

Evaluates: MAX20754 and MAX20790

MAX20754EVKIT8 Evaluation Kit

General Description

This MAX20754EVKIT8 evaluation kit (EV kit) demonstrates the MAX20754 PMBus™-compatible dual-output multiphase power-supply controller. The controller generates six pulse-width modulated (PWM) control signals, or “phases.” The MAX20754EVKIT8 EV kit is a single-output design, with all six phases assigned to one output. The output uses coupled inductor topologies. Coupled inductors reduce the effective inductor value and size without excessive ripple current, reducing required output capacitance, and improving transient response.

The EV kit also demonstrates the MAX20790 power-stage device; there are six MAX20790 devices, one per phase.

Features

- Optimized for Single +10V to +16V Supply
 - Onboard +3.3V Regulator (MAX17501)
- Generates One Output
 - Output: 6-Phase, 1V, 225A
- 500kHz Switching Frequency
- Enable Switch
- PMBus Configuration and Control
 - Compatible with Maxim’s PowerTool™ GUI
 - Easy Connection to PC Using MAXPOW-ERTOOL002 USB-to-SMBus Interface (order separately)
- Status LEDs
 - Power-Good
 - Power-Stage Fault
 - SMBus Alert
- Proven PCB Layout
- Compensation Scheme Optimized for High Bandwidth
- Fully Tested and Assembled

MAX20754EVKIT8 Board



[Ordering Information](#) appears at end of data sheet.

PMBus is a trademark of SMIF, Inc.
PowerTool is a trademark of Maxim Integrated Products, Inc.

319-100863; Rev 0; 12/21

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Quick Start

Required Equipment

- 12V DC power supply capable of delivering 300W at the desired input voltage
- Windows PC with a spare USB port
- MAXPOWERTOOL002 USB-to-SMBus Interface (order separately)
- Maxim Digital PowerTool [GUI](#) software

Optional Equipment

- AC/DC “wall adapter” for convenient low-power evaluation, connecting to J5 on the EV kit. For example:
 - CUI p/n ETSA120500UC-P5P-SZ (12V, 5A, 60W max)
 - CUI p/n EMSA120300-P5P-SZ (12V, 3A, 40W max)
- 300MHz four-channel oscilloscope
- BNC-to-SMB cables for convenient, low-noise oscilloscope connection to the input and output voltage sense points. For example: CD International Technology p/n BSB-174TPR-3.
- Electronic load capable of sinking 240A at 1V
 - Ask about the Maxim MINILOAD device
- Digital multimeter (DMM)

Procedure

Note: In the following sections, text in bold refers to items directly from the EV kit software.

The EV kit is fully assembled and tested. Follow the steps below to verify board operation.

Caution: Do not turn on the power supply until all connections are completed.

- 1) Visit the Maxim Integrated website to download and install the latest version of the Digital PowerTool software.
- 2) Connect the USB cable from the PC to the MAX-POWERTOOL002 interface adapter.
- 3) Connect the adapter ribbon cable to the matching header J13 on the EV kit, ensuring that J13-Pin 1 is adjacent to the red wire on the ribbon cable.
- 4) Connect the DC power supply positive lead to J6 and the negative lead to J7 (or use an AC-DC adapter through J5 using a center-positive 2.1mm I.D. x 5.5mm O.D. plug).
- 5) If available, connect the electronic load(s) to the outputs at screw terminals ST1, ST2, ST3, and ST4, being careful to observe the VOUT and GND polarity indicated by the silkscreen labels.
- 6) If available, connect the oscilloscope to the EV kit for waveform analysis. Coaxial SMB cable connections J8, and J9 allow low-noise measurement of the input and output ripple waveforms. (Note that the input voltage signal at J8 is resistively attenuated 20:1 to protect oscilloscope inputs.)
- 7) Ensure that jumpers JP1 and JP2 have shunts installed.
- 8) Enable the external 12V supply.
- 9) Enable the onboard MAX17501 12V-to-3.3V supply circuit with switch S5. This supplies 3.3V to the MAX20754, which in turn generates 1.8V power for the MAX20790 power-stage devices.
- 10) Start the GUI software. The “Dashboard” window should appear as shown in [Figure 1](#).
- 11) Enable the MAX20754 output by operating switch S2 on the EV kit, or by setting the OPERATION and ON_OFF_CONFIG commands in the PowerTool GUI.

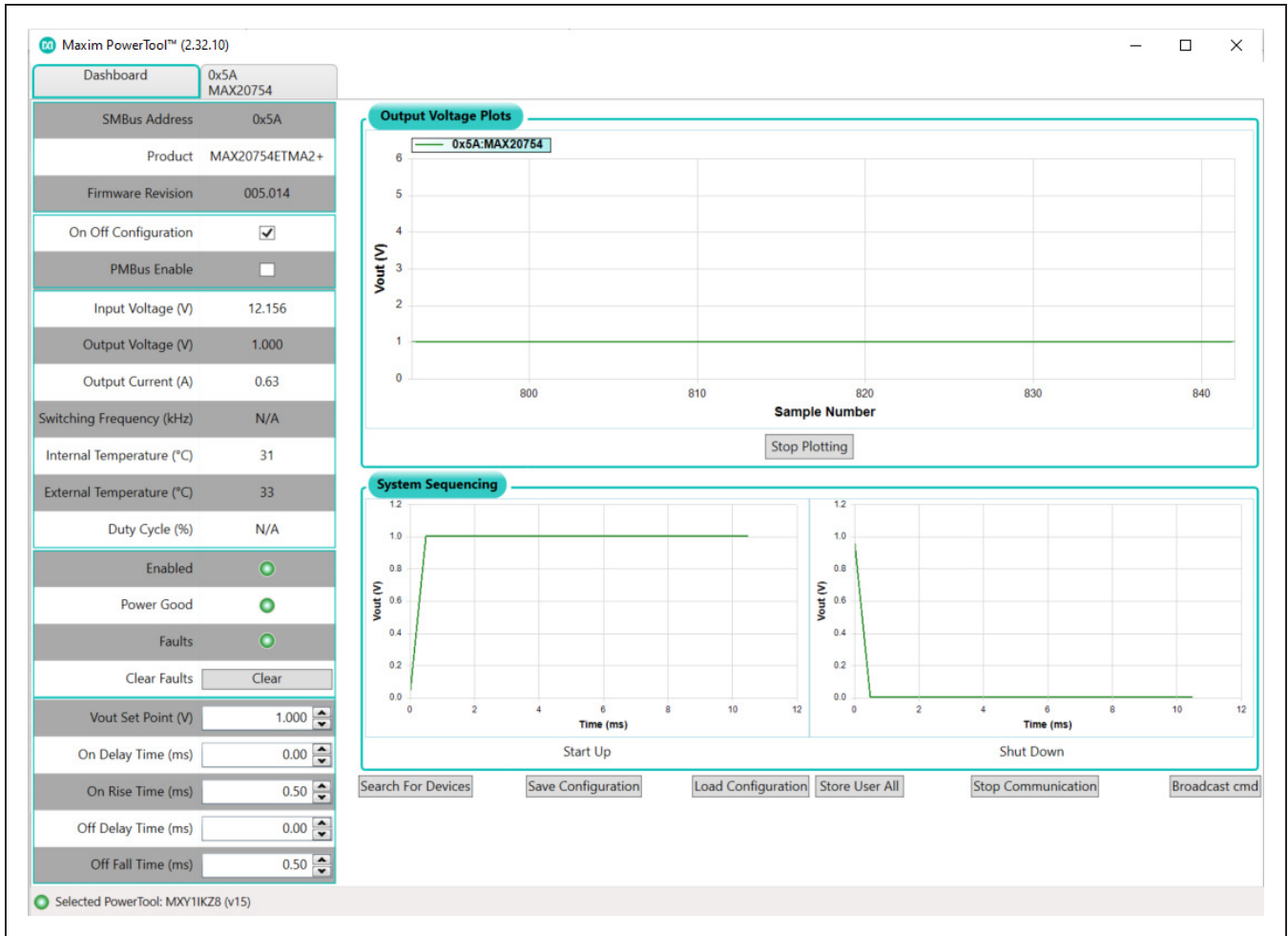


Figure 1. Maxim PowerTool Graphical User Interface Software Dashboard Window

Detailed Description of Software

The PowerTool software presents system-level information on the **Dashboard** tab. This view collects basic information for all Maxim PMBus devices found on the bus. This tab configures sequencing and output voltage levels and presents an overview of the system status. Clicking the **Stop Communication** button stops all PMBus transactions from the PowerTool GUI. To force detection of all active devices on the bus, click the **Search for Devices** button.

For detailed information on a particular device, click on the sub-tab for that device's slave address. This opens a view with a set of further sub-tabs specific to that device as shown in [Figure 2](#). The sub-tabs available vary depending on the GUI version and the connected device's

capability, but typically include **Configuration**, **Monitor**, **Faults Set**, and **PMBus Command**.

The **Configuration** tab presents the most commonly used PMBus command data in human-readable form. The device status is updated by continuous polling of these commands. Configuration settings for an individual device can be saved to or restored from an external file. The PMBus command settings can be saved to or restored from the device's internal nonvolatile memory as well.

The **Monitor** tab shows continuously updated telemetry data from the device. Rolling plots of output voltage, input voltage, output current, and temperature data are shown, including indication of fault limits relative to the operating point.

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The **Faults Set** tab allows the user to configure and monitor the status of most protection and warning functions. The fault levels and fault response commands are configured from this tab. The full contents of the STATUS_ register commands are available by clicking the **View Fault/Warning bit by bit** button. Fault and warning flags are cleared by clicking the **Clear Fault/Warning** button, which sends the CLEAR_FAULTS PMBus command to the device.

The **PMBus Command** tab shows all supported PMBus commands in a series of sub-tabs, allowing detailed configuration and analysis of the command values. The user can view the command values in a hexadecimal or decimal format by checking or clearing the **Force Hex** checkbox. The **Use PEC** checkbox enables or disables Packet Error Checking for all GUI communications. Note that the command data is continuously updated by polling; typing a new value into the text boxes causes the new value to be sent to the device.

