

DATA SHEET

$T_n = 70 \text{ to } 170 \text{ } ^\circ\text{C}$

PTC thermistors for temperature protection

Product specification
Supersedes data of 17th May 1999
File under BCcomponents, BC02

2001 May 02

PTC thermistors for temperature protection

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FEATURES

- Very fast action for maximum protection
- Well defined protection levels
- Well defined resistance for ease of circuit design
- Coated and leaded devices available
- High sensitivity to small temperature changes
- Excellent long term behaviour.

APPLICATIONS

- Industrial electronics
- Power supplies
- Electronic data processing.

DESCRIPTION

These directly heated thermistors have a positive temperature coefficient and are primarily intended for sensing.

QUICK REFERENCE DATA

PARAMETER	VALUE	UNIT
Maximum resistance at 25 °C	120	Ω
Minimum resistance at (T _n + 15) °C	4000	Ω
Maximum (DC) voltage	30	V
Temperature range	-20 to (T _n + 15)	°C
Weight:		
91002 to 91014	≈0.013	g
91052 to 91067	≈0.008	g
91072 to 91087	≈0.003	g
91102 to 91114	≈0.08	g
91152 to 91164	≈0.09	g
Climatic category	25/125/56	

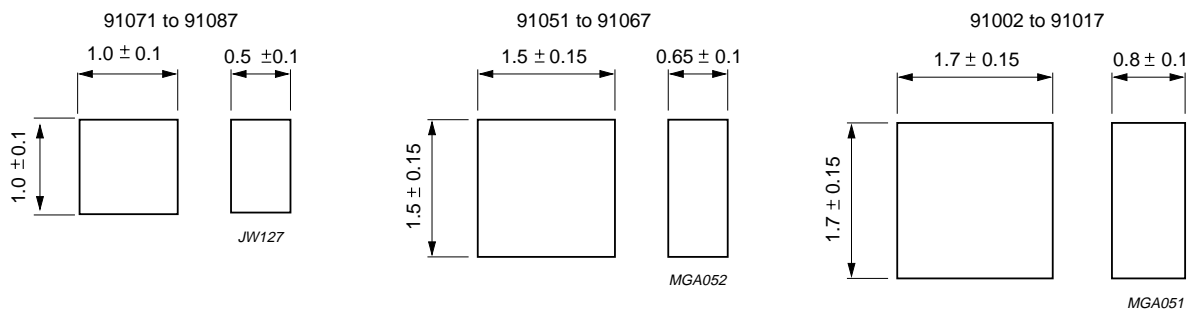
PACKAGING INFORMATION

PACKAGING		CATALOGUE NUMBERS 2322
SPQ	PQ	
5000	20000	671 91002 to 671 91014
5000	20000	671 91052 to 671 91067
5000	20000	671 91072 to 671 91087
500	5000	671 91102 to 671 91114
500	5000	671 91152 to 671 91164

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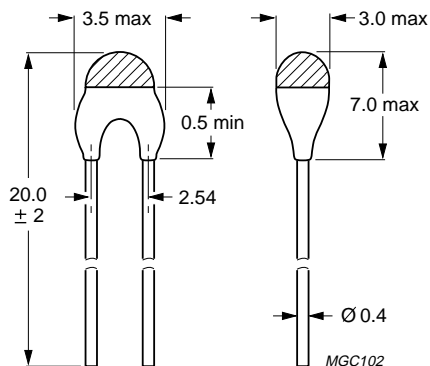
MECHANICAL DATA



Dimensions in mm.

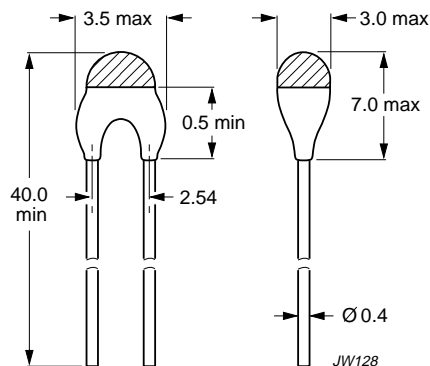
For clamping, reflow or hand soldering. Not intended for either wave or ultrasonic soldering and not for spot welding.
All standard solder alloys with low activated halogene-free fluxes are acceptable, for example: 62Sn/36Pb/2Ag.

