

MAX20307 Evaluation Kit

Evaluates: MAX20307

General Description

The MAX20307 evaluation kit (EV kit) is a fully assembled and tested circuit board that demonstrates the MAX20307 eGaN driver IC. The driver is used to drive the high and low-side switches of a synchronous buck converter designed with space-saving EPC2039 eGaN FETs.

Features

- Small Solution Size
- Operates with High-Side Inputs up to 60V
- Supports Fast Drive Signals up to 15MHz
- Onboard Voltage Regulator Allows Testing with Single Power Supply
- Proven PCB Layout
- Fully Assembled and Tested

Ordering Information appears at end of data sheet.

Quick Start

Required Equipment

The following is the minimum required equipment to use this EV kit:

- Power supply with up to 35V capability
- Function generator
- DMM

Required Equipment

The following equipment can be used for more effective testing of this EV kit:

- Power supply with up to 60V capability
- 5V USB supply and a USB-B cable or 5V power supply

Procedure

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

- 1) Verify that shunts are installed on JU1, JU6, JU9, JU10, and that JU11 is open.
- 2) Configure the power supply output from at least 7V to no more than 35V.
- 3) Configure the function generator to output a 3.3V square wave at the desired frequency and duty cycle.
- 4) Connect the positive lead of the power supply to TP2 and the negative lead to TP1. Turn on the power supply.
- 5) Connect the function generator to the BNC connector J1. Turn on the function generator.
- 6) Using the DMM, measure the voltage at H8 and confirm that it is the correct value set by V_{IN} and the duty cycle of the function generator.

Detailed Description of Hardware

The MAX20307 EV kit is a fully assembled and tested PCB demonstrating the MAX20307 as a buck converter. An on-board 7805 5V regulator can be connected to the VIN supply, allowing the EV kit to operate from one power supply. By shunting JU9, the regulator receives power through the VIN supply on TP2. While keeping JU11 open, shunting JU10 connects the regulator's output to the 5V rail of the PCB and powers the indicator LEDs and, optionally, the MAX20307. Note that when using the 7805 regulators, VIN is limited to 35V. To avoid any risk of damaging a device connected the USB port J4, make sure JU11 is open before using the 7805 to power the board.

To measure the MAX20307's supply current, remove the shunt on jumper JU6 and apply 5V directly to TP3. An ammeter in series with the 5V supply will measure the current drawn by the MAX20307.

Table 1. Description of Test Points

TEST POINT	SIGNAL
TP1	Ground
TP2	High-side rail. Connects to V_{IN} through JU1.
TP3	V_{CC}
TP4	LDTY0
TP5	LDTY1
TP6	DTP0
TP7	DTP1
TP8	INH
TP9	Ground
TP10	N.C.
TP11	Ground
TP12	Ground
TP13	5V PCB

Table 2. Jumper Descriptions

JUMPER	SHUNT POSITION	DESCRIPTION
JU1	Installed*	Connect high side input from TP2 to V_{IN} of U1
	Not Installed	V_{IN} not connected to high-side voltage
JU2	Installed	Tie N.C. to V_{CC} through a 5kΩ pullup resistor
	Not Installed*	Leave N.C. floating
JU3	Installed*	Connect a LDTY1 to V_{CC} through a 10kΩ pullup resistor. Buffers LDTY1 to control an indicator LED (LED2)
	Not Installed	Leave LDTY1 floating
JU4	Installed*	Connect a LDTY1 to V_{CC} through a 10kΩ pullup resistor. Buffers LDTY1 to control an indicator LED (LED2)
	Not Installed	Leave LDTY1 floating
JU5	Installed*	Tie N.C. to GND
	Not Installed	Leave N.C. floating
JU6	Installed*	Connect V_{CC} of the MAX20307 to the 5V rail of the PCB
	Not Installed	V_{CC} supplied externally
JU7	1-2	Connect DTP0 to 5V
	2-3*	Connect DTP0 to ground
	Not Installed	DTP0 floating
JU8	1-2	Connect DTP1 to 5V
	2-3*	Connect DTP1 to ground
	Not Installed	DTP1 floating

Table 2. Jumper Descriptions (continued)

JUMPER	SHUNT POSITION	DESCRIPTION
JU9	Installed	Connect V_{IN} to the input of a 7805 voltage regulator
	Not Installed*	7805 not regulating V_{IN}
JU10	Installed	PCB 5V rail supplied by onboard regulator
	Not Installed*	PCB 5V rail not supplied by onboard regulator
JU11	Installed*	PCB 5V rail supplied by USB connector
	Not Installed	PCB 5V rail not supplied by USB connector

*Default configuration

Component Suppliers

SUPPLIER	WEBSITE
EPC	https://epc-co.com/epc/

Note: Indicate that you are using the MAX20307 when contacting these component suppliers.