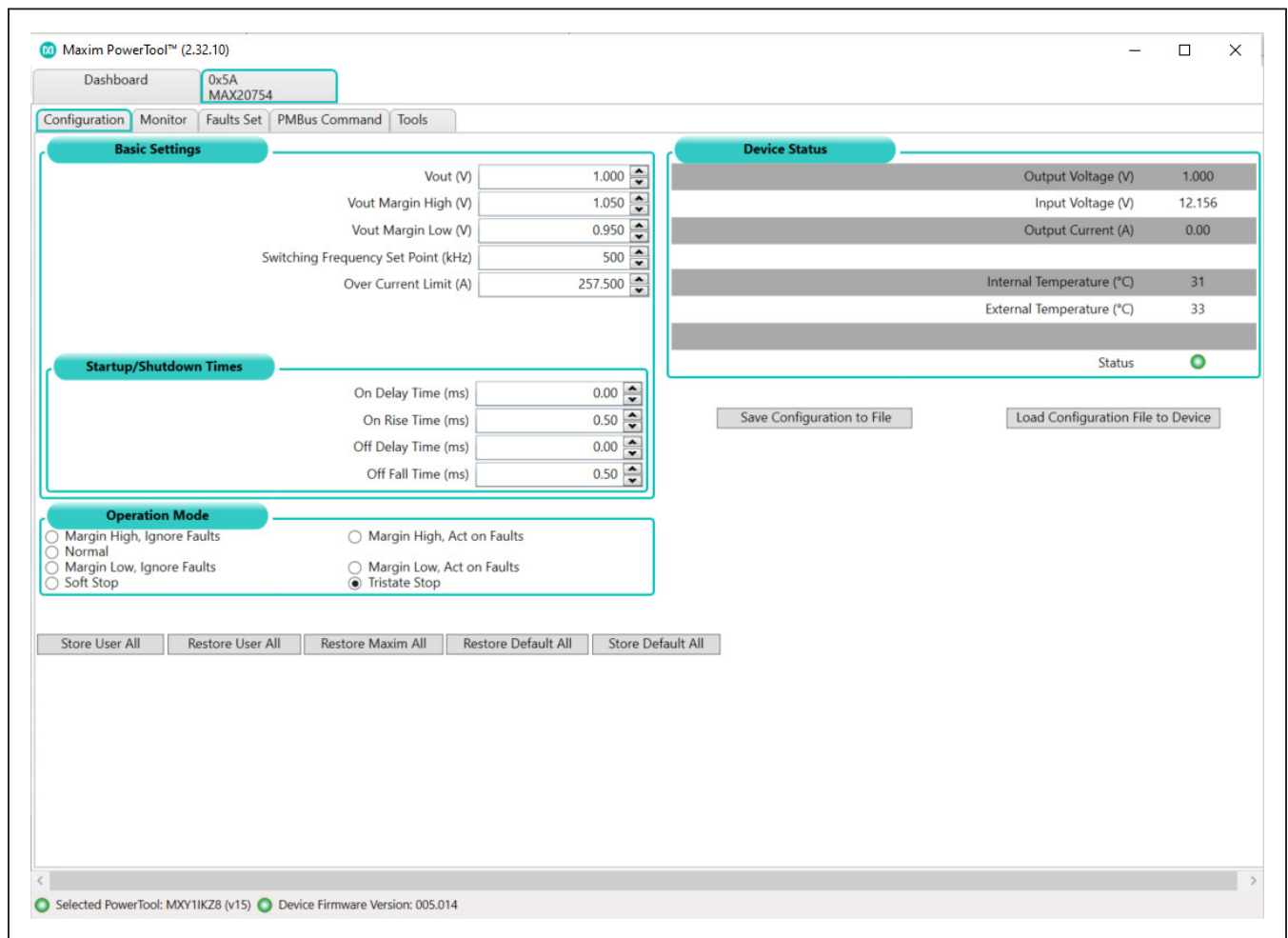


Figure 2. Detailed View for One Device; Configuration Sub-Tab

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Detailed Description of Hardware

The MAX20754EVKIT8 demonstrates a single-output step-down power supply solution, with one six-phase output, which makes use of the coupled inductors. This solution provides high output-current with high efficiency, fast load-transient response, and low ripple and noise.

The MAX20754 controller automatically interleaves all PWM outputs assigned to a given output at even intervals. The output is six-phase resulting in 60° timing. Each PWM signal is connected to one MAX20790 power-stage device, operating in parallel configuration. This configuration is capable of supplying up to 37.5A per phase. Each power-stage is in turn connected to one winding of a coupled inductor.

The MAX20754 controller evenly shares the load current between phases in a given output. The EV kit is configured to operate both outputs at 500kHz fundamental switching frequency, but can be modified to operate anywhere from 300kHz to 800kHz with appropriate compensation network changes. The output is set to supply 1V. The maximum output current for the output is 225A.

The output voltage, output rise-time and fall-time, switching frequency, PMBus address, slope compensation, and maximum output current are set using only five external resistors, allowing simple setup and application configuration that does not require PMBus commands. Refer to the MAX20754 and MAX20790 integrated circuit data sheets for complete details on design and component selection.

Table 1. Jumper JP1

| SHUNT POSITION | DESCRIPTION |
|----------------|--|
| Installed | MAX17501 +3.3V output connected to MAX20754 V_{DD3P3} input. |
| Not installed | MAX20754 can be powered by an external +3.3V supply at TP35. |

Table 2. Jumper JP2

| SHUNT POSITION | DESCRIPTION |
|----------------|---|
| Installed | MAX17501 +3.3V output connected to AUX3P3 rail (ENx debounce and status LED logic, etc.). |
| Not installed | The AUX3P3 rail can be powered by an external +3.3V supply at Pin 2 of JP2. |

Table 3. Connector List

| REFERENCE DESIGNATOR | DESCRIPTION |
|----------------------|--|
| J6 | Input supply positive voltage (+5V to +16V) |
| J7 | Input supply ground |
| ST1 | Rail 1 output positive voltage |
| ST2 | Rail 1 output ground |
| ST3 | Rail 1 output positive voltage |
| ST4 | Rail 1 output ground |
| J13 | Header for connection to MAXPOWERTOOL002 USB-to-SMBus interface. Pin 1: SCL Pin 3: SDA Pin 7: ALERT Even-numbered pins: Ground |
| J8 | SMB jack for input supply monitoring. This connection has a 1/20 resistive divider with 50Ω back-impedance. Connect to an oscilloscope with 20x scaling and $\geq 1\text{M}\Omega$ input resistance. |
| J9 | SMB jack for Rail 1 output voltage monitoring. This connection has 50Ω back-impedance. Connect to an oscilloscope with 1x scaling and $\geq 1\text{M}\Omega$ input resistance. |
| J5 | Alternate input supply barrel connector, 2.1mm I.D. x 5.5mm O.D. barrel jack, center-positive. Do not exceed 5A current. |

Table 4. Switches

| REFERENCE DESIGNATOR | FUNCTION |
|----------------------|---|
| S5 | SPDT toggle switch. Enable MAX17501 +3.3V buck regulator to supply V_{DD3P3} Green light: output enabled |
| S4 | Momentary tactile switch; no function on MAX20754 |
| S2 | SPDT toggle switch. Enable Rail 1 output regulation. Green light: PGOOD1 pin high Amber light: ALERT pin asserted low Red light: FAULT pin asserted low (power stage fault detected) |

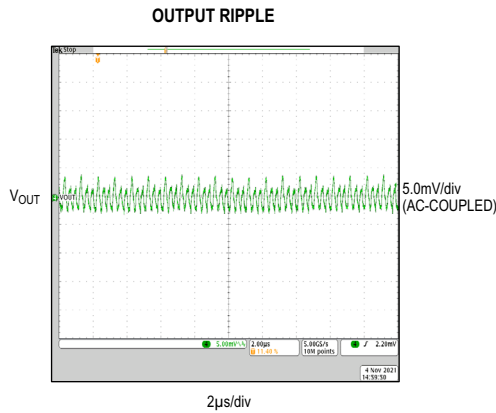
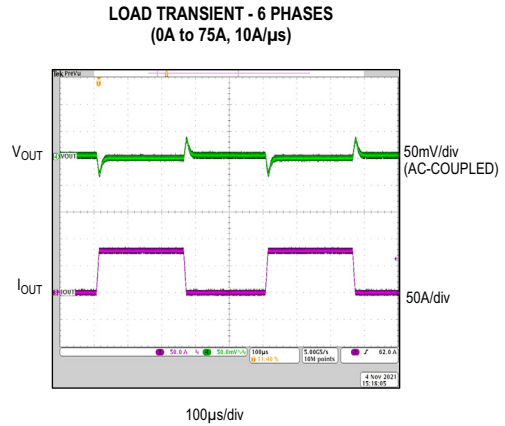
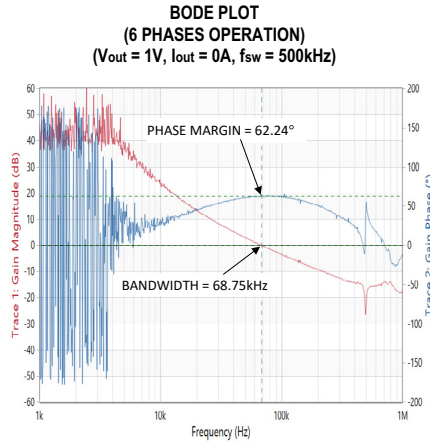
Table 5. Test Points

| REFERENCE DESIGNATOR | DESCRIPTION |
|------------------------------------|---|
| TP21 | ALERT signal (open-drain) |
| TP20 | FAULT signal (open-drain) |
| TP36 | SDA signal (open-drain) |
| TP37 | SCL signal (open-drain) |
| TP17 | EN1 signal (open-drain) |
| TP7 | Input supply positive voltage |
| TP8 | Input supply ground |
| TP19 | Input voltage sense point for efficiency measurements |
| TP22 | Input ground sense point for efficiency measurements |
| TP18 | PGOOD1 signal (open-drain) |
| TP6 | PWM0 signal (Rail 1) |
| TP5 | PWM1 signal (Rail 1) |
| TP4 | PWM2 signal (Rail 1) |
| TP3 | PWM3 signal (Rail 1) |
| TP2 | PWM4 signal (Rail 1) |
| TP1 | PWM5 signal (Rail 1) |
| TP13 | Rail 1 loop-response (Bode plot) measurement positive injection point (see MAX20754 EV Kit Schematic) |
| TP23 | Rail 1 loop-response (Bode plot) measurement negative injection point (see MAX20754 EV Kit Schematic) |
| TP25 | Rail 1 output voltage efficiency measurement point |
| TP26 | Rail 1 output ground efficiency measurement point |
| TP9 | Rail 1 output voltage feedback sense point (for line/load regulation accuracy measurement with DMM) |
| TP10 | Rail 1 output ground feedback sense point (for line/load regulation accuracy measurement with DMM) |
| TP34 | V_{DDS} supply; +1.8V power to MAX20790 power stage, from MAX20754 integrated switcher output |
| TP35 | V_{DD3P3} supply; +3.3V power to MAX20754 integrated switcher |
| TP29, TP30, TP31, TP32, TP33, TP39 | Ground |

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Typical Operating Characteristics



Ordering Information

| PART | TYPE |
|------------------|------------------------|
| MAX20754EVKIT8# | MAX20754 EV Kit |
| MAXPOWERTOOL002# | USB-to-SMBus Interface |

#Denotes RoHS compliance.

