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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

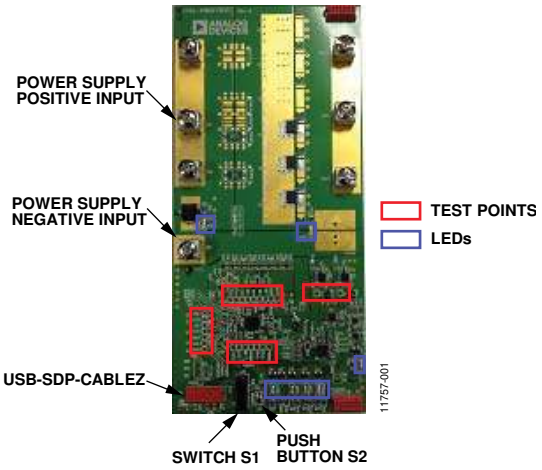

Figure 1.

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

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 $\overline{\text{FAULT}}$, 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.

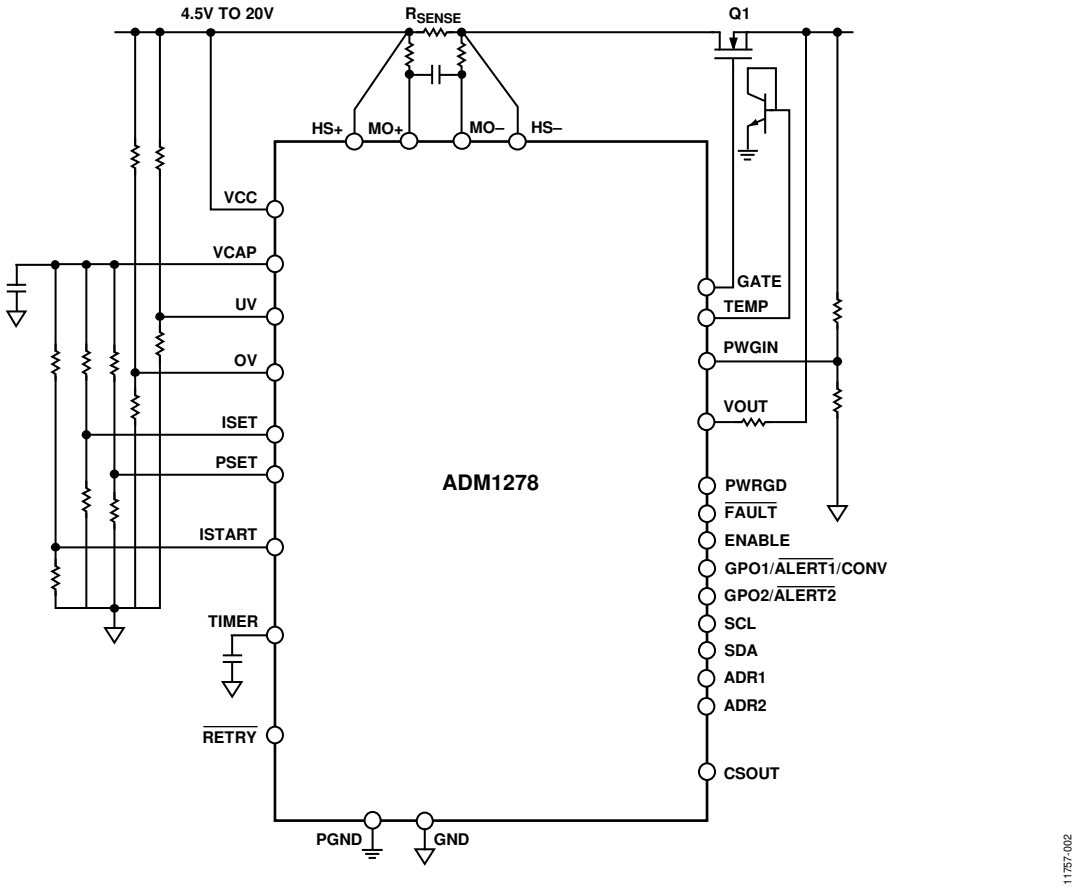

Figure 2. Basic Block Diagram

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.

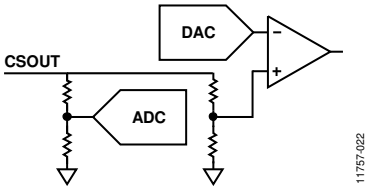

Figure 3.

