Click here for production status of specific part numbers.

MAX20333 Evaluation Kit

Evaluates: MAX20333/A/B/C/D/E/F/G/H/I/J/K

General Description

The MAX20333 evaluation kit (EV kit) is a fully assembled and tested circuit board that demonstrates the MAX20333 0.2A to 4.75A adjustable current-limit switch device. The EV kit comes with the MAX20333ENL+ installed. The EV kit board can also be used to evaluate MAX20333A/B/C/D/E/F/G/H/I/J/K.

Features

- 3.5V to 22V Operating Voltage Range
- Output and Flag LED Reading
- Adjustable Current Limit Setting
- Adjustable Blanking Time (PBT version)
- Proven PCB Layout
- Fully Assembled and Tested

EV Kit Contents

- EV Kit Board Containing a MAX20333ENL+

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

Quick Start

Required Equipment

- MAX20333 EV kit
- 9V Power Supply
- 5V Power Supply
- Multimeter
- Load Box

Procedure

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

1) Connect 5V on V_{IO} TP14.
2) Connect 9V on INPUT TP5. Use the voltmeter to check that the OUT TP6 voltage is 9V.
3) Connect the load box to OUT. Increase the load current and verify that the OUT voltage goes down when output current goes up to about 1A, and D3 turns on (when overcurrent is in normal mode, $\overline{FLAG}$ is asserted).
4) Remove the output load. Cycle the INPUT power, verify D3 is off, and OUT voltage is 9V.
5) Change JU3 to the 1–2 position. Connect the load box to OUT.
6) Increase the load current and verify the OUT voltage goes down when output current goes up to about 2A, and D3 turns on (when overcurrent is in high current mode, $\overline{FLAG}$ is asserted).

319-100404; Rev 0; 7/19

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Detailed Description

The MAX20333 EV kit is a fully assembled and tested circuit board demonstrating the MAX20333 0.2A to 4.75A adjustable current limit switch device in a 15-bump WLP package.

LED Indicator

The EV kit features D2 to indicate power on output and D3 to indicate $\overline{FLAG}$ is asserted.

Current Limit Threshold

The current limit is set with the SETI resistor. Use JU1 to select the desirable current limit in normal mode (NM) or high current mode (HCM).

Table 1. Default Jumper Settings

JUMPER	SHUNT POSITION	DESCRIPTION
JU1	1–2*	R_{SETI} = 2kΩ (current limit: 1A in NM, 2A in HCM)
	3–4	R_{SETI} = 665Ω (current limit: 3A in NM, 5.5A in HCM)
	5–6	R_{SETI} = 442Ω (current limit: 4.5A in NM, 5.5A in HCM)
	7–8	Variable R_{SETI}

**Default position.*

Table 2. JU2, JU3 Jumper Setting

JUMPER	SHUNT POSITION	DESCRIPTION
JU2	1–2	EN/$\overline{EN}$ is low
	2–3*	EN/$\overline{EN}$ is high
JU3	1–2	PG is low
	2–3*	PG is high

**Default position.*

Enable Pin and Mode Selection

Use jumper JU2 and JU3 to enable the device and select the mode.

NVP or PBT Version

Use jumper JU4 to connect NVP to the gate of external pFET or connect PBT to a capacitor for adjustable blanking time.

Table 3. Functional Truth Table

MAX20333/A/B/C/D/E		
EN	**PG**	**MODE**
Low	Low	Shutdown (SHDN)
High	Low	High current (HCM)
High	High	Normal current (NM)
Low	High	Low Power (LPM)

MAX20333F/G/H/I/J/K		
$\overline{EN}$	**PG**	**MODE**
High	Low	Shutdown (SHDN)
Low	Low	High current (HCM)
Low	High	Normal current (NM)
High	High	Low Power (LPM)

Table 4. JU4 Setting

JUMPER	SHUNT POSITION	DESCRIPTION
JU4	1–2*	For PBT version. Connect PBT to C_{PBT}
	2–3	For NVP version. Connect NVP to gate of external pFET

**Default position.*

Blanking Time Setting

The PBT versions have adjustable blanking time. Use JU5 to set different blanking times.

pFET Gate

Use JU6 to have pFET Q1 stay on.

OUT Load and LED Indicator

Use JU7 to add load capacitor to OUT. Use JU8 to connect D2 to OUT. D2 indicates there is power on OUT.

