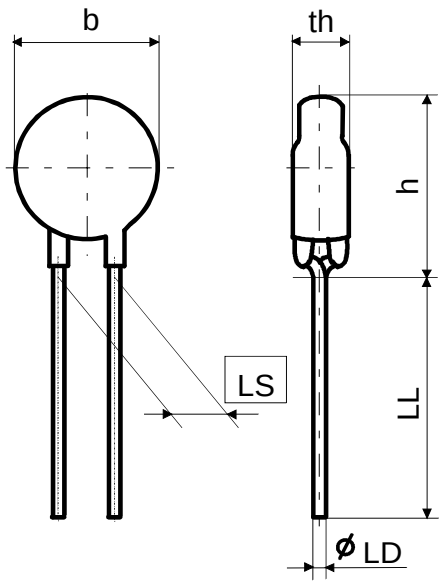
APPLICATION :

NTC-thermistor for inrush current limiting in peripheral communication equipment, e.g. in switch-mode power supplies

FEATURES :

- Black coated thermistor disk
- Coating material is flame retardant (UL 94 V-0 approved)
- Kinked leads of tinned copper wire
- Lead spacing 7.5 mm
- Manufacturer’s logo, NTC and resistance value stamped in white
- High stability of electrical characteristic
- Terminals solderable in accordance with IEC 60068-2-20, test ta, method 1
- ICL support to fulfill the requirements according EN 61000 of power circuits
- Usable in series connections up to 265 V_{rms}
- UL approval (E 69802)
- The component is compliant with ROHS (DIRECTIVE 2002/95/EC OF THE EUROPEAN PARLIAMENT AND THE COUNCIL of 27 January 2003 on the restriction of the use of certain hazardous substances in electrical and electronic equipment
- Also available on tape

DRAWING :



b	15.0max	mm
th	7.0 max	mm
h	22.0 max	mm
LL	32^{+3}	mm
LD	$0.8^{\pm 0.05}$	mm
LS	$7.5^{\pm 0.8}$	mm

Approx. weight : 2.0 [g]

RATINGS AND CHARACTERISTICS

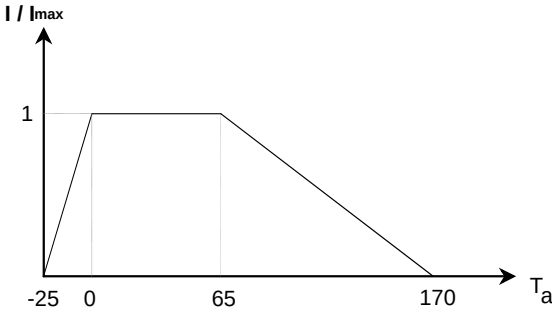
Lower/upper category temperature	T	[°C]	**-55/+170**
Resistance tolerance	$\Delta R/R_N$	[%]	**± 20**
Rated temperature	T_N	[°C]	**25**
B value tolerance	$\Delta B/B$	[%]	**± 3**
Max. power at 25°C	P_{max}	[W]	**3.6**
Dissipation factor (in air)	δ_{th}	[mW/K]	**approx. 17**
Thermal cooling time constant (in air)	τ_{th}	[s]	**approx. 90**
Heat capacity	C_{th}	[mJ/K]	**approx. 1530**

Ordering Code	R_{25} [Ω]	I_{max} [A]	$B_{25/100}$ [K]	C_T at 110 VAC [µF]	C_T at 230 VAC [µF]	Parameter for R(I) k	Parameter for R(I) n
B57234S0109M000	1.0	11.5	2600	2800	700	0.622	-1.27
B57234S0229M000	2.2	9.0	2800	2800	700	0.806	-1.30
B57234S0259M000	2.5	8.4	2800	2000	500	0.843	-1.30
B57234S0479M000	4.7	6.6	2900	2800	700	1.03	-1.32
B57234S0509M000	5.0	6.4	2900	2800	700	1.05	-1.32
B57234S0709M000	7.0	6.0	3000	2800	700	1.16	-1.33
B57234S0100M000	10	5.0	3060	2800	700	1.29	-1.34
B57234S0150M000	15	4.0	3000	2800	700	1.49	-1.33
B57234S0220M000	22	4.0	3300	2800	700	1.57	-1.37
B57234S0330M000	33	3.3	3300	3600	900	1.78	-1.37

Maximum continuous current I_{max} :

The I_{max} denotes the maximum permissable continuous current (dc or rms values for sine-shaped ac) in the temperature range 0 to 65°C.

Maximum current derating (I / I_{max}) :



$$\text{Percent of } I_{max} = 100\left[1 - \frac{T_A - 65°C}{T_{max} - 65°C}\right]$$

T_A = ambient temperature ($T_A > 65°C$)
$T_{max} = 170°C$

Fig. 1. - Maximum current derating (I / I_{max})

Maximum switchable capacity (C_T) :

The maximum switchable capacity (C_T) is the maximum capacity which may be discharged across the thermistor. See Fig.2 Maximum switchable capacity measuring circuit.

Dependence of NTC resistance on current :

The resistance effective in the usual current range can be approximated with the fit parameter **k** and **n.**

