

LTC3880EUJ

Dual Phase Step-Down DC/DC Controller with Digital Power Management

DESCRIPTION

Demonstration circuit 1753A is a dual phase single-output, synchronous buck converter featuring the LTC[®]3880EUJ, a dual phase current mode controller with digital power management. There are two versions of the board available:

- DC1753A-A: senses inductor current across a sense resistor. Default switching Freq = 350kHz
- DC1753A-B: senses inductor current with the inductor DCR. Default switching Freq = 425kHz

Either version can be populated with the LTC3880EUJ-1, which allows the user to provide bias power to the IC from an external power supply.

The output voltage of the board can be programmed from 0.5V to 3.3V, with output current up to 40A. The factory default setting for the output is 1.8V.

The DC1753A powers up to default settings and produces power based on configuration resistors without the need for any serial bus communication. This allows easy

evaluation of the DC/DC converter aspects of the LTC3880. To fully explore the extensive digital power management features of the part, download the LTpowerPlay[™] GUI software onto your PC and use LTC's I²C/SMBus/PMBus dongle DC1613A to connect to the board. LTpowerPlay allows the user to reconfigure the part on-the-fly and store the configuration in EEPROM, view telemetry of voltage, current, temperature and fault status.

GUI DOWNLOAD

The software can be downloaded from:
<http://www.linear.com/ltpowerplay>

For more details and instructions of LTpowerPlay, please refer to the LTpowerPlay for LTC3880 Quick Start Guide.

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

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PERFORMANCE SUMMARY

Specifications are at T_A = 25°C

SYMBOL	PARAMETER	CONDITIONS	MIN	TYP	MAX	UNITS
V _{IN}	Input Supply Range		6.5	12	24	V
V _{OUT}	Output Voltage Range	I _{OUT} = 0A to 20A, V _{IN} = 6.5V to 24V	0.5	1.8	3.3	V
V _{OUT_ACCURACY}	Output Voltage Accuracy	I _{OUT} = 0A to 20A, V _{IN} = 6.5V to 24V V _{OUT} for 0.5V to 3.3V		±0.5		%
I _{OUT}	Output Current Range		0		40	A
f _{SW, A}	Factory Default Switching, Freq: A (R _{SENSE})			350		kHz
f _{SW, B}	Factory Default Switching, Freq: B (DCR)			425		kHz
EFFICIENCY	Peak Efficiency	V _{OUT} = 1.8V, See Figures 6 and 7		91.8		%

QUICK START PROCEDURE

Demonstration circuit 1753A makes it easy to evaluate the performance of the LTC3880. 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 C20 or C23. See Figure 5 for the proper scope probe technique.

1. Make sure jumpers are in the following positions:

JUMPER	POSITION	FUNCTION
JP1	OFF	Write Protection of LTC3880
JP3	ON	LED Indicator
JP4	OFF	EXTVCC_DRV: External V_{CC} for the LTC3880-1
JP5	C	GPIO0B to GPIO1B: Tie GPIOs Together

2. With power off, connect the input power supply to V_{IN} and GND. Connect active load to outputs.
3. Make sure RUN switch is OFF.
4. Turn on the power at the input.

NOTE: Make sure that the input voltage does not exceed 24V.

5. Turn on the RUN switch as desired.
6. Check for the correct output voltages. $V_{OUT} = 1.8V \pm 0.5\%$.
- NOTE: If there is no output, temporarily disconnect the load to make sure that the load is not set too high.
7. Once the proper output voltages are established, adjust the loads within the operating range and observe the output voltage regulation, ripple voltage, efficiency and other parameters.
8. Connect the dongle and control the output voltages from the GUI. See next section for details.

CONNECTING A PC TO DC1753A

You can use a PC to reconfigure the power management features of the LTC3880, such as: nominal V_{OUT} , margin set points, OV/UV limits, temperature fault limits, sequencing parameters, the fault log, fault responses, GPIOs and other functionality. The DC1613A dongle may be plugged in regardless of whether or not V_{IN} is present.

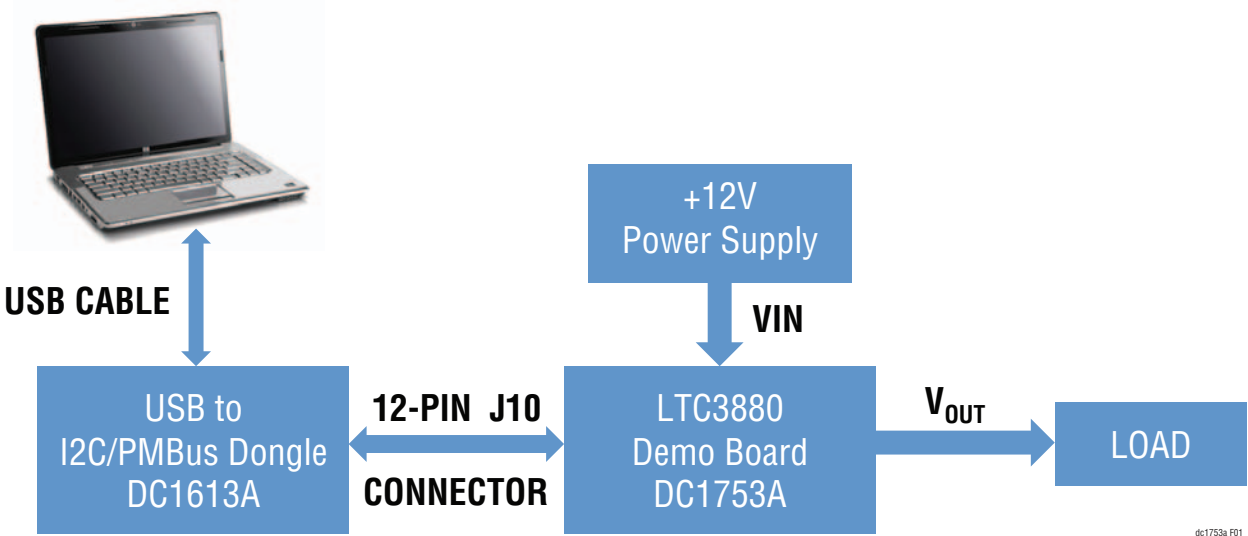


Figure 1. Demo Setup with PC

QUICK START PROCEDURE

Combining DC1753A with Other Digital Power Demo Boards

The DC1753A may be plugged together in a multiboard array with other digital power boards using J7 and J8.

