

# MAX17690B No-Opto Flyback Evaluation Kit

Evaluates: MAX17690

## General Description

The MAX17690B 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 1875VAC.

## Features

- 18V to 36V Input Range
- Isolated Output: 5V/1A DC
- Compact Design with High-Frequency (180kHz) Switching
- Minimum Number of External Components
- 85.8% Peak Efficiency
- Low-Cost Flyback Design
- Galvanic Isolation up to 1875VAC
- Proven PCB Layout
- Fully Assembled and Tested

*Ordering Information appears at end of data sheet.*

## Quick Start

### Recommended Equipment

- One 18V–36V DC, 1A power supply
- 5W resistive load with 1A sink capacity
- Four digital multimeters (DMM)
- MAX17690EVKITB#

### 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 +24VDC. 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 18V to 36V, the load current from 0mA to 1A, and verify that output voltage is 5V.

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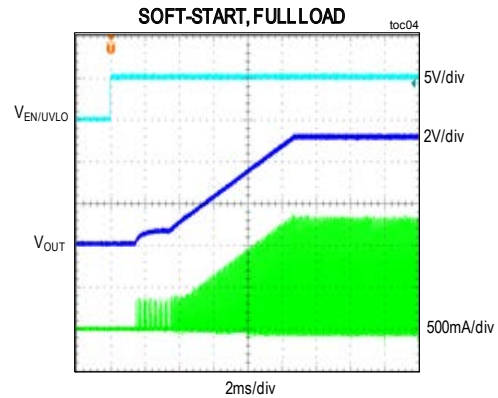
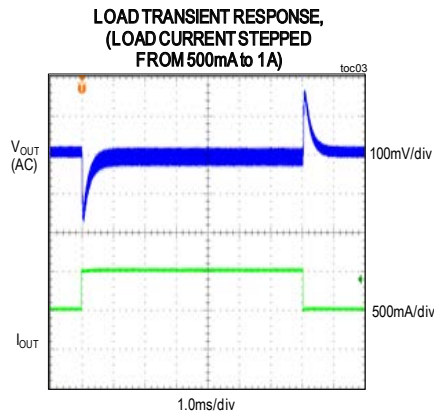
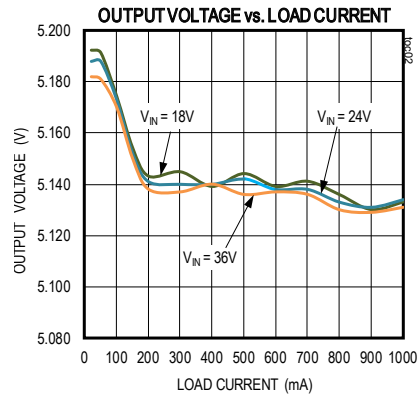
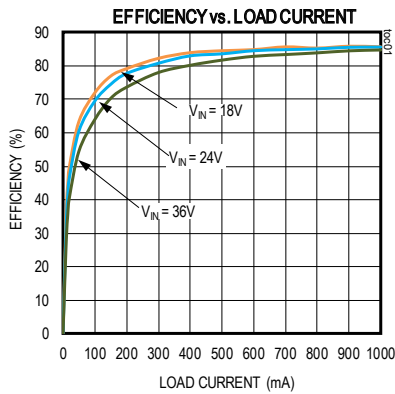
## Detailed Description

The MAX17690B 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
Würth Elektronik	<a href="http://www.we-online.com">www.we-online.com</a>
Murata Americas	<a href="http://www.murata.com">www.murata.com</a>
Panasonic Corp.	<a href="http://www.panasonic.com">www.panasonic.com</a>

