

Actual Situation of Lead Free Soldering for SMW

September 21st, 2007

All SMW capacitors, with manufacturing code V9 (September 2007) and later, are capable to fulfil the recommended reflow soldering profile for lead free process presented at end of this document.

Capacitance µF	Size code	Dimensions in mm		Max dU/dt V/µs	Article code	Capacitance µF	Size code	Dimensions in mm		Max dU/dt V/µs	Article code
		B ±0.4	H max					B ±0.4	H max		
50 VDC/30 VAC						50 VDC/30 VAC					
CHIP LENGTH 5.7 MM CODE 2220						CHIP LENGTH 7.3 MM CODE 2824					
0.0010	J91	5.0	2.0	20	SMW5.7 102K50J91 TR12	0.33	K93	6.0	2.7	8	SMW7.3 334K50K93 TR12
0.0012	J91	5.0	2.0	20	SMW5.7 122K50J91 TR12	0.39	K95	6.0	3.2	8	SMW7.3 394K50K95 TR12
0.0015	J91	5.0	2.0	20	SMW5.7 152K50J91 TR12	0.47	K95	6.0	3.2	8	SMW7.3 474K50K95 TR12
0.0018	J91	5.0	2.0	20	SMW5.7 182K50J91 TR12	0.56	K97	6.0	4.2	8	SMW7.3 564K50K97 TR12
0.0022	J91	5.0	2.0	20	SMW5.7 222K50J91 TR12	100 VDC/63 VAC					
0.0027	J91	5.0	2.0	20	SMW5.7 272K50J91 TR12	CHIP LENGTH 5.7 MM CODE 2220					
0.0033	J91	5.0	2.0	20	SMW5.7 332K50J91 TR12	0.0010	J91	5.0	2.0	20	SMW5.7 102K100J91 TR12
0.0039	J91	5.0	2.0	20	SMW5.7 392K50J91 TR12	0.0012	J91	5.0	2.0	20	SMW5.7 122K100J91 TR12
0.0047	J91	5.0	2.0	20	SMW5.7 472K50J91 TR12	0.0015	J91	5.0	2.0	20	SMW5.7 152K100J91 TR12
0.0056	J91	5.0	2.0	20	SMW5.7 562K50J91 TR12	0.0018	J91	5.0	2.0	20	SMW5.7 182K100J91 TR12
0.0068	J91	5.0	2.0	20	SMW5.7 682K50J91 TR12	0.0022	J91	5.0	2.0	20	SMW5.7 222K100J91 TR12
0.0082	J91	5.0	2.0	20	SMW5.7 822K50J91 TR12	0.0027	J91	5.0	2.0	20	SMW5.7 272K100J91 TR12
0.010	J91	5.0	2.0	20	SMW5.7 103K50J91 TR12	0.0033	J91	5.0	2.0	20	SMW5.7 332K100J91 TR12
0.012	J91	5.0	2.0	20	SMW5.7 123K50J91 TR12	0.0039	J91	5.0	2.0	20	SMW5.7 392K100J91 TR12
0.015	J91	5.0	2.0	20	SMW5.7 153K50J91 TR12	0.0047	J91	5.0	2.0	20	SMW5.7 472K100J91 TR12
0.018	J91	5.0	2.0	15	SMW5.7 183K50J91 TR12	0.0056	J91	5.0	2.0	20	SMW5.7 562K100J91 TR12
0.022	J91	5.0	2.0	15	SMW5.7 223K50J91 TR12	0.0068	J91	5.0	2.0	20	SMW5.7 682K100J91 TR12
0.027	J91	5.0	2.0	15	SMW5.7 273K50J91 TR12	0.0082	J91	5.0	2.0	20	SMW5.7 822K100J91 TR12
0.033	J91	5.0	2.0	15	SMW5.7 333K50J91 TR12	0.010	J91	5.0	2.0	20	SMW5.7 103K100J91 TR12
0.039	J91	5.0	2.0	15	SMW5.7 393K50J91 TR12	0.012	J91	5.0	2.0	20	SMW5.7 123K100J91 TR12
0.047	J91	5.0	2.0	15	SMW5.7 473K50J91 TR12	0.015	J91	5.0	2.0	20	SMW5.7 153K100J91 TR12
0.056	J91	5.0	2.0	15	SMW5.7 563K50J91 TR12	0.018	J91	5.0	2.0	15	SMW5.7 183K100J91 TR12
0.068	J91	5.0	2.0	15	SMW5.7 683K50J91 TR12	0.022	J91	5.0	2.0	15	SMW5.7 223K100J91 TR12
0.082	J91	5.0	2.0	10	SMW5.7 823K50J91 TR12	0.027	J91	5.0	2.0	15	SMW5.7 273K100J91 TR12
0.10	J91	5.0	2.0	10	SMW5.7 104K50J91 TR12	0.033	J91	5.0	2.0	15	SMW5.7 333K100J91 TR12
