



MAX8716评估板

概述

MAX8716评估板用于演示MAX8716的标准应用电路。这款双组PWM同步DC-DC转换器能够从电池和/或交流适配器的高压输出降压，获得笔记本电脑所需的主电源。

MAX8716评估板可从+6V至+24V范围的电池输入产生+5V和+3.3V两路输出。两路输出都能够以95%的高效率分别提供高达5A的输出电流。该评估板工作于300kHz开关频率，具有出色的电源和负载瞬态响应。

该评估板已组装完好并经过测试。通过改变反馈电阻R19、R20、R21和R22，两路输出都可在+1.0V至+5.5V范围内调节。

特性

- ◆ +6V至+24V输入电压范围
- ◆ 输出电压
 - +3.3V/5A (可在+1.0V至+5.5V间调节)
 - +5.0V/5A (可在+1.0V至+5.5V间调节)
- ◆ 300kHz开关频率
- ◆ 可独立选择PWM、跳脉冲和低噪声工作模式
- ◆ 独立的电源就绪输出
- ◆ 小尺寸元件
- ◆ 组装完好并经过测试

订购信息

PART	TEMP RANGE	IC PACKAGE
MAX8716EVKIT	0°C to +70°C	24 Thin QFN (4mm x 4mm)

元件列表

DESIGNATION	QTY	DESCRIPTION
C1, C3	2	10 μ F \pm 20%, 25V X5R ceramic capacitors (1210) TDK C3225X7R1E106M AVX 12103D106M Taiyo Yuden TMK325BJ106MM
C2	0	Not installed (1210)
C4, C6	0	Not installed (E case)
C5	1	220 μ F, 4V, 40m Ω low-ESR capacitor (D case) Sanyo 4TPC220M
C7	1	150 μ F, 6.3V, 40m Ω low-ESR capacitor (D case) Sanyo 6TPC150M
C9, C11, C14, C18	4	1 μ F \pm 20%, 10V X5R ceramic capacitors (0805) Taiyo Yuden LMK212BJ105KG or TDK C2012X7R1C105MKT
C10, C17	2	0.1 μ F \pm 10%, 50V X7R ceramic capacitors (0603) Murata GRM188R71H104K or equivalent
C12	1	0.22 μ F, 16V X5R ceramic capacitor (0805) Taiyo Yuden EMK212BJ224KG
C24, C25	0	Not installed (0603)
D1, D2	2	1A, 30V Schottky diodes Nihon EP10QY03 or Toshiba CRS02

DESIGNATION	QTY	DESCRIPTION
D3	1	100mA, 30V dual Schottky diode (SOT23) common anode Central Semiconductor CMPSH-3A
JU1, JU2	2	4-pin headers
JU3, JU4	2	3-pin headers
JU5, JU6, JU12, JU14	0	Not installed (short jumpers)
L1, L2	2	5.7 μ H, 5.8A, 10.3m Ω power inductors Sumida CDEP105-5R7NC
N1, N3	2	n-channel MOSFETs (8-pin SO) Fairchild FDS6612A
N2, N4	2	n-channel MOSFETs (8-pin SO) Fairchild FDS6670A
R1, R2	2	0.007 Ω \pm 1%, 1/2W resistors (2010) IRC LR2010-01-R0007-F or Dale WSL-2010-R0007F
R3	1	20 Ω \pm 5% resistor (0805)
R4, R14	2	100k Ω \pm 5% resistors (0603)
R5, R6	0	Not installed (short PC trace) (0603)
R10, R16	2	3 Ω \pm 5% resistors (0603)
R19–R24	0	Not installed (0603)
U1	1	MAX8716ETG (24-pin thin QFN 4mm x 4mm)
—	4	Shunts
—	1	MAX8716 rev B PC board



MAX8716评估板

元件供应商

SUPPLIER	PHONE	WEBSITE
Central Semiconductor	631-435-1110	www.centrasemi.com
Dale-Vishay	402-564-3131	www.vishay.com
Fairchild	888-522-5372	www.fairchildsemi.com
IRC	361-992-7900	www.irctt.com
Kemet	864-963-6300	www.kemet.com
Murata	770-436-1300	www.murata.com
Nihon	847-843-7500	www.niec.co.jp
Sanyo	619-661-6835	www.sanyodevice.com
Sumida	847-545-6700	www.sumida.com
Taiyo Yuden	800-348-2496	www.t-yuden.com
TDK	847-803-6100	www.component.tdk.com
Toshiba	408-526-2459	www.toshiba.com

