

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).
- No Ozone Depleting Chemicals(ODC's), controlled under the Montreal Protocol Agreement, are used in producing this product.
- We do not 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 Thank you for your consideration.

■ 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.

Items to be observed

- This specification guarantees the quality and performance of the product as individual components. Before use, check and evaluate their compatibility with installed in your products.
- Do not use the products beyond the specifications described in this document.

■ For specifications

- 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.
 - The system is equipped with a protection circuit and protection device.
 - 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 Cl₂, H₂S, NH₃, SO₂, or NO_x.
 - (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 solvent, 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 which strays Acid or alkaline.
 - (9) Using in the atmosphere which there are excessive vibration and shock.
- 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) Time constant circuits
- (3) Circuits greatly affected by leakage current
- (4) 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.

- (1) If POSCAP emit smoke, turn off the main power of the equipment. In this case, keep your face and hands away from the area.
- (2) It may take a few seconds to a few minutes before POSCAP emits smoke by the situation. Increase safety by using a protective circuit.
- (3) If the smoke comes into eyes, rinse immediately. If the smoke is inhaled, gargle immediately.
- (4) 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 electric characteristics of capacitance and ESR may possibly change within the specified range in specifications when it is used under the condition of the rated voltage, electric and mechanical performance. Please note it when design.

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

- (a) Set the operating temperature so that it falls within the range stipulated in this delivery specification.
- (b) 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.)

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 and 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 than 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 as 18 months or shorter.

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 be conscious that POSCAP in the storage bag is used up.

When remainder unfortunately occurs, return them to the storage bag once again and, please seal the unsealed part by adhesive tape etc., including desiccants. Moreover, once and use it in time the storage bag is opened, store POSCAP according to the table's Floor Life "Time" and "conditions".

| MSL | Floor life | |
|-----|------------|----------------|
| | Time | Conditions |
| 2a | 4 weeks | ≤ 30 °C/60 %Rh |
| 3 | 168 hours | ≤ 30 °C/60 %Rh |
| 5 | 48 hours | ≤ 30 °C/60 %Rh |

(Conform to IPC/JEDEC J-STD-020)

◇ 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 Nos. 6168639 and 6313979

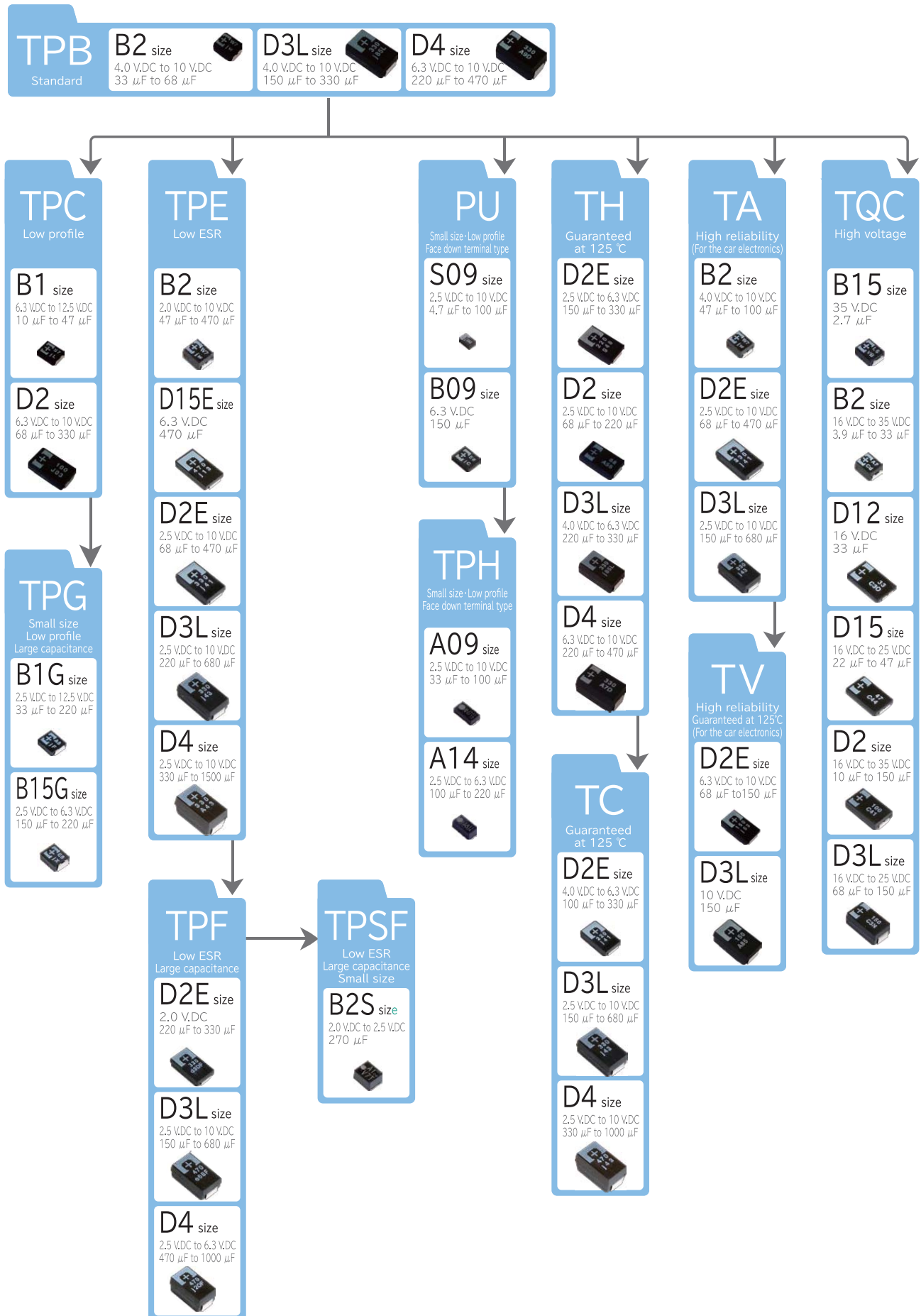
Line up

| Series | Features | Small size/low profile | Large capacitance | Low ESR | For automotive | High voltage | Guaranteed at 125 °C | Category temperature range (°C) | Rated voltage (V.DC) | ESR (mΩ) | Capacitance (μF) | Size code | Size (mm) | | |
|--------|---|------------------------|-------------------|---------|----------------|--------------|----------------------|---------------------------------|----------------------|------------|------------------|-----------|-----------|------|-----|
| | | | | | | | | | | | | | L | W | H |
| TPU | Small size Low profile Face down terminal | ● | | | | | | -55 to 85 | 2.5 to 10 | 150 to 300 | 4.7 to 100 | S09 | 2.0 | 1.25 | 0.9 |
| | | | | | | | | -55 to 85 | 6.3 | 100 | 150 | B09 | 3.5 | 2.8 | 0.9 |
| TPH | Small size Low profile Face down terminal | ● | | ● | | | | -55 to 85 | 6.3 to 10 | 100 to 150 | 33 to 100 | A09 | 3.2 | 1.6 | 0.9 |
| | | | | | | | | -55 to 105 | 2.5 to 6.3 | 150 | 47 to 100 | A09 | 3.2 | 1.6 | 0.9 |
| | | | | | | | | -55 to 85 | 2.5 to 6.3 | 70 | 100 to 220 | A14 | 3.2 | 1.6 | 1.4 |
| TPG | Small size Low profile Large capacitance | ● | ● | | | | | -55 to 105 | 2.5 to 12.5 | 35 to 70 | 33 to 220 | B1G | 3.5 | 2.8 | 1.1 |
| | | | | | | | | -55 to 105 | 2.5 to 6.3 | 30 to 70 | 150 to 220 | B15G | 3.5 | 2.8 | 1.4 |
| TPSF | Low ESR / Small size Large capacitance Face down terminal | ● | ● | ● | | | | -55 to 105 | 2.0 to 2.5 | 6 to 9 | 270 | B2S | 3.5 | 2.8 | 1.9 |
| TPE | Low ESR | | | | ● | | | -55 to 105 | 2.0 to 10 | 11 to 35 | 47 to 470 | B2 | 3.5 | 2.8 | 1.9 |
| | | | | | | | | -55 to 105 | 6.3 | 35 | 470 | D15E | 7.3 | 4.3 | 1.4 |
| | | | | | | | | -55 to 105 | 2.5 to 10 | 7 to 25 | 68 to 470 | D2E | 7.3 | 4.3 | 1.8 |
| | | | | | | | | -55 to 105 | 2.5 to 10 | 9 to 25 | 220 to 680 | D3L | 7.3 | 4.3 | 2.8 |
| | | | | | | | | -55 to 105 | 2.5 to 10 | 10 to 25 | 330 to 1500 | D4 | 7.3 | 4.3 | 3.8 |
| TPF | Low ESR Large capacitance | ● | ● | | | | | -55 to 105 | 2.0 | 6 | 220 to 330 | D2E | 7.3 | 4.3 | 1.8 |
| | | | | | | | | -55 to 105 | 2.5 to 10 | 5 to 15 | 150 to 680 | D3L | 7.3 | 4.3 | 2.8 |
| | | | | | | | | -55 to 105 | 2.5 to 6.3 | 5 to 10 | 470 to 1000 | D4 | 7.3 | 4.3 | 3.8 |
| TA | High reliability (for the car electronics) | | | | | ● | | -55 to 105 | 4.0 to 10 | 70 | 47 to 100 | B2 | 3.5 | 2.8 | 1.9 |
| | | | | | | | | -55 to 105 | 2.5 to 10 | 9 to 25 | 68 to 470 | D2E | 7.3 | 4.3 | 1.8 |
| | | | | | | | | -55 to 105 | 2.5 to 10 | 15 to 25 | 150 to 680 | D3L | 7.3 | 4.3 | 2.8 |
| TV | High reliability Guaranteed at 125 °C (for the car electronics) | | | | | ● | ● | -55 to 125 | 6.3 to 10 | 25 | 6 to 150 | D2E | 7.3 | 4.3 | 1.8 |
| | | | | | | | | -55 to 125 | 10 | 25 | 150 | D3L | 7.3 | 4.3 | 2.8 |

Line up

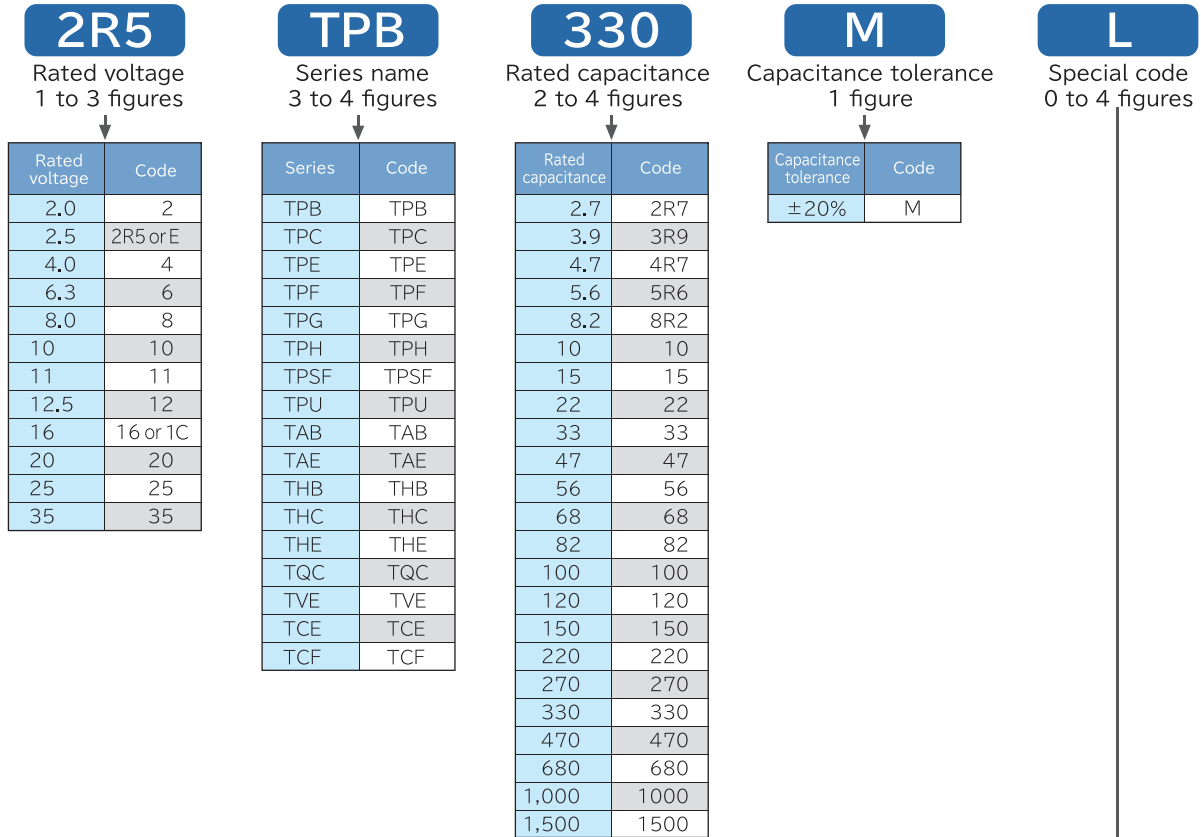
| Series | Features | Small size/Low profile | Large capacitance | Low ESR | For automotive | High voltage | Guaranteed at 125 °C | Category temperature range (°C) | Rated voltage (V.DC) | ESR (mΩ) | Capacitance (μF) | Size code | Size (mm) | | |
|--------|----------------------|------------------------|-------------------|---------|----------------|--------------|----------------------|---------------------------------|----------------------|-----------|------------------|-----------|-----------|-----|------|
| | | | | | | | | | | | | | L | W | H |
| TQC | High voltage | | | | | ● | | -55 to 105 | 35 | 300 | 2.7 | B15 | 3.5 | 2.8 | 1.4 |
| | | | | | | | | -55 to 105 | 16 to 35 | 90 to 400 | 3.9 to 33 | B2 | 3.5 | 2.8 | 1.9 |
| | | | | | | | | -55 to 105 | 16 | 40 | 33 | D12 | 7.3 | 4.3 | 1.15 |
| | | | | | | | | -55 to 105 | 16 to 25 | 55 to 70 | 22 to 47 | D15 | 7.3 | 4.3 | 1.4 |
| | | | | | | | | -55 to 105 | 16 to 35 | 40 to 150 | 10 to 150 | D2 | 7.3 | 4.3 | 1.9 |
| | | | | | | | | -55 to 105 | 16 to 25 | 50 to 70 | 68 to 150 | D3L | 7.3 | 4.3 | 2.8 |
| TPB | Standard | | | | | | | -55 to 105 | 4.0 to 10 | 70 | 33 to 68 | B2 | 3.5 | 2.8 | 1.9 |
| | | | | | | | | -55 to 105 | 4.0 to 10 | 40 | 150 to 330 | D3L | 7.3 | 4.3 | 2.8 |
| | | | | | | | | -55 to 105 | 6.3 to 10 | 35 to 40 | 220 to 470 | D4 | 7.3 | 4.3 | 3.8 |
| TPC | Low profile | ● | | | | | | -55 to 105 | 6.3 to 12.5 | 55 to 80 | 10 to 47 | B1 | 3.5 | 2.8 | 1.1 |
| | | | | | | | | -55 to 105 | 6.3 to 10 | 40 to 45 | 68 to 330 | D2 | 7.3 | 4.3 | 1.9 |
| TH | Guaranteed at 125 °C | | | | | ● | | -55 to 125 | 2.5 to 6.3 | 15 to 25 | 150 to 330 | D2E | 7.3 | 4.3 | 1.8 |
| | | | | | | | | -55 to 125 | 2.5 to 10 | 40 to 45 | 68 to 220 | D2 | 7.3 | 4.3 | 1.9 |
| | | | | | | | | -55 to 125 | 4.0 to 6.3 | 40 | 220 to 330 | D3L | 7.3 | 4.3 | 2.8 |
| | | | | | | | | -55 to 125 | 6.3 to 10 | 35 to 40 | 220 to 470 | D4 | 7.3 | 4.3 | 3.8 |
| TC | Guaranteed at 125 °C | | | | | ● | | -55 to 125 | 4.0 to 6.3 | 15 to 25 | 100 to 330 | D2E | 7.3 | 4.3 | 1.8 |
| | | | | | | | | -55 to 125 | 2.5 to 10 | 5 to 25 | 150 to 680 | D3L | 7.3 | 4.3 | 2.8 |
| | | | | | | | | -55 to 125 | 2.5 to 10 | 5 to 25 | 330 to 1000 | D4 | 7.3 | 4.3 | 3.8 |

