

MA17690EVKITJ# Evaluation Kit

Evaluates: MAX17690 in 12V Output-Voltage Application

General Description

The MAX17690EVKITJ# evaluation kit (EV kit) is a fully assembled and tested circuit board that demonstrates the operation of an isolated 25W No-Opto Flyback DC-DC converter. This circuit uses MAX17690 in a 16-pin TQFN package with an exposed pad. The IC data sheet provides a complete description of the part and should be read in conjunction with this EV kit data sheet prior to operating the EV kit.

The MAX17690EVKITJ# EV kit output is configured for an isolated +12V and provides up to 2.1A of output current over a 40V to 80V input range, suitable for power-over-ethernet (PoE) applications. The EV kit regulates the output voltage within $\pm 8\%$ over line, load, and temperature without using the auxiliary winding/optocoupler for output-voltage feedback.

Features

- 40V to 80V Input Range, Suitable for PoE Applications
- Isolated Output: 12V/2.1A DC
- Compact Design with High Frequency (100kHz) Switching
- 89.9% Full-Load Efficiency
- Minimum Number of External Components
- Proven PCB Layout
- Fully Assembled and Tested

Ordering Information appears at end of data sheet.

Quick Start

Recommended Equipment

- MAX17690EVKITJ#
- One 40V to 80V DC, 2A power supply
- 25W resistive load with at least 2.1A sink capacity
- Four digital multimeters (DMM)

Warning:

- Do not turn on the power supply until all connections are completed.
- 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 Procedure

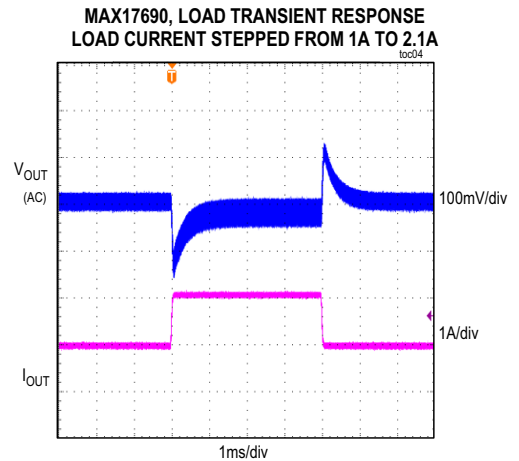
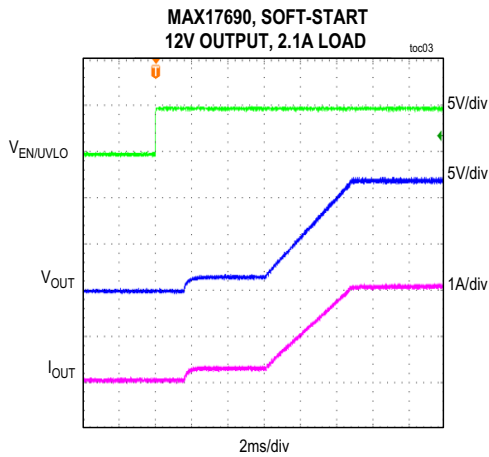
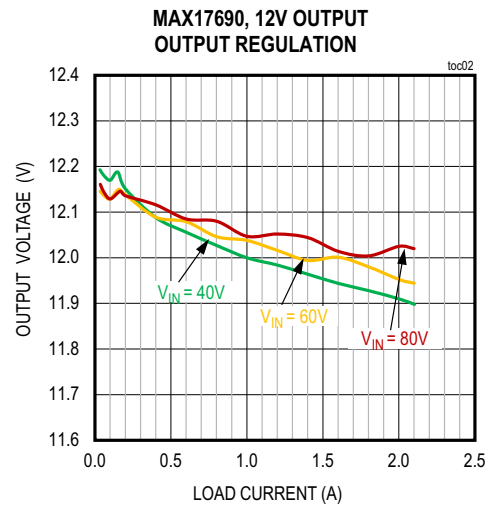
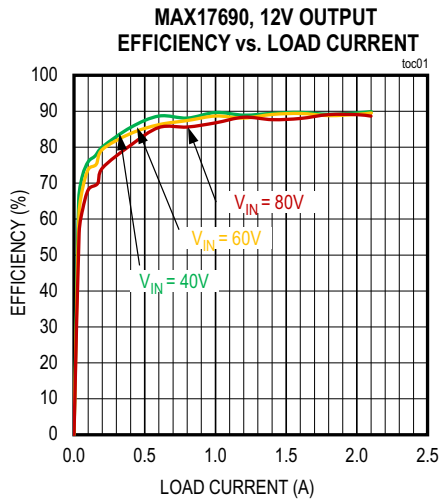
- 1) Set the power supply to +40V_{DC}. Disable the power supply output.
- 2) Connect the positive terminal of the power supply to the VIN PCB pad and the negative terminal to the nearest PGND PCB pad. Connect the positive terminal of the electronic load to the VOUT PCB pad and the negative terminal to the nearest GND0 PCB pad.
- 3) Connect a DMM configured in voltmeter mode across the VOUT PCB pad and the nearest GND0 PCB pad.
- 4) Enable the power supply.
- 5) Verify that the output voltmeter displays 12V and, if required, measure the output current using a DMM in Ammeter mode.
- 6) If required, vary the input voltage from 40V to 80V, the load current from 35mA to 2.1A, and verify that the output voltage is 12V.

