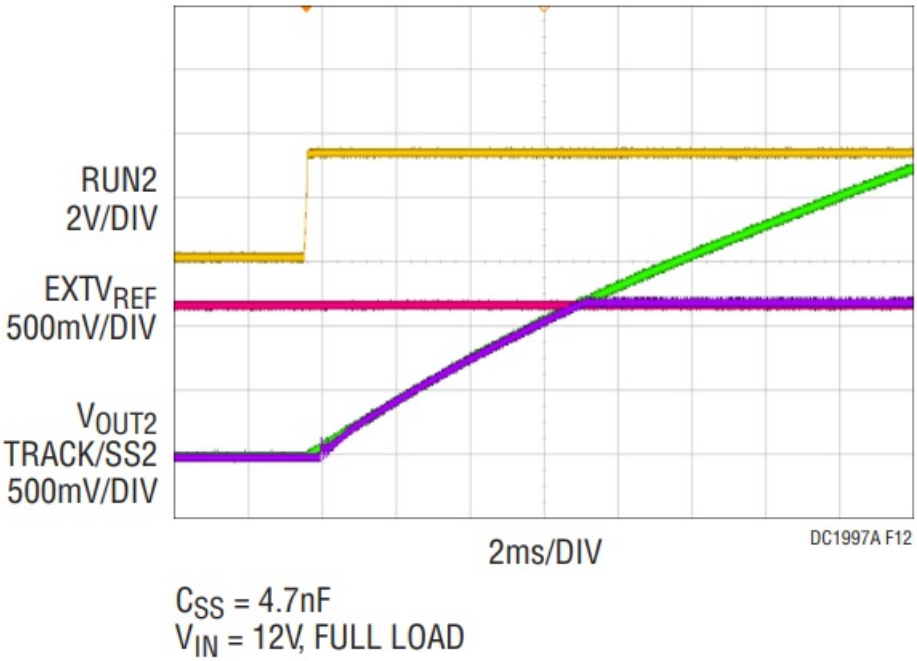
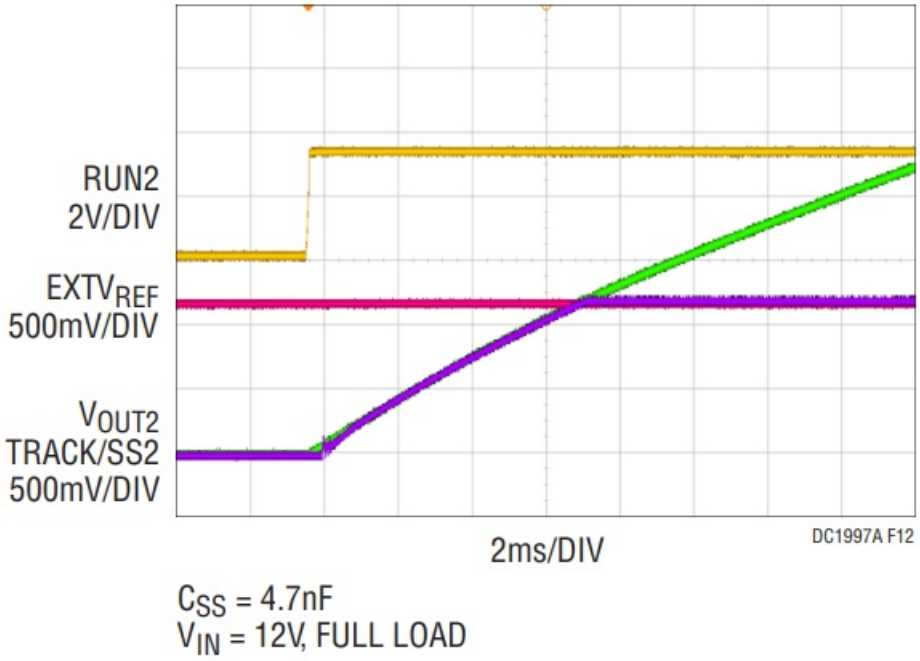


