

## Evaluates: MAX20754 and MAX20790

## MAX20754EVKIT7 Evaluation Kit

### General Description

This MAX20754EVKIT7 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 MAX20754EVKIT7 EV kit is a two-output design, with four phases assigned to Output 1 and the remaining two phases assigned to Output 2. Both outputs use 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 Two Independent Outputs
  - Output 1: 4-Phase, 1V, 150A
  - Output 2: 2-Phase, 1V, 75A
- 500kHz Switching Frequency
- Independent Enable Switches
- PMBus Configuration and Control
  - Compatible with Maxim’s PowerTool™ GUI
  - Easy Connection to PC Using MAXPOWERTOOL002 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

**Ordering Information** appears at end of data sheet.

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

### Quick Start

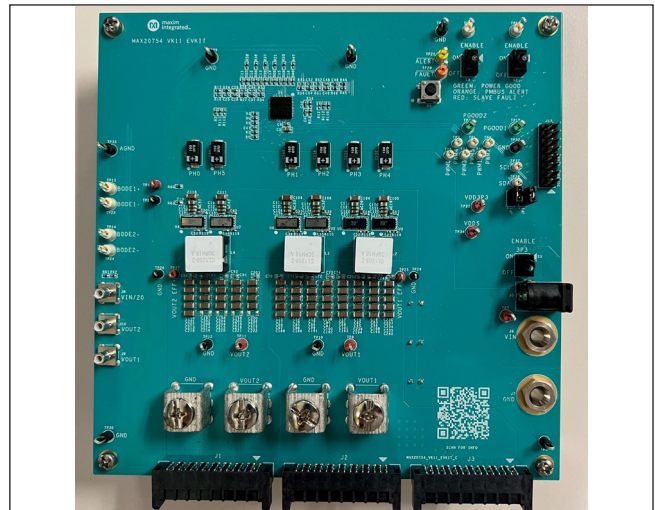
#### Required Equipment

- 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 150A at 1V
- Two loads are required to test both outputs simultaneously
- Ask about the Maxim MINILOAD device
- Digital multimeter (DMM)

### EV Kit Board Photo



319-100852; Rev 0; 11/21

## 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, J9, and J10 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 outputs by operating switches S2 and S3 on the EV kit, or by setting the OPERATION and ON\_OFF\_CONFIG commands in the PowerTool GUI.

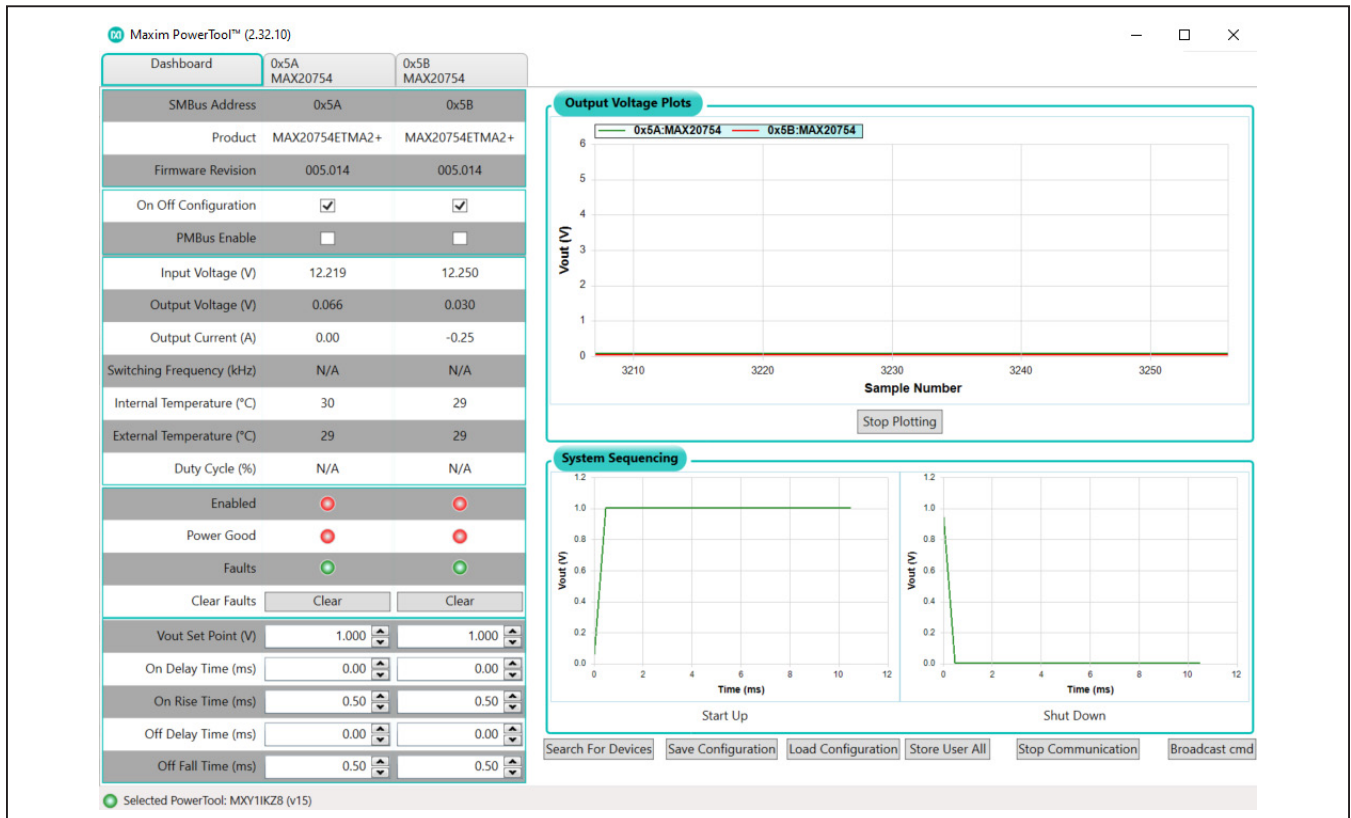


Figure 1. Maxim PowerTool Graphical User Interface Software Dashboard Window

### 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.

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.

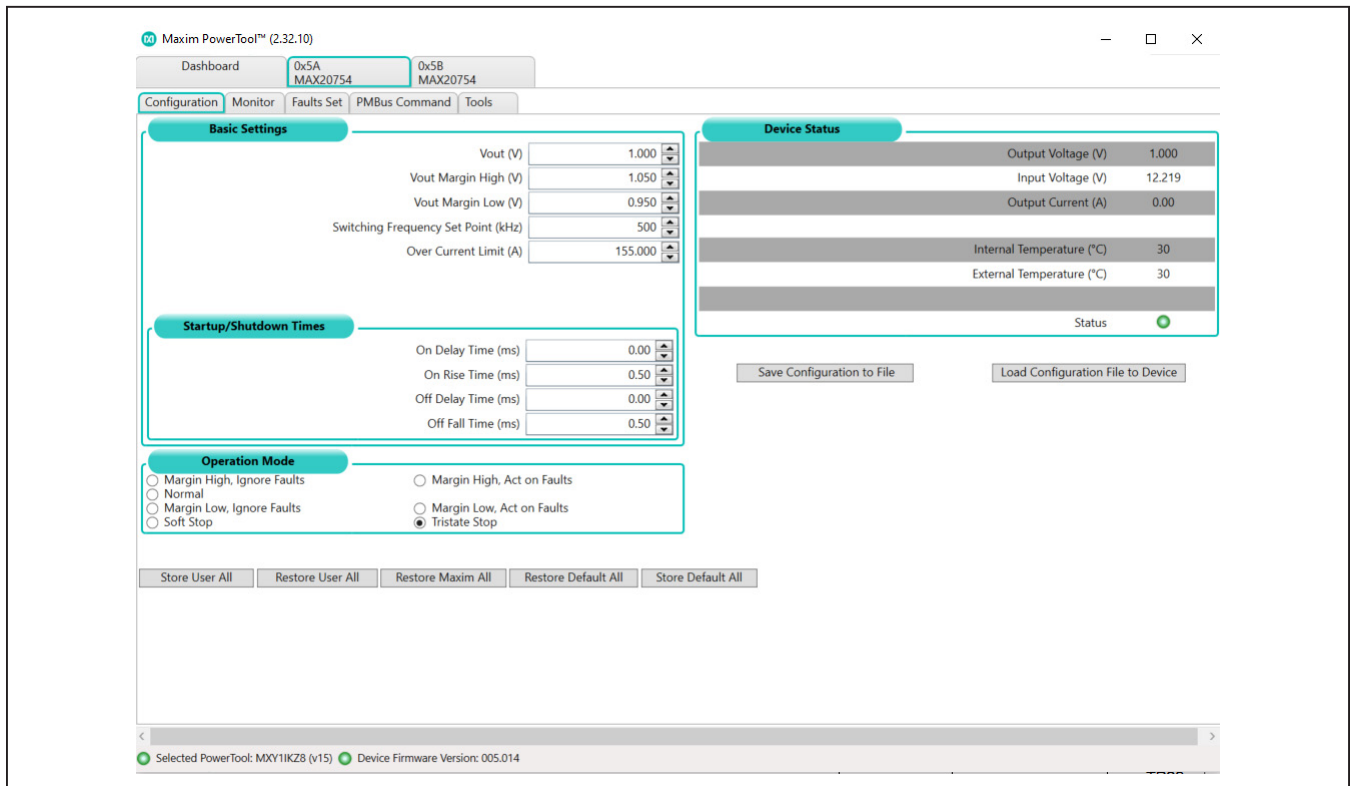


Figure 2. Detailed View for One Device; **Configuration** Sub-Tab

## Detailed Description of Hardware

The MAX20754EVKIT7 demonstrates a dual-output step-down power supply solution with one four-phase output and one two-phase output, both of which make 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 first output is four-phase resulting in 90° timing; the second output is two-phase with 180° 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. Both outputs are set to supply 1V. The maximum output current for Output 1 is 150A, and for Output 2 is 75A.