Detailed Description

The MAX17690EVKITJ# 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 sensing and regulating the isolated output voltage. The transformer design, as well as the selection of different components, are detailed in the *MAX17690 IC data sheet*.

EV Kit Performance Report

(VIN = 40V, unless otherwise noted.)



Component Supplier

SUPPLIER	WEBSITE
Sumida Corp	www.sumida.com
TDK	www.tdk.com
Murata Americas	www.murata.com
Vishay Dale	www.vishay.com
ON Semiconductor	www.onsemi.com
Infineon	www.infineon.com
Diodes Incorporated	www.diodes.com

Note: Indicate that you are using the MAX17690 EV Kit J when contacting these component suppliers.

Ordering Information

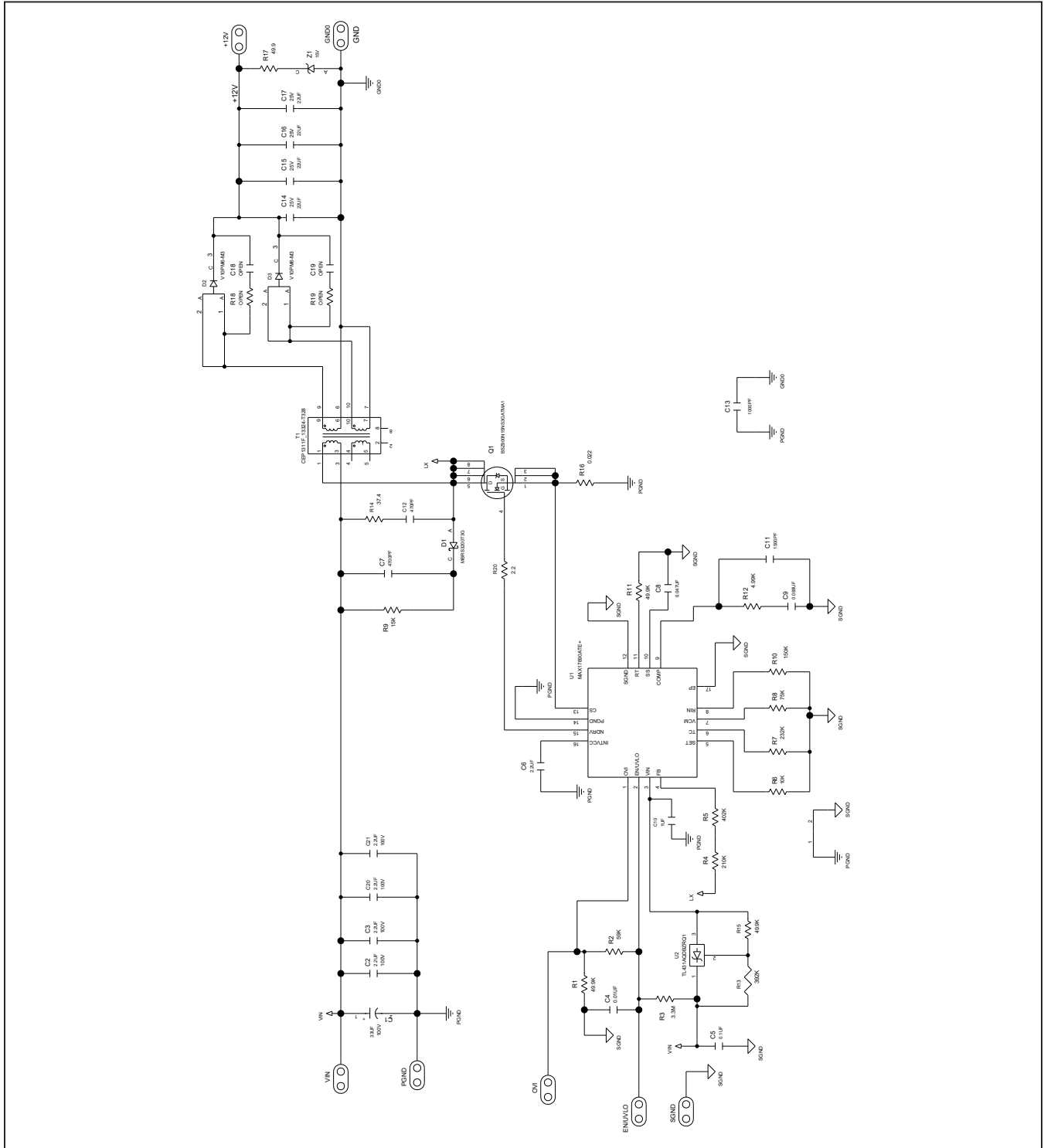
PART	TYPE
MAX17690EVKITJ#	EV Kit

#Denotes RoHS compliant.

MAX17690 EV Kit J Bill of Materials

ITEM	DESIGNATION	QTY	DESCRIPTION	PART NUMBER	MANUFACTURER
1	C1	1	33UF±20%, 100V, aluminum electrolytic capacitor	EEE-FK2A330P	PANASONIC
2	C2, C3, C20, C21	4	2.2UF±10%, 100V, X7R, ceramic capacitor(1210)	G CJ32DR72A225KA01	MURATA
3	C4	1	0.01UF±10%, 50V, X7R, ceramic capacitor(0402)	GRM155R71H103KA88	MURATA
4	C5	1	0.1UF±10%, 100V, X7R, ceramic capacitor(0603)	GRM188R72A104KA35	MURATA
5	C6	1	2.2UF±10%, 50V, X7R, ceramic capacitor(0805)	C2012X7R1H225K	TDK
6	C7	1	4700PF±10%, 100V, X7R, ceramic capacitor(0805)	C0805C472K1RAC	KEMET
7	C8	1	0.047UF±10%, 50V, X7R, ceramic capacitor(0402)	C1005X7R1H473K	TDK
8	C9	1	0.068UF±10%, 16V, X7R, ceramic capacitor(0402)	GCM155R71C683KA55D	MURATA
9	C10	1	1UF±10%, 100V, X7R, ceramic capacitor(0805)	08051C105K4Z2A	AVX
10	C11	1	1500PF±10%, 25V, X7R, ceramic capacitor(0402)	C0402C152K3RAC	KEMET
