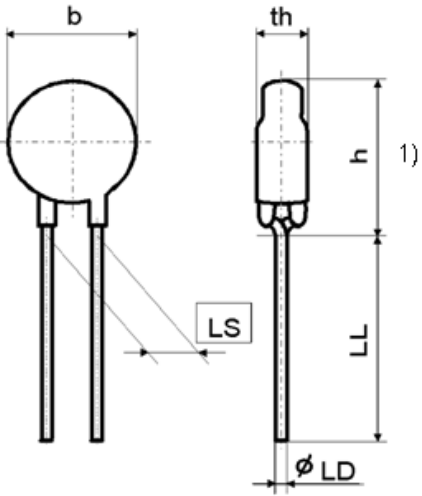


<p>Specification available from:</p> <p>Österreichischer Verband für Elektrotechnik (OVE) Eschenbachgasse 9 A-1010 VIENNA</p>	<p>IEC 60539-1-1 AT0002 Issue 4 / 2023-03</p>
<p>ELECTRONIC COMPONENTS OF ASSESSED QUALITY IN ACCORDANCE WITH:</p> <p>IEC 60539-1:2022-12</p>	
<p>Outline drawing: [see 1.2]</p>  <p>Note: 1-Other shapes and crimp styles are permitted within the dimensions given. 2-The undimensioned details do not affect the performance of the device.</p>	<p>DIRECTLY HEATED NEGATIVE TEMPERATURE COEFFICIENT THERMISTORS – Inrush Current Limiters</p>

Information on the availability of components qualified to this detail specification is given in the Register of Approvals

1. General data

1.1 Method(s) of mounting

The ICLs shall be mounted by their normal means in such a manner that there shall be no parasitic vibration.

1.2 Dimensions

- Body diameter: b
- Body thickness (including terminations of styles with wire terminations): th
- Body height: h
- Diameter of wire terminations: LD
- Length of wire termination: LL
- Distance between wire terminations: LS

Ordering code	b _{max}	th _{max}	h _{max}	LD ¹⁾	LL _{min}	LS ¹⁾
	mm	mm	mm	mm	mm	mm
B57205P*	8	6	12	0.6±0.05	2.5	5.0±0.6
B57153S*	9.5	6	15	0.6±0.05	2.5	5.0±0.6
B57235S*	11	6	16	0.6±0.05	2.5	5.0±0.6
B57236S*	12.5	6	18	0.6±0.05	2.5	5.0±0.6
B57211P*	14	7	22	0.8±0.05	2.5	7.5±0.8
B57213P*	15.5	7	24	0.8±0.05	2.5	7.5±0.8
B57234S*	18	7	24	0.8±0.05	2.5	7.5±0.8
B57237S*	18	7	24	0.8±0.05	2.5	7.5±0.8
B57238S*	19	7	25	1.0±0.05	2.5	7.5±0.8
B57364S*	24	7	30	1.0±0.05	2.5	7.5±0.8
B57464S*	28	7	35	1.0±0.05	2.5	7.5±0.8

¹⁾ Also other LD/LS are permitted, which do not affect the performance of device.

1.3 Coating

Heat resisting silicone base coating material, flame retardant

Relative Thermal Index (RTI): min 200.

Insulated types: Same material, double coated.

1.4 Terminations

The terminations are suitable for soldering.

The terminations are suitable for printed wiring applications.

The terminations are tinned copper wire

1.5 Flammability

According to 1.3, flame retardant

1.6 Resistance to solvents

The coating and marking of the thermistors is resistant to solvents.

1.7 Packaging

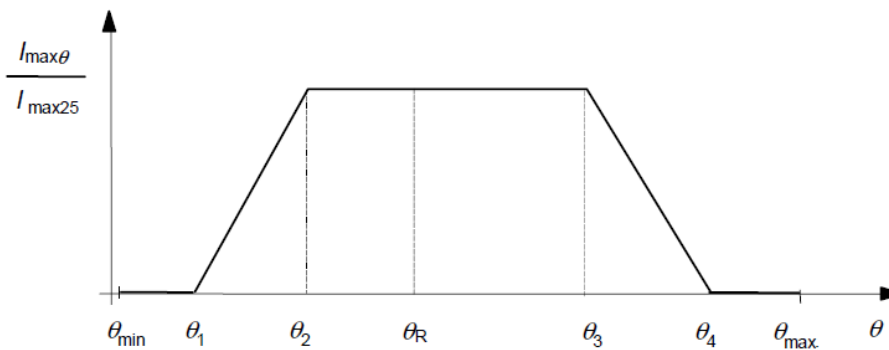
The packages containing the ICLs are clearly label with below information:

- a) Rated zero-power resistance;
- b) Manufacturer's name and/or trade mark;
- c) Date of manufacture;
- d) Tolerance on rated zero-power resistance;

1.8 Electrical data/ratings and characteristics

Climatic category :	55/170/21
Lower/Upper category temperature (LCT/UCT, $\theta_{min}/\theta_{max}$)	-55°C/170°C
θ_1, θ_4 : Same as $\theta_{min}/\theta_{max}$	-55°C/170°C
Lowest temperature with I_{max25} (θ_2)	0°C
Highest temperature with I_{max25} (θ_3)	25°C for P5, P11, P13, S237 65°C for the rest types.
Highest temperature with P_{max25} (θ_3)	25°C
Zero-power resistance ($R_T = R_{25}$)	see rating table
Resistance tolerance of R_{25} ($R_{25-tol.}$)	see note of rating table
B-value	not specified
Maximum current at 25°C (I_{max25})	see rating table
Maximum permissible capacitance (C_T)	see rating table
Isolation voltage (for insulated types only)	1000 V _{DC}
Insulation resistance (for insulated types only)	>500 MOhm
Cooling time constant, in air (τ_C)	see rating table
Maximum power dissipation at 25°C (P_{max25})	see rating table
Resistance-temperature characteristics	see annex A

Derating curve



Ordering Code ³⁾	R ₂₅ [Ohm]	R ₁₀₀ ²⁾ [Ohm]	ΔR ₁₀₀ ²⁾ [%]	I _{max25} [A]	C _T 230Vac [μF]	C _T 110Vac [μF]	δ _{th} typ. ¹⁾ [mW/K]	T _c typ. ¹⁾ [s]	P _{max25} [W]
B57205Px100y***	10	1.516	± 25.7	1	50	200	7	25	0.8
B57153Sx479y***	4.7	0.713	± 25.7	3	100	400	8	30	1.4
B57153Sx809y***	8	1.213	± 25.7	2.2	100	400	8	30	1.4
B57153Sx100y***	10	1.516	± 25.7	2	100	400	8	30	1.4
B57153Sx150y***	15	2.124	± 25.9	1.8	100	400	8	30	1.4
B57153Sx160y***	16	2.265	± 25.9	1.7	100	400	8	30	1.4
B57153Sx200y***	20	2.647	± 26.1	1.6	100	400	8	30	1.4
B57153Sx330y***	33	4.367	± 26.1	1.3	100	400	8	30	1.4
B57235Sx259y***	2.5	0.405	± 25.5	5.2	200	800	9	60	1.8
B57235Sx479y***	4.7	0.713	± 25.7	4.4	200	800	9	60	1.8
B57235Sx509y***	5	0.758	± 25.7	4.2	200	800	9	60	1.8
B57235Sx609y***	6	0.91	± 25.7	4	200	800	9	60	1.8
B57235Sx809y***	8	1.133	± 25.9	3.5	200	800	9	60	1.8
B57235Sx100y***	10	1.416	± 25.9	3	200	800	9	60	1.8
B57236Sx229y***	2.2	0.356	± 25.5	6	200	800	10	70	2.1
B57236Sx259y***	2.5	0.405	± 25.5	5.5	200	800	10	70	2.1
B57236Sx309y***	3	0.486	± 25.5	5	300	1200	10	70	2.1
B57236Sx479y***	4.7	0.713	± 25.7	4.6	300	1200	10	70	2.1
B57236Sx509y***	5	0.708	± 25.9	4.5	300	1200	10	70	2.4
B57236Sx809y***	8	1.133	± 25.9	3.7	300	1200	10	70	2.4
B57236Sx100y***	10	1.416	± 25.9	3.5	300	1200	10	70	2.1
B57236Sx120y***	12	1.699	± 25.9	3.2	300	1200	10	70	2.1
B57236Sx160y***	16	2.167	± 26	2.9	300	1200	10	70	2.1
B57236Sx200y***	20	2.535	± 26.2	2.8	300	1200	10	70	2.1
B57236Sx250y***	25	3.168	± 26.2	2.5	300	1200	10	70	2.1
B57236Sx500y***	50	5.925	± 26.5	1.9	300	1200	10	70	2.1
B57236Sx800y***	80	9.48	± 26.5	1.6	400	1600	10	70	2.1
B57236Sx121y***	120	13.27	± 26.7	1.5	400	1600	10	70	2.1
B57211Px109y***	1	0.162	± 25.5	7	330	1320	13	70	3
B57211Px139y***	1.3	0.226	± 25.5	7	330	1320	13	70	3
B57211Px259y***	2.5	0.379	± 25.7	6	330	1320	13	70	3
B57211Px409y***	4	0.566	± 25.9	5	330	1320	13	70	3
B57211Px479y***	4.7	0.665	± 25.9	5	330	1320	13	70	3
B57211Px509y***	5	0.708	± 25.9	5	330	1320	13	70	3
B57211Px709y***	7	0.948	± 26.0	4	330	1320	13	70	3
B57211Px809y***	8	1.083	± 26.0	4	330	1320	13	70	3
B57211Px100y***	10	1.267	± 26.2	4	330	1320	13	70	3
B57211Px120y***	12	1.521	± 26.2	4	330	1320	13	70	3
B57211Px150y***	15	1.901	± 26.2	3	330	1320	13	70	3
B57211Px160y***	16	2.028	± 26.2	3	330	1320	13	70	3
B57211Px180y***	18	2.281	± 26.2	3	330	1320	13	70	3
B57211Px200y***	20	2.37	± 26.5	3	330	1320	13	70	3
B57211Px220y***	22	2.607	± 26.5	3	330	1320	13	70	3
B57211Px250y***	25	2.963	± 26.5	2.5	330	1320	13	70	3
B57211Px300y***	30	3.241	± 26.7	2.5	330	1320	13	70	3
B57211Px330y***	33	3.565	± 26.7	2.5	330	1320	13	70	3
B57211Px400y***	40	4.321	± 26.7	2	330	1320	13	70	3
B57211Px470y***	47	5.078	± 26.7	2	330	1320	13	70	3