$R_{NTC} = \mathbf{k} * I^{\mathbf{n}}$ $\qquad 0.3 * I_{max} < I \leq I_{max}$

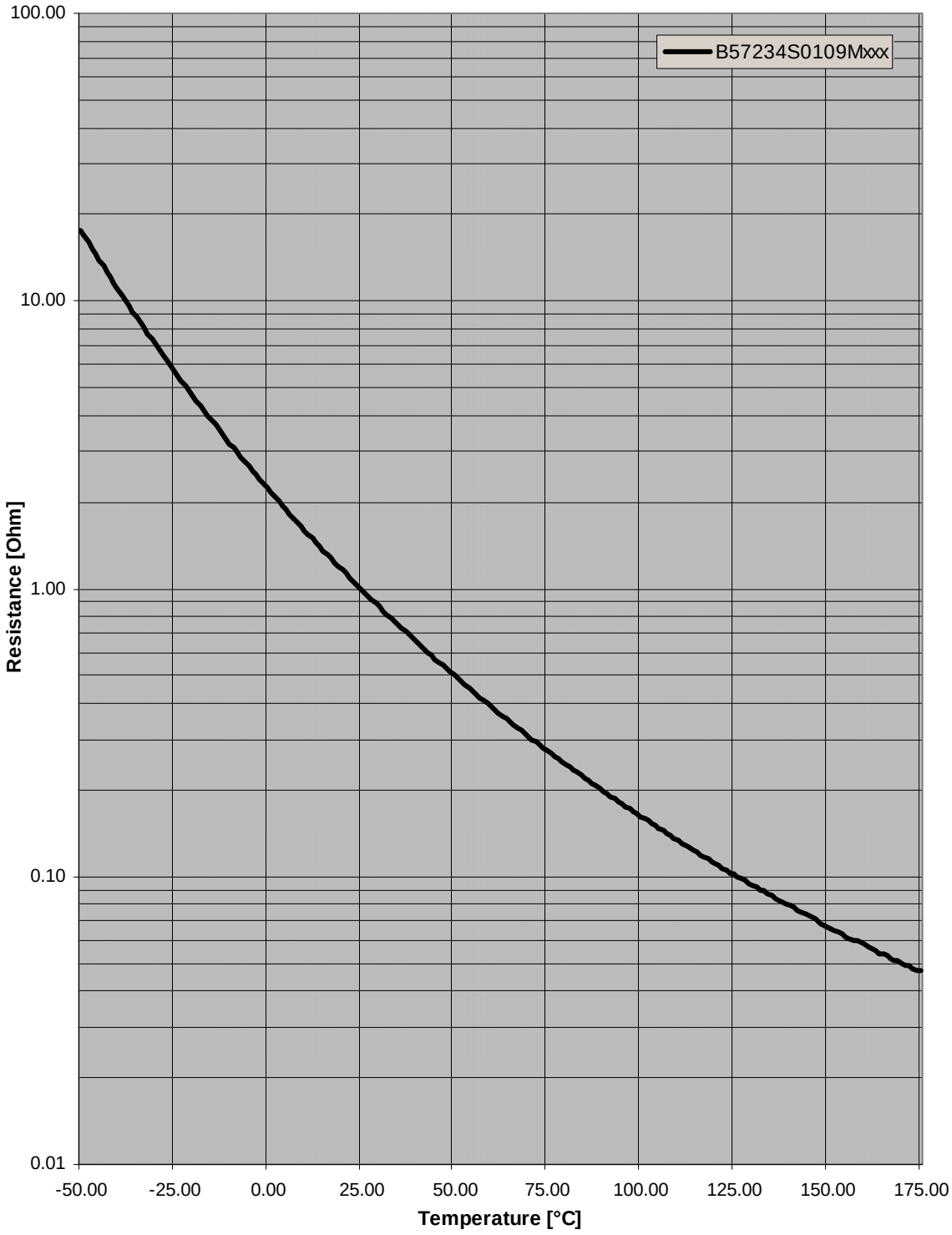
R_{NTC}	Resistance value to be determined at current I [Ω]
k, n	Fit parameter, see table with ordering codes
I	Current flowing through the NTC (insert numerical value in A)

The calculated values only serve as an estimate for operation in still air at an ambient temperature of 25°C.

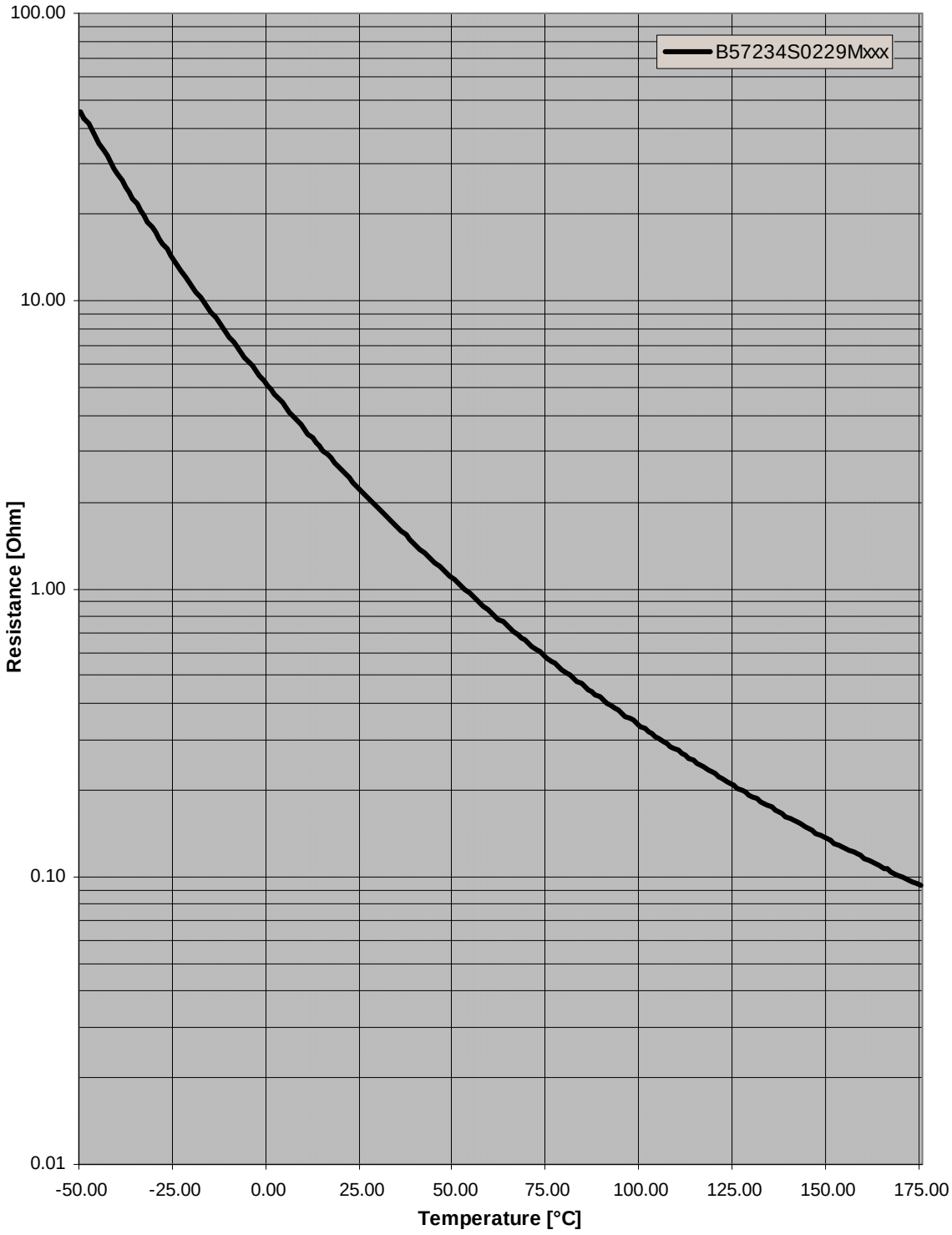
MARKING :

