

## Wet Tantalum Capacitor, Button, All-Tantalum Case, - 55 °C to + 150 °C Operation



### INTRODUCTION

This conveniently-packaged polar button unit employs a non-solid electrolyte, and has a sintered tantalum anode. The anode is produced from a medium capacitance powder and the lower CV product allows a tighter specification of capacitance stability, dissipation factor and leakage current. The cathode is also of tantalum, and overcomes the restrictions of a silver cathode system in allowing a high ripple current rating and application of a 3 V reverse potential.

Both anode and cathode consists of sintered compacts of high purity tantalum powder. The dielectric layer of tantalum pentoxid electrolytically formed on each compact is completely stable. The system is enclosed between a tantalum plate and a tantalum cup, with an outer nickel case.

The seal is a highly efficient system comprising a PTFE gasket clamped between coined plates of tantalum by a work-hardened nickel ring. This type of seal, common to all button styles, is largely responsible for their long life and high reliability under severe military environments.

The combination of the tantalum pentoxide dielectric stability and the extremely efficient seal has been shown to ensure that there is no significant difference in electrical parameters or instant use behaviour after 10 years storage or longer. A shelf life in excess of 20 years is confidently expected.

There are four types of terminations and mounting options are available. These include a treated stud or bolt, PCB pins, a tab for panels, and ribbons leads slotted through-holes. These are illustrated in the photograph, and dimensional table drawing.

### APPLICATIONS

The CH2 series is designed for use in general military and professional applications. For example: Power supply "smoothing", filter networks, switching, by-pass, timer functions, and where reverse potential occur.

### WEIGHT

The CH2 style with a stud termination weighs approximately 18.1 g, including the nut. The CH2 styles, which has a printed circuit board mounting, weighs approximately 17.3 g.

### FEATURES

- All-Tantalum electrodes eliminate silver migration
- Withstands high ripple current
- Long life reliability
- Reverse voltage capability
- Mounting: Through-hole

### PERFORMANCE CHARACTERISTICS

**Operating Temperature:** - 55 °C to + 150 °C

**Voltage Range:** 3 V<sub>DC</sub> to 75 V<sub>DC</sub>

**Capacitance Range:** 33 µF to 470 µF

### SPECIFICATIONS

**Environmental classification:** 55/150/56

**Vibration:** 10 Hz to 2000 Hz, 0.75 mm or 98 m/s<sup>2</sup>, 150 h

**Bump:** 390 m/s<sup>2</sup>, 4000 bumps

**Shock:** 981 m/s<sup>2</sup>

**Acceleration:** 981 m/s<sup>2</sup>

**Low air pressure:** 1 kPa

### REVERSE VOLTAGE CAPABILITY

The CH2 series employ tantalum cathodes which allow the continuous application of reverse potentials not exceeding 3 V over the whole temperature range.

### SURGE VOLTAGE

The surge voltage capability is 115 % of the voltage rating at the relevant temperature.

### TEMPERATURE RANGE

The capacitor is designed for operation between - 55 °C and + 150 °C, with linear voltage derating above + 85 °C to 66 % of the rated voltage at + 150 °C.

### CAPACITANCE TOLERANCE

The standard capacitance tolerance is ± 20 % although special tolerances are available by arrangement.

### RIPPLE CURRENT CAPABILITY

The maximum allowable ripple current is 750 mA<sub>RMS</sub>. This value applies under normal cooling conditions and is irrespective of frequency or waveform. The algebraic sum of the AC peak and DC voltages must not exceed the forward or reverse voltage ratings at the relevant temperature.

**APPLICATION INFORMATION**

Capacitors may be operated at less than the rated voltage, resulting in significantly reduced leakage current values.

In timing circuits, or other applications where the device is subjected only to a DC voltage, the ballistic or DC capacitance will be somewhat larger than measured at 50 Hz.

The parametric information must necessarily be brief, although additional comprehensive data is available on request, and the tests tailored to customers' requirements can be made.

**RELIABILITY**

All capacitors are subjected to burn-in. This is to remove infant mortalities and ensure reliability. The capacitor lifetime is enhanced when the unit is subjected to a reduced ripple current, a low ambient temperature, and is externally cooled. The use of a heat sink is recommended.

