

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.

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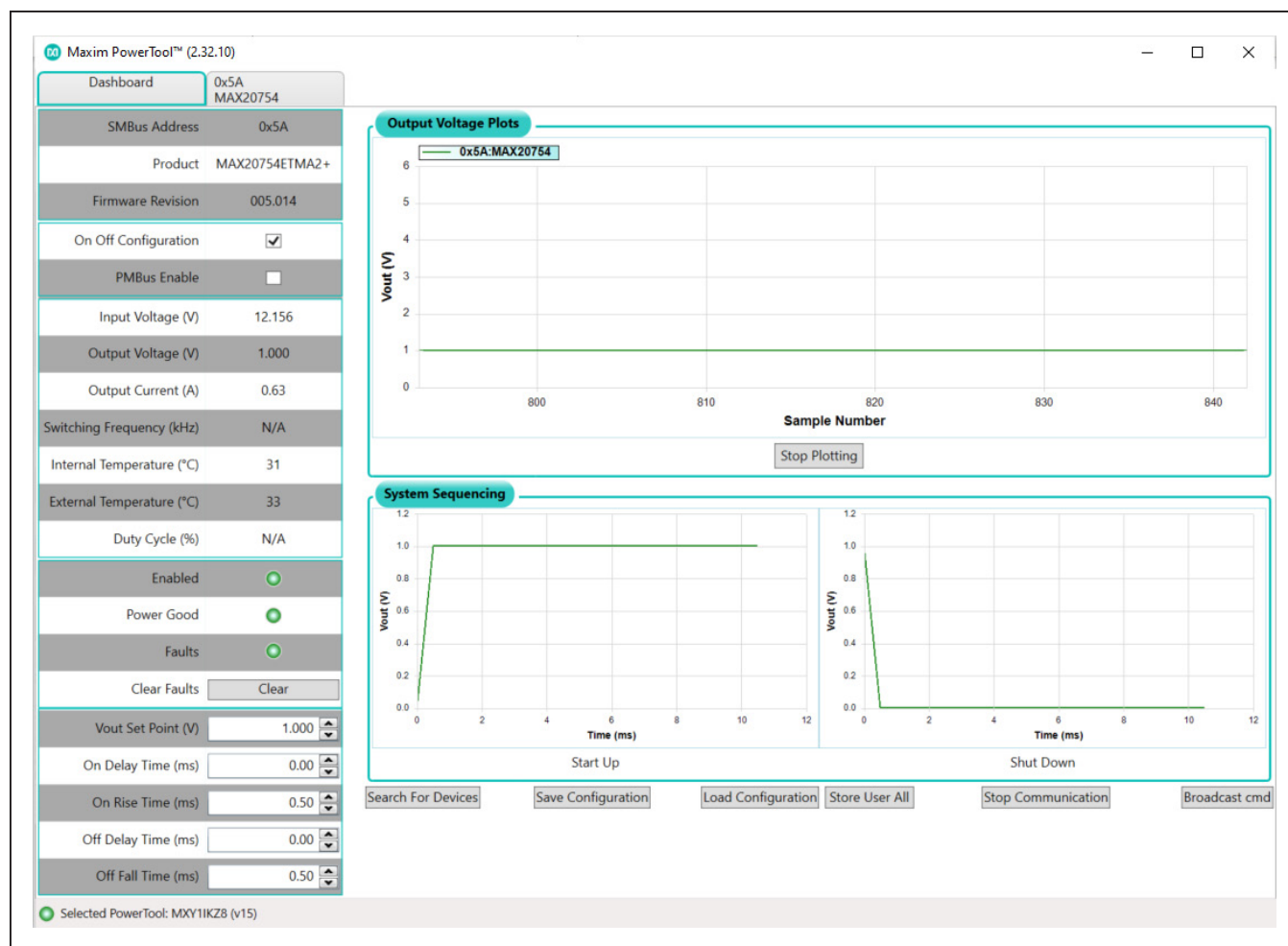


Figure 1. Maxim PowerTool Graphical User Interface Software Dashboard Window

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.

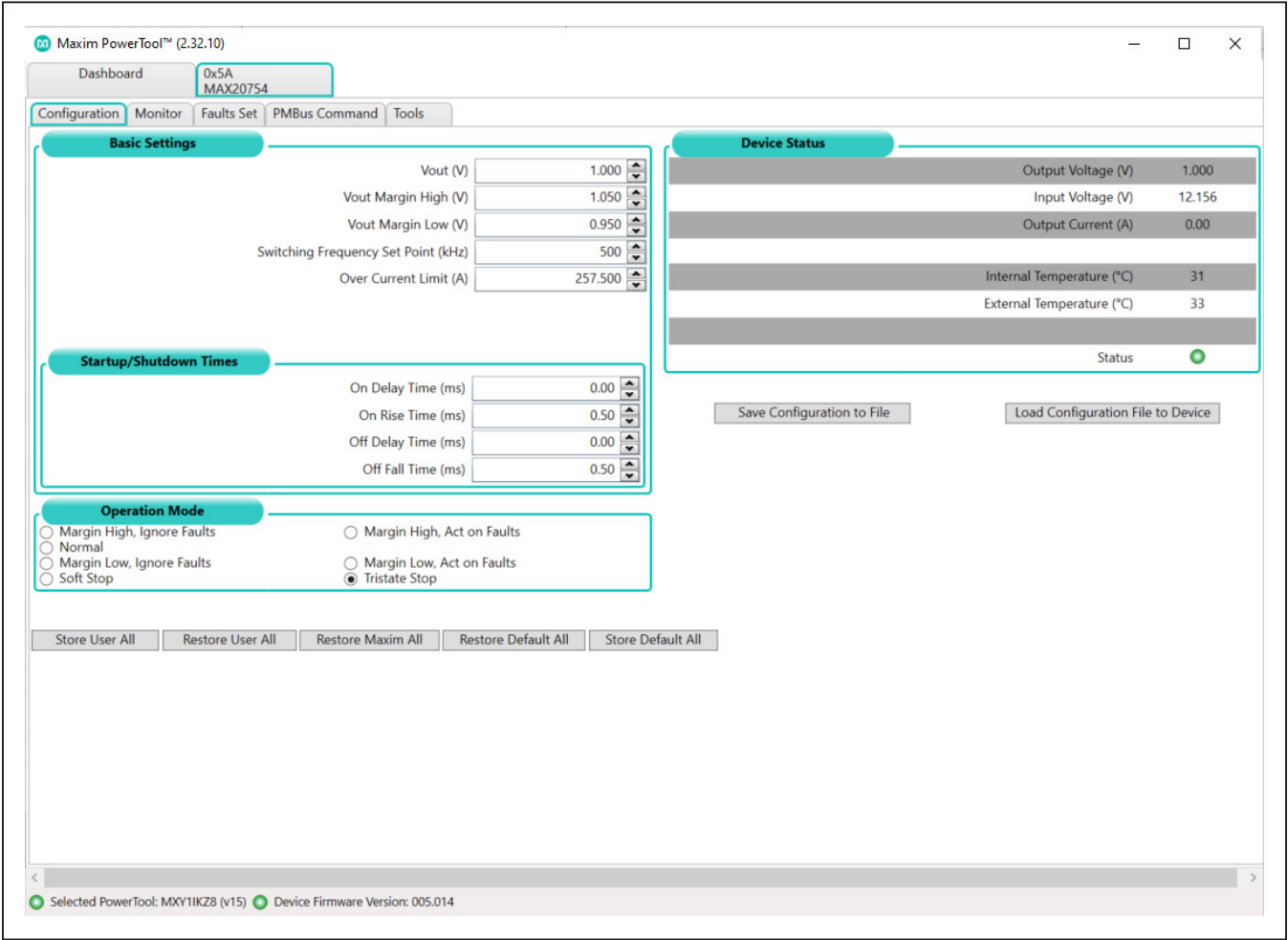


Figure 2. Detailed View for One Device; Configuration Sub-Tab

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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 ≥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.
J5	Alternate input supply barrel connector, 2.1mm I.D. x 5.5mm O.D. barrel jack, center-positive. Do not exceed 5A current.

