General Purpose, High Stability and AC Line EMI Suppression

GMW Series Unencapsulated Winding, Size 2220, 63 – 630 VDC

The Capacitance Company
KEMET
CHARGED.

Overview

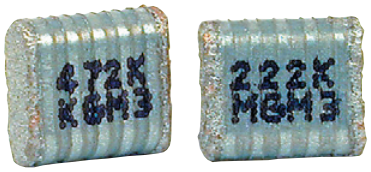
Polyethylene naphthalate (PEN) film capacitor for surface mounting.

Applications

Typical applications include bypassing and signal coupling. GMW is a general purpose series designed for the highest reliability and high temperature service.

Benefits

- Rated voltage: 63 – 630 VDC
- Rated voltage: 40 – 220 VAC
- Capacitance range: 0.001 – 0.47 µF
- EIA size: 2220
- Capacitance tolerance: ±10%, ±20%, ±5% on request
- Climatic category: 55/125/56
- RoHS Compliant and lead-free terminations
- Operating temperature range of -55˚C to +125˚C



Legacy Part Number System

GMW	5.7	102	K	63	J91	TR12
Series	Chip Length (mm)	Capacitance Code (pF)	Capacitance Tolerance	Rated Voltage (VDC)	Size Code	Packaging Code
Metallized PEN	5.7	First two digits indicate the two most significant digits of the capacitance value in picofarads. The third digit is the number of following zeros.	K = ±10% M = ±20% J = ±5% on request	63 100 250 400 630	See Dimension Table	See Ordering Options Table

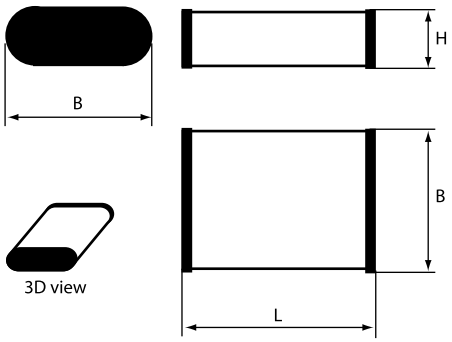
New KEMET Part Number System

F	116	P	H	102	K	063	V
Capacitor Class	Series	Chip Size	Size Code	Capacitance Code (pF)	Capacitance Tolerance	Rated Voltage (VDC)	Packaging Code
F = Film	Metallized PEN	P = 2220	See Dimension Table	First two digits indicate the two most significant digits of the capacitance value in picofarads. The third digit is the number of following zeros.	J = ±5% K = ±10% Other tolerances on request	063 = 63 100 = 100 250 = 250 400 = 400 630 = 630	See Ordering Options Table

Ordering Options Table

Packaging Type	KEMET Packaging Code	Legacy Packaging Code
Standard Packaging Options		
Tape & Reel (Standard Reel)	V	TR12
Bulk (Bag)	A	BULK

Dimensions – Millimeters



KEMET Size Code	Legacy Size Code	Chip Size (EIA)	B		H		L	
			Nominal	Tolerance	Nominal	Tolerance	Nominal	Tolerance
PH	J91	2220	5.0	+/-0.4	2.0	Maximum	5.7	+/-0.4
PP	J93	2220	5.0	+/-0.4	3.0	Maximum	5.7	+/-0.4
PU	J95	2220	5.0	+/-0.4	4.0	Maximum	5.7	+/-0.4

