Pin/Solder Tag/Audio Aluminum Electrolytic Capacitors

ALN20S, +85°C

YAGEO GROUP KEMET

Overview

KEMET's ALN20S series of capacitors is a new generation T-Network Capacitor (TNC). The TNC is manufactured by KEMET in Portugal. In a normal capacitor unwanted resistance and inductance force the input and output together electrically, making its unwanted characteristics very critical for performance – Figure 1.

The new TNC behaves differently because the input must flow along the capacitor plate to reach the output. The signal is forced into pure capacitance with most of the unwanted resistance and inductance appearing on each side of the bulk capacitance. The residual defects, therefore, tend to assist capacitance filtering in the T-Network design – Figure 2.

The TNC is designed for the most demanding filtering situations and it will redefine performance standards in many non-audio applications. For use in audio amplifiers, the TNC incorporates current slit foil technology to produce the ultimate audio capacitor. These capacitors give excellent results against standard components on a direct replacement. However, TNC high frequency performance is so enhanced that the H.F. compensation of test amplifiers may need resetting for best results.

Figure 1: Conventional Capacitor

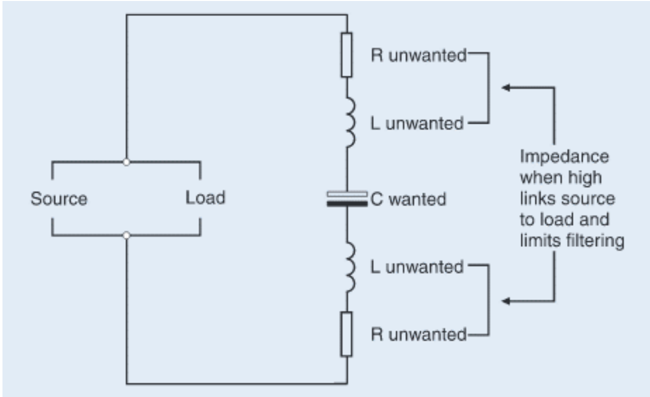
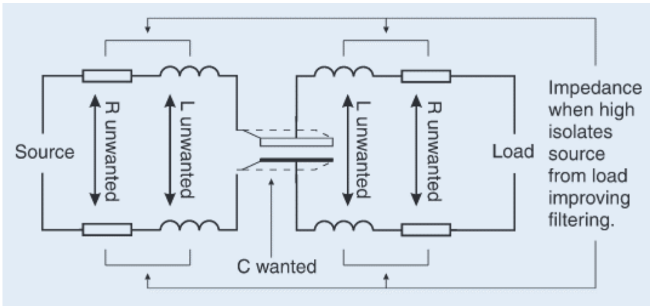


Figure 2: Network Capacitor



Benefits

- 4 pin Solder tag
- Long life, up to 18,000 hours at +85°C (V_R, I_R applied)
- Slit foil technology
- Specifically designed for audio applications use only.

Part Number System

ALN20	S	1053	DD
Series	Construction	Unique Sequential Number	Size Code
Snap-In type Aluminum Electrolytic	S = Slit foil		See Dimension Table

Applications

KEMET's ALN20S capacitors are a unique T-Network Capacitor (TNC) designed specifically for audio applications. The main advantage of the TNC lies in its ability to reduce the effects of unwanted resistance and inductance placing the signal closer to the pure capacitance of the component.

