EV-DPS-PWRBD1Z/4Z/5Z

20A LTC3871 Power boards for LT8740 Device Power Supply

General Description

The 20A *LTC3871* power boards are power attachments for *LT8740* Device power supply (DPS) evaluation boards. Each power board has two output voltage rails, Positive output voltage (VPOS) and Negative output voltage (VNEG), with voltage levels depending on the variant. Each rail can deliver a 20A current.

Note: The power boards can only deliver 20A, one voltage rail at a time, and are not evaluated simultaneously with both voltage rails sourcing 20A. See *Table 1* for the three variants and their electrical specifications.

Benefits and Features

- Fully Supported Power Boards for LT8740 DPS Evaluation Boards
- $I_{OUT(MAX)}$ = 20A Steady State, 22A Peak for each Rail
- Multiple Test Points allow Easy Access to all Critical Nodes and Pins
- Synchronous Rectification: See *Efficiency Curves*
- Source-Sink Feature Procedure

Table 1. Variants and Electrical Specifications

VARIANT	INPUT VOLTAGE RANGE	NOMINAL INPUT VOLTAGE	OUTPUT (REFERENCED TO GND)	
			VPOS	VNEG
EV-DPS-PWRBD1Z	20V–26V	24V	+17.5V	–17.5V
EV-DPS-PWRBD4Z	12V–24V	12V/24V	+9.0V	–5.5V
EV-DPS-PWRBD5Z	20V–26V	24V	+30.0V	–5.0V

Multiple test points allow easy access to all critical nodes and pins.

Evaluation Board Photos

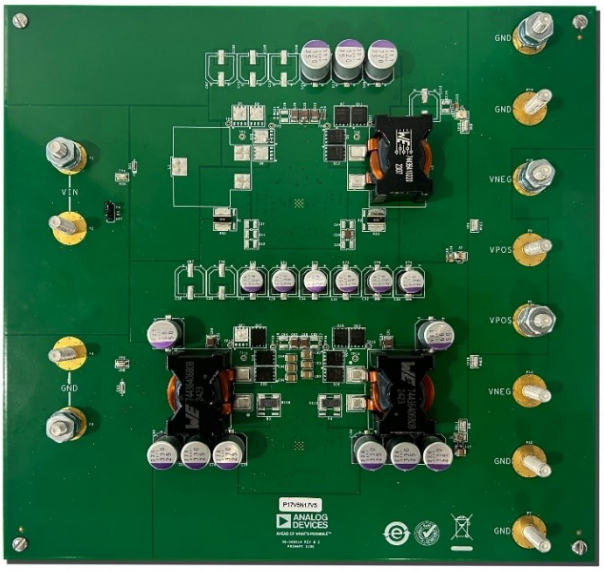


Figure 1. EV-DPS-PWRBD1Z Hardware (Top View)

One Analog Way, Wilmington, MA 01887-2356, U.S.A. | Tel: 781.329.4700

Evaluation Board Photos (continued)

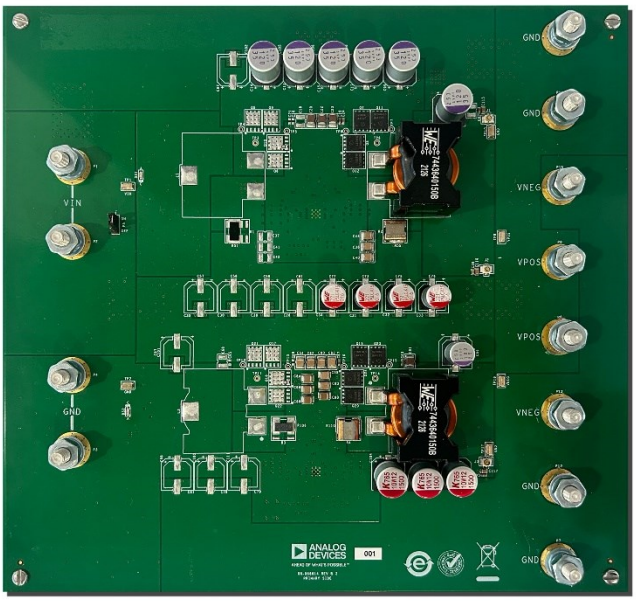


Figure 2. EV-DPS-PWRBD4Z Hardware (Top View)

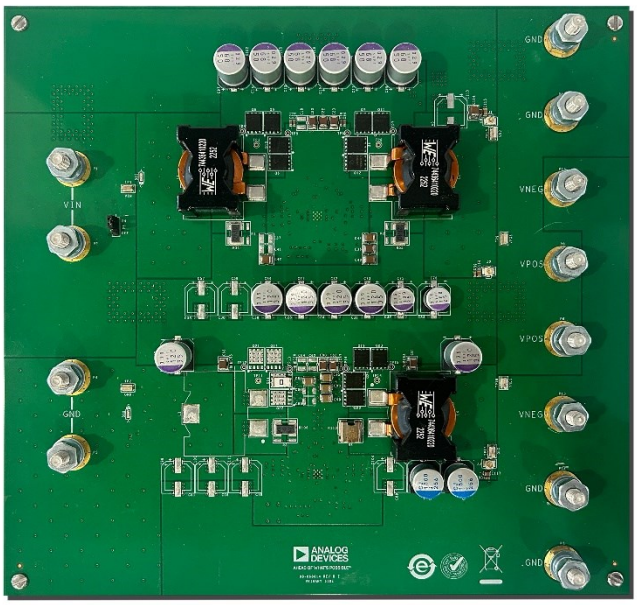


Figure 3. EV-DPS-PWRBD5Z Hardware (Top View)

Evaluation Board Overview

The controller used on the power boards is the LTC3871. Each variant uses two LTC3871 ICs, one generating VPOS and the other generating VNEG. On the EV-DPS-PWRBD1Z and EV-DPS-PWRBD4Z variants, the LTC3871, which provides VPOS, is configured as a buck. For the EV-DPS-PWRBD5Z variant, the LTC3871, which generates VPOS, is configured as a boost. The LTC3871, which provides VNEG, is configured as an inverting buck/boost for all three variants. The inverting buck/boost receives its input power from VPOS for the EV-DPS-PWRBD1Z and EV-DPS-PWRBD4Z variants and VIN for the EV-DPS-PWRBD5Z variant.

Each rail can source or sink a roughly equal current since the LTC3871 has a symmetrical current limit. The current limit is set by the constant current loop of the LTC3871 and the resistor network tied to the SETCUR pin. When a load is placed from VPOS to GND or from GND to VNEG, the respective converter is sourcing power. The positive converter sinks power when an external voltage source greater than the regulated voltage is placed from VPOS to GND. Similarly, when an external voltage source is placed from GND to VNEG, which is greater than the absolute regulated value of VNEG, the negative converter also sinks power. The amount of current that flows into VPOS or out of VNEG when sinking power is set by the current limit of the external supply or the CC limit of the LTC3871, whichever is lower. When one rail sinks power and the other is not sourcing power, be sure to place sufficient load across V_{IN} to prevent V_{IN} from being boosted.

Evaluation Board Hardware

Required Equipment

- DC Power Source with Electrical Specifications: At least 30V (max) and at least 30A output current rating.
- Electronic Load capable of 800W, 0V–60V.
- Precision Digital Multimeter (HP34401 or equivalent).
- An Oscilloscope capable of a 500MHz Bandwidth or above, 2-Channel to 4-Channel.
- Wires with Ring Connectors or Alligator Clips. Use a wire gauge of at least AWG 18, with a wire length of at least 1ft for the input and output connections.

Evaluation Board Configurations

The evaluation board comes preconfigured with the default settings to operate the power supply at the rated load. No additional configuration is necessary other than to enable the toggle set to “ON” before turning on the board (see *Figure 4*).

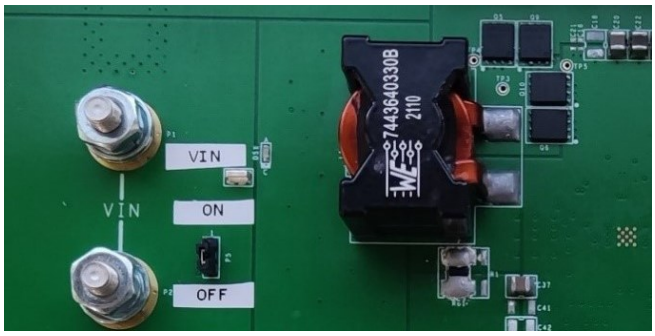


Figure 4. Toggle Setting to Enable DPS Board

Power-up Procedure

Use the following steps to verify the board operation.

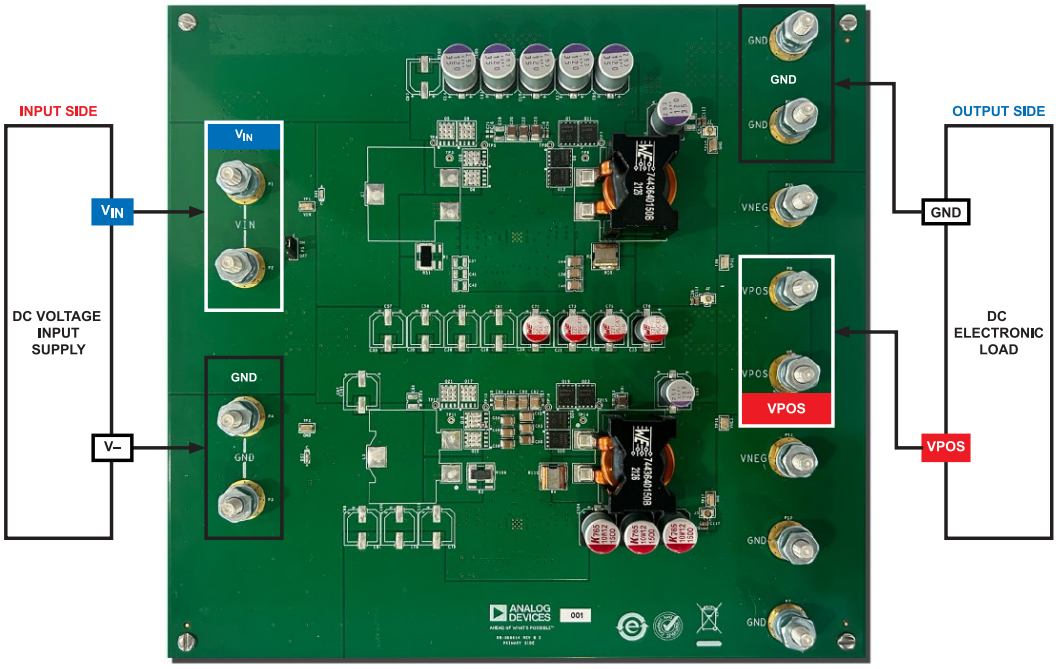


Figure 5. Test Setup for VPOS Loading

Powering up with loading at VPOS

- Connect the DC source to the input terminals and an electronic load to the VPOS output terminals.
  - Input terminals (V_{IN} - “positive terminal”, GND – “negative terminal”).
  - VPOS Output terminals (VPOS – “positive terminal”, GND – “negative terminal”).
- Connect voltmeters on the input terminals and VPOS output terminals separately, as needed.
  - Input terminals (VIN - “positive terminal” , GND – “negative terminal”)
  - b. VNEG Output terminals (GND – “positive terminal” ,VNEG– “negative terminal”)
- Turn on the DC source based on the selected variant’s input voltage. See *Table 1* for more details.
- Set the Electronic Load to 20A.
- Measure the VPOS output voltage.
- The voltage measured should be read based on the selected variant.

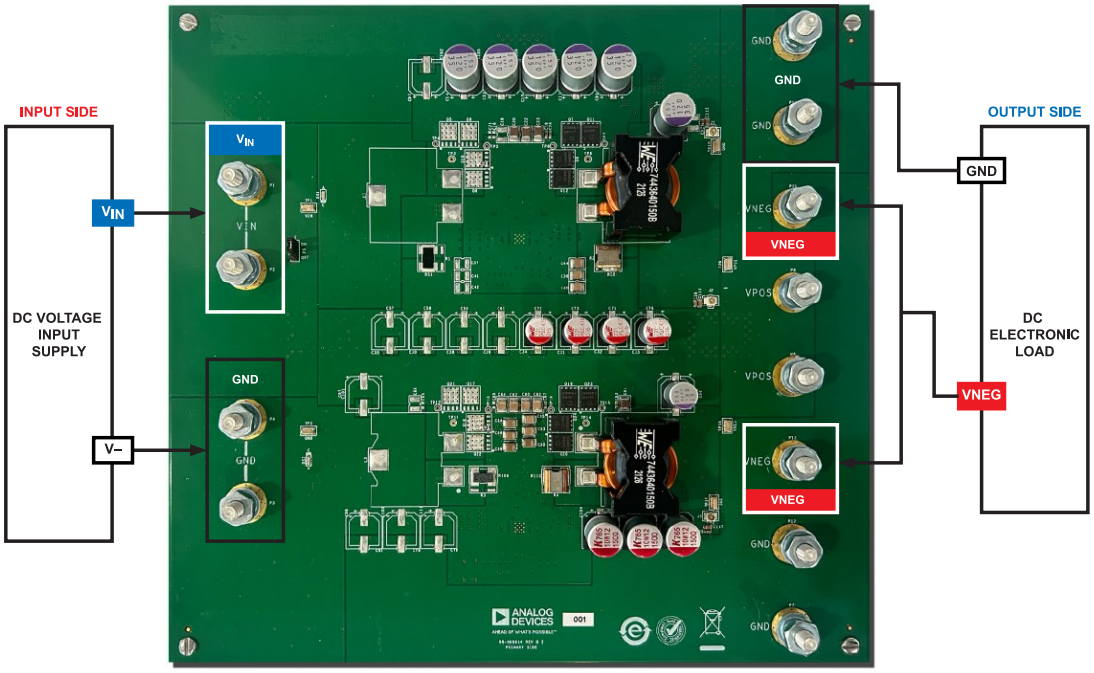


Figure 6. Test Setup for VNEG Loading

Powering up with loading at VNEG

- Connect the DC source to the input terminals and an electronic load to the VNEG output terminals.
- Connect voltmeters on the input terminals and VNEG output terminals separately, as needed.
- Turn on the DC source based on the selected variant's input voltage. See *Table 1* for more details.
- Set the Electronic Load to 20A.
- Measure the VNEG output voltage. The voltage measured should be read based on the selected variant.

Caution: Power boards are not advised to load 20A for both VPOS and VNEG simultaneously.

Hardware Assembly with LT8740 Evaluation Boards

The EV-DPS-PWRBD1Z/4Z/5Z serves as the DPS power evaluation board for the LT8740 Evaluation board. Figure 7 shows the complete setup of the assembly (DPS power and LT8740 Evaluation board). Request for LT8740/LT8750 Evaluation board user guide for instructions on performing the testing with LT8740 Evaluation board.

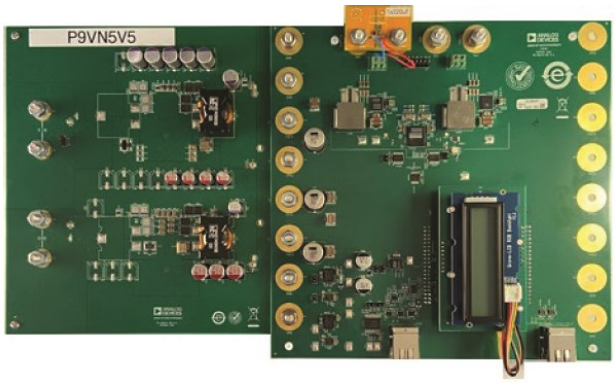


Figure 7. Assembled Evaluation Kit (DPS power + LT8740 Evaluation board)

Evaluating the Hardware

Efficiency Curves

Figure 8 to *Figure 13* shows the typical efficiency curves at different loading conditions for the three DPS power board variants.