Table 5. JU5 Setting

JUMPER	SHUNT POSITION	DESCRIPTION
JU5	1–2*	C_{PBT} = 0.33µF, blanking time = 100ms
	3–4	C_{PBT} = 0.1µF, blanking time = 30ms
	5–6	C_{PBT} = 0.033µF, blanking time = 10ms

**Default position.*

Table 6. JU6 Setting

JUMPER	SHUNT POSITION	DESCRIPTION
JU6	Installed	Gate of Q1 is pulled to ground (pFET is on).
	Not installed*	Gate of Q1 is not ground

**Default position.*

Table 7. JU7, JU8 Settings

JUMPER	SHUNT POSITION	DESCRIPTION
JU7	Installed	C9 and C10 connected to OUT
	Not installed*	C9 and C10 not connected to OUT
JU8	Installed	D2 connected to OUT
	Not installed*	D2 not connected to OUT

**Default position.*

Ordering Information

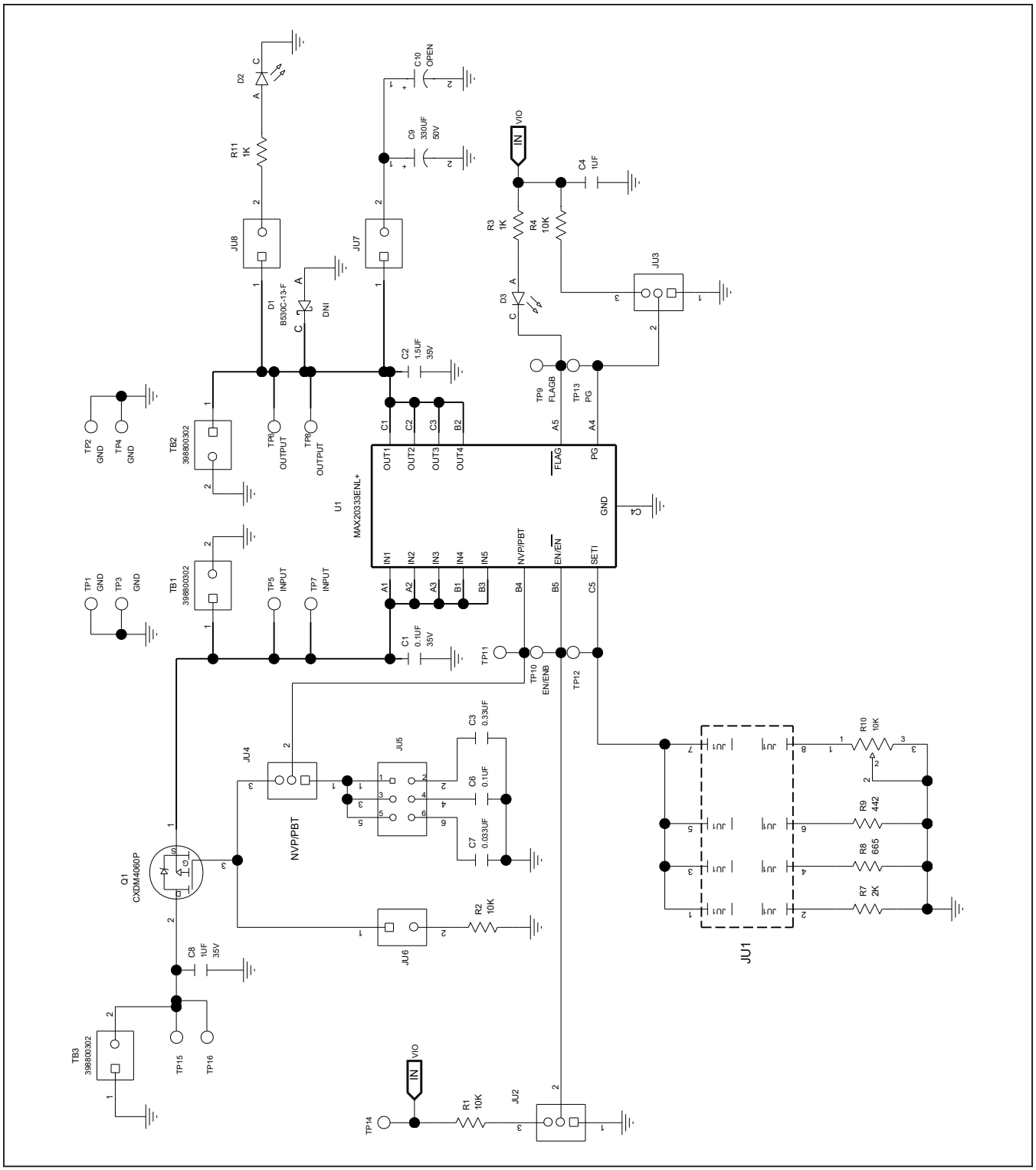
PART	TYPE
MAX20333EVKIT#	EV Kit

#Denotes RoHS compliance.

