

# PMR205 Series Metallized Impregnated Paper, 125 VAC/250 VDC

## Overview

The PMR205 Series is constructed of multilayer metallized paper encapsulated and impregnated in self-extinguishing material meeting the requirements of UL 94 V-0.

## Applications

Typical applications include worldwide use in contact protection, contact interference suppression and transient suppression.

## Benefits

- Rated voltage: 125 VAC/250 VDC, 50/60 Hz
- Capacitance range: 0.1 – 1.0  $\mu$ F
- Capacitance tolerance:  $\pm$ 20%
- Resistance range: 22 – 680  $\Omega$
- Resistance tolerance:  $\pm$ 30%
- Lead spacing: 15.2 – 25.4 mm
- Climatic category: 40/085/56/B, IEC 60068-1
- Tape and reel packaging in accordance with IEC 60286-2
- RoHS Compliant and lead-free terminations
- Operating temperature range of -40°C to +85°C
- Excellent self-healing properties which ensure long life even when subjected to frequent over voltages
- Good resistance to ionization due to impregnated paper dielectric
- High dV/dt capability
- Impregnated paper ensures excellent stability and reliability properties, particularly in applications with continuous operation



## Legacy Part Number System

PMR205	A	B	6100	M	033	R30
Series	Rated Voltage (VAC)	Lead Spacing (mm)	Capacitance Code (pF)	Capacitance Tolerance	Resistance ( $\Omega$ )	Lead and Packaging Code
RC Snubber, Metallized Paper	A = 125	B = 15.2 C = 20.3 E = 25.4	Digits 2 – 4 (3) indicates the first three digits of the capacitance value. First digit indicates the total number of digits in the capacitance value.	M = $\pm$ 20%	Resistance Value in $\Omega$	See Ordering Options Table

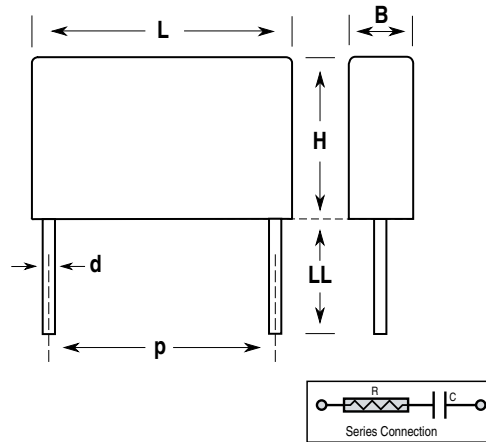
## New KEMET Part Number System

P	405	Q	E	104	M	125	A	H330
Capacitor Class	Series	Lead Spacing (mm)	Size Code	Capacitance Code (pF)	Capacitance Tolerance	Rated Voltage (VAC)	Lead and Packaging Code	Resistance ( $\Omega$ )
P = Metallized Paper	RC Snubber	Q = 15.2 C = 20.3 E = 25.4	See Dimension Table	First two digits represent significant figures. Third digit specifies number of zeros.	M = $\pm$ 20%	125 = 125	See Ordering Options Table	H + first two digits representing significant figures. Third digit specifies number of zeros.

## Ordering Options Table

Lead Spacing Nominal (mm)	Type of Leads and Packaging	Lead Length (mm)	KEMET Lead and Packaging Code	Legacy Lead and Packaging Code
15.2	<b>Standard Lead and Packaging Options</b>			
	Bulk (Bag) – Short Leads	6 +0/-1	C	R06
	Bulk (Bag) – Max Length Leads	30 +5/-0	A	R30
	Tape & Reel (Standard Reel)	$H_0 = 18.5 \pm 0.5$	L	R19T0
	<b>Other Lead and Packaging Options</b>			
	Tape & Reel (Large Reel)	$H_0 = 18.5 \pm 0.5$	P	R19T1
20.3	<b>Standard Lead and Packaging Options</b>			
	Bulk (Tray) – Short Leads	6 +0/-1	C	R06
	Bulk (Bag) – Max Length Leads	30 +5/-0	A	R30
	Tape & Reel (Standard Reel)	$H_0 = 18.5 \pm 0.5$	L	R19T0
	<b>Other Lead and Packaging Options</b>			
	Tape & Reel (Large Reel)	$H_0 = 18.5 \pm 0.5$	P	R19T1
25.4	<b>Standard Lead and Packaging Options</b>			
	Bulk (Bag) – Short Leads	6 +0/-1	C	R06
	Bulk (Tray) – Max Length Leads	30 +5/-0	A	R30

## Dimensions – Millimeters



Size Code	p		B		H		L		d	
	Nominal	Tolerance	Nominal	Tolerance	Nominal	Tolerance	Nominal	Tolerance	Nominal	Tolerance
QE	15.2	+/-0.4	5.2	Maximum	10.5	Maximum	18.5	Maximum	0.8	+/-0.05
QM	15.2	+/-0.4	7.3	Maximum	13	Maximum	18.5	Maximum	0.8	+/-0.05
QP	15.2	+/-0.4	7.8	Maximum	13.5	Maximum	18.5	Maximum	0.8	+/-0.05
CE	20.3	+/-0.4	7.6	Maximum	14	Maximum	24	Maximum	0.8	+/-0.05
CJ	20.3	+/-0.4	9	Maximum	15	Maximum	24	Maximum	0.8	+/-0.05
CP	20.3	+/-0.4	11.3	Maximum	16.5	Maximum	24	Maximum	0.8	+/-0.05
EE	25.4	+/-0.4	10.6	Maximum	16.1	Maximum	30.5	Maximum	1.0	+/-0.05

**Note: See Ordering Options Table for lead length (LL) options.**

## Performance Characteristics

Rated Voltage	125 VAC 50/60 Hz														
Capacitance Range	0.1 – 1.0 $\mu$ F														
Capacitance Tolerance	$\pm$ 20%														
Resistance Range	22 – 680 $\Omega$														
Resistance Tolerance	$\pm$ 30%														
Temperature Range	-40°C to +85°C														
Climatic Category	40/085/56/B														
Peak Pulse Voltage	375 V														
Series Resistance	The series resistance is defined at 1 kHz for RC $\geq$ 50 $\mu$ s and at 100 kHz for RC < 50 $\mu$ s														
Insulation Resistance	Minimum Values Between Terminals														
	$C \leq 0.33 \mu\text{F}$	$\geq 3,000 \text{ M}\Omega$													
	$C > 0.33 \mu\text{F}$	$\geq 1,000 \text{ M}\Omega \cdot \mu\text{F}$													
Power Ratings	The average losses may reach 0.5 W provided the surface temperature does not exceed + 85°C. For maximum permitted power dissipation vs. temperature, see Derating Curves.														
Derating Curves	Maximum Allowable Power Dissipation vs. Ambient Temperature and Case Sizes.														
	<table border="1" style="margin-top: 10px;"> <thead> <tr> <th>Curve</th> <th>Dimension B (mm)</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>5.2</td> </tr> <tr> <td>2</td> <td>7.3</td> </tr> <tr> <td>2</td> <td>7.8</td> </tr> <tr> <td>3</td> <td>7.6</td> </tr> <tr> <td>4</td> <td>9</td> </tr> <tr> <td>5</td> <td>11.3</td> </tr> </tbody> </table>		Curve	Dimension B (mm)	1	5.2	2	7.3	2	7.8	3	7.6	4	9	5
Curve	Dimension B (mm)														
1	5.2														
2	7.3														
2	7.8														
3	7.6														
4	9														
5	11.3														

## Environmental Test Data

Test	IEC Publication	Procedure
Vibration	IEC 60068–2–6 Test Fc	3 directions at 2 hours each 10 – 500 Hz at 0.75 mm or 98 m/s <sup>2</sup>
Bump	IEC 60068–2–29 Test Eb	4,000 bumps at 390 m/s <sup>2</sup>
Solderability	IEC 60068–2–20 Test Ta	Wetting time for d > 0.8 < 1.5 seconds
Damp Heat Steady State	IEC 60068–2–78 Test Cab	+40°C and 93% RH, 56 days

## Environmental Compliance

All KEMET EMI capacitors are RoHS Compliant.



RoHS Compliant

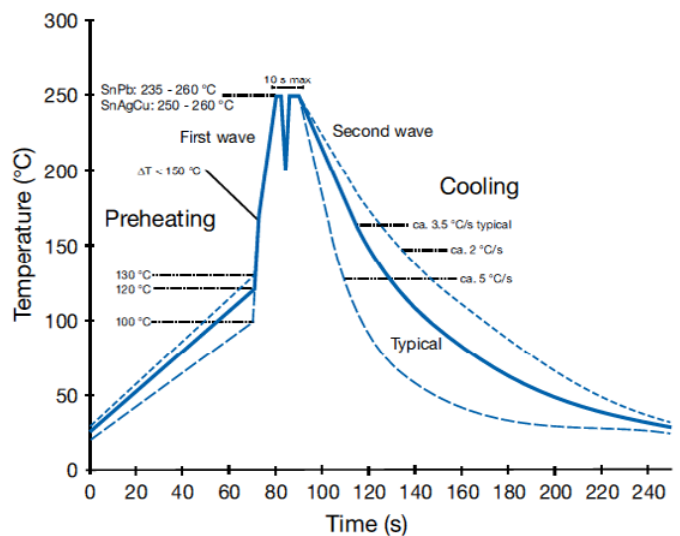
**Table 1 – Ratings & Part Number Reference**

Lead Spacing (p)	Cap Value (µF)	Resistance (Ω)	Maximum Dimensions in mm			New KEMET Part Number	Legacy Part Number
			B	H	L		
15.2	0.10	33	5.2	10.5	18.5	P405QE104M125(1)H330	PMR205AB6100M033(1)
15.2	0.10	47	5.2	10.5	18.5	P405QE104M125(1)H470	PMR205AB6100M047(1)
15.2	0.10	100	5.2	10.5	18.5	P405QE104M125(1)H101	PMR205AB6100M100(1)
15.2	0.10	220	5.2	10.5	18.5	P405QE104M125(1)H221	PMR205AB6100M220(1)
15.2	0.15	68	5.2	10.5	18.5	P405QE154M125(1)H680	PMR205AB6150M068(1)
15.2	0.15	100	5.2	10.5	18.5	P405QE154M125(1)H101	PMR205AB6150M100(1)
15.2	0.22	47	7.3	13.0	18.5	P405QM224M125(1)H470	PMR205AB6220M047(1)
15.2	0.22	100	7.3	13.0	18.5	P405QM224M125(1)H101	PMR205AB6220M100(1)
15.2	0.22	220	7.3	13.0	18.5	P405QM224M125(1)H221	PMR205AB6220M220(1)
15.2	0.22	330	7.3	13.0	18.5	P405QM224M125(1)H331	PMR205AB6220M330(1)
15.2	0.22	470	7.3	13.0	18.5	P405QM224M125(1)H471	PMR205AB6220M470(1)
15.2	0.25	200	7.3	13.0	18.5	P405QM254M125(1)H201	PMR205AB6250M200(1)
15.2	0.25	350	7.3	13.0	18.5	P405QM254M125(1)H351	PMR205AB6250M350(1)
15.2	0.25	600	7.3	13.0	18.5	P405QM254M125(1)H601	PMR205AB6250M600(1)
15.2	0.33	47	7.8	13.5	18.5	P405QP334M125(1)H470	PMR205AB6330M047(1)
20.3	0.47	22	7.6	14.0	24.0	P405CE474M125(1)H220	PMR205AC6470M022(1)
20.3	0.47	33	7.6	14.0	24.0	P405CE474M125(1)H330	PMR205AC6470M033(1)
20.3	0.47	47	7.6	14.0	24.0	P405CE474M125(1)H470	PMR205AC6470M047(1)
20.3	0.47	68	7.6	14.0	24.0	P405CE474M125(1)H680	PMR205AC6470M068(1)
20.3	0.47	100	7.6	14.0	24.0	P405CE474M125(1)H101	PMR205AC6470M100(1)
20.3	0.47	150	7.6	14.0	24.0	P405CE474M125(1)H151	PMR205AC6470M150(1)
20.3	0.47	220	7.6	14.0	24.0	P405CE474M125(1)H221	PMR205AC6470M220(1)
20.3	0.47	330	7.6	14.0	24.0	P405CE474M125(1)H331	PMR205AC6470M330(1)
20.3	0.47	470	9.0	15.0	24.0	P405CJ474M125(1)H471	PMR205AC6470M470(1)
20.3	0.47	680	11.3	16.5	24.0	P405CP474M125(1)H681	PMR205AC6470M680(1)
25.4	1.0	33	10.6	16.1	30.5	P405EE105M125(1)H330	PMR205AE7100M033(1)
20.3	1.0	47	11.3	16.5	24.0	P405CP105M125(1)H470	PMR205AC7100M047(1)
20.3	1.0	68	11.3	16.5	24.0	P405CP105M125(1)H680	PMR205AC7100M068(1)
20.3	1.0	100	11.3	16.5	24.0	P405CP105M125(1)H101	PMR205AC7100M100(1)
20.3	1.0	150	11.3	16.5	24.0	P405CP105M125(1)H151	PMR205AC7100M150(1)
20.3	1.0	220	11.3	16.5	24.0	P405CP105M125(1)H221	PMR205AC7100M220(1)
Lead Spacing (p)	Cap Value (µF)	Resistance Ω	B (mm)	H (mm)	L (mm)	New KEMET Part Number	Legacy Part Number

(1) Insert lead and packaging code. See Ordering Options Table for available options.

## Soldering Process

The implementation of the RoHS Directive has required the use of SnAuCu (SAC) or SnCu alloys as primary solder. These alloys require a higher liquidus temperature (217°C – 221°C) as compared to SnPb eutectic alloy (183°C). Due to the higher pre-heat and wave temperatures, the heat stress to components has increased considerably. Polypropylene capacitors are especially sensitive to soldering temperature due to the relatively low melting point of polypropylene material (160°C – 170°C). As a result, wave soldering can be destructive, especially to mechanically small polypropylene capacitors with lead spacings of 5 – 10 mm. For more information, please refer to KEMET's Recommended Soldering Profiles or contact a KEMET representative. IEC Publication 61760–1 Edition 2 may also be consulted for general guidelines.



## Marking

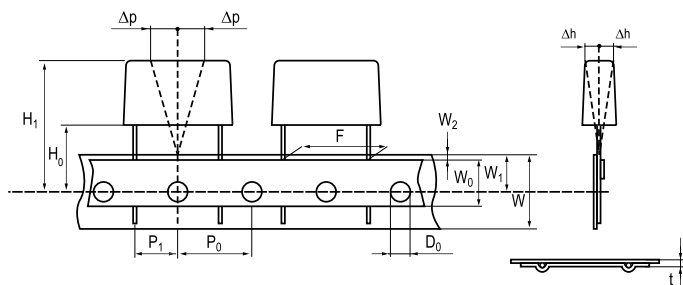
- KEMET's logo
- Series
- RC unit
- Capacitance
- Rated resistance
- Rated voltage
- IEC climatic category
- Circuit diagram
- Passive flammability class
- Manufacturing date code

## Packaging Quantities

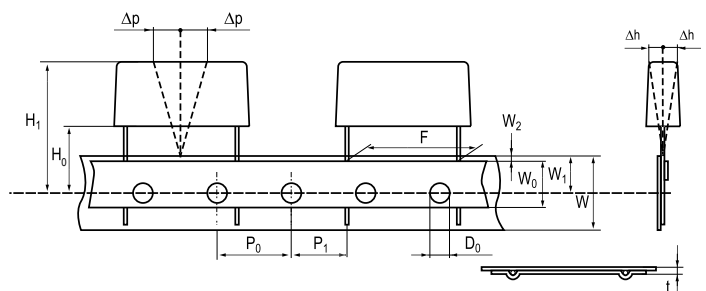
Size Code	Lead Spacing (mm)	Thickness (mm)	Height (mm)	Length (mm)	Bulk Short Leads	Bulk Long Leads	Standard Reel ø 360 mm
QE	15.2	5.2	10.5	18.5	500	100	600
QM	15.2	7.3	13	18.5	400	800	400
QP	15.2	7.8	13.5	18.5	400	800	400
CE	20.3	7.6	14	24	250	1500	250
CJ	20.3	9	15	24	200	1200	250
CP	20.3	11.3	16.5	24	150	1000	180
EE	25.4	10.6	16.1	30.5	150	1000	

## Lead Taping & Packaging (IEC 60286-2)

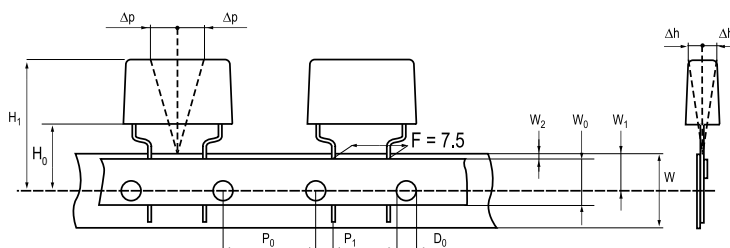
### Lead Spacing 10.2 – 15.2 mm



### Lead Spacing 20.3 – 22.5 mm



### Formed Leads from 10.2 to 7.5 mm



## Taping Specification

Dimensions in mm								Standard IEC 60286-2
Lead spacing	+6/-0.1	F	Formed 7.5	10.2	15.2	20.3	22.5	F
Carrier tape width	+/-0.5	W	18	18	18	18	18	18 <sup>+1/-0.5</sup>
Hold-down tape width	+/-0.3	W <sub>0</sub>	9	12	12	12	12	
Position of sprocket hole	+/-0.5	W <sub>1</sub>	9	9	9	9	9	9 <sup>+0.75/-0.5</sup>
Distance between tapes	Maximum	W <sub>2</sub>	3	3	3	3	3	3
Sprocket hole diameter	+/-0.2	D <sub>0</sub>	4	4	4	4	4	4
Feed hole lead spacing	+/-0.3	P <sub>0</sub> <sup>(1)</sup>	12.7 <sup>(4)</sup>	12.7	12.7	12.7	12.7	12.7
Distance lead – feed hole	+/-0.7	P <sub>1</sub>	3.75	7.6	5.1	8.9	5.3	P <sup>1</sup>
Deviation tape – plane	Maximum	Δp	1.3	1.3	1.3	1.3	1.3	1.3
Lateral deviation	Maximum	Δh	2	2	2	2	2	2
Total thickness	+/-0.2	t	0.7	0.7	0.7	0.7	0.9 <sup>MAX</sup>	0.9 <sup>MAX</sup>
Sprocket hole/cap body	Nominal	H <sub>0</sub> <sup>(2)</sup>	18 <sup>+2/-0</sup>	18 <sup>+2/-0</sup>	18 <sup>+2/-0</sup>	18 <sup>+2/-0</sup>	18.5 <sup>+/-0.5</sup>	18 <sup>+2/-0</sup>
Sprocket hole/top of cap body	Maximum	H <sub>1</sub> <sup>(3)</sup>	35	35	35	35	58	58 <sup>MAX</sup>

(1) Maximum cumulative feed hole error, 1 mm per 20 parts.

(2) 16.5 mm available on request.

(3) Depending on case size.

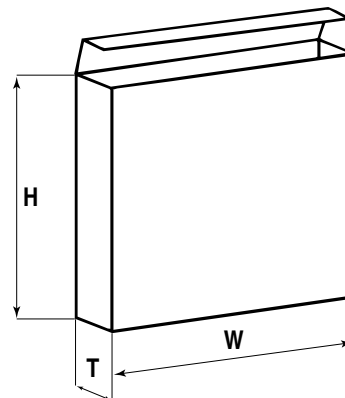
(4) 15 mm available on request.



## Lead Taping & Packaging (IEC 60286–2) cont'd

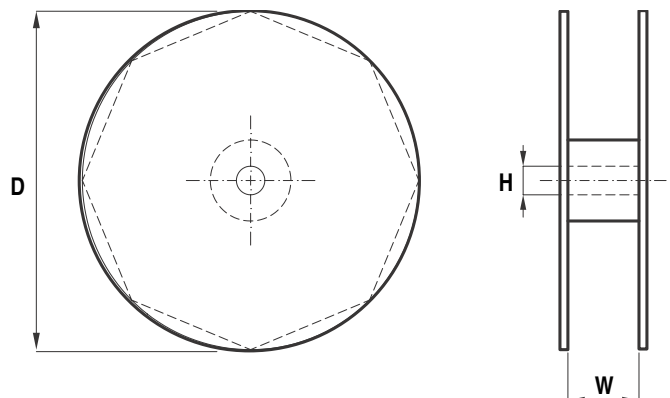
### Ammo Specifications

Series	Dimensions (mm)		
	H	W	T
R4x, R4x+R, R7x, RSB	360	340	59
F5A, F5B, F5D			
F6xx, F8xx			
PHExxx, PMExxx, PMRxxx	330	330	50



### Reel Specifications

Series	Dimensions (mm)		
	D	H	W
R4x, R4x+R, R7x, RSB	355 500	30	55 (Max)
F5A, F5B, F5D		25	
F6xx, F8xx			
PHExxx, PMExxx, PMRxxx	360 500	30	46 (Max)



### Manufacturing Date Code (IEC–60062)

Y = Year, Z = Month			
Year	Code	Month	Code
2000	M	January	1
2001	N	February	2
2002	P	March	3
2003	R	April	4
2004	S	May	5
2005	T	June	6
2006	U	July	7
2007	V	August	8
2008	W	September	9
2009	X	October	O
2010	A	November	N
2011	B	December	D
2012	C		
2013	D		
2014	E		
2015	F		
2016	H		
2017	J		
2018	K		
2019	L		
2020	M		

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Tel: 954-766-2800

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### Southeast

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Tel: 407-855-8886

### Northeast

Wilmington, MA  
Tel: 978-658-1663

West Chester, PA  
Tel: 610-692-4642

### Central

Novi, MI  
Tel: 248-994-1030

Carmel, IN  
Tel: 317-706-6742

### West

Milpitas, CA  
Tel: 408-433-9950

### Mexico

Zapopan, Jalisco  
Tel: 52-33-3123-2141

## Europe

### Southern Europe

Geneva, Switzerland  
Tel: 41-22-715-0100

Paris, France  
Tel: 33-1-4646-1009

Sasso Marconi, Italy  
Tel: 39-051-939111

Milan, Italy  
Tel: 39-02-57518176

Rome, Italy  
Tel: 39-06-23231718

Madrid, Spain  
Tel: 34-91-804-4303

### Central Europe

Landsberg, Germany  
Tel: 49-8191-3350800

Dortmund, Germany  
Tel: 49-2307-3619672

Kwidzyn, Poland  
Tel: 48-55-279-7025

### Northern Europe

Bishop's Stortford, United Kingdom  
Tel: 44-1279-757201

Weymouth, United Kingdom  
Tel: 44-1305-830747

Coatbridge, Scotland  
Tel: 44-1236-434455

Färjestaden, Sweden  
Tel: 46-485-563934

Espoo, Finland  
Tel: 358-9-5406-5000

## Asia

### Northeast Asia

Hong Kong  
Tel: 852-2305-1168

Shenzhen, China  
Tel: 86-755-2518-1306

Beijing, China  
Tel: 86-10-5829-1711

Shanghai, China  
Tel: 86-21-6447-0707

Taipei, Taiwan  
Tel: 886-2-27528585

### Southeast Asia

Singapore  
Tel: 65-6586-1900

Penang, Malaysia  
Tel: 60-4-6430200

Bangalore, India  
Tel: 91-806-53-76817

*Note: KEMET reserves the right to modify minor details of internal and external construction at any time in the interest of product improvement. KEMET does not assume any responsibility for infringement that might result from the use of KEMET Capacitors in potential circuit designs. KEMET is a registered trademark of KEMET Electronics Corporation.*

## Other KEMET Resources

Tools	
Resource	Location
Configure A Part: CapEdge	<a href="http://capacitoredge.kemet.com">http://capacitoredge.kemet.com</a>
SPICE & FIT Software	<a href="http://www.kemet.com/spice">http://www.kemet.com/spice</a>
Search Our FAQs: KnowledgeEdge	<a href="http://www.kemet.com/keask">http://www.kemet.com/keask</a>

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

Product Request	
Resource	Location
Sample Request	<a href="http://www.kemet.com/sample">http://www.kemet.com/sample</a>
Engineering Kit Request	<a href="http://www.kemet.com/kits">http://www.kemet.com/kits</a>

Contact	
Resource	Location
Website	<a href="http://www.kemet.com">www.kemet.com</a>
Contact Us	<a href="http://www.kemet.com/contact">http://www.kemet.com/contact</a>
Investor Relations	<a href="http://www.kemet.com/ir">http://www.kemet.com/ir</a>
Call Us	1-877-MyKEMET
Twitter	<a href="http://twitter.com/kemetcapacitors">http://twitter.com/kemetcapacitors</a>

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Although we design and manufacture our products to the most stringent quality and safety standards, given the current state of the art, isolated component failures may still occur. Accordingly, customer applications which require a high degree of reliability or safety should employ suitable designs or other safeguards (such as installation of protective circuitry or redundancies) in order to ensure that the failure of an electrical component does not result in a risk of personal injury or property damage.

Although all product-related warnings, cautions and notes must be observed, the customer should not assume that all safety measures are indicated or that other measures may not be required.



Digitally signed by: Marcy Brand  
DN: o=KEMET Corporation  
Location: Fort Lauderdale, FL  
Date: D:2012.07.30  
10:18:37-05'00'