

Power Reference Design for the TMS320C6472 12-Vin Digital Power Controllers and LDOs (8x C6472)

This design was created to help designers wishing to design up to eight TMS320C6472 Digital Signal Processors (DSP) into a system using a nominal input voltage of 12 V, having a highly flexible power design, the ability to monitor temperature, and dynamically monitor and control voltage and current.

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1 Introduction

This reference design is for powering up to eight TMS320C6472 DSPs and accounts for voltage and current requirements given in [Table 2](#). The core voltage has been optimized for 1-V operation. This design also includes enough margin on the 1.8-V rail to account for typical amounts of memory (2 x 667MHz DDR SDRAM) per TMS320C6472, which comes to just over 600 mA.

The TMS320C6472 requires a 3.3-V, 1.8-V, 1.2-V, and 1-V/1.1-V/1.2-V input. Power-up sequencing is required and is shown in the following power specification table ([Table 1](#)). In multivoltage architectures, coordinated management of power supplies is necessary to avoid potential problems and ensure reliable performance. Power supply designers must consider the timing and voltage differences between core and I/O voltage supplies during power-up and power-down operations.

Sequencing refers to the order, timing, and differential in which the two voltage rails are powered up and down. A system designed without proper sequencing may be at risk for two types of failures. The first of these represents a threat to the long-term reliability of the dual-voltage device, while the second is more immediate, with the possibility of damaging interface circuits in the processor or system devices such as memory, logic, or data converter integrated circuits (IC)

Another potential problem with improper supply sequencing is bus contention. Bus contention is a condition when the processor and another device both attempt to control a bidirectional bus during power up. Bus contention may also affect input/output (I/O) reliability. Power supply designers must check the requirements regarding bus contention for individual devices.

2 Power Requirements

The power requirements for each TMS320C6472 are listed in [Table 1](#).

For more information and other reference designs, visit www.ti.com/processorpower.

Table 1. TMS320C6472⁽¹⁾ Power Requirements

Core, I/O	Pin Name	Voltage (V)	I _{max} (mA)	Tolerance	Sequencing Order	Timing Delay
Core	CVDD, CVDD2 ⁽²⁾	1 / 1.1 / 1.2	9500	±5	2	<200 ms
	CVDD1	1.2	260	±5		
IO	DVDD33	3.3	100	±5	1	<200 ms
	DVDD18 ⁽³⁾ , DVDD15	1.8 ⁽⁴⁾	150	±5	3	
Analog	AVDDA1, AVDDA2, AVDDA3, DVDDD	1.8 ⁽⁴⁾	190	±5		3
	AVDDA, DVDDD, AVDDT, AVDDA4, DVDDR	1.2	170	±5		

⁽¹⁾ Consult the TMS320C6472 power spreadsheet for your exact power requirements.

⁽²⁾ CVDD and CVDD2 are 1 V @ 500 MHz, 1.1 V @ 625 MHz (I_{max} = 4900 mA), and 1.2 V @ 700 MHz (I_{max} = 9500 mA).

⁽³⁾ DVDD18 voltage rail includes power required for external DDR2 memory.

⁽⁴⁾ All 1.8-V rails may be combined, and all 1.1-V rails may be combined; however, follow the filtering recommendations for each voltage rail in the *TMS320C6472 Hardware Design Guide* ([SPRAAQ4](#)).

Table 2. Reference Design Parameters

V _{in}	12 V ± 10%
V _{out1}	1 V ± 5% at 40 A
V _{out2}	1.2 V ± 5% at 2.4 mA
V _{out3}	3.3 V ± 5% at 8 A
V _{out4}	1.8 V ± 5% at 8 A
V _{out5}	1.2 V ± 5% at 1.6 A
DDR Termination	0.9 V at 3 A (x8)

3 Device Features

UCD9240

- Fully Configurable Multi-output and Multiphase Nonisolated DC/DC PWM Controller
- Controls Up To Four Voltage Rails and Up To Eight Phases
- Supports Switching Frequencies Up to 2 MHz With 250-ps Duty-Cycle Resolution
- Up to 1-mV, Closed-Loop Resolution
- Hardware-Accelerated, 3-Pole/3-Zero Compensator With Nonlinear Gain for Improved Transient Performance
- Supports Multiple Soft-Start and Soft-Stop Configurations Including Prebias Start-Up
- Supports Voltage Tracking, Margining, and Sequencing
- Supports Current and Temperature Balancing for Multiphase Power Stages
- Supports Phase Adding/Shedding for Multiphase Power Stages
- Synchronous In/Out Pins Align DPWM Clocks Between Multiple UCD9240 Devices
- Fan Monitoring and Control
- 12-Bit Digital Monitoring of Power Supply Parameters

UCD7230A

- Up to 2-MHz Switching Frequency
- Dual-Current Limit Protection With Independently Adjustable Thresholds
- Fast Current Sense Circuit With Adjustable Blanking Interval Prevents Catastrophic Current Levels
- Digital Output Current Limit Flag
- Low Offset, Gain of 48, Differential Current Sense Amplifier
- 3.3-V, 10-mA Internal Regulator
- Dual TrueDrive™ High-Current Drivers
- 10-ns Typical Rise/Fall Times With 2.2-nF Loads
- 4.5-V to 15.5-V Supply Voltage Range

TPS74401

- Soft-Start (SS) Pin Provides a Linear Start-Up With Ramp Time Set by External Capacitor
- 1% Accuracy Over Line, Load, and Temperature
- Supports Input Voltages as Low as 0.9 V With External Bias Supply
- Adjustable Output (0.8 V to 3.6 V)
- Ultralow Dropout: 115 mV at 3 A (Typical)
- Stable With Any or No Output Capacitor
- Available in 5-mm × 5-mm × 1-mm QFN and DDPAK-7 Packages

TPS51200

- 3-A DDR Termination LDO
- VLDOIN Voltage Range: 1.1 V to 3.5 V
- Sink/Source Termination Regulator Includes Droop Compensation
- Requires Minimum Output Capacitance of 20-μF (Typically 3 × 10-μF MLCCs) for Memory Termination Applications (DDR)
- PGOOD to Monitor Output Regulation and Remote Sensing (VOSNS)
- ±10-mA Buffered Reference (REFOUT)
- Meets DDR, DDR2 JEDEC Specifications; Supports DDR3 and Low-Power DDR3/DDR4 VTT Applications

TMP300

- Accuracy: ±1°C (Typical at +25°C)
- Programmable Trip Point
- Programmable Hysteresis: 5°C/10°C
- Open-Drain Outputs
- Low-Power: 110 μA (Maximum)

- Wide Voltage Range: +1.8 V to +18 V
- Operating Temperature Range: -40°C to $+150^{\circ}\text{C}$
- Analog Out: 10 mV/ $^{\circ}\text{C}$
- SC70-6 and SOT23-6 Packages