Environmental Compliance

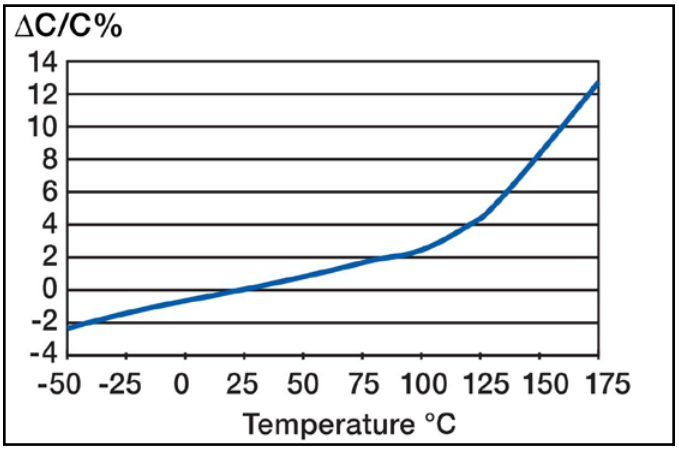
All KEMET surface mount capacitors are RoHS Compliant.

RoHS Compliant

Performance Characteristics

Rated Voltage (VDC)	63	100	250	400	630
Rated Voltage (VAC)	40	63	160	200	220
Capacitance Range (µF)	0.001 – 0.47	0.001 – 0.22	0.001 – 0.068	0.001 – 0.015	0.001 – 0.0068
Chip Size (EIA)	2220				
Capacitance Tolerance	±10%, ±20%, ±5% on request				
Category Temperature Range	-55°C to +125°C				
Rated Temperature	+100°C				
Voltage Derating	The rated voltage should be decreased with 1.25%/°C from +100°C to +125°C and 1.5%/°C from +125°C to 175°C				
Climatic Category	55/125/56				
Test Voltage	1.6 x V_R, 60 seconds				
Insulation Resistance	Measured at +20°C According to IEC 60384–19				
	Minimum Value Between Terminals				
			C ≤ 0.47 µF		
	V_R ≤ 100		10,000 MΩ		
	V_R > 100		30,000 MΩ		
Dissipation Factor	Maximum Values at +23°C				
		C ≤ 0.1 µF		0.1 < C ≤ 0.47 µF	
	1 kHz	0.6%		0.6%	
	10 kHz	1.0%		1.0%	
	100 kHz	2.0%		2.5%	
Pulse Rise Time	The capacitors can withstand an unlimited number of pulses with a dV/dt according to Table 1. For voltages (V) lower than the rated voltage (V_R), the specified dV/dt can be multiplied by V_R/V.				