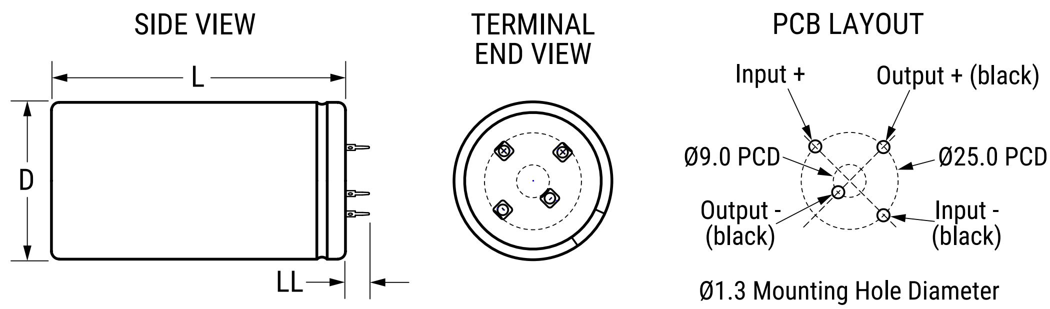
Performance Characteristics

Item	Performance Characteristics	
Capacitance Range	10,000 µF	
Rated Voltage	50 – 100 VDC	
Operating Temperature	−40 to +85°C	
Storage Temperature Range	−55 to +85°C	
Capacitance Tolerance	±20% (−10/+30% where specified)	
Operational Lifetime	D (mm)	Rated Voltage and Ripple Current at +85°C (hours)
	40	18,000
End of Life Requirement	Δ C/C ≤ ±10%	
	ESR ≤ 2 x initial ESR value	
	IL ≤ initial specified limit	
Shelf Life	2,000 hours at 0V +85°C, or 30,000 hours at 0V +40°C	
Leakage Current	I = 0.006 CV or 6,000 (µA, whichever is smaller)	
	C = rated capacitance (µF), V = rated voltage (VDC). Voltage applied for 5 minutes at +20°C.	
Standards	IEC 60384−4	

Surge Voltage

Condition	Voltage (VDC)			
	50	63	80	100
≤ 30 s surge, 1,000 cycles at +85°C	57.5	72.5	92	115

Dimensions – Millimeters



Size Code	Dimensions in mm			Approximate Weight Grams
	D	L	LL	
	Nominal		±1.0	
DD	40	55	6.3	95
DE	40	75	6.3	125
DF	40	105	6.3	170
Note: Dimensions include sleeving				

Table 1 – Ratings & Part Number Reference

VDC	Rated Capacitance (µF)	Case Size	Part Number
50	10,000 −10% +30%	40 x 55	ALN20S1053DD
50	10,000 ±20%	40 x 55	ALN20S1106DD
63	10,000 ±20%	40 x 55	ALN20S1067DD
80	10,000 ±20%	40 x 75	ALN20S1107DE
100	10,000 ±20%	40 x 105	ALN20S1108DF

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.

Environmental Compliance

All Part Numbers in this datasheet are Reach and RoHS compliant.

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 such as 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 worldwide and make 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.

Due to customer requirements, there may appear additional markings such as lead-free (LF), or lead-free wires (LFW) on the label.

Mechanical Data

Polarity and Reversed Voltage
Aluminium Electrolytic capacitors manufactured for use in DC applications contain an anode foil and a cathode foil. As such, they are polarized devices and must be connected with the +ve to the anode foil and the -ve to the cathode foil. If this were to be reversed then the electrolytic process that took place in forming the oxide layer on the anode would be recreated in trying to form an oxide layer on the cathode. In forming the cathode foil in this way, heat would be generated and gas given off within the capacitor, usually leading to catastrophic failure.

The cathode foil already possesses a thin stabilized oxide layer. This thin oxide layer is equivalent to a forming voltage of approximately 2 V. As a result, the capacitor can withstand a voltage reversal of up to 2 V for short periods. Above this voltage, the formation process will commence. Aluminium Electrolytic capacitors can also be manufactured for use in intermittent AC applications by using two anode foils in place of one anode and one cathode.

Mounting Position
The capacitor can be mounted upright or inclined to a horizontal position.

Insulating Resistance
≥ 100 MΩ at 100 VDC across insulating sleeve.

Voltage Proof
≥ 2,500 VDC across insulating sleeve.

Safety Vent
A safety vent for overpressure is featured on either the base (opposing end to the terminals) or the side of the can. This appears in the form of a grooved section on the surface of the can, which is a weakened area and designed to relieve build-up of internal pressure due to overstress or catastrophic failure.