4 Schematics

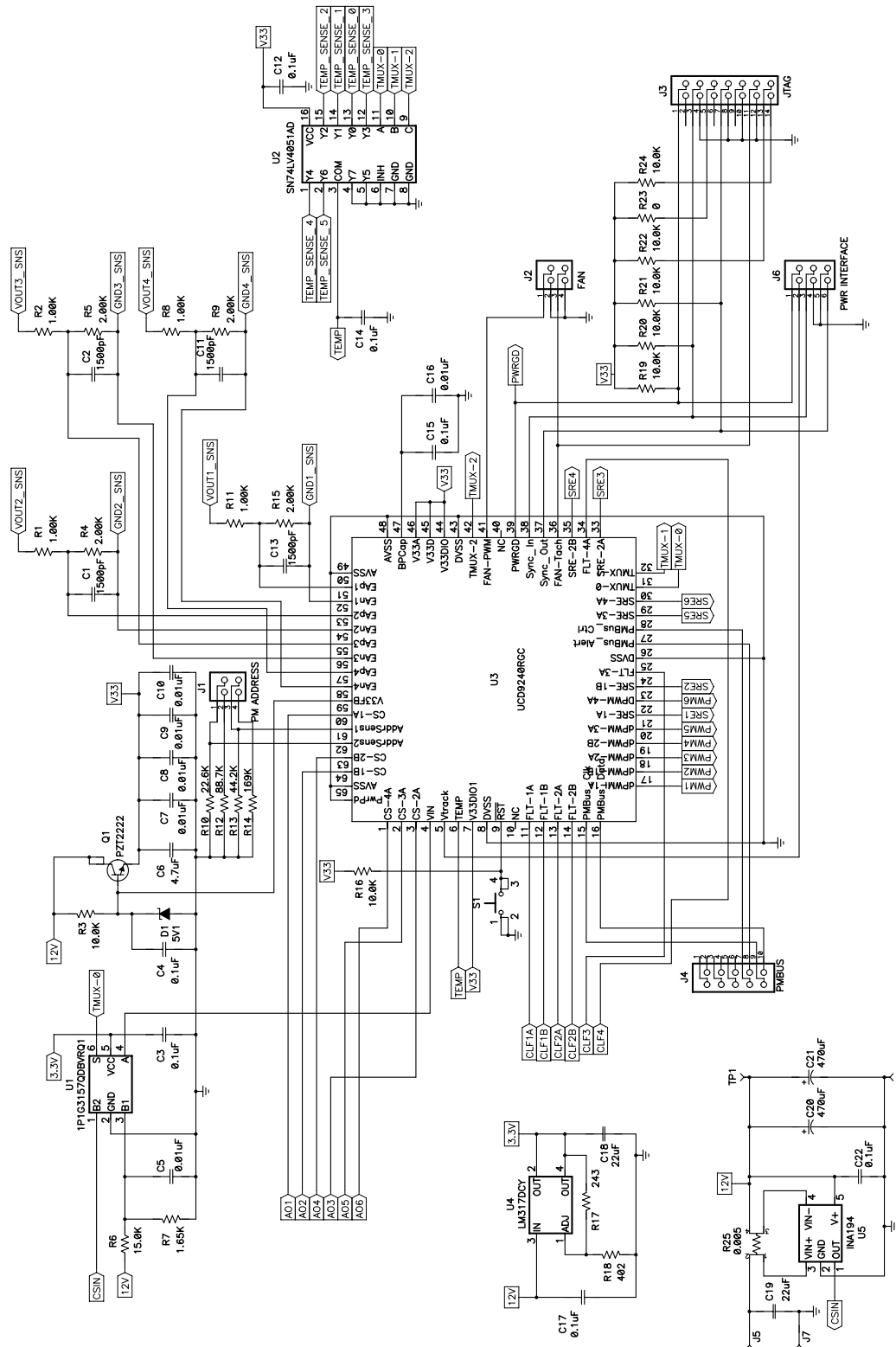


Figure 1. Schematic, 1 of 5

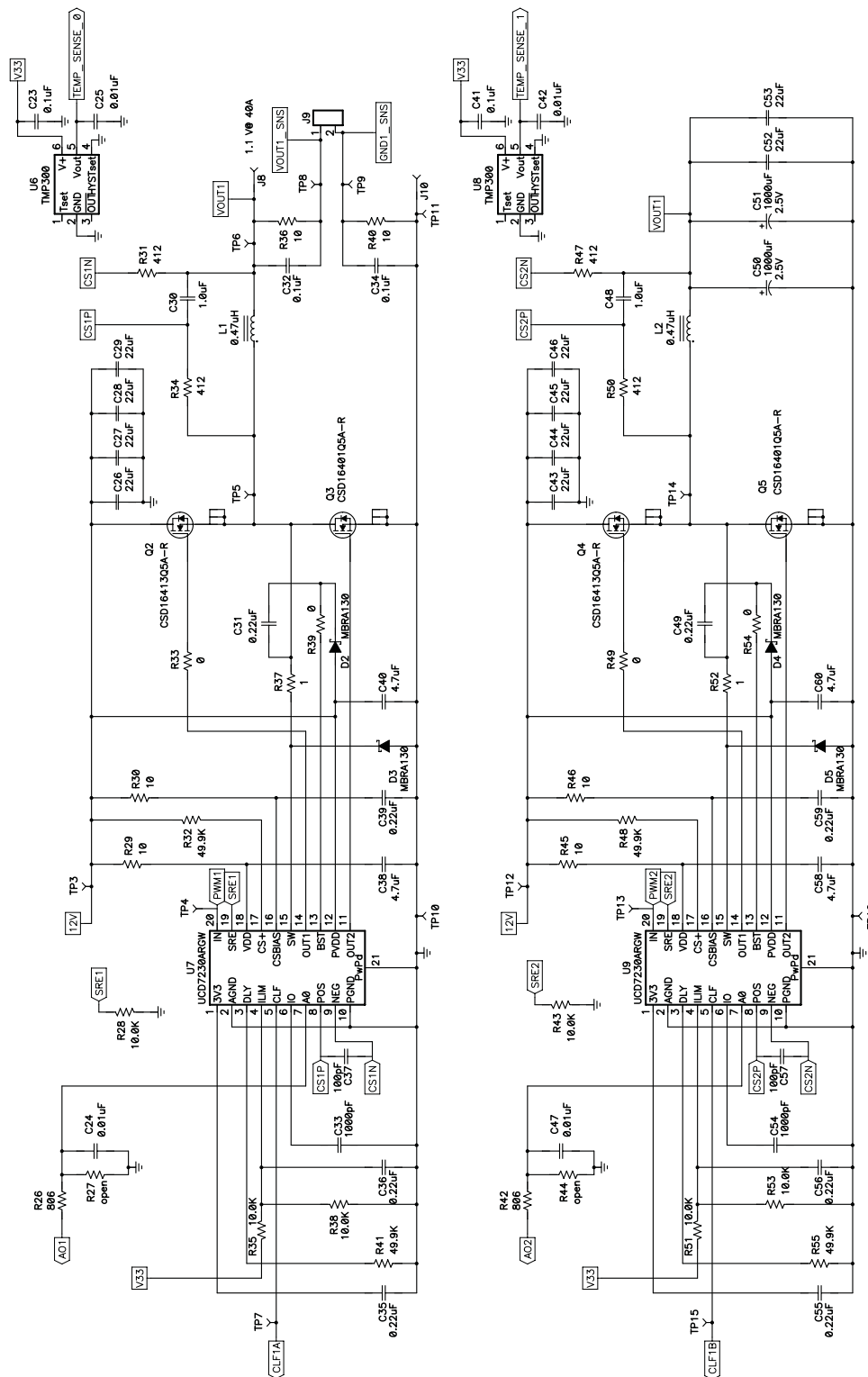


Figure 2. Schematic, 2 of 5

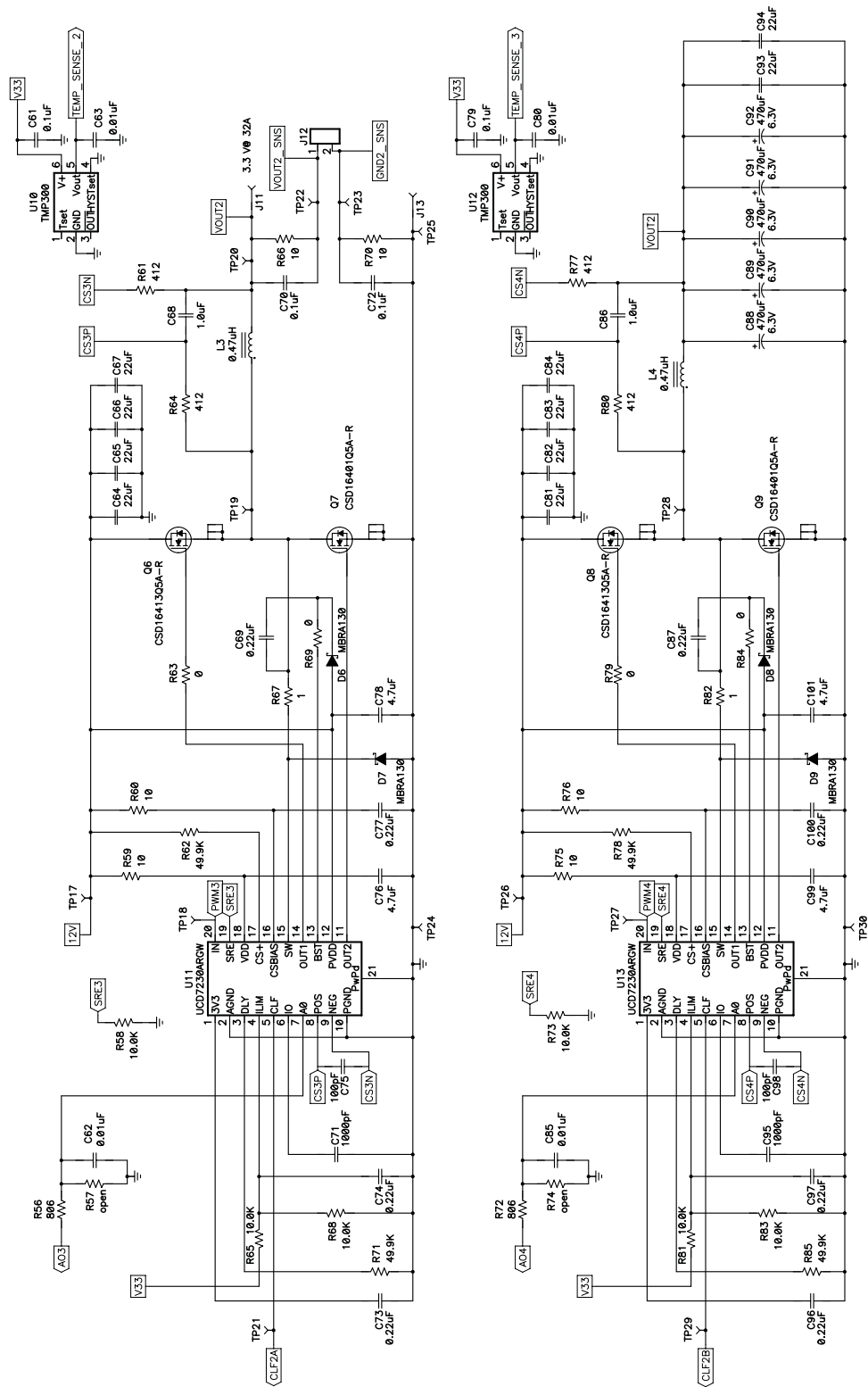


Figure 3. Schematic, 3 of 5

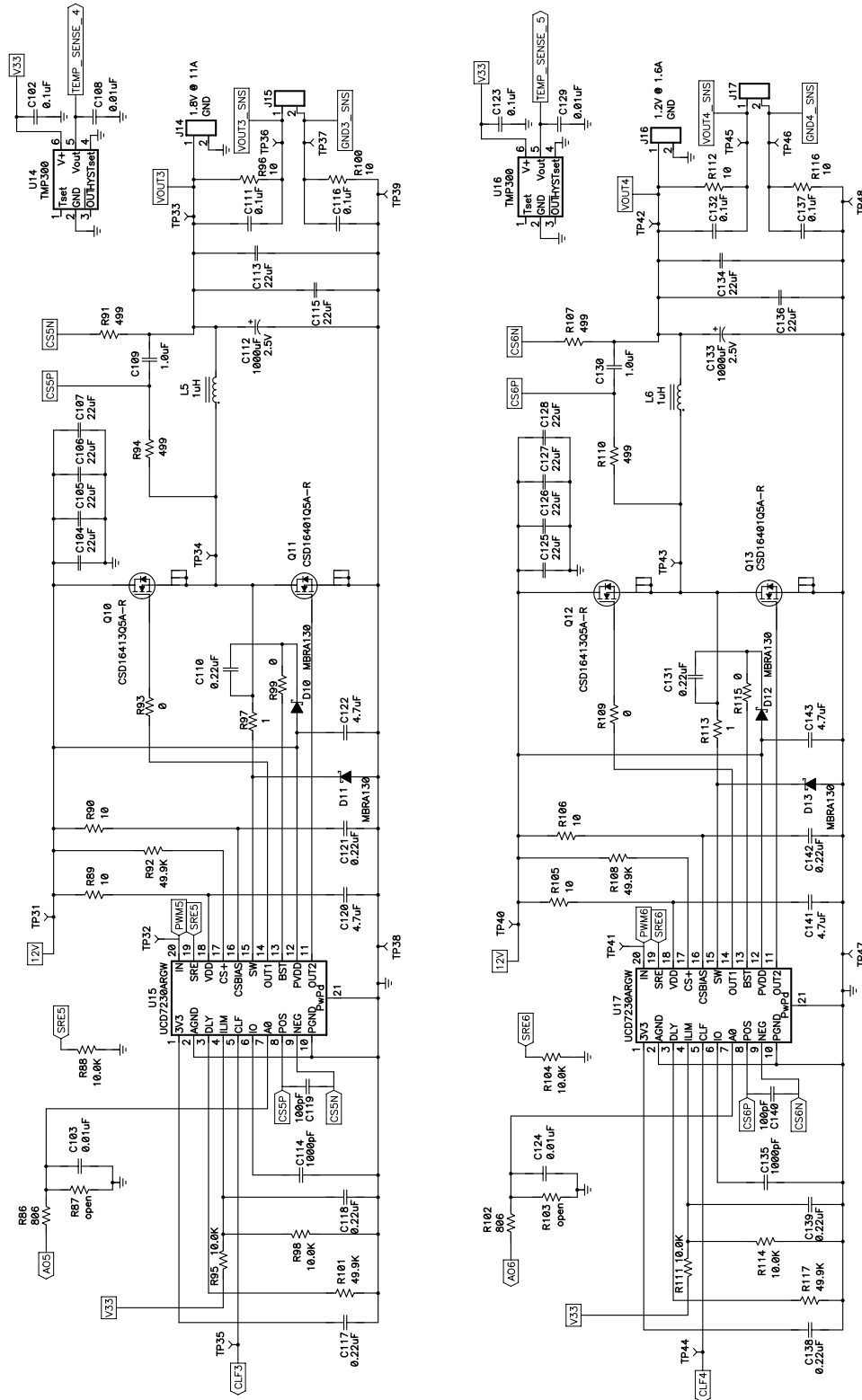


Figure 4. Schematic, 4 of 5

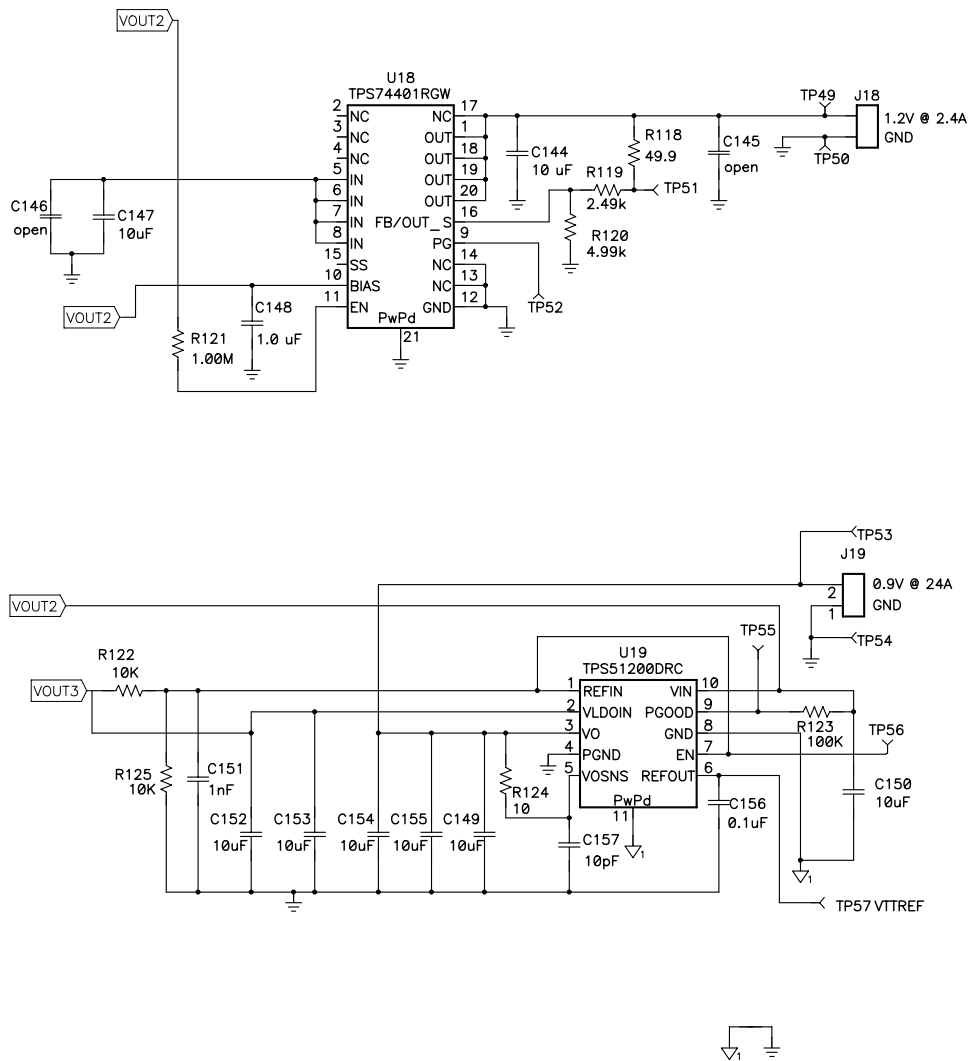


Figure 5. Schematic, 5 of 5

5 Bill of Materials

Table 3. PMP5176.6 Bill of Materials

Count	RefDes	Value	Description	Size	Part Number	MFR
4	C1	1500pF	Capacitor, Ceramic, 50V, C0G, 5%	0603	Std	Std
	C2	1500pF	Capacitor, Ceramic, 50V, C0G, 5%	0603	Std	Std
	C3	0.1µF	Capacitor, Ceramic, 50V, X7R, 10%	0603	Std	Std
	C4	0.1µF	Capacitor, Ceramic, 50V, X7R, 10%	0603	Std	Std
12	C5	0.01µF	Capacitor, Ceramic, 50V, X7R, 10%	0603	Std	Std
1	C6	4.7µF	Capacitor, Ceramic, 6.3, X5R, 20%	0603	Std	Std
	C7	0.01µF	Capacitor, Ceramic, 50V, X7R, 10%	0603	Std	Std
	C8	0.01µF	Capacitor, Ceramic, 50V, X7R, 10%	0603	Std	Std
	C9	0.01µF	Capacitor, Ceramic, 50V, X7R, 10%	0603	Std	Std
	C10	0.01µF	Capacitor, Ceramic, 50V, X7R, 10%	0603	Std	Std
	C11	1500pF	Capacitor, Ceramic, 50V, C0G, 5%	0603	Std	Std
	C12	0.1µF	Capacitor, Ceramic, 50V, X7R, 10%	0603	Std	Std
	C13	1500pF	Capacitor, Ceramic, 50V, C0G, 5%	0603	Std	Std
	C14	0.1µF	Capacitor, Ceramic, 50V, X7R, 10%	0603	Std	Std
	C15	0.1µF	Capacitor, Ceramic, 50V, X7R, 10%	0603	Std	Std
	C16	0.01µF	Capacitor, Ceramic, 50V, X7R, 10%	0603	Std	Std
	C17	0.1µF	Capacitor, Ceramic, 50V, X7R, 10%	0603	Std	Std
2	C18	22µF	Capacitor, Ceramic, 25V, X5R, 20%	1210	Std	Std
	C19	22µF	Capacitor, Ceramic, 25V, X5R, 20%	1210	Std	Std
2	C20	470µF	Capacitor, OS CON, 16V, 20mΩ, 20%	10.3mm (F12)	16SVP470M	Sanyo
	C21	470µF	Capacitor, OS CON, 16V, 20mΩ, 20%	10.3mm (F12)	16SVP470M	Sanyo
13	C22	0.1µF	Capacitor, Ceramic, 50V, X7R, 10%	0603	Std	Std
	C23	0.1µF	Capacitor, Ceramic, 50V, X7R, 15%	0603	Std	Std