**Note:** Indicate that you are using the MAX17690B when contacting these component suppliers.

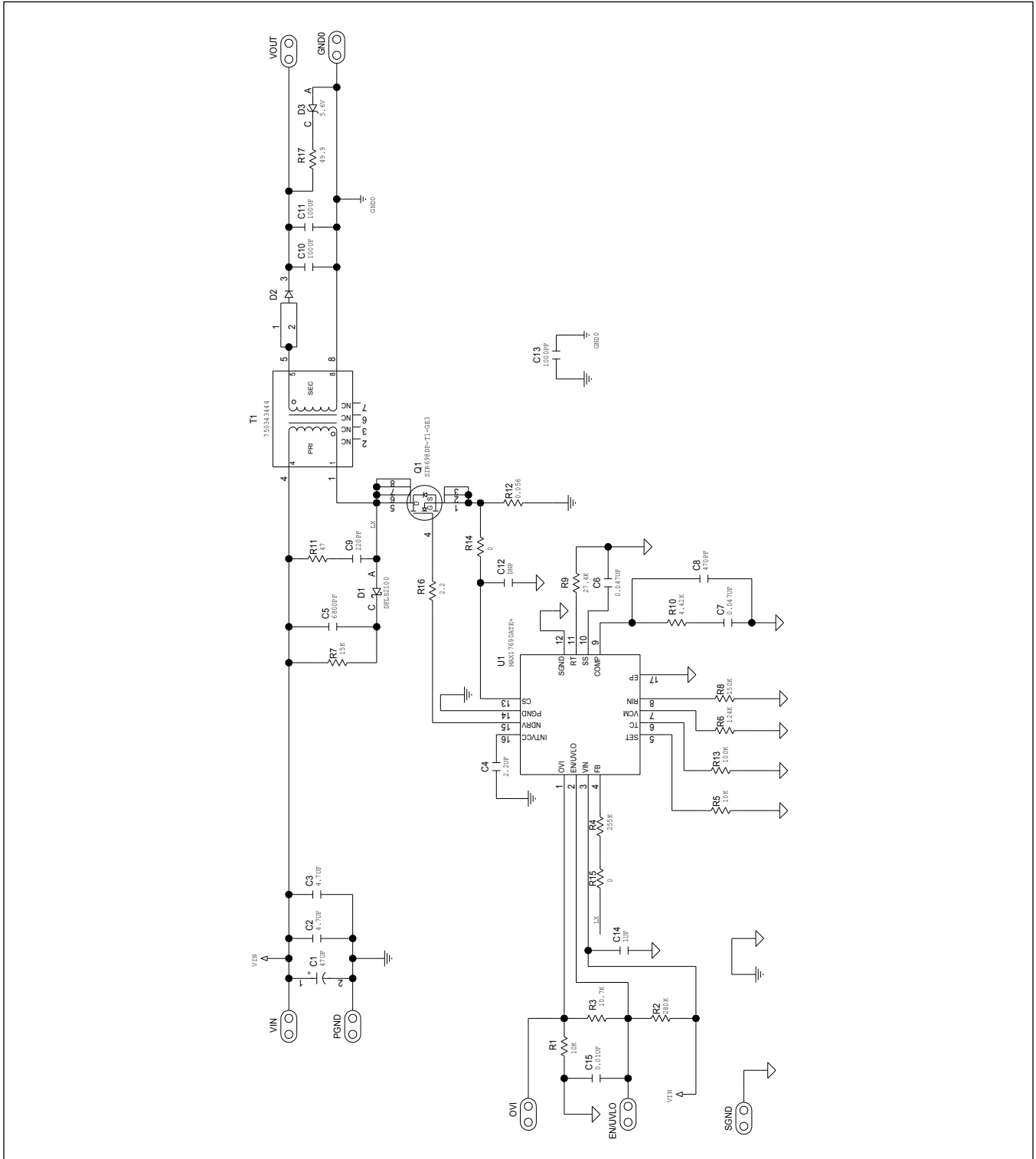
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## MAX17690 EV Kit Bill of Materials