Ordering Information

PART	TYPE
MAX20307EVKIT#	EV Kit

#Denotes RoHS Compliant

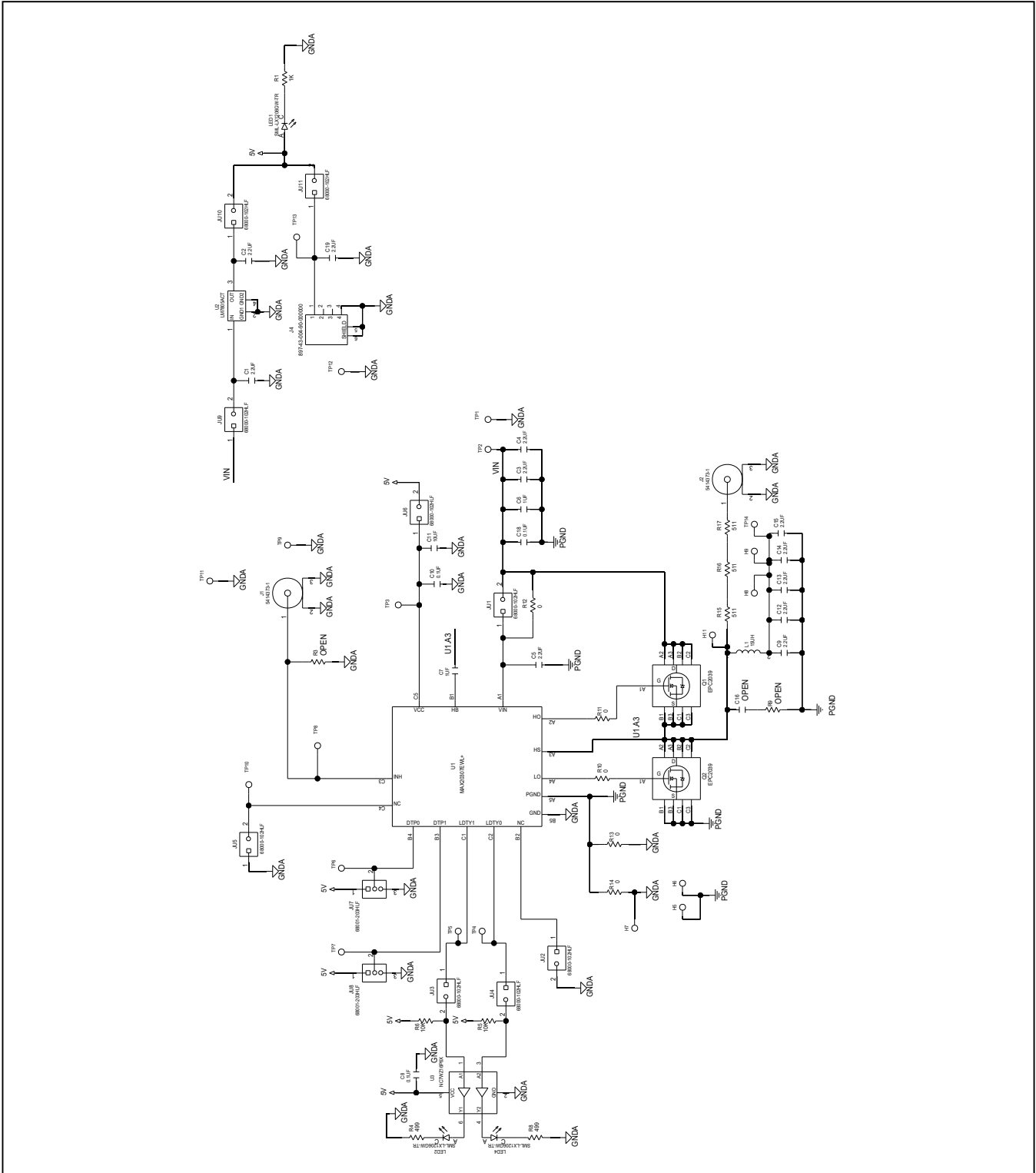
MAX20307 EV Kit Bill of Materials

ITEM REF_DES	DNI/ DNP	QTY	MFG PART #	MFG	VALUE	DESCRIPTION
1 C1, C3-C5, C9, C12-C15	-	9	CL31B225KCHSNN	SAMSUNG ELECTRO-MECHANICS	2.2UF	CAP: SMT (1206), 2.2UF, 10%; 100V; X7R; CERAMIC CHIP
2 C2, C19	-	2	C1210F225KGRAC;CGA6M3X7R1H2	KEMET;TDK;SAMSUNG ELECTROMECHANICS	2.2UF	CAPACITOR; SMT (1210); CERAMIC CHIP; 2.2UF; 50V; TOL=10%; TG=-55 DEGC TO +125 DEGC; TC=X7R
3 C6, C7	-	2	C1210C105K1TRAC;C1210C105K1TR1	KEMET;SAMSUNG ELECTRO MECHANICS	1UF	CAPACITOR; SMT (1210); CERAMIC CHIP; 1UF; 100V; TOL=10%; TG=-55 DEGC TO +125 DEGC; TC=X7R
4 C8, C10	-	2	CL10B104KB8NFN	SAMSUNG ELECTRONICS	0.1UF	CAPACITOR; SMT (0603); CERAMIC; 0.1UF; 50V; TOL=10%; TG=-55 DEGC TO +125 DEGC; TC=X7R
5 C11	-	1	CL43B106KALNINN	SAMSUNG ELECTRO-MECHANICS	10UF	CAP: SMT (1812), 10UF, 10%; 25V; X7R; CERAMIC CHIP
6 C18	-	1	C1812C104J1GAC	KEMET	0.1UF	CAPACITOR; SMT (1812); CERAMIC; 0.1UF; 100V; TOL=5%; MODEL=C1812C SERIES; TG=-55 DEGC TO +125 DEGC; TC=C0G
7 J1, J2	-	2	5414373-1	TE CONNECTIVITY	5414373-1	CONNECTOR; FEMALE; THROUGH HOLE; 50 OHM BNC CONNECTOR; RIGHT ANGLE; 3PINS
8 J4	-	1	897-43-004-90-000000	MILL-MAX	000000	CONNECTOR; FEMALE; THROUGH HOLE; USB 2.0; TYPE B; RIGHT ANGLE; 4PINS
9 JU1-JU6, JU9-JU11	-	9	68000-102HLF	FCI CONNECT	68000-102HLF	CONNECTOR; MALE; THROUGH HOLE; 6800 SERIES; BERGSTIK II HEADER; STRAIGHT; 2PINS
10 J07, J08	-	2	68001-203HLF	FCI CONNECT	68001-203HLF	CONNECTOR; MALE; THROUGH HOLE; BERGSTIK BREAKAWAY HEADER; STRAIGHT; 3PINS
11 L1	-	1	P1170.153NLS	PULSE	15UH	INDUCTOR; SMT; SHIELDED; 15UH; 20%; 4.00A
12 LED1, LED2, LED4	-	3	SML-LX1206GW-TR	LUMEX OPTOCOMPONENTS	SML-LX1206GW-TR	DIODE; LED; STANDARD; GREEN; SMT (1206); PIV=2.2V; IF=0.02A; -40 DEGC TO +85 DEGC