- EPCOS – logo
- resistance value
- NTC
- Date code with 4 digits (year and week of production): 0540 (example for week 40 in year 2005)

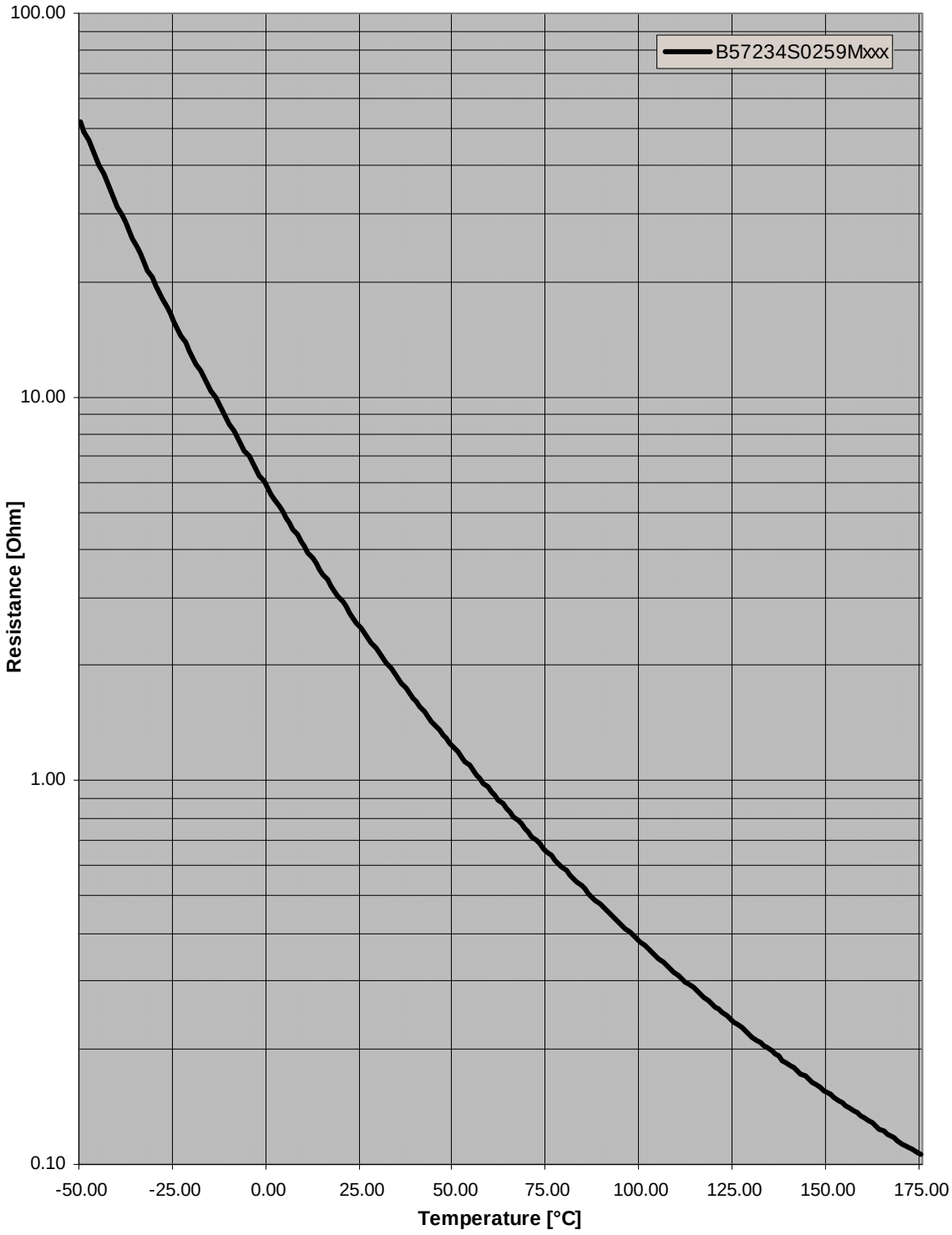
Resistance - Temperature Curve



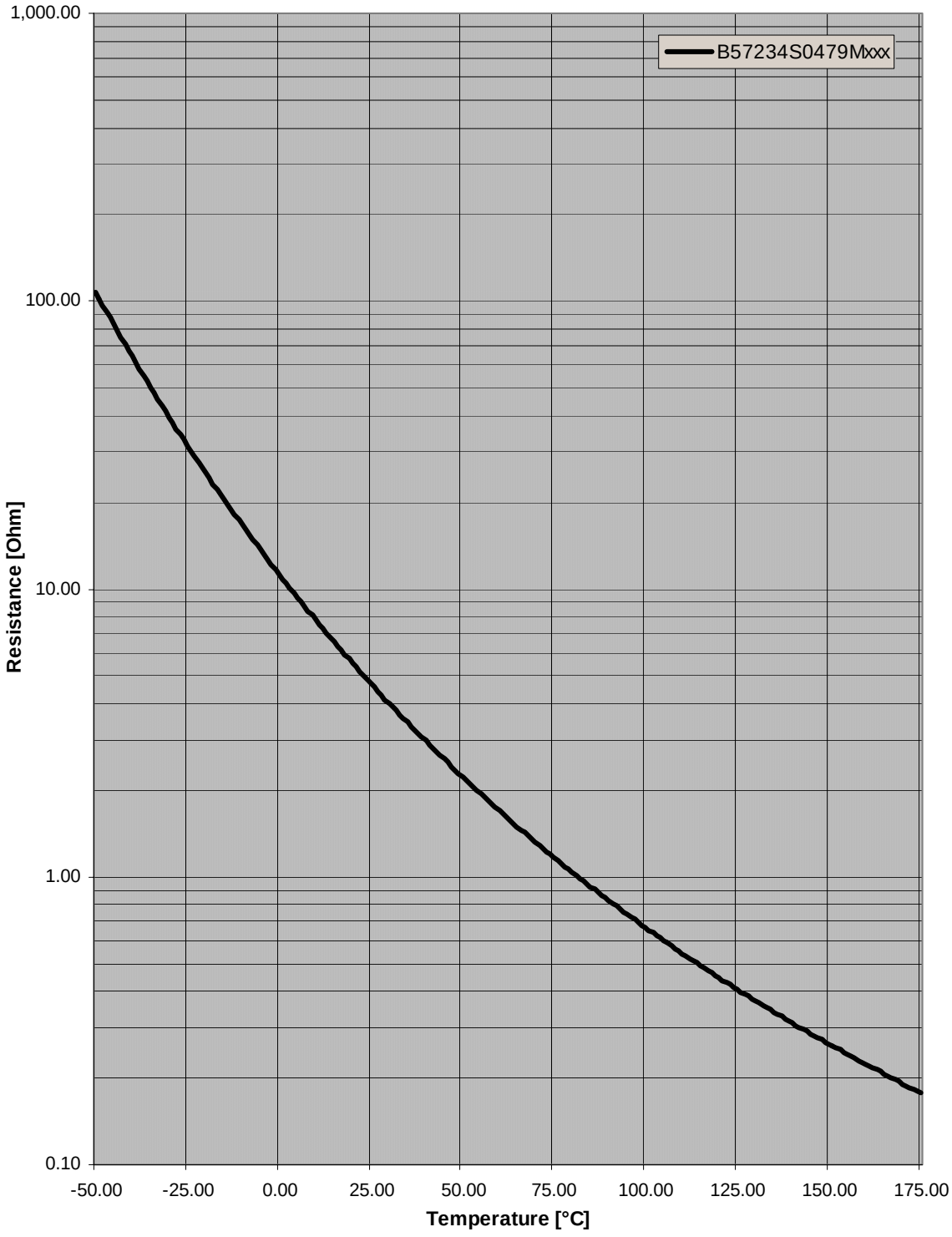
Resistance - Temperature Curve



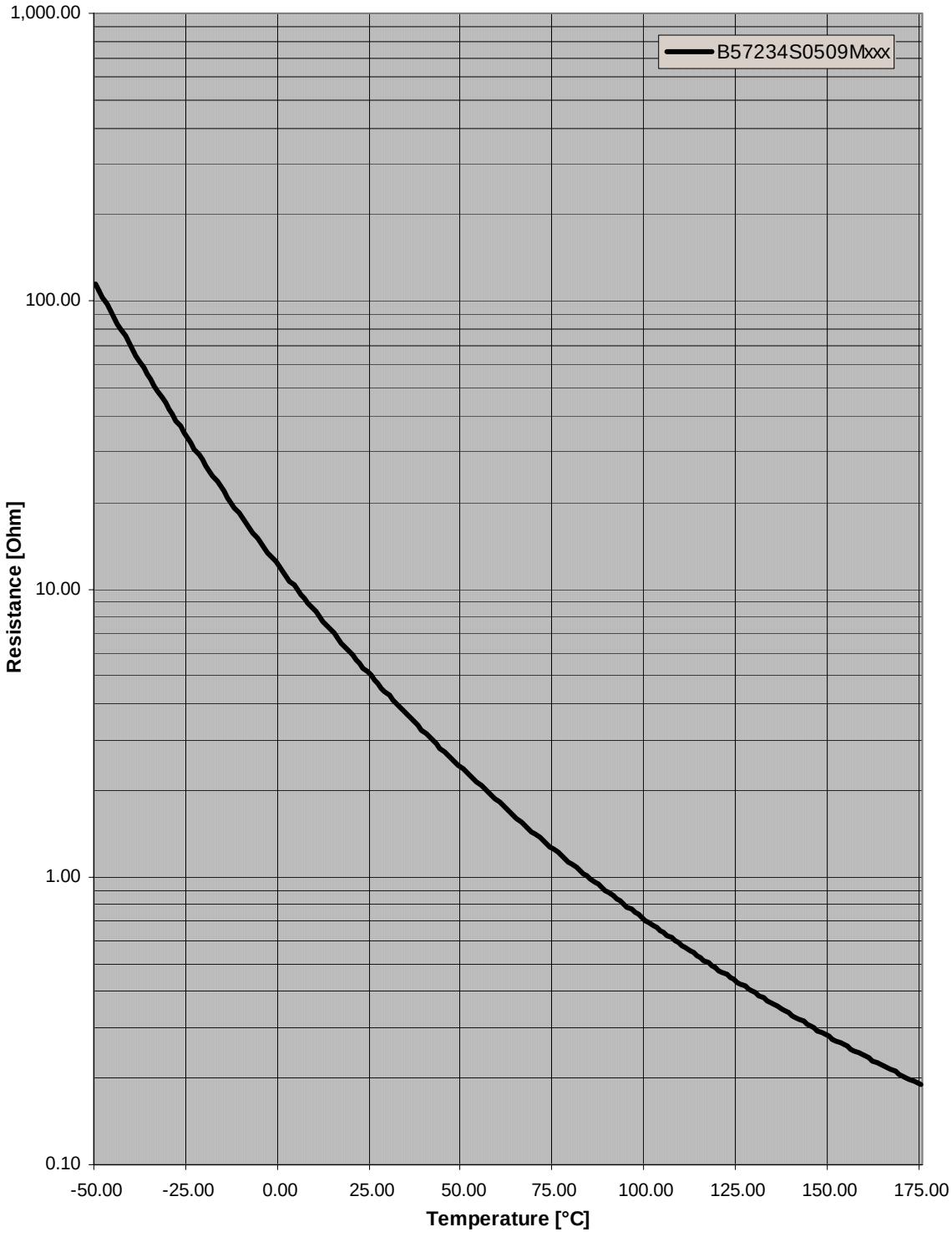
Resistance - Temperature Curve



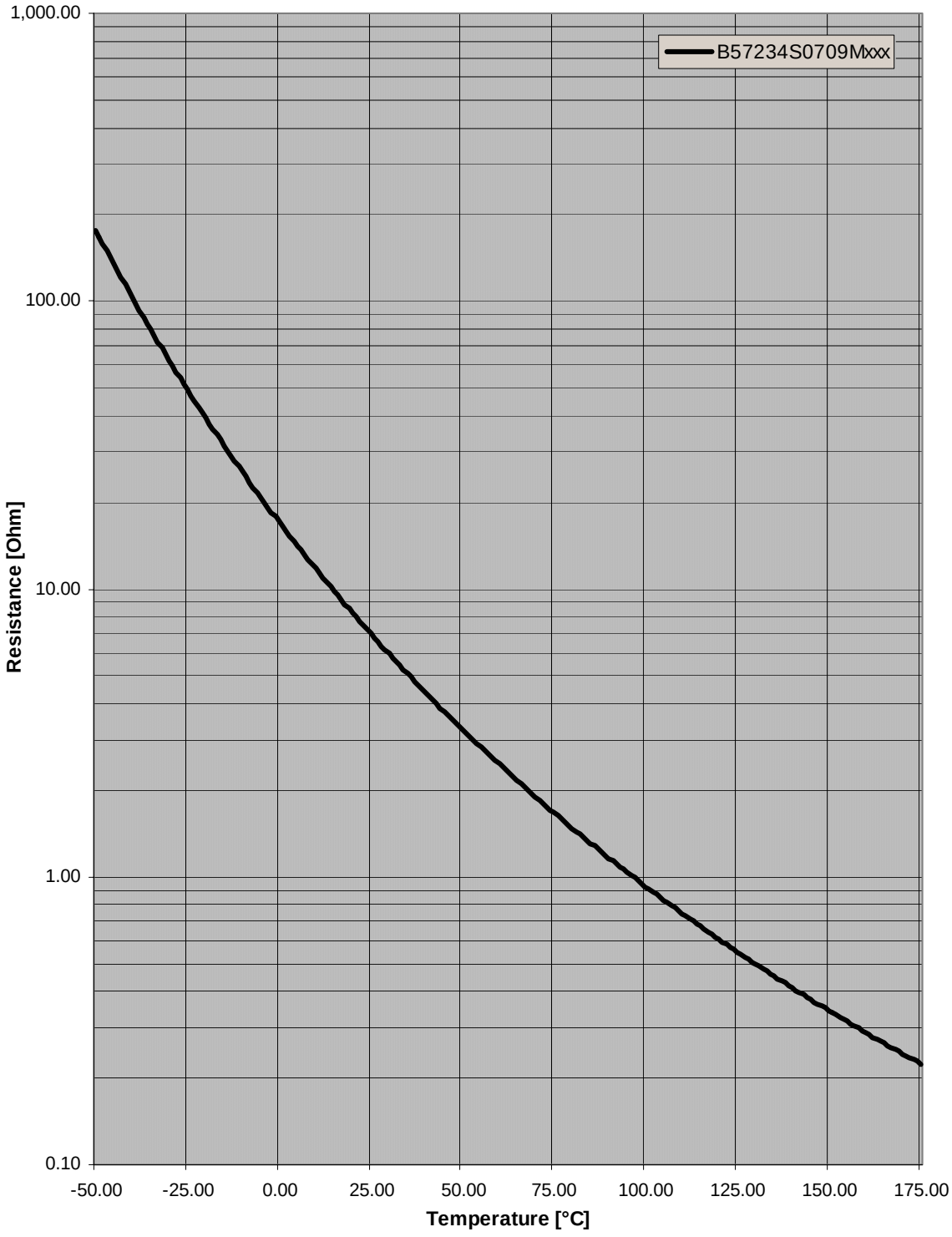
Resistance - Temperature Curve



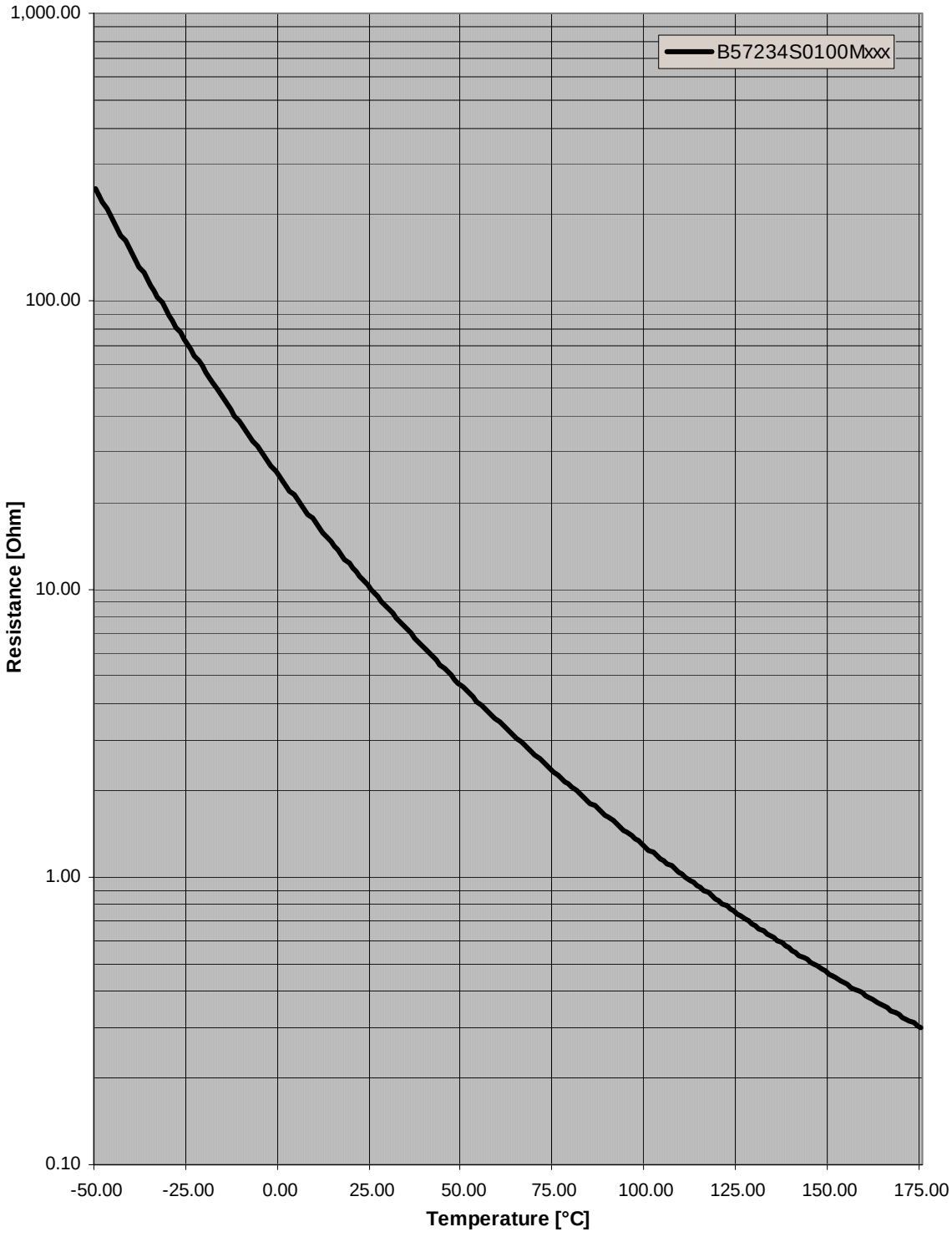
Resistance - Temperature Curve



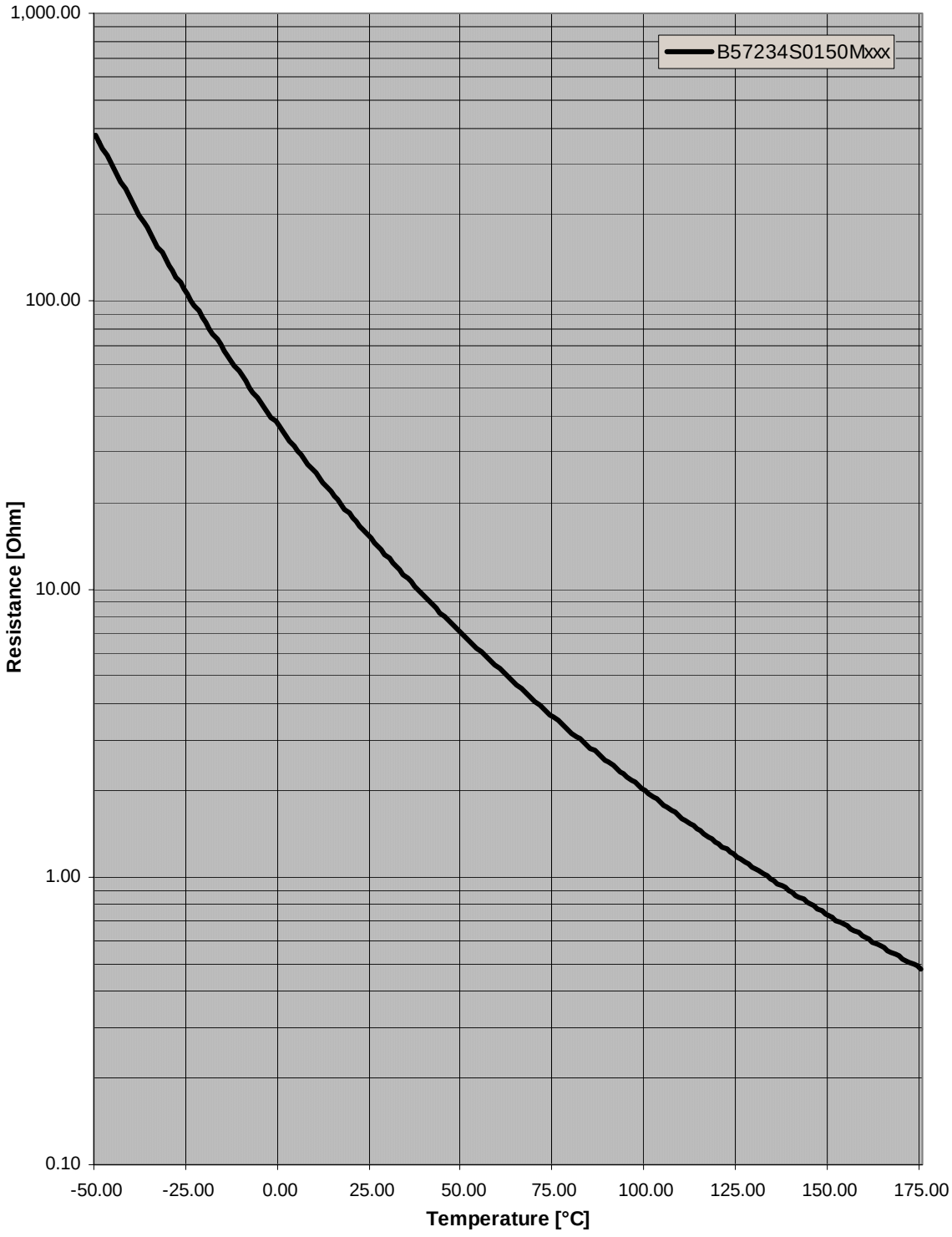