Measuring Efficiency

To accurately measure efficiency of any configuration, do the following:

- Remove R65 (bleeder resistor on bottom side of board).
- Set JP3 to OFF to disable the regulator that provides power to LEDs.
- Measure VIN across the input ceramic capacitor (C18, C19). Measure VOUT across the output ceramic capacitor (C24, C25).

Evaluating the LTC3880-1

For applications that require the highest possible efficiency, the LTC3880-1 allows the user to supply the bias current and gate driver current from an external power supply. Connect the power supply, 4.8V to 5.2V, to the INTVCC/EXTVCC pin. Obtain a DC1753A with an LTC3880-1 installed from your Linear Technology Field Applications Engineer.

To use the on-board LDO to drive INTVCC, make the following modifications to the demo board:

- Set JP4 to ON so that U7 provides the drive to INTVCC. U7 takes the place of the external power supply.
- Install R60.

To accurately measure efficiency of a demo board containing an LTC3880-1:

- Drive INTVCC from an external source through the pin named: INTVCC/EXTVCC. Install R60, R65 if installed
- Set JP4 to OFF to disable U7.
- Set JP3 to OFF to disable the regulator that provides power to LEDs.
- Measure VIN across the input ceramic capacitor (C18, C19). Measure VOUT across the output ceramic capacitor (C24, C25).

Measuring Output Ripple Voltage

An accurate ripple measurement may be performed by using the configuration in Figure 5 across C20 or C23.

