

MAX17690EVKITG# No-Opto Flyback Evaluation Kit

Evaluates: MAX17690

General Description

The MAX17690G evaluation kit (EV kit) is a fully assembled and tested circuit board that demonstrates the operation of an isolated 5W no-opto flyback DC-DC converter. This circuit uses a MAX17690 in a 16-pin TQFN package with an exposed pad. The data sheet must be read in conjunction with this quick start guide for demo circuit.

The EV kit output is configured for an isolated +5V and provides up to 1A of output current. The device switches at a 180kHz switching frequency. The transformer provides the galvanic isolation between input and output, up to 1500VAC.

Features

- 4.5V to 5.5V Input Range
- Isolated Output: 5V/1A DC
- Compact Design with High-Frequency (180kHz) Switching
- Minimum Number of External Components
- 86.4% Peak Efficiency
- Low-Cost Flyback Design
- Galvanic Isolation up to 1500VAC
- Proven PCB Layout
- Fully Assembled and Tested

Ordering Information appears at end of data sheet.

Quick Start

Recommended Equipment

- One 4.5V to 5.5V DC, 1.5A power supply
- 5W resistive load with 1A sink capacity
- Four digital multimeters (DMM)
- MAX17690EVKITG#

Warning:

- Do not turn on the power supply until all connections are completed.
- Wear protective eye gear at all times.
- Do not touch any part of the circuit with bare hands or conductive materials when powered up.
- Make sure all high-voltage capacitors are fully discharged before handling. Allow 5 minutes after disconnecting the input power source before touching circuit parts.

Equipment Setup and Test Procedure

- 1) Set the power supply to +5VDC. Disable the power supply output.
- 2) Connect the positive terminal of the power supply to the V_{IN} PCB pad and the negative terminal to the nearest PGND PCB pad. Connect the positive terminal of the electronic load to the V_{OUT} PCB pad and the negative terminal to the nearest GND0 PCB pad.
- 3) Connect the resistive load across the output terminals.
- 4) Connect a DMM configured in voltmeter mode across the V_{OUT} PCB pad and the nearest GND0 PCB pad.
- 5) Enable the power supply.
- 6) Verify that the output voltmeter displays 5V and, if required, measure the output current using a DMM in Ammeter mode.
- 7) If required, vary the input voltage from 4.5V to 5.5V, the load current from 15mA to 1A, and verify that output voltage is 5V.

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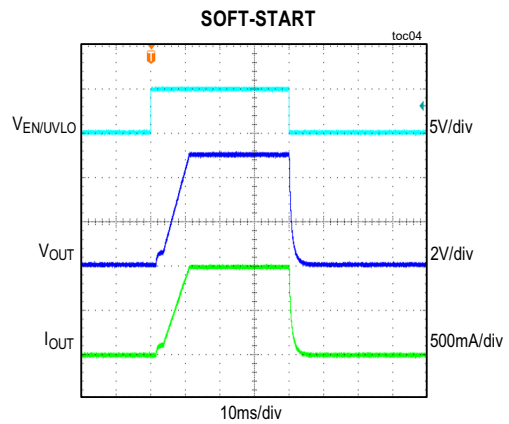
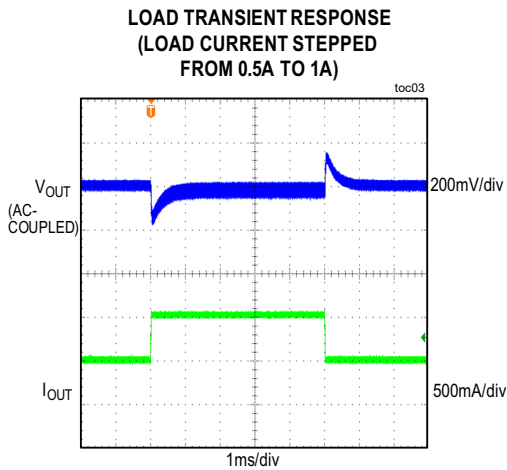
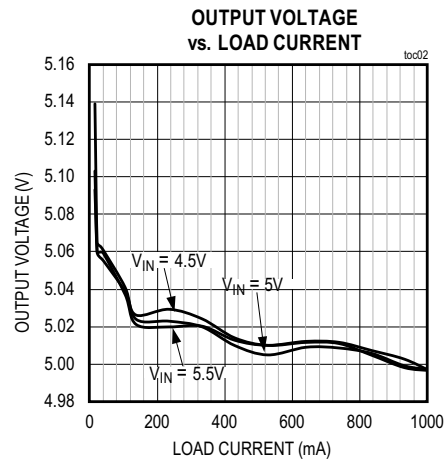
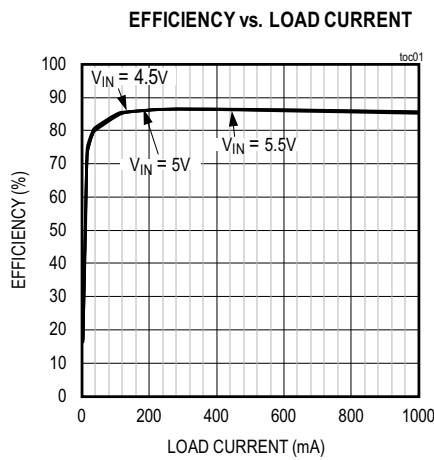
Detailed Description

