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Keywords: powered device, PD, Power over Ethernet, PoE, IEEE 802.3af, IEEE 802.3at, Class 2 PD, Class 3 PD, IP phones, IP cameras, security camera, WAP, Wireless Access Point, Point of Sales, POS, Thin Client, Ethernet repeater, active clamped forward, flyback

Apr 28, 2011

REFERENCE DESIGN 5043 INCLUDES: ✓Tested circuit ✓Schematic ✓BOM

Active-Clamped Forward, Dual-Output PD Provides High-Performance Solution for PoE Applications

Abstract: This reference design is for a highly efficient, active-clamped forward, dual 3.3V/8.8V-output powered device (PD). The design features the MAX5969A and MAX5900 as its controllers. The design also uses the MAX5974C, which controls current-mode PWM converters and provides zero-voltage switching (ZVS) and frequency foldback to enhance supply efficiency. Using these devices, this RD is IEEE® 802.3at compliant and is a high-performance, compact, and cost-efficient solution for PoE and nonstandard high-power PDs. The design can also support the auxiliary input voltage to provide maximum 55W output power.

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General Description

The design features the [MAX5969A](#), [MAX5900](#), and [MAX5974C](#). The MAX5969A is compliant with the IEEE 802.3at standard in a power-over-Ethernet (PoE) system. The device can also get power from a wall adapter (WAD). The MAX5900 hot-swap controller smoothly enables a nonstandard high power from a nonstandard Power Sourcing Equipment (PSE). The MAX5974C provides control for wide-input-voltage, ZVS active-clamped, current-mode PWM converters and frequency foldback for PoE and high-power applications. Using these devices, this reference design is IEEE 802.3at compliant. It is also a high-performance, compact, and cost-effective solution for a nonstandard high power PD.

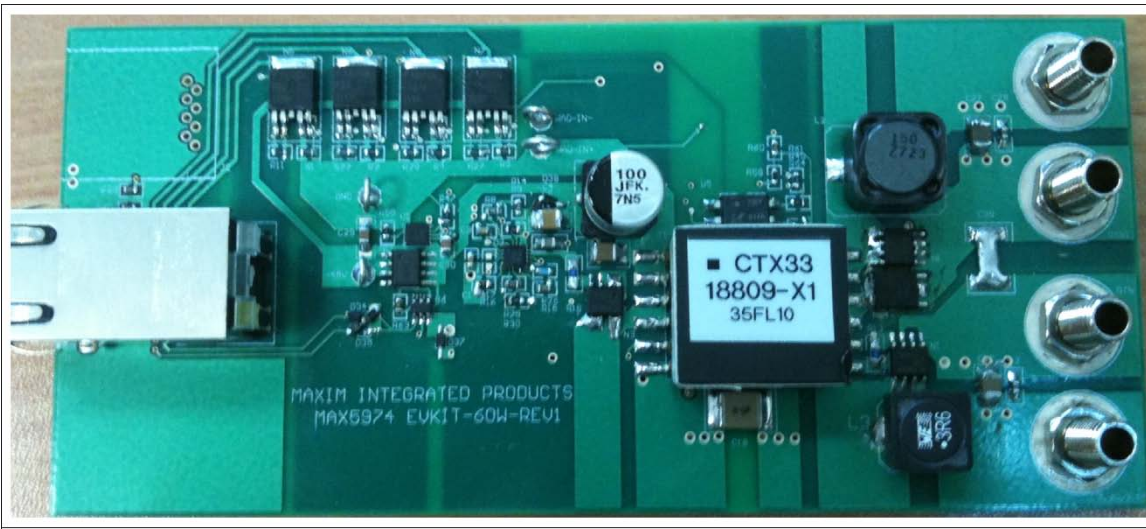


[Click here for an overview of the wireless components used in a typical radio transceiver.](#)

