

Technical Data Sheet



THICK FILM MATERIALS

Product Type: Resistors

9000 Series



0.1 ohm/sq to 20G ohm/sq Resistor Paste

Description

Series 9000 Resistor System provides excellent stability, low firing sensitivity and low TCR's. The 9000 Series is designed to be fired in air at an optimum temperature of 850 °C. All ranges exhibit excellent compatibility with various conductor and dielectric systems.

Key Benefits

- REACH¹ and ROHS² compliant
- TCR's of 50 ppm 10 Ω through 1 MΩ
- Blendable System
- Excellent post laser trim stability
- Minimal sensitivity to processing variations and resistor geometries
- Extremely tight as-fired resistance distribution

Typical Properties

9000 Series ¹	9000.1	9001	9011	9014	9114	9121	9131	9135
Viscosity, Kcps @ 25 °C Brookfield HBT, Spindle SC4-14, 10 rpm	150 – 250	150 – 250	150 – 250	150 – 250	150 – 250	150 – 250	150 – 250	150 – 250
Resistivity ² (Ω/□)	0.1	1	10	40	40	100	1K	5K
Tolerance %	± 20	± 20	± 10	± 10	± 10	± 10	± 10	± 10
TCR ² (ppm/°C)	250	150	50	50	50	50	50	50
Short term overload voltage ³ (V/mm)	0.39	1.8	7	13.5	14	27	70	200
Standard working voltage ⁴ (V/mm)	0.15	0.7	2.8	5.4	5.6	10.8	28	80
Quan tech noise ⁵ (db)	-	< -27	< -29	< -22	< -31	< -29	< -18	-13
ESD ⁶ (2000V/mm)	-	-	± 0.9 %	± 0.9 %	± 0.1 %	± 0.1 %	± 0.2 %	0.5%
Blendable Series	A	A	A	A	B	B	B	B

TEST CONDITIONS

1. Resistor properties based on laboratory tests using recommended processing conditions; termination- 3504 Palladium Silver Conductor pre-fired at 850 °C; substrate-96 % alumina; printing-280 mesh stainless screen 12µm emulsion thickness to a dried thickness of 20-22µm; firing-30 minute cycle to peak temperature of 850 °C for 10 minutes.
2. Shipping specifications: Resistor geometry 5mm x 1mm for 9000.1 and 9001; 1mm x 1mm for remaining values. Temperature coefficient of resistance -55 °C to +25 °C and +25 °C to +125 °C.
3. Short Term overload voltage. Voltage required (5 second duration) to induce a resistance change to 0.1% in a 1mm x 1mm resistor at 25 °C.
4. Standard working voltage = 0.4 x short term overload voltage.
5. Resistor geometry 5mm x 1mm.
6. Electrostatic Discharge. Resistance change after two 2000 volt pulses on a 1mm x 1mm resistor.

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Typical Properties (continued)

9000 Series ¹	9141	9151	9161	9171	9181	9191	9194	91910	91920
Viscosity, Kcps @ 25 °C Brookfield HBT, Spindle SC4-14, 10 rpm	150 – 250	150 – 250	150 – 250	150 – 250	150 – 250	150 – 250	150 – 250	150 – 250	150 – 250
Resistivity ² (Ω/□)	10K	100K	1M	10M	100M	1G	4G	10G	20G
Tolerance %	± 10	± 10	± 10	± 10	± 20	± 20	± 20	± 20	± 20
TCR ² (ppm/°C)	50	50	50	100	100	-	-	-	-
Short term overload voltage ³ (V/mm)	200	520	1000	1000	1600	-	-	-	-
Standard working voltage ⁴ (V/mm)	80	208	400	400	640	-	-	-	-
Quan tech noise ⁵ (db)	< -13	< -6	< -1	-	-	-	-	-	-
ESD ⁶ (2000V/mm)	± 0.5 %	± 0.2 %	± 0.1 %	-	-	-	-	-	-
Blendable Series	B	B	B	B	B	B	B	B	B

TEST CONDITIONS

1. Resistor properties based on laboratory tests using recommended processing conditions; termination- 3504 Palladium Silver Conductor pre-fired at 850 °C; substrate-96 % alumina; printing-280 mesh stainless screen 12µm emulsion thickness to a dried thickness of 20-22 µm; firing-30 minute cycle to peak temperature of 850 °C for 10 minutes.
2. Shipping specifications: Resistor geometry 5mm x 1mm for 9000.1 and 9001; 1mm x 1mm for remaining values. Temperature coefficient of resistance -55 °C to +25 °C and +25 °C to +125 °C.
3. Short Term overload voltage. Voltage required (5 second duration) to induce a resistance change to 0.1% in a 1mm x 1mm resistor at 25 °C.
4. Standard working voltage = 0.4 x short term overload voltage.
5. Resistor geometry 5mm x 1mm.
6. Electrostatic Discharge. Resistance change after two 2000 volt pulses on a 1mm x 1mm resistor.

Thinner:
RV-372

Warranty:
Material guaranteed to meet specifications for 6 months from date of shipment.

Storage:
Store in a dry location at 5 – 25 °C.

DO NOT REFRIGERATE.

Allow paste to come to room temperature prior to opening. Spatulate well before using, as settling may occur during storage.

Legend:

¹⁾ REACH compliant according to the latest * Annex XIV to Regulation (EC) of the European Parliament and of the council on the Registration, Evaluation, Authorisation and Restriction of Chemicals (“REACH”) by European Chemicals Agency and its subsequent amendments; the material does not contain any substance listed in Annex XIV.

²⁾ RoHS compliant according to the latest * Directives (European Union) of Restriction of Hazardous Substances (“RoHS”) and its subsequent amendments (including the exceptions related to Pb)

Heraeus Electronics
Heraeus Deutschland GmbH & Co. KG
Heraeusstraße 12 – 14
63450 Hanau, Germany
www.heraeus-electronics.com

Americas
Phone +1 610 825 6050
electronics.americas@heraeus.com

China
Phone +86 21 3357 5457
electronics.china@heraeus.com

Asia Pacific
Phone +65 6571 7677
electronics.apac@heraeus.com

Europe, Middle East and Africa
Phone +49 6181 35 3069, +49 6181 35 3627
electronics.emea@heraeus.com