13 Q1, Q2	-	2	EPC2039	EFFICIENT POWER CONVERSION CORP.	EPC2039	TRAN; NCH; SMT; (46.8A); V;(80V)
14 R1	-	1	6ENF1001V;MCR10EZHF1001;RC0805FR-0710K	VISHAY DALE; PANASONIC; ROHM; YAGEO	1K	RESISTOR; 0805; 1K; 1%; 100PPM; 0.125W; THICK FILM
15 R4, R8	-	2	CRCW0805499RFK;ERJ-6ENF4990;RC0805FR-07499RL	VISHAY DALE; PANASONIC; YAGEO	499	RESISTOR; 0805; 499 OHM; 1%; 100PPM; 0.125W; THICK FILM
16 R5, R6	-	2	MCR10EZHF1002; ERJ-6ENF1002V; RC0805FR-0710K	VISHAY DALE; ROHM SEMI; MURATA; YAGEO	10K	RESISTOR; 0805; 10K; 1%; 100PPM; 0.125W; THICK FILM
17 R10, R11	-	2	RC0402FR-070RL	YAGEO	0	RES; SMT (0402); 0; 1%; JUMPER; 0.063W
18 R12	-	1	RC0805JR-070RL	YAGEO PHYCOMP	0	RESISTOR; 0805; 0 OHM; 5%; JUMPER; 0.125W; THICK FILM
19 R13, R14	-	2	5T08	KEYSTONE	0	RES; SMT (0805); 0; JUMPER; 0.5W
20 TP1, TP12	-	2	5011	KEYSTONE	N/A	TEST POINT; PIN DIA=0.1IN; TOTAL LENGTH=0.3IN; BOARD HOLE=0.063IN; BLACK; PHOSPHOR BRONZE WIRE SILVER PLATE FINISH;
21 TP2, TP3, TP13	-	3	5010	KEYSTONE	N/A	TESTPOINT WITH 1.80MM HOLE DIA. RED. MULTIPURPOSE;
22 TP4, TP5, TP8, TP10	-	4	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;
23 TP6, TP7	-	2	5116	KEYSTONE	N/A	TEST POINT; PIN DIA=0.1IN; TOTAL LENGTH=0.3IN; BOARD HOLE=0.04IN; GREEN; PHOSPHOR BRONZE WIRE SILVER PLATE FINISH;
24 TP9, TP11	-	2	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;
25 U1	-	1	MAX20307EVL+	MAXIM	MAX20307EVL+	EGAN DRIVER; PACKAGE OUTLINE: 21-1031; PACKAGE CODE: W151E2+1; WLP15
26 U2	-	1	LM7805ACT	FAIRCHILD SEMICONDUCTOR	LM7805ACT	IC; VREG; 3-TERMINAL 1A POSITIVE VOLTAGE REGULATOR; TO220 ; 0 DEGC TO +125 DEGC
27 U3	-	1	NC7WZ16P6X	FAIRCHILD SEMICONDUCTOR	NC7WZ16P6X	IC; BUF; TINY LOGIC; UHS DUAL BUFFER; SC70-6
28 PCB	-	1	MAX	MAXIM	PCB	PCB;MAX