The MAX17690G EV kit provides a proven design to evaluate the MAX17690 high-efficiency DC-DC flyback converter. The device uses a novel sampling technique to eliminate the optocoupler in the output voltage sensing across the isolation boundary. The transformer design, as

well as the selection of different components, are detailed in the MAX17690 IC data sheet.

This EV kit provides the programmable soft-start time to limit the inrush current. The IC has overcurrent and thermal protection.

EV Kit Performance Report



Component Suppliers

SUPPLIER	WEBSITE
SUMIDA	www.sumida.com
Murata Americas	www.murata.com
Panasonic Corp.	www.panasonic.com

Note: Indicate that you are using the MAX17690G when contacting these component suppliers.

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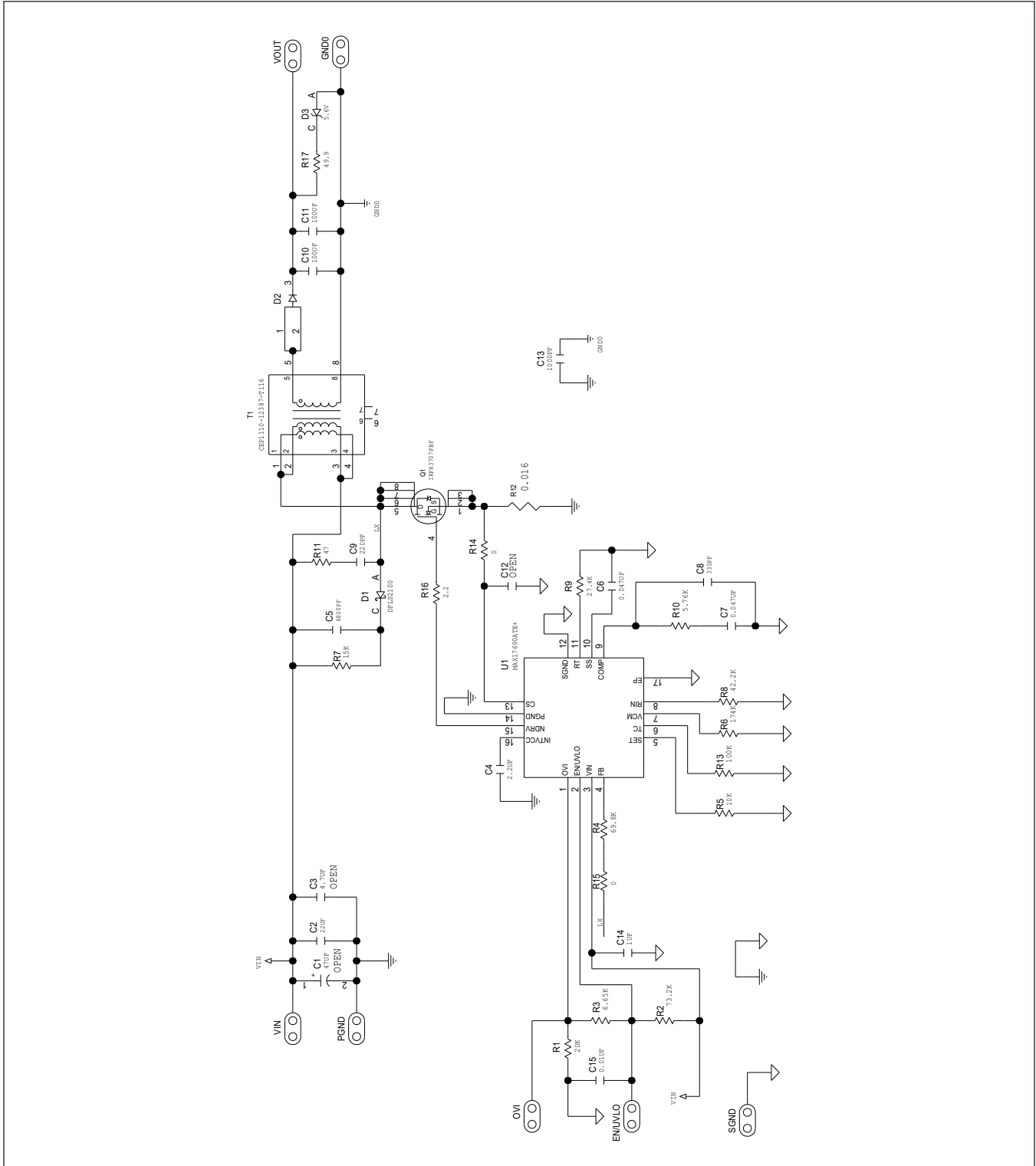
MAX17690 EV Kit Bill of Materials

