

LTC3871

High Power PolyPhase® Bi-Directional Supply/Charger

DESCRIPTION

Demonstration circuit 2348A is a high power high efficiency bi-directional synchronous buck or boost converter featuring the [LTC®3871](#) and is available in two versions. The DC2348A-A operates with two each LTC3871 devices with four phases and the DC2348A-B utilizes one LTC3871 device with two phases.

When operating in buck mode, this demo circuit has an input voltage range of 30V to 75V and produces a 12V output. When operating in boost mode, the input voltage is from 10V to 13V and produces a 48V output voltage.

Both boards have a switch that allows the converter to run in either buck or boost mode. A DC voltage source can be connected to the SETCUR turret to set the average inductor current in each phase of the converter. Both boards also utilize a mode jumper to select forced continuous conduction mode, buck-mode only pulse-skipping or full pulse-skipping mode for buck and boost.

Synchronization to an external clock (frequency range 100 kHz to 300 kHz) is also possible on these boards.

The demo circuit senses inductor current with a sense resistor. An optional DCR sense circuit utilizes the inductor's DCR as the current sensing element further saving cost, footprint and improving efficiency.

The LTC3871 data sheet gives a complete description of the part's operation and application information and must be read in conjunction with this quick start guide.

Design files for this circuit board are available at <http://www.linear.com/demo/DC2348A>

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PERFORMANCE SUMMARY

DC2348A-A (4-Phase) Buck Mode

| SYMBOL | PARAMETER | CONDITIONS | MIN | TYP | MAX | UNITS |
|-------------------|---------------------|-------------------|------|------|------|-------|
| V _{HIGH} | Supply Range | | 30 | | 75 | V |
| V _{LOW} | Output Voltage | | 11.8 | 12 | 12.2 | V |
| Output Current | | | | | 60 | A |
| f _{SW} | Operating Frequency | | | 110 | | kHz |
| | Efficiency | 48V to 12V at 60A | | 97.5 | | % |

Boost Mode

| SYMBOL | PARAMETER | CONDITIONS | MIN | TYP | MAX | UNITS |
|-------------------|---------------------|-------------------|-----|-----|-----|-------|
| V _{LOW} | Supply Range | | 10 | | 13 | V |
| V _{HIGH} | Output Voltage | | 47 | 48 | 49 | V |
| Output Current | | | | | 15 | A |
| f _{SW} | Operating Frequency | | | 110 | | kHz |
| | Efficiency | 12V to 48V at 15A | | 97 | | % |

DEMO MANUAL

DC2348A-A/DC2348A-B

PERFORMANCE SUMMARY

DC2348-B (2-Phase) Buck Mode

| SYMBOL | PARAMETER | CONDITIONS | MIN | TYP | MAX | UNITS |
|----------------|---------------------|-------------------|------|-----|------|-------|
| V_{HIGH} | Supply Range | | 30 | | 75 | V |
| V_{LOW} | Output Voltage | | 11.8 | 12 | 12.2 | V |
| Output Current | | | | | 30 | A |
| f_{SW} | Operating Frequency | | | 110 | | kHz |
| | Efficiency | 48V to 12V at 30A | | 97 | | % |

Boost Mode

| SYMBOL | PARAMETER | CONDITIONS | MIN | TYP | MAX | UNITS |
|----------------|---------------------|--------------------|-----|-----|-----|-------|
| V_{LOW} | Supply Range | | 10 | | 13 | V |
| V_{HIGH} | Output Voltage | | 47 | 48 | 49 | V |
| Output Current | | | | | 7.5 | A |
| f_{SW} | Operating Frequency | | | 110 | | kHz |
| | Efficiency | 12V to 48V at 7.5A | | 97 | | % |

QUICK START PROCEDURE

Demonstration circuit DC2348A has voltage regulation (CV) and current regulation (CC) modes that can be evaluated. Refer to Figure 1 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 input or output voltage ripple by touching the probe tip directly across the V_{HIGH} or V_{LOW} and GND terminals or directly across relevant capacitor. See Figure 2 for proper scope probe technique.

For CV (constant voltage) buck mode (V_{HIGH} is the input and V_{LOW} is the output):

1. Place jumpers in the following positions:

| | | |
|-----|------------|------|
| JP1 | ILIM | OPEN |
| JP2 | PHASE1 | OPEN |
| JP3 | MODE | FCM |
| JP4 | RUN | OFF |
| JP6 | PHASE2 | GND |
| S1 | BUCK/BOOST | BUCK |

2. With the power off, connect the input power supply to V_{HIGH} and GND. Connect the load to V_{LOW} and GND. The load current should be less than 60A for DC2348A-A and less than 30A for DC2348A-B.

3. Connect the SETCUR turret according to the BUCK/BOOST setting:

Buck: SETCUR = V5 (JP1 pin 2)

Boost: SETCUR = GND

4. Turn on the power at the input.

NOTE: Make sure that the input voltage is between 30V and 75V.

5. Change the JP4 to ON position.

6. Check for the proper output voltage (V_{LOW} = 11.8V to 12.2V).

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 voltage is established, adjust the loads within the operating range and observe the output voltage regulation, ripple voltage, efficiency and other parameters.

QUICK START PROCEDURE

8. Disconnect the load from the DC2348A and then turn off the input power.

For CV boost mode (V_{LOW} is the input and V_{HIGH} is the output).

9. Change the S1 position from BUCK to BOOST.

10. Connect the input power supply to V_{LOW} and GND. Connect the load to V_{HIGH} and GND. The load current should be less than 15A for DC2348A-A and less than 7.5A for DC2348A-B.

11. Turn on the input power.

NOTE: Make sure that the input voltage is between 10V and 13V.

Check for the proper output voltage (V_{HIGH} = 47V to 49V).

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

For CC (constant current) mode operation:

1. Use the same afore mentioned jumpers setting.
2. An electronic load active in CV (constant voltage) mode is required as the current-sinking device. Set the electronic load voltage to below 11V or below 46V for buck or boost mode respectively.

