

# Actual Situation of Lead Free Soldering for GMC

September 26th, 2008

All following GMC capacitors, with manufacturing code WO (October 2008) 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 ±0.2		Max dU/dt V/µs	Article code	Capacitance µF	Size code	Dimensions in mm ±0.2		Max dU/dt V/µs	Article code
		B	H					B	H		
<b>50 VDC/30 VAC</b>						<b>100 VDC/63 VAC</b>					
<b>CHIP LENGTH 5.7 MM CODE 2220</b>						<b>CHIP LENGTH 5.7 MM CODE 2220</b>					
0.022	J31	5.0	2.5	30	GMC5.7 223K50J31 TR12	0.022	J31	5.0	2.5	30	GMC5.7 223K100J31 TR12
0.027	J31	5.0	2.5	30	GMC5.7 273K50J31 TR12	0.027	J33	5.0	3.0	30	GMC5.7 273K100J33 TR12
0.033	J31	5.0	2.5	20	GMC5.7 333K50J31 TR12	0.033	J33	5.0	3.0	30	GMC5.7 333K100J33 TR12
0.039	J31	5.0	2.5	20	GMC5.7 393K50J31 TR12	0.039	J35	5.0	4.0	30	GMC5.7 393K100J35 TR12
0.047	J31	5.0	2.5	20	GMC5.7 473K50J31 TR12	0.047	J35	5.0	4.0	30	GMC5.7 473K100J35 TR12
0.056	J31	5.0	2.5	20	GMC5.7 563K50J31 TR12	<b>CHIP LENGTH 7.3 MM CODE 2824</b>					
0.068	J31	5.0	2.5	20	GMC5.7 683K50J31 TR12	0.0010	K31	6.0	2.5	50	GMC7.3 102K100K31 TR12
0.082	J31	5.0	2.5	20	GMC5.7 823K50J31 TR12	0.0012	K31	6.0	2.5	50	GMC7.3 122K100K31 TR12
0.10	J31	5.0	2.5	20	GMC5.7 104K50J31 TR12	0.0015	K31	6.0	2.5	50	GMC7.3 152K100K31 TR12
0.12	J33	5.0	3.0	20	GMC5.7 124K50J33 TR12	0.0018	K31	6.0	2.5	50	GMC7.3 182K100K31 TR12
0.15	J35	5.0	4.0	20	GMC5.7 154K50J35 TR12	0.0022	K31	6.0	2.5	50	GMC7.3 222K100K31 TR12
0.18	J35	5.0	4.0	20	GMC5.7 184K50J35 TR12	0.0027	K31	6.0	2.5	50	GMC7.3 272K100K31 TR12
<b>63 VDC/40 VAC</b>						0.0033	K31	6.0	2.5	50	GMC7.3 332K100K31 TR12
<b>CHIP LENGTH 7.3 MM CODE 2824</b>						0.0039	K31	6.0	2.5	50	GMC7.3 392K100K31 TR12
0.0010	K31	6.0	2.5	50	GMC7.3 102K63K31 TR12	0.0047	K31	6.0	2.5	50	GMC7.3 472K63K31 TR12
0.0012	K31	6.0	2.5	50	GMC7.3 122K63K31 TR12	0.0056	K31	6.0	2.5	50	GMC7.3 562K63K31 TR12
0.0015	K31	6.0	2.5	50	GMC7.3 152K63K31 TR12	0.0068	K31	6.0	2.5	40	GMC7.3 682K100K31 TR12
0.0018	K31	6.0	2.5	50	GMC7.3 182K63K31 TR12	0.0082	K31	6.0	2.5	40	GMC7.3 822K100K31 TR12
0.0022	K31	6.0	2.5	50	GMC7.3 222K63K31 TR12	0.010	K31	6.0	2.5	40	GMC7.3 103K100K31 TR12
0.0027	K31	6.0	2.5	50	GMC7.3 272K63K31 TR12	0.012	K31	6.0	2.5	40	GMC7.3 123K100K31 TR12