Marking

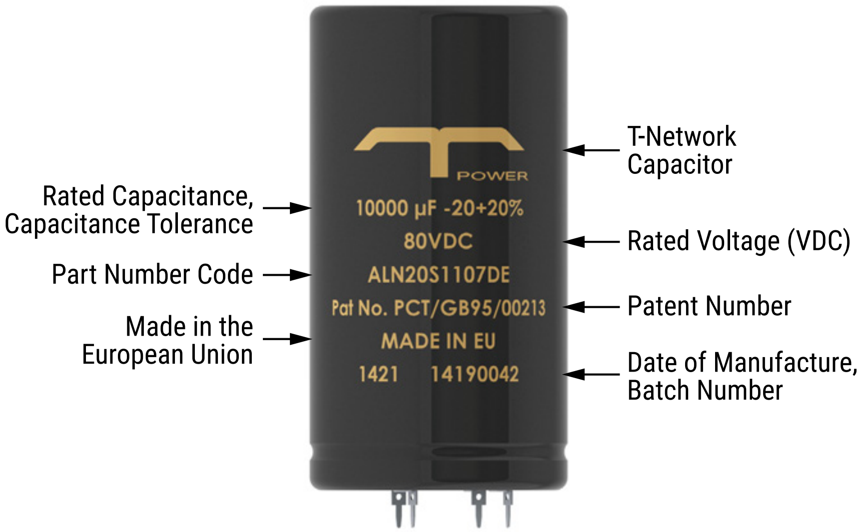
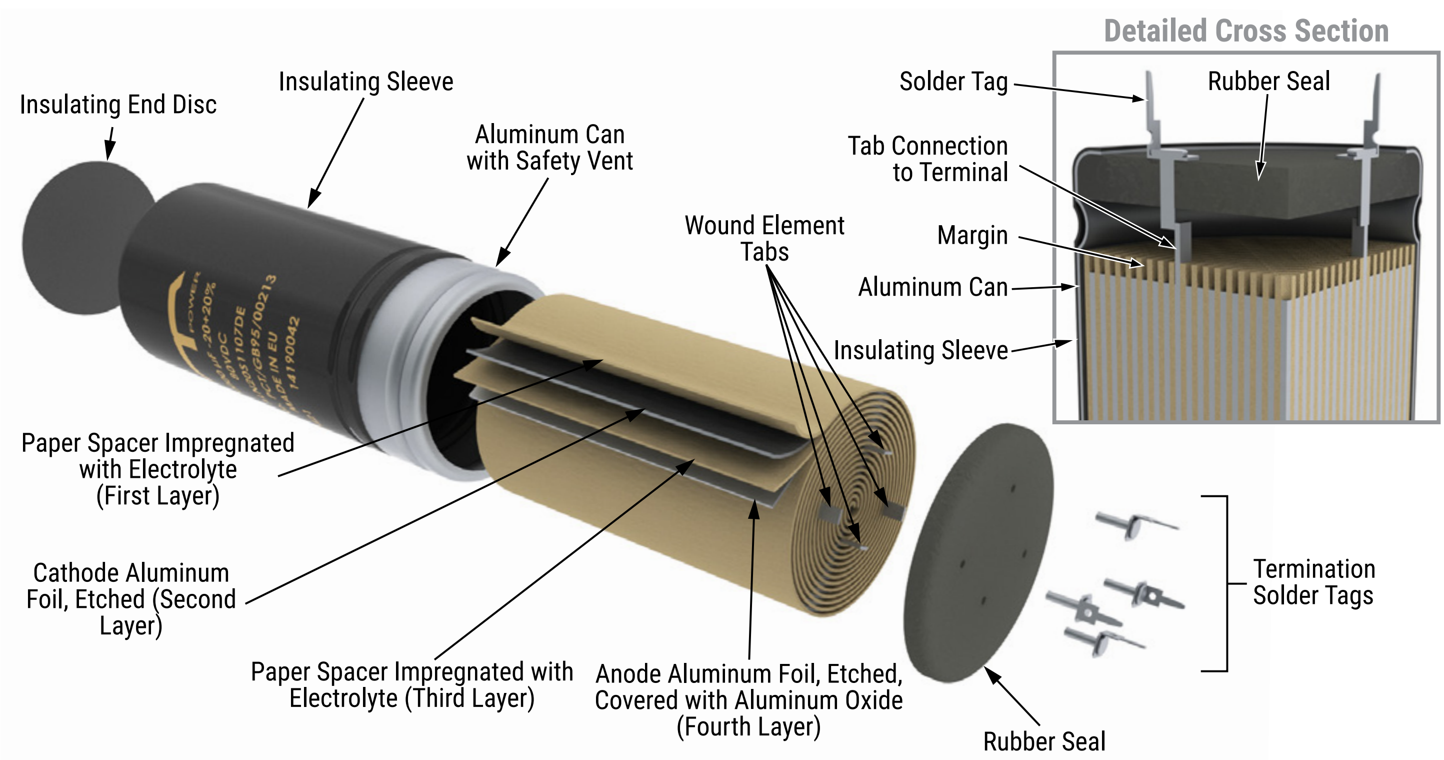


