

ADM1278 Evaluation Board User Guide

FEATURES

- Fully functional support evaluation kit for the [ADM1278](#)
- Populated and tested with 12 V, 73 A, 3 mF design
- Special N-MOSFET footprint suits different packages
- Supports up to 4 sense resistors in parallel
- Supports up to 6 FETs in parallel
- LED indicated status outputs
- Wide input voltage range of up to 20 V
- FET temperature measurement capability
- Supports cascade setup for multiple boards
- Toggle and push-button switch for easy input control
- PMBus communication supported

PACKAGE CONTENTS

[EVAL-ADM1278EBZ](#) evaluation board

ADDITIONAL HARDWARE NEEDED

Serial I/O interface [USB-SDP-CABLEZ](#) (not included in the evaluation kit and should be ordered separately)
 Only one dongle is required in multiple board cascade setup

SOFTWARE NEEDED

Analog Devices, Inc., hot swap and power monitoring evaluation software

EVALUATION BOARD CONNECTION DIAGRAM

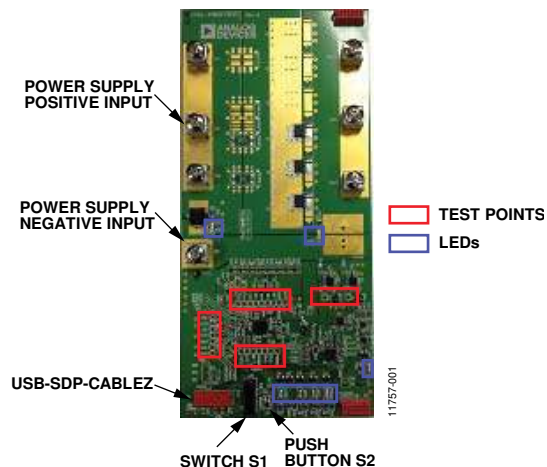


Figure 1.

GENERAL DESCRIPTION

The [EVAL-ADM1278EBZ](#) is a compact, full featured evaluation board for the [ADM1278](#). The board layout provides a clear visual of all the peripheral components and the hot swap power path. The layout also maximizes the ability of the board to dissipate heat for some of the key components on the power path, allowing the evaluation of very high current hot swap setups.

Four sense-resistor slots and six multipackage FET slots provide great flexibility and allow a wide range of application setups.

Multiple test points allow easy access to all critical points/pins. Seven LEDs provide direct visual indication on variations in the board status, such as supply input, output, IC power-good output, fault output, current sense output, and general-purpose outputs (GPO). An [AD7291](#) 8-channel, I²C, 12-bit, successive approximation analog-to-digital converter (SAR ADC) allows users to measure voltages such as CSOUT and other pin voltages, as well as to read ambient board temperature through an I²C bus in real time.

The kit supports I²C communication, allowing users to communicate with the [ADM1278](#). The evaluation kit also supports cascade setup so multiple evaluation boards can be connected together and share the same I²C bus.

The boards are fully compatible with the [ADM1278](#) evaluation software tool, which can be downloaded from the [ADM1278](#) product page.

Users need a [USB-SDP-CABLEZ](#) USB-to-I²C dongle to use the evaluation software tools.

The standard evaluation kit is prepopulated and tested with a 12 V, 73 A hot swap design capable of working with a 3 mF output capacitor.

Complete specifications for the [ADM1278](#) are available in the [ADM1278](#) data sheet, available from Analog Devices, which should be consulted in conjunction with this user guide when using the evaluation board.

TABLE OF CONTENTS

| | | | |
|---|---|---|----|
| Features | 1 | Board Specifications..... | 5 |
| Package Contents..... | 1 | Evaluation Board Hardware..... | 6 |
| Additional Hardware Needed | 1 | Switch, Jumper, and LED Functions..... | 6 |
| Software Needed..... | 1 | Test Plots..... | 7 |
| Evaluation Board Connection Diagram | 1 | Evaluation Board Schematics and Artwork | 9 |
| General Description | 1 | Ordering Information..... | 14 |
| Revision History | 2 | Bill of Materials..... | 14 |
| Quick Start Guide..... | 3 | Related Links..... | 18 |
| Evaluation Board Description..... | 4 | | |

REVISION HISTORY

12/14—Rev. 0 to Rev. A

| | |
|---|----|
| Changes to Quick Start Guide Section | 3 |
| Change to Evaluation Board Description Section..... | 4 |
| Changes to Table 1 | 5 |
| Changes to Figure 13..... | 9 |
| Changes to Figure 14..... | 10 |
| Changes to Table 6..... | 14 |

7/14—Revision 0: Initial Version

QUICK START GUIDE

To set up and start using the evaluation board, take the following steps:

1. Download the hot swap and power monitor software from www.analog.com/hotswaptools (see the [UG-353](#) user guide for more information).
2. Connect the evaluation board ([EVAL-ADM1278EBZ](#)) to a PC through the 10-way connector and [USB-SDP-CABLEZ](#).
3. Connect the power supply to the evaluation board ([EVAL-ADM1278EBZ](#)) using thick wires suitable for the current levels to be observed.
4. To confirm that the boards are configured correctly, set the output of the power supply to 12 V with less than 1 A current limit and with no load capacitance. If the boards are configured correctly, the green LED, labeled PWRGD on the [EVAL-ADM1278EBZ](#), should illuminate.
5. Push the ENABLE switch to the off position or press the push-button on the [EVAL-ADM1278EBZ](#). The green LED, labeled PWRGD, should turn off and then turn back on again when re-enabled.
6. If a fault event occurs (for example, a short circuit during operation), the red LED, labeled **FAULT**, illuminates. This fault can be cleared by toggling the ENABLE pin after the fault condition has been removed.
7. Disable the hot swap using the **Hot Swap Control** section of the **Basic Operation** tab of the GUI. Disabling the hot swap turns off the green LED (PWRGD) on the evaluation board.
8. Manually program the sense resistor value, if required, using the options in the GUI.
9. Check that the voltage and current measurements are as expected (for example, VIN = 12 V) in the **Power Monitor** tab of the software GUI.

EVALUATION BOARD DESCRIPTION

The EVAL-ADM1278EBZ is designed to demonstrate several features of the ADM1278. A simplified drawing of the evaluation board is shown in Figure 2.

The EVAL-ADM1278EBZ is connected to a PC using a USB-SDP-CABLEZ dongle for I²C communication.

The EVAL-ADM1278EBZ is shown in Figure 1. To minimize inductance, use thick wires between the power supply and the EVAL-ADM1278EBZ board connector. The PWRGD, VIN, and VOUT LEDs illuminate green after the board is powered.

The board is intended to be plugged into a system where load capacitance already exists. Two through-hole vias are provided to allow the placement of a load capacitor on the board when testing the board outside of a real system. All testing performed on the board was done with a 3 mF load capacitor.

The EVAL-ADM1278EBZ uses a 10 nF CTIMER1 capacitor to maintain a 1 ms FET safe operating area (SOA). The undervoltage and overvoltage thresholds were set using resistor dividers. A resistor divider was also used on the ISET pin to set the current limit to approximately 73 A. The constant power level was set to 180 W to allow the board to power up while maintaining the FET SOA at all times. These values can all be fine-tuned further if necessary.