Fig.1 Component outlines.



Dimensions in mm.

Fig.2 Component outline for 91102 to 91114.



Dimensions in mm.

Fig.3 Component outline for 91152 to 91164.

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ELECTRICAL CHARACTERISTICS

PARAMETER	VALUES
Maximum resistance at 25 °C	120 Ω
Maximum resistance at ($T_n - 5$) °C	see Table 1
Minimum resistance at ($T_n + 15$) °C	4000 Ω
Minimum resistance at ($T_n + 5$) °C	see Table 1
Maximum voltage	30 V (AC or DC)

Table 1 Nominal working temperatures and ordering information

NOMINAL WORKING TEMPERATURE				TYPE/CATALOGUE NUMBER 2322					
T_n (°C)	RESISTANCE from -20 °C to $T_n - 20$ °C (Ω)	RESISTANCE at $T_n - 5$ °C (Ω)	RESISTANCE at $T_n + 5$ °C (k Ω)	NAKED CHIP ⁽¹⁾			LEADED DEVICE		
				1.0 × 1.0 (mm)	1.5 × 1.5 (mm)	1.7 × 1.7 (mm)	NORMAL LEADS	LONG LEADS	COLOUR CODE
				671	671	671	671	671	
70	30 to 250	50 to 570	0.570 to 50	91072	91052	91002	91102	91152	black
80	30 to 250	50 to 550	1.33 to 50	91073 ⁽²⁾	91053	91003	91103	91153	brown
90	30 to 250	50 to 550	1.33 to 50	91074 ⁽²⁾	91054	91004	91104	91154	red
100	30 to 250	50 to 550	1.33 to 50	91075 ⁽²⁾	91055	91005	91105	91155	orange
110	30 to 250	50 to 550	1.33 to 50	91076	91056	91006	91106	91156	yellow
120	30 to 250	50 to 550	1.33 to 50	91077	91057	91007	91107	91157	green
125	30 to 250	50 to 550	1.33 to 50	91078	91058	–	–	–	–
130	30 to 250	50 to 550	1.33 to 50	91079	91059	91009	91109	91159	blue
135	30 to 250	50 to 550	1.33 to 50	91081	91061	–	–	–	–
140	30 to 250	50 to 550	1.33 to 50	91082	91062	91012	91112	91162	violet
145	30 to 250	50 to 550	1.33 to 50	91083	91063	–	–	–	–
150	30 to 250	50 to 550	1.33 to 50	91084	91064	91014	91114	91164	grey
155	30 to 250	50 to 550	1.33 to 50	91085	91065	–	–	–	–
160	30 to 250	50 to 550	1.33 to 50	91086	91066	–	–	–	–
170	30 to 250	50 to 550	1.33 to 50	91087	91067	–	–	–	–