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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)

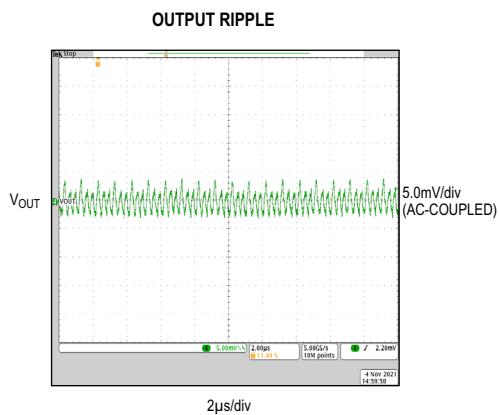
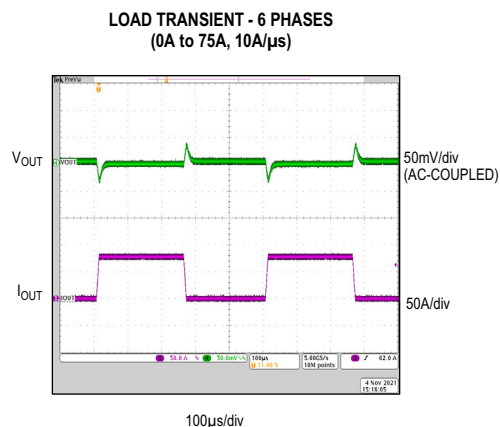
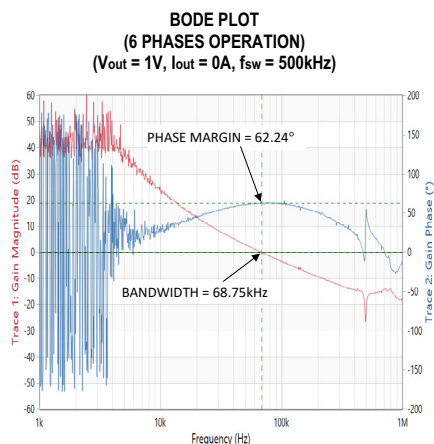
Table 5. Test Points

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.

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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	GRM188C80G220MEAD	MURATA	22UF	CAP: SMT (0603); 22UF; 20%; 4V; X8S; CERAMIC	
2	15	C2, C6, C9, C17, C18, C30, C31, C42, C50, C114, C116, C160-C183	Pref	20-000U1-L1A	C1005X7R1C104K050BC; ATC30K; 104K11E; 0402YC104KAT2A; C0402X7R160-104KNE; CL05B104K050NNNC; GRM155R71C104K48B; C1005X7R1C104K; C0402X0R7R7BB104; ENK105B7104KV; CL05B104K05	TDK;AMERICAN TECHNICAL CERAMICS;AVK;VENKEL LTD.;SAMSUNG ELECTRONICS;MURATA;YAGEO PHICOMP;TAIYO YUDEN;SAMSUNG ELECTRONICS	0.1UF	CAP: SMT (0402); 0.1UF; 10%; 16V; X7R; CERAMIC	
3	2	C7, C68	Pref	20-0100P-27	C0402C101J5GAC; NMC0402NP0101J; C0402JRNPO08N101; GRM1555C1H101JA01; C1005CG1H101J050BA	KEMET;NMC COMPONENTS CORP.;YAGEO PHICOMP;MURATA;TDK	100PF	CAP: SMT (0402); 100PF; 5%; 50V; COG; CERAMIC	
4	1	C10	Pref	20-0100P-26	C0402C101K5GAC; C1005CG1H101K050BA	KEMET;TDK	100PF	CAP: SMT (0402); 100PF; 10%; 50V; COG; CERAMIC	
5	6	C19, C20, C32, C33, C43, C51	Pref	20-0001U-B9	GRM188R60J105KA01	MURATA	1UF	CAP: SMT (0603); 1UF; 10%; 6.3V; XSR; CERAMIC; NOTE: NOT RECOMMENDED FOR NEW DESIGN. USE 20-0001u-C3	
6	6	C21, C22, C35, C36, C44, C53	Pref	20-00U22-B19	GRM155R71C224KA12	MURATA	0.22UF	CAP: SMT (0402); 0.22UF; 10%; 16V; X7R; CERAMIC	
7	12	C23, C24, C38, C39, C64, C102, C153, C224, C226-C231	Pref	20-0001U-26	GAK107B1105KA; C1808XR1V105K080AB	TAIYO YUDEN;TDK	1.0UF	CAP: SMT (0603); 1.0UF; 10%; 35V; XSR; CERAMIC	
8	1	C27	Pref	20-0047U-V7	C3216XR1C475M10A0B; GRM31CR61C475ME44	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	20-0U015-12	C0402X7R250-153KNE; GRM155R71E153KA01; GCM155R71E153KA55	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; CL10B105KQNNNC	MURATA;SAMSUNG ELECTRONICS	1.0UF	CAP: SMT (0603); 1.0UF; 10%; 6.3V; X7R; CERAMIC; NOTE: NOT RECOMMENDED FOR NEW DESIGN. USE 20-0001u-B3	
12	1	C41	Pref	20-3300P-04	GRM155R71H332KA01	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	GRM155R71E472KA01	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, C188-C202, C204-C211, C213-C217, C234-C240	Pref	20-0100U-B57	C3216XR60J107M160AB; GRM31CR60J107M63B39	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-08CON	
17	6	C60, C61, C149-C152	Pref	20-0100U-BA9	20TQC100MYF	PANASONIC	100UF	CAP: SMT (7343); 100UF; 20%; 20V; TANTALUM	
18	13	C66-C74, C91-C94, C203, C212, C241	Pref	20-00U01-12	C0402C101K5GAC; GRM155R71E103KA01; C1005X7R1E103K050BB	KEMET;MURATA;TDK	0.001UF	CAP: SMT (0402); 0.01UF; 10%; 25V; X7R; CERAMIC; NOTE: NOT RECOMMENDED FOR NEW DESIGN. USE 20-00u01-B60	
19	12	C69, C103-C111, C113, C118	Pref	20-0047U-AA2	C3216XR1E475M160AC	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	C1608XR1E106M080AC; CL10A106MABNNNC; GRM155R61E106KA73; ZR618AR61E106ME01; GRT186R61E106ME13	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; C2012XR1E106K085AC; C2012XR1E106K085AC; TMC2126B1106K02; CL21A106KAFJ3N	MURATA;TDK;TDK;TAIYO YUDEN;SAMSUNG	10UF	CAP: SMT (0805); 10UF; 10%; 25V; XSR; CERAMIC	
23	2	D1, D2	Pref	30-MBRSS40T3-00	MBRSS40T3G	ON SEMICONDUCTOR	MBRSS40T3	DIODE: SCH; SURFACE MOUNT SCHOTTKY POWER RECTIFIER; SMC; PV=40V; IF=5A	
24	3	J2-J4	Pref	01-UPS080101LRABP-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	
25	1	J5	Pref	01-PJ102AH3P-27	PJ-102AH	QUI INC.	PJ-102AH	CONNECTOR: FEMALE; THROUGH HOLE; DC POWER JACK; RIGHT ANGLE; 3PINS	
26	2	J6, J7	Pref	01-10807400011P-40	108-0740-001	EMERSON NETWORK POWER	108-0740-001	CONNECTOR: MALE; PANELMOUNT; BANANA JACK; STRAIGHT; 1PIN	
27	2	J8, J9	Pref	01-13137012665P-01	131-3701-266	JOHNSON COMPONENTS	131-3701-266	CONNECTOR: MALE; THROUGH HOLE; 9MM JACK VERTICAL PCB MOUNT; STRAIGHT; 5PINS	
28	1	J13	Pref	01-TSW10807LD16P-17	TSW-108-07-L-D	SAMTEC	TSW-108-07-L-D	CONNECTOR: THROUGH HOLE; TSW SERIES; STRAIGHT; 16PINS	
29	2	JP1, JP2	Pref	01-PC025AANGP-21	PC025AAN	BULLINS	PC025AAN	CONNECTOR: MALE; THROUGH HOLE; BREAKAWAY; STRAIGHT THROUGH; 2PINS; -65 DEGC TO +125 DEGC	
30	1	L1	Pref	50-0011U2-0GT	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	CL1208-2-100TR-R	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	TRAN.: 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		RES: SMT (0603); 0.47; 1%; +/-300PPM/DEGC; 0.1000W	0.47
35	4	R2, R15, R64, R67	Pref	80-0000R-BA38	CRCW04020000020EDHP; RC04020000020	VISHAY DIAL;ORIC;VISHAY DALE		RES: SMT (0402); 0; JUMPER; JUMPER; 0.2000W	0
36	1	R3	Pref	80-0806R-23	CRCW04020806RFX	VISHAY DALE		RES: SMT (0402); 806; 1%; +/-100PPM/DEGC; 0.0630W	806
37	1	R4	Pref	80-05K76-AA23	ERJ-2RKF5761	PANASONIC		RES: SMT (0402); 5.76K; 1%; +/-100PPM/DEGC; 0.1000W	5.76K
38	1	R5	Pref	80-0649R-18	ERJ-2RKF6490	PANASONIC		RES: SMT (0402); 649; 1%; +/-100PPM/DEGC; 0.1000W	649
39	1	R6	Pref	80-04K64-AA23	ERJ-2RKF4641	PANASONIC		RES: SMT (0402); 4.64K; 1%; +/-100PPM/DEGC; 0.1000W	4.64K
40	1	R7	Pref	80-0034K-23	CRCW0402034K0FX	VISHAY DALE		RES: SMT (0402); 34K; 1%; +/-100PPM/DEGC; 0.0630W	34K
41	1	R8	Pref	80-02K49-23	CRCW0402249K0FX	VISHAY DALE		RES: SMT (0402); 2.49K; 1%; +/-100PPM/DEGC; 0.0630W	2.49K
42	1	R9	Pref	80-0020K-23B	RPS010P-203-D	SUSUMI CO.LTD		RES: SMT (0402); 20K; 0.5%; +/-25PPM/DEGC; 0.0630W	20K
43	6	R10, R11, R25, R26, R41, R49	Pref	80-0010R-23	CRCW040210R0FX; RC04021A10R0FL	VISHAY DALE;YAGEO		RES: SMT (0402); 10; 1%; +/-100PPM/DEGC; 0.0630W	10
44	10	R13, R14, R39, R59, R64, R66, R68, R69, R99, R102	Pref	80-0100K-23	CRCW0402100KFX; RC04022FR-07100K	VISHAY;YAGEO		RES: SMT (0402); 100K; 1%; +/-100PPM/DEGC; 0.0630W	100K
45	1	R17	Pref	80-0402R-23	CRCW04020402RFX	VISHAY DALE		RES: SMT (0402); 402; 1%; +/-100PPM/DEGC; 0.0630W	402
46	7	R18, R19, R35, R36, R46, R57, R61	Pref	80-0001K-23	CRCW04021K00FX; RC0402FR-071K-L; MCR01M2PF1001	VISHAY DALE;YAGEO PHICOMP;ROHM SEMI		RES: SMT (0402); 1K; 1%; +/-100PPM/DEGC; 0.0630W	1K
47	6	R20, R21, R37, R38, R47, R50	Pref	80-0499R-23	CRCW0402499RFX	VISHAY DALE		RES: SMT (0402); 499; 1%; +/-100PPM/DEGC; 0.0630W	499
48	1	R23	Pref	80-0100R-23	RC04021A1000FL; RC04022FR-07100R	PANASONIC;YAGEO PHYCOMP		RES: SMT (0402); 100; 1%; +/-100PPM/DEGC; 0.0630W	100
49	1	R24	Pref	80-0804R-23	CR0402-18W-4040FT; CRCW04020804RFX	VENKEL LTD.;VISHAY DALE		RES: SMT (0402); 804; 1%; +/-100PPM/DEGC; 0.0630W	804
50	1	R27	Pref	80-0165R-25	CRCW0402165RFX	VISHAY DALE		RES: SMT (0805); 165; 1%; +/-100PPM/DEGC; 0.1250W	165