**ORDERING PROCEDURE**

Example: CH2C (220  $\mu$ F, 15 V<sub>DC</sub>)

Vishay Part Number: CH2C227M015A

ORDERING INFORMATION						
CH2	C	227	M	100	A	-
MODEL	CASE CODE	CAPACITANCE	TOLERANCE	VOLTAGE	TERMINATION AND PACKAGING	
	See Ratings and Case Codes Table	This is expressed in picofarads. The first two digits are the significant figures. The third is the number of zeros to follow	M = 20 % (std) K = 10 % (special order)	This is expressed in volts. To complete the three-digit block, zeros precede the voltage rating. A decimal point is indicated by an "R" (6R3 = 6.3 V)	A = Stud B = PC mount pins C = Twin tag or ribbon D = Panel or potting tag	Blank = Standard (tin/lead coating)

DIMENSIONS in millimeters																					
The CH2 series is comprised of two case sizes, differing in depth of cup only. The case size dimensions are shown in the table. Four mounting styles are available in both case sizes.																					
<b>A</b>	<b>B</b>	<b>C</b>	<b>D</b>	<b>E</b>	<b>F</b>	<b>G</b>	<b>H</b>	<b>J</b>	<b>K</b>	<b>L</b>	<b>M</b>	<b>N</b>	<b>P</b>	<b>Q</b>	<b>R</b>	<b>S</b>	<b>T</b>	<b>U</b>	<b>V</b>	<b>W</b>	
3.6	6.7 <sup>(1)</sup>	21.8	8.4 <sup>(2)</sup>	8.4	16.2	8.4	1.8	0.8	20.3	10.2	1.1	2.4	13.1	1.0	7.5	10.7	1.6	13.0	3.5	0.30	
									crs.	crs.	dia.	nom.		dia.			dia.	crs.	dia.	nom.	

**Notes**

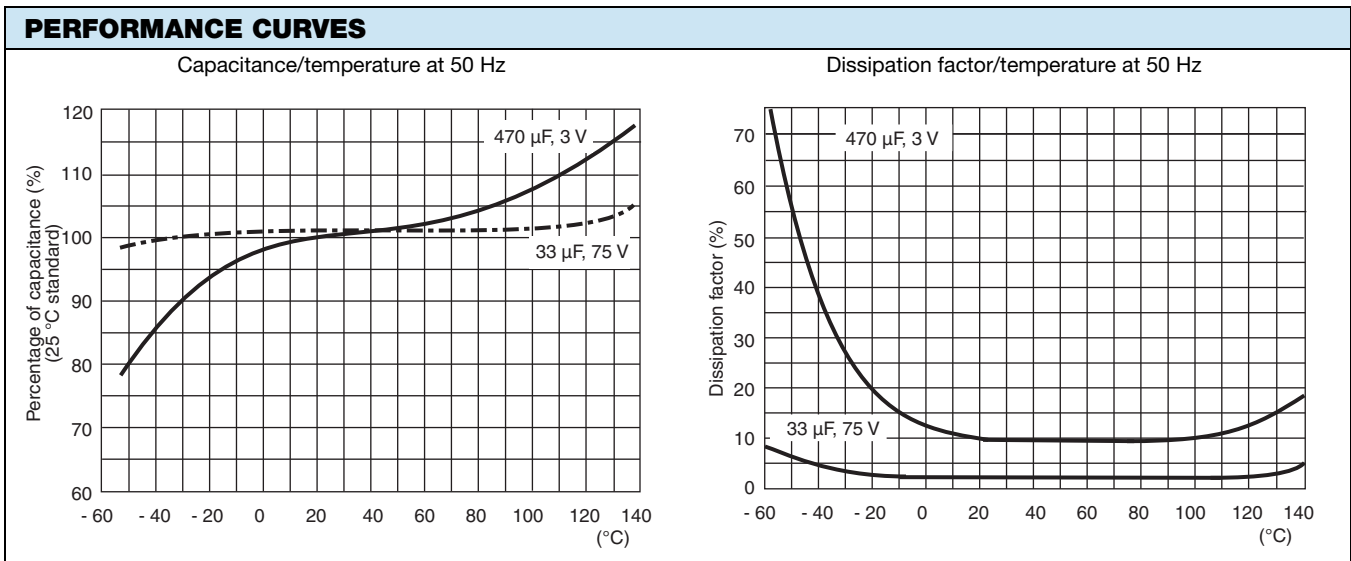
- (1) All dimensions are in mm, and are maximum unless otherwise stated
- (2) For C case size, case height is 8.5 mm
- (3) Width of anode tag 4.22 mm max.