Figure 12. Turn-On of the 1.2V Rail of the DC1997A-B Assembly. RUN Pin Released from Ground



PARTS LIST–DC1997A-A

ITEM	QTY	REFERENCE	PART DESCRIPTION	MANUFACTURER/PART NUMBER
Required Circuit Components				
1	1	C12	CAP X7R 470pF 16V 5% 0603	AVX 0603YC471JAT2A
2	2	C21, C22	CAP X5R 10µF 16V,10% 0805	MURATA GRM21BR61C106KE15L
3	2	C3, C16	CAP NPO 1000pF 25V 5% 0603	AVX 06033A102JAT2A
4	3	C4, C10, C14	CAP X5R 0.1µF 16V 10% 0603	AVX 0603YD104KAT2A
5	2	C5, C11	CAP NPO 47pF 16V 5% 0603	AVX,0603YA470JAT2A
6	1	C6	CAP X7R 330pF 16V 0603	AVX 0603YC331JAT2A
7	2	C7, C13	CAP X5R 0.01µF 16V 10% 0603	AVX 0603YD103KAT2A
8	1	C8	CAP X5R 4.7µF 16V,10% 0805	AVX 0805YD475KAT2A
9	2	C9, C18	CAP X5R 1µF 16V,10% 0603	AVX 0603YD105KAT2A
10	4	CIN1, CIN2, CIN3, CIN4	CAP X5R 22µF 16V 1210	AVX 1210YD226MAT2A
11	1	CIN6	CAP 180µF 16V SVP-F8	SANYO 16SVP180MX
12	4	COUT1, COUT2, COUT6, COUT7	CAP X5R 100µF 6.3V 20% 1206	MURATA GRM31CR60J107ME39L

13	4	COUT4, COUT5, COUT9, COUT10	CAP 330µF 2.5V SIZE 7343	SANYO 2R5TPE330M9
14	2	D1, D2	DIODE SCHOTTKY SOD-323	CENTRAL SEMI. CMDSH-4E TR
15	2	L1, L2	IND 0.47µH 0.8mΩ DCR	WÜRTH 7443330047
16	2	Q1, Q2	MOSFET 5mm x 6mm POWER STAGE	INFINEON BSC0911ND
17	2	R13, R45	RES 100k 1% 0603	VISHAY CRCW0603100KFKEA
18	6	R2, R11, R19, R44, R4, R12	RES 10k 1% 0603	VISHAY CRCW060310K0FKEA
19	1	R27	RES CHIP 11k 1% 0603	VISHAY CRCW060311K0FKEA
20	2	R29, R31	RES 2.2Ω 1% 0603	VISHAY CRCW06032R20FKEA
21	1	R30	RES 133k 1% 0603	VISHAY CRCW0603133KFKEA
22	2	R32, R40	RES 15k 1% 0603	VISHAY CRCW060315K0FKEA
23	12	R5, R17, R21, R23, R25, R35, R38, R41, R42, R50, R14, R24	RES 0Ω,0603	VISHAY CRCW06030000Z0EA
24	4	R6, R7, R46, R48	RES 10Ω 1% 0603	VISHAY CRCW060310R0FKED
25	2	RS1, RS2	RES 0.001Ω 1W 1% 2512	VISHAY WSL25121L000FEA
26	1	U1	LTC3838EUHF-1 QFN 38-LEAD	LINEAR TECH. LTC3838EUHF-1