	C24	0.01µF	Capacitor, Ceramic, 50V, X7R, 10%	0603	Std	Std
5	C25	0.01µF	Capacitor, Ceramic, 50V, X7R, 15%	0603	Std	Std
16	C26	22µF	Capacitor, Ceramic, 25V, X7R, 20%	1210	Std	Std
	C27	22µF	Capacitor, Ceramic, 25V, X7R, 20%	1210	Std	Std
	C28	22µF	Capacitor, Ceramic, 25V, X7R, 20%	1210	Std	Std
	C29	22µF	Capacitor, Ceramic, 25V, X7R, 20%	1210	Std	Std
5	C30	1.0µF	Capacitor, Ceramic, 25V, X5R, 20%	0603	Std	Std
9	C31	0.22µF	Capacitor, Ceramic, 25V, X7R, 15%	0603	Std	Std
	C32	0.1µF	Capacitor, Ceramic, 50V, X7R, 10%	0603	Std	Std
4	C33	1000pF	Capacitor, Ceramic, 50V, C0G, 5%	0603	Std	Std
	C34	0.1µF	Capacitor, Ceramic, 50V, X7R, 10%	0603	Std	Std
15	C35	0.22µF	Capacitor, Ceramic, 25V, X7R, 10%	0603	Std	Std
	C36	0.22µF	Capacitor, Ceramic, 25V, X7R, 10%	0603	Std	Std
4	C37	100pF	Capacitor, Ceramic, 50V, C0G, 5%	0603	Std	Std
10	C38	4.7µF	Capacitor, Ceramic, 10V, X5R, 20%	0805	Std	Std
	C39	0.22µF	Capacitor, Ceramic, 25V, X7R, 10%	0603	Std	Std
	C40	4.7µF	Capacitor, Ceramic, 10V, X5R, 20%	0805	Std	Std
	C41	0.1µF	Capacitor, Ceramic, 50V, X7R, 10%	0603	Std	Std
	C42	0.01µF	Capacitor, Ceramic, 50V, X7R, 10%	0603	Std	Std
	C43	22µF	Capacitor, Ceramic, 25V, X7R, 20%	1210	Std	Std
	C44	22µF	Capacitor, Ceramic, 25V, X7R, 20%	1210	Std	Std
	C45	22µF	Capacitor, Ceramic, 25V, X7R, 20%	1210	Std	Std
	C46	22µF	Capacitor, Ceramic, 25V, X7R, 20%	1210	Std	Std
	C47	0.01µF	Capacitor, Ceramic, 50V, X7R, 10%	0603	Std	Std
	C48	1.0µF	Capacitor, Ceramic, 25V, X5R, 20%	0603	Std	Std
	C49	0.22µF	Capacitor, Ceramic, 25V, X7R, 15%	0603	Std	Std
4	C50	1000µF	Capacitor, POS-Cap, 1000µF, 2.5V, 0.005 Ω, 20%, 7343	7343	2R5TPD1000M5	Sanyo
	C51	1000µF	Capacitor, POS-Cap, 1000µF, 2.5V, 0.005 Ω, 20%, 7343	7343	2R5TPD1000M5	Sanyo
16	C52	22µF	Capacitor, Ceramic, 16V, X7R, 15%	1210	Std	Std
	C53	22µF	Capacitor, Ceramic, 16V, X7R, 15%	1210	Std	Std
2	C54	1000pF	Capacitor, Ceramic, 50V, X7R, 15%	0603	Std	Std

