General-Purpose Two-Channel Step-Down DC-DC Converter IC for Stationary Equipment

CXA3738N

Functionality has been increasing rapidly in stationary electronic equipment and as a result the power supply systems in these products have become more complex. This has resulted in an increasing diversity in the power supply ICs used in this equipment.
To respond to this issue, Sony has developed a 0.25 μm analog CMOS process that can include high-voltage transistors and is now releasing the CXA3738N DC-DC converter IC fabricated in this process. The CXA3738N is a two-channel step-down DC-DC converter that adopts the highly general, high-speed, and high-performance synchronous rectification technique.
Sony is committed to continued expansion of its product lines in this area.

- **Input voltage range: 4.5 to 19.2 V**
- **Maximum operating frequency: 2 MHz**
- **Wideband error amplifier: 9 MHz (typ.)**
- **Built-in soft start function**
- **Timer-latch type short circuit protection function**

The CXA3738N is a two-channel high-efficiency synchronous rectification step-down DC-DC converter IC. When combined with p- and n-channel external MOSFETs, it can implement a DC-DC converter that down-converts the equipment internal bus voltage to the required voltage.

Highly General Inputs and Outputs

The CXA3738N achieves the wide input voltage range of 4.5 to 19.2 V by using the absolute maximum rating 24 V high-voltage transistors that are a feature of this 0.25 μm analog CMOS process. This device is optimal for the ever lower supply voltages required by recent digital ICs due to adopting both a low reference voltage of 0.6 V and the use of external resistors to set the output voltage. It can support a wide range of input voltages, output voltages, and load conditions by use in combination with external MOSFETs.

High Switching Frequency (adjustable)

The switching frequency can be set with an external resistor, and the CXA3738N can operate up to 2 MHz. Unlike ordinarily DC-DC converters that operate at low frequencies, the CXA3738N can use a miniature external coil.

Wideband Error Amplifier

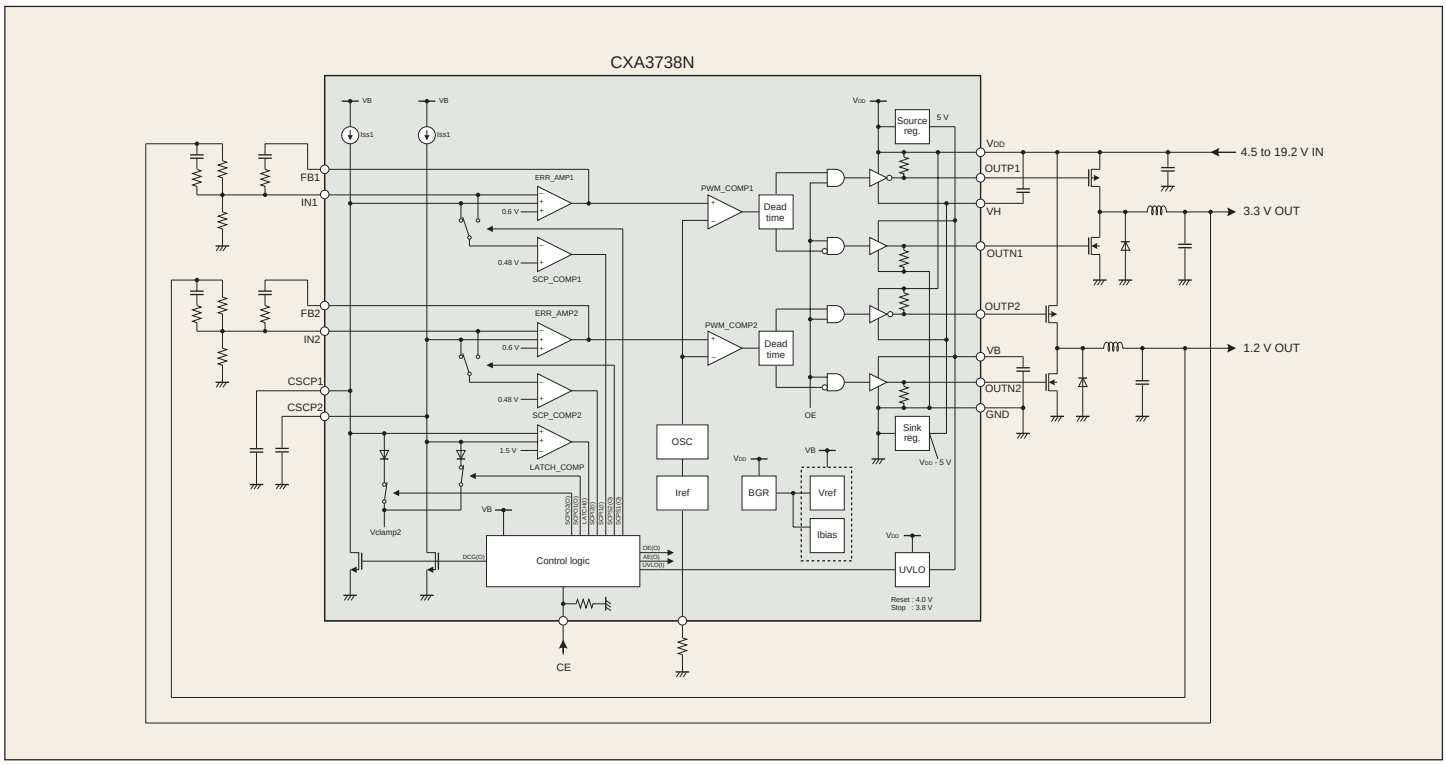
By optimizing internal circuits, Sony achieved a unity gain frequency of 9 MHz (typ.) in the wideband error amplifier. In conjunction with the high switching frequency, this can be used to reduce the size of the external components and increase the speed of the response.

