

Detail specification for

**Fixed tantalum
electrolytic
capacitors —
Porous anode, polar
non-solid electrolyte —
Tubular insulated
metallic case,
PTFE/elastomer seal,
axial wire
terminations —
Full plus additional
assessment level**

UDC 621.319.45

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Summary of pages

This document comprises a front cover, an inside front cover, pages i and ii, pages 1 to 18 and a back cover.

This standard has been updated (see copyright date) and may have had amendments incorporated. This will be indicated in the amendment table on the inside front cover.

Amendments issued since publication

Amd. No.	Date of issue	Comments
3318	October 1980	Indicated by a sideline in the margin

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Contents

	Page
1 Ratings	2
2 Marking	3
3 Related documents	3
4 Special characteristics	3
5 Additional information	3
6 Ordering information	4
7 Inspection requirements	4
Table 1 — Dimensions	1
Table 2 — Capacitance and voltage ratings	2
Table 3 — Voltage ratings	3
Table 4 — Case-size A test limits	12
Table 5 — Case-size B test limits	14
Table 6 — Case-size C test limits	16
Table 7 — Case-size D test limits	18

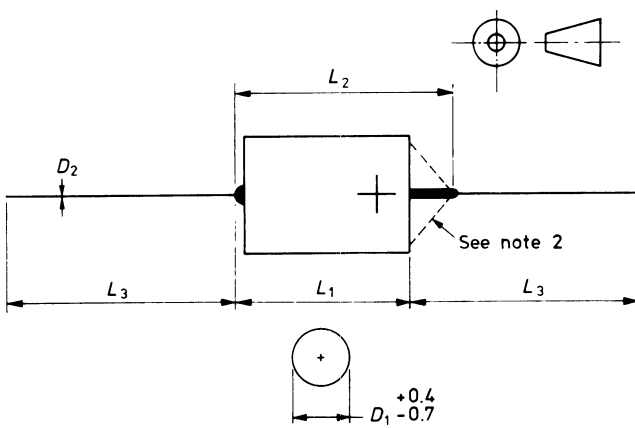
ELECTRONIC COMPONENTS OF ASSESSED QUALITY DETAIL SPECIFICATION IN ACCORDANCE WITH BS 9070 SECTIONS 1 AND 2 (1969) BS 9070 SECTION 3 (1971)	MANUFACTURER'S TYPE NUMBER See PD 9002
OUTLINE AND DIMENSIONS. THIRD ANGLE PROJECTION  see Table 1 Marking information see clause 2	For ordering information see clause 6
	FIXED CAPACITORS TANTALUM ELECTROLYTIC
	POROUS ANODE POLAR NON-SOLID ELECTROLYTE TUBULAR METALLIC CASE INSULATED PTFE/ELASTOMER SEAL AXIAL WIRE TERMINATIONS SOLDER COATED
	FULL PLUS ADDITIONAL ASSESSMENT

Table 1 — Dimensions (in millimetres)

Case size	L ₁ max.	L ₂ max.	L ₃ min.	D ₁	D ₂		Typical mass (g)
					min.	max.	
A	13.9	20.25	30	5.2	0.61	0.76	1.5
B	18.7	25.05	30	7.6	0.61	0.76	4.2
C	21.8	28.15	30	9.9	0.61	0.76	8.0
D	29.4	35.75	30	9.9	0.61	0.76	12.0
NOTE 1 The complete range of capacitance/voltage values is given in Table 2.							
NOTE 2 Within the constraints of the dimensions L ₂ D ₁ the anode termination area can be as shown.							

Refer to Qualified Products List PD 9002 for details of manufacturers approved to this specification.

1 Ratings (including limiting conditions of use) and characteristics

Capacitance range (at 120 Hz) (see Table 2)	3.3 μ F to 1 200 μ F (E12 series, BS 2488)
Standard selection tolerances	+ 50 – 15 % (A), $\pm$ 20 % (M), $\pm$ 10 % (K)
Environmental classification	55/125/56
Rated temperature	85 °C
Vibration	10 Hz to 2 000 Hz, 0.75 mm or 98 m/s ² , 6 h
Bump	390 m/s ² , 4 000 $\pm$ 10 bumps
Shock	981 m/s ² , 6 ms, trapezoidal, 6 shocks total
Acceleration	981 m/s ² , 30 min
Low air pressure	1.0 kPa
Salt mist	Severity 1
Solderability	2 s without ageing 3 s with ageing
Resistance to soldering heat	350 °C

Table 2 — Capacitance and voltage ratings

Capacitance (μ F)	Rated voltage (V)								
	6.3	10	16	25	40	63	75	100	125
3.3									A
3.9									A
4.7									A
5.6									A
6.8								A	A
8.2							A		
10							A		B
12						A			B
15					A	A			B
18					A				B
22				A	A				BC
27				A	A				BC
33			A	A				B	C
39			A	A			B	B	C
47		A		A			B		C
56		A	A			B	B	C	D
68	A		A		B		B	C	
82	A	A			B	BC		D	
100	A	A		B	B	C	C		
120	A			B	BC	C	D		
150			B	B	C	D			
180			B	BC	CD				
220			B	C	D				
270		B	BC	CD					
330		B	C	CD					
390		BC		CD					
470	B	C	CD						
560	B	C	CD						
680	C	CD							
820	C	CD							
1 000	CD								
1 200	D								

The capacitors may be operated at voltage lower than their rated/category values.

