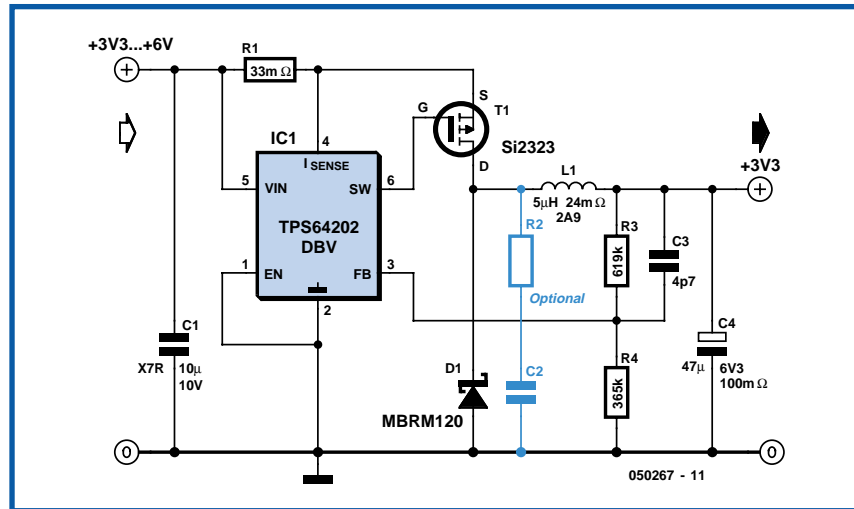


# Step-Down Converter Controller

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The TPS6420x controller is designed to operate from one to three series-connected cells or from a 3.3 V or 5 V supply obtained from a USB port. At its output it can produce 3.3 V at 2 A, suitable for powering a microcontroller-based system. With a suitable choice of external components (inductor, P-channel MOSFET and Schottky diode) the device can be operated over a wide range of possible output voltages and currents. A further advantage is its extremely low quiescent current consumption in power-down mode (100 nA typical) and in no-load operation (20 mA). Also, if the input voltage is less than or equal to the desired output voltage, the device can connect the output directly to the input.

Using just a few external components the TPS6420x can cover an output voltage range from 1.2 V up to the input voltage at up to 3 A, as long as a suitable P-channel MOSFET and Schottky diode are used. The device is an asynchronous step-down converter which, unlike the more widely-used PFM (pulse-frequency modulation) and PWM (pulse width modulation) types, involves a constant on-time and/or constant off-time. Conventional controllers operate in PWM mode at medium to high loads, switching to PFM at lower loads in order to minimise switching losses. The controller described here also adjusts its switching frequency in accordance with the load to achieve a similar effect to the PFM/PWM controllers.



TPS	On time	Off time	Applications
64200	1.6 $\mu$ s	600 ns	Ideal for high efficiency over the entire range of output loads
64201	1.6/0.8/0.4/ 0.2 $\mu$ s	600 ns	Reduced on-time for higher frequency operation than TPS64200, with switching frequency outside audio range
64202	0.6/0.8/0.4 $\mu$ s	300 ns	Ideal for high switching frequency applications where the mark-space ratio approaches 1, such as converting 3.8 V to 3.3 V; the minimum off time determines the switching frequency
64203	0.6 $\mu$ s	600 ns	Ideal for circuits with a low mark-space ratio where high switching frequency is required, such as converting 5 V to 1.5 V; the minimum on time determines the switching frequency