

BRITISH STANDARDS INSTITUTION

2 PARK STREET, LONDON W1A 2BS

Specification available from:-
As shown in PD 9002, CECC 00 200 and

OXLEY DEVELOPMENTS COMPANY LIMITED,
PRIORY PARK,
ULVERSTON,
CUMBRIA LA12 9QG

BS CECC 30 701-024
Issue 1 October 1986



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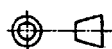
ELECTRONIC COMPONENTS OF ASSESSED QUALITY DETAIL SPECIFICATION IN ACCORDANCE WITH BS CECC 30 000 : 1975 and BS CECC 30 700 : 1979

MANUFACTURER'S TYPE NUMBER

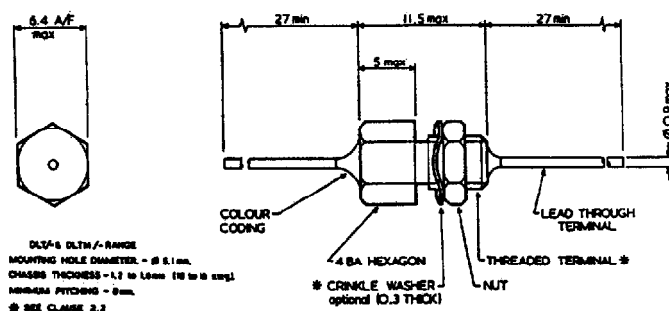
DLT/-, DLT-/Ref 1 and
dBZ-/Ref 1 SERIES

For ordering information
See Clause 6

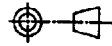
OUTLINE AND DIMENSIONS Third angle projection



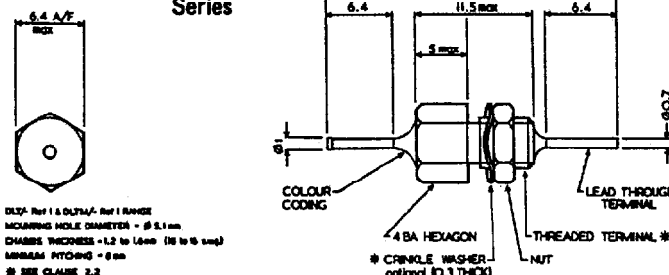
DLT/- & DLTM/-Series



Third angle projection



DLT-/Ref 1 & DLTM-/Ref. 1 Series



For detail dimensions see Appendix B
Marking information see Clause 5.

Fixed capacitor monolithic
discoidal, ceramic
dielectric. Class 2.

Terminals:-

DLT/- SERIES - Axial wire
lead-through and threaded
case with nut for chassis
mounting

DLT-/Ref 1 SERIES - Axial
pin headed lead-through
and threaded case with nut
for chassis mounting

dBZ-/Ref 1 SERIES - Pin
and eyelet lead-through
for soldering to chassis
and printed circuit boards

FULL ASSESSMENT PLUS
ADDITIONAL TEST

Refer to Qualified Products List PD 9002 and/or CECC 00 200 for details
of manufacturers approved to this specification

1. DIMENSIONS (in mm)

TABLE 1 (not applicable)

For outline and dimensions see Appendix B

2. SPECIFIED METHOD OF MOUNTING FOR VIBRATION AND BUMP TESTING.

Capacitors shall be mounted by clamping the body and the terminations.

3. RATINGS AND CHARACTERISTICS

Capacitance	See Table 2
Tolerance	-20 % +80 %
Rated voltage	See Table 2
Category voltage	See Table 2
Rated temperature	85 °C
Temperature characteristic	See Table 2A
Tangent of loss angle	See Table 2B
Insulation resistance	> 5000Mohm
Climatic category	40/100/21
Bump severity	390 m/s ² , 4000 ± 10 bumps
Vibration severity	10-500 Hz, 10 h, 98 m/s ²
	Test Fc Procedure B4
Low air pressure	85 mbar
Solderability (Method 1)	2 s without ageing
	3 s with ageing
Resistance to soldering heat	350 °C

TABLE 2 : Capacitance values and ratings

Manufacturer's Type Number			Rated Capacitance	Rated Voltage	Category Voltage	Colour Coding
DLT/22 *	DLT/22/Ref 1*	dBZ/22/Ref 1	22pF	100 V	50 V	Black
DLT/47*	DLT/47/Ref 1*	dBZ/47/Ref 1	47pF	100 V	50 V	Yellow
DLT/100*	DLT/100/Ref 1*	dBZ/100/Ref 1	100pF	100 V	50 V	White
DLT/330*	DLT/330/Ref 1*	dBZ/330/Ref 1	330pF	100 V	50 V	Green
DLT/470*	DLT/470/Ref 1*	dBZ/470/Ref 1	470pF	100 V	50 V	Orange
DLT/680*	DLT/680/Ref 1*	dBZ/680/Ref 1	680pF	100 V	50 V	Grey
DLT/1000*	DLT/1000/Ref 1*	dBZ/1000/Ref 1	1nF	100 V	50 V	Brown
DLT/4700*	DLT/4700/Ref 1*	dBZ/4700/Ref 1	4.7nF	100 V	50 V	Red
DLT/10000*	DLT/10000/Ref 1*	dBZ/10000/Ref 1	10nF	100 V	50 V	Blue
DLT/47000*	DLT/47000/Ref 1*	dBZ/47000/Ref 1	47nF	100 V	50 V	Light Blue
DLT/100000*	DLT/100000/Ref 1*	dBZ/100000/Ref 1	100nF	50 V	25 V	Beige