11	C12	1	470PF±10%, 100V, X7R, ceramic capacitor(0603)	C0603C471K1RAC	KEMET
12	C13	1	1000PF±10%, 1500V, X7R, ceramic capacitor(1206)	1206SC102KAT	AVX
13	C14-C17	4	22UF±20%, 25V, X7R, ceramic capacitor(1210)	C3225X7R1E226M250AB	TDK
14	D1	1	200V/3A, (SMB), diode	MBR3200T3G	ON SEMICONDUCTOR
15	D2, D3	2	60V/10A, (TO-277A), diode	V10PM6-M3	VISHAY
16	Q1	1	150V/13A/38W, (PG-TSDSON8), NCH, POWER TRANSISTOR	BSZ900N15NS3GATMA1	INFINEON
17	R1	1	49.9KΩ±1%, 0402	CRCW040249K9FKTD	VISHAY
18	R2	1	59KΩ±1%, 0402	CRCW040259K0FK	VISHAY
19	R3	1	3.3MΩ±1%, 0402	CRCW04023M30FK	VISHAY
20	R4	1	210KΩ±1%, 0603	CRCW0603210KFK	VISHAY
21	R5	1	402KΩ±1%, 0603	CRCW0603402KFKEA	VISHAY
22	R6	1	10KΩ±1%, 0402	CRCW040210K0FKED	VISHAY
23	R7	1	232KΩ±1%, 0402	CRCW0402232KFKED	VISHAY
24	R8	1	75KΩ±1%, 0402	CRCW040275K0FKED	VISHAY
25	R9	1	15KΩ±1%, 0805	CRCW080515K0FKEAHP	VISHAY
26	R10	1	150KΩ±1%, 0402	CRCW0402150KFKTD	VISHAY
27	R11, R15	2	49.9KΩ±1%, 0402	ERJ-2RKF4992	PANASONIC
28	R12	1	4.99KΩ±1%, 0402	CRCW04024K99FKEDC	VISHAY
29	R13	1	392KΩ±1%, 0402	ERJ-2RKF3923	PANASONIC
30	R14	1	37.4Ω±1%, 1210	ERJ-14NF37R4	PANASONIC
31	R16	1	0.022Ω±1%, 1206	UCR18EVHFSR022	ROHM SEMICONDUCTOR
32	R17	1	49.9Ω±1%, 0603	CRCW060349R9FK	VISHAY
33	R20	1	2.2Ω±1%, 0402	CRCW04022R20FKED	VISHAY
34	T1	1	EP13, 10-pin SMT, 57uH±10%, 3.5A, (1-3):(9-6):(10-7) = 3:1:1	CEP1311F_13324-T328	SUMIDA
35	U1	1	MAX17690, TQFN16-EP, NO-OPTO ISOLATED FLYBACK CONTORLLER	MAX17690ATE+	MAXIM
36	U2	1	Shunt Voltage Reference, 36V, 1%, SOT-23	TL431AQDBZRQ1	TEXAS INSTRUMENTS
37	Z1	1	15V/1W, (SMA), zener diode	SMAZ15-13-F	Diodes Incorporated
38	C18, C19	2	OPEN, capacitor, 0603	N/A	N/A
39	R18, R19	2	OPEN, resistor, 1206	N/A	N/A