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.

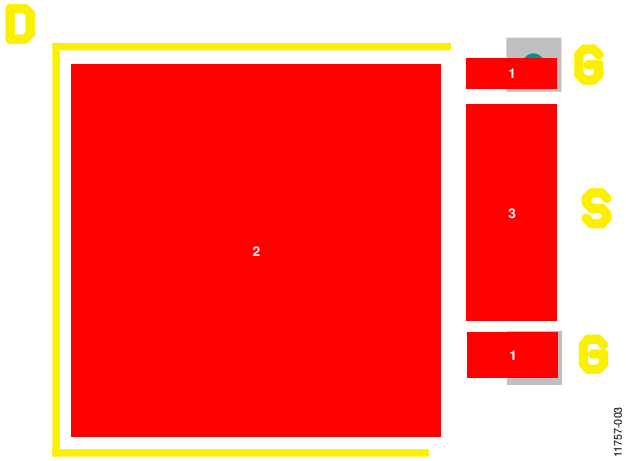

Figure 4. Multipackage N-MOSFET Footprint

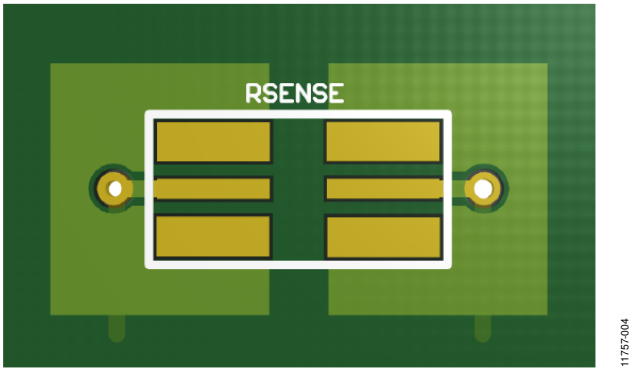

Figure 5. Recommended Sense Resistor Footprint

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^2C EEPROM
U4	AD7291, ±1°C accurate, 8-channel, I^2C, 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 *nano*DAC® with I^2C-compatible interface
U5	ADR435ARMZ, ultralow noise XFET® 5 V output

TEST PLOTS

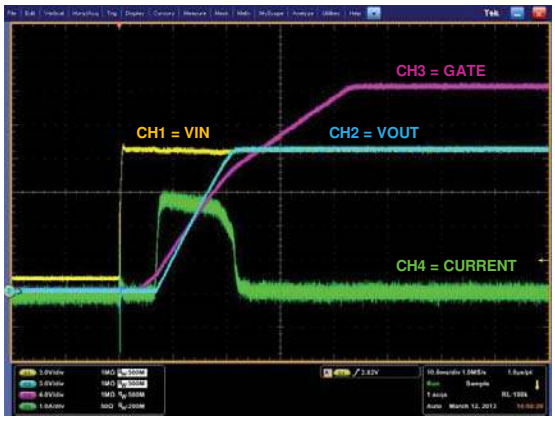

Figure 6. Power Up with 3 mF Load Capacitor and No DC Load

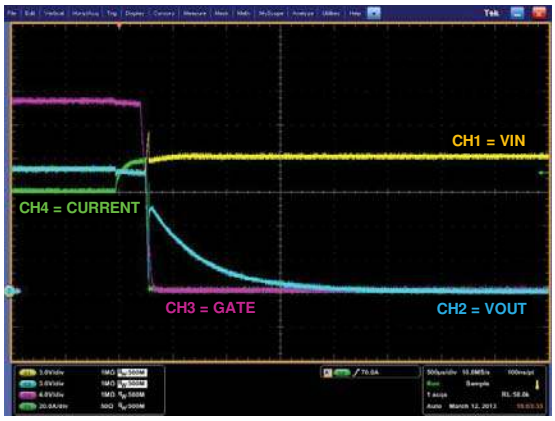

Figure 8. Overcurrent Shutdown

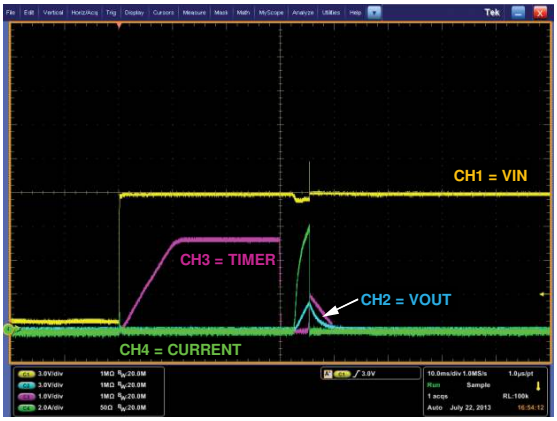

Figure 7. Power Up into 0.6 Ω DC Load (Start-Up Current Circuit Break Limit = 6.5 A)