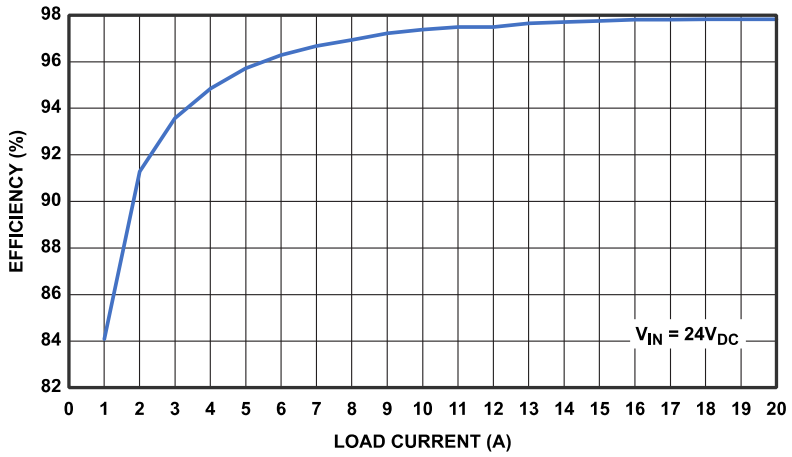


Figure 8. EV-DPS-PWRBD1Z VPOS Efficiency Curve

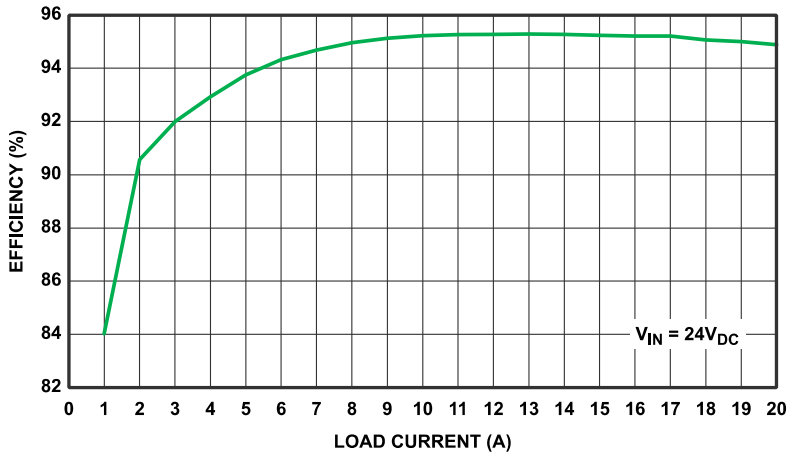


Figure 9. EV-DPS-PWRBD1Z VPOS Efficiency Curve

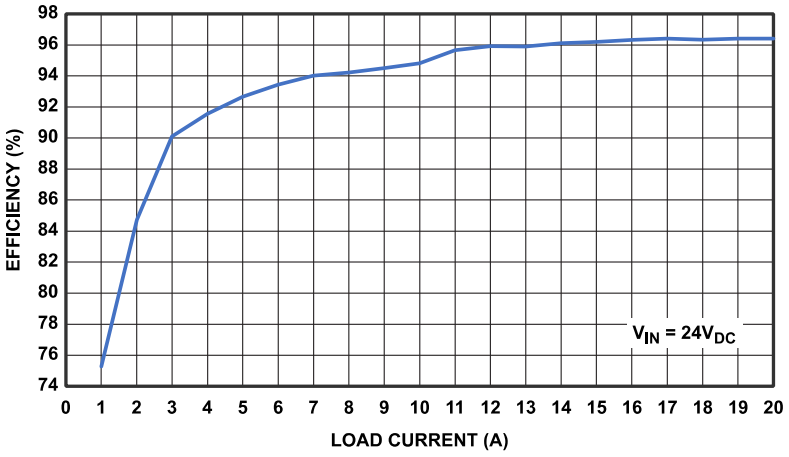


Figure 10. EV-DPS-PWRBD4Z VPOS Efficiency Curve

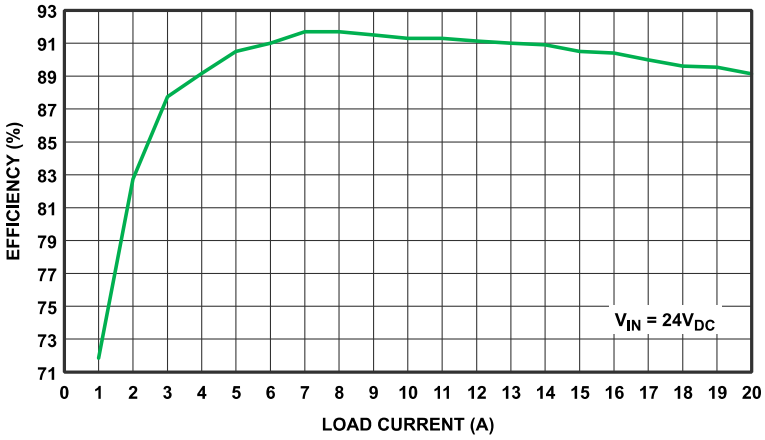


Figure 11. EV-DPS-PWRBD4Z VNEG Efficiency Curve

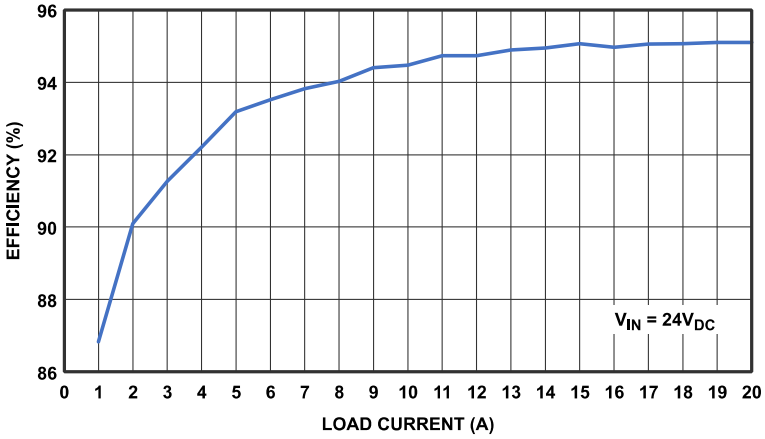


Figure 12. EV-DPS-PWRBD5Z VPOS Efficiency Curve

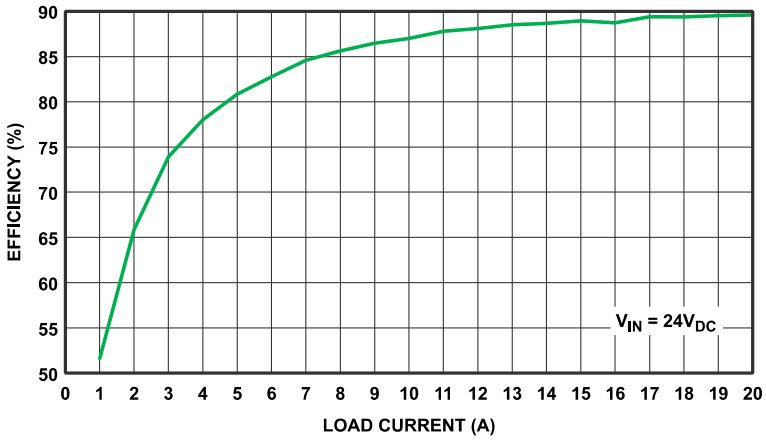


Figure 13. EV-DPS-PWRBD5Z VNEG Efficiency Curve

Voltage Ripple

The waveforms shown in *Figure 14* to *Figure 19* shows the output voltage ripple and the voltage spike of the MOSFET at V_{IN} = 24V_{DC}, 20A of the three variants.

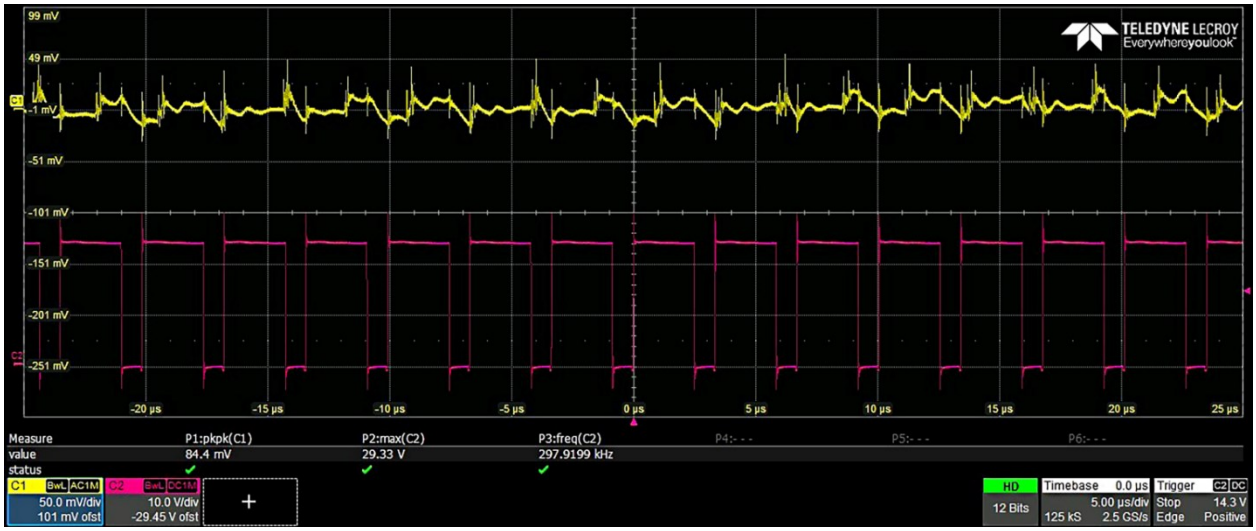


Figure 14. EV-DPS-PWRBD1Z VPOS (+17.5V), Output Voltage Ripple (Yellow), and MOSFET Voltage Spike (Red). V_{IN} = 24V_{DC}, 20A

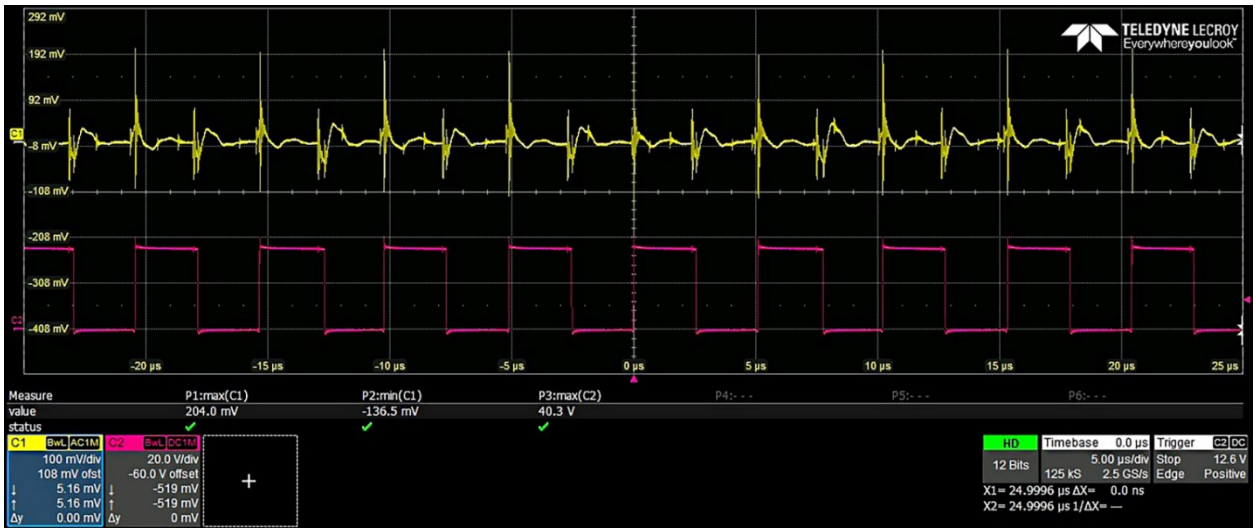


Figure 15. EV-DPS-PWRBD1Z VNEG (-17.5V), Output Voltage Ripple (Yellow), and MOSFET Voltage Spike (Red). V_{IN} = 24V_{DC}, 20A

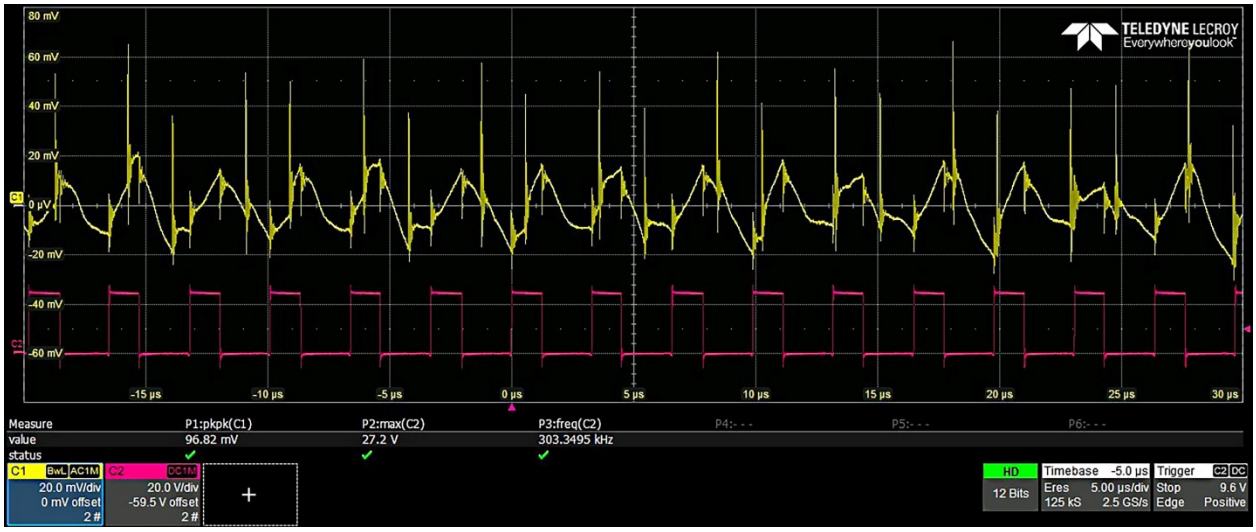


Figure 16. EV-DPS-PWRBD4Z VPOS (+9.0V), Output Voltage Ripple (Yellow), and MOSFET Voltage Spike (Red). V_{IN} = 24V_{DC}, 20A

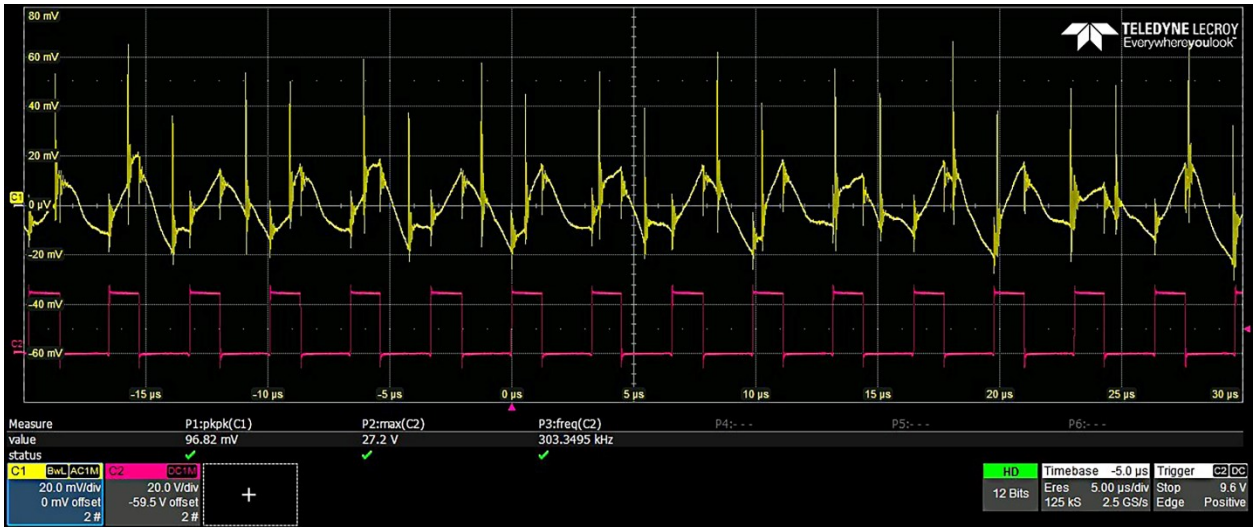


Figure 17. EV-DPS-PWRBD4Z VNEG (-5.5V), Output Voltage Ripple (Yellow), and MOSFET Voltage Spike (Red). V_{IN} = 24V_{DC}, 20A

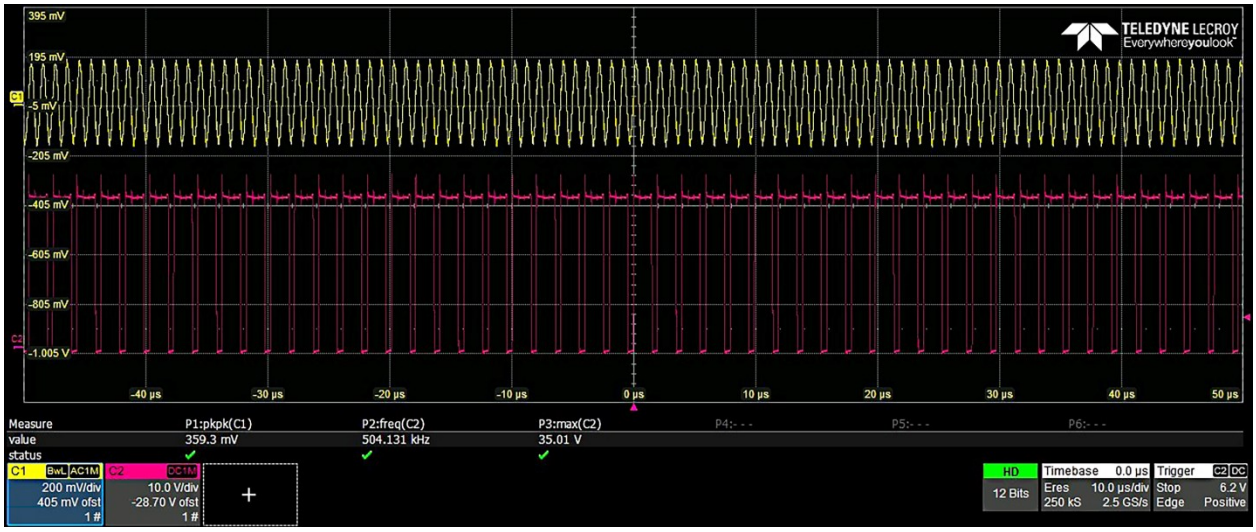


Figure 18. EV-DPS-PWRBD5Z VPOS (+30.0V), Output Voltage Ripple (Yellow), and MOSFET Voltage Spike (Red). V_{IN} = 24V_{DC}, 20A

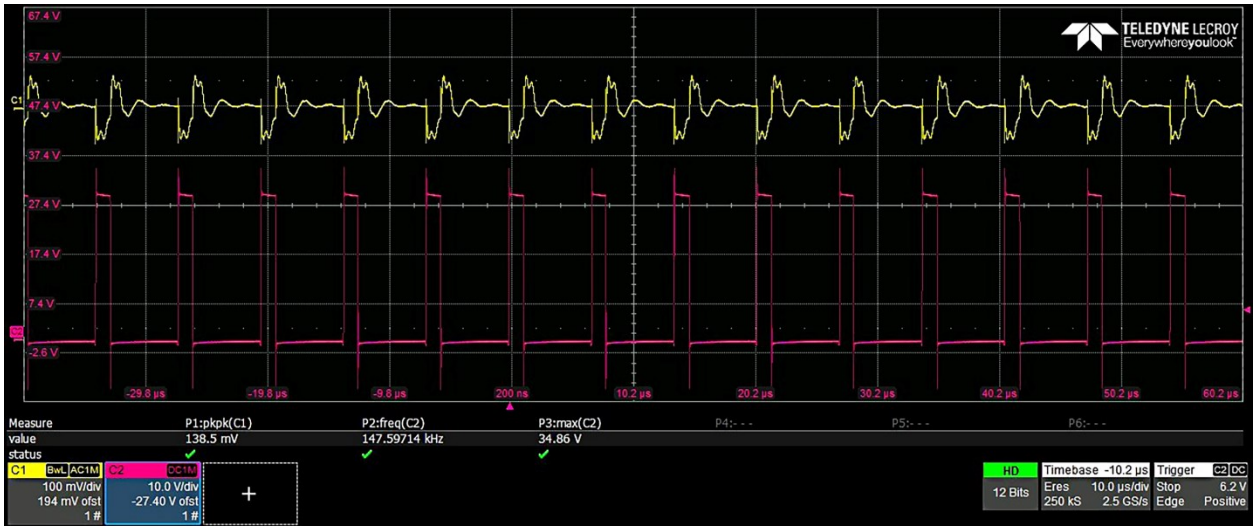


Figure 19. EV-DPS-PWRBD5Z VNEG (-5.0V), Output Voltage Ripple (Yellow), and MOSFET Voltage Spike (Red). V_{IN} = 24V_{DC}, 20A

Dynamic Loading

The waveforms shown in *Figure 20* to *Figure 25* shows the output voltage transient , Drain-Source voltage of MOSFET (D-S MOSFET), and output current load during dynamic loading (0A to 20A for 17.5V and 9V variant; 10A to 20A for 30V variant) at V_{IN} = 24V_{DC}.

