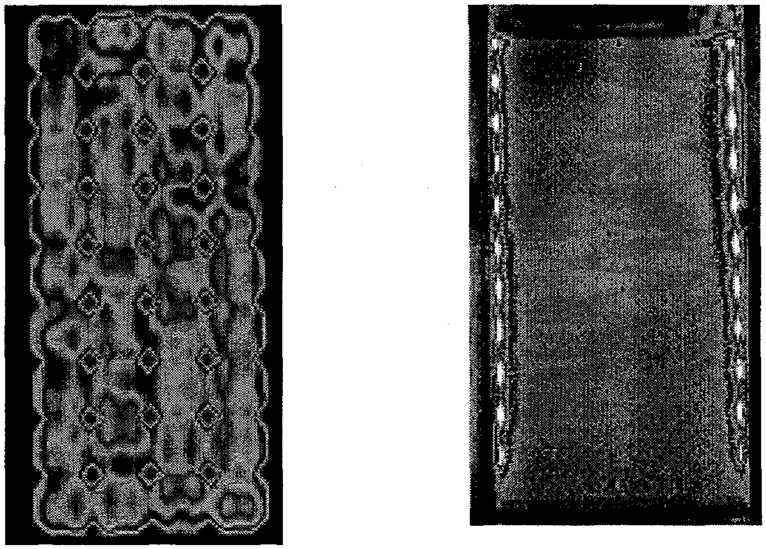

FIGURE 11. Infrared images of crystalline silicon module in forward bias indicating normal temperature distribution with cell variation less than 5 °C (left) and amorphous silicon module in reverse bias showing correct function of bypass diodes located under module frame (right).

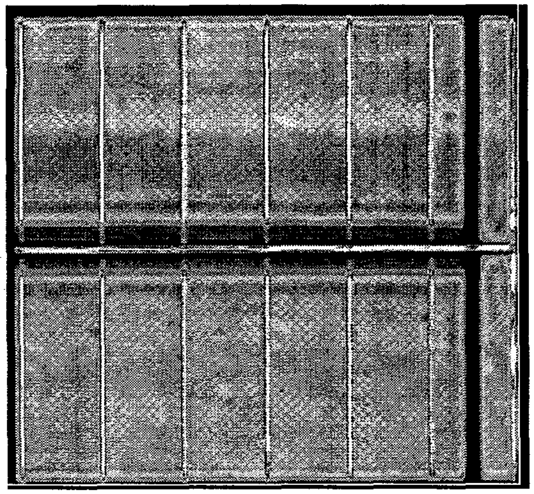

FIGURE 12. Ultrasonic image of a module scanned at a frequency of 20 MHz. Dark regions in the image indicate the presence of air voids internal to the module.

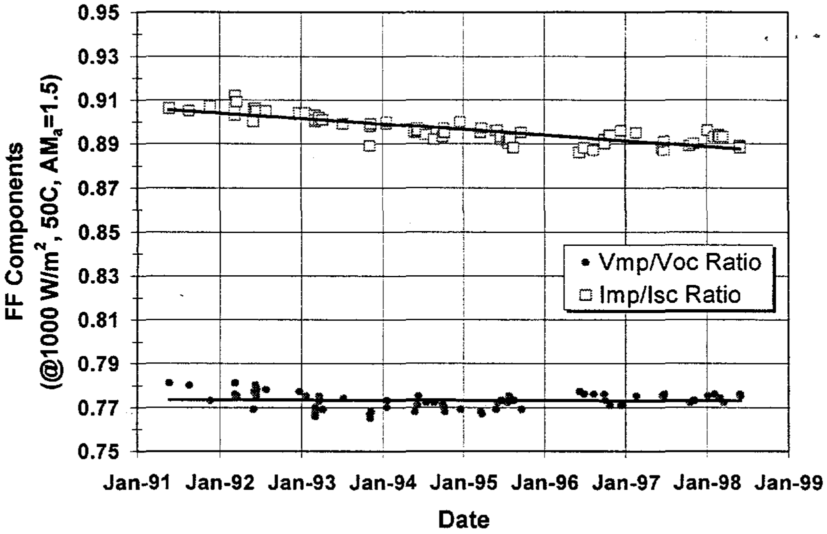

FIGURE 13. Long-term performance monitoring of a 36-cell silicon module at Sandia showing gradual decline in I_{mp}/I_{sc} ratio. Product of the two ratios is the fill factor (FF). Power from this module has declined at a rate of about –0.4 (%/yr).