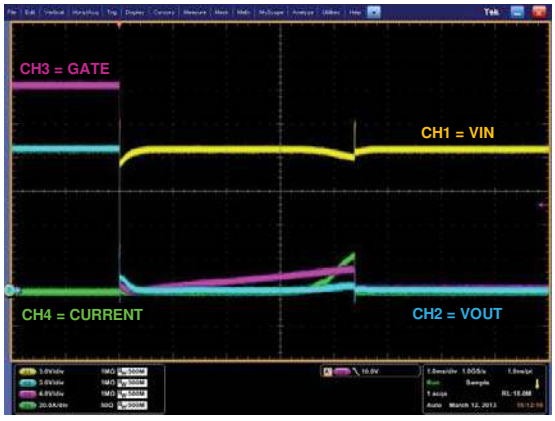

Figure 9. Output Short Circuit

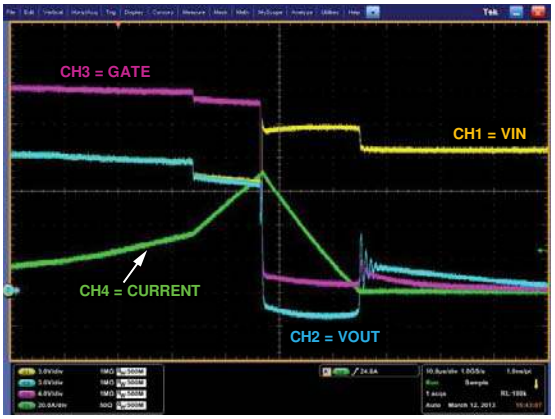

Figure 10. Output Short Circuit (Zoom-In)

