



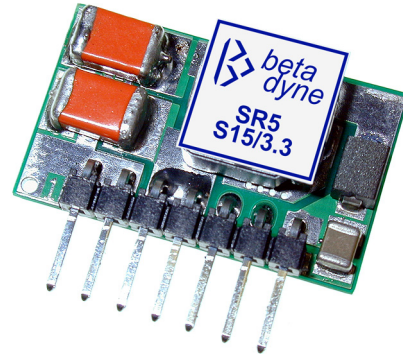
SR5001

5W STEP-UP SWITCHING REGULATOR

2.1V_{IN} to 4.5V_{IN} Range

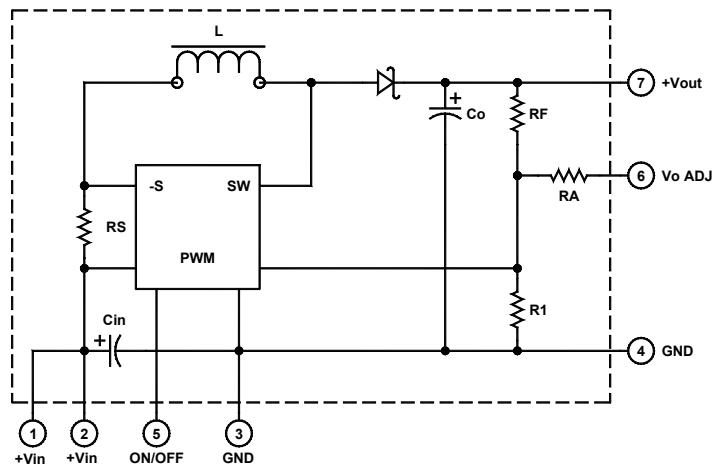
Key Features

- 89% efficiency
- Wide input range (2:1)
- 300μA off state current
- Input current limit
- Undervoltage protection
- 550kHz constant frequency
- Burst mode operation
- 30W/in³ power density



Functional Description

The SR5001 is a constant frequency, current mode step-up switching regulator with excellent line and load regulation. The converter operates from a DC source from 4.5V_{IN} down to 2.1V_{IN} and provides a regulated 5V_{OUT}@450mA. Burst mode operation improves efficiency at light loads, while high switching frequency and SMD technology makes achieving high power density, low cost and high reliability possible. Package size is 1"×0.6"×0.28" in 7-pin SIP.



Typical Block Diagram

Electrical Specifications

INPUT SPECIFICATIONS

Unless otherwise specified, all parameters are given under typical +25°C with nominal input voltage and under full output load conditions.

| PARAMETER | CONDITION / NOTE | MIN | TYP | MAX | UNIT |
|-------------------------|--|-----|-----|-----|------------------|
| Input Voltage Range | | 2.1 | 3.3 | 4.5 | Vdc |
| No Load Input Current | | | 300 | | μA |
| Full Load Input Current | | | 760 | | mA |
| Input Reflected Ripple | See Figure 2 | | 50 | | mA _{PP} |
| Off State Input Current | | | 300 | | μA |
| Remote On/Off Control | Reference to GND, Open = ON, Short = OFF | | | | |
| Turn On Delay | Including Soft Start, See Figure 3 | | 5 | 8 | mS |
| Undervoltage Lockout | | 1.5 | 2 | 2.4 | Vdc |

OUTPUT SPECIFICATIONS

| PARAMETER | CONDITION / NOTE | MIN | TYP | MAX | UNIT |
|--------------------------|---------------------------------|-----|------|------|-----------------------|
| Output Voltage | | | 5 | | Vdc |
| Output Voltage Accuracy | | | 0.5 | 1 | % |
| Full Load Output Current | | | 450 | | mA |
| Line Regulation | | | ±1 | ±2 | % of V _{OUT} |
| Load Regulation | V = 3.3V, NL to FL | | 1 | 2 | % of V _{OUT} |
| Ripple and Noise | See Figure 2 | | 30 | 50 | mV |
| Temperature Coefficient | | | 0.01 | 0.02 | % |
| Transient Response | See Figure 4 | | 100 | | μS |
| Short Circuit Current | Input Current Limit, Input Fuse | | | | |
| V Adjust Range | | | 5 | 10 | % |