Ordering Code ³⁾	R ₂₅ [Ohm]	R ₁₀₀ ²⁾ [Ohm]	ΔR ₁₀₀ ²⁾ [%]	I _{max25} [A]	C _T 230Vac [μF]	C _T 110Vac [μF]	δ _{th} typ. ¹⁾ [mW/K]	T _c typ. ¹⁾ [s]	P _{max25} [W]
B57211Px600y***	60	5.863	± 27.0	2	330	1320	13	70	3
B57211Px800y***	80	7.818	± 27.0	1.5	330	1320	13	70	3
B57211Px101y***	100	9.772	± 27.0	1.5	330	1320	13	70	3
B57211Px121y***	120	11.73	± 27.0	1.5	330	1320	13	70	3
B57213Px109y***	1	0.162	± 25.5	8	470	1880	15	80	3.8
B57213Px139y***	1.3	0.226	± 25.5	8	470	1880	15	80	3.8
B57213Px159y***	1.5	0.26	± 25.5	8	470	1880	15	80	3.8
B57213Px209y***	2	0.347	± 25.5	8	470	1880	15	80	3.8
B57213Px259y***	2.5	0.379	± 25.7	8	470	1880	15	80	3.8
B57213Px309y***	3	0.425	± 25.9	7	470	1880	15	80	3.8
B57213Px409y***	4	0.566	± 25.9	6	470	1880	15	80	3.8
B57213Px479y***	4.7	0.665	± 25.9	5.1	470	1880	15	80	3.8
B57213Px509y***	5	0.708	± 25.9	6	470	1880	15	80	3.8
B57213Px609y***	6	0.813	± 26.0	5	470	1880	15	80	3.8
B57213Px709y***	7	0.948	± 26.0	5	470	1880	15	80	3.8
B57213Px809y***	8	1.083	± 26.0	5	470	1880	15	80	3.8
B57213Px100y***	10	1.267	± 26.2	5	470	1880	15	80	3.8
B57213Px120y***	12	1.422	± 26.5	5	470	1880	15	80	3.8
B57213Px150y***	15	1.778	± 26.5	4	470	1880	15	80	3.8
B57213Px160y***	16	1.896	± 26.5	4	470	1880	15	80	3.8
B57213Px180y***	18	2.133	± 26.5	4	470	1880	15	80	3.8
B57213Px200y***	20	2.37	± 26.5	4	470	1880	15	80	3.8
B57213Px220y***	22	2.377	± 26.7	4	470	1880	15	80	3.8
B57213Px250y***	25	2.701	± 26.7	3	470	1880	15	80	3.8
B57213Px300y***	30	3.241	± 26.7	3	470	1880	15	80	3.8
B57213Px330y***	33	3.565	± 26.7	3	470	1880	15	80	3.8
B57213Px400y***	40	3.909	± 27.0	3	470	1880	15	80	3.8
B57213Px470y***	47	4.593	± 27.0	3	470	1880	15	80	3.8
B57213Px600y***	60	5.863	± 27.0	2	470	1880	15	80	3.8
B57213Px800y***	80	8.000	± 28.1	2	470	1880	15	80	3.8
B57213Px101y***	100	6.745	± 28.1	2	470	1880	15	80	3.8
B57213Px121y***	120	12.000	± 28.1	2	470	1880	15	80	3.8
B57234Sx109y***	1	0.162	± 25.5	11.5	700	2800	17	90	3.6
B57234Sx229y***	2.2	0.334	± 25.7	9	700	2800	17	90	3.6
B57234Sx259y***	2.5	0.379	± 25.7	8.4	700	2800	17	90	3.6
B57234Sx479y***	4.7	0.665	± 25.9	6.6	700	2800	17	90	3.6
B57234Sx509y***	5	0.708	± 25.9	6.4	700	2800	17	90	3.6
B57234Sx709y***	7	0.926	± 26.1	6	700	2800	17	90	3.6
B57234Sx100y***	10	1.271	± 26.2	5	700	2800	17	90	3.6
B57234Sx150y***	15	1.985	± 26.1	4	700	2800	17	90	3.6
B57234Sx220y***	22	2.377	± 26.7	4	700	2800	17	90	3.6
B57234Sx330y***	33	3.565	± 26.7	3.3	900	3600	17	90	3.6
B57234Sx400y***	40	3.909	± 27	3.4	400	1600	17	90	3.6
B57234Sx600y***	60	4.047	± 76.7	4	400	1600	17	90	3.6
B57234Sx221y***	220	15.87	± 27.9	2	500	2000	17	90	3.6
B57237Sx109y***	1	0.162	± 25.5	9	700	2800	17	90	3.1
B57237Sx139y***	1.3	0.197	± 25.7	8.5	700	2800	17	90	3.1
B57237Sx229y***	2.2	0.334	± 25.7	7	700	2800	17	90	3.1

Ordering Code ³⁾	R ₂₅ [Ohm]	R ₁₀₀ ²⁾ [Ohm]	ΔR ₁₀₀ ²⁾ [%]	I _{max25} [A]	C _T 230Vac [μF]	C _T 110Vac [μF]	δ _{th} typ. ¹⁾ [mW/K]	T _c typ. ¹⁾ [s]	P _{max25} [W]
B57237Sx259y***	2.5	0.379	± 25.7	6.5	700	2800	17	90	3.1
B57237Sx479y***	4.7	0.665	± 25.9	5.1	700	2800	17	90	3.1
B57237Sx509y***	5	0.708	± 25.9	5	700	2800	17	90	3.1
B57237Sx709y***	7	0.926	± 26.1	4.2	700	2800	17	90	3.1
B57237Sx100y***	10	1.271	± 26.2	3.7	700	2800	17	90	3.1
B57237Sx150y***	15	1.985	± 26.1	3	700	2800	17	90	3.1
B57237Sx220y***	22	2.377	± 26.7	2.8	700	2800	17	90	3.1
B57237Sx330y***	33	3.565	± 26.7	2.5	900	3600	17	90	3.1
B57237Sx600y***	60	4.047	± 76.7	2	400	1600	17	90	3.1
B57238Sx259y***	2.5	0.379	± 25.7	8.4	700	2800	20	80	3.9
B57238Sx309y***	3	0.425	± 25.9	7.4	700	2800	20	80	3.9
B57238Sx479y***	4.7	0.637	± 26	6.6	700	2800	20	80	3.9
B57238Sx509y***	5	0.677	± 26	6.4	700	2800	20	80	3.9
B57238Sx709y***	7	0.948	± 26	6	700	2800	20	80	3.9
B57238Sx809y***	8	1.014	± 26.2	5.5	700	2800	20	80	3.9
B57238Sx100y***	10	1.267	± 26.2	5	700	2800	20	80	3.9
B57238Sx150y***	15	1.778	± 26.5	4.4	700	2800	20	80	3.9
B57238Sx160y***	16	1.896	± 26.5	4	700	2800	20	80	3.9
B57238Sx220y***	22	2.433	± 26.7	4	700	2800	20	80	3.9
B57238Sx250y***	25	2.765	± 26.7	3.4	700	2800	20	80	3.9
B57364Sx209y***	2	0.283	± 25.9	12	1000	4000	24	100	5.1
B57364Sx259y***	2.5	0.354	± 25.9	11	1000	4000	24	100	5.1
B57364Sx409y***	4	0.508	± 26.2	9.5	1000	4000	24	100	5.1
B57364Sx509y***	5	0.635	± 26.2	8.5	1000	4000	24	100	5.1
B57364Sx100y***	10	1.08	± 26.7	7.5	1000	4000	24	100	5.1
B57364Sx121y***	120	8.203	± 28.1	3.5	1000	4000	24	100	5.1
B57464Sx209y***	2	0.283	± 25.9	13.5	2500	10000	30	130	6.7
B57464Sx229y***	2.2	0.311	± 25.9	13	2500	10000	30	130	6.7
B57464Sx259y***	2.5	0.354	± 25.9	12.5	2500	10000	30	130	6.7
B57464Sx309y***	3	0.406	± 26	12	2500	10000	30	130	6.7
B57464Sx409y***	4	0.542	± 26	11.5	2500	10000	30	130	6.7
B57464Sx479y***	4.7	0.596	± 26.2	10.5	2500	10000	30	130	6.7
B57464Sx509y***	5	0.635	± 26.2	9.5	2500	10000	30	130	6.7
B57464Sx609y***	6	0.711	± 26.5	9.5	2500	10000	30	130	6.7
B57464Sx689y***	6.8	0.806	± 26.5	9	2500	10000	30	130	6.7
B57464Sx709y***	7	0.83	± 26.5	9	2500	10000	30	130	6.7
B57464Sx809y***	8	0.948	± 26.5	8.5	2500	10000	30	130	6.7
B57464Sx100y***	10	1.08	± 26.7	8	2500	10000	30	130	6.7
B57464Sx400y***	40	3.909	± 27	4	2500	10000	30	130	6.7

*** =kink style and packing model; do not affect the performance of the device

¹⁾ The values for dissipation factor and cooling time constant are typical values. The limits are ±35%.