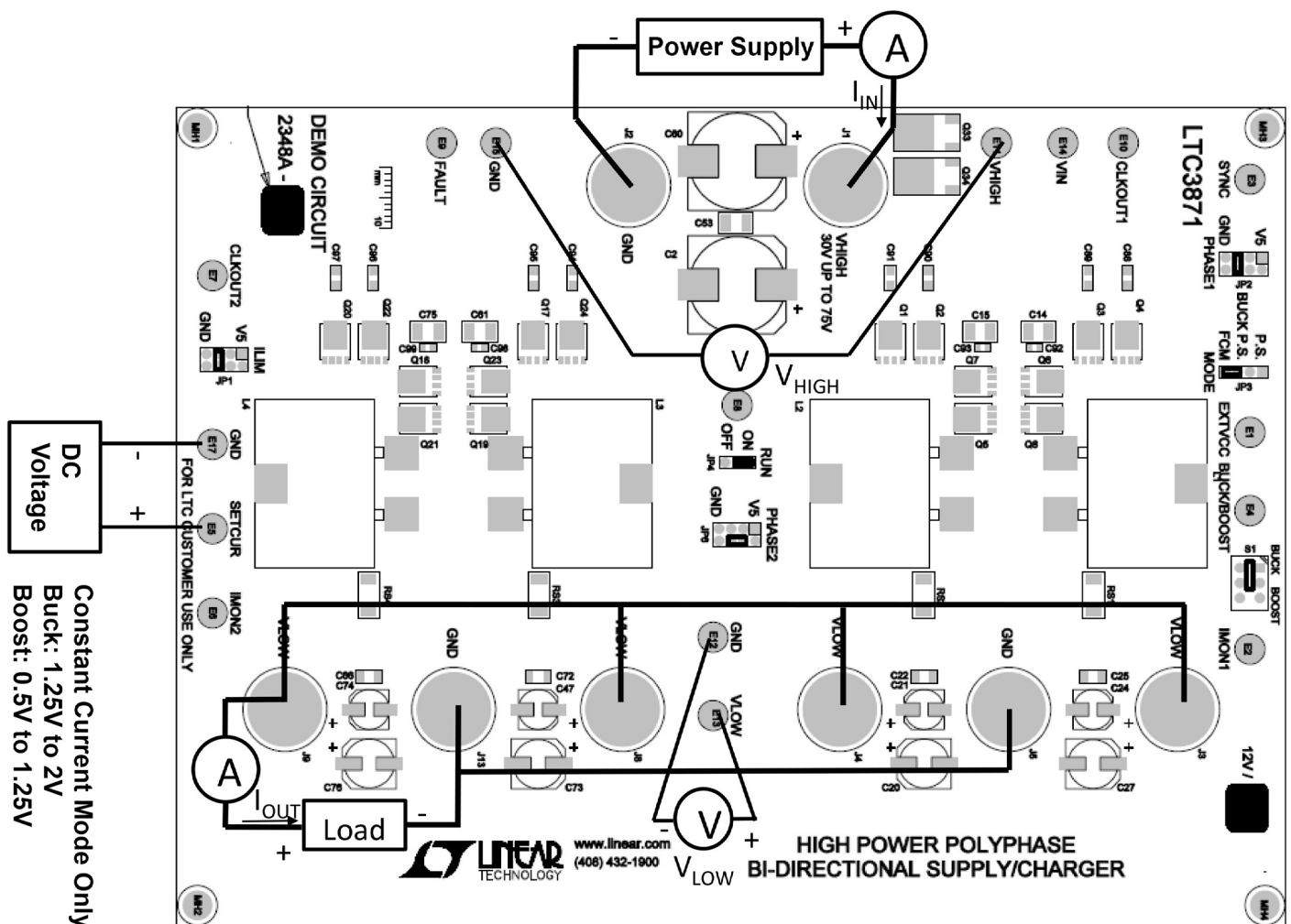


Figure 1. Proper Measurement Equipment Setup (Buck Mode)

DEMO MANUAL

DC2348A-A/DC2348A-B

QUICK START PROCEDURE

3. With the power off, connect the input power supply and the load according to the BUCK/BOOST setting:

| | POWER SUPPLY | ELECTRONIC LOAD |
|-------|--------------|-----------------|
| BUCK | VHIGH | VLOW |
| BOOST | VLOW | VHIGH |

4. Connect a DC voltage source between the SETCUR and GND turrets. Set the initial DC voltage to 1.25V. The valid SETCUR voltage range is 1.25V to 2V for BUCK mode and 1.25V to 0.5V for BOOST mode. Turn on the power and then change the JP4 to ON position.

NOTE: Watch closely for the load current, which is proportional to the SETCUR voltage. At SETCUR = 1.25V the load current may or may not be zero, depending upon the different ILIM settings.

5. Observe the IMON1 or IMON2 turret voltage. It should be equal to the SETCUR voltage until the ILIM-set current limit is hit.

6. Adjust the SETCUR back to 1.25V. Change the JP4 to OFF position. Turn off the input power.

For battery charging applications, SETCUR can be programmed dynamically on-the-fly to set the charging currents to the batteries in either BUCK or BOOST mode. The BUCK/BOOST mode can also be set dynamically: Toggle the S1 switch to the middle position and drive the BUCK turret by a signal generator.

BUCK: 5V

BOOST: 0V

NOTE (Constant Current Mode Only): When doing the bidirectional current transition tests, both VHIGH and VLOW sides need a power supply and an electronic load which is active in the CV mode. In this case, the electronic load functions like a battery which is being charged. Make sure the power supply voltages are always below the same side electronic load voltages. See Figure 3 for proper equipment setup.

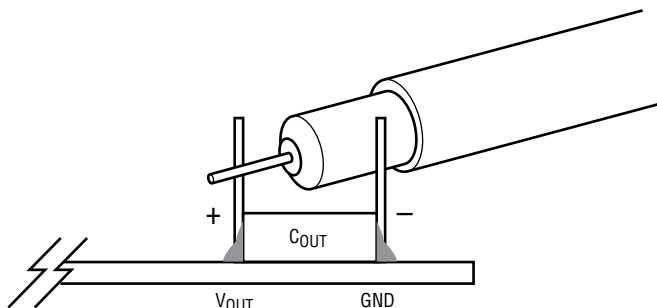


Figure 2. Measuring Input or Output Ripple Across Terminals or Directly Across Bulk Capacitor

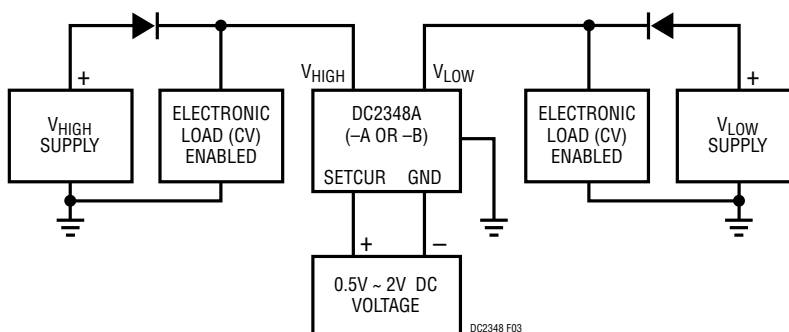


Figure 3. Proper Equipment Setup For Bidirectional Current Transition Tests (DC2348A in CC Mode)

dc2348aabf

OPTIONAL INDUCTOR DCR CURRENT SENSING

Demonstration circuit 2348A provides an optional circuit for Inductor DCR current sensing. Inductor DCR current sensing uses the DCR of the inductor to sense the inductor current instead of discrete sense resistors. The advantages of DCR sensing are lower cost, reduced board space and higher efficiency, but the disadvantage is a less accurate

current limit. If DCR sensing is used, be sure to select an inductor with sufficiently high saturation current or use an iron powder type material.

Refer to Table 2 for Optional Inductor DCR Current Sensing setup and to the data sheet for more details.