注：当与这些元件供应商联系时，请说明你正在使用MAX8716。

快速入门

推荐设备

开始评估以前，需要准备以下设备。完成所有连接以前，请勿打开电源：

- +6V至+24V电源、电池或笔记本交流适配器
- 直流偏置电源，+5V/100mA
- 可吸收5A的假负载
- 数字万用表 (DMM)
- 100MHz双踪示波器

步骤

- 1) 在加电以前，确保电路正确连接到电源和假负载上。
- 2) 确认以下跳线已短接：
 - (a) JU4引脚1和2 (ON1高，OUT1 (+3.3V)使能)
 - (b) JU3引脚1和2 (ON2高，OUT2 (+5.0V)使能)
 - (c) JU1引脚1和2 ($\overline{\text{SKIP1}}$ 高，OUT1为强制PWM模式)
 - (d) JU2引脚1和2 ($\overline{\text{SKIP2}}$ 高，OUT2为强制PWM模式)

3) 先接通电池电源，再打开+5V偏置电源。否则，随着输出UVLO定时器的超时，FAULT锁存器将被置位，调节器输出被禁止，直到关闭并重新施加+5V电源，或者切换ON1/ON2。

4) 确定输出电压为 $V_{\text{OUT1}} = +3.3\text{V}$ ， $V_{\text{OUT2}} = +5.0\text{V}$ 。

详细说明

跳线设置

表1. 跳线JU4功能(OUT1输出电压控制)

JU4	ON1 PIN	OUT1
1 and 2 (default)	Connected to VDD	OUT1 is enabled, $V_{\text{OUT1}} = 3.3\text{V}$
2 and 3	Connected to GND	OUT1 is disabled
Not installed	ON1 must be driven by an external signal connected to ON1 pad	OUT1 operation depends on the external ON1 signal levels

表2. 跳线JU3功能(OUT2输出电压控制)

JU3	ON2 PIN	OUT2
1 and 2 (default)	Connected to VDD	OUT2 is enabled, $V_{\text{OUT2}} = 5.0\text{V}$
2 and 3	Connected to GND	OUT2 is disabled
Not installed	ON2 must be driven by an external signal connected to ON2 pad	OUT2 operation depends on the external ON2 signal levels

表3. 跳线JU1功能(OUT1低噪声模式控制)

JU1	$\overline{\text{SKIP1}}$ PIN	OPERATIONAL MODE
1 and 2 (default)	Connected to VDD	OUT1 is in forced-PWM mode (fixed frequency)
1 and 4	Connected to REF	OUT1 is in low-noise mode
1 and 3	Connected to GND	OUT1 is in pulse-skipping mode

MAX8716评估板

评估板：MAX8716

调节输出电压

表4. 跳线JU2功能(OUT2低噪声模式控制)

JU2	SKIP2 PIN	OPERATIONAL MODE
1 and 2 (default)	Connected to VDD	OUT2 is in forced-PWM mode (fixed frequency)
1 and 4	Connected to REF	OUT2 is in low-noise mode
1 and 3	Connected to GND	OUT2 is in pulse-skipping mode

当FB1接到VCC (R6 = 0)时, MAX8716的OUT1具有固定的+3.3V输出; 当FB2接到VCC (R5 = 0)时, OUT2具有固定的+5.0V输出。

OUT1和OUT2还可以通过R21/R22 (R6开路)和R19/R20 (R5开路)组成的电阻分压器在+1.0V至+5.5V范围内调节。MAX8716将FB1和FB2调整于固定的基准电压(+1.0V)。