GENERAL SPECIFICATIONS

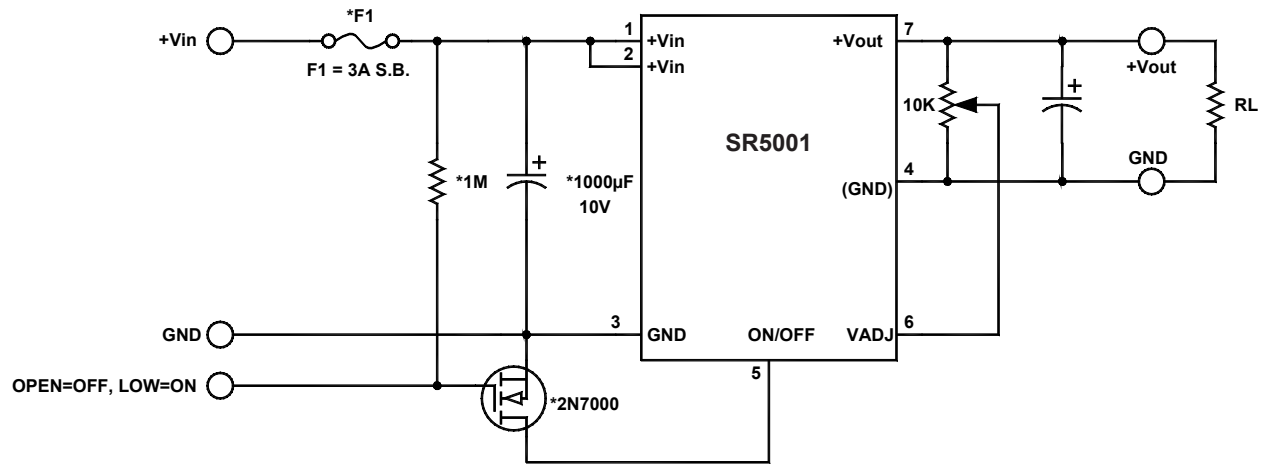
| PARAMETER | CONDITION / NOTE | MIN | TYP | MAX | UNIT |
|---------------------|---|-----|---------------------|-----|-------|
| Efficiency | V _{IN} = 3.3, V _O = 5V@450mA; See Figures 5 & 6 | | 89 | | % |
| Switching Frequency | Fixed | 500 | 550 | 650 | kHz |
| Isolation | None | | | | |
| Thermal Resistance | Internally dissipated | | 0.3 | 0.4 | °C/W |
| MTBF | per MIL-HNBK-217F (Ground benign, +25°C) | | 2.9x10 ⁶ | | hours |

ENVIRONMENTAL SPECIFICATIONS

| PARAMETER | CONDITION / NOTE | MIN | TYP | MAX | UNIT |
|-----------------------------------|------------------|-----|-----|------|------|
| Humidity | Non-condensing | | | 95 | % |
| Storage Temperature | | -60 | | +125 | °C |
| Operating Temperature, Commercial | | -40 | | +71 | °C |

PHYSICAL CHARACTERISTICS

| PARAMETER | CONDITION / NOTE | MIN | TYP | MAX | UNIT |
|--------------------|---|-----|-----|-----|------|
| Dimensions (L×W×H) | 1.00×0.60×0.28 in. (25.40×15.24×7.11mm) | | | | |
| Weight | 0.17 oz. (4.7g) | | | | |



*OPTIONAL PARTS

FIGURE 1. Typical connection diagram

BURST MODE OPERATION

At loads of less than 50% of full load (FL), the converter operates in Burst Mode. Burst Mode Operation saves energy by reducing the switching frequency of the converter down to 25kHz. Operation at frequencies lower than 500kHz results in higher output ripple,

which can be 3–5 times higher than that at full load. In applications where higher output ripple cannot be accepted, a capacitor from 220µF to 4700µF can be used to reduce the Burst Mode Operation ripple down to acceptable levels.