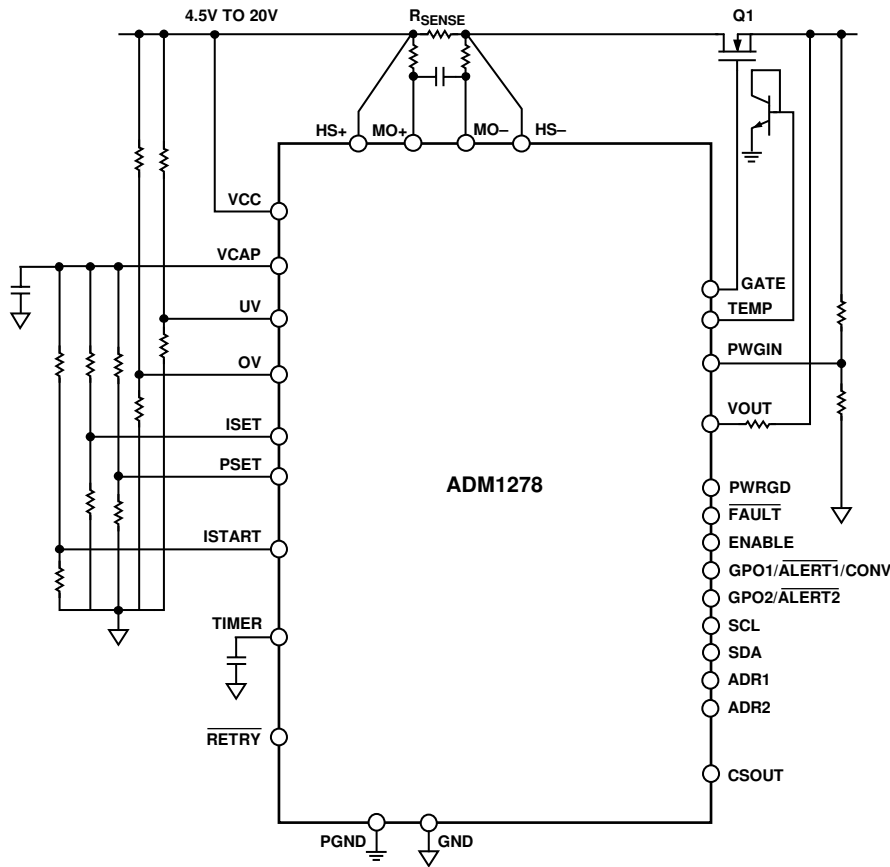


Figure 2. Basic Block Diagram

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The EVAL-ADM1278EBZ has the capability to mimic power throttling by allowing the user to set a programmable threshold on CSOUT. There is a resistor divider on the board to set the CSOUT within the input threshold range of the ADC, and another resistor divider is used to set it within the input threshold range of the comparator. When the CSOUT voltage exceeds the comparator threshold programmed by the AD5622 digital-to-analog converter (DAC) (via the evaluation software), an alert signal is asserted. The yellow LED (D2) illuminates to mimic this alert signal. The fast response time of the CSOUT pin to a load step (typically 10 μs) makes it suitable for fast alerts to overcurrent events. For example, it can be used to drive the fast PROCHOT pin of an Intel® processor for power throttling.

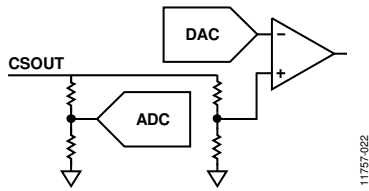


Figure 3.

For the best current sensing accuracy with the footprint shown in Figure 5, chip resistors without a nickel barrier layer (usually green in color) are recommended. The data in this user guide may not be applicable to all resistors, and results may vary depending on resistor composition and size. Alternative resistors should be tested independently. It is the responsibility of the user to ensure the layout dimensions and structure of the footprint comply with individual SMT manufacturing requirements. Analog Devices does not accept responsibility for any issues that may arise as a result of using this footprint.

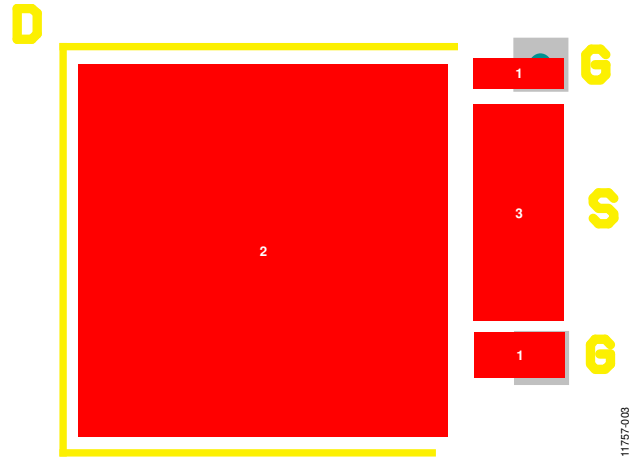


Figure 4. Multipackage N-MOSFET Footprint

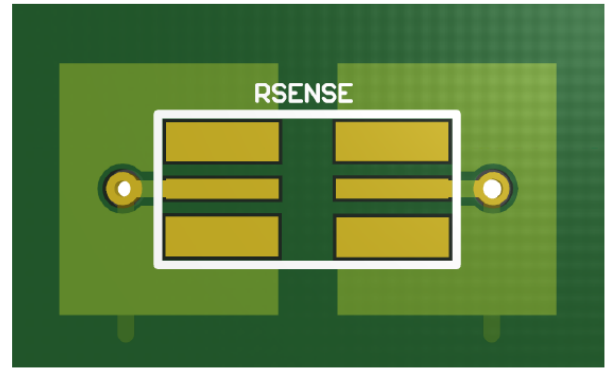


Figure 5. Recommended Sense Resistor Footprint

BOARD SPECIFICATIONS

Table 1.

| Parameter | Typical Value | Unit |
|-------------------------|---------------|------|
| Load Capacitance | 3000 | μF |
| Circuit Breaker Current | 69.5 | A |
| Regulation Current | 73 | A |
| Start-Up Current Limit | 8.0 | A |
| Constant Power Foldback | 180 | W |
| Ambient Temperature | 60 | °C |
| UV Falling Threshold | 9.26 | V |
| UV Rising Threshold | 9.81 | V |
| OV Rising Threshold | 16.4 | V |
| PWRGD Falling Threshold | 10.3 | V |
| TIMER Regulation | 167 | μs |

EVALUATION BOARD HARDWARE

SWITCH, JUMPER, AND LED FUNCTIONS

Table 2. Connector Functions

| Connector | Description |
|---------------------|--|
| VIN1, VIN2, VIN3 | Hot swap line voltage input, which also powers the board. Input voltage is 4.5 V to 20 V. For low voltage operations, provide auxiliary power input through Connector VCC. |
| VOUT1, VOUT2, VOUT3 | Hot swap line voltage output. |
| GND | Board common ground. |
| SK1 | 10-way connector for USB-SDP-CABLEZ . |
| SK2 | Bottom cascade connector; connect with the Micro-MaTch ribbon cable to link with another EVAL-ADM1278EBZ board. |
| SK4 | Top cascade connector; connect with the Micro-MaTch ribbon cable to link with another EVAL-ADM1278EBZ board. |

Table 3. Switch Functions

| Switch | Description |
|--------|--|
| S1 | Toggle switch for the ENABLE pin. |
| S2 | Push-button switch for the ENABLE pin. |

Table 4. LED Functions

| LED | Description |
|-----|--|
| D2 | CSOUT comparator output, active high; yellow |
| D3 | $\overline{\text{FAULT}}$, active low; red |
| D4 | GPO1, active high; blue |
| D5 | GPO2, active high; blue |
| D6 | Power good, active high; green |
| D7 | Board input power; green |
| D8 | Board output power; green |

