

Output Considerations

Output Overload and Short Circuit Protection

MDI's hybrid DC-DC converters are protected against the damage caused by output overloads and short circuits

The peak current of the input switching stage is sampled and used to implement an inner current regulation loop, or current mode system. This current mode system improves the dynamic response of the converter.

On a cycle by cycle basis, the peak current in the switching FET is measured and compared to the set value. This then controls the switch off point of the switching FET.

In addition, this set point is limited. Therefore, on a high frequency, cycle basis, the peak current in the switching FET is also limited. This is the fast current limit.

In addition to the fast current limit, the converters have a slow current limit that operates at a lower trip current. This cycle circuit is called the "burp circuit". The burp circuit has a delay before actuation, typically 5 milliseconds. After actuation, the DC-DC converter is switched off for approximately 15 to 20 milliseconds. Then, the converter automatically restarts. This duty cycle feature produces a fold back characteristic of power dissipation. However, the fold back does not affect the converter's ability to charge output capacitors due to the delay built in.

The combination of the fast current limit provided through the current mode circuitry, and the slow current limit provided through the burp circuit provides good protection for the converter.

Since the over load and short circuit protection circuitry samples peak current in the switching FET, the circuit is more sensitive at the lower ranges of input voltages (where the input current is higher for a given load).

Therefore, the trip points are set at the lower steady state voltage.

The current protection circuitry is relatively insensitive to temperature effects. Nevertheless, the current protection circuitry is not intended to be a precision circuit. That is why it is normally set to activate between 120% and 130% of full load rated current, at the low line condition.

For Triple output converters, the auxiliary outputs are derived from three terminal linear regulators. These regulators provide additional current limiting protection, as well as thermal shutdown.