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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	CRCW0402787R9K	VISHAY DALE	787	RES; SMT (0402); 787; 1%; +/-100PPMDEGC; 0.0630W	
52	2	R40, R104	Pref	80-0150R-23	CRCW0402150R9K; RC04021A1500FL	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	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-52R3FT; CRCW040252R3FK	VENKEL LTD.; VISHAY DALE	52.3	RES; SMT (0402); 52.3; 1%; +/-100PPMDEGC; 0.0630W	
56	1	R65	Pref	80-048R9-BA37	CRCW040248R9KEDHP	VISHAY DRALORIC	48.9	RES; SMT (0402); 48.9; 1%; +/-100PPMDEGC; 0.2000W	
57	1	R66	Pref	80-0100R-45	CRCW2512100R9K	VISHAY DALE	100	RES; SMT (2512); 100; 1%; +/-100PPMDEGC; 1W	
58	2	R66, R67	Pref	80-0002K-23	CRCW0402002K9FK; RK73H1ETTP2001F	VISHAY DALE; KOA SPEER	2K	RES; SMT (0402); 2K; 1%; +/-100PPMDEGC; 0.0630W	
59	1	R103	Pref	80-0221R-23	CRCW0402221R9K	VISHAY DALE	221	RES; SMT (0402); 221; 1%; +/-100PPMDEGC; 0.0630W	
60	1	R111	Pref	80-0010R-16	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-G12JPCF-00	G12JPCF	NKK SWITCHES	G12JPCF	SWITCH; SPST; 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;PLATEFINISH;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, TP38, 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, P38,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; FCQFN-12; 7.40MM X 3.25MM; 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 - MICROPM	
78	1	U12	Pref	10-NC7S214MSX-U	NC7S214MSX	FAIRCHILD SEMICONDUCTOR	NC7S214MSX	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	20-0008P-27	C0402C880J5GAC; GRM1555C1H680JA01	KEMET;MURATA	68PF	CAP; SMT (0402); 68PF; 5%; 50V; COG; CERAMIC	
3	1	C25	DNP	20-1200P-Q4C	CL05B122K8VANN; GRM1556P7H122KA01	SAMSUNG ELECTRONICS;MURATA	1200PF	CAP; SMT (0402); 1200PF; 10%; 50V; X7R; CERAMIC	
4	9	C96, C87, C154-C158, C223	DNP	20-0033U-DA76	TS21X33M0502ATE075	KEMET	33UF	CAP; SMT (7343-43); 33UF; 20%; 50V; CONDUCTIVE POLYMER	
5	23	C131-C148, C218-C222	DNP	20-0100U-B57	C3216KSR0J107M160AB; GRM31CR60J107ME39	TDK;MURATA	100UF	CAP; SMT (1206); 100UF; 20%; 6.3V; XSR; CERAMIC	
6	1	R16	DNP	80-0332R-23	CRCW0402332R9K	VISHAY DALE	332	RES; SMT (0402); 332; 1%; +/-100PPMDEGC; 0.0630W	
7	2	R33, R113	DNP	80-0000R-BA38	CRCW04020000Z0EDHP; RC040200000Z0	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-000RJ	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								

