



# Soldering Guidelines for Film Capacitors

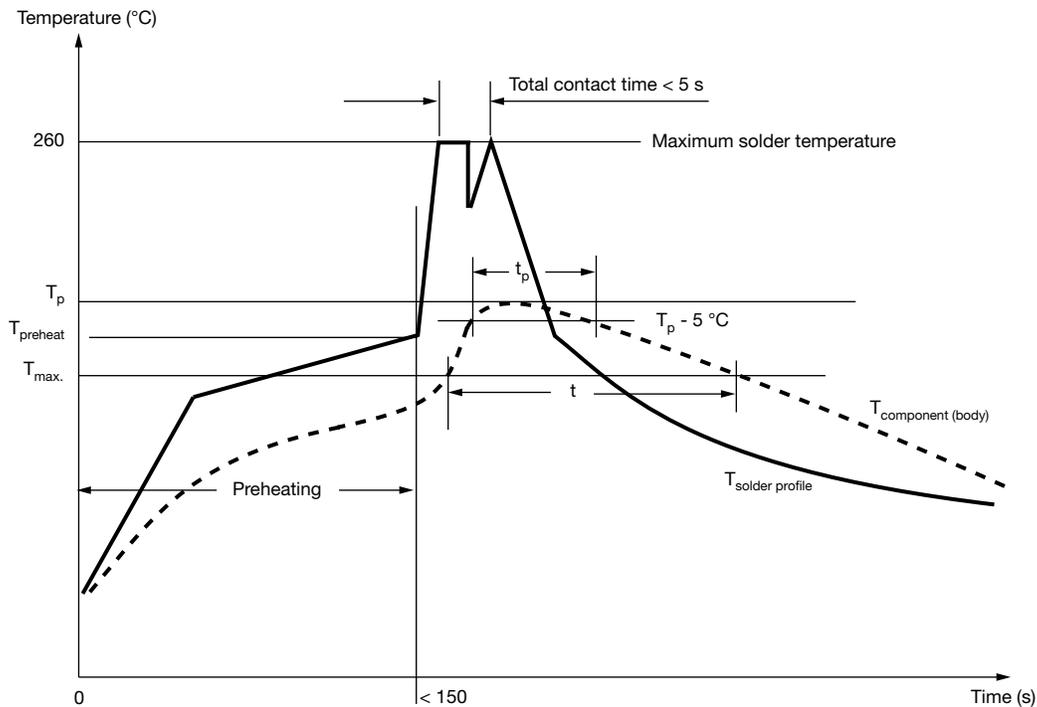
Vishay recommends that users observe the following guidelines for soldering our film capacitors. Adherence to these recommendations will help to safeguard product specifications and reliability while preventing damage to the capacitors during soldering.

Reflow soldering process should not be attempted on leaded film capacitors.

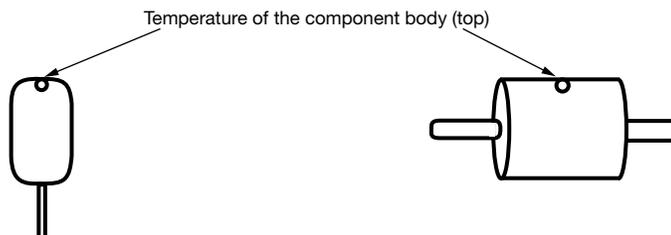
## SOLDERING GUIDELINES AND RECOMMENDED WAVE SOLDERING PROFILE

With regard to the resistance to soldering heat and the solderability, our products comply with “IEC 60384-1” and the additional type specifications.

The recommended wave soldering profile for our leaded components is defined as follows:



$T_p$ : Peak temperature of the component body (top)  
 $T_{\text{max.}}$ : Maximum application temperature of the component





The DNA of tech.™

# Soldering Guidelines for Film Capacitors

The PSL (Process Sensitivity Level) is classified according JEDEC standard J-STD-075 “Classification of Non-IC Electronic Components for Assembly Processes” and summarized in following tables per product family and pitch size of the component:

RADIAL POLYESTER TYPES								
FAMILY	PRODUCT PITCH SIZE							
	5 mm	7.5 mm	10 mm	15 mm	22.5 mm	27.5 mm	37.5 mm	52.5 mm
MKT 303			W4C (2)(4)	W4C (2)(4)	W4C (2)(4)			
MKT 365	W4Y (1)(3)							
MKT 366		W4Y (1)(3)						
MKT 367		W4Y (1)(3)						
MKT 368			W4C (2)(4)	W4C (2)(4)	W4C (2)(4)	W4C (2)(4)		
MKT 369			W4C (2)(4)					
MKT 370	W4Y (1)(3)							
MKT 371		W4Y (1)(3)						
MKT 372			W4C (2)(4)					
MKT 373				W4C (2)(4)	W4C (2)(4)	W4C (2)(4)		
MKT 373M			W4C (2)(4)	W4C (2)(4)	W4C (2)(4)	W4C (2)(4)		
MKT 468			W4C (2)(4)	W4C (2)(4)	W4C (2)(4)	W4C (2)(4)		
MKT 470	W4Y (1)(3)							
MKT 1817	W4Y (1)(3)							
MKT 1818		W4Y (1)(3)						
MKT 1820			W4C (2)(4)					
MKT 1822			W4C (2)(4)	W4C (2)(4)	W4C (2)(4)	W4C (2)(4)		
F1772				W4C (2)(4)	W4C (2)(4)	W4C (2)(4)	W4C (2)(4)	

### Notes

- (1) Risk for parameter change if PSL is not strictly followed
- (2) C: the component has a preheat limitation of 150 °C
- (3) Y: temperature is measured at the body top and must be kept as follows:  
 During preheating:  $T_{max.} \leq 125 \text{ °C}$   
 During soldering:  $T_p \leq 135 \text{ °C}$ ,  $t_p \leq 30 \text{ s}$ ,  $t \leq 50 \text{ s}$
- (4) Y: temperature is measured at the body top and must be kept as follows:  
 During preheating:  $T_{max.} \leq 125 \text{ °C}$   
 During soldering:  $T_p \leq 135 \text{ °C}$ ,  $t_p \leq 30 \text{ s}$ ,  $t \leq 60 \text{ s}$



The DNA of tech.™

## Soldering Guidelines for Film Capacitors

RADIAL POLYPROPYLENE TYPES								
FAMILY	PRODUCT PITCH SIZE							
	5 mm	7.5 mm	10 mm	15 mm	22.5 mm	27.5 mm	37.5 mm	52.5 mm
MKP 375				W4C (5)(6)	W4C (5)(6)	W4C (5)(6)		
MKP 376				W4C (5)(6)	W4C (5)(6)	W4C (5)(6)		
MKP 378				W4C (5)(6)	W4C (5)(6)	W4C (5)(6)		
MKP 379			W4Y (1)(4)	W4C (5)(6)	W4C (5)(6)	W4C (5)(6)		
MKP 380	W4Y (2)(3)							
MMKP 383			W4Y (1)(4)	W4C (5)(6)	W4C (5)(6)	W4C (5)(6)		
MKP 385	W4Y (2)(3)	W4Y (2)(4)	W4Y (1)(4)	W4C (5)(6)				
MKP 416 / MKP 417 / MKP 418 / MKP 419 / MKP 420	W4Y (2)(3)	W4Y (2)(4)	W4Y (1)(4)	W4C (5)(6)	W4C (5)(6)	W4C (5)(6)		
MKP 422		W4Y (2)(4)	W4Y (1)(4)					
MKP 336 1				W4C (5)(6)	W4C (5)(6)	W4C (5)(6)		
MKP 336 2			W4Y (1)(4)	W4C (5)(6)	W4C (5)(6)	W4C (5)(6)		
MKP 336 6			W4Y (1)(4)	W4C (5)(6)				
MKP 338 1				W4C (5)(6)	W4C (5)(6)	W4C (5)(6)		
MKP 338 2		W4Y (2)(4)	W4Y (1)(4)	W4C (5)(6)	W4C (5)(6)	W4C (5)(6)		
MKP 338 4				W4C (5)(6)				
MKP 338 6		W4Y (2)(4)	W4Y (1)(4)	W4C (5)(6)	W4C (5)(6)	W4C (5)(6)		
MKP 339		W4Y (2)(4)	W4Y (1)(4)	W4C (5)(6)	W4C (5)(6)	W4C (5)(6)		
F339M		W4Y (2)(4)	W4Y (1)(4)	W4C (5)(6)				
MKP 479			W4Y (1)(4)	W4C (5)(6)	W4C (5)(6)	W4C (5)(6)		
F1710				W4C (5)(6)	W4C (5)(6)	W4C (5)(6)		
F1778			W4Y (1)(4)	W4C (5)(6)	W4C (5)(6)	W4C (5)(6)		
KP1830	W4Y (2)(3)							
MKP 1837	W4Y (2)(3)							
MKP 1840 / MKP 1840M		W4Y (2)(4)	W4Y (1)(4)	W4C (5)(6)	W4C (5)(6)	W4C (5)(6)	W4C (5)(6)	
MKP 1841 / MKP 1841M	W4Y (1)(3)	W4Y (1)(4)	W4Y (1)(4)	W4C (5)(6)	W4C (5)(6)	W4C (5)(6)	W4C (5)(6)	
MKP 1848 / MKP 1848C / MKP 1848S / MKP 1848H / MKP 1848Se						W4C (5)(6)	W4C (5)(6)	W4C (5)(6)
F339X2				W4C (5)(6)	W4C (5)(6)	W4C (5)(6)		
F340X1						W4C (5)(6)	W4C (5)(6)	W4C (5)(6)
F340X2						W4C (5)(6)	W4C (5)(6)	W4C (5)(6)
F340Y2				W4C (5)(6)	W4C (5)(6)	W4C (5)(6)	W4C (5)(6)	
MKP 385e				W4C (5)(6)				
MKP 1847 / MKP 1847H / MKP 1847C						W4C (5)(6)	W4C (5)(6)	W4C (5)(6)

