INTERNATIONAL ELECTROTECHNICAL COMMISSION

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THERMAL RESISTANCE MEASUREMENTS FOR SMD CHIP RESISTORS

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IEC 60XXX-X has been prepared by IEC technical committee 40: Capacitors and resistors for electronic equipment. It is an International Standard.

The text of this standard is based on the following documents:

FDIS	Report on voting
40/xx/FDIS	40/xx/RVD

Full information on the voting for the approval of this standard can be found in the report on voting indicated in the above table.

The committee has decided that the contents of this publication will remain unchanged until the stability date indicated on the IEC web site under "http://webstore.iec.ch" in the data related to the specific publication. At this date, the publication will be

- reconfirmed,
- withdrawn,
- replaced by a revised edition, or
- amended.

The National Committees are requested to note that for this publication the stability date is xxxx.

THIS TEXT IS INCLUDED FOR THE INFORMATION OF THE NATIONAL COMMITTEES AND WILL BE DELETED AT THE PUBLICATION STAGE.

A bilingual version of this publication may be issued at a later date.

METHOD OF MEASUREMENT OF THERMAL RESISTANCE OF SMD CHIP RESISTORS

1. Scope

Thermal resistance measurement is a method to evaluate the ability of resistor that can handle the expected power dissipation without overheating, allows to estimate the temperature rise accurately, to optimize the layout and thermal management of the system ensuring that resistor operate within safe temperature limit, to prevent premature failure or degradation of the resistor due to excessive temperatures, to assess thermal performance of resistor and predict long term reliability.

This International Standard specifies a method of measurement and associated test conditions to assess the thermal resistance generated in a resistor. This method is applied if prescribed by a relevant component specification, or if agreed between a customer and a manufacturer.

2. Normative references

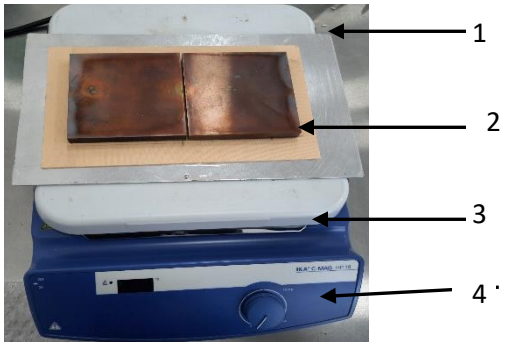
The following referenced documents are indispensable for the application of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendment) applies.

IEC 60115-1, *Fixed resistors for use in electronic equipment Part 1: Generic specification*

3. Terms and definitions

For the purpose of this document the following terms and definitions apply.

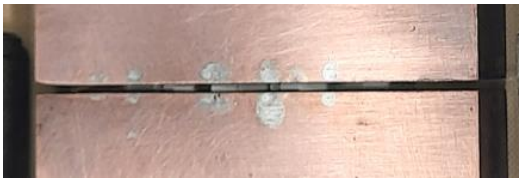
4. Method of measurement



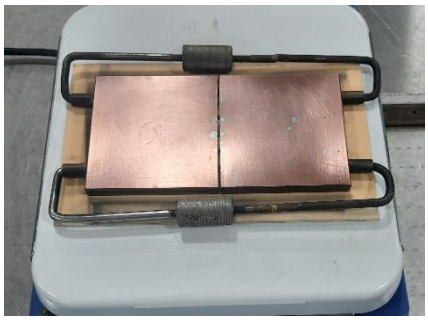
Key

1. Aluminum plate
2. Copper plate
3. Ceramic plate
4. Hot plate

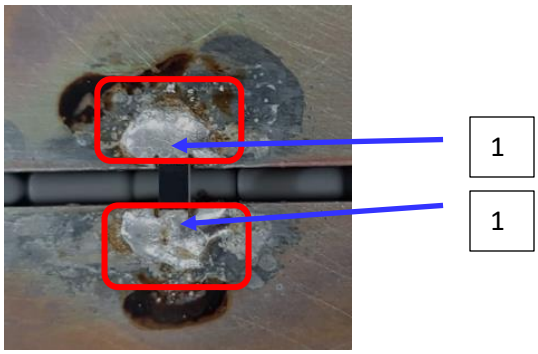
- Clean copper block by liquid soap and dry in air.
- Place ceramic plate and aluminum plate on hot plate – refer below snap.
- Place copper block on Ceramic plate. (Note : Make sure that copper block is completely dried and contains no moisture)



