NADAGY

ND15A20
Superdiode

FEATURES

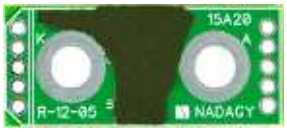
- **Max continuous current: 15A**
- **Forward voltage: 75mV (at 15A)**
- **Continuous blocking voltage: 20V**
- **Reverse breakdown voltage: 24V**
- **Dimensions: 1.45" × 0.65" × 0.2"**

APPLICATIONS

- Battery banks
- Solar installations

GENERAL DESCRIPTION

The ND15A20 superdiode is a low-frequency rectifier performing a function analogous to the standard diode. Compared to a standard diode, the superdiode will conduct current with much reduced forward voltage drop. Typical forward voltage drop at 15A current is around 75mV. The standard Schottky diode rated for the same maximum forward current will feature substantially more power dissipation due to higher voltage drop across the device.

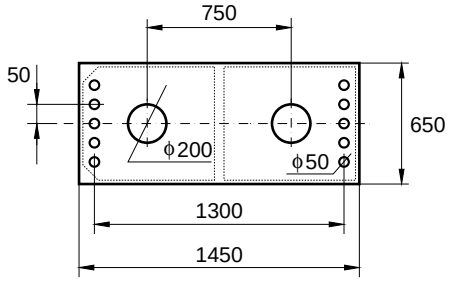


The ND15A20 superdiode is designed to operate without a heat-sink. As is the case with all semiconductor devices, forward current flow causes temperature rise of the device beyond the ambient temperature of the environment. The actual maximum sustainable device current is therefore dependent on the ambient temperature. The temperature rise of 50C corresponds to 15A forward current. Nevertheless, the device can sustain an occasional overcurrent exceeding 20A.

The forward start-up current of ND15A20 is less than 15mA. The voltage-current characteristic for currents below this value exhibits hysteresis. Once in superdiode mode (forward conduction with low voltage drop) the current can be decreased down to single milliamps before the superdiode mode stops. When not in superdiode mode, the characteristic is that of the standard Schottky diode.

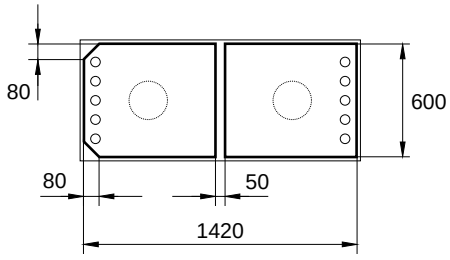
The dynamic response of the ND15A20 is fast-on, slow-off. Switching times are somewhat dependent on the overall circuit impedance. The turn-off time when driven with a 20V peak-to-peak function generator square wave with a $50\,\Omega$ port is typically less than 5ms. The reverse continuous blocking voltage is at least 20V.

