Panasonic INDUSTRY

Conductive Polymer Tantalum Solid Capacitors

Surface Mount Type

TPB series

POSCAP

Features

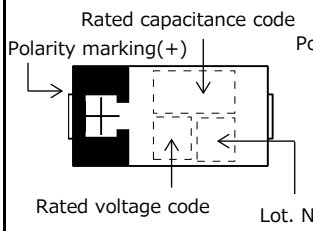
- Standard
- RoHS compliance, Halogen free

Specifications

Size code	B2	D3L	D4
Category temp. range	−55 ℃ to +105 ℃		
Rated volt. range	4.0 V to 10 V		6.3 V to 10 V
Category volt. range	4.0 V to 10 V		6.3 V to 10 V
Rated cap. range	33 μF to 68 μF	150 μF to 330 μF	220 μF to 470 μF
Capacitance tolerance	±20 % (120 Hz / +20 ℃)		
Leakage current	Please see the attached characteristics list		
Dissipation factor(tan δ)	Please see the attached characteristics list		
Surge voltage (V)	Rated voltage × 1.15		
Endurance	+105 ℃ 2000 h, (B2 size : 1000 h) rated voltage appled Rated temp. +85 ℃ 1000 h rated voltage applied		
	Capacitance change	Within ±20 % of the initial value	
	Dissipation factor(tan δ)	≦ 1.5 times of the initial limit	
	Leakage current	Within the initial limit	
Damp heat (Steady State)	+60 ℃, 90 % to 95 %, 500 h, No-applied voltage		
	Capacitance change	Within +40 %, −20 % of the initial value (Except for above model)	
	Dissipation factor(tan δ)	≦ 1.5 times of the initial limit	
	Leakage current	≦ 3 times of the initial limit	

Marking

< B2 size >



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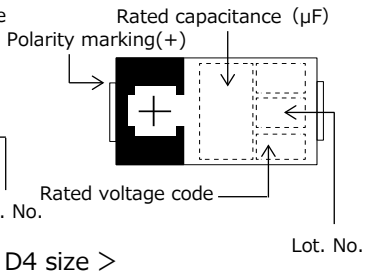

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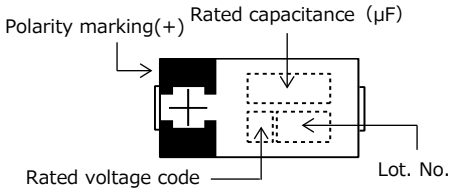


R. voltage code — Unit : V

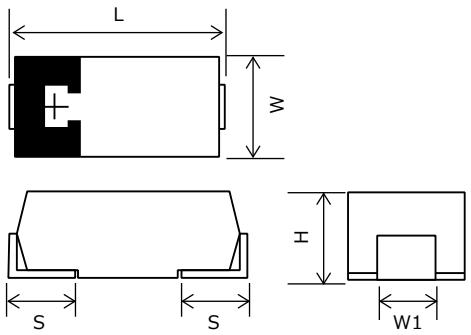
g	4.0	j	6.3	A	10

< B2 size >

R. capacitance code — Unit : μF

N7	33	S7	47	W7	68

Dimensions (not to scale)



Unit : mm

Size code	L	W±0.2	H	S±0.2	W1±0.1
B2	3.5±0.2	2.8	1.9±0.1	0.8	2.2
D3L	7.3±0.3	4.3	2.8±0.2	1.3	2.4
D4	7.3±0.3	4.3	3.8±0.2	1.3	2.4

* Externals of figure are the reference.

Design and specifications are each subject to change without notice. Ask factory for the current technical specifications before purchase and/or use.
Should a safety concern arise regarding this product, please be sure to contact us immediately.