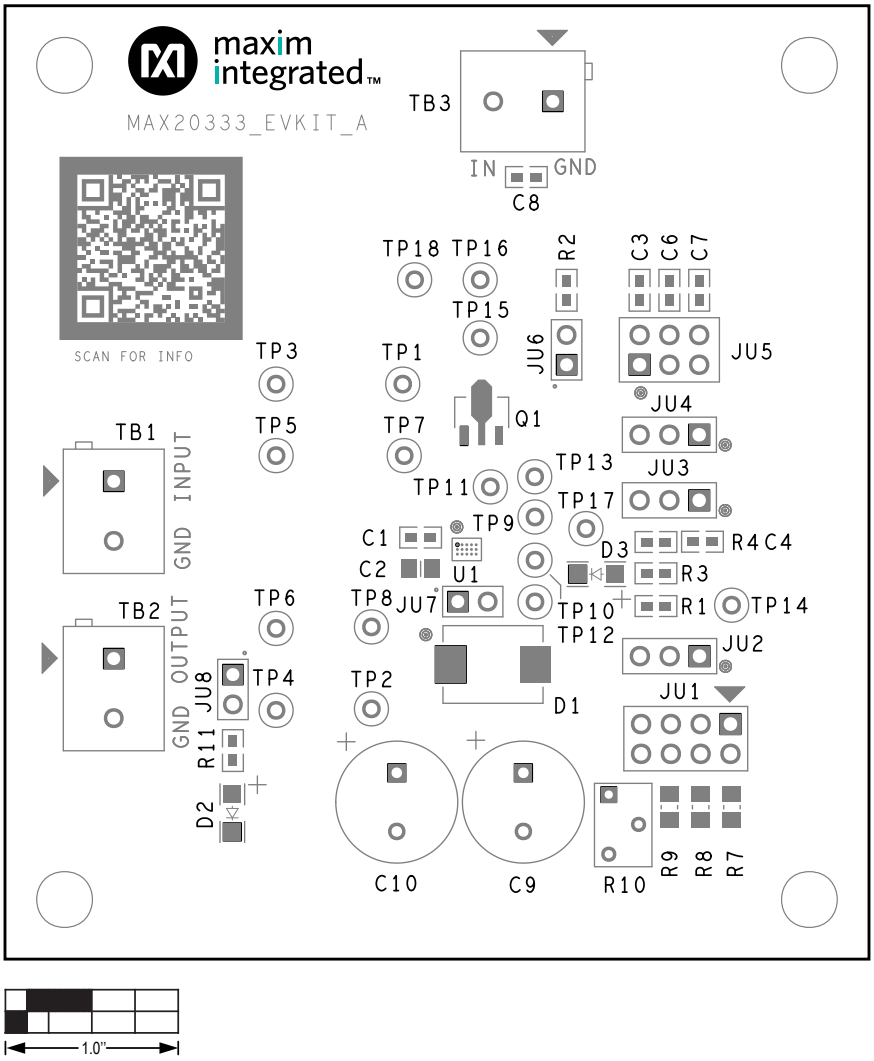
MAX20333 EV Kit Bill of Materials

ITEM	REF_DES	DNI/DNP	QTY	MFG PART #	MANUFACTURER	VALUE	DESCRIPTION	COMMENTS
1	C1	—	1	GMK107B7104KAH	TAIYO YUDEN	0.1µF	CAPACITOR; SMT (0603); CERAMIC CHIP; 0.1µF; 35V; TOL = 10%; TG = -55°C TO +125°C; TC = X7R	
2	C2	—	1	CGA4J1X7R1V155M125AC	TDK	1.5µF	CAP; SMT (0805); 1.5µF; 20%; 35V; X7R; CERAMIC CHIP	
3	C3	—	1	C0603C334K4RAC	KEMET	0.33µUF	CAPACITOR; SMT (0603); CERAMIC CHIP; 0.33µF; 16V; TOL = 10%; MODEL =; TG = -55°C TO +125°C; TC = X7R	
4	C4	—	1	C0603C105K4RAC; GRM188R71C105KA12; C1608X7R1C105K080AC; EMK107B7105KA; GCM188R71C105KA64; CGA3E1X7R1C105K080AC	KEMET;MURATA;TDK; TAIYO YUDEN; MURATA;TDK	1µF	CAPACITOR; SMT (0603); CERAMIC CHIP; 1µF; 16V; TOL = 10%; MODEL =; TG = -55°C TO +125°C; TC = X7R	
5	C6	—	1	VJ0603Y104JXQCW1BC	VISHAY	0.1µF	CAP; SMT (0603); 0.1µF; 5%; 10V; X7R; CERAMIC CHIP	
6	C7	—	1	C0603C333K8RAC	KEMET	0.033µF	CAP; SMT (0603); 0.033µF; 10%; 10V; X7R; CERAMIC CHIP	
7	C8	—	1	C1608X7R1V105K080AC; CGA3E1X7R1V105K080AC	TDK;TDK	1µF	CAPACITOR; SMT (0603); CERAMIC CHIP; 1µF; 35V; TOL = 10%; TG = -55°C TO +125°C; TC = X7R	
8	C9	—	1	EEU-EB1H331	PANASONIC	330µF	CAPACITOR; THROUGH HOLE-RADIAL LEAD; ALUMINUM-ELECTROLYTIC; 330µF; 50V; TOL = 20%; MODEL = EB SERIES; TG = -40°C TO +105°C	
9	D2	—	1	LTST-C150KGKT	LITE-ON ELECTRONICS INC.	LTST-C150KGKT	DIODE; LED; STANDARD; GREEN; SMT (1206); PIV = 2V; IF = 0.02A; -55°C TO +85°C	
