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PRECISE OTP POINT SETTING OVER A WIDE VOLTAGE RANGE

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Precise OTP Point Setting Over a Wide Voltage Range

Abstract: In order to meet skin temperature requirements for an electronic product, an over temperature protection circuit is compensation to maintain the OTP trigger point within a tight tolerance over a wide range of input voltages.

This disclosure relates to the field of environmental requirements for electronic products.

A technique is disclosed that compensates an overtemperature protection circuit over a wide range of AC input voltages to maintain the OTP trigger point within a tight tolerance.

According to IEC 62368-1, 3rd Edition, Section 9.3, "Touch temperature limits Requirements", in the event of an abnormal condition, the skin temperature of a plastic part (e.g. a handle, knob, grip, or housing) of an electronic product should be less than 87 degrees C.

For a device which has a normal operation temperature of 35 degrees C and a plastic part skin temperature specification is 45 degrees C, the skin temperature in the event of abnormal operation, as determined by an overtemperature protection circuit (OTP), will be 80 degrees C. This provides only 6 degrees C of tolerance for meeting IEC 62368. As a result, the OTP trigger point must be set very accurately between a 90 Vac (low) input voltage and a 264 Vac (high) input voltage in order to meet the temperature requirements.

According to the present disclosure, and as understood with reference to the Figure, in order to detect AC input signals to compensate for the proximity of the OTP high and low voltage protection points, the winding forward signals in the Aux winding can be used. The Aux forward signal 10 is applied to a voltage dividing compensation circuit 20 (having voltage divider R31/R32 30) to determine the compensation voltage 40. The compensation voltage 40 is then applied to the OTP circuit 50 in order to set an overtemperature protection point for triggering the OTP signal 60. The overtemperature protection point will be within a narrow tolerance for any AC input voltage between the low AC input voltage and the high AC input voltage.

This technique advantageously allows the OTP circuit to meet environmental temperature requirements regardless of the AC input voltage applied to the electronic device.

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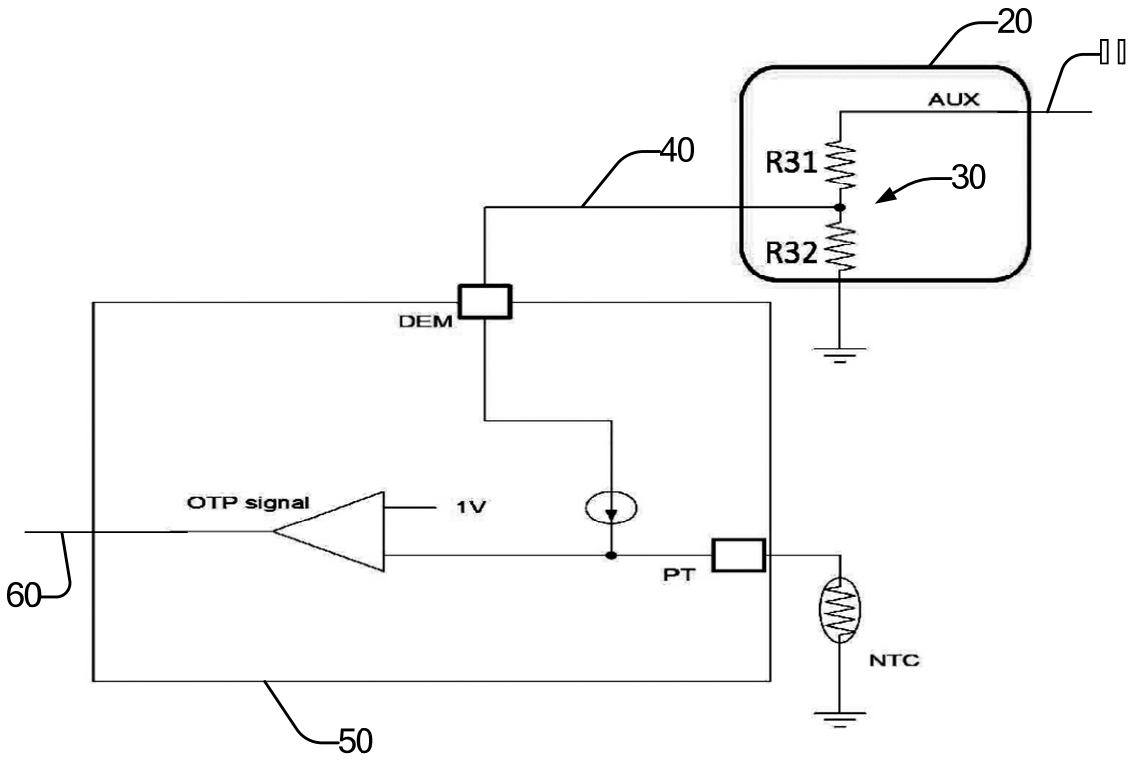
20
AUX
40
R31
30
R32
DEM
OTP signal
1V
PT
NTC
60
50