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 <sub>DD3P3</sub> 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 2 output positive voltage
ST4	Rail 2 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 ≥1MΩ 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 ≥1MΩ input resistance.
J10	SMB jack for Rail 2 output voltage monitoring. This connection has 50Ω back-impedance. Connect to an oscilloscope with 1x scaling and ≥1MΩ 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 3. Connector List**

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)
S3	SPDT toggle switch. Enable Rail 2 output regulation. Green light: PGOOD2 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)
TP38	EN2 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)
TP40	PGOOD2 signal (open drain)
TP6	PWM0 signal (Rail 2)
TP5	PWM1 signal (Rail 1)
TP4	PWM2 signal (Rail 1)
TP3	PWM3 signal (Rail 1)
TP2	PWM4 signal (Rail 1)
TP1	PWM5 signal (Rail 2)
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

Table 5. Test Points (continued)

REFERENCE DESIGNATOR	DESCRIPTION
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)
TP14	Rail 2 loop-response (Bode plot) measurement positive injection point (see MAX20754 EV Kit Schematic)
TP24	Rail 2 loop-response (Bode plot) measurement negative injection point (see MAX20754 EV Kit Schematic)
TP27	Rail 2 output voltage efficiency measurement point
TP28	Rail 2 output ground efficiency measurement point
TP11	Rail 2 output voltage feedback sense point (for line/load regulation accuracy measurement with DMM)
TP12	Rail 2 output ground feedback sense point (for line/load regulation accuracy measurement with DMM)
TP34	V <sub>DDS</sub> supply; +1.8V power to MAX20790 power stage, from MAX20754 integrated switcher output
TP35	V <sub>DD3P3</sub> supply; +3.3V power to MAX20754 integrated switcher
TP29, TP30, TP31, TP32, TP33, TP39	Ground

Typical Operating Characteristics

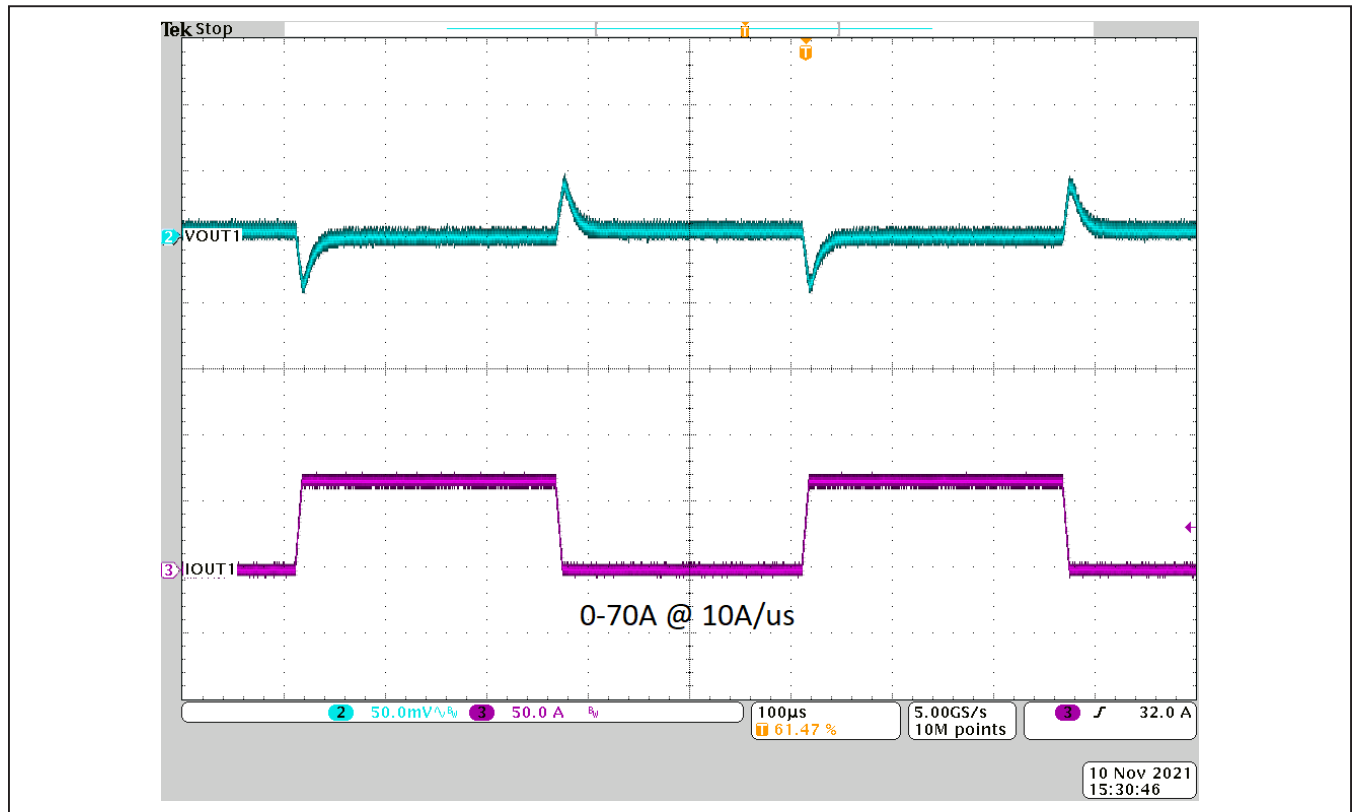


Figure 3. Output 1 Load Transient Response

Typical Operating Characteristics (continued)

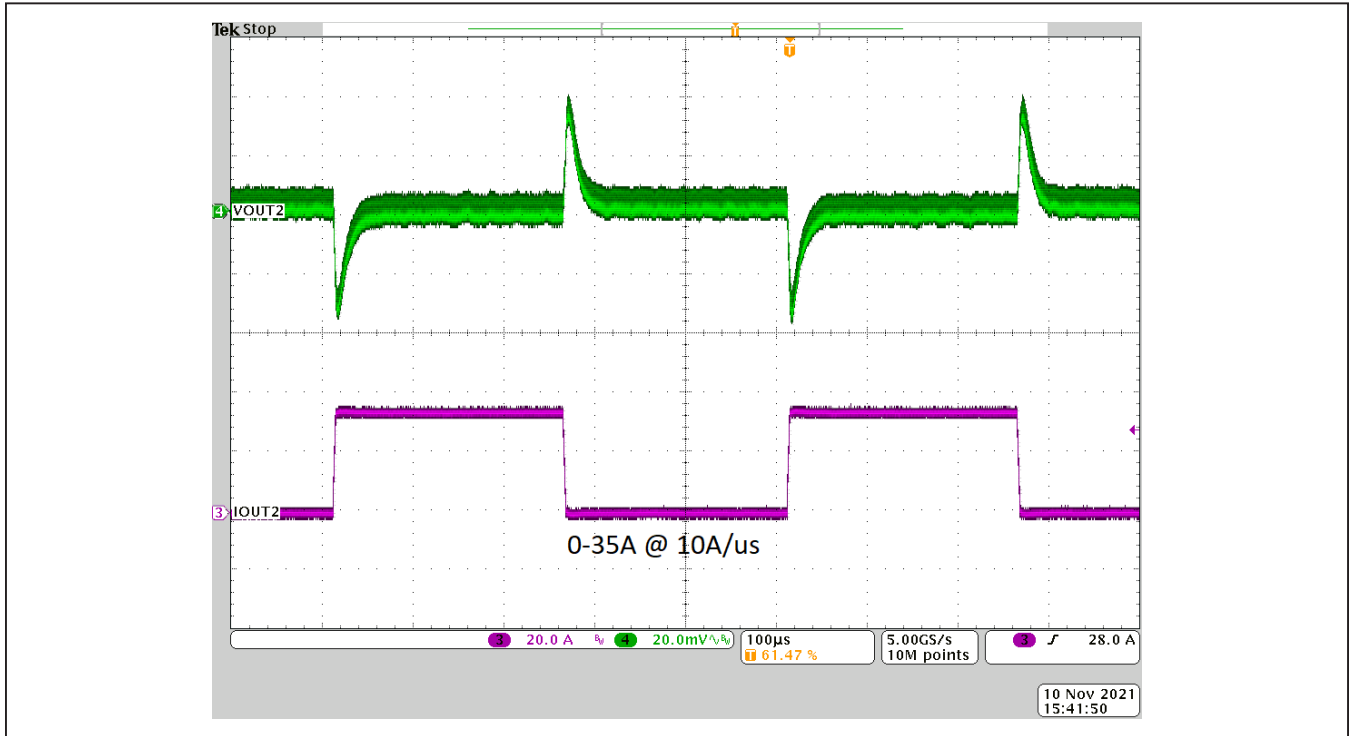


Figure 4. Output 2 Load Transient Response

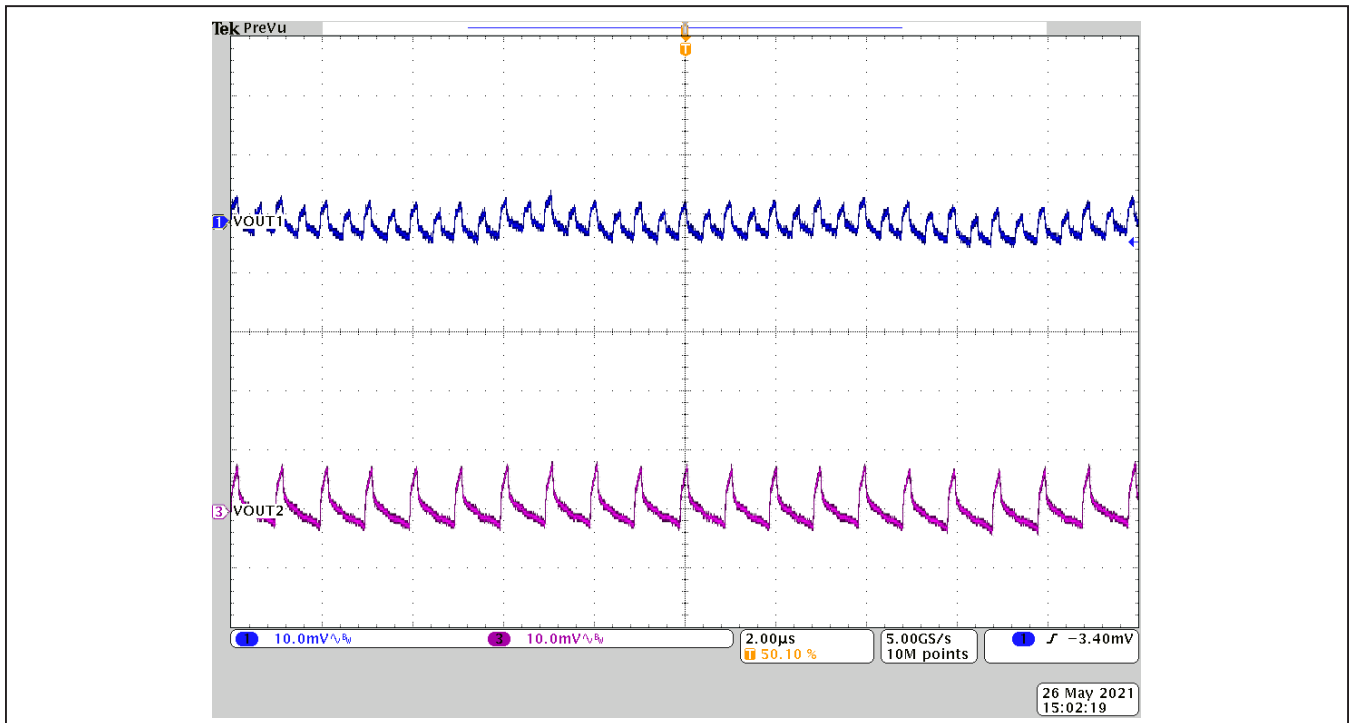


Figure 5. Output 1 and Output 2 Ripple

Typical Operating Characteristics (continued)