10	D3	—	1	LTST-C150KRKT	LITE-ON ELECTRONICS INC.	LTST-C150KRKT	DIODE; LED; STANDARD; RED; SMT (1206); PIV = 2V; IF = 0.02A; -30°C TO +85°C	
11	JU1	—	1	PEC04DAAN	SULLINS ELECTRONICS CORP.	PEC04DAAN	CONNECTOR; MALE; THROUGH HOLE; BREAKAWAY; STRAIGHT; 8PINS	
12	JU2-JU4	—	3	PEC03SAAN	SULLINS	PEC03SAAN	CONNECTOR; MALE; THROUGH HOLE; BREAKAWAY; STRAIGHT; 3PINS	
13	JU5	—	1	PEC03DAAN	SULLINS ELECTRONICS CORP.	PEC03DAAN	CONNECTOR; MALE; THROUGH HOLE; BREAKAWAY; STRAIGHT THROUGH; 6PINS; -65°C TO +125°C	
14	JU6-JU8	—	3	PEC02SAAN	SULLINS	PEC02SAAN	CONNECTOR; MALE; THROUGH HOLE; BREAKAWAY; STRAIGHT; 2PINS	
15	MH1-MH4	—	4	9032	KEYSTONE	9032	MACHINE FABRICATED; ROUND-THRU HOLE SPACER; NO THREAD; M3.5; 5/8IN; NYLON	
16	Q1	—	1	CXDM4060P	CENTRAL SEMICONDUCTOR	CXDM4060P	TRAN; PCH; ENHANCEMENT-MODE MOSFET; SOT-89; PD-(1.2W); I-(-6A); V-(-40V)	
17	R1, R2, R4	—	3	CRCW060310K0FK; ERJ-3EKF1002	VISHAY DALE; PANASONIC	10K	RESISTOR; 0603; 10K; 1%; 100PPM; 0.10W; THICK FILM	
18	R3, R11	—	2	ERJ-3GEYJ102	PANASONIC	1K	RESISTOR; 0603; 1KΩ; 5%; 200PPM; 0.10W; THICK FILM	
19	R7	—	1	CRCW08052K00FK	VISHAY DALE	2K	RESISTOR; 0805; 2K; 1%; 100PPM; 0.125W; THICK FILM	
20	R8	—	1	CRCW0805665RFK	VISHAY DALE	665	RESISTOR; 0805; 665Ω; 1%; 100PPM; 0.125W; THICK FILM	
21	R9	—	1	CRCW0805442RFK	VISHAY DALE	442	RESISTOR; 0805; 442Ω; 1%; 100PPM; 0.125W; THICK FILM	
22	R10	—	1	PV37W103C01B00	BOURNS	10K	RES; THROUGH HOLE-RADIAL LEAD; 10K; 10%; ±150PPM/°C; 0.25W	