0.0033	K31	6.0	2.5	50	GMC7.3 332K63K31 TR12	0.015	K31	6.0	2.5	40	GMC7.3 153K100K31 TR12
0.0039	K31	6.0	2.5	50	GMC7.3 392K63K31 TR12	0.018	K31	6.0	2.5	40	GMC7.3 183K100K31 TR12
0.0047	K31	6.0	2.5	50	GMC7.3 472K63K31 TR12	0.022	K31	6.0	2.5	30	GMC7.3 223K100K31 TR12
0.0056	K31	6.0	2.5	50	GMC7.3 562K63K31 TR12	0.027	K31	6.0	2.5	30	GMC7.3 273K100K31 TR12
0.0068	K31	6.0	2.5	40	GMC7.3 682K63K31 TR12	0.033	K31	6.0	2.5	30	GMC7.3 333K100K31 TR12
0.0082	K31	6.0	2.5	40	GMC7.3 822K63K31 TR12	0.039	K31	6.0	2.5	30	GMC7.3 393K100K31 TR12
0.010	K31	6.0	2.5	40	GMC7.3 103K63K31 TR12	0.047	K31	6.0	2.5	30	GMC7.3 473K100K31 TR12
0.012	K31	6.0	2.5	40	GMC7.3 123K63K31 TR12	0.056	K33	6.0	3.0	30	GMC7.3 563K100K33 TR12
0.015	K31	6.0	2.5	40	GMC7.3 153K63K31 TR12	0.068	K35	6.0	3.5	30	GMC7.3 683K100K35 TR12
0.018	K31	6.0	2.5	40	GMC7.3 183K63K31 TR12	0.082	K35	6.0	3.5	30	GMC7.3 823K100K35 TR12
0.022	K31	6.0	2.5	30	GMC7.3 223K63K31 TR12	0.10	K37	6.0	4.5	30	GMC7.3 104K100K37 TR12
0.027	K31	6.0	2.5	30	GMC7.3 273K63K31 TR12	<b>250 VDC/160 VAC</b>					
0.033	K31	6.0	2.5	30	GMC7.3 333K63K31 TR12	<b>CHIP LENGTH 7.3 MM CODE 2824</b>					
0.039	K31	6.0	2.5	30	GMC7.3 393K63K31 TR12	0.0010	K31	6.0	2.5	50	GMC7.3 102K250K31 TR12
0.047	K31	6.0	2.5	30	GMC7.3 473K63K31 TR12	0.0012	K31	6.0	2.5	50	GMC7.3 122K250K31 TR12
0.056	K31	6.0	2.5	30	GMC7.3 563K63K31 TR12	0.0015	K31	6.0	2.5	50	GMC7.3 152K250K31 TR12
0.068	K31	6.0	2.5	20	GMC7.3 683K63K31 TR12	0.0018	K31	6.0	2.5	50	GMC7.3 182K250K31 TR12
0.082	K31	6.0	2.5	20	GMC7.3 823K63K31 TR12	0.0022	K31	6.0	2.5	50	GMC7.3 222K250K31 TR12
0.10	K31	6.0	2.5	20	GMC7.3 104K63K31 TR12	0.0027	K31	6.0	2.5	50	GMC7.3 272K250K31 TR12
0.12	K31	6.0	2.5	20	GMC7.3 124K63K31 TR12	0.0033	K31	6.0	2.5	50	GMC7.3 332K250K31 TR12
0.15	K31	6.0	2.5	20	GMC7.3 154K63K31 TR12	0.0039	K31	6.0	2.5	50	GMC7.3 392K250K31 TR12
0.18	K33	6.0	3.0	20	GMC7.3 184K63K33 TR12	0.0047	K31	6.0	2.5	50	GMC7.3 472K250K31 TR12
0.22	K33	6.0	3.0	20	GMC7.3 224K63K33 TR12	0.0056	K31	6.0	2.5	50	GMC7.3 562K250K31 TR12
0.27	K35	6.0	3.5	20	GMC7.3 274K63K35 TR12	0.0068	K31	6.0	2.5	40	GMC7.3 682K250K31 TR12
0.33	K35	6.0	3.5	20	GMC7.3 334K63K35 TR12						
0.39	K37	6.0	4.5	20	GMC7.3 394K63K37 TR12						