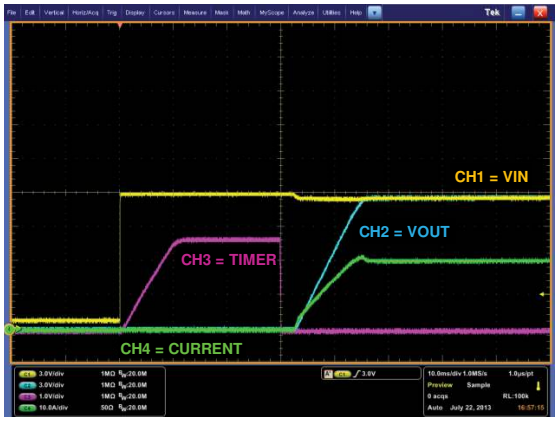

Figure 12. Power Up into 0.6 Ω DC Load with Start-Up Current Limit Disabled

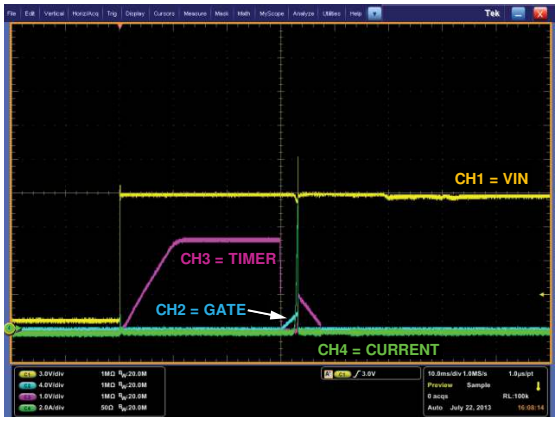

Figure 11. Power Up into Short

EVALUATION BOARD SCHEMATICS AND ARTWORK

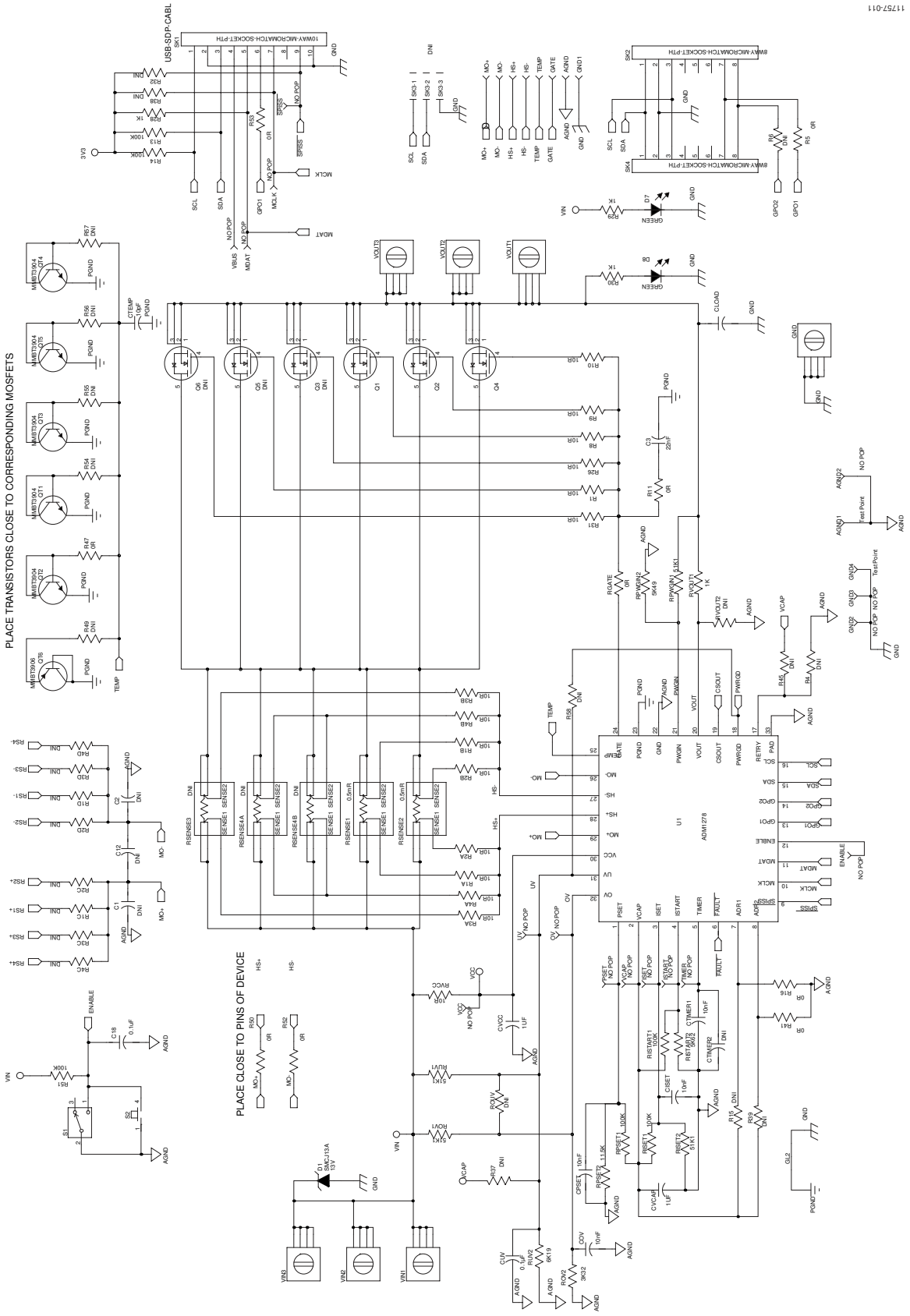

Figure 13. Evaluation Board Schematic 1

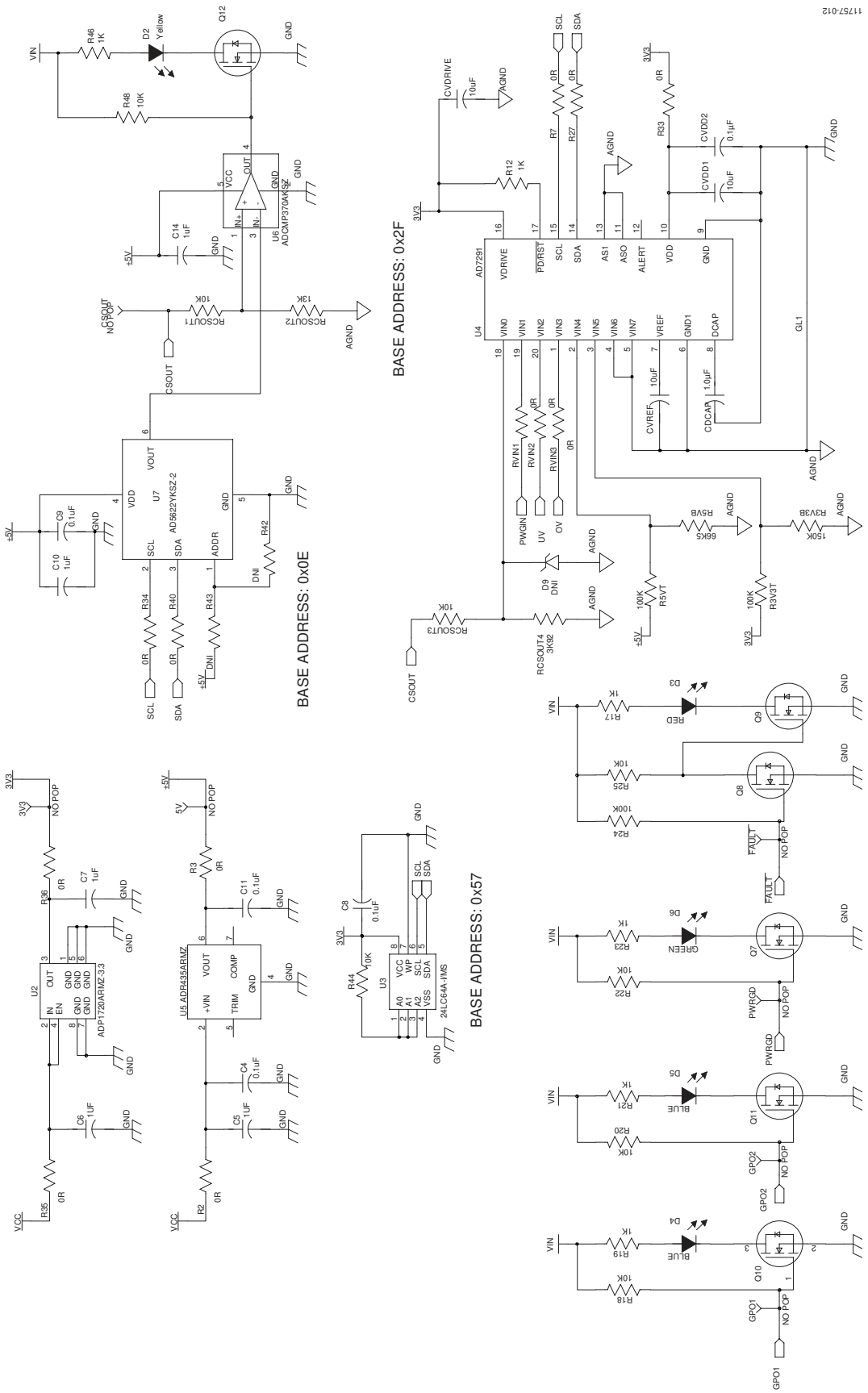

Figure 14. Evaluation Board Schematic 2

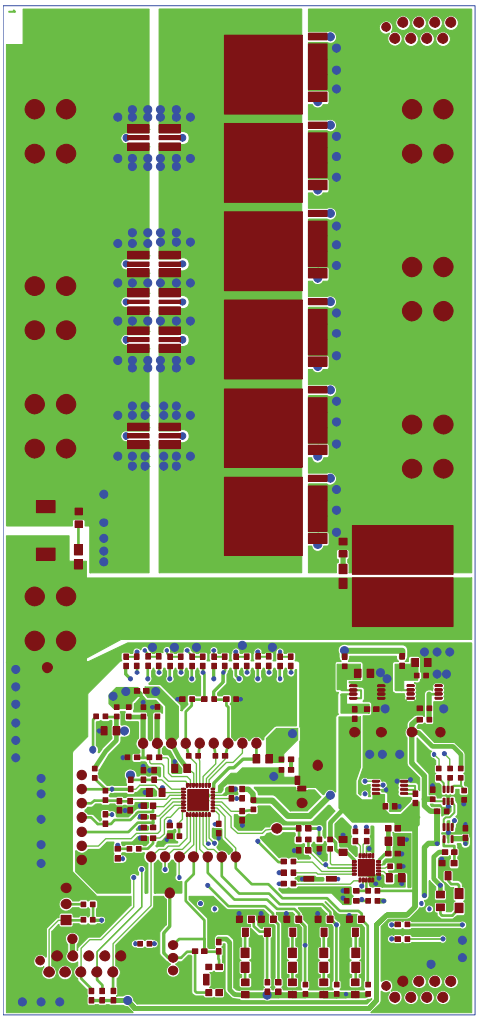

Figure 15. Top Layer 1

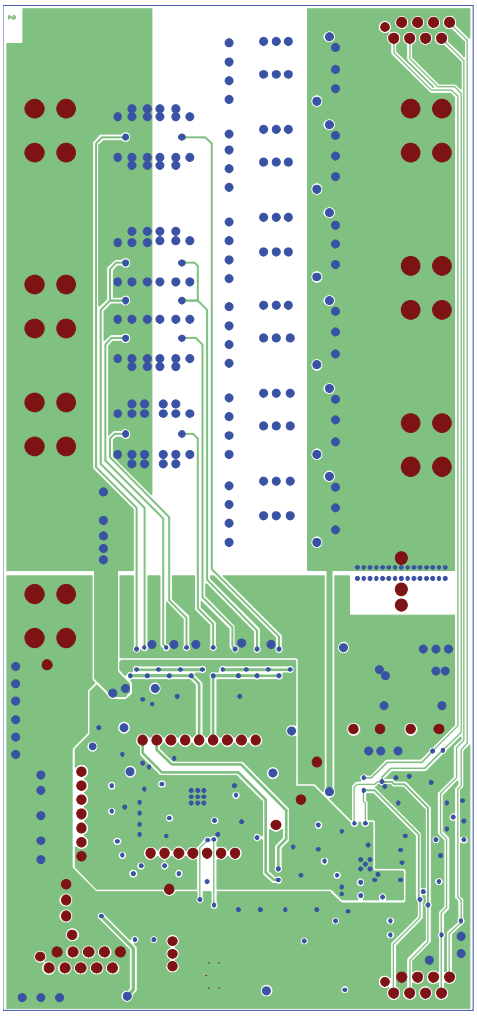

Figure 16. Inner Layer 2

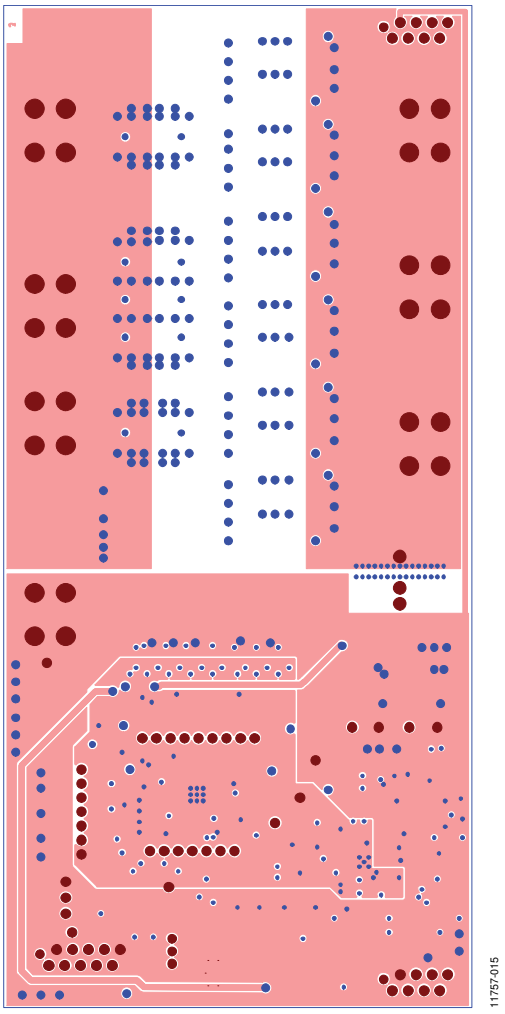

Figure 17. Inner Layer 3

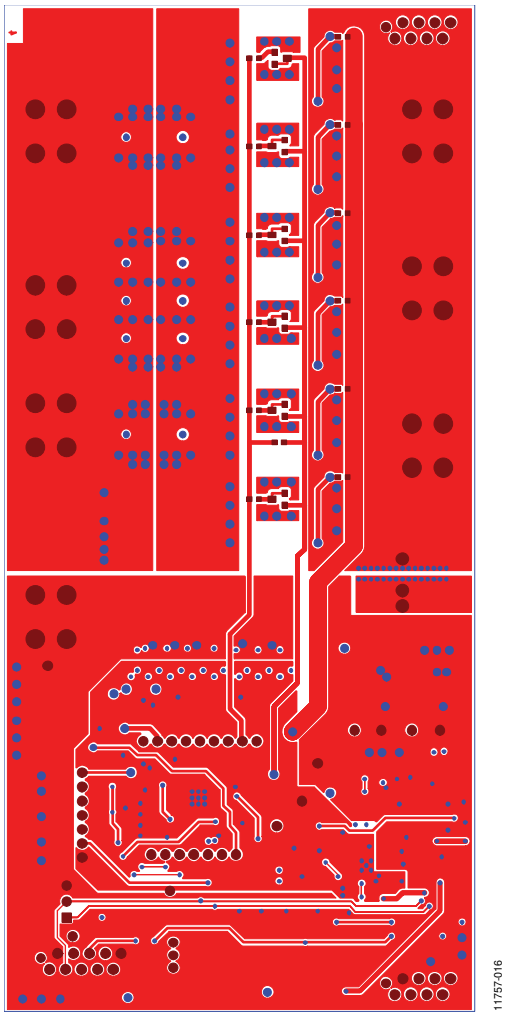

Figure 18. Bottom Layer

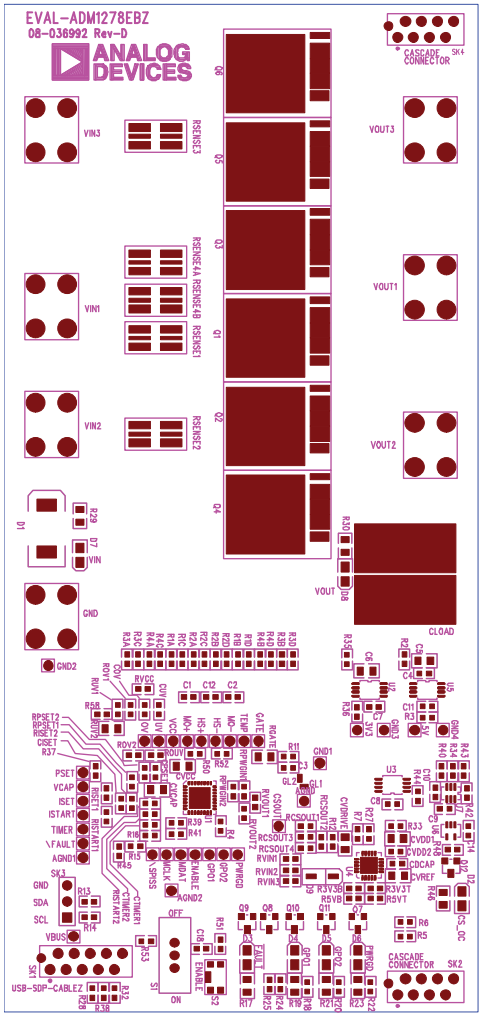

Figure 19. Assembly Top

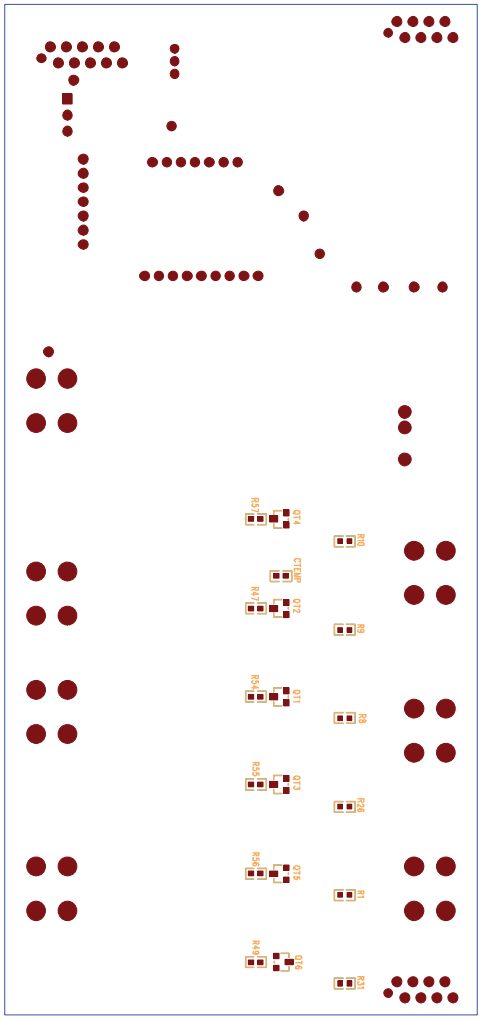