23	TB1-TB3	—	3	398800302	MOLEX	398800302	CONNECTOR; FEMALE; THROUGH HOLE; 5.08/.200 EUROSTYLE LOW; SINGLE ROW FIXED BLOCK; RIGHT ANGLE; 2PINS	
24	TP5, TP7, TP6, TP8	—	4	5000	KEYSTONE	N/A	TEST POINT; PIN DIA = 0.1IN; TOTAL LENGTH = 0.3IN; BOARD HOLE = 0.04IN; RED; PHOSPHOR BRONZE WIRE SILVER PLATE FINISH;	(TP5,TP7:INPUT) (TP6,TP8:OUTPUT)
25	TP9, TP10, TP11, TP12, TP13	—	5	5002	KEYSTONE	N/A	TESTPOINT; PINDIA = 0.1IN;TOTAL LENGTH = 0.3IN; BOARDHOLE = 0.04IN; WHITE; PHOSPHOR BRONZE WIRE SILVER; NOT FOR COLD TEST	(TP9:FLAGB) (TP10:EN/ENB) (TP13:PG)
26	TP14-TP16	—	3	5003	KEYSTONE	N/A	TEST POINT; PIN DIA = 0.1IN; TOTAL LENGTH = 0.3IN; BOARD HOLE = 0.04IN; ORANGE; PHOSPHOR BRONZE WIRE SILVER PLATE FINISH;	
27	TP1-TP4, TP17, TP18	—	6	5001	KEYSTONE	N/A	TEST POINT; PIN DIA = 0.1IN; TOTAL LENGTH = 0.3IN; BOARD HOLE = 0.04IN; BLACK; PHOSPHOR BRONZE WIRE SILVER PLATE FINISH;	(TP1-TP4:GND)
28	U1	—	1	MAX20333ENL+	MAXIM	MAX20333ENL+	EVKIT PART - IC; MAX20333ENL+; ADJUSTABLE CURRENT LIMIT SWITCH WITH LOW POWER MODE; PACKAGE OUTLINE: 21-100295; PACKAGE CODE: N151A2+1; WLP15	
29	PCB	—	1	MAX20333	MAXIM	PCB	PCB:MAX20333	-
30	C10	DNP	0	EEU-EB1H331	PANASONIC	330UF	CAPACITOR; THROUGH HOLE-RADIAL LEAD; ALUMINUM-ELECTROLYTIC; 330µF; 50V; TOL = 20%; MODEL = EB SERIES; TG = -40°C TO +105°C	OPEN
31	D1	DNP	0	B530C-13-F	DIODES INCORPORATED	B530C-13-F	DIODE; SCH; SMC; PIV = 30V; IF = 5A	
TOTAL			55					