QUICK START PROCEDURE

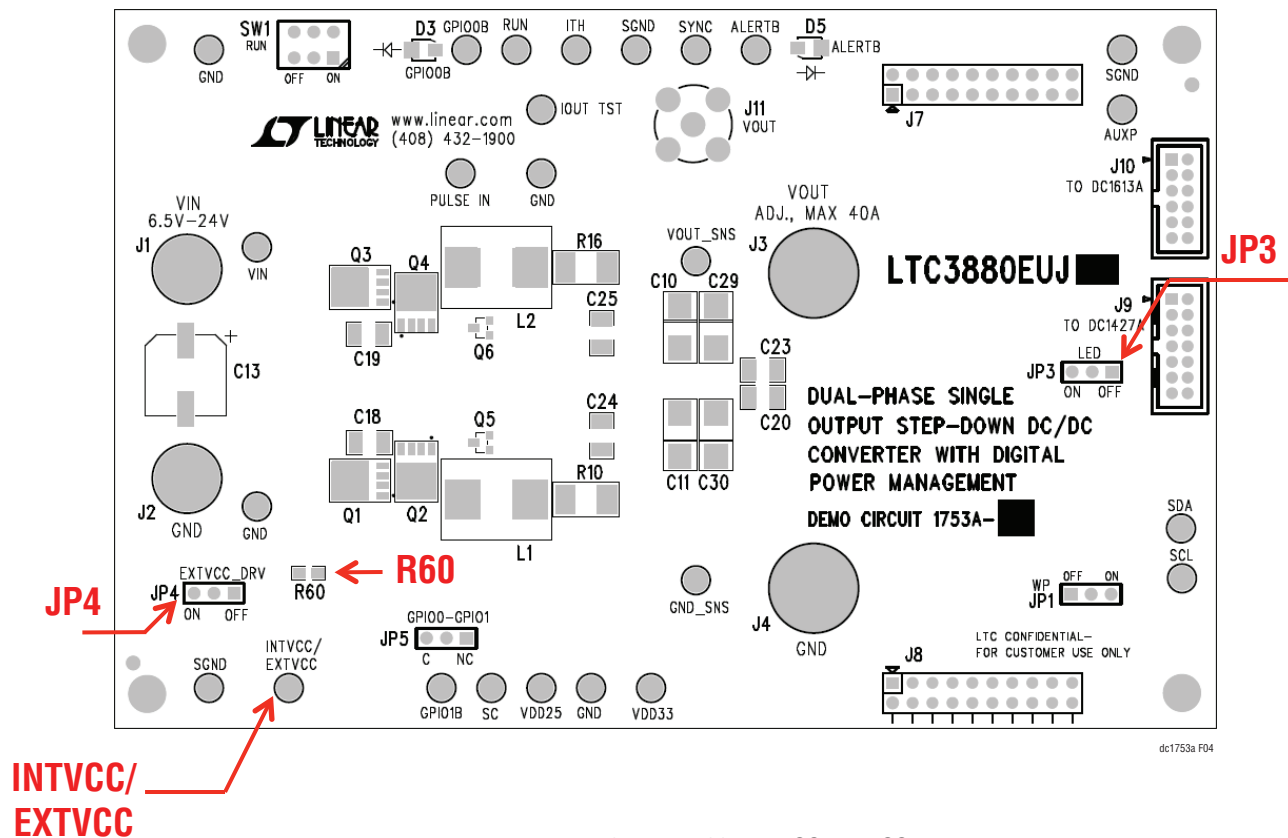


Figure 4. Jumper Locations: JP3, JP4, R60, INTVCC/EXTVCC Turret

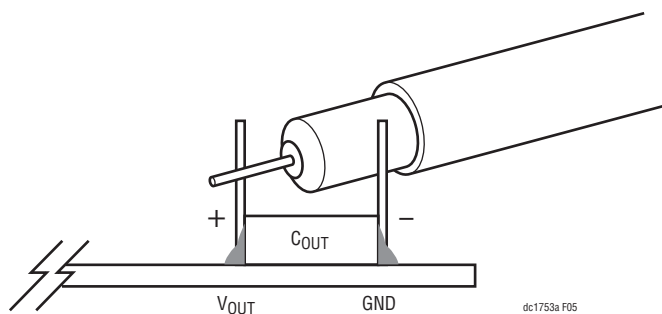


Figure 5. Measuring Output Voltage Ripple

QUICK START PROCEDURE

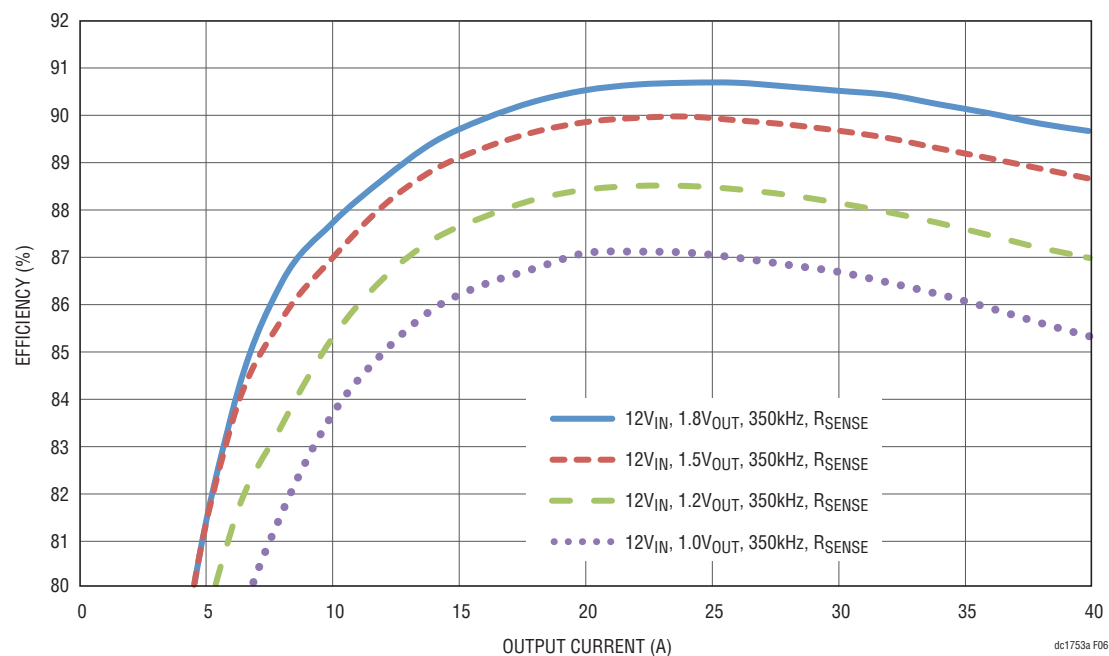


Figure 6. Typical Efficiency Curves, Sense Resistor Current Sensing, 12VIN, fSW = 350kHz

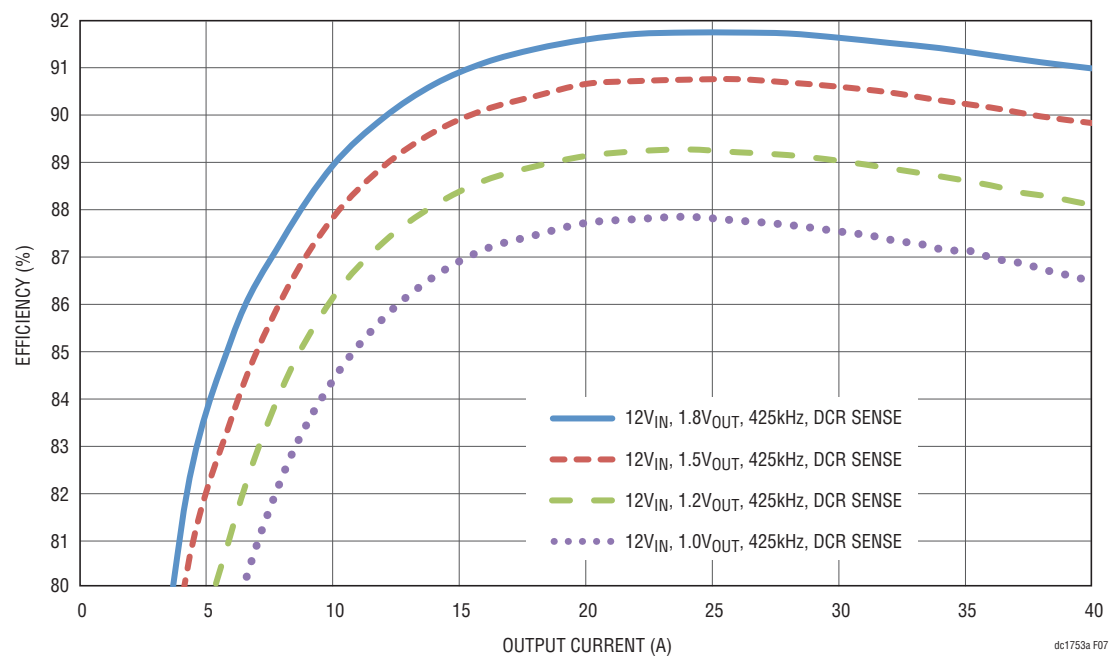


Figure 7. Typical Efficiency Curves, DCR Current Sensing, 12VIN, fSW = 425kHz

QUICK START PROCEDURE

LTpowerPlay Software GUI

LTpowerPlay is a powerful Windows based development environment that supports Linear Technology digital power ICs with EEPROM, including the LTC3880, LTC2974 and LTC2978, the quad and octal PMBus power supply managers. The software supports a variety of different tasks. You can use LTpowerPlay to evaluate Linear Technology ICs by connecting to a demo board system. LTpowerPlay can also be used in an offline mode (with no hardware present) in order to build a multichip configuration file that can be saved and reloaded at a later time. LTpowerPlay provides unprecedented diagnostic and debug features. It becomes a valuable diagnostic tool during board bring-up

to program or tweak the power management scheme in a system, or to diagnose power issues when bringing up rails. LTpowerPlay utilizes the DC1613A USB-to-SMBus controller to communicate with one of many potential targets, including the LTC2974's DC1978A demo system, or a customer board. The software also provides an automatic update feature to keep the software current with the latest set of device drivers and documentation. The LTpowerPlay software can be downloaded from:

<http://linear.com/ltpowerplay>

To access technical support documents for LTC Digital Power Products visit Help. View online help on the LTpowerPlay menu.