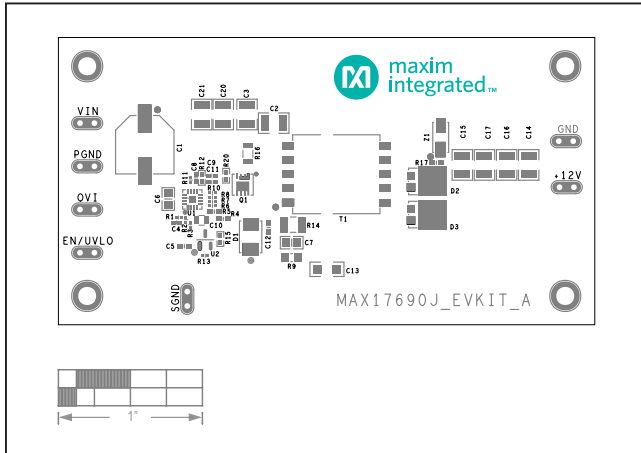
MAX17690 EV Kit J Schematic



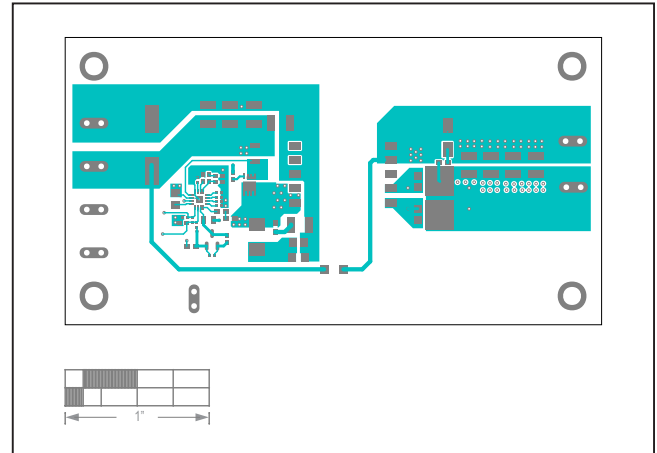
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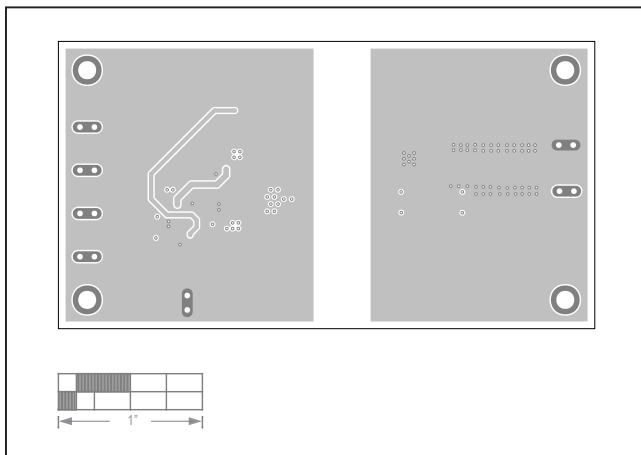
MAX17690 EV Kit J PCB Layout Diagrams