Table 5. On-Board ICs

| IC | Description |
|----|--|
| U1 | ADM1278 , main IC |
| U2 | ADP1720ARMZ-3.3 , 4 V to 28 V input, 3.3 V, 50 mA output LDO; powering EEPROM |
| U3 | 64 Kb I ² C EEPROM |
| U4 | AD7291 , $\pm 1^\circ\text{C}$ accurate, 8-channel, I ² C, 12-bit SAR ADC with temperature sensor |
| U6 | ADCMP370AKSZ , general-purpose comparator with open-drain output |
| U7 | AD5622YKSZ , 2.7 V to 5.5 V, 12-bit <i>nano</i> DAC [®] with I ² C-compatible interface |
| U5 | ADR435ARMZ , ultralow noise XFET [®] 5 V output |

TEST PLOTS

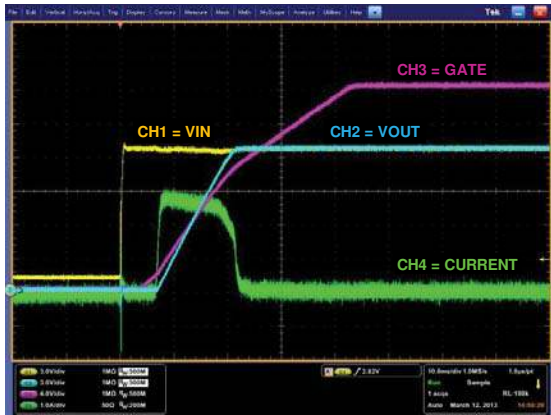


Figure 6. Power Up with 3 mF Load Capacitor and No DC Load

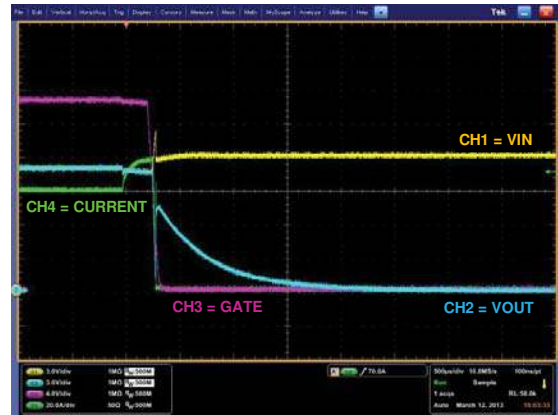


Figure 8. Overcurrent Shutdown

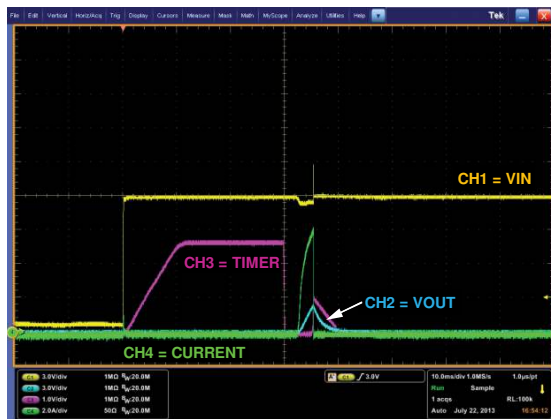


Figure 7. Power Up into 0.6 Ω DC Load (Start-Up Current Circuit Break Limit = 6.5 A)

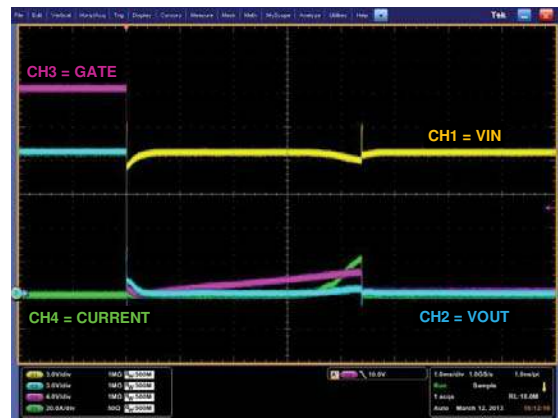


Figure 9. Output Short Circuit

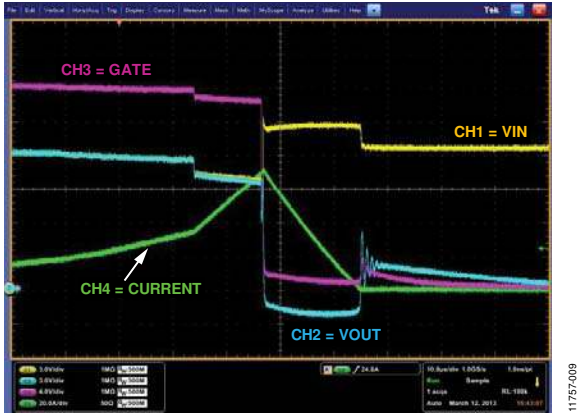


Figure 10. Output Short Circuit (Zoom-In)