Table 3. PMP5176.6 Bill of Materials (continued)

Count	RefDes	Value	Description	Size	Part Number	MFR
	C55	0.22μF	Capacitor, Ceramic, 25V, X7R, 10%	0603	Std	Std
	C56	0.22μF	Capacitor, Ceramic, 25V, X7R, 10%	0603	Std	Std
2	C57	100pF	Capacitor, Ceramic, 25V, X7R, 15%	0603	Std	Std
	C58	4.7μF	Capacitor, Ceramic, 10V, X5R, 20%	0805	Std	Std
	C59	0.22μF	Capacitor, Ceramic, 25V, X7R, 10%	0603	Std	Std
	C60	4.7μF	Capacitor, Ceramic, 10V, X5R, 20%	0805	Std	Std
	C61	0.1μF	Capacitor, Ceramic, 50V, X7R, 15%	0603	Std	Std
	C62	0.01μF	Capacitor, Ceramic, 50V, X7R, 10%	0603	Std	Std
	C63	0.01μF	Capacitor, Ceramic, 50V, X7R, 15%	0603	Std	Std
	C64	22μF	Capacitor, Ceramic, 25V, X7R, 20%	1210	Std	Std
	C65	22μF	Capacitor, Ceramic, 25V, X7R, 20%	1210	Std	Std
	C66	22μF	Capacitor, Ceramic, 25V, X7R, 20%	1210	Std	Std
	C67	22μF	Capacitor, Ceramic, 25V, X7R, 20%	1210	Std	Std
	C68	1.0μF	Capacitor, Ceramic, 25V, X5R, 20%	0603	Std	Std
	C69	0.22μF	Capacitor, Ceramic, 25V, X7R, 15%	0603	Std	Std
	C70	0.1μF	Capacitor, Ceramic, 50V, X7R, 10%	0603	Std	Std
	C71	1000pF	Capacitor, Ceramic, 50V, C0G, 5%	0603	Std	Std
	C72	0.1μF	Capacitor, Ceramic, 50V, X7R, 10%	0603	Std	Std
	C73	0.22μF	Capacitor, Ceramic, 25V, X7R, 10%	0603	Std	Std
	C74	0.22μF	Capacitor, Ceramic, 25V, X7R, 10%	0603	Std	Std
	C75	100pF	Capacitor, Ceramic, 50V, C0G, 5%	0603	Std	Std
	C76	4.7μF	Capacitor, Ceramic, 10V, X5R, 20%	0805	Std	Std
	C77	0.22μF	Capacitor, Ceramic, 25V, X7R, 10%	0603	Std	Std
	C78	4.7μF	Capacitor, Ceramic, 10V, X5R, 20%	0805	Std	Std
1	C79	0.1μF	Capacitor, Ceramic, 50V, X7R, 20%	0603	Std	Std
1	C80	0.01μF	Capacitor, Ceramic, 50V, X7R, 20%	0603	Std	Std
	C81	22μF	Capacitor, Ceramic, 25V, X7R, 20%	1210	Std	Std
	C82	22μF	Capacitor, Ceramic, 25V, X7R, 20%	1210	Std	Std
	C83	22μF	Capacitor, Ceramic, 25V, X7R, 20%	1210	Std	Std
	C84	22μF	Capacitor, Ceramic, 25V, X7R, 20%	1210	Std	Std
	C85	0.01μF	Capacitor, Ceramic, 50V, X7R, 10%	0603	Std	Std
	C86	1.0μF	Capacitor, Ceramic, 25V, X5R, 20%	0603	Std	Std
	C87	0.22μF	Capacitor, Ceramic, 25V, X7R, 15%	0603	Std	Std
5	C88	470μF	Capacitor, POS-Cap, 470μF, 6.3V, 0.01Ω, 20%, 7343	7343	6TPD470M	Sanyo
	C89	470μF	Capacitor, POS-Cap, 470μF, 6.3V, 0.01Ω, 20%, 7343	7343	6TPD470M	Sanyo
	C90	470μF	Capacitor, POS-Cap, 470μF, 6.3V, 0.01Ω, 20%, 7343	7343	6TPD470M	Sanyo
	C91	470μF	Capacitor, POS-Cap, 470μF, 6.3V, 0.01Ω, 20%, 7343	7343	6TPD470M	Sanyo
	C92	470μF	Capacitor, POS-Cap, 470μF, 6.3V, 0.01Ω, 20%, 7343	7343	6TPD470M	Sanyo
	C93	22μF	Capacitor, Ceramic, 16V, X7R, 15%	1210	Std	Std
	C94	22μF	Capacitor, Ceramic, 16V, X7R, 15%	1210	Std	Std
	C95	1000pF	Capacitor, Ceramic, 50V, C0G, 5%	0603	Std	Std
	C96	0.22μF	Capacitor, Ceramic, 25V, X7R, 10%	0603	Std	Std
	C97	0.22μF	Capacitor, Ceramic, 25V, X7R, 10%	0603	Std	Std
	C98	100pF	Capacitor, Ceramic, 50V, C0G, 5%	0603	Std	Std
	C99	4.7μF	Capacitor, Ceramic, 10V, X5R, 20%	0805	Std	Std
	C100	0.22μF	Capacitor, Ceramic, 25V, X7R, 10%	0603	Std	Std
	C101	4.7μF	Capacitor, Ceramic, 10V, X5R, 20%	0805	Std	Std
	C102	0.1μF	Capacitor, Ceramic, 50V, X7R, 15%	0603	Std	Std
	C103	0.01μF	Capacitor, Ceramic, 50V, X7R, 10%	0603	Std	Std
	C104	22μF	Capacitor, Ceramic, 16V, X7R, 15%	1210	Std	Std
	C105	22μF	Capacitor, Ceramic, 16V, X7R, 15%	1210	Std	Std
	C106	22μF	Capacitor, Ceramic, 16V, X7R, 15%	1210	Std	Std
	C107	22μF	Capacitor, Ceramic, 16V, X7R, 15%	1210	Std	Std
	C108	0.01μF	Capacitor, Ceramic, 50V, X7R, 15%	0603	Std	Std
1	C109	1.0μF	Capacitor, Ceramic, 16V, X7R, 15%	0603	Std	Std
	C110	0.22μF	Capacitor, Ceramic, 25V, X7R, 15%	0603	Std	Std

Table 3. PMP5176.6 Bill of Materials (continued)