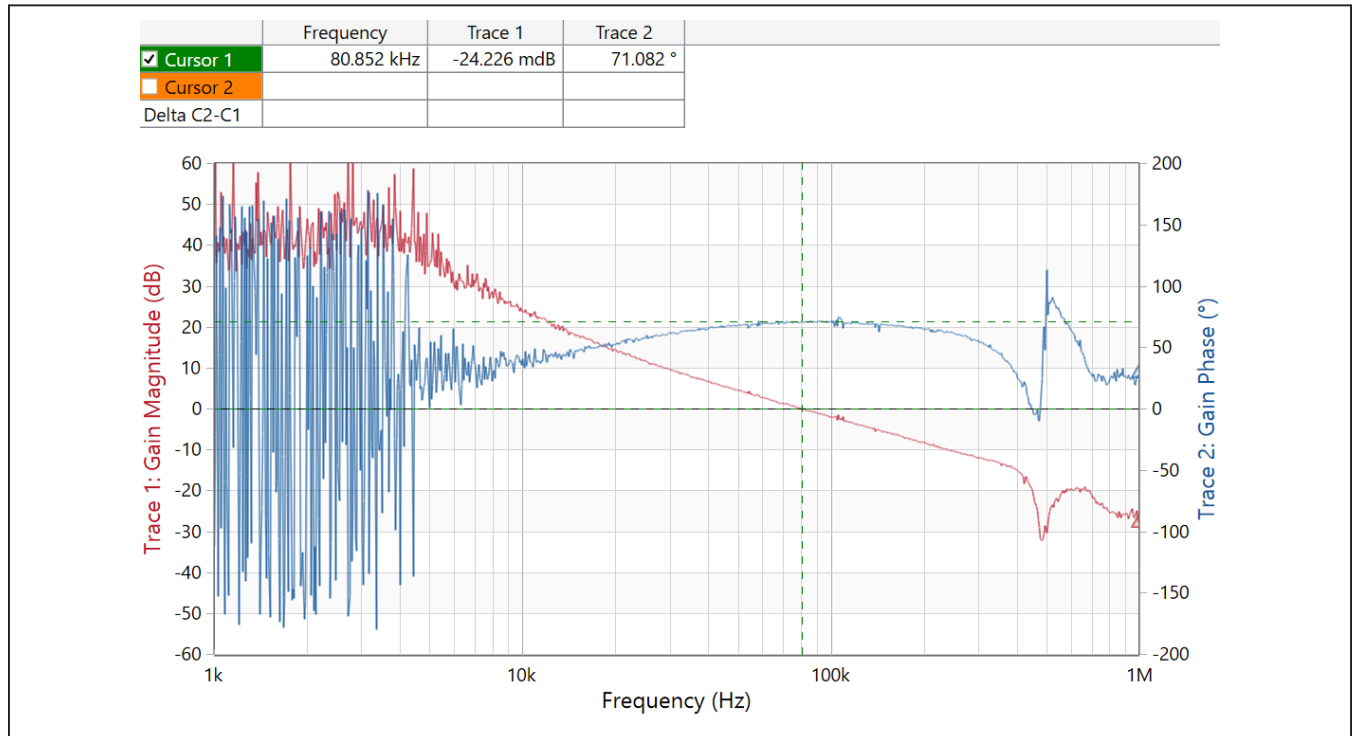


Figure 6. Output 1 Bode Plot

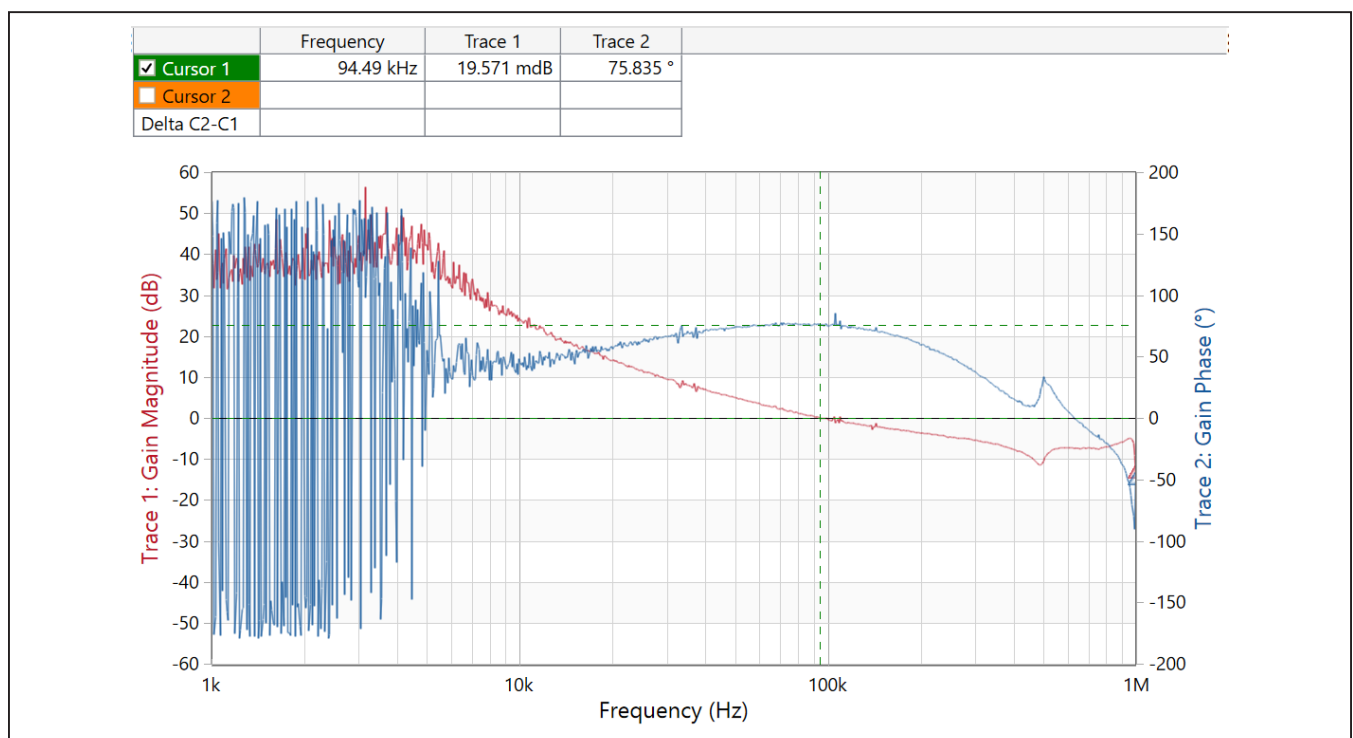


Figure 7. Output 2 Bode Plot



# MAX20754EVKIT7 Evaluation Kit

Evaluates: MAX20754 and  
MAX20790

## Ordering Information

PART	TYPE
MAX20754EVKIT7#	MAX20754 EV Kit
MAXPOWERTOOL002	USB-to-SMBus Interface

#Denotes RoHS compliance.

## 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	GRM188C80229MEAO	MURATA	22UF	CAP: SMT (0603); 22UF; 20%; 4V; X6S; CERAMIC	
2	15	C2, C6, C17, C18, C30, C31, C42, C50, C114-C116, C160-C163	Pref	20-000U1-L1A	C100SX7R1C104K050BC; ATCS30L104KT1B; 0402YC104KAT2A; C0402X7R160-104K0NE; CL05B104K020NNC; GRM155SR71C104K488; C100SX7R1C104K; CC0402X7R7R7B104; ERM105B7104KV; 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	3	C7, C68, C90	Pref	20-0100P-27	C0402C101J5GAC; NMC2402RFD101J; CC0402JRNPO5BN101; GRM1555C1H101JA01; C100SC0G1H101J050BA	KEMET;NIC COMPONENTS CORP.; YAGEO PHICOMP;MURATA; TDK;TDK	100PF	CAP: SMT (0402); 100PF; 5%; 50V; COG; CERAMIC	
4	2	C9, C10	Pref	20-1000P-05	GRM155R71H102JA01; GCM155R71H102JA37	MURATA;MURATA	1000PF	CAP: SMT (0402); 1000PF; 5%; 50V; X7R; CERAMIC	
5	6	C11-C16	Pref	20-0068P-27	C0402C680J5GAC; GRM1555C1H680JA01	KEMET;MURATA	68PF	CAP: SMT (0402); 68PF; 5%; 50V; COG; CERAMIC	
6	6	C19, C20, C32, C33, G43, C51	Pref	20-000U1-B9	GRM188R60J100KA01	MURATA	1UF	CAP: SMT (0603); 1UF; 10%; 6.3V; X5R; CERAMIC; NOTE: NOT RECOMMENDED FOR NEW DESIGN. USE 20-0001U-G3	
7	6	C21, C22, C35, C36, C44, C53	Pref	20-00U22-B19	GRM155R71C22KA12	MURATA	0.22UF	CAP: SMT (0402); 0.22UF; 10%; 16V; X7R; CERAMIC	
8	12	C23, C24, C38, C39, C64, C102, C153, C224, C228-C231	Pref	20-000U1-Z6	GMK107BJ109KA; C1608XSR1V105K080AB	TAIYO YUDEN;TDK	1.0UF	CAP: SMT (0603); 1.0UF; 10%; 35V; X5R; CERAMIC	
9	1	C25	Pref	20-1200P-G4C	CL05B122K8NNNC; GRM155R71H122KA01	SAMSUNG ELECTRONICS; MURATA	1200PF	CAP: SMT (0402); 1200PF; 10%; 50V; X7R; CERAMIC	
10	1	C27	Pref	20-0047U-Y7	C3216XSR1C476M160AB; GRM31CR61C476ME44	TDK;MURATA	47UF	CAP: SMT (1206); 47UF; 20%; 16V; X5R; CERAMIC	
11	1	C28	Pref	20-0220P-BA31	GRM1555C1H221JA01	MURATA	220PF	CAP: SMT (0402); 220PF; 5%; 50V; COG; CERAMIC	
12	4	C29, C37, C49, C54	Pref	20-0U015-12	C0402X7R250-153K0NE; GRM155R71E153KA61; GCM155R71E153KA55	VENKEL LTD.;MURATA;MURATA	0.015UF	CAP: SMT (0402); 0.015UF; 10%; 25V; X7R; CERAMIC; NOTE: PURCHASE DIRECT FROM THE MANUFACTURER	
13	2	C40, C112	Pref	20-000U1-R1	GRM188R70J100KA01; 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-G3	
14	1	C41	Pref	20-3300P-04	GRM155R71H332KA01	MURATA	3300PF	CAP: SMT (0402); 3300PF; 10%; 50V; X7R; CERAMIC	
15	18	C45, C55, C164, C165, C168, C169, C172, C173, C178, C177, C180, C181, C184, C185, C226, C227, C232, C233	Pref	20-4700P-12	GRM155R71E47KA01	MURATA	4700PF	CAP: SMT (0402); 4700PF; 10%; 25V; X7R; CERAMIC	
16	1	C46	Pref	20-1800P-14	C0402X7R500-182KNP	VENKEL LTD.	1800PF	CAP: SMT (0402); 1800PF; 10%; 50V; X7R; CERAMIC	
17	1	C47	Pref	20-1000P-27	GRM1555C1H102JA01; C100SC0G1H102J050	MURATA;TDK	1000PF	CAP: SMT (0402); 1000PF; 5%; 50V; COG; CERAMIC	
18	61	C56, C62, C63, C65, C75-C88, C95-C101, C108-C202, C204-C211, C213-C218, C234-C240	Pref	20-0100U-B57	C3216XSR0J107M160AB; GRM31CR60J107ME39	TDK;MURATA	100UF	CAP: SMT (1206); 100UF; 20%; 6.3V; X5R; CERAMIC	
19	3	C57-C59	Pref	20-0330U-49	1E6EP330M	PANASONIC	330UF	CAP: THROUGH HOLE-RADIAL LEAD; 330UF; 20%; 16V; ELECTROLYTIC-OSCON	
20	6	C60, C61, C149-C152	Pref	20-0100U-BA9	2070C100MYF	PANASONIC	100UF	CAP: SMT (7343); 100UF; 20%; 20V; TANTALUM	
21	13	C69-C74, C91-C94, C203, C212, C241	Pref	20-00U01-12	C0402C103K3RAC; GRM155R71E103KA01; C100SX7R1E103K050BB	KEMET;MURATA;TDK	0.01UF	CAP: SMT (0402); 0.01UF; 10%; 25V; X7R; CERAMIC; NOTE: NOT RECOMMENDED FOR NEW DESIGN. USE 20-00U01-B60	
22	12	C89, C103-C111, C117, C118	Pref	20-0047U-A42	C3216XSR1E476M160AC	TDK	47UF	CAP: SMT (1206); 47UF; 20%; 25V; X5R; CERAMIC	
23	2	C113, C225	Pref	20-0010U-A51	GRM218C81C108KA73	MURATA	10UF	CAP: SMT (0805); 10UF; 10%; 16V; X6S; CERAMIC	
24	12	C119-C130	Pref	20-0010U-P7	GRM218R61E105K; C1608XSR1E106M090AC; CL10A105M08NNNC; GRM188R61E106MA73; ZRB18AR61E106ME01; GRT188R61E106ME13	TDK;SAMSUNG ELECTRONICS; MURATA;MURATA	10UF	CAP: SMT (0603); 10UF; 20%; 25V; X5R; CERAMIC	
25	12	C166, C167, C170, C171, C174, C175, C178, C179, C182, C183, C186, C187	Pref	20-0010U-E6	GRM218R61E105K; C2012XSR1E106K085AC125AB; C2012XSR1E106K085AC; TMK2128BJ109KG; CL21A109K6FN3N	MURATA;TDK;TDK;TAIYO YUDEN;SAMSUNG	10UF	CAP: SMT (0805); 10UF; 10%; 25V; X5R; CERAMIC	
26	3	D1-D3	Pref	30-MBRSS40T3-00	MBRS540T3G	ON SEMICONDUCTOR	MBRS540T3	DIODE: SCH; SURFACE MOUNT SCHOTTKY POWER RECTIFIER; SMC; PW=40V; IF=5A	