Table 2. Optional Inductor DCR Current Sensing

| | | | | | |
|----------------------------------|-----------|-----|---------|----------------------------------|------|
| Configuration | CHANNEL1 | RS1 | R39 | R26 | C32 |
| | CHANNEL2 | RS2 | R40 | R25 | C33 |
| | CHANNEL3 | RS3 | R43 | R79 | C34 |
| | CHANNEL4 | RS4 | R49 | R54 | C35 |
| Current Sense Resistor (Default) | REF SCH | | REF SCH | OPEN | OPEN |
| Inductor DCR Current Sensing | 0Ω Copper | | OPEN | Calculated Value from Data Sheet | |

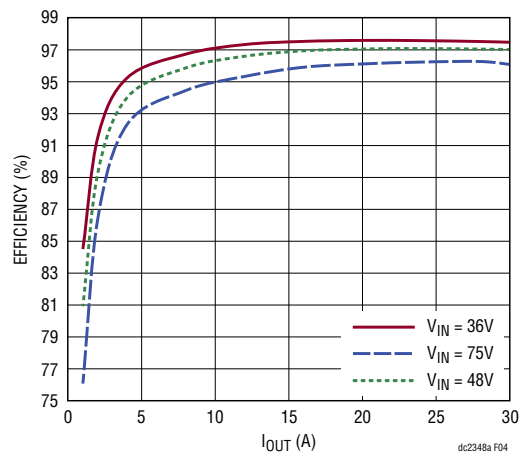


Figure 4. DC2348A-B Buck Mode Typical Efficiency vs Load Current

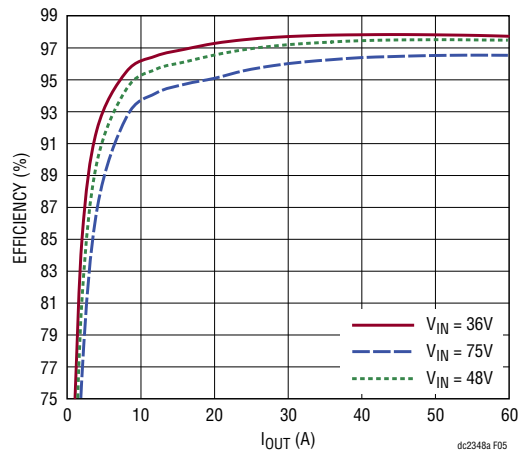


Figure 5. DC2348A-A Buck Mode Typical Efficiency vs Load Current

OPTIONAL INDUCTOR DCR CURRENT SENSING

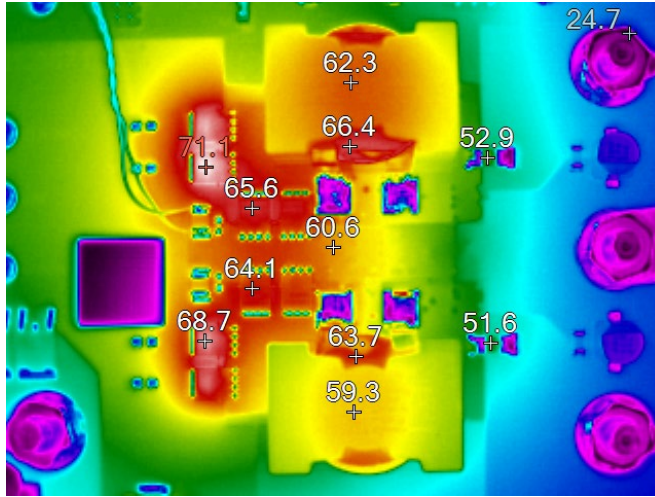


Figure 6. DC2348A-B Thermal Image, $V_{HIGH} = 75V$, $V_{LOW} = 12V$, $I_{OUT} = 30A$, Free Air, $T_A = 25^\circ C$

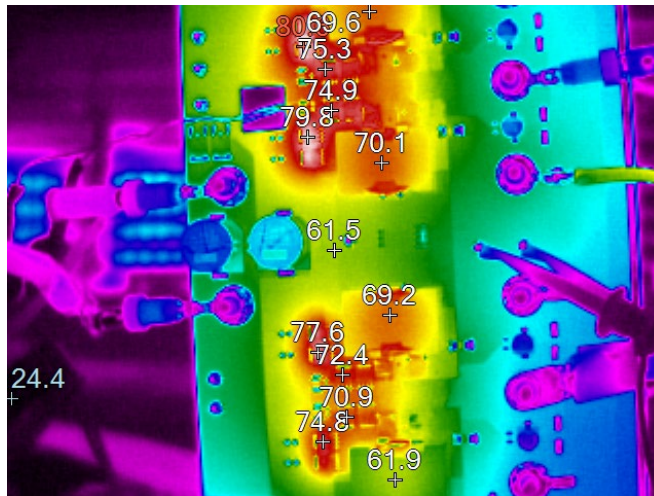


Figure 7. DC2348A-A Thermal Image, $V_{HIGH} = 75V$, $V_{LOW} = 12V$, $I_{OUT} = 60A$, Free Air, $T_A = 25^\circ C$

