

# T522 Reduced Leakage Polymer Electrolytic, 6.3 VDC

## Overview

## KOCAP

based on the T520 KO-CAP series. Developed specifically

efficiency of tantalum into a single surface mount package.

## Benefits

- ESR: 25 to 40 mΩ
- Volumetrically efficient
  
- Low profile designs



## Applications

systems, energy harvesting, wireless sensors and other applications that seek high capacitance, low profile, safety and low

## Environmental Compliance

## K-SIM

For a detailed analysis of specific part numbers, please visit [ksim.kemet.com](http://ksim.kemet.com) to access KEMET's K-SIM software. KEMET

## Ordering Information

T	522	V	157	M	006	A	T	E025	
			significant figures. Third digit specifies					ESR in mΩ. mΩ)	

## Performance Characteristics

Item	Performance Characteristics
	-55°C to 105°C
	150 – 470 uF at 120 Hz/25°C
	≤ 10%
	Refer to Part Number Electrical Specification Table 1
	≤ 0.03 CV (μA) at rated voltage after 10 minutes

## Qualification

Test	Condition	Characteristics				
	105°C at rated voltage, 2,000 hours	Δ C/C	Within -20/+10% of initial value			
	105°C at 0 volts, 2,000 hours	Δ C/C	Within -20/+10% of initial value			
	60°C, 90% RH, 500 hours, rated voltage	Δ C/C	Within -5%/+35% of initial value			
	succession of continuous steps at +25°C, -55°C, +25°C, +85°C, +105°/125°C, +25°C	Δ C/C	+25°C	-55°C	+85°C	+105°C
	105°C, 1.32 x rated voltage, 33 Ω Resistance, 1,000	Δ C/C	Within -20%/+10% of initial value			
		Δ C/C				

\*IL = Initial limit

## Reliability

These capacitors are qualified using industry test standards at U

< 85°C, the life expectancy will typically exceed

The lifetime of a KO-CAP capacitor at a specific application voltage and temperature can be modeled using the equations below. A failure is defined as passing enough current to blow a 1-Amp fuse. The calculation is an estimation based on

$$VAF = \left(\frac{U_C}{U_A}\right)^n$$

$$TAF = e^{\left[\frac{E_a}{k} \left(\frac{1}{T_A} - \frac{1}{T_C}\right)\right]}$$

$$AF = VAF * TAF$$

$$Life_{U_A, T_A} = Life_{U_C, T_C} * AF$$

Reliability Table 1 – Common temperature range classifications												
85°C (T)												
85°C (T)												
105°C (T)												
105°C (T)												
105°C (T)												
125°C (T)												

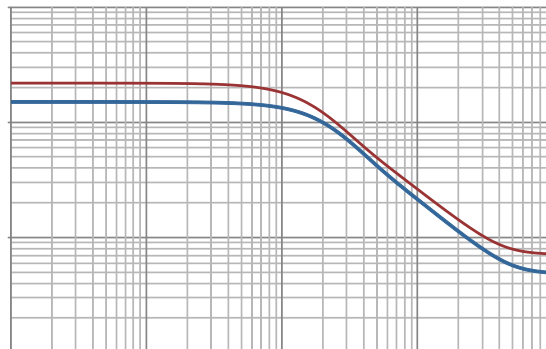
Terms:

Category Voltage,  $U_C$ : Maximum recommended peak DC operating voltage for continuous operation at the category temperature,  $T_C$

Rated Voltage,  $U_R$ : Maximum recommended peak DC operating voltage for continuous operation up to the rated temperature,  $T_R$

Category Temperature,  $T_C$ : Maximum recommended operating temperature; voltage derating may be required at  $T_C$

Rated Temperature,  $T_R$ : Maximum recommended operating temperature without voltage derating;  $T_R$  is equal to or lower than  $T_C$