# MAX20754EVKIT7 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
27	3	J1-J3	Pref	01-UPS080101LRA8P-27	UPS-08-01-01-L-RA	SAMTEC	UPS-08-01-01-L-RA	CONNECTOR, FEMALE, THROUGH HOLE, DUAL LEAF POWER HEADER, RIGHT ANGLE, 8PINS	
28	1	J5	Pref	01-PJ102AH3P-27	PJ-102AH	CUI INC.	PJ-102AH	CONNECTOR, FEMALE, THROUGH HOLE, DC POWER JACK, RIGHT ANGLE, 3PINS	
29	2	J6, J7	Pref	01-1080740001P-80	108-0740-001	EMERSON NETWORK POWER	108-0740-001	CONNECTOR, MALE, PANELMOUNT, BANANA JACK, STRAIGHT, 1FN	
30	3	J8-J10	Pref	01-13137012665P-01	131-3701-266	JOHNSON COMPONENTS	131-3701-266	CONNECTOR, MALE, THROUGH HOLE, SMB JACK VERTICAL PCB MOUNT, STRAIGHT, 5PINS	
31	1	J13	Pref	01-TSW10807LD16P-17	TSW-108-07-L-D	SAMTEC	TSW-108-07-L-D	CONNECTOR, THROUGH HOLE, TSW SERIES, STRAIGHT, 16PINS	
32	2	JP1, JP2	Pref	01-PCC02SAAN2P-21	PCC02SAAN	SULLINS	PCC02SAAN	CONNECTOR, MALE, THROUGH HOLE, BREAKAWAY, STRAIGHT THROUGH, 2PINS, -65 DEGC TO +125 DEGC	
33	1	L1	Pref	50-001UZ-DGT	XAL4020-12ZME	COILCRAFT	1.2UH	INDUCTOR, SMT, SHIELDED, 1.2UH; TOL+/-20%; 65A	
34	3	L2, L3, L6	Pref	50-0100N-0EV	CL1208-2-100TR-R	EATON POWERING BUSINESS WORLDWIDE	CL1208-2-100TR-R	INDUCTOR, SMT, 100NH; TOL+/-20%; 56A	
35	1	L5	Pref	50-0033U-GR	LPS6235-33MR	COILCRAFT	33UH	INDUCTOR, SMT, MAGNETICALLY SHIELDED, 33UH; TOL+/-20%; 1.3A	
36	1	Q1	Pref	90-2N7002-06	2N7002;2N7002;2N7002;2N7002	DIODES INCORPORATED, 5T MICROELECTRONICS/ON SEMICONDUCTOR/MICRO COMMERCIAL COMPONENTS	2N7002	TRAN.: NCH, SOT-23, PD(0.33W); IC(0.5A); VCEO(60V); -55 DEGC TO +150 DEGC	
37	1	R1	Pref	80-0004R-CA06	ERJ-3RQF47	PANASONIC	0.47	RES: SMT (0603); 0.47; 1%; +/-300PPMDEGC; 0.1000W	
38	6	R2, R64, R67, R68, R71, R112	Pref	80-0000R-BA38	CRCW0402000020E0DHP; RC50402200020	VISHAY DRALORIC,VISHAY DALE	0	RES: SMT (0402); 0; JUMPER; JUMPER; 0.2000W	
39	1	R3	Pref	80-0806R-23	CRCW0402806R9FK	VISHAY DALE	806	RES: SMT (0402); 806; 1%; +/-100PPMDEGC; 0.0630W	
40	1	R4	Pref	80-01K78-23	ERJ-2RKF1781	PANASONIC	1.78K	RES: SMT (0402); 1.78K; 1%; +/-100PPMDEGC; 0.0630W	
41	1	R5	Pref	80-01K33-23	CR0402-16W-1331FT; CRCW04021K33FK	VISHAY	1.33K	RES: SMT (0402); 1.33K; 1%; +/-100PPMDEGC; 0.0630W	
42	1	R6	Pref	80-0649R-18	ERJ-2RKF6490	PANASONIC	649	RES: SMT (0402); 649; 1%; +/-100PPMDEGC; 0.1000W	
43	1	R7	Pref	80-0034K-23	CRCW040234K0FK	VISHAY DALE	34K	RES: SMT (0402); 34K; 1%; +/-100PPMDEGC; 0.0630W	
44	1	R8	Pref	80-02K49-23	CRCW04022K49FK	VISHAY DALE	2.49K	RES: SMT (0402); 2.49K; 1%; +/-100PPMDEGC; 0.0630W	
45	1	R9	Pref	80-0020K-23	CRCW040220K0FK	VISHAY DALE	20K	RES: SMT (0402); 20K; 1%; +/-100PPMDEGC; 0.0630W	
46	6	R10, R11, R25, R26, R41, R50	Pref	80-0010R-23	CRCW040210R0FK; 9C04021A10R0FL	VISHAY DALE;YAGEO	10	RES: SMT (0402); 10; 1%; +/-100PPMDEGC; 0.0630W	
47	13	R13, R14, R39, R59, R64, R85, R88, R90, R92, R93, R98, R99, R102	Pref	80-0100K-23	CRCW0402100KFK; RC0402FR-07100RL	VISHAY;YAGEO	100K	RES: SMT (0402); 100K; 1%; +/-100PPMDEGC; 0.0630W	
48	2	R17, R45	Pref	80-0402R-23	CRCW0402402R9FK	VISHAY DALE	402	RES: SMT (0402); 402; 1%; +/-100PPMDEGC; 0.0630W	
49	7	R18, R19, R35, R36, R46, R57, R61	Pref	80-0001K-23	CRCW04021K00FK; RC0402FR-071K; MCR01M02PF1001	VISHAY DALE;YAGEO PHICOMP; ROHM SEMI	1K	RES: SMT (0402); 1K; 1%; +/-100PPMDEGC; 0.0630W	
50	6	R20, R21, R37, R38, R47, R58	Pref	80-0499R-23	CRCW0402499R9FK	VISHAY DALE	499	RES: SMT (0402); 499; 1%; +/-100PPMDEGC; 0.0630W	
51	1	R23	Pref	80-0100R-23	CRCW0402100R0FK	PANASONIC;YAGEO PHICOMP	100	RES: SMT (0402); 100; 1%; +/-100PPMDEGC; 0.0630W	
52	1	R24	Pref	80-01K65-23	CR0402-16W-1651FT; CRCW04021K65FK	VENKEL LTD.;VISHAY DALE	1.65K	RES: SMT (0402); 1.65K; 1%; +/-100PPMDEGC; 0.0630W	
53	1	R27	Pref	80-0274R-BA18	ERA-2AEB2740	PANASONIC	274	RES: SMT (0402); 274; 0.10%; +/-25PPMDEGC; 0.0630W	
54	2	R34, R56	Pref	80-0787R-23	CRCW0402787R9FK	VISHAY DALE	787	RES: SMT (0402); 787; 1%; +/-100PPMDEGC; 0.0630W	
55	3	R40, R104, R105	Pref	80-0150R-23	CRCW0402150R9FK; 9C04021A1500FL	VISHAY DALE;YAGEO	150	RES: SMT (0402); 150; 1%; +/-100PPMDEGC; 0.0630W	
56	1	R44	Pref	80-0332R-23	CRCW0402332R9FK	VISHAY DALE	332	RES: SMT (0402); 332; 1%; +/-100PPMDEGC; 0.0630W	
57	1	R48	Pref	80-037K4-AA18	CRCW040237K4FK	VISHAY DALE	37.4K	RES: SMT (0402); 37.4K; 1%; +/-100PPMDEGC; 0.0630W	
58	1	R49	Pref	80-01K21-C5D	ERA-2AEB1211	PANASONIC	1.21K	RES: SMT (0402); 1.21K; 0.10%; +/-25PPMDEGC; 0.0630W	
59	1	R51	Pref	80-0499R-18	ERJ-2RKF4990	PANASONIC	499	RES: SMT (0402); 499; 1%; +/-100PPMDEGC; 0.1000W	
60	2	R53, R54	Pref	80-0001R-23	CRCW04021R00FK	VISHAY DALE	1	RES: SMT (0402); 1; 1%; +/-100PPMDEGC; 0.0630W	
61	8	R60, R63, R114-R119	Pref	80-0000R-26B	RC0402JR-070RL; CR0402-16W-000RJT	YAGEO PHICOMP;VENKEL LTD.	0	RES: SMT (0402); 0; 5%; JUMPER; 0.0630W	
62	1	R62	Pref	80-052R3-23	CR0402-16W-52R3FT; CRCW040252R3FK	VENKEL LTD.;VISHAY DALE	52.3	RES: SMT (0402); 52.3; 1%; +/-100PPMDEGC; 0.0630W	
63	2	R65, R69	Pref	80-049R9-BA37	CRCW040249R9FKEDHP	VISHAY DRALORIC	49.9	RES: SMT (0402); 49.9; 1%; +/-100PPMDEGC; 0.2000W	
64	2	R66, R70	Pref	80-0100R-65	CRCW2512100R9FK	VISHAY DALE	100	RES: SMT (2512); 100; 1%; +/-100PPMDEGC; 1W	
65	4	R66, R87, R94, R95	Pref	80-0002K-23	CRCW04022K00FK; RK73H1ETT2001F	VISHAY DALE;KOA SPEER	2K	RES: SMT (0402); 2K; 1%; +/-100PPMDEGC; 0.0630W	
66	2	R103, R106	Pref	80-0221R-23	CRCW0402221R9FK	VISHAY DALE	221	RES: SMT (0402); 221; 1%; +/-100PPMDEGC; 0.0630W	
67	2	R110, R111	Pref	80-0010R-18	ERJ-2RKF10R0	PANASONIC	10	RES: SMT (0402); 10; 1%; +/-100PPMDEGC; 0.1000W	
68	3	S2, S3, S5	Pref	11-G12JPCF-00	G12JPCF	NKK SWITCHES	G12JPCF	SWITCH, SPDT, SMT, STRAIGHT, 28V, FULLY ILLUMINATED ULTRA-MINIATURE TOGGLE, RC0IL=0 OHM; RINSULATION=500M OHM; NKK SWITCHES	
69	1	S4	Pref	11-TL3301AF160QJ-00	TL3301AF160QJ	E-SWITCH	TL3301AF160QJ	SWITCH, SPST, SMT, STRAIGHT, 250V, 0.05A, TACT SWITCH, RC0IL=0 OHM; RINSULATION=500M OHM; E-SWITCH	
70	4	ST1-ST4	Pref	02-TTVET7808-00		7808 KEYSTONE	7808	TERMINAL, BODY LENGTH=0.67N; BODY WIDTH=0.47N; HEIGHT=0.45N; SCRW, BRASS	

