

## SP6133 Converts 5V to 1.2V at 30A

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**Part Number:** SP6133ER1

**Application Description:** Powering GPU on a graphics card

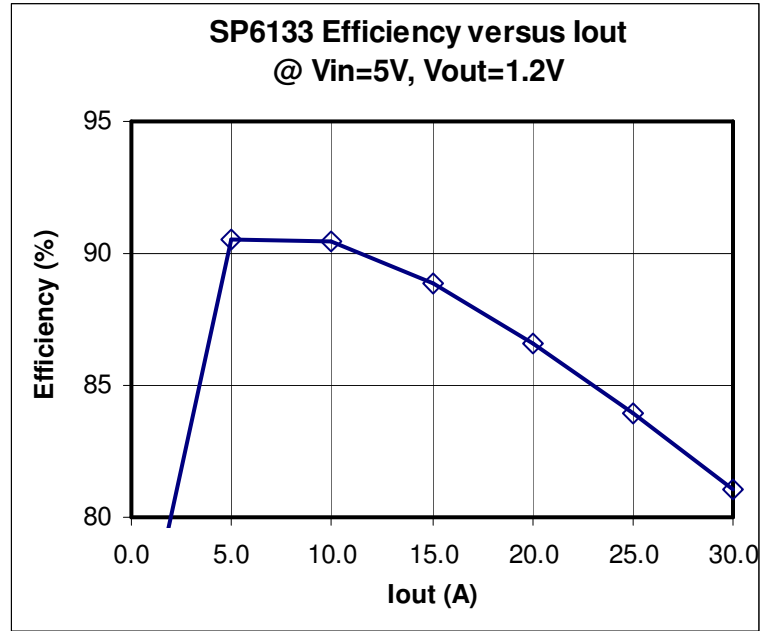
### Electrical Requirements:

Input Voltage	4.5V – 5.5V
Output Voltage	1.2V
Output Current	30A

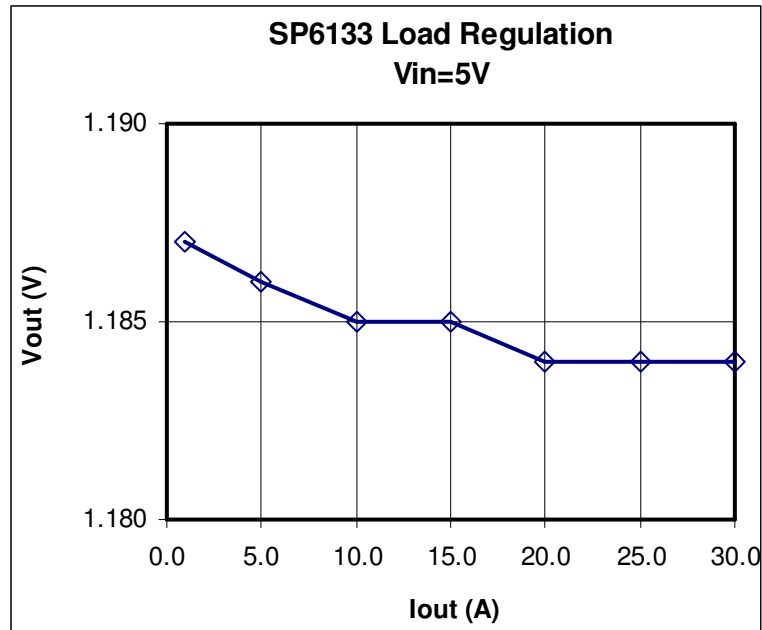
### Circuit Description:

This buck converter has been designed to provide 1.2V output at 30A for powering a high-current GPU (graphics processor) on a graphics card. High output current and low cost dictated the choice of the controller and external components. In order to reduce cost, a single-phase synchronous buck regulator topology was chosen. The SP6133 is a high performance buck regulator controller that provides all necessary functions required by a buck regulator: Over-Current protection, Power-Good output, adjustable UVLO and Enable input. Constant switching frequency (300KHz) optimizes against switching losses.