Resistance - Temperature Curve



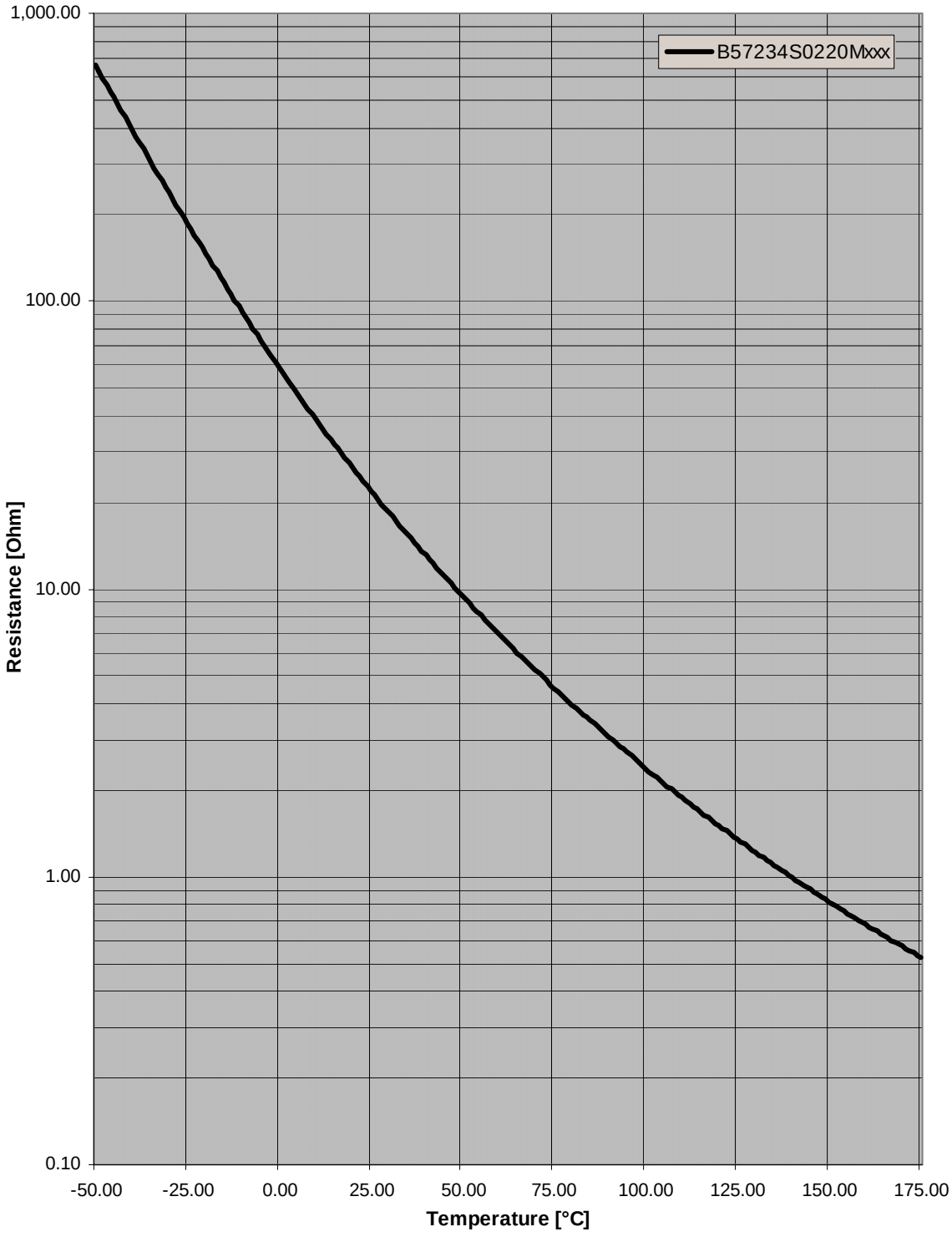
Resistance - Temperature Curve



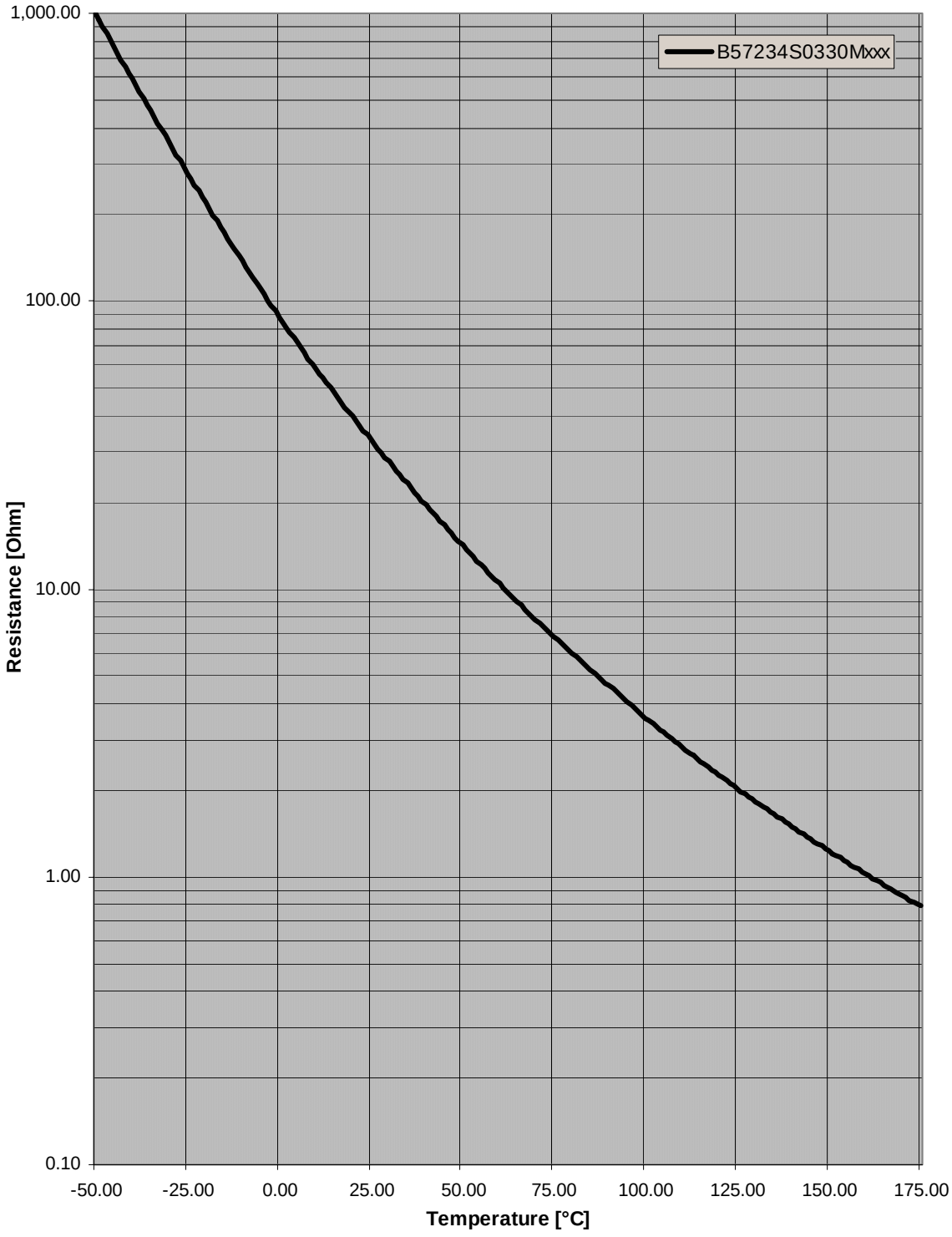
Resistance - Temperature Curve



Resistance - Temperature Curve



Resistance - Temperature Curve



ROBUSTNESS OF TERMINATIONS :

The leads meet the requirements of IEC 60068-2-21.

Test	Test conditions	Remarks
Tensile strength	Test Ua1: Fasten body with a force applied to each lead 10 [N] for 10 [s]	No visible damage