DESIGNATION	QTY	DESCRIPTION
C2	1	22uF±10%, 10V, X7R Ceramic capacitor (1210) MURATA GRM32ER71A226K
C4	1	2.2uF±10%, 50V, X7R Ceramic capacitor (0805) TDK C2012X7R1H225K
C5	1	6800pF±10%, 100V, X7R Ceramic capacitor (0805) KEMET C0805C682K1RAC
C6, C7	2	0.047uF±10%, 16V, X7R Ceramic capacitor (0402) MURATA GRM155R71C473KA01
C8	1	330pF±10%, 50V, X7R Ceramic capacitor (0402) MURATA GRM155R71H331KA01
C9	1	220pF±10%, 100V, X7R Ceramic capacitor (0402) MURATA GRM155R72A221KA01
C10, C11	2	100uF±20%, 6.3V, X7S Ceramic capacitor (1210) MURATA GRM32EC70J107ME15
C13	1	1000pF±10%, 2000V, X7R Ceramic capacitor (1206) AVX 1206GC102KAT2A
C14	1	1uF±10%, 50V, X7R Ceramic capacitor (0805) SAMSUNG ELECTRONICS CL21B105KBFNFNE MURATA GCJ21BR71H105KA01L
C15	1	0.01uF±10%, 50V, X7R Ceramic capacitor (0402) KEMET C0402C103K5RAC MURATA GRM155R71H103KA88
D1	1	100V/2A, (POWERDI-123), DIODE DIODES INCORPORATED DFSL2100
D2	1	60V/8A, (POWERDI-5), DIODE DIODES INCORPORATED SBR8U60P5
D3	1	5.6V/1W, (SMA, DO-214AC), DIODE, ZNR DIODES INCORPORATED SMAZ5V6 CENTRAL SEMICONDUCTOR CMZ5919B
Q1	1	30V/29A/2.8W, 8-PowerVDFN, POWER TRANSISTOR INTERNATIONAL RECTIFIER IRFH3707PBF
R1	1	20kΩ±1% resistor, 0402 VISHAY DALE CRCW040220K0FK