Diagram



Explanation of part numbers

Part number system



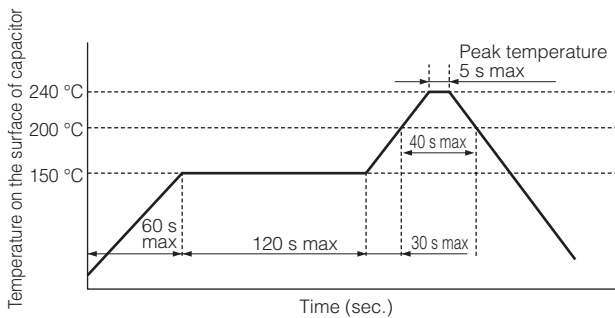
| Standard | | Code |
|-------------------|--------------------------|------|
| TPE series | | |
| B2 size | ESR 35mΩ max | ZB |
| | ESR 25mΩ max | PB |
| | ESR 21mΩ max | LB |
| | ESR 15mΩ max | FB |
| | ESR 15mΩ/300kHz max | FGB |
| | ESR 35mΩ max 85°C | AZB |
| | ESR 25mΩ max 85°C | APB |
| | ESR 15mΩ max 85°C | AFB |
| | ESR 13mΩ/300kHz max 85°C | ADGB |
| | ESR 11mΩ/300kHz max 85°C | AJGB |
| D15E size | ESR 35mΩ max 85°C | AZU |
| D2E size | ESR 25mΩ max 85°C | AP |
| D3L size | ESR 25mΩ max | L |
| | ESR 18mΩ max | IL |
| | ESR 15mΩ max | FL |
| | ESR 12mΩ max | CL |
| | ESR 10mΩ max | AL |
| | ESR 25mΩ max 85°C | AL |
| | ESR 9mΩ/500kHz max 85°C | A9EL |
| TPG series | | |
| B1G size | ESR 35mΩ/300kHz max | ZGD |
| TPH series | | |
| A09 size | ESR 150mΩ max | AHA |
| | ESR 100mΩ max | AEA |
| A14 size | ESR 70mΩ max | ABC |
| TPB series | | |
| D3L size | | L |
| TPC series | | |
| 85°C | | A |
| B1 size | | B |

| Standard | | Code |
|-------------------------------------|--------------|------|
| TPF series | | |
| D3L size | ESR 9mΩ max | 9L |
| | ESR 7mΩ max | 7L |
| | ESR 6mΩ max | 6L |
| | ESR 5mΩ max | 5L |
| D4 size | ESR 10mΩ max | AH |
| | ESR 6mΩ max | 6H |
| | ESR 5mΩ max | 5H |
| TPU series | | |
| S09 size | | SI |
| B09 size | | BI |
| TQC series | | |
| Capacitance enlarged type | | YF |
| Capacitance enlarged type(B size) | | YFB |
| Capacitance enlarged type(D12 size) | | YFS |
| Capacitance enlarged type(D15 size) | | YFT |
| Capacitance enlarged type(D2 size) | | YFD |
| All series | | |
| ESR 55mΩ max | | G |
| ESR 45mΩ max | | V |
| ESR 40mΩ max | | W |
| ESR 35mΩ max | | Z |
| ESR 18mΩ max | | I |
| ESR 15mΩ max | | F |
| ESR 12mΩ max | | C |
| ESR 9mΩ max | | 9 |
| ESR 7mΩ max | | 7 |
| ESR 6mΩ max | | 6 |
| ESR 5mΩ max | | 5 |
| ESR 35mΩ/300kHz max | | ZG |
| ESR 30mΩ/300kHz max | | UG |
| ESR 9mΩ/300kHz max | | 9G |
| ESR 6mΩ/500kHz max | | 6E |
| ESR 4mΩ/500kHz max | | 4E |

Mounting specifications

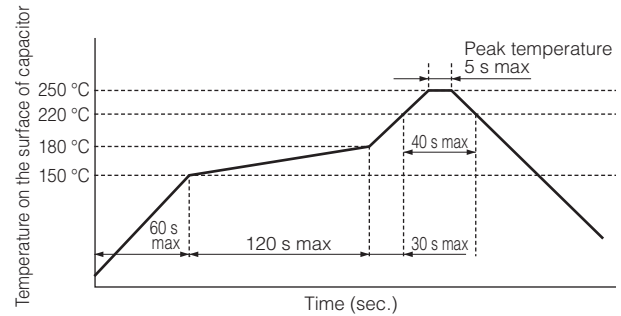
- Recommendable reflow soldering

<Recommended reflow soldering temperature profile>



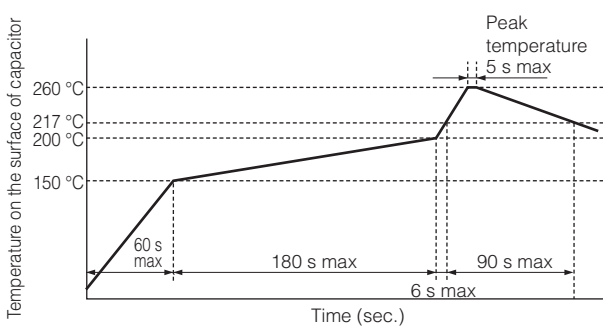
The cycles of reflow soldering : Twice (max)

<Peak temperature 250 °C lead free reflow soldering profile>



The cycles of reflow soldering : Twice (max)

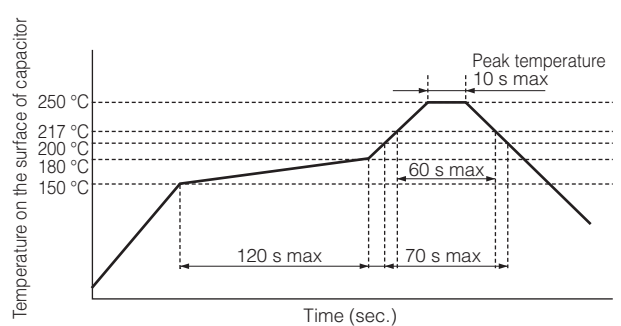
<Peak temperature 260 °C lead free reflow soldering profile>



The model of MSL "2a" is changed into MSL "3" with this reflow condition.

The cycles of reflow soldering : Twice (max)

<TQC series>



The cycles of reflow soldering : Twice (max)

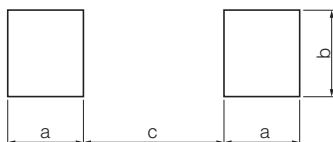
- Soldering with a soldering iron

Tip of a soldering iron : 350 °C max (TQC serie : 400 °C max) Power of a soldering iron : 30 W max

Working time : 3 sec. max (TQC serie : 5 sec max)

(Do not let the tip of soldering iron touch the POSCAP itself. Do not subject the POSCAP itself to excessive stress when soldering.)

Land Pattern

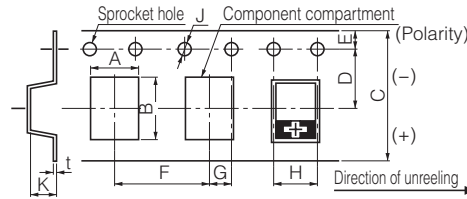


Unit : mm

| Size code | a | b | c |
|----------------------------------|-----|-----|-----|
| S09 | 1.0 | 0.9 | 0.6 |
| A09, A14 | 1.6 | 1.4 | 1.0 |
| B09, B1, B1G, B15G, B2, B2S | 1.6 | 2.7 | 1.4 |
| D12, D15, D15E, D2E, D2, D3L, D4 | 2.4 | 2.9 | 3.7 |

Packing specifications

● Dimension of carrier tape

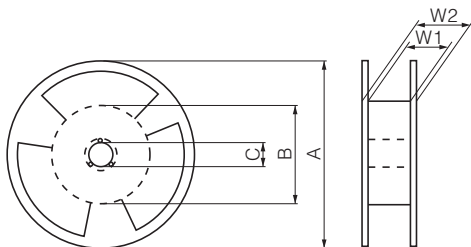


Unit : mm

| Size code | A±0.1 | B±0.1 | C±0.3 | D±0.05 | E±0.1 | F±0.1 | G±0.05 | H±0.1 | J ^{+0.1} ₀ | K±0.1 | t±0.05 |
|-----------|-------|-------|-------|--------|-------|-------|--------|-------|--------------------------------|-------|--------|
| S09 | 1.65 | 2.4 | 8.0 | 3.5 | 1.75 | 4.0 | 2.0 | 4.0 | φ1.5 | 1.3 | 0.25 |
| A09 | 2.05 | 3.65 | 8.0 | 3.5 | 1.75 | 4.0 | 2.0 | 4.0 | φ1.5 | 1.3 | 0.25 |
| A14 | 2.05 | 3.65 | 8.0 | 3.5 | 1.75 | 4.0 | 2.0 | 4.0 | φ1.5 | 1.7 | 0.25 |
| B09 | 3.2 | 3.8 | 8.0 | 3.5 | 1.75 | 4.0 | 2.0 | 4.0 | φ1.5 | 1.4 | 0.25 |
| B1 | 3.2 | 3.8 | 8.0 | 3.5 | 1.75 | 4.0 | 2.0 | 4.0 | φ1.5 | 1.4 | 0.25 |
| B1G | 3.25 | 3.9 | 8.0 | 3.5 | 1.75 | 4.0 | 2.0 | 4.0 | φ1.5 | 1.7 | 0.25 |
| B15 | 3.3 | 3.8 | 8.0 | 3.5 | 1.75 | 4.0 | 2.0 | 4.0 | φ1.5 | 2.1 | 0.25 |
| B15G | 3.25 | 3.9 | 8.0 | 3.5 | 1.75 | 4.0 | 2.0 | 4.0 | φ1.5 | 1.7 | 0.25 |
| B2 | 3.3 | 3.8 | 8.0 | 3.5 | 1.75 | 4.0 | 2.0 | 4.0 | φ1.5 | 2.1 | 0.25 |
| B2S | 3.25 | 4.0 | 8.0 | 3.5 | 1.75 | 4.0 | 2.0 | 4.0 | φ1.5 | 2.1 | 0.25 |
| D12 | 4.5 | 7.5 | 12.0 | 5.5 | 1.75 | 8.0 | 2.0 | 4.0 | φ1.5 | 1.7 | 0.3 |
| D15 | 4.5 | 7.5 | 12.0 | 5.5 | 1.75 | 8.0 | 2.0 | 4.0 | φ1.5 | 2.4 | 0.3 |
| D15E | 4.7 | 7.8 | 12.0 | 5.5 | 1.75 | 8.0 | 2.0 | 4.0 | φ1.5 | 1.7 | 0.3 |
| D2E | 4.5 | 7.5 | 12.0 | 5.5 | 1.75 | 8.0 | 2.0 | 4.0 | φ1.5 | 2.4 | 0.3 |
| D2 | 4.5 | 7.5 | 12.0 | 5.5 | 1.75 | 8.0 | 2.0 | 4.0 | φ1.5 | 2.4 | 0.3 |
| D3L | 4.5 | 7.7 | 12.0 | 5.5 | 1.75 | 8.0 | 2.0 | 4.0 | φ1.5 | 3.2 | 0.3 |
| D4 | 4.5 | 7.7 | 12.0 | 5.5 | 1.75 | 8.0 | 2.0 | 4.0 | φ1.5 | 4.2 | 0.3 |

- Dimension A and B are the measure of compartment's inside bottom.
- The (+) Polarity of the chip is placed on right side towards the unreeling direction.
- Dimension of the topcover tape Thickness of cover tape : 62±10 μm Width of cover tape : 9.5±0.2 mm 5.5±0.2 mm (φ180 reel)

● Reel dimension



Unit : mm

| A | B | C | W1 | W2 |
|---------------------------------|-------|-----------|----------|----------|
| φ330±2 | φ80±2 | φ13.0±0.2 | 13.5±0.5 | 17.5±1.0 |
| φ180 ⁰ ₋₃ | φ60±2 | φ13.0±0.2 | 9.0±0.5 | 11.4±1.0 |

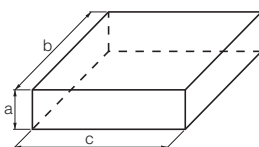
● Minimum packing quantity and weight

| Size code | Quantity (pcs./Reel, φ180) | Typical weight (g) |
|-----------|----------------------------|--------------------|
| S09, A09 | 3000 | 200 |
| A14 | 2500 | 200 |
| B09, B1 | 3000 | 200 |
| B1G | 2500 | 200 |
| B15 | 2000 | 160 |
| B15G | 2500 | 200 |
| B2, B2S | 2000 | 200 |

| Size code | Quantity (pcs./Reel, φ330) | Typical weight (g) |
|-----------|----------------------------|--------------------|
| D12 | 4500 | 1200 |
| D15 | 3000 | 1000 |
| D15E | 4000 | 1000 |
| D2E, D2 | 3000 | 1000 |
| D3L | 2500 | 1100 |
| D4 | 2000 | 1200 |

* Small order quantity (500 pcs/reel) is available with TPE, TPF and TQC series. Please contact our sales representative if you prefer it.

● Dimension of packing case



Unit : mm

| Reel size | φ180 | φ330 |
|-----------|------|------|
| a | 90 | 120 |
| b | 240 | 360 |
| c | 240 | 360 |

● Units per packing case

| Size code | Pieces/case | Size code | Pieces/case |
|-----------|-------------|-----------|-------------|
| S09, A09 | 15000 | D12 | 22500 |
| A14 | 12500 | D15 | 15000 |
| B09, B1 | 15000 | D15E | 20000 |
| B1G | 12500 | D2E, D2 | 15000 |
| B15 | 10000 | D3L | 12500 |
| B15G | 12500 | D4 | 10000 |
| B2, B2S | 10000 | | |

Surface Mount Type

POSCAP

Series : TPU



Features

- Small size, Low profile (L2.0 × W 1.25 × H 0.9 mm)
- Face down terminal type
- RoHS compliance, Halogen free

Specifications

| Size code | S09 | B09 |
|----------------------------|---|--|
| Category temperature range | -55 °C to +85 °C | |
| Rated voltage range | 2.5 V.DC to 10 V.DC | 6.3 V.DC |
| Category voltage range | 2.5 V.DC to 10 V.DC | 6.3 V.DC |
| Rated capacitance range | 4.7 μF to 100 μF | 150 μF |
| Capacitance tolerance | ±20 % (120 Hz / + 20 °C) | |
| Leakage current | Please see the attached characteristics list | |
| Dissipation factor (tan δ) | Please see the attached characteristics list | |
| Surge voltage (V.DC) | Rated voltage × 1.15 | |
| Endurance | +85 °C, 1000 h, rated voltage applied | |
| | Capacitance change | Within ±20 % of the initial value |
| | tan δ | ≤ 1.5 times of the initial limit |
| | DC leakage current | Within the initial limit |
| Damp heat (Steady State) | +60 °C, 90 % to 95 %, 500 h, No-applied voltage | |
| | Capacitance change | Within +40 %, -20 % of the initial value |
| | tan δ | ≤ 1.5 times of the initial limit |
| | DC leakage current | ≤ 3 times of the initial limit |

Marking

| S09 Size | | B09 Size | |
|---------------------|-------------|---------------------|-------------|
| Polarity marking(+) | R.Cap. code | Polarity marking(+) | R.Cap. code |
| R. Voltage code | Lot. No. | R. Voltage code | Lot. No. |

| R. Voltage (V.DC) | 2.5 | 4.0 | 6.3 | 10.0 |
|-------------------|-----|-----|-----|------|
| Code | e | g | j | A |

| S09 Size | |
|--------------|---------------------|
| R. Cap. (μF) | 4.7 10 22 47 68 100 |
| Code | s A J S W A |

| B09 Size | |
|--------------|-----|
| R. Cap. (μF) | 150 |
| Code | E8 |

Dimensions (not to scale)

| Size code | L±0.1*1 | W±0.1*1 | H±0.1 | S±0.1*1 | W1±0.1 |
|-----------|---------|---------|-------|---------|--------|
| S09 | 2.0 | 1.25 | 0.9 | 0.5 | 0.9 |
| B09 | 3.5 | 2.8 | 0.9 | 0.8 | 2.2 |

Unit : mm

* Externals of figure are the reference. *1 ±0.2 : B09

Characteristics list

| Series | Rated voltage (V.DC) | Rated temp. (°C) | Category voltage (V.DC) | Category temp. (°C) | Rated capacitance (μF) | Case size (mm) | | | Size code | Specifications | | | | Standard | | |
|--------|----------------------|------------------|-------------------------|---------------------|------------------------|----------------|------|-----|-----------|----------------------|-----------------|---------|-----------|-------------|--------------------------|------|
| | | | | | | L | W | H | | Ripple*1 (mA r.m.s.) | ESR*2 (mΩ max.) | tan δ*3 | LC*4 (μA) | Part number | Min. Packaging Qty (pcs) | |
| TPU | 2.5 | 85 | 2.5 | 85 | 47 | 2.0 | 1.25 | 0.9 | S09 | 510 | 150 | 0.10 | 23.5 | 2R5TPU47MSI | 3000 | |
| | | 85 | 2.5 | 85 | 100 | 2.0 | 1.25 | 0.9 | | 510 | 150 | 0.10 | 50.0 | ETPU100MSI | 3000 | |
| | 6.3 | 85 | 4.0 | 85 | 68 | 2.0 | 1.25 | 0.9 | | 510 | 150 | 0.10 | 54.4 | 4TPU68MSI | 3000 | |
| | | 85 | 6.3 | 85 | 10 | 2.0 | 1.25 | 0.9 | | 400 | 250 | 0.10 | 6.3 | 6TPU10MSI | 3000 | |
| | | 85 | 6.3 | 85 | 22 | 2.0 | 1.25 | 0.9 | | 510 | 150 | 0.10 | 27.7 | 6TPU22MSI | 3000 | |
| | | 85 | 6.3 | 85 | 47 | 2.0 | 1.25 | 0.9 | | 510 | 150 | 0.10 | 59.2 | 6TPU47MSI | 3000 | |
| | | 85 | 6.3 | 85 | 150 | 3.5 | 2.8 | 0.9 | | B09 | 670 | 100 | 0.10 | 94.5 | 6TPU150MBI | 3000 |
| | | 85 | 6.3 | 85 | 4.7 | 2.0 | 1.25 | 0.9 | | S09 | 360 | 300 | 0.10 | 4.7 | 10TPU4R7MSI | 3000 |

*1 Ripple current (100 kHz/ +45 °C) *2 ESR (100 kHz/+20 °C) *3 tan δ (120 Hz/+20 °C) *4 After 5 minutes

◆ Please refer to each page in this catalog for "Reflow conditions" and "Taping specifications".

Surface Mount Type

POSCAP

Series : TPH



Features

- Small size, Low profile (L3.2 × W 1.6 × H 0.9 mm)
- Face down terminal type
- RoHS compliance, Halogen free

Specifications

| Size code | A09 | A14 |
|----------------------------|---|---|
| Category temperature range | -55 °C to +105 °C / -55 °C to +85 °C (Rated temp. +85 °C) | |
| Rated voltage range | 2.5 V.DC to 10 V.DC | 2.5 V.DC to 6.3 V.DC |
| Category voltage range | 2.5 V.DC to 10 V.DC | 2.5 V.DC to 6.3 V.DC |
| Rated capacitance range | 33 µF to 100 µF | 100 µF to 220 µF |
| Capacitance tolerance | ±20 % (120 Hz / + 20 °C) | |
| Leakage current | Please see the attached characteristics list | |
| Dissipation factor (tan δ) | Please see the attached characteristics list | |
| Surge voltage (V.DC) | Rated voltage × 1.15 | |
| Endurance | +105 °C, 1000 h rated voltage applied | |
| | * Rated temp, +85 °C Products : +85 °C, 1000 h, rated voltage applied | |
| | Capacitance change | Within ±20 % of the initial value |
| | tan δ | ≤ 1.5 times of the initial limit |
| Damp heat (Steady State) | +60 °C, 90 % to 95 %, 500 h, No-applied voltage | |
| | Capacitance change | Within +50 %, -20 % of the initial value (ETPH220MABC) |
| | | Within +40 %, -20 % of the initial value (Except for above model) |
| | tan δ | ≤ 1.5 times of the initial limit |
| | DC leakage current | ≤ 3 times of the initial limit |

Marking

| A09/A14 Size | | A09 Size (6TPH100MAEA) | | | | |
|-------------------|-----|------------------------|-----|------|-----|-----|
| | | | | | | |
| R. Voltage (V.DC) | 2.5 | 4.0 | 6.3 | 10.0 | | |
| Code | e | g | j | A | | |
| R. Cap. (µF) | 33 | 47 | 68 | 100 | 150 | 220 |
| Code | N7 | S7 | W7 | A8 | E8 | J8 |

Dimensions (not to scale)

| A09/A14 Size | | A09 Size (6TPH100MAEA) | | | |
|--------------|-------|------------------------|-------|-------|--------|
| | | | | | |
| Size code | L±0.2 | W±0.2 | H±0.1 | S±0.2 | W1±0.1 |
| A09 | 3.2 | 1.6 | 0.9 | 0.8 | 1.2 |
| A14 | 3.2 | 1.6 | 1.4 | 0.8 | 1.2 |

Unit : mm

* Externals of figure are the reference.