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

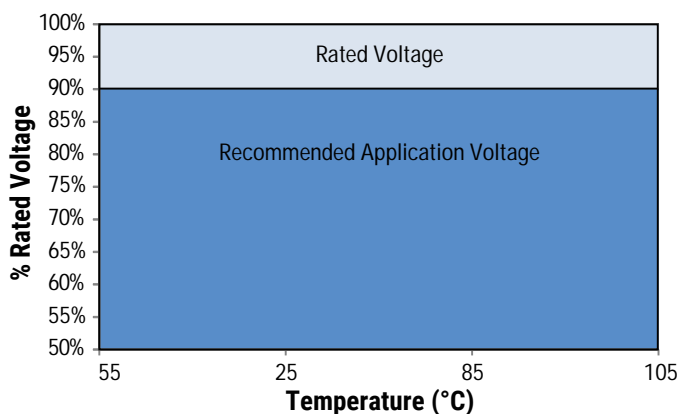
Rated Voltage	Rated Capacitance	Case Code/ Case Size	KEMET Part Number	DC Leakage	DF	ESR	Maximum Allowable Ripple Current	MSL	Maximum Operating Temp
VDC at 105°C	μF	KEMET/EIA	(See below for part options)	μA at +25°C Max/10 Min.	% at +25°C 120 Hz Max	mΩ at +25°C 100 kHz Max	mA at +45°C 100 kHz	Reflow Temp ≤ 260°C	°C

(1) Standard with tin terminations (14th character = T). Tin/lead terminations is also available (14th character = H).

Also available on large (13 inch) reels. Add 7280 to the end of the part number.

Higher voltage ratings and tighter tolerance product including ESR may be substituted within the same size at KEMET's option. Voltage substitutions will be marked with the higher voltage rating. Substitutions can include better than series.

## Derating Guidelines



### Recommended Application Voltage

KOCAP's are solid state capacitors that demonstrate no wearout mechanism when operated within their recommended

Voltage Rating	Maximum Recommended Steady State Voltage
	-55°C to 105°C

$V_R$  = Rated Voltage

## Ripple Current/Ripple Voltage

specified for reverse voltage. See the Reverse Voltage



## Surge Voltage

Surge voltage capability is demonstrated by application of 1,000cycles at relevant voltage at 105°C and 125°C.

Rated Voltage (V)	Surge Voltage (V)	Derated Voltage (V)	Derated Surge Voltage (V)
-55°C to 105°C		Up to 125°C	

## Reverse Voltage

Temperature	Permissible Transient Reverse Voltage
25°C	
55°C	
85°C	
105°C	
125°C*	

\*For series rated to 125°C



**Table 2 – Land Dimensions/Courtyard**

KEMET	Metric Size Code	Density Level A: Maximum (Most) Land Protrusion (mm)					Density Level B: Median (Nominal) Land Protrusion (mm)					Density Level C: Minimum (Least) Land Protrusion (mm)						
		Case	EIA	W	L	S	V1	V2	W	L	S	V1	V2	W	L	S	V1	V2

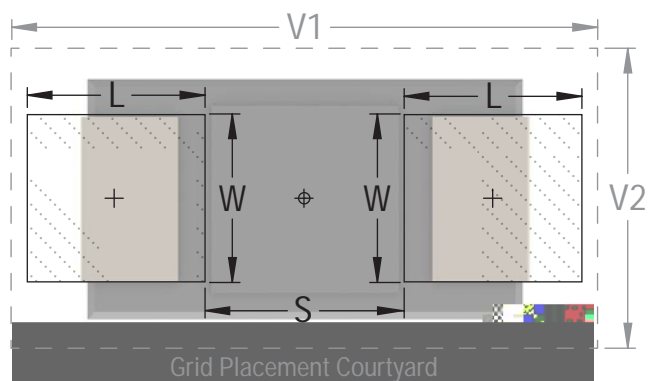
*Density Level A: For low-density product applications. Recommended for wave solder applications and provides a wider process window for reflow solder processes.*

*Density Level B: For products with a moderate level of component density. Provides a robust solder attachment condition for reflow solder processes.*

*Density Level C: For high component density product applications. Before adapting the minimum land pattern variations the user should perform qualification testing based on the conditions outlined in IPC standard 7351 (IPC-7351).*

<sup>1</sup> Height of these chips may create problems in wave soldering.

<sup>2</sup> Land pattern geometry is too small for silkscreen outline.