**Notes**

- (1) Risk for parameter change if PSL is not strictly followed
- (2) Risk for product damage if PSL is not strictly followed
- (3) Y: temperature is measured at the body top and must be kept as follows:  
 During preheating:  $T_{max.} \leq 100 \text{ }^\circ\text{C}$   
 During soldering:  $T_p \leq 110 \text{ }^\circ\text{C}$ ,  $t_p \leq 20 \text{ s}$ ,  $t \leq 30 \text{ s}$
- (4) Y: temperature is measured at the body top and must be kept as follows:  
 During preheating:  $T_{max.} \leq 110 \text{ }^\circ\text{C}$   
 During soldering:  $T_p \leq 120 \text{ }^\circ\text{C}$ ,  $t_p \leq 20 \text{ s}$ ,  $t \leq 30 \text{ s}$
- (5) C: temperature is measured at the body top and must be kept as follows:  
 During preheating:  $T_{max.} \leq 110 \text{ }^\circ\text{C}$   
 During soldering:  $T_p \leq 120 \text{ }^\circ\text{C}$ ,  $t_p \leq 20 \text{ s}$ ,  $t \leq 60 \text{ s}$
- (6) C: the component has a preheat limitation of  $150 \text{ }^\circ\text{C}$

## Soldering Guidelines for Film Capacitors

AXIAL POLYESTER TYPES						
FAMILY	PRODUCT BODY LENGTH					
	11 mm	14 mm	19 mm	26.5 mm	31.5 mm	41.5 mm
MKT 1813	W4Y (1)(3)	W4Y (1)(3)	W4C (2)(4)	W4C (2)(4)	W4C (2)(4)	W4C (2)(4)
F1773			W4C (2)(4)	W4C (2)(4)	W4C (2)(4)	W4C (2)(4)

**Notes**

- (1) Risk for product damage if PSL is not strictly followed
- (2) C: The component has a preheat limitation of 150 °C
- (3) Y: temperature is measured at the body top and must be kept as follows:  
 During preheating:  $T_{max.} \leq 125 \text{ °C}$   
 During soldering:  $T_p \leq 135 \text{ °C}$ ,  $t_p \leq 30 \text{ s}$ ,  $t \leq 50 \text{ s}$
- (4) Y: temperature is measured at the body top and must be kept as follows:  
 During preheating:  $T_{max.} \leq 125 \text{ °C}$   
 During soldering:  $T_p \leq 135 \text{ °C}$ ,  $t_p \leq 30 \text{ s}$ ,  $t \leq 60 \text{ s}$

