



MAX1630/MAX1631/MAX1632 Evaluation Kits

General Description

The MAX1630/MAX1631/MAX1632 evaluation kits (EV kits) each consist of one of three preassembled and tested evaluation boards (EV boards) that embody the standard application circuits. The MAX1630 and MAX1632 EV boards provide the triple-output 3.3V/5V/12V circuit, and the MAX1631 EV board provides the dual-output 3.3V/5V circuit.

All three use the same PC board but have different components to accommodate different input voltage ranges. The main differences between the MAX1630 and MAX1632 EV boards are in the turns ratio (1:4 or 1:2.2) and in the location of the transformer connection (3.3V side or 5V side). Connecting the transformer to the 3.3V side allows lower input voltage. Connecting the transformer to the 5V side provides slightly better efficiency and lower stress voltages.

These circuits are configured to deliver up to 3A of output current on each of the main PWM outputs with greater than 90% efficiency. The MAX1630/MAX1631/MAX1632 EV kits can also be used to evaluate other output voltages.

Features

- ◆ **Battery Range:** 5.2V to 20V (MAX1630)
5.2V to 28V (MAX1631)
6.5V to 28V (MAX1632)
- ◆ **Outputs:** 3.3V at 3A 12V at 120mA
5V at 3A 5V at 30mA Keep-Alive
- ◆ **1:4 Transformer (MAX1630)**
1:2.2 Transformer (MAX1632)
- ◆ **Adjustable 2.5V to 5.5V Outputs (optional resistor divider)**
- ◆ **Precision 2.5V Reference Output**
- ◆ **Oscillator Sync Input**
- ◆ **Low-Noise Mode Control Input ($\overline{\text{SKIP}}$)**
- ◆ **Power-Good Monitor ($\overline{\text{RESET}}$ output)**
- ◆ **Fully Assembled and Tested**

Ordering Information

PART	TEMP. RANGE	BOARD TYPE
MAX1630EVKIT-SO	0°C to +70°C	Surface Mount
MAX1631EVKIT-SO	0°C to +70°C	Surface Mount
MAX1632EVKIT-SO	0°C to +70°C	Surface Mount

Components Common to All Three EV Kits

DESIGNATION	QTY	DESCRIPTION
C1, C7, C21, C22, C25	5	0.1µF ceramic capacitors
C2, C3, C12, C13, C20	5	220µF, 10V, low-ESR tantalum caps Sprague 594D227X0010D2T or 595D227X0010R2T
C5, C6, C15, C16	4	10µF, 30V electrolytic capacitors Sanyo OS-CON 30SC10M
C8	1	4.7µF, 25V ceramic capacitor United Chemicon/Marcon THCR40E1E475Z
C9, C14	2	4.7µF, 16V tantalum capacitors Sprague 595D475X0016A2B
C10, C18, C23	3	0.01µF ceramic capacitors
C17	1	0.22µF ceramic capacitor
C19	0	Open
C24	1	4.7µF, 35V tantalum capacitor Sprague 595D475X0035C2B or 5950475X0035B2B
D1, D5, D7, D8	4	1A, 40V Schottky diodes Nihon EC10QS04 or Motorola MBRS140T3

DESIGNATION	QTY	DESCRIPTION
D3	1	100mA, 30V dual Schottky diode Central Semiconductor CMPSH-3A
D6	1	200mA, 75V dual diode Central Semiconductor CMPD2838
N1-N4	4	N-channel MOSFETs International Rectifier IRF7413 or Siliconix Si4410DY
R1-R4	4	2MΩ, 5% resistors
R5, R8	2	0.020Ω, 1% resistors Dale WSL-2010-R020-F or IRC LR2010-01-R020-F
R6, R7, R10-R13, R15-R18	0	Open
R9	1	1kΩ, 5% resistor
R14	1	100kΩ, 5% resistor
R19	1	10Ω, 5% resistor
SW1	1	DIP-8 dip switch
None	1	MAX1630/MAX1631/MAX1632 PC board

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MAX1630 EV Kit Additional Components