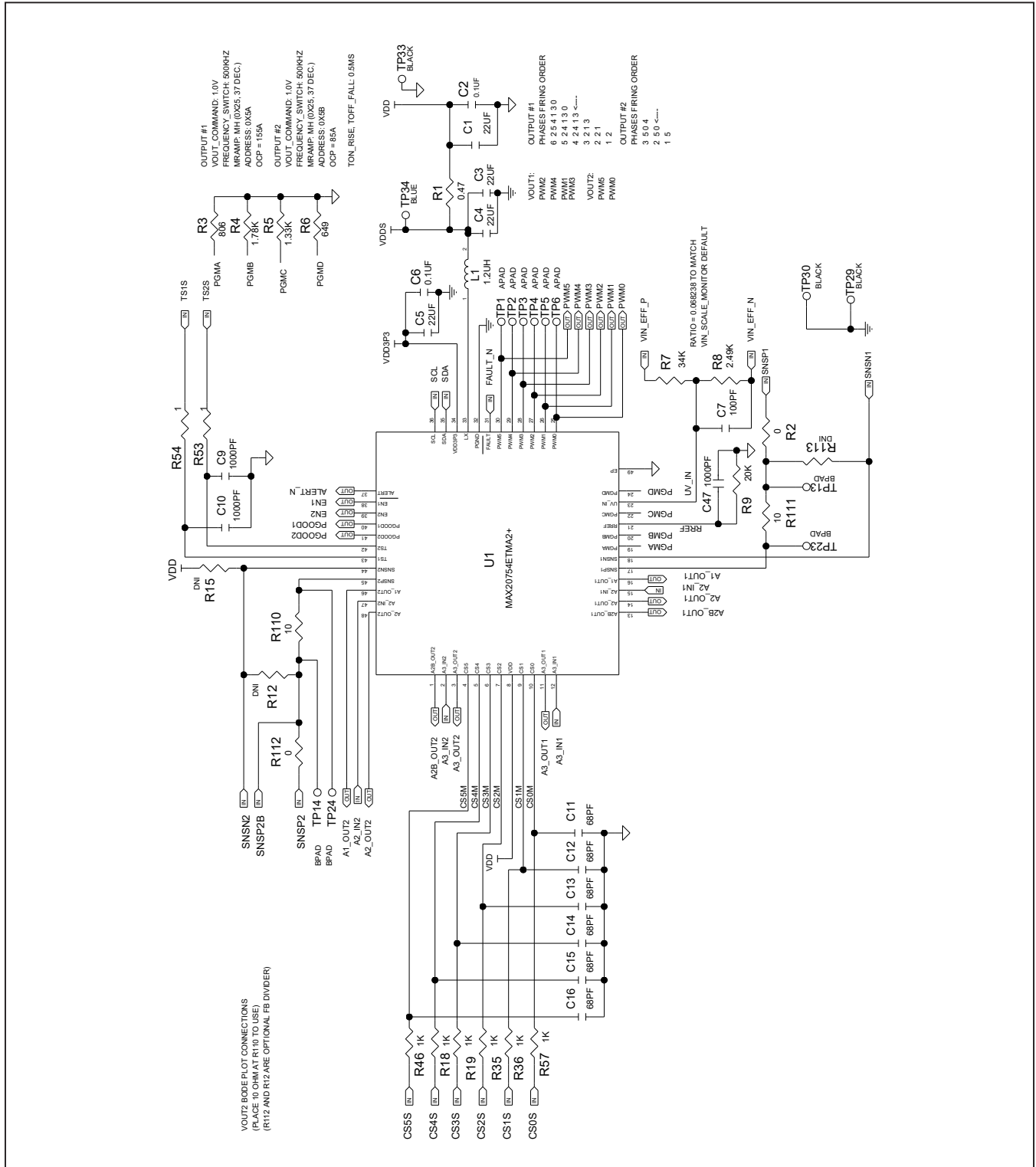
# MAX20754EVKIT7 Evaluation Kit

Evaluates: MAX20754 and  
MAX20790

## MAX20754 EV Kit Bill of Materials (continued)

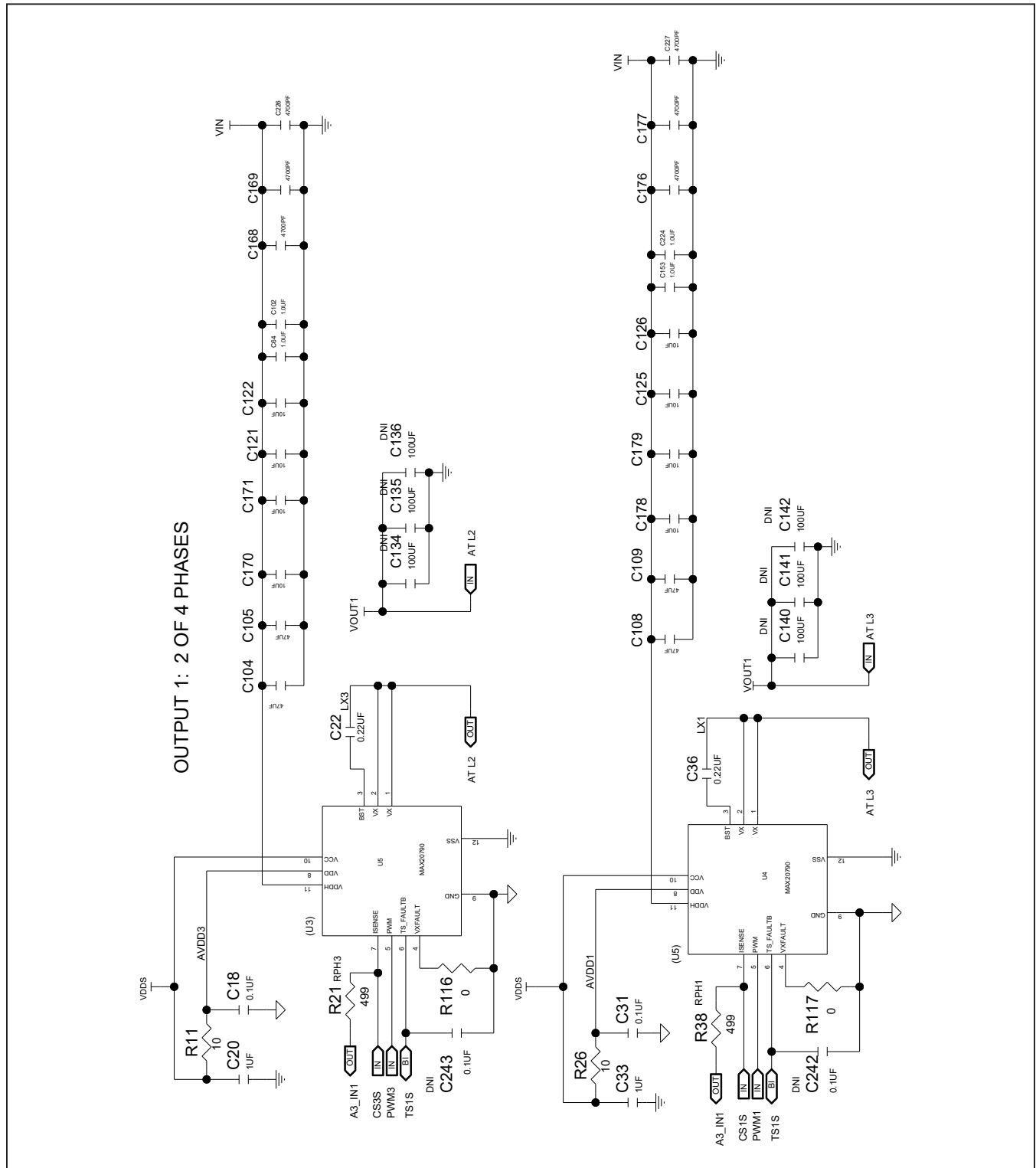
ITEM	QTY	REF DES	VAR STATUS	MAXINV	MFG PART #	MANUFACTURER	VALUE	DESCRIPTION	COMMENTS
71	8	TP1-TP6, TP36, TP37	Pref	02-TPMINS002-00	5002	KEYSTONE	NA	TEST POINT; PIN DIA=0.1IN; TOTAL LENGTH=0.3IN; BOARD HOLE=0.04IN; WHITE; PHOSPHOR BRONZE WIRE SILVER; NOT FOR COLD TEST	APAD
72	9	TP8, TP10, TP12, TP29-TP33, TP39	Pref	02-TPMINS011-00	5011	KEYSTONE	NA	TEST POINT; PIN DIA=0.125IN; TOTAL LENGTH=0.445IN; BOARD HOLE=0.063IN; BLACK; PHOSPHOR BRONZE WIRE SILVER PLATE FINISH; RECOMMENDED FOR BOARD THICKNESS=0.062IN; NOT FOR COLD TEST	BLACK
73	6	TP13, TP14, TP23, TP24, TP17, TP38	Pref	02-TPMINS012-00	5012	KEYSTONE	NA	TEST POINT; PIN DIA=0.125IN; TOTAL LENGTH=0.445IN; BOARD HOLE=0.063IN; WHITE; PHOSPHOR BRONZE WIRE SILVER PLATE FINISH; RECOMMENDED FOR BOARD THICKNESS=0.062IN; NOT FOR COLD TEST	(TP13,TP14,TP23, TP24:SPAD) (TP17,TP38:WHITE)
74	2	TP18, TP40	Pref	02-TPMULTI5126-00	5126	KEYSTONE	NA	TEST POINT; PIN DIA=0.125IN; TOTAL LENGTH=0.445IN; BOARD HOLE=0.063IN; GREEN; PHOSPHOR BRONZE WIRE SILVER PLATE FINISH; RECOMMENDED FOR BOARD THICKNESS=0.062IN; NOT FOR COLD TEST	GREEN
75	3	TP19, TP25, TP27	Pref	02-TPMINS000-00	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	APAD
76	2	TP20, TP21	Pref	02-TPMINS013-00	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	(TP20:ORANGE) (TP21:YELLOW)
77	3	TP22, TP26, TP28	Pref	02-TPMINS001-00	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	APAD
78	5	TP7, TP9, TP11, TP35, TP34	Pref	02-TPMINS010-00	5010	KEYSTONE	NA	TEST POINT; PIN DIA=0.125IN; TOTAL LENGTH=0.445IN; BOARD HOLE=0.063IN; RED; PHOSPHOR BRONZE WIRE SILVER; NOT FOR COLD TEST	(TP7,TP9,TP11, TP35:RED) (TP34:BLUE)
79	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: T48774; PACKAGE OUTLINE NO.: 21-0144; PACKAGE LAND PATTERN DRAWING NO.: 90-0130; TQFN48-EP	
80	6	U2-U7	Pref	00-SAMPLE-02	MAX20790	MAXIM	MAX20790	EVKIT PART - IC; FCOFN-12; 7.40MM X 3.25MM; 12 PINS; NOTE: PCB FOOTPRINT UNDER DEVELOPMENT	
81	1	U8	Pref	10-MAX17501EATB-T	MAX17501EATB+	MAXIM	MAX17501EATB+	IC; CONV, ULTRA-SMALL; HIGH-EFFICIENCY; SYNCHRONOUS STEP-DOWN DC-DC CONVERTER; TDFN10-EP	
82	3	U9, U10, U14	Pref	10-NC7WZ38K8X-U	NC7WZ38K8X	FAIRCHILD SEMICONDUCTOR	NC7WZ38K8X	IC; NAND; TINY LOGIC UHS DUAL 2-INPUT NAND GATE; OPEN DRAIN OUTPUT; VSSOP8	
83	1	U11	Pref	10-NC7SZ08L6X-G	NC7SZ08L6X	FAIRCHILD SEMICONDUCTOR	NC7SZ08L6X	IC; AND; NC7SZ08; TINY LOGIC; ULTRA HIGH SPEED; TWO-INPUT AND GATE; MICROPAK	
84	1	U12	Pref	10-NC7SZ14MSX-U	NC7SZ14MSX	FAIRCHILD SEMICONDUCTOR	NC7SZ14MSX	IC; INV; TINY LOGIC UHS INVERTER WITH SCHMITT TRIGGER INPUT; SOT23-5	
85	1	U13	Pref	10-NC7WZ32K8X-U	NC7WZ32K8X	FAIRCHILD SEMICONDUCTOR	NC7WZ32K8X	IC; OR; TINY LOGIC; UHS DUAL 2-INPUT OR GATE; US8-8	
86	1	PCB	-	EPCB20754VK11	MAX20754VK11	MAXIM	PCB	PCB MAX20754VK11	-
TOTAL	370								