DIMENSIONS

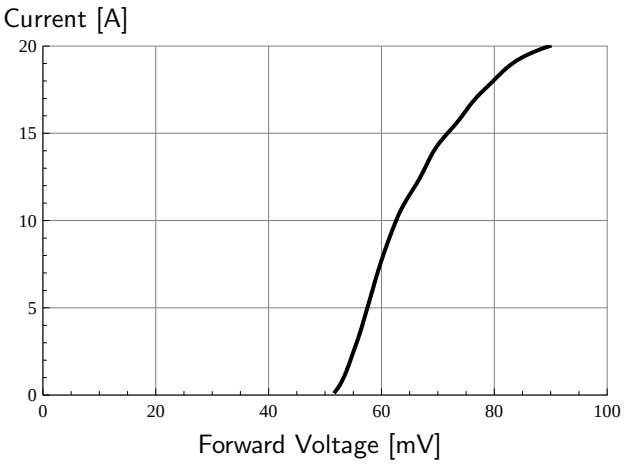


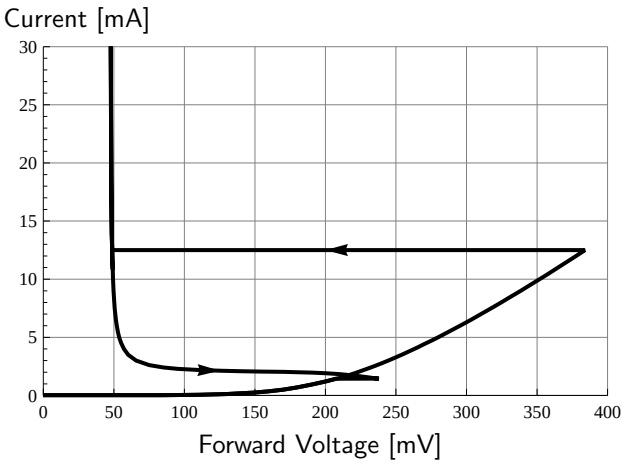
The ND15A20 is a mini-circuit assembled on the FR-4 printed circuit board material. It is solder-ready on both sides of the PCB. Five solder vias at both edges of the board can accommodate current routing wires. Two large holes allow for terminal connections such as the standard 3/4 inch mounting posts or banana plugs.

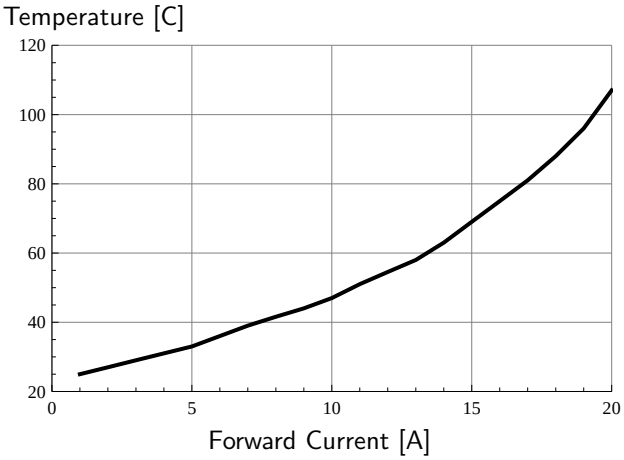
FOOTPRINT

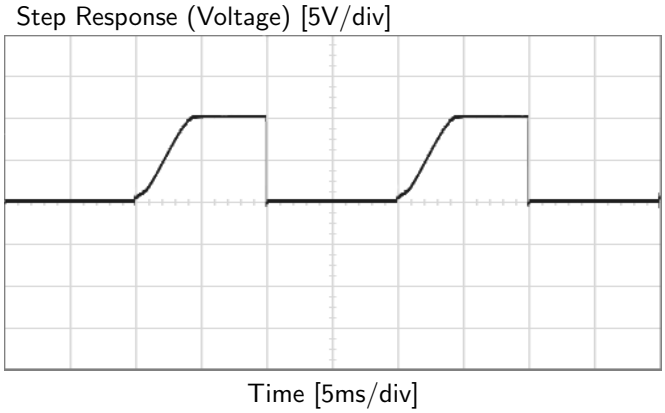


The board is flat with exposed pads on solder side and can be directly soldered to the main printed circuit board, according to the footprint provided.



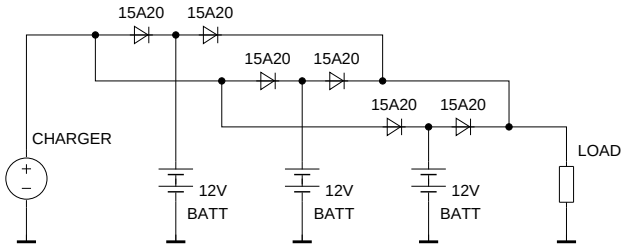






APPLICATIONS

Battery separation: A common method to build a large capacity battery bank is to connect many batteries in parallel. However, if one of the batteries becomes weak or fails, the entire battery bank could be compromised and in need for service. Instead, batteries can be separated from each other with superdiodes, as shown in the figure.



In such arrangement, the battery with the lowest voltage will receive charge first, whereas the battery with the highest voltage will be loaded the most. Even if one or more batteries in the bank would fail, the system will still function with the remaining good batteries.

Solar panel bypass diode: Solar arrays are built of strings of solar cells arranged in individual sections (panels). In a long string, one of the sections may become completely shaded, while other sections still producing power. The section in shade may become damaged due to power dissipation (hot spot) caused by reverse bias of cells. The 15A20 superdiode will protect solar cell strings through bypassing reverse polarity current.