MAX20333 EV Kit Schematic

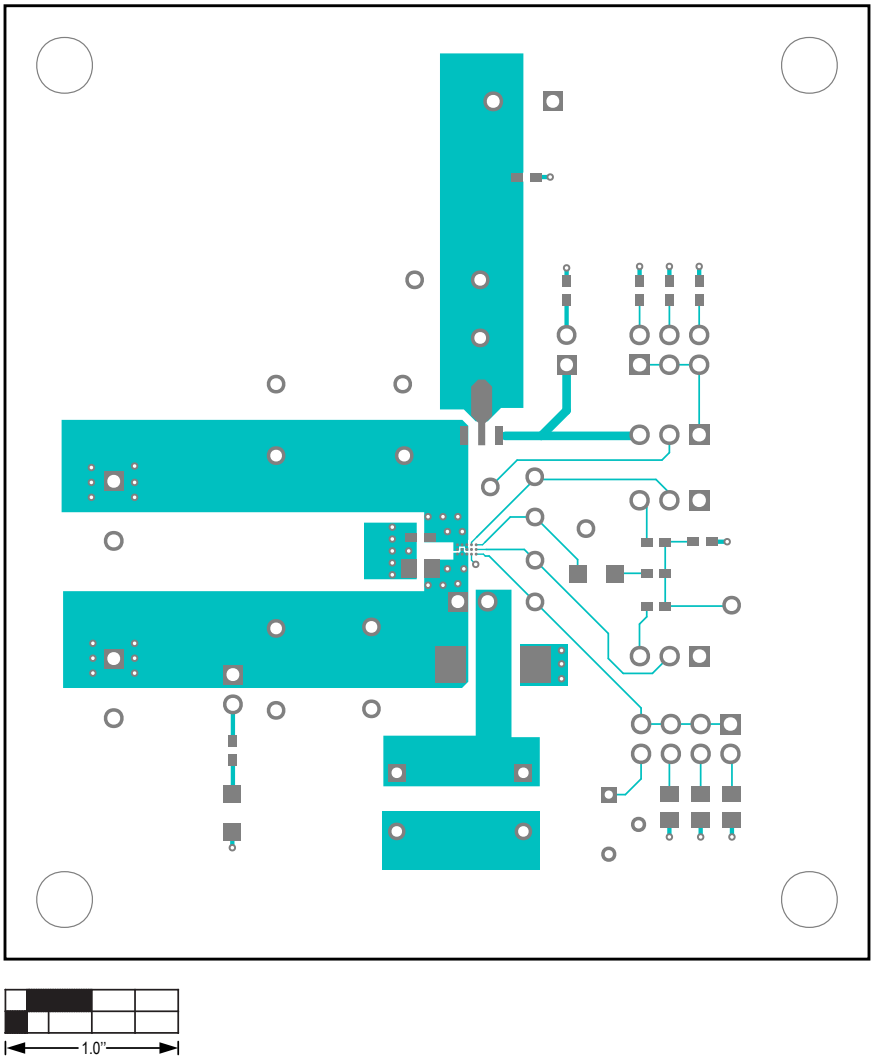


MAX20333 EV Kit PCB Layout Diagrams



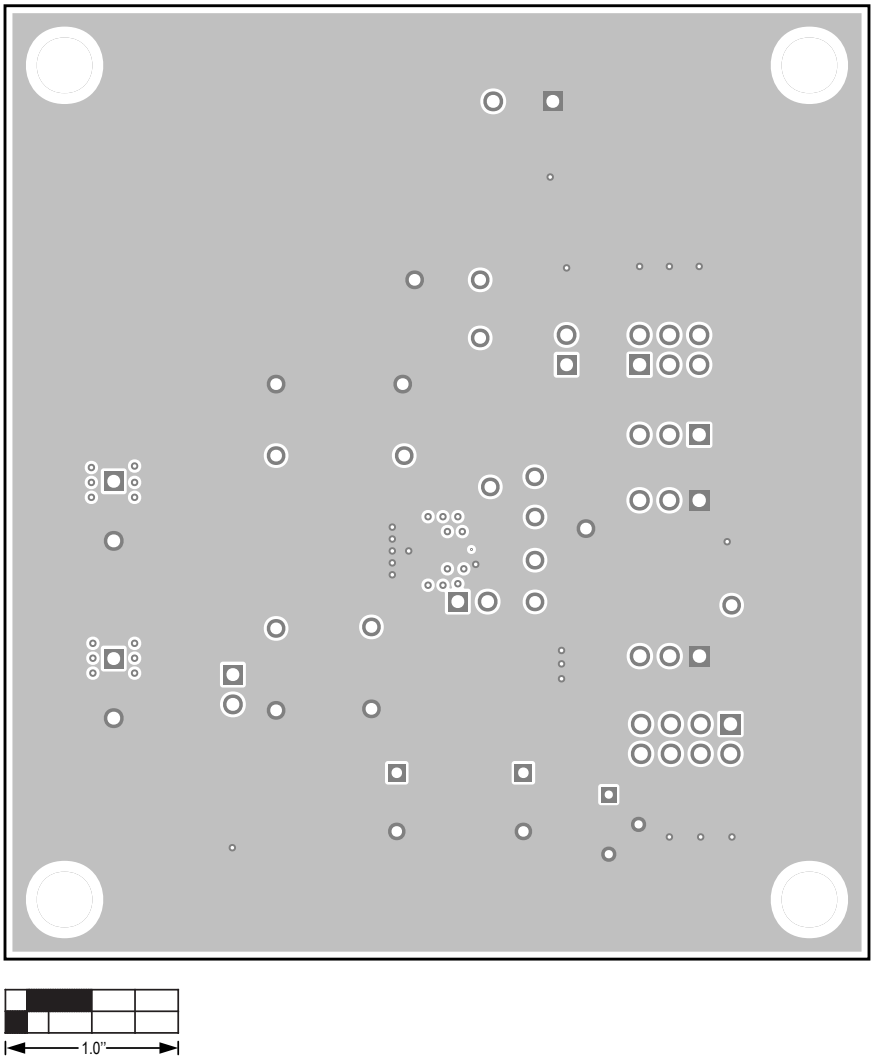
MAX20333 EV PCB Layout—Top Silkscreen

MAX20333 EV Kit PCB Layout Diagrams (continued)