Count	RefDes	Value	Description	Size	Part Number	MFR
8	C111	0.1µF	Capacitor, Ceramic, 50V, X7R, 15%	0603	Std	Std
	C112	1000µF	Capacitor, POS-Cap, 1000µF, 2.5V, 0.005 Ω, 20%, 7343	7343	2R5TPD1000M5	Sanyo
	C113	22µF	Capacitor, Ceramic, 16V, X7R, 15%	1210	Std	Std
	C114	1000pF	Capacitor, Ceramic, 50V, C0G, 5%	0603	Std	Std
	C115	22µF	Capacitor, Ceramic, 16V, X7R, 15%	1210	Std	Std
	C116	0.1µF	Capacitor, Ceramic, 50V, X7R, 15%	0603	Std	Std
	C117	0.22µF	Capacitor, Ceramic, 25V, X7R, 10%	0603	Std	Std
	C118	0.22µF	Capacitor, Ceramic, 25V, X7R, 10%	0603	Std	Std
	C119	100pF	Capacitor, Ceramic, 50V, C0G, 5%	0603	Std	Std
	C120	4.7µF	Capacitor, Ceramic, 10V, X5R, 20%	0805	Std	Std
	C121	0.22µF	Capacitor, Ceramic, 25V, X7R, 10%	0603	Std	Std
	C122	4.7µF	Capacitor, Ceramic, 10V, X5R, 20%	0805	Std	Std
	C123	0.1µF	Capacitor, Ceramic, 50V, X7R, 15%	0603	Std	Std
	C124	0.01µF	Capacitor, Ceramic, 50V, X7R, 15%	0603	Std	Std
	C125	22µF	Capacitor, Ceramic, 16V, X7R, 15%	1210	Std	Std
	C126	22µF	Capacitor, Ceramic, 16V, X7R, 15%	1210	Std	Std
	C127	22µF	Capacitor, Ceramic, 16V, X7R, 15%	1210	Std	Std
	C128	22µF	Capacitor, Ceramic, 16V, X7R, 15%	1210	Std	Std
	C129	0.01µF	Capacitor, Ceramic, 50V, X7R, 15%	0603	Std	Std
	C130	1.0µF	Capacitor, Ceramic, 25V, X5R, 20%	0603	Std	Std
	C131	0.22µF	Capacitor, Ceramic, 25V, X7R, 15%	0603	Std	Std
	C132	0.1µF	Capacitor, Ceramic, 50V, X7R, 15%	0603	Std	Std
	C133	1000µF	Capacitor, POS-Cap, 1000µF, 2.5V, 0.005 Ω, 20%, 7343	7343	2R5TPD1000M5	Sanyo
	C134	22µF	Capacitor, Ceramic, 16V, X7R, 15%	1210	Std	Std
	C135	1000pF	Capacitor, Ceramic, 50V, X7R, 15%	0603	Std	Std
	C136	22µF	Capacitor, Ceramic, 16V, X7R, 15%	1210	Std	Std
	C137	0.1µF	Capacitor, Ceramic, 50V, X7R, 15%	0603	Std	Std
	C138	0.22µF	Capacitor, Ceramic, 25V, X7R, 15%	0603	Std	Std
	C139	0.22µF	Capacitor, Ceramic, 25V, X7R, 15%	0603	Std	Std
	C140	100pF	Capacitor, Ceramic, 25V, X7R, 15%	0603	Std	Std
2	C141	4.7µF	Capacitor, Ceramic, 16V, X5R, 15%	0805	Std	Std
	C142	0.22µF	Capacitor, Ceramic, 25V, X7R, 15%	0603	Std	Std
	C143	4.7µF	Capacitor, Ceramic, 16V, X5R, 15%	0805	Std	Std
1	C144	10 µF	Capacitor, Ceramic, 6.3V, X5R, 20%	0805	Std	Std
2	C145	open	Capacitor, Multi-pattern, 603-D case	7343 (D)		
	C146	open	Capacitor, Multi-pattern, 603-D case	7343 (D)		
1	C147	10µF	Capacitor, Ceramic, 6.3, X5R, 20%	0805	Std	Std
1	C148	1.0µF	Capacitor, Ceramic, 25V, X5R, 20%	0603	Std	Std
6	C149	10µF	Capacitor, Ceramic, 6.3V, X5R, 20%	0805	Std	Std
	C150	10µF	Capacitor, Ceramic, 6.3V, X5R, 20%	0805	Std	Std
1	C151	1nF	Capacitor, Ceramic, 50V, C0G, 5%	0603	Std	Std
	C152	10µF	Capacitor, Ceramic, 6.3V, X5R, 20%	0805	Std	Std
	C153	10µF	Capacitor, Ceramic, 6.3V, X5R, 20%	0805	Std	Std
	C154	10µF	Capacitor, Ceramic, 6.3V, X5R, 20%	0805	Std	Std
	C155	10µF	Capacitor, Ceramic, 6.3V, X5R, 20%	0805	Std	Std
	C156	0.1µF	Capacitor, Ceramic, 50V, X7R, 10%	0603	Std	Std
1	C157	10pF	Capacitor, Ceramic, 50V, C0G, 5%	0603	Std	Std
1	D1	5V1	Diode, Zener, 5.1-V, 350-mW	SOT-23	BZX84C5V1T	Diodes
12	D2	MBRA130	Diode, Schottky, 1-A, 30-V	SMA	MBRA130LT3	Motorola
	D3	MBRA130	Diode, Schottky, 1-A, 30-V	SMA	MBRA130LT3	Motorola
	D4	MBRA130	Diode, Schottky, 1-A, 30-V	SMA	MBRA130LT3	Motorola
	D5	MBRA130	Diode, Schottky, 1-A, 30-V	SMA	MBRA130LT3	Motorola
	D6	MBRA130	Diode, Schottky, 1-A, 30-V	SMA	MBRA130LT3	Motorola
	D7	MBRA130	Diode, Schottky, 1-A, 30-V	SMA	MBRA130LT3	Motorola
	D8	MBRA130	Diode, Schottky, 1-A, 30-V	SMA	MBRA130LT3	Motorola
	D9	MBRA130	Diode, Schottky, 1-A, 30-V	SMA	MBRA130LT3	Motorola

Table 3. PMP5176.6 Bill of Materials (continued)