S NO	Des	Qty	Description	Manufacturer Partnumber-1	Manufacturer Partnumber-2
1	C1	1	47uF±20%, 50V, ALUMINUM-ELECTROLYTIC SMT(CASE_D8)	PANASONIC EEEFK1H470P	
2	C2, C3	2	4.7uF±10% 50V, X7R Ceramic capacitor (1210)	Murata GRM32ER71H475KA88K	KEMET C1210C475K5RAC
3	C4	1	2.2uF±10%, 50V, X7R ceramic capacitor (0805)	TDK C2012X7R1H225K	
4	C5	1	6800pF, 10%, 100V, X7R ceramic capacitor (0805)	KEMET C0805C682K1RAC	
5	C6, C7	2	0.047uF±10%, 16V, X7R ceramic capacitor (0402)	Murata GRM155R71C473KA01	
7	C8	1	470pF ±10%, 50V, X7R ceramic capacitor (0402)	Murata GRM155R71H471K	KEMET C0402S471K5RAC
8	C9	1	220pF ±10%, 100V, X7R ceramic capacitor (0402)	Murata GRM155R72A221KA01	
9	C10, C11	2	100uF±20%, 6.3V, X7S ceramic capacitor(1210)	Murata GRM32C70J107ME15	
10	C12	1	OPEN (0402)		
11	C13	1	1000PF±10%, 1500V, 7R ceramic capacitor (1206)	AVX 1206SC102KAT	
12	C14	1	1uF±10%, 50V, X7R ceramic capacitor(0805)	Murata GRM21BR71H105KA12	SAMSUNG ELECTRONICS CL21B105KBFN1N1E
13	C15	1	0.01uF±10%, 50V, X7R ceramic capacitor(0402)	Murata GRM155R71H103KA88	KEMET C0402C103K5RAC
14	D1	1	100V/2A, (POWERDI-123), DIODE	DIODES INCORPORATED DFLS2100	
15	D2	1	0.53V/8A, (POWERDI-5), DIODE	DIODES INCORPORATED SBR8U60P5	
16	D3	1	5.6V/1W, (SMA.DO-214AC), ZENER DIODE	DIODES INCORPORATED SMAZ5V6-FDITR-ND	CENTRAL SEMICONDUCTOR CMZ5919B
17	Q1	1	100V/7.5A/23W, (SO-8), MOSFET: NCH	VISHAY SILICONIX SJR698DP-T1-GE3	
18	R1, R5	2	10kΩ ±1% resistor (0402)	VISHAY DALE CRCW040210K0FK	YAGEO PHICOMP RC0402FR-0710K
19	R2	1	280kΩ ±1% resistor (0402)	PANASONIC ERJ-2RKF2803X	
20	R3	1	10.7kΩ ±1% resistor (0402)	VISHAY DALE CRCW040210K7FK	
21	R4	1	255kΩ ±1% resistor (0603)	VISHAY DALE CRCW0603255KFK	PANASONIC ERJ-3EKF2553V
22	R6	1	124kΩ ±1% resistor (0402)	VISHAY DALE CRCW0402124KFK	
23	R7	1	15kΩ ±1% resistor (1206)	VISHAY DALE CRCW120615K0FK	
24	R8	1	150kΩ ±1% resistor (0603)	VISHAY DALE CRCW0603150KFK	
25	R9	1	27.4kΩ ±1% resistor (0402)	VISHAY DALE CRCW040227K4FK	
26	R10	1	4.42kΩ ±1% resistor (0402)	VENKEL LTD CR0402-16W-4421FT	VISHAY DALE D1004020B4421F
27	R11	1	47Ω ±5% resistor (1210)	VISHAY DRALORIC CRCW121047R0JNEAHP	
28	R12	1	0.056kΩ ±1% resistor (0805)	PANASONIC ERJ6BWFR056	
29	R13	1	100kΩ ±1% resistor (0402)	VISHAY DALE CRCW0402100KFK	YAGEO PHICOMP RC0402FR-07100KL
30	R14	1	0Ω ±0% resistor (0402)	PANASONIC ERJ-2GE0R00X	
31	R15	1	0Ω ±5% resistor (0603)	SAMSUNG ELECTRONICS RC1608J000CS	BOURNS CR0603-J-000ELF
32	R16	1	2.2Ω ±1% resistor (0402)	VISHAY DALE CRCW04022R20FK	
33	R17	1	49.9Ω ±1% resistor (0603)	VISHAY DALE CRCW060349R9FK	
34	T1	1	EP10.8-pin SMT, 36uH ±10%, 1.6A, (1-4); (5-8)± 4.5:1±1%	WURTH ELECTRONICS INC. 750343444	
35	U1	1	MAX17690, TQFN16-EP, Flyback converters	MAX17690ATE+	