MAX20754EVKIT8 Evaluation Kit

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MAX20754 EV Kit Bill of Materials

| ITEM | QTY | REF DES | VAR STATUS | MAXINV | MFG PART # | MANUFACTURER | VALUE | DESCRIPTION | COMMENTS |
|------|-----|--|------------|-----------------------|--|--|---------|--|----------|
| 1 | 4 | C1, C3-C5 | Pref | 20-0022U-BA44 | GRM188C02G220MEAO | MURATA | 22UF | CAP: SMT (0603); 22UF; 20%; 4V; X6S; CERAMIC | |
| 2 | 15 | C2, C6, C9, C17, C18, C30, C31, C42, C50, C114, C116, C160-C163 | Pref | 20-000U1-L1A | C1005X7R1C104K050BC; ATC306; 104K11E; 0402YC104KAT2A; C0402X7R160-104KNE; CL05B104K0290NNNC; GRM15SR71C104K488; C1005X7R1C104K; C0402X7R160-104K; ENK105B7104KV; CL05B104K05 | TDK;AMERICAN TECHNICAL CERAMICS;AVK;VENKEL LTD.;SAMSUNG ELECTRONICS;MURATA;TDK;YAGEO PHICOMP;TAIYO YUDEN;SAMSUNG ELECTRONICS | 0.1UF | CAP: SMT (0402); 0.1UF; 10%; 16V; X7R; CERAMIC | |
| 3 | 2 | C7, C88 | Pref | 20-0100P-27 | C0402C101J5GAC; NMC0402NP0101J; C0402JRNPO98N101; GRM1555C1H101J401; C1005CG1H101J050BA | HEMET;NIC COMPONENTS CORP.;YAGEO PHICOMP;MURATA;TDK | 100PF | CAP: SMT (0402); 100PF; 5%; 50V; COG; CERAMIC | |
| 4 | 1 | C10 | Pref | 20-0100P-26 | C0402C101K5GAC; C1005CG1H101K050BA | HEMET;TDK | 100PF | CAP: SMT (0402); 100PF; 10%; 50V; COG; CERAMIC | |
| 5 | 6 | C19, C20, C32, C33, C43, C51 | Pref | 20-0001U-B9 | GRM188R0J105KA11 | MURATA | 1UF | CAP: SMT (0803); 1UF; 10%; 6.3V; XSR; CERAMIC; NOTE: NOT RECOMMENDED FOR NEW DESIGN. USE 20-0001U-03 | |
| 6 | 6 | C21, C22, C35, C36, C44, C53 | Pref | 20-00U22-B19 | GRM15SR71C22KA12 | MURATA | 0.22UF | CAP: SMT (0402); 0.22UF; 10%; 16V; X7R; CERAMIC | |
| 7 | 12 | C23, C24, C38, C39, C64, C102, C153, C224, C225, C231 | Pref | 20-0001U-26 | GAM107B1105KA; C1608XSR1V105K080AB | TAIYO YUDEN;TDK | 1.0UF | CAP: SMT (0603); 1.0UF; 10%; 35V; XSR; CERAMIC | |
| 8 | 1 | C27 | Pref | 20-0047U-V7 | C3216XSR1C47FM160AB; GRM31CR81C47FM644 | TDK;MURATA | 47UF | CAP: SMT (1206); 47UF; 20%; 16V; XSR; CERAMIC | |
| 9 | 1 | C28 | Pref | 20-0220P-BA31 | GRM1555C1H221JA01 | MURATA | 220PF | CAP: SMT (0402); 220PF; 5%; 50V; COG; CERAMIC | |
| 10 | 2 | C29, C37 | Pref | 20-01015-12 | C0402X7R250-153KNE; GRM15SR71E153KA11; GCM15SR71E153KA55 | VENKEL LTD.;MURATA;MURATA | 0.015UF | CAP: SMT (0402); 0.015UF; 10%; 25V; X7R; CERAMIC; NOTE: PURCHASE DIRECT FROM THE MANUFACTURER | |
| 11 | 2 | C40, C112 | Pref | 20-0001U-R1 | GRM188R70J105KA01; CL10B105K08NNNC | MURATA;SAMSUNG ELECTRONICS | 1.0UF | CAP: SMT (0603); 1.0UF; 10%; 6.3V; X7R; CERAMIC; NOTE: NOT RECOMMENDED FOR NEW DESIGN. USE 20-0001U-63 | |
| 12 | 1 | C41 | Pref | 20-3300P-04 | GRM15SR71H332KA01 | MURATA | 3300PF | CAP: SMT (0402); 3300PF; 10%; 50V; X7R; CERAMIC | |
| 13 | 18 | C45, C56, C164, C165, C168, C169, C172, C173, C176, C177, C180, C181, C184, C185, C226, C227, C232, C233 | Pref | 20-4700P-12 | GRM15SR71E472KA01 | MURATA | 4700PF | CAP: SMT (0402); 4700PF; 10%; 25V; X7R; CERAMIC | |
| 14 | 1 | C47 | Pref | 20-1000P-27 | GRM1555C1H102JA01; C1005CG1H102J050 | MURATA;TDK | 1000PF | CAP: SMT (0402); 1000PF; 5%; 50V; COG; CERAMIC | |
| 15 | 60 | C56, C62, C63, C65, C75-C88, C95-C101, C189-C202, C204-C211, C213-C217, C234-C240 | Pref | 20-0100U-B57 | C3216XSR0J107M160AB; GRM31CR80J107M639 | TDK;MURATA | 100UF | CAP: SMT (1206); 100UF; 20%; 6.3V; XSR; CERAMIC | |
| 16 | 3 | C57-C59 | Pref | 20-0330U-49 | 16SEP330M | PANASONIC | 330UF | CAP: THROUGH HOLE-RADIAL LEAD; 330UF; 20%; 16V; ELECTROLYTIC-OSCON | |
| 17 | 6 | C60, C61, C149-C152 | Pref | 20-0100U-BA9 | 20TQC100MYF | PANASONIC | 100UF | CAP: SMT (7343); 100UF; 20%; 20V; TANTALUM | |
| 18 | 13 | C69-C74, C91-C94, C203, C212, C241 | Pref | 20-00U01-12 | C0402C103K3RAC; GRM15SR71E103KA01; C1005X7R1E103K050BB | HEMET;MURATA;TDK | 0.011UF | CAP: SMT (0402); 0.011UF; 10%; 25V; X7R; CERAMIC; NOTE: NOT RECOMMENDED FOR NEW DESIGN. USE 20-00U01-880 | |
| 19 | 12 | C89, C103-C111, C113, C118 | Pref | 20-0047U-AA2 | C3216XSR1E47FM160AC | TDK | 47UF | CAP: SMT (1206); 47UF; 20%; 25V; XSR; CERAMIC | |
| 20 | 2 | C113, C225 | Pref | 20-0010U-A51 | GRM21BC81C108KA73 | MURATA | 10UF | CAP: SMT (0805); 10UF; 10%; 16V; X6S; CERAMIC | |
| 21 | 12 | C119-C130 | Pref | 20-0010U-P7 | C1608XSR1E106M080AC; CL10A106MARNNRC; GRM15SR61E106MA73; ZRB18AR61E106ME01; GRT188R61E106ME13 | TDK;SAMSUNG ELECTRONICS;MURATA;MURATA | 10UF | CAP: SMT (0603); 10UF; 20%; 25V; XSR; CERAMIC | |
| 22 | 12 | C166, C167, C170, C171, C174, C175, C178, C179, C182, C183, C186, C187 | Pref | 20-0010U-E6 | GRM21BR61E106K; C2012XSR1E106K085AC; TMC2126B; J106K; CL21A106KAFJ3N | MURATA;TDK;TAIYO YUDEN;SAMSUNG | 10UF | CAP: SMT (0805); 10UF; 10%; 25V; XSR; CERAMIC | |
| 23 | 2 | D1, D2 | Pref | 30-MBRSS40T3-00 | MBRSS40T3G | ON SEMICONDUCTOR | | DIODE; SCH; SURFACE MOUNT SCHOTTKY POWER RECTIFIER; SMC; PV=40V; IF=50 | |
| 24 | 3 | J2-44 | Pref | 01-UPS080101-LRABP-27 | UPS-08-01-01-L-RA | SAMTEC | | CONNECTOR; FEMALE; THROUGH HOLE; DUAL LEAF POWER HEADER; RIGHT ANGLE; 8PINS | |
| 25 | 1 | J5 | Pref | 01-PJ102AH3P-27 | PJ1-102AH | GUI INC. | | CONNECTOR; FEMALE; THROUGH HOLE; DC POWER JACK; RIGHT ANGLE; 3PINS | |
| 26 | 2 | J6, J7 | Pref | 01-1080740001-1P-40 | 108-0740-001 | EMERSON NETWORK POWER | | CONNECTOR; MALE; PANELMOUNT; BANANA JACK STRAIGHT; 1PIN | |
| 27 | 2 | J8, J9 | Pref | 01-13137012665P-01 | 131-3701-266 | JOHNSON COMPONENTS | | CONNECTOR; MALE; THROUGH HOLE; SMB JACK VERTICAL PCB MOUNT; STRAIGHT; 5PINS | |
| 28 | 1 | J13 | Pref | 01-TSW10807LD16P-17 | TSW-108-07-L-D | SAMTEC | | CONNECTOR; THROUGH HOLE; TSW SERIES; STRAIGHT; 16PINS | |
| 29 | 2 | JP1, JP2 | Pref | 01-PC0205AAN2P-21 | PC0205AAN | SULLINS | | CONNECTOR; MALE; THROUGH HOLE; BREAKAWAY; STRAIGHT THROUGH; 2PINS; -65 DEGC TO +125 DEGC | |
| 30 | 1 | L1 | Pref | 50-001U2-0GT | XAL4020-122ME | COILCRAFT | 1.2UH | INDUCTOR; SMT; SHIELDED; 1.2UH; TOL +/-20%; 6.6A | |
| 31 | 3 | L2-L4 | Pref | 50-0100N-0EV | CL1208-2-100TR-R | EATON POWERING BUSINESS WORLDWIDE | | INDUCTOR; SMT; 100NH; TOL +/-20%; 56A | |
| 32 | 1 | L5 | Pref | 50-0033U-0IR | LPS6235-333MR | COILCRAFT | 33UH | INDUCTOR; SMT; MAGNETICALLY SHIELDED; 33UH; TOL +/-20%; 1.3A | |
| 33 | 1 | Q1 | Pref | 90-2N7002-06 | 2N7002-2N7002-2N7002-2N7002 | DIODES INCORPORATED;ST MICROELECTRONICS; ON SEMICONDUCTOR; MICRO COMMERCIAL COMPONENTS | 2N7002 | TRANS; NCH; SOT-23; PD-(0.33W); IC-(0.5A); VCEO-(60V); -55 DEGC TO +150 DEGC | |
| 34 | 1 | R1 | Pref | 80-00R47-CA06 | ERJ-3RQFR47 | PANASONIC | 0.47 | RES; SMT (0603); 0.47; 1%; +/-300PPM/DEGC; 0.1000W | |
| 35 | 4 | R2, R15, R64, R67 | Pref | 80-0000R-BA38 | CRCW04020000Z02EDHP; RC30402000000 | VISHAY DRALORIC;VISHAY DALE | 0 | RES; SMT (0402); 0; JUMPER; JUMPER; 0.2000W | |
| 36 | 1 | R3 | Pref | 80-0006R-23 | CRCW04020060RFX | VISHAY DALE | 606 | RES; SMT (0402); 606; 1%; +/-100PPM/DEGC; 0.0630W | |
| 37 | 1 | R4 | Pref | 80-05K76-AA23 | ERJ-2RKF5761 | PANASONIC | 5.76K | RES; SMT (0402); 5.76K; 1%; +/-100PPM/DEGC; 0.1000W | |
| 38 | 1 | R5 | Pref | 80-0549R-18 | ERJ-2RKF6490 | PANASONIC | 649 | RES; SMT (0402); 649; 1%; +/-100PPM/DEGC; 0.1000W | |
| 39 | 1 | R6 | Pref | 80-04K64-AA23 | ERJ-2RKF4641 | PANASONIC | 4.64K | RES; SMT (0402); 4.64K; 1%; +/-100PPM/DEGC; 0.1000W | |
| 40 | 1 | R7 | Pref | 80-0034K-23 | CRCW040234K0RFX | VISHAY DALE | 34K | RES; SMT (0402); 34K; 1%; +/-100PPM/DEGC; 0.0630W | |
| 41 | 1 | R8 | Pref | 80-02W49-23 | CRCW0402249RFX | VISHAY DALE | 2.49K | RES; SMT (0402); 2.49K; 1%; +/-100PPM/DEGC; 0.0630W | |
| 42 | 1 | R9 | Pref | 80-0020K-23B | R05S10P-203-D | SUSUMI CO LTD | 20K | RES; SMT (0402); 20K; 0.5%; +/-25PPM/DEGC; 0.0630W | |
| 43 | 6 | R10, R11, R25, R26, R41, R50 | Pref | 80-0016R-23 | CRCW040216R0RFX; RC04021A1080RFL | VISHAY DALE;YAGEO | 16 | RES; SMT (0402); 16; 1%; +/-100PPM/DEGC; 0.0630W | |
| 44 | 10 | R13, R14, R39, R59, R84, R85, R88, R89, R102 | Pref | 80-0100K-23 | CRCW0402100K0RFX; RC0402FR-07100K | VISHAY;YAGEO | 100K | RES; SMT (0402); 100K; 1%; +/-100PPM/DEGC; 0.0630W | |
| 45 | 1 | R17 | Pref | 80-0402R-23 | CRCW04020402RFX | VISHAY DALE | 402 | RES; SMT (0402); 402; 1%; +/-100PPM/DEGC; 0.0630W | |
| 46 | 7 | R18, R19, R35, R36, R46, R57, R61 | Pref | 80-0001K-23 | CRCW04021K00RFX; RC0402FR-071K; MCR01MZPF1001 | VISHAY DALE;YAGEO PHICOMP;ROHM SEMI | 1K | RES; SMT (0402); 1K; 1%; +/-100PPM/DEGC; 0.0630W | |
| 47 | 1 | R20, R21, R37, R38, R47, R55 | Pref | 80-0499R-23 | CRCW0402499RFX | VISHAY DALE | 499 | RES; SMT (0402); 499; 1%; +/-100PPM/DEGC; 0.0630W | |
| 48 | 6 | R23 | Pref | 80-0100R-23 | RC04021A1000RFL; RC0402FR-07100R | PANASONIC;YAGEO PHICOMP | 100 | RES; SMT (0402); 100; 1%; +/-100PPM/DEGC; 0.0630W | |
| 49 | 1 | R24 | Pref | 80-0604R-23 | CR0402-16W-6040RFT; CRCW0402604RFX | VENKEL LTD.;VISHAY DALE | 604 | RES; SMT (0402); 604; 1%; +/-100PPM/DEGC; 0.0630W | |
| 50 | 1 | R27 | Pref | 80-0165R-25 | CRCW0805165RFX | VISHAY DALE | 165 | RES; SMT (0805); 165; 1%; +/-100PPM/DEGC; 0.1250W | |