Count	RefDes	Value	Description	Size	Part Number	MFR
	D10	MBRA130	Diode, Schottky, 1-A, 30-V	SMA	MBRA130LT3	Motorola
	D11	MBRA130	Diode, Schottky, 1-A, 30-V	SMA	MBRA130LT3	Motorola
	D12	MBRA130	Diode, Schottky, 1-A, 30-V	SMA	MBRA130LT3	Motorola
	D13	MBRA130	Diode, Schottky, 1-A, 30-V	SMA	MBRA130LT3	Motorola
2	J1	PTC36DAAN	Header, 2x2-pin, 100mil spacing (36-pin strip)	0.20 x 0.20 inch	PTC36DAAN	Sullins
	J2	PTC36DAAN	Header, 2x2-pin, 100mil spacing (36-pin strip)	0.20 x 0.20 inch	PTC36DAAN	Sullins
1	J3	PTC36DAAN	Header, Male 2x7 pin, 100mil spacing (36 pin strip)	0.100 inch x 2X7	PTC36DAAN	Sullins
1	J4	PTC36DAAN	Header, Male 2x5-pin, 100mil spacing (36-pin strip)	0.100 inch x 5 X 2	PTC36DAAN	Sullins
6	J5	{Value}	Lug, Solderless, #2-#8 AWG, 1/4	GSLU-70	Copper	
1	J6	PTC36DAAN	Header, Male 2x3-pin, 100mil spacing (36-pin strip)	0.20 inch x 0.30	PTC36DAAN	Sullins
	J7	{Value}	Lug, Solderless, #2-#8 AWG, 1/4	GSLU-70	Copper	
	J8	{Value}	Lug, Solderless, #2-#8 AWG, 1/4	GSLU-70	Copper	
4	J9	ED1514	Terminal Block, 2-pin, 6-A, 3.5mm	0.27 x 0.25 inch	ED1514	OST
	J10	{Value}	Lug, Solderless, #2-#8 AWG, 1/4	GSLU-70	Copper	
	J11	{Value}	Lug, Solderless, #2-#8 AWG, 1/4	GSLU-70	Copper	
	J12	ED1514	Terminal Block, 2-pin, 6-A, 3.5mm	0.27 x 0.25 inch	ED1514	OST
	J13	{Value}	Lug, Solderless, #2-#8 AWG, 1/4	GSLU-70	Copper	
2	J14	D120/2DS	Terminal Block, 2-pin, 15-A, 5.1mm	0.40 x 0.35 inch	D120/2DS	OST
	J15	ED1514	Terminal Block, 2-pin, 6-A, 3.5mm	0.27 x 0.25 inch	ED1514	OST
	J16	D120/2DS	Terminal Block, 2-pin, 15-A, 5.1mm	0.40 x 0.35 inch	D120/2DS	OST
	J17	ED1514	Terminal Block, 2-pin, 6-A, 3.5mm	0.27 x 0.25 inch	ED1514	OST
1	J18	ED1609-ND	Terminal Block, 2-pin, 15-A, 5.1mm	0.40 x 0.35 inch	ED1609	OST
1	J19	ED555/2DS	Terminal Block, 2-pin, 6-A, 3.5mm	0.27 x 0.25 inch	ED555/2DS	OST
4	L1	0.47μH	Inductor, SMT, 41A, 1.2-mΩ	0.51 x 0.51 inch	IHLP5050FD	Vishay
	L2	0.47μH	Inductor, SMT, 41A, 1.2-mΩ	0.51 x 0.51 inch	IHLP5050FD	Vishay
	L3	0.47μH	Inductor, SMT, 41A, 1.2-mΩ	0.51 x 0.51 inch	IHLP5050FD	Vishay
	L4	0.47μH	Inductor, SMT, 41A, 1.2-mΩ	0.51 x 0.51 inch	IHLP5050FD	Vishay
2	L5	1μH	Inductor, SMT, 32A, 2-mΩ	0.51 x 0.51 inch	IHLP5050FD	Vishay
	L6	1μH	Inductor, SMT, 32A, 2-mΩ	0.51 x 0.51 inch	IHLP5050FD	Vishay
1	Q1	PZT2222	Bipolar, NPN, 40-V, 600-mA	SOT223	PZT2222	Fairchild
6	Q2	CSD16413Q5A-R	MOSFET, NChan, 25V, 24A, 3.1mΩ	QFN5X6mm	CSD16413Q5A-R	TI
6	Q3	CSD16401Q5A-R	MOSFET, NChan, 25V, 37A, 1.3mΩ	QFN5X6mm	CSD16401Q5A-R	TI
	Q4	CSD16413Q5A-R	MOSFET, NChan, 25V, 24A, 3.1mΩ	QFN5X6mm	CSD16413Q5A-R	TI
	Q5	CSD16401Q5A-R	MOSFET, NChan, 25V, 37A, 1.3mΩ	QFN5X6mm	CSD16401Q5A-R	TI
	Q6	CSD16413Q5A-R	MOSFET, NChan, 25V, 24A, 3.1mΩ	QFN5X6mm	CSD16413Q5A-R	TI
	Q7	CSD16401Q5A-R	MOSFET, NChan, 25V, 37A, 1.3mΩ	QFN5X6mm	CSD16401Q5A-R	TI
	Q8	CSD16413Q5A-R	MOSFET, NChan, 25V, 24A, 3.1mΩ	QFN5X6mm	CSD16413Q5A-R	TI
	Q9	CSD16401Q5A-R	MOSFET, NChan, 25V, 37A, 1.3mΩ	QFN5X6mm	CSD16401Q5A-R	TI
	Q10	CSD16413Q5A-R	MOSFET, NChan, 25V, 24A, 3.1mΩ	QFN5X6mm	CSD16413Q5A-R	TI
	Q11	CSD16401Q5A-R	MOSFET, NChan, 25V, 37A, 1.3mΩ	QFN5X6mm	CSD16401Q5A-R	TI
	Q12	CSD16413Q5A-R	MOSFET, NChan, 25V, 24A, 3.1mΩ	QFN5X6mm	CSD16413Q5A-R	TI
	Q13	CSD16401Q5A-R	MOSFET, NChan, 25V, 37A, 1.3mΩ	QFN5X6mm	CSD16401Q5A-R	TI
4	R1	1.00K	Resistor, Chip, 1/16W, 1%	0603	Std	Std
	R2	1.00K	Resistor, Chip, 1/16W, 1%	0603	Std	Std
	R3	10.0K	Resistor, Chip, 1/16W, 1%	0603	Std	Std
4	R4	2.00K	Resistor, Chip, 1/16W, 1%	0603	Std	Std
	R5	2.00K	Resistor, Chip, 1/16W, 1%	0603	Std	Std
1	R6	15.0K	Resistor, Chip, 1/16W, 1%	0603	Std	Std
1	R7	1.65K	Resistor, Chip, 1/16W, 1%	0603	Std	Std
	R8	1.00K	Resistor, Chip, 1/16W, 1%	0603	Std	Std
	R9	2.00K	Resistor, Chip, 1/16W, 1%	0603	Std	Std
1	R10	22.6K	Resistor, Chip, 1/16W, 1%	0603	Std	Std
	R11	1.00K	Resistor, Chip, 1/16W, 1%	0603	Std	Std
1	R12	88.7K	Resistor, Chip, 1/16W, 1%	0603	Std	Std
1	R13	44.2K	Resistor, Chip, 1/16W, 1%	0603	Std	Std
1	R14	169K	Resistor, Chip, 1/16W, 1%	0603	Std	Std

Table 3. PMP5176.6 Bill of Materials (continued)

Count	RefDes	Value	Description	Size	Part Number	MFR
	R15	2.00K	Resistor, Chip, 1/16W, 1%	0603	Std	Std
	R16	10.0K	Resistor, Chip, 1/16W, 1%	0603	Std	Std
1	R17	243	Resistor, Chip, 1/16W, 1%	0603	Std	Std
1	R18	402	Resistor, Chip, 1/16W, 1%	0603	Std	Std
	R19	10.0K	Resistor, Chip, 1/16W, 1%	0603	Std	Std
	R20	10.0K	Resistor, Chip, 1/16W, 1%	0603	Std	Std
	R21	10.0K	Resistor, Chip, 1/16W, 1%	0603	Std	Std
	R22	10.0K	Resistor, Chip, 1/16W, 1%	0603	Std	Std
	R23	0	Resistor, Chip, 1/16W, 1%	0603	Std	Std
	R24	10.0K	Resistor, Chip, 1/16W, 1%	0603	Std	Std
1	R25	0.005	Resistor, Power Metal Strip	3637	WSL3637xx	Vishay Dale
6	R26	806	Resistor, Chip, 1/16W, 1%	0603	Std	Std
6	R27	open	Resistor, Chip, 1/16W, 1%	0603	Std	Std
1	R28	10.0K	Resistor, Chip, 1/16W, 1%	0603	Std	Std
21	R29	10	Resistor, Chip, 1/16W, 1%	0603	Std	Std
	R30	10	Resistor, Chip, 1/16W, 1%	0603	Std	Std
8	R31	412	Resistor, Chip, 1/16W, 1%	0603	Std	Std
12	R32	49.9K	Resistor, Chip, 1/16W, 1%	0603	Std	Std
13	R33	0	Resistor, Chip, 1/16W, 1%	0603	Std	Std
	R34	412	Resistor, Chip, 1/16W, 1%	0603	Std	Std
24	R35	10.0K	Resistor, Chip, 1/16W, 1%	0603	Std	Std
	R36	10	Resistor, Chip, 1/16W, 1%	0603	Std	Std
6	R37	1	Resistor, Chip, 1/16W, 1%	0603	Std	Std
	R38	10.0K	Resistor, Chip, 1/16W, 1%	0603	Std	Std
	R39	0	Resistor, Chip, 1/16W, 1%	0603	Std	Std
	R40	10	Resistor, Chip, 1/16W, 1%	0603	Std	Std
	R41	49.9K	Resistor, Chip, 1/16W, 1%	0603	Std	Std
	R42	806	Resistor, Chip, 1/16W, 1%	0603	Std	Std
	R43	10.0K	Resistor, Chip, 1/16W, 1%	0603	Std	Std
	R44	open	Resistor, Chip, 1/16W, 1%	0603	Std	Std
	R45	10	Resistor, Chip, 1/16W, 1%	0603	Std	Std
	R46	10	Resistor, Chip, 1/16W, 1%	0603	Std	Std
	R47	412	Resistor, Chip, 1/16W, 1%	0603	Std	Std
	R48	49.9K	Resistor, Chip, 1/16W, 1%	0603	Std	Std
	R49	0	Resistor, Chip, 1/16W, 1%	0603	Std	Std
	R50	412	Resistor, Chip, 1/16W, 1%	0603	Std	Std
	R51	10.0K	Resistor, Chip, 1/16W, 1%	0603	Std	Std
	R52	1	Resistor, Chip, 1/16W, 1%	0603	Std	Std
	R53	10.0K	Resistor, Chip, 1/16W, 1%	0603	Std	Std
	R54	0	Resistor, Chip, 1/16W, 1%	0603	Std	Std
	R55	49.9K	Resistor, Chip, 1/16W, 1%	0603	Std	Std
	R56	806	Resistor, Chip, 1/16W, 1%	0603	Std	Std
	R57	open	Resistor, Chip, 1/16W, 1%	0603	Std	Std
	R58	10.0K	Resistor, Chip, 1/16W, 1%	0603	Std	Std
	R59	10	Resistor, Chip, 1/16W, 1%	0603	Std	Std
	R60	10	Resistor, Chip, 1/16W, 1%	0603	Std	Std
	R61	412	Resistor, Chip, 1/16W, 1%	0603	Std	Std
	R62	49.9K	Resistor, Chip, 1/16W, 1%	0603	Std	Std
	R63	0	Resistor, Chip, 1/16W, 1%	0603	Std	Std
	R64	412	Resistor, Chip, 1/16W, 1%	0603	Std	Std
	R65	10.0K	Resistor, Chip, 1/16W, 1%	0603	Std	Std
	R66	10	Resistor, Chip, 1/16W, 1%	0603	Std	Std
	R67	1	Resistor, Chip, 1/16W, 1%	0603	Std	Std
	R68	10.0K	Resistor, Chip, 1/16W, 1%	0603	Std	Std
	R69	0	Resistor, Chip, 1/16W, 1%	0603	Std	Std
	R70	10	Resistor, Chip, 1/16W, 1%	0603	Std	Std

Table 3. PMP5176.6 Bill of Materials (continued)