R2	1	73.2kΩ±1% resistor, 0402 PANASONIC ERJ-2RKF7322
R3	1	6.65kΩ±1% resistor, 0402 PANASONIC ERJ-2RKF6651
R4	1	69.8kΩ±1% resistor, 0603 VISHAY DALE CRCW060369K8FK
R5	1	10kΩ±1% resistor, 0402 VISHAY DALE CRCW040210K0FK
R6	1	174kΩ±1% resistor, 0402 PANASONIC ERJ-2RKF1743X
R7	1	15kΩ±1% resistor, 1206 VISHAY DALE CRCW120615K0FK
R8	1	42.2kΩ±1% resistor, 0603 VISHAY DALE CRCW060342K2FK
R9	1	27.4kΩ±1% resistor, 0402 VISHAY DALE CRCW040227K4FK
R10	1	5.76kΩ±1% resistor, 0402 YAGEO RC0402FR-075K76L
R11	1	47Ω±5% resistor, 1210 VISHAY DRALORIC CRCW121047R0JNEAHP
R12	1	0.016Ω±1% resistor, 1206 ROHM UCR18EVHFSR016
R13	1	100kΩ±1% resistor, 0402 VISHAY DALE CRCW0402100KFKED
R14	1	0Ω resistor, 0402 PANASONIC ERJ-2GE0R00X
R15	1	0Ω resistor, 0603 SAMSUNG ELECTRONICS RC1608J000CS
R16	1	2.2Ω±1% resistor, 0402 VISHAY DALE CRCW04022R20FK
R17	1	49.9Ω±1% resistor, 0603 VISHAY DALE CRCW060349R9FK
T1	1	8-pin SMT, 3uH, 5.6A, (1,2-3,4):(5-8) = 1:0.8 SUMIDA CEP1110-12387-T116
U1	1	MAX17690, TQFN16-EP, NO-OPTO ISOLATED FLYBACK CONTORLLER IC MAXIM MAX17690ATE+
C1	0	OPEN
C3	0	OPEN
C12	0	OPEN

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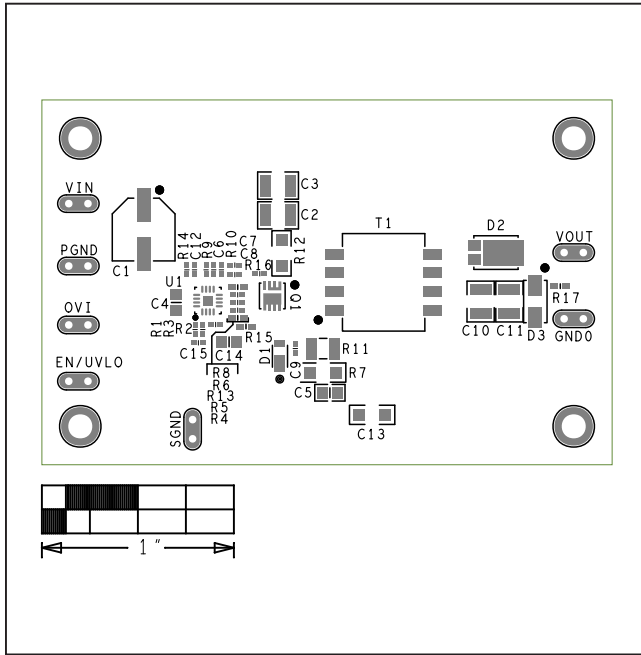
MAX17690 EV Kit Schematic