²⁾ Internal specification

³⁾ x and y are internal codes, x=0/ 1/ 2; do not affect the performance of the device

y =M/ L/ K/ A. M: R_{25-tol.} ±20%; L: R_{25-tol.} ±15%, insulated; K: R_{25-tol.} ±10%;

A: customer specific, R_{25-tol.} ±10%/ ±15%/ ±20%

1.9 Related documents

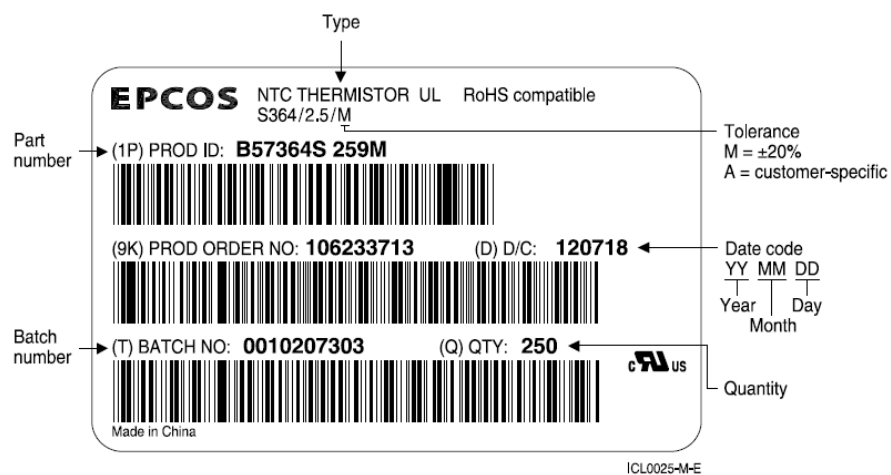
IEC 60539-1:2022, Thermistors – Directly heated negative temperature coefficient – Part 1: Generic specification

1.10 Marking

Marking on the Thermistor:

- Manufacturer – logo
- Resistance value
- NTC
- Date code with 4 digits (year and week of production).

Marking on the package with bar code label (as example):



Note:

For part number, when “0”, “00” and “000” next after the letters, respectively, they display as one/ two/ three blank space in the label.

1.11 Ordering information

Ordering code structure for Inrush Current Limiters

Example: Nominal diameter Φ 11.5 mm, $R_{25} = 8\Omega \pm 20\%$, bulk packing

B57	236S	0	809	M	000																																				
<table border="1"> <tr> <td style="background-color: #cccccc;">NTC thermistor</td> <td colspan="5"></td> </tr> <tr> <td style="background-color: #cccccc;">ICLs series:</td> <td colspan="5"> 153S = S153 series, nominal diameter Φ 8.5 mm 235S = S235 series, nominal diameter Φ 9.5 mm 236S = S236 series, nominal diameter Φ 11.5 mm 211P = P11 series, nominal diameter Φ 13 mm 213P = P13 series, nominal diameter Φ 14.5 mm 237S = S237 series, nominal diameter Φ 15 mm 238S = S238 series, nominal diameter Φ 16 mm 364S = S364 series, nominal diameter Φ 21 mm 464S = S464 series, nominal diameter Φ 26 mm </td> </tr> <tr> <td style="background-color: #cccccc;">Internal coding</td> <td colspan="5"></td> </tr> <tr> <td colspan="6"> Resistance at rated temperature (25°C): Examples: 259 = $25 \times 10^{-1}\Omega = 2.5 \Omega$ 250 = $25 \times 10^0\Omega = 25 \Omega$ 251 = $25 \times 10^1\Omega = 250 \Omega$ </td> </tr> <tr> <td colspan="6"> Internal coding M = Resistance tolerance $\pm 20\%$ L = Resistance tolerance $\pm 15\%$, Insulated A = Customer specific </td> </tr> <tr> <td colspan="6" style="background-color: #cccccc;">Kink style and packing model</td> </tr> </table>						NTC thermistor						ICLs series:	153S = S153 series, nominal diameter Φ 8.5 mm 235S = S235 series, nominal diameter Φ 9.5 mm 236S = S236 series, nominal diameter Φ 11.5 mm 211P = P11 series, nominal diameter Φ 13 mm 213P = P13 series, nominal diameter Φ 14.5 mm 237S = S237 series, nominal diameter Φ 15 mm 238S = S238 series, nominal diameter Φ 16 mm 364S = S364 series, nominal diameter Φ 21 mm 464S = S464 series, nominal diameter Φ 26 mm					Internal coding						Resistance at rated temperature (25°C): Examples: 259 = $25 \times 10^{-1}\Omega = 2.5 \Omega$ 250 = $25 \times 10^0\Omega = 25 \Omega$ 251 = $25 \times 10^1\Omega = 250 \Omega$						Internal coding M = Resistance tolerance $\pm 20\%$ L = Resistance tolerance $\pm 15\%$, Insulated A = Customer specific						Kink style and packing model					
NTC thermistor																																									
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Internal coding M = Resistance tolerance $\pm 20\%$ L = Resistance tolerance $\pm 15\%$, Insulated A = Customer specific																																									
Kink style and packing model																																									

1.12 Additional information (not for inspection purposes)

None.

1.13 Additional or increased severities or requirements to those specified in the generic sectional specification

ICL specific requirements according to IEC60539-1.

Inspection requirements

2.1 Procedures

- 2.1.1** For qualification approval, the procedures shall be in accordance with the generic specification, IEC 60539-1, 4.4 / Annex Q.
- 2.1.2** For quality conformance inspection, the test schedules (tables 1 and 2) include sampling, periodicity, severities and requirements. The formation of inspection lots is covered by the generic specification IEC 60539-1, 4.4 / Annex Q.

The following list applies to the test schedules developed in tables 1 and 2:

- 1) Sub-clause numbers of tests and performance requirements refer to the generic specification IEC 60539-1.
- 2) Number to be tested: sample size as directly allotted to the code letter for IL of IEC 61193-2 (Single sampling plan for normal inspection).
- 3) In these tables:
 - p is the periodicity (in months)
 - n is the sample size
 - c is the acceptance criterion (permitted number of non-conforming items)
 - D indicates a destructive test
 - ND indicates a non-destructive test
 - IL is the inspection level
- 4) The temperature at which the zero-power resistance shall be measured is the temperature specified in the detail specification. This temperature shall be stated, where required, in the test schedule.
- 5) The specimens used for this group may, at the discretion of the manufacturer, be used for any subsequent group which is identified as being "destructive".
- 6) The soldering – solderability and soldering resistance to heat tests – shall only be applied where the thermistor has terminations which are appropriate for soldering.
- 7) Where the terminations are stated to be suitable for printed wiring applications, the appropriate test conditions in IEC 60068-2-58 shall apply.
- 8) The thermistors shall be mounted by their normal means.
- 9) The bump test and the shock test are alternatives. The test selected in the detail specification shall be used.
- 10) The detail specification shall specify which test is appropriate to the construction and application of the thermistor for measuring the thermal time constant.
- 11) Any deviation from annex B of the generic specification shall be given in the detail specification.
- 12) 100 % testing shall be followed by re-inspection by sampling in order to monitor outgoing quality level by non-conforming items per million ($\times 10^{-6}$). The sampling level shall be established by the manufacturer. For the calculation of $\times 10^{-6}$ values any parametric failure shall be counted as a non-conforming item. In case one or more non-conforming items occur in a sample, this lot shall be rejected.
- 13) IL deviant to IEC/PAS 60539-1-1 requirement: Changed from S-4 to S-2.
- 14) For each diameter and soldering method, the sample size is calculated according the total produced quantity in the week, according to the indicated IL.

Table 1 - Test schedule for quality conformance inspection: lot-by-lot

Subclause number and test (see list item 1)	D or ND	Conditions of test (see list item 1)	Sample size and criterion of acceptability (see list item 3)			Performance requirements (see list item 1)
			IL	n	c	
GROUP A INSPECTION Subgroup A0 6.1 Zero power resistance R_T	ND	R_{25}	100% (see list item 12)			according the detail specification 1.8
Subgroup A1 7.1.1 Visual examination	ND	According OIP	S-4	2)	0	According 7.1.1.1
Subgroup A2 7.1.1.2 Marking 7.1.2 Dimensions	ND	According 1.2 b, th, h, LD, LL, LS	S-2	2) 13)	0	according the detail specification 1.2
GROUP B INSPECTION Subgroup B1 6.2 B-Value 6.5 Resistance/temp. characteristic	ND	Not specified R_{25} (R_T), R_{100} Resistance-temperature curve	S-2	2)	0	according the detail specification 1.8
Subgroup B2 6.4 Voltage proof 9.2 Solderability 9.4 Solvent resistance of the marking	ND	IEC 60539-1, (6.3.2 Method 1) 1000V _{DC} , 60s ± 5 s IEC 60068-2-20 Test Ta, Method 1: solder bath Bath temp. 245°C±5°C Duration: 3 sec. IEC 60068-2-45, xA (3.1.1, Method 1): T = 23±5°C, t = 5±0,5 min Solvent: 2-propanol Rubbing material: Cotton wool F = 5±0,5 N, 10 strokes. Visual examination	S-2	2) 14)	0	No breakdown/ flashover according 6.4.3 Wetting of the wire according OIP Legible marking