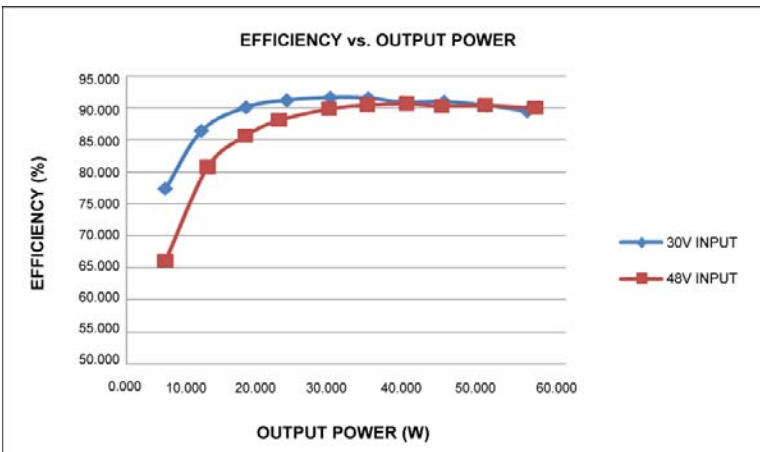
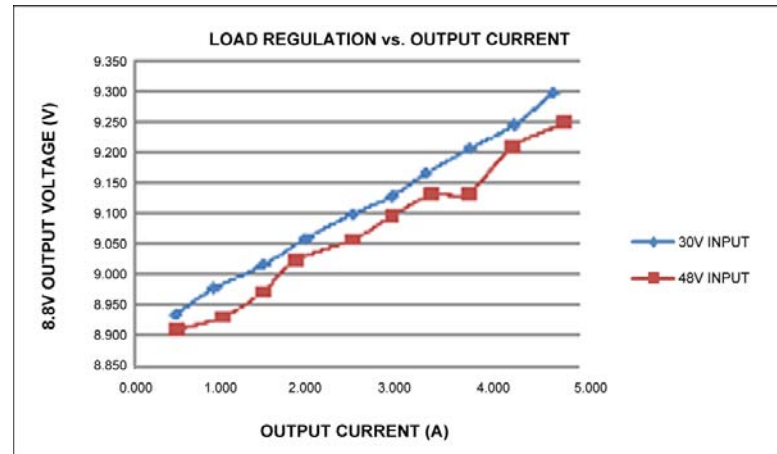
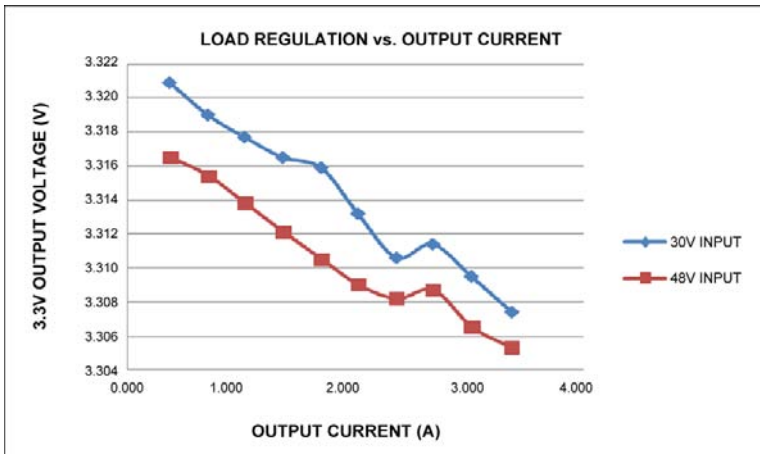
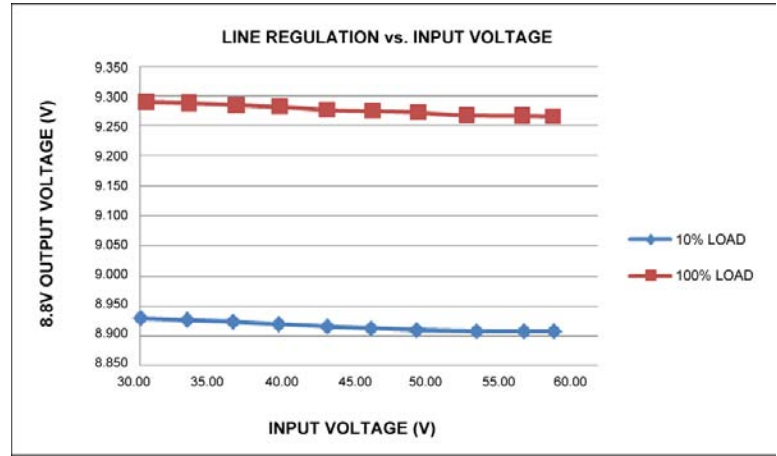
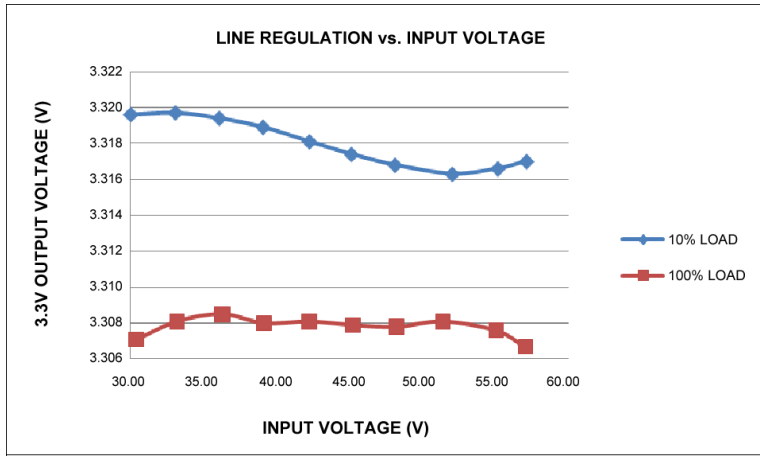
Specifications