MAX20754EVKIT8 Evaluation Kit

Evaluates: MAX20754 and MAX20790

MAX20754 EV Kit Bill of Materials (continued)

| ITEM | QTY | REF DES | VAR STATUS | MAXINV | MFG PART # | MANUFACTURER | VALUE | DESCRIPTION | COMMENTS |
|--------------|------------|--|------------|----------------------|--------------------------------------|---------------------------|----------------|---|--|
| 51 | 1 | R34 | Pref | 80-0787R-23 | CRCW0402787RFK | VISHAY DALE | 787 | RES; SMT (0402); 787; 1%; +/-100PPMDEGC; 0.0630W | |
| 52 | 2 | R40, R104 | Pref | 80-0150R-23 | CRCW0402150RFK; RC04021A1500FJ | VISHAY DALE;YAGEO | 150 | RES; SMT (0402); 150; 1%; +/-100PPMDEGC; 0.0630W | |
| 53 | 1 | R48 | Pref | 80-037K4-AA18 | CRCW040237K4FK | VISHAY DALE | 37.4K | RES; SMT (0402); 37.4K; 1%; +/-100PPMDEGC; 0.0630W | |
| 54 | 8 | R60, R63, R114-R119 | Pref | 80-0000R-26B | RC0402JR-070RL; CR0402-16W-0000JT | YAGEO PHYCOMP;VENKEL LTD. | 0 | RES; SMT (0402); 0; 5%; JUMPER; 0.0630W | |
| 55 | 1 | R62 | Pref | 80-052R3-23 | CR0402-16W-052R3FT | VENKEL LTD.;VISHAY DALE | 52.3 | RES; SMT (0402); 52.3; 1%; +/-100PPMDEGC; 0.0630W | |
| 56 | 1 | R65 | Pref | 80-049R9-BA37 | CRCW040249R9FKEDHP | VISHAY DRALORIC | 49.9 | RES; SMT (0402); 49.9; 1%; +/-100PPMDEGC; 0.2000W | |
| 57 | 1 | R66 | Pref | 80-0100R-65 | CRCW2512100RFK | VISHAY DALE | 100 | RES; SMT (2512); 100; 1%; +/-100PPMDEGC; 1W | |
| 58 | 2 | R66, R87 | Pref | 80-0002K-23 | CRCW04022000FK; RK73H1ETP2001F | VISHAY DALE;KOA SPEER | 2K | RES; SMT (0402); 2K; 1%; +/-100PPMDEGC; 0.0630W | |
| 59 | 1 | R103 | Pref | 80-0221R-23 | CRCW0402221RFK | VISHAY DALE | 221 | RES; SMT (0402); 221; 1%; +/-100PPMDEGC; 0.0630W | |
| 60 | 1 | R111 | Pref | 80-0010R-18 | ERJ-2RKF 10R0 | PANASONIC | 10 | RES; SMT (0402); 10; 1%; +/-100PPMDEGC; 0.1000W | |
| 61 | 6 | R122, R123, R126, R127, R130, R133 | Pref | 80-004R7-Q6 | ERJ-2GE4R7 | PANASONIC | 4.7 | RES; SMT (0402); 4.7; 5%; +/-200PPMDEGC; 0.1000W | |
| 62 | 2 | S2, S5 | Pref | 11-G12;PCF-00 | G12;PCF | NKK SWITCHES | G12;PCF | SWITCH; SPDT; SMT; STRAIGHT; 28V; FULLY ILLUMINATED ULTRA-MINIATURE TOGGLE; RC0L=0 OHM; RINSULATION=500M OHM; NKK SWITCHES | |
| 63 | 1 | S4 | Pref | 11-TL3301AF160QJ-00 | TL3301AF160QJ | E-SWITCH | TL3301AF160QJ | SWITCH; SPST; SMT; STRAIGHT; 250V; 0.05A; TACT SWITCH; RC0L=0 OHM; RINSULATION=500M OHM; E-SWITCH | |
| 64 | 4 | ST1-ST4 | Pref | 02-TTVER7808-00 | | 7808 KEYSTONE | 7808 | TERMINAL; BODY LENGTH=0.87IN; BODY WIDTH=0.47IN; HEIGHT=0.45IN; SCRW; BRASS | |
| 65 | 8 | TP1-TP6, TP36, TP37 | Pref | 02-TPMIN5002-00 | | 5002 KEYSTONE | NA | TEST POINT; PIN DIA=0.1IN; TOTAL LENGTH=0.3IN; BOARD HOLE=0.04IN; WHITE; PHOSPHOR BRONZE WIRE SILVER; NOT FOR COLD TEST | APAD |
| 66 | 3 | TP13, TP23, TP17 | Pref | 02-TPCOMP5007-00 | | 5007 KEYSTONE | NA | TESTPOINT;PINDIA=0.125IN;TOTALLENGTH=0.35IN; BOARDHOLE=0.063IN;WHITE;PHOSPHORBRONZE WIRE SILVER;LATEFINISH;RECOMMENDEDFORBOARD THICKNESS=0.062IN;NOTFORCOLDTEST | (TP13,TP23,BPAD) (TP17,WHITE) |
| 67 | 1 | TP18 | Pref | 02-TPCOMP5121-00 | | 5121 KEYSTONE | NA | TEST POINT; PIN DIA=0.125IN; TOTAL LENGTH=0.35IN; BOARD HOLE=0.063IN; GREEN; PHOSPHOR BRONZE WIRE SILVER PLATE FINISH; RECOMMENDED FOR BOARD THICKNESS=0.062IN; NOT FOR COLD TEST | GREEN |
| 68 | 5 | TP7, TP9, TP35, TP19, TP25 | Pref | 02-TPMIN5000-00 | | 5000 KEYSTONE | NA | TEST POINT; PIN DIA=0.1IN; TOTAL LENGTH=0.3IN; BOARD HOLE=0.04IN; RED; PHOSPHOR BRONZE WIRE SILVER PLATE FINISH; RECOMMENDED FOR BOARD THICKNESS=0.062IN; NOT FOR COLD TEST | (TP7,TP9,TP35,RED) (TP19,TP25,APAD) |
| 69 | 1 | TP20 | Pref | 02-TPMIN5013-00 | | 5013 KEYSTONE | NA | TEST POINT; PIN DIA=0.125IN; TOTAL LENGTH=0.445IN; BOARD HOLE=0.063IN; ORANGE; PHOSPHOR BRONZE WIRE SILVER PLATE FINISH; RECOMMENDED FOR BOARD THICKNESS=0.062IN; NOT FOR COLD TEST | ORANGE |
| 70 | 1 | TP21 | Pref | 02-TPMIN5014-00 | | 5014 KEYSTONE | NA | TEST POINT; PIN DIA=0.125IN; TOTAL LENGTH=0.445IN; BOARD HOLE=0.063IN; YELLOW; PHOSPHOR BRONZE WIRE SILVER PLATE FINISH; RECOMMENDED FOR BOARD THICKNESS=0.062IN; NOT FOR COLD TEST | YELLOW |
| 71 | 10 | TP8, TP10, TP29-TP33, TP39, TP22, TP26 | Pref | 02-TPMIN5001-00 | | 5001 KEYSTONE | NA | TEST POINT; PIN DIA=0.1IN; TOTAL LENGTH=0.3IN; BOARD HOLE=0.04IN; BLACK; PHOSPHOR BRONZE WIRE SILVER PLATE FINISH; RECOMMENDED FOR BOARD THICKNESS=0.062IN; NOT FOR COLD TEST | (TP8,TP10,TP29-TP33,TP39,BLACK) (TP22,TP26,APAD) |
| 72 | 1 | TP34 | Pref | 02-TPCOMP5122-00 | | 5122 KEYSTONE | NA | TEST POINT; PIN DIA=0.125IN; TOTAL LENGTH=0.35IN; BOARD HOLE=0.063IN; BLUE; PHOSPHOR BRONZE WIRE SILVER PLATE FINISH; RECOMMENDED FOR BOARD THICKNESS=0.062IN; NOT FOR COLD TEST | BLUE |
| 73 | 1 | U1 | Pref | 00-SAMPLE-01 | MAX20754ETMA2+ | MAXIM | MAX20754ETMA2+ | EVKIT PART - IC; CTRL; DUAL-OUTPUT; CONFIGURABLE MULTIPHASE POWER-SUPPLY CONTROLLER WITH PMBUS INTERFACE AND INTERNAL BUCK CONVERTER; LOW-VOLTAGE APPLICATIONS; PACKAGE CODE: 1487T-4; PACKAGE OUTLINE NO.: 21-0144; PACKAGE LAND PATTERN DRAWING NO.: 90-0130; TQFN48-EP | |
| 74 | 6 | U2-U7 | Pref | 00-SAMPLE-02 | MAX20790 | MAXIM | MAX20790 | EVKIT PART - IC; FCQFN12; 7.40MM X 3.28MM; 12 PINS; NOTE: PCB FOOTPRINT UNDER DEVELOPMENT | |
| 75 | 1 | U8 | Pref | 10-MAX17501EATB-T | MAX17501EATB+ | MAXIM | MAX17501EATB+ | IC; CONV; ULTRA-SMALL; HIGH EFFICIENCY; SYNCHRONOUS STEP-DOWN DC-DC CONVERTER; TQFN10-EP | |
| 76 | 2 | U9, U14 | Pref | 10-NC7WZ38K8X-U | NC7WZ38K8X | FAIRCHILD SEMICONDUCTOR | NC7WZ38K8X | IC; NAND; TINY LOGIC UHS DUAL 2-INPUT NAND GATE; OPEN DRAIN OUTPUT; VSSOP8 | |
| 77 | 1 | U11 | Pref | 10-NC7S208L6X-G | NC7S208L6X | FAIRCHILD SEMICONDUCTOR | NC7S208L6X | IC; AND; NC7S208; TINY LOGIC; ULTRA HIGH SPEED; TWO-INPUT AND GATE - MICROPAK | |
| 78 | 1 | U12 | Pref | 10-NC7SZ14MSX-U | NC7SZ14MSX | FAIRCHILD SEMICONDUCTOR | NC7SZ14MSX | IC; INV; TINY LOGIC UHS INVERTER WITH SCHMITT TRIGGER INPUT; SOT23-5 | |
| 79 | 1 | U13 | Pref | 10-NC7WZ32K8X-U | NC7WZ32K8X | FAIRCHILD SEMICONDUCTOR | NC7WZ32K8X | IC; OR; TINY LOGIC; UHS DUAL 2-INPUT OR GATE; US8-8 | |
| 80 | 1 | PCB | - | EPCB20754EPCB2079060 | MAX20754MAX2079060 | MAXIM | PCB | PCB-MAX20754MAX2079060 | |
| TOTAL | 332 | | | | | | | | |

