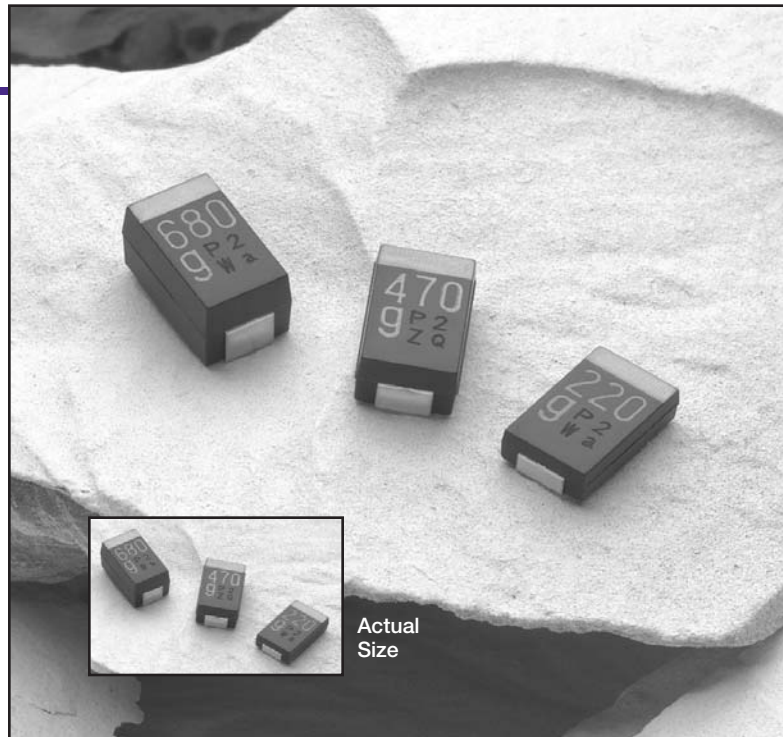


- **Tantalum Solid Functional Polymer Chip**
- **65% Lower ESR Than Polymer PT Series**
- **Lead-Free Construction**
- **+105°C Maximum Temperature**



The PTB series is a tantalum electrolytic chip capacitor series that is designed with a solid functional polymer as the electrolyte and constructed of lead-free non-combustible materials. These PTB chips, which are enhanced versions of the polymer PT series, offer 65% lower ESR than the polymer PT series and also allow higher ripple current submission. The PTB chips provide stable electrical parameters and high reliability over a rated life of 1,000 hours at +105°C. The PTB series capacitors can withstand high temperature lead-free alloy melting points over 230°C for 40 seconds max. during reflow soldering. Target applications include DC-DC converters, voltage regulators and decoupling applications where very low ESR at high frequency is required.

The PTB series capacitors are solvent proof. Refer to the Mini-Glossary for cleaning guidelines and recommended cleaning agents that are compatible with United Chemi-Con products.

Summary of Specifications

- **Surface mount lead terminals.**
- **Capacitance range: 47 to 1,000µF.**
- **Voltage range: 2.5 to 10VDC.**
- **Category temperature range: -55°C to +105°C.**
- **Standard capacitance tolerance: ±20%**
- **Nominal case size (L×W×H): 3.5×2.8×1.9mm to 7.3×4.3×3.8mm.**
- **Rated lifetime: 1,000 hours at +105°C.**