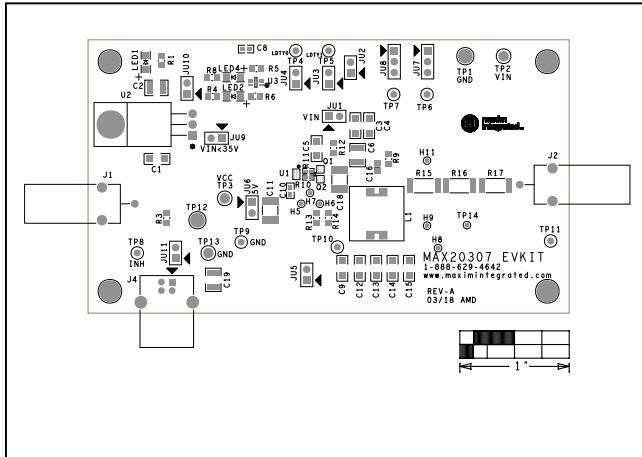
MAX20307 EV Kit Bill of Materials (continued)

ITEM	REF	DIES	DNP	QTY	MFG PART #	MFG	VALUE	DESCRIPTION
29	C16		DNP	0	N/A	N/A	OPEN	PACKAGE OUTLINE 0805 NON-POLAR CAPACITOR
30	R3, R9		DNP	0	N/A	N/A	OPEN	PACKAGE OUTLINE 0805 RESISTOR
31	R15-R17		DNP	0	N/A	N/A	OPEN	PACKAGE OUTLINE 2512 RESISTOR
TOTAL				64				