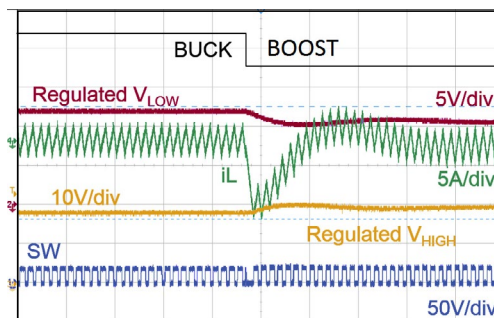


Figure 8. Mode Transition from Buck to Boost

PARTS LIST DC2348A-A

| ITEM | QTY | REFERENCE | PART DESCRIPTION | MANUFACTURER/PART NUMBER |
|------------------------------------|-----|--|----------------------------------|---------------------------|
| Required Circuit Components | | | | |
| 1 | 10 | C1, C14, C15, C16, C19, C53, C54, C55, C61, C75 | CAP, 1210 2.2μF 10% 100V X7R | AVX 12101C225KAT2A |
| 2 | 2 | C2, C60 | CAP, 100μF 20% 100V ELEC | SUN ELECT. 100CE100KXT |
| 3 | 4 | C3, C4, C70, C100 | CAP, 33μF 20% 80V ELEC | PANASONIC EEE-FK1K330P |
| 4 | 1 | C5 | CAP, 0603 47pF 10% 50V C0G | AVX 06035A470KAT2A |
| 5 | 2 | C6, C9 | CAP, 0603 10nF 10% 100V X7R | AVX 06031C103KAT2A |
| 6 | 2 | C7, C39, C58 | CAP, 0603 100nF 10% 50V X7R | AVX 06035C104KAT2A |
| 7 | 8 | C8, C13, C28, C29, C45, C46, C48, C63 | CAP, 0603 0.22μF 10% 25V X5R | AVX 06033D224KAT2A |
| 8 | 5 | C10, C31, C51, C64, C107 | CAP, 0805 4.7μF 10% 16V X7R | AVX 0805YC475KAT2A |
| 9 | 3 | C11, C62, C65 | CAP, 0603 100pF 10% 100V NPO | AVX 06031A101KAT2A |
| 10 | 2 | C12, C67 | CAP, 0603 10pF 10% 100V C0G | AVX 06031A100KAT2A |
| 11 | 6 | C18, C23, C59, C71, C105, C106 | CAP, 0603 1μF 10% 25V X7R | MURATA GRM188R71E105KA12D |
| 12 | 4 | C21, C24, C47, C74 | CAP, 100μF 20% 25V ALUM | PANASONIC EEHA1E101XP |
| 13 | 4 | C22, C25, C66, C72 | CAP, 1206 10μF 10% 25V X7R | MURATA GRM31CR71E106KA12L |
| 14 | 4 | D1, D2, D3, D4 | DIODE, SCHOTTKY, RECTIFIER | DIODES INC. DFSL1100-7 |
| 15 | 4 | L1, L2, L3, L4 | IND, 10μH | WURTH 7443641000 |
| 16 | 8 | Q1, Q2, Q3, Q4, Q17, Q20, Q22, Q24 | XSTR, MOSFET N-CH 80V 100A TDSO8 | INFINEON BSC117N08NS5 |
| 17 | 8 | Q5, Q6, Q7, Q8, Q18, Q19, Q21, Q23 | XSTR, MOSFET N-CH 80V 100A TDSO8 | INFINEON BSC040N08NS5 |
| 18 | 2 | Q33, Q34 | XSTR, SIPMOS, P-CHANNEL | VISHAY SUD50P08-25L |
| 19 | 4 | RS1, RS2, RS3, RS4 | RES, 2010 0.001Ω 1% 1W | VISHAY WSL20101L000FEA18 |
| 20 | 1 | R1 | RES, 0603 649kΩ 1% 1/10W | VISHAY CRCW0603649KFKEA |
| 21 | 1 | R2 | RES, 0603 243kΩ 1% 1/10W | VISHAY CRCW0603243KFKEA |
| 22 | 1 | R3 | RES, 0603 200kΩ 1% 0.1W | VISHAY CRCW0603200KFKEA |
| 23 | 23 | R4, R12, R14, R21, R24, R30, R33, R34, R35, R39, R40, R43, R49, R67, R72, R80, R82, R85, R86, R87, R88, R89, R90 | RES, 0603 0Ω JUMPER | VISHAY CRCW06030000Z0EA |
| 24 | 1 | R5 | RES, 0603 69.8kΩ 1% 0.1W | VISHAY CRCW060369K8FKEA |
| 25 | 1 | R6 | RES, 0603 12.7kΩ 1% 1/10W | VISHAY CRCW060312K7FKEA |
| 26 | 8 | R7, R8, R9, R17, R27, R36, R46, R48 | RES, 0603 10kΩ 1% 1/10W | VISHAY CRCW060310K0FKEA |
| 27 | 1 | R10 | RES, 0603 3.01kΩ 1% 1/10W | VISHAY CRCW06033K01FKEA |
| 28 | 1 | R11 | RES, 0603 4.53kΩ 1% 1/10W | VISHAY CRCW06034K53FKEA |
| 29 | 2 | R13, R47 | RES, 0603 20kΩ 1% 1/10W | VISHAY CRCW060320K0FKEA |
| 30 | 1 | R15 | RES, 0603 110kΩ 1% 1/10W | VISHAY CRCW0603110KFKEA |
| 31 | 1 | R16 | RES, 0805 499kΩ 1% 1/8W | VISHAY CRCW0805499KFKEA |
| 32 | 1 | R18 | RES, 0603 100kΩ 5% 1/10W | VISHAY CRCW0603100KJNEA |
| 33 | 1 | R22 | RES, 0603 90.9kΩ 1% 1/10W | VISHAY CRCW060390K9FKEA |
| 34 | 2 | R23, R81 | RES, 0603 10Ω 1% 1/10W | VISHAY CRCW060310R0FKEA |
| 35 | 2 | R29, R78 | RES, 1206 2.2Ω 1% 1/4W | VISHAY CRCW12062R20FKEA |
| 36 | 4 | R31, R32, R53, R65 | RES, 0603 4.99kΩ 1% 0.1W | VISHAY CRCW06034K99FKEA |
| 37 | 4 | R38, R41, R42, R50 | RES, 0603 300Ω 1% 0.1W | VISHAY CRCW0603300RFKEA |
| 38 | 2 | R44, R51 | RES, 0603 34kΩ 1% 0.1W | VISHAY CRCW060334K0FKEA |

DEMO MANUAL

DC2348A-A/DC2348A-B

PARTS LIST DC2348A-A

| ITEM | QTY | REFERENCE | PART DESCRIPTION | MANUFACTURER/PART NUMBER |
|---|-----|--|-------------------------------------|----------------------------------|
| 39 | 2 | R83, R84 | RES, 2512 0Ω JUMPER | VISHAY CRCW25120000Z0EG |
| 40 | 2 | U1, U2 | IC, HIGH POWER BiDIRECTIONAL SUPPLY | LINEAR TECH LTC3871HLXE#PBF |
| Additional Demo Board Circuit Components | | | | |
| 1 | 0 | C20, C27, C73, C76 | CAP, ALUM OPTION | OPTION |
| 2 | 0 | C30, C32, C33, C34, C35, C92, C93, C98, C99, C101, C102, C103, C104 | CAP, 0603 OPTION | OPTION |
| 3 | 0 | C88, C89, C90, C91, C94, C95, C96, C97, C108, C109, C110, C111, C112, C113, C114, C115 | CAP, 0805 OPTION | OPTION |
| 4 | 0 | L1, L2, L3, L4 - ALTERNATE | IND, 10μH | COILCRAFT SER2918H-103 |
| 5 | 0 | Q9, Q10, Q11, Q12, Q13, Q14, Q15, Q16, Q25, Q26, Q27, Q28, Q29, Q30, Q31, Q32 | XSTR, MOSFET OPTION | INFINEON IPD60N10S4-12 OPTION |
| 6 | 0 | R19, R20 | RES, 0603 OPTION | OPTION |
| 7 | 0 | R25, R26, R54, R79 | RES, 1206 OPTION | OPTION |
| Hardware: For Demo Board Only | | | | |
| 1 | 16 | E1, E2, E3, E4, E5, E6, E7, E8, E9, E10, E11, E12, E13, E14, E15, E17 | TURRET | MIIL-MAX 2501-2-00-80-00-00-07-0 |
| 2 | 3 | JP1, JP2, JP6 | HEADER, 4PIN, DBL ROW 2mm | WURTH ELEKTRONIK 62000821121 |
| 3 | 1 | JP3 | HEADER, 4PIN, 2mm | WURTH ELEKTRONIK 62000411121 |
| 4 | 1 | JP4 | HEADER, 2mm, 3PIN | WURTH ELEKTRONIK 62000311121 |
| 6 | 8 | J1, J2, J3, J4, J5, J8, J9, J13 | STUD, TESTPIN | PEM KFH-032-10 |
| 7 | 8 | | LUG RING, #10 | KEYSTONE 8205 |
| 8 | 16 | | NUT, BRASS 10-32 | ANY #10-32 |
| 9 | 4 | MH1, MH2, MH3, MH4 | STANDOFF, SNAP ON | KEYSTONE 8834 |
| 10 | 8 | | WASHER, #10 TIN PLATED BRASS | ANY #10 EXT BZ TN |
| 11 | 1 | S1 | SWITCH, SUBMINATURE, SLIDE, SPDT | C&K-COMPONENTS JS202011CQN |
| 12 | 5 | XJP1, XJP3, XJP4, XJP6, XJP7 | SHUNT, 2mm | WURTH ELEKTRONIK 60800213421 |