PTB Specifications

Item	Characteristics																		
Category Temperature Range	-55 to +105°C																		
Rated Voltage Range	2.5 to 10VDC																		
Capacitance Range	47 to 1,000μF																		
Capacitance Tolerance	± 20% (M) at +20°C, 120Hz																		
Leakage Current	I = 0.1CV maximum after 5 minutes at +20°C. Where I = Max. leakage current (μA), C = Nominal capacitance (μF) and V = Rated voltage (V)																		
Dissipation Factor (Tan δ)	At +20°C, 120Hz <table border="1" style="margin-left: 20px;"> <tr> <td>Case Code</td> <td>D4L & D6</td> <td>D8</td> </tr> <tr> <td>Max. Tan δ (DF)</td> <td>0.08</td> <td>0.10</td> </tr> </table>	Case Code	D4L & D6	D8	Max. Tan δ (DF)	0.08	0.10												
Case Code	D4L & D6	D8																	
Max. Tan δ (DF)	0.08	0.10																	
Temperature Characteristics	At 120Hz, the change in electrical performance at -55°C, +85°C or +105°C compared to the initial measured value at +20°C shall not exceed the values given below. <table border="1" style="margin-left: 20px;"> <tr> <td>Temperature</td> <td>-55°C</td> <td>+85°C</td> <td>+105°C</td> </tr> <tr> <td>Capacitance Change</td> <td>-15 to 0%</td> <td>0 to +20%</td> <td>0 to +30%</td> </tr> <tr> <td>Max. Tan δ (DF)</td> <td>≤ initial specified value</td> <td>≤ 150% of initial specified value</td> <td>≤ 150% of initial specified value</td> </tr> <tr> <td>Leakage Current</td> <td>—</td> <td>≤ 1.0CV (μA)</td> <td>≤ 1.0CV (μA)</td> </tr> </table>	Temperature	-55°C	+85°C	+105°C	Capacitance Change	-15 to 0%	0 to +20%	0 to +30%	Max. Tan δ (DF)	≤ initial specified value	≤ 150% of initial specified value	≤ 150% of initial specified value	Leakage Current	—	≤ 1.0CV (μA)	≤ 1.0CV (μA)		
Temperature	-55°C	+85°C	+105°C																
Capacitance Change	-15 to 0%	0 to +20%	0 to +30%																
Max. Tan δ (DF)	≤ initial specified value	≤ 150% of initial specified value	≤ 150% of initial specified value																
Leakage Current	—	≤ 1.0CV (μA)	≤ 1.0CV (μA)																
Rated Ripple Current Multipliers.	Ambient Temperature (°C) <table border="1" style="margin-left: 20px;"> <tr> <td>+45°C</td> <td>+65°C</td> <td>+85°C</td> <td>+105°C</td> </tr> <tr> <td>1.00</td> <td>0.75</td> <td>0.60</td> <td>0.40</td> </tr> </table> Frequency (kHz) <table border="1" style="margin-left: 20px;"> <tr> <td>10kHz</td> <td>40kHz</td> <td>100kHz</td> <td>400kHz</td> <td>500kHz</td> </tr> <tr> <td>0.25</td> <td>0.95</td> <td>1.00</td> <td>1.15</td> <td>1.25</td> </tr> </table>	+45°C	+65°C	+85°C	+105°C	1.00	0.75	0.60	0.40	10kHz	40kHz	100kHz	400kHz	500kHz	0.25	0.95	1.00	1.15	1.25
+45°C	+65°C	+85°C	+105°C																
1.00	0.75	0.60	0.40																
10kHz	40kHz	100kHz	400kHz	500kHz															
0.25	0.95	1.00	1.15	1.25															
Soldering Heat Resistance	The following specifications shall be satisfied when the capacitors are restored to +20°C after subjecting them to reflow soldering conditions of 40 seconds max. over 230°C with a 250°C max. peak temperature. Capacitance change : ≤ ±10% of initial measured value Tan δ (DF) : ≤ 200% of initial specified value Leakage current : ≤ 300% of initial specified value																		
Humidity Test	The following specifications shall be satisfied when the capacitors are restored to +20°C after exposing them for 500 hours at +60°C, 90-95% RH without voltage applied. Capacitance change : ≤ -20% to +30% of initial measured value Tan δ (DF) : ≤ 150% of initial specified value Leakage current : ≤ 300% of initial specified value																		
Surge Voltage	The following specifications shall be satisfied when the capacitors are restored to +20°C after applying the specified surge voltage at +85°C for 1,000 cycles (1 cycle = 30 seconds charge through a 33Ω protective resistor and 5 minutes and 30 seconds discharge). Capacitance change : ≤ ±20% of initial measured value Tan δ (DF) : ≤ initial specified value Leakage current : ≤ initial specified value																		
Endurance (Load Life)	The following specifications shall be satisfied when the capacitors are restored to +20°C after applying the DC rated voltage for 1,000 hours at +105°C. (8V category voltage shall be applied for the capacitors with a rated voltage of 10V.) Capacitance change : ≤ ±20% of initial measured value Tan δ (DF) : ≤ 150% of initial specified value Leakage current : initial specified value																		

Diagram of Dimensions

Polymer Tantalum Chips Unit: mm

Case Dimensions

Case Code	L	W	H	a	b
B2	3.5±0.2	2.8±0.2	1.9±0.1	0.8±0.2	2.2±0.2
D4L	7.3±0.2	4.3±0.2	1.8±0.1	1.3±0.2	2.4±0.2
D6	7.3±0.2	4.3±0.2	2.8±0.2	1.3±0.2	2.4±0.2
D8	7.3±0.2	4.3±0.2	3.8±0.2	1.3±0.2	2.4±0.2