STANDARD RATINGS										
VISHAY PART NUMBERS	CASE CODE	CAPACITANCE AT 50 Hz (μF)	DISSIPATION FACTOR AT 50 Hz (%)		MAX. ESR AT 20 °C 100 kHz (Ω)	MAX. ESR AT -55 °C 100 kHz (Ω)	MAX. DC AT 20 °C (μA)	MAX. DC AT 150 °C (μA)	ΔC AT 50 Hz (%)	
			20 °C	125 °C					-55 °C	150 °C
<b>3 V<sub>DC</sub> AT 150 °C</b>										
CH2B337(1)003(2)	B	330	15.0	18.0	1.0	5.0	2.0	100	-40.0	30.0
CH2C477(1)003(2)	C	470	20.0	23.0	1.0	5.0	2.0	100	-50.0	40.0
<b>6 V<sub>DC</sub> AT 150 °C</b>										
CH2B227(1)006(2)	B	220	12.5	15.0	1.0	5.0	2.0	100	-35.0	25.0
CH2C337(1)006(2)	C	330	15.0	18.0	1.0	5.0	2.0	100	-35.0	25.0
<b>15 V<sub>DC</sub> AT 150 °C</b>										
CH2B157(1)015(2)	B	150	10.0	12.0	1.0	5.0	2.0	100	-30.0	20.0
CH2C227(1)015(2)	C	220	12.5	15.0	1.0	5.0	2.0	100	-30.0	20.0
<b>25 V<sub>DC</sub> AT 150 °C</b>										
CH2B107(1)025(2)	B	100	6.0	7.5	1.0	5.0	2.0	100	-20.0	15.0
CH2C157(1)025(2)	C	150	9.0	11.0	1.0	5.0	2.0	100	-20.0	15.0
<b>35 V<sub>DC</sub> AT 150 °C</b>										
CH2B686(1)035(2)	B	68	5.0	6.5	1.0	5.0	2.0	100	-15.0	12.5
CH2C107(1)035(2)	C	100	7.5	9.0	1.0	5.0	2.0	100	-15.0	12.5
<b>50 V<sub>DC</sub> AT 150 °C</b>										
CH2B476(1)050(2)	B	47	4.0	5.0	1.0	5.0	2.0	100	-10.0	10.0
CH2C686(1)050(2)	C	68	6.0	7.5	1.0	5.0	2.0	100	-10.0	10.0
<b>75 V<sub>DC</sub> AT 150 °C</b>										
CH2B336(1)075(2)	B	33	2.0	3.0	1.0	5.0	2.0	100	-5.0	7.5
CH2C476(1)075(2)	C	47	2.5	3.5	1.0	5.0	2.0	100	-5.0	7.5

**Note**

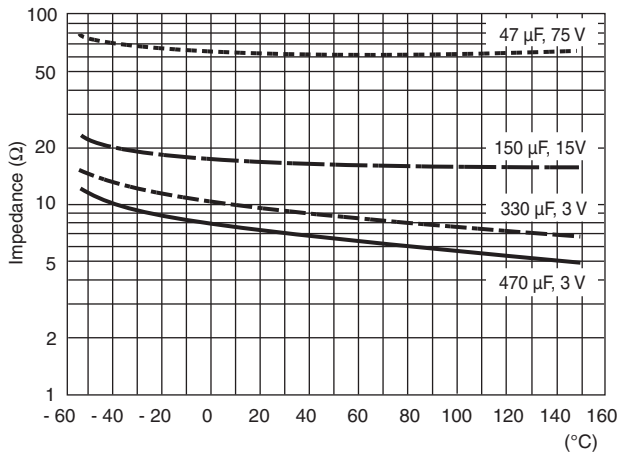
- Part number definitions:
  - (1) Capacitance tolerance:
    - M = 20 % standard
    - K = 10 % special order
  - (2) Termination type:
    - A = Stud or bolt
    - B = Pins for PCB
    - C = Twin tags or ribbons
    - D = Potting tag