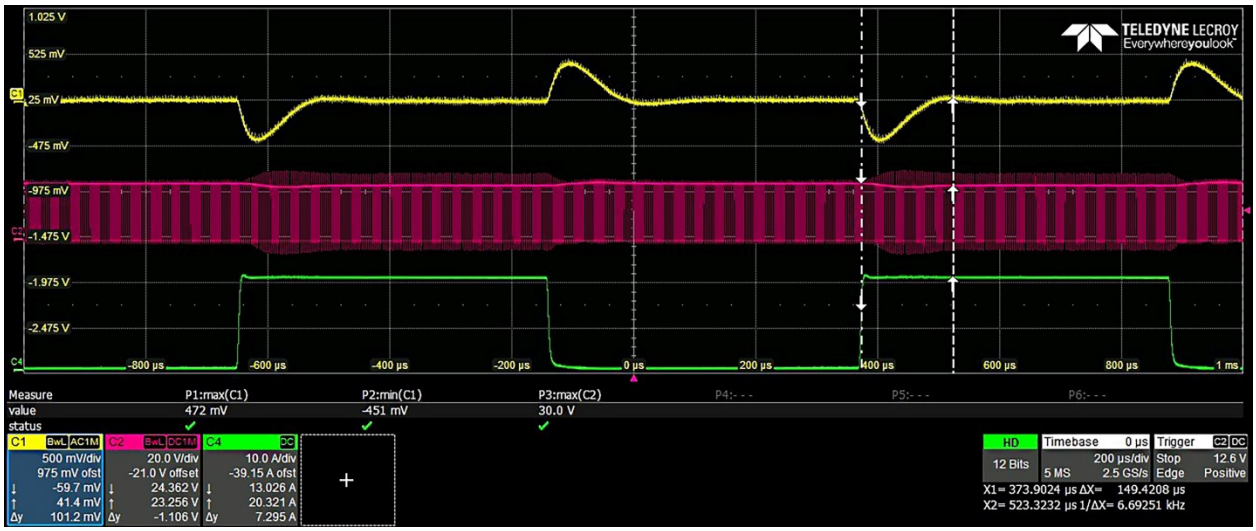


Figure 20. EV-DPS-PWRBD1Z VPOS (+17.5V), Output Voltage Transient (Yellow), D-S MOSFET (Red), and Output Load (Green). V_{IN} = 24V_{DC} Dynamic Loading (0A–20A)

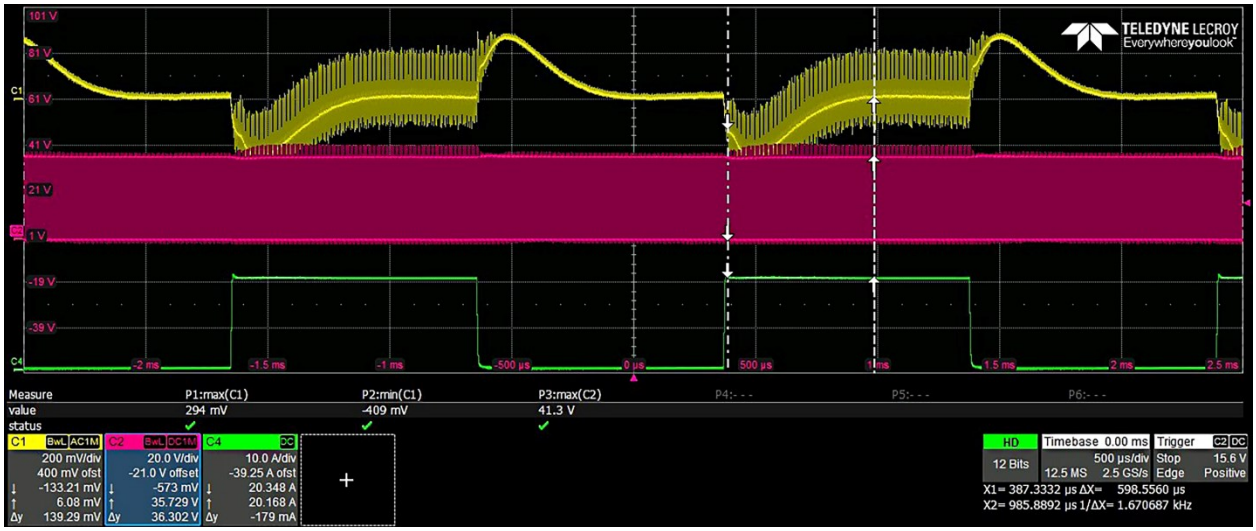


Figure 21. EV-DPS-PWRBD1Z VNEG (-17.5V), Output Voltage Transient (Yellow), D-S MOSFET (Red), and Output Load (Green). V_{IN} = 24V_{DC} Dynamic Loading (0A–20A)

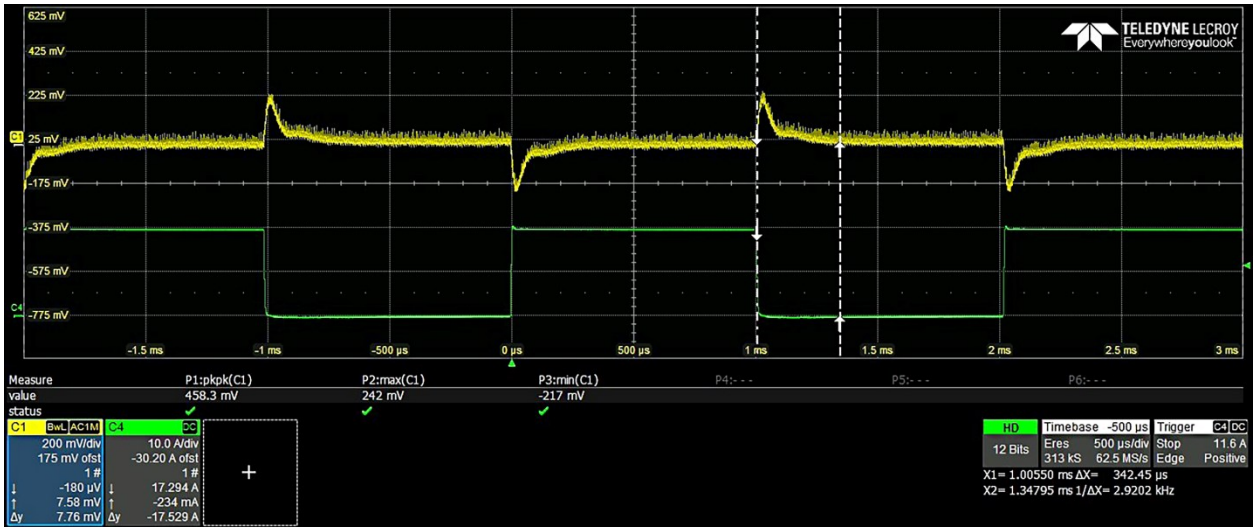


Figure 22. EV-DPS-PWRBD4Z VPOS (+9.0V), Output Voltage Transient (Yellow), D-S MOSFET (Red), and Output Load (Green). V_{IN} = 24V_{DC} Dynamic Loading (0A–20A)

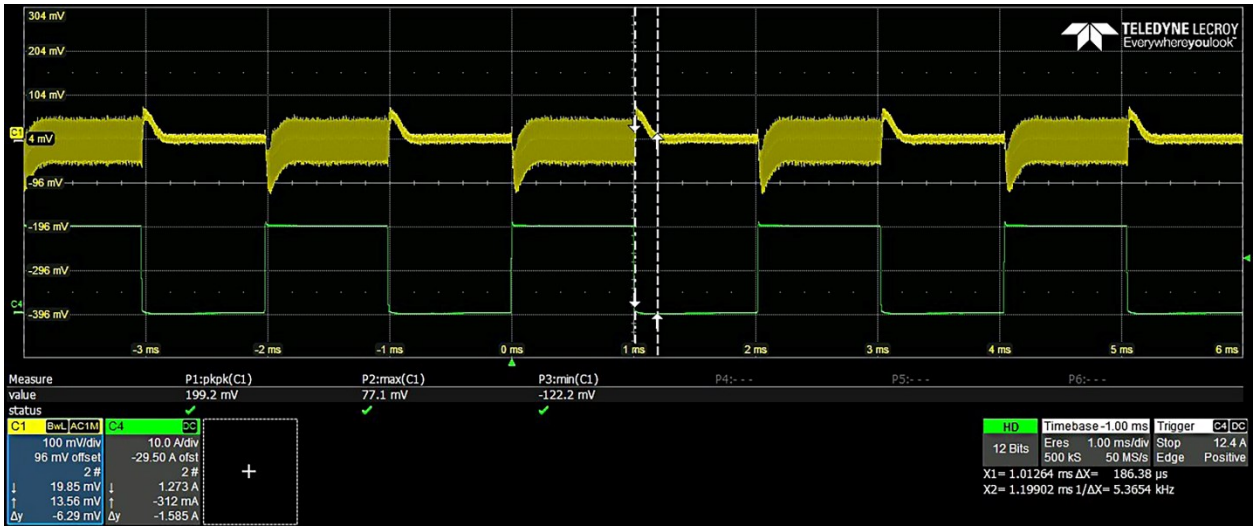


Figure 23. EV-DPS-PWRBD4Z VNEG (-5.5V), Output Voltage Transient (in Yellow), D-S MOSFET (Red) and Output Load (Green). V_{IN} = 24V_{DC} Dynamic Loading (0A–20A)

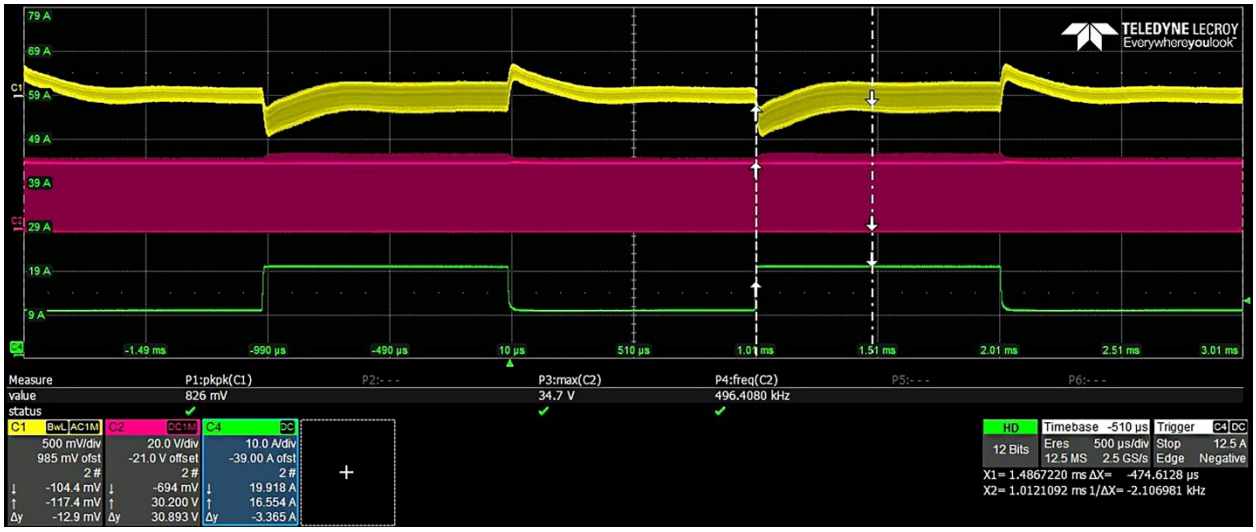


Figure 24. EV-DPS-PWRBD5Z VPOS (+30.0V), Output Voltage Transient (Yellow), D-S MOSFET (Red), and Output Load (Green). V_{IN} = 24V_{DC} Dynamic Loading (10A–20A)

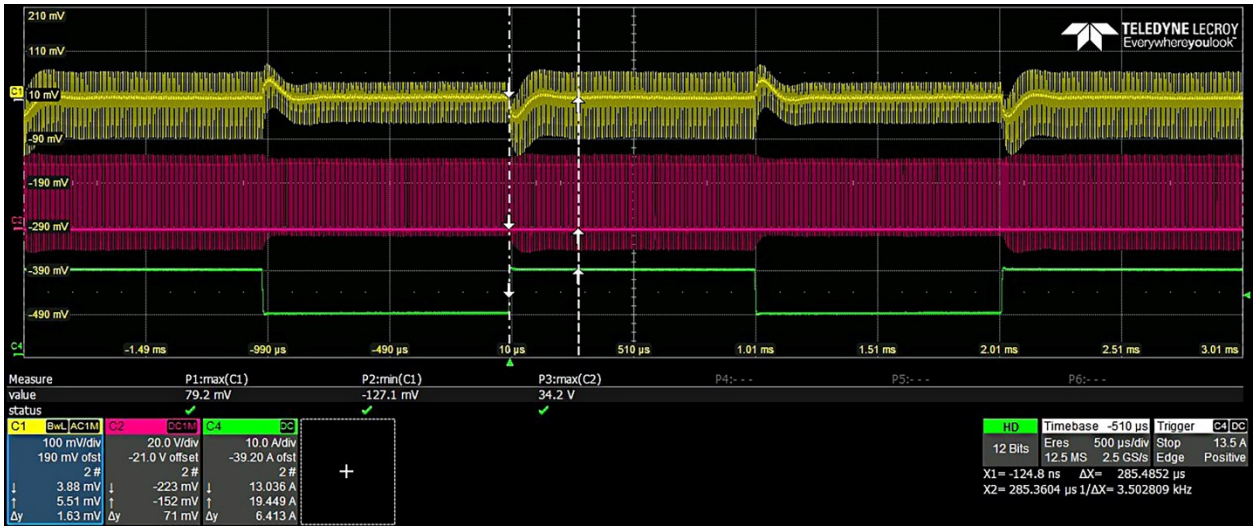


Figure 25. EV-DPS-PWRBD5Z VNEG (-5.0V), Output Voltage Transient (Yellow), D-S MOSFET (Red), and Output Load (Green). V_{IN} = 24V_{DC} Dynamic Loading (10A–20A)

Control Loop

The Bode plots of the evaluation boards were measured using the ADALM2000. Figure 26 to Figure 31 shows the loop gain of the three variants for V_{IN} = 24V and 20A Loading condition.

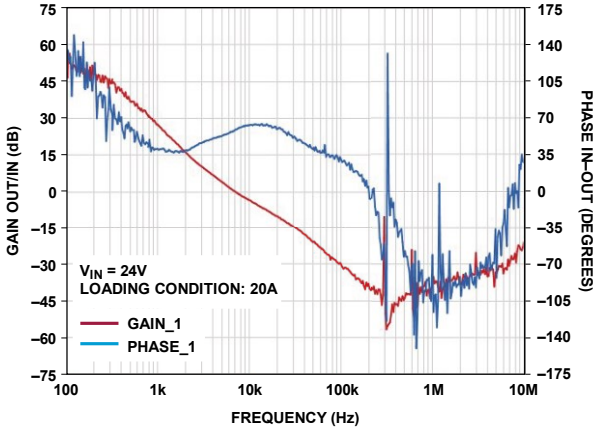


Figure 26. EV-DPS-PWRBD1Z VPOS (+17.5V) Bode Plot

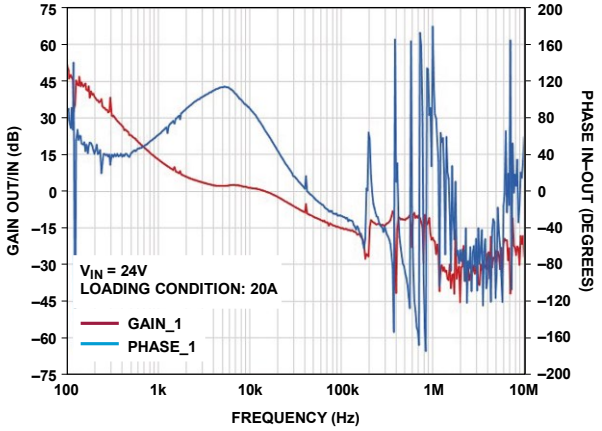


Figure 27. EV-DPS-PWRBD1Z VNEG (-17.5V) Bode Plot

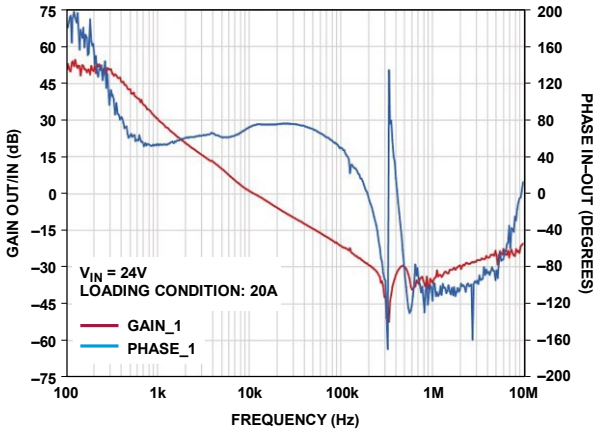


Figure 28. EV-DPS-PWRBD4Z VPOS (+9.0V) Bode Plot

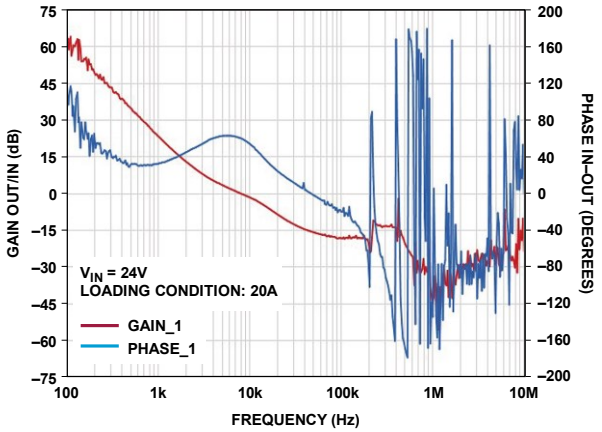


Figure 29. EV-DPS-PWRBD4Z VNEG (-5.5V) Bode Plot

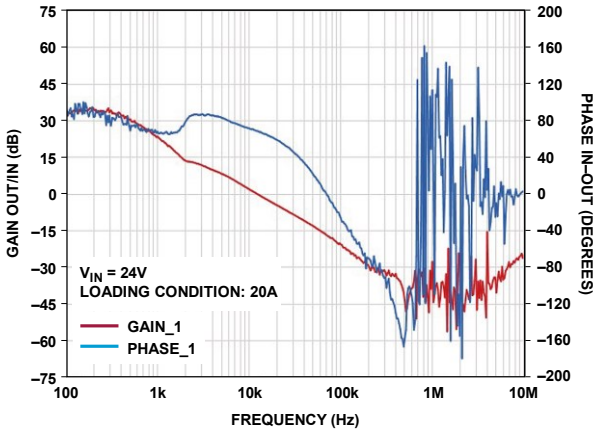


Figure 30. EV-DPS-PWRBD5Z VPOS (+30.0V) Bode Plot

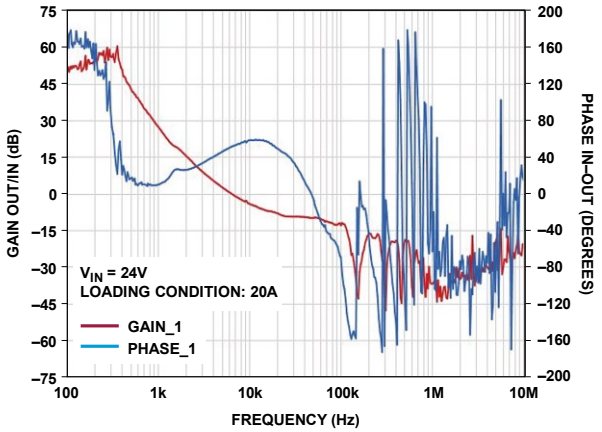


Figure 31. EV-DPS-PWRBD5Z VNEG (-5.0V) Bode Plot

Hardware Description

EV-DPS-PWRBD1Z

The EV-DPS-PWRBD1Z can source and sink up to 20A for each voltage rail. The VPOS and VNEG output voltage rail of this variant is ±17.5V. The board transitions from source to sink when a higher external DC voltage is injected across VPOS or VNEG. During sinking conditions, the power board is in open-loop control. In addition, the sinking current is limited by the Constant Current (CC) mode or maximum current setting of the external DC source.