Additional Circuit Components

1	0	C1, C2, C15, C17, C19, C23, C24	CAP 0603	OPT
2	0	C20	CAP 0805	OPT
3	0	CIN5	CAP SVP-F8	OPT
4	0	CIN7-CIN12	CAP OPT 1210	OPT
5	0	COUT3, COUT8, COUT11-COUT14	CAP OPT 7343	OPT
6	0	D3	DIODE SOD-323	OPT
7	0	E19, E20	TESTPOINT TURRET 0.095″	OPT
8	0	JP5, JP6	HEADER OPT 2MM SINGLE 3-PIN	OPT
9	2	Q11, Q12	MOSFET N-CH 30V TO-252	FAIRCHILD FDD8874
10	0	Q3-Q10	MOSFET LFPAK	OPT
11	0	R1, R3, R8, R9, R10, R15, R16, R18, R20, R22, R26, R28, R33, R34, R36, R37, R39, R43, R47, R49, R63	RES 0603	OPT
12	0	R51, R53, R54, R59, R60, R61, R62	RES 0603	OPT
13	0	R52	RES POT-3313J-1	OPT
14	2	R55, R56	RES 10k 1% 0603	VISHAY CRCW060310K0FKEA
15	2	R57, R58	RES 0.005Ω 1/2W 1% 2010	VISHAY WSL20105L000FEA
16	0	U2	LT6650HS5 SOT23-5	OPT

Hardware

1	6	J1-J6	STUD TEST PIN	PEM KFH-032-10
2	12	J1-J6	NUT BRASS #10-32	ANY
3	6	J1-J6	RING LUG #10	KEYSTONE 8205
4	6	J1-J6	WASHER TIN PLATED BRASS	ANY
5	2	J7,J8	CONN BNC 5 PINS	CONNEX 112404
6	2	JP1, JP4	HEADER 2MM SINGLE 3-PIN	SAMTEC TMM-103-02-L-S
7	2	JP2, JP3	HEADER 2MM SINGLE 4-PIN	SAMTEC TMM-104-02-L-S
8	4	XJP1-XJP4	SHUNT	SAMTEC 2SN-BK-G

PARTS LIST–DC1997A-B

Required Circuit Components

1	1	C12	CAP X7R 470pF 16V 5% 0603	AVX 0603YC471JAT2A
2	2	C21, C22	CAP X5R 10µF 16V 10% 0805	MURATA GRM21BR61C106KE15L
3	2	C3, C16	CAP NPO 1000pF 25V 5% 0603	AVX 06033A102JAT2A
4	3	C4, C10, C14	CAP X5R 0.1µF 16V 10% 0603	AVX 0603YD104KAT2A
5	2	C5, C11	CAP NPO 47pF 16V 5% 0603	AVX,0603YA470JAT2A
6	1	C6	CAP NPO 680pF 16V 0603	AVX 0603YC681JAT2A
7	1	C13	CAP X5R 0.01µF 16V 10% 0603	AVX 0603YD103KAT2A
8	1	C7	CAP X7R 4.7nF 10V 0603	AVX 0603ZC472JAT2A
9	1	C8	CAP X5R 4.7µF 16V,10% 0805	AVX 0805YD475KAT2A
10	2	C9, C18	CAP X5R 1µF 16V,10% 0603	AVX 0603YD105KAT2A
11	4	CIN1, CIN2, CIN3, CIN4	CAP X5R 22µF 16V 1210	AVX 1210YD226MAT2A
12	1	CIN6	CAP 180µF 16V SVP-F8	SANYO 16SVP180MX
13	4	COUT1, COUT2, COUT6, COUT7	CAP X5R 100µF 6.3V 20% 1206	MURATA GRM31CR60J107ME39L
14	4	COUT4, COUT5, COUT9, COUT10	CAP 330µF 2.5V SIZE 7343	SANYO 2R5TPE330M9