Characteristics list

| Series | Rated voltage (V.DC) | Rated temp. (°C) | Category voltage (V.DC) | Category temp. (°C) | Rated capacitance (µF) | Case size (mm) | | | Size code | Specifications | | | | Standard | |
|--------|----------------------|------------------|-------------------------|---------------------|------------------------|----------------|-----|-----|-----------|---------------------------|------------------|----------|------------|-------------|--------------------------|
| | | | | | | L | W | H | | Ripple current (mAr.m.s.) | ESR *2 (mΩ max.) | tan δ *3 | LC *4 (µA) | Part number | Min. Packaging Qty (pcs) |
| TPH | 2.5 | 105 | 2.5 | 105 | 100 | 3.2 | 1.6 | 0.9 | A09 | 510 | 150 | 0.10 | 25.0 | ETPH100MHA | 3000 |
| | | 85 | 2.5 | 85 | 220 | 3.2 | 1.6 | 1.4 | A14 | 740 | 70 | 0.10 | 110.0 | ETPH220MABC | 2500 |
| | 4 | 105 | 4.0 | 105 | 68 | 3.2 | 1.6 | 0.9 | A09 | 510 | 150 | 0.10 | 27.2 | 4TPH68MHA | 3000 |
| | | 85 | 4.0 | 85 | 150 | 3.2 | 1.6 | 1.4 | A14 | 740 | 70 | 0.10 | 120.0 | 4TPH150MABC | 2500 |
| | 6.3 | 105 | 6.3 | 105 | 47 | 3.2 | 1.6 | 0.9 | A09 | 510 | 150 | 0.10 | 29.6 | 6TPH47MHA | 3000 |
| | | 85 | 6.3 | 85 | 100 | 3.2 | 1.6 | 0.9 | | 670 | 100 | 0.10 | 63.0 | 6TPH100MAEA | 3000 |
| | | 85 | 6.3 | 85 | 100 | 3.2 | 1.6 | 1.4 | | A14 | 740 | 70 | 0.10 | 126.0 | 6TPH100MABC |
| | 10 | 85 | 10.0 | 85 | 33 | 3.2 | 1.6 | 0.9 | A09 | 510 | 150 | 0.10 | 33.0 | ATPH33MAHA | 3000 |

*1 Ripple current (100 kHz/ +45 °C), *2 ESR (100 kHz/+20 °C) *3 tan δ (120 Hz/+20 °C) *4 After 5 minutes

◆ Please refer to each page in this catalog for "Reflow conditions" and "Taping specifications".

Surface Mount Type

POSCAP



Series : TPG

Features

- Small size, Low profile (L3.5 × W 2.8 × H 1.1 mm)
- Large capacitance (220 μF max.)
- RoHS compliance, Halogen free

Specifications

| Size code | B1G | B15G |
|----------------------------|---|--|
| Category temperature range | -55 °C to +105 °C | |
| Rated voltage range | 2.5 V.DC to 12.5 V.DC | 2.5 V.DC to 6.3 V.DC |
| Category voltage range | 2.0 V.DC to 10.0 V.DC | 2.0 V.DC to 5.0 V.DC |
| Rated capacitance range | 33 μF to 220 μF | 150 μF to 220 μF |
| Capacitance tolerance | ±20 % (120 Hz / + 20 °C) | |
| Leakage current | Please see the attached characteristics list | |
| Dissipation factor (tan δ) | Please see the attached characteristics list | |
| Surge voltage (V.DC) | Rated voltage × 1.15 | |
| Endurance | +85 °C, 1000 h rated voltage applied | |
| | Capacitance change | Within ±20 % of the initial value |
| | tan δ | ≤ 1.5 times of the initial limit |
| | DC leakage current | Within the initial limit |
| Damp heat (Steady State) | +60 °C, 90 % to 95 %, 500 h, No-applied voltage | |
| | Capacitance change | Within +40 %, -20 % of the initial value |
| | tan δ | ≤ 1.5 times of the initial limit |
| | DC leakage current | ≤ 3 times of the initial limit |

Marking

| R. Voltage (V.DC) | 2.5 | 4.0 | 6.3 | 8.0 | 10.0 | 12.5 |
|-------------------|-----|-----|-----|-----|------|------|
| Code | e | g | j | k | A | B |
| R. Cap. (μF) | 33 | 47 | 100 | 150 | 220 | |
| Code | N7 | S7 | A8 | E8 | J8 | |

Dimensions (not to scale)

| Size code | L ^{+0.3} _{-0.1} | W ^{+0.3} _{-0.1} | H±0.1 | S±0.2 | W1±0.1 |
|-----------|-----------------------------------|-----------------------------------|-------|-------|--------|
| B1G | 3.5 | 2.8 | 1.1 | 0.8 | 2.2 |
| B15G | 3.5 | 2.8 | 1.4 | 0.8 | 2.2 |

Unit : mm

* Externals of figure are the reference.

Characteristics list

| Series | Rated voltage (V.DC) | Rated temp. (°C) | Category voltage (V.DC) | Category temp. (°C) | Rated capacitance (μF) | Case size (mm) | | | Size code | Specifications | | | | Standard | |
|--------|----------------------|------------------|-------------------------|---------------------|------------------------|----------------|-----|-----|-----------|---|-----------------------------|---------------------|-----------------------|--------------|-------------------------|
| | | | | | | L | W | H | | Ripple* ¹ current (mAr.m.s.) | ESR* ² (mΩ max.) | tan δ* ³ | LC* ⁴ (μA) | Part number | Mn. Packaging Qty (pcs) |
| TPG | 2.5 | 85 | 2.0 | 105 | 220 | 3.5 | 2.8 | 1.1 | B1G | 1000 | 70 | 0.10 | 55.0 | 2R5TPG220M | 2500 |
| | | 85 | 2.0 | 105 | | 3.5 | 2.8 | 1.4 | B15G | 1400 | 30/300 kHz | 0.10 | 110.0 | 2R5TPG220MUG | 2500 |
| | 4 | 85 | 3.2 | 105 | 220 | 3.5 | 2.8 | 1.4 | B15G | 1000 | 70 | 0.10 | 88.0 | 4TPG220M | 2500 |
| | | 85 | 5.0 | 105 | | 100 | 3.5 | 2.8 | 1.1 | B1G | 1000 | 70 | 0.10 | 63.0 | 6TPG100M |
| | 6.3 | 85 | 5.0 | 105 | 100 | | 3.5 | 2.8 | 1.1 | B1G | 1100 | 55 | 0.10 | 63.0 | 6TPG100MG |
| | | 85 | 5.0 | 105 | | 3.5 | 2.8 | 1.1 | B1G | 1200 | 35/300 kHz | 0.10 | 126.0 | 6TPG100MZGD | 2500 |
| | | 85 | 5.0 | 105 | 150 | 3.5 | 2.8 | 1.4 | B15G | 1000 | 70 | 0.10 | 94.5 | 6TPG150M | 2500 |
| | | 85 | 5.0 | 105 | | 3.5 | 2.8 | 1.4 | B15G | 1200 | 35/300 kHz | 0.10 | 189.0 | 6TPG150MZG | 2500 |
| | 8 | 85 | 6.3 | 105 | 47 | 3.5 | 2.8 | 1.1 | B1G | 1000 | 70 | 0.10 | 37.6 | 8TPG47M | 2500 |
| | 10 | 85 | 8.0 | 105 | 47 | 3.5 | 2.8 | 1.1 | | 1000 | 70 | 0.10 | 47.0 | 10TPG47M | 2500 |
| | 12.5 | 85 | 10.0 | 105 | 33 | 3.5 | 2.8 | 1.1 | B1G | 1000 | 70 | 0.10 | 41.3 | 12TPG33M | 2500 |

*1 Ripple current (100 kHz/ +45 °C), *2 ESR (100 kHz/+20 °C) *3 tan δ (120 Hz/+20 °C) *4 After 5 minutes

◆ Please refer to each page in this catalog for "Reflow conditions" and "Taping specifications".

Surface Mount Type

POSCAP



Series : **TPSF**

Features

- Super low ESR (6 mΩ max.)
- Super low ESL (0.7 nH)
- Face down terminal type
- RoHS compliance, Halogen free

Specifications

| | | |
|----------------------------|---|--|
| Size code | B2S | |
| Category temperature range | -55 °C to +105 °C | |
| Rated voltage range | 2.0 V.DC to 2.5 V.DC | |
| Category voltage range | 2.0 V.DC to 2.5 V.DC | |
| Rated capacitance range | 270 μF | |
| Capacitance tolerance | ±20 % (120 Hz / + 20 °C) | |
| Leakage current | Please see the attached characteristics list | |
| Dissipation factor (tan δ) | Please see the attached characteristics list | |
| Surge voltage (V.DC) | Rated voltage × 1.15 | |
| Endurance | +105 °C, 1000 h rated voltage applied | |
| | Capacitance change | Within ±20 % of the initial value |
| | tan δ | ≤ 1.5 times of the initial limit |
| Damp heat (Steady State) | +60 °C, 90 % to 95 %, 500 h, No-applied voltage | |
| | Capacitance change | Within +40 %, -20 % of the initial value |
| | tan δ | ≤ 1.5 times of the initial limit |
| | DC leakage current | ≤ 3 times of the initial limit |

Marking

| | | |
|-------------------|-----|-----|
| R. Voltage (V.DC) | 2.0 | 2.5 |
| Code | d | e |

| | |
|--------------|-----|
| R. Cap. (μF) | 270 |
| Code | L8 |

Dimensions (not to scale)

| Size code | L±0.2 | W±0.2 | H±0.1 | S±0.3 | W1±0.1 |
|-----------|-------|-------|-------|-------|--------|
| B2S | 3.5 | 2.8 | 1.9 | 0.8 | 2.2 |

Unit : mm

* Externals of figure are the reference.

Characteristics list

| Series | Rated voltage (V.DC) | Rated temp. (°C) | Category voltage (V.DC) | Category temp. (°C) | Rated capacitance (μF) | Case size (mm) | | | Size code | Specifications | | | | Standard | |
|--------|----------------------|------------------|-------------------------|---------------------|------------------------|----------------|-----|-----|-----------|---------------------|-----------------|---------|-----------|-------------|--------------------------|
| | | | | | | L | W | H | | Ripple*1 (mAr.m.s.) | ESR*2 (mΩ max.) | tan δ*3 | LC*4 (μA) | Part number | Min. Packaging Qty (pcs) |
| TPSF | 2 | 105 | 2.0 | 105 | 270 | 3.5 | 2.8 | 1.9 | B2S | 3200 | 6/500 kHz | 0.08 | 108 | 2TPSF270M6E | 2000 |
| | | 105 | 2.0 | 105 | | 3.5 | 2.8 | 1.9 | | 2400 | 9/300 kHz | 0.08 | 108 | 2TPSF270M9G | 2000 |
| | 2.5 | 105 | 2.5 | 105 | 270 | 3.5 | 2.8 | 1.9 | | 3200 | 6/500 kHz | 0.08 | 135 | ETPSF270M6E | 2000 |

*1 Ripple current (100 kHz/ +45 °C) *2 ESR (100 kHz/+20 °C) *3 tan δ (120 Hz/+20 °C) *4 After 5 minutes

◆ Please refer to each page in this catalog for "Reflow conditions" and "Taping specifications".

Surface Mount Type

POSCAP



Series : **TPE**

Size : **B**

Features

- Small size (L 3.5×W 2.8×H 1.9 mm)
- Low ESR (15 mΩ)
- RoHS compliance, Halogen free

Specifications

| | | | |
|----------------------------|---|--|--|
| Size code | B2 | | |
| Category temperature range | -55 °C to +105 °C | | |
| Rated voltage range | 2.0 V.DC to 10 V.DC | | |
| Category voltage range | 1.8 V.DC to 8.0 V.DC | | |
| Rated capacitance range | 47 μF to 470 μF | | |
| Capacitance tolerance | ±20 % (120 Hz / + 20 °C) | | |
| Leakage current | Please see the attached characteristics list | | |
| Dissipation factor (tan δ) | Please see the attached characteristics list | | |
| Surge voltage (V.DC) | Rated voltage × 1.15 | | |
| Endurance | +105 °C, 1000 h rated voltage applied | | |
| | * Rated temp, +85 °C Products : +85 °C, 1000 h, rated voltage applied | | |
| | Capacitance change | Within ±20 % of the initial value | |
| | tan δ | ≤ 1.5 times of the initial limit | |
| Damp heat (Steady State) | DC leakage current | Within the initial limit | |
| | +60 °C, 90 % to 95 %, 500 h, No-applied voltage | | |
| | Capacitance change | Within +50 %, -20 % of the initial value (2R5TPE220MAZB (MAPB, MAFB), 2R5TPE330MAZB, 2TPE330MAFB (MADGB), 2TPE470MAJGB (MAFB), 2TPE330MFB) | |
| | | Within +40 %, -20 % of the initial value (Except for above model) | |
| | tan δ | ≤ 1.5 times of the initial limit | |
| DC leakage current | ≤ 3 times of the initial limit | | |

Marking

| | | | | | | | |
|-------------------|-----|-----|-----|-----|-----|------|-----|
| R. Voltage (V.DC) | 2.0 | 2.5 | 4.0 | 6.3 | 8.0 | 10.0 | |
| Code | d | e | g | j | k | A | |
| R. Cap. (μF) | 47 | 100 | 120 | 150 | 220 | 330 | 470 |
| Code | S7 | A8 | C8 | E8 | J8 | N8 | S8 |

Dimensions (not to scale)

Unit : mm

| | | | | | |
|-----------|-------|-------|-------|-------|--------|
| Size code | L±0.2 | W±0.2 | H±0.1 | S±0.2 | W1±0.1 |
| B2 | 3.5 | 2.8 | 1.9 | 0.8 | 2.2 |

* External of figure are the reference.

Characteristics list

| Series | Rated voltage (V.DC) | Rated temp. (°C) | Category voltage (V.DC) | Category temp. (°C) | Rated capacitance (μF) | Case size (mm) | | | Size code | Specifications | | | | Standard | | |
|--------|----------------------|------------------|-------------------------|---------------------|------------------------|----------------|-----|------|-----------|----------------------|------------------|------------|---------------|---------------|--------------------------|------|
| | | | | | | L | W | H | | Ripple *1 (mAr.m.s.) | ESR *2 (mΩ max.) | tan δ *3 | LC *4 (μA) | Part number | Min. Packaging Qty (pcs) | |
| TPE | 2 | 105 | 2.0 | 105 | 330 | 3.5 | 2.8 | 1.9 | B2 | 2000 | 15 | 0.08 | 132.0 | 2TPE330MFB | 2000 | |
| | | 85 | 1.8 | 105 | | 3.5 | 2.8 | 1.9 | | 2000 | 15 | 0.08 | 132.0 | 2TPE330MAFB | 2000 | |
| | | 85 | 1.8 | 105 | | 470 | 3.5 | 2.8 | | 1.9 | 2000 | 13/300 kHz | 0.10 | 132.0 | 2TPE330MADGB | 2000 |
| | | 85 | 1.8 | 105 | 3.5 | | 2.8 | 1.9 | | 2300 | 15 | 0.10 | 188.0 | 2TPE470MAFB | 2000 | |
| | | 2.5 | 85 | 1.8 | 105 | 220 | 3.5 | 2.8 | | 1.9 | 2300 | 11/300 kHz | 0.08 | 188.0 | 2TPE470MAJGB | 2000 |
| | 85 | | 2.0 | 105 | 3.5 | | 2.8 | 1.9 | | 2000 | 15 | 0.08 | 110.0 | 2R5TPE220MAFB | 2000 | |
| | 105 | | 2.5 | 105 | 3.5 | | 2.8 | 1.9 | | 1800 | 15/300 kHz | 0.08 | 110.0 | 2R5TPE220MFGB | 2000 | |
| | 105 | | 2.5 | 105 | 3.5 | | 2.8 | 1.9 | | 1700 | 21 | 0.08 | 55.0 | 2R5TPE220MLB | 2000 | |
| | 85 | | 2.0 | 105 | 3.5 | | 2.8 | 1.9 | | 1600 | 25 | 0.08 | 55.0 | 2R5TPE220MAPB | 2000 | |
| | 105 | | 2.5 | 105 | 3.5 | | 2.8 | 1.9 | | 1400 | 35 | 0.08 | 55.0 | 2R5TPE220MZB | 2000 | |
| | 85 | | 2.0 | 105 | 3.5 | 2.8 | 1.9 | 1400 | | 35 | 0.08 | 55.0 | 2R5TPE220MAZB | 2000 | | |
| | 85 | | 2.0 | 105 | 330 | 3.5 | 2.8 | 1.9 | | 1400 | 35 | 0.08 | 82.5 | 2R5TPE330MAZB | 2000 | |
| | 4 | | 105 | 4.0 | 105 | 100 | 3.5 | 2.8 | | 1.9 | 1400 | 35 | 0.08 | 40.0 | 4TPE100MZB | 2000 |
| | | | 85 | 3.2 | 105 | 150 | 3.5 | 2.8 | | 1.9 | 1400 | 35 | 0.08 | 60.0 | 4TPE150MAZB | 2000 |
| | | 85 | 3.2 | 105 | 220 | 3.5 | 2.8 | 1.9 | | 1400 | 35 | 0.08 | 88.0 | 4TPE220MAZB | 2000 | |
| | 6.3 | 105 | 6.3 | 105 | 100 | 3.5 | 2.8 | 1.9 | | 1600 | 25 | 0.08 | 63.0 | 6TPE100MPB | 2000 | |
| | | 85 | 5.0 | 105 | | 3.5 | 2.8 | 1.9 | | 1400 | 35 | 0.08 | 63.0 | 6TPE100MAZB | 2000 | |
| | | 85 | 5.0 | 105 | 150 | 3.5 | 2.8 | 1.9 | | 1400 | 35 | 0.08 | 75.6 | 6TPE120MAZB | 2000 | |
| | | 85 | 5.0 | 105 | | 3.5 | 2.8 | 1.9 | | 1600 | 25 | 0.08 | 94.5 | 6TPE150MAPB | 2000 | |
| | | 85 | 5.0 | 105 | | 3.5 | 2.8 | 1.9 | | 1400 | 35 | 0.08 | 94.5 | 6TPE150MAZB | 2000 | |
| | | 85 | 5.0 | 105 | | 220 | 3.5 | 2.8 | | 1.9 | 1400 | 35 | 0.10 | 138.6 | 6TPE220MAZB | 2000 |
| | 8 | 85 | 6.3 | 105 | 100 | 3.5 | 2.8 | 1.9 | | 1400 | 35 | 0.08 | 80.0 | 8TPE100MAZB | 2000 | |
| | 10 | 85 | 8.0 | 105 | 47 | 3.5 | 2.8 | 1.9 | | 1400 | 35 | 0.08 | 47.0 | 10TPE47MAZB | 2000 | |

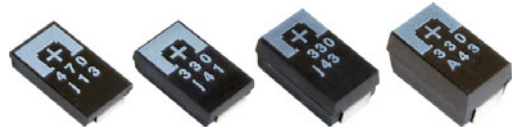
*1 Ripple current (100 kHz/ +45 °C), *2 ESR (100 kHz/+20 °C) *3 tan δ (120 Hz/+20 °C) *4 After 5 minutes
 ◆ Please refer to each page in this catalog for "Reflow conditions" and "Taping specifications".