Notes

1. Naked chips are packed in a hermetically-sealed alu-plastic bag.
2. Resistance at $T_n + 5$ °C = 0.570 to 50 k Ω .

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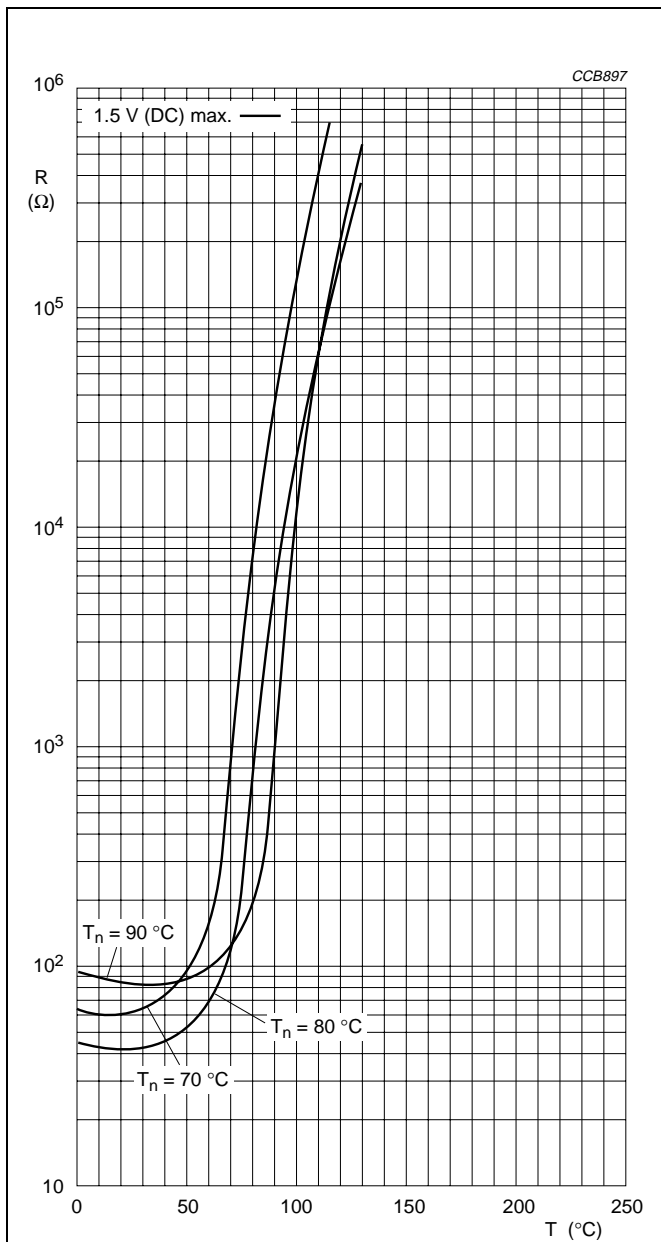


Fig.4 Typical resistance/temperature characteristic for 2322 671 91052/002/102, 91053/003/103 and 91054/004/104.

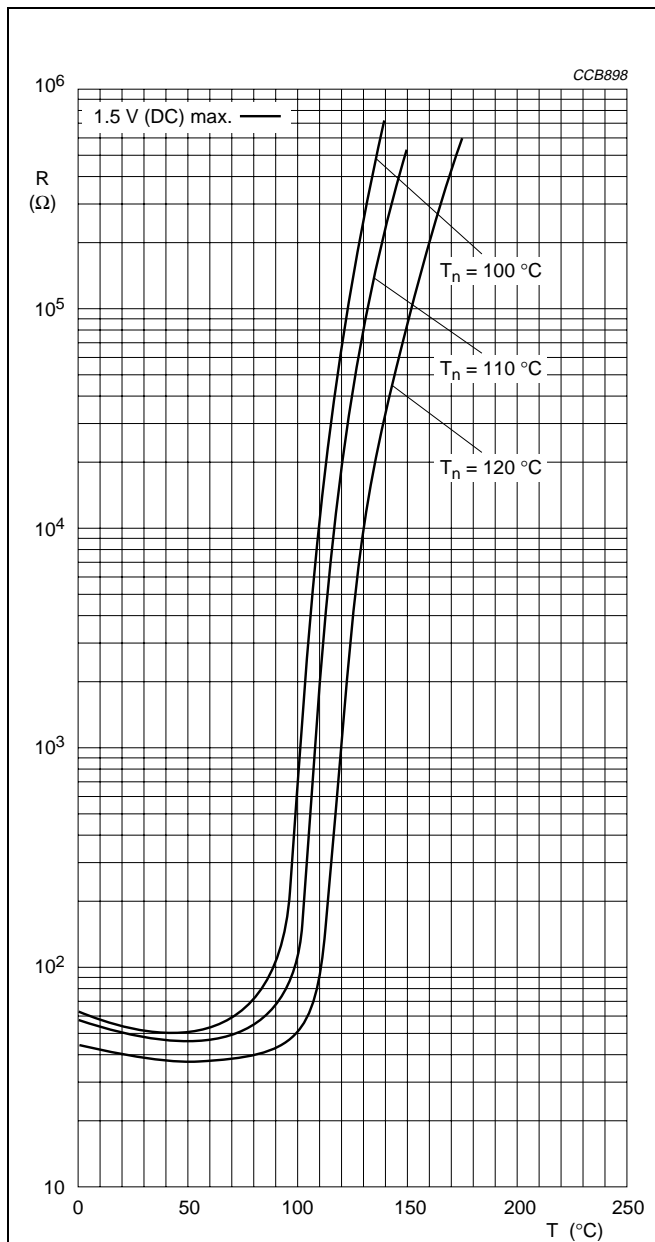


Fig.5 Typical resistance/temperature characteristic for 2322 671 91055/005/105, 91056/006/106 and 91057/007/107.