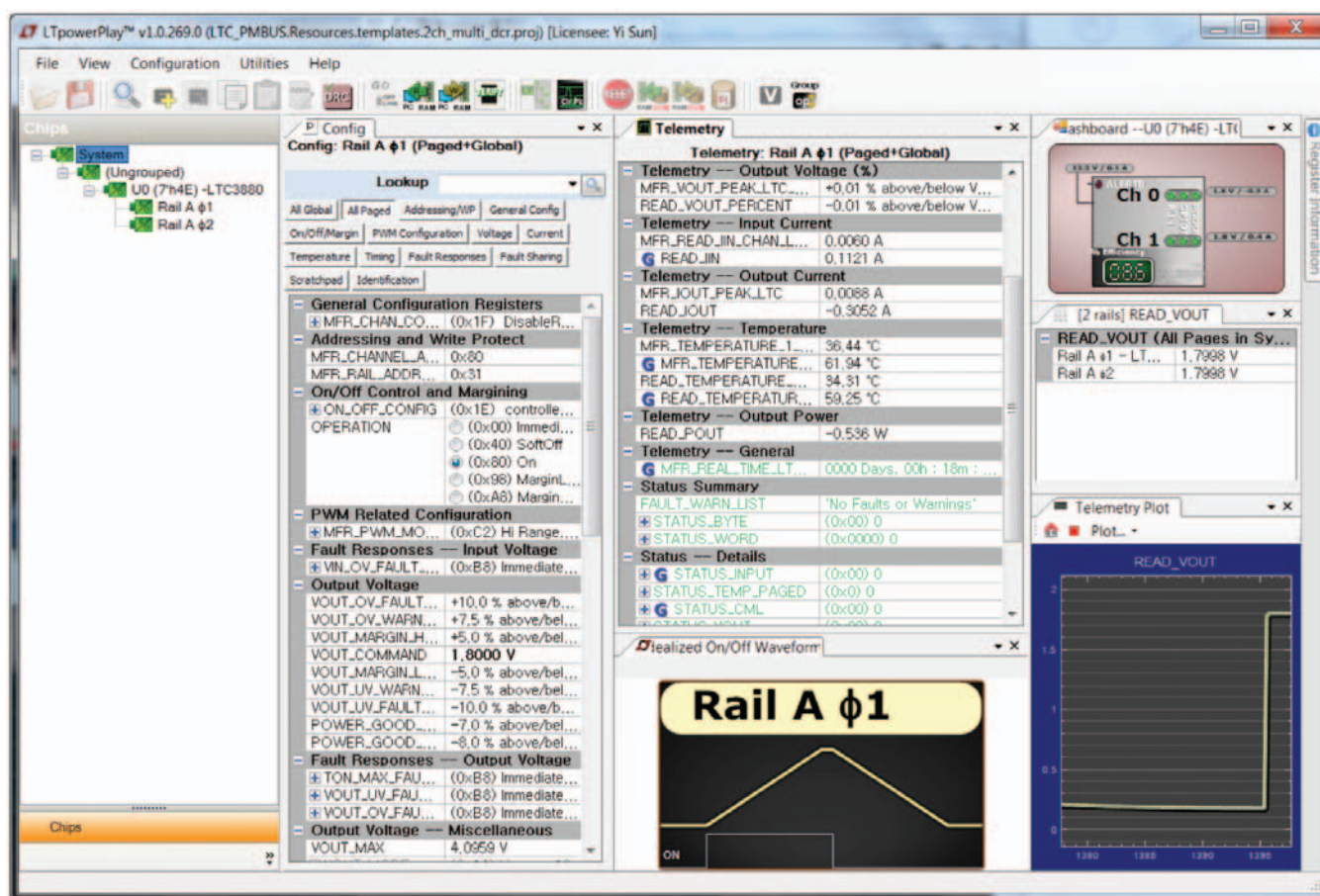


Figure 8. LTpowerPlay Software GUI

GUI QUICK START PROCEDURE

LTpowerPlay Software GUI

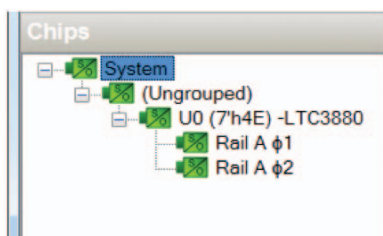
The following procedure describes how to use LTpowerPlay to monitor and change the settings of LTC3880.

1. Download and install the LTPowerPlay GUI:

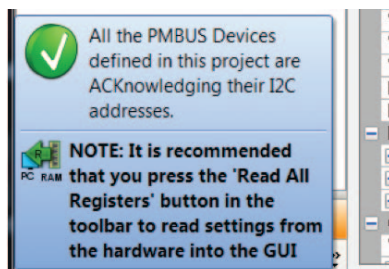
<http://linear.com/ltpowerplay>

2. Launch the LTpowerPlay GUI.

- a. The GUI should automatically identify the LTC3880. The system tree on the left hand side should look like this:



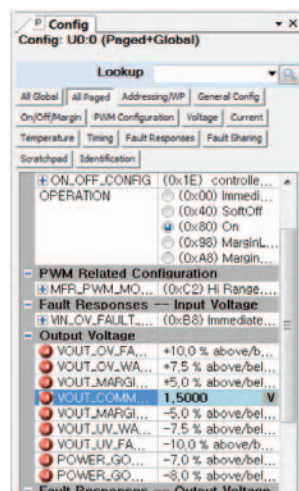
- b. A green message box shows for a few seconds in the lower left hand corner, confirming that the LTC3880 is communicating:



- c. In the tool bar, click the “R” (RAM to PC) icon to read the RAM from the LTC3880. This reads the configuration from the RAM of LTC3880 and loads it into the GUI.



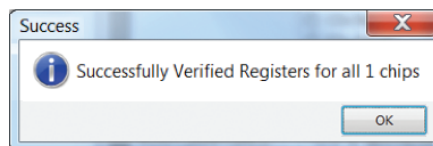
- d. To change the output voltage to a different value, like 1.5V: In the Config tab, type 1.5 in the VOUT_COMMAND box, like this:



Then, click the “W” (PC to RAM) icon to write these register values to the LTC3880. After finishing this step, you will see the output voltage will change to 1.5V.



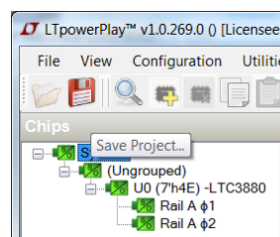
If the write is successful, this message appears:



- e. To save the changes into the NVM: In the tool bar, click the “RAM to NVM” button:



- f. Save the demo board configuration to a (*.proj) file by clicking the Save icon. Name it whatever you want.



GUI QUICK START PROCEDURE

Loading a LTC3880 Configuration (*.proj) File with the GUI

- In the upper left hand corner of the GUI: File>Open>browse to your *.proj file. This will load the file into the GUI.
- Click the “Go On Line” button to link the GUI to the existing LTC3880, as this:



- Click on the “W” (PC to RAM) button. This loads the configuration into LTC3880 RAM.
- Then, you can save the configuration to the EEPROM. Please see previous step f for details.