MAX20754 EV Kit Schematic

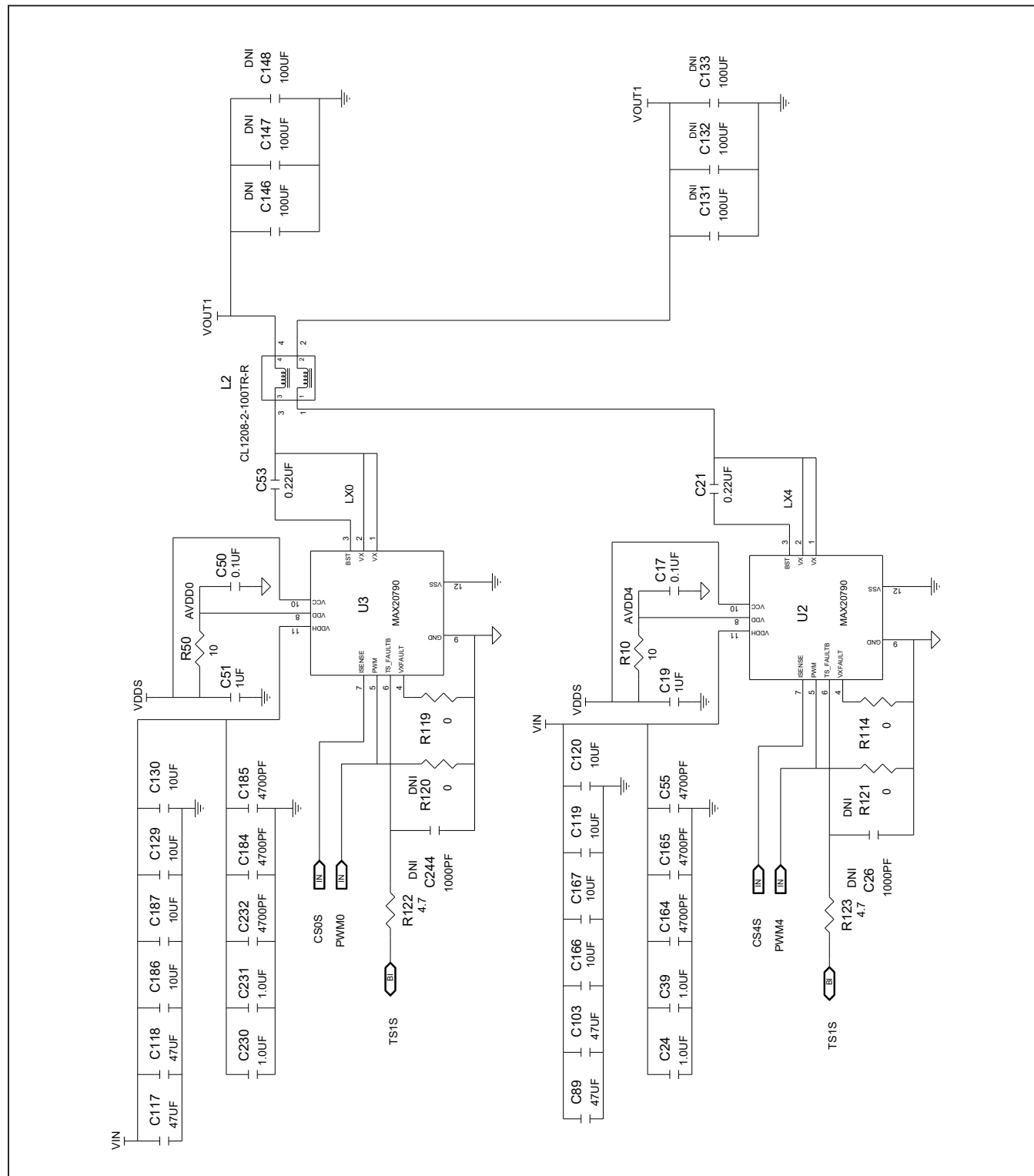
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The schematic diagram illustrates the compensation network for the MAX2254ETW2+ integrated circuit. The circuit is powered by VDD and includes a compensation network (Z1, Z2) and a feedback network (R1, R2, R3, R4, R5, R6, R7, R8, R9, R10, R11, R12, R13, R14, R15, R16, R17, R18, R19, R20, R21, R22, R23, R24, R25, R26, R27, R28, R29, R30, R31, R32, R33, R34, R35, R36, R37, R38, R39, R40, R41, R42, R43, R44, R45, R46, R47, R48, R49, R50, R51, R52, R53, R54, R55, R56, R57, R58, R59, R60, R61, R62, R63, R64, R65, R66, R67, R68, R69, R70, R71, R72, R73, R74, R75, R76, R77, R78, R79, R80, R81, R82, R83, R84, R85, R86, R87, R88, R89, R90, R91, R92, R93, R94, R95, R96, R97, R98, R99, R100, R101, R102, R103, R104, R105, R106, R107, R108, R109, R110, R111, R112, R113, R114, R115, R116, R117, R118, R119, R120, R121, R122, R123, R124, R125, R126, R127, R128, R129, R130, R131, R132, R133, R134, R135, R136, R137, R138, R139, R140, R141, R142, R143, R144, R145, R146, R147, R148, R149, R150, R151, R152, R153, R154, R155, R156, R157, R158, R159, R160, R161, R162, R163, R164, R165, R166, R167, R168, R169, R170, R171, R172, R173, R174, R175, R176, R177, R178, R179, R180, R181, R182, R183, R184, R185, R186, R187, R188, R189, R190, R191, R192, R193, R194, R195, R196, R197, R198, R199, R200, R201, R202, R203, R204, R205, R206, R207, R208, R209, R210, R211, R212, R213, R214, R215, R216, R217, R218, R219, R220, R221, R222, R223, R224, R225, R226, R227, R228, R229, R230, R231, R232, R233, R234, R235, R236, R237, R238, R239, R240, R241, R242, R243, R244, R245, R246, R247, R248, R249, R250, R251, R252, R253, R254, R255, R256, R257, R258, R259, R260, R261, R262, R263, R264, R265, R266, R267, R268, R269, R270, R271, R272, R273, R274, R275, R276, R277, R278, R279, R280, R281, R282, R283, R284, R285, R286, R287, R288, R289, R290, R291, R292, R293, R294, R295, R296, R297, R298, R299, R300, R301, R302, R303, R304, R305, R306, R307, R308, R309, R310, R311, R312, R313, R314, R315, R316, R317, R318, R319, R320, R321, R322, R323, R324, R325, R326, R327, R328, R329, R330, R331, R332, R333, R334, R335, R336, R337, R338, R339, R340, R341, R342, R343, R344, R345, R346, R347, R348, R349, R350, R351, R352, R353, R354, R355, R356, R357, R358, R359, R360, R361, R362, R363, R364, R365, R366, R367, R368, R369, R370, R371, R372, R373, R374, R375, R376, R377, R378, R379, R380, R381, R382, R383, R384, R385, R386, R387, R388, R389, R390, R391, R392, R393, R394, R395, R396, R397, R398, R399, R400, R401, R402, R403, R404, R405, R406, R407, R408, R409, R410, R411, R412, R413, R414, R415, R416, R417, R418, R419, R420, R421, R422, R423, R424, R425, R426, R427, R428, R429, R430, R431, R432, R433, R434, R435, R436, R437, R438, R439, R440, R441, R442, R443, R444, R445, R446, R447, R448, R449, R450, R451, R452, R453, R454, R455, R456, R457, R458, R459, R460, R461, R462, R463, R464, R465, R466, R467, R468, R469, R470, R471, R472, R473, R474, R475, R476, R477, R478, R479, R480, R481, R482, R483, R484, R485, R486, R487, R488, R489, R490, R491, R492, R493, R494, R495, R496, R497, R498, R499, R500, R501, R502, R503, R504, R505, R506, R507, R508, R509, R510, R511, R512, R513, R514, R515, R516, R517, R518, R519, R520, R521, R522, R523, R524, R525, R526, R527, R528, R529, R530, R531, R532, R533, R534, R535, R536, R537, R538, R539, R540, R541, R542, R543, R544, R545, R546, R547, R548, R549, R550, R551, R552, R553, R554, R555, R556, R557, R558, R559, R560, R561, R562, R563, R564, R565, R566, R567, R568, R569, R570, R571, R572, R573, R574, R575, R576, R577, R578, R579, R580, R581, R582, R583, R584, R585, R586, R587, R588, R589, R590, R591, R592, R593, R594, R595, R596, R597, R598, R599, R600, R601, R602, R603, R604, R605, R606, R607, R608, R609, R610, R611, R612, R613, R614, R615, R616, R617, R618, R619, R620, R621, R622, R623, R624, R625, R626, R627, R628, R629, R630, R631, R632, R633, R634, R635, R636, R637, R638, R639, R640, R641, R642, R643, R644, R645, R646, R647, R648, R649, R650, R651, R652, R653, R654, R655, R656, R657, R658, R659, R660, R661, R662, R663, R664, R665, R666, R667, R668, R669, R670, R671, R672, R673, R674, R675, R676, R677, R678, R679, R680, R681, R682, R683, R684, R685, R686, R687, R688, R689, R690, R691, R692, R693, R694, R695, R696, R697, R698, R699, R700, R701, R702, R703, R704, R705, R706, R707, R708, R709, R710, R711, R712, R713, R714, R715, R716, R717, R718, R719, R720, R721, R722, R723, R724, R725, R726, R727, R728, R729, R730, R731, R732, R733, R734, R735, R736, R737, R738, R739, R740, R741, R742, R743, R744, R745, R746, R747, R748, R749, R750, R751, R752, R753, R754, R755, R756, R757, R758, R759, R760, R761, R762, R763, R764, R765, R766, R767, R768, R769, R770, R771, R772, R773, R774, R775, R776, R777, R778, R779, R780, R781, R782, R783, R784, R785, R786, R787, R788, R789, R790, R791, R792, R793, R794, R795, R796, R797, R798, R799, R800, R801, R802, R803, R804, R805, R806, R807, R808, R809, R810, R811, R812, R813, R814, R815, R816, R817, R818, R819, R820, R821, R822, R823, R824, R825, R826, R827