Table 2 - Test schedule for quality conformance inspection: periodic

Subclause number and test (see list item 1)	D or ND	Conditions of test (see list item 1)	Sample size and criterion of acceptability (see list item 3)			Performance requirements (see list item 1)
			p	n	c	
GROUP C INSPECTION						
Subgroup C1A						
Part of sample						
9.1 Resistance to soldering heat	D	IEC 60068-2-20 Test Tb, Method 1: solder bath T = 260°C±3°C, t = 5s. Visual examination Zero power resistance R ₂₅	6	5	0	No visible damage ΔR ₂₅ /R ₂₅ : ±10%
7.2 Robustness of terminations		IEC 60068-2-21 Tensile strength: Ua1, F = 10N, or 20N (20N types with LD=1mm); t = 10s; Bending strength: Ub: 2 bends 90°; Torsion strength: Uc: 2x 180° Visual examination Zero power resistance R ₂₅				No visible damage ΔR ₂₅ /R ₂₅ : ±10%
Subgroup C1B						
Other part of sample						
8.1 Rapid change of temperature	D	IEC60068-2-14; Na T _A = -55±2°C T _B = 170±2°C Dwell time: t= 30min, 5 cycles, Visual examination Zero power resistance R ₂₅	6	5	0	No visible damage Δ R ₂₅ /R ₂₅ : ±20%
7.3 Vibration		IEC 60068-2-6 Frequency range: f = 10 – 55Hz; amp = 0,75 mm or a = 100 m/s ² , t = 6h Visual examination Zero power resistance R ₂₅				No visible damage Δ R ₂₅ /R ₂₅ : ±10%
7.4 Shock		IEC 60068-2-27 a = 400 m/s ² , t = 6 ms Number of shocks: 5000 (each direction) Visual examination Zero power resistance R ₂₅				No visible damage Δ R ₂₅ /R ₂₅ : ±10%

Table 2 - Test schedule for quality conformance inspection: periodic

Subclause number and test (see list item 1)	D or ND	Conditions of test (see list item 1)	Sample size and criterion of acceptability (see list item 3)			Performance requirements (see list item 1)
			p	n	c	
Subgroup C1 Combined sample of specimens of subgroups C1A and C1B 8.4 Dry heat 8.9 Climatic sequence Temperature/ Humidity cycle Final measurement	D	IEC 60068-2-2 T = 170±2°C, t = 16h IEC 60068-2-38 Damp heat: 10 cycles - first 5 cycles with cold, - next 5 cycles without cold: T = 25±2°C, 65±2°C 93±3% r.H.; Cold: T = -10±2°C, t=3h Visual examination Zero power resistance R ₂₅ Insulation resistance 6.3 (Insulated types only): Metal balls method (1.6±0.2mm) U =500±15V, t = 60±5s Voltage proof 6.4 (Insulated types only):	6	10	0	No visible damage Δ R ₂₅ /R ₂₅ : ±20% R _{IS} > 500 MOhm No breakdown/flashover according 6.4.3
GROUP D INSPECTION Subgroup D1 6.6 Power dissipation 6.7 Thermal time constant by ambient temperature change 6.8 Thermal time constant by cooling after self-heating	D	T _b = 85±2°C Dissipation factor in still air at T = 25±5°C. Not specified T _a =25±2°C, T _b =85±2°C Measurement in still air at T = 25±5°C. τ after T _i = T _b - (T _b - T _a)x0,632	6	10	0	according the detail specification 1.8 according the detail specification 1.8

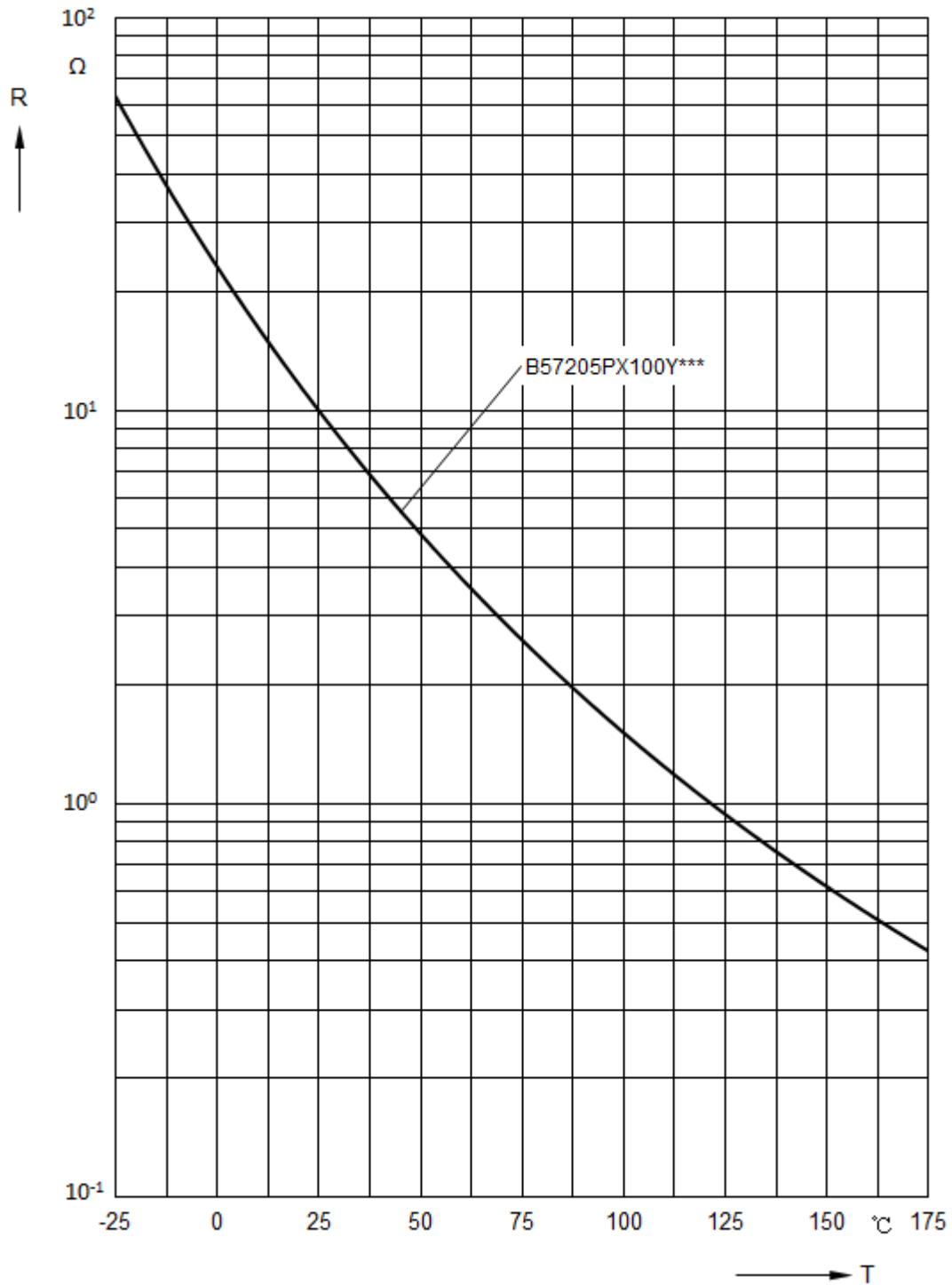
Table 2 - Test schedule for quality conformance inspection: periodic

Subclause number and test (see list item 1)	D or ND	Conditions of test (see list item 1)	Sample size and criterion of acceptability (see list item 3)			Performance requirements (see list item 1)
			p	n	c	
Subgroup D2 8.6.5 Endurance at upper category temperature	D	Temperature: 170±2°C Duration: 1000h Zero power resistance R ₂₅ Examination at 168h, 500h and 1000h Visual examination Zero power resistance R ₂₅	12	10	0	No visible damage Δ R ₂₅ /R ₂₅ : ±30%
Subgroup D3 8.6.4 Endurance at θ ₃ and P _{max θ}	D	Not specified	12	10	0	
Subgroup D4 8.5 Damp heat, steady state	D	IEC 60068-2-78, Cab Temperature: 40±2 °C Humidity: 93±3%rF Duration: t = 21 d Visual examination Zero power resistance R ₂₅ Insulation resistance 6.3 (Insulated types only): Metal balls method (1.6±0.2mm) U =500±15V, t = 60±5s Voltage proof 6.4 (Insulated types only):	12	10	0	No visible damage Δ R ₂₅ /R ₂₅ : ±20% R _{IS} > 500 MOhm No breakdown/ flashover according 6.4.3

Subclause number and test (see list item 1)	D or ND	Conditions of test (see list item 1)	Sample size and criterion of acceptability (see list item 3)			Performance requirements (see list item 1)
			p	n	c	
ICL specific test according to IEC60539-1						
8.6.2 Endurance at room temperature with applied continuous maximum current (I _{max25})	D	Temperature: θ_3 , I = I _{max} (according to 1.8.) Duration: 1000h Examination at 168h, 500h and 1000h: Visual examination Zero power resistance R ₂₅	12	10	0	No visible damage $\Delta R_{25}/R_{25}: \pm 30\%$
8.6.3 Endurance at room temperature with applied cyclic maximum current (I _{max25})	D	Temperature: 25±5°C, I = I _{max} (according to 1.8.) On- time = 1 min Cooling time = 5 min Number of cycles: 1000 Visual examination Zero power resistance R ₂₅	12	10	0	No visible damage $\Delta R_{25}/R_{25}: \pm 20\%$
8.6.6 Maximum permissible capacitance	D	Temperature: 25±5°C, U _{NTC} = 180V/375V Method 1: C = C _T (according to 1.8.) Number of cycles: 1000 Visual examination Zero power resistance R ₂₅	12	10	0	No visible damage $\Delta R_{25}/R_{25}: \pm 30\%$