DEMO MANUAL

DC2348A-A/DC2348A-B

PARTS LIST DC2348A-B

| ITEM | QTY | REFERENCE | PART DESCRIPTION | MANUFACTURER/PART NUMBER |
|------------------------------------|-----|--|-------------------------------------|-----------------------------|
| Required Circuit Components | | | | |
| 1 | 5 | C1, C14, C15, C16, C19 | CAP, 1210 2.2 μ F 10% 100V X7R | AVX 12101C225KAT2A |
| 2 | 1 | C2 | CAP, 100 μ F 20% 100V ELEC | SUN ELECT. 100CE100KXT |
| 3 | 2 | C3, C4 | CAP, 33 μ F 20% 80V ELEC | PANASONIC EEE-FK1K330P |
| 4 | 1 | C5 | CAP, 0603 47pF 10% 50V C0G | AVX 06035A470KAT2A |
| 5 | 2 | C6, C9 | CAP, 0603 10nF 10% 100V X7R | AVX 06031C103KAT2A |
| 6 | 2 | C7, C39 | CAP, 0603 100nF 10% 50V X7R | AVX 06035C104KAT2A |
| 7 | 4 | C8, C13, C28, C29 | CAP, 0603 0.22 μ F 10% 25V X5R | AVX 06033D224KAT2A |
| 8 | 2 | C10, C31 | CAP, 0805 4.7 μ F 10% 16V X7R | AVX 0805YC475KAT2A |
| 9 | 1 | C11 | CAP, 0603 100pF 10% 100V NPO | AVX 06031A101KAT2A |
| 10 | 1 | C12 | CAP, 0603 10pF 10% 100V C0G | AVX 06031A100KAT2A |
| 11 | 3 | C18, C23, C105 | CAP, 0603 1 μ F 10% 25V X7R | MURATA GRM188R71E105KA12D |
| 12 | 2 | C21, C24 | CAP, 100 μ F 20% 25V ALUM | PANASONIC EEHA1E101XP |
| 13 | 2 | C22, C25 | CAP, 1206 10 μ F 10% 25V X7R | MURATA GRM31CR71E106KA12L |
| 14 | 2 | D1, D2 | DIODE, SCHOTTKY, RECTIFIER | DIODES INC. DFLS1100-7 |
| 15 | 2 | L1, L2 | IND, 10 μ H | WURTH 7443641000 |
| 16 | 4 | Q1, Q2, Q3, Q4 | XSTR, MOSFET N-CH 80V 100A TDSO8 | INFINEON BSC117N08NS5 |
| 17 | 4 | Q5, Q6, Q7, Q8 | XSTR, MOSFET N-CH 80V 100A TDSO8 | INFINEON BSC040N08NS5 |
| 18 | 2 | Q33, Q34 | XSTR, SIPMOS, P-CHANNEL | VISHAY SUD50P08-25L |
| 19 | 2 | RS1, RS2 | RES, 2010 0.001 Ω 1% 1W | VISHAY WSL20101L000FEA18 |
| 20 | 1 | R1 | RES, 0603 649k Ω 1% 1/10W | VISHAY CRCW0603649KFKEA |
| 21 | 1 | R2 | RES, 0603 243k Ω 1% 1/10W | VISHAY CRCW0603243KFKEA |
| 22 | 1 | R3 | RES, 0603 200k Ω 1% 0.1W | VISHAY CRCW0603200KFKEA |
| 23 | 11 | R4, R12, R14, R21, R24, R30, R33, R34, R35, R39, R40 | RES, 0603 0 Ω JUMPER | VISHAY CRCW06030000Z0EA |
| 24 | 1 | R5 | RES, 0603 69.8k Ω 1% 0.1W | VISHAY CRCW060369K8FKEA |
| 25 | 1 | R6 | RES, 0603 12.7k Ω 1% 1/10W | VISHAY CRCW060312K7FKEA |
| 26 | 6 | R7, R8, R9, R17, R27, R36 | RES, 0603 10k Ω 1% 1/10W | VISHAY CRCW060310K0FKEA |
| 27 | 1 | R10 | RES, 0603 3.01k Ω 1% 1/10W | VISHAY CRCW06033K01FKEA |
| 28 | 1 | R11 | RES, 0603 4.53k Ω 1% 1/10W | VISHAY CRCW06034K53FKEA |
| 29 | 1 | R13 | RES, 0603 20k Ω 1% 1/10W | VISHAY CRCW060320K0FKEA |
| 30 | 1 | R15 | RES, 0603 110k Ω 1% 1/10W | VISHAY CRCW0603110KFKEA |
| 31 | 1 | R16 | RES, 0805 499k Ω 1% 1/8W | VISHAY CRCW0805499KFKEA |
| 32 | 1 | R18 | RES, 0603 100k Ω 5% 1/10W | VISHAY CRCW0603100KJNEA |
| 33 | 1 | R22 | RES, 0603 90.9k Ω 1% 1/10W | VISHAY CRCW060390K9FKEA |
| 34 | 1 | R23 | RES, 0603 10 Ω 1% 1/10W | VISHAY CRCW060310R0FKEA |
| 35 | 1 | R29 | RES, 1206 2.2 Ω 1% 1/4W | VISHAY CRCW12062R20FKEA |
| 36 | 2 | R31, R32 | RES, 0603 4.99k Ω 1% 0.1W | VISHAY CRCW06034K99FKEA |
| 37 | 1 | R44 | RES, 0603 34k Ω 1% 0.1W | VISHAY CRCW060334K0FKEA |
| 38 | 2 | R38, R41 | RES, 0603 300 Ω 1% 0.1W | VISHAY CRCW0603300RFKEA |
| 39 | 2 | R83, R84 | RES, 2512 0 Ω JUMPER | VISHAY CRCW25120000Z0EG |
| 40 | 1 | U1 | IC, HIGH POWER BiDIRECTIONAL SUPPLY | LINEAR TECH LTC3871HLXE#PBF |

