

ZXSC100 Power Supply for Digital Still Camera.

The ZXSC100 is a DC-DC boost converter designed for single or multi-cell portable equipment. A typical application is shown in Figure 1. The application is for a digital still camera DSP power supply, providing a regulated 3.3V/250mA supply from two cell input.

Other typical applications for this reference design are MP3 players and PDA's where high efficiency step-up conversion is required.

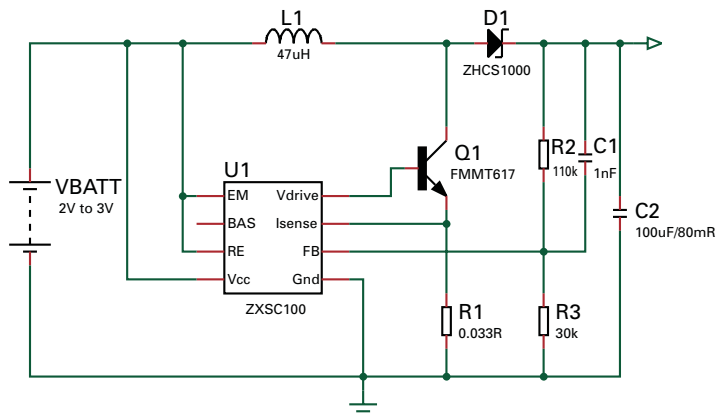


Figure 1. Digital still camera power supply solution.

Materials List

Ref	Value	Part Number	Manufacture	Comments
U1		ZXSC100X8	Zetex	DC-DC boost converter
Q1		FMMT617	Zetex	SuperSOT™ NPN transistor
D1		ZHCS1000	Zetex	1A Schottky diode in SOT23
R1	33mΩ		Generic	
R2	110k		Generic	
R3	30k		Generic	
C1	1nF		Generic	
C2	100uF	TPSD107M010R0080	AVX	100uF/80mohm SMT
L1	47uH	DO3316P-473	Coilcraft	47uF/500mohm SMT

The ZXSC100 is an adjustable converter allowing the end user maximum flexibility in output voltage selection. The output voltage is determined by:

$$V_{OUT} = V_{FB} (1 + R2/R3),$$

where $V_{FB} = 730mV$.

The solution achieves a peak efficiency of 85%. The graphs are shown below in figures 2 and 3. Line and load regulation are also shown in figures 4 and 5 respectively. Figures 6 and 7 show waveforms of the output voltage ripple at 2V and 3V input.

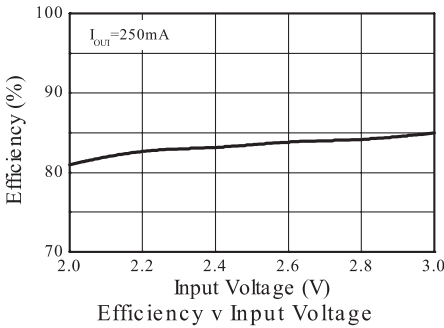


Figure 2. Efficiency v Input Voltage.

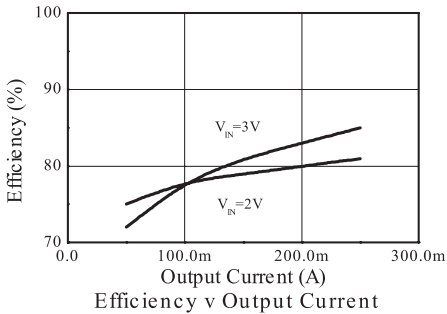


Figure 3. Efficiency v Load Current.