Extensive Set of Built-in Protection Circuits

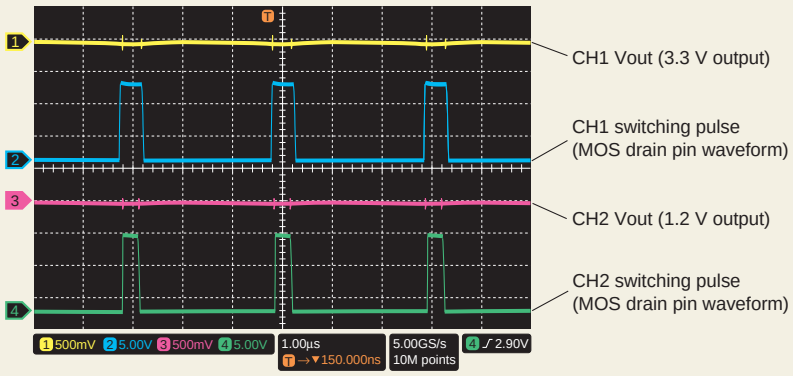
The CXA3738N includes a Under-Voltage Lock Out (UVLO) circuit, a soft start function, and a short circuit protection function as protection functions.
The UVLO circuit prevents IC malfunctions when the supply voltage is too low, for example when power is being applied or shut down.
The soft start function prevents surge currents when the IC starts up. This function can be set independently for each channel with external capacitors.
The timer-latch type short circuit protection function detects when the output voltage has fallen below 80% of the set value and, after a set time has elapsed, latches the output in the stopped state. Like the soft start function, the time can be set independently for each channel. The latched state is cleared by a restart or by reapplying power, thus returning operation to the initial state.

V O I C E

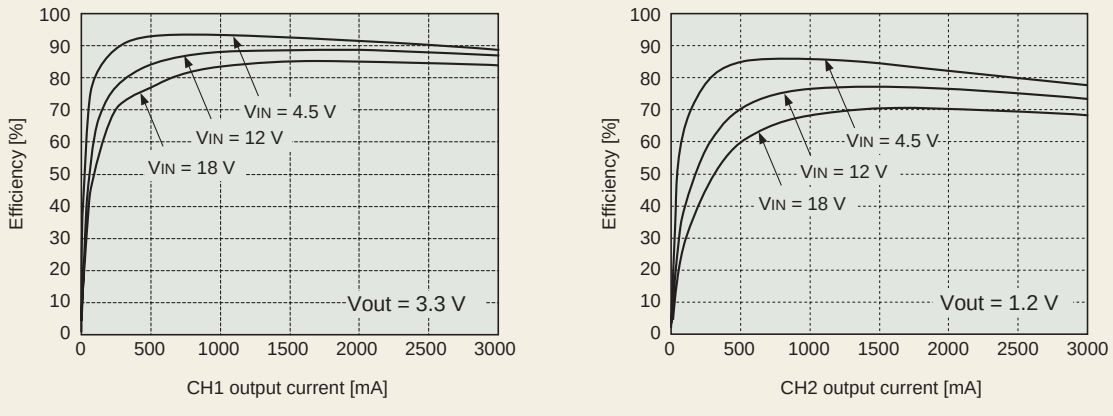
Although the CXA3738N's functions are simple, it features low cost and high flexibility and allows the customer to set up the DC-DC converter characteristics freely. It can contribute to reduced costs if the customer standardizes on this product as the power supply IC in multiple end products. I am confident that you will be satisfied with it and strongly recommend that you consider using it.



■ **Figure 1 Block Diagram and Application Circuit Example**



■ **Figure 2 Operating Waveforms**



■ **Figure 3 Efficiency Characteristics**