MAX20754EVKIT8 Evaluation Kit

Evaluates: MAX20754 and MAX20790

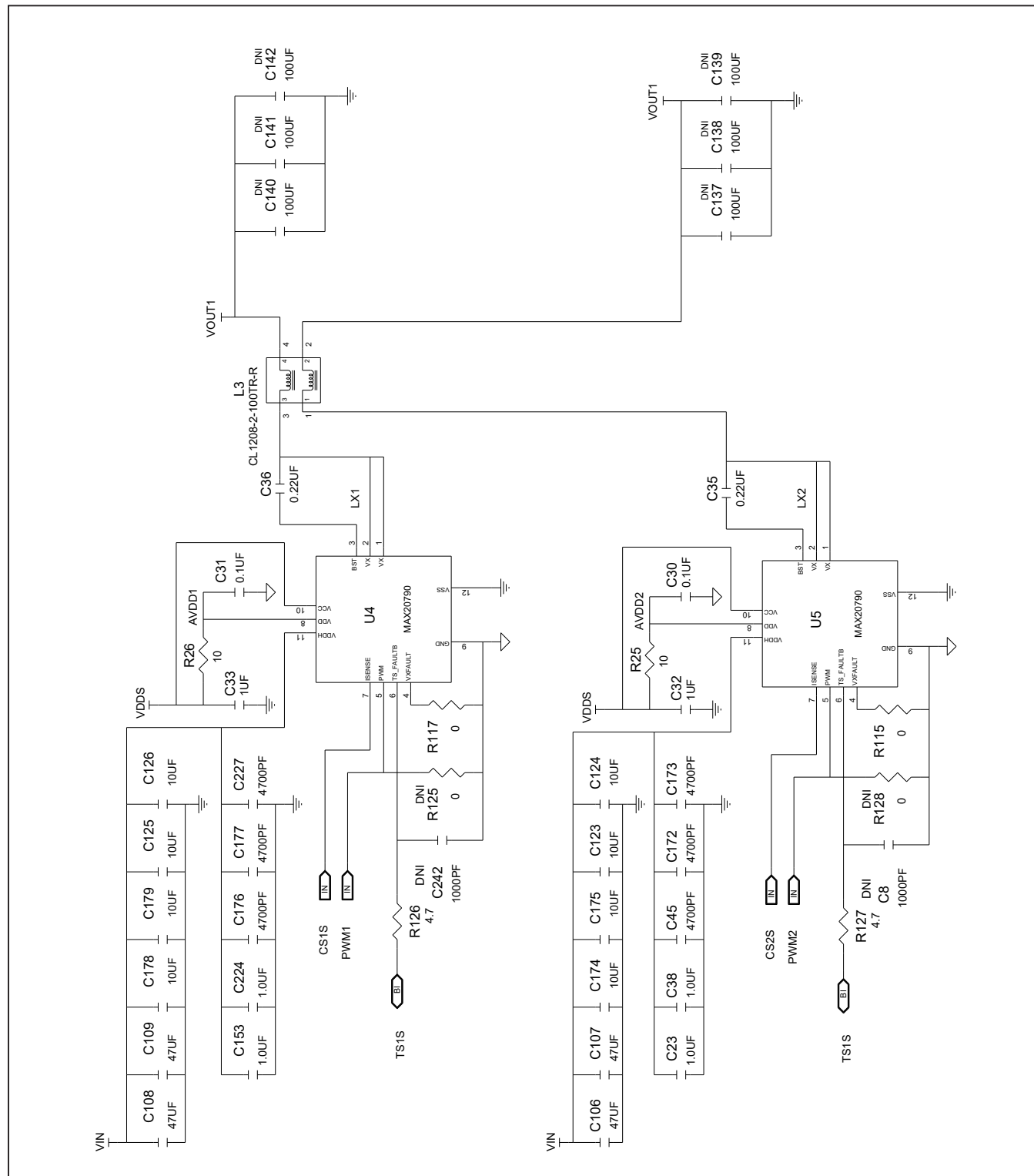
MAX20754 EV Kit Schematic (continued)



MAX20754EVKIT8 Evaluation Kit

Evaluates: MAX20754 and MAX20790

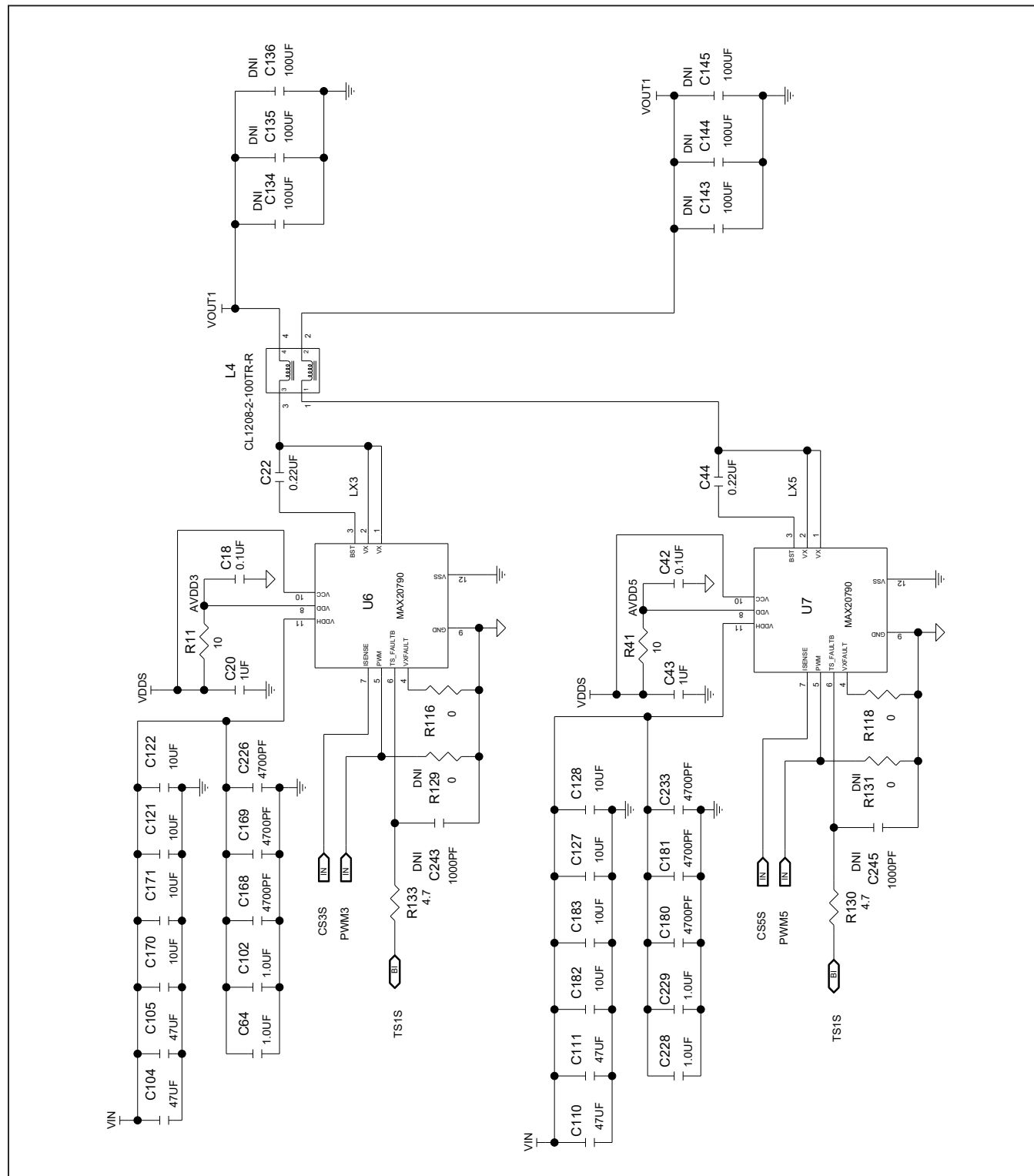
MAX20754 EV Kit Schematic (continued)