可调输出电压为:

$$V_{OUT1} = V_{FB1} (1 + R21 / R22)$$

其中VFB1 = +1.0V, 和:

$$V_{OUT2} = V_{FB2} (1 + R19 / R20)$$

其中VFB2 = +1.0V。

MAX8716评估板

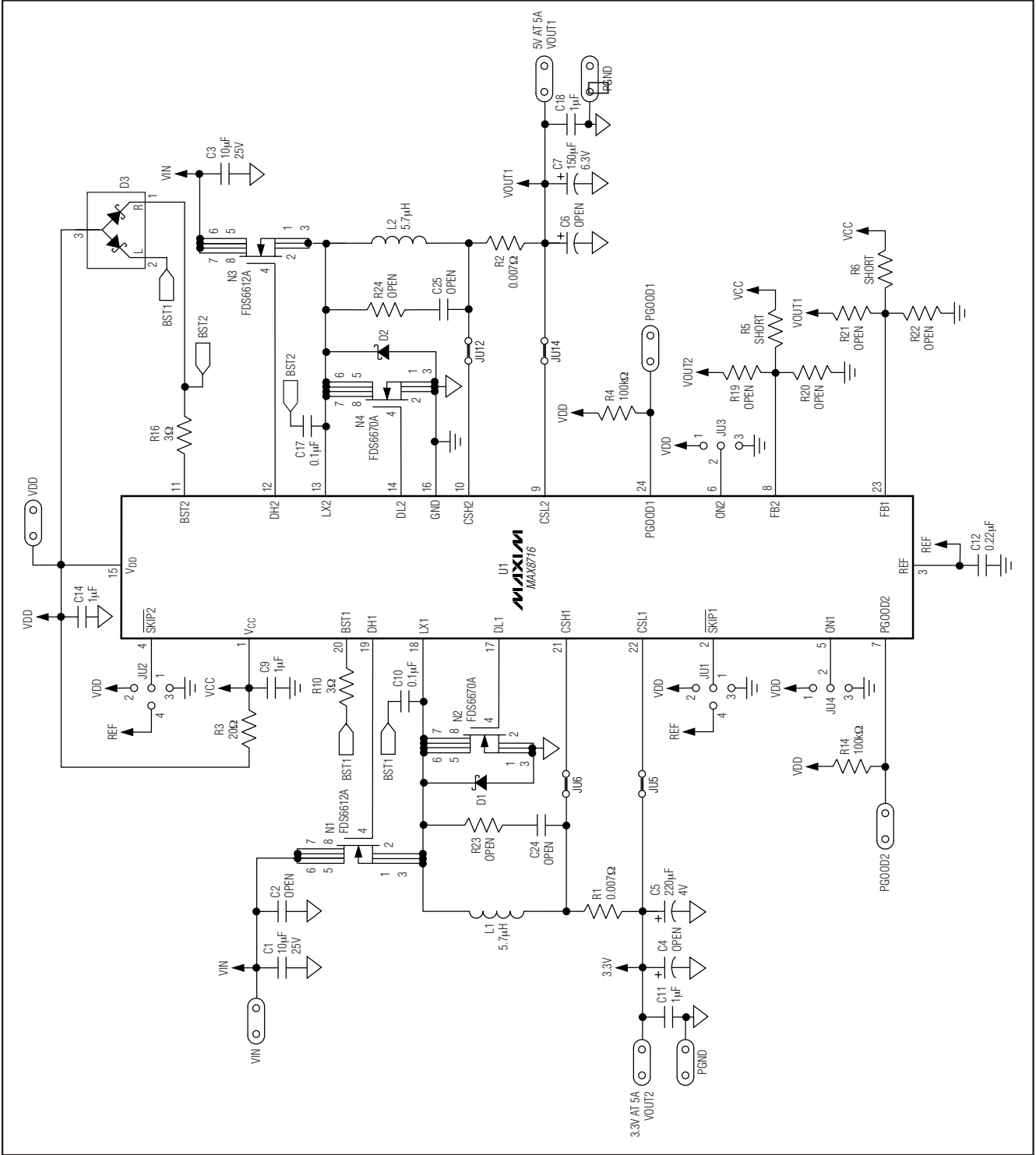


图1. MAX8716评估板原理图

MAX8716评估板

评估板：MAX8716

