PF600-1 Load Enable Function

Application Note

Load Enable Function for the PF600-1 in DPAs

In this application note, you will find information on implementation of a “load enable” function for the PF600-1 used in distributed power architecture (DPA) applications.

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The PF600 has a pair of pins providing the Output Monitor function, to indicate the status of the output. They are marked “DCOK+” and “DCOK-”, and are designated P12 and P13 respectively.

DCOK- is at the potential of the negative main output terminal, and is connected to it through a low-value resistor (47Ω). This allows DCOK- to be connected to a logic return rail remotely from the module without degrading the logic margin. (Up to 1V is allowed between P7 and P13.)

DCOK+ is an open-drain output that is pulled low to DCOK- when the output has been above about 40V for at least 140ms (the maximum delay is 460ms). It is released if the output falls, even momentarily, below about 38V. For this purpose, the output voltage is that between P6 and P13. DCOK+ can sink up to 30mA, and withstand 20V when off.

This arrangement was chosen because the signal is then valid under all conditions, including when the module is unpowered. For downstream converters that are enabled by a logic low with respect to the negative rail, DCOK+ may be used directly to enable the converters. If pull-up current is required, it can be obtained from the main or auxiliary output. If necessary, place a zener diode across P12-P13 to limit the voltage there. Both the DCOK+ output transistor and the destination logic are otherwise likely to be damaged, particularly if it is the 48V rail that has been used as the pull-up supply.

If an output monitor signal is required relative to the positive rail (for example, if the PF600 is being used to generate a negative 48V supply, as is conventional for telecom applications), the conversion may be obtained in many ways, of which an optoisolator offers perhaps the simplest. With a pull-up resistor from the 48V supply, its transmit diode can be connected in series with DCOK+ or in parallel, between DCOK+ and DCOK-. In the latter case, it will not even be necessary to limit the off-state voltage with a zener or resistor, since the transmit diode will limit the voltage to only 1.1V or so. The pull-up resistor in either case must provide enough drive current for the needs of the output logic signal. The receive transistor can then be connected to provide whatever logic level, polarity and reference is required.

Where multiple PF600 units are used together, there will be as many DCOK+ signals. There are three ways to deal with them, depending on the information required:

1. The simplest: if all the modules are connected directly in parallel without gating diodes, the several DCOK+ signals will all be equivalent. You may use any one of them, and ignore the rest.
2. With gating diodes between parallel-connected main outputs, their voltages can differ. If the several DCOK+ signals are connected directly in parallel, they will indicate that at least one of the supplies is in regulation. All the others could be faulty. This method may be sufficient to generate a “start” command for downstream modules.
3. If it is required to indicate that all the parallel outputs are functioning, a gating operation must be performed on the DCOK+ signals. This can be done with diodes or an OR logic gate in the usual way, or by appropriately connecting the receive transistors in an optoisolator circuit. Either the “series” or the “parallel” configuration can be used. If the main outputs are series-connected, the opto method is the only (sensible) one.

See also ACAN-09, which deals with series and parallel operation of the PF600.

The possible variations make it impractical to give full details for all circumstances, but if help is needed in implementing these ideas in a particular application, please contact the factory.