Characteristics list

Rated voltage (V)	Rated temperature (℃)	Category voltage (V)	Category temperature (℃)	Rated capacitance (μF)	Case size (mm) L	W	H	Size code	Specifications Ripple*1 current (mA rms)	ESR*2 (mΩ max.)	tan δ*3	LC*4 (μA)	Standard Part number	Min. packaging q'ty (pcs)	Floor life level Reflow temp ≤260℃	Reflow temp ≤250℃
4.0	105	4.0	105	68	3.5	2.8	1.9	B2	1100	70	0.08	27.2	4TPB68M	2000	3	3
	105	4.0	105	330	7.3	4.3	2.8	D3L	2000	40	0.10	132	4TPB330ML	2500		2a
6.3	105	6.3	105	33	3.5	2.8	1.9	B2	1100	70	0.08	20.7	6TPB33M	2000		3
	105	6.3	105	68	3.5	2.8	1.9		1100	70	0.08	42.8	6TPB68M	2000		
	105	6.3	105	220	7.3	4.3	2.8	D3L	2000	40	0.10	138.6	6TPB220ML	2500		2a
	85	5.0	105	330	7.3	4.3	2.8		2000	40	0.10	207.9	6TPB330MAL	2500		
	105	6.3	105		7.3	4.3	2.8		2000	40	0.10	207.9	6TPB330ML	2500		
	105	6.3	105		7.3	4.3	3.8	D4	3000	40	0.10	207.9	6TPB330M	2000		
	105	6.3	105	470	7.3	4.3	3.8		3000	35	0.15	296.1	6TPB470M	2000		
10	105	10	105	33	3.5	2.8	1.9	B2	1100	70	0.08	33.0	10TPB33M	2000		3
	105	10	105	47	3.5	2.8	1.9		1100	70	0.08	47.0	10TPB47M	2000		
	105	10	105	150	7.3	4.3	2.8	D3L	2000	40	0.10	150.0	10TPB150ML	2500		2a
	105	10	105	220	7.3	4.3	2.8		2000	40	0.10	220.0	10TPB220ML	2500	–	
	105	10	105		7.3	4.3	3.8	D4	3000	40	0.10	220.0	10TPB220M	2000	3	
	105	10	105	330	7.3	4.3	3.8		3000	35	0.10	330.0	10TPB330M	2000	–	

*1: Ripple current（100 kHz / +45 ℃）
*2: ESR（100 kHz / +20 ℃）
*3: tan δ (120 Hz / +20 ℃)
*4: After 5 minutes
◆ Please refer to each page in this catarog for “Reflow conditions” ,“Taping specifications” and "Floor life level" .

Guidelines and precautions regarding the technical information and use of our products described in this online catalog.

- If you want to use our products described in this online catalog for applications requiring special qualities or reliability, or for applications where the failure or malfunction of the products may directly jeopardize human life or potentially cause personal injury (e.g. aircraft and aerospace equipment, traffic and transportation equipment, combustion equipment, medical equipment, accident prevention, anti-crime equipment, and/or safety equipment), it is necessary to verify whether the specifications of our products fit to such applications. Please ensure that you will ask and check with our inquiry desk as to whether the specifications of our products fit to such applications use before you use our products.

- The quality and performance of our products as described in this online catalog only apply to our products when used in isolation. Therefore, please ensure you evaluate and verify our products under the specific circumstances in which our products are assembled in your own products and in which our products will actually be used.

- If you use our products in equipment that requires a high degree of reliability, regardless of the application, it is recommended that you set up protection circuits and redundancy circuits in order to ensure safety of your equipment.

- The products and product specifications described in this online catalog are subject to change for improvement without prior notice. Therefore, please be sure to request and confirm the latest product specifications which explain the specifications of our products in detail, before you finalize the design of your applications, purchase, or use our products.

- The technical information in this online catalog provides examples of our products' typical operations and application circuits. We do not guarantee the non-infringement of third party's intellectual property rights and we do not grant any license, right, or interest in our intellectual property.

- If any of our products, product specifications and/or technical information in this online catalog is to be exported or provided to non-residents, the laws and regulations of the exporting country, especially with regard to security and export control, shall be observed.

<Regarding the Certificate of Compliance with the EU RoHS Directive/REACH Regulations>

- The switchover date for compliance with the RoHS Directive/REACH Regulations varies depending on the part number or series of our products.

- When you use the inventory of our products for which it is unclear whether those products are compliant with the RoHS Directive/REACH Regulation, please select "Sales Inquiry" in the website inquiry form and contact us.

We do not take any responsibility for the use of our products outside the scope of the specifications, descriptions, guidelines and precautions described in this online catalog.

Notices

■ Applicable laws and regulations

・This product complies with the RoHS Directive (Restriction of the use of certain hazardous substances in electrical and electronic equipment (DIRECTIVE 2011/65/EU and (EU)2015/863)).
・ No Ozone Depleting Chemicals(ODC's), controlled under the Montreal Protocol Agreement, are used in producing this product.
We do not use PBBs or PBDEs as brominated flame retardants.
・ Export procedure which followed export related regulations, such as foreign exchange and a foreign trade method, on the occasion of export of this product.
・ These products are not dangerous goods on the transportation as identified by UN(United Nations) numbers or UN classification.

■ Limited applications

・ This capacitor is designed to be used for electronics circuits such as audio/visual equipment, home appliances, computers and other office equipment, optical equipment, measuring equipment.
・ High reliability and safety are required [be / a possibility that incorrect operation of this product may do harm to a human life or property] more. When use is considered by the use, the delivery specifications which suited the use separately need to be exchanged.