Capacitance vs. Temperature



Dissipation Factor vs. Temperature

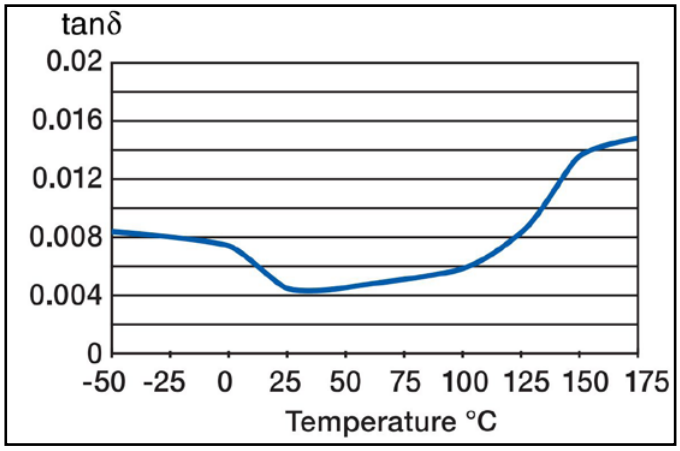


Table 1 – Ratings & Part Number Reference

VDC	VAC	Cap Value (µF)	Size Code (New/Legacy)	Dimensions in mm			Chip Size	dV/dt (V/µs)	New KEMET Part Number	Legacy Part Number
				B	H	L				
63	40	0.0010	PH/J91	5.0	2.0	5.7	2220	50	F116PH102(1)063(2)	GMW5.7102(1)63J91(2)
63	40	0.0012	PH/J91	5.0	2.0	5.7	2220	50	F116PH122(1)063(2)	GMW5.7122(1)63J91(2)
63	40	0.0015	PH/J91	5.0	2.0	5.7	2220	50	F116PH152(1)063(2)	GMW5.7152(1)63J91(2)
63	40	0.0018	PH/J91	5.0	2.0	5.7	2220	50	F116PH182(1)063(2)	GMW5.7182(1)63J91(2)
63	40	0.0022	PH/J91	5.0	2.0	5.7	2220	50	F116PH222(1)063(2)	GMW5.7222(1)63J91(2)
63	40	0.0027	PH/J91	5.0	2.0	5.7	2220	50	F116PH272(1)063(2)	GMW5.7272(1)63J91(2)
63	40	0.0033	PH/J91	5.0	2.0	5.7	2220	50	F116PH332(1)063(2)	GMW5.7332(1)63J91(2)
63	40	0.0039	PH/J91	5.0	2.0	5.7	2220	50	F116PH392(1)063(2)	GMW5.7392(1)63J91(2)
63	40	0.0047	PH/J91	5.0	2.0	5.7	2220	50	F116PH472(1)063(2)	GMW5.7472(1)63J91(2)
63	40	0.0056	PH/J91	5.0	2.0	5.7	2220	50	F116PH562(1)063(2)	GMW5.7562(1)63J91(2)
63	40	0.0068	PH/J91	5.0	2.0	5.7	2220	50	F116PH682(1)063(2)	GMW5.7682(1)63J91(2)
63	40	0.0082	PH/J91	5.0	2.0	5.7	2220	40	F116PH822(1)063(2)	GMW5.7822(1)63J91(2)
63	40	0.010	PH/J91	5.0	2.0	5.7	2220	40	F116PH103(1)063(2)	GMW5.7103(1)63J91(2)
63	40	0.012	PH/J91	5.0	2.0	5.7	2220	40	F116PH123(1)063(2)	GMW5.7123(1)63J91(2)
63	40	0.015	PH/J91	5.0	2.0	5.7	2220	40	F116PH153(1)063(2)	GMW5.7153(1)63J91(2)
63	40	0.018	PH/J91	5.0	2.0	5.7	2220	40	F116PH183(1)063(2)	GMW5.7183(1)63J91(2)
63	40	0.022	PH/J91	5.0	2.0	5.7	2220	40	F116PH223(1)063(2)	GMW5.7223(1)63J91(2)
63	40	0.027	PH/J91	5.0	2.0	5.7	2220	40	F116PH273(1)063(2)	GMW5.7273(1)63J91(2)