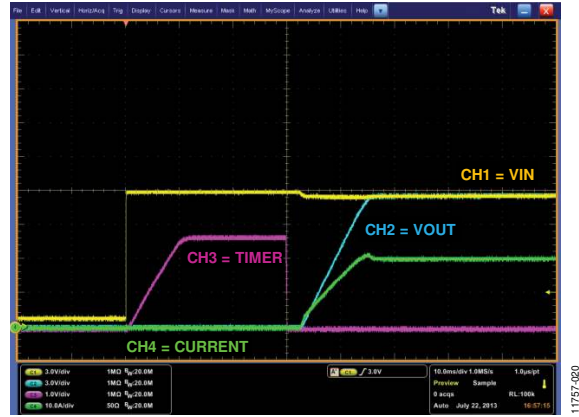


Figure 12. Power Up into 0.6 Ω DC Load with Start-Up Current Limit Disabled

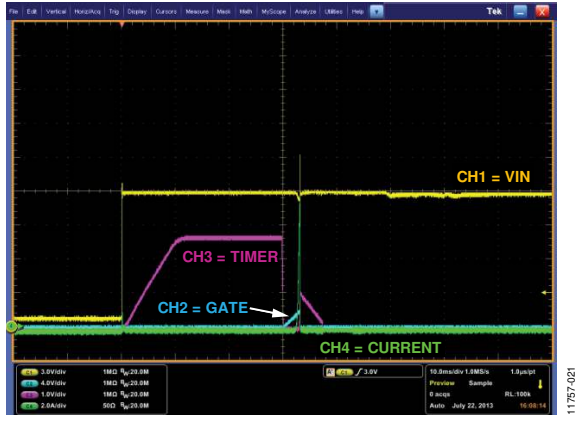


Figure 11. Power Up into Short

EVALUATION BOARD SCHEMATICS AND ARTWORK

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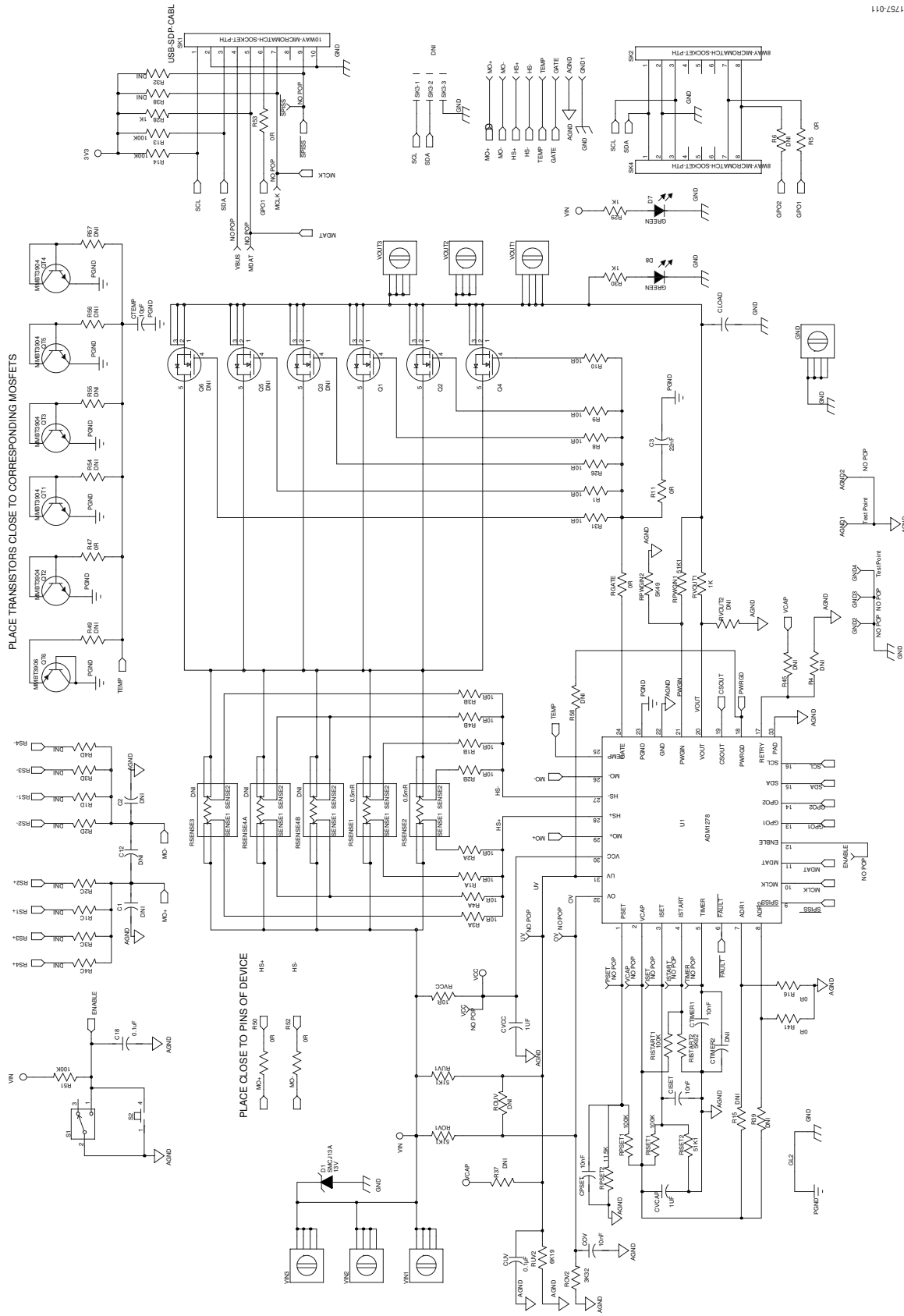


