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BRITISH STANDARDS INSTITUTION
2, PARK STREET, LONDON, W1A 2BS

Specification available from:—
CORNING LIMITED, ELECTROSIL DIVISION,
P.O. BOX NO. 37,
PALLION,
SUNDERLAND,
TYNE & WEAR, SR4 6SU.

BS CECC 30 201 015 and 016
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**ELECTRONIC COMPONENTS OF ASSESSED
QUALITY**

DETAIL SPECIFICATION IN ACCORDANCE WITH

BS E9070 : 1975 (CECC 30 000 : 1975)

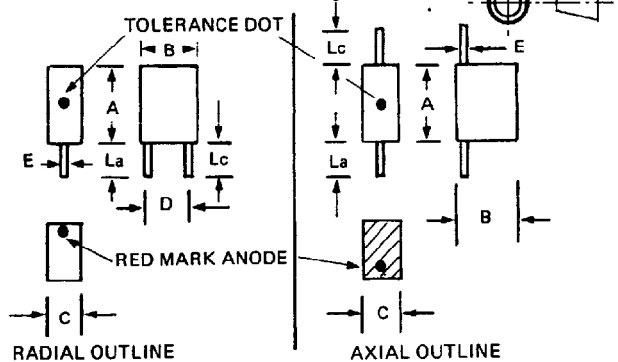
BS E9073 : 1976 (CECC 30 200 : 1975)

MANUFACTURER'S TYPE NUMBER
MINITAN MM

SEE PD 9002 & CECC 00200

For ordering information
see CLAUSE 5

Outline and dimensions Third angle projection



TANTALUM CAPACITORS WITH
SOLID ELECTROLYTE POROUS
ANODE
TYPICAL CONSTRUCTION
RECTANGULAR - POLAR.
RESIN SEAL, POLYESTER CASE
INSULATED
AXIAL WIRE TERMINATIONS
OFFSET ON ONE FACE
(BS CECC 30201 015)
RADIAL WIRE TERMINATIONS
(BS CECC 30 201 016)

**FULL ASSESSMENT PLUS
ADDITIONAL**

TABLE 1 DIMENSIONS

All dimensions are in millimetres

CASE SIZE	A	B	C	D		La ANODE LEAD		Lc CATHODE LEAD		E	
				MAX	MIN	MAX	MIN	MAX	MIN	MAX	MIN
MMF	4.19	3.05	1.78	3.05	2.03	44.5	38.1	38.1	31.7	.3	.2
MMM	5.72	4.70	1.91	4.32	3.30	44.5	38.1	38.1	31.7	.3	.2
MML	7.37	5.59	2.79	5.21	3.93	44.5	38.1	38.1	31.7	.46	.36
MMS	7.87	5.84	3.30	5.72	4.44	44.5	38.1	38.1	31.7	.46	.36
MMJ	12.07	9.53	3.81	8.26	6.98	44.5	38.1	38.1	31.7	.46	.36

Refer to Qualified Products List PD 9002 and/or CECC 00200 for details of manufacturers approved to this specification.

1. Ratings (including limiting conditions of use) and characteristics

		Table Number
Capacitance range.	Capacitance values are taken from the E12 series of BS 2488 (IEC 63)	2A
Capacitance tolerance	$\pm 5\% \pm 10\% \pm 20\%$	
Rated Voltage U_R		2A
Category Voltage U_C		2A
Rated temperature	85°C	
Leakage current		2B
Tangent of loss angle		2B
Impedance		2C
Environmental classification	55/125/56	
Bump Severity	390m/s ²	
Shock Severity	981m/s ²	
Vibration Severity	0.7m/m or 98 m/s ² , 10Hz - 2000Hz	
Acceleration Severity	981 m/s ²	
Low air pressure	1kPa (10mbar)	
Resistance to soldering heat	350°C	
Surge Voltage	130% of the Rated Voltage at 85°C or Category Voltage at 125°C	3A

*1 mbar = 10² N/m² = 100Pa

2. Additional information (not for inspection purposes)

The reliability of these capacitors depends on circuit impedance. In very low impedance (e.g. less than 3Ω/V circuits, such as power supplies, particular care is necessary to ensure that the surge voltage rating is not exceeded. This may necessitate voltage derating of up to 50%.

The main mode of failure is high leakage current or short circuit.

These capacities may not meet the above mechanical severities when mounted solely by their leads.