15	2	D1, D2	DIODE SCHOTTKY SOD-323	CENTRAL SEMI. CMDSH-4E TR
16	2	L1, L2	IND 0.47µH 0.8mΩ DCR	WÜRTH 7443330047
17	2	Q1, Q2	MOSFET 5mm x 6mm POWER S TAGE	INFINEON BSC0911ND
18	3	R13, R24, R45	RES 100k 1% 0603	VISHAY CRCW0603100KFKE A
19	4	R2, R11, R19, R44	RES 10k 1% 0603	VISHAY CRCW060310K0FKE A
20	1	R27	RES CHIP 5.23k 1% 0603	VISHAY CRCW06035K23FKE A
21	2	R29, R31	RES 2.2Ω 1% 0603	VISHAY CRCW06032R20FKE A
22	1	R30	RES 133k 1% 0603	VISHAY CRCW0603133KFKE A
23	2	R32, R40	RES 15k 1% 0603	VISHAY CRCW060315K0FKE A
24	13	R5, R17, R21, R23, R25, R3 5, R38, R41, R42, R50, R59, R61, R62	RES 0Ω, 0603	VISHAY CRCW06030000Z0EA
25	4	R6, R7, R46, R48	RES 10Ω 1% 0603	VISHAY CRCW060310R0FKE D
26	2	RS1, RS2	RES 0.001Ω 1W 1% 2512	VISHAY WSL25121L000FEA
27	1	U1	LTC3838EUHF-2 QFN 38-LEAD	LINEAR TECH. LTC3838EUHF-2