Figure 20. Assembly Bottom

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 µF, 25 V, X7R, 0805	FEC 1637035
C6	Capacitor, 1 µF, 25 V, X7R, 0805	FEC 1637035
C7	Capacitor, 1 µF, 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 µF, 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 µF, 25 V, X5R, 0603	FEC 1288256
C18	Capacitor, 100 nF, 50 V, X7R, 0603	FEC 1288255
CDCAP	Capacitor, 1 µF, 25 V, X5R, 0603	FEC 1288256
CISET	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 µF, 25 V, X7R, 0805	FEC 1637035
CVCC	Capacitor, 1 µF, 25 V, X7R, 0805	FEC 1637035
CVDD1	Capacitor, 10 µF, 6.3 V, X7R, 0805	FEC 2112846
CVDD2	Capacitor, 100 nF, 50 V, X7R, 0603	FEC 1288255
CVDRIVE	Capacitor, 10 µF, 6.3 V, X7R, 0805	FEC 2112846
CVREF	Capacitor, 10 µF, 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, LFPAK PSMN0R9-25YLC SOT669-CUSTOM	Digi-Key 568-6720-1-ND
Q2	MOSFET, N-Ch, 25 V, 100 A, LFPAK PSMN0R9-25YLC SOT669-CUSTOM	Digi-Key 568-6720-1-ND
Q3	MOSFET, N-Ch, 25 V, 100 A, LFPAK PSMN0R9-25YLC SOT669-CUSTOM	Do not insert
Q4	MOSFET, N-Ch, 25 V, 100 A, LFPAK PSMN0R9-25YLC SOT669-CUSTOM	Digi-Key 568-6720-1-ND
Q5	MOSFET, N-Ch, 25 V, 100 A, LFPAK PSMN0R9-25YLC SOT669-CUSTOM	Do not insert
Q6	MOSFET, N-Ch, 25 V, 100 A, LFPAK 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 kΩ	FEC 2122639
R3V3T	Resistor, 0603, 0.1 W, 100 kΩ	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 kΩ	FEC 2122597
R5VT	Resistor, 0603, 0.1 W, 100 kΩ	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 kΩ	FEC 1469740