Figure 32. EV-DPS-PWRBD1Z Hardware

EV-DPS-PWRBD1Z Kit Bill of Materials

ITEM#	QTY	REFERENCE	PART DESCRIPTION	MANUFACTURER	MANUFACTURER PART NUMBER
1	2	C1, C45	CAP CER 0.1NF 100V 10% C0G 0603	AVX CORPORATION	06031A101KAT2A
2	3	C10, C54, C55	CAP CER 0.22uF 50V 10% X7R 0603 AEC-Q200	MURATA	GCM188R71H224KA64D
3	3	C115, C116, C117	CAP CER 0.015uF 50V 10% X7R 0805	PHYCOMP (YAGEO)	2238 910 15638
4	2	C12, C56	CAP CER 1uF 50V 10% X7R 0603	TAIYO YUDEN	UMK107AB7105KA-T
5	3	C15, C17, C99	CAP ALUM POLY 120UF 35V 20% 10X12.6MM 0.018OHM 4400MA 5000H	PANASONIC	35SVPF120M
6	7	C19, C24, C60, C63, C65, C67, C92	CAP CER 0.1uF 100V 10% X7R 0603	MURATA	GRM188R72A104KA35D
7	2	C2, C46	CAP CER 0.1uF 50V 10% X7R 0603	AVX	06035C104KAT2A
8	10	C20, C22, C23, C36, C62, C68, C70, C80, C91, C94	CAP CER 10UF 75V 10% X7R 1210 AEC-Q200 LOW ESR	TDK	CGA6P1X7R1N106K250AC
9	1	C26	CAP CER 0.1uF 16V 10% X7R 0603	KEMET	C0603C104K4RAC
10	1	C3	CAP CER 47PF 50V 10% C0G 0603	AVX CORPORATION	06035A470KAT2A
11	2	C39, C96	CAP CER 0.015uF 25V 10% X7R 0603	PHYCOMP (YAGEO)	CC0603KRX7R8BB153
12	1	C4	CAP CER 0.01uF 100V 10% X7R 0603	TDK	C1608X7R2A103K080AA
13	1	C47	CAP CER 33pF 100V 1% C0G 0603	YAGEO	CC0603FRNPO0BN330

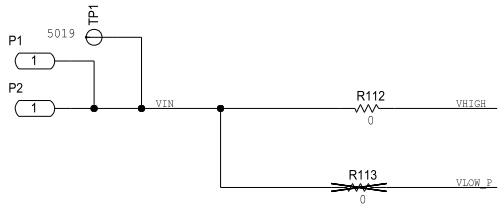
ITEM#	QTY	REFERENCE	PART DESCRIPTION	MANUFACTURER	MANUFACTURER PART NUMBER
14	1	C48	CAP CER 0.015uF 25V 5% C0G 0603 EXTREME LOW ESR	KEMET	C0603C153J3GACTU
15	2	C5, C49	CAP CER 10pF 25V 1% C0G 0603	AVX CORPORATION	06033A100FAT2A
16	1	C50	CAP CER 0.01uF 50V 10% X7R 0603	PHYCOMP (YAGEO)	2238 586 15636
17	4	C7, C8, C51, C52	CAP CER 4.7uF 16V 10% X7R 0805	KEMET	C0805C475K4RACTU
18	2	C9, C53	CAP CER 0.1uF 50V 10% X7R 0603 AEC-Q200	VISHAY	J0603Y104KXAAC31X
19	6	C59, C61, C72, C73, C75, C76	CAP ALUM POLY 100UF 25V 20% 8X6.9MM 0.024 OHM 3200MA 5000H	PANASONIC	25SVPF100M
20	1	C6	CAP CER 1000pF 50V 10% X7R 0603	YAGEO	CC0603KRX7R9BB102
21	2	C66, C87	CAP ALUM POLY 68UF 50V 20% 10X12.6MM 0.02 OHM 4300MA 20000H	PANASONIC	50SVPT68M
22	2	C69, C71	CAP CER 0.47uF 25V 10% X7R 0603	MURATA	GRM188R71E474KA12D
23	6	C78, C79, C81, C83, C85, C88	CAP ALUM POLY 330UF 25V 20% 10X12.6MM 0.014 OHM 5000MA 5000H	PANASONIC	25SVPF330M
24	6	C84, C86, C89, C90, C93, C95	CAP CER 10uF 63V 10% X7R 1210	SAMSUNG	CL32B106KMVNNWE
25	4	D1, D2, D3, D4	DIO SCHOTTKY BARRIER RECTIFIER, COMMERCIAL	DIODES INCORPORATED	DFLS1100-7
26	2	D5, D6	DIO SCHOTTKY LOW VF, 5A	NEXPERIA	PMEG3050EP,115
27	2	DS1, DS2	OBSOLETE - LED SMD 0603 RED	VISHAY	TLMS1000-GS08
28	3	J1, J2, J3	CONN-PCB UMC JACK STR 50 OHM SMD	HIROSE ELECTRIC	U.FL-R-SMT-1(01)
29	1	L2	IND HIGH CURRENT 2.2UH 0.00131OHM DCR 26A	WURTH ELEKTRONIK	74436410220
30	2	L3, L4	IND POWER SHIELDED WIREWOUND 6.8UH 20% 100KHZ 47.5A 0.88MOHM 28X27MM AEC-Q200	WURTH ELEKTRONIK	7443640680B
31	12	P1, P2, P3, P4, P6, P7, P8, P9, P12, P13, P14, P15	CONN-PCB THREADED BROACHING STUD, 625MIL LENGTH	PENN ENGINEERING	KFH-032-10ET
32	1	P5	CONN-PCB 3POS MALE HDR UNSHROUDED SINGLE ROW ST, 2MM PITCH, 2.70MM SOLDER TAIL	WURTH ELEKTRONIK	62000311121
33	3	Q1, Q13, Q15	TRANS N-CHA SMALL SIGNAL MOSFET	ON SEMICONDUCTOR	2N7002LT1G
34	4	Q7, Q8, Q11, Q12	TRAN N-CHANNEL POWER MOSFET 40V 98A	INFINEON TECHNOLOGIES	BSC032N04LSATMA1
35	1	Q14	TRAN MOSFET P-CH 60V 0.18A	DIODES INCORPORATED	DMP610DL-7
36	2	Q4, Q16	TRAN MOSFET N-CH 60V 0.21A, AEC-Q101	DIODES INCORPORATED	DMN67D8L-7
37	4	Q17, Q19, Q21, Q23	TRAN MOSFET N-CH 60V 15A	INFINEON TECHNOLOGIES	BSC065N06LS5ATMA1

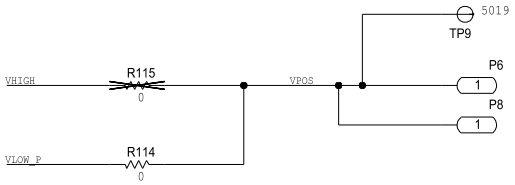
ITEM#	QTY	REFERENCE	PART DESCRIPTION	MANUFACTURER	MANUFACTURER PART NUMBER
38	4	Q18, Q20, Q22, Q24	TRAN MOSFET N-CH 60V 23A 8LD TDSON EP	INFINEON TECHNOLOGIES	BSC027N06LS5ATMA1
39	1	R10	RES SMD 9.53K OHM 0.1% 1/10W 0603 AEC-Q200	PANASONIC	ERA-3AEB9531V
40	2	R98, R101	RES SMD 7.32K Ohm 1% 1/10W 0603 AEC-Q200	PANASONIC	ERJ-3EKF7321V
41	20	R7, R14, R16, R25, R44, R47, R48, R52, R53, R54, R56, R61, R71, R74, R102, R103, R107, R108, R109, R111	RES SMD 0 Ohm JUMPER 1/10W 0603 AEC-Q200	PANASONIC	ERJ-3GEY0R00V
42	2	R99, R104	RES SMD 732 OHM 1% 1/10W 0603 AEC-Q200	VISHAY	CRCW0603732RFKEA
43	2	R106, R110	RES SMD 0.002 OHM 1% 3W 2512 AEC-Q200	PANASONIC	ERJ-MS4SF2M0U
44	2	R11, R80	RES SMD 196K Ohm 0.1% 1/10W 0603 AEC-Q200 HIGH RELIABILITY	PANASONIC	ERA-3AEB1963V
45	3	R26, R112, R114	RES SMD 0 OHM JUMPER 2512 AEC-Q200	VISHAY	WSL251200000ZEA9
46	2	R57, R119	RES SMD 10.7 OHM 1% 1/10W 0603 AEC-Q200	STACKPOLE ELECTRONICS, INC.	RMCF0603FT10R7
47	1	R12	RES SMD 53.6K Ohm 0.1% 1/10W 0603 AEC-Q200 HIGH RELIABILITY	PANASONIC	ERA-3AEB5362V
48	2	R62, R121	RES SMD 10K Ohm 1% 1/10W 0603 AEC-Q200	PANASONIC	ERJ-3EKF1002V
49	2	R122, R123	RES SMD 2 Ohm 1% 1/10W 0603	YAGEO	RC0603FR-072RL
50	3	R17, R41, R96	RES SMD 90.9K Ohm 0.1% 1/10W 0603 AEC-Q200 HIGH RELIABILITY	PANASONIC	ERA-3AEB9092V
51	1	R18	RES SMD 5.9K Ohm 0.1% 1/10W 0603 AEC-Q200 HIGH RELIABILITY	PANASONIC	ERA-3AEB5901V
52	1	R19	RES SMD 71.5K Ohm 0.1% 1/10W 0603 AEC-Q200 HIGH RELIABILITY	PANASONIC	ERA-3AEB7152V
53	1	R20	RES SMD 100K Ohm 0.1% 1/10W 0603 AEC-Q200 HIGH RELIABILITY	PANASONIC	ERA-3AEB104V
54	1	R21	RES SMD 4.42K Ohm 0.1% 1/10W 0603 AEC-Q200 HIGH RELIABILITY	PANASONIC	ERA-3AEB4421V
55	5	R24, R65, R82, R83, R84	RES SMD 100K Ohm 5% 1/10W 0603	YAGEO	RC0603JR-07100KL
56	4	R28, R29, R59, R60	RES SMD 1MEG Ohm 1% 1/10W 0603 AEC-Q200	PANASONIC	ERJ-3EKF1004V
57	2	R30, R85	RES SMD 11.3K Ohm 1% 1/10W 0603 AEC-Q200	PANASONIC	ERJ-3EKF1132V
58	2	R31, R86	RES SMD 2.2 Ohm 1% 1/10W 0603 AEC-Q200	PANASONIC	ERJ-3RQF2R2V
59	8	R32, R33, R36, R87, R88, R89, R90, R91	RES SMD 0 Ohm 1/8W 0805 AEC-Q200	PANASONIC	ERJ-6GEY0R00V

ITEM#	QTY	REFERENCE	PART DESCRIPTION	MANUFACTURER	MANUFACTURER PART NUMBER
60	4	R37, R40, R92, R95	RES SMD 10 Ohm 1% 1/10W 0603 AEC-Q200	PANASONIC	ERJ-3EKF10R0V
61	1	R38	RES SMD 499K Ohm 0.1% 1/10W 0603 HIGH PRECISION - HIGH STABILITY	YAGEO	RT0603BRE07499KL
62	1	R39	RES SMD 26.1K OHM 0.1% 1/5W 0603 AEC-Q200	PANASONIC	ERJ-PB3B2612V
63	2	R42, R97	RES SMD 6.65K OHM 0.1% 1/10W 0603	YAGEO	RT0603BRE076K65L
64	1	R46	RES SMD 6.81K Ohm 1% 1/10W 0603 AEC-Q200	PANASONIC	ERJ-3EKF6811V
65	1	R49	RES SMD 680 Ohm 1% 1/10W 0603 AEC-Q200	PANASONIC	ERJ-3EKF6800V
66	2	R5, R58	RES SMD 4.53K Ohm 1% 1/10W 0603 AEC-Q200	PANASONIC	ERJ-3EKF4531V
67	2	R51, R55	RES SMD 0.0008 1% 2W 2512, AEC-Q200 CURRENT SENSE	VISHAY	WSL2512L8000FEA18
68	1	R6	RES SMD 143K Ohm 0.1% 1/10W 0603 AEC-Q200 HIGH RELIABILITY	PANASONIC	ERA-3AEB1433V
69	2	R64, R93	RES SMD 1.24MEG OHM 1% 1/10W 0603	YAGEO	RC0603FR-071M24L
70	1	R68	RES SMD 200K Ohm 1% 1/10W 0603 AEC-Q200	PANASONIC	ERJ-3EKF2003V
71	1	R69	RES SMD 82.5K OHM 0.1% 1/10W 0603, AEC-Q200	PANASONIC	ERA-3AEB8252V
72	1	R73	RES SMD 95.3K OHM 0.1% 1/10W 0603 AEC-Q200	PANASONIC	ERA-3AEB9532V
73	1	R75	RES SMD 124K OHM 0.1% 1/10W 0603 AEC-Q200	SUSUMU CO, LTD	RG1608P-1243-B-T5
74	1	R76	RES SMD 11K Ohm 0.1% 1/10W 0603 AEC-Q200 HIGH RELIABILITY	PANASONIC	ERA-3AEB113V
75	1	R77	RES SMD 49.9K Ohm 1% 1/10W 0603 AEC-Q200	PANASONIC	ERJ-3EKF4992V
76	1	R8	RES SMD 3.32K OHM 1% 1/10W 0603 AEC-Q200	PANASONIC	ERJ-3EKF3321V
77	1	R81	RES SMD 6.19K Ohm 1% 1/10W 0603	YAGEO	RC0603FR-076K19L
78	1	R94	RES SMD 42.2K Ohm 1% 1/10W 0603	YAGEO	RC0603FR-0742K2L
79	6	TP1, TP2, TP9, TP10, TP17, TP18	CONN-PCB TEST POINT COMPACT MINI	KEYSTONE ELECTRONICS	5019
80	2	U1, U2	IC-ADI BIDIRECTIONAL POLYPHASE SYNCHRONOUS BUCK OR BOOST CONTROLLER	ANALOG DEVICES	LTC3871ILXE#PBF
DNI COMPONENTS LIST					
1	15	C98, C100, C101, C102, C103, C104, C105, C106, C107, C108, C109, C110, C111, C112, C113	CAP ALUM POLY 68UF 20% 25V 8X11.7MM	WURTH ELEKTRONIK	8.75076E+11
2	1	C11	CAP CER 0.22uF 50V 10% X7R 0603 AEC-Q200	MURATA	GCM188R71H224KA64D
3	9	C18, C37, C40, C41, C42, C44, C64, C82, C114	CAP CER 10UF 75V 10% X7R 1210 AEC-Q200 LOW ESR	TDK	CGA6P1X7R1N106K250AC

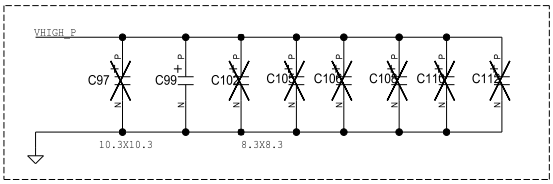
ITEM#	QTY	REFERENCE	PART DESCRIPTION	MANUFACTURER	MANUFACTURER PART NUMBER
4	12	C13, C14, C28, C30, C31, C32, C33, C34, C35, C38, C43, C97	CAP ALUM POLY 120UF 35V 20% 10X12.6MM 0.018 OHM 4400MA 5000H	PANASONIC	35SVPF120M
5	2	C16, C21	CAP CER 0.1uF 100V 10% X7R 0603	MURATA	GRM188R72A104KA35D
6	5	C25, C27, C29, C74, C77	CAP CER 0.1uF 16V 10% X7R 0603	KEMET	C0603C104K4RAC
7	2	C57, C58	CAP ALUM POLY 100UF 25V 20% 8X6.9MM 0.024 OHM 3200MA 5000H	PANASONIC	25SVPF100M
8	1	L1	IND HIGH CURRENT 2.2UH 0.00131OHM DCR 26A	WURTH ELEKTRONIK	74436410220
9	4	Q5, Q6, Q9, Q10	TRAN N-CHANNEL POWER MOSFET 40V 98A	INFINEON TECHNOLOGIES	BSC032N04LSATMA1
10	2	Q2, Q3	TRAN, P-CHANNEL (D-S) MOSFET, 12.5A	VISHAY	SUD50P08-25L
11	4	R1, R2, R3, R4	RES SMD 0.0007 OHM 1% 7W 2526 AEC-Q200	VISHAY	WSLP2726L7000FEA
12	4	R45, R50, R100, R105	RES SMD 0 Ohm JUMPER 1/4W 1206 AEC-Q200	PANASONIC	ERJ-8GEY0R00V
13	2	R113, R115	RES SMD 0 OHM JUMPER 2512 AEC-Q200	VISHAY	WSL251200000ZEA9
14	9	R13, R15, R22, R23, R70, R72, R78, R79, R116	RES SMD 0 Ohm JUMPER 1/10W 0603 AEC-Q200	PANASONIC	ERJ-3GEY0R00V
15	1	R117	RES SMD 150K Ohm 1% 1/10W 0603 AEC-Q200	PANASONIC	ERJ-3EKF1503V
16	1	R118	RES SMD 10K Ohm 0.1% 1/10W 0603 AEC-Q200 HIGH RELIABILITY	PANASONIC	ERA-3AEB103V
17	1	R120	RES SMD 10K Ohm 1% 1/10W 0603 AEC-Q200	PANASONIC	ERJ-3EKF1002V
18	3	R27, R34, R35	RES SMD 0 Ohm 1/8W 0805 AEC-Q200	PANASONIC	ERJ-6GEY0R00V
19	1	R43	RES SMD 6.81K Ohm 1% 1/10W 0603 AEC-Q200	PANASONIC	ERJ-3EKF6811V
20	2	R9, R63	RES SMD 30.1K Ohm 1% 1/10W 0603 AEC-Q200	PANASONIC	ERJ-3EKF3012V
21	1	R66	RES SMD 100K Ohm 5% 1/10W 0603	YAGEO	RC0603JR-07100KL
22	1	R67	RES SMD 20K Ohm 1% 1/10W 0603 AEC-Q200	PANASONIC	ERJ-3EKF2002V
MECHANICAL PARTS					
1	1		SHUNT, 2POS, 2MM PITCH, BLACK	SAMTEC INC.	2SN-BK-G
2	12		WASHER, #10 FLAT STEEL	KEYSTONE	4703
3	12		WASHER, LOCK STEEL 3/64 INCHES THICK	KEYSTONE	1477
4	24		NUT, HEX STEEL, 10-32 THREAD, 9.27MM OUT DIA	KEYSTONE	4705
5	4		SCREW, PAN HD, SLOTD, 4-40 X 3/8	MCMASTER-CARR	91792A108
6	4		STANDOFF, NYLON HEX FEMALE 6.35MM O.D, 4-40 THREAD, 1/2 INCH LONG	KEYSTONE	1902C

