

Design Photovoltaic System with Constant Output using SEPIC Converter

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Abstract – Now a day everywhere in world solar energy is more useful & everyone try to maintain solar energy but solar energy gives variable output which is not good for home appliances & industry. So to maintain it is necessary. In this paper we try to maintain output of solar panel. For this we refer MPPT, SEPIC converter & solar panel.

Key Words: PV module, Solar panel, Sepic converter, MPPT

1. INTRODUCTION

The photovoltaic (PV) system gives variable output voltage due to temperature and insolation variation with respect to time. This paper presents the design of a SEPIC converter for getting constant output voltage from PV system using a simple control circuit. The SEPIC is designed to make the power flow from PV module to load effectively and maintaining constant output voltage. This paper gives the detailed design and implementation of a 20W prototype SEPIC integrated PV power supply with soft start feature. The efficiency of the proposed method is proved with simulation results and prototype experimental results. The SEPIC is a DC to DC converter in which the output voltage is having same polarity as that of input voltage. One benefit of the SEPIC converter is that the input ripple current in the input capacitor is continuous. This reduces the amount of input capacitance necessary for low-ripple voltage, which reduces EMI (Electro Magnetic Interference). SEPIC converter maintains a fixed output voltage regardless of whether the input voltage.

2.1 ARCHITECTURE



FIGURE 2.1 BLOCK DIAGRAM OF SYSTEM

2.1 DETAILS OF ARCHITECTURE

2.1.1 SOLAR PANEL

There are many types of PV systems namely the stand alone and grid connected PV system. The standalone PV system require battery for the supply of power to the load during the low solar period. Generally the I-V characteristic of a solar panel depends on insolation level and temperature. If the output voltage of PV system does not match with the battery voltage, the energy conversion efficiency of PV system is reduced. Hence it is required to track the PV panel voltage at all operating conditions. Photovoltaic (PV) system gives variable output voltage due to temperature & insolation variation with respect to time Solar panel is packed & connected assembly of photovoltaic cells. The solar panel can be used as component of larger photovoltaic system to generate & supply electricity in commercial & residential applications.

Table 2.1.1 Specifications of solar PV panel

Sr .no	Description	Specification
1	Short circuit current	2.0A
2	Voltage at MPP	15
3	Current at MPP	2.15
4	Open circuit voltage	20V
5	Maximum power	35W

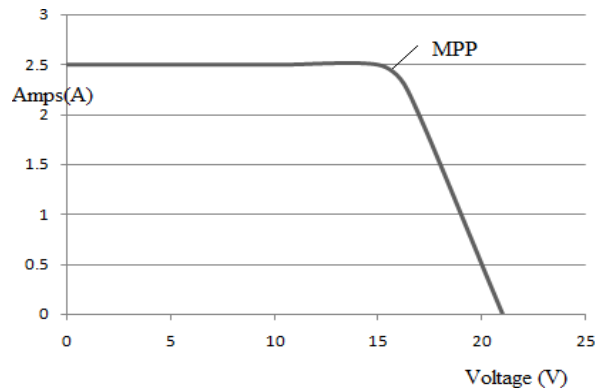


FIGURE 2.1.1 V-I characteristics of solar panel

2.1.2 SEPIC CONVERTER

A SEPIC is used as power factor correction stage is good solution for power supplies in electronic blasts. SEPIC converter is the best alternative to track maximum power from PV panel. The maximum power tracking for PV panel using dc-dc converter is developed without using micro controller. The nominal duty cycle of the main switch in the SEPIC converter is adjusted to a value, so that the input resistance of the converter is equal to the equivalent output resistance of the solar panel at the MPPT. A SEPIC is applied to interface a thermoelectric power generator output to battery & to track maximum power point (MPPT) of TE power generation. Power distribution system having central power supply whose output is connected to load which is regulated by constant frequency techniques.

Table 2.1.2 specifications of SEPIC converter

Sr .no	Description	Specification
1	Input Voltage	10V DC -30V DC
2	Output Voltage Switching	15V DC
3	Output Current	2A
4	Ripple	38%
5	Duty Cycle range	0.50 to 0.40
6	Switching frequency	300KHz