■ Intellectual property rights and licenses

・ The technical information in this specification provides examples of our products' typical operations and application circuits. We do not guarantee the non-infringement of third party's intellectual property rights and we do not grant any license, right, or interest in our intellectual property.

Items to be observed

■ For specification

・ This specification guarantees the quality and performance of the product as individual components.
The durability differs depending on the environment and the conditions of usage.
Before use, check and evaluate their compatibility with actual conditions when installed in the products.
When safety requirements cannot be satisfied in your technical examination, inform us immediately.
・ Do not use the products beyond the specifications described in this document.

■ Upon application to products where safety is regarded as important

Install the following systems for a failsafe design to ensure safety if these products are to be used in equipment where a defect in these products may cause the loss of human life or other signification damage, such as damage to vehicles (automobile, train, vessel), traffic lights, medical equipment, aerospace equipment, electric heating appliances, combustion/ gas equipment, rotating rotating equipment, and disaster/crime prevention equipment.

(1) The system is equipped with a protection circuit and protection device.
(2) The system is equipped with a redundant circuit or other system to prevent an unsafe status in the event of a single fault.

■ Conditions of use

・ Before using the products, carefully check the effects on their quality and performance, and determined whether or not they can be used. These products are designed and manufactured for general-purpose and standard use in general electronic equipment. These products are not intended for use in the following special conditions.

(1) In liquid, such as Water, Oil, Chemicals, or Organic solvent.
(2) In direct sunlight, outdoors, or in dust.
(3) In vapor, such as dew condensation water of resistive element, or water leakage, salty air, or air with a high concentration corrosive gas, such as Cl_2, H_2S, NH_3, SO_2, or NOx.
(4) In an environment where strong static electricity or electromagnetic waves exist.
(5) Mounting or placing heat-generating components or inflammables, such as vinyl-coated wires, near these products.
(6) Sealing or coating of these products or a printed circuit board on which these products are mounted, with resin and other material.
(7) Using resolvent, water or water-soluble cleaner for flux cleaning agent after soldering. (In particular, when using water or a water-soluble cleaning agent, be careful not to leave water residues)
(8) Using in the atmosphere where strays acid or alkaline.
(9) Using in the atmosphere where there are excessive vibration and shock.
(10) Using in the atmosphere where there are low pressure or decompression.

・ Please arrange circuit design for preventing impulse or transitional voltage.
Do not apply voltage, which exceeds the full rated voltage when the capacitors receive impulse voltage, instantaneous high voltage, high pulse voltage etc.
・ Our products there is a product are using an electrolyte solution. Therefore, misuse can result in rapid deterioration of characteristics and functions of each product. Electrolyte leakage damages printed circuit and affects performance, characteristics, and functions of customer system.

⚠Guidelines and precautions（POSCAP）

1. Circuit design

1.1 Prohibited circuits

Since problems can be expected, POSCAP cannot be used on the following circuits.

(1) High impedance voltage retention circuits
(2) Coupling circuit
(3) Time constant circuits
(4) Circuits greatly affected by leakage current
(5) The circuit in which two or more POSCAP are connected in a series so as to raise the endurance voltage.

1.2 Failure and life-span

The failure rate is 0.5 %* / 1000 h (Confidence level : 60 %) based on JIS C 5003.
The mainly failure modes are as follows.
* B2 size or less : 1.0 %

1.2-1 Contingency failure

The main causes of failure are thermal stresses cause by the soldering or thermal use environment, along with heat stresses, electrical stresses or mechanical stresses. The most common failure mode is a short circuit. In case a short circuit occurs, ensure safety by fully considering the followings.

(a) If POSCAP emit smoke, turn off the main power of the equipment. In this case, keep your face and hands away from the area.
(b) It may take a few seconds to a few minutes before POSCAP emits smoke by the situation. Increase safety by using a protective circuit.
(c) If the smoke comes into eyes, rinse immediately. If the smoke is inhaled, gargle immediately.
(d) In case a large current continues to flow after a short circuit, in the worst case, the shorted-out section may ignite. For safety, install a redundant circuit or a protective circuit, etc.

1.2-2 Wear-out failure (lifetime)

When lifetime exceeded the specified guarantee time of Endurance and Damp heat, electrolyte might insulate and cause electric characteristic changed. This is called an open circuit. The rated capacitance values and the electrical characteristics values such as ESR specified in the characteristics list are factory default values. Please carefully design a circuit since rated capacitance values and the electrical characteristics values may change (increase) beyond the specified values under the conditions of rated voltage/temperature and electrical/mechanical performances.