MAX20754EVKIT8 Evaluation Kit

Evaluates: MAX20754 and MAX20790

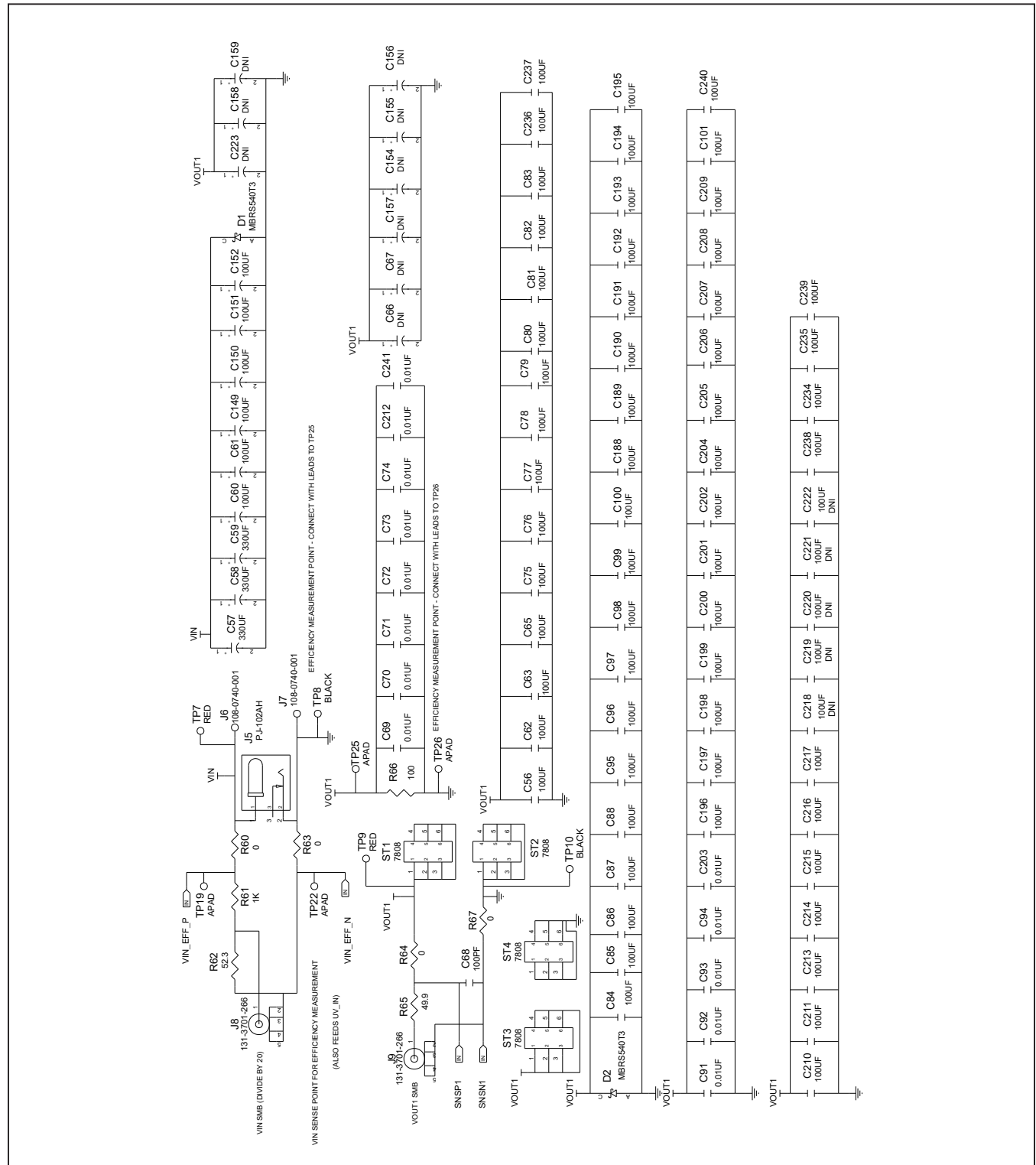
MAX20754 EV Kit Schematic (continued)



MAX20754EVKIT8 Evaluation Kit

Evaluates: MAX20754 and MAX20790

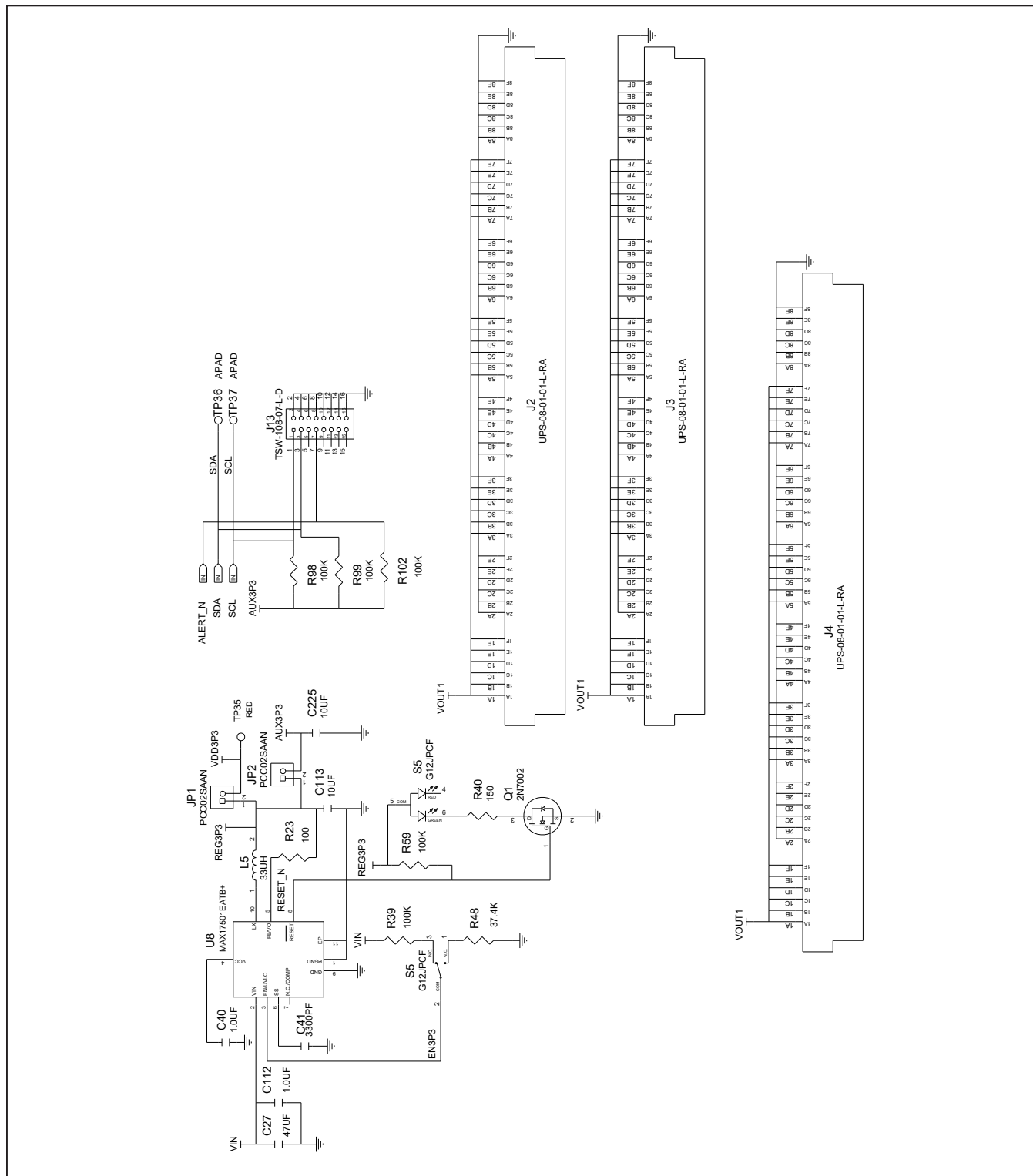
MAX20754 EV Kit Schematic (continued)