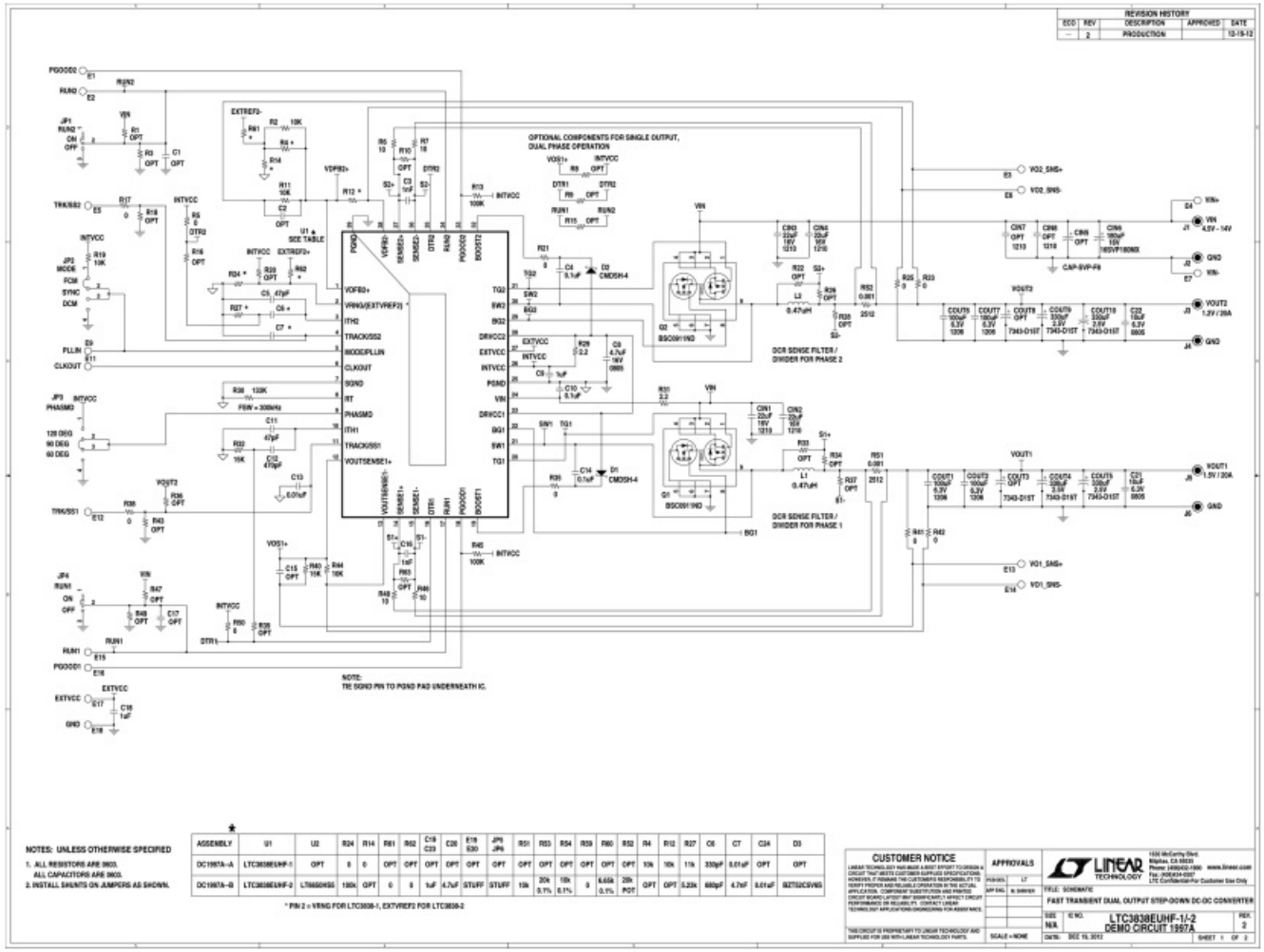
Additional Circuit Components

1	0	C1, C2, C15, C17	CAP 0603	OPT
2	1	C19	CAP X5R 1µF 16V 0603	AVX 0603YD105KAT2A
3	1	C20	CAP X5R 4.7µF 16V 0805	AVX 0805YD475KAT2A
4	1	C23	CAP X5R 1µF 16V 0603	AVX 0603YD105KAT2A
5	1	C24	CAP X5R 0.01µF 16V 0603	AVX 0603YD103KAT2A
6	0	CIN5	CAP SVP-F8	OPT
7	0	CIN7-CIN12	CAP OPT 1210	OPT
8	0	COUT3, COUT8, COUT11-COUT14	CAP OPT 7343	OPT
9	1	D3	DIODE BZT52C5V6S 5.6V ZENER SOD-323	DIODES BZT52C5V6S-7-F
10	2	Q11, Q12	MOSFET N-CH 30V TO-252	FAIRCHILD FDD8874
11	0	Q3-Q10 (OPT)	MOSFET LFPAK	OPT
12	0	R1, R3, R8, R9, R10, R15, R16, R18, R20, R22, R26, R28, R33, R34, R36, R37, R39, R43, R47, R49, R63	RES 0603	OPT
13	0	R4, R12, R14	RES 0603	OPT
14	1	R51	RES CHIP 10k 1% 0603	VISHAY CRCW060310K0FKEA
15	1	R52	RES POT 20k 1% POT-3313J-1	BOURN 3313J-1-203E
16	1	R53	RES 20k 0.1% 0603	VISHAY PTN0603E2002BST1
17	1	R54	RES 10k 0.1% 0603	VISHAY PTN0603E1002BSTS
18	2	R55, R56	RES 10k 1% 0603	VISHAY CRCW060310K0FKEA
19	2	R57, R58	RES 0.005Ω 1/2W 1% 2010	VISHAY WSL20105L000FEA
20	1	R60	RES CHIP 6.65k 0.1% 0603	VISHAY PTN0603E6651BSTS
21	1	U2	LT6650HS5 SOT23-5	LINEAR TECH. LT6650HS5

Hardware

1	2	E19, E20	TESTPOINT TURRET 0.095″	MILL-MAX 2501-2-00-80-00-00-07-0
2	26	E1-E7, E9, E11-E28	TESTPOINT TURRET 0.095″	MILL-MAX 2501-2-00-80-00-00-07-0
3	6	J1-J6	STUD TEST PIN	PEM KFH-032-10
4	6	J1-J6	NUT BRASS #10-32	ANY
5	6	J1-J6	RING LUG #10	KEYSTONE 8205
6	12	J1-J6	WASHER TIN PLATED BRASS	ANY
7	2	J7, J8	CONN BNC 5 PINS	CONNEX 112404
8	2	JP1, JP4	HEADER 2MM SINGLE 3-PIN	SAMTEC TMM-103-02-L-S
9	2	JP2, JP3	HEADER 2MM SINGLE 4-PIN	SAMTEC TMM-104-02-L-S
10	2	JP5, JP6	HEADER 2MM SINGLE 3-PIN	SAMTEC TMM-103-02-L-S
11	1	XJP1-XJP4	SHUNT	SAMTEC 2SN-BK-G
12	1	XJP5,XJP6	SHUNT	SAMTEC 2SN-BK-G