Bending strength	Test Ub: Fasten body with two 90°-bends in opposite direction at a force of 10 [N]	No visible damage (Peel off of coating along the lead accepted)

RELIABILITY REQUIREMENTS :

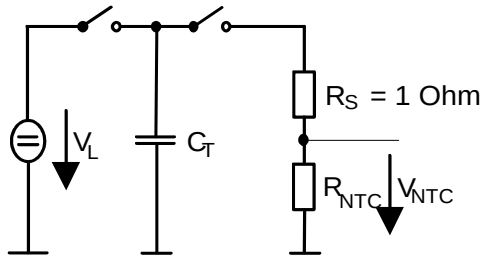
Test	Standard	Test conditions	$\Delta R_{25}/R_{25}$ (typical)	Remarks
Storage in dry heat	IEC 60068-2-2	Storage at upper category temperature T: 170°C t: 1 000 h	< 10 %	No visible damage
Storage in damp heat, steady state	IEC 60068-2-3	Temperature of air: 40°C Relative humidity of air: 93 % Duration: 21 days	< 5 %	No visible damage
Rapid change of temperature	IEC 60068-2-14	Lower test temperature: -55°C (time: 15 min) Upper test temperature: 170°C (time: 15 min) Time to change from lower to upper temperature : < 30 sec Number of cycles: 10	< 10 %	No visible damage
Endurance (storage at max. current)		$I = I_{max}$ t = 1000 h T = 25°C	< 10 %	No visible damage
Electrical cycling test	*	$I = I_{max}$ load on: 1 min load off: 6 min Number of cycles: 1000	< 10 %	No visible damage
Maximum switchable capacity test	**	Capacity = C_T Number of cycles: 1000	< 5 %	No visible damage

Soldering of Components

Process	Conditions	Remarks
Soldering	**Dip soldering** : 260°C max, 4 sec max, 6mm min from thermistor body **Iron soldering** : 360°C max, 2 sec max, 6 mm min from thermistor body	Low resistance drift

* Electrical cycling Test
Each cycle has to start with parts cooled down to room temperature. It has to cover the portion of the R/T curve between room temperature and the resistance of the components as stabilized at the maximum continous current I_{max} (that is the minimum operating resistance). One cycle lasts 7 minutes.