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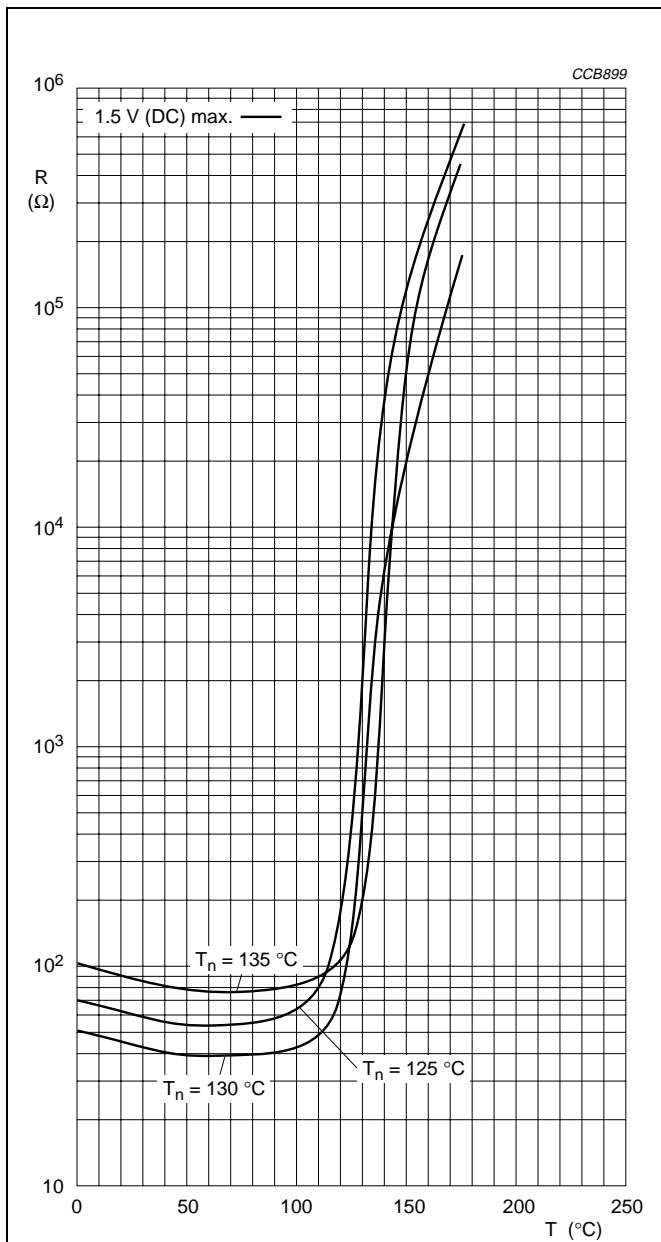


Fig.6 Typical resistance/temperature characteristic for 2322 671 91058, 91059/009/109 and 91061.