Count	RefDes	Value	Description	Size	Part Number	MFR
	R71	49.9K	Resistor, Chip, 1/16W, 1%	0603	Std	Std
	R72	806	Resistor, Chip, 1/16W, 1%	0603	Std	Std
	R73	10.0K	Resistor, Chip, 1/16W, 1%	0603	Std	Std
	R74	open	Resistor, Chip, 1/16W, 1%	0603	Std	Std
	R75	10	Resistor, Chip, 1/16W, 1%	0603	Std	Std
	R76	10	Resistor, Chip, 1/16W, 1%	0603	Std	Std
	R77	412	Resistor, Chip, 1/16W, 1%	0603	Std	Std
	R78	49.9K	Resistor, Chip, 1/16W, 1%	0603	Std	Std
	R79	0	Resistor, Chip, 1/16W, 1%	0603	Std	Std
	R80	412	Resistor, Chip, 1/16W, 1%	0603	Std	Std
	R81	10.0K	Resistor, Chip, 1/16W, 1%	0603	Std	Std
	R82	1	Resistor, Chip, 1/16W, 1%	0603	Std	Std
	R83	10.0K	Resistor, Chip, 1/16W, 1%	0603	Std	Std
	R84	0	Resistor, Chip, 1/16W, 1%	0603	Std	Std
	R85	49.9K	Resistor, Chip, 1/16W, 1%	0603	Std	Std
	R86	806	Resistor, Chip, 1/16W, 1%	0603	Std	Std
	R87	open	Resistor, Chip, 1/16W, 1%	0603	Std	Std
	R88	10.0K	Resistor, Chip, 1/16W, 1%	0603	Std	Std
	R89	10	Resistor, Chip, 1/16W, 1%	0603	Std	Std
	R90	10	Resistor, Chip, 1/16W, 1%	0603	Std	Std
4	R91	499	Resistor, Chip, 1/16W, 1%	0603	Std	Std
	R92	49.9K	Resistor, Chip, 1/16W, 1%	0603	Std	Std
	R93	0	Resistor, Chip, 1/16W, 1%	0603	Std	Std
	R94	499	Resistor, Chip, 1/16W, 1%	0603	Std	Std
	R95	10.0K	Resistor, Chip, 1/16W, 1%	0603	Std	Std
	R96	10	Resistor, Chip, 1/16W, 1%	0603	Std	Std
	R97	1	Resistor, Chip, 1/16W, 1%	0603	Std	Std
	R98	10.0K	Resistor, Chip, 1/16W, 1%	0603	Std	Std
	R99	0	Resistor, Chip, 1/16W, 1%	0603	Std	Std
	R100	10	Resistor, Chip, 1/16W, 1%	0603	Std	Std
	R101	49.9K	Resistor, Chip, 1/16W, 1%	0603	Std	Std
	R102	806	Resistor, Chip, 1/16W, 1%	0603	Std	Std
	R103	open	Resistor, Chip, 1/16W, 1%	0603	Std	Std
	R104	10.0K	Resistor, Chip, 1/16W, 1%	0603	Std	Std
	R105	10	Resistor, Chip, 1/16W, 1%	0603	Std	Std
	R106	10	Resistor, Chip, 1/16W, 1%	0603	Std	Std
	R107	499	Resistor, Chip, 1/16W, 1%	0603	Std	Std
	R108	49.9K	Resistor, Chip, 1/16W, 1%	0603	Std	Std
	R109	0	Resistor, Chip, 1/16W, 1%	0603	Std	Std
	R110	499	Resistor, Chip, 1/16W, 1%	0603	Std	Std
	R111	10.0K	Resistor, Chip, 1/16W, 1%	0603	Std	Std
	R112	10	Resistor, Chip, 1/16W, 1%	0603	Std	Std
	R113	1	Resistor, Chip, 1/16W, 1%	0603	Std	Std
	R114	10.0K	Resistor, Chip, 1/16W, 1%	0603	Std	Std
	R115	0	Resistor, Chip, 1/16W, 1%	0603	Std	Std
	R116	10	Resistor, Chip, 1/16W, 1%	0603	Std	Std
	R117	49.9K	Resistor, Chip, 1/16W, 1%	0603	Std	Std
1	R118	49.9	Resistor, Chip, 1/16W, 1%	0603	Std	Std
1	R119	2.49k	Resistor, Chip, 1/16W, 1%	0603	Std	Std
1	R120	4.99k	Resistor, Chip, 1/16W, 1%	0603	Std	Std
1	R121	1.00M	Resistor, Chip, 1/16W, 1%	0603	Std	Std
2	R122	10K	Resistor, Chip, 1/16W, 1%	0603	Std	Std
1	R123	100K	Resistor, Chip, 1/16W, 1%	0603	Std	Std
	R124	10	Resistor, Chip, 1/16W, 1%	0603	Std	Std
	R125	10K	Resistor, Chip, 1/16W, 1%	0603	Std	Std
1	S1	KSC221J	Switch, Momentary, Sealed Tact	0.394 x 0.260 inch	KSC221J	ITT

Table 3. PMP5176.6 Bill of Materials (continued)

Count	RefDes	Value	Description	Size	Part Number	MFR
1	SH1		Short jumper			
29	TP1	5000	Test Point, Red, Thru Hole Color Keyed	0.100 x 0.100 inch	5000	Keystone
11	TP2	5001	Test Point, Black, Thru Hole Color Keyed	0.100 x 0.100 inch	5001	Keystone
	TP3	5000	Test Point, Red, Thru Hole Color Keyed	0.100 x 0.100 inch	5000	Keystone
	TP4	5000	Test Point, Red, Thru Hole Color Keyed	0.100 x 0.100 inch	5000	Keystone
	TP5	5000	Test Point, Red, Thru Hole Color Keyed	0.100 x 0.100 inch	5000	Keystone
	TP6	5000	Test Point, Red, Thru Hole Color Keyed	0.100 x 0.100 inch	5000	Keystone
	TP7	5000	Test Point, Red, Thru Hole Color Keyed	0.100 x 0.100 inch	5000	Keystone
8	TP8	5002	Test Point, White, Thru Hole Color Keyed	0.100 x 0.100 inch	5002	Keystone
	TP9	5002	Test Point, White, Thru Hole Color Keyed	0.100 x 0.100 inch	5002	Keystone
	TP10	5001	Test Point, Black, Thru Hole Color Keyed	0.100 x 0.100 inch	5001	Keystone
	TP11	5001	Test Point, Black, Thru Hole Color Keyed	0.100 x 0.100 inch	5001	Keystone
	TP12	5000	Test Point, Red, Thru Hole Color Keyed	0.100 x 0.100 inch	5000	Keystone
	TP13	5000	Test Point, Red, Thru Hole Color Keyed	0.100 x 0.100 inch	5000	Keystone
	TP14	5000	Test Point, Red, Thru Hole Color Keyed	0.100 x 0.100 inch	5000	Keystone
	TP15	5000	Test Point, Red, Thru Hole Color Keyed	0.100 x 0.100 inch	5000	Keystone
	TP16	5001	Test Point, Black, Thru Hole Color Keyed	0.100 x 0.100 inch	5001	Keystone
	TP17	5000	Test Point, Red, Thru Hole Color Keyed	0.100 x 0.100 inch	5000	Keystone
	TP18	5000	Test Point, Red, Thru Hole Color Keyed	0.100 x 0.100 inch	5000	Keystone
	TP19	5000	Test Point, Red, Thru Hole Color Keyed	0.100 x 0.100 inch	5000	Keystone
	TP20	5000	Test Point, Red, Thru Hole Color Keyed	0.100 x 0.100 inch	5000	Keystone
	TP21	5000	Test Point, Red, Thru Hole Color Keyed	0.100 x 0.100 inch	5000	Keystone
	TP22	5002	Test Point, White, Thru Hole Color Keyed	0.100 x 0.100 inch	5002	Keystone
	TP23	5002	Test Point, White, Thru Hole Color Keyed	0.100 x 0.100 inch	5002	Keystone
	TP24	5001	Test Point, Black, Thru Hole Color Keyed	0.100 x 0.100 inch	5001	Keystone
	TP25	5001	Test Point, Black, Thru Hole Color Keyed	0.100 x 0.100 inch	5001	Keystone
	TP26	5000	Test Point, Red, Thru Hole Color Keyed	0.100 x 0.100 inch	5000	Keystone
	TP27	5000	Test Point, Red, Thru Hole Color Keyed	0.100 x 0.100 inch	5000	Keystone
	TP28	5000	Test Point, Red, Thru Hole Color Keyed	0.100 x 0.100 inch	5000	Keystone
	TP29	5000	Test Point, Red, Thru Hole Color Keyed	0.100 x 0.100 inch	5000	Keystone
	TP30	5001	Test Point, Black, Thru Hole Color Keyed	0.100 x 0.100 inch	5001	Keystone
	TP31	5000	Test Point, Red, Thru Hole Color Keyed	0.100 x 0.100 inch	5000	Keystone
	TP32	5000	Test Point, Red, Thru Hole Color Keyed	0.100 x 0.100 inch	5000	Keystone
	TP33	5000	Test Point, Red, Thru Hole Color Keyed	0.100 x 0.100 inch	5000	Keystone
	TP34	5000	Test Point, Red, Thru Hole Color Keyed	0.100 x 0.100 inch	5000	Keystone
	TP35	5000	Test Point, Red, Thru Hole Color Keyed	0.100 x 0.100 inch	5000	Keystone
	TP36	5002	Test Point, White, Thru Hole Color Keyed	0.100 x 0.100 inch	5002	Keystone
	TP37	5002	Test Point, White, Thru Hole Color Keyed	0.100 x 0.100 inch	5002	Keystone
	TP38	5001	Test Point, Black, Thru Hole Color Keyed	0.100 x 0.100 inch	5001	Keystone
	TP39	5001	Test Point, Black, Thru Hole Color Keyed	0.100 x 0.100 inch	5001	Keystone
	TP40	5000	Test Point, Red, Thru Hole Color Keyed	0.100 x 0.100 inch	5000	Keystone
	TP41	5000	Test Point, Red, Thru Hole Color Keyed	0.100 x 0.100 inch	5000	Keystone
	TP42	5000	Test Point, Red, Thru Hole Color Keyed	0.100 x 0.100 inch	5000	Keystone
	TP43	5000	Test Point, Red, Thru Hole Color Keyed	0.100 x 0.100 inch	5000	Keystone
	TP44	5000	Test Point, Red, Thru Hole Color Keyed	0.100 x 0.100 inch	5000	Keystone
	TP45	5002	Test Point, White, Thru Hole Color Keyed	0.100 x 0.100 inch	5002	Keystone
	TP46	5002	Test Point, White, Thru Hole Color Keyed	0.100 x 0.100 inch	5002	Keystone
	TP47	5001	Test Point, Black, Thru Hole Color Keyed	0.100 x 0.100 inch	5001	Keystone
	TP48	5001	Test Point, Black, Thru Hole Color Keyed	0.100 x 0.100 inch	5001	Keystone
4	TP49	5010	Test Point, Red, Thru Hole	0.125 x 0.125 inch	5010	Keystone
2	TP50	5011	Test Point, Black, Thru Hole	0.125 x 0.125 inch	5011	Keystone
1	TP51		Test Point, Red, 1mm	0.038	240-345	Farnell
	TP52	5010	Test Point, Red, Thru Hole	0.125 x 0.125 inch	5010	Keystone
	TP53	5010	Test Point, Red, Thru Hole	0.125 x 0.125 inch	5010	Keystone
	TP54	5011	Test Point, Black, Thru Hole	0.125 x 0.125 inch	5011	Keystone
2	TP55	5012	Test Point, White, Thru Hole	0.125 x 0.125 inch	5012	Keystone