Surface Mount Type

POSCAP

Series : TPE

Size : D



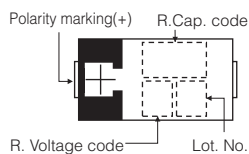
Features

- Low profile (Height 1.5 mm max.)
- Low ESR (7 mΩ)
- Large capacitance (1500 μF max.)
- RoHS compliance, Halogen free

Specifications

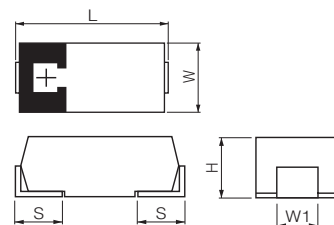
| Size code | D15E | D2E | D3L | D4 |
|----------------------------|---|---|------------------|-------------------|
| Category temperature range | -55 °C to +105 °C | | | |
| Rated voltage range | 6.3 V.DC | 2.5 V.DC to 10 V.DC | | |
| Category voltage range | 5.0 V.DC | 2.5 V.DC to 10 V.DC | | |
| Rated capacitance range | 470 μF | 68 μF to 470 μF | 220 μF to 680 μF | 330 μF to 1500 μF |
| Capacitance tolerance | ±20 % (120 Hz / + 20 °C) | | | |
| Leakage current | Please see the attached characteristics list | | | |
| Dissipation factor (tan δ) | Please see the attached characteristics list | | | |
| Surge voltage (V.DC) | Rated voltage × 1.15 | | | |
| Endurance | +105 °C, 2000 h rated voltage applied * Rated temp, +85 °C Products : +85 °C, 1000 h, rated voltage applied 6TPE330MAP, 6TPE470MAZU : +85 °C, 2000 h, | | | |
| | Capacitance change | Within ±20 % of the initial value | | |
| | tan δ | ≤ 1.5 times of the initial limit | | |
| | DC leakage current | Within the initial limit | | |
| Damp heat (Steady State) | +60 °C, 90 % to 95 %, 500 h, No-applied voltage | | | |
| | Capacitance change | Within +50 %, -20 % of the initial value (2R5TPE220M (I, F, 9), 2R5TPE330M (I, F, C, 9, 7), 2R5TPE470M (I, F, C, 9, 7), 2R5TPE1000MF, 2R5TPE1500M (F, C)) | | |
| | | Within +40 %, -20 % of the initial value (Except for above model) | | |
| | tan δ | ≤ 1.5 times of the initial limit | | |
| DC leakage current | ≤ 3 times of the initial limit | | | |

Marking



| | | | | |
|-------------------|-----|-----|-----|------|
| R. Voltage (V.DC) | 2.5 | 4.0 | 6.3 | 10.0 |
| Code | e | g | j | A |

Dimensions (not to scale)



Unit : mm

| Size code | L±0.3 | W±0.2 | H±0.2*1 | S±0.2 | W1±0.1 |
|-----------|-------|-------|---------|-------|--------|
| D15E | 7.3 | 4.3 | 1.4 | 1.1 | 2.4 |
| D2E | 7.3 | 4.3 | 1.8 | 1.3 | 2.4 |
| D3L | 7.3 | 4.3 | 2.8 | 1.3 | 2.4 |
| D4 | 7.3 | 4.3 | 3.8 | 1.3 | 2.4 |

* Externals of figure are the reference.

* 1 ±0.1 :D15E, D2E

Characteristics list

| Series | Rated voltage (V.DC) | Rated temp. (°C) | Category voltage (V.DC) | Category temp. (°C) | Rated capacitance (μF) | Case size (mm) | | | Size code | Specifications | | | | Standard | | |
|--------|----------------------|------------------|-------------------------|---------------------|------------------------|----------------|------|------|-----------|-----------------------------|-----------------|--------------|--------------|--------------|-------------------------|------|
| | | | | | | L | W | H | | Ripple*1 current (mAr.m.s.) | ESR*2 (mΩ max.) | tan δ*3 | LC*4 (μA) | Part number | Mn. Packaging Qty (pcs) | |
| TPE | 2.5 | 105 | 2.5 | 105 | 220 | 7.3 | 4.3 | 1.8 | D2E | 3900 | 9 | 0.10 | 55.0 | 2R5TPE220M9 | 3000 | |
| | | 105 | 2.5 | 105 | | 7.3 | 4.3 | 1.8 | | 3100 | 15 | 0.10 | 55.0 | 2R5TPE220MF | 3000 | |
| | | 105 | 2.5 | 105 | | 7.3 | 4.3 | 1.8 | | 2800 | 18 | 0.10 | 55.0 | 2R5TPE220MI | 3000 | |
| | | 105 | 2.5 | 105 | | 7.3 | 4.3 | 1.8 | | 2400 | 25 | 0.10 | 55.0 | 2R5TPE220M | 3000 | |
| | | 105 | 2.5 | 105 | 330 | 7.3 | 4.3 | 1.8 | | 4400 | 7 | 0.10 | 82.5 | 2R5TPE330M7 | 3000 | |
| | | 105 | 2.5 | 105 | | 7.3 | 4.3 | 1.8 | | 3900 | 9 | 0.10 | 82.5 | 2R5TPE330M9 | 3000 | |
| | | 105 | 2.5 | 105 | | 7.3 | 4.3 | 1.8 | | 3500 | 12 | 0.10 | 82.5 | 2R5TPE330MC | 3000 | |
| | | 105 | 2.5 | 105 | | 7.3 | 4.3 | 1.8 | | 3100 | 15 | 0.10 | 82.5 | 2R5TPE330MF | 3000 | |
| | | 105 | 2.5 | 105 | 470 | 7.3 | 4.3 | 1.8 | | 2800 | 18 | 0.10 | 82.5 | 2R5TPE330MI | 3000 | |
| | | 105 | 2.5 | 105 | | 7.3 | 4.3 | 1.8 | | 2400 | 25 | 0.10 | 82.5 | 2R5TPE330M | 3000 | |
| | | 105 | 2.5 | 105 | | 7.3 | 4.3 | 1.8 | | 4400 | 7 | 0.10 | 117.5 | 2R5TPE470M7 | 3000 | |
| | | 105 | 2.5 | 105 | | 7.3 | 4.3 | 1.8 | | 3900 | 9 | 0.10 | 117.5 | 2R5TPE470M9 | 3000 | |
| | | 105 | 2.5 | 105 | 680 | 7.3 | 4.3 | 1.8 | | 3500 | 12 | 0.10 | 117.5 | 2R5TPE470MC | 3000 | |
| | | 105 | 2.5 | 105 | | 7.3 | 4.3 | 1.8 | | 3100 | 15 | 0.10 | 117.5 | 2R5TPE470MF | 3000 | |
| | | 105 | 2.5 | 105 | | 7.3 | 4.3 | 1.8 | | 2800 | 18 | 0.10 | 117.5 | 2R5TPE470MI | 3000 | |
| | | 105 | 2.5 | 105 | | 7.3 | 4.3 | 2.8 | | D3L | 3500 | 12 | 0.10 | 170.0 | 2R5TPE680MCL | 2500 |
| | | 105 | 2.5 | 105 | 7.3 | 4.3 | 2.8 | 3100 | | | 15 | 0.10 | 170.0 | 2R5TPE680MFL | 2500 | |
| | | 105 | 2.5 | 105 | 1000 | 7.3 | 4.3 | 3.8 | | D4 | 3900 | 15 | 0.15 | 250.0 | 2R5TPE1000MF | 2000 |
| | 105 | 2.5 | 105 | 7.3 | | 4.3 | 3.8 | 4400 | 12 | | 0.15 | 375.0 | 2R5TPE1500MC | 2000 | | |
| | 105 | 2.5 | 105 | 1500 | 7.3 | 4.3 | 3.8 | 3900 | 15 | 0.15 | 375.0 | 2R5TPE1500MF | 2000 | | | |
| | 105 | 4.0 | 105 | | 4 | 7.3 | 4.3 | 1.8 | D2E | 2800 | 18 | 0.10 | 60.0 | 4TPE150MI | 3000 | |
| | 105 | 4.0 | 105 | 7.3 | | 4.3 | 1.8 | 3100 | | 15 | 0.10 | 88.0 | 4TPE220MF | 3000 | | |
| | 105 | 4.0 | 105 | 220 | | 7.3 | 4.3 | 1.8 | | 2800 | 18 | 0.10 | 88.0 | 4TPE220MI | 3000 | |
| | 105 | 4.0 | 105 | | | 7.3 | 4.3 | 1.8 | | 2400 | 25 | 0.10 | 88.0 | 4TPE220M | 3000 | |
| | 105 | 4.0 | 105 | 330 | | 7.3 | 4.3 | 1.8 | | 2800 | 18 | 0.10 | 132.0 | 4TPE330MI | 3000 | |
| | 105 | 4.0 | 105 | | | 7.3 | 4.3 | 1.8 | | 2400 | 25 | 0.10 | 132.0 | 4TPE330M | 3000 | |
| | 105 | 4.0 | 105 | 470 | | 7.3 | 4.3 | 2.8 | | D3L | 3500 | 12 | 0.10 | 188.0 | 4TPE470MCL | 2500 |
| | 105 | 4.0 | 105 | | | 7.3 | 4.3 | 2.8 | | | 3100 | 15 | 0.10 | 188.0 | 4TPE470MFL | 2500 |
| | 105 | 4.0 | 105 | | 7.3 | 4.3 | 2.8 | 2800 | 18 | | 0.10 | 188.0 | 4TPE470MIL | 2500 | | |
| | 105 | 4.0 | 105 | | 7.3 | 4.3 | 2.8 | 2400 | 25 | | 0.10 | 188.0 | 4TPE470ML | 2500 | | |
| | 105 | 6.3 | 105 | 100 | 7.3 | 4.3 | 1.8 | D2E | 2800 | 18 | 0.10 | 63.0 | 6TPE100MI | 3000 | | |
| | 105 | 6.3 | 105 | | 7.3 | 4.3 | 1.8 | | 2400 | 25 | 0.10 | 63.0 | 6TPE100M | 3000 | | |
| | 105 | 6.3 | 105 | | 150 | 7.3 | 4.3 | | 1.8 | 3100 | 15 | 0.10 | 94.5 | 6TPE150MF | 3000 | |
| | 105 | 6.3 | 105 | | | 7.3 | 4.3 | | 1.8 | 2800 | 18 | 0.10 | 94.5 | 6TPE150MI | 3000 | |
| | 105 | 6.3 | 105 | 220 | 7.3 | 4.3 | 1.8 | | 2400 | 25 | 0.10 | 94.5 | 6TPE150M | 3000 | | |
| | 105 | 6.3 | 105 | | 7.3 | 4.3 | 1.8 | | 2800 | 18 | 0.10 | 138.6 | 6TPE220MI | 3000 | | |
| 105 | 6.3 | 105 | 7.3 | | 4.3 | 1.8 | 2400 | | 25 | 0.10 | 138.6 | 6TPE220M | 3000 | | | |
| 85 | 5.0 | 105 | 330 | | 7.3 | 4.3 | 1.8 | | D2E | 2400 | 25 | 0.10 | 138.6 | 6TPE220MAP | 3000 | |
| 85 | 5.0 | 105 | | 7.3 | 4.3 | 1.8 | 2400 | 25 | | 0.10 | 207.9 | 6TPE330MAP | 3000 | | | |
| 85 | 5.0 | 105 | | 470 | 7.3 | 4.3 | 2.8 | D3L | | 2400 | 25 | 0.10 | 207.9 | 6TPE330MAL | 2500 | |
| 85 | 5.0 | 105 | | | 7.3 | 4.3 | 2.8 | | | 3900 | 9/500 Hz | 0.10 | 207.9 | 6TPE330MA9EL | 2500 | |
| 105 | 6.3 | 105 | | 680 | 7.3 | 4.3 | 2.8 | D3L | 3100 | 15 | 0.10 | 207.9 | 6TPE330MFL | 2500 | | |
| 105 | 6.3 | 105 | | | 7.3 | 4.3 | 2.8 | | 2800 | 18 | 0.10 | 207.9 | 6TPE330MIL | 2500 | | |
| 105 | 6.3 | 105 | | | 7.3 | 4.3 | 2.8 | | 2400 | 25 | 0.10 | 207.9 | 6TPE330ML | 2500 | | |
| 85 | 5.0 | 105 | | | 7.3 | 4.3 | 3.8 | | D4 | 4400 | 10 | 0.10 | 207.9 | 6TPE330MAA | 2000 | |
| 105 | 6.3 | 105 | 10 | 7.3 | 4.3 | 1.4 | D15E | 1700 | 35 | 0.10 | 296.1 | 6TPE470MAZU | 4000 | | | |
| 105 | 6.3 | 105 | | 470 | 7.3 | 4.3 | | 3.8 | D4 | 3500 | 18 | 0.15 | 296.1 | 6TPE470MI | 2000 | |
| 105 | 6.3 | 105 | | | 7.3 | 4.3 | | 3.8 | | 3000 | 25 | 0.15 | 296.1 | 6TPE470M | 2000 | |
| 105 | 6.3 | 105 | | 680 | 7.3 | 4.3 | | 3.8 | 3500 | 18 | 0.15 | 428.4 | 6TPE680MI | 2000 | | |
| 105 | 6.3 | 105 | 7.3 | | 4.3 | 3.8 | 3000 | 25 | 0.15 | 428.4 | 6TPE680M | 2000 | | | | |
| 105 | 10.0 | 105 | 10 | 68 | 7.3 | 4.3 | 1.8 | D2E | 2400 | 25 | 0.10 | 68.0 | 10TPE68M | 3000 | | |
| 105 | 10.0 | 105 | | 220 | 7.3 | 4.3 | 2.8 | | D3L | 2800 | 18 | 0.10 | 220.0 | 10TPE220MIL | 2500 | |
| 105 | 10.0 | 105 | | | 7.3 | 4.3 | 2.8 | 2400 | | 25 | 0.10 | 220.0 | 10TPE220ML | 2500 | | |
| 105 | 10.0 | 105 | | 330 | 7.3 | 4.3 | 3.8 | D4 | 3000 | 25 | 0.10 | 330.0 | 10TPE330M | 2000 | | |

*1 Ripple current (100 kHz/+45 °C), *2 ESR (100 kHz/+20 °C) *3 tan δ (120 Hz/+20 °C) *4 After 5 minutes

◆ Please refer to each page in this catalog for "Reflow conditions" and "Taping specifications".