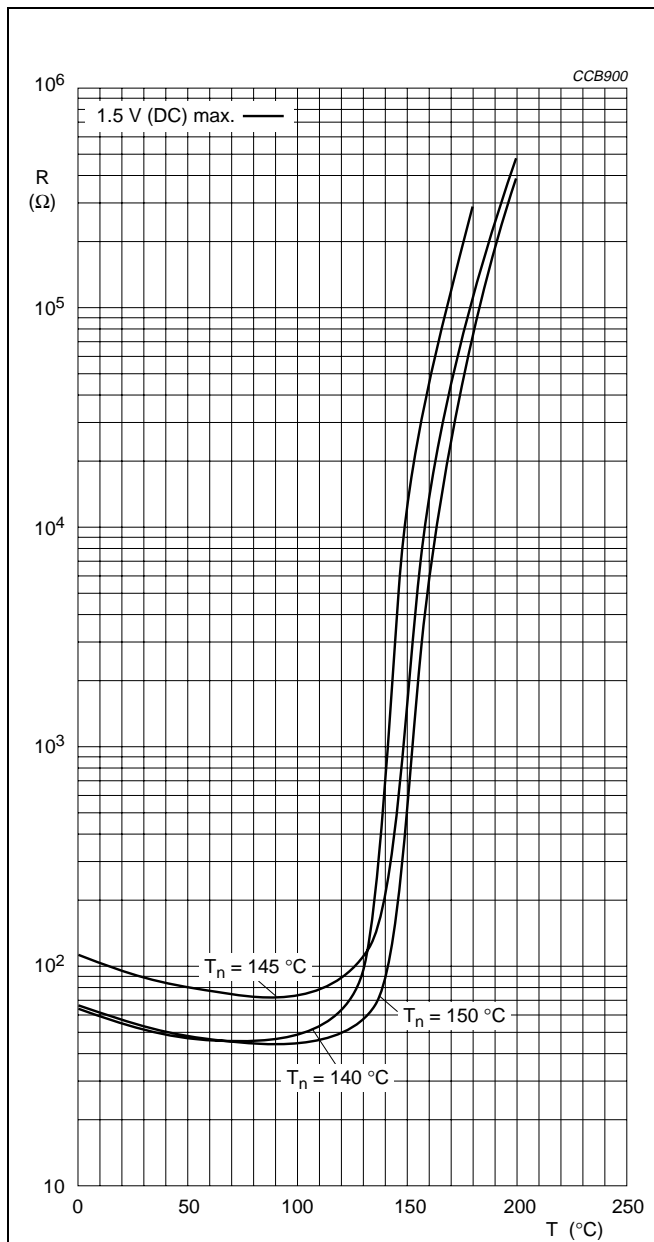


Fig.7 Typical resistance/temperature characteristic for 2322 671 91062/012/112, 91063 and 91064/014/114.

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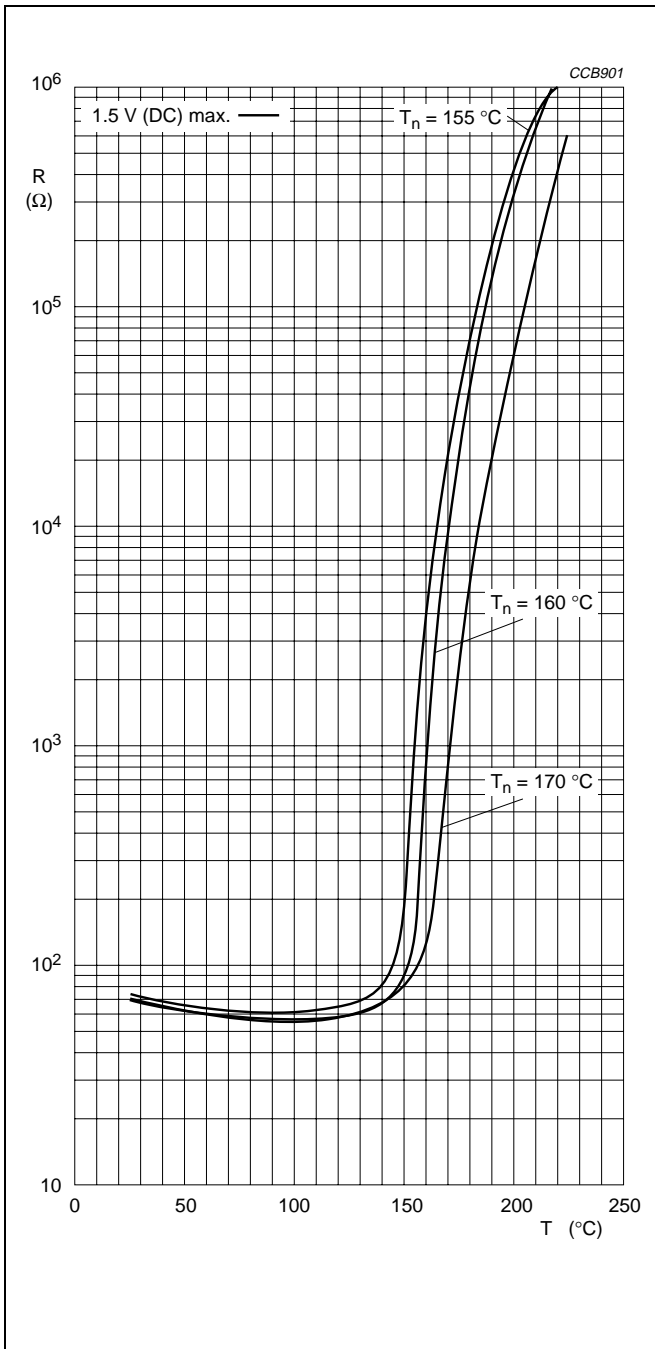


Fig.8 Typical resistance/temperature characteristic for 2322 671 91065, 91066 and 91067.