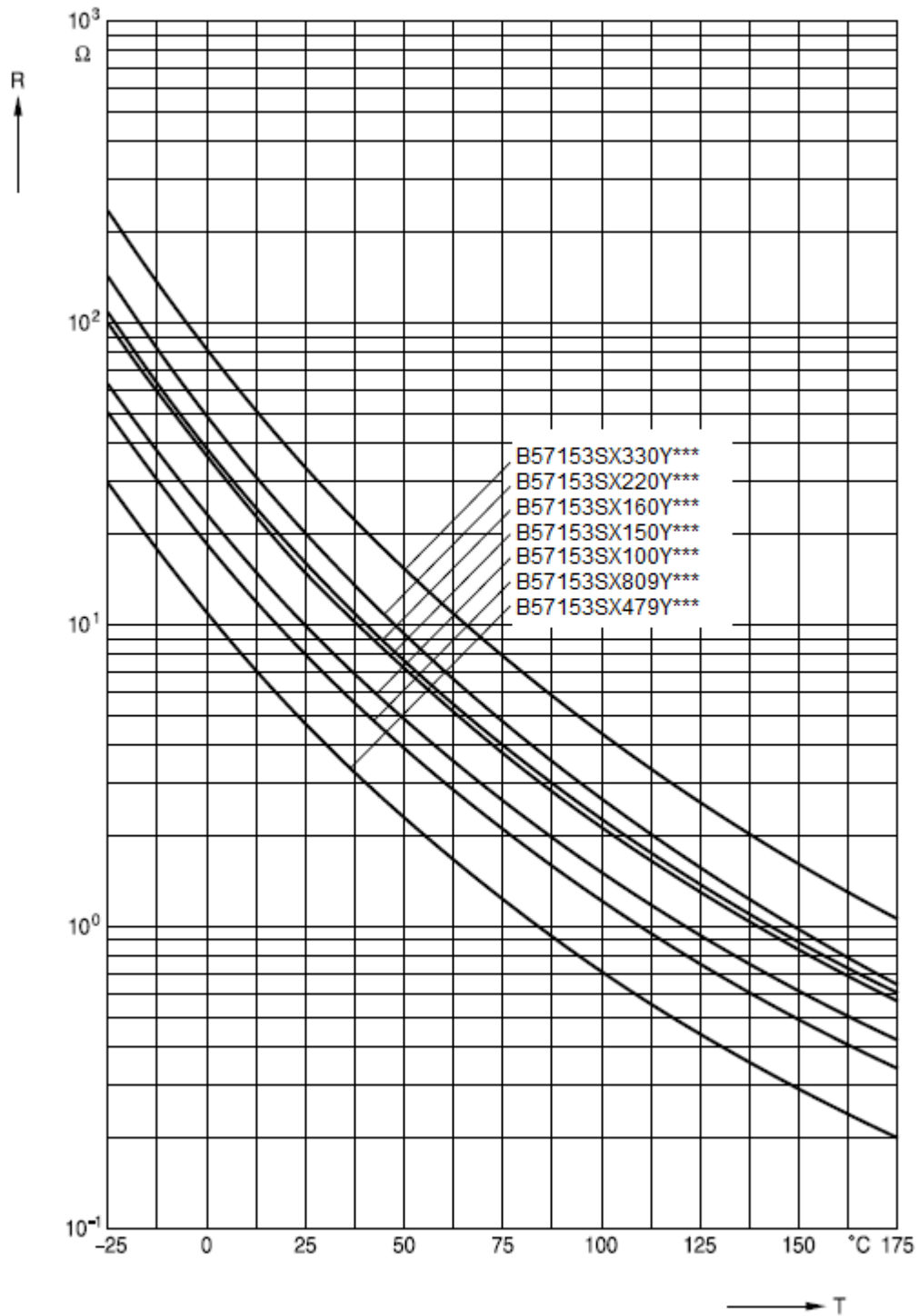
Annex A:

Resistance versus temperature



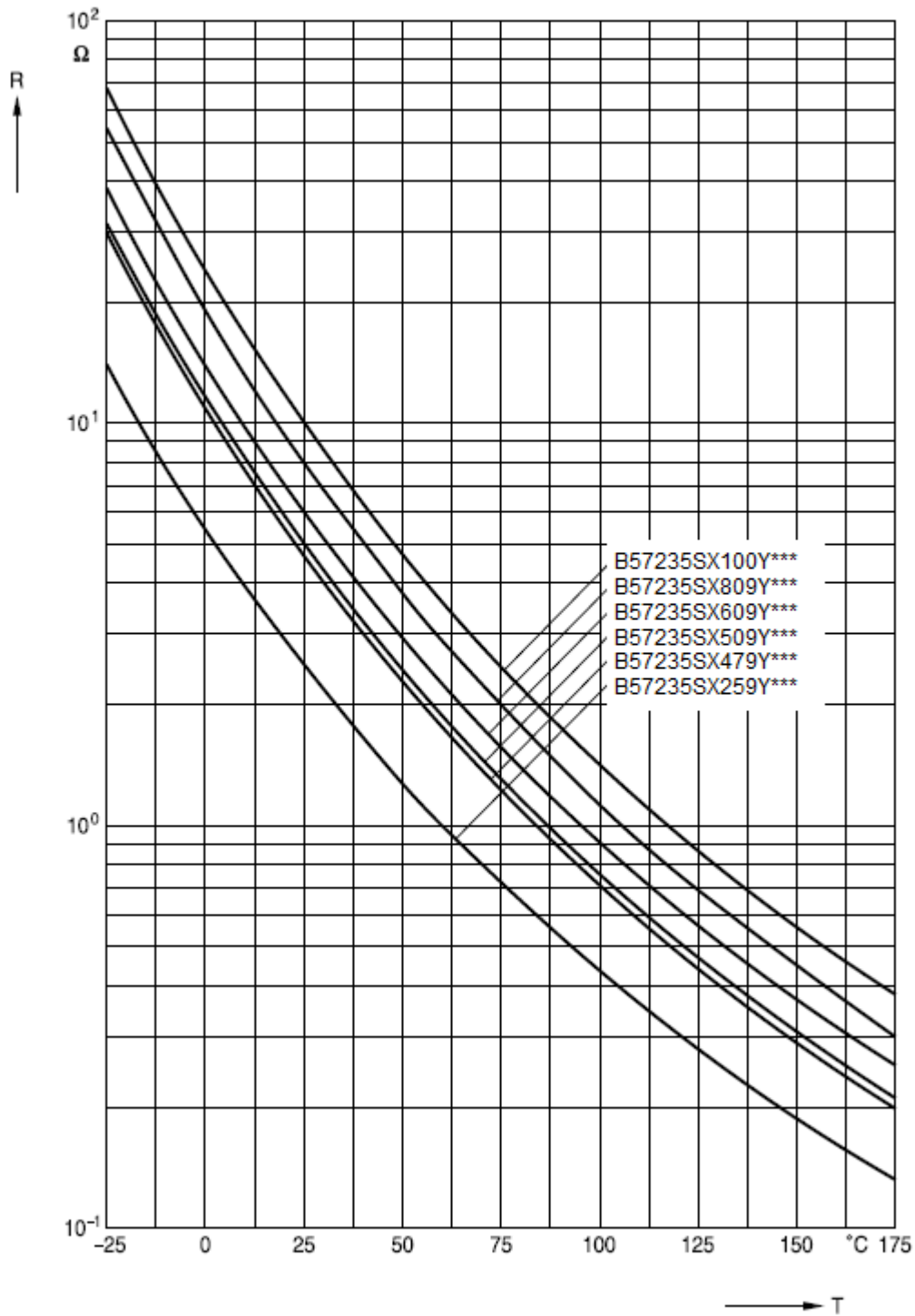
P5 series

Resistance versus temperature



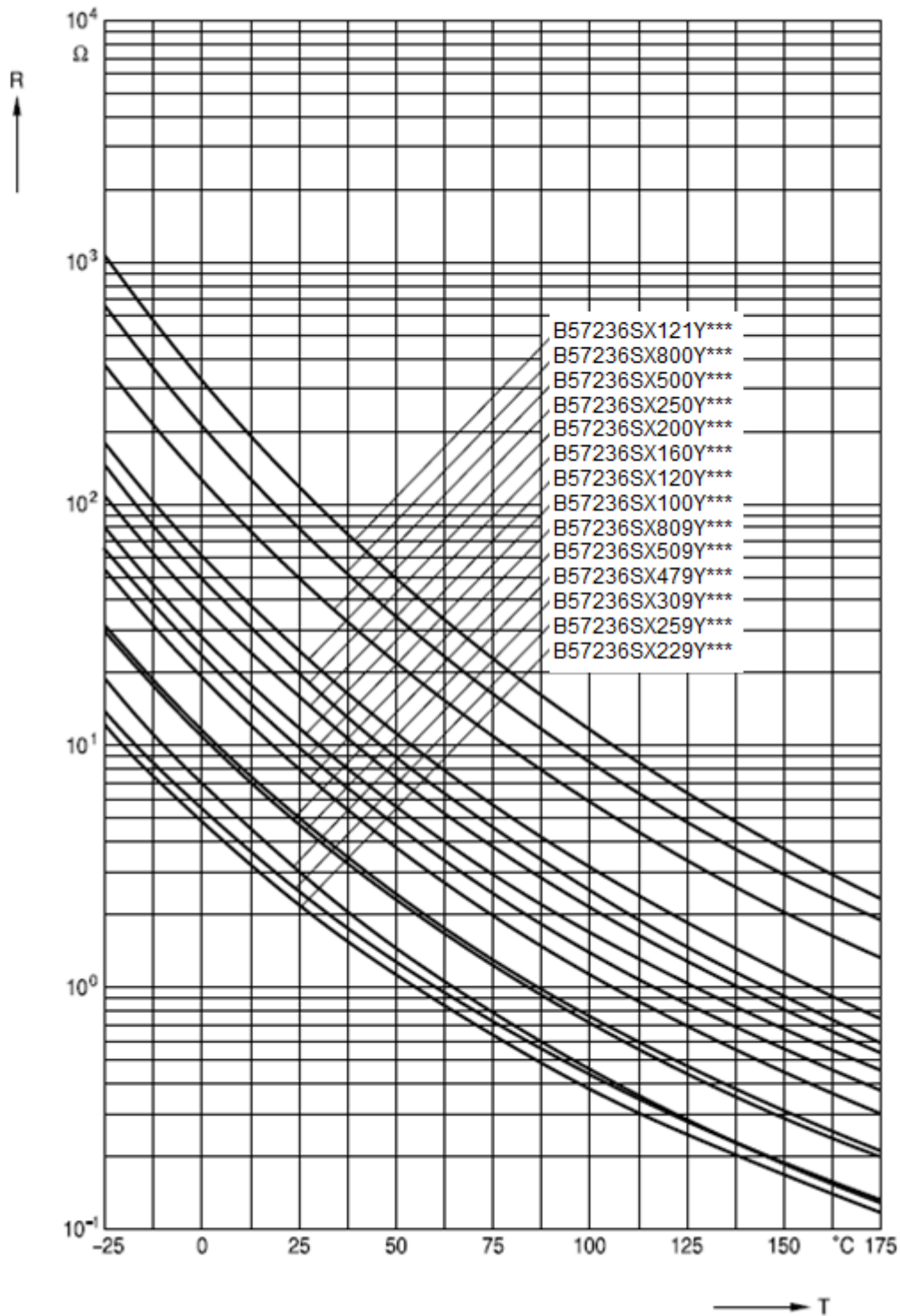
S153 series

Resistance versus temperature



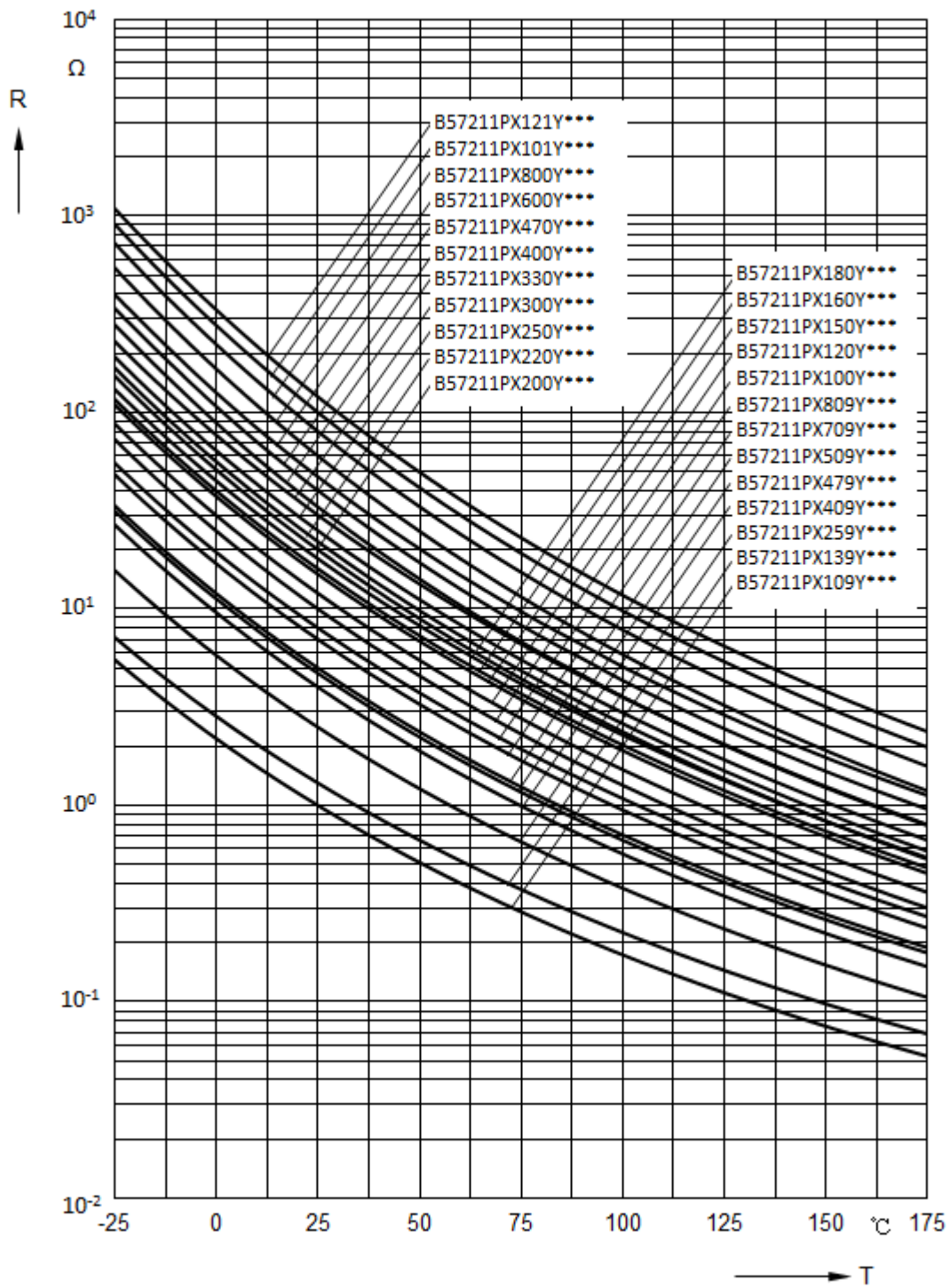
S235 series

Resistance versus temperature