63	40	0.033	PH/J91	5.0	2.0	5.7	2220	40	F116PH333(1)063(2)	GMW5.7333(1)63J91(2)
63	40	0.039	PH/J91	5.0	2.0	5.7	2220	30	F116PH393(1)063(2)	GMW5.7393(1)63J91(2)
63	40	0.047	PH/J91	5.0	2.0	5.7	2220	30	F116PH473(1)063(2)	GMW5.7473(1)63J91(2)
63	40	0.056	PH/J91	5.0	2.0	5.7	2220	30	F116PH563(1)063(2)	GMW5.7563(1)63J91(2)
63	40	0.068	PH/J91	5.0	2.0	5.7	2220	30	F116PH683(1)063(2)	GMW5.7683(1)63J91(2)
63	40	0.082	PH/J91	5.0	2.0	5.7	2220	30	F116PH823(1)063(2)	GMW5.7823(1)63J91(2)
63	40	0.10	PH/J91	5.0	2.0	5.7	2220	30	F116PH104(1)063(2)	GMW5.7104(1)63J91(2)
63	40	0.12	PH/J91	5.0	2.0	5.7	2220	20	F116PH124(1)063(2)	GMW5.7124(1)63J91(2)
63	40	0.15	PH/J91	5.0	2.0	5.7	2220	20	F116PH154(1)063(2)	GMW5.7154(1)63J91(2)
63	40	0.18	PH/J91	5.0	2.0	5.7	2220	20	F116PH184(1)063(2)	GMW5.7184(1)63J91(2)
63	40	0.22	PH/J91	5.0	2.0	5.7	2220	20	F116PH224(1)063(2)	GMW5.7224(1)63J91(2)
63	40	0.27	PH/J91	5.0	2.0	5.7	2220	20	F116PH274(1)063(2)	GMW5.7274(1)63J91(2)
63	40	0.33	PP/J93	5.0	3.0	5.7	2220	20	F116PP334(1)063(2)	GMW5.7334(1)63J93(2)
63	40	0.39	PP/J93	5.0	3.0	5.7	2220	20	F116PP394(1)063(2)	GMW5.7394(1)63J93(2)
63	40	0.47	PU/J95	5.0	4.0	5.7	2220	20	F116PU474(1)063(2)	GMW5.7474(1)63J95(2)
100	63	0.0010	PH/J91	5.0	2.0	5.7	2220	50	F116PH102(1)100(2)	GMW5.7102(1)100J91(2)
100	63	0.0012	PH/J91	5.0	2.0	5.7	2220	50	F116PH122(1)100(2)	GMW5.7122(1)100J91(2)
100	63	0.0015	PH/J91	5.0	2.0	5.7	2220	50	F116PH152(1)100(2)	GMW5.7152(1)100J91(2)
100	63	0.0018	PH/J91	5.0	2.0	5.7	2220	50	F116PH182(1)100(2)	GMW5.7182(1)100J91(2)
100	63	0.0022	PH/J91	5.0	2.0	5.7	2220	50	F116PH222(1)100(2)	GMW5.7222(1)100J91(2)
100	63	0.0027	PH/J91	5.0	2.0	5.7	2220	50	F116PH272(1)100(2)	GMW5.7272(1)100J91(2)
100	63	0.0033	PH/J91	5.0	2.0	5.7	2220	50	F116PH332(1)100(2)	GMW5.7332(1)100J91(2)