0.12	J91	5.0	2.0	10	SMW5.7 124K50J91 TR12	0.039	J91	5.0	2.0	15	SMW5.7 393K100J91 TR12
0.15	J91	5.0	2.0	10	SMW5.7 154K50J91 TR12	0.047	J91	5.0	2.0	15	SMW5.7 473K100J91 TR12
0.18	J93	5.0	3.0	10	SMW5.7 184K50J93 TR12	0.056	J91	5.0	2.0	15	SMW5.7 563K100J91 TR12
0.22	J93	5.0	3.0	10	SMW5.7 224K50J93 TR12	0.068	J91	5.0	2.0	15	SMW5.7 683K100J91 TR12
0.27	J93	5.0	3.0	10	SMW5.7 274K50J93 TR12	0.082	J93	5.0	3.0	15	SMW5.7 823K100J93 TR12
0.33	J95	5.0	4.0	10	SMW5.7 334K50J95 TR12	0.10	J93	5.0	3.0	15	SMW5.7 104K100J93 TR12
CHIP LENGTH 7.3 MM CODE 2824						0.12	J95	5.0	4.0	15	SMW5.7 124K100J95 TR12
0.0022	K91	6.0	2.0	20	SMW7.3 222K50K91 TR12	0.15	J95	5.0	4.0	15	SMW5.7 154K100J95 TR12
0.0027	K91	6.0	2.0	20	SMW7.3 272K50K91 TR12	CHIP LENGTH 7.3 MM CODE 2824					
0.0033	K91	6.0	2.0	20	SMW7.3 332K50K91 TR12	0.0022	K91	6.0	2.0	20	SMW7.3 222K100K91 TR12
0.0039	K91	6.0	2.0	20	SMW7.3 392K50K91 TR12	0.0027	K91	6.0	2.0	20	SMW7.3 272K100K91 TR12
0.0047	K91	6.0	2.0	20	SMW7.3 472K50K91 TR12	0.0033	K91	6.0	2.0	20	SMW7.3 332K100K91 TR12
0.0056	K91	6.0	2.0	20	SMW7.3 562K50K91 TR12	0.0039	K91	6.0	2.0	20	SMW7.3 392K100K91 TR12
0.0068	K91	6.0	2.0	20	SMW7.3 682K50K91 TR12	0.0047	K91	6.0	2.0	20	SMW7.3 472K100K91 TR12
0.0082	K91	6.0	2.0	20	SMW7.3 822K50K91 TR12	0.0056	K91	6.0	2.0	20	SMW7.3 562K100K91 TR12
0.010	K91	6.0	2.0	20	SMW7.3 103K50K91 TR12	0.0068	K91	6.0	2.0	20	SMW7.3 682K100K91 TR12
0.012	K91	6.0	2.0	20	SMW7.3 123K50K91 TR12	0.0082	K91	6.0	2.0	20	SMW7.3 822K100K91 TR12
0.015	K91	6.0	2.0	20	SMW7.3 153K50K91 TR12	0.010	K91	6.0	2.0	20	SMW7.3 103K100K91 TR12
0.018	K91	6.0	2.0	20	SMW7.3 183K50K91 TR12	0.012	K91	6.0	2.0	20	SMW7.3 123K100K91 TR12
0.022	K91	6.0	2.0	20	SMW7.3 223K50K91 TR12	0.015	K91	6.0	2.0	20	SMW7.3 153K100K91 TR12
0.027	K91	6.0	2.0	15	SMW7.3 273K50K91 TR12	0.018	K91	6.0	2.0	20	SMW7.3 183K100K91 TR12
0.033	K91	6.0	2.0	15	SMW7.3 333K50K91 TR12	0.022	K91	6.0	2.0	20	SMW7.3 223K100K91 TR12
0.039	K91	6.0	2.0	15	SMW7.3 393K50K91 TR12	0.027	K91	6.0	2.0	15	SMW7.3 273K100K91 TR12
0.047	K91	6.0	2.0	15	SMW7.3 473K50K91 TR12	0.033	K91	6.0	2.0	15	SMW7.3 333K100K91 TR12
0.056	K91	6.0	2.0	15	SMW7.3 563K50K91 TR12	0.039	K91	6.0	2.0	15	SMW7.3 393K100K91 TR12
0.068	K91	6.0	2.0	15	SMW7.3 683K50K91 TR12	0.047	K91	6.0	2.0	15	SMW7.3 473K100K91 TR12
0.082	K91	6.0	2.0	8	SMW7.3 823K50K91 TR12	0.056	K91	6.0	2.0	15	SMW7.3 563K100K91 TR12
0.10	K91	6.0	2.0	8	SMW7.3 104K50K91 TR12	0.068	K91	6.0	2.0	15	SMW7.3 683K100K91 TR12
0.12	K91	6.0	2.0	8	SMW7.3 124K50K91 TR12	0.082	K91	6.0	2.0	15	SMW7.3 823K100K91 TR12
0.15	K91	6.0	2.0	8	SMW7.3 154K50K91 TR12	0.10	K93	6.0	2.7	15	SMW7.3 104K100K93 TR12
0.18	K91	6.0	2.0	8	SMW7.3 184K50K91 TR12						
0.22	K91	6.0	2.0	8	SMW7.3 224K50K91 TR12						
0.27	K91	6.0	2.0	8	SMW7.3 274K50K91 TR12						