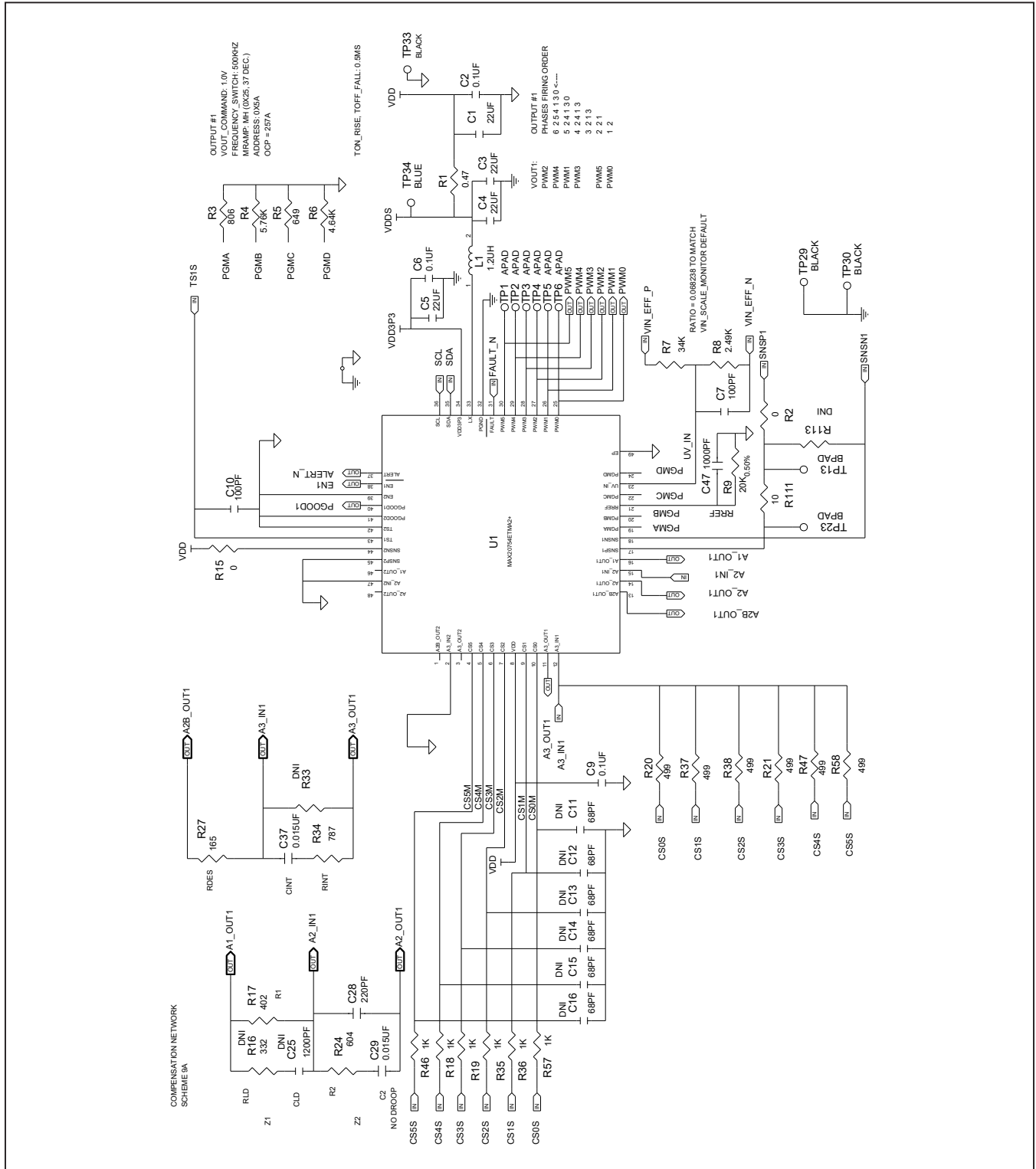
| DO NOT PURCHASE (DNP) | | | | | | | | | |
|-----------------------|-----------|------------------------------------|------------|---------------|---|-----------------------------|--------|---|----------|
| ITEM | QTY | REF DES | Var Status | MAXINV | MFG PART # | MANUFACTURER | VALUE | DESCRIPTION | COMMENTS |
| 1 | 6 | C8, C26, C342-C245 | DNP | 20-1000P-E7 | C0402C100K5GAC | KEMET | 1000PF | CAP; SMT (0402); 1000PF; 10%; 50V; COG; CERAMIC | |
| 2 | 6 | C11-C16 | DNP | 20-0068P-27 | C0402C06805GAC; GRM1555C1H680JA01 | KEMET;MURATA | 68PF | CAP; SMT (0402); 68PF; 5%; 50V; COG; CERAMIC | |
| 3 | 1 | C25 | DNP | 20-1200P-04C | CL150122630NKN; GRM1556R71H122KA01 | SAMSUNG ELECTRONICS;MURATA | 1200PF | CAP; SMT (0402); 1200PF; 10%; 50V; X7R; CERAMIC | |
| 4 | 9 | C96, C97, C154-C159, C223 | DNP | 20-0033U-DA76 | TS21X33M0502ATE075 | KEMET | 33UF | CAP; SMT (343-43); 33UF; 20%; 50V; CONDUCTIVE POLYMER | |
| 5 | 23 | C131-C148, C218-C222 | DNP | 20-0100U-B57 | C3216XSR0J107M160AB; GRM31CR60J107ME39 | TDK;MURATA | 100UF | CAP; SMT (1206); 100UF; 20%; 6.3V; XSR; CERAMIC | |
| 6 | 1 | R16 | DNP | 80-0332R-23 | CRCW0402332RFK | VISHAY DALE | 332 | RES; SMT (0402); 332; 1%; +/-100PPMDEGC; 0.0630W | |
| 7 | 2 | R33, R113 | DNP | 80-0000R-BA38 | CRCW04020000Z0EDHP; RCS04020000Z0 | VISHAY DRALORIC;VISHAY DALE | 0 | RES; SMT (0402); 0; JUMPER; JUMPER; 0.2000W | |
| 8 | 6 | R120, R121, R125, R128, R129, R131 | DNP | 80-0000R-26B | RC0402JR-070RL; CR0402-16W-000RJT | YAGEO PHYCOMP;VENKEL LTD. | 0 | RES; SMT (0402); 0; 5%; JUMPER; 0.0630W | |
| TOTAL | 54 | | | | | | | | |

| PACKOUT (These are purchased parts but not assembled on PCB and will be shipped with PCB) | | | | | | | | | |
|---|----------|---------|------------|--------|------------|--------------|-------|-------------|----------|
| ITEM | QTY | REF DES | Var Status | MAXINV | MFG PART # | MANUFACTURER | VALUE | DESCRIPTION | COMMENTS |
| TOTAL | 0 | | | | | | | | |