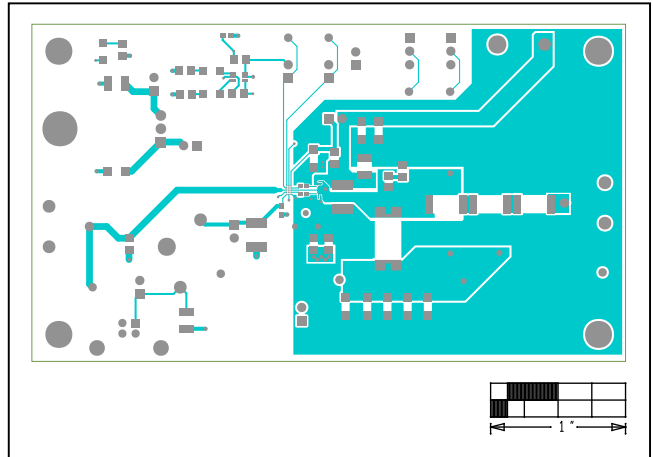
MAX20307 EV Kit Schematic



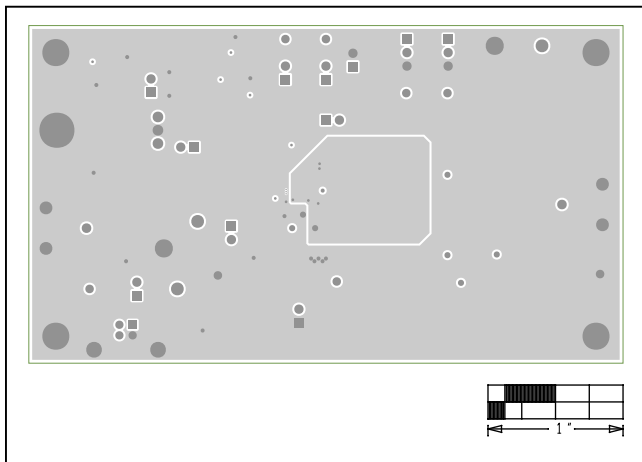
MAX20307 EV Kit PCB Layout Diagrams



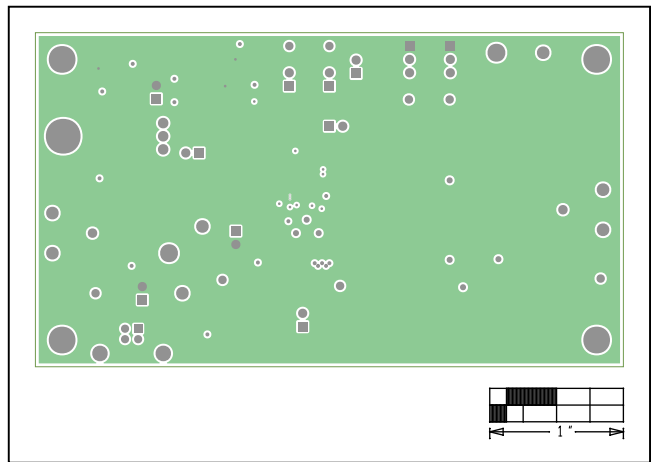
MAX20307 EV Kit—Top Silkscreen



MAX20307 EV Kit—Top

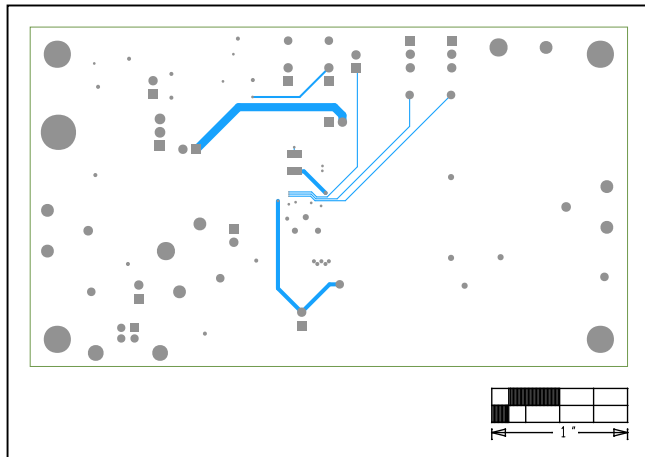


MAX20307 EV Kit—Internal 2

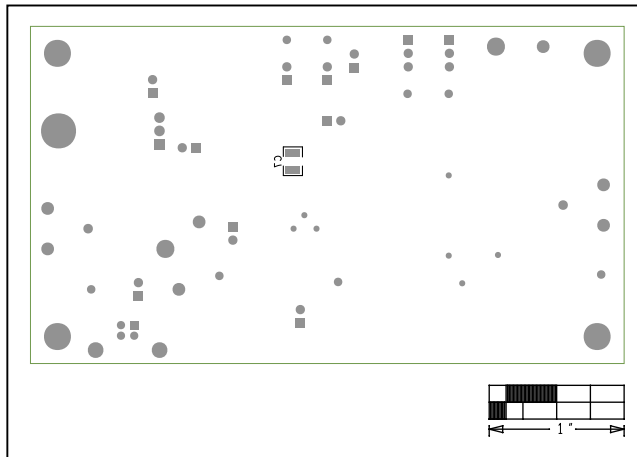


MAX20307 EV Kit—Internal 3

MAX20307 EV Kit PCB Layout Diagrams (continued)



MAX20307 EV Kit—Bottom



MAX20307 EV Kit—Bottom Silkscreen

Revision History

REVISION NUMBER	REVISION DATE	DESCRIPTION	PAGES CHANGED
0	5/18	Initial release	—

For pricing, delivery, and ordering information, please contact Maxim Direct at 1-888-629-4642, or visit Maxim Integrated's website at www.maximintegrated.com.

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