SHORT CIRCUIT PROTECTION

The converter features input current limit protection. The maximum input current limit is set at $-V_{IN}$ minimum (2.5V) for I_O FL+20% typical at room temperature. When I_O exceeds its maximum output value, the output voltage starts to drop until $V_O \leq V_{IN} - V_{FB}$. At this point, the input is connected through the series inductor and diode to the

output load. The input fuse will open when a direct short is placed between V_O and ground (GND). A slow blow fuse is recommended to allow enough time to charge any input and/or output capacitance. When a resettable fuse is used, make sure it will operate over the temperature range of the converter.

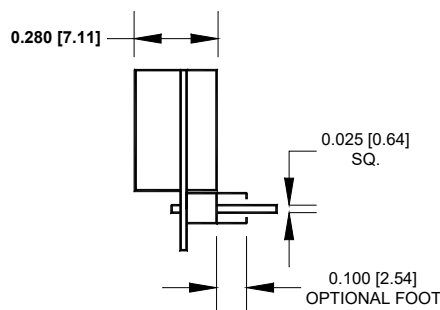
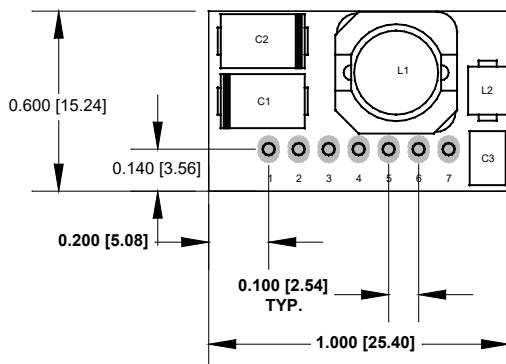
ON/OFF

The converter can be turned ON/OFF through Pin 5. When Pin 5 is left open, the converter is ON. When Pin 5 is pulled low, $V_{PIN5} \leq 0.35V$, the converter will turn OFF. Use a low $R_{DS ON}$ MOSFET

(see Figure 1) for switching.

MECHANICAL SPECIFICATIONS

DIMENSION ARE IN INCH(mm)
TOLERANCE: .XX ±.02(.508)
.XXX ±.01(.254)



| Pin | Function |
|-----|--------------------|
| 1 | +V _{IN} |
| 2 | +V _{IN} |
| 3 | GND |
| 4 | GND |
| 5 | ON/OFF |
| 6 | V _O ADJ |
| 7 | +V _{OUT} |