PARTS LIST DC1753A-A

ITEM	QTY	REFERENCE	PART DESCRIPTION	MANUFACTURER/PART NUMBER
Required Circuit Components				
1	3	C1, C2, C6	CAP., X7R, 0.1µF, 50V, 10%, 0603	AVX, 06035C104KAT2A
2	1	C17	CAP., X7R, 0.22µF, 25V, 10%, 0603	TDK, C1608X7R1E224K
3	2	C3, C9	CAP., X7R, 1µF, 16V, 10%, 0603	AVX, 0603YC105KAT2A
4	1	C5	CAP., X5R, 4.7µF, 25V, 0805	TAIYO YUDEN, TMK212BJ475KG-T
5	1	C8	CAP., X7R, 4700pF, 10%, 50V, 0603	AVX, 06035C472KAT2A
6	4	C10, C29, C11, C30	CAP., POSCAP, 330µF, 6.3V, D3L	SANYO, 6TPF330M9L
7	1	C13	CAP., OS-CON, 150µF, 35V	SUNCON, 35HVP150M
8	4	C20, C23-C25	CAP., X5R, 100µF, 6.3V, 1210	AVX, 12106D107MAT2A
9	3	C12, C14, C26	CAP., X7R, 0.01µF, 10%, 50V, 0603	AVX, 06035C103KAT2A
	2	C21, C22	CAP., X5R, 1000pF, 25, 10%, 0603	AVX, 06035C102JAT2A
10	2	C15, C16	CAP., X7R, 100pF, 5%, 50V, 0603	AVX, 06035C101KAT2A
11	4	C18, C19, C27, C28	CAP., X5R, 10µF, 35V, 1210	TAIYO YUDEN, GMK325BJ106KN
12	1	C48	CAP., X5R, 10µF, 6.3V, 0603	TDK, C1608X5R0J106M
13	2	D1, D2	DIODE, SCHOTTKY, SOD-323	CENTRAL, CMDSH-3TR
14	2	Q1, Q3	OPTIMOS3 POWER-TRANSISTOR, PG-TDSON-8	INFINEON, BSC050N03LS
15	2	Q2, Q4	OPTIMOS3 POWER-TRANSISTOR, PG-TDSON-8	INFINEON, BSC011N03LSI
16	2	Q5, Q6	TRANS GP, SS, PNP, 40V, SOT-23	ON SEMI, MMBT3906LT1G
17	1	Q11	MOSFET P-CH, 20V, 0.58A, SOT-23	VISHAY, TP0101K-T1-E3
18	12	R5, R17, R27, R39, R40-R42, R44, R45, R57, R62, R64	RES., CHIP, 10k, 5%, 0603	VISHAY, CRCW060310K0JNEA
19	1	R66	RES., CHIP, 24.3k, 1%, 0603	VISHAY, CRCW060324K3FKEA
20	4	R8, R25, R56, R59, R6, R29, R30, R34	RES., CHIP, 0, 0603	YAGEO, RC0603FR-070RL
21	1	R3	RES., CHIP, 4.87k, 1%, 0603	AAC, CR16-4871FM
22	1	R24	RES., CHIP, 15.8k, 1%, 0603	VISHAY, CRCW060315K8FKEA
23	1	R52	RES., CHIP, 2, 1%, 0603	YAGEO, RC0603FR-072RL
24	1	R63	RES., CHIP, 10, 5%, 0603	YAGEO, RC0603FR-0710RL
25	2	R10, R16	RES., 0.002, 2512, 1%	PANASONIC, ERJ-M1WTF2M0U
26	4	R11, R12, R13, R14	RES., CHIP, 100, 1%, 0603	VISHAY, CRCW0603100RFKEA
27	2	L1, L2	INDUCTOR, 0.4µH	VITEC, 59PR9875
28	1	U4	IC, LTC3880EUJ, QFN 6mm × 6mm	LINEAR TECHNOLOGY, LTC3880EUJ#010J-1PBF

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DEMO MANUAL DC1753A

PARTS LIST DC1753A-A

ITEM	QTY	REFERENCE	PART DESCRIPTION	MANUFACTURER/PART NUMBER
Additional Demo Board Circuit Components				
1	1	C31	CAP., X7R, 0.1µF, 50V, 10%, 0603	AVX, 06035C104KAT2A
2	1	C49	CAP., X5R, 4.7µF, 10V, 0603	AVX, 0603ZD475KAT2A
3	0	C42-C45	CAP., POSCAP, 330µF, 6.3V, D3L	
4	0	C4, C38	CAP., 0603	
5	0	C32, C34	CAP., 1210	
6	1	C35	CAP., X5R, 10µF, 35V, 1206	TAIYO YUDEN, GMK316BJ106ML
7	1	C36	CAP., TANT., LOW ESR, 3.3µF, 25V, 10%,	AVX, TPSB335K025R2000
8	2	C37, C40	CAP., X7R, 1µF, 50V, 1206	AVX, 12065C105KAT2A
9	1	C41	CAP., X7R, 0.22µF, 16V, 0805	AVX, 0805YC224KAT2A
10	1	D3	LED GREEN S-GW TYPE SMD	PANASONIC, LN1371SGTRP
11	1	D5	LED RED, S-TYPE, GULL WING SMD	PANASONIC, LN1271RTR
12	1	Q15	MOSFET, SPEED, SRS, 30V, 30A, LFPK	RENESAS, RJK0305DPB-00#J0
13	0	Q7, Q8, Q9, Q10	OPTIMOS3, POWER-TRANSISTOR, PG-TDSON-8	
14	1	Q14	MOSFET P-CH, 20V, 0.58A, SOT-23	VISHAY, TP0101K-T1-E3
15	1	Q12	MOSFET N-CH, 60V, 115mA, SOT-23	FAIRCHILD, 2N7002A
16	1	R62	RES., CHIP, 10k, 5%, 0603	VISHAY, CRCW060310K0JNEA
17	5	R48, R51, R77, R79, R80	RES., CHIP, 0, 0603	YAGEO, RC0603FR-070RL
18	0	R18, R20, R22, R23, R32, R58, R60, R73, R31, R33, R70, R1, R2, R7, R15	RES., CHIP, 0603	
19	3	R35, R36, R37	RES., CHIP, 4.99k, 1%, 0603	YEGEO, RC0603FR-074K99L
20	2	R50, R61	RES., CHIP, 100k, 1%, 0603	VISHAY, CRCW0603100KFKEA
21	1	R53	RES., CHIP, 200, 1%, 0603	YAGEO, RC0603FR-07200RL
22	1	R55	RES., CHIP, 127, 1%, 0603	VISHAY, CRCW0603127RFKEA
23	0	R65	RES., CHIP, 30, 1%, 1W, 2512	
24	1	R68	RES., CHIP, 0.01, 1%, 2010	VISHAY, WSL2010R0100FEA
25	0	R60	RES., 0805	
26	3	R77, R79, R80	RES., CHIP, 0, 0805	
27	1	R38	RES., CHIP, 49.9, 1%, 0603	
28	1	U5	IC, 24LC025-I/ST, SOIC	MICROCHIP, 24LC025-I/ST
29	1	U6	IC, LT1129CS8-3.3, S8 PACKAGE	LINEAR TECHNOLOGY, LT1129CS8-3.3
30	1	U7	IC, LT1129CS8-5, S8 PACKAGE	LINEAR TECHNOLOGY, LT1129CS8-5
Hardware: For Demo Board Only				
1	4	JP1,JP3-JP5	0.100", SINGLE ROW HEADER, 3 PIN	SAMTEC, TSW-103-07-L-S
2	4	JP1,JP3-JP5	SHUNT, 0.100", BLK	SAMTEC, SNT-100-B-G
3	1	SW1	CONNECTOR, SUB MINIATURE SLIDE SWITCHES	C&K, JS202011CQN
4	2	J1, J2	JACK, BANANA	KEYSTONE, 575-4
5	4	J3, J4 (x2)	STUD, TEST PIN	PEM, KFH-032-10
6	4	J3, J4 (x2)	NUT, BRASS 10-32	ANY, #10-32
7	1	J7	CONN., SOCKET, 20 DUAL ROW, RA	MILL MAX, 803-93-020-20-001
8	1	J8	PIN HEADER, 20 DUAL ROW, RA	MILL MAX, 802-40-020-20-0001
9	0	J9 (OPT)	HEADER, 14 POS, 2mm, VERT GOLD	MOLEX, 87831-1420
10	1	J10	CONN., HEADER, 12 POS, 2mm, STR, DL, PCB	FCI, 98414-G06-12ULF
11	1	J11	CONN., BNC, 5 PINS	CONNEX, 112404