dc2348aabf

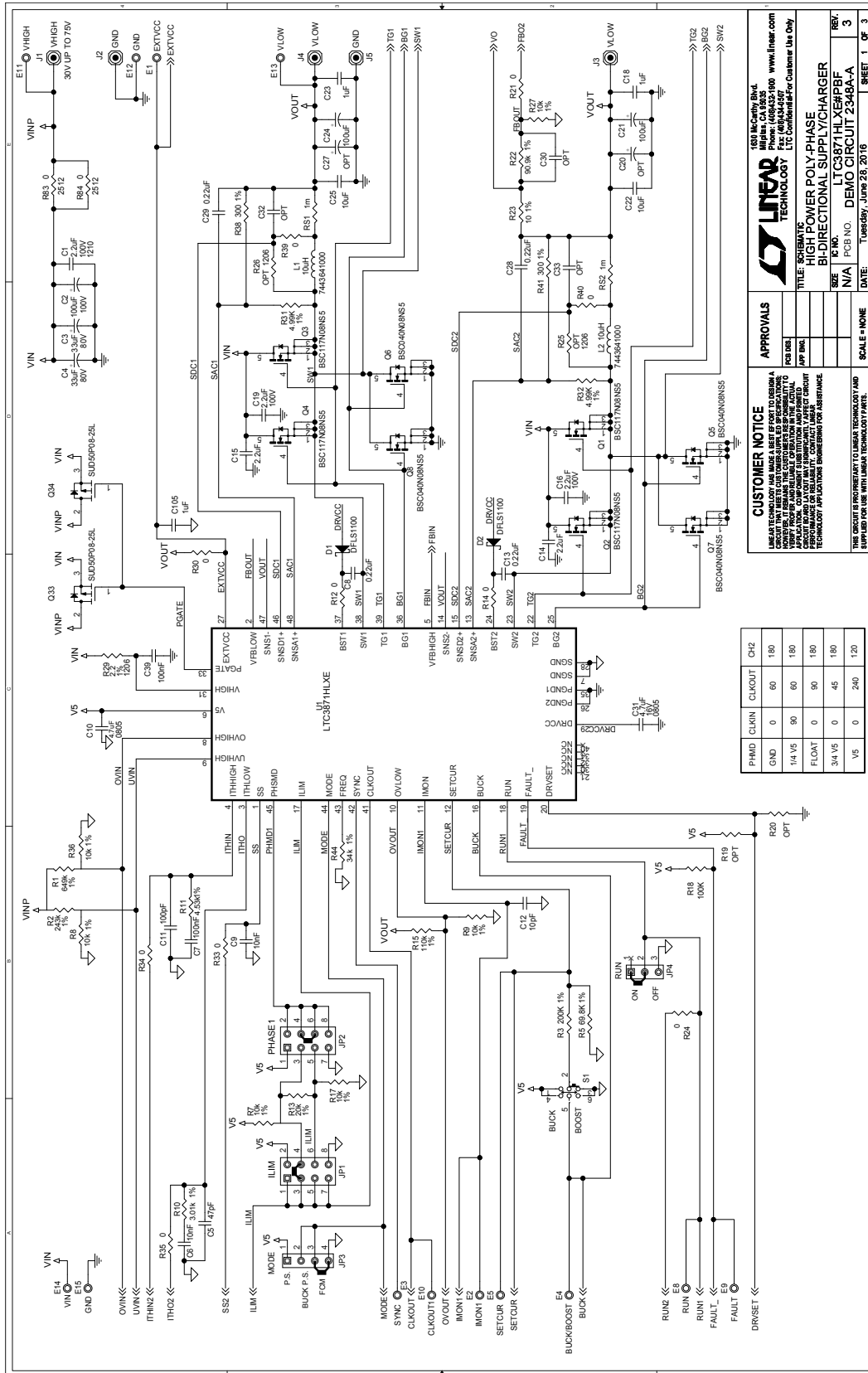
DEMO MANUAL

DC2348A-A/DC2348A-B

PARTS LIST DC2348A-B

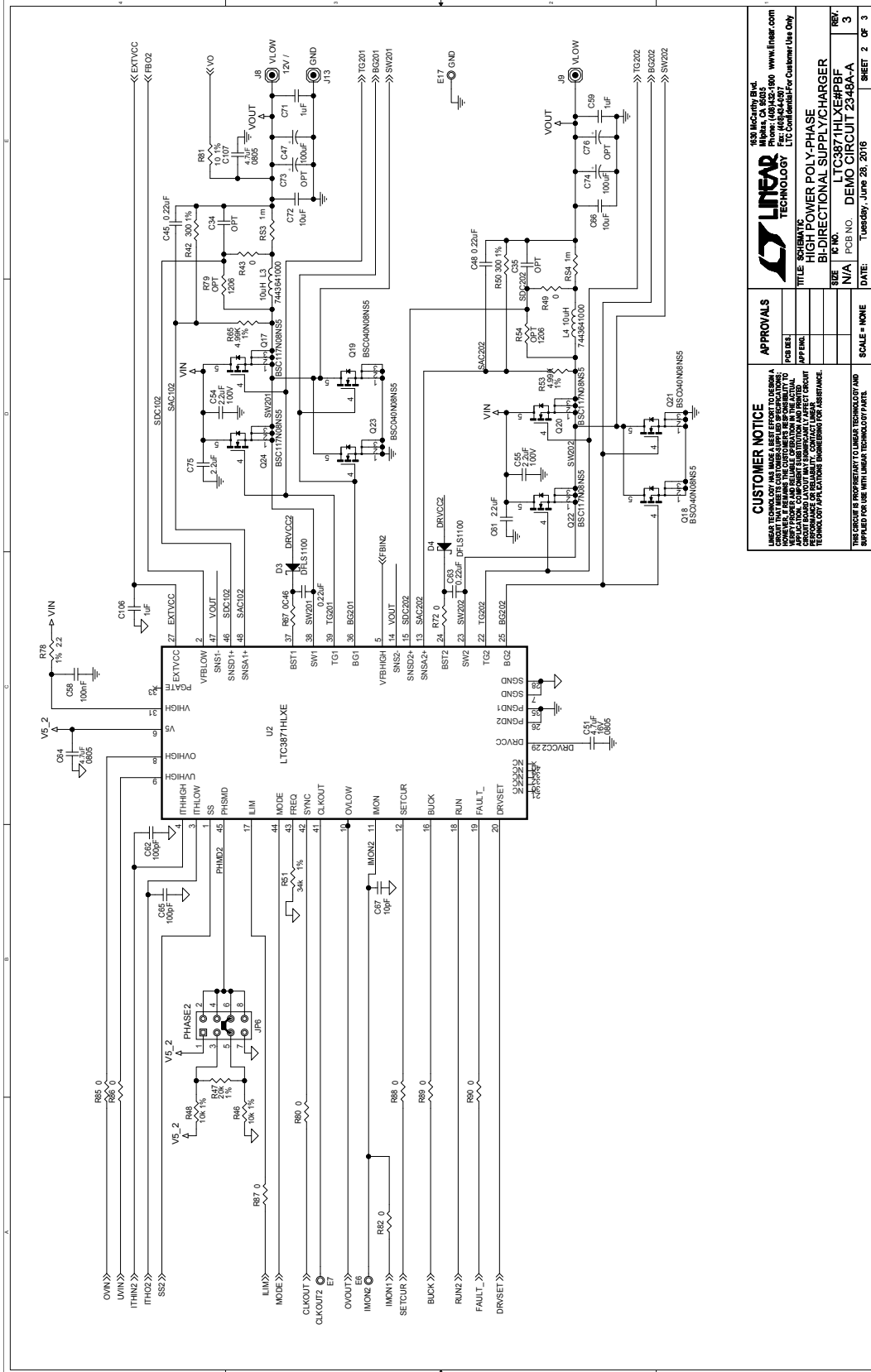
| ITEM | QTY | REFERENCE | PART DESCRIPTION | MANUFACTURER/PART NUMBER |
|---|-----|--|----------------------------------|----------------------------------|
| Additional Demo Board Circuit Components | | | | |
| 1 | 0 | C20, C27 | CAP, ALUM OPTION | OPTION |
| 2 | 0 | C30, C32, C33, C92, C93, C101, C102 | CAP, 0603 OPTION | OPTION |
| 3 | 0 | C88, C89, C90, C91, C108, C109, C110, C111 | CAP, 0805 OPTION | OPTION |
| 4 | 0 | L1, L2 - ALTERNATE | IND, 10 μ H | COILCRAFT SER2918H-103 |
| 5 | 0 | Q9, Q10, Q11, Q12, Q13, Q14, Q15, Q16 | XSTR, MOSFET OPTION | INFINEON IPD60N10S4-12 OPTION |
| 6 | 0 | R19, R20 | RES, 0603 OPTION | OPTION |
| 7 | 0 | R25, R26 | RES, 1206 OPTION | OPTION |
| 8 | 1 | S1 | SWITCH, SUBMINATURE, SLIDE, SPDT | C&K-COMPONENTS JS202011CQN |
| 9 | 4 | XJP1, XJP4, XJP6, XJP7 | SHUNT, 2mm | WURTH ELEKTRONIK 60800213421 |
| Hardware: For Demo Board Only | | | | |
| 1 | 13 | E1, E2, E3, E4, E5, E8, E9, E10, E11, E12, E13, E14, E15 | TURRET | MIIL-MAX 2501-2-00-80-00-00-07-0 |
| 2 | 2 | JP1, JP2 | HEADER, 4PIN, DBL ROW 2mm | WURTH ELEKTRONIK 62000821121 |
| 3 | 1 | JP3 | HEADER, 4PIN, 2mm | WURTH ELEKTRONIK 62000411121 |
| 4 | 1 | JP4 | HEADER, 2mm, 3PIN | WURTH ELEKTRONIK 62000311121 |
| 5 | 5 | J1, J2, J3, J4, J5 | STUD, TESTPIN | PEM KFH-032-10 |
| 6 | 5 | | LUG RING, #10 | KEYSTONE 8205 |
| 7 | 10 | | NUT, BRASS 10-32 | ANY #10-32 |
| 8 | 5 | | WASHER, #10 TIN PLATED BRASS | ANY #10 EXT BZ TN |
| 9 | 4 | MH1, MH2, MH3, MH4 | STANDOFF, SNAP ON | KEYSTONE 8834 |