EV-DPS-PWRBD1Z Schematic Diagrams

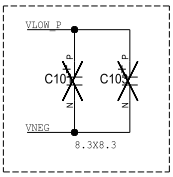




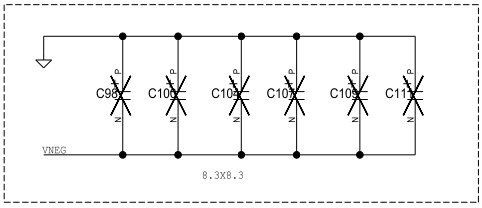
VHIGH ADDITIONAL PROVISION CAPS

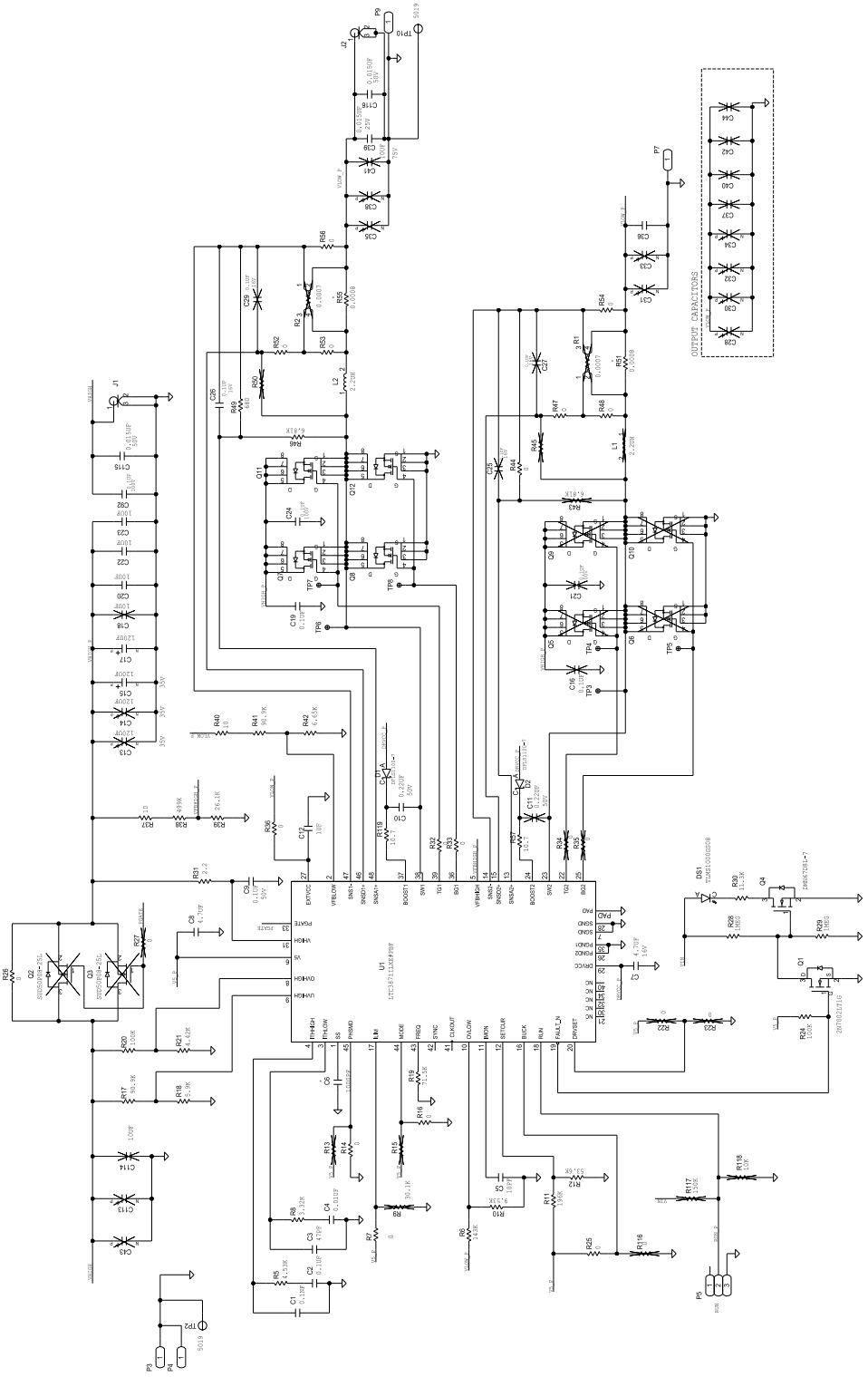


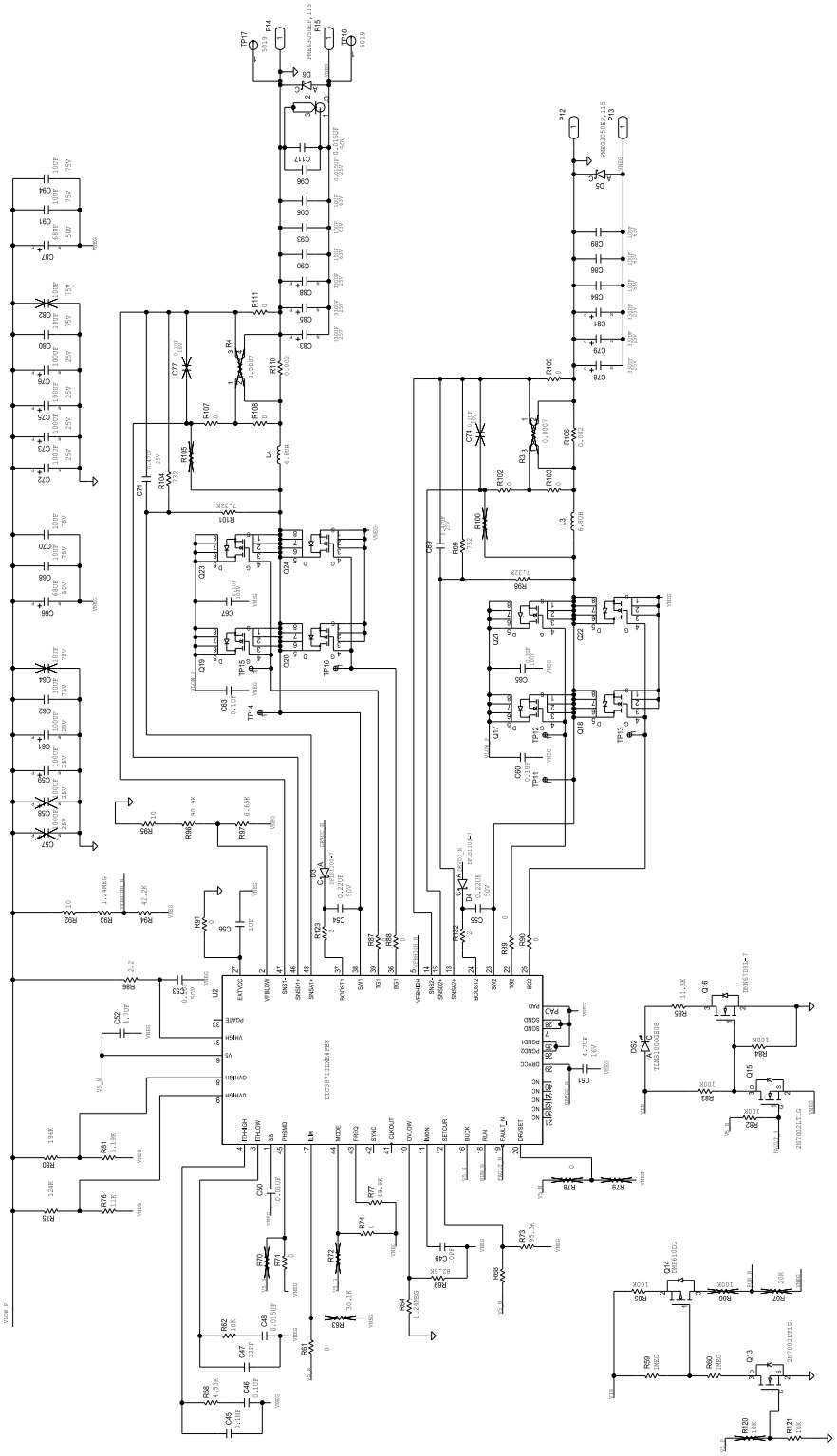
VLOW TO VNEG ADDITIONAL PROVISION CAPS



VNEG ADDITIONAL PROVISION CAPS







EV-DPS-PWRBD4Z

The EV-DPS-PWRBD4Z can source and sink up to 20A for each voltage rail. This variant's VPOS and VNEG output voltage rail are +9V and -5.5V, respectively. The board transitions from source to sink when a higher external DC voltage is injected across VPOS or VNEG. During sinking conditions, the power board is in open-loop control. In addition, the sinking current is limited by the Constant Current (CC) mode or maximum current setting of the external DC source.

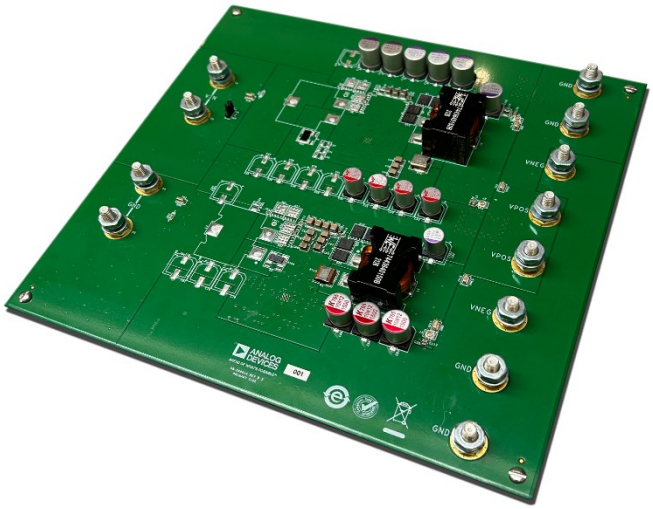


Figure 33. EV-DPS-PWRBD4Z Hardware

EV-DPS-PWRBD4Z Kit Bill of Materials

ITEM#	QTY	REFERENCE	PART DESCRIPTION	MANUFACTURER	MANUFACTURER PART NUMBER
1	2	C1, C45	CAP CER 0.1NF 100V 10% C0G 0603	AVX CORPORATION	06031A101KAT2A
2	2	C10, C54	CAP CER 0.22uF 50V 10% X7R 0603 AEC-Q200	MURATA	GCM188R71H224KA64D
3	1	C103	CAP ALUM POLY 180UF 25V 20% 8x11.9mm 0.016 Ohm 4650mA 5000h	PANASONIC	25SVPF180M
4	3	C115, C116, C117	CAP CER 0.015uF 50V 10% X7R 0805	PHYCOMP (YAGEO)	2238 910 15638
5	2	C12, C56	CAP CER 1uF 50V 10% X7R 0603	TAIYO YUDEN	UMK107AB7105KA-T
6	3	C13, C14, C43	CAP ALUM POLY 120UF 35V 20% 10X12.6MM 0.018 OHM 4400MA 5000H	PANASONIC	35SVPF120M
7	3	C15, C17, C99	CAP ALUM POLY 120UF 35V 20% 10X12.6MM 0.018 OHM 4400MA 5000H	PANASONIC	35SVPF120M
8	5	C19, C24, C63, C67, C92	CAP CER 0.1uF 100V 10% X7R 0603	MURATA	GRM188R72A104KA35D
9	2	C2, C46	CAP CER 0.1uF 50V 10% X7R 0603	AVX	06035C104KAT2A
10	6	C20, C22, C23, C70, C91, C94	CAP CER 10UF 75V 10% X7R 1210 AEC-Q200 LOW ESR	TDK	CGA6P1X7R1N106K250AC
11	1	C26	CAP CER 0.1uF 16V 10% X7R 0603	KEMET	C0603C104K4RAC
12	1	C3	CAP CER 47PF 50V 10% C0G 0603	AVX CORPORATION	06035A470KAT2A

ITEM#	QTY	REFERENCE	PART DESCRIPTION	MANUFACTURER	MANUFACTURER PART NUMBER
13	13	C36, C40, C44, C62, C64, C80, C82, C84, C86, C89, C90, C93, C95	CAP CER 22uF 25V 10% X7R 1210	SAMSUNG	CL32B226KAJNNNE
14	2	C39, C96	CAP CER 0.015uF 25V 10% X7R 0603	PHYCOMP (YAGEO)	CC0603KRX7R8BB153
15	1	C4	CAP CER 0.01uF 100V 10% X7R 0603	TDK	C1608X7R2A103K080AA
16	1	C47	CAP CER 0.22NF 16V 5% C0G 0603	AVX CORPORATION	0603YA221JAT2A
17	1	C48	CAP CER 4700pF 50V 1% C0G 0603 EXTREME LOW ESR	KEMET	C0603C472F5GACTU
18	2	C5, C49	CAP CER 10pF 25V 1% C0G 0603	AVX CORPORATION	06033A100FAT2A
19	1	C50	CAP CER 0.01uF 50V 10% X7R 0603	PHYCOMP (YAGEO)	2238 586 15636
20	4	C7, C8, C51, C52	CAP CER 4.7uF 16V 10% X7R 0805	KEMET	C0805C475K4RACTU
21	2	C9, C53	CAP CER 0.1uF 50V 10% X7R 0603 AEC-Q200	VISHAY	VJ0603Y104KXAAC31X
22	1	C6	CAP CER 1000pF 50V 10% X7R 0603	YAGEO	CC0603KRX7R9BB102
23	1	C71	CAP CER 0.47uF 25V 10% X7R 0603	MURATA	GRM188R71E474KA12D
24	4	C72, C73, C75, C76	CAP ALUM POLY 220UF 20% 16V 8X11.7MM	WURTH ELEKTRONIK	8.75075E+11
25	3	C83, C85, C88	CAP ALUM POLY 1500UF 10V 20% 10X12.6MM	KEMET	A765MU158M1ALAE014
26	2	D1, D3	DIO SCHOTTKY BARRIER RECTIFIER, COMMERCIAL	DIODES INCORPORATED	DFLS1100-7
27	4	D2, D4, Q10, Q18	RES SMD 0Ohm 1/8W 0805 AEC-Q200	PANASONIC	ERJ-6GEY0R00V
28	2	D5, D6	DIO SCHOTTKY LOW VF , 5A	NEXPERIA	PMEG3050EP,115
29	2	DS1, DS2	OBSOLETE - LED SMD 0603 RED	VISHAY	TLMS1000-GS08
30	3	J1, J2, J3	CONN-PCB UMC JACK STR 50 OHM SMD	HIROSE ELECTRIC	U.FL-R-SMT-1(01)
31	2	L2, L4	IND POWER CHOKE SHIELDED WIREWOUND 1.5UH 20% 100KHZ 56A 0.00044 OHM, AEC-Q200	WURTH ELEKTRONIK	7443640150B
32	12	P1, P2, P3, P4, P6, P7, P8, P9, P12, P13, P14, P15	CONN-PCB THREADED BROACHING STUD, 625MIL LENGTH	PENN ENGINEERING	KFH-032-10ET
33	1	P5	CONN-PCB 3POS MALE HDR UNSHROUDED SINGLE ROW ST, 2MM PITCH, 2.70MM SOLDER TAIL	WURTH ELEKTRONIK	62000311121
34	3	Q1, Q13, Q15	TRANS N-CHA SMALL SIGNAL MOSFET	ON SEMICONDUCTOR	2N7002LT1G
35	8	Q7, Q8, Q11, Q12, Q19, Q20, Q23, Q24	TRAN MOSFET N-CH 40V 23A 8LD TDSON EP	INFINEON TECHNOLOGIES	BSC026N04LSATMA1
36	1	Q14	TRAN MOSFET P-CH 60V 0.18A	DIODES INCORPORATED	DMP610DL-7

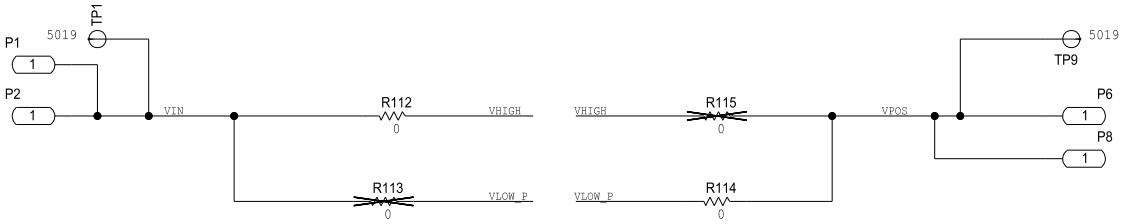
ITEM#	QTY	REFERENCE	PART DESCRIPTION	MANUFACTURER	MANUFACTURER PART NUMBER
37	2	Q4, Q16	TRAN MOSFET N-CH 60V 0.21A, AEC-Q101	DIODES INCORPORATED	DMN67D8L-7
38	1	R10	RES SMD 15.8K Ohm 1% 1/10W 0603 AEC-Q200	PANASONIC	ERJ-3EKF1582V
39	2	R46, R101	RES SMD 2.87K OHM 1% 1/10W 0603 AEC-Q200	PANASONIC	ERJ-3EKF2871V
40	15	R7, R14, R16, R25, R47, R48, R52, R54, R61, R71, R74, R102, R103, R107, R109	RES SMD 0 Ohm JUMPER 1/10W 0603 AEC-Q200	PANASONIC	ERJ-3GEY0R00V
41	2	R49, R104	RES SMD 287 Ohm 1% 0.1W 0603 AEC-Q200	PANASONIC	ERJ-3EKF2870V
42	1	R106	RES SMD 0.002 OHM 1% 3W 2512 AEC-Q200	PANASONIC	ERJ-MS4SF2M0U
43	1	R11	RES SMD 158K Ohm 1% 1/10W 0603	YAGEO	RC0603FR-07158KL
44	3	R26, R112, R114	RES SMD 0 OHM JUMPER 2512 AEC-Q200	VISHAY	WSL2512000000ZEA9
45	2	R57, R119	RES SMD 3 OHM 1% 1/10W 0603 AEC-Q200	VISHAY	CRCW06033R00FKEA
46	1	R12	RES SMD 48.7K Ohm 1% 1/10W 0603 AEC-Q200	VISHAY	CRCW060348K7FKEA
47	1	R121	RES SMD 10K Ohm 1% 1/10W 0603 AEC-Q200	PANASONIC	ERJ-3EKF1002V
48	2	R122, R123	RES SMD 5.9 OHM 0.1% 1/16W 0603	TE CONNECTIVITY	RN73C1J5R9BTD
49	3	R6, R17, R75	RES SMD 115K Ohm 1% 1/10W 0603 AEC-Q200	PANASONIC	ERJ-3EKF1153V
50	1	R18	OBSOLETE - RES SMD 15K OHM 1% 1/10W 0603 AEC-Q200	VISHAY	CRCW060315K0FKEB
51	1	R19	RES SMD 71.5K Ohm 0.1% 1/10W 0603 AEC-Q200 HIGH RELIABILITY	PANASONIC	ERA-3AEB7152V
52	2	R2,R4	RES SMD 0.0013 OHM 1% 5W 2726 AEC-Q200 4-TERMINAL LOW VALUE	VISHAY	WSLP27261L300FEA
53	1	R20	RES SMD 316K Ohm 1% 1/10W 0603	YAGEO	RC0603FR-07316KL
54	1	R21	RES SMD 13.7K Ohm 1% 1/10W 0603 AEC-Q200	PANASONIC	ERJ-3EKF1372V
55	5	R24, R65, R82, R83, R84	RES SMD 100K Ohm 5% 1/10W 0603	YAGEO	RC0603JR-07100KL
56	4	R28, R29, R59, R60	RES SMD 1MEG Ohm 1% 1/10W 0603 AEC-Q200	PANASONIC	ERJ-3EKF1004V
57	2	R30, R85	RES SMD 11.3K Ohm 1% 1/10W 0603 AEC-Q200	PANASONIC	ERJ-3EKF1132V
58	2	R31, R86	RES SMD 2.2 Ohm 1% 1/10W 0603 AEC-Q200	PANASONIC	ERJ-3RQF2R2V
59	8	R32, R33, R36, R87, R88, R89, R90, R91	RES SMD 0 Ohm 1/8W 0805 AEC-Q200	PANASONIC	ERJ-6GEY0R00V
60	4	R37, R40, R92, R95	RES SMD 10 Ohm 1% 1/10W 0603 AEC-Q200	PANASONIC	ERJ-3EKF10R0V
61	1	R38	RES SMD 221K OHM 0.1% 1/10W 0603	YAGEO	RT0603BRD07221KL
62	2	R39, R97	RES SMD 11.5K Ohm 0.1% 1/10W 0603 AEC-Q200 HIGH RELIABILITY	PANASONIC	ERA-3AEB1152V
63	1	R41	RES SMD 71.5K Ohm 0.1% 1/10W 0603 AEC-Q200 HIGH RELIABILITY	PANASONIC	ERA-3AEB7152V