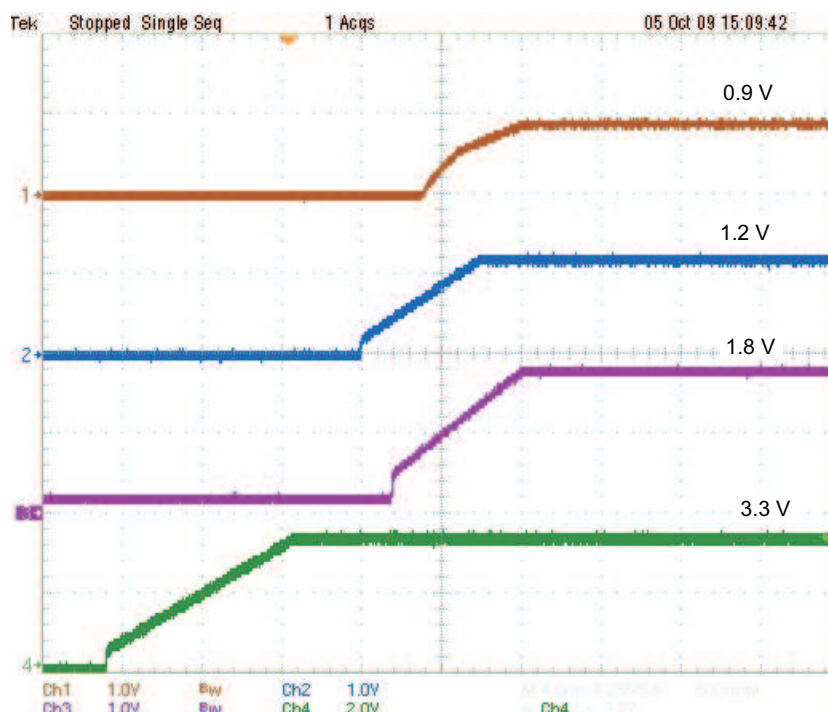
Table 3. PMP5176.6 Bill of Materials (continued)

Count	RefDes	Value	Description	Size	Part Number	MFR
	TP56	5012	Test Point, White, Thru Hole	0.125 x 0.125 inch	5012	Keystone
	TP57	5010	Test Point, Red, Thru Hole	0.125 x 0.125 inch	5010	Keystone
1	U1	1P1G3157QDBVRQ1	IC, SPDT Analog Switch	SOT23-6	1P1G3157QDBVRQ1	TI
1	U2	SN74LV4051AD	IC, 8-Ch Analog Mux/Dmux	SO-16	SN74LV4051AD	TI
1	U3	UCD9240RGC	IC, Digital Point of Load System Controller	QFN-64	UCD9240RGC	TI
1	U4	LM317DCY	IC, 3 Terminal Adjustable Regulator	SOT223	LM317DCY	TI
1	U5	INA194	IC, High-Side Measurement Current Shunt Monitor, 2.7V to 40V	SOT23-5	INA194DBV	TI
6	U6	TMP300	IC, 1.8V, $\pm 3^\circ\text{C}$, Low-power, Resistor Programmable Temperature Switches	SC-70	TMP300AIDCK	TI
6	U7	UCD7230ARGW	Digital Compatible Synchronous Buck ± 4 Amp Drivers With Average Current Sense	QFN20	UCD7230RGW	TI
	U8	TMP300	IC, 1.8V, $\pm 3^\circ\text{C}$, Low-power, Resistor Programmable Temperature Switches	SC-70	TMP300AIDCK	TI
	U9	UCD7230ARGW	Digital Compatible Synchronous Buck ± 4 Amp Drivers With Average Current Sense	QFN20	UCD7230RGW	TI
	U10	TMP300	IC, 1.8V, $\pm 3^\circ\text{C}$, Low-power, Resistor Programmable Temperature Switches	SC-70	TMP300AIDCK	TI
	U11	UCD7230ARGW	Digital Compatible Synchronous Buck ± 4 Amp Drivers With Average Current Sense	QFN20	UCD7230RGW	TI
	U12	TMP300	IC, 1.8V, $\pm 3^\circ\text{C}$, Low-power, Resistor Programmable Temperature Switches	SC-70	TMP300AIDCK	TI
	U13	UCD7230ARGW	Digital Compatible Synchronous Buck ± 4 Amp Drivers With Average Current Sense	QFN20	UCD7230RGW	TI
	U14	TMP300	IC, 1.8V, $\pm 3^\circ\text{C}$, Low-power, Resistor Programmable Temperature Switches	SC-70	TMP300AIDCK	TI
	U15	UCD7230ARGW	Digital Compatible Synchronous Buck ± 4 Amp Drivers With Average Current Sense	QFN20	UCD7230RGW	TI
	U16	TMP300	IC, 1.8V, $\pm 3^\circ\text{C}$, Low-power, Resistor Programmable Temperature Switches	SC-70	TMP300AIDCK	TI
	U17	UCD7230ARGW	Digital Compatible Synchronous Buck ± 4 Amp Drivers With Average Current Sense	QFN20	UCD7230RGW	TI
1	U18	TPS74401RGW	IC, 1.5a LDO With Programmable Sequencing	QFN-20	TPS744xxRGW	TI
1	U19	TPS51200DRC	IC, Sink/Source DDR Termination Regulator	DRC	TPS51200DRC	TI

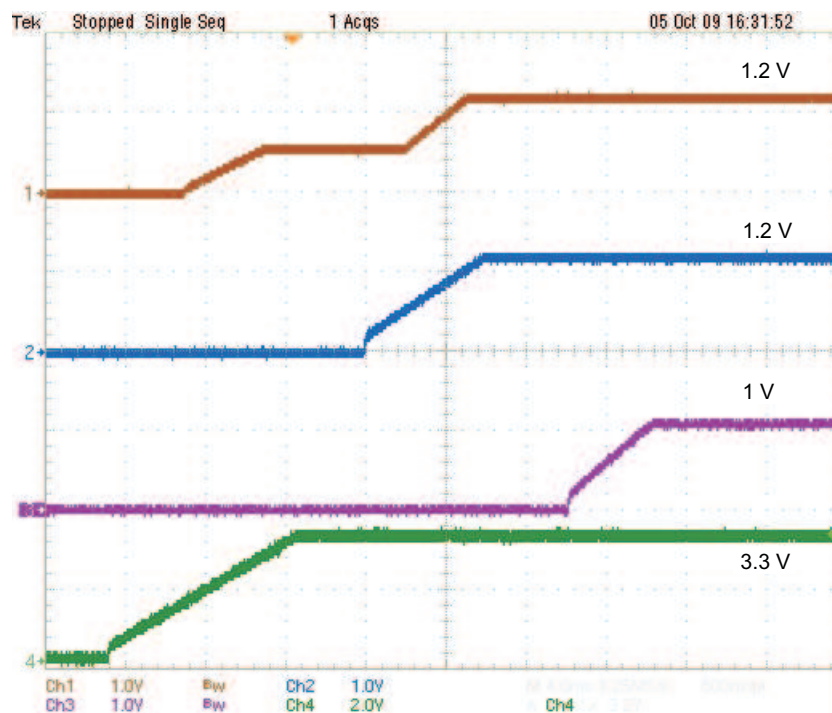
- Notes: 1. These assemblies are ESD sensitive, ESD precautions shall be observed.
2. These assemblies must be clean and free from flux and all contaminants. Use of unclean flux is unacceptable.
3. These assemblies must comply with workmanship standards IPC-A-610 Class 2.
4. Reference designators marked with an asterisk (***) cannot be substituted. All other components can be substituted with equivalent MFG's components.

6 12-Vin, Digital Power Controllers and LDOs (8x C6472)

CH1 – DDR termination, CH2 – Vout 5, CH3 – Vout 4, CH4 – Vout 3
 (1 V/div, 1 V/div, 1 V/div, 2 V/div 4 ms/div)



CH1 – Vout 2, CH2 – Vout 5, CH3 – Vout 1, CH4 – Vout 3
 (1 V/div, 1 V/div, 1 V/div, 2 V/div 4 ms/div)



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