This type of capacitor is designed to operate over the temperature range -55°C to +85°C and with proper derating to +125°C (See tables 3A and 3B).

Reverse Voltage	Peak Voltages 15% of forward DC rating at 25°C 10% of forward DC rating at 55°C 5% of forward DC rating at 85°C	
Ripple Ratings	See Appendix A for graph of peak AC voltage -% of rated voltage/frequency	3B

3. Related documents

BS 2011 (IEC 68)	Methods for the environmental testing of electronic components and electronic equipment.
BS 2488 (IEC 63)	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 E9000	General requirements for electronic components of assessed quality.
BS E9070 (CECC 30000)	Harmonized system of quality assessment for electronic components: Generic specification for fixed capacitors.
BS E9073 (CECC 30200)	Sectional specification for tantalum capacitors.
PD 9002 (CECC 00200)	BS 900 component selection guide.

4. Marking

The marking of the component and package shall be in accordance with 1.4 of BS E9073.

- Polarity marking shall be as shown in the figures on the front page.
- The tolerance identification shall be one of the following:

$\pm 5\%$	Gold Tolerance dot
$\pm 10\%$	Silver Tolerance dot
$\pm 20\%$	None

Table 2A

Table of capacitance and rated voltage (WVDC) and category voltage related to case size.

VALUE	RATED VOLTAGE (WVDC) U_R					
	6.3	10	16	20	25	35
μF	CATEGORY VOLTAGE U_C					
	4.0	6.3	10	16	20	23
.0047	←					MMF472
.0068	←					MMF682
.010	←					MMF103
.015	←					MMF152
.022	←					MMF223
.033	←					MMF333
.047	←					MMF473
.068	←					MMF683
.10	←					MMF104
.15	←					MMF154
.22	←					MMF224
.33	←					MMF334
.47	←					MMF474
.68	←				MMF684	MMM684
1	←			MMF105	←	MMM105
1.5	←		MMF155	←		MMM155
2.2	←	MMF225	←		MMM225	MML225
3.3	MMF335	←		MMM335	←	MML335
4.7	←			MMM475	←	MML475
6.8	←	MMM685	←		MML685	MMS685
10	MMM106			MML106	MMS106	MMJ106
15	←		MML156	MMS156	←	MMJ156
22	←	MML226	MMS226	←		MMJ226
33	MML336	MMS336	←		MMJ336	
47	MMS476	←		MMJ476		
68	←		MMJ686			
100	←	MMJ107				
150	MMJ157					

Table 2B Capacitance change, Tan Delta and Leakage current

TEST TEMP	CAP CHANGE	TAN DELTA (MAX)						
		CAPACITOR SIZE						
		MMF	MMM	MML	MMS	MMJ		
		$\leq 3.3 \mu F$	$\leq 10 \mu F$	$\leq 33 \mu F$	$\leq 47 \mu F$	$\leq 33 \mu F$	$47 \mu F - 100 \mu F$	$150 \mu F$
25°C	—	6%	6%	6%	6%	6%	8%	10%
– 55°C	$\leq 12\%$	8%	8%	8%	8%	8%	10%	12,5%
+125°C	$\leq 15\%$	9%	9%	9%	9%	9%	12%	15%

Table 2B cont'd.....

TEST TEMP	CAP CHANGE	(LEAKAGE CURRENT (MAX))				
		CAPACITOR SIZE				
		MMF	MMM	MML	MMS	MMJ
25°C	—	$0.5 \mu A$	$1.0 \mu A$	$2.0 \mu A$	$3.0 \mu A$	$9.0 \mu A$
– 55°C	$\leq 12\%$	—	—	—	—	—
+125°C	$\leq 15\%$	$7.5 \mu A$	$15 \mu A$	$30 \mu A$	$75 \mu A$	$135 \mu A$

Table 2C. Impedance at 100kHz
($C \geq 0.68 \mu F$ only)

CASE SIZE	IMPEDANCE (MAX) Ω
MMF	25
MMM	15
MML	10
MMS	5
MMJ	1

Table 3A. Surge Voltage

RATED VOLTAGE 85°C	CATEGORY VOLTAGE 125°C	SURGE VOLTAGE	
		85°C	125°C
6.3 V	4.0 V	8.2	5.2
10.0 V	6.3 V	13	9
16.0 V	10.0 V	20.8	13
20.0 V	13.0 V	26	16.9
25.0 V	16.0 V	33	21
35.0 V	23.0 V	46	30