MAX20754EVKIT8 Evaluation Kit

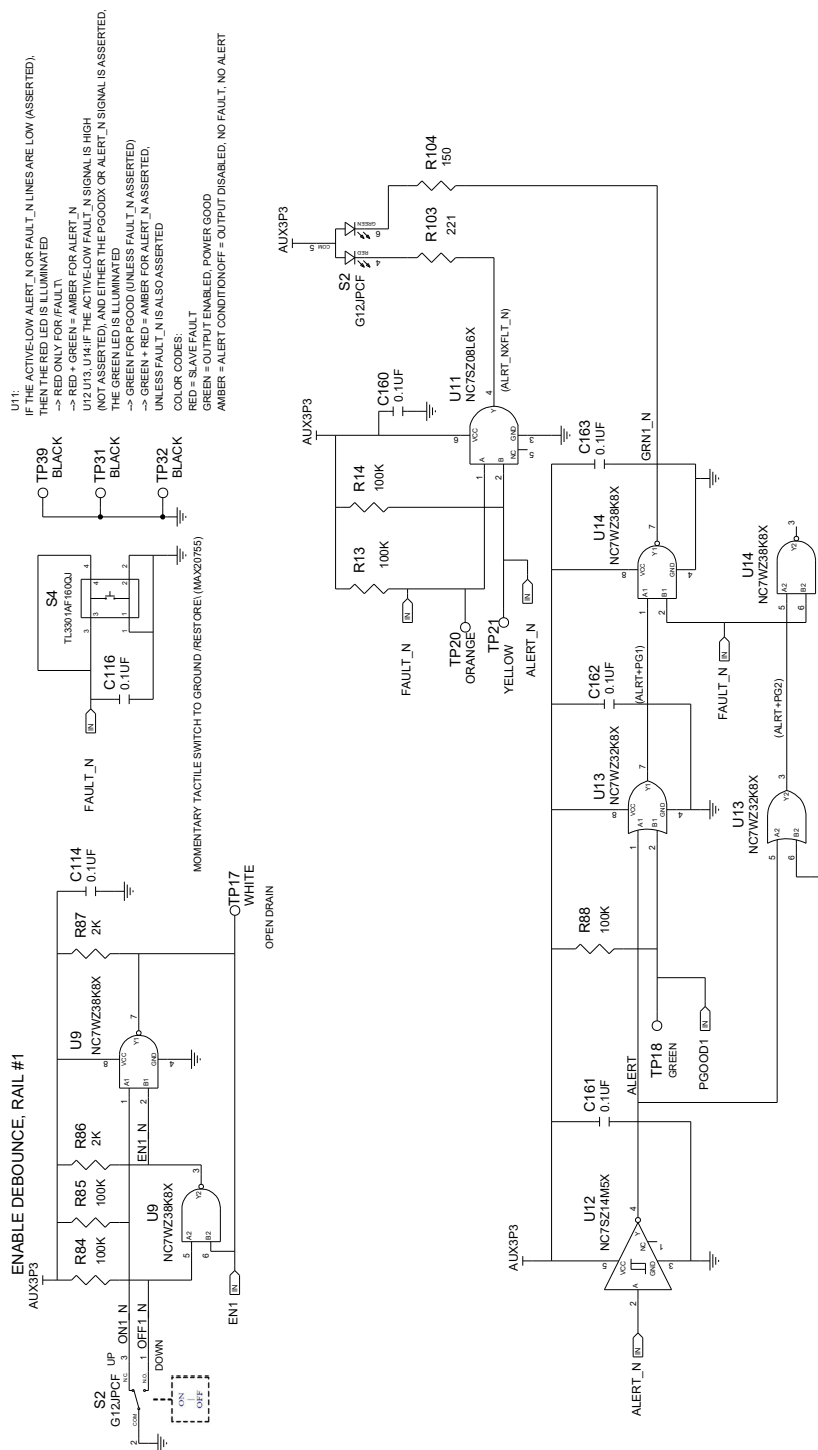
Evaluates: MAX20754 and MAX20790

MAX20754 EV Kit Schematic (continued)



MAX20754 EV Kit Schematic (continued)

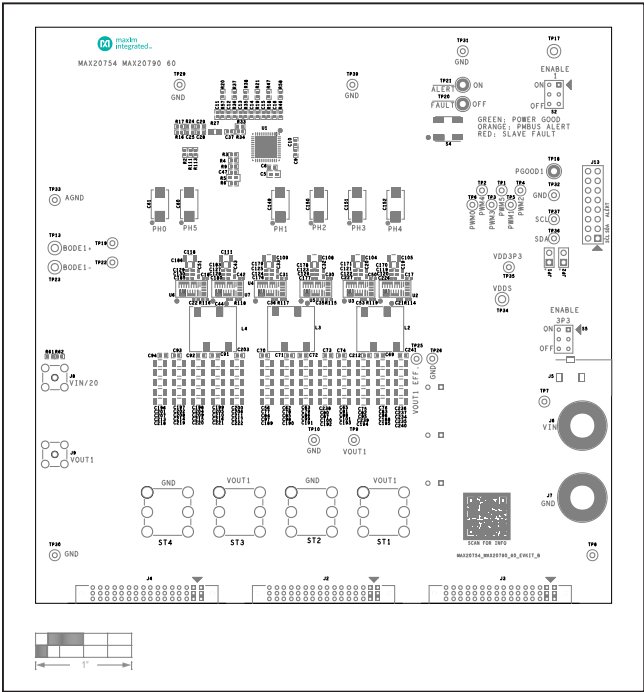
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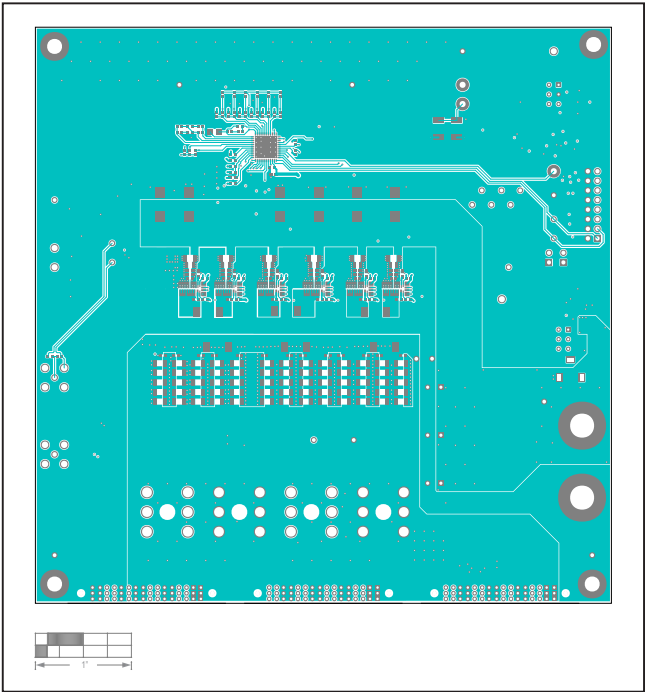
MAX20754EVKIT8
Evaluation Kit