Figure 13. Evaluation Board Schematic 1

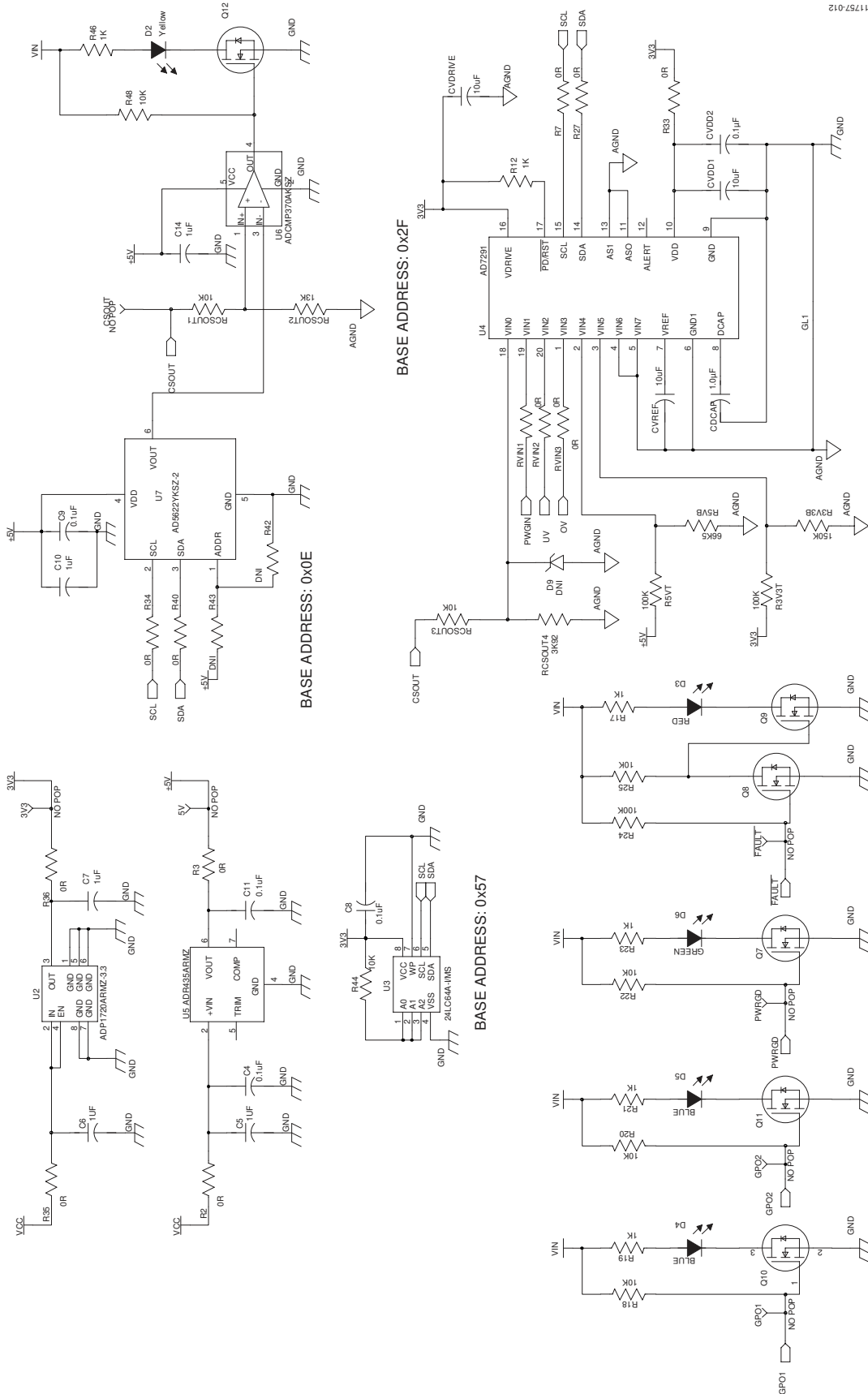


Figure 14. Evaluation Board Schematic 2

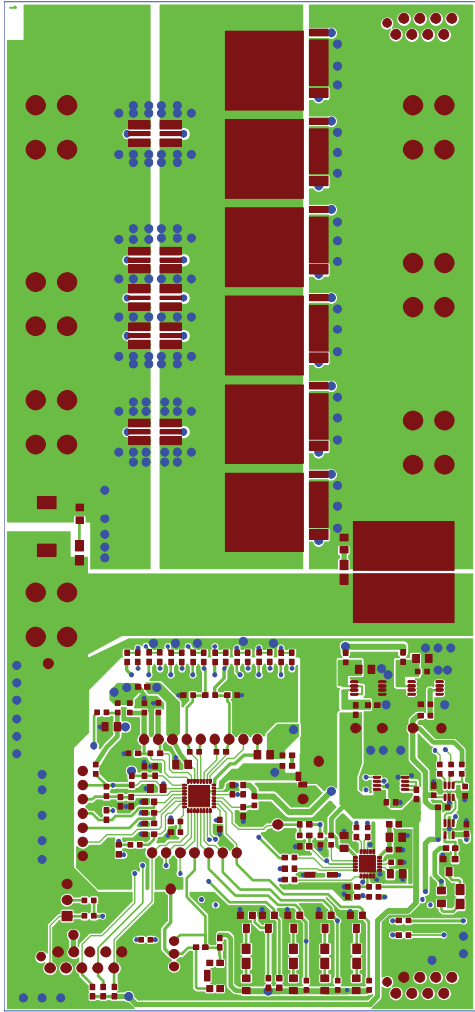


Figure 15. Top Layer 1

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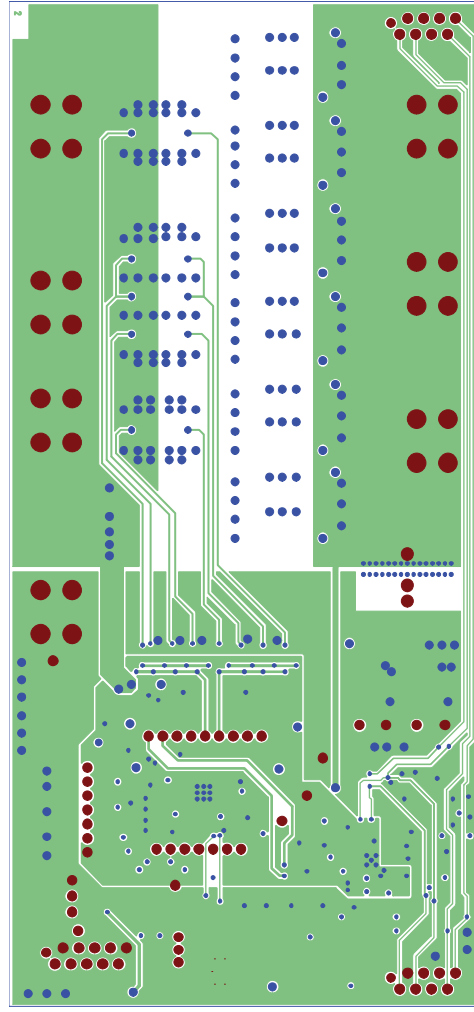
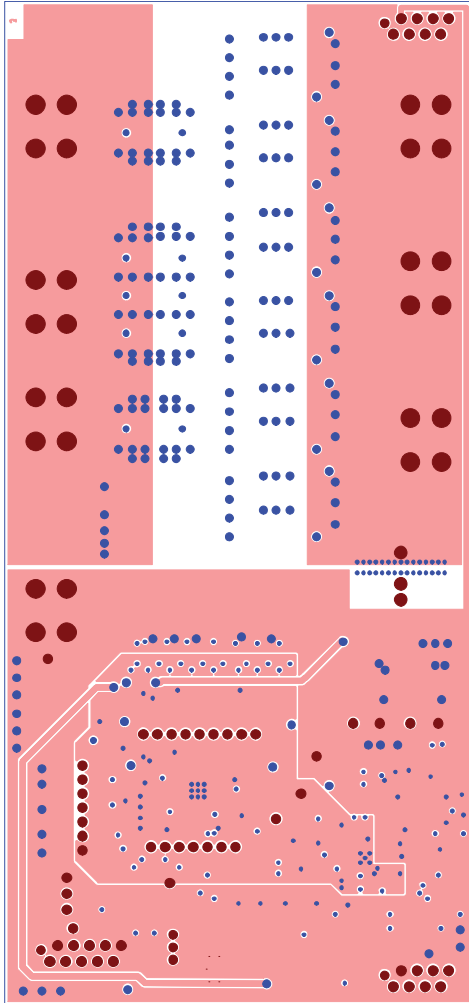