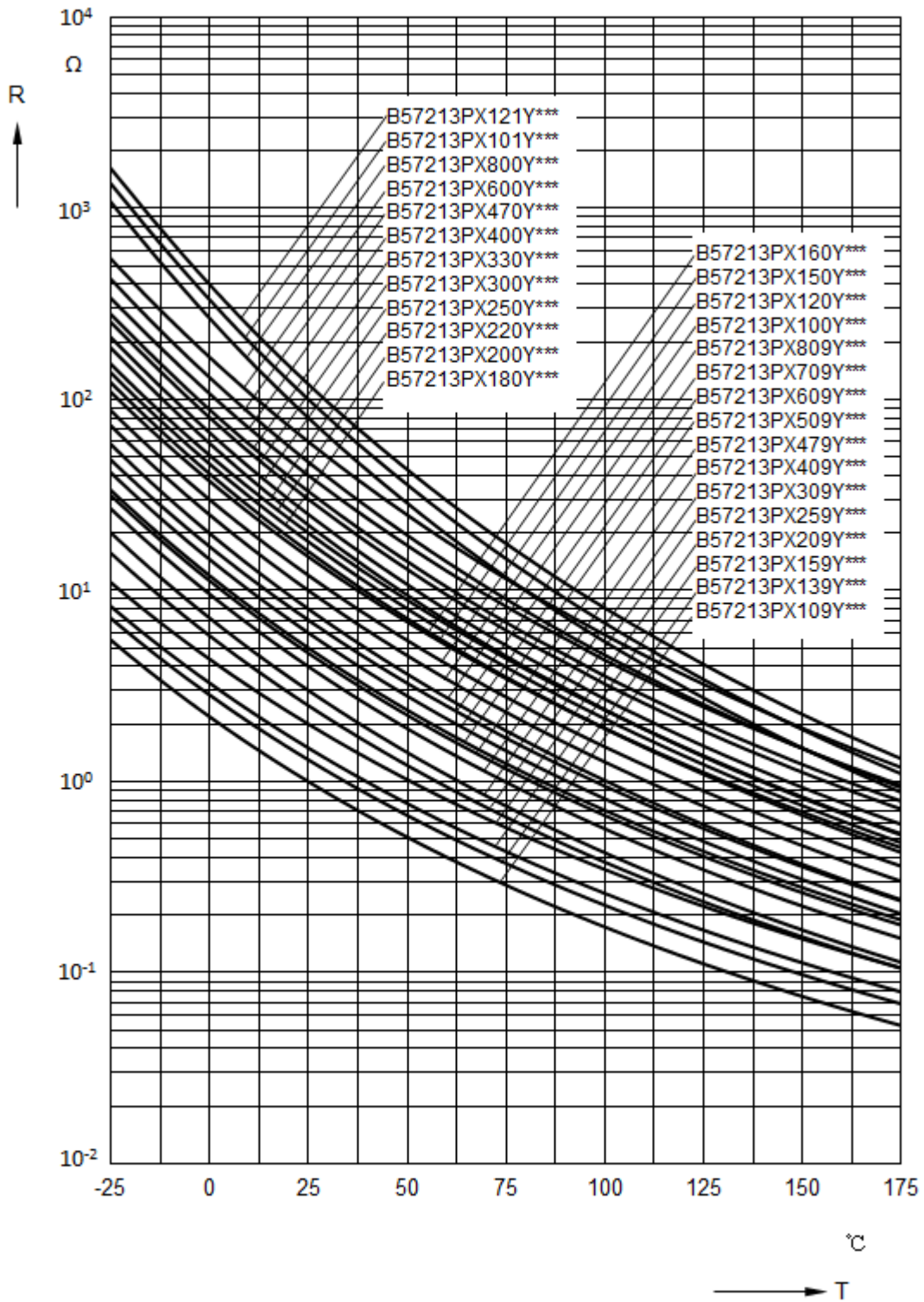
S236 series

Resistance versus temperature



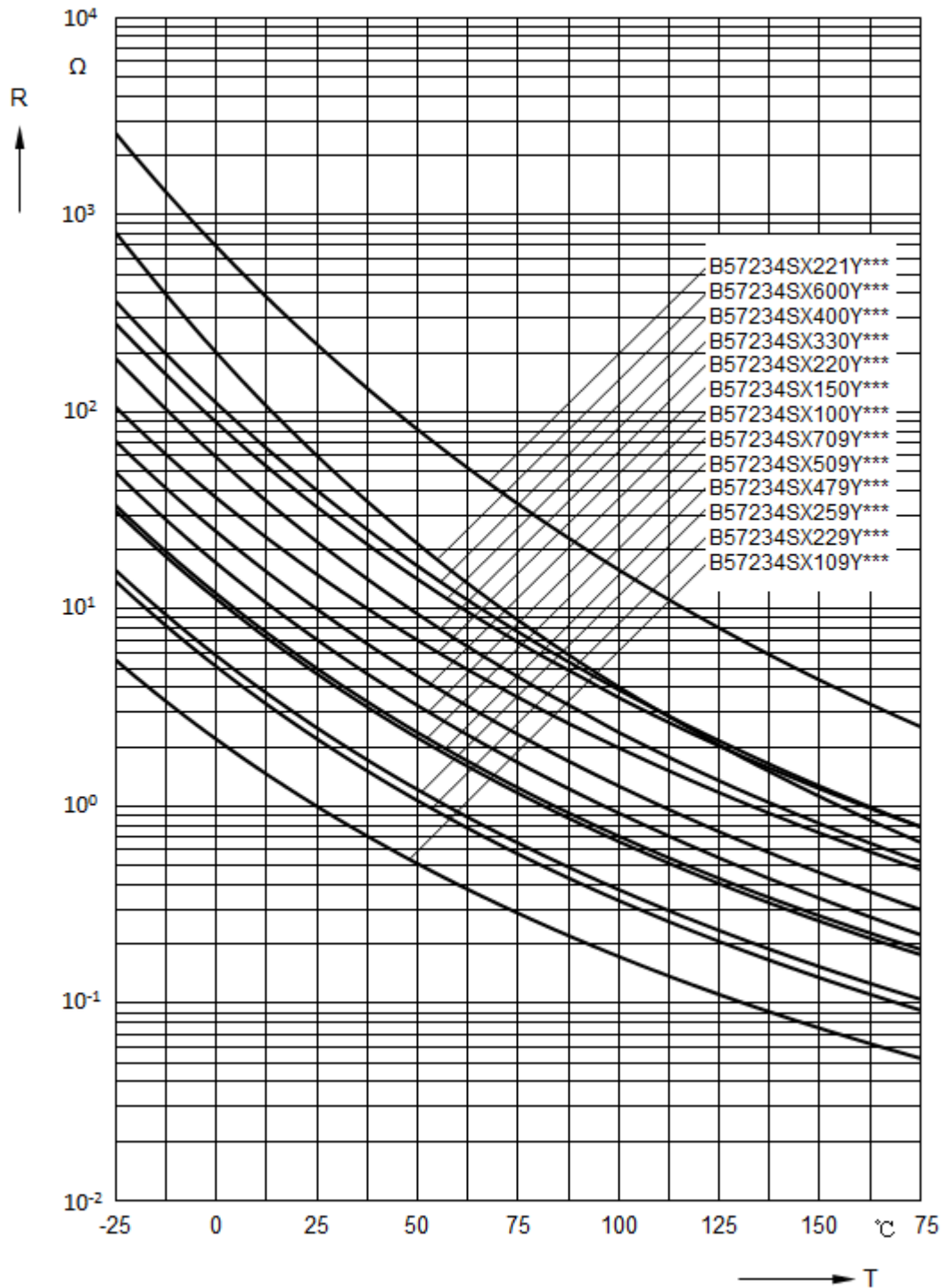
P11 series

Resistance versus temperature



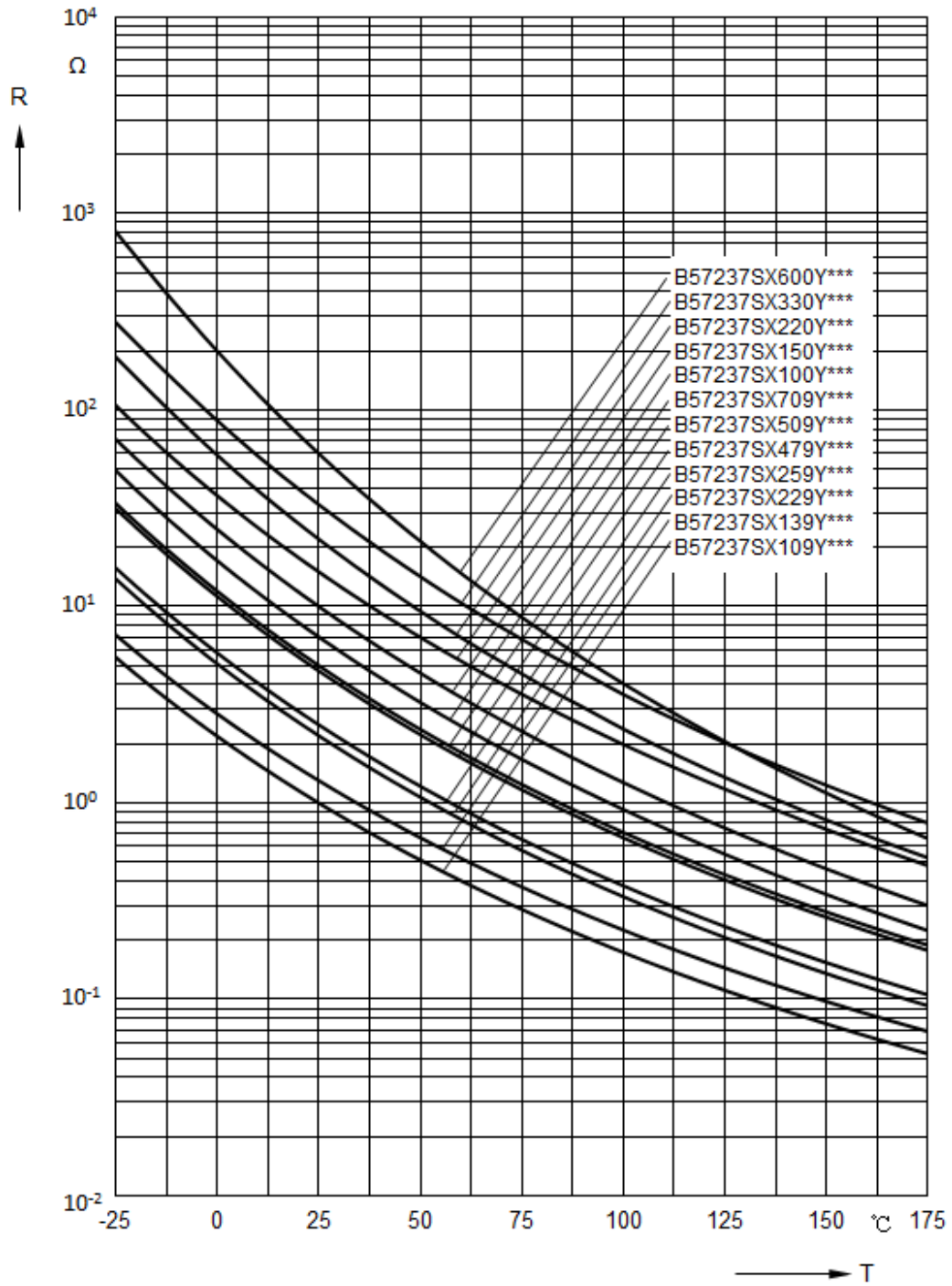
P13 series

Resistance versus temperature



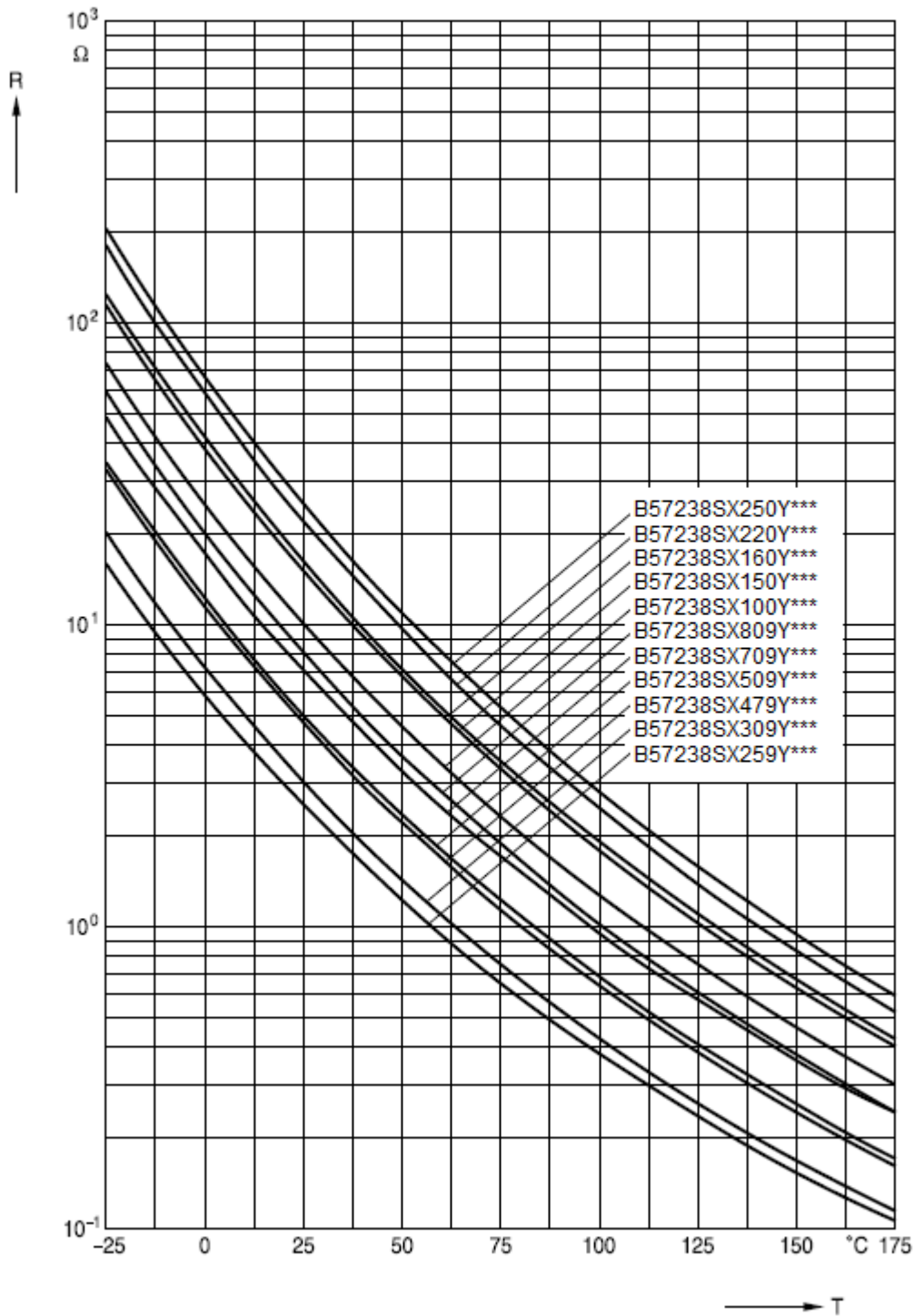