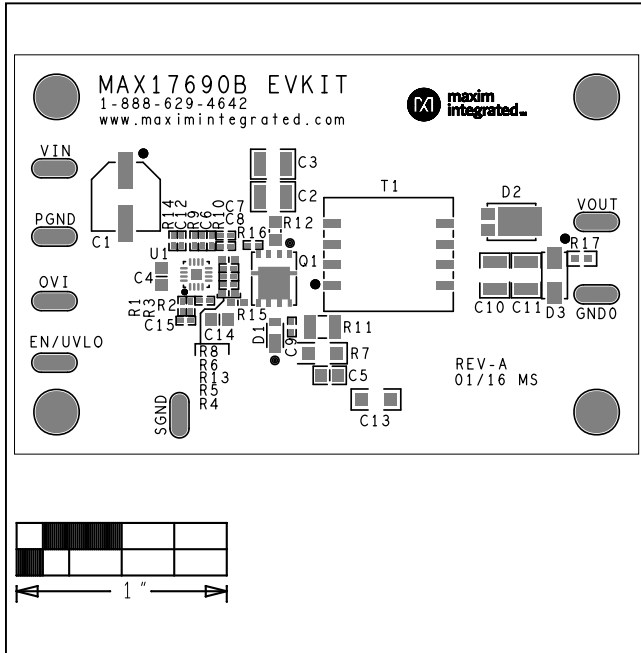
MAX17690 EV Kit Schematic



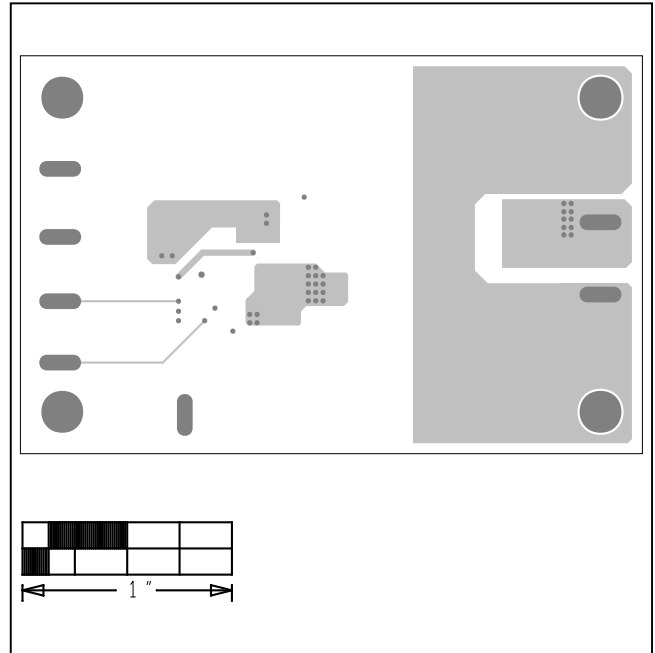
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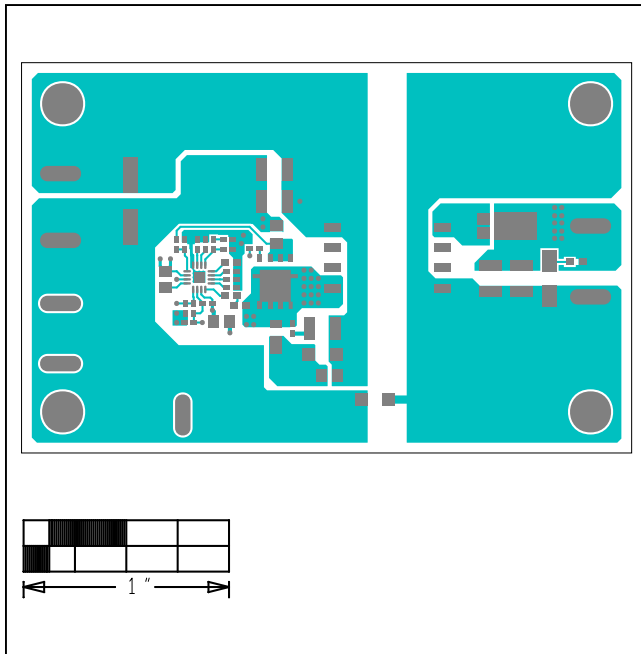
## MAX17690 EV Kit PCB Layout Diagrams