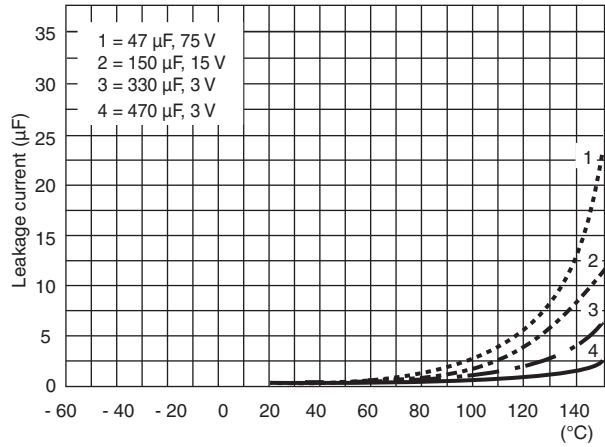


PERFORMANCE CURVES

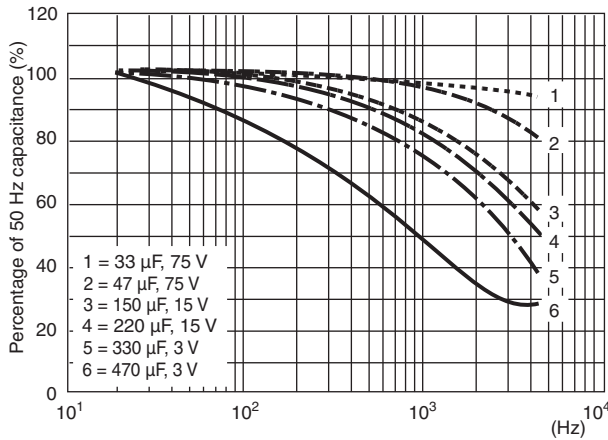
Impedance/temperature at 50 Hz



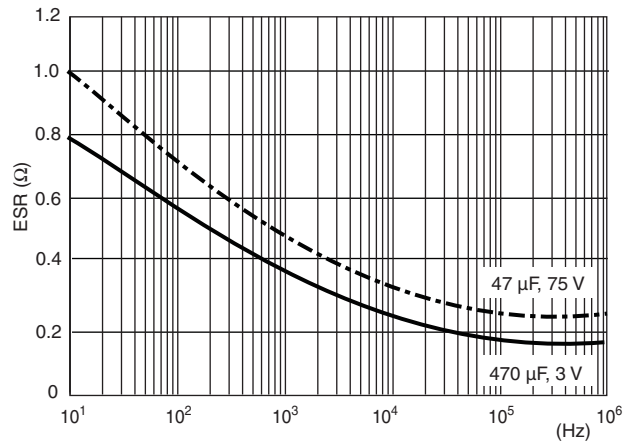
Leakage current/temperature at maximum voltage



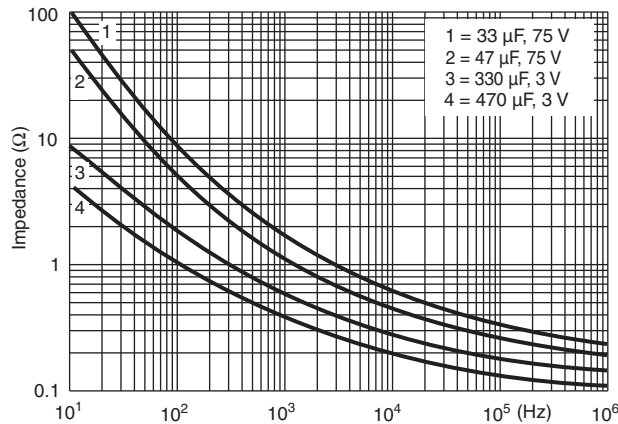
Capacitance/frequency at 25 °C



ESR/frequency at 25 °C



Impedance/frequency at 25 °C



Note

- All performance curves are provided from historic Arcotronics style AHS datasheet information