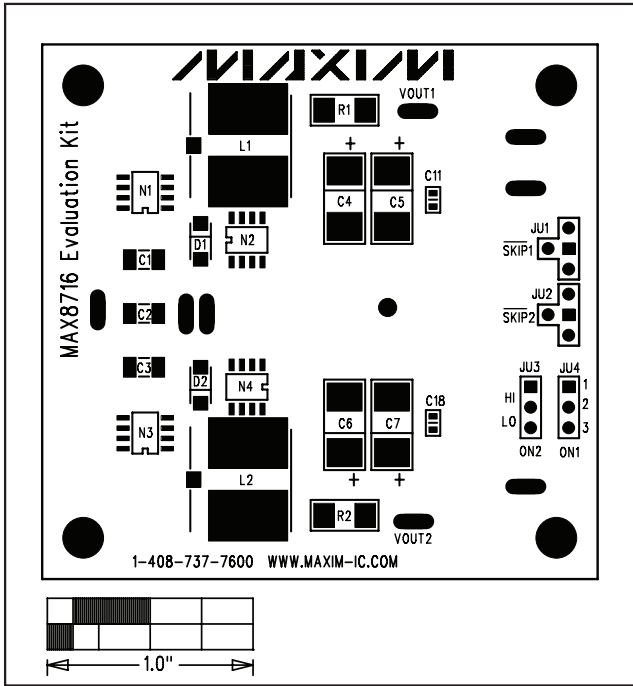


图2. MAX8716评估板元件布局—元件层

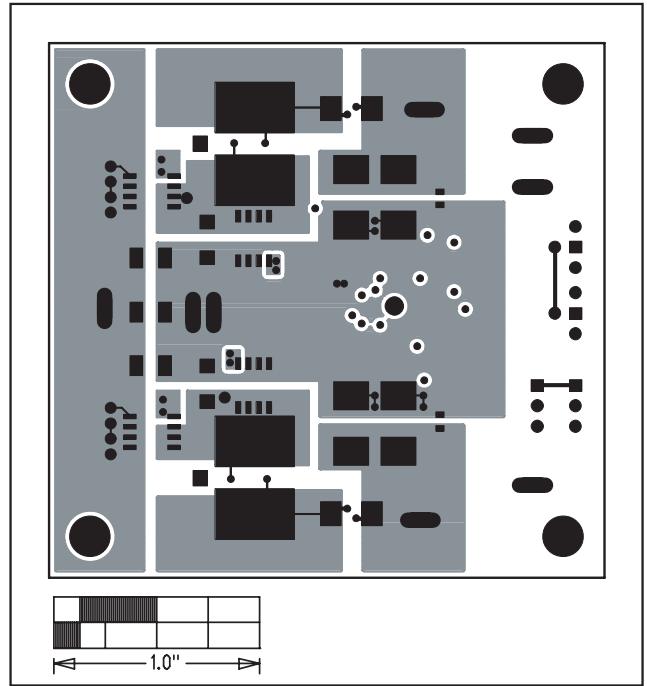


图3. MAX8716评估板印制板布局—元件层

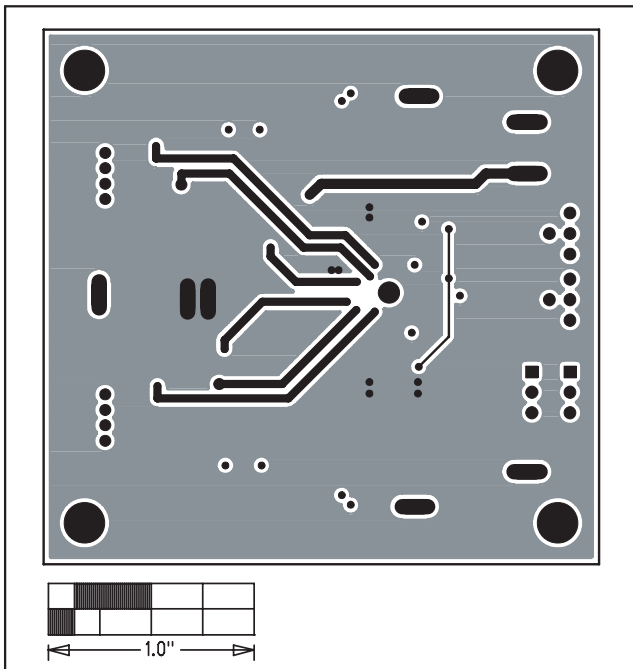


图4. MAX8716评估板印制板布局—中间层2, PGND/信号层

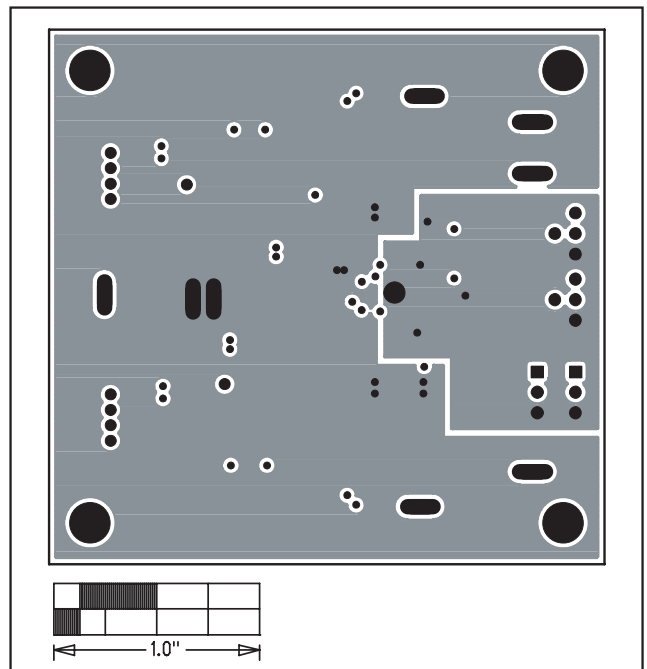