Capacitance µF	Size code	Dimensions in mm		Max dU/dt V/µs	Article code
		B	H		
		±0.4	max		

100 VDC/63 VAC

CHIP LENGTH 7.3 MM CODE 2824

0.12	K93	6.0	2.7	15	SMW7.3 124K100K93 TR12
0.15	K95	6.0	3.2	15	SMW7.3 154K100K95 TR12
0.18	K97	6.0	4.2	15	SMW7.3 184K100K97 TR12

250 VDC/160 VAC

CHIP LENGTH 5.7 MM CODE 2220

0.0010	J91	5.0	2.0	20	SMW5.7 102K250J91 TR12
0.0012	J91	5.0	2.0	20	SMW5.7 122K250J91 TR12
0.0015	J91	5.0	2.0	20	SMW5.7 152K250J91 TR12
0.0018	J91	5.0	2.0	20	SMW5.7 182K250J91 TR12
0.0022	J91	5.0	2.0	20	SMW5.7 222K250J91 TR12
0.0027	J91	5.0	2.0	20	SMW5.7 272K250J91 TR12
0.0033	J91	5.0	2.0	20	SMW5.7 332K250J91 TR12
0.0039	J91	5.0	2.0	20	SMW5.7 392K250J91 TR12
0.0047	J91	5.0	2.0	20	SMW5.7 472K250J91 TR12
0.0056	J91	5.0	2.0	20	SMW5.7 562K250J91 TR12
0.0068	J91	5.0	2.0	20	SMW5.7 682K250J91 TR12
0.0082	J91	5.0	2.0	20	SMW5.7 822K250J91 TR12
0.010	J91	5.0	2.0	20	SMW5.7 103K250J91 TR12
0.012	J91	5.0	2.0	20	SMW5.7 123K250J91 TR12
0.015	J91	5.0	2.0	20	SMW5.7 153K250J91 TR12
0.018	J93	5.0	3.0	20	SMW5.7 183K250J93 TR12
0.022	J93	5.0	3.0	20	SMW5.7 223K250J93 TR12
0.027	J93	5.0	3.0	20	SMW5.7 273K250J93 TR12
0.033	J95	5.0	4.0	20	SMW5.7 333K250J95 TR12

CHIP LENGTH 7.3 MM CODE 2824

0.0022	K91	6.0	2.0	20	SMW7.3 222K250K91 TR12
0.0027	K91	6.0	2.0	20	SMW7.3 272K250K91 TR12
0.0033	K91	6.0	2.0	20	SMW7.3 332K250K91 TR12
0.0039	K91	6.0	2.0	20	SMW7.3 392K250K91 TR12
0.0047	K91	6.0	2.0	20	SMW7.3 472K250K91 TR12
0.0056	K91	6.0	2.0	20	SMW7.3 562K250K91 TR12
0.0068	K91	6.0	2.0	20	SMW7.3 682K250K91 TR12
0.0082	K91	6.0	2.0	20	SMW7.3 822K250K91 TR12
0.010	K91	6.0	2.0	20	SMW7.3 103K250K91 TR12
0.012	K91	6.0	2.0	20	SMW7.3 123K250K91 TR12
0.015	K91	6.0	2.0	20	SMW7.3 153K250K91 TR12
0.018	K91	6.0	2.0	20	SMW7.3 183K250K91 TR12
0.022	K91	6.0	2.0	20	SMW7.3 223K250K91 TR12
0.027	K91	6.0	2.0	15	SMW7.3 273K250K91 TR12
0.033	K93	6.0	2.7	15	SMW7.3 333K250K93 TR12
0.039	K93	6.0	2.7	15	SMW7.3 393K250K93 TR12
0.047	K95	6.0	3.2	15	SMW7.3 473K250K95 TR12
0.056	K97	6.0	4.2	15	SMW7.3 563K250K97 TR12
0.068	K97	6.0	4.2	15	SMW7.3 683K250K97 TR12