MAX20754 EV Kit Schematic

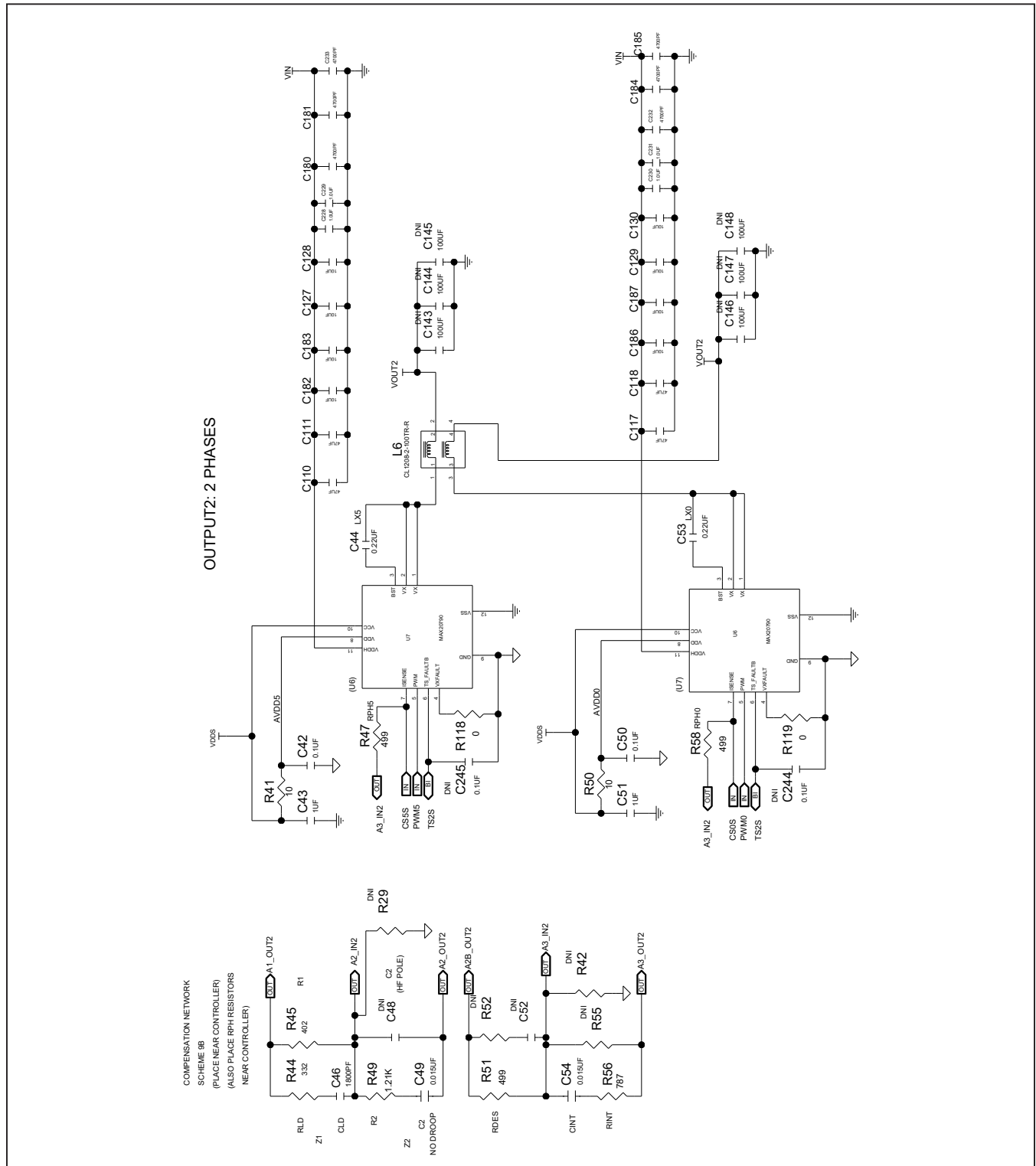




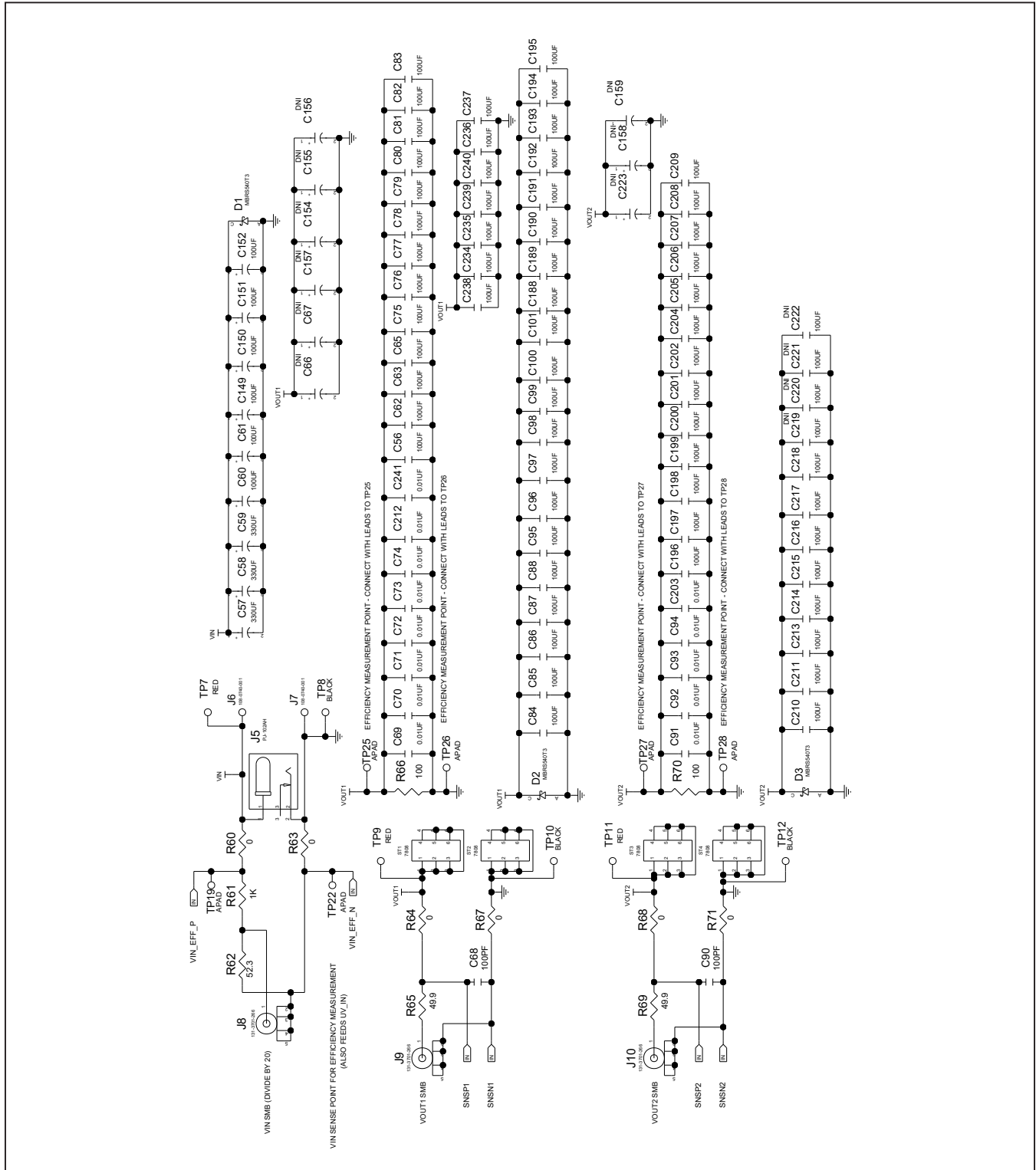
MAX20754 EV Kit Schematic (continued)