Surface Mount Type

POSCAP

Series : TPF



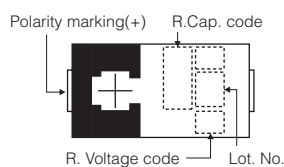
Features

- Super low ESR (5 mΩ max.)
- Large capacitance (1000 μF max.)
- RoHS compliance, Halogen free

Specifications

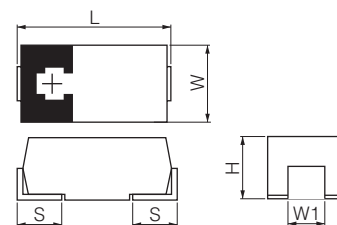
| Size code | D2E | D3L | D4 |
|----------------------------|---|---|----------------------|
| Category temperature range | -55 °C to +105 °C | | |
| Rated voltage range | 2.0 V.DC | 2.5 V.DC to 10 V.DC | 2.5 V.DC to 6.3 V.DC |
| Category voltage range | 2.0 V.DC | 2.5 V.DC to 10 V.DC | 2.5 V.DC to 6.3 V.DC |
| Rated capacitance range | 220 μF to 330 μF | 150 μF to 680 μF | 470 μF to 1000 μF |
| Capacitance tolerance | ±20 % (120 Hz / + 20 °C) | | |
| Leakage current | Please see the attached characteristics list | | |
| Dissipation factor (tan δ) | Please see the attached characteristics list | | |
| Surge voltage (V.DC) | Rated voltage × 1.15 | | |
| Endurance | +105 °C, 2000 h rated voltage applied | | |
| | Capacitance change | Within ±20 % of the initial value | |
| | tan δ | ≤ 1.5 times of the initial limit | |
| | DC leakage current | Within the initial limit | |
| Damp heat (Steady State) | +60 °C, 90 % to 95 %, 500 h, No-applied voltage | | |
| | Capacitance change | Within +50 %, -20 % of the initial value (2TPF220M6, 2TPF330M6, ETPF1000M6H (5H)) | |
| | tan δ | ≤ 1.5 times of the initial limit | |
| | DC leakage current | ≤ 3 times of the initial limit | |

Marking



| R. Voltage (V.DC) | 2.0 | 2.5 | 4.0 | 6.3 | 10.0 |
|-------------------|-----|-----|-----|-----|------|
| Code | d | e | g | j | A |

Dimensions (not to scale)



Unit : mm

| Size code | L±0.3 | W±0.2 | H±0.2*1 | S±0.2 | W1±0.1 |
|-----------|-------|-------|---------|-------|--------|
| D2E | 7.3 | 4.3 | 1.8 | 1.3 | 2.4 |
| D3L | 7.3 | 4.3 | 2.8 | 1.3 | 2.4 |
| D4 | 7.3 | 4.3 | 3.8 | 1.3 | 2.4 |

* Externals of figure are the reference.
* 1 ±0.1 :D2E

Characteristics list

| Series | Rated voltage (V.DC) | Rated temp. (°C) | Category voltage (V.DC) | Category temp. (°C) | Rated capacitance (μF) | Case size (mm) | | | Size code | Specifications | | | | Standard | |
|--------|----------------------|------------------|-------------------------|---------------------|------------------------|----------------|-------|--------------|-----------|-------------------------------|------------------|----------|------------|--------------|--------------------------|
| | | | | | | L | W | H | | Ripple *1 current (mA r.m.s.) | ESR *2 (mΩ max.) | tan δ *3 | LC *4 (μA) | Part number | Min. Packaging Qty (pcs) |
| TPF | 2 | 105 | 2.0 | 105 | 220 | 7.3 | 4.3 | 1.8 | D2E | 4700 | 6 | 0.10 | 88.0 | 2TPF220M6 | 3000 |
| | | 105 | 2.0 | 105 | 330 | 7.3 | 4.3 | 1.8 | | 4700 | 6 | 0.10 | 132.0 | 2TPF330M6 | 3000 |
| | 2.5 | 105 | 2.5 | 105 | 470 | 7.3 | 4.3 | 2.8 | D3L | 4400 | 7 | 0.10 | 82.5 | 2R5TPF330M7L | 2500 |
| | | | | | | | | | | 4400 | 6 | 0.10 | 117.5 | 2R5TPF470M6L | 2500 |
| | | | 4400 | 7 | | 0.10 | 117.5 | 2R5TPF470M7L | | 2500 | | | | | |
| | | | 4400 | 10 | | 0.10 | 117.5 | 2R5TPF470ML | | 2500 | | | | | |
| | | 105 | 2.5 | 105 | 680 | 7.3 | 4.3 | 2.8 | D4 | 6100 | 5 | 0.10 | 117.5 | ETPF470M5H | 2000 |
| | | | | | | | | | | 4400 | 6 | 0.10 | 170.0 | 2R5TPF680M6L | 2500 |
| | | 105 | 2.5 | 105 | 680 | 7.3 | 4.3 | 2.8 | D3L | 4400 | 7 | 0.10 | 170.0 | 2R5TPF680M7L | 2500 |
| | | | | | | | | | | 4400 | 10 | 0.10 | 170.0 | 2R5TPF680ML | 2500 |
| | | 105 | 2.5 | 105 | 1000 | 7.3 | 4.3 | 3.8 | D4 | 6100 | 5 | 0.10 | 170.0 | ETPF680M5H | 2000 |
| | | | | | | | | | | 6100 | 5 | 0.10 | 250.0 | ETPF1000M5H | 2000 |
| | | 105 | 2.5 | 105 | 1000 | 7.3 | 4.3 | 3.8 | D4 | 5600 | 6 | 0.10 | 250.0 | ETPF1000M6H | 2000 |
| | | | | | | | | | | 4000 | 12 | 0.10 | 132.0 | 4TPF330ML | 2500 |
| | 4 | 105 | 4.0 | 105 | 470 | 7.3 | 4.3 | 2.8 | D3L | 4400 | 10 | 0.10 | 188.0 | 4TPF470ML | 2500 |
| | | | | | | | | | | 4400 | 10 | 0.10 | 272.0 | 4TPF680MAH | 2000 |
| | 6.3 | 105 | 6.3 | 105 | 220 | 7.3 | 4.3 | 2.8 | D3L | 6100 | 5 | 0.10 | 138.6 | 6TPF220M5L | 2500 |
| | | | | | | | | | | 4600 | 9 | 0.10 | 138.6 | 6TPF220M9L | 2500 |
| | | | 4000 | 12 | | 0.10 | 138.6 | 6TPF220ML | | 2500 | | | | | |
| | | | 3900 | 9 | | 0.10 | 207.9 | 6TPF330M9L | | 2500 | | | | | |
| 105 | | 6.3 | 105 | 470 | 7.3 | 4.3 | 3.8 | D4 | 4400 | 10 | 0.10 | 296.1 | 6TPF470MAH | 2000 | |
| 10 | 105 | 10.0 | 105 | 150 | 7.3 | 4.3 | 2.8 | D3L | 3600 | 15 | 0.10 | 150.0 | 10TPF150ML | 2500 | |

*1 Ripple current (100 kHz/ +45 °C), *2 ESR (100 kHz/+20 °C) *3 tan δ (120 Hz/+20 °C) *4 After 5 minutes

◆ Please refer to each page in this catalog for "Reflow conditions" and "Taping specifications".

Surface Mount Type

POSCAP

Series : TA



Features

- Guaranteed at 85 °C 85 %RH
- RoHS compliance, Halogen free

Specifications

| Size code | B2 | D2E | D3L |
|----------------------------|---|--|------------------|
| Category temperature range | -55 °C to +105 °C | | |
| Rated voltage range | 4 V.DC to 10 V.DC | 2.5 V.DC to 10 V.DC | |
| Category voltage range | 4 V.DC to 10 V.DC | 2.5 V.DC to 10 V.DC | |
| Rated capacitance range | 47µF to 100 µF | 68 µF to 470 µF | 150 µF to 680 µF |
| Capacitance tolerance | ±20 % (120 Hz / + 20 °C) | | |
| Leakage current | Please see the attached characteristics list | | |
| Dissipation factor (tan δ) | Please see the attached characteristics list | | |
| Surge voltage (V.DC) | Rated voltage × 1.15 | | |
| Endurance | +105 °C, 2000 h, (B2 size : 1000 h) rated voltage applied | | |
| | Capacitance change | Within ±20 % of the initial value | |
| | tan δ | ≤ 1.5 times of the initial limit | |
| | DC leakage current | Within the initial limit | |
| Damp heat (Steady State) | +85 °C, 85 % to 90 %, 500 h, rated voltage applied | | |
| | Capacitance change | Within +50 %, -20 % of the initial value (2R5TAE470M(F), 2R5TAE330M(F, I), 2R5TAE220M(F, 9)) | |
| | tan δ | Within +40 %, -20 % of the initial value (Except for above model) | |
| | DC leakage current | Within the initial limit | |

Marking

| D2E, D3L Size | | B2 Size | | | | | | | | | | | | | | | | | | | |
|---|-------------|---------------------|-------------|------|-----|------|------|---|---|---|---|--|--|--------------|----|----|-----|------|----|----|----|
| Polarity marking(+) | R.Cap. code | Polarity marking(+) | R.Cap. code | | | | | | | | | | | | | | | | | | |
| R. Voltage code | Lot. No. | R. Voltage code | Lot. No. | | | | | | | | | | | | | | | | | | |
| <table border="1"> <tr> <th>R. Voltage (V.DC)</th> <td>2.5</td> <td>4.0</td> <td>6.3</td> <td>10.0</td> </tr> <tr> <th>Code</th> <td>e</td> <td>g</td> <td>j</td> <td>A</td> </tr> </table> | | R. Voltage (V.DC) | 2.5 | 4.0 | 6.3 | 10.0 | Code | e | g | j | A | <table border="1"> <tr> <th>R. Cap. (µF)</th> <td>47</td> <td>68</td> <td>100</td> </tr> <tr> <th>Code</th> <td>S7</td> <td>W7</td> <td>A8</td> </tr> </table> | | R. Cap. (µF) | 47 | 68 | 100 | Code | S7 | W7 | A8 |
| R. Voltage (V.DC) | 2.5 | 4.0 | 6.3 | 10.0 | | | | | | | | | | | | | | | | | |
| Code | e | g | j | A | | | | | | | | | | | | | | | | | |
| R. Cap. (µF) | 47 | 68 | 100 | | | | | | | | | | | | | | | | | | |
| Code | S7 | W7 | A8 | | | | | | | | | | | | | | | | | | |

Dimensions (not to scale)

| Unit : mm | | | | | |
|-----------|---------|-------|---------|-------|--------|
| Size Code | L±0.3*1 | W±0.2 | H±0.2*2 | S±0.2 | W1±0.1 |
| B2 | 3.5 | 2.8 | 1.9 | 0.8 | 2.2 |
| D2E | 7.3 | 4.3 | 1.8 | 1.3 | 2.4 |
| D3L | 7.3 | 4.3 | 2.8 | 1.3 | 2.4 |

* External of figure are the reference.
 * 1 ±0.2 : B2
 * 2 ±0.1 : B2, D2E

Characteristics list

| Series | Rated voltage (V.DC) | Rated temp. (°C) | Category voltage (V.DC) | Category temp. (°C) | Rated capacitance (µF) | Case size (mm) | | | Size code | Specifications | | | | Standard | | |
|--------|----------------------|------------------|-------------------------|---------------------|------------------------|----------------|--------------|------|-----------|----------------------|-----------------|---------|------------|-------------|--------------------------|------|
| | | | | | | L | W | H | | Ripple*1 (mA r.m.s.) | ESR*2 (mΩ max.) | tan δ*3 | LC*4 (µA) | Part number | Min. Packaging Qty (pcs) | |
| TA | 2.5 | 105 | 2.5 | 105 | 220 | 7.3 | 4.3 | 1.8 | D2E | 3900 | 9 | 0.10 | 110.0 | 2R5TAE220M9 | 3000 | |
| | | | | | | | | | | 3100 | 15 | 0.10 | 55.0 | 2R5TAE220MF | 3000 | |
| | | | | | | | | | | 2400 | 25 | 0.10 | 55.0 | 2R5TAE220M | 3000 | |
| | | 3100 | 15 | 0.10 | 82.5 | 2R5TAE330MF | 3000 | | | | | | | | | |
| | | 2800 | 18 | 0.10 | 82.5 | 2R5TAE330MI | 3000 | | | | | | | | | |
| | | 2400 | 25 | 0.10 | 82.5 | 2R5TAE330M | 3000 | | | | | | | | | |
| | | D3L | 3100 | 15 | 0.10 | 117.5 | 2R5TAE470MF | 3000 | | | | | | | | |
| | | | 2400 | 25 | 0.10 | 117.5 | 2R5TAE470M | 3000 | | | | | | | | |
| | | | 3100 | 15 | 0.10 | 170.0 | 2R5TAE680MFL | 2500 | | | | | | | | |
| | | | 2400 | 25 | 0.10 | 170.0 | 2R5TAE680ML | 2500 | | | | | | | | |
| | | | B2 | 105 | 2.5 | 105 | 470 | 7.3 | 4.3 | 1.8 | 1100 | 70 | 0.08 | 40.0 | 4TAB100M | 2000 |
| | | | | 105 | 2.5 | 105 | 680 | 7.3 | 4.3 | 2.8 | 2800 | 18 | 0.10 | 88.0 | 4TAE220MI | 3000 |
| | 4 | 4.0 | | 105 | 100 | 3.8 | 2.8 | 1.9 | B2 | 2400 | 25 | 0.10 | 88.0 | 4TAE220M | 3000 | |
| | | | | | | | | | | 2800 | 18 | 0.10 | 188.0 | 4TAE470MIL | 2500 | |
| | | | | | | | | | | 2400 | 25 | 0.10 | 188.0 | 4TAE470ML | 2500 | |
| | | | | | | | | | | 2400 | 25 | 0.10 | 188.0 | 4TAE470MFL | 2500 | |
| | 6.3 | 6.3 | 105 | 47 | 3.5 | 2.8 | 1.9 | B2 | 1100 | 70 | 0.08 | 29.6 | 6TAB47M | 2000 | | |
| | | | | | | | | | 1100 | 70 | 0.08 | 42.8 | 6TAB68M | 2000 | | |
| | | | | | | | | | 2400 | 25 | 0.10 | 94.5 | 6TAE150M | 3000 | | |
| | | | | | | | | | 2800 | 18 | 0.10 | 138.6 | 6TAE220MI | 3000 | | |
| | | | | | | | | | 2400 | 25 | 0.10 | 138.6 | 6TAE220M | 3000 | | |
| | | | | | | | | | 2400 | 25 | 0.10 | 207.9 | 6TAE330ML | 2500 | | |
| | 10 | 10.0 | 105 | 47 | 3.5 | 2.8 | 1.9 | B2 | 1100 | 70 | 0.08 | 47.0 | 10TAB47M | 2000 | | |
| | | | | | | | | | D2E | 2400 | 25 | 0.10 | 68.0 | 10TAE68M | 3000 | |
| 2400 | | | | | | | | | | 25 | 0.10 | 150.0 | 10TAE150ML | 2500 | | |
| 2400 | | | | | | | | | | 25 | 0.10 | 220.0 | 10TAE220ML | 2500 | | |
| D3L | | | | | | | | | | 2400 | 25 | 0.10 | 220.0 | 10TAE220ML | 2500 | |

*1 Ripple current (100 kHz/ +45 °C), *2 ESR (100 kHz/+20 °C) *3 tan δ (120 Hz/+20 °C) *4 After 5 minutes

◆ Please refer to each page in this catalog for "Reflow conditions" and "Taping specifications".

Surface Mount Type

POSCAP



Series : TV

Features

- Guaranteed at 85 °C 85 %RH
- Guaranteed at 125 °C
- RoHS compliance, Halogen free

Specifications

| Size code | D2E | D3L | |
|----------------------------|---|--|-----------------------------------|
| Category temperature range | -55 °C to +125 °C | | |
| Rated voltage range | 6.3 V.DC to 10 V.DC | 10 V.DC | |
| Category voltage range | 4.0 V.DC to 6.3 V.DC | 6.3 V.DC | |
| Rated capacitance range | 68 μF to 150 μF | 150 μF | |
| Capacitance tolerance | ±20 % (120 Hz / + 20 °C) | | |
| Leakage current | Please see the attached characteristics list | | |
| Dissipation factor (tan δ) | Please see the attached characteristics list | | |
| Surge voltage (V.DC) | Rated voltage × 1.15 | | |
| Endurance | +125 °C, 1000 h, category voltage applied (+105 °C 2000 h, rated voltage applied) | | |
| | temp. | 125 °C | 105 °C |
| | Capacitance change | Within ±20 % of the initial value | Within ±20 % of the initial value |
| | tan δ | ≤ 2 times of the initial limit | ≤ 1.5 times of the initial limit |
| Damp heat (Steady State) | DC leakage current | ≤ 2 times of the initial limit | Within the initial limit |
| | +85 °C, 85 % to 90 %, 500 h, rated voltage applied | | |
| | Capacitance change | Within +40 %, -20 % of the initial value | |
| | tan δ | ≤ 1.5 times of the initial limit | |
| DC leakage current | Within the initial limit | | |

Marking

| R. Voltage (V.DC) | 6.3 | 10.0 |
|-------------------|-----|------|
| Code | j | A |

Dimensions (not to scale)

| Size code | L±0.3 | W±0.2*1 | H±0.2 | S±0.2 | W1±0.1 |
|-----------|-------|---------|-------|-------|--------|
| D2E | 7.3 | 4.3 | 1.8 | 1.3 | 2.4 |
| D3L | 7.3 | 4.3 | 2.8 | 1.3 | 2.4 |

Unit : mm

*1 Externals of figure are the reference. *1 ±0.1 : D2E

Characteristics list

| Series | Rated voltage (V.DC) | Rated temp. (°C) | Category voltage (V.DC) | Category temp. (°C) | Rated capacitance (μF) | Case size (mm) | | | Size code | Specifications | | | | Standard | |
|--------|----------------------|------------------|-------------------------|---------------------|------------------------|----------------|-----|-----|-----------|-----------------------------|-----------------|---------|-----------|-------------|--------------------------|
| | | | | | | L | W | H | | Ripple*1 current (mAr.m.s.) | ESR*2 (mΩ max.) | tan δ*3 | LC*4 (μA) | Part number | Min. Packaging Qty (pcs) |
| TV | 6.3 | 105 | 4.0 | 125 | 150 | 7.3 | 4.3 | 1.8 | D2E | 2400 | 25 | 0.10 | 94.5 | 6TVE150M | 3000 |
| | | | | | | | | | | 2400 | 25 | 0.10 | 68.0 | 10TVE68M | 3000 |
| | 10 | 105 | 6.3 | 125 | 68 | 7.3 | 4.3 | 1.8 | D3L | 2400 | 25 | 0.10 | 150.0 | 10TVE150ML | 2500 |

*1 Ripple current (100 kHz/ +45 °C), *2 ESR (100 kHz/+20 °C) *3 tan δ (120 Hz/+20 °C) *4 After 5 minutes

◆ Please refer to each page in this catalog for "Reflow conditions" and "Taping specifications".

Surface Mount Type

POSCAP



Series : **TQC**

Size : **B**

Features

- High voltage (35 V.DC max.)
- RoHS compliance, Halogen free

Specifications

| Size code | B15 | B2 |
|----------------------------|---|--|
| Category temperature range | -55 °C to +105 °C | |
| Rated voltage range | 35 V.DC | 16 V.DC to 35 V.DC |
| Category voltage range | 35 V.DC | 16 V.DC to 35 V.DC |
| Rated capacitance range | 2.7 μF | 3.9 μF to 33 μF |
| Capacitance tolerance | ±20 % (120 Hz / + 20 °C) | |
| Leakage current | Please see the attached characteristics list | |
| Dissipation factor (tan δ) | Please see the attached characteristics list | |
| Surge voltage (V.DC) | Rated voltage × 1.15 | |
| Endurance | +105 °C, 2000 h (16TQC33MYFB : 1000 h), rated voltage applied | |
| | Capacitance change | Within ±20 % of the initial value |
| | tan δ | ≤ 1.5 times of the initial limit |
| | DC leakage current | Within the initial limit |
| Damp heat (Steady State) | +60 °C, 90 % to 95 %, 500 h, No-applied voltage | |
| | Capacitance change | Within +40 %, -20 % of the initial value |
| | tan δ | ≤ 1.5 times of the initial limit |
| | DC leakage current | ≤ 3 times of the initial limit |

Marking

| R. Voltage (V.DC) | 16 | 20 | 25 | 35 |
|-------------------|----|----|----|----|
| Code | C | D | E | V |

| R. Cap. (μF) | 2.7 | 3.9 | 5.6 | 8.2 | 10 | 15 | 22 | 33 |
|--------------|-----|-----|-----|-----|----|----|----|----|
| Code | L6 | Q6 | U6 | Y6 | A7 | E7 | J7 | N7 |

Dimensions (not to scale)

| Size code | L±0.2 | W±0.2 | H±0.1 | S±0.2 | W1±0.1 |
|-----------|-------|-------|-------|-------|--------|
| B15 | 3.5 | 2.8 | 1.4 | 0.8 | 2.2 |
| B2 | 3.5 | 2.8 | 1.9 | 0.8 | 2.2 |

Unit : mm

* Externals of figure are the reference.