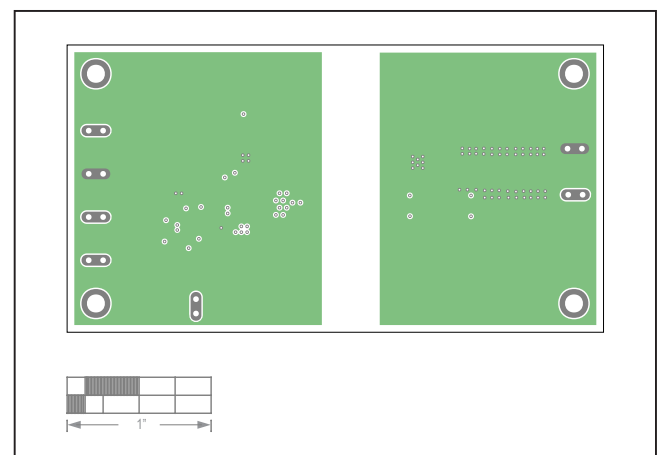
MAX17690 EV Kit J Layout—Top Silkscreen



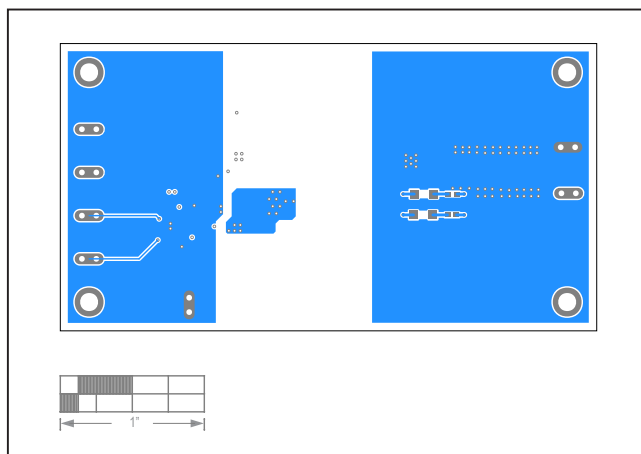
MAX17690 EV Kit J Layout—Top Layer



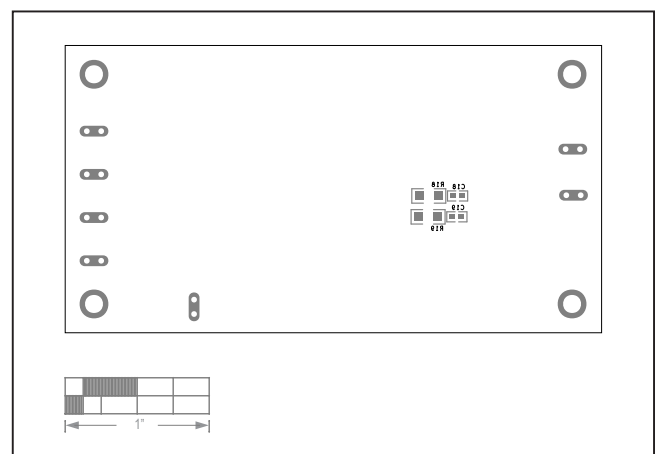
MAX17690 EV Kit J Layout—Layer 2



MAX17690 EV Kit J Layout—Layer 3



MAX17690 EV Kit J Layout—Bottom Layer



MAX17690 EV Kit J Layout—Bottom Silkscreen

Revision History

REVISION NUMBER	REVISION DATE	DESCRIPTION	PAGES CHANGED
0	2/21	Release for Market Intro	—

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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