DESIGNATION	QTY	DESCRIPTION
C4	1	2.2µF, 25V tantalum capacitor Sprague 595D225X0025B2B
C11	0	Open
D2	1	1A, 100V, fast-recovery diode Nihon EC11FS1 or Motorola MBRS1100T3
D4	0	Open
JU1, JU3-JU6, JU8, JU10, JU11	8	2-pin headers
JU5	1	Shunt
L2	1	10µH power inductor Sumida CDRH125-100 (shielded) or Coiltronics UP2-100 or Coilcraft DO3316P-103
T1	1	10µH, 1:4 transformer Transpower Technologies TTI-5902
U1	1	MAX1630 (SSOP-28) Maxim MAX1630CAI

MAX1632 EV Kit Additional Components

DESIGNATION	QTY	DESCRIPTION
C4	0	Open
C11	1	2.2µF, 25V tantalum capacitor Sprague 595D225X0025B2B
D4	1	1A, 100V, fast-recovery diode Nihon EC11FS1 or Motorola MBRS1100T3
L1	1	10µH power inductor Sumida CDRH125-100 (shielded) or Coiltronics UP2-100 or Coilcraft DO3316P-103
T2	1	10µH, 1:2.2 transformer Transpower Technologies TTI-5870
JU1, JU3-JU6, JU8, JU10, JU11	8	2-pin headers
JU5	1	Shunt
U1	1	MAX1632 (SSOP-28) Maxim MAX1632CAI

MAX1631 EV Kit Additional Components

DESIGNATION	QTY	DESCRIPTION
C4, C11	0	Open
D2, D4	0	Open
JU1, JU3-JU6	5	2-pin headers
JU5	1	Shunt
JU10, JU11	2	Short
L1, L2	2	10µH power inductors Sumida CDRH125-100 (shielded) or Coiltronics UP2-100 or Coilcraft DO3316P-103
U1	1	MAX1631 (SSOP-28) Maxim MAX1631CAI

Component Suppliers

SUPPLIER*	PHONE	FAX
AVX	(803) 946-0690	(803) 626-3123
Central Semiconductor	(516) 435-1110	(516) 435-1824
Coilcraft	(847) 639-6400	(847) 639-1469
Coiltronics	(561) 241-7876	(561) 241-9339
Dale-Vishay	(402) 564-3131	(402) 563-6418
International Rectifier	(310) 322-3331	(310) 322-3332
IRC	(512) 992-7900	(512) 992-3377
Motorola	(602) 303-5454	(602) 994-6430
Nihon	(805) 867-2555	(805) 867-2698
Sanyo	(619) 661-6835	(619) 661-1055
Siliconix	(408) 988-8000	(408) 970-3950
Sprague	(603) 224-1961	(603) 224-1430
Sprague/Sanyo	(207) 324-4140	(207) 324-7223
Sumida	(847) 956-0666	(847) 956-0702
Vishay/Vitramon	(203) 268-6261	(203) 452-5670
Transpower Technologies	(702) 831-0140	(702) 831-3521

*Note: Please indicate that you are using the MAX1630/ MAX1631/MAX1632 when contacting these component suppliers.

MAX1630/MAX1631/MAX1632 Evaluation Kits

Evaluate: MAX1630/MAX1631/MAX1632

Quick Start

The MAX1630/MAX1631/MAX1632 EV kits are fully assembled and tested. Follow these steps to verify board operation. **Do not turn on the power supply until all connections are completed.**

- 1) Connect a bench power supply (50W or better) to the VIN and GND pads at the edge of the board.
- 2) Connect voltmeters and loads (if any) to the VOUT pads.
- 3) Verify that switch SW1 positions $\overline{\text{SHDN}}$, ON5, and ON3 are on, and that the shunt is across JU5.
- 4) Turn on the power supply and verify that the output voltages are 3.3V and 5V.

Detailed Description

Output Voltage

The main output voltages come preset to 3.3V and 5V. Install resistors R6/R7 and R12/R13 for adjustable mode. **Two small PC trace jumpers, JU9 and JU7, shunt FB3 and FB5 to GND on the board. These default jumpers must be cut for adjustable-mode operation.** Refer to the MAX1630–MAX1635 data sheet for instructions on calculating R6/R7 and R12/R13. Do not operate the circuit without a jumper or resistor-divider installed, or output overvoltage will damage the IC.

In addition to the standard components, the extra pull-up and pull-down resistors listed below are used to set logic input levels. These resistors can usually be omitted in the final design.