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TEST AND REQUIREMENTS

Clause numbers of tests and performance requirements refer to the "IEC 60738-1-4".

Tables with requirements for lot-by-lot and periodic tests.

In these tables:

D = Destructive

ND = Non-destructive.

Acceptable quality level

IEC CLAUSE	TEST	D or ND	PROCEDURE	REQUIREMENTS
Group A inspection (lot-by-lot)				
SUB-GROUP A0		ND		
4.5	zero power resistance		temperature: 25 °C voltage: ≤1.5 V ($T_n - 5$) °C ($T_n + 5$) °C ($T_n + 15$) °C	30 to 120 Ω as specified as specified ≥4000 Ω
SUB-GROUP A1		ND		
4.4.1	visual examination			no defect likely to impair function
SUB-GROUP A2		ND		
4.4.3	dimensions (gauging)			as specified
Group B inspection (lot-by-lot)				
SUB-GROUP B2		D		
4.16.1	soldering, solderability		for 2322 671 91052 to 91067 and 91002 to 91017: solder bath: 60/40; 260 ±5 °C and RMA flux; duration: 30 s for 2322 671 91102 to 91114 and 91102 to 91114: solder bath method: 235 ±5 °C	75% of surface covered with solder the terminations shall be evenly tinned
Group C inspection (periodic)				
SUB-GROUP C1A		D		
4.15	robustness of terminations		for 2322 671 91102 to 91114: test Ua (10 N) and test Ub (5 N) of "IEC 60068-2-21" visual examination zero power resistance at 25 °C	as in 4.12.4; see note 1 ΔR/R ≤±10%
4.16.2	resistance to soldering heat		for 2322 671 91102 to 91114: test Tb of "IEC 60068-2-20A" visual examination zero power resistance at 25 °C	as in 4.13.2.3 ΔR/R ≤±10%

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IEC CLAUSE	TEST	D or ND	PROCEDURE	REQUIREMENTS
SUB-GROUP C1B		D		
4.17	rapid change of temperature, no load		for 2322 671 91052 to 91067, 91002 to 91017 and 91102 to 91114: test Na of "IEC 60068-2-14" T_A : lower category temperature = $-25 \text{ } ^\circ\text{C}$ T_B : upper category temperature = $+125 \text{ } ^\circ\text{C}$ 5 cycles visual examination zero power resistance at $25 \text{ } ^\circ\text{C}$	as in 4.17 $\Delta R/R \leq \pm 10\%$ as in 4.14.4 $\Delta R/R \leq \pm 10\%$
SUB-GROUP C4		D		
4.23.2	endurance at upper category temperatures		for 2322 671 91002 to 91017 and 91052 to 91067: duration 168 hours at $200 \text{ } ^\circ\text{C}$ for 2322 671 91102 to 91114: duration 168 hours at $150 \text{ } ^\circ\text{C}$ for 2322 671 91002 to 91017, 91052 to 91067 and 91102 to 91114: duration 1000 hours at $125 \text{ } ^\circ\text{C}$ examination: at 168, 500 and 1000 hours visual examination zero power resistance at $25 \text{ } ^\circ\text{C}$	as in 4.23.2 $\Delta R/R \leq \pm 5\%$
SUB-GROUP D2		D		
4.23.3	endurance at maximum rated temperature		duration: 24 hours at $(T_n + 15) \text{ } ^\circ\text{C}$ and 30 V (DC) examination: at 24 hours visual examination zero power resistance at $25 \text{ } ^\circ\text{C}$	as in 4.23.3 $\Delta R/R \leq \pm 10\%$
SUB-GROUP D3		D		
4.22	damp heat, steady state, no load		visual examination zero power resistance at $25 \text{ } ^\circ\text{C}$	as in 4.22 $\Delta R/R \leq \pm 10\%$

Note

1. No loose or broken leads.