1.3 Reduction of failure stress

When POSCAP is used within the rated voltage, it shows a stable characteristic, but it may be damaged in a short circuit when an overvoltage, for instance, is applied. The time to reach the failure mode can be extended by using POSCAP with reduced environment temperature, ripple current and applied voltage.
Failure rate

- In the case of the endurance which is 105 °C 2000 h.
  0.5 %/1000 h (Environment temp. : 105 °C, Rated voltage or Category voltage applied)
- In the case of the endurance which is 105 °C 1000 h or 125 °C 1000 h.
  1.0 %/1000 h (Environment temp. : 105 °C, Rated voltage or Category voltage applied)
- In the case of the endurance which is 85 °C 1000 h.
  1.0 %/1000 h (Environment temp. : 85 °C, Rated voltage applied)

1.4 Check the rated performance

After checking the operation and installation environments, design the circuit so that it falls within the rated performance range stipulated in this delivery specification.

1.5 Operating temperature and ripple current

(1) Set the operating temperature so that it falls within the range stipulated in this delivery specification.
(2) Do not apply current that exceeds the allowable ripple current. Ripple current should be controlled so that surface temperature of a capacitor do not exceed the rated temperature.
(For questions regarding TQC series, please contact us.)
(3) The ESR values specified in the characteristics list are factory default values.
ESR values may change (increase) beyond the specified values depending on the customer's use conditions.

1.6 Leakage current

Even when the soldering conditions fall within the range of this delivery specifications, leakage current increases a little on occasion. It also increases a little during high temperature storage, high humidity storage Zand temperature cycling with no voltage applied. In cases such as these, leakage current will decrease by applying voltage under the condition of below the POSCAP's maximum operating temperature.
The speed at which the leakage current is restored is increased by applying voltage when the POSCAP's temperature is close to the maximum operating temperature.

1.7 Rapid charge and discharge limitation

Rapid charge and discharge are restricted (for maintainance of high-proof reliability).
A protective circuit is recommended for when a rapid charge or discharge causes excessive rush current since this is main cause of short circuit and large leakage current. Use a protective circuits in case the rush current value exceeds 20 A*.
Be sure to insert a protection resistor of about 1 kΩ for charge and discharge when measuring the leakage current.
* When TH series use under the ambient temperature more than 105 °C : 10 A, TPU series : 10 A

2. Mounting

2.1 Protect circuit

The failure mode of POSCAP is the short mode. When it breaks down, short electric current flows to it. POSCAP gives off heat by this short current.
Do the following consideration in design fully for the safety because it has a bad influence on the part around POSCAP due to this heat.

・A protective circuit and a protective device are set up, so as to make the system safer.
・A diffuse circuit and so on is set up, so as to make the system safer such as that a machine may not break down as to the single trouble.

2.2 Considerations when soldering

The soldering conditions are to be within the range prescribed in this delivery specification.
If the specifications are not followed, there is the possibility of degradation of electric characteristic and lifetime when soldering is conducted under conditions that are harsher that those stipulated.

2.3 Others

POSCAP's Electrical characteristics are affected by temperature and frequency fluctuations.
Design circuits after checking the amount of fluctuation.

3. Storage

It is necessary to set an environment to prevent a trouble at the time of soldering by the degradation of solder ability or moisture's getting into the molding resin when POSCAP are stored.

- Please make storage of POSCAP sealing up in the reel and storage bag at the time of delivery in the following environment. Also, set storage period of unopened as 18 months or shorter after shipment from factory.
  - ・Room temperature and room humidity (generally : 15 to 35 °C, 45 to 75% RH) are desirable.
  - ・Place where POSCAP is not exposed by direct sunshine.
- Please unseal storage bag just before mounting and use up POSCAP in the storage bag.

Floor life		
Level	Time	Conditions
2a	4 weeks	≦ 30 ℃ / 60 %Rh
3	168 hours	≦ 30 ℃ / 60 %Rh
5	48 hours	≦ 30 ℃ / 60 %Rh

POSCAP is not compatible with JEDEC J-STD-020, J-STD-033

✻ Intellectual property right

We, Panasonic Group are providing the product and service that customers can use without anxiety, and are working positively on the protection of our products under intellectual property rights.

Representative patents relating to POSCAP are as follows:
US Patent No.6508800, No.6891717, No.7158368, No.7326260号, No.8081421, No.8149569, No.8456804, No.8559166

Mouser Electronics

Authorized Distributor

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Panasonic:

10TPB220ML 6TPB470M 6TPB330M 10TPB220M 4TPB68M 10TPB33M 6TPB330MAL 10TPB150ML 6TPB68M 4TPB330ML 6TPB330ML 6TPB220ML 10TPB47M 10TPB330M 6TPB33M

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