400 VDC/200 VAC

CHIP LENGTH 5.7 MM CODE 2220

0.0010	J91	5.0	2.0	20	SMW5.7 102K400J91 TR12
0.0012	J91	5.0	2.0	20	SMW5.7 122K400J91 TR12
0.0015	J91	5.0	2.0	20	SMW5.7 152K400J91 TR12
0.0018	J91	5.0	2.0	20	SMW5.7 182K400J91 TR12
0.0022	J91	5.0	2.0	20	SMW5.7 222K400J91 TR12
0.0027	J91	5.0	2.0	20	SMW5.7 272K400J91 TR12
0.0033	J91	5.0	2.0	20	SMW5.7 332K400J91 TR12
0.0039	J91	5.0	2.0	20	SMW5.7 392K400J91 TR12

Capacitance µF	Size code	Dimensions in mm		Max dU/dt V/µs	Article code
		B	H		
		±0.4	max		

400 VDC/200 VAC

CHIP LENGTH 5.7 MM CODE 2220

0.0047	J91	5.0	2.0	20	SMW5.7 472K400J91 TR12
0.0056	J93	5.0	3.0	20	SMW5.7 562K400J93 TR12
0.0068	J93	5.0	3.0	20	SMW5.7 682K400J93 TR12
0.0082	J93	5.0	3.0	20	SMW5.7 822K400J93 TR12
0.010	J93	5.0	3.0	20	SMW5.7 103K400J93 TR12
0.012	J95	5.0	4.0	20	SMW5.7 123K400J95 TR12
0.015	J95	5.0	4.0	20	SMW5.7 153K400J95 TR12

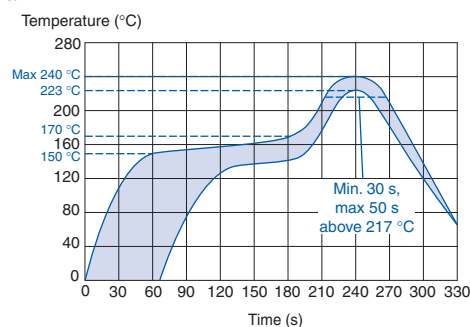
CHIP LENGTH 7.3 MM CODE 2824

0.0022	K91	6.0	2.0	20	SMW7.3 222K400K91 TR12
0.0027	K91	6.0	2.0	20	SMW7.3 272K400K91 TR12
0.0033	K91	6.0	2.0	20	SMW7.3 332K400K91 TR12
0.0039	K91	6.0	2.0	20	SMW7.3 392K400K91 TR12
0.0047	K91	6.0	2.0	20	SMW7.3 472K400K91 TR12
0.0056	K91	6.0	2.0	20	SMW7.3 562K400K91 TR12
0.0068	K91	6.0	2.0	20	SMW7.3 682K400K91 TR12
0.0082	K91	6.0	2.0	20	SMW7.3 822K400K91 TR12
0.010	K91	6.0	2.0	20	SMW7.3 103K400K91 TR12
0.012	K93	6.0	2.7	20	SMW7.3 123K400K93 TR12
0.015	K93	6.0	2.7	20	SMW7.3 153K400K93 TR12
0.018	K95	6.0	3.2	20	SMW7.3 183K400K95 TR12
0.022	K95	6.0	3.2	20	SMW7.3 223K400K95 TR12

Reflow soldering on the top body surface of the component

Preheating temperature should be less than 170°C. The time above 217°C should be less than 50 s. The peak temperature must not exceed 240°C.

This profile is recommended for convection reflow ovens and IR reflow ovens. If vapour phase reflow oven is used, please consult Evox Rifa.



This recommended reflow soldering profile for lead free soldering is valid for those SMW products, which have manufacturing code V9 (September 2007) and later.

For marking of our SMD capacitors, please see page 18 in the Evox Rifa SMD Film Capacitors catalogue or www.evoxrifa.com/smd_catalog/wound_tech_caps/gen_info_wound_smd.pdf

Exceeding the manufacturer's process recommendations may harm the component and keep the manufacturer not liable for any defect caused by exceeding the recommendations.

According to international standards, the maximum temperature capability shall be measured on the top surface of a component. Any of the international standards do not define how the thermocouple should be fastened on the component. Our recommendation for attaching the thermocouple on the top surface of the component is glueing with high temperature resistant glue.

All updates for SMD capacitors reflow capability will be informed through www.evoxrifa.com.

Additional information available directly from Mr. Matti Niskala, e-mail MattiNiskala@kemet.com, telephone +358 50 387 3205.