

## SolarTech Power Solutions

# Outdoor power supply output fixed matching



## Overview

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How many Ma does a power supply need?

Typical requirements for such applications include the ability to operate for wide input voltage from 85 VAC to 265 Vac to make them universal for both 110-V and 220-V systems, while providing a regulated 5-V or 3.3-V output. Output load current could vary from a few mA up to 100 mA depending on the application.

What is resistance matching & impedance matching?

When we start working in the frequency domain and including capacitors and inductors in our circuits, then the idea of “resistance matching” for maximum power transfer becomes broadened to “impedance matching,” where impedance is essentially a complex-valued resistance.

How to make a power supply more efficient?

Another alternate approach is by using a combination of multiple discrete components such as rectifiers, MOSFETs (high voltage), Zener diodes, LDO, and so forth, which results in slightly better efficiency. cap-drop power supply which introduces a high-voltage capacitor between the AC line and a Zener diode (acts as a DC clamp).

How do you find the efficiency of a power supply?

The efficiency here is defined as the ratio of power delivered to the load divided by power supplied by the source: That's it. Load is short circuit. If  $R_L = 0$ , then the efficiency  $\eta = 0$ . Load is open circuit. If  $R_L = \infty$ , then the efficiency  $\eta = 1$ . Load is maximum power point. If  $R_L = R_S$  then the efficiency  $\eta = 0.5$ .

How do you find the maximum power delivered to a load?

As an exercise, you can write the source impedance  $Z_S = a + bj$  and the load impedance  $Z_L = c + dj$  and solve the maximum power equations above. You'll

find that the maximum power delivered to the load happens with  $a = c$  and  $b = -d$ . In design problems, these are merely theoretical tools to think about the extremes of matching various sources and loads.

What is a capacitive drop power supply?

It drops the voltage across a high-voltage capacitor (typically 200 nF to 680 nF) which is specially designed for a fixed input voltage (110 Vac or 220 Vac). While capacitive drop power supplies are small and more cost-effective than transformer-based or switch-mode based, the efficiency is low.

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