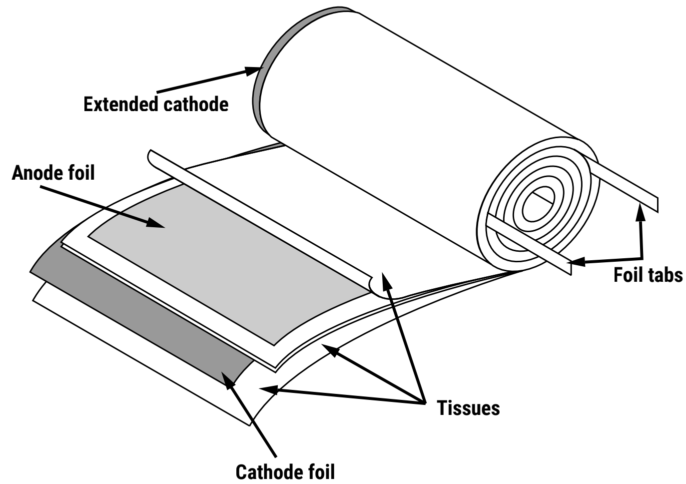
**Image for reference only. A slight change in the layout can occur, not affecting the marking content. This change will not impact the product's form, fit, or function, as the products remain equivalent in physical, mechanical, quality, and reliability characteristics.*

Construction



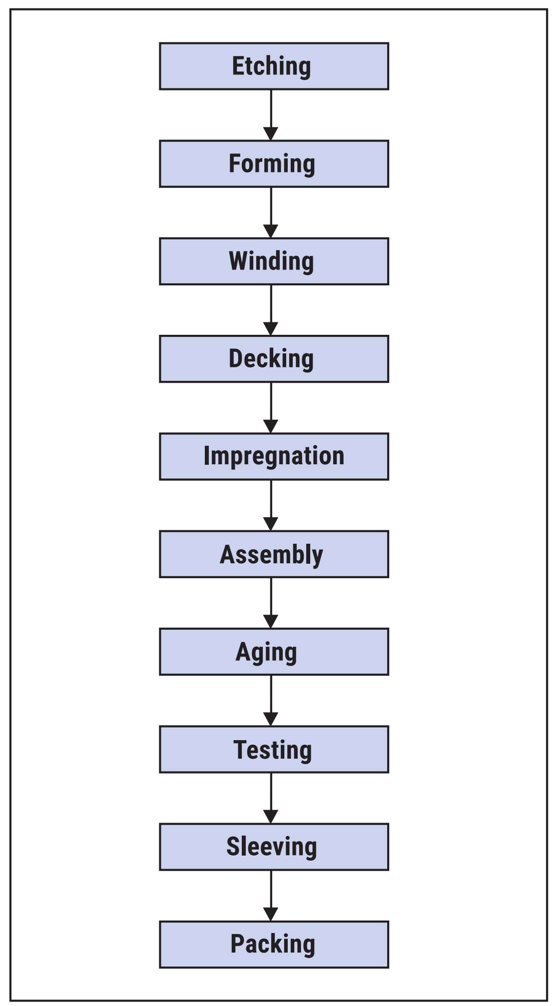
Construction Data

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

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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.

KEMET requires its products to be packaged and shipped on pallets. This is because KEMET's products are specifically designed to be packed onto pallets during shipment. If for any reason, the products are removed from pallets by the shipping party and shipped to the end customer, then additional external protection is required. In this instance, an external box with two carton layers and an upwards orientation sticker must be used by the shipping party, with the empty space filled with filling material, and afterwards sealing the box. If this packing and packaging guideline is not followed by the shipping party, the shipping party, and not KEMET, will be held responsible for any packaging, packing and/or product damages upon delivery of the products to the end customer. KEMET hereby disclaims any liability for damages to the products or otherwise that have been, or threaten to be, inflicted, result from or are in any way related to the packaging, packing or damage by the shipping party in contravention of the packing and packaging guidelines herein.