AXIAL POLYPROPYLENE TYPES						
FAMILY	PRODUCT BODY LENGTH					
	11 mm	14 (17) mm	19 (22) mm	26.5 (29) mm	31.5 (34) mm	41.5 (44) mm
MKP 1839 / MKP 1839 HQ	W4Y (3)(4)	W4Y (3)(4)	W4Y (3)(5)	W4Y (2)(5)	W4Y (1)(5)	W4Y (1)(5)
MKP 1845		W4Y (3)(4)	W4Y (3)(5)	W4Y (2)(5)	W4Y (1)(5)	W4Y (1)(5)

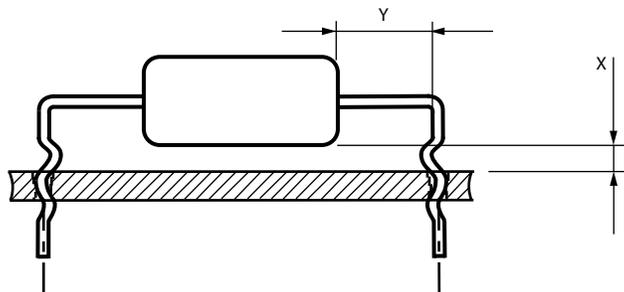
**Notes**

- (1) No risk
- (2) Risk for parameter change if PSL is not strictly followed
- (3) Risk for product damage if PSL is not strictly followed
- (4) Y: Temperature is measured at the body top and must be kept as follows:  
 During preheating:  $T_{max.} \leq 100 \text{ °C}$   
 During soldering:  $T_p \leq 110 \text{ °C}$ ,  $t_p \leq 20 \text{ s}$ ,  $t \leq 30 \text{ s}$
- (5) Y: Temperature is measured at the body top and must be kept as follows:  
 During preheating:  $T_{max.} \leq 110 \text{ °C}$   
 During soldering:  $T_p \leq 120 \text{ °C}$ ,  $t_p \leq 20 \text{ s}$ ,  $t \leq 30 \text{ s}$

**WARNINGS**

Excessive soldering heat (preheating or soldering above the recommended limits) can result in product damage and malfunctioning and should be thus strictly avoided. If PSL limits have been exceeded at any point in time during the soldering process, the products could possibly show a change in certain parameters (e.g. capacitance value,  $\tan \delta$ , insulation resistance, breakdown level, etc.). Exceeding PSL limits can even result in destruction of the product. Warning signs include a bulged or deformed product encapsulation. Such an appearance may also be the result of other causes, such as interruptions, cooling malfunctioning of the soldering machine, etc.

Axial components can better protected from direct heat conducted by the PCB, when a distance is kept from the product to the PCB as follows:





The DNA of tech.™

# Soldering Guidelines for Film Capacitors

TRIMMER CAPACITORS	
FAMILY	PRODUCT BODY LENGTH
	ALL SIZES
808 / 809	W4Y <sup>(1)(2)</sup>

### Notes

- (1) Risk for product damage if PSL is not strictly followed
- (2) Y: temperature is measured at the body top and must be kept as follows:  
 During preheating:  $T_{max.} \leq 85 \text{ }^\circ\text{C}$   
 During soldering:  $T_p \leq 100 \text{ }^\circ\text{C}$ ,  $t_p \leq 20 \text{ s}$ ,  $t \leq 30 \text{ s}$

Due to the sensitivity of these electromechanical components, it is critical to solder these components in a wave soldering method. We recommend to use manual soldering, see below.

### SOLDERING CONDITIONS FOR MANUAL SOLDERING

1. Use a soldering iron with sufficient wattage and a regulated temperature. The adequacy of the soldering iron can be judged by the amount of time needed to reflow the solder. Beginning at 650 °F (343 °C), adjust the temperature so that the solder reflows within 1.5 s to 3 s.
  - If the solder reflow occurs in less than 1 s to 1.5 s, this indicates that the tip temperature is excessive.
  - If more than 3 s to 3.5 s are needed for solder reflow, either the tip temperature is insufficient or the tip is cooling down when applied to the circuit board.
2. Apply a small amount of flux to the component termination and the pad layout.
3. After tinning the iron, place the iron tip on the circuit pad at the edge furthest from the component. The soldering should be completed in 1.5 s to 3 s. If it is necessary to keep the iron on longer than 3 s, replace the component with a fresh device.
4. Add the solder at the solder tip to ensure that it flows from the pad to the termination of the component. Be careful not to add too much solder. The minimum is the best.
5. Never touch the component being worked on or any adjacent components with the soldering iron.

APPLICATION NOTE