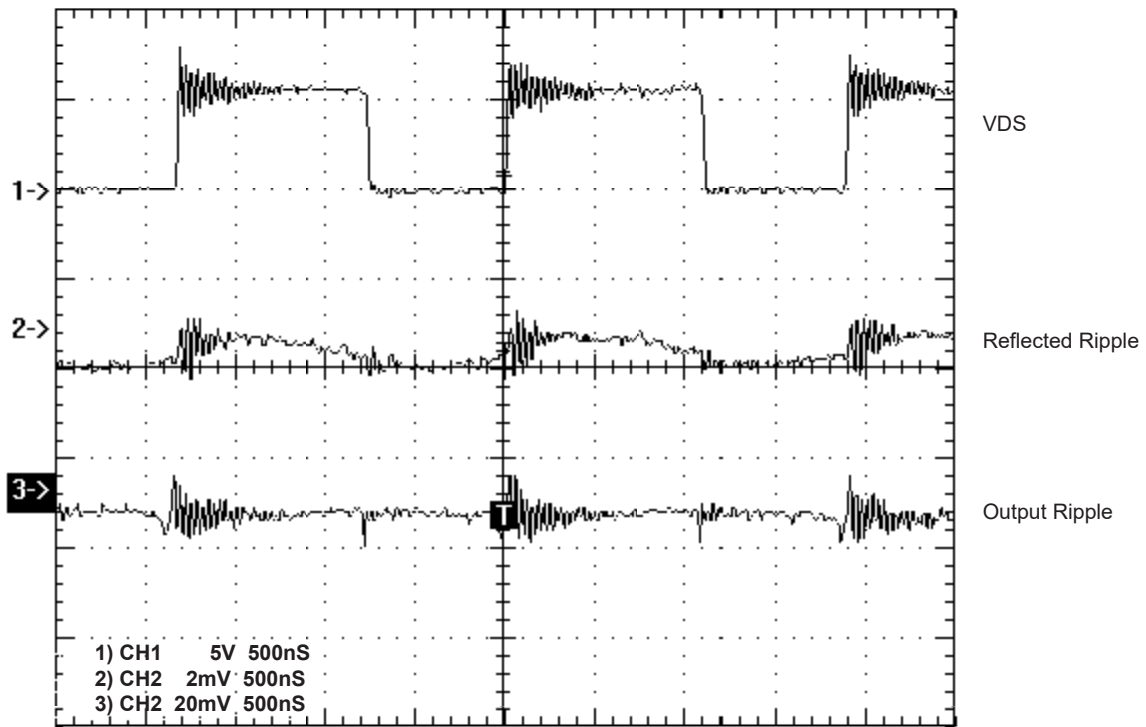


FIGURE 2. Input reflected ripple/output ripple

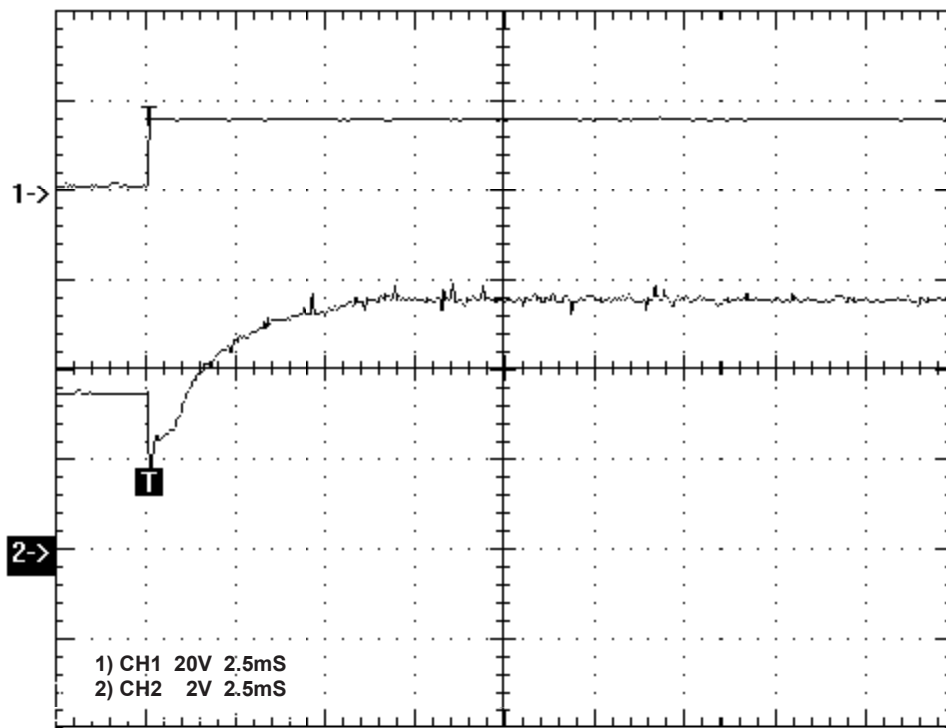


FIGURE 3. Turn on delay, V_o fully loaded

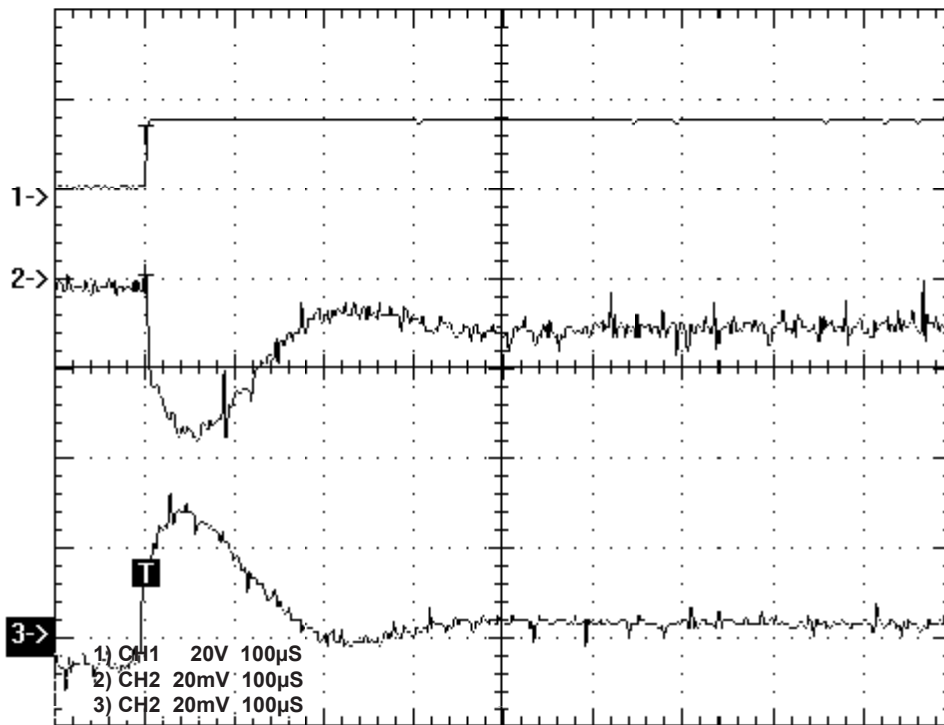