SCHEMATIC DIAGRAM



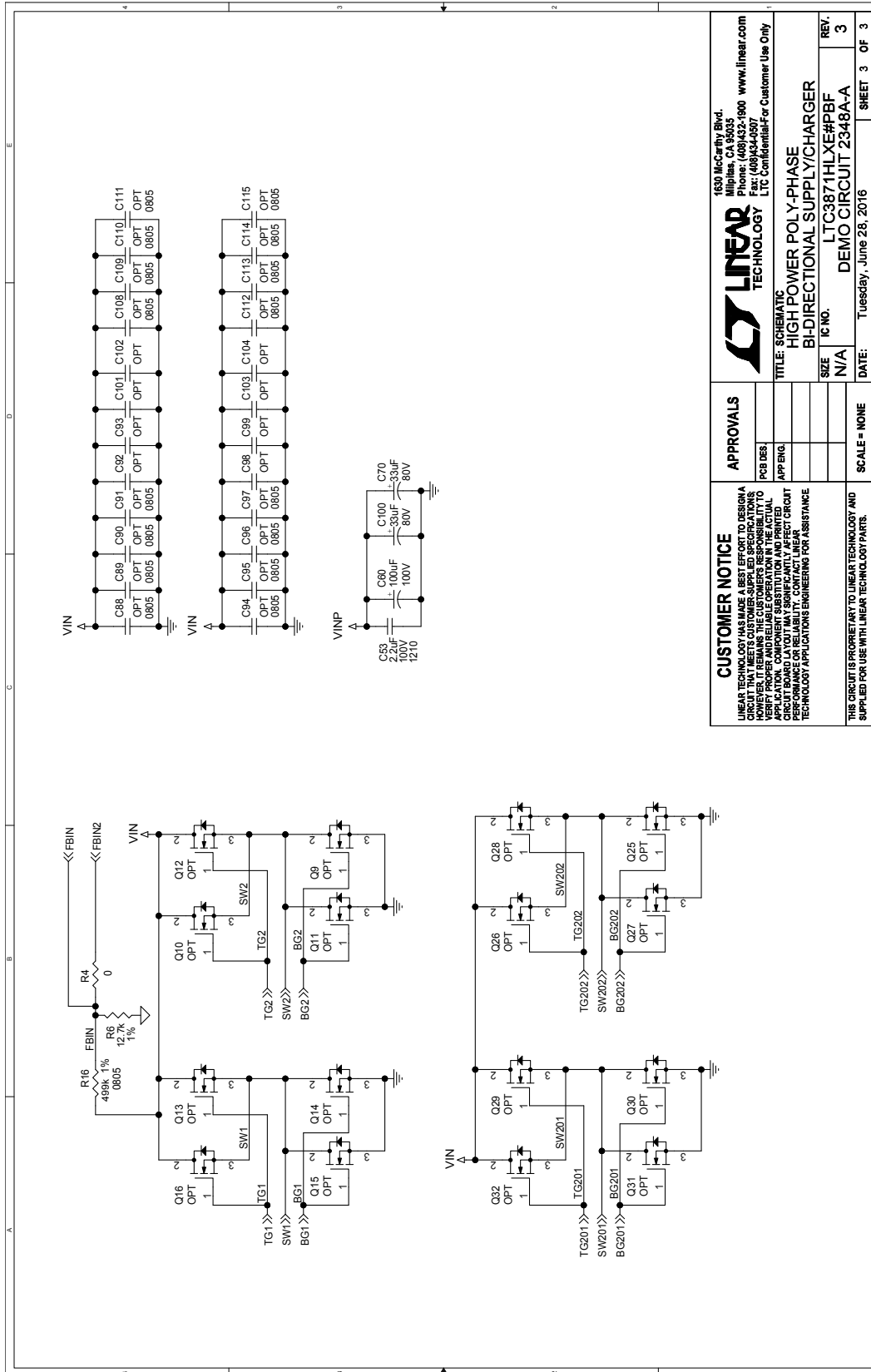
DEMO MANUAL DC2348A-A/DC2348A-B

SCHEMATIC DIAGRAM



dc2348aabf

SCHEMATIC DIAGRAM

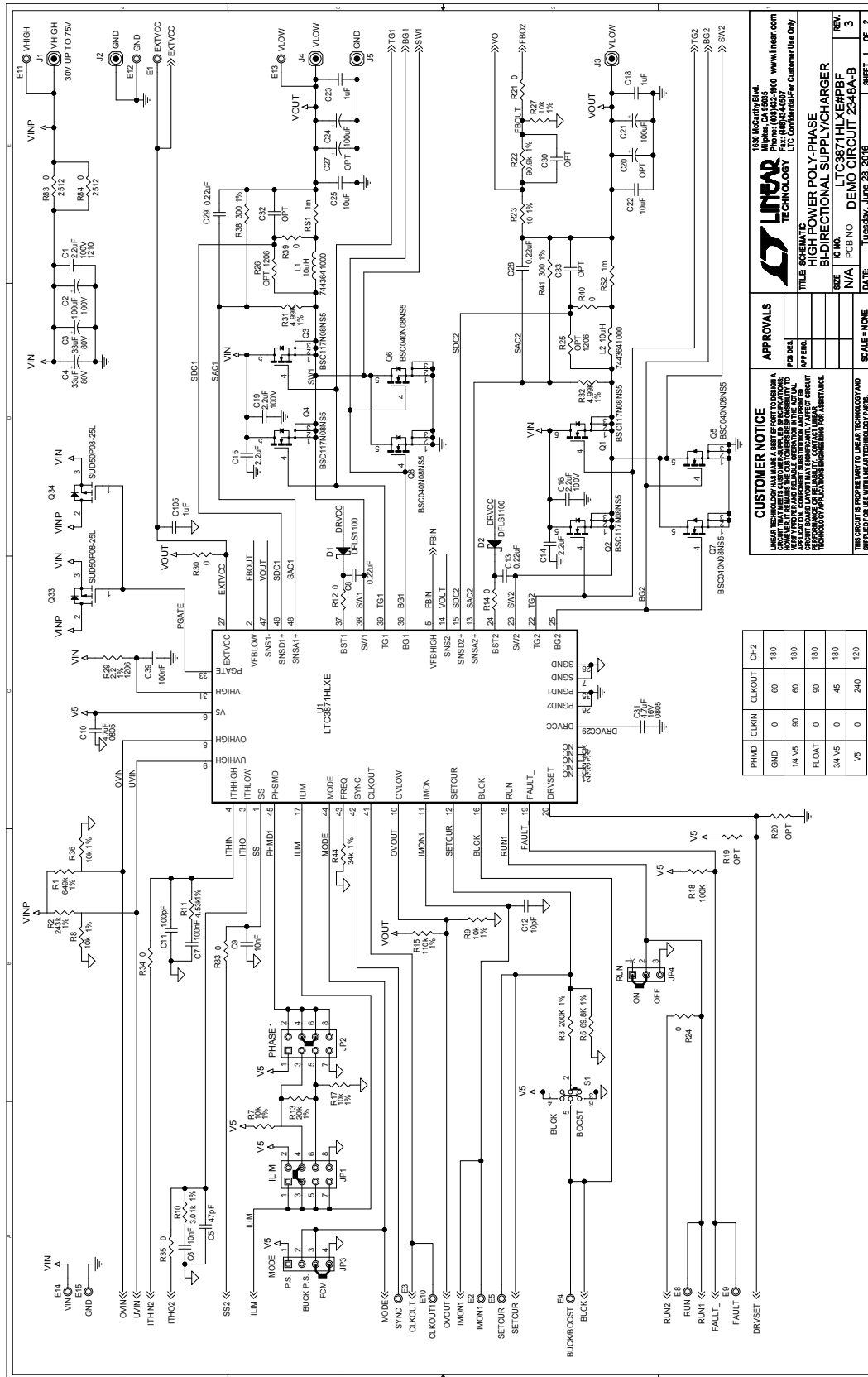


| | | | |
|---|--|--|----------------------|
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| APPROVALS | | TITLE: SCHEMATIC | |
| FDS DES | | HIGH POWER POLY-PHASE | |
| APP ENG | | BI-DIRECTIONAL SUPPLY/CHARGER | |
| | | SIZE | IC NO. |
| | | N/A | LTC3874HLX#PBF |
| | | DATE | REV. |
| | | Tuesday, June 28, 2016 | DEMO CIRCUIT 2348A-A |
| | | SCALE = NONE | SHEET 3 OF 3 |
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| THIS CIRCUIT IS PROPRIETARY TO LINEAR TECHNOLOGY AND SUPPLIED FOR USE WITH LINEAR TECHNOLOGY PARTS. | | | |

DEMO MANUAL

DC2348A-A/DC2348A-B

SCHEMATIC DIAGRAM



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TITLE HIGH POWER POLY-PHASE BI-DIRECTIONAL SUPPLY CHARGER
REV 3
DATE Tuesday, June 28, 2016
SCALE NONE

APPROVALS