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PARTS LIST DC1753A-B

ITEM	QTY	REFERENCE	PART DESCRIPTION	MANUFACTURER/PART NUMBER
Required Circuit Components				
1	3	C1, C2, C6	CAP., X7R, 0.1µF, 50V, 10%, 0603	AVX, 06035C104KAT2A
2	1	C17	CAP., X7R, 0.22µF, 25V, 10%, 0603	TDK, C1608X7R1E224K
3	2	C3, C9	CAP., X7R, 1µF, 16V, 10%, 0603	AVX, 0603YC105KAT2A
4	2	C4, C38	CAP., X5R, 1µF, 25V, 10%, 0603	AVX, 06033D105KAT2A
5	1	C5	CAP., X5R, 4.7µF, 25V, 0805	TAIYO YUDEN, TMK212BJ475KG-T
6	1	C8	CAP., X7R, 4700pF, 10%, 50V, 0603	AVX, 06035C472KAT2A
7	4	C10, C29, C11, C30	CAP., POSCAP, 330µF, 6.3V, D3L	SANYO, 6TPF330M9L
8	1	C13	CAP., OS-CON, 150µF, 35V	SUNCON, 35HVP150M
9	4	C20, C23-C25	CAP., X5R, 100µF, 6.3V, 1210	AVX, 12106D107MAT2A
10	3	C12, C14, C26	CAP., X7R, 0.01µF, 10%, 50V, 0603	AVX, 06035C103KAT2A
11	2	C21, C22	CAP., X5R, 0.22µF, 25, 10%, 0603	AVX, 06033D224KAT2A
12	2	C15, C16	CAP., X7R, 100pF, 5%, 50V, 0603	AVX, 06035C101KAT2A
13	4	C18, C19, C27, C28	CAP., X5R, 10µF, 35V, 1210	TAIYO YUDEN, GMK325BJ106KN
14	1	C48	CAP., X5R, 10µF, 6.3V, 0603	TDK, C1608X5R0J106M
15	2	D1,D2	DIODE, SCHOTTKY, SOD-323	CENTRAL, CMDSH-3TR
16	2	Q1, Q3	OPTIMOS3 POWER-TRANSISTOR, PG-TDSON-8	INFINEON, BSC050N03LS
17	2	Q2, Q4	OPTIMOS3 POWER-TRANSISTOR, PG-TDSON-8	INFINEON, BSC011N03LSI
18	2	Q5, Q6	TRANS, GP, SS, PNP, 40V, SOT-23	ON SEMI, MMBT3906LT1G
19	1	Q11	MOSFET P-CH, 20V, 0.58A, SOT-23	VISHAY, TP0101K-T1-E3
20	12	R5, R17, R27, R39, R40-R42, R44, R45, R57, R62, R64	RES., CHIP 10k, 5%, 0603	VISHAY, CRCW060310K0JNEA
21	8	R8, R25, R56, R59, R7, R11, R13, R15	RES., CHIP, 0, 0603	YAGEO, RC0603FR-070RL
22	1	R3	RES., CHIP, 4.87k, 1%, 0603	AAC, CR16-4871FM
	1	R66	RES., CHIP, 24.3k, 1%, 0603	VISHAY, CRCW060324K3FKEA
23	1	R24	RES., CHIP, 15.8k, 1%, 0603	VISHAY, CRCW060315K8FKEA
24	4	R1, R2, R12, R14	RES., X5R, 1.4k, 1%, 0603	VISHAY, CRCW06031K40FKEA
25	1	R52	RES., CHIP, 2, 1%, 0603	YAGEO, RC0603FR-072RL
26	1	R63	RES., CHIP, 10, 5%, 0603	YAGEO, RC0603FR-0710RL
27	2	R10, R16	RES., CHIP, 0, 1W, 2512	TEPRO, RN5326
28	2	L1, L2	INDUCTOR, 0.56µH	VISHAY, IHLP-4040-DZ-01
29	1	U4	IC, LTC3880EUJ, QFN 6mm × 6mm	LINEAR TECHNOLOGY, LTC3880EUJ#010H-1PBF
Additional Demo Board Circuit Components				
1	1	C31	CAP., X7R, 0.1µF, 50V, 10%, 0603	AVX, 06035C104KAT2A
2	1	C49	CAP., X5R, 4.7µF, 10V, 0603	AVX, 0603ZD475KAT2A
3	0	C42-C45	CAP., POSCAP, 330µF, 6.3V, D3L	
4	0	C32, C34	CAP., 1210	
5	1	C35	CAP., X5R, 10µF, 35V, 1206	TAIYO YUDEN, GMK316BJ106ML
6	1	C36	CAP., TANT., LOW ESR, 3.3µF, 25V, 10%,	AVX, TPSB335K025R2000
7	2	C37, C40	CAP., X7R, 1µF, 50V, 1206	AVX, 12065C105KAT2A