R13	Resistor, 0603, 0.1 W, 100 kΩ	FEC 1469649
R14	Resistor, 0603, 0.1 W, 100 kΩ	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 kΩ	FEC 1738959
R18	Resistor, 0603, 0.25 W, 10 kΩ	FEC 1738918
R19	Resistor, 0805, 0.33 W, 1 kΩ	FEC 1738959
R20	Resistor, 0603, 0.25 W, 10 kΩ	FEC 1738918
R21	Resistor, 0805, 0.33 W, 1 kΩ	FEC 1738959
R22	Resistor, 0603, 0.25 W, 10 kΩ	FEC 1738918
R23	Resistor, 0805, 0.33 W, 1 kΩ	FEC 1738959
R24	Resistor, 0603, 0.1 W, 100 kΩ	FEC 1469649
R25	Resistor, 0603, 0.25 W, 10 kΩ	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 kΩ	FEC 1469740
R29	Resistor, 0805, 0.33 W, 1 kΩ	FEC 1738959
R30	Resistor, 0805, 0.33 W, 1 kΩ	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 kΩ	FEC 1738918
R45	Unpopulated resistor (0603)	Do not insert
R46	Resistor, 0805, 0.33 W, 1 kΩ	FEC 1738959
R47	Resistor, 0603, 0.1 W, 0 Ω	FEC 1469739
R48	Resistor, 0603, 0.25 W, 10 kΩ	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 kΩ	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
RISET1	Resistor, 0603, 0.063 W, 100 kΩ	FEC 9330402
RISET2	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^2C, 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
$\overline{\text{FAULT}}$	Test point	Do not insert
$\overline{\text{SPISS}}$	Test point	Do not insert

RELATED LINKS

Resource	Description
AD5622	Product page, 2.7 V to 5.5 V, 12-bit *nano*DAC® with I²C-compatible interface
AD7291	Product page, ±1°C accurate, 8-channel, I²C, 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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