** Maximum switchable capacity test
The capacitor (C_T) is discharged across a series fixed resistor and the thermistor, shown in Figure 2. The charge voltage is chosen so that the voltage applied to the thermistor at the beginning of discharge is 170/345 [V], corresponding to (110/230V+ΔV)*1.41.
The capacitor is discharged across a series fixed resistor and the thermistor 1 000 times at ambient temperature of between 15°C and 35°C. Each cycle has to start with thermistors cooled down to ambient temperature.



V_L ... Load voltage
C_T ... Test capacitance
R_S ... Fixed resistance
V_{NTC} ... Voltage drop across the NTC
V_{NTC} = 170/345 V
(corresponds (110/230 V + dV) x 1.41)

Fig. 2. - Maximum switchable capacity measuring circuit

TAPING AND PACKING :

Packing codes :

The last two digits of the complete ordering code state the packing mode :

Packing		Code	Number of Pieces
Bulk packing	Bulk	00	500
Reel packing	Tape	51	1000
AMMO packing	Tape	54	750

Example : B57234S0100M000 untaped
B57234S0100M051 taped reel packing

Table 1: Package dimensions and weights of unit packages

Packing	Pcs / unit	Approx. Weight (g)	Dimensions (mm)
Bulk	500	1100	x=65, y=230, z=125
Ammo	750	2100	x=56, y=355, z=355
Reel	1000	2500	d=500, f=23±1, n=approx. 59, w=72 max

Dimensions x, y, z acc. to fig. 1
Dimensions d, f, n, w acc. to fig. 2

Drawings

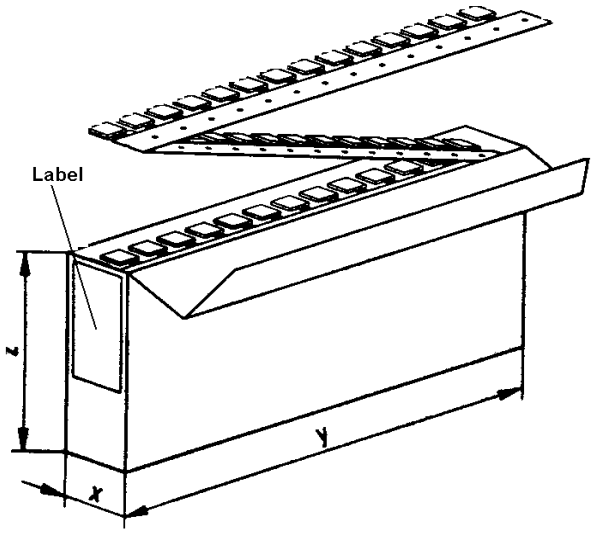


Fig. 1: AMMO packing

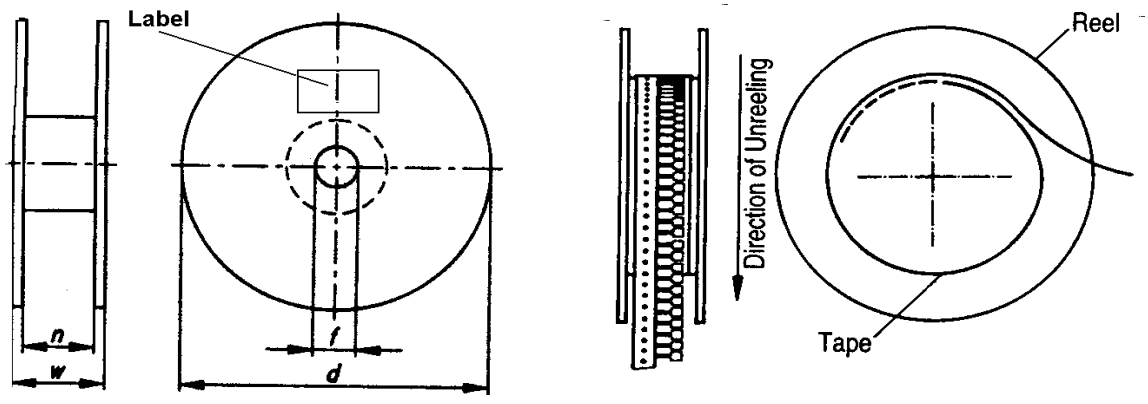


Fig. 2: Reel packing

Shipping package

Table 2: Dimensions and weights of shipping package.

BULK		
Dimensions L x W x H (mm)	Pcs/package -	Approx. Weight (kg)
330x230x100	1000	3.1
260x180x190	1500	4.3
360x360x130	4000	11.5
370x270x270	6000	16.8
354x354x274	7500	21.2

AMMO		
Dimensions L x W x H (mm)	Pcs/package -	Approx. Weight (kg)
354x354x58	750	2.6
354x354x112	1500	4.8
354x354x166	2250	7.0
354x354x220	3000	9.2
354x354x274	3750	11.4

REEL		
Dimensions L x W x H (mm)	Pcs/package -	Approx. Weight (kg)
505x505x74	1000	3.5
505x505x220	3000	9.8
505x505x360	5000	15.7

L x W x H acc. to fig. 3.

Drawing

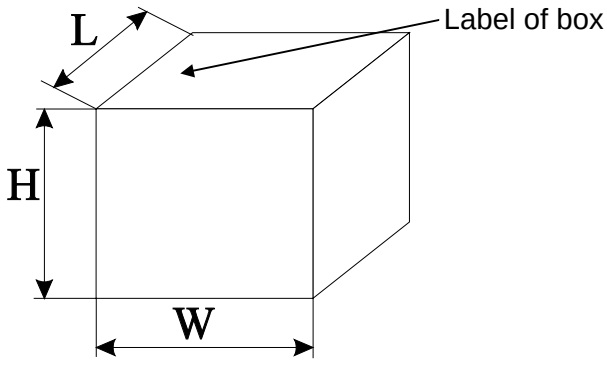


Fig. 3: Shipping Package

Packing material: Cardboard box