- R6, R7 Adjustable-mode resistor-divider (not installed). $V_{\text{OUT}} = 2.5V (1 + R6 / R7)$.
- R12, R13 Adjustable-mode resistor-divider (not installed). $V_{\text{OUT}} = 2.5V (1 + R12 / R13)$.
- R1–R4 2M Ω logic pull-down resistors. Shorted out or driven by logic.
- R14 100k Ω SYNC pull-up resistor (usually shorted out). SYNC to VL.

Jumper Selection

The three 2-pin headers JU3, JU4, and JU5 select the power-up sequence mode. Table 1 lists the selectable jumper options.

The 2-pin header JU6 selects the operating frequency. Table 2 lists the selectable jumper options. The EV kit's components are selected for 300kHz operation. Component values might need to be changed if 200kHz operation is selected (refer to the *Design Procedure* section in the MAX1630–MAX1635 data sheet). Synchronize the oscillator to an external clock signal by driving the SYNC pad with a pulse train of 5V amplitude in the 240kHz to 350kHz frequency range.

Table 1. Jumper JU3, JU4, JU5 Functions

SHUNT LOCATION	SEQ PIN	POWER-UP SEQUENCE
JU3	Connected to GND	5V before 3.3V
JU4	Connected to VL	3.3V before 5V
JU5	Connected to REF	Separate ON3/ON5 controls

Table 2. Jumper JU6 Functions

SHUNT JU6 LOCATION	SYNC PIN	FREQUENCY (kHz)
On	Connected to GND	200
Off	Connected to VL	300

Additional Jumpers (MAX1631 Only)

Additional jumpers on the board along with R10 and R11 are for configuring the MAX1631 for an auxiliary secondary output. R10 and R11 set the secondary feedback voltage (refer to the MAX1630–MAX1635 data sheet). Table 3 lists the MAX1631 jumper settings.

Table 3. MAX1631 Jumper Settings

JUMPER	FUNCTION
JU1	Connects the secondary feedback to R10 and R11.
JU2	Used in MAX1630 and MAX1632 for normal connections.
JU8	Steers secondary feedback to the 3.3V SMPS.
JU10	Steers secondary feedback to the 5V SMPS.
JU11	Disables secondary feedback.