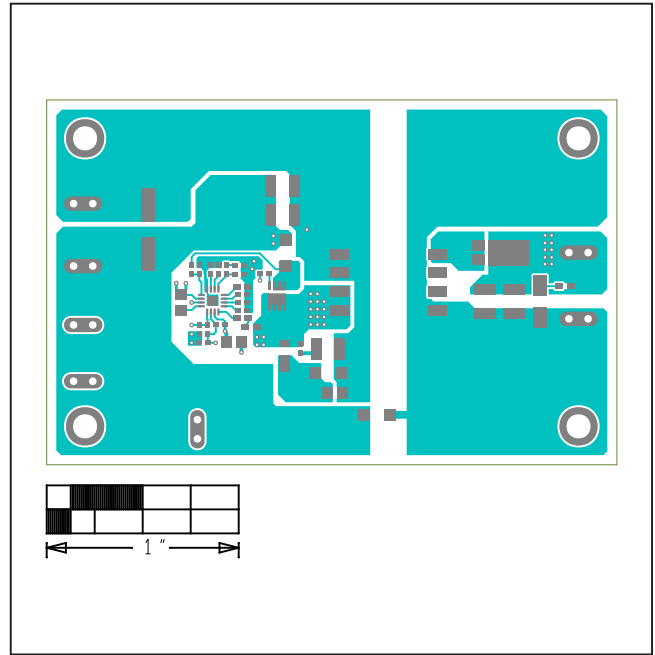
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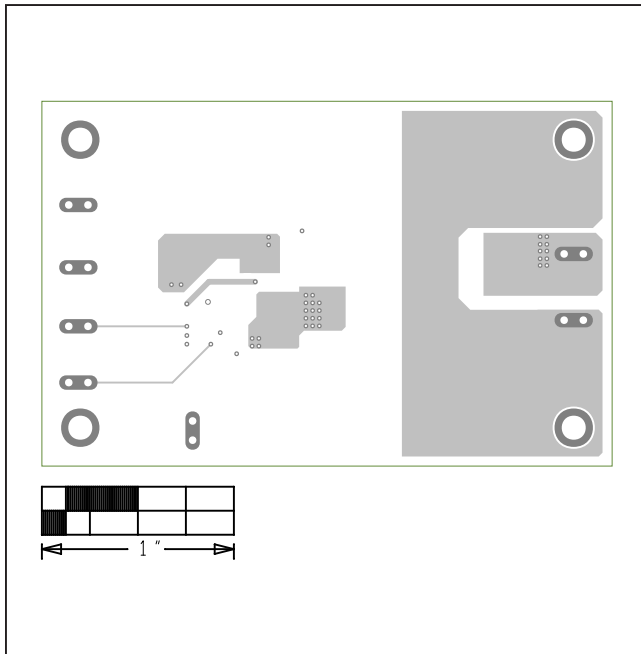
MAX17690 EV Kit PCB Layout Diagrams