MAX20754 EV Kit Schematic (continued)

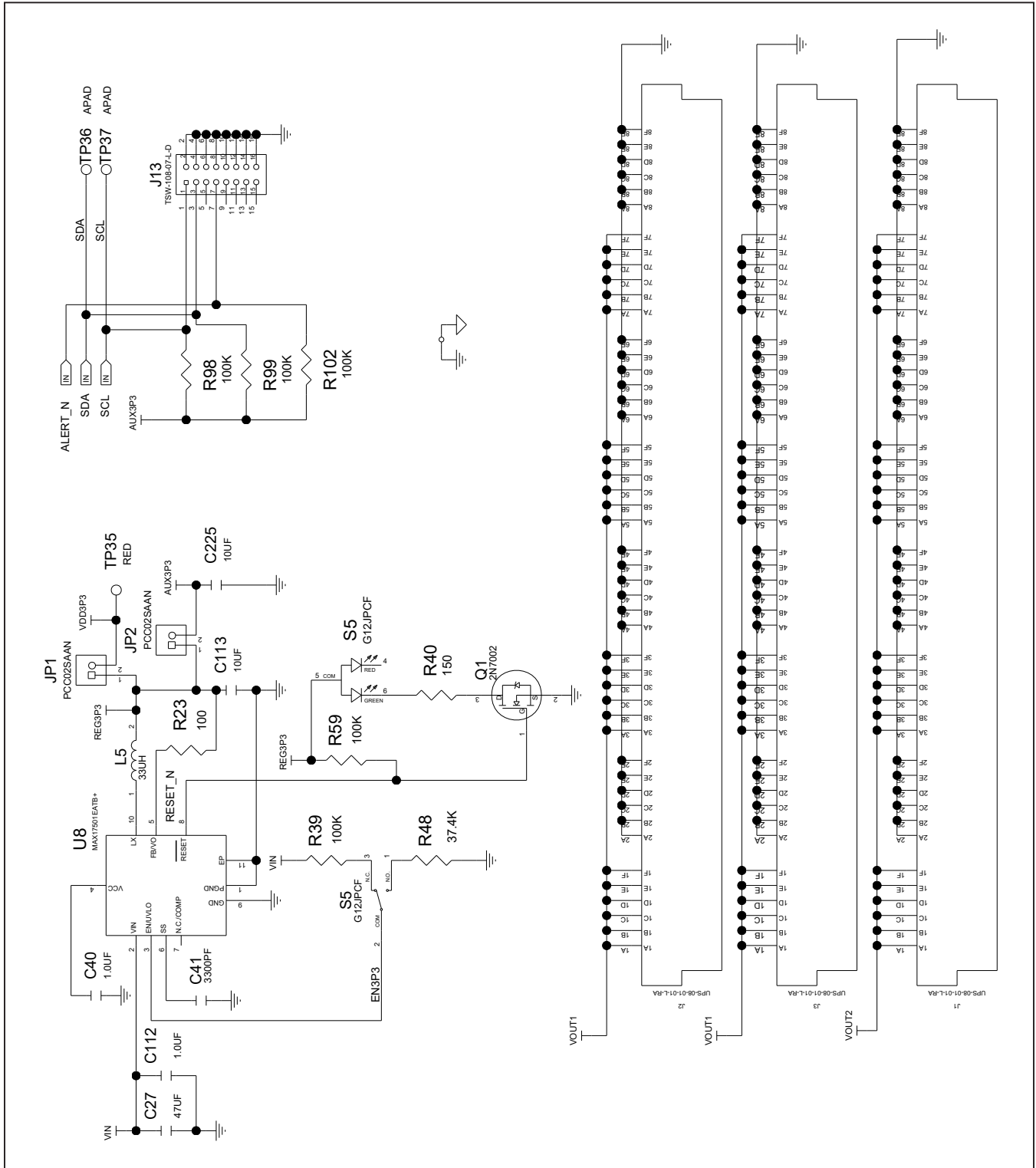


MAX20754 EV Kit Schematic (continued)

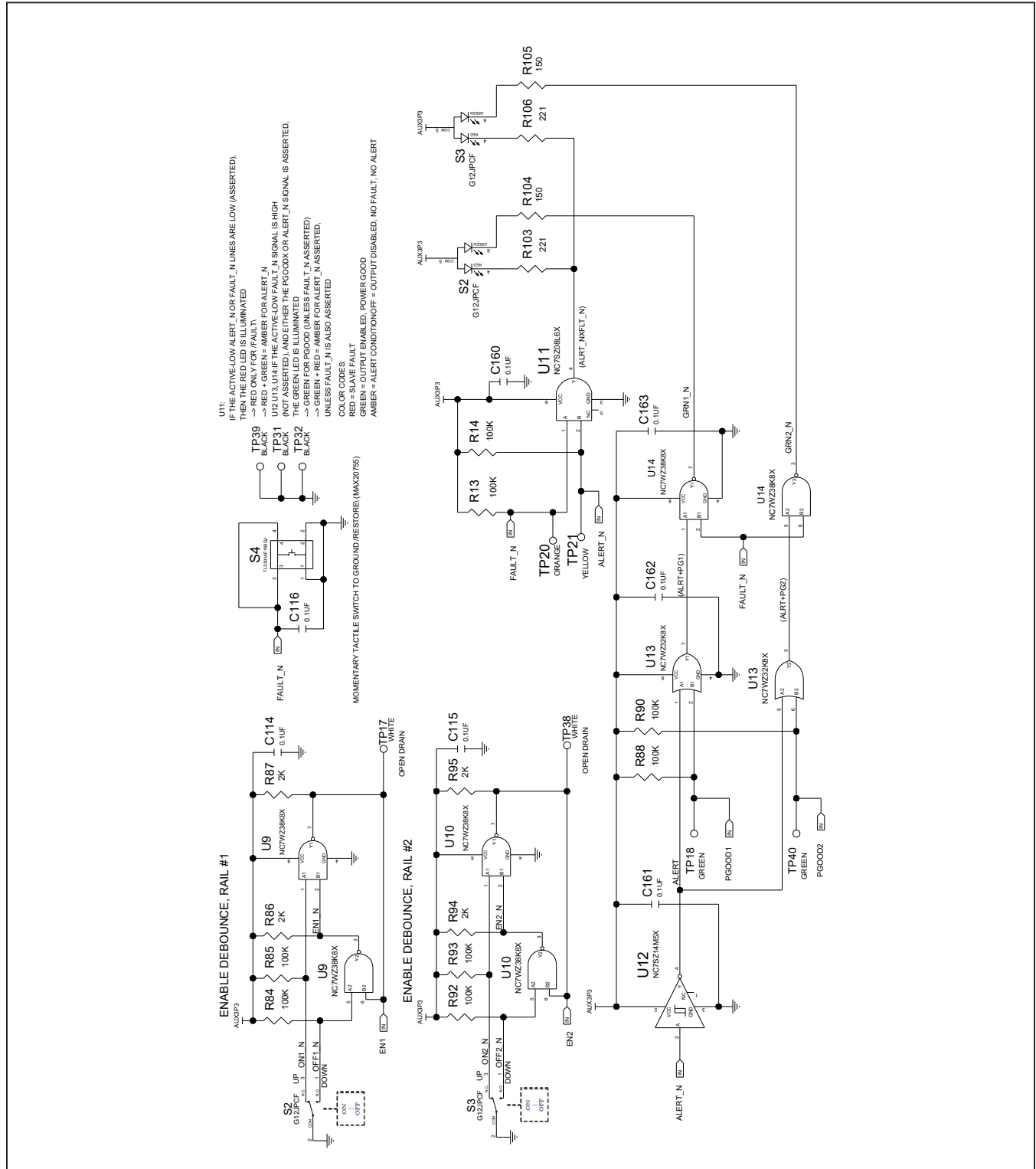




MAX20754 EV Kit Schematic (continued)



MAX20754 EV Kit Schematic (continued)



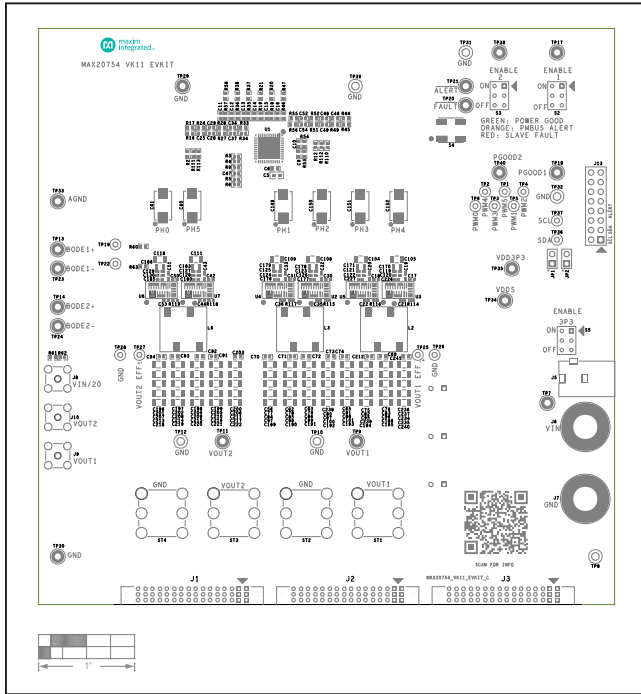
U11:  
IF THE ACTIVE-LOW ALERT\_N OR FAULT\_N LINES ARE LOW (ASSERTED), THEN THE RED LED IS ILLUMINATED  
→ RED ONLY FOR FAULT\_N OR ALERT\_N  
→ U11, U13, U14 IF THE ACTIVE-LOW FAULT\_N SIGNAL IS HIGH (NOT ASSERTED) AND EITHER THE PG00DX OR ALERT\_N SIGNAL IS ASSERTED, THE GREEN LED IS ILLUMINATED  
→ GREEN FOR PG00D (UNLESS FAULT\_N IS ASSERTED)  
→ GREEN + RED = AMBER FOR ALERT\_N ASSERTED, UNLESS FAULT\_N IS ALSO ASSERTED