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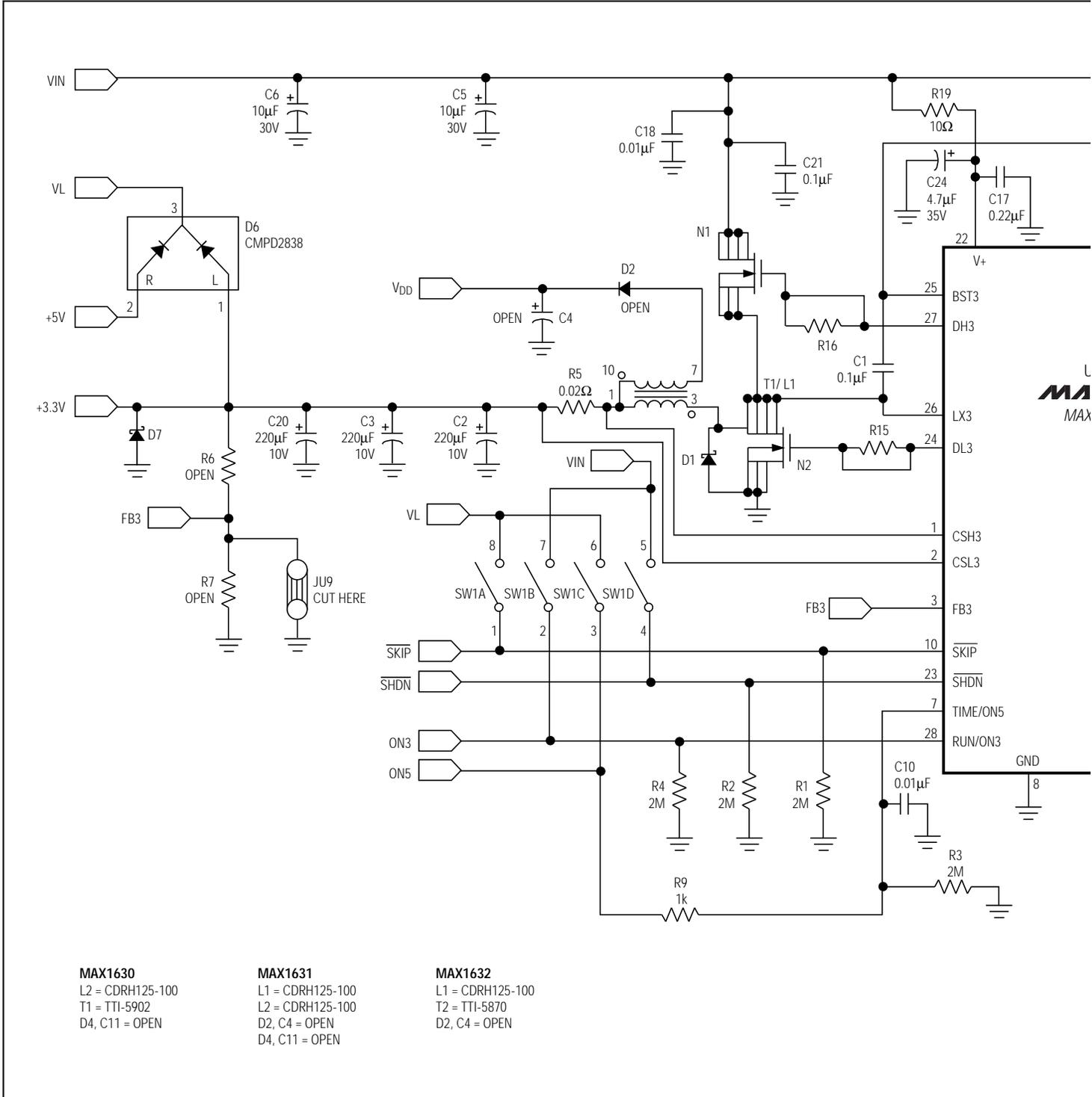
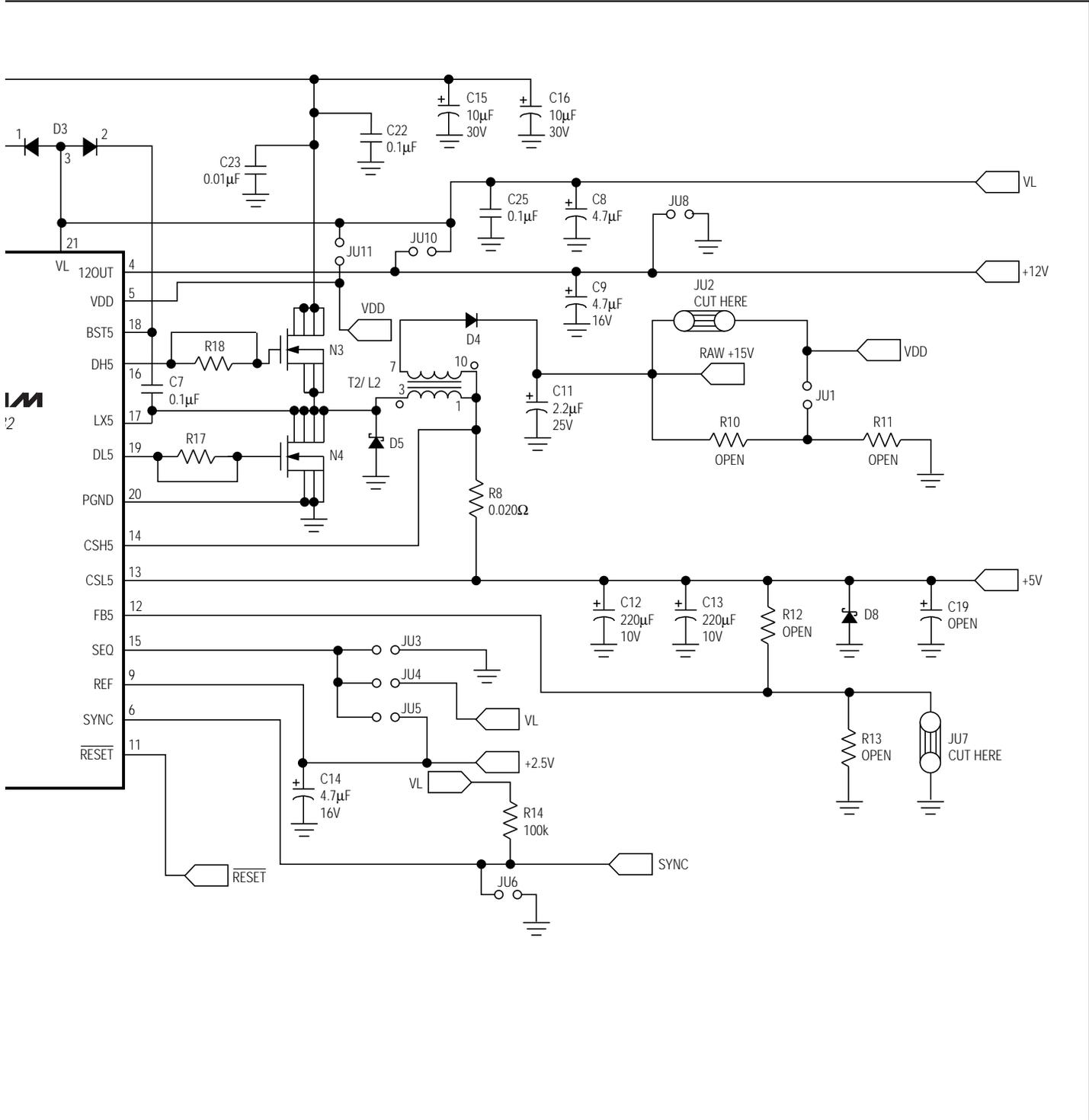