Evaluates: MAX20754 and MAX20790

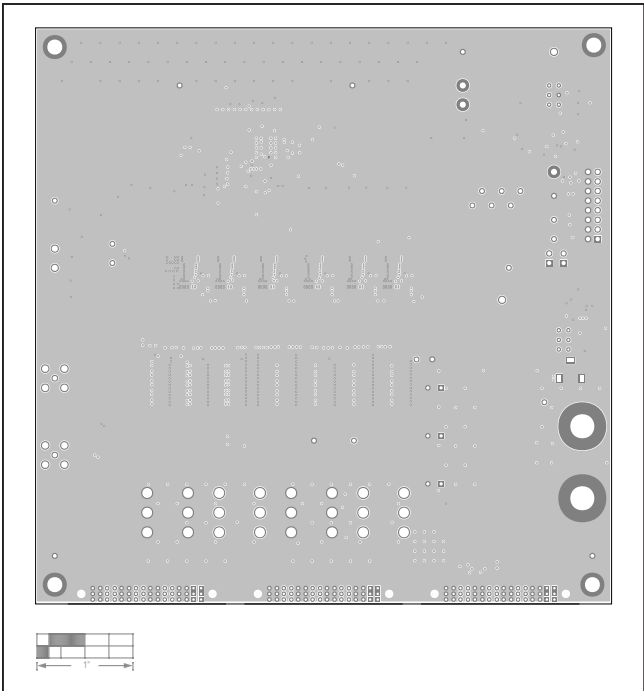
MAX20754 EV Kit PCB Layout Diagrams



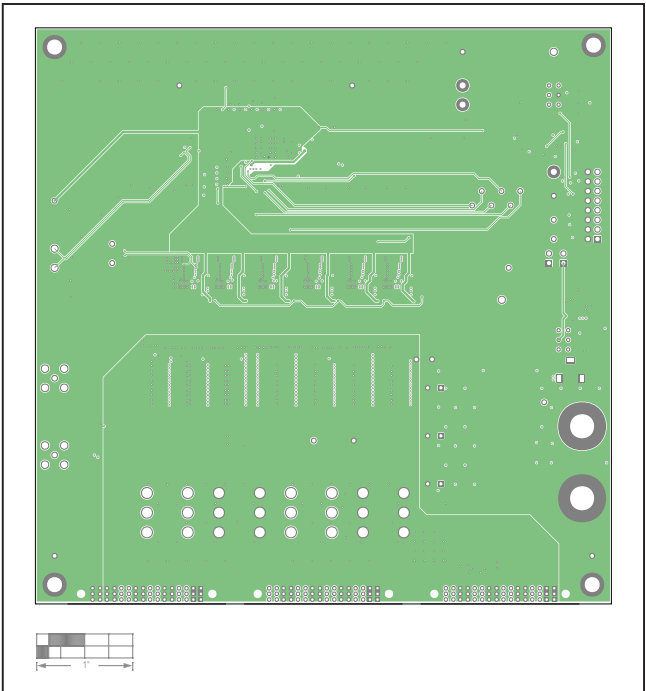
MAX20754 EV Kit PCB Layout—Top Silkscreen



MAX20754 EV Kit PCB Layout—Top Layer



MAX20754 EV Kit PCB Layout—Internal Layer 2 GND

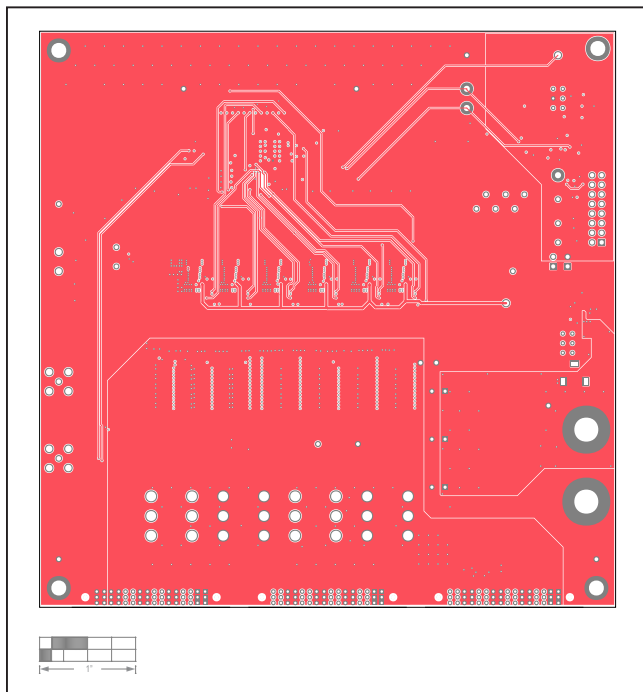


MAX20754 EV Kit PCB Layout—Internal Layer 3 Signal

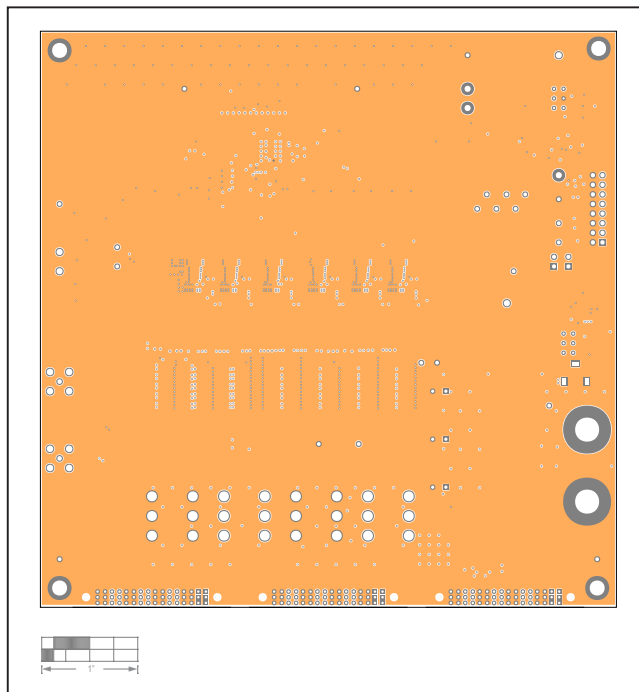
MAX20754EVKIT8 Evaluation Kit

Evaluates: MAX20754 and MAX20790

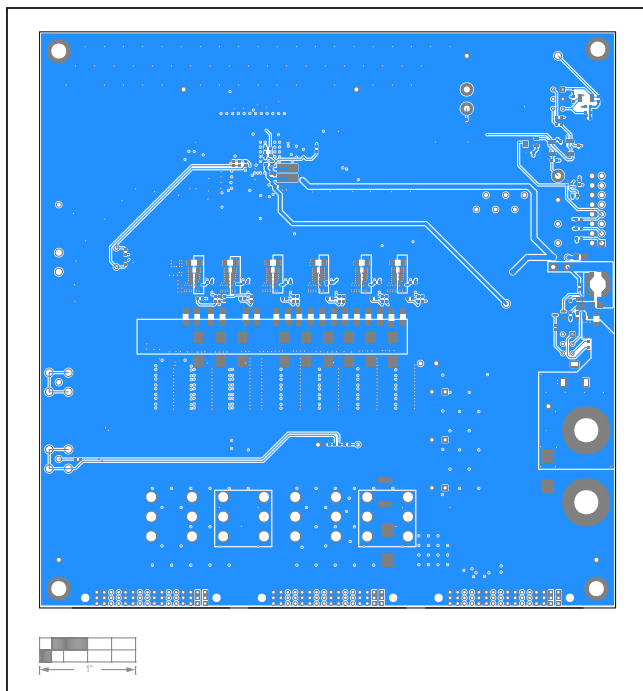
MAX20754 EV Kit PCB Layout Diagrams (continued)



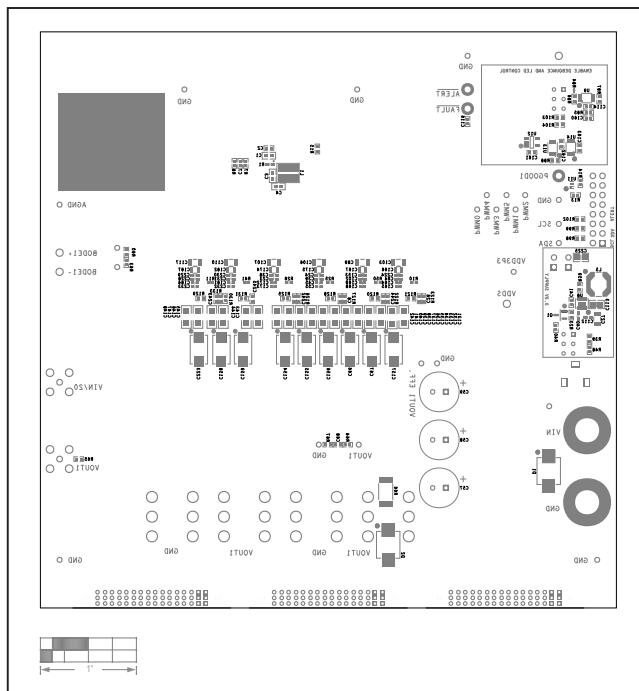
MAX20754 EV Kit PCB Layout—Internal Layer 4 Signal



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	—



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[MAX20754EVKIT8#](#)