Characteristics list

| Series | Rated voltage (V.DC) | Rated temp. (°C) | Category voltage (V.DC) | Category temp. (°C) | Rated capacitance (μF) | Case size (mm) | | | Size code | Specifications | | | | Standard | | |
|--------|----------------------|------------------|-------------------------|---------------------|------------------------|----------------|-----|-----|-----------|---------------------|-----------------|---------|-----------|-------------|--------------------------|------|
| | | | | | | L | W | H | | Ripple*1 (mAr.m.s.) | ESR*2 (mΩ max.) | tan δ*3 | LC*4 (μA) | Part number | Min. Packaging Qty (pcs) | |
| TQC | 16 | 105 | 16.0 | 105 | 10 | 3.5 | 2.8 | 1.9 | B2 | 800 | 100 | 0.10 | 48.0 | 16TQC10M | 2000 | |
| | | | | | 15 | 3.5 | 2.8 | 1.9 | | 1000 | 90 | 0.10 | 72.0 | 16TQC15M | 2000 | |
| | | | | | 33 | 3.5 | 2.8 | 1.9 | | 1000 | 90 | 0.10 | 158.4 | 16TQC33MYFB | 2000 | |
| | 20 | 105 | 20.0 | 105 | 8.2 | 3.5 | 2.8 | 1.9 | | 800 | 100 | 0.10 | 49.2 | 20TQC8R2M | 2000 | |
| | | | | | 22 | 3.5 | 2.8 | 1.9 | | 1100 | 90 | 0.10 | 132.0 | 20TQC22MYFB | 2000 | |
| | 25 | 105 | 25.0 | 105 | 5.6 | 3.5 | 2.8 | 1.9 | | 800 | 100 | 0.10 | 42.0 | 25TQC5R6M | 2000 | |
| | | | | | 15 | 3.5 | 2.8 | 1.9 | | 900 | 100 | 0.10 | 112.5 | 25TQC15MYFB | 2000 | |
| | 35 | 105 | 35.0 | 105 | 2.7 | 3.5 | 2.8 | 1.4 | | B15 | 800 | 300 | 0.10 | 47.3 | 35TQC2R7MYF | 2000 |
| | | | | | 3.9 | 3.5 | 2.8 | 1.9 | | B2 | 500 | 400 | 0.10 | 40.9 | 35TQC3R9MYF | 2000 |

*1 Ripple current (100 kHz/ +105 °C), *2 ESR (100 kHz/+20 °C) *3 tan δ (120 Hz/+20 °C) *4 After 5 minutes

◆ Please refer to each page in this catalog for "Reflow conditions" and "Taping specifications".

Surface Mount Type

POSCAP



Series : **TQC**

Size : **D**

Features

- High voltage (35 V.DC max.)
- RoHS compliance, Halogen free

Specifications

| Size code | D12 | D15 | D2 | D3L |
|----------------------------|---|--|--------------------|--------------------|
| Category temperature range | -55 °C to +105 °C | | | |
| Rated voltage range | 16 V.DC | 16 V.DC to 25 V.DC | 16 V.DC to 35 V.DC | 16 V.DC to 25 V.DC |
| Category voltage range | 16 V.DC | 16 V.DC to 25 V.DC | 16 V.DC to 35 V.DC | 16 V.DC to 25 V.DC |
| Rated capacitance range | 33 μF | 22 μF to 47 μF | 10 μF to 100 μF | 68 μF to 150 μF |
| Capacitance tolerance | ±20 % (120 Hz / + 20 °C) | | | |
| Leakage current | Please see the attached characteristics list | | | |
| Dissipation factor (tan δ) | Please see the attached characteristics list | | | |
| Surge voltage (V.DC) | Rated voltage × 1.15 | | | |
| Endurance | +105 °C, 2000 h, rated voltage applied | | | |
| | Capacitance change | Within ±20 % of the initial value | | |
| | tan δ | ≤ 1.5 times of the initial limit | | |
| | DC leakage current | Within the initial limit | | |
| Damp heat (Steady State) | +60 °C, 90 % to 95 %, 500 h, No-applied voltage | | | |
| | Capacitance change | Within +40 %, -20 % of the initial value | | |
| | tan δ | ≤ 1.5 times of the initial limit | | |
| | DC leakage current | ≤ 3 times of the initial limit | | |

Marking

| R. Voltage (V.DC) | 16 | 20 | 25 | 35 |
|-------------------|----|----|----|----|
| Code | C | D | 1E | V |

Dimensions (not to scale)

| Size code | Unit : mm | | | | |
|-----------|-----------|-------|---------|-------|--------|
| | L±0.2*1 | W±0.2 | H±0.1*2 | S±0.2 | W1±0.1 |
| D12 | 7.3 | 4.3 | 1.15 | 1.3 | 2.4 |
| D15 | 7.3 | 4.3 | 1.4 | 1.3 | 2.4 |
| D2 | 7.3 | 4.3 | 1.9 | 1.3 | 2.4 |
| D3L | 7.3 | 4.3 | 2.8 | 1.3 | 2.4 |

* 1 ±0.3 : D3L
* 2 ±0.05 : D12, ±0.2 : D3L

Characteristics list

| Series | Rated voltage (V.DC) | Rated temp. (°C) | Category voltage (V.DC) | Category temp. (°C) | Rated capacitance (μF) | Case size (mm) | | | Size code | Specifications | | | | Standard | |
|--------|----------------------|------------------|-------------------------|---------------------|------------------------|----------------|------|------|-----------|---------------------|-----------------|-------------|------------|--------------|-------------------------|
| | | | | | | L | W | H | | Ripple*1 (mAr.m.s.) | ESR*2 (mΩ max.) | tan δ*3 | LC*4 (μA) | Part number | Mn. Packaging Qty (pcs) |
| TQC | 16 | 105 | 16.0 | 105 | 33 | 7.3 | 4.3 | 1.15 | D12 | 1800 | 40 | 0.10 | 52.8 | 16TQC33MYFS | 4500 |
| | | | | | | 7.3 | 4.3 | 1.9 | D2 | 1400 | 70 | 0.10 | 52.8 | 16TQC33MYFD | 3000 |
| | | | 47 | 7.3 | 4.3 | 1.4 | D15 | 1500 | 55 | 0.10 | 75.2 | 16TQC47MYFT | 3000 | | |
| | | | | 7.3 | 4.3 | 1.9 | D2 | 1800 | 40 | 0.10 | 75.2 | 16TQC47MW | 3000 | | |
| | | 68 | 7.3 | 4.3 | 1.9 | D2 | 1450 | 55 | 0.10 | 75.2 | 16TQC47MYFD | 3000 | | | |
| | | | 7.3 | 4.3 | 1.9 | D2 | 1500 | 50 | 0.10 | 108.8 | 16TQC68MYF | 3000 | | | |
| | | | 7.3 | 4.3 | 1.9 | D2 | 1800 | 50 | 0.10 | 160.0 | 16TQC100MYF | 3000 | | | |
| | | | 7.3 | 4.3 | 2.8 | D3L | 1800 | 50 | 0.10 | 240.0 | 16TQC150MYF | 2500 | | | |
| | 20 | 105 | 20.0 | 105 | 33 | 7.3 | 4.3 | 1.9 | D2 | 1500 | 70 | 0.15 | 240.0 | 1CTQC15173F1 | 3000 |
| | | | | | | 7.3 | 4.3 | 1.9 | D2 | 1400 | 60 | 0.10 | 66.0 | 20TQC33MYFD | 3000 |
| | | | 47 | 7.3 | 4.3 | 1.9 | D2 | 1450 | 55 | 0.10 | 94.0 | 20TQC47MYF | 3000 | | |
| | | | | 7.3 | 4.3 | 1.4 | D15 | 1500 | 55 | 0.10 | 94.0 | 20TQC47MYFT | 3000 | | |
| | | 100 | 7.3 | 4.3 | 2.8 | D3L | 1700 | 55 | 0.10 | 200.0 | 20TQC100MYF | 2500 | | | |
| | | | 7.3 | 4.3 | 1.9 | D2 | 1500 | 45 | 0.10 | 38.0 | 25TQC15MV | 3000 | | | |
| | | | 7.3 | 4.3 | 1.9 | D2 | 1000 | 90 | 0.10 | 38.0 | 25TQC15MYFD | 3000 | | | |
| | | | 7.3 | 4.3 | 1.9 | D2 | 1500 | 45 | 0.10 | 55.0 | 25TQC22MV | 3000 | | | |
| | 25 | 105 | 25.0 | 105 | 15 | 7.3 | 4.3 | 1.9 | D2 | 1400 | 60 | 0.10 | 55.0 | 25TQC22MYFD | 3000 |
| | | | | | | 7.3 | 4.3 | 1.9 | D2 | 1500 | 45 | 0.10 | 55.0 | 25TQC22MYFT | 3000 |
| | | | 22 | 7.3 | 4.3 | 1.9 | D15 | 1400 | 70 | 0.10 | 55.0 | 25TQC22MYFT | 3000 | | |
| | | | | 7.3 | 4.3 | 1.4 | D15 | 1400 | 70 | 0.10 | 55.0 | 25TQC22MYFT | 3000 | | |
| | | 33 | 7.3 | 4.3 | 1.9 | D2 | 1400 | 60 | 0.10 | 82.5 | 25TQC33MYF | 3000 | | | |
| | | | 7.3 | 4.3 | 2.8 | D3L | 1400 | 70 | 0.10 | 170.0 | 25TQC68MYF | 2500 | | | |
| | | | 7.3 | 4.3 | 1.9 | D2 | 1000 | 120 | 0.10 | 35.0 | 35TQC10M | 3000 | | | |
| | | | 7.3 | 4.3 | 1.9 | D2 | 1000 | 120 | 0.10 | 35.0 | 35TQC10MYF | 3000 | | | |
| 35 | 105 | 35.0 | 105 | 10 | 7.3 | 4.3 | 1.9 | D2 | 900 | 150 | 0.10 | 52.5 | 35TQC15MYF | 3000 | |
| | | | | | 7.3 | 4.3 | 1.9 | D2 | 900 | 150 | 0.10 | 52.5 | 35TQC15MYF | 3000 | |
| | 15 | 7.3 | 4.3 | 1.9 | D2 | 900 | 150 | 0.10 | 52.5 | 35TQC15MYF | 3000 | | | | |
| | | 7.3 | 4.3 | 1.9 | D2 | 900 | 150 | 0.10 | 52.5 | 35TQC15MYF | 3000 | | | | |

*1 Ripple current (100 kHz/ +105 °C), *2 ESR (100 kHz/+20 °C) *3 tan δ (120 Hz/+20 °C) *4 After 5 minutes
◆ Please refer to each page in this catalog for "Reflow conditions" and "Taping specifications".

Surface Mount Type **POSCAP**

Series : **TPB**



Features

- Standard
- RoHS compliance, Halogen free

Specifications

| Size code | B2 | D3L | D4 |
|----------------------------|--|--|---------------------|
| Category temperature range | -55 °C to +105 °C | | |
| Rated voltage range | 4 V.DC to 10 V.DC | | 6.3 V.DC to 10 V.DC |
| Category voltage range | 4 V.DC to 10 V.DC | | 6.3 V.DC to 10 V.DC |
| Rated capacitance range | 33 μF to 68 μF | 150 μF to 330 μF | 220 μF to 470 μF |
| Capacitance tolerance | ±20 % (120 Hz / + 20 °C) | | |
| Leakage current | Please see the attached characteristics list | | |
| Dissipation factor (tan δ) | Please see the attached characteristics list | | |
| Surge voltage (V.DC) | Rated voltage × 1.15 | | |
| Endurance | +105 °C 2000h, (B2 size : 1000h) rated voltage applied * Rated temp. +85 °C 1000h rated voltage applied | | |
| | Capacitance change | Within ±20 % of the initial value | |
| | tan δ | ≤ 1.5 times of the initial limit | |
| | DC leakage current | Within the initial limit | |
| Damp heat (Steady State) | +60 °C, 90 % to 95 %, 500 h, No-applied voltage | | |
| | Capacitance change | Within +40 %, -20 % of the initial value | |
| | tan δ | ≤ 1.5 times of the initial limit | |
| | DC leakage current | ≤ 3 times of the initial limit | |

Marking

B2 Size

D3L Size

D4 Size

| R. Voltage (V.DC) | 4.0 | 6.3 | 10.0 |
|-------------------|-----|-----|------|
| Code | g | j | A |

| R. Cap. (μF) | 33 | 47 | 68 |
|--------------|----|----|----|
| Code | N7 | S7 | W7 |

Dimensions (not to scale)

Unit : mm

| Size code | L±0.3*1 | W±0.2 | H±0.2*2 | S±0.2 | W1±0.1 |
|-----------|---------|-------|---------|-------|--------|
| B2 | 3.5 | 2.8 | 1.9 | 0.8 | 2.2 |
| D3L | 7.3 | 4.3 | 2.8 | 1.3 | 2.4 |
| D4 | 7.3 | 4.3 | 3.8 | 1.3 | 2.4 |

* Externals of figure are the reference.
* 1 ±0.2 : B2 * 2 ±0.1 : B2

Characteristics list

| Series | Rated voltage (V.DC) | Rated temp. (°C) | Category voltage (V.DC) | Category temp. (°C) | Rated capacitance (μF) | Case size (mm) | | | Size code | Specifications | | | | Standard | |
|--------|----------------------|------------------|-------------------------|---------------------|------------------------|----------------|-----|-----|-----------|---------------------|-----------------|---------|-----------|-------------|--------------------------|
| | | | | | | L | W | H | | Ripple*1 (mAr.m.s.) | ESR*2 (mΩ max.) | tan δ*3 | LC*4 (μA) | Part number | Min. Packaging Qty (pcs) |
| TPB | 4.0 | 105 | 4.0 | 105 | 68 | 3.5 | 2.8 | 1.9 | B2 | 1100 | 70 | 0.08 | 27.2 | 4TPB68M | 2000 |
| | | 105 | 4.0 | 105 | 330 | 7.3 | 4.3 | 2.8 | D3L | 2000 | 40 | 0.10 | 132.0 | 4TPB330ML | 2500 |
| | 6.3 | 105 | 6.3 | 105 | 68 | 3.5 | 2.8 | 1.9 | B2 | 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 |
| | | 85 | 5.0 | 105 | | 7.3 | 4.3 | 2.8 | | 2000 | 40 | 0.10 | 207.9 | 6TPB330MAL | 2500 |
| | | 105 | 6.3 | 105 | 330 | 7.3 | 4.3 | 2.8 | D4 | 2000 | 40 | 0.10 | 207.9 | 6TPB330ML | 2500 |
| | | 105 | 6.3 | 105 | 470 | 7.3 | 4.3 | 3.8 | | 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 | 10.0 | 105 | 33 | 3.5 | 2.8 | 1.9 | B2 | 1100 | 70 | 0.08 | 33.0 | 10TPB33M | 2000 |
| | | 105 | 10.0 | 105 | 47 | 3.5 | 2.8 | 1.9 | | 1100 | 70 | 0.08 | 47.0 | 10TPB47M | 2000 |
| | | 105 | 10.0 | 105 | 150 | 7.3 | 4.3 | 2.8 | D3L | 2000 | 40 | 0.10 | 150.0 | 10TPB150ML | 2500 |
| | | 105 | 10.0 | 105 | 220 | 7.3 | 4.3 | 2.8 | | 2000 | 40 | 0.10 | 220.0 | 10TPB220ML | 2500 |
| | | 105 | 10.0 | 105 | 330 | 7.3 | 4.3 | 3.8 | D4 | 3000 | 40 | 0.10 | 220.0 | 10TPB220M | 2000 |
| | | 105 | 10.0 | 105 | 330 | 7.3 | 4.3 | 3.8 | | 3000 | 35 | 0.10 | 330.0 | 10TPB330M | 2000 |

*1 Ripple current (100 kHz/ +45 °C), *2 ESR (100 kHz/+20 °C) *3 tan δ (120 Hz/+20 °C) *4 After 5 minutes

◆ Please refer to each page in this catalog for "Reflow conditions" and "Taping specifications".

Surface Mount Type

POSCAP

Series : TPC



Features

- Low profile (Height 1.1 mm)
- RoHS compliance, Halogen free

Specifications

| Size code | B1 | D2 |
|----------------------------|--|--|
| Category temperature range | -55 °C to +105 °C | |
| Rated voltage range | 6.3 V.DC to 12.5 V.DC | 6.3 V.DC to 10 V.DC |
| Category voltage range | 5.0 V.DC to 10.0 V.DC | 6.3 V.DC to 10 V.DC |
| Rated capacitance range | 10 µF to 47 µF | 68 µF to 330 µF |
| Capacitance tolerance | ±20 % (120 Hz / + 20 °C) | |
| Leakage current | Please see the attached characteristics list | |
| Dissipation factor (tan δ) | Please see the attached characteristics list | |
| Surge voltage (V.DC) | Rated voltage × 1.15 | |
| Endurance | +105 °C 2000h, (B1 size : 1000h) rated voltage applied * Rated temp. +85 °C 1000h rated voltage applied | |
| | Capacitance change | Within ±20 % of the initial value |
| | tan δ | ≤ 1.5 times of the initial limit |
| | DC leakage current | Within the initial limit |
| Damp heat (Steady State) | +60 °C, 90 % to 95 %, 500 h, No-applied voltage | |
| | Capacitance change | Within +40 %, -20 % of the initial value |
| | tan δ | ≤ 1.5 times of the initial limit |
| | DC leakage current | ≤ 3 times of the initial limit |

Marking

| B1 Size | | D2 Size | | | |
|-------------------|-----|---------|------|------|----|
| | | | | | |
| R. Voltage (V.DC) | 6.3 | 8.0 | 10.0 | 12.5 | |
| Code | j | k | A | B | |
| B1 Size | | | | | |
| R. Cap. (µF) | 10 | 15 | 22 | 33 | 47 |
| Code | A7 | E7 | J7 | N7 | S7 |

Dimensions (not to scale)

| Size code | L±0.2 | W±0.2 | H±0.1 | S±0.2 | W1±0.1 |
|-----------|-------|-------|-------|-------|--------|
| B1 | 3.5 | 2.8 | 1.1 | 0.8 | 2.2 |
| D2 | 7.3 | 4.3 | 1.9 | 1.3 | 2.4 |

Unit : mm

* Externals of figure are the reference.