MAX20754EVKIT8 Evaluation Kit

Evaluates: MAX20754 and MAX20790

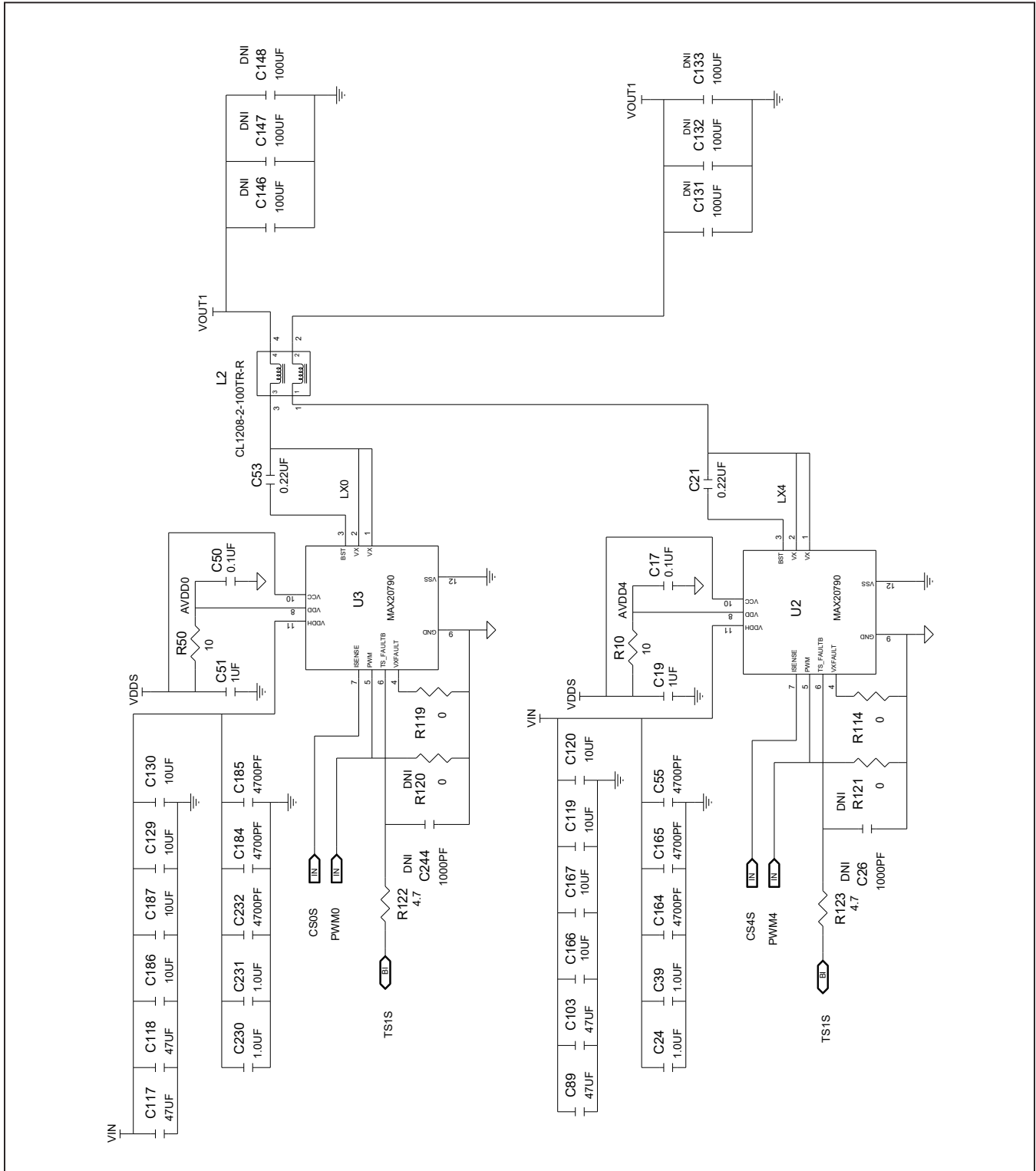
MAX20754 EV Kit Schematic



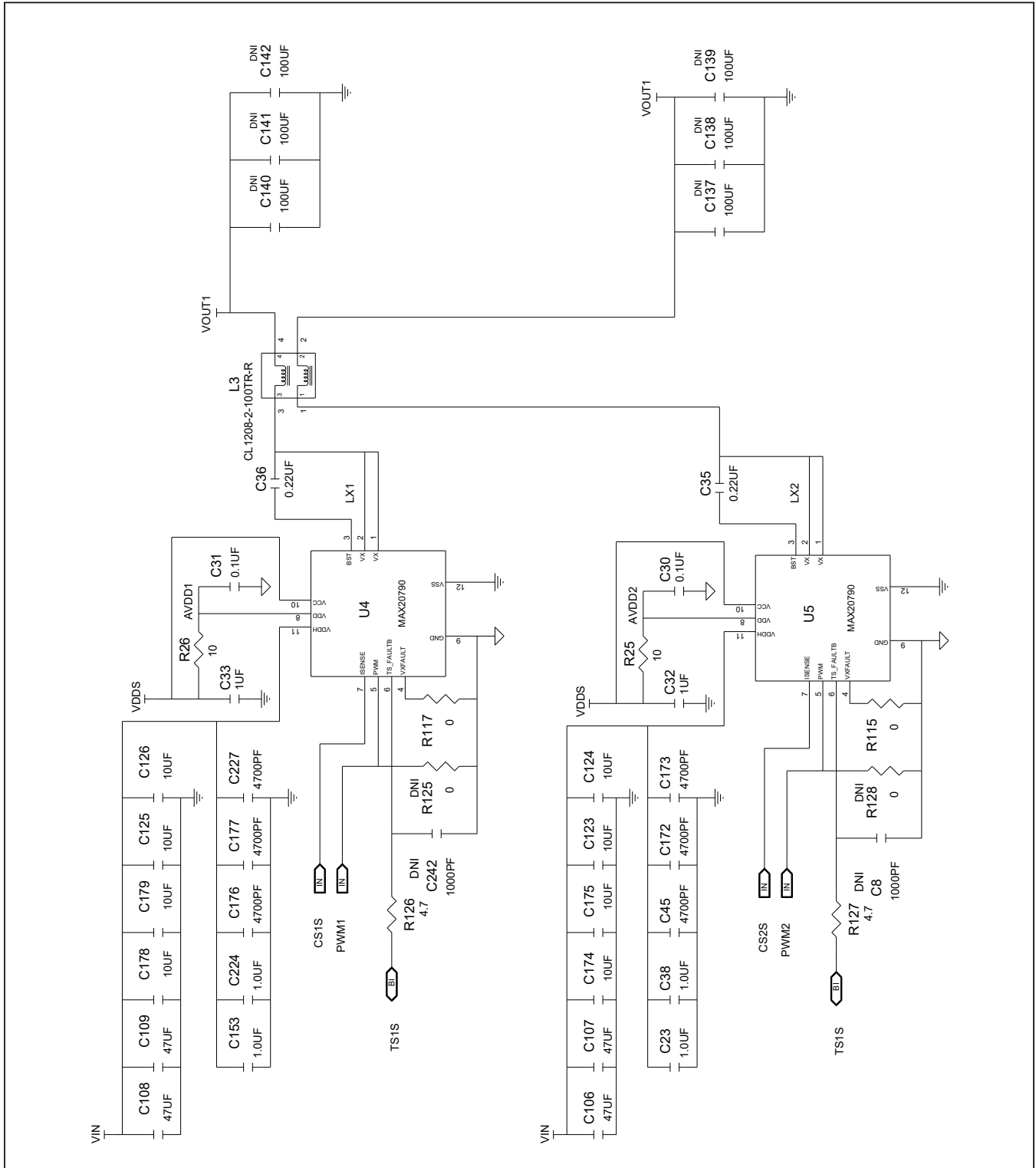
MAX20754EVKIT8 Evaluation Kit

Evaluates: MAX20754 and MAX20790

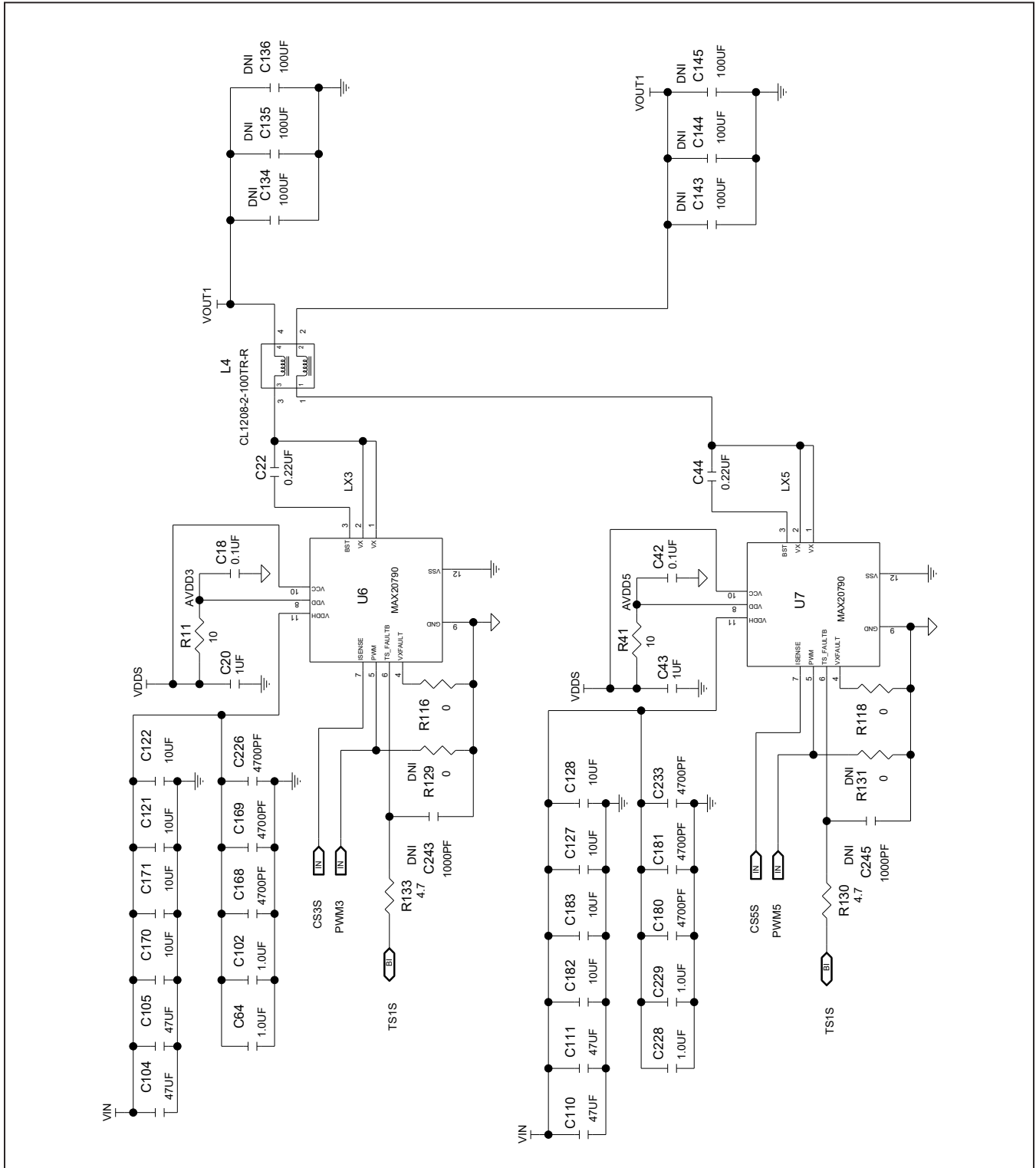
MAX20754 EV Kit Schematic (continued)



MAX20754 EV Kit Schematic (continued)



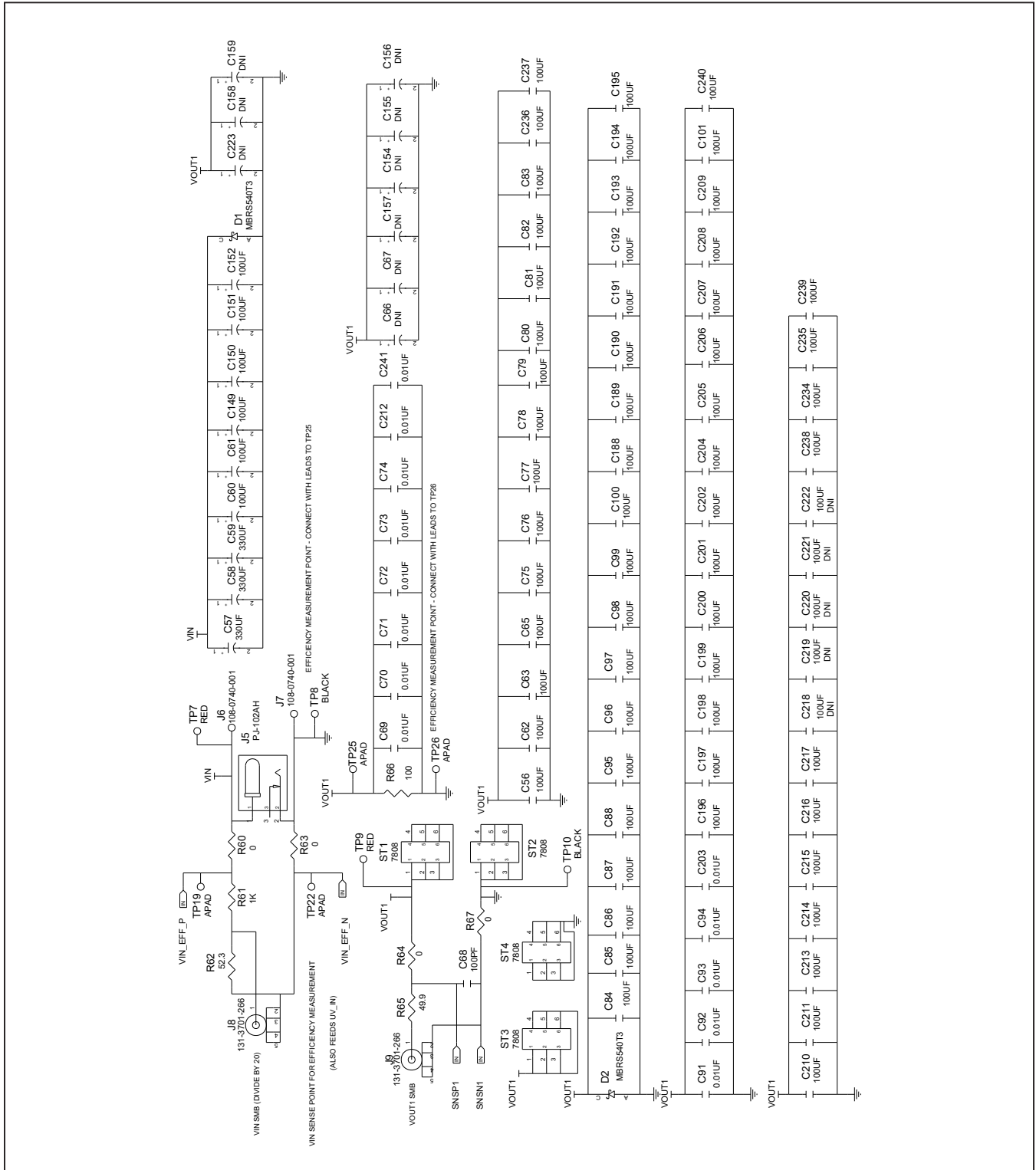
MAX20754 EV Kit Schematic (continued)