FIGURE 4. Transient response 50%FL to FL to 50%FL

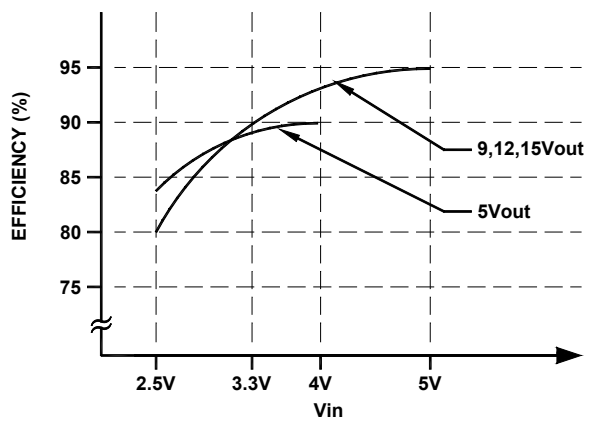


FIGURE 5. Efficiency vs. Input Voltage

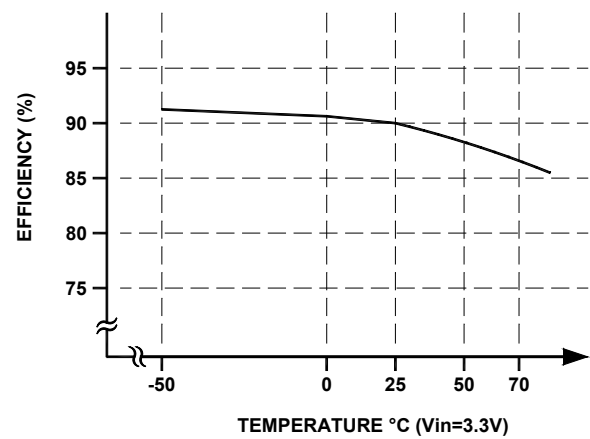


FIGURE 6. Efficiency vs. Temperature