

Overview

KEMET's PEG 127 is an electrolytic capacitor with outstanding electrical performance. The device has a polarized all-welded design, tinned copper wire leads, a negative pole connected to the case, and plastic insulation. The PEG 127 winding is housed in a cylindrical aluminum can with a high purity aluminum lid and high quality rubber gasket, as well as high temperature capability in small case sizes. The PEG 127 has 1600 h operational life at +150°C for all case sizes.

Applications

KEMET's PEG127 is a high performance axial electrolytic capacitor. It is designed for automotive applications with high demands on resistance to vibrations and high ambient temperature.

Benefits

- 1,500 hours at +150°C
- High ripple capability



Part Number System

PEG127	H	A	318	0	Q	T1
Series	Voltage (VDC)	Size Code	Capacitance Code (µF)	Version	Capacitance Tolerance	Packaging
Axial Aluminum Electrolytic	H = 25 K = 40 M = 63	See Dimension Table	The second two digits indicate the two most significant digits of the capacitance value. The first digit indicates the total number digits.	0 = Standard	Q = -10 +30%	See Ordering Options Table

Performance Characteristics

Item	Performance Characteristics	
Capacitance Range	33 – 1,300 μ F	
Rated Voltage	25 – 63 VDC	
Temperature Range	-40 to +150°C	
Capacitance Tolerance	-10/+30% at 100 Hz/+20°C	
Shelf Life	5,000 hours at +105°C or 10 years at +40°C 0 VDC	
Leakage Current	$I = 0.003 CV + 4,000$ (μ A)	
	C = rated capacitance (μ F), V = rated voltage (VDC). Voltage applied for 5 minutes at +20°C.	
Vibration Test Specifications	Procedure	Requirements
	1.5 mm displacement amplitude or 20 g maximum acceleration. Vibration applied for three 2-hour sessions at 10 – 2,000 Hz (capacitor clamped by body).	No leakage of electrolyte or other visible damage. Deviations in capacitance and $\tan \delta$ from initial measurements must not exceed: $\Delta C/C < 5\%$
Standards	IEC 60384–4 long life grade 40/125/56, AEC–Q200	

Compensation Factor of Ripple Current (RC) vs. Frequency

Frequency	100 Hz	300 Hz	1 kHz	5 kHz	100 kHz
Coefficient	0.35	0.57	0.80	1.00	1.04

Compensation Factor of ESR (5 kHz,+125 °C) vs. Frequency

Frequency	300 Hz	1 kHz	5 kHz	100 kHz
Coefficient	8.00	3.00	1.5	1

Compensation Factor of ESR (5 kHz,+125 °C) vs. Temperature

Frequency	-10°C	60°C	105°C	125°C
Coefficient	5.00	1.50	1.1	1

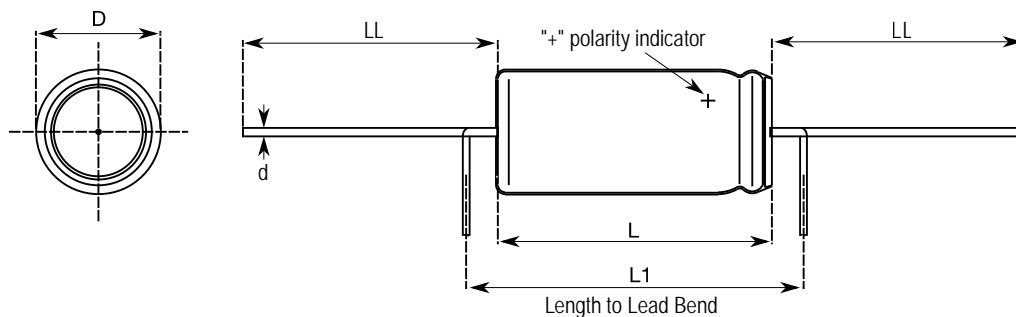
Test Method & Performance

Endurance Life Test	
Conditions	Performance
Temperature	+150°C
Test Duration	1,600 hours
Ripple Current	Maximum ripple current specified in table
Voltage	The sum of DC voltage and the peak AC voltage must not exceed the rated voltage of the capacitor
Performance	The following specifications will be satisfied when the capacitor is tested at +20°C:
Capacitance Change	Within 15% of the initial value
Equivalent Series Resistance	Does not exceed 200% of the initial value
Leakage Current	Does not exceed leakage current limit

Ordering Options Table

Packaging Kind	Lead Length (mm)	Lead and Packaging Code
Standard Packaging Options		
Bulk (bag)	42 +3/-2	(Blank)
Tape & Reel	See Dimension Table	T1