DEMO MANUAL DC1753A

PARTS LIST DC1753A-B

ITEM	QTY	REFERENCE	PART DESCRIPTION	MANUFACTURER/PART NUMBER
8	1	C41	CAP., X7R, 0.22µF, 16V, 0805	AVX, 0805YC224KAT2A
9	1	D3	LED GREEN, S-GW TYPE SMD	PANASONIC, LN1371SGTRP
10	1	D5	LED RED, S-TYPE GULL WING SMD	PANASONIC, LN1271RTR
11	1	Q15	MOSFET, SPEED, SRS, 30V, 30A, LPAK	RENESAS, RJK0305DPB-00#J0
12	0	Q7, Q8, Q9, Q10	OPTIMOS3 POWER-TRANSISTOR, PG-TDSON-8	
13	1	Q14	MOSFET P-CH, 20V, 0.58A, SOT-23	VISHAY, TP0101K-T1-E3
14	1	Q12	MOSFET N-CH, 60V, 115mA, SOT-23	FAIRCHILD, 2N7002A
15	1	R62	RES., CHIP, 10k, 5%, 0603	VISHAY, CRCW060310K0JNEA
16	5	R48, R51, R77, R79, R80	RES., CHIP, 0, 0603	YAGEO, RC0603FR-070RL
17	0	R18, R20, R22, R23, R32, R58, R60, R73, R31, R33, R70, R6, R29, R30, R34	RES., CHIP, 0603	
18	3	R35, R36, R37	RES., CHIP, 4.99k, 1%, 0603	YEGEO, RC0603FR-074K99L
19	2	R50, R61	RES., CHIP, 100k, 1%, 0603	VISHAY, CRCW0603100KFKEA
20	1	R53	RES., CHIP, 200, 1%, 0603	YAGEO, RC0603FR-07200RL
21	1	R55	RES., CHIP, 127, 1%, 0603	VISHAY, CRCW0603127RFKEA
22	0	R65	RES., CHIP, 30, 1%, 1W, 2512	
23	1	R68	RES., CHIP, 0.01, 1%, 2010	VISHAY, WSL2010R0100FEA
24	0	R60	RES., 0805	
25	3	R77, R79, R80	RES., CHIP, 0, 0805	
26	1	R38	RES., CHIP, 49.9, 1%, 0603	
27	1	U5	IC, 24LC025-I/ST, SOIC	MICROCHIP, 24LC025-I/ST
28	1	U6	IC, LT1129CS8-3.3, S8 PACKAGE	LINEAR TECHNOLOGY, LT1129CS8-3.3
29	1	U7	IC, LT1129CS8-5, S8 PACKAGE	LINEAR TECHNOLOGY, LT1129CS8-5

Hardware: For Demo Board Only

1	4	JP1,JP3-JP5	0.100", SINGLE ROW HEADER, 3 PIN	SAMTEC, TSW-103-07-L-S
2	4	JP1,JP3-JP5	SHUNT, 0.100" BLK	SAMTEC, SNT-100-B-G
3	1	SW1	CONNECTOR, SUB MINIATURE SLIDE SWITCHES	C&K, JS202011CQN
4	2	J1, J2	JACK, BANANA	KEYSTONE, 575-4
5	4	J3, J4 (x2)	STUD, TEST PIN	PEM, KFH-032-10
6	4	J3, J4 (x2)	NUT, BRASS, 10-32	ANY, #10-32
7	1	J7	CONN., SOCKET, 20 DUAL ROW RA	MILL MAX, 803-93-020-20-001
8	1	J8	PIN HEADER, 20 DUAL ROW RA	MILL MAX, 802-40-020-20-0001
9	0	J9 (OPT)	HEADER, 14 POS, 2mm, VERT GOLD	MOLEX, 87831-1420
10	1	J10	CONN., HEADER, 12 POS, 2mm, STR DL PCB	FCI, 98414-G06-12ULF
11	1	J11	CONN., BNC, 5 PINS	CONNEX, 112404