CROSS REFERENCE		
VISHAY PART NUMBER	ARCOTRONICS PART NUMBER	NATO PART NUMBER
CH2C476M075A	402/1/50028/004	5910-99-014-3024
CH2B336M075A	402/1/50027/003	5910-99-014-3023
CH2C686M050A	402/1/50028/005	5910-99-014-3026
CH2B476M050A	402/1/50027/004	5910-99-014-3025
CH2C107M035A	402/1/50028/006	5910-99-014-3028
CH2B686M035A	402/1/50027/005	5910-99-014-3027
CH2C157M025A	402/1/50028/007	5910-99-014-3030
CH2B107M025A	402/1/50027/006	5910-99-014-3029
CH2C227M015A	402/1/50028/008	5910-99-014-3032
CH2B157M015A	402/1/50027/007	5910-99-014-3031
CH2C337M006A	402/1/50028/009	5910-99-014-3034
CH2B227M006A	402/1/50027/008	5910-99-014-3033
CH2C477M003A	402/1/50028/010	5910-99-014-3036
CH2B337M003A	402/1/50027/009	5910-99-014-3035
CH2C476M075B	402/1/50148/004	5910-99-014-3056
CH2B336M075B	402/1/50147/003	5910-99-014-3055
CH2C686M050B	402/1/50148/005	5910-99-014-3058
CH2B476M050B	402/1/50147/004	5910-99-014-3057
CH2C107M035B	402/1/50148/006	5910-99-014-3060
CH2B686M035B	402/1/50147/005	5910-99-014-3059
CH2C157M025B	402/1/50148/007	5910-99-014-3062
CH2B107M025B	402/1/50147/006	5910-99-014-3061
CH2C227M015B	402/1/50148/008	5910-99-014-3064
CH2B157M015B	402/1/50147/007	5910-99-014-3063
CH2C337M006B	402/1/50148/009	5910-99-014-3066
CH2B227M006B	402/1/50147/008	5910-99-014-3065
CH2C477M003B	402/1/50148/010	5910-99-014-3068
CH2B337M003B	402/1/50147/009	5910-99-014-3067
CH2C476M075D	402/1/50030/004	5910-99-014-3088
CH2B336M075D	402/1/50029/003	5910-99-014-3087
CH2C686M050D	402/1/50030/005	5910-99-014-3090
CH2B476M050D	402/1/50029/004	5910-99-014-3089
CH2C107M035D	402/1/50030/006	5910-99-014-3092
CH2B686M035D	402/1/50029/005	5910-99-014-3091
CH2C157M025D	402/1/50030/007	5910-99-014-3094
CH2B107M025D	402/1/50029/006	5910-99-014-3093
CH2C227M015D	402/1/50030/008	5910-99-014-3096
CH2B157M015D	402/1/50029/007	5910-99-014-3095
CH2C337M006D	402/1/50030/009	5910-99-014-3098
CH2B227M006D	402/1/50029/008	5910-99-014-3097
CH2C477M003D	402/1/50030/010	5910-99-014-3100
CH2B337M003D	402/1/50029/009	5910-99-014-3099
CH2C476M075C	402/1/50032/004	5910-99-651-4349
CH2B336M075C	402/1/50031/003	5910-99-651-4348
CH2C686M050C	402/1/50032/005	5910-99-651-4347
CH2B476M050C	402/1/50031/004	5910-99-651-4346
CH2C107M035C	402/1/50032/006	5910-99-651-4345
CH2B686M035C	402/1/50031/005	5910-99-651-4344
CH2C157M025C	402/1/50032/007	5910-99-651-4343
CH2B107M025C	402/1/50031/006	5910-99-651-4342
CH2C227M015C	402/1/50032/008	5910-99-651-4341
CH2B157M015C	402/1/50031/007	5910-99-651-4340
CH2C337M006C	402/1/50032/009	5910-99-651-4339
CH2B227M006C	402/1/50031/008	5910-99-651-4338
CH2C477M003C	402/1/50032/010	5910-99-651-4337
CH2B337M003C	402/1/50031/009	5910-99-651-4336



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