S234 series

Resistance versus temperature



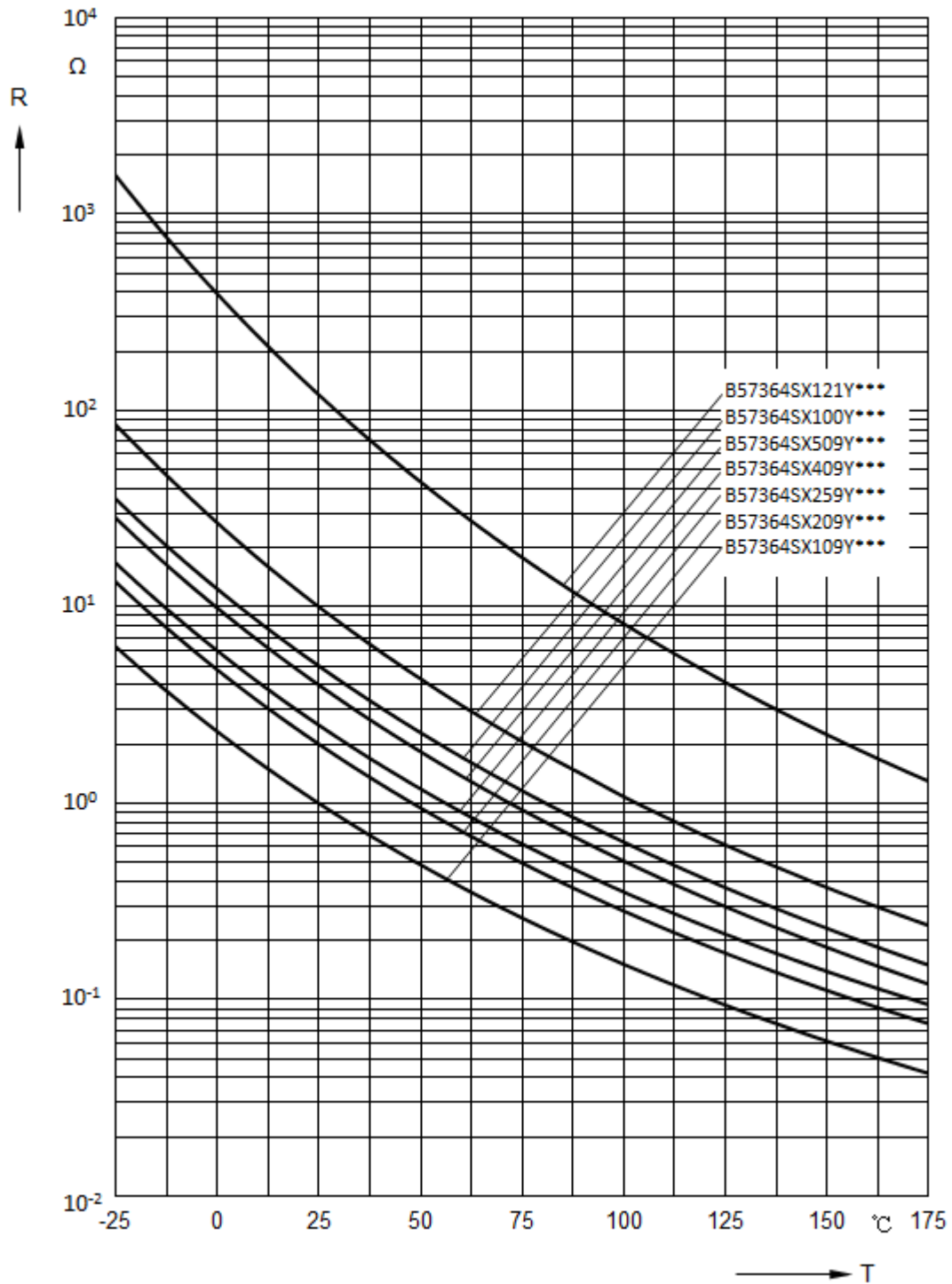
S237 series

Resistance versus temperature



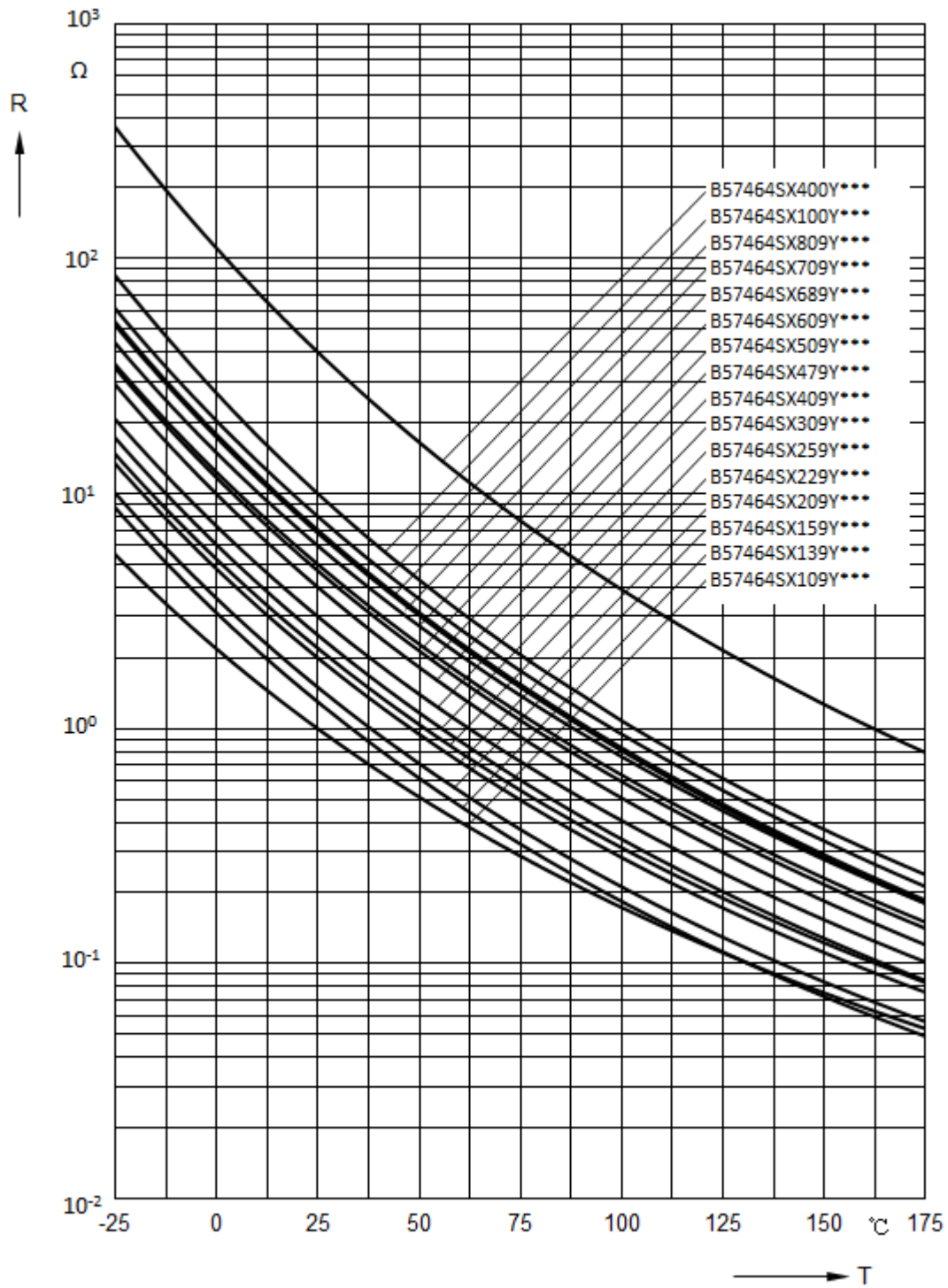
S238 series

Resistance versus temperature



S364 series

Resistance versus temperature



S464 series