SCHEMATIC DIAGRAM



NOTES: UNLESS OTHERWISE SPECIFIED

1. ALL RESISTORS ARE 0603.
   ALL CAPACITORS ARE 0603.
2. INSTALL SHUNTS ON JUMPERS AS SHOWN.

ASSEMBLY	U1	U2	R24	R14	R61	R62	C19 C23	C26	E18 E20	JP5 JP6	R51	R53	R54	R59	R60	R52	R4	R12	R27	C6	C7	C24	D3
DC1997A–A	LTC3838EUHF-1	OPT	0	0	OPT	OPT	OPT	OPT	OPT	OPT	OPT	OPT	OPT	OPT	OPT	OPT	10k	10k	11k	330pF	0.01uF	OPT	OPT
DC1997A–B	LTC3838EUHF-2	LT6660HSS	100k	OPT	0	0	1uF	4.7uF	ST/FF	ST/FF	10k	30k 0.1%	10k 0.1%	0	6.65k 0.1%	20k POT	OPT	OPT	5.23k	680pF	4.7nF	0.01uF	BZT52C5V6S

* PIN 2 = VRNG FOR LTC3838-1, EXTVREF2 FOR LTC3838-2

CUSTOMER NOTICE

LINEAR TECHNOLOGY HAS MADE A BEST EFFORT TO DESIGN A CIRCUIT THAT MEETS CUSTOMER-SUPPLIED SPECIFICATIONS; HOWEVER, IT REMAINS THE CUSTOMER'S RESPONSIBILITY TO VERIFY PROPER AND RELIABLE OPERATION IN THE ACTUAL APPLICATION. COMPONENT SUBSTITUTION AND PRINTED CIRCUIT BOARD LAYOUT MAY SIGNIFICANTLY AFFECT CIRCUIT PERFORMANCE OR RELIABILITY. CONTACT LINEAR TECHNOLOGY APPLICATIONS ENGINEERING FOR ASSISTANCE.