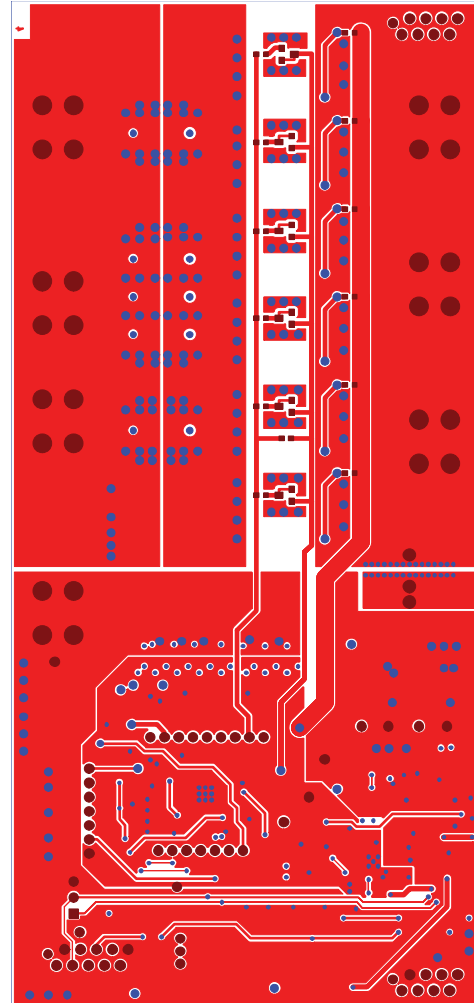
Figure 16. Inner Layer 2

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Figure 17. Inner Layer 3



11757-016

Figure 18. Bottom Layer

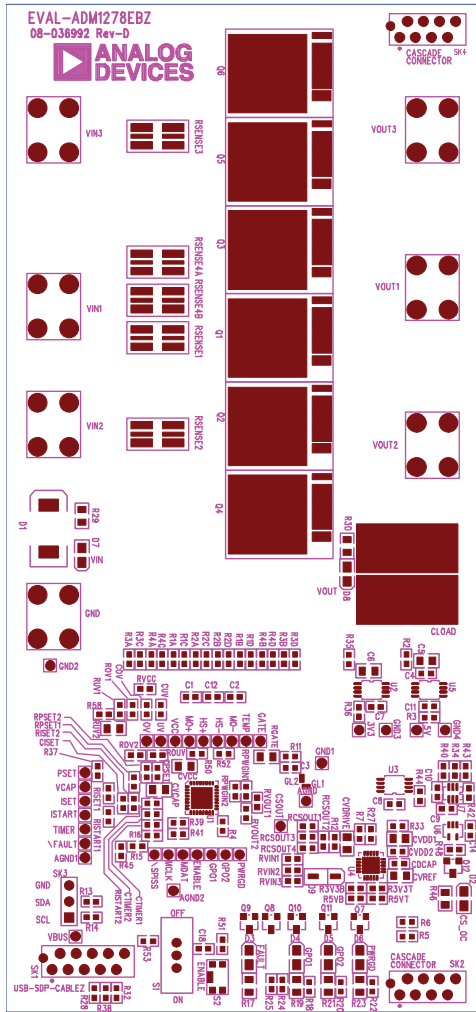


Figure 19. Assembly Top

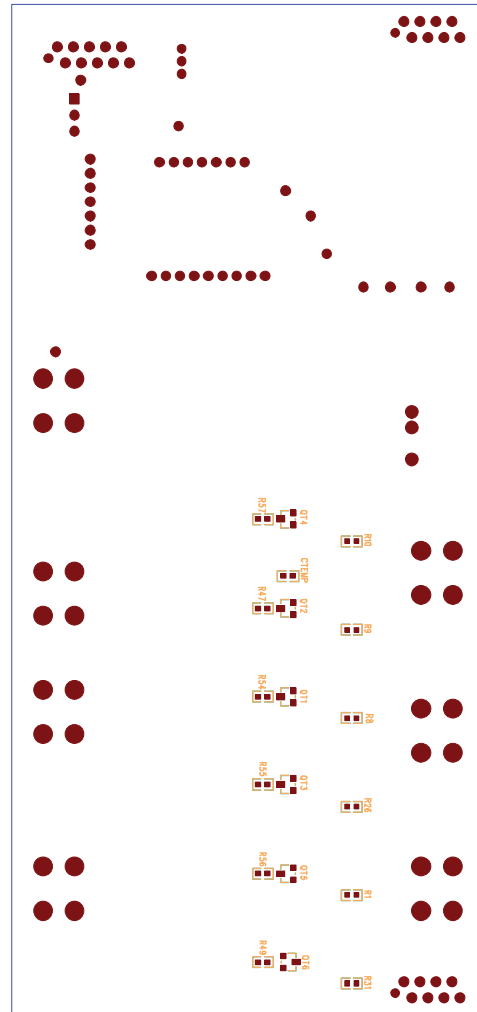


Figure 20. Assembly Bottom

ORDERING INFORMATION

BILL OF MATERIALS

Table 6.

| Reference Designator | Description | Manufacturer/Part Number |
|----------------------|---|--------------------------|
| 3V3 | Test point | Do not insert |
| 5V | Test point | Do not insert |
| AGND | Test point | FEC 8731128 |
| AGND1 | Test point | Do not insert |
| AGND2 | Test point | FEC 8731128 |
| C1 | Unpopulated capacitor (0603) | Do not insert |
| C2 | Unpopulated capacitor (0603) | Do not insert |
| C3 | Capacitor, 22 nF, 50 V, X7R, 0603 | FEC 3019755 |
| C4 | Capacitor, 100 nF, 50 V, X7R, 0603 | FEC 1288255 |
| C5 | Capacitor, 1 μ F, 25 V, X7R, 0805 | FEC 1637035 |
| C6 | Capacitor, 1 μ F, 25 V, X7R, 0805 | FEC 1637035 |
| C7 | Capacitor, 1 μ F, 25 V, X5R, 0603 | FEC 1288256 |
| C8 | Capacitor, 100 nF, 50 V, X7R, 0603 | FEC 1288255 |
| C9 | Capacitor, 100 nF, 50 V, X7R, 0603 | FEC 1288255 |
| C10 | Capacitor, 1 μ F, 25 V, X5R, 0603 | FEC 1288256 |
| C11 | Capacitor, 100 nF, 50 V, X7R, 0603 | FEC 1288255 |
| C12 | Unpopulated capacitor (0603) | Do not insert |
| C14 | Capacitor, 1 μ F, 25 V, X5R, 0603 | FEC 1288256 |
| C18 | Capacitor, 100 nF, 50 V, X7R, 0603 | FEC 1288255 |
| CDCAP | Capacitor, 1 μ F, 25 V, X5R, 0603 | FEC 1288256 |
| CISSET | Capacitor, 10 nF, 50 V, X7R, 0603 | FEC 1414609 |
| CLOAD | Load capacitor | Do not insert |
| COV | Capacitor, 10 nF, 50 V, X7R, 0603 | FEC 1414609 |
| CPSET | Capacitor, 10 nF, 50 V, X7R, 0603 | FEC 1414609 |
| CSOUT | Red test point | Do not insert |
| CTEMP | Capacitor, ceramic, 10 pF, 50 V, C0G/NP0, 0603 | FEC 1414601 |
| CTIMER1 | Capacitor, 10 nF, 50 V, X7R, 0603 | FEC 722236 |
| CTIMER2 | Unpopulated capacitor (0603) | Do not insert |
| CUV | Capacitor, 100 nF, 50 V, X7R, 0603 | FEC 1288255 |
| CVCAP | Capacitor, 1 μ F, 25 V, X7R, 0805 | FEC 1637035 |
| CVCC | Capacitor, 1 μ F, 25 V, X7R, 0805 | FEC 1637035 |
| CVDD1 | Capacitor, 10 μ F, 6.3 V, X7R, 0805 | FEC 2112846 |
| CVDD2 | Capacitor, 100 nF, 50 V, X7R, 0603 | FEC 1288255 |
| CVDRIVE | Capacitor, 10 μ F, 6.3 V, X7R, 0805 | FEC 2112846 |
| CVREF | Capacitor, 10 μ F, 6.3 V, X7R, 0805 | FEC 2112846 |
| D1 | TVS, 13 V, SMC diode, SMCJ13A | FEC 1467622 |
| D2 | LED, SMD, yellow, 0805 | FEC 1318247 |
| D3 | LED, SMD, red, 0805 | FEC 1318244 |
| D4 | LED, SMD, blue, 0805 | FEC 8529876 |
| D5 | LED, SMD, blue, 0805 | FEC 8529876 |
| D6 | LED, SMD, green, 0805 | FEC 1318243 |
| D7 | LED, SMD, green, 0805 | FEC 1318243 |
| D8 | LED, SMD, green, 0805 | FEC 1318243 |
| D9 | Zener diode, 2.7 V, 0.5 W, SOD-123 BZT52C5V1-V-GS08 | FEC 1902432 |
| ENABLE | Test point | Do not insert |
| GATE | Test point | Do not insert |
| GND | Terminal, screw, vertical | Digi-Key 7691K-ND |
| GND1 | Test point | Do not insert |
| GND2 | Test point | FEC 8731128 |