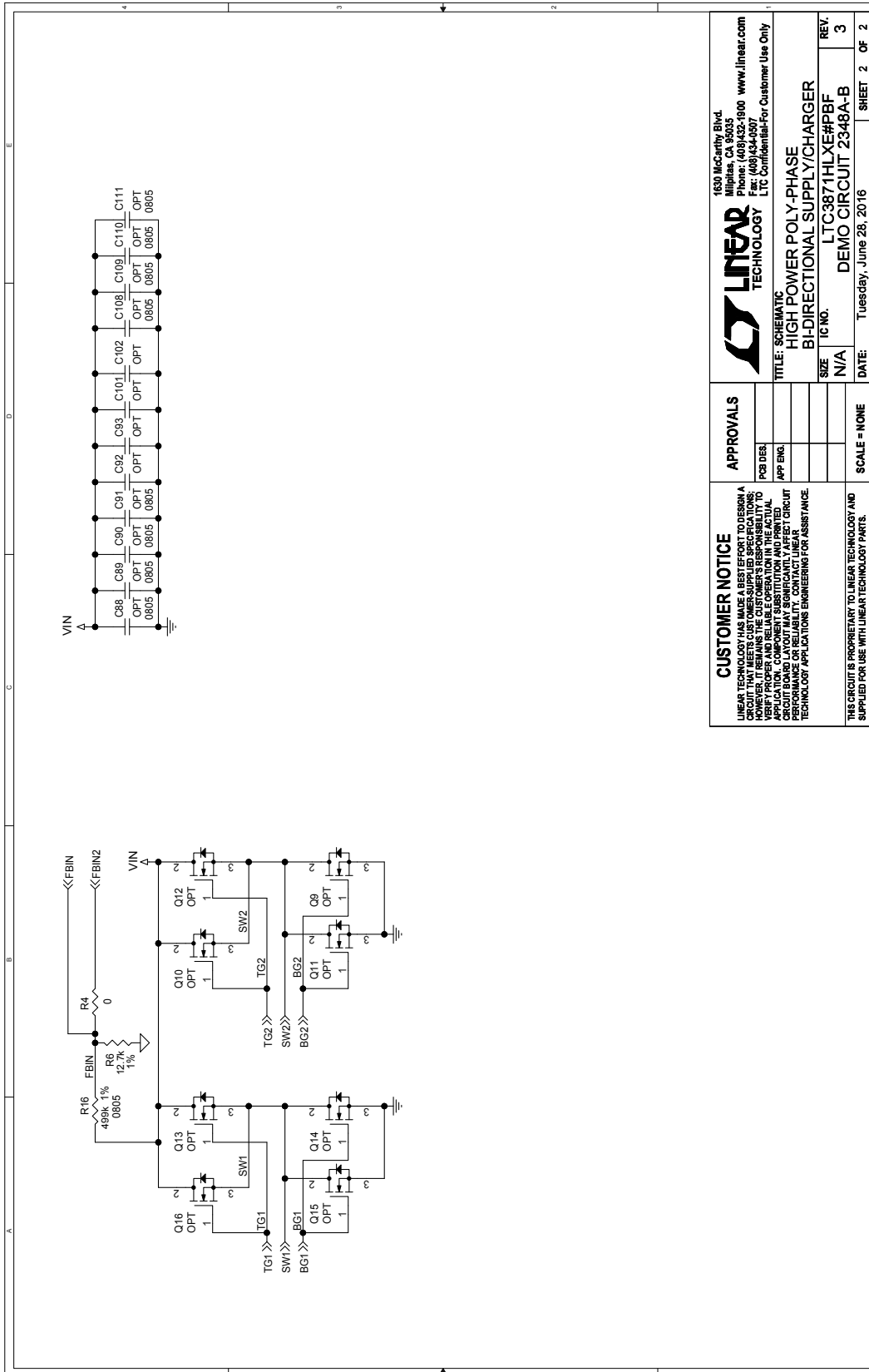
| | |
|-------------|-----------|
| DESIGNED BY | FOR DESIG |
| CHECKED BY | APP'D BY |
| DATE | DATE |

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| PHMD | CLKIN | CH2 |
|--------|-------|-----|
| SND | 0 | 180 |
| 1/4 V5 | 90 | 180 |
| FLOAT | 0 | 180 |
| 3/4 V5 | 0 | 45 |
| V5 | 0 | 240 |
| | | 120 |

DEMO MANUAL DC2348A-A/DC2348A-B

SCHEMATIC DIAGRAM



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| | |
|---------------------|--|
| APPROVALS | |
| POB DES | |
| APP ENG | |
| SCALE = NONE | |

**TITLE: SCHEMATIC
HIGH POWER POLY-PHASE
BI-DIRECTIONAL SUPPLY/CHARGER**

| | | | |
|----------------------|-----------------|--------------|------------------------|
| SIZE | N/A | REV. | 3 |
| IC NO. | LTC3871HLXE#PBF | DATE | Tuesday, June 28, 2016 |
| DEMO CIRCUIT 2348A-B | | SHEET 2 OF 2 | |

dc2348aabf

DEMO MANUAL

DC2348A-A/DC2348A-B

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