ITEM#	QTY	REFERENCE	PART DESCRIPTION	MANUFACTURER	MANUFACTURER PART NUMBER
64	1	R42	RES SMD 11K Ohm 0.1% 1/10W 0603 AEC-Q200 HIGH RELIABILITY	PANASONIC	ERA-3AEB113V
65	2	R44, R99	RES SMD 0 Ohm JUMPER 1/10W 0603 AEC-Q200	PANASONIC	ERJ-3GEY0R00V
66	2	R5, R58	RES SMD 4.53K Ohm 1% 1/10W 0603 AEC-Q200	PANASONIC	ERJ-3EKF4531V
67	1	R51	RES SMD 0.0008 1% 2W 2512, AEC-Q200 CURRENT SENSE	CYNTEC CO., LTD.	VSML2512S2-0M80F
68	1	R62	RES SMD 2.49K Ohm 1% 1/10W 0603 AEC-Q200	PANASONIC	ERJ-3EKF2491V
69	1	R64	RES SMD 41.2K Ohm 1% 1/10W 0603 AEC-Q200	VISHAY	CRCW060341K2FKEA
70	1	R68	RES SMD 133K Ohm 1% 1/10W 0603	YAGEO	RC0603FR-07133KL
71	1	R69	RES SMD 10.2K Ohm 1% 1/10W 0603 AEC-Q200	PANASONIC	ERJ-3EKF1022V
72	1	R73	RES SMD 49.9K Ohm 0.1% 1/8W 0603 AEC-Q200 SULFUR RESISTANT	VISHAY	TNPW060349K9BEEA
73	1	R76	RES SMD 20K Ohm 1% 1/10W 0603 AEC-Q200	PANASONIC	ERJ-3EKF2002V
74	1	R77	RES SMD 52.3K Ohm 1% 1/10W 0603 AEC-Q200	PANASONIC	ERJ-3EKF5232V
75	1	R8	RES SMD 4.87K Ohm 1% 1/10W 0603 AEC-Q200	PANASONIC	ERJ-3EKF4871V
76	1	R80	RES SMD 140K Ohm 1% 1/10W 0603 AEC-Q200	PANASONIC	ERJ-3EKF1403V
77	1	R81	RES SMD 10.7K Ohm 0.1% 1/10W 0603 AEC-Q200 HIGH RELIABILITY	PANASONIC	ERA-3AEB1072V
78	1	R93	RES SMD 768K Ohm 1% 1/10W 0603 AEC-Q200	PANASONIC	ERJ-3EKF7683V
79	1	R94	RES SMD 64.9K Ohm 1% 1/10W 0603 AEC-Q200	PANASONIC	ERJ-3EKF6492V
80	1	R96	RES SMD 41.2K Ohm 0.1% 1/10W 0603 AEC-Q200 HIGH RELIABILITY	PANASONIC	ERA-3AEB4122V
81	6	TP1, TP2, TP9, TP10, TP17, TP18	CONN-PCB TEST POINT COMPACT MINI	KEYSTONE ELECTRONICS	5019
82	2	U1, U2	IC-ADI BIDIRECTIONAL POLYPHASE SYNCHRONOUS BUCK OR BOOST CONTROLLER	ANALOG DEVICES	LTC3871ILXE#PBF
DNI COMPONENTS LIST					
1	14	C98, C100, C101, C102, C104, C105, C106, C107, C108, C109, C110, C111, C112, C113	CAP ALUM POLY 68UF 20% 25V 8X11.7MM	WURTH ELEKTRONIK	875075555003
2	2	C11, C55	CAP CER 0.22uF 50V 10% X7R 0603 AEC-Q200	MURATA	GCM188R71H224KA64D
3	6	C18, C37, C41, C42, C68, C114	CAP CER 10UF 75V 10% X7R 1210 AEC-Q200 LOW ESR	TDK	CGA6P1X7R1N106K250AC
4	4	C16, C21, C60, C65	CAP CER 0.1uF 100V 10% X7R 0603	MURATA	GRM188R72A104KA35D
5	5	C25, C27, C29, C74, C77	CAP CER 0.1uF 16V 10% X7R 0603	KEMET	C0603C104K4RAC

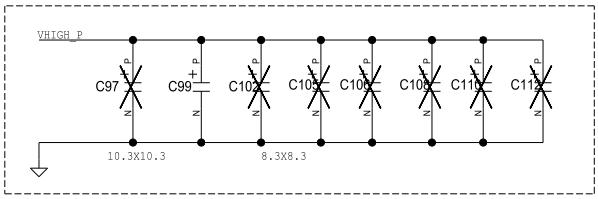
ITEM#	QTY	REFERENCE	PART DESCRIPTION	MANUFACTURER	MANUFACTURER PART NUMBER
6	9	C28, C30, C31, C32, C33, C34, C35, C38, C97	CAP ALUM POLY 120UF 35V 20% 10X12.6MM 0.018 OHM 4400MA 5000H	PANASONIC	35SVPF120M
7	4	C57, C58, C59, C61	CAP ALUM POLY 100UF 25V 20% 8X6.9MM 0.024 OHM 3200MA 5000H	PANASONIC	25SVPF100M
8	2	C66, C87	CAP ALUM POLY 68UF 50V 20% 10X12.6MM 0.02 OHM 4300MA 20000H	PANASONIC	50SVPT68M
9	1	C69	CAP CER 0.47uF 25V 10% X7R 0603	MURATA	GRM188R71E474KA12D
10	3	C78, C79, C81	CAP ALUM POLY 330UF 25V 20% 10X12.6MM 0.014 OHM 5000MA 5000H	PANASONIC	25SVPF330M
11	1	L1	IND HIGH CURRENT 2.2UH 0.00131OHM DCR 26A	WURTH ELEKTRONIK	74436410220
12	1	L3	IND POWER SHIELDED WIREWOUND 6.8UH 20% 100KHZ 47.5A 0.88MOHM 28X27MM AEC-Q200	WURTH ELEKTRONIK	7443640680B
13	2	Q17, Q21	TRAN MOSFET N-CH 60V 15A	INFINEON TECHNOLOGIES	BSC065N06LS5ATMA1
14	2	Q2, Q3	TRAN, P-CHANNEL (D-S) MOSFET, 12.5A	VISHAY	SUD50P08-25L
15	1	Q22	TRAN MOSFET N-CH 60V 23A 8LD TDSON EP	INFINEON TECHNOLOGIES	BSC027N06LS5ATMA1
16	3	Q5, Q6, Q9	TRAN N-CHANNEL POWER MOSFET 40V 98A	INFINEON TECHNOLOGIES	BSC032N04LSATMA1
17	2	R1, R3	RES SMD 0.0007 OHM 1% 7W 2526 AEC-Q200	VISHAY	WSLP2726L7000FEA
18	4	R45, R50, R100, R105	RES SMD 0 Ohm JUMPER 1/4W 1206 AEC-Q200	PANASONIC	ERJ-8GEY0R00V
19	13	R13, R15, R22, R23, R53, R56, R70, R72, R78, R79, R108, R111, R116	RES SMD 0 Ohm JUMPER 1/10W 0603 AEC-Q200	PANASONIC	ERJ-3GEY0R00V
20	1	R110	RES SMD 0.002 OHM 1% 3W 2512 AEC-Q200	PANASONIC	ERJ-MS4SF2M0U
21	2	R113, R115	RES SMD 0 OHM JUMPER 2512 AEC-Q200	VISHAY	WSL2512000000ZEA9
22	1	R117	RES SMD 150K Ohm 1% 1/10W 0603 AEC-Q200	PANASONIC	ERJ-3EKF1503V
23	1	R118	RES SMD 10K Ohm 0.1% 1/10W 0603 AEC-Q200 HIGH RELIABILITY	PANASONIC	ERA-3AEB103V
24	1	R120	RES SMD 10K Ohm 1% 1/10W 0603 AEC-Q200	PANASONIC	ERJ-3EKF1002V
25	3	R27, R34, R35	RES SMD 0 Ohm 1/8W 0805 AEC-Q200	PANASONIC	ERJ-6GEY0R00V
26	1	R43	RES SMD 6.81K Ohm 1% 1/10W 0603 AEC-Q200	PANASONIC	ERJ-3EKF6811V
27	1	R55	RES SMD 0.0008 1% 2W 2512, AEC-Q200 CURRENT SENSE	CYNTEC CO., LTD.	VSML2512S2-0M80F
28	2	R9, R63	RES SMD 30.1K Ohm 1% 1/10W 0603 AEC-Q200	PANASONIC	ERJ-3EKF3012V
29	1	R66	RES SMD 100K Ohm 5% 1/10W 0603	YAGEO	RC0603JR-07100KL
30	1	R67	RES SMD 20K Ohm 1% 1/10W 0603 AEC-Q200	PANASONIC	ERJ-3EKF2002V
31	1	R98	RES SMD 7.32K Ohm 1% 1/10W 0603 AEC-Q200	PANASONIC	ERJ-3EKF7321V

ITEM#	QTY	REFERENCE	PART DESCRIPTION	MANUFACTURER	MANUFACTURER PART NUMBER
MECHANICAL PARTS					
1	1		SHUNT, 2POS, 2MM PITCH, BLACK	SAMTEC INC.	2SN-BK-G
2	12		WASHER, #10 FLAT STEEL	KEYSTONE	4703
3	12		WASHER, LOCK STEEL 3/64 INCHES THICK	KEYSTONE	1477
4	24		NUT, HEX STEEL, 10-32 THREAD, 9.27MM OUT DIA	KEYSTONE	4705
5	4		SCREW, PAN HD, SLOTD, 4-40 X 3/8	MCMASTER-CARR	91792A108
6	4		STANDOFF, NYLON HEX FEMALE 6.35MM O.D, 4-40 THREAD, 1/2 INCH LONG	KEYSTONE	1902C

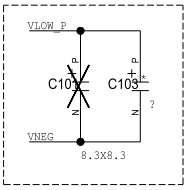
EV-DPS-PWRBD4Z Schematic



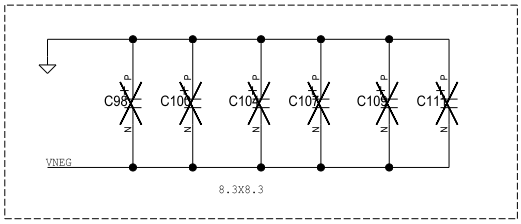
VHIGH ADDITIONAL PROVISION CAPS

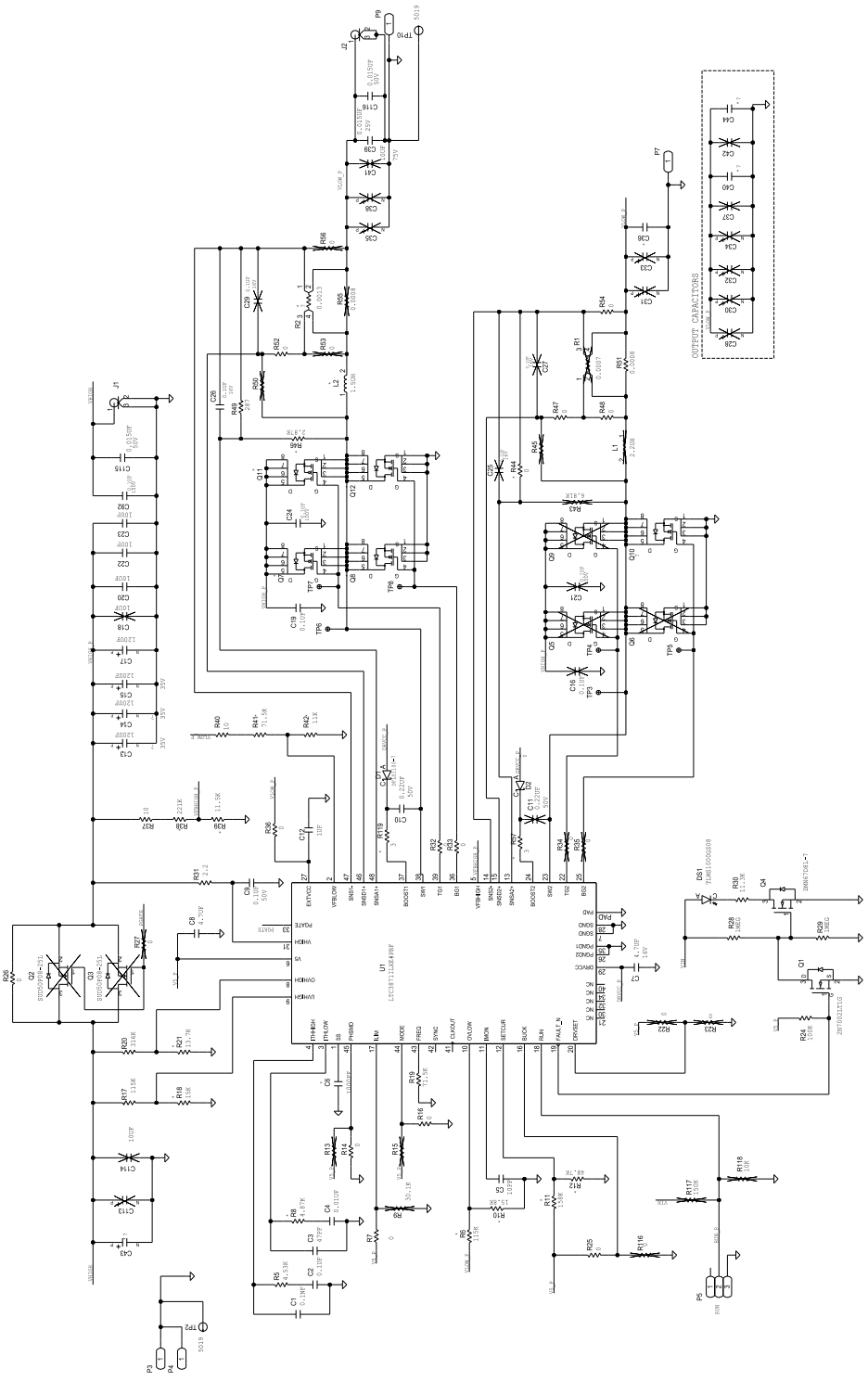


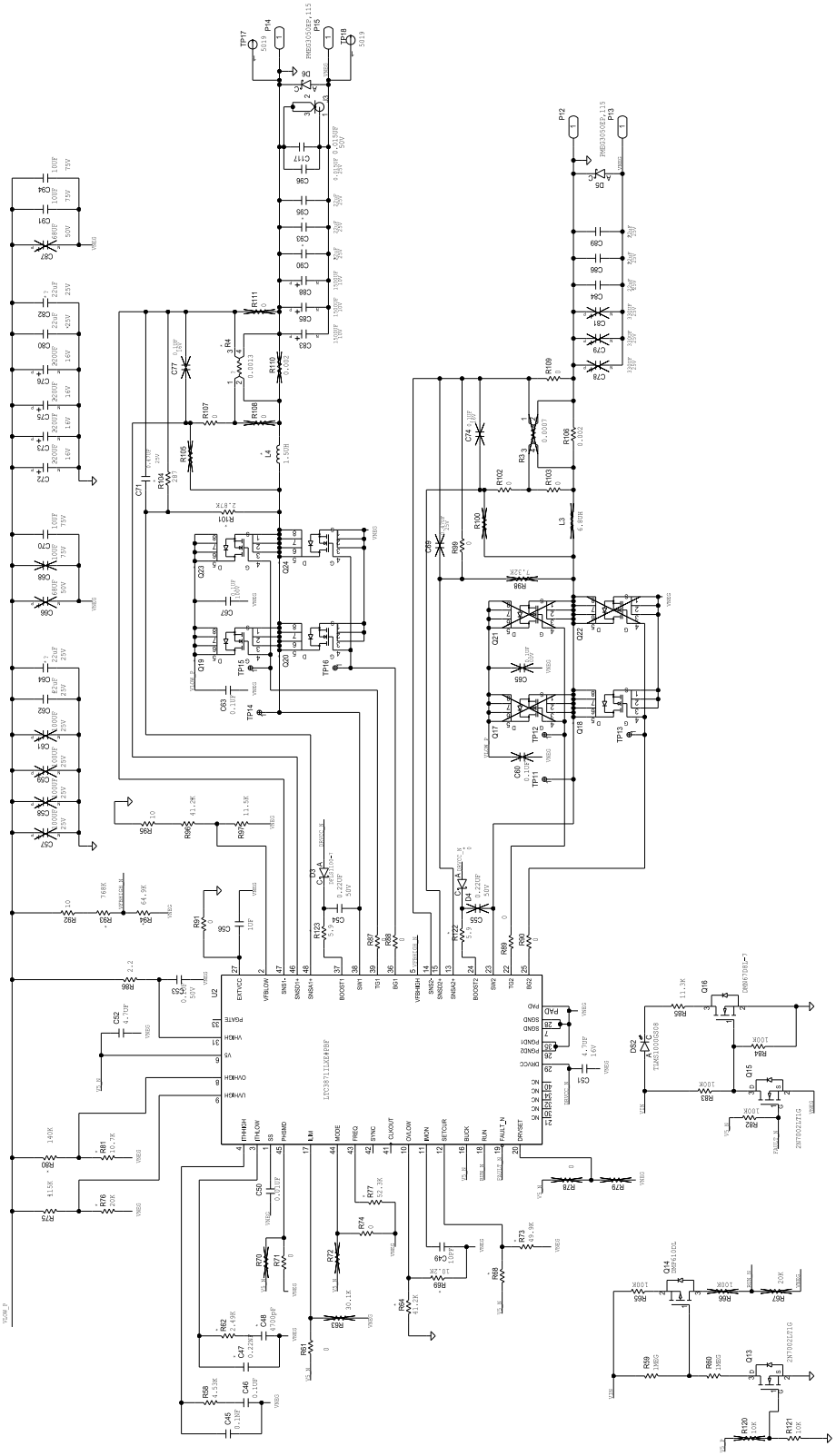
VLOW TO VNEG
ADDITIONAL PROVISION CAPS



VNEG ADDITIONAL PROVISION CAPS







EV-DPS-PWRBD5Z

The EV-DPS-PWRBD5Z can source and sink up to 20A for each voltage rail. The VPOS and VNEG output voltage rail of this variant is +30V and -5V, respectively. The board transitions from source to sink when a higher external DC voltage is injected across VPOS or VNEG. During sinking conditions, the power board is in open-loop control. In addition, the sinking current is limited by the Constant Current (CC) mode or maximum current setting of the external DC source.