| Reference Designator | Description | Manufacturer/Part Number |
|----------------------|---|--------------------------|
| GND3 | Test point | FEC 8731128 |
| GND4 | Test point | FEC 8731128 |
| GPO1 | Test point | Do not insert |
| GPO2 | Test point | Do not insert |
| HS+ | Test point | Do not insert |
| HS- | Test point | Do not insert |
| ISET | Test point | Do not insert |
| ISTART | Test point | Do not insert |
| MCLK | Test point | Do not insert |
| MDAT | Test point | Do not insert |
| MO+ | Test point | Do not insert |
| MO- | Test point | Do not insert |
| OV | Test point | Do not insert |
| PSET | Test point | Do not insert |
| PWRGD | Red test point | Do not insert |
| Q1 | MOSFET, N-Ch, 25 V, 100 A, LPAK PSMN0R9-25YLC SOT669-CUSTOM | Digi-Key 568-6720-1-ND |
| Q2 | MOSFET, N-Ch, 25 V, 100 A, LPAK PSMN0R9-25YLC SOT669-CUSTOM | Digi-Key 568-6720-1-ND |
| Q3 | MOSFET, N-Ch, 25 V, 100 A, LPAK PSMN0R9-25YLC SOT669-CUSTOM | Do not insert |
| Q4 | MOSFET, N-Ch, 25 V, 100 A, LPAK PSMN0R9-25YLC SOT669-CUSTOM | Digi-Key 568-6720-1-ND |
| Q5 | MOSFET, N-Ch, 25 V, 100 A, LPAK PSMN0R9-25YLC SOT669-CUSTOM | Do not insert |
| Q6 | MOSFET, N-Ch, 25 V, 100 A, LPAK PSMN0R9-25YLC SOT669-CUSTOM | Do not insert |
| Q7 | MOSFET, N-Ch, 60 V, 0.115 A, SOT23 2N7002-7-F | FEC 1713823 |
| Q8 | MOSFET, N-Ch, 60 V, 0.115 A, SOT23 2N7002-7-F | FEC 1713823 |
| Q9 | MOSFET, N-Ch, 60 V, 0.115 A, SOT23 2N7002-7-F | FEC 1713823 |
| Q10 | MOSFET, N-Ch, 60 V, 0.115 A, SOT-23 2N7002-7-F | FEC 1713823 |
| Q11 | MOSFET, N-Ch, 60 V, 0.115 A, SOT-23 2N7002-7-F | FEC 1713823 |
| Q12 | MOSFET, N-Ch, 60 V, 0.115 A, SOT-23 2N7002-7-F | FEC 1713823 |
| QT1 | NPN transistor, SOT-23 MMBT3904 | FEC 1757935 |
| QT2 | NPN transistor, SOT-23 MMBT3904 | FEC 1757935 |
| QT3 | NPN transistor, SOT-23 MMBT3904 | FEC 1757935 |
| QT4 | NPN transistor, SOT-23 MMBT3904 | FEC 1757935 |
| QT5 | NPN transistor, SOT-23 MMBT3904 | FEC 1757935 |
| QT6 | PNP transistor, (SOT-23) MMBT3904 | FEC 9846832 |
| R1 | Resistor, 0603, 0.25 W, 10 Ω | FEC 1738878 |
| R1A | Resistor, 0603, 0.1 W, 10 Ω | FEC 1469751 |
| R1B | Resistor, 0603, 0.1 W, 10 Ω | FEC 1469751 |
| R1C | Unpopulated resistor (0603) | Do not insert |
| R1D | Unpopulated resistor (0603) | Do not insert |
| R2 | Resistor, 0603, 0.1 W, 0 Ω | FEC 1469739 |
| R2A | Resistor, 0603, 0.1 W, 10 Ω | FEC 1469751 |
| R2B | Resistor, 0603, 0.1 W, 10 Ω | FEC 1469751 |
| R2C | Unpopulated resistor (0603) | Do not insert |
| R2D | Unpopulated resistor (0603) | Do not insert |
| R3 | Resistor, 0603, 0.1 W, 0 Ω | FEC 1469739 |
| R3A | Resistor, 0603, 0.1 W, 10 Ω | FEC 1469751 |
| R3B | Resistor, 0603, 0.1 W, 10 Ω | FEC 1469751 |
| R3C | Unpopulated resistor (0603) | Do not insert |
| R3D | Unpopulated resistor (0603) | Do not insert |
| R3V3B | Resistor, 0603, 0.1 W, 150 k Ω | FEC 2122639 |
| R3V3T | Resistor, 0603, 0.1 W, 100 k Ω | FEC 1469649 |
| R4 | Unpopulated resistor (0603) | Do not insert |
| R4A | Resistor, 0603, 0.1 W, 10 Ω | FEC 1469751 |
| R4B | Resistor, 0603, 0.1 W, 10 Ω | FEC 1469751 |

| Reference Designator | Description | Manufacturer/Part Number |
|----------------------|--|--------------------------|
| R4C | Unpopulated resistor (0603) | Do not insert |
| R4D | Unpopulated resistor (0603) | Do not insert |
| R5 | Resistor, 0603, 0.1 W, 0 Ω | FEC 1469739 |
| R5VB | Resistor, 0603, 0.1 W, 66.5 k Ω | FEC 2122597 |
| R5VT | Resistor, 0603, 0.1 W, 100 k Ω | FEC 1469649 |
| R6 | Unpopulated resistor (0603) | Do not insert |
| R7 | Resistor, 0603, 0.1 W, 0 Ω | FEC 1469739 |
| R8 | Resistor, 0603, 0.25 W, 10 Ω | FEC 1738878 |
| R9 | Resistor, 0603, 0.25 W, 10 Ω | FEC 1738878 |
| R10 | Resistor, 0603, 0.25 W, 10 Ω | FEC 1738878 |
| R11 | Resistor, 0603, 0.1 W, 0 Ω | FEC 1469739 |
| R12 | Resistor, 0603, 0.1 W, 1 k Ω | FEC 1469740 |
| R13 | Resistor, 0603, 0.1 W, 100 k Ω | FEC 1469649 |
| R14 | Resistor, 0603, 0.1 W, 100 k Ω | FEC 1469649 |
| R15 | Unpopulated resistor (0603) | Do not insert |
| R16 | Resistor, 0603, 0.1 W, 0 Ω | FEC 1469739 |
| R17 | Resistor, 0805, 0.33 W, 1 k Ω | FEC 1738959 |
| R18 | Resistor, 0603, 0.25 W, 10 k Ω | FEC 1738918 |
| R19 | Resistor, 0805, 0.33 W, 1 k Ω | FEC 1738959 |
| R20 | Resistor, 0603, 0.25 W, 10 k Ω | FEC 1738918 |
| R21 | Resistor, 0805, 0.33 W, 1 k Ω | FEC 1738959 |
| R22 | Resistor, 0603, 0.25 W, 10 k Ω | FEC 1738918 |
| R23 | Resistor, 0805, 0.33 W, 1 k Ω | FEC 1738959 |
| R24 | Resistor, 0603, 0.1 W, 100 k Ω | FEC 1469649 |
| R25 | Resistor, 0603, 0.25 W, 10 k Ω | FEC 1738918 |
| R26 | Resistor, 0603, 0.25 W, 10 Ω | FEC 1738878 |
| R27 | Resistor, 0603, 0.1 W, 0 Ω | FEC 1469739 |
| R28 | Resistor, 0603, 0.1 W, 1 k Ω | FEC 1469740 |
| R29 | Resistor, 0805, 0.33 W, 1 k Ω | FEC 1738959 |
| R30 | Resistor, 0805, 0.33 W, 1 k Ω | FEC 1738959 |
| R31 | Resistor, 0603, 0.25 W, 10 Ω | FEC 1738878 |
| R32 | Unpopulated resistor (0603) | Do not insert |
| R33 | Resistor, 0603, 0.1 W, 0 Ω | FEC 1469739 |
| R34 | Resistor, 0603, 0.1 W, 0 Ω | FEC 1469739 |
| R35 | Resistor, 0603, 0.1 W, 0 Ω | FEC 1469739 |
| R36 | Resistor, 0603, 0.1 W, 0 Ω | FEC 1469739 |
| R37 | Unpopulated resistor (0603) | Do not insert |
| R38 | Unpopulated resistor (0603) | Do not insert |
| R39 | Unpopulated resistor (0603) | Do not insert |
| R40 | Resistor, 0603, 0.1 W, 0 Ω | FEC 1469739 |
| R41 | Resistor, 0603, 0.1 W, 0 Ω | FEC 1469739 |
| R42 | Resistor, 0603, 0.1 W, 0 Ω | Do not insert |
| R43 | Resistor, 0603, 0.1 W, 0 Ω | Do not insert |
| R44 | Resistor, 0603, 0.25 W, 10 k Ω | FEC 1738918 |
| R45 | Unpopulated resistor (0603) | Do not insert |
| R46 | Resistor, 0805, 0.33 W, 1 k Ω | FEC 1738959 |
| R47 | Resistor, 0603, 0.1 W, 0 Ω | FEC 1469739 |
| R48 | Resistor, 0603, 0.25 W, 10 k Ω | FEC 1738918 |
| R49 | Unpopulated resistor (0603) | Do not insert |
| R50 | Resistor, 0603, 0.1 W, 0 Ω | FEC 1469739 |
| R51 | Resistor, 0603, 0.1 W, 100 k Ω | FEC 1469649 |
| R52 | Resistor, 0603, 0.1 W, 0 Ω | FEC 1469739 |
| R53 | Resistor, 0603, 0.1 W, 0 Ω | FEC 1469739 |