Figure 1. MAX1630/MAX1631/MAX1632 EV Kit Schematic

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Evaluate: MAX1630/MAX1631/MAX1632



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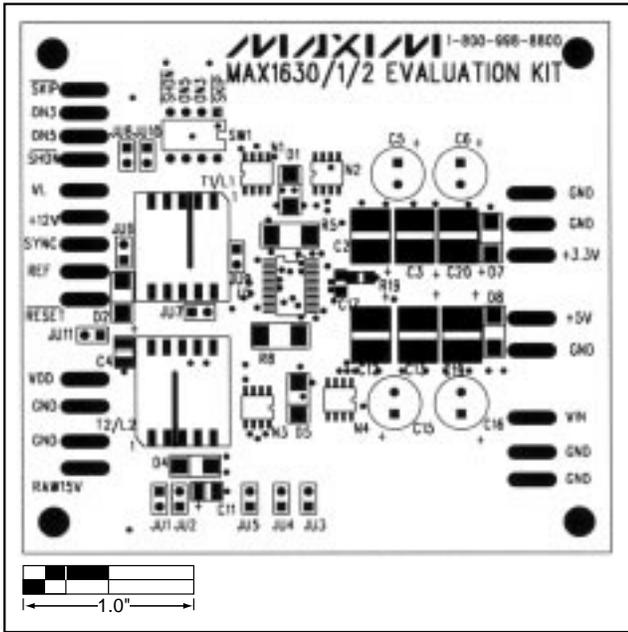


Figure 2. MAX1630/MAX1631/MAX1632 EV Kit Component Placement Guide—Component Side



Figure 3. MAX1630/MAX1631/MAX1632 EV Kit Component Placement Guide—Solder Side

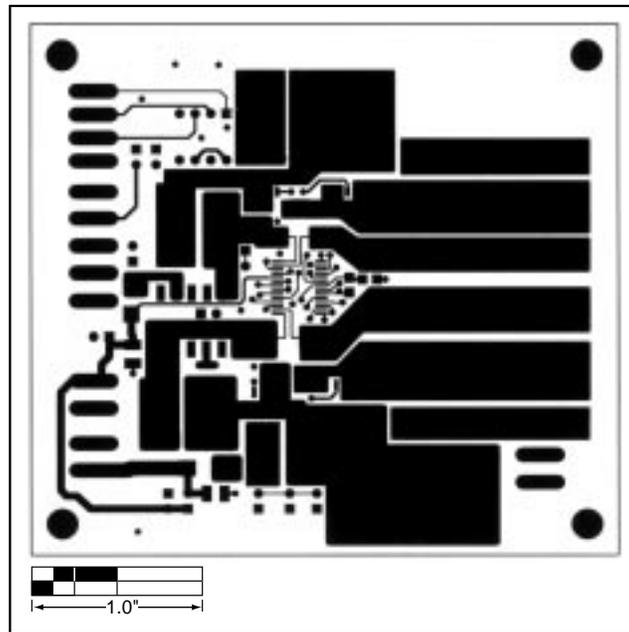


Figure 4. MAX1630/MAX1631/MAX1632 EV Kit PC Board Layout—Component Side

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Evaluate: MAX1630/MAX1631/MAX1632