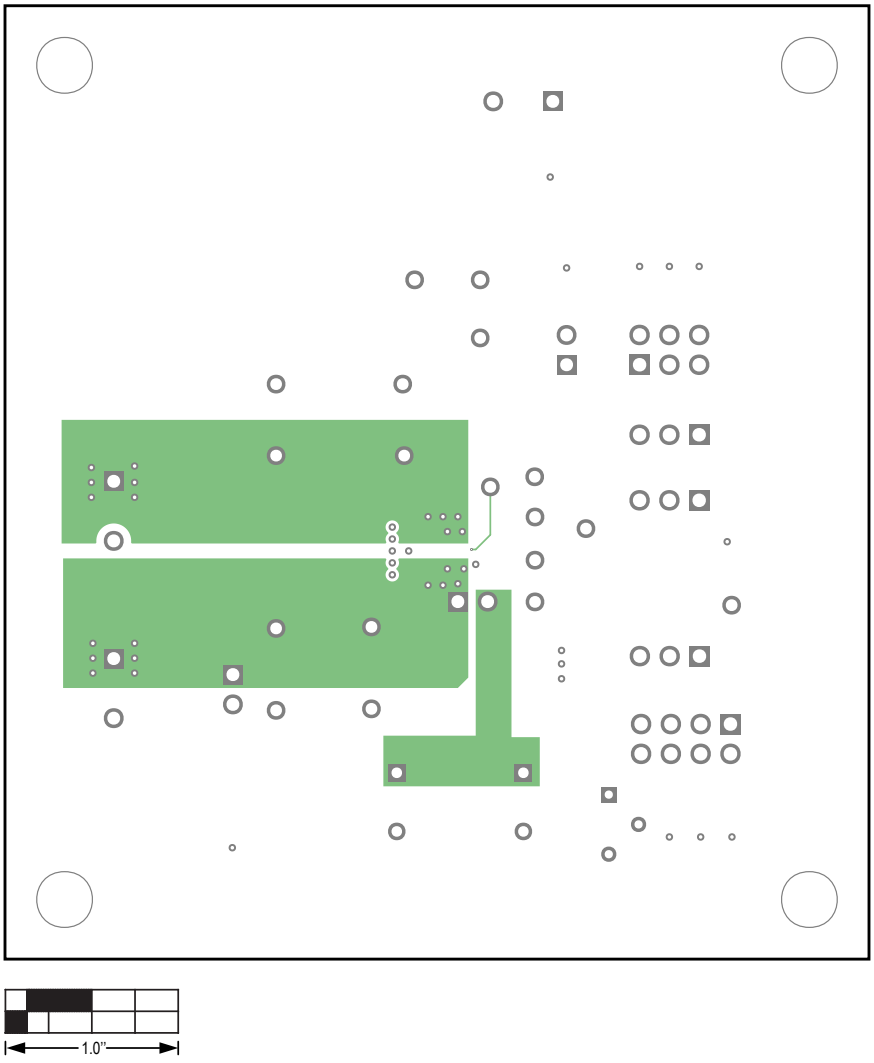
MAX20333 EV PCB Layout—Top Layer

MAX20333 EV Kit PCB Layout Diagrams (continued)



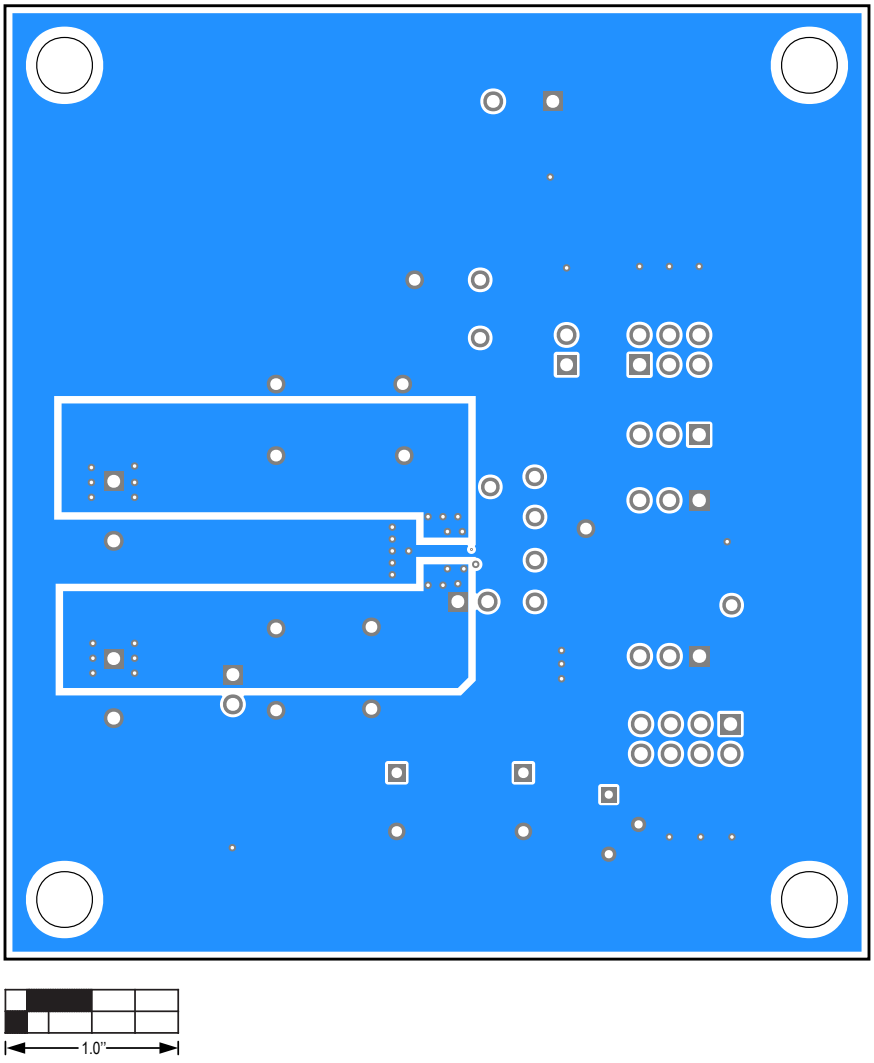
MAX20333 EV PCB Layout—Layer 2

MAX20333 EV Kit PCB Layout Diagrams (continued)