This report includes the application schematic and Figures 1 through 6 illustrate electrical performance of the design.



**Figure 1.** Converter Efficiency vs. Output Current



**Figure 2.** Converter Load Regulation

Component	Temperature °C
SP6133	74
L	94
M1T	97
M2T	97
M1B	95
M2B	95

Figure 3- Component surface temperature at  $I_{out}=30A$ ,  $V_{out}=1.2V$   
Natural convection,  $T_a=23C$

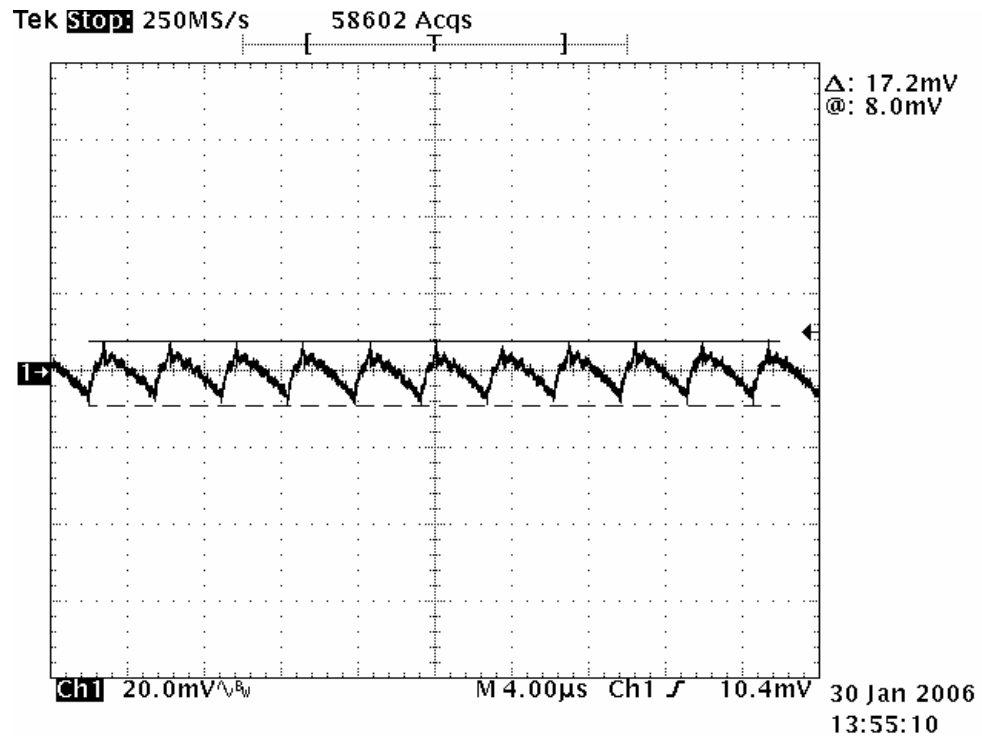


Figure 4- Output ripple is 17mV

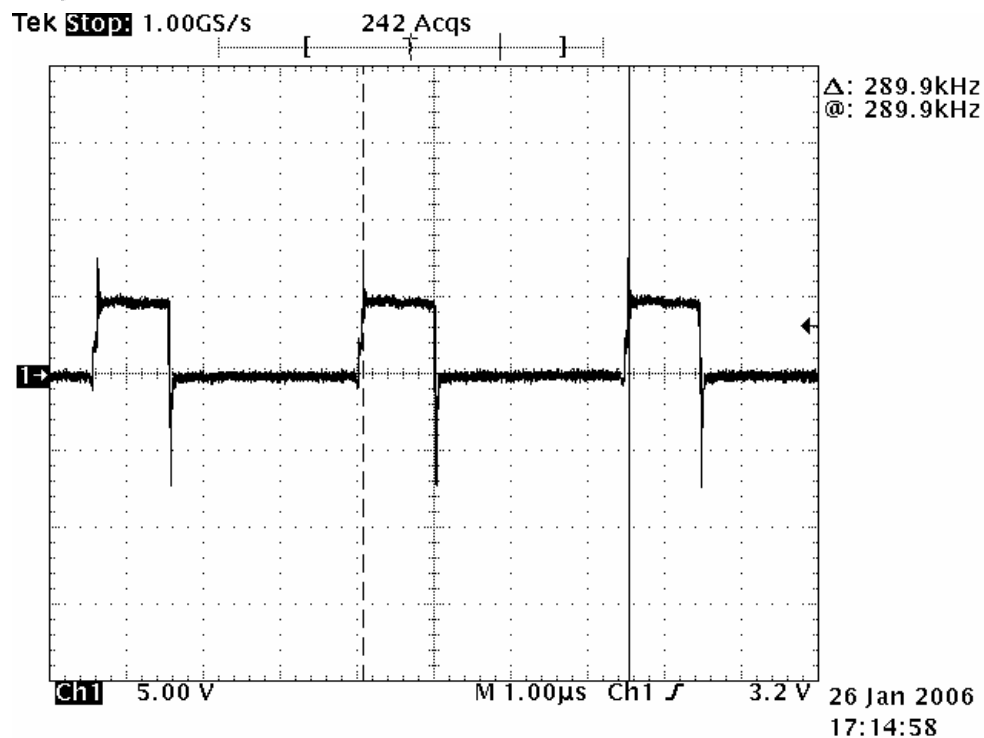


Figure 5- Switch node,  $f=290\text{kHz}$ ,  $V_{in}=5\text{V}$ ,  $V_{out}=1.2\text{V}$ ,  $I_{out}=30\text{A}$

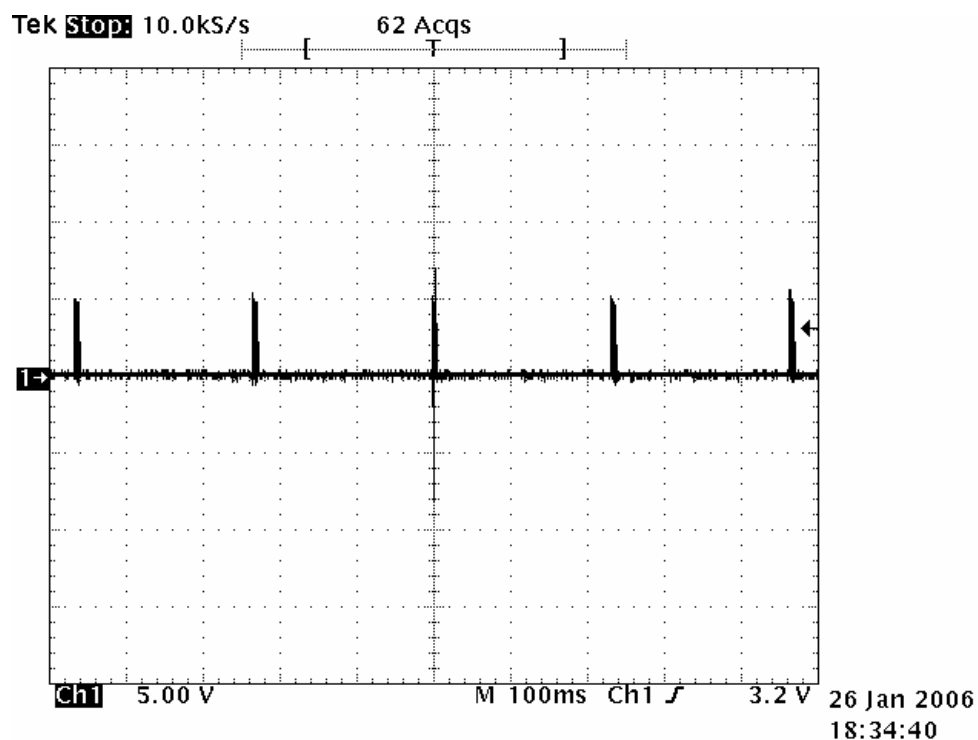


Figure 6- Hiccup is activated when  $I_{out}$  increases to more than 35A

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