2 Marking

The marking of the component and package shall be in accordance with the requirements of 1.1.6 of BS 9070.

Tolerances are coded as in BS 1852. The letter A represents a tolerance of + 50 – 15 %.

3 Related documents

BS 2011, *Basic environmental testing procedures*.

BS 2488, *Schedule of preferred numbers for the resistance of resistors and the capacitance of capacitors for telecommunication equipment*.

BS 6001, *Sampling procedures and tables for inspection by attributes*.

BS 9000, *General requirements for electronic components of assessed quality*.

BS 9070, *Fixed capacitors of assessed quality: generic data and methods of test*.

PD 9002, *Qualified products list for electronic components of assessed quality*.

4 Special characteristics

The following special characteristics are covered by this detail specification.

- a) High and low temperature characteristics (subgroup C4).
- b) High frequency impedance at low temperature (subgroup C4).
- c) Surge voltage: 115 % of the relevant voltage rating. Surge voltage limits for the rated/category voltages are listed in Table 3.

Table 3 — Voltage ratings

D.C. Rated voltage 85 °C	D.C. Category voltage 125 °C	D.C. Surge voltage	
		85 °C	125 °C
6.3	4.0	7.2	4.6
10	6.3	11.5	7.2
16	10	18.4	11.5
25	16	28.8	18.4
40	25	46	28.8
63	40	72	46
75	50	86	57
100	63	115	72
125	80	144	92

5 Additional information (not for inspection purposes)

5.1 Stability. These polar capacitors offer a high stability, with a high capacitance/voltage product and low leakage current, and are suited to applications where size, mass and stability are of paramount importance. They are designed for use in integrating and feed back circuits, by-pass, coupling, decoupling, timing and low level smoothing function. The main features are detailed below.

<u>Capacitance range</u>	<u>Voltage range</u>	<u>Temperature range</u>
3.3 µF to 1 200 µF	125 V to 6.3 V (derated above 85 °C)	– 55 °C to 125 °C

5.2 These capacitors are designed to operate over the temperature range – 55 °C to 85 °C, and above 85 °C with linear derating up to a maximum of 66 % of the rated voltage at 125 °C, as shown in Table 3.

5.3 Life. The life of the capacitor is enhanced when the unit is subjected to a reduced ripple current, a low ambient temperature, and is externally cooled. The main failure mode is open circuit.

5.4 Storage. Small changes in capacitance, tangent of loss angle and leakage current may occur during shelf storage.

5.5 Reverse voltage. These capacitors should not be used where any reverse potentials occur.

5.6 Capacitance values. Capacitance values decrease at higher frequencies. This is most apparent with the high capacitance devices.

5.7 Ripple currents. Typical maximum r.m.s ripple currents which may be applied to each case size.

Case size	A	B	C	D
Maximum ripple current up to 125 °C at $f \leq 10$ kHz ^a	40 mA r.m.s.	180 mA r.m.s.	300 mA r.m.s.	450 mA r.m.s.
^a At frequencies in excess of 10 kHz, and for higher ripple current usage, the manufacturer should be consulted.				

5.8 Burn-in. All capacitors are subjected to burn-in. This is to remove premature failures and ensure reliability.

6 Ordering information

Orders for components to this specification shall include the following minimum information:

- Quantity.
- Capacitance value and tolerance.
- Rated voltage and case size.
- Manufacturer's type number.
- BS specification number, issue number and date.

EXAMPLE. 1 000 off 39 $\mu\text{F} \pm 20\%$ 25 V Case size A to BS 9073 N0034 Issue 1, 1978.

7 Inspection requirements

The capacitors covered by this specification shall be tested to the inspection requirements given below.

This schedule gives the appropriate tests from BS 9070-1, Sections 1, 2 and 3.

Tests shall be performed in the order in which they appear in this schedule.

Samples submitted to tests marked (D) shall not be accepted for release under BS 9000 (see 2.6.5 BS 9000-1)

Inspection	BS 9070:Sections 1 and 2:1969 or Section 3:1970 Reference and conditions of test	Performance requirements where not otherwise specified
GROUP A	To be applied 100 % on all capacitors. All failures shall be rejected.	
<u>Subgroup A1</u> Visual examination	3.2.2	As 1.2.2 of BS 9070
<u>Subgroup A2</u> Capacitance	3.2.4.3 Frequency of measurement 120 Hz. 75 % – 85 % of the rated voltage applied.	Within the specified selection tolerance.
<u>Subgroup A3</u> Tangent of loss angle	3.2.4.4 Frequency of measurement 120 Hz. 75 % – 85 % of the rated voltage applied.	As Table 4, Table 5, Table 6 and Table 7
Leakage current	3.2.4.5	As Table 4, Table 5, Table 6 and Table 7
<u>Subgroup A5</u> CTR information	3.1.11 Attributes information for subgroups A1, A2 and A3.	
GROUP B	To be applied on a sampling basis lot-by-lot. Subgroups B3 to B6 not applicable.	
<u>Subgroup B1</u> Dimensions (outline)	<u>Inspection level S-4, AQL 4 %</u> 1.2.3.1	