Capacitance $\mu\text{F}$	Size code	Dimensions in mm $\pm 0.2$		Max dU/dt V/ $\mu\text{s}$	Article code
		B	H		

250 VDC/160 VAC

CHIP LENGTH 7.3 MM CODE 2824

0.0068	K31	6.0	2.5	40	GMC7.3 682K250K31 TR12
0.0082	K31	6.0	2.5	40	GMC7.3 822K250K31 TR12
0.010	K31	6.0	2.5	40	GMC7.3 103K250K31 TR12
0.012	K31	6.0	2.5	40	GMC7.3 123K250K31 TR12
0.015	K31	6.0	2.5	40	GMC7.3 153K250K31 TR12
0.018	K33	6.0	3.0	40	GMC7.3 183K250K33 TR12
0.022	K33	6.0	3.0	40	GMC7.3 223K250K33 TR12
0.027	K35	6.0	3.5	40	GMC7.3 273K250K35 TR12
0.033	K37	6.0	4.5	30	GMC7.3 333K250K37 TR12
0.039	K37	6.0	4.5	30	GMC7.3 393K250K37 TR12

Capacitance $\mu\text{F}$	Size code	Dimensions in mm $\pm 0.2$		Max dU/dt V/ $\mu\text{s}$	Article code
		B	H		

400 VDC/200 VAC

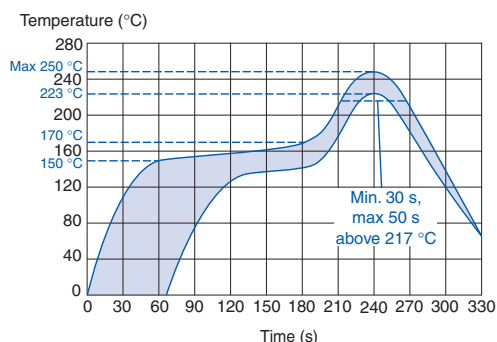
CHIP LENGTH 7.3 MM CODE 2824

0.0010	K31	6.0	2.5	50	GMC7.3 102K400K31 TR12
0.0012	K31	6.0	2.5	50	GMC7.3 122K400K31 TR12
0.0015	K31	6.0	2.5	50	GMC7.3 152K400K31 TR12
0.0018	K31	6.0	2.5	50	GMC7.3 182K400K31 TR12
0.0022	K31	6.0	2.5	50	GMC7.3 222K400K31 TR12
0.0027	K31	6.0	2.5	50	GMC7.3 272K400K31 TR12
0.0033	K31	6.0	2.5	50	GMC7.3 332K400K31 TR12
0.0039	K31	6.0	2.5	50	GMC7.3 392K400K31 TR12
0.0047	K31	6.0	2.5	50	GMC7.3 472K400K31 TR12
0.0056	K31	6.0	2.5	50	GMC7.3 562K400K31 TR12
0.0068	K33	6.0	3.0	50	GMC7.3 682K400K33 TR12
0.0082	K35	6.0	3.5	50	GMC7.3 822K400K35 TR12
0.010	K35	6.0	3.5	50	GMC7.3 103K400K35 TR12
0.012	K35	6.0	3.5	50	GMC7.3 123K400K35 TR12
0.015	K37	6.0	4.5	50	GMC7.3 153K400K37 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 250 °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 GMC products listed above, which have manufacturing code WO (October 2008) 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](http://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](http://www.evoxrifa.com).

Additional information available directly from Mr. Matti Niskala, e-mail [MattiNiskala@kemet.com](mailto:MattiNiskala@kemet.com), telephone +358 50 387 3205.