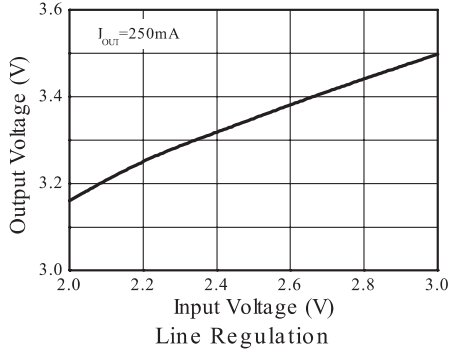


Figure 4. Line Regulation

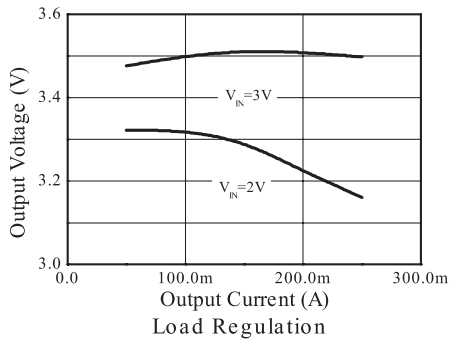


Figure 5. Load Regulation

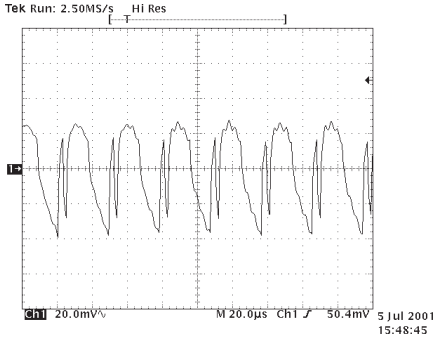


Figure 6. Output ripple at 2V input, $I_{OUT}=250mA$.

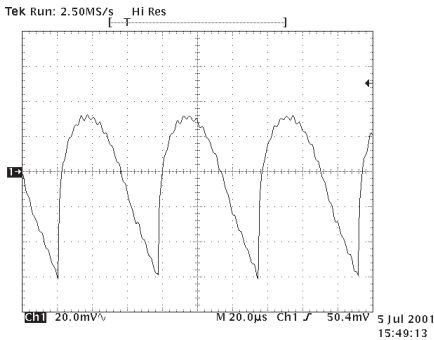


Figure 7. Output ripple at 3V input, $I_{OUT}=250mA$.

Low Battery Detect.

In many portable equipment applications a low battery flag is necessary. Two cost-effective solutions, to be used with the ZXSC100 power supply, are given below. Both solutions have been designed for low battery indication between 2.1V and 2.3V.

Figure 8 shows a simple linear low battery detect circuit. This circuit would be ideal for driving an LED to indicate low power.

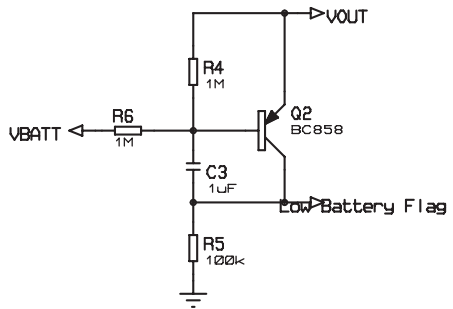


Figure 8. Low Battery Detect using BC858.

Materials List

Ref	Value	Part Number	Manufacture	Comments
Q2		BC858C	Generic	Small signal PNP transistor
R4	1M		Generic	
R5	100k		Generic	
R6	1M		Generic	
C3	1nF		Generic	

Low Battery Detect cont.

Figure 9 shows a solution using the ZR431L configured as a comparator. The ZR431L is an adjustable Zener shunt regulator with a 1.25V reference voltage. When the batteries voltage is above the 2.2V threshold the low battery flag is set to the reference voltage of the ZR431L, 1.25V. As the battery discharges and approaches the 2.2V threshold the low battery flag pulls up to the output voltage. This type of flag is best suited for use with a microprocessor.

Another alternative to the circuits in figure 9 are supply voltage monitors such as the ZXCM series for Zetex. The ZXCM209 are reset low and the ZXCM210 are reset high. They are available in a range of threshold voltages from 4.63V to 2.63V.

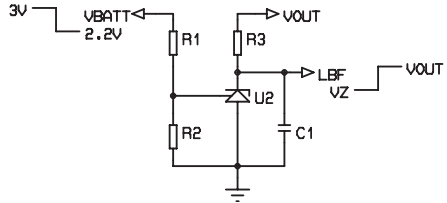


Figure 9 . Low Battery Detect using ZR431L.

Materials List

Ref	Value	Part Number	Manufacture	Comments
U2		ZR431LF01	Zetex	1.25V adjustable voltage reference - 1% tol
R1	100K		Generic	
R2	130k		Generic	
R3	1k		Generic	
C1*	1uF		Generic	

*Optional - used for noise suppression

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