

CERTIFICATE OF REFERENCE MATERIAL

- CRM Description: Sheet Resistance of Semiconductor(Siliconwafer: 10 mΩ/□ ~ 10 kΩ/□)
- CRM No.: 206-01-028 · Serial No.:
- Specification: 1 kΩ/□
- Producer: Korea Research Institute of Standards and Science, 267 Gajeong-ro, Yuseong-gu,
Daejeon 34113, Republic of Korea
- . Summary: Sheet Resistance Standards

Description of Certification

- Intended Use: The CRMs are used for the calibration of equipments to measure semiconducting electrical resistivity and sheet resistance for maintenance of traceability and quality control in semiconductor production process.
- Instructions for Storage and Use: Measurement temperature: $(23.0 \pm 1.0) ^\circ\text{C}$, Measurement Humidity: $(50 \pm 10) \%$, Measurement current: DC 1.0 mA, probe: Jandel, probe spacing: 1.00 mm, tip radius: 0.100 mm, load: 300 g, Sample thickness: 0.597 mm, Sample diameter: 100 mm.
- Method(s) of Certification: Four-Point Probe method, ASTM F84-02(2002)
- Certified Reference Values and Uncertainties:
Certified value: $1.018 \text{ k}\Omega/\square$, Uncertainty: 1.0 %
 - ※ The certified value is an average value measured in a range of 360 degrees with a center diameter of 10 mm or less of the CRM.
 - ※ The expanded uncertainty in this certificate does not include the long term stability of the CRM.
 - ※ The expanded uncertainty in this certificate has been calculated in accordance with the principles of the ISO Guide to the expression of Uncertainty in Measurement, and is expressed as the standard uncertainty multiplied by the coverage factor $k = 2$, which corresponds to a level of confidence of approximately 95 %.
- ※ Measurement uncertainty calculation:
 - KRISS/SP-2010-105, Guide to the Expression of Uncertainty in Measurement.
 - EA-4/02(2106), Expression the uncertainty of measurement in calibration.
- Metrological Traceability: The measurement results are traceable via the national measurement standards of Korea to the International System of Units (SI)
- Standards used
Sheet resistance measurement system (Model: RSD-1G, S/N: 10153)
- Safety Information: Material Safety Data Sheet(MADS) is not required.
- Date of Certification: Valid until:

This is to certify that the above CRM(Certified Reference Material) is traceable to the national measurement standards in accordance with the provision of Article 13 of the Framework Act on National Standards.

• **Date of Issue :**

• **Approved by :** Lee, Hyung Kew

Sign

President of KRISS

Seal

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