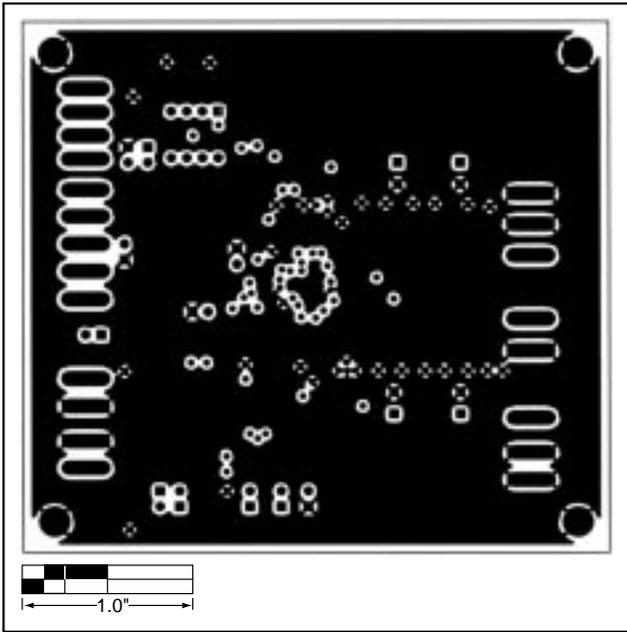


Figure 5. MAX1630/MAX1631/MAX1632 EV Kit PC Board Layout—Internal GND Plane

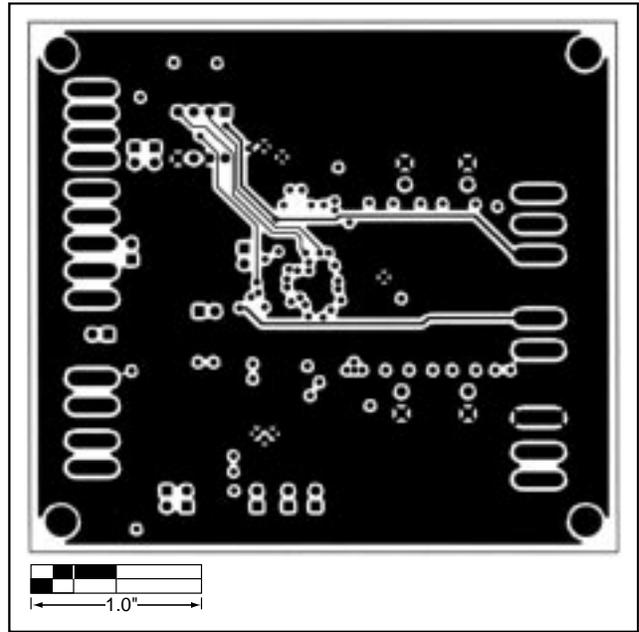


Figure 6. MAX1630/MAX1631/MAX1632 EV Kit PC Board Layout—Internal Voltage Plane

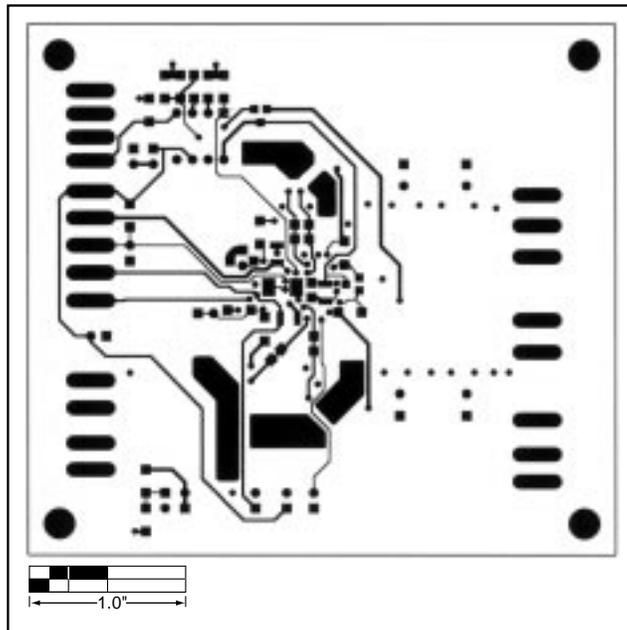


Figure 7. MAX1630/MAX1631/MAX1632 EV Kit PC Board Layout—Solder Side

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NOTES

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