- Adjust gap between the copper blocks by using filler material(Mica sheets, ceramic rods etc) as per dimension between chip component terminals



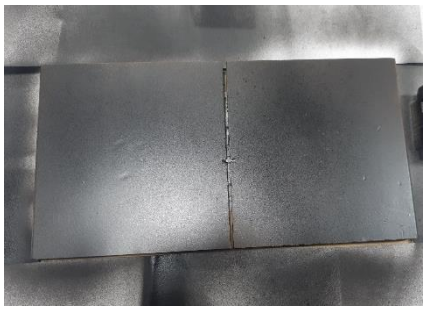
- Set temperature 320°C of hot plate
- Wait for 30 minutes until the copper plate is heated.(Observed change in colour of copper blocks)
- Apply small amount of solder paste on corner of the each copper plate to check whether the copper plate has reached desire temperature. If solder paste melt immediately, we can proceed for next step. Other wise wait for few minutes more and again confirm copper block temperature by applying solder paste.
- For new copper block tinning of component, placing position need to be tinned.
- After confirming copper block temperature, apply solder paste at either opposite edge of copper blocks for tinning of copper block edge. Place the sample on it. After solder paste application, wipe out excess solder to get tinned spot/ position.



Key : 1 Application of solder paste

- After component placement, reduce temperature of hot plate from 320°C to 0°C and wait until the temperature of copper block reaches room temperature. (For guidance purpose - It will take approximate 2 hrs. to reach at room temperature)

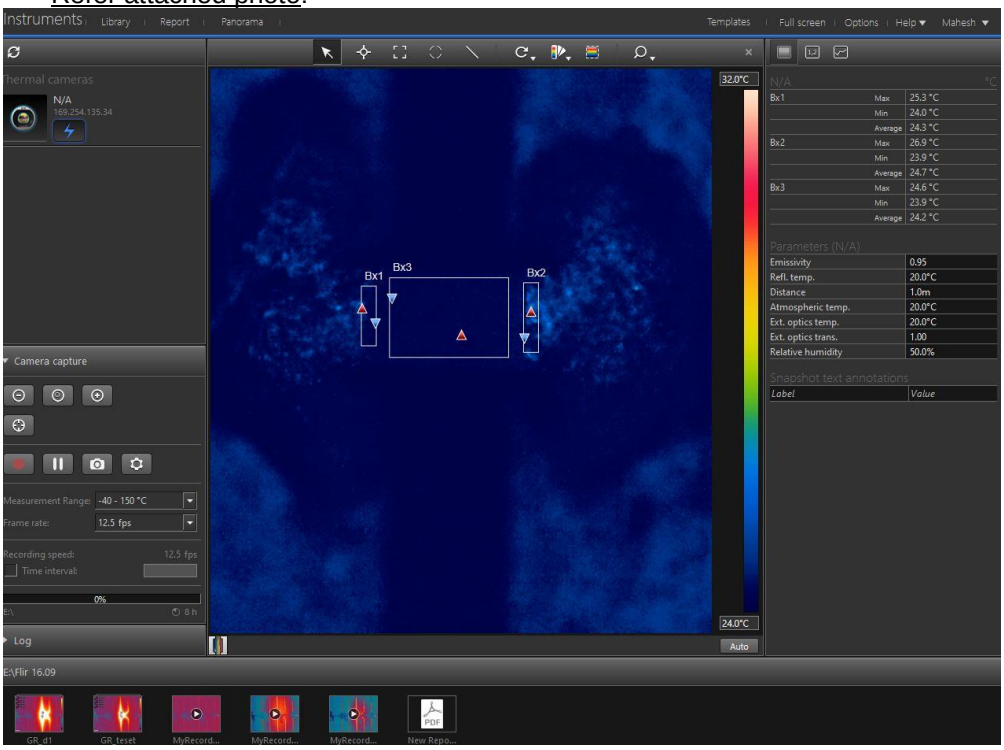
- Apply thin layer of black spray paint on copper block. And let it dry for approximate 45 minutes.



- Carefully place the Copper plate with component, under thermal imager lens.
- Carefully connect copper blocks to power supply using probes.

- Use thermal imaging camera to measure the temperature.

Refer attached photo:



- Apply require voltage.
- Measure thermal resistance with appropriate measurement equipment.

SAFETY:

- Ensure the temperature of Copper block reached to room temperature before application of black spray paint
- Connect and disconnect test jig only after turning power supply OFF.
- Use Nitrile hand gloves for cleaning paint on copper block.