100	63	0.0039	PH/J91	5.0	2.0	5.7	2220	50	F116PH392(1)100(2)	GMW5.7392(1)100J91(2)
100	63	0.0047	PH/J91	5.0	2.0	5.7	2220	50	F116PH472(1)100(2)	GMW5.7472(1)100J91(2)
100	63	0.0056	PH/J91	5.0	2.0	5.7	2220	50	F116PH562(1)100(2)	GMW5.7562(1)100J91(2)
100	63	0.0068	PH/J91	5.0	2.0	5.7	2220	50	F116PH682(1)100(2)	GMW5.7682(1)100J91(2)
100	63	0.0082	PH/J91	5.0	2.0	5.7	2220	40	F116PH822(1)100(2)	GMW5.7822(1)100J91(2)
100	63	0.010	PH/J91	5.0	2.0	5.7	2220	40	F116PH103(1)100(2)	GMW5.7103(1)100J91(2)
100	63	0.012	PH/J91	5.0	2.0	5.7	2220	40	F116PH123(1)100(2)	GMW5.7123(1)100J91(2)
100	63	0.015	PH/J91	5.0	2.0	5.7	2220	40	F116PH153(1)100(2)	GMW5.7153(1)100J91(2)
100	63	0.018	PH/J91	5.0	2.0	5.7	2220	40	F116PH183(1)100(2)	GMW5.7183(1)100J91(2)
100	63	0.022	PH/J91	5.0	2.0	5.7	2220	40	F116PH223(1)100(2)	GMW5.7223(1)100J91(2)
100	63	0.027	PH/J91	5.0	2.0	5.7	2220	40	F116PH273(1)100(2)	GMW5.7273(1)100J91(2)
100	63	0.033	PH/J91	5.0	2.0	5.7	2220	40	F116PH333(1)100(2)	GMW5.7333(1)100J91(2)
100	63	0.039	PH/J91	5.0	2.0	5.7	2220	30	F116PH393(1)100(2)	GMW5.7393(1)100J91(2)
100	63	0.047	PH/J91	5.0	2.0	5.7	2220	30	F116PH473(1)100(2)	GMW5.7473(1)100J91(2)
100	63	0.056	PH/J91	5.0	2.0	5.7	2220	30	F116PH563(1)100(2)	GMW5.7563(1)100J91(2)
100	63	0.068	PH/J91	5.0	2.0	5.7	2220	30	F116PH683(1)100(2)	GMW5.7683(1)100J91(2)
100	63	0.082	PH/J91	5.0	2.0	5.7	2220	30	F116PH823(1)100(2)	GMW5.7823(1)100J91(2)
100	63	0.10	PH/J91	5.0	2.0	5.7	2220	30	F116PH104(1)100(2)	GMW5.7104(1)100J91(2)
100	63	0.12	PP/J93	5.0	3.0	5.7	2220	30	F116PP124(1)100(2)	GMW5.7124(1)100J93(2)
VDC	VAC	Capacitance Value (µF)	Size Code (New/Legacy)	B (mm)	H (mm)	L (mm)	Chip Size	dV/dt (V/µs)	New KEMET Part Number	Legacy Part Number

(1) K = ±10%, M = ±20%, J = ±5% on request.

(2) Insert ordering code for lead type and packaging. See Ordering Options Table for available options.

Table 1 – Ratings & Part Number Reference cont'd

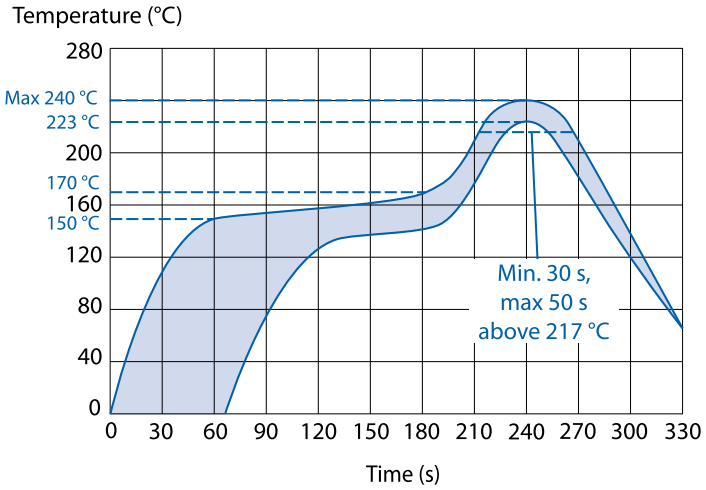
VDC	VAC	Cap Value (µF)	Size Code (New/Legacy)	Dimensions in mm			Chip Size	dV/dt (V/µs)	New KEMET Part Number	Legacy Part Number
				B	H	L				
100	63	0.15	PP/J93	5.0	3.0	5.7	2220	30	F116PP154(1)100(2)	GMW5.7154(1)100J93(2)
100	63	0.18	PU/J95	5.0	4.0	5.7	2220	30	F116PU184(1)100(2)	GMW5.7184(1)100J95(2)
100	63	0.22	PU/J95	5.0	4.0	5.7	2220	30	F116PU224(1)100(2)	GMW5.7224(1)100J95(2)
250	160	0.0010	PH/J91	5.0	2.0	5.7	2220	50	F116PH102(1)250(2)	GMW5.7102(1)250J91(2)
250	160	0.0012	PH/J91	5.0	2.0	5.7	2220	50	F116PH122(1)250(2)	GMW5.7122(1)250J91(2)
250	160	0.0015	PH/J91	5.0	2.0	5.7	2220	50	F116PH152(1)250(2)	GMW5.7152(1)250J91(2)
250	160	0.0018	PH/J91	5.0	2.0	5.7	2220	50	F116PH182(1)250(2)	GMW5.7182(1)250J91(2)
250	160	0.0022	PH/J91	5.0	2.0	5.7	2220	50	F116PH222(1)250(2)	GMW5.7222(1)250J91(2)
250	160	0.0027	PH/J91	5.0	2.0	5.7	2220	50	F116PH272(1)250(2)	GMW5.7272(1)250J91(2)
250	160	0.0033	PH/J91	5.0	2.0	5.7	2220	50	F116PH332(1)250(2)	GMW5.7332(1)250J91(2)
250	160	0.0039	PH/J91	5.0	2.0	5.7	2220	50	F116PH392(1)250(2)	GMW5.7392(1)250J91(2)
250	160	0.0047	PH/J91	5.0	2.0	5.7	2220	50	F116PH472(1)250(2)	GMW5.7472(1)250J91(2)
250	160	0.0056	PH/J91	5.0	2.0	5.7	2220	50	F116PH562(1)250(2)	GMW5.7562(1)250J91(2)
250	160	0.0068	PH/J91	5.0	2.0	5.7	2220	50	F116PH682(1)250(2)	GMW5.7682(1)250J91(2)
250	160	0.0082	PH/J91	5.0	2.0	5.7	2220	40	F116PH822(1)250(2)	GMW5.7822(1)250J91(2)
250	160	0.010	PH/J91	5.0	2.0	5.7	2220	40	F116PH103(1)250(2)	GMW5.7103(1)250J91(2)
250	160	0.012	PH/J91	5.0	2.0	5.7	2220	40	F116PH123(1)250(2)	GMW5.7123(1)250J91(2)
250	160	0.015	PH/J91	5.0	2.0	5.7	2220	40	F116PH153(1)250(2)	GMW5.7153(1)250J91(2)
250	160	0.018	PH/J91	5.0	2.0	5.7	2220	40	F116PH183(1)250(2)	GMW5.7183(1)250J91(2)
250	160	0.022	PH/J91	5.0	2.0	5.7	2220	40	F116PH223(1)250(2)	GMW5.7223(1)250J91(2)
250	160	0.027	PH/J91	5.0	2.0	5.7	2220	40	F116PH273(1)250(2)	GMW5.7273(1)250J91(2)
250	160	0.033	PH/J91	5.0	2.0	5.7	2220	40	F116PH333(1)250(2)	GMW5.7333(1)250J91(2)
250	160	0.039	PP/J93	5.0	3.0	5.7	2220	40	F116PP393(1)250(2)	GMW5.7393(1)250J93(2)
250	160	0.047	PP/J93	5.0	3.0	5.7	2220	40	F116PP473(1)250(2)	GMW5.7473(1)250J93(2)
250	160	0.056	PP/J93	5.0	3.0	5.7	2220	40	F116PP563(1)250(2)	GMW5.7563(1)250J93(2)
250	160	0.068	PU/J95	5.0	4.0	5.7	2220	40	F116PU683(1)250(2)	GMW5.7683(1)250J95(2)
400	200	0.0010	PH/J91	5.0	2.0	5.7	2220	50	F116PH102(1)400(2)	GMW5.7102(1)400J91(2)
400	200	0.0012	PH/J91	5.0	2.0	5.7	2220	50	F116PH122(1)400(2)	GMW5.7122(1)400J91(2)
400	200	0.0015	PH/J91	5.0	2.0	5.7	2220	50	F116PH152(1)400(2)	GMW5.7152(1)400J91(2)
400	200	0.0018	PH/J91	5.0	2.0	5.7	2220	50	F116PH182(1)400(2)	GMW5.7182(1)400J91(2)
400	200	0.0022	PH/J91	5.0	2.0	5.7	2220	50	F116PH222(1)400(2)	GMW5.7222(1)400J91(2)
400	200	0.0027	PH/J91	5.0	2.0	5.7	2220	50	F116PH272(1)400(2)	GMW5.7272(1)400J91(2)
400	200	0.0033	PH/J91	5.0	2.0	5.7	2220	50	F116PH332(1)400(2)	GMW5.7332(1)400J91(2)
400	200	0.0039	PH/J91	5.0	2.0	5.7	2220	50	F116PH392(1)400(2)	GMW5.7392(1)400J91(2)
400	200	0.0047	PH/J91	5.0	2.0	5.7	2220	50	F116PH472(1)400(2)	GMW5.7472(1)400J91(2)
400	200	0.0056	PH/J91	5.0	2.0	5.7	2220	50	F116PH562(1)400(2)	GMW5.7562(1)400J91(2)
400	200	0.0068	PH/J91	5.0	2.0	5.7	2220	50	F116PH682(1)400(2)	GMW5.7682(1)400J91(2)
400	200	0.0082	PP/J93	5.0	3.0	5.7	2220	50	F116PP822(1)400(2)	GMW5.7822(1)400J93(2)
400	200	0.010	PP/J93	5.0	3.0	5.7	2220	50	F116PP103(1)400(2)	GMW5.7103(1)400J93(2)
400	200	0.012	PP/J93	5.0	3.0	5.7	2220	50	F116PP123(1)400(2)	GMW5.7123(1)400J93(2)
400	200	0.015	PU/J95	5.0	4.0	5.7	2220	50	F116PU153(1)400(2)	GMW5.7153(1)400J95(2)
630	220	0.0010	PH/J91	5.0	2.0	5.7	2220	50	F116PH102(1)630(2)	GMW5.7102(1)630J91(2)
630	220	0.0012	PH/J91	5.0	2.0	5.7	2220	50	F116PH122(1)630(2)	GMW5.7122(1)630J91(2)
630	220	0.0015	PH/J91	5.0	2.0	5.7	2220	50	F116PH152(1)630(2)	GMW5.7152(1)630J91(2)
630	220	0.0018	PH/J91	5.0	2.0	5.7	2220	50	F116PH182(1)630(2)	GMW5.7182(1)630J91(2)
630	220	0.0022	PH/J91	5.0	2.0	5.7	2220	50	F116PH222(1)630(2)	GMW5.7222(1)630J91(2)
630	220	0.0027	PH/J91	5.0	2.0	5.7	2220	50	F116PH272(1)630(2)	GMW5.7272(1)630J91(2)
630	220	0.0033	PP/J93	5.0	3.0	5.7	2220	50	F116PP332(1)630(2)	GMW5.7332(1)630J93(2)
630	220	0.0039	PP/J93	5.0	3.0	5.7	2220	50	F116PP392(1)630(2)	GMW5.7392(1)630J93(2)
630	220	0.0047	PU/J95	5.0	4.0	5.7	2220	50	F116PU472(1)630(2)	GMW5.7472(1)630J95(2)
630	220	0.0056	PU/J95	5.0	4.0	5.7	2220	50	F116PU562(1)630(2)	GMW5.7562(1)630J95(2)
630	220	0.0068	PU/J95	5.0	4.0	5.7	2220	50	F116PU682(1)630(2)	GMW5.7682(1)630J95(2)
VDC	VAC	Capacitance Value (µF)	Size Code (New/Legacy)	B (mm)	H (mm)	L (mm)	Chip Size	dV/dt (V/µs)	New KEMET Part Number	Legacy Part Number

(1) K = ±10%, M = ±20%, J = ±5% on request.

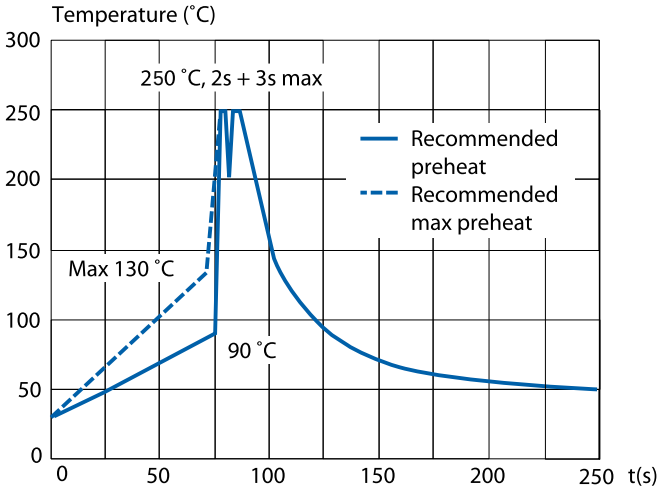
(2) Insert ordering code for lead type and packaging. See Ordering Options Table for available options.

Soldering Process

Reflow soldering temperature is measured 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 seconds. The peak temperature must not exceed 240°C.



Wave soldering: The recommended preheating temperature is 90°C (130°C maximum). The peak temperature 250°C may be applied for 2 – 5 seconds maximum. KEMET recommends wave soldering for parts with up to 2 mm height.



Marking

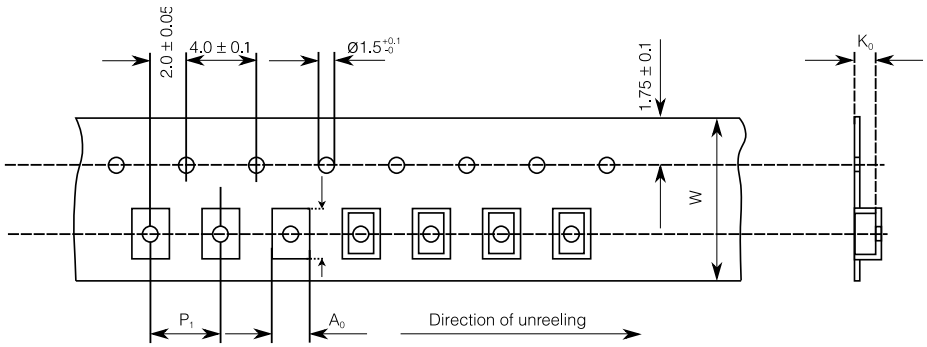
- Capacitance
- Capacitance tolerance code
- Rated voltage code
- Capacitor type G for GMW
- Manufacturing date code

Packaging Quantities

Chip Size (EIA)	Base (mm)	Height (mm)	Length (mm)	Bulk	Reel Horizontal Orientation
2220	5.0	2.0	5.7	2000	3100
2220	5.0	3.0	5.7	2000	2400
2220	5.0	4.0	5.7	2000	2100

Carrier Taping & Packaging (IEC 60286–2)

Horizontal Taping Orientation



Chip Size (EIA) Horizontal Mounting	Dimensions in mm			Taping Specification							
	B	H	L	W	P_1	A_0	B_0	K_0	D	W_1	W_2
	Nominal	Nominal	Nominal	-0/+0.3	+/-0.1	Nominal	Nominal	Nominal	-/+2.0	-0/+2	Maximum
2220	5.0	2.0	5.7	12.0	8.0	5.5	6.0	2.8	330	12.4	22.0
2220	5.0	3.0	5.7	12.0	8.0	5.5	6.0	3.3	330	12.4	22.0
2220	5.0	4.0	5.7	12.0	8.0	5.5	6.0	4.3	330	12.4	22.0

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Other KEMET Resources

Tools	
Resource	Location
Configure A Part: CapEdge	http://capacitoredge.kemet.com
SPICE & FIT Software	http://www.kemet.com/spice
Search Our FAQs: KnowledgeEdge	http://www.kemet.com/keask
Electrolytic LifeCalculator	http://www.kemet.com:8080/elc

Product Information	
Resource	Location
Products	http://www.kemet.com/products
Technical Resources (Including Soldering Techniques)	http://www.kemet.com/technicalpapers
RoHS Statement	http://www.kemet.com/rohs
Quality Documents	http://www.kemet.com/qualitydocuments

Product Request	
Resource	Location
Sample Request	http://www.kemet.com/sample
Engineering Kit Request	http://www.kemet.com/kits

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Twitter	http://twitter.com/kemetcapacitors

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