Characteristics list

| Series | Rated voltage (V.DC) | Rated temp. (°C) | Category voltage (V.DC) | Category temp. (°C) | Rated capacitance (µF) | Case size (mm) | | | Size code | Specifications | | | | Standard | |
|--------|----------------------|------------------|-------------------------|---------------------|------------------------|----------------|-----|-----|-----------|------------------------------|-----------------|----------|-----------|-------------|--------------------------|
| | | | | | | L | W | H | | Ripple*1 current (mA r.m.s.) | ESR*2 (mΩ max.) | tan δ*3 | LC*4 (µA) | Part number | Min. Packaging Qty (pcs) |
| TPC | 6.3 | 85 | 5.0 | 105 | 47 | 3.5 | 2.8 | 1.1 | B1 | 1100 | 55 | 0.10 | 29.6 | 6TPC47M | 3000 |
| | | 85 | 5.0 | 105 | | 3.5 | 2.8 | 1.1 | | 1000 | 70 | 0.10 | 29.6 | 6TPC47MB | 3000 |
| | | 105 | 6.3 | 105 | 100 | 7.3 | 4.3 | 1.9 | D2 | 1700 | 45 | 0.10 | 63.0 | 6TPC100M | 3000 |
| | | 105 | 6.3 | 105 | 150 | 7.3 | 4.3 | 1.9 | | 1900 | 40 | 0.10 | 94.5 | 6TPC150M | 3000 |
| | | 85 | 5.0 | 105 | 330 | 7.3 | 4.3 | 1.9 | | D2 | 1900 | 40 | 0.10 | 207.9 | 6TPC330MA |
| | 8.0 | 85 | 6.3 | 105 | 22 | 3.5 | 2.8 | 1.1 | B1 | 1000 | 70 | 0.10 | 17.6 | 8TPC22M | 3000 |
| | | 105 | 8.0 | 105 | 150 | 7.3 | 4.3 | 1.9 | D2 | 1900 | 40 | 0.10 | 120.0 | 8TPC150M | 3000 |
| | | 105 | 10.0 | 105 | 68 | 7.3 | 4.3 | 1.9 | D2 | 1700 | 45 | 0.10 | 68.0 | 10TPC68M | 3000 |
| | 10 | 105 | 10.0 | 105 | 100 | 7.3 | 4.3 | 1.9 | D2 | 1700 | 45 | 0.10 | 100.0 | 10TPC100M | 3000 |
| | | 85 | 10.0 | 105 | 10 | 3.5 | 2.8 | 1.1 | B1 | 800 | 80 | 0.10 | 12.5 | 12TPC10M | 3000 |
| 85 | 10.0 | 105 | 15 | 3.5 | 2.8 | 1.1 | B1 | 800 | 80 | 0.10 | 18.8 | 12TPC15M | 3000 | | |

*1 Ripple current (100 kHz/ +45 °C), *2 ESR (100 kHz/+20 °C) *3 tan δ (120 Hz/+20 °C) *4 After 5 minutes

◆ Please refer to each page in this catalog for "Reflow conditions" and "Taping specifications".

Surface Mount Type

POSCAP



Series : TH

Features

- Guaranteed at 125 °C, 1000h
- RoHS compliance, Halogen free

Specifications

| Size code | D2E | D2 | D3L | D4 |
|----------------------------|---|--|----------------------|----------------------|
| Category temperature range | -55 °C to +125 °C | | | |
| Rated voltage range | 2.5 V.DC to 6.3 V.DC | 2.5 V.DC to 10 V.DC | 4 V.DC to 6.3 V.DC | 6.3 V.DC to 10 V.DC |
| Category voltage range | 1.6 V.DC to 4.0 V.DC | 1.6 V.DC to 6.3 V.DC | 2.5 V.DC to 4.0 V.DC | 4.0 V.DC to 6.3 V.DC |
| Rated capacitance range | 150 μF to 330 μF | 68 μF to 220 μF | 220 μF to 330 μF | 220 μF to 470 μF |
| Capacitance tolerance | ±20 % (120 Hz / + 20 °C) | | | |
| Leakage current | Please see the attached characteristics list | | | |
| Dissipation factor (tan δ) | Please see the attached characteristics list | | | |
| Surge voltage (V.DC) | Rated voltage × 1.15 | | | |
| Endurance | +125 °C 1000h, category voltage applied | | | |
| | Capacitance change | Within ±20 % of the initial value | | |
| | tan δ | ≤ 2 times of the initial limit | | |
| | DC leakage current | ≤ 2 times of the initial limit | | |
| Damp heat (Steady State) | +60 °C, 90 % to 95 %, 500 h, No-applied voltage | | | |
| | Capacitance change | Within +40 %, -20 % of the initial value | | |
| | tan δ | ≤ 1.5 times of the initial limit | | |
| | DC leakage current | ≤ 3 times of the initial limit | | |

Marking

D2E, D3L Size

D2, D4 Size

| R. Voltage (V.DC) | 2.5 | 4.0 | 6.3 | 10 |
|-------------------|-----|-----|-----|----|
| Code | e | g | j | A |

Dimensions (not to scale)

Unit : mm

| Size code | L±0.3*1 | W±0.2 | H±0.1*2 | S±0.2 | W1±0.1 |
|-----------|---------|-------|---------|-------|--------|
| D2E | 7.3 | 4.3 | 1.8 | 1.3 | 2.4 |
| D2 | 7.3 | 4.3 | 1.9 | 1.3 | 2.4 |
| D3L | 7.3 | 4.3 | 2.8 | 1.3 | 2.4 |
| D4 | 7.3 | 4.3 | 3.8 | 1.3 | 2.4 |

* Externals of figure are the reference. * 1 ±0.2 : D2 * 2 ±0.2 : D3L, D4

Characteristics list

| Series | Rated voltage (V.DC) | Rated temp. (°C) | Category voltage (V.DC) | Category temp. (°C) | Rated capacitance (μF) | Case size (mm) | | | Size code | Specifications | | | | Standard | | | |
|--------|----------------------|------------------|-------------------------|---------------------|------------------------|----------------|-----|-----|-----------|----------------------|------------------|----------|------------|-------------|-------------------------|-------------|------|
| | | | | | | L | W | H | | Ripple *1 (mAr.m.s.) | ESR *2 (mΩ max.) | tan δ *3 | LC *4 (μA) | Part number | Mn. Packaging Qty (pcs) | | |
| THB | 4.0 | 105 | 2.5 | 125 | 330 | 7.3 | 4.3 | 2.8 | D3L | 2000 | 40 | 0.10 | 132.0 | 4THB330ML | 2500 | | |
| | | | | | | | | | | 2000 | 40 | 0.10 | 138.6 | 6THB220ML | 2500 | | |
| | 6.3 | 105 | 4.0 | 125 | 330 | 7.3 | 4.3 | 3.8 | | D4 | 3000 | 40 | 0.10 | 207.9 | 6THB330M | 2000 | |
| | | | | | | | | | | | 3000 | 35 | 0.10 | 296.1 | 6THB470M | 2000 | |
| | 10 | 105 | 6.3 | 125 | 220 | 7.3 | 4.3 | 3.8 | | | D2 | 3000 | 40 | 0.10 | 220.0 | 10THB220M | 2000 |
| | | | | | | | | | | | | 3000 | 35 | 0.10 | 330.0 | 10THB330M | 2000 |
| THC | 2.5 | 105 | 1.6 | 125 | 220 | 7.3 | 4.3 | 1.9 | D2E | | | 1700 | 45 | 0.10 | 55.0 | 2R5THC220M | 3000 |
| | | | | | | | | | | | | 1900 | 40 | 0.10 | 94.5 | 6THC150M | 3000 |
| | | | | | | | | | | 1700 | | 45 | 0.10 | 68.0 | 10THC68M | 3000 | |
| THE | 2.5 | 105 | 1.6 | 125 | 330 | 7.3 | 4.3 | 1.8 | | D2E | | 3100 | 15 | 0.10 | 82.5 | 2R5THE330MF | 3000 |
| | | | | | | | | | | | 2800 | 18 | 0.10 | 82.5 | 2R5THE330MI | 3000 | |
| | | | | | | | | | | | 2400 | 25 | 0.10 | 82.5 | 2R5THE330M | 3000 | |
| | 4.0 | 105 | 2.5 | 125 | 220 | 7.3 | 4.3 | 1.8 | D2E | | 3100 | 15 | 0.10 | 88.0 | 4THE220MF | 3000 | |
| | | | | | | | | | | | 2800 | 18 | 0.10 | 88.0 | 4THE220MI | 3000 | |
| | | | | | | | | | | | 2400 | 25 | 0.10 | 88.0 | 4THE220M | 3000 | |
| | 6.3 | 105 | 4.0 | 125 | 150 | 7.3 | 4.3 | 1.8 | | | D2E | 2800 | 18 | 0.10 | 94.5 | 6THE150MI | 3000 |
| | | | | | | | | | | | | 2400 | 25 | 0.10 | 94.5 | 6THE150M | 3000 |
| | | | | | | | | | | | | 2400 | 25 | 0.10 | 94.5 | 6THE150M | 3000 |

*1 Ripple current (100 kHz/ +45 °C), *2 ESR (100 kHz/+20 °C) *3 tan δ (120 Hz/+20 °C) *4 After 5 minutes

◆ Please refer to each page in this catalog for "Reflow conditions" and "Taping specifications".

Surface Mount Type

POSCAP

Series : TC



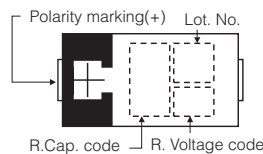
Features

- Guaranteed at 125 °C
- RoHS compliance, Halogen free

Specifications

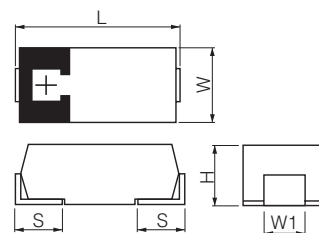
| Size code | D2E | D3L | D4 |
|----------------------------|--|---|-------------------|
| Category temperature range | -55 °C to +125 °C | | |
| Rated voltage range | 4 V.DC to 6.3 V.DC | 2.5 V.DC to 10 V.DC | |
| Category voltage range | 3.2 V.DC to 5.0 V.DC | 2.0 V.DC to 8.0 V.DC | |
| Rated capacitance range | 100 μF to 330 μF | 150 μF to 680 μF | 330 μF to 1000 μF |
| Capacitance tolerance | ±20 % (120 Hz / + 20 °C) | | |
| Leakage current | Please see the attached characteristics list | | |
| Dissipation factor (tan δ) | Please see the attached characteristics list | | |
| Surge voltage (V.DC) | Rated voltage × 1.15 | | |
| Endurance | +125 °C, 1000 h Category temperature range voltage applied | | |
| | Capacitance change | Within ±20 % of the initial value | |
| | tan δ | ≤ 2 times of the initial limit | |
| | DC leakage current | ≤ 2 times of the initial limit | |
| Damp heat (Steady State) | +60 °C, 90 % to 95 %, 500 h, No-applied voltage | | |
| | Capacitance change | Within +50 %, -20 % of the initial value (ETCF1000M6H (5H)) | |
| | tan δ | ≤ 1.5 times of the initial limit | |
| | DC leakage current | ≤ 3 times of the initial limit | |

Marking



| R. Voltage (VDC) | 2.5 | 4.0 | 6.3 | 10.0 |
|------------------|-----|-----|-----|------|
| Code | e | g | j | A |

Dimensions (not to scale)



Unit : mm

| Size code | L±0.3 | W±0.2 | H±0.2*1 | S±0.2 | W1±0.1 |
|-----------|-------|-------|---------|-------|--------|
| D2E | 7.3 | 4.3 | 1.8 | 1.3 | 2.4 |
| D3L | 7.3 | 4.3 | 2.8 | 1.3 | 2.4 |
| D4 | 7.3 | 4.3 | 3.8 | 1.3 | 2.4 |

* Externals of figure are the reference.
* 1 ±0.1 : D2E

Characteristics list

| Series | Rated voltage (V.DC) | Rated temp. (°C) | Category voltage (V.DC) | Category temp. (°C) | Rated capacitance (μF) | Case size (mm) | | | Size code | Specifications | | | | Standard | | |
|--------|----------------------|------------------|-------------------------|---------------------|------------------------|----------------|-----|------|-----------|---|-----------------------------|---------------------|-----------------------|-------------|--------------------------|------|
| | | | | | | L | W | H | | Ripple* ¹ current (mAr.m.s.) | ESR* ² (mΩ max.) | tan δ* ³ | LC* ⁴ (μA) | Part number | Min. Packaging Qty (pcs) | |
| TCE | 2.5 | 105 | 2.0 | 125 | 680 | 7.3 | 4.3 | 2.8 | D3L | 3500 | 12 | 0.10 | 170.0 | ETCE680MCL | 2500 | |
| | | 105 | 2.0 | 125 | | 7.3 | 4.3 | 2.8 | | 3100 | 15 | 0.10 | 170.0 | ETCE680MFL | 2500 | |
| | | 105 | 2.0 | 125 | 1000 | 7.3 | 4.3 | 3.8 | D4 | 3900 | 15 | 0.15 | 250.0 | ETCE1000MF | 2000 | |
| | 4 | 105 | 3.2 | 125 | 150 | 7.3 | 4.3 | 1.8 | D2E | 2800 | 18 | 0.10 | 60.0 | 4TCE150MI | 3000 | |
| | | 105 | 3.2 | 125 | | 7.3 | 4.3 | 1.8 | | 3100 | 15 | 0.10 | 88.0 | 4TCE220MF | 3000 | |
| | | 105 | 3.2 | 125 | 220 | 7.3 | 4.3 | 1.8 | D2E | 2800 | 18 | 0.10 | 88.0 | 4TCE220MI | 3000 | |
| | | 105 | 3.2 | 125 | | 7.3 | 4.3 | 1.8 | | 2400 | 25 | 0.10 | 88.0 | 4TCE220M | 3000 | |
| | | 105 | 3.2 | 125 | 330 | 7.3 | 4.3 | 1.8 | D2E | 2800 | 18 | 0.10 | 132.0 | 4TCE330MI | 3000 | |
| | | 105 | 3.2 | 125 | | 7.3 | 4.3 | 1.8 | | 2400 | 25 | 0.10 | 132.0 | 4TCE330M | 3000 | |
| | | 105 | 3.2 | 125 | 470 | 7.3 | 4.3 | 2.8 | D3L | 3500 | 12 | 0.10 | 188.0 | 4TCE470MCL | 2500 | |
| | | 105 | 3.2 | 125 | | 7.3 | 4.3 | 2.8 | | 3100 | 15 | 0.10 | 188.0 | 4TCE470MFL | 2500 | |
| | | 105 | 3.2 | 125 | | 7.3 | 4.3 | 2.8 | | 2800 | 18 | 0.10 | 188.0 | 4TCE470MIL | 2500 | |
| | | 6.3 | 105 | 3.2 | 125 | 100 | 7.3 | 4.3 | 1.8 | D2E | 2400 | 25 | 0.10 | 63.0 | 6TCE100MI | 3000 |
| | | | 105 | 5.0 | 125 | | 7.3 | 4.3 | 1.8 | | 2800 | 18 | 0.10 | 63.0 | 6TCE100M | 3000 |
| | 105 | | 5.0 | 125 | 150 | 7.3 | 4.3 | 1.8 | D2E | 3100 | 15 | 0.10 | 94.5 | 6TCE150MF | 3000 | |
| | 105 | | 5.0 | 125 | | 7.3 | 4.3 | 1.8 | | 2800 | 18 | 0.10 | 94.5 | 6TCE150MI | 3000 | |
| | 105 | | 5.0 | 125 | 220 | 7.3 | 4.3 | 1.8 | D2E | 2400 | 25 | 0.15 | 94.5 | 6TCE150M | 3000 | |
| | 105 | | 5.0 | 125 | | 7.3 | 4.3 | 1.8 | | 2800 | 18 | 0.15 | 138.6 | 6TCE220MI | 3000 | |
| | 105 | | 5.0 | 125 | 220 | 7.3 | 4.3 | 1.8 | D2E | 2400 | 25 | 0.15 | 138.6 | 6TCE220M | 3000 | |
| | 105 | | 5.0 | 125 | | 7.3 | 4.3 | 2.8 | | D3L | 3100 | 15 | 0.10 | 207.9 | 6TCE330MFL | 2500 |
| | 105 | | 5.0 | 125 | 330 | 7.3 | 4.3 | 2.8 | D3L | | 2800 | 18 | 0.10 | 207.9 | 6TCE330MIL | 2500 |
| | 105 | | 5.0 | 125 | | 7.3 | 4.3 | 2.8 | | D4 | 2400 | 25 | 0.10 | 207.9 | 6TCE330ML | 2500 |
| | 105 | | 5.0 | 125 | 470 | 7.3 | 4.3 | 3.8 | D4 | | 3500 | 18 | 0.15 | 296.1 | 6TCE470MI | 2000 |
| | 105 | | 5.0 | 125 | | 7.3 | 4.3 | 3.8 | | D4 | 3000 | 25 | 0.15 | 296.1 | 6TCE470M | 2000 |
| 105 | 5.0 | | 125 | 680 | 7.3 | 4.3 | 3.8 | D4 | 3500 | | 18 | 0.15 | 428.4 | 6TCE680MI | 2000 | |
| 105 | 5.0 | | 125 | | 7.3 | 4.3 | 3.8 | | 3000 | 25 | 0.15 | 428.4 | 6TCE680M | 2000 | | |
| 10 | 105 | | 8.0 | 125 | 220 | 7.3 | 4.3 | 2.8 | D3L | 2800 | 18 | 0.10 | 220.0 | 10TCE220MIL | 2500 | |
| | 105 | 8.0 | 125 | 7.3 | | 4.3 | 2.8 | 2400 | | 25 | 0.10 | 220.0 | 10TCE220ML | 2500 | | |
| | 105 | 8.0 | 125 | 330 | 7.3 | 4.3 | 3.8 | D4 | 3000 | 25 | 0.10 | 330.0 | 10TCE330M | 2000 | | |
| TCF | 2.5 | 105 | 2.0 | 125 | 680 | 7.3 | 4.3 | 2.8 | D3L | 4400 | 6 | 0.10 | 170.0 | ETCF680M6L | 2500 | |
| | | 105 | 2.0 | 125 | | 7.3 | 4.3 | 2.8 | | 4400 | 7 | 0.10 | 170.0 | ETCF680M7L | 2500 | |
| | | 105 | 2.0 | 125 | | 7.3 | 4.3 | 2.8 | | 4400 | 10 | 0.10 | 170.0 | ETCF680ML | 2500 | |
| | | 105 | 2.0 | 125 | 1000 | 7.3 | 4.3 | 3.8 | D4 | 6100 | 5 | 0.10 | 170.0 | ETCF680M5H | 2000 | |
| | | 105 | 2.0 | 125 | | 7.3 | 4.3 | 3.8 | | 6100 | 5 | 0.10 | 250.0 | ETCF1000M5H | 2000 | |
| | | 105 | 2.0 | 125 | | 7.3 | 4.3 | 3.8 | | 5600 | 6 | 0.10 | 250.0 | ETCF1000M6H | 2000 | |
| | 4 | 105 | 3.2 | 125 | 330 | 7.3 | 4.3 | 2.8 | D3L | 4000 | 12 | 0.10 | 132.0 | 4TCF330ML | 2500 | |
| | | 105 | 3.2 | 125 | 470 | 7.3 | 4.3 | 2.8 | | 4400 | 10 | 0.10 | 188.0 | 4TCF470ML | 2500 | |
| | | 105 | 3.2 | 125 | 680 | 7.3 | 4.3 | 3.8 | | D4 | 4400 | 10 | 0.10 | 272.0 | 4TCF680MAH | 2000 |
| | 6.3 | 105 | 5.0 | 125 | 220 | 7.3 | 4.3 | 2.8 | D3L | 6100 | 5 | 0.10 | 138.6 | 6TCF220M5L | 2500 | |
| | | 105 | 5.0 | 125 | | 7.3 | 4.3 | 2.8 | | 4600 | 9 | 0.10 | 138.6 | 6TCF220M9L | 2500 | |
| | | 105 | 5.0 | 125 | 330 | 7.3 | 4.3 | 2.8 | D3L | 4000 | 12 | 0.10 | 138.6 | 6TCF220ML | 2500 | |
| | | 105 | 5.0 | 125 | | 7.3 | 4.3 | 2.8 | | 3900 | 9 | 0.10 | 207.9 | 6TCF330M9L | 2500 | |
| | 105 | 5.0 | 125 | 470 | 7.3 | 4.3 | 3.8 | D4 | 4400 | 10 | 0.10 | 296.1 | 6TCF470MAH | 2000 | | |
| | 10 | 105 | 10.0 | 125 | 150 | 7.3 | 4.3 | 2.8 | D3L | 3600 | 15 | 0.10 | 150.0 | 10TCF150ML | 2500 | |