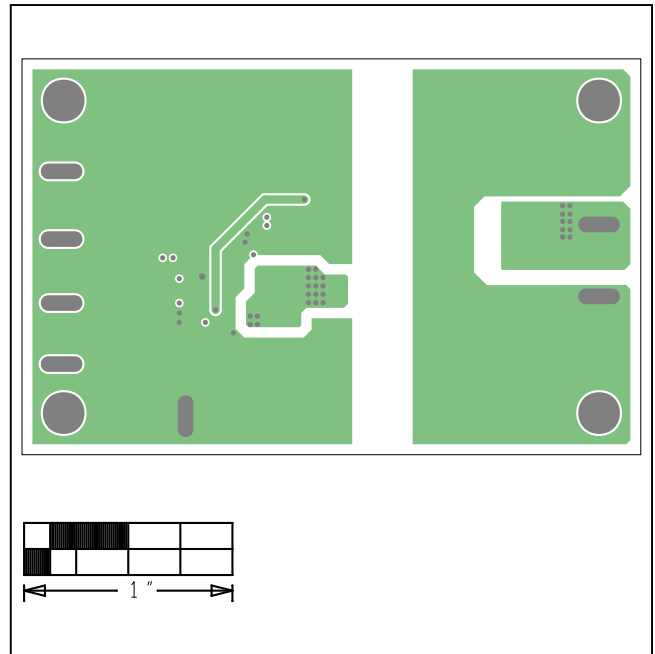
MAX17690 EV Kit—Top Silkscreen



MAX17690 EV Kit—Layer 2



MAX17690 EV Kit—Top

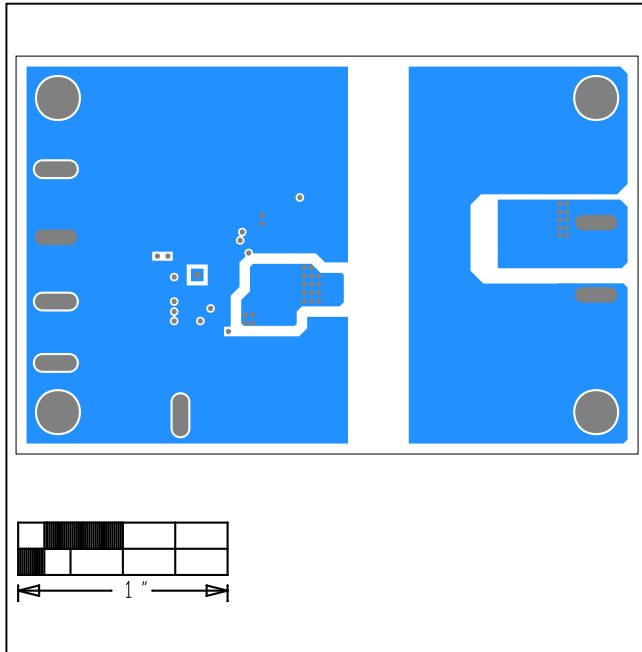


MAX17690 EV Kit—Layer 3

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## MAX17690 EV Kit PCB Layout Diagrams (continued)



MAX17690 EV Kit—Bottom

## Ordering Information

PART	TYPE
MAX17690EVKITB#	EV Kit

## Revision History

REVISION NUMBER	REVISION DATE	DESCRIPTION	PAGES CHANGED
0	2/16	Initial release	—
1	8/16	Updated <i>Typical Operating Characteristics</i> , <i>Bill of Materials</i> , <i>Ordering Information</i> table, and schematic.	2–6
2	1/17	Updated TOCs, <i>Bill of Materials</i> , and schematic for 180kHz switching frequency	1–7

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](http://www.maximintegrated.com).

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