Figure 34. EV-DPS-PWRBD5Z Hardware

EV-DPS-PWRBD5Z Bill of Materials

ITEM#	QTY	REFERENCE	PART DESCRIPTION	MANUFACTURER	MANUFACTURER PART NUMBER
1	2	C1, C45	CAP CER 0.1NF 100V 10% C0G 0603	AVX CORPORATION	06031A101KAT2A
2	3	C10, C11, C54	CAP CER 0.22uF 50V 10% X7R 0603 AEC-Q200	MURATA	GCM188R71H224KA64D
3	14	C20, C22, C23, C36, C40, C42, C44, C68, C70, C80, C82, C91, C94, C114	CAP CER 10UF 75V 10% X7R 1210 AEC-Q200 LOW ESR	TDK	CGA6P1X7R1N106K250AC
4	2	C115, C116	CAP CER 0.015uF 50V 10% X7R 0805	PHYCOMP (YAGEO)	2238 910 15638
5	1	C117	CAP CER 10uF 16V 10% X7R 0805	SAMSUNG	CL21B106KOQNNNE
6	2	C12, C56	CAP CER 1uF 50V 10% X7R 0603	TAIYO YUDEN	UMK107AB7105KA-T
7	6	C13, C14, C15, C17, C97, C99	CAP ALUM POLY 68UF 50V 20% 10X12.6MM 0.02 OHM 4300MA 20000H	PANASONIC	50SVPT68M
8	7	C16, C19, C21, C24, C63, C67, C92	CAP CER 0.1uF 100V 10% X7R 0603	MURATA	GRM188R72A104KA35D
9	1	C2	CAP CER 0.0068UF 50V 10% X7R 0603 AEC-Q200	AVX CORPORATION	ESD35C682K4T2A18
10	2	C25, C26	CAP CER 0.047uF 50V 10% X7R 0603 AEC-Q200	KEMET	C0603X473K5RACTU

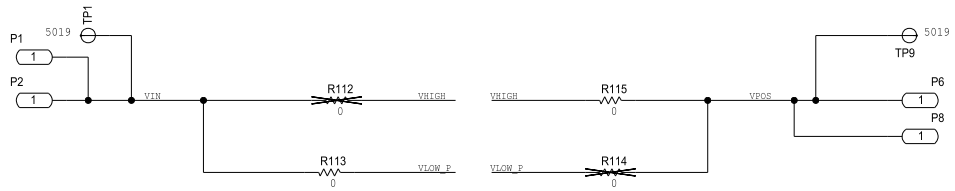
ITEM#	QTY	REFERENCE	PART DESCRIPTION	MANUFACTURER	MANUFACTURER PART NUMBER
11	4	C28, C31, C34, C38	CAP ALUM POLY 120UF 35V 20% 10X12.6MM 0.018 OHM 4400MA 5000H	PANASONIC	35SVPF120M
12	1	C3	CAP CER 47PF 50V 10% C0G 0603	AVX CORPORATION	06035A470KAT2A
13	2	C39, C96	CAP CER 0.015uF 25V 10% X7R 0603	PHYCOMP (YAGEO)	CC0603KRX7R8BB153
14	1	C4	CAP CER 0.01uF 100V 10% X7R 0603	TDK	C1608X7R2A103K080AA
15	1	C46	CAP CER 0.1uF 50V 10% X7R 0603	AVX	06035C104KAT2A
16	1	C47	CAP CER 560PF 50V 1% C0G 0603	KEMET	C0603C561F5GACTU
17	1	C48	CAP CER 2700pF 50V 10% X7R 0603	KEMET	C0603C272K5RAC
18	2	C5, C49	CAP CER 10pF 25V 1% C0G 0603	AVX CORPORATION	06033A100FAT2A
19	1	C50	CAP CER 0.01uF 50V 10% X7R 0603	PHYCOMP (YAGEO)	2238 586 15636
20	4	C7, C8, C51, C52	CAP CER 4.7uF 16V 10% X7R 0805	KEMET	C0805C475K4RACTU
21	2	C9, C53	CAP CER 0.1uF 50V 10% X7R 0603 AEC-Q200	VISHAY	VJ0603Y104KXAAC31X
22	1	C6	CAP CER 1000pF 50V 10% X7R 0603	YAGEO	CC0603KRX7R9BB102
23	2	C66, C87	CAP ALUM POLY 120UF 35V 20% 10X12.6MM 0.018 OHM 4400MA 5000H	PANASONIC	35SVPF120M
24	1	C71	CAP CER 0.68UF 16V 10% X5R 0603	KYOCERA	0603YD684KAT2A
25	2	C75, C76	CAP ALUM POLY 100UF 25V 20% 8X6.9MM 0.024 OHM 3200MA 5000H	PANASONIC	25SVPF100M
26	3	C83, C85, C88	CAP ALUM POLY 1500UF 10V 20% 10X12.6MM	KEMET	A765MU158M1ALAE014
27	4	C84, C90, C93, C95	CAP CER 10uF 63V 10% X7R 1210	SAMSUNG	CL32B106KMVNNWE
28	4	D1, D2, D3, D4	DIO SCHOTTKY BARRIER RECTIFIER, COMMERCIAL	DIODES INCORPORATED	DFLS1100-7
29	2	D5, D6	DIO SCHOTTKY LOW VF, 5A	NEXPERIA	PMEG3050EP,115
30	2	DS1, DS2	OBSOLETE - LED SMD 0603 RED	VISHAY	TLMS1000-GS08
31	3	J1, J2, J3	CONN-PCB UMC JACK STR 50 OHM SMD	HIROSE ELECTRIC	U.FL-R-SMT-1(01)
32	2	L1, L2	IND HIGH CURRENT 2.2UH 0.00131OHM DCR 26A	WURTH ELEKTRONIK	74436410220
33	2	L4	IND POWER SHIELDED WIREWOUND 6.8UH 20% 100KHZ 47.5A 0.88MOHM 28X27MM AEC-Q200	WURTH ELEKTRONIK	7443640680B
34	2	P1, P2, P3, P4, P6, P7, P8, P9, P12, P13, P14, P15	CONN-PCB THREADED BROACHING STUD, 625MIL LENGTH	PENN ENGINEERING	KFH-032-10ET
35	2	P5	CONN-PCB 3POS MALE HDR UNSHROUDED SINGLE ROW ST, 2MM PITCH, 2.70MM SOLDER TAIL	WURTH ELEKTRONIK	62000311121
36	2	Q1, Q13, Q15	TRANS N-CHA SMALL SIGNAL MOSFET	ON SEMICONDUCTOR	2N7002LT1G

ITEM#	QTY	REFERENCE	PART DESCRIPTION	MANUFACTURER	MANUFACTURER PART NUMBER
37	2	Q5, Q6, Q7, Q8, Q9, Q10, Q11, Q12	TRAN MOSFET N-CH 60V 100A 8LD TDSON	INFINEON TECHNOLOGIES	BSC034N06NSATMA1
38	1	Q14	TRAN MOSFET P-CH 60V 0.18A	DIODES INCORPORATED	DMP610DL-7
39	2	Q4, Q16	TRAN MOSFET N-CH 60V 0.21A, AEC-Q101	DIODES INCORPORATED	DMN67D8L-7
40	1	Q18	TRAN MOSFET N-CH 60V 23A 8LD TDSON EP	INFINEON TECHNOLOGIES	BSC027N06LS5ATMA1
41	4	Q19, Q20, Q23, Q24	TRAN MOSFET N-CH 40V 23A 8LD TDSON EP	INFINEON TECHNOLOGIES	BSC026N04LSATMA1
42	3	R7, R10, R61	RES SMD 10K Ohm 0.1% 1/10W 0603 AEC-Q200 HIGH RELIABILITY	PANASONIC	ERA-3AEB103V
43	1	R101	RES SMD 2.49K Ohm 1% 1/10W 0603 AEC-Q200	PANASONIC	ERJ-3EKF2491V
44	15	R14, R16, R47, R48, R52, R53, R54, R56, R71, R74, R102, R103, R107, R109, R116	RES SMD 0 Ohm JUMPER 1/10W 0603 AEC-Q200	PANASONIC	ERJ-3GEY0R00V
45	1	R104	RES SMD 255 OHM 1% 1/10W 0603 AEC-Q200	STACKPOLE ELECTRONICS, INC.	RMCF0603FT255R
46	1	R106	RES SMD 0.002 OHM 1% 3W 2512 AEC-Q200	PANASONIC	ERJ-MS4SF2M0U
47	1	R11	RES SMD 200K Ohm 1% 1/10W 0603 AEC-Q200	PANASONIC	ERJ-3EKF2003V
48	3	R26, R113, R115	RES SMD 0 OHM JUMPER 2512 AEC-Q200	VISHAY	WSL2512000000ZEA9
49	2	R17, R117	RES SMD 249K OHM 0.1% 1/10W 0603 AEC-Q200	PANASONIC	ERA-3AEB2493V
50	1	R118	RES SMD 15.8K Ohm 1% 1/10W 0603 AEC-Q200	PANASONIC	ERJ-3EKF1582V
51	3	R57, R99, R119	RES SMD 0 Ohm JUMPER 1/10W 0603 AEC-Q200	PANASONIC	ERJ-3GEY0R00V
52	1	R12	RES SMD 16.2K OHM 0.1% 1/10W 0603 AEC-Q200	PANASONIC	ERA-3AEB1622V
53	1	R121	RES SMD 10K Ohm 1% 1/10W 0603 AEC-Q200	PANASONIC	ERJ-3EKF1002V
54	2	R122, R123	RES SMD 5.9 OHM 0.1% 1/16W 0603	TE CONNECTIVITY	RN73C1J5R9BTD
55	1	R18	RES SMD 11.3K Ohm 1% 1/10W 0603 AEC-Q200	PANASONIC	ERJ-3EKF1132V
56	1	R19	RES SMD 118K Ohm 1% 1/10W 0603 AEC-Q200	PANASONIC	ERJ-3EKF1183V
57	2	R20, R80	RES SMD 309K OHM 0.1% 1/10W 0603 AEC-Q200	PANASONIC	ERA-3AEB3093V
58	2	R21, R81	RES SMD 10.7K Ohm 0.1% 1/10W 0603 AEC-Q200 HIGH RELIABILITY	PANASONIC	ERA-3AEB1072V
59	5	R24, R65, R82, R83, R84	RES SMD 100K Ohm 5% 1/10W 0603	YAGEO	RC0603JR-07100KL
60	4	R28, R29, R59, R60	RES SMD 1MEG Ohm 1% 1/10W 0603 AEC-Q200	PANASONIC	ERJ-3EKF1004V
61	2	R30, R85	RES SMD 11.3K Ohm 1% 1/10W 0603 AEC-Q200	PANASONIC	ERJ-3EKF1132V
62	2	R31, R86	RES SMD 2.2 Ohm 1% 1/10W 0603 AEC-Q200	PANASONIC	ERJ-3RQF2R2V

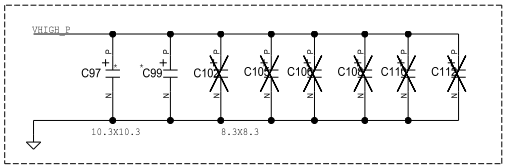
ITEM#	QTY	REFERENCE	PART DESCRIPTION	MANUFACTURER	MANUFACTURER PART NUMBER
63	8	R32, R33, R34, R35, R36, R87, R88, R91	RES SMD 0 Ohm 1/8W 0805 AEC-Q200	PANASONIC	ERJ-6GEY0R00V
64	4	R37, R40, R92, R95	RES SMD 10 Ohm 1% 1/10W 0603 AEC-Q200	PANASONIC	ERJ-3EKF10R0V
65	1	R38	RES SMD 246K OHM 1% 1/10W 0603 AEC-Q200	KOA SPEER	RN73H1JTTD2463F100
66	1	R39	RES SMD 10.2K Ohm 1% 1/10W 0603 AEC-Q200	PANASONIC	ERJ-3EKF1022V
67	1	R4	RES SMD 0.001 OHM 1% 7W 2726 AEC-Q200 4-TERMINAL LOW VALUE	VISHAY	WSLP27261L000FEA
68	2	R41, R93	RES SMD 221K OHM 0.1% 1/10W 0603	YAGEO	RT0603BRD07221KL
69	2	R42, R94	RES SMD 11.5K Ohm 0.1% 1/10W 0603 AEC-Q200 HIGH RELIABILITY	PANASONIC	ERA-3AEB1152V
70	2	R43, R46	RES SMD 8.87K Ohm 1% 1/10W 0603 AEC-Q200	PANASONIC	ERJ-3EKF8871V
71	2	R44, R49	RES SMD 887 OHM 1% 1/10W 0603 AEC-Q200	PANASONIC	ERJ-3EKF8870V
72	1	R5	RES SMD 12.4K OHM 1% 1/5W 0603 AEC-Q200	PANASONIC	ERJ-P03F1242V
73	2	R51, R55	RES SMD 0.002 OHM 1% 3W 2512 AEC-Q200	PANASONIC	ERJ-MS4SF2M0U
74	1	R58	RES SMD 4.53K Ohm 1% 1/10W 0603 AEC-Q200	PANASONIC	ERJ-3EKF4531V
75	1	R6	RES SMD 210K OHM 0.1% 1/16W 0603	TE CONNECTIVITY	RN73C1J210KBTD
76	1	R62	RES SMD 7.5K OHM 1% 1/10W 0603	BOURNS	CR0603-FX-7501ELF
77	2	R9, R63	RES SMD 30.1K Ohm 1% 1/10W 0603 AEC-Q200	PANASONIC	ERJ-3EKF3012V
78	1	R64	RES SMD 17.4K Ohm 1% 1/10W 0603	YAGEO	RC0603FR-0717K4L
79	1	R68	RES SMD 200K Ohm 1% 1/10W 0603 AEC-Q200	PANASONIC	ERJ-3EKF2003V
80	1	R69	RES SMD 4.3K Ohm 1% 1/10W 0603 AEC-Q200	PANASONIC	ERJ-3EKF4301V
81	1	R73	RES SMD 62K OHM 1% 1/10W 0603 AEC-Q200	KOA SPEER ELECTRONICS, INC.	RK73H1JTTD6202F
82	1	R75	RES SMD 158K Ohm 1% 1/10W 0603	YAGEO	RC0603FR-07158KL
83	1	R76	RES SMD 11K Ohm 0.1% 1/10W 0603 AEC-Q200 HIGH RELIABILITY	PANASONIC	ERA-3AEB113V
84	1	R77	RES SMD 41.2K Ohm 0.1% 1/10W 0603 AEC-Q200 HIGH RELIABILITY	PANASONIC	ERA-3AEB4122V
85	1	R8	RES SMD 3.32K OHM 1% 1/10W 0603 AEC-Q200	PANASONIC	ERJ-3EKF3321V
86	1	R96	RES SMD 47.5K Ohm 1% 1/10W 0603 AEC-Q200	VISHAY	CRCW060347K5FKEA
87	1	R97	RES SMD 15K Ohm 0.1% 1/10W 0603 AEC-Q200 HIGH RELIABILITY	PANASONIC	ERA-3AEB153V
88	6	TP1, TP2, TP9, TP10, TP17, TP18	CONN-PCB TEST POINT COMPACT MINI	KEYSTONE ELECTRONICS	5019
89	2	U1, U2	IC-ADI BIDIRECTIONAL POLYPHASE SYNCHRONOUS BUCK OR BOOST CONTROLLER	ANALOG DEVICES	LTC3871ILXE#PBF
DNI COMPONENTS LIST					
1	15	C98, C100, C101, C102, C103, C104, C105, C106, C107, C108, C109, C110, C111, C112, C113	CAP ALUM POLY 68UF 20% 25V 8X11.7MM	WURTH ELEKTRONIK	875075555003

ITEM#	QTY	REFERENCE	PART DESCRIPTION	MANUFACTURER	MANUFACTURER PART NUMBER
2	5	C18, C37, C41, C62, C64	CAP CER 10UF 75V 10% X7R 1210 AEC-Q200 LOW ESR	TDK	CGA6P1X7R1N106K250AC
3	4	C27, C29, C74, C77	CAP CER 0.1uF 16V 10% X7R 0603	KEMET	C0603C104K4RAC
4	5	C30, C32, C33, C35, C43	CAP ALUM POLY 120UF 35V 20% 10X12.6MM 0.018 OHM 4400MA 5000H	PANASONIC	35SVPF120M
5	1	C55	CAP CER 0.22uF 50V 10% X7R 0603 AEC-Q200	MURATA	GCM188R71H224KA64D
6	6	C57, C58, C59, C61, C72, C73	CAP ALUM POLY 100UF 25V 20% 8X6.9MM 0.024 OHM 3200MA 5000H	PANASONIC	25SVPF100M
7	2	C60, C65	CAP CER 0.1uF 100V 10% X7R 0603	MURATA	GRM188R72A104KA35D
8	1	C69	CAP CER 0.47uF 25V 10% X7R 0603	MURATA	GRM188R71E474KA12D
9	3	C78, C79, C81	CAP ALUM POLY 330UF 25V 20% 10X12.6MM 0.014 OHM 5000MA 5000H	PANASONIC	25SVPF330M
10	2	C86, C89	CAP CER 10uF 63V 10% X7R 1210	SAMSUNG	CL32B106KMVNNWE
11	1	L3	IND POWER SHIELDED WIREWOUND 6.8UH 20% 100KHZ 47.5A 0.88MOHM 28X27MM AEC-Q200	WURTH ELEKTRONIK	7443640680B
12	2	Q17, Q21	TRAN MOSFET N-CH 60V 15A	INFINEON TECHNOLOGIES	BSC065N06LS5ATMA1
13	2	Q2, Q3	TRAN, P-CHANNEL (D-S) MOSFET, 12.5A	VISHAY	SUD50P08-25L
14	1	Q22	TRAN MOSFET N-CH 60V 23A 8LD TDSON EP	INFINEON TECHNOLOGIES	BSC027N06LS5ATMA1
15	3	R1, R2, R3	RES SMD 0.0007 OHM 1% 7W 2526 AEC-Q200	VISHAY	WSLP2726L7000FEA
16	4	R45, R50, R100, R105	RES SMD 0 Ohm JUMPER 1/4W 1206 AEC-Q200	PANASONIC	ERJ-8GEY0R00V
17	11	R13, R15, R22, R23, R25, R70, R72, R78, R79, R108, R111	RES SMD 0 Ohm JUMPER 1/10W 0603 AEC-Q200	PANASONIC	ERJ-3GEY0R00V
18	1	R110	RES SMD 0.002 OHM 1% 3W 2512 AEC-Q200	PANASONIC	ERJ-MS4SF2M0U
19	2	R112, R114	RES SMD 0 OHM JUMPER 2512 AEC-Q200	VISHAY	WSL251200000ZEA9
20	1	R120	RES SMD 10K Ohm 1% 1/10W 0603 AEC-Q200	PANASONIC	ERJ-3EKF1002V
21	3	R27, R89 ,R90	RES SMD 0 Ohm 1/8W 0805 AEC-Q200	PANASONIC	ERJ-6GEY0R00V
22	1	R66	RES SMD 100K Ohm 5% 1/10W 0603	YAGEO	RC0603JR-07100KL
23	1	R67	RES SMD 20K Ohm 1% 1/10W 0603 AEC-Q200	PANASONIC	ERJ-3EKF2002V
24	1	R98	RES SMD 7.32K Ohm 1% 1/10W 0603 AEC-Q200	PANASONIC	ERJ-3EKF7321V
MECHANICAL PARTS					
1	1		SHUNT, 2POS, 2MM PITCH, BLACK	SAMTEC INC.	2SN-BK-G
2	12		WASHER, #10 FLAT STEEL	KEYSTONE	4703
3	12		WASHER, LOCK STEEL 3/64 INCHES THICK	KEYSTONE	1477
4	24		NUT, HEX STEEL, 10-32 THREAD, 9.27MM OUT DIA	KEYSTONE	4705
5	4		SCREW, PAN HD, SLOTD, 4-40 X 3/8	MCMASTER-CARR	91792A108
6	4		STANDOFF, NYLON HEX FEMALE 6.35MM O.D, 4-40 THREAD, 1/2 INCH LONG	KEYSTONE	1902C