*1 Ripple current (100 kHz/ +45 °C), *2 ESR (100 kHz/+20 °C) *3 tan δ (120 Hz/+20 °C) *4 After 5 minutes

◆ Please refer to each page in this catalog for "Reflow conditions" and "Taping specifications".

Deletion models

The following table is a list of our items which have been deleted from our catalogs. If you are using any of the following models on the deleted list, please substitute them with the suggested alternative model as soon as possible. Our company continue to supply them to customers who have already used them, for the time being.

| Series | Size code | Models for deletion | Year of deletion | Alternative model | Series | Size code | Models for deletion | Year of deletion | Alternative model | | |
|-----------|------------|---------------------|------------------|-------------------|--------|--------------|---------------------|------------------|-------------------|-----------|-----------|
| TPB | B2 | 8TPB47M | 2009 | 10TPB47M | TPE | D3L | 2R5TPE680ML | 2012 | 2R5TPE680MFL | | |
| | | 6TPB100MA | 2009 | 6TPE100MAZB | | | 2R5TPE680MIL | 2011 | 2R5TPE680MFL | | |
| | | 6TPB100MAV | 2009 | 6TPE100MAZB | | D4 | 4TPE680M | 2011 | 6TPE680MI | | |
| | | 6TPB47M | 2009 | 6TPC47MB | | | 4TPE680MI | 2012 | 6TPE680MI | | |
| | | 4TPB100M | 2009 | 4TPE100MZB | | | 4TPE680MF | 2012 | 4TPF680MAH | | |
| | | 2R5TPB220MA | 2009 | 2R5TPE220MZB | | | 2R5TPE1000M | 2011 | 2R5TPE1000MF | | |
| | | 2R5TPB100M | 2012 | 4TPE100MZB | | | 2R5TPE1000MI | 2012 | 2R5TPE1000MF | | |
| | D3L | 10TPB100ML | 2010 | 10TPC100M | | D3L | 6TPF330M5EL | 2014 | - | | |
| | | 6TPB150ML | 2009 | 6TPC150M | | | 4TPF470M5EL | 2014 | - | | |
| | | 4TPB470ML | 2009 | 4TPE470ML | | TPG | B1G | 10TPG33M | 2011 | 10TPC33MB | |
| | | 4TPB220ML | 2009 | 4TPE220M | | | B15G | 6TPG220MZG | 2014 | - | |
| | | 2R5TPB330ML | 2009 | 2R5TPE330M | | TPL | D12T | All models | 2013 | - | |
| | D3 | 10TPB100M | 2008 | 10TPC100M | | | D15T | All models | 2013 | - | |
| | | 6TPB150M | 2008 | 6TPC150M | | | D2T | All models | 2013 | - | |
| | | 4TPB220M | 2008 | 4TPE220M | | TPLF | D2T | All models | 2013 | - | |
| | D4 | 4TPB680M | 2009 | 6TPE680MI | | TPSF | B1S | ETPSF200M9ED | 2014 | - | |
| | | 4TPB470M | 2009 | 4TPE470ML | | | B2S | 11TPSF62MAIG | 2012 | - | |
| | | 2R5TPB1000M | 2009 | 2R5TPE1000MF | | TPH | A14 | ETPH220MAZC | 2013 | - | |
| | | 2R5TPB680M | 2009 | 2R5TPE680MFL | | | TPU | S09 | 2R5TPU22MSI | 2011 | 6TPU22MSI |
| | TPC | B1 | 10TPC33MB | 2013 | | 12TPG33M | | | 4TPU15MSI | 2011 | 6TPU22MSI |
| | | | 6TPC33M | 2012 | | 6TPC47MB | | | 4TPU33MSI | 2011 | 6TPU47MSI |
| 4TPC47M | | | 2012 | 6TPC47MB | S11 | 6TPU33MSK | | 2013 | 6TPU47MSI | | |
| 2R5TPC56M | | | 2012 | 6TPB68M | | 4TPU47MSK | | 2013 | 6TPU47MSI | | |
| 4TPC220M | | 2009 | 4TPE220M | 2R5TPU68MSK | | 2013 | | 4TPU68MSI | | | |
| D2 | | 4TPC150M | 2009 | 4TPE150MI | A09 | 10TPU33MAI | | 2011 | ATPH33MAHA | | |
| | | 2R5TPC330M | 2009 | 2R5TPE330M | | 6TPU47MAI | | 2011 | 6TPH47MHA | | |
| | 6TPE100MZB | 2011 | 6TPE100MPB | 4TPU68MAI | | 2011 | | 4TPH68MHA | | | |
| TPE | B2 | 4TPE150MUB | 2013 | 4TPE150MAZB | | 2R5TPU100MAI | | 2011 | ETPH100MHA | | |
| | | 2R5TPE220MIB | 2012 | 2R5TPE220MFGB | TH | D2 | 4THC220M | 2013 | 4THE220M | | |
| | | 2R5TPE220MDGB | 2013 | 2R5TPE220MFGB | | D3L | 10THB100ML | 2010 | - | | |
| | | 2R5TPE150MZB | 2011 | 2R5TPE220MZB | | | 2R5THB330ML | 2010 | - | | |
| | | 2TPE330MIB | 2011 | 2TPE330MFB | D4 | 4THB680M | 2013 | - | | | |
| | | 2TPE330MAFGB | 2011 | 2TPE330MAFB | TQC | C | 25TQC10M | 2011 | 25TQC15MYFD | | |
| | D2E | 4TPE150M | 2011 | 4TPE150MI | | | 20TQC15M | 2011 | 25TQC15MYFD | | |
| | | 2R5TPE470M | 2011 | 2R5TPE470MI | | | 16TQC22M | 2011 | 25TQC22MYFD | | |
| | | 2TPE470M9 | 2011 | 2R5TPE470M9 | | 25TQC15M | 2012 | 25TQC15MYFD | | | |
| | | 2TPE470M7 | 2011 | 2R5TPE470M7 | | 25TQC22M | 2012 | 25TQC22MYFD | | | |
| | | 2TPE470M6 | 2011 | 2R5TPF470M6L | | 20TQC22M | 2012 | 25TQC22MYFD | | | |
| | | 2TPE330M9 | 2011 | 2R5TPE330M9 | | 20TQC22MYFD | 2015 | 25TQC22MYFD | | | |
| | | 2TPE330M7 | 2011 | 2R5TPE330M7 | | 20TQC47MY | 2012 | 20TQC47MYF | | | |
| | | 2TPE330M6 | 2011 | 2TPF330M6 | | 16TQC33M | 2012 | 16TQC33MYFD | | | |
| | | 2R5TPE220MC | 2012 | 2R5TPE220M9 | | 16TQC47M | 2012 | 16TQC47MYFD | | | |
| | | 2R5TPE220M7 | 2012 | 2R5TPE330M7 | | 16TQC68MY | 2012 | 16TQC68MYF | | | |
| D2E | 25TQC33M | 2012 | 25TQC33MYF | D3L | | 20TQC47M | 2012 | 20TQC47MYF | | | |
| | 20TQC15M | 2011 | 25TQC15MYFD | | | 16TQC68M | 2012 | 16TQC68MYF | | | |
| | 16TQC22M | 2011 | 25TQC22MYFD | | | D3 | 16TQC100M | 2012 | 16TQC100MYF | | |

EOL models

The following table is a list of the End-Of-Life (EOL) models.

Sales of these items will end as soon as we run out of its stock.

We would like to express our appreciation for your business over the years with these products and we hope the new, alternative parts will continue to serve your needs.

Thank you very much.

| Series | Size code | Models for deletion | Year of deletion | Alternative model | Series | Size code | Models for deletion | Year of deletion | Alternative model |
|-------------|--------------|---------------------|------------------|-------------------|------------|---------------|---------------------|------------------|-------------------|
| TPA | C | 10TPA33M | 2012/9 | 10TPB33M | TPE | B2 | 2R5TPE220MPB | 2012/9 | 2R5TPE220MLB |
| | | 6TPA47M | 2012/9 | 10TPB47M | | | 8TPE100MPC2 | 2012/9 | 10TPF150ML |
| | D3 | 10TPA100M | 2012/9 | 10TPC100M | | | 6TPE150MPC2 | 2012/9 | 6TPE150M |
| | | 6TPA150M | 2012/9 | 6TPC150M | | | 6TPE150MIC2 | 2012/9 | 6TPE150MI |
| | | 4TPA220M | 2012/9 | 4TPE220M | | | 4TPE220MPC2 | 2012/9 | 4TPE220MI |
| TPB | B2 | 8TPB33M | 2012/9 | 10TPB33M | | | 4TPE220MIC2 | 2012/9 | 4TPE220MI |
| | | 4TPB150MA | 2012/9 | 4TPE150MAZB | | | 4TPE220MFC2 | 2012/9 | 4TPE220MF |
| | | 4TPB100MV | 2012/9 | 4TPE100MZB | | | 2R5TPE330MIC2 | 2012/9 | 2R5TPE330MF |
| | C | 10TPB220MC | 2009/10 | - | | | 2R5TPE330MFC2 | 2012/9 | 2R5TPE330MF |
| | | 10TPB68MC | 2012/9 | 10TPC68M | | | 2R5TPE330MCC2 | 2012/9 | 2R5TPE330MC |
| | | 10TPB47MC | 2012/9 | 10TPC68M | | 2R5TPE330M9C2 | 2012/9 | 2R5TPE330M9 | |
| | | 8TPB82MC | 2012/9 | 8TPE100MAZB | | C3 | 10TPE180MGC | 2012/9 | 10TPE220ML |
| | | 6TPB150MC | 2012/9 | 6TPE150M | | | 10TPE150MGC | 2012/9 | 10TPE220ML |
| | | 6TPB100MC | 2012/9 | 6TPG100MG | | | 6TPE220MPC | 2012/9 | 6TPE220M |
| | | 4TPB220MC | 2012/9 | 4TPE220MI | | | 6TPE220MIC | 2012/9 | 6TPE220MI |
| 4TPB150MC | 2012/9 | 6TPE150M | 6TPE150MPC | 2012/9 | 6TPE150M | | | | |
| 2R5TPB220MC | 2012/9 | 4TPE220MI | 4TPE220MPC | 2012/9 | 4TPE220MI | | | | |
| D3L | 16TPB47ML | 2003/6 | 16TQC47MYFD | 4TPE220MIC | 2012/9 | | 4TPE220MI | | |
| | 2R5TPB680ML | 2012/9 | 2R5TPE680MFL | 2R5TPE330MPC | 2012/9 | | 2R5TPE330MF | | |
| | 2R5TPB470ML | 2012/9 | 2R5TPE470MI | 2R5TPE330MIC | 2012/9 | | 2R5TPE330MF | | |
| D3 | 16TPB47M | 2003/6 | 16TQC47MYFD | 2R5TPE330MFC | 2012/9 | | 2R5TPE330MF | | |
| | 2R5TPB330M | 2012/9 | 2R5TPE330M | TPF | D2E | 2TPF470M6 | 2012/9 | 2R5TPF470M6L | |
| TPC | C1 | 8TPC33M | 2012/9 | 12TPG33M | TPG | B1G | 6TPG68MG | 2012/9 | 6TPG100M |
| | | 6TPC100MC | 2012/9 | 6TPG100MG | 4TPG150M | | 2012/9 | 6TPG150M | |
| | | 6TPC68M | 2012/9 | 6TPG100MG | TPL | D2T | 2R5TPL330M7 | 2011/7 | - |
| | | 4TPC100M | 2012/9 | 6TPG100MG | | | 2R5TPL220MC | 2012/9 | - |
| | | 4TPC56M | 2012/9 | - | TPLF | D2T | 2TPLF560M6 | 2011/7 | - |
| | | 2R5TPC82M | 2012/9 | - | | | 2TPLF470M7 | 2012/9 | - |
| | D2 | 16TPC33M | 2003/6 | 16TQC33MYFD | TPSF | B2S | 2TPSF270MC | 2012/9 | 2TPSF270M9G |
| | | 2R5TPC220M | 2012/9 | 2R5TPE220M | | | 2TPSF270M9 | 2012/9 | 2TPSF270M9G |
| TPD | D4D | 10TPD150M | 2007/10 | 10TPF150ML | TPU | S08 | 6TPU10M | 2012/9 | 6TPU10MSI |
| | | 6TPD470M | 2012/3 | 6TPF470MAH | | | 4TPU15M | 2012/9 | 6TPU22MSI |
| | | 6TPD330M | 2007/10 | 6TPF330M9L | | | 2R5TPU22M | 2012/9 | 6TPU22MSI |
| | | 6TPD220M | 2007/10 | 6TPF220ML | | S11 | 6TPU22MSK | 2012/9 | 6TPU22MSI |
| | | 4TPD680M | 2012/3 | 4TPF680MAH | | | 4TPU33MSK | 2012/9 | 6TPU47MSI |
| | | 4TPD470M | 2007/10 | 4TPF470ML | | 2R5TPU47MSK | 2012/9 | 2R5TPU47MSI | |
| | | 4TPD330M | 2007/10 | 4TPF330ML | | B09 | 8TPU33MBI | 2012/9 | ATPH33MAHA |
| | | 2R5TPD1000M | 2012/3 | ETPF1000M6H | | | 6TPU47MBI | 2012/9 | 6TPH47MHA |
| | | 2R5TPD1000M8 | 2012/3 | ETPF1000M6H | | 4TPU68MBI | 2012/9 | 4TPH68MHA | |
| | | 2R5TPD1000M6 | 2012/3 | ETPF1000M6H | | TH | D3L | 2R5THB470ML | 2012/9 |
| | 2R5TPD1000M5 | 2012/3 | ETPF1000M5H | 2R5THB1000M | 2012/9 | | | - | |
| | 2R5TPD680M | 2007/10 | 2R5TPF680ML | D4 | 2R5THB680M | | 2012/9 | - | |
| | 2R5TPD680M8 | 2007/10 | 2R5TPF680M7L | | 6THD330M | | 2012/3 | 6TPF330M9L | |
| | 2R5TPD680M6 | 2012/3 | 2R5TPF680M6L | D4D | 4THD470M | | 2012/9 | - | |
| | 2R5TPD680M5 | 2012/3 | ETPF680M5H | | 2R5THD680M | | 2012/3 | 2R5TPF680M6L | |
| | 2R5TPD470M | 2007/10 | 2R5TPF470ML | TR | | | TR series | - | TA series |
| | 2R5TPD470M8 | 2007/10 | 2R5TPF470M7L | APA | D2A | | APA series | 2006/4 | - |
| | 2R5TPD470M6 | 2012/3 | 2R5TPF470M6L | APB | D1 | APB series | 2006/4 | - | |
| | 2R5TPD470M5 | 2012/3 | ETPF470M5H | APC | D2 | APC series | 2009/6 | - | |
| | | | | APD | D1 | APD series | 2009/6 | - | |

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