* A special option type DLTm is also available with the above values and ratings but with metric thread and finish as shown in 3.1.2

TABLE 2A : Temperature characteristics

Letter code	Manufacturer's Type Number			Max capacitance change in % with no applied d.c. voltage	Max capacitance change in % with applied d.c. voltage	Temperature range
2C	DLT/22 to DLT/100	DLT/22/Ref 1 to DLT/100/Ref 1	dBZ/22/Ref 1 to dBZ/100/Ref 1	± 20	+20 / -30%	-40°C to +100°C
2E	DLT/330 to DLT/47000	DLT/330/Ref 1 to DLT/47000/Ref 1	dBZ/330/Ref 1 to dBZ/47000/Ref 1	+20 / -55	+20 / -70%	-40°C to +100°C
2F	DLT/100000	DLT/100000/Ref 1	dBZ/100000/Ref 1	+30 / -80	+30 / -90%	-40°C to +100°C

TABLE 2B : Tangent of loss angle

Manufacturer's Type No.			Tan δ	Tans after Tests in Subgroups C1, C2, C3
DLT/22 to DLT/100	DLT/22/Ref 1 to DLT/100/Ref 1	dBZ/22/Ref 1 to dBZ/100/Ref 1	≤ 0.01	≤ 0.05
DLT/330 to DLT/47000	DLT/330/Ref 1 to DLT/47000/Ref 1	dBZ/330/Ref 1 to dBZ/47000/Ref 1	≤ 0.03	≤ 0.05
DLT/100000	DLT/100000/Ref 1	dBZ/100000/Ref 1	≤ 0.03	≤ 0.05

TABLE 3 : Insertion loss

Minimum performance requirements for the insertion loss of Type DLT/-, DLT/-/Ref 1 and dBZ/-/Ref 1 series filter capacitors. Test frequency 100 MHz for values ≥ 100 pF and 500 MHz for values < 100 pF. See Appendix A for test method.

Type No.			Minimum Insertion Loss (dB)
DLT/22	DLT/22/Ref 1	dBZ/22/Ref 1	3
DLT/47	DLT/47/Ref 1	dBZ/47/Ref 1	4
DLT/100	DLT/100/Ref 1	dBZ/100/Ref 1	8
DLT/330	DLT/330/Ref 1	dBZ/330/Ref 1	10
DLT/470	DLT/470/Ref 1	dBZ/470/Ref 1	15
DLT/680	DLT/680/Ref 1	dBZ/680/Ref 1	18
DLT/1000	DLT/1000/Ref 1	dBZ/1000/Ref 1	20
DLT/4700	DLT/4700/Ref 1	dBZ/4700/Ref 1	35
DLT/10000	DLT/10000/Ref 1	dBZ/10000/Ref 1	40
DLT/47000	DLT/47000/Ref 1	dBZ/47000/Ref 1	40
DLT/100000	DLT/100000/Ref 1	dBZ/100000/Ref 1	45

3.1 Additional Information (Not for inspection purposes)

3.1.1 This range of fixed ceramic capacitors is designed to offer high capacitance per unit volume with low inductance.

The d.c. or low frequency current rating is 13 A.

Recommended mounting torque is 0.35 Nm. (not applicable to dBZ/-/Ref 1 series).

Minimum pitching : the user should allow appropriate clearance for assembly tools.

3.1.2 The special option type DLTM is identical with Type DLT/- and DLT/-/Ref 1 apart from finish and thread as shown in the following Table.

TABLE 3A

	DLT/- and DLT/-/Ref 1	DLTM/- and DLTM/-/Ref 1	dBZ/-/Ref 1
mounting	2BA thread crinkle washer only on special request	M5 x 0.8 thread with crinkle washer as standard	chassis or p.c. mounting (soldered)
plating	gold, tin or tin-lead	gold, tin or tin-lead	silver

3.1.3 Typical values of insertion loss at various frequencies for DLT/-, DLT/-/Ref 1 and dBZ/-/Ref 1 capacitors are shown in Table 3B. Measurements are made in a 50 Ohm system : insertion loss is expressed in decibels (See Appendix A).