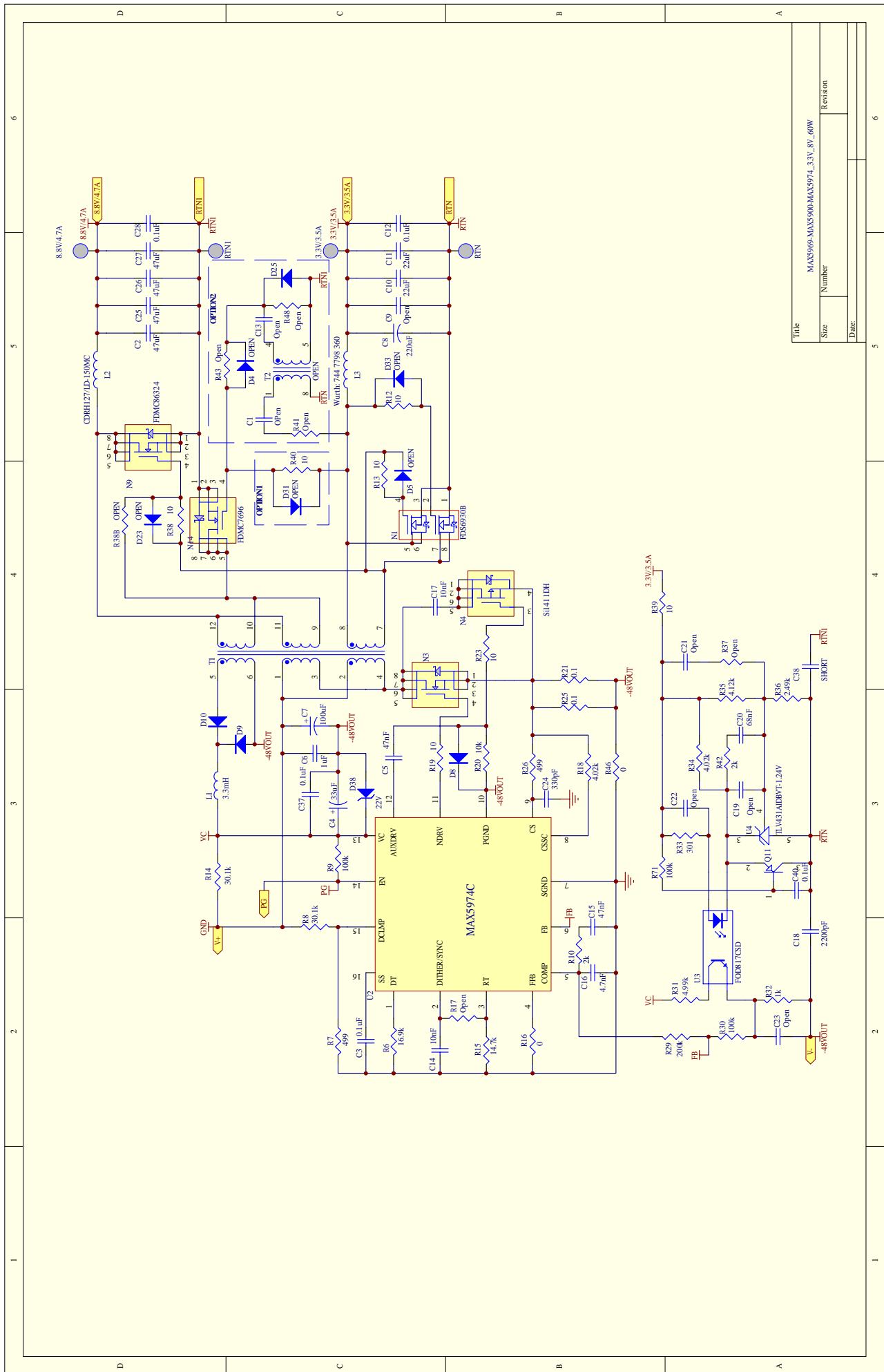
The 3.3V/3.35A and 8.8V/4.6A PD is designed to meet the following specifications:

- Input voltage: 42V to 57V
- Nonstandard PSE: 37V to 57V
- WAD input voltage: 30V up to 57V
- V_{OUT1} : 3.3V/3.35A
- V_{OUT2} : 8.8V/4.6A
- Output ripples: $\pm 1\%$
- Line and load regulation: 3.3V = $\pm 0.2\%$, 8.8V = $\pm 2\%$
- Total efficiency with loads of 3A at 3.3V, 4.2A at 8.8V, and 48V input: 90.4% (including input LAN transformer and MOSFET bridge)



Top view of the reference design.





Title		MAX5969-MAX5900-MAX5974_3.3V_8V_60W	
Size	Number	Revision	
Date:			

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Related Parts

MAX5900	-100V, SOT23/TDFN, Simple Swapper Hot-Swap Controllers	-- Free samples
MAX5969A	IEEE 802.3af/at-Compliant, Powered Device Interface Controllers with Integrated Power MOSFET	-- Free samples
MAX5974C	Active-Clamped, Spread-Spectrum, Current-Mode PWM Controllers	-- Free samples

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