Marking Codes

Rated Voltage	Code All Cases
2.5V	e
4V	g
6.3V	j
10V	A

Marking Example 4V, 470µF

Recommended Reflow Soldering Conditions

Temperature Profile for Air or Infrared Reflow Soldering Methods

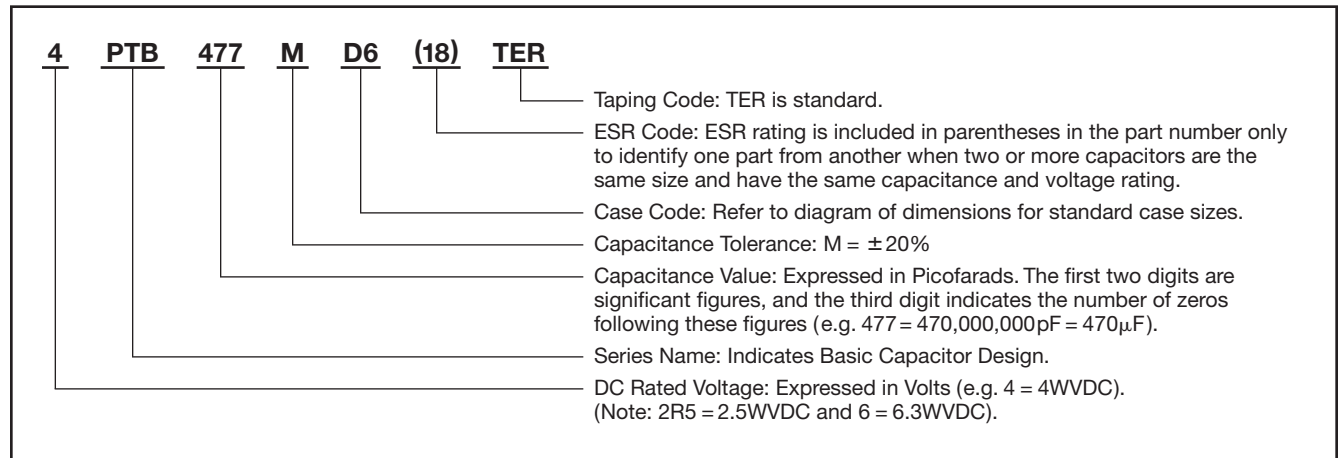
Recommended time and temperature for soldering conditions is specified for the surface and terminal temperature of the polymer tantalum chip capacitors.

Time and Temperature Ranges

Reflow Conditions		Case Code B2, D4L, D6, D8
Preheat	Max. Time	120 seconds
	Temperature	150°C
Reflow	Max. Time Over 200°C	60 seconds
	Max. Time Over 230°C	40 seconds
	Max. Peak Temperature	250°C

Part Numbering System for PTB Series

When ordering, always specify complete catalog number for PTB Series.



Standard Voltage Ratings - Polymer Tantalum Chips

Rated Voltage (WVDC)	Category Voltage at > +85°C (WVDC)	Capacitance (μF)	Catalog Part Number	Nominal Case Size* L×W×H (mm)	Case Code	Maximum ESR (mΩ) at +20°C, 100kHz	Rated Ripple Current (mA rms) at +45°C, 100kHz
2.5 Volts 3.2 Volts Surge	—	150	2R5PTB157MB2TER	3.5 × 2.8 × 1.9	B2	45	1,400
	—	330	2R5PTB337MD4LTER	7.3 × 4.3 × 1.8	D4L	25	2,400
	—	330	2R5PTB337MD4L(18)TER	7.3 × 4.3 × 1.8	D4L	18	2,800
	—	330	2R5PTB337MD4L(15)TER	7.3 × 4.3 × 1.8	D4L	15	3,100
	—	680	2R5PTB687MD6TER	7.3 × 4.3 × 2.8	D6	25	2,600
	—	680	2R5PTB687MD6(18)TER	7.3 × 4.3 × 2.8	D6	18	2,800
	—	1,000	2R5PTB108MD8TER	7.3 × 4.3 × 3.8	D8	25	3,000
4 Volts 5.2 Volts Surge	—	100	4PTB107MB2TER	3.5 × 2.8 × 1.9	B2	45	1,400
	—	220	4PTB227MD4LTER	7.3 × 4.3 × 1.8	D4L	25	2,400
	—	220	4PTB227MD4L(18)TER	7.3 × 4.3 × 1.8	D4L	18	2,800
	—	220	4PTB227MD4L(15)TER	7.3 × 4.3 × 1.8	D4L	15	3,100
	—	470	4PTB477MD6TER	7.3 × 4.3 × 2.8	D6	25	2,600
	—	470	4PTB477MD6(18)TER	7.3 × 4.3 × 2.8	D6	18	2,800
	—	680	4PTB687MD8TER	7.3 × 4.3 × 3.8	D8	25	3,000
6.3 Volts 8 Volts Surge	—	68	6PTB686MB2TER	3.5 × 2.8 × 1.9	B2	45	1,400
	—	150	6PTB157MD4LTER	7.3 × 4.3 × 1.8	D4L	25	2,400
	—	150	6PTB157MD4L(18)TER	7.3 × 4.3 × 1.8	D4L	18	2,800
	—	330	6PTB337MD6TER	7.3 × 4.3 × 2.8	D6	25	2,600
	—	470	6PTB477MD8TER	7.3 × 4.3 × 3.8	D8	25	3,000
10 Volts 13 Volts Surge	8	47	10PTB476MB2TER	3.5 × 2.8 × 1.9	B2	70	1,100
	8	100	10PTB107MD4LTER	7.3 × 4.3 × 1.8	D4L	25	2,400
	8	220	10PTB227MD6TER	7.3 × 4.3 × 2.8	D6	25	2,600