TABLE 3B

Type No.			Frequency MHz			
			1	10	100	1000
			Insertion Loss (dB)			
DLT/22	DLT/22/Ref 1	dBZ/22/Ref 1	0	0	3	15
DLT/47	DLT/47/Ref 1	dBZ/47/Ref 1	0	0	5	20
DLT/100	DLT/100/Ref 1	dBZ/100/Ref 1	0	0	8	28
DLT/330	DLT/330/Ref 1	dBZ/330/Ref 1	0	2	18	34
DLT/470	DLT/470/Ref 1	dBZ/470/Ref 1	0	3	20	40
DLT/680	DLT/680/Ref 1	dBZ/680/Ref 1	0	4	22	40
DLT/1000	DLT/1000/Ref 1	dBZ/1000/Ref 1	0	9	27	40
DLT/4700	DLT/4700/Ref 1	dBZ/4700/Ref 1	3	20	38	53
DLT/10000	DLT/10000/Ref 1	dBZ/10000/Ref 1	8	27	44	63
DLT/47000	DLT/47000/Ref 1	dBZ/47000/Ref 1	20	41	45	74
DLT/100000	DLT/100000/Ref 1	dBZ/100000/Ref 1	25	45	57	75

The above values of insertion loss are correct for 50 Ohm source and load impedances only. Other systems will yield different insertion losses.
Table 3C below gives values of insertion loss where R_{source} = 10 kohm, and R_{load} = 1 kohm

TABLE 3C

Type No.			Frequency MHz	1	10	100	1000
			Insertion Loss (dB)				
DLT/22	DLT/22/Ref 1	dBZ/22/Ref 1	0	4	22	42	
DLT/47	DLT/47/Ref 1	dBZ/47/Ref 1	0	9	29	49	
DLT/100	DLT/100/Ref 1	dBZ/100/Ref 1	1	15	35	55	
DLT/330	DLT/330/Ref 1	dBZ/330/Ref 1	6	25	45	65	
DLT/470	DLT/470/Ref 1	dBZ/470/Ref 1	9	28	48	68	
DLT/680	DLT/680/Ref 1	dBZ/680/Ref 1	12	31	51	71	
DLT/1000	DLT/1000/Ref 1	dBZ/1000/Ref 1	15	35	55	75	
DLT/4700	DLT/4700/Ref 1	dBZ/4700/Ref 1	28	48	68	84	
DLT/10000	DLT/10000/Ref 1	dBZ/10000/Ref 1	35	55	75	94	
DLT/47000	DLT/47000/Ref 1	dBZ/47000/Ref 1	48	68	88	108	
DLT/100000	DLT/100000/Ref 1	dBZ/100000/Ref 1	55	75	95	115	

4. RELATED DOCUMENTS

BS CECC 30 000	'Generic specification, Fixed capacitors'
BS CECC 30 700	'Sectional specification, Fixed capacitors with ceramic dielectric, class 2'.
BS E9000	'Harmonized systems for general requirements for electronic components of assessed quality'.
CECC 00 200	'CECC qualified products lists'.
IEC 410	'Sampling plans and procedures for inspection by attributes'.
PD 9002	'BS 9000 and BS CECC qualified products list'.

5. MARKING

The capacitors shall be identified by colour code, see Table 2.

The packaging shall be marked in accordance with the requirements of 1.4 of BS CECC 30 700.

6. ORDERING INFORMATION

When ordering capacitors to this detail specification, the following minimum information shall be given:

- (1) Quantity.
- (2) manufacturer's type number (See Table 2 and 3.1.2).
- (3) plating (See 3.1.2).
- (4) BS CECC specification number, Issue number, and date.

Ordering example: A DLT/1000 with gold plating would be ordered as DLT/1000, gold plated, BS CECC 30 701-024 Issue 1 October 1986

7. QUALIFICATION APPROVAL AND QUALITY CONFORMANCE INSPECTION

- 7.1** For qualification approval test and quality conformance inspection the test schedule, severities and requirements given in the sectional specification BS CECC 30 700 and in Tables 4A and 4B of this specification, shall apply.
- 7.2** Samples submitted to tests marked 'D' shall not be accepted for release under BS E9000.
- 7.3** The tests shall be performed in the order in which they appear in the schedule.

8. CERTIFIED TEST RECORDS

Certified test records shall be prepared in accordance with 3.2 of BS CECC 30 700.

TABLE 4A**LOT BY LOT INSPECTION (GROUP A AND B)**

CLAUSE NUMBER AND TEST (1)	D or ND (3)	CONDITION OF TEST	IL (2)	AQL (%) (2)	PERFORMANCE REQUIREMENT (1)
Sub-group A1. 4.2 Visual Examination Dimensions	ND		S4	2.5	The condition, workmanship, marking and finish shall be satisfactory. Dimensions shall be within the specified tolerances.
Sub-group A2. 4.3 Capacitance	ND	Preconditioning as in 4.1.2. Measuring voltage ≤ 1.2 V. Measurement frequency 1 kHz or 10 kHz ± 20 %	II	1.0	Within the specified selection tolerance.
4.4 Tangent of loss angle		Preconditioning and measurement conditions as for capacitance.			See Table 2B
4.5 Insulation resistance		Test point (1a) Measuring Voltage : U_R			≥ 5000 MOhm
4.6 Voltage proof		Test points (1a) and (1d) Applied voltage: $25 U_R$			No breakdown or flashover.

(1), (2) and (3) : See Page 13