COLOR CODES:  
RED = SLAVE FAULT  
GREEN = OUTPUT ENABLED, POWER GOOD  
AMBER = ALERT CONDITION OFF = OUTPUT DISABLED, NO FAULT, NO ALERT

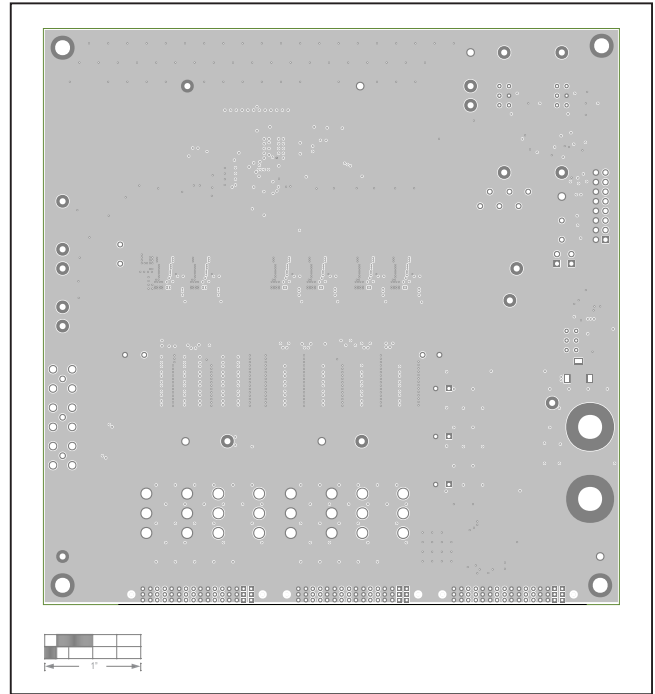
# MAX20754EVKIT7 Evaluation Kit

Evaluates: MAX20754 and  
MAX20790

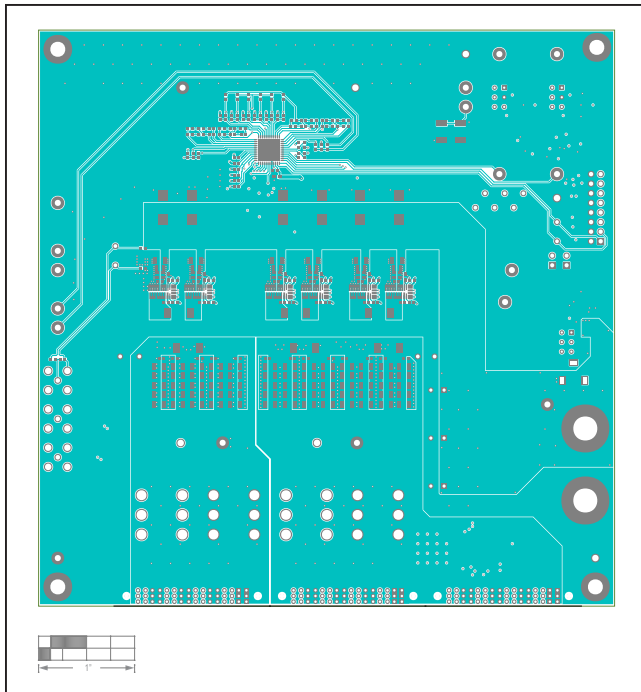
## MAX20754 EV Kit PCB Layout Diagrams



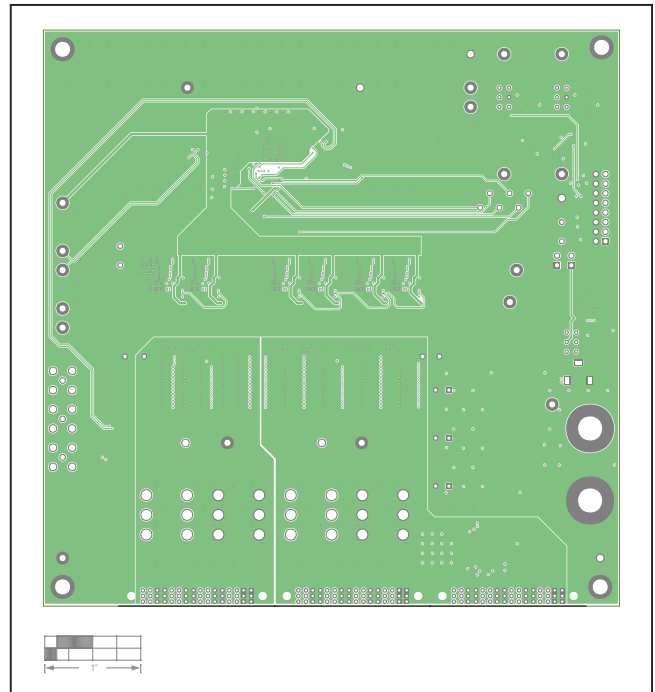
MAX20754 EV Kit---Top Silkscreen



MAX20754 EV Kit---Internal Layer 2 GND

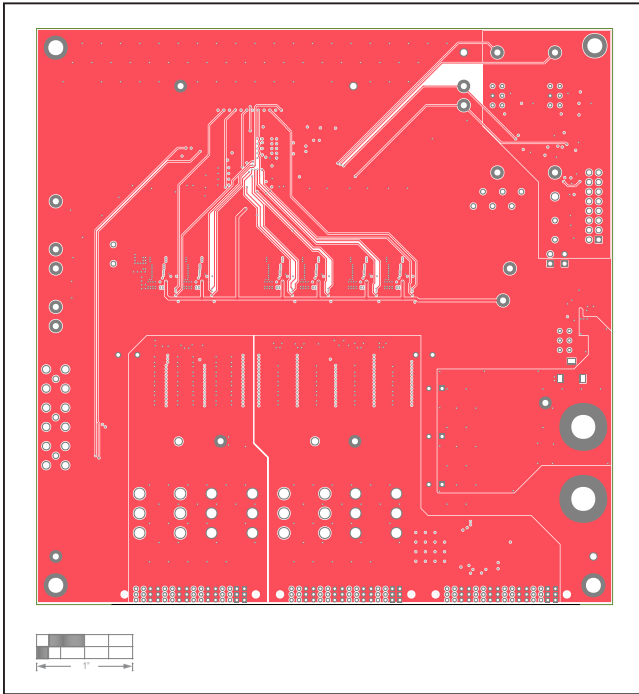


MAX20754 EV Kit---Top Layer

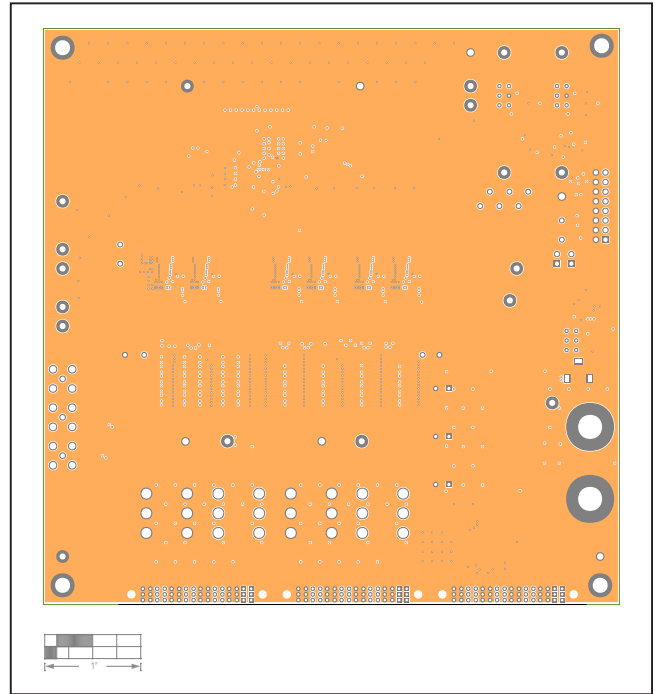


MAX20754 EV Kit---Internal Layer 3 Signal

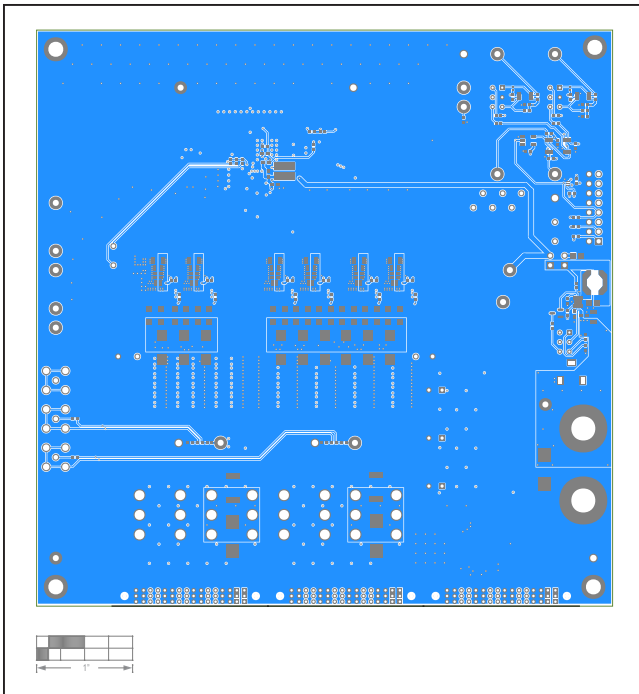
MAX20754 EV Kit PCB Layout Diagrams (continued)



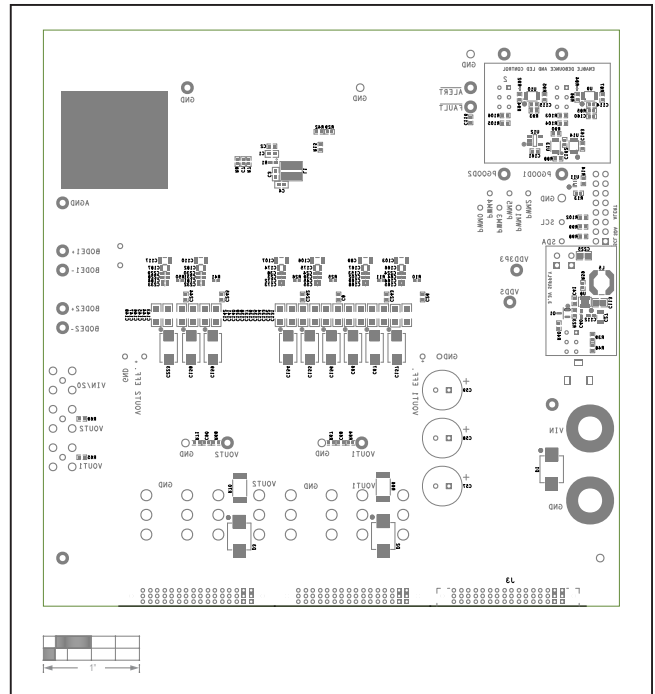
MAX20754 EV Kit--Internal Layer 4 Signal



MAX20754 EV Kit--Internal Layer 5 GND



MAX20754 EV Kit--Bottom Layer



MAX20754 EV Kit--Bottom Silkscreen