TABLE 2-continued

Load Regulation vs Frequency			
Frequency Hz	Current change ppm	Phase change Rad	Output impedance
16 K	−610	9577	327
20 K	−793	11800	252

The last column in the table shows the calculated equivalent output impedance. The output impedance falls off rapidly with frequency to about two hundred fifty ohms at 20 kHz. The low output impedance at higher frequencies is a result of the negative feedback that was added to make the amplifier unconditionally stable for all loads.

A high-current, very-wide-band transconductance amplifier has been described. The approach is based on paralleling the input and output of complementary unipolar current-mirror cells. The cell approach has the advantage of avoiding the need for a single low-resistance current shunt and the attendant problems inherent in such resistors. It was shown that the bandwidth of the system is independent of the number of current cells. Test results of transconductance amplifier **12** indicate that a bandwidth of 750 kHz and output currents up to thirty-five amps rms at 100 kHz can be achieved.

While the present invention has been described by way of a preferred embodiment, it is to be understood that this is for illustration purposes only and that the present invention should not be limited thereto. To those skilled in the art, many modifications and variations of the present invention are possible in light of the above teachings. It is therefore to be understood that the present invention can be practiced otherwise than as specifically described herein and still be within the spirit and scope of the appended claims.

What is claimed is:

1. A high current transconductance amplifier comprising:

differential voltage to current converter means for converting an input voltage to a positive current signal and a negative current signal;

a plurality of positive current mirror cells, said positive mirror cells connected to each other in parallel and connected to said converter on their input side each of which receives a portion of said positive current signal and each of which generates a positive output current signal;

a plurality of negative current mirror cells, said negative mirror cells connected to each other in parallel and connected to said converter on their input side each of which receives a portion of said negative current signal and each of which produces a negative output current signal; and

means for connecting each of the positive output current signals from said plurality of positive current mirror cells and each of said negative output current signals from said plurality of negative current mirror cells to add together forming an output current signal delivered to a load.

2. The transconductance amplifier according to claim **1**, wherein said differential voltage to current converter includes:

differential input means for separating an input voltage terminal and an output load current terminal.

3. The transconductance amplifier according to claim **2**, wherein said differential input means comprises:

a first input terminal and a second input terminal across which said input voltage is supplied;

a first differential amplifier having its positive input connected to said first input terminal;

a second differential amplifier having its positive input connected to connected to said second input terminal; and

current amplification means for providing a current signal to said output load current terminal.

4. The high current transconductance amplifier of claim **1**, wherein each of said positive current mirror cells and negative current mirror cells comprises:

an input terminal for receiving an input current signal;

power supply means;

first resistor means connected in series with said power supply means and said input terminal;

operational amplifier means having positive and negative input terminals and an output terminal, said positive input being connected to said first resistor means at the junction of said first resistor means and said input terminal;

second resistor means connected at one end to said power supply means;

power MOSFET means connected to said output terminal of said operational amplifier means and having an input and an output;

transformer means connected in series between the other end of said second resistor means and said power MOSFET means; and

output terminal means connected to said output of said power MOSFET means.

5. A method for producing a stable high current over a wide bandwidth comprising the steps of:

converting a voltage input to a positive current signal and a negative current signal using a differential voltage to current converter;

connecting a plurality of positive current mirror cells to each other in parallel and to said converter on their input side;

providing a portion of said positive current signal to each of said positive current mirror cells;

connecting a plurality of negative current mirror cells to each other in parallel and to said converter on their input side;

providing a portion of said negative current signal to each of said negative current mirror cells; and

providing an output to a load by connecting outputs from said plurality of positive current mirror cells and said plurality of negative current mirror cells together and to said load.

6. The method according to claim **5**, wherein said step of converting said differential voltage to current converter includes:

isolating said input voltage from said output current by separating an input terminal for receiving said input voltage and an output terminal for providing said output current.

7. The method according to claim **6**, wherein said step of isolating said input voltage includes:

receiving said input voltage across a first input terminal and a second input terminal;

connecting the positive input of a first differential amplifier to said first input terminal;

connecting the positive input of a second differential amplifier to said second input terminal; and