MAX20754EVKIT8 Evaluation Kit

Evaluates: MAX20754 and MAX20790

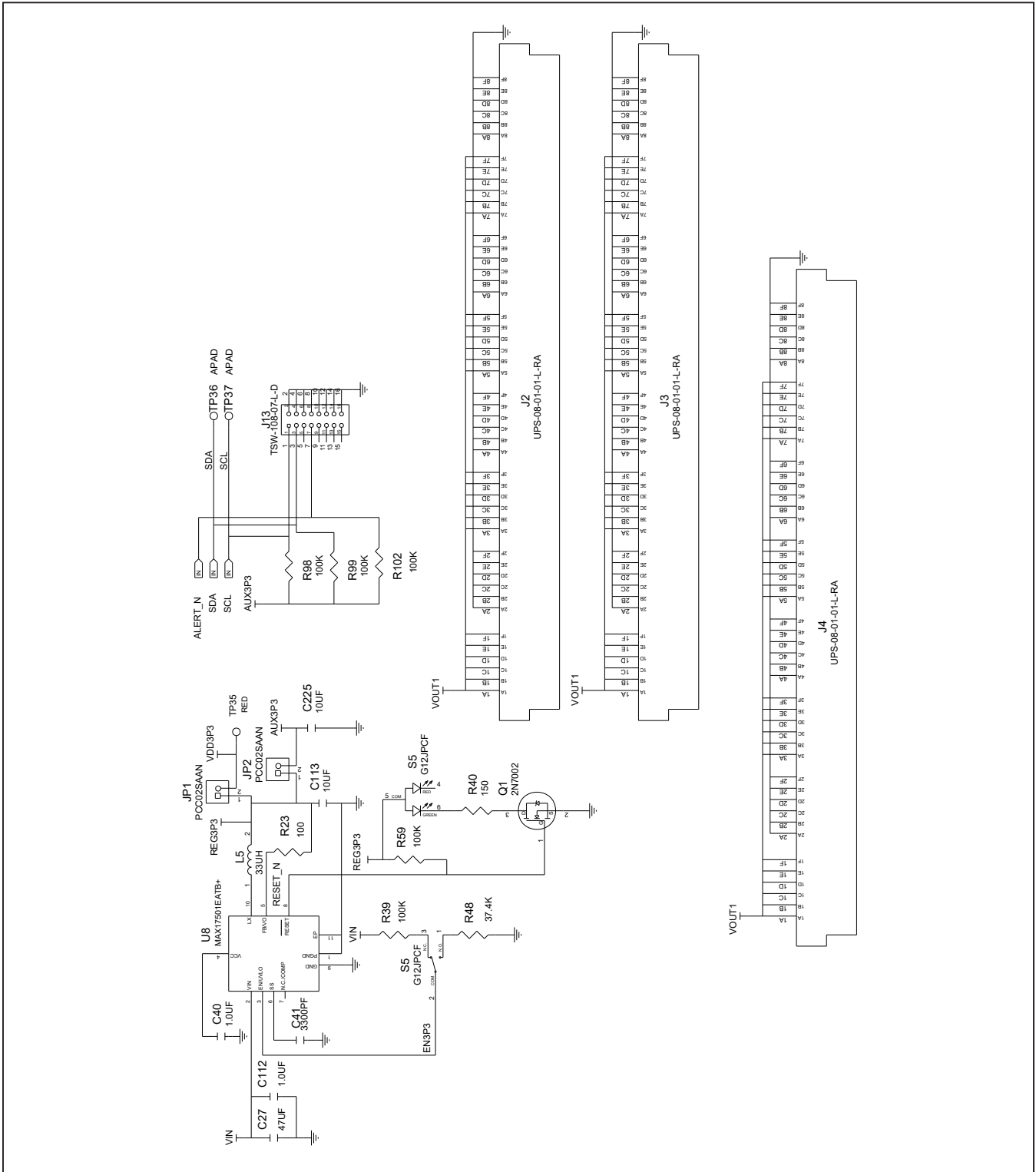
MAX20754 EV Kit Schematic (continued)



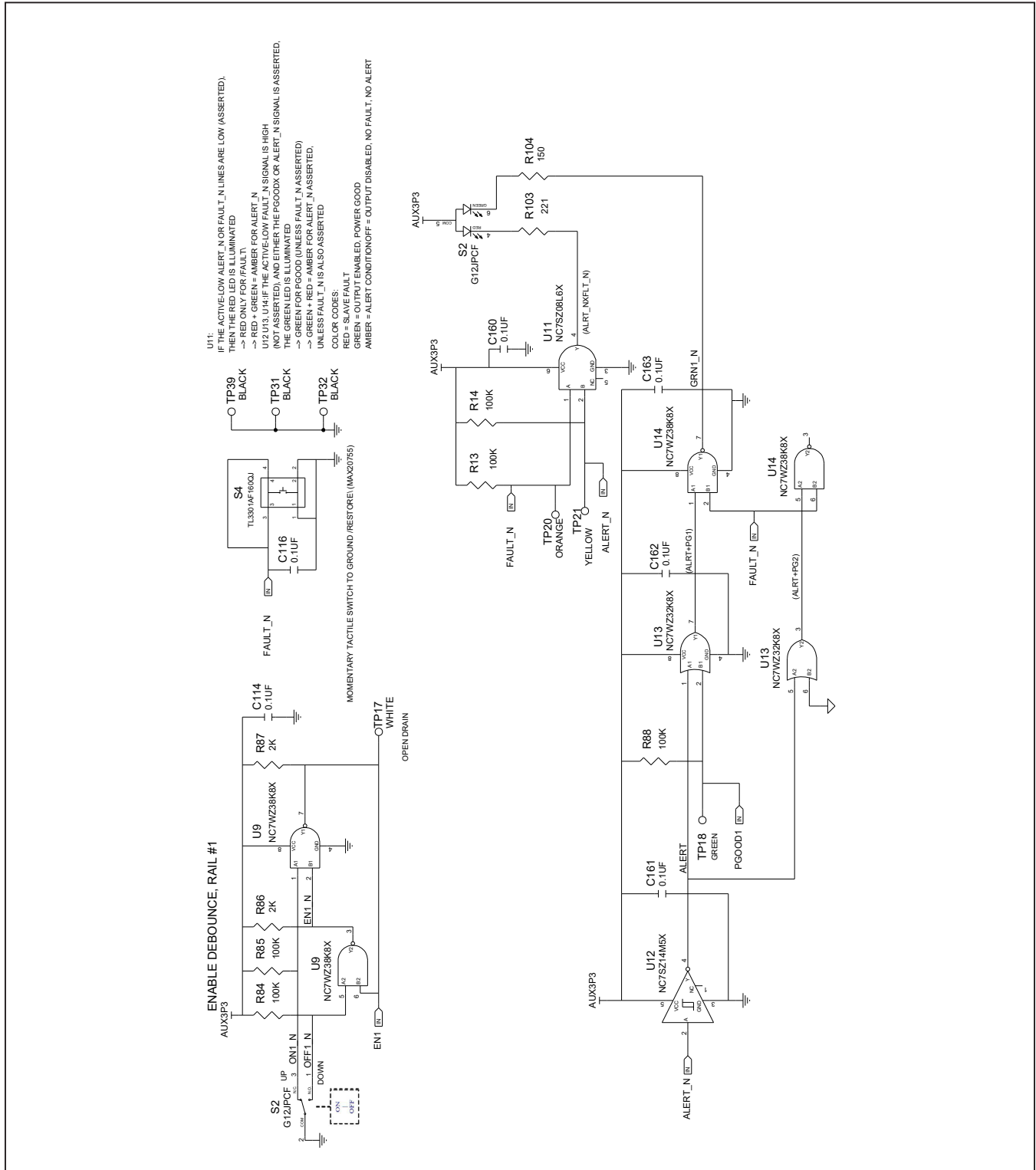
MAX20754EVKIT8 Evaluation Kit

Evaluates: MAX20754 and MAX20790

MAX20754 EV Kit Schematic (continued)



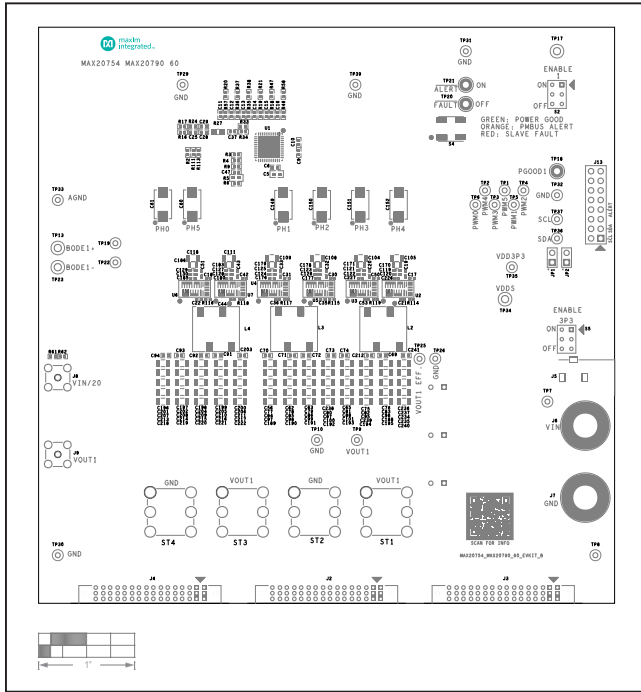
MAX20754 EV Kit Schematic (continued)