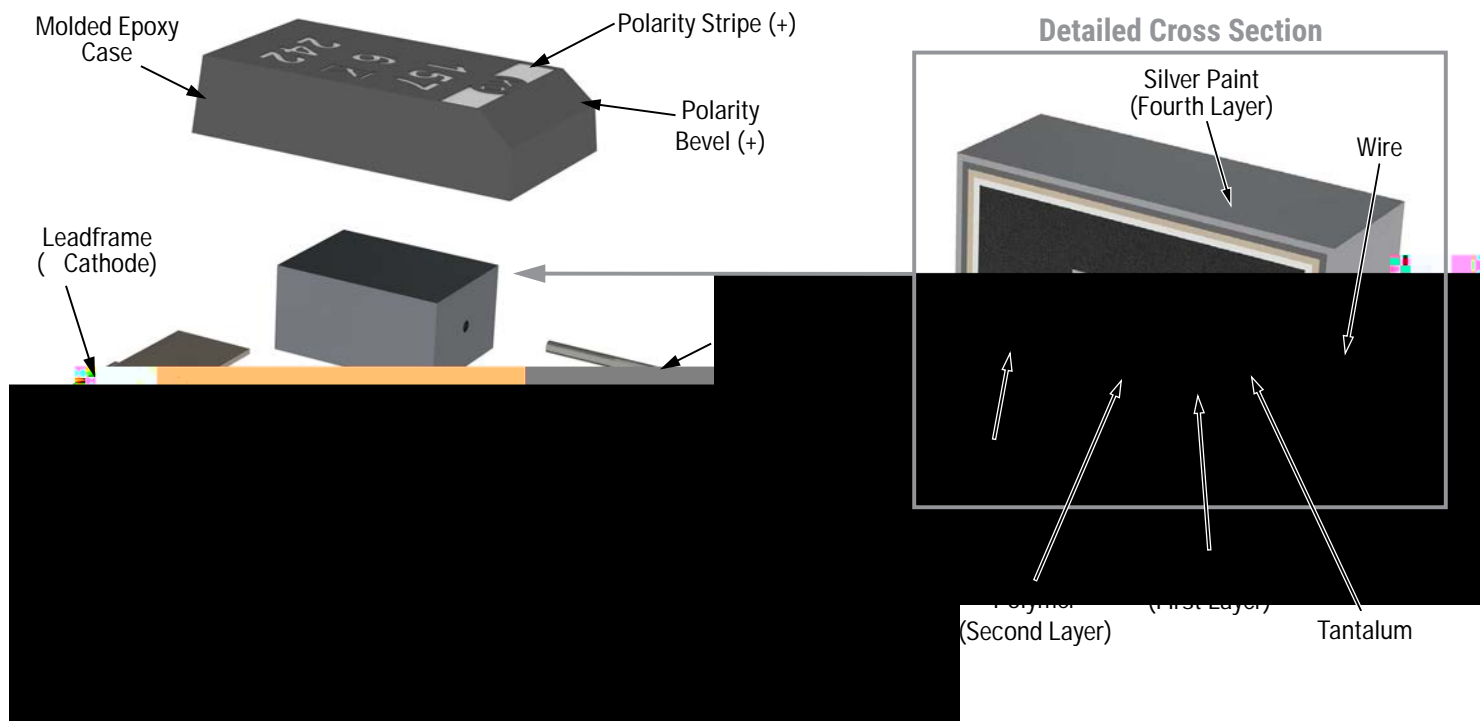


## Soldering Process

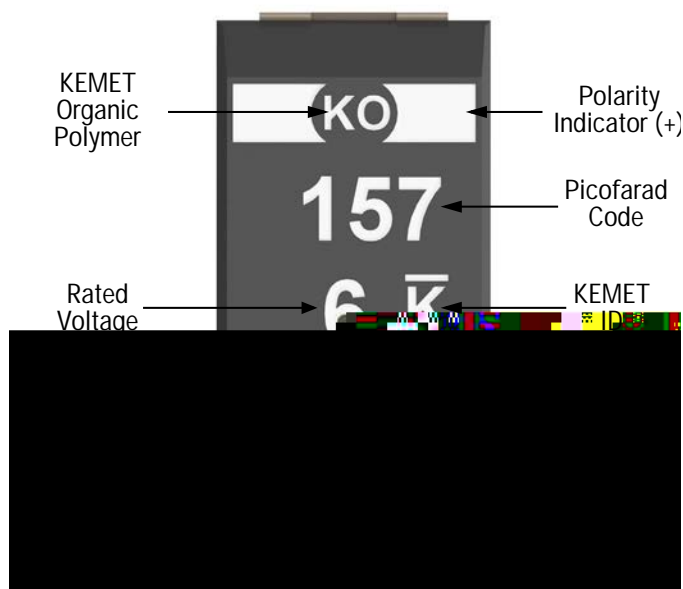
KEMET's families of surface mount capacitors are or vapor phase reflow