| Reference Designator | Description | Manufacturer/Part Number |
|----------------------|--|------------------------------------|
| R54 | Unpopulated resistor (0603) | Do not insert |
| R55 | Unpopulated resistor (0603) | Do not insert |
| R56 | Unpopulated resistor (0603) | Do not insert |
| R57 | Unpopulated resistor (0603) | Do not insert |
| R58 | Unpopulated resistor (0603) | Do not insert |
| RCSOUT1 | Resistor, 0603, 0.25 W, 10 kΩ | FEC 1738918 |
| RCSOUT2 | Resistor, 0603, 0.1 W, 13 kΩ | FEC 1652839 |
| RCSOUT3 | Resistor, 0603, 0.25 W, 10 kΩ | FEC 1738918 |
| RCSOUT4 | Resistor, 0603, 0.1 W, 3.92 kΩ | FEC 2138394 |
| RGATE | Resistor, 0805, 0.125 W, 0 Ω | FEC 1469846 |
| RISSET1 | Resistor, 0603, 0.063 W, 100 kΩ | FEC 9330402 |
| RISSET2 | Resistor, 0603, 0.1 W, 51.1 kΩ | FEC 2059473 |
| RISTART1 | Resistor, 0603, 0.063 W, 100 kΩ | FEC 9330402 |
| RISTART2 | Resistor, 0603, 0.1 W, 5.62 kΩ | FEC 2138405 |
| ROUV | Unpopulated resistor (0603) | Do not insert |
| ROV1 | Resistor, 0603, 0.1 W, 51.1 kΩ | FEC 2059473 |
| ROV2 | Resistor, 0603, 0.1 W, 3.32 kΩ | FEC 2059362 |
| RPSET1 | Resistor, 0603, 0.063 W, 100 kΩ | FEC 9330402 |
| RPSET2 | Resistor, 0603, 0.1 W, 11.5 kΩ | FEC 1469753 |
| RPWGIN1 | Resistor, 0603, 0.1 W, 51.1 kΩ | FEC 2059473 |
| RPWGIN2 | Resistor, 0603, 0.1 W, 5.49 kΩ | FEC 2138404 |
| RSENSE1 | Sense resistor (2512 case size) | FEC 1292504 |
| RSENSE2 | Sense resistor (2512 case size) | FEC 1292504 |
| RSENSE3 | Sense resistor (2512 case size) | Do not insert |
| RSENSE4A | Sense resistor (2512 case size) | Do not insert |
| RSENSE4B | Sense resistor (2512 case size) | Do not insert |
| RUV1 | Resistor, 0603, 0.1 W, 51.1 kΩ | FEC 2059473 |
| RUV2 | Resistor, 0603, 0.1 W, 6.19 kΩ | FEC 2059387 |
| RVCC | Resistor, 0603, 10 Ω | FEC 1738878 |
| RVIN1 | Resistor, 0603, 0.1 W, 0 Ω | FEC 1469739 |
| RVIN2 | Resistor, 0603, 0.1 W, 0 Ω | FEC 1469739 |
| RVIN3 | Resistor, 0603, 0.1 W, 0 Ω | FEC 1469739 |
| RVOUT1 | Resistor, 0603, 0.1 W, 1 kΩ | FEC 1469740 |
| RVOUT2 | Unpopulated resistor (0603) | Do not insert |
| S1 | SPDT slide switch | FEC 1123875 |
| S2 | Push button, 2.8 mm × 3.8 mm, vertical push | FEC 1605470 |
| SK1 | 10-way Micro-MaTch | FEC 148600 |
| SK2 | 8-way Micro-MaTch | FEC 148593 |
| SK3 | Header, right angle, 1 row, 3-way, SIP-3P, 2.54 mm | Do not insert |
| SK4 | 8-way, female, PTH socket, Micro-MaTch | FEC 148593 |
| TEMP | Test point | Do not insert |
| TIMER | Test point | Do not insert |
| U1 | ADM1278 hot swap controller and digital power and energy monitor | ADM1278-2ACPZ |
| U2 | 50 mA, high voltage, micropower linear regulator, 3.3 V | ADP1720ARMZ-3.3-R7 |
| U3 | IC, EEPROM, serial 64KB, SMD, MSOP8 | FEC 1331335 |
| U4 | 8-channel, I ² C, 12-bit SAR ADC with temperature sensor | AD7291BCPZ |
| U5 | Ultralow noise XFET voltage references | ADR435ARMZ |
| U6 | Comparator | ADCMP370AKSZ-REEL |
| U7 | 12-bit DAC | AD5622YKSZ-2500RL7 |
| UV | Test point | Do not insert |
| VBUS | Test point | Do not insert |
| VCAP | Test point | Do not insert |
| VCC | Test point | Do not insert |

| Reference Designator | Description | Manufacturer/Part Number |
|----------------------|---------------------------|--------------------------|
| VIN1 | Terminal, screw, vertical | Digi-Key 7691K-ND |
| VIN2 | Terminal, screw, vertical | Digi-Key 7691K-ND |
| VIN3 | Terminal, screw, vertical | Digi-Key 7691K-ND |
| VOUT1 | Terminal, screw, vertical | Digi-Key 7691K-ND |
| VOUT2 | Terminal, screw, vertical | Digi-Key 7691K-ND |
| VOUT3 | Terminal, screw, vertical | Digi-Key 7691K-ND |
| FAULT | Test point | Do not insert |
| SPISS | Test point | Do not insert |

RELATED LINKS

| Resource | Description |
|--------------------------|--|
| AD5622 | Product page, 2.7 V to 5.5 V, 12-bit <i>nanoDAC</i> ® with I ² C-compatible interface |
| AD7291 | Product page, ±1°C accurate, 8-channel, I ² C, 12-bit SAR ADC with temperature sensor |
| ADCMP370 | Product page, general-purpose comparator with open-drain output |
| ADM1278 | Product page, hot swap controller and digital power and energy monitor with PMBus interface |
| ADP1720 | Product page, 4 V to 28 V input, 3.3 V, 50 mA output LDO; powering EEPROM |
| ADR435 | Product page, ultralow noise XFET® 3.5 µV p-p at 2.5 V output |

I²C refers to a communications protocol originally developed by Philips Semiconductors (now NXP Semiconductors).



ESD Caution

ESD (electrostatic discharge) sensitive device. Charged devices and circuit boards can discharge without detection. Although this product features patented or proprietary protection circuitry, damage may occur on devices subjected to high energy ESD. Therefore, proper ESD precautions should be taken to avoid performance degradation or loss of functionality.

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