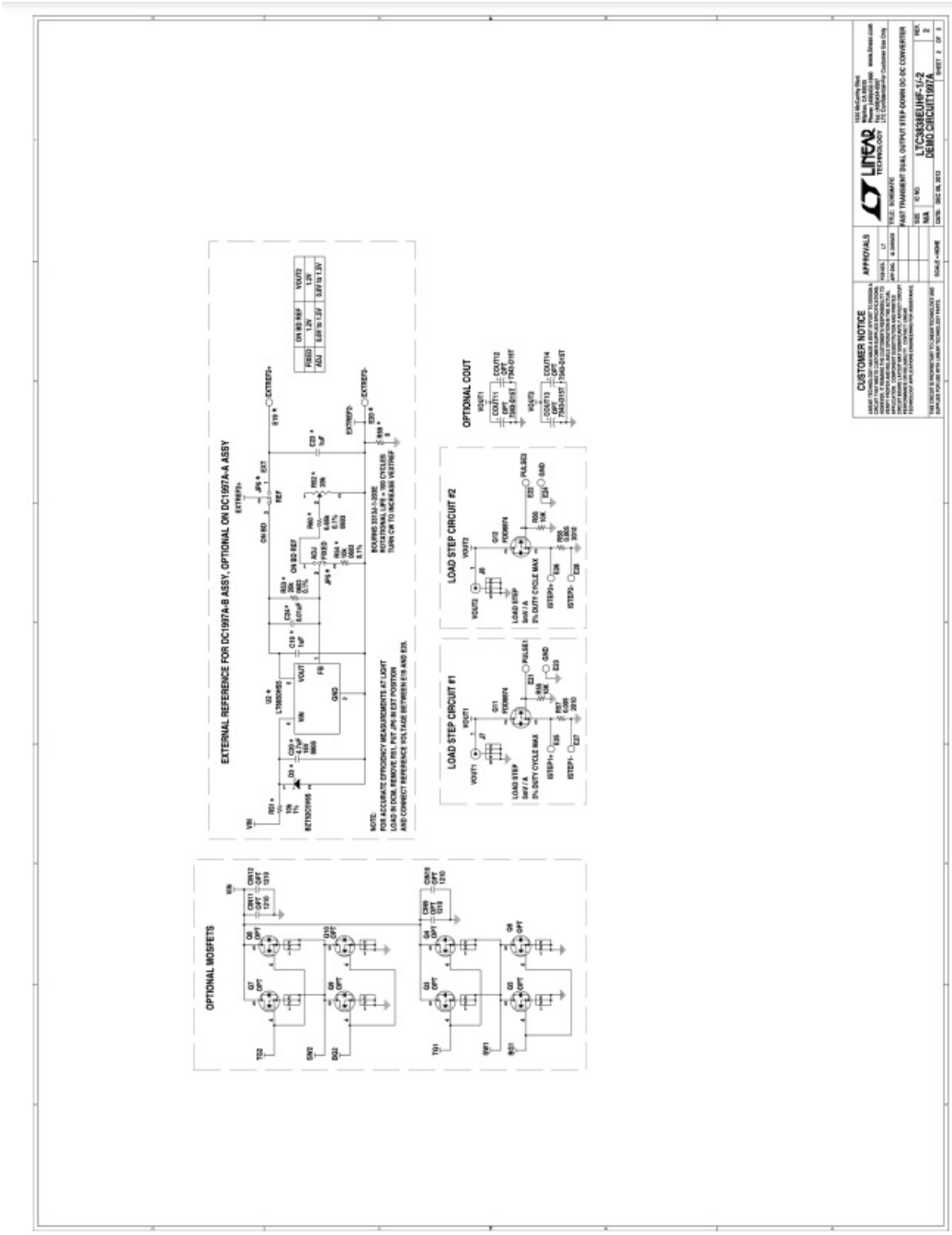
THIS CIRCUIT IS PROPRIETARY TO LINEAR TECHNOLOGY AND SUPPLIED FOR USE WITH LINEAR TECHNOLOGY PARTS.

SCALE = NONE

APPROVALS	
PCB DES.	LT
APP ENG.	M. DARGEI

LINEAR TECHNOLOGY
1630 McCarthy Blvd.
Milpitas, CA 95035
Phone: (408)432-1900 www.linear.com
Fax: (408)434-0507
LTC Confidential–For Customer Use Only

SIZE	IC NO.	REV.
N/A	LTC3838EUHF-1/-2 DEMO CIRCUIT 1997A	2



DEMONSTRATION BOARD IMPORTANT NOTICE

Linear Technology Corporation (LT C) 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 LT C 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 LT C 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. LT C assumes no liability for applications assistance, customer product design, software performance, or infringement of patents or any other intellectual property rights of any kind. LT C 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 LT C application engineer.

Mailing Address:
Linear Technology
1630 McCarthy Blvd.
Milpitas, CA 95035

Linear Technology Corporation
1630 McCarthy Blvd., Milpitas, CA 95035-7417
(408) 432-1900
FAX: (408) 434-0507
www.linear.com

Documents / Resources

	**LINEAR TECHNOLOGY LTC3838EUHF-1 High Current Dual Output Synchronous Buck Converter** [pdf] Owner's Manual LTC3838EUHF-1 High Current Dual Output Synchronous Buck Converter, LTC3838EUHF-1, High Current Dual Output Synchronous Buck Converter, Synchronous Buck Converter, Buck Converter