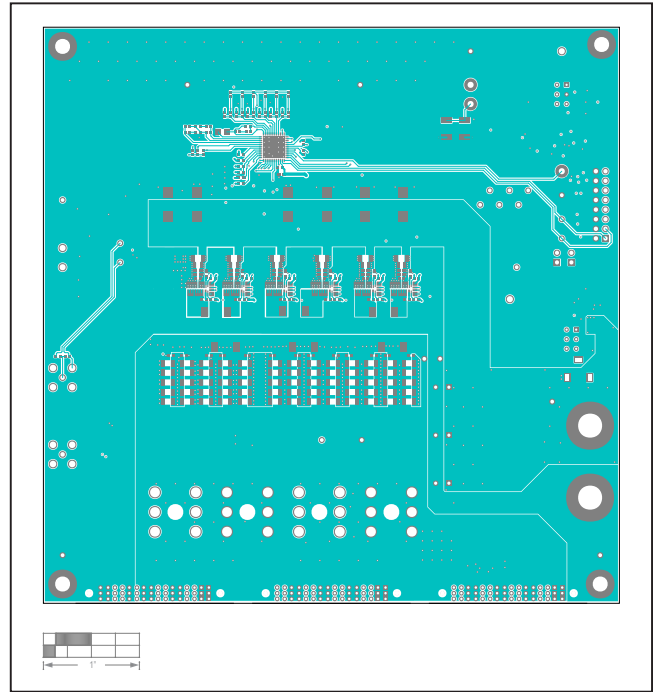
MAX20754EVKIT8 Evaluation Kit

Evaluates: MAX20754 and MAX20790

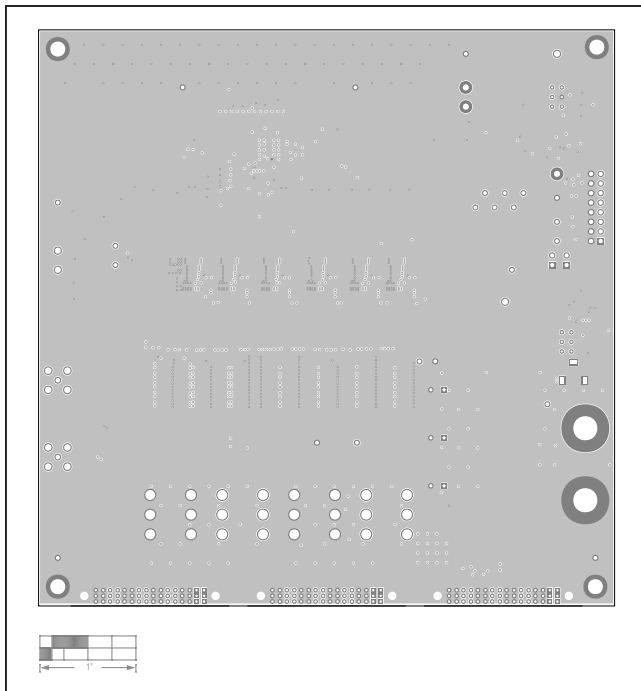
MAX20754 EV Kit PCB Layout Diagrams



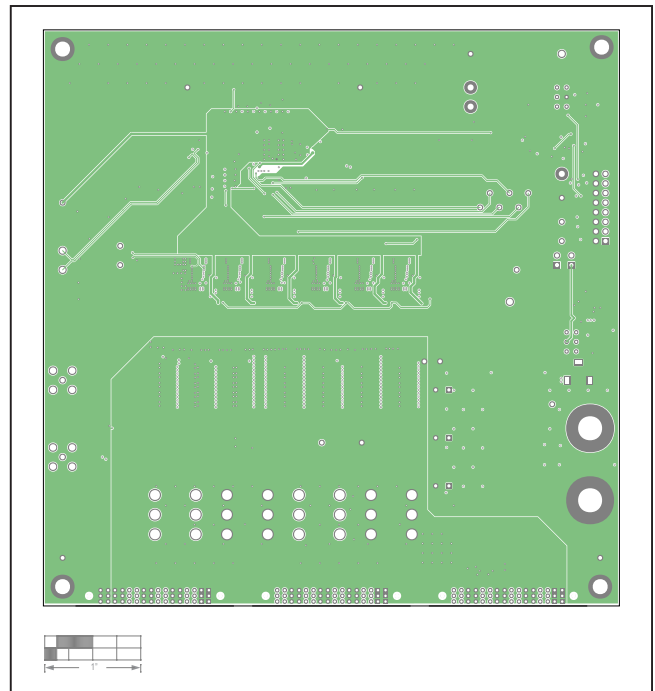
MAX20754 EV Kit PCB Layout—Top Silkscreen



MAX20754 EV Kit PCB Layout—Top Layer



MAX20754 EV Kit PCB Layout—Internal Layer 2 GND

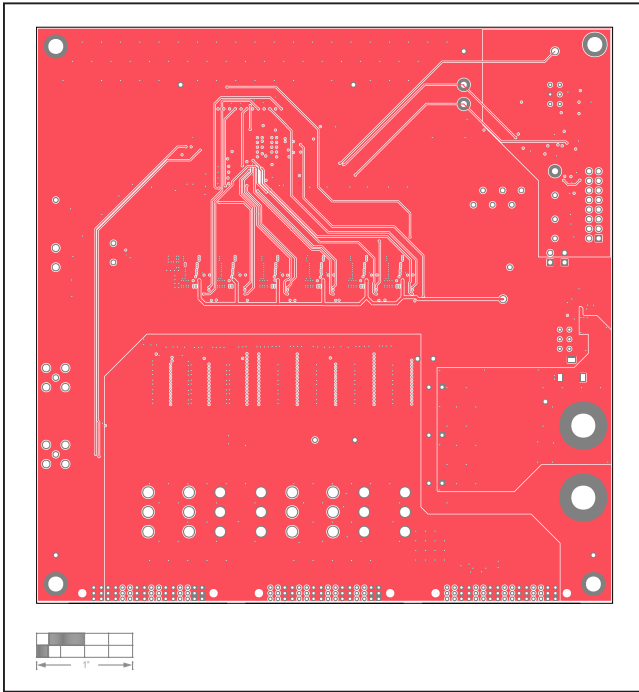


MAX20754 EV Kit PCB Layout—Internal Layer 3 Signal

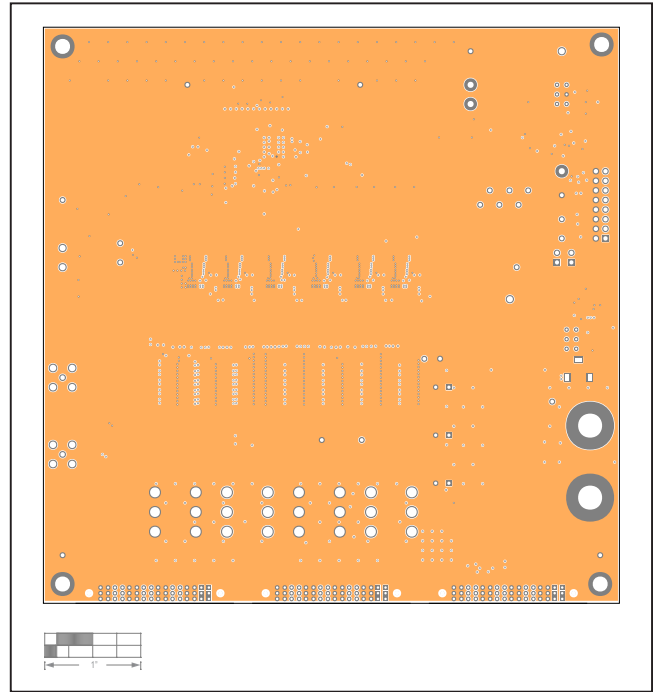
MAX20754EVKIT8 Evaluation Kit

Evaluates: MAX20754 and MAX20790

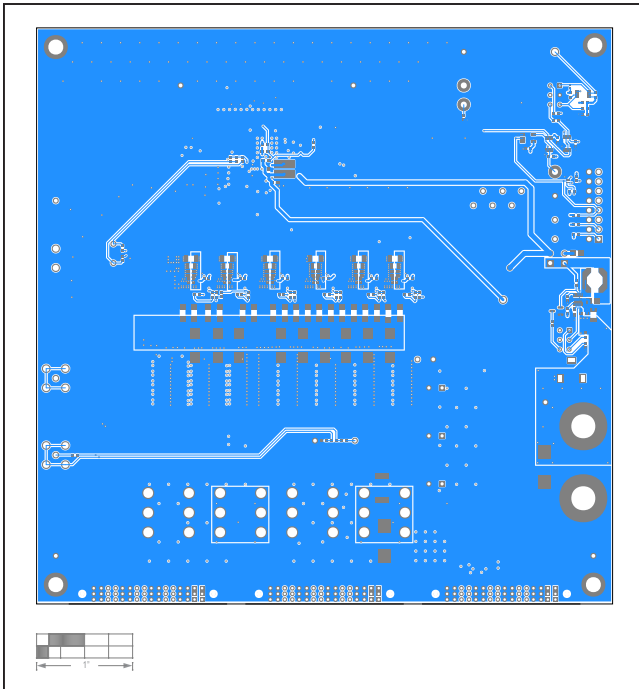
MAX20754 EV Kit PCB Layout Diagrams (continued)



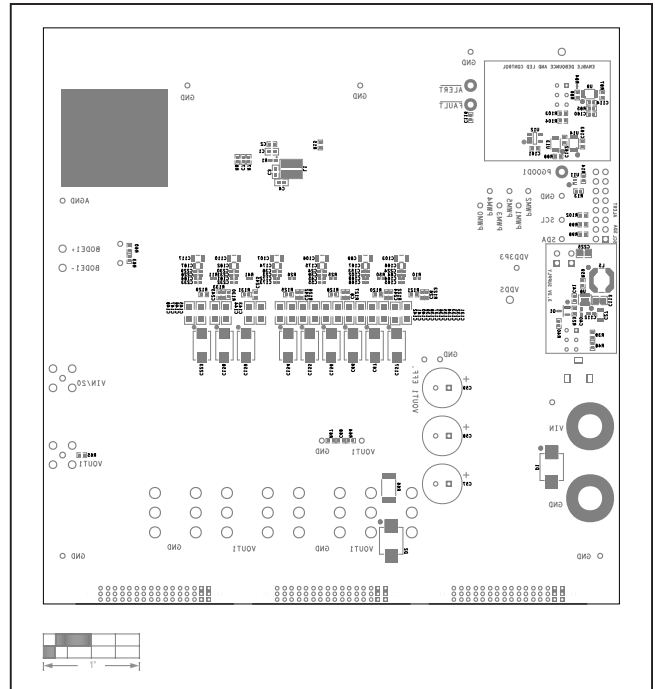
MAX20754 EV Kit PCB Layout—Internal Layer 4 Signal



MAX20754 EV Kit PCB Layout—Internal Layer 5 GND



MAX20754 EV Kit PCB Layout—Bottom Layer



MAX20754 EV Kit PCB Layout—Bottom Silkscreen

MAX20754EVKIT8 Evaluation Kit

Evaluates: MAX20754 and MAX20790

Revision History

| REVISION NUMBER | REVISION DATE | DESCRIPTION | PAGES CHANGED |
|-----------------|---------------|-----------------|---------------|
| 0 | 12/21 | Initial release | — |

