This device has three types of current limit modes:

a) Frequency fold-back

b) Cycle-by-cycle peak current limit

c) Hiccup short circuit mode

As the load on the converter is increased, both the peak and valley of the inductor current increase. When the valley goes above the low side current limit (ILS-LIMIT in data sheet), the frequency begins to drop. In this mode the output voltage is still in regulation. The frequency is reduced as the load is increased to keep the valley of the inductor current approximately equal to ILS-LIMIT. With further increase in load, the frequency drops and the inductor ripple current increases while the valley current is approximately constant at ILS-LIMIT. The equations below can be used to estimate the approximate load current when the device enters this mode and the switching frequency:



As the load is increased further, a point will be reached where the peak of the inductor current reaches the high-side current limit (ISC in data sheet). At this point both the peak and valley of the inductor current will be limited at ISC and ILS-LIMIT, respectively. With the inductor current restrained, the output voltage will now drop out of regulation; this can be considered the "true" current limit. The maximum output current will be approximately constant at the value given by the equation below:



In some cases, depending on the input voltage, output voltage, inductor and switching frequency, the peak inductor current may reach ISC before the valley goes above ILS-LIMIT. In this case the converter behaves as with ordinary peak current limit; the output voltage will drop with no frequency fold back. In this case the maximum output current is given by:



The frequency fold-back feature is designed to prevent inductor current run-away during a hard short circuit on the output. Since the valley of the inductor current must always reach ILS-LIMIT in each cycle, the inductor volt-second balance is maintained during a short circuit event. However, allowing the converter to run in current limit for a long duration short circuit may cause excessive power dissipation. This may lead to the thermal shutdown circuit activating, and in some applications this may not be acceptable. To help reduce the power dissipation during a prolonged short circuit, this device incorporates a "hiccup" mode. When the device is in current limit and the voltage on the FB pin falls below about 40% of nominal, the converter is shut down for approximately 100ms. After this pause time, the device tries to re-start, going through a normal soft-start sequence. If the short persist, the device stays in current limit for approximately 23ms and the cycle repeats. If the short has been removed, the device will start up normally.