图5. MAX8716评估板印制板布局—中间层3, PGND/GND层

MAX8716评估板

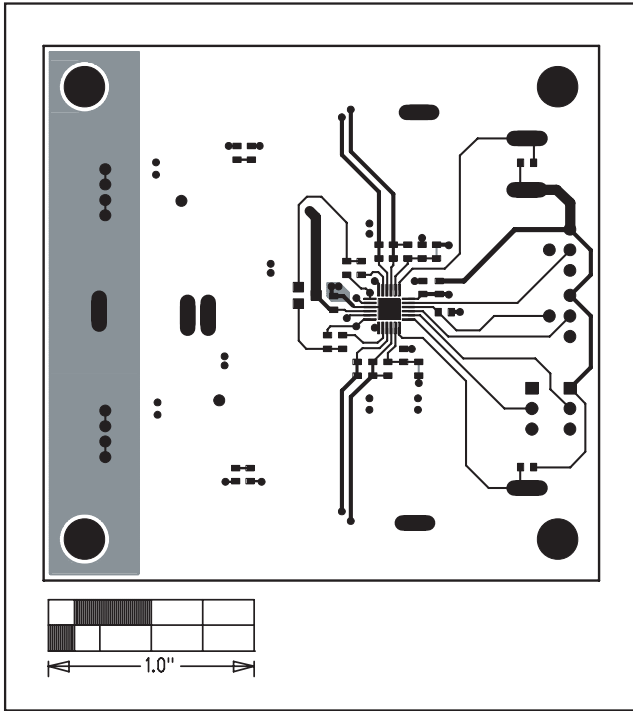


图6. MAX8716评估板印制板布局—焊接层

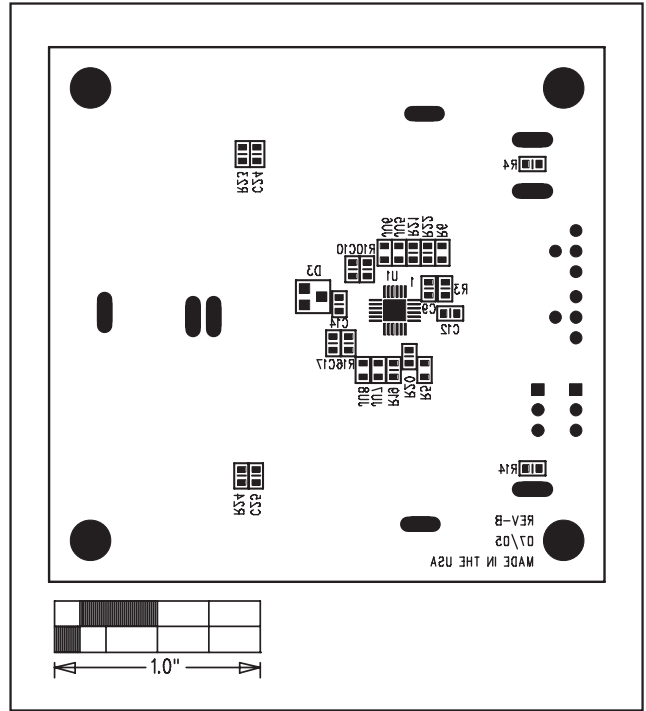


图7. MAX8716评估板元件布局—焊接层

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