SCHEMATIC DIAGRAM

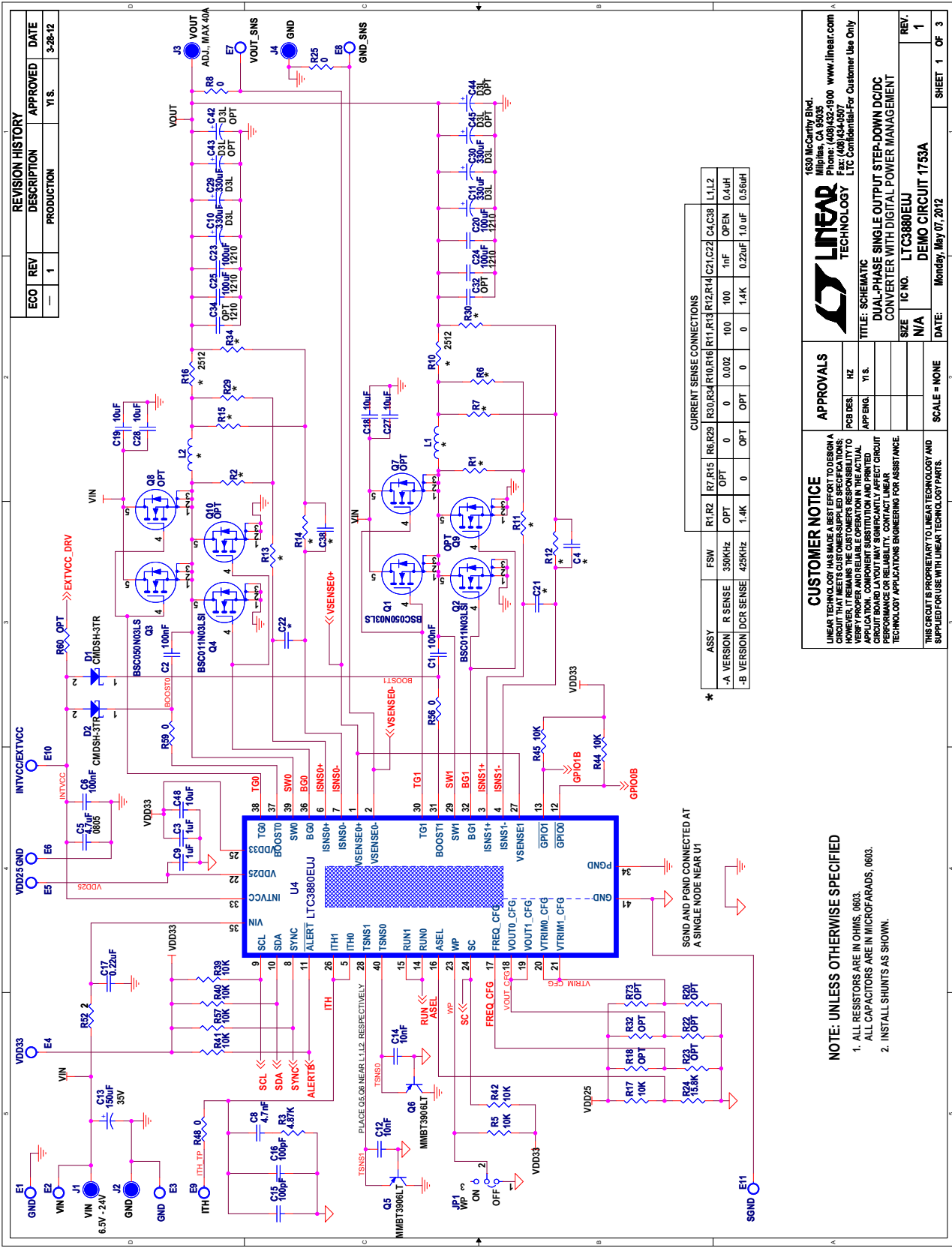


Figure 9. Demo Circuit 1753A Dual-Phase, Single-Output, Step-Down DC/DC Converter with Digital Power Management



Figure 10. Demo Circuit 1753A Dual-Phase, Step-Down DC/DC Converter with Digital Power Management

SCHEMATIC DIAGRAM

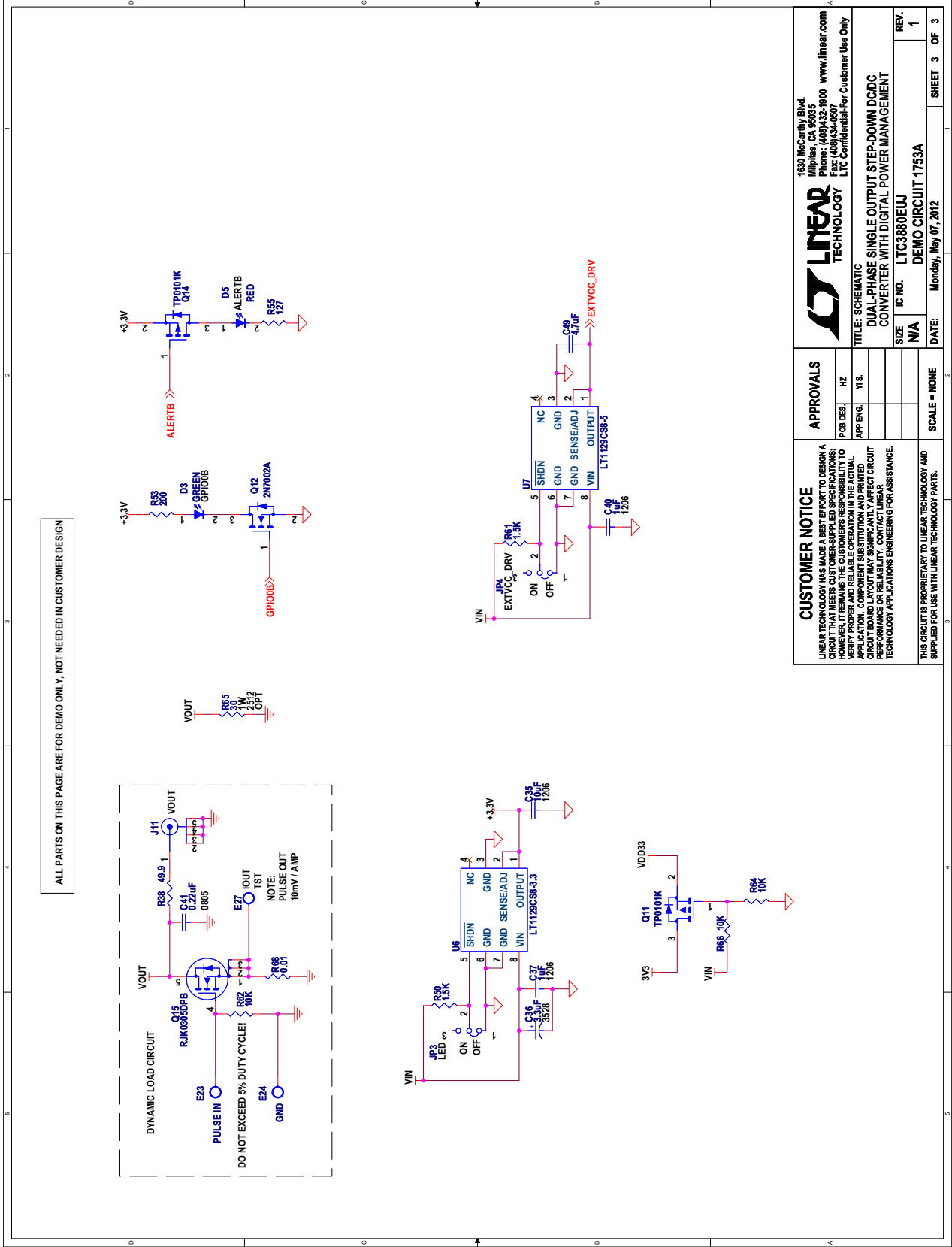


Figure 11. Demo Circuit 1753A Dual-Phase, Single-Output, Step-Down DC/DC Converter with Digital Power Management

DEMO MANUAL DC1753A

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