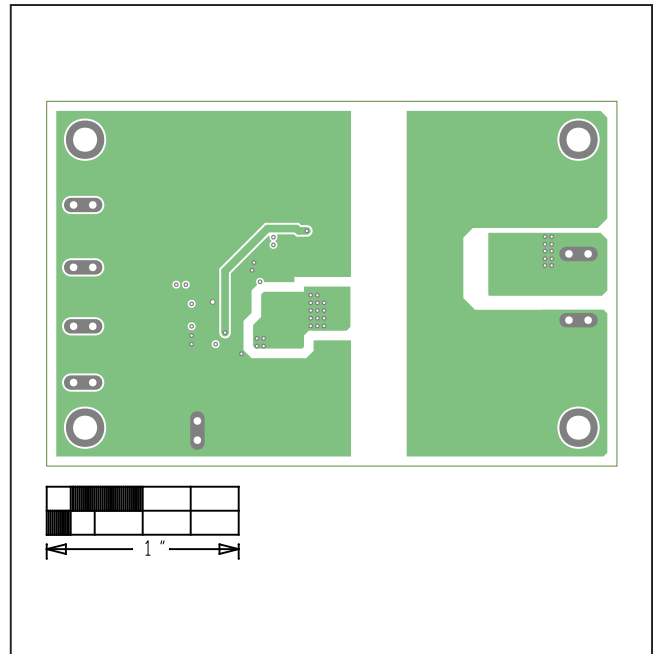
MAX17690 EV Kit—Silk Top



MAX17690 EV Kit—Top Layer

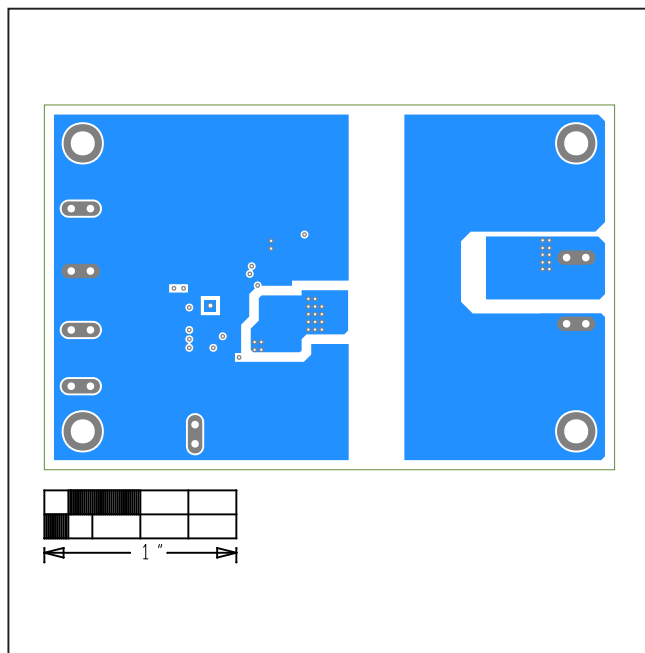


MAX17690 EV Kit—GND Layer 2

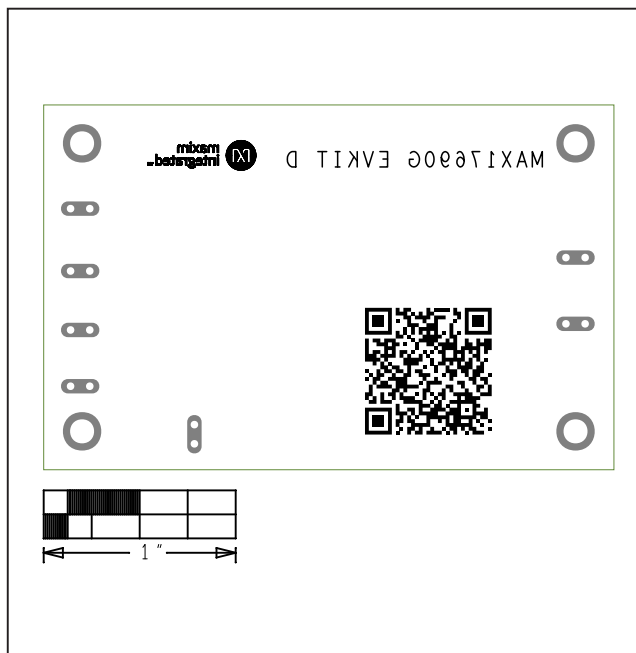


MAX17690 EV Kit—PWR Layer 3

MAX17690 EV Kit PCB Layout Diagrams (continued)



MAX17690 EV Kit—Bottom Layer



MAX17690 EV Kit—Silk Bottom

Ordering Information

PART	TYPE
MAX17690EVKITG#	EV Kit

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Revision History

REVISION NUMBER	REVISION DATE	DESCRIPTION	PAGES CHANGED
0	4/18	Initial release	—
1	8/18	Updated <i>Quick Start</i> section and PCB Layout images	1, 5–6

For pricing, delivery, and ordering information, please visit Maxim Integrated's online storefront at <https://www.maximintegrated.com/en/storefront/storefront.html>.

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