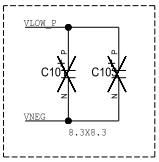
EV-DPS-PWRBD5Z Schematic Diagrams



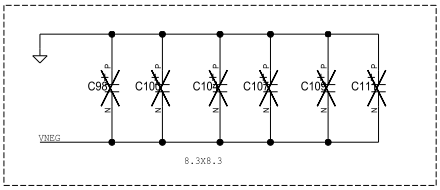
VHIGH ADDITIONAL PROVISION CAPS

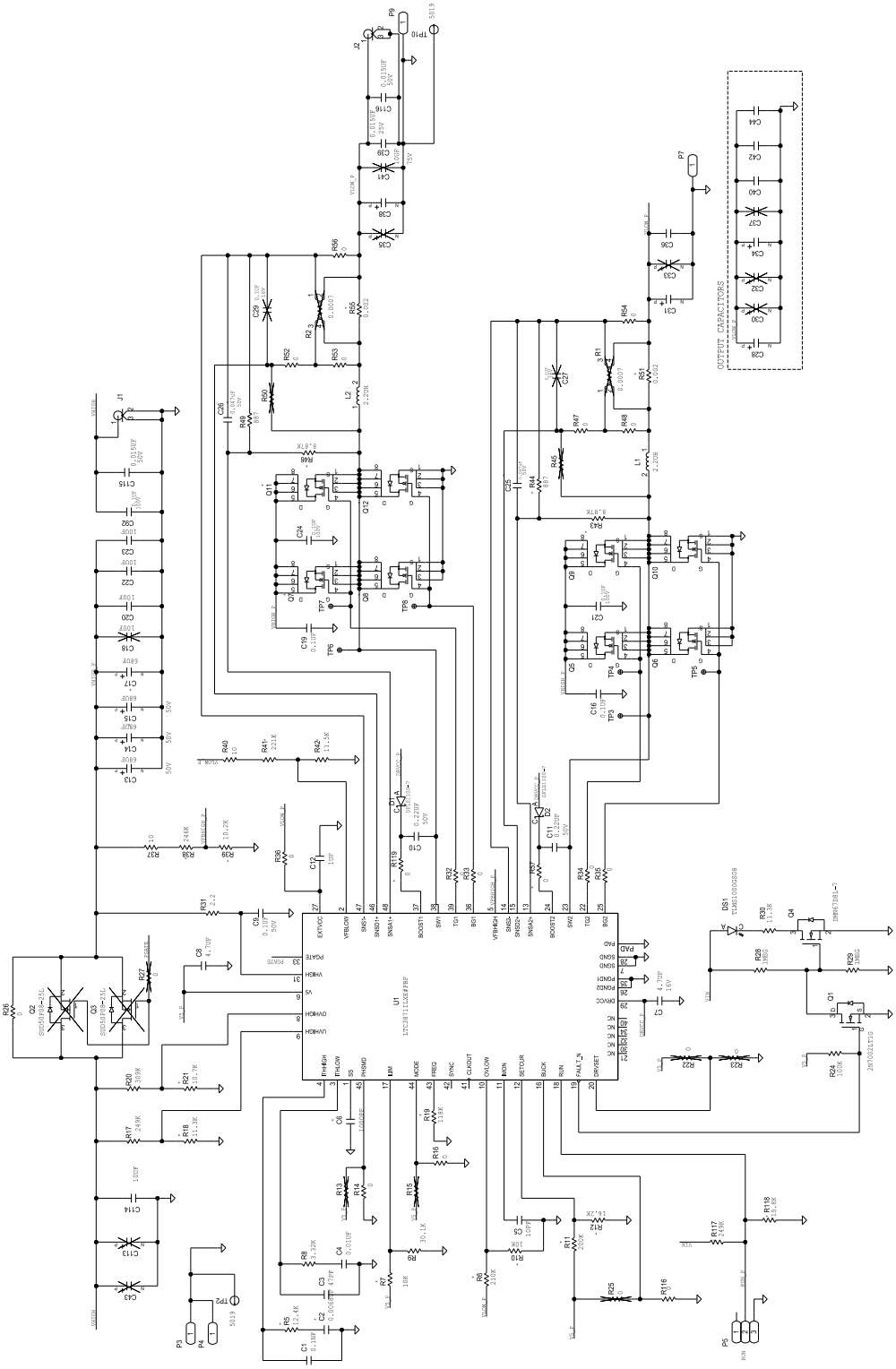


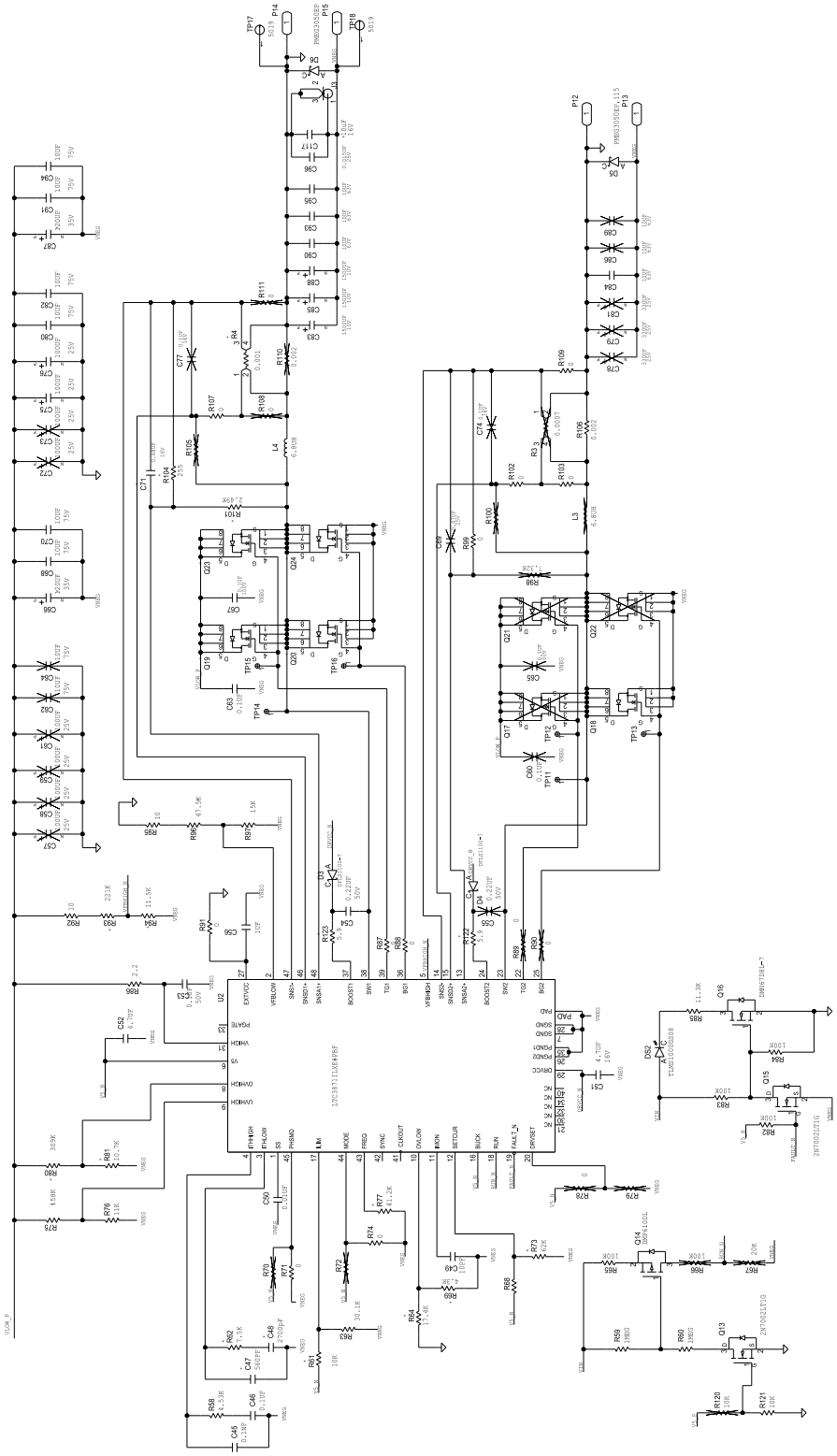
VLOW TO VNEG ADDITIONAL PROVISION CAPS



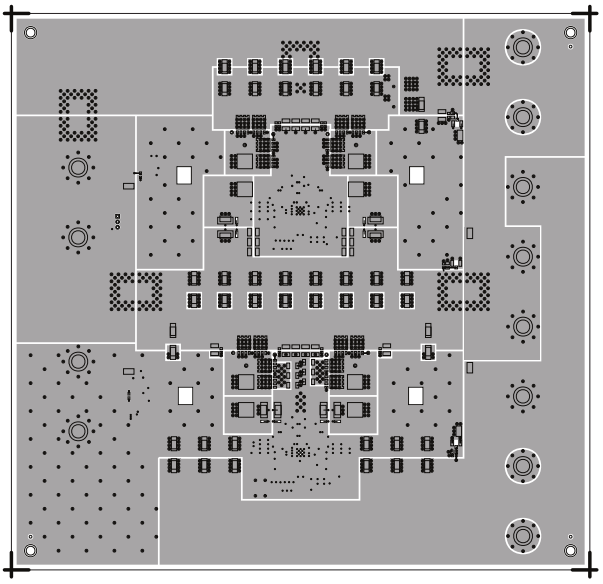
VNEG ADDITIONAL PROVISION CAPS



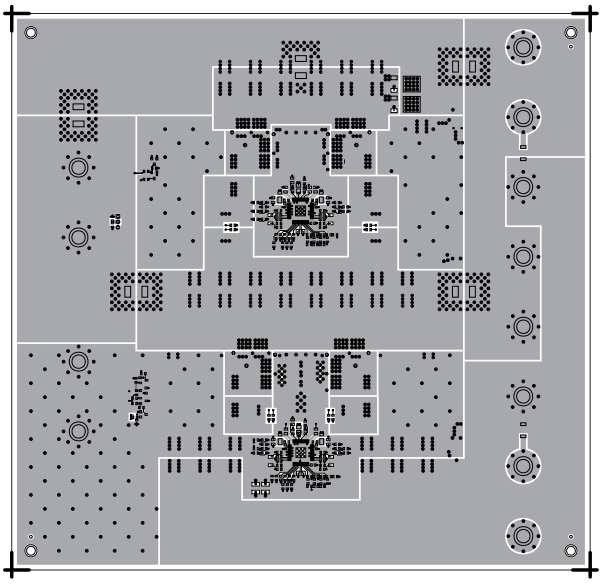




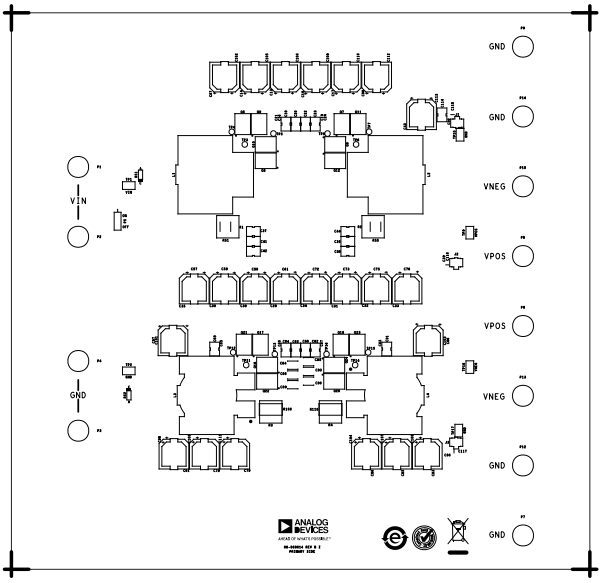
EV-DPS-PWRBD1Z/4Z/5Z PCB Layout Diagrams



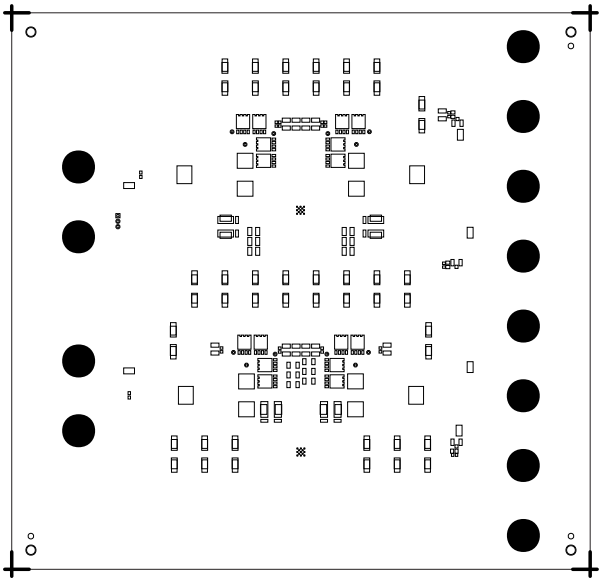
EV-DPS-PWRBD1Z/4Z/5Z EV Kit PCB Layout—Top Layer



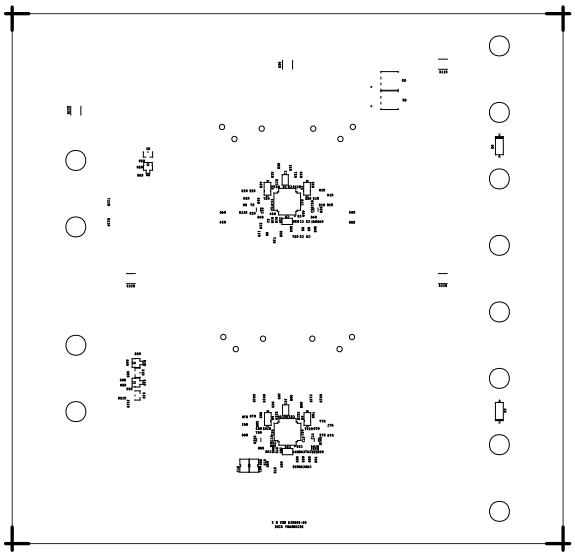
EV-DPS-PWRBD1Z/4Z/5Z EV Kit PCB Layout—Bottom Layer



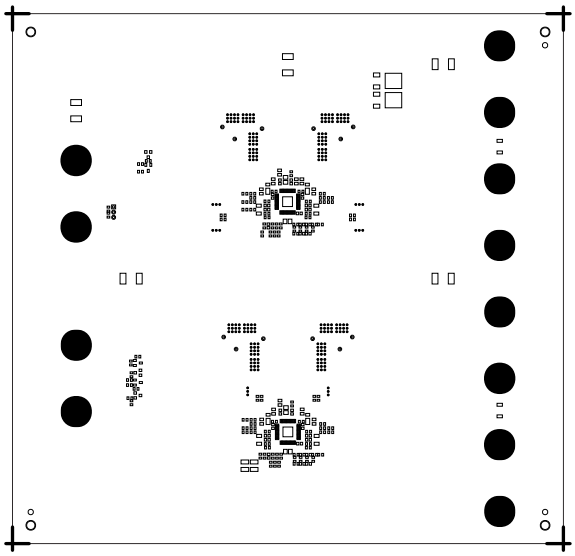
EV-DPS-PWRBD1Z/4Z/5Z EV Kit Silkscreen—Top Layer



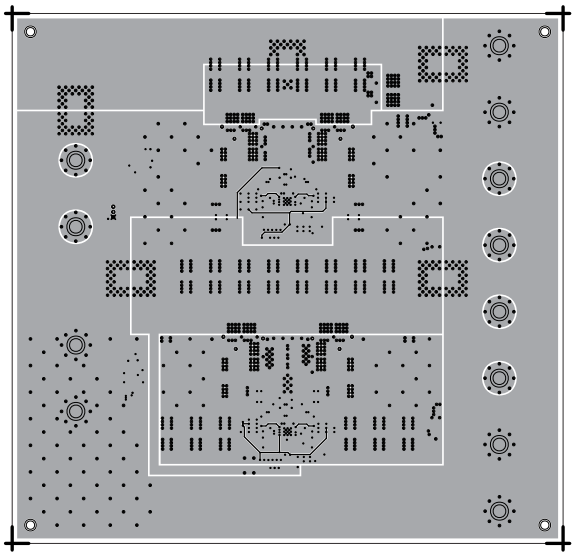
EV-DPS-PWRBD1Z/4Z/5Z EV Kit Silkscreen—Bottom Layer



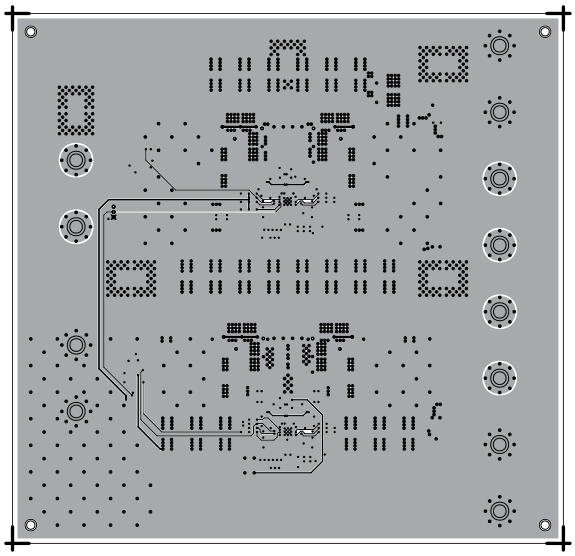
EV-DPS-PWRBD1Z/4Z/5Z EV Kit PCB Layout—Second Layer (Power)



EV-DPS-PWRBD1Z/4Z/5Z EV Kit PCB Layout—Third Layer (Signal)



EV-DPS-PWRBD1Z/4Z/5Z EV Kit PCB Layout—Fourth Layer (Signal)



EV-DPS-PWRBD1Z/4Z/5Z EV Kit PCB Layout—Fifth Layer (GND)

Revision History

REVISION NUMBER	REVISION DATE	DESCRIPTION	PAGES CHANGED
0	5/25	Initial release	—

Notes

Mouser Electronics

Authorized Distributor

Click to View Pricing, Inventory, Delivery & Lifecycle Information:

Analog Devices Inc.:

EV-DPS-PWRBD5Z EV-DPS-PWRBD4Z EV-DPS-PWRBD1Z