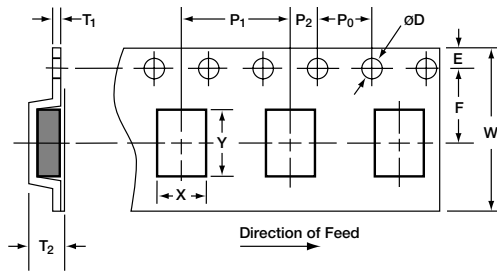
*Refer to diagram for detailed case size dimensions.

Tape and Reel Specifications

Polymer Tantalum Chips

Unit: mm

Taping

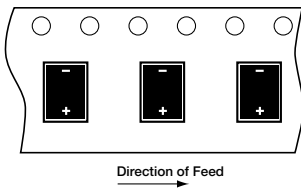


Taping Dimensions

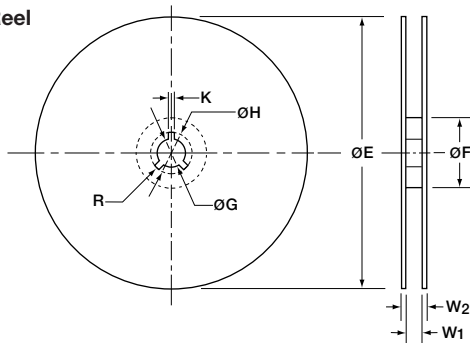
Dimension	Case Code			
	B2	D4L	D6	D8
$X \pm 0.1$	3.1	4.8 ± 0.2	4.8 ± 0.2	4.8 ± 0.2
$Y \pm 0.1$	3.8	7.7 ± 0.2	7.7 ± 0.2	7.7 ± 0.2
$W \pm 0.3$	8.0	12.0	12.0	12.0
$E \pm 0.1$	1.75	1.75	1.75	1.75
$F \pm 0.05$	3.5	5.5	5.5	5.5
$P_1 \pm 0.1$	4.0	8.0	8.0	8.0
$P_2 \pm 0.05$	2.0	2.0	2.0	2.0
$P_0 \pm 0.1$	4.0	4.0	4.0	4.0
$\phi D \pm 0.1, -0$	1.5	1.5	1.5	1.5
T_1	0.2 to 0.3	0.2 to 0.3	0.2 to 0.3	0.4
$T_2 \pm 0.2$	2.2	2.5	3.6	4.6

Orientation of Component Polarity

Taping Code: TER (standard)



Reel



Reel Dimensions and Quantity Per Reel

Dimension	Case Code			
	B2	D4L	D6	D8
$\phi E + 0, -3.0$	180	180	180	180
$\phi F + 1.0, -0$	60	60	60	60
$\phi G \pm 0.2$	13	13	13	13
$\phi H \pm 0.8$	21	21	21	21
$K \pm 0.5$	2	2	2	2
$W_1 \pm 0.3$	9	13	13	13
$W_2 \pm 1.0$	11.4	15.4	15.4	15.4
R	1.0	1.0	1.0	1.0
Pieces Per Reel	2,000	500	500	500