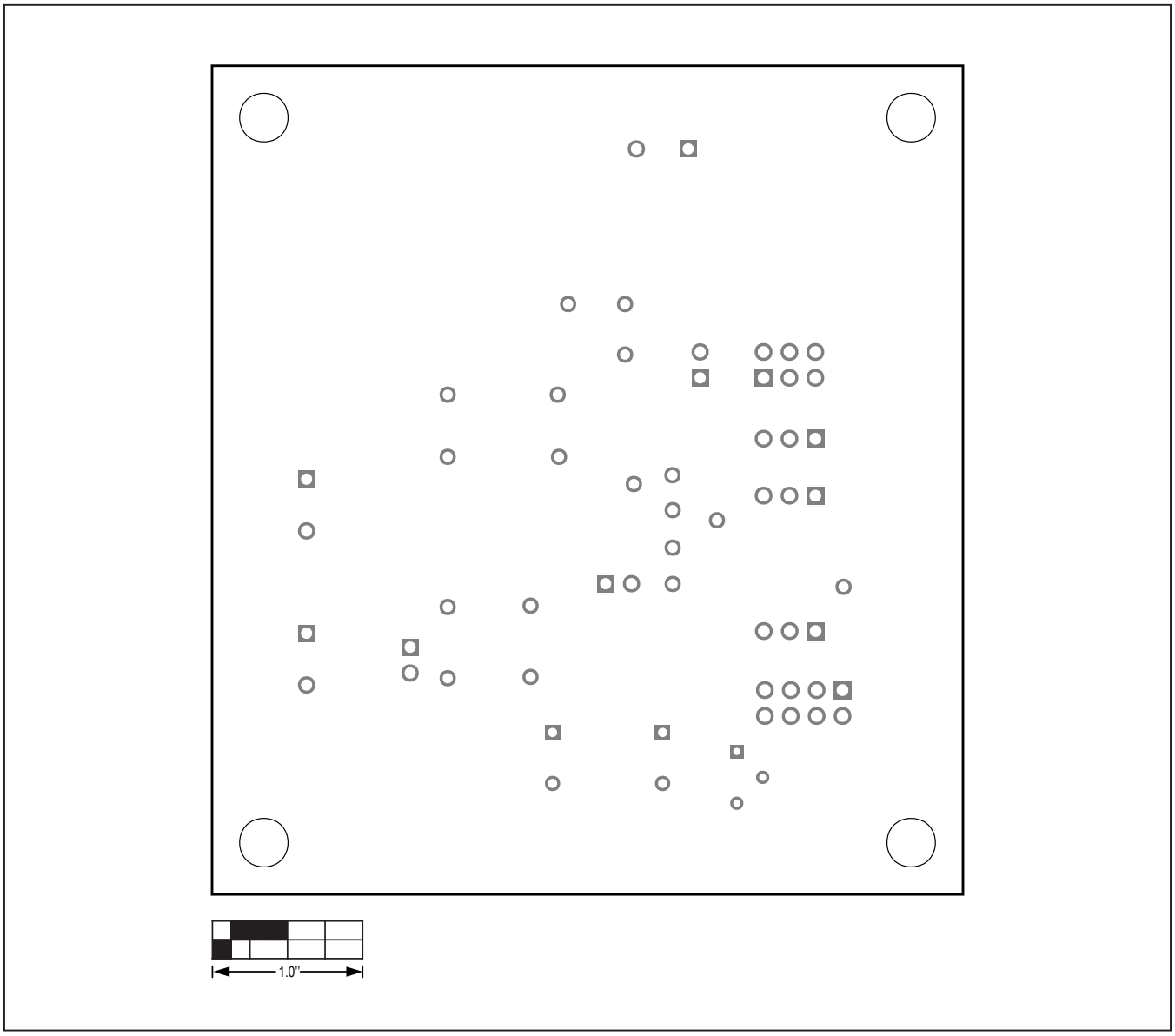
MAX20333 EV PCB Layout—Layer 3

MAX20333 EV Kit PCB Layout Diagrams (continued)



MAX20333 EV PCB Layout—Bottom Layer

MAX20333 EV Kit PCB Layout Diagrams (continued)



MAX20333 EV PCB Layout—Bottom Silkscreen

Revision History

REVISION NUMBER	REVISION DATE	DESCRIPTION	PAGES CHANGED
0	7/19	Initial release	—

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