Dimensions – Millimeters



Size Code	Dimensions in mm				Bulk	Taped
	D	L	L1	d	LL	LL
	± 0.5	± 1	Minimum	± 0.03	+3/-2	+3/-2
A	10	20.0	26.0	0.8	42	31
B	10	29.0	35.0	0.8	42	27
C	13	20.0	26.0	0.8	42	31
D	13	29.0	35.0	0.8	42	27
E	13	37.0	43.0	0.8	42	24

Shelf Life

The capacitance, ESR and impedance of a capacitor will not change significantly after extended storage periods, however the leakage current will very slowly increase. KEMET products are particularly stable and allow a shelf life in excess of three years at 40°C. See sectional specification under each product series for specific data.

Re-age (Reforming) Procedure

Apply the rated voltage to the capacitor at room temperature for a period of one hour, or until the leakage current has fallen to a steady value below the specified limit. During re-aging a maximum charging current of twice the specified leakage current or 5 mA (whichever is greater) is suggested.

Reliability

The reliability of a component can be defined as the probability that it will perform satisfactorily under a given set of conditions for a given length of time.

In practice, it is impossible to predict with absolute certainty how any individual component will perform; thus, we must utilize probability theory. It is also necessary to clearly define the level of stress involved (e.g. operating voltage, ripple current, temperature and time). Finally, the meaning of satisfactory performance must be defined by specifying a set of conditions which determine the end of life of the component.

Reliability as a function of time, $R(t)$, is normally expressed as: $R(t) = e^{-\lambda t}$
where $R(t)$ is the probability that the component will perform satisfactorily for time t , and λ is the failure rate.

Failure Rate

The failure rate is the number of components failing per unit time. The failure rate of most electronic components follows the characteristic pattern:

- Early failures are removed during the manufacturing process.
- The operational life is characterized by a constant failure rate.
- The wear out period is characterized by a rapidly increasing failure rate.

The failures in time (FIT) are given with a 60% confidence level for the various type codes. By convention, FIT is expressed as 1×10^{-9} failures per hour. Failure rate is also expressed as a percentage of failures per 1,000 hours.

e.g., 100FIT = 1×10^{-7} failures per hour = 0.01%/1,000 hours

End of Life Definition

Catastrophic Failure: short circuit, open circuit or safety vent operation

Parametric Failure:

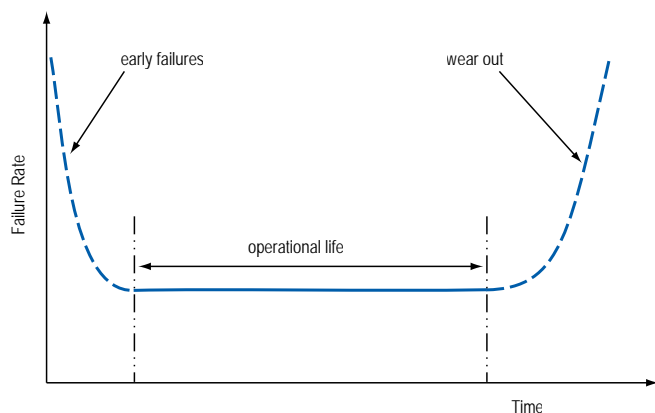
- Change in capacitance $> \pm 10\%$
- Leakage current $>$ specified limit
- ESR $> 2 \times$ initial ESR value

Failure Rate cont'd

MTBF

The mean time between failures (MTBF) is simply the inverse of the failure rate.

$$MTBF = 1/\lambda$$



Estimated field failure rate: ≤ 0.15 ppm (failures per year/produced number of capacitors per year)

The expected failure rate for this capacitor range is based on field experience for capacitors with structural similarity.

Environmental Compliance

As an environmentally conscious company, KEMET is working continuously with improvements concerning the environmental effects of both our capacitors and their production. In Europe (RoHS Directive) and in some other geographical areas like China, legislation has been put in place to prevent the use of some hazardous materials, such as lead (Pb), in electronic equipment. All products in this catalog are produced to help our customers' obligations to guarantee their products and fulfill these legislative requirements. The only material of concern in our products has been lead (Pb), which has been removed from all designs to fulfill the requirement of containing less than 0.1% of lead in any homogeneous material. KEMET will closely follow any changes in legislation world wide and makes any necessary changes in its products, whenever needed.

Some customer segments such as medical, military and automotive electronics may still require the use of lead in electrode coatings. To clarify the situation and distinguish products from each other, a special symbol is used on the packaging labels for RoHS compatible capacitors.

Because of customer requirements, there may appear additional markings such as LF = Lead Free or LFW = Lead Free Wires on the label.



RoHS Compliant

Table 1 – Ratings & Part Number Reference

VDC	Rated Capacitance 100 Hz 20°C (µF)	Size Code	Case Size D x L (mm)	Ripple Current Maximum				ESR Maximum			Part Number
				≥ 5 kHz 100°C (A)	≥ 5 kHz 125°C (A)	≥ 5 kHz 140°C (A)	≥ 5 kHz 150°C (A)	100 Hz 20°C (mΩ)	100 kHz 20°C (mΩ)	5 – 100 kHz 125 – 150°C (mΩ)	
25	180	A	10 x 20	2.4	1.7	1.1	0.49	560	255	80	PEG127HA3180Q(1)
25	360	B	10 x 29	3.5	2.5	1.6	0.71	281	130	43	PEG127HB3360Q(1)
25	470	C	13 x 20	3.8	2.8	1.8	0.79	226	110	40	PEG127HC3470Q(1)
25	900	D	13 x 29	5.6	4.0	2.6	1.15	118	58	23	PEG127HD3900Q(1)
25	1300	E	13 x 37	6.6	4.8	3.0	1.35	85	42	18	PEG127HE4130Q(1)
40	110	A	10 x 20	2.3	1.7	1.1	0.48	710	240	82	PEG127KA3110Q(1)
40	220	B	10 x 29	3.4	2.5	1.6	0.70	360	125	45	PEG127KB3220Q(1)
40	270	C	13 x 20	3.7	2.7	1.7	0.77	301	110	42	PEG127KC3270Q(1)
40	520	D	13 x 29	5.4	3.9	2.5	1.11	157	58	24	PEG127KD3520Q(1)
40	750	E	13 x 37	6.5	4.7	3.0	1.32	110	42	19	PEG127KE3750Q(1)
63	33	A	10 x 20	1.6	1.1	0.7	0.32	1700	370	181	PEG127MA2330Q(1)
63	68	B	10 x 29	2.4	1.7	1.1	0.49	825	185	92	PEG127MB2680Q(1)
63	80	C	13 x 20	2.7	1.9	1.2	0.55	704	160	82	PEG127MC2800Q(1)
63	160	D	13 x 29	4.0	2.9	1.8	0.83	354	82	44	PEG127MD3160Q(1)
63	230	E	13 x 37	4.9	3.5	2.2	1.00	250	59	32	PEG127ME3230Q(1)
VDC	Rated Capacitance	Size Code	Case Size	Ripple Current				ESR			Part Number

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

Packaging Quantities

Size Code	Packaging Quantities	
	Tape and Reel	Bulk
A	500	250
B	500	200
C	400	250
D	400	200
E	400	150

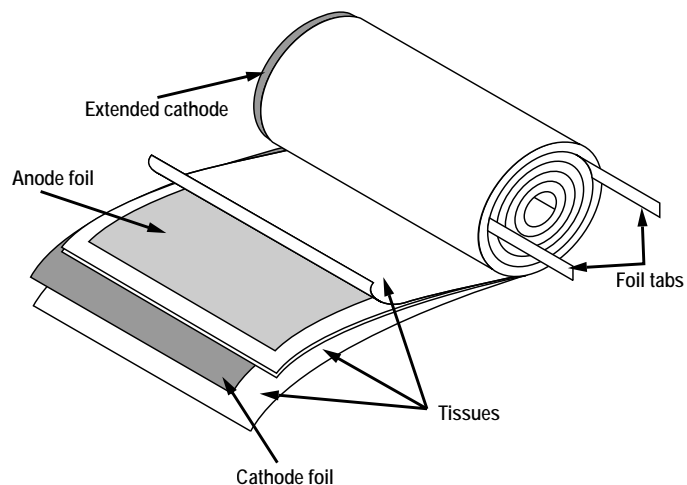
Print Detail

Standard Marking for PEG and PEH types

- KEMET Logo
- Rated capacitance
- Capacitance tolerance
- Rated voltage
- Date code
- Polarity indication
- Article code

Construction

The manufacturing process begins with the anode foil being electrochemically etched to increase the surface area and then “formed” to produce the aluminum oxide layer. Both the anode and cathode foils are then interleaved with absorbent paper and wound into a cylinder. During the winding process, aluminum tabs are attached to each foil to provide the electrical contact.



The deck, complete with terminals, is attached to the tabs and then folded down to rest on top of the winding. The complete winding is impregnated with electrolyte before being housed in a suitable container, usually an aluminum can, and sealed. Throughout the process, all materials inside the housing must be maintained at the highest purity and be compatible with the electrolyte.

Each capacitor is aged and tested before being sleeved and packed. The purpose of aging is to repair any damage in the oxide layer and thus reduce the leakage current to a very low level. Aging is normally carried out at the rated temperature of the capacitor and is accomplished by applying voltage to the device while carefully controlling the supply current. The process may take several hours to complete.

Damage to the oxide layer can occur due to variety of reasons:

- Slitting of the anode foil after forming
- Attaching the tabs to the anode foil
- Minor mechanical damage caused during winding

A sample from each batch is taken by the quality department after completion of the production process.

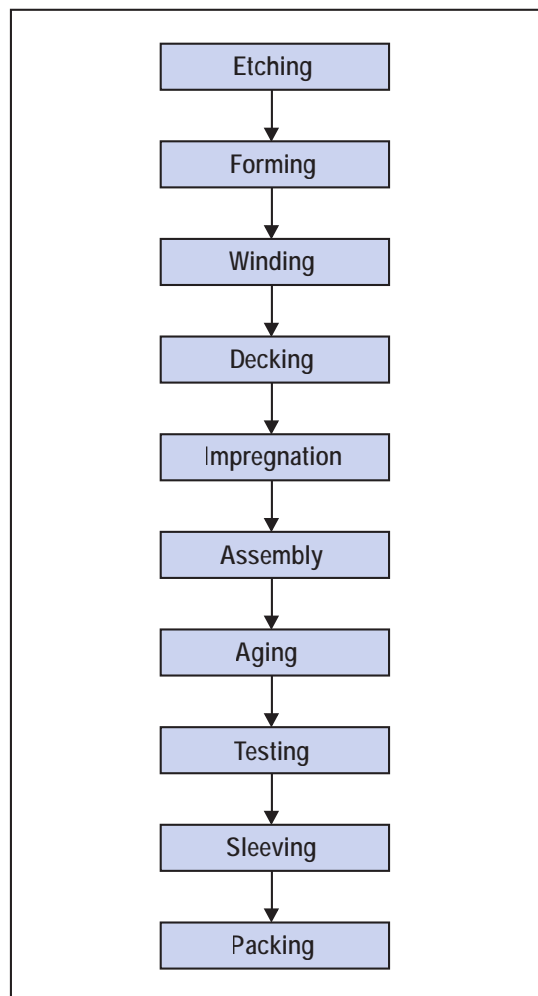
The following tests are applied and may be varied at the request of the customer. In this case the batch, or special procedure, will determine the course of action.

Electrical:

- Leakage current
- Capacitance
- ESR
- Impedance
- Tan Delta

Mechanical/Visual:

- Overall dimensions
- Torque test of mounting stud
- Print detail
- Box labels
- Packaging, including packed quantity



KEMET Corporation World Headquarters

2835 KEMET Way
Simpsonville, SC 29681

Mailing Address:
P.O. Box 5928
Greenville, SC 29606

www.kemet.com
Tel: 864-963-6300
Fax: 864-963-6521

Corporate Offices
Fort Lauderdale, FL
Tel: 954-766-2800

North America

Southeast
Lake Mary, FL
Tel: 407-855-8886

Northeast
Wilmington, MA
Tel: 978-658-1663

Central
Novi, MI
Tel: 248-994-1030

West
Milpitas, CA
Tel: 408-433-9950

Mexico
Guadalajara, Jalisco
Tel: 52-33-3123-2141

Europe

Southern Europe
Paris, France
Tel: 33-1-4646-1006

Sasso Marconi, Italy
Tel: 39-051-939111

Central Europe
Landsberg, Germany
Tel: 49-8191-3350800

Kamen, Germany
Tel: 49-2307-438110

Northern Europe
Bishop's Stortford, United Kingdom
Tel: 44-1279-460122

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	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

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

Disclaimer

All product specifications, statements, information and data (collectively, the "Information") in this datasheet are subject to change. The customer is responsible for checking and verifying the extent to which the Information contained in this publication is applicable to an order at the time the order is placed.

All Information given herein is believed to be accurate and reliable, but it is presented without guarantee, warranty, or responsibility of any kind, expressed or implied.

Statements of suitability for certain applications are based on KEMET Electronics Corporation's ("KEMET") knowledge of typical operating conditions for such applications, but are not intended to constitute – and KEMET specifically disclaims – any warranty concerning suitability for a specific customer application or use. The Information is intended for use only by customers who have the requisite experience and capability to determine the correct products for their application. Any technical advice inferred from this Information or otherwise provided by KEMET with reference to the use of KEMET's products is given gratis, and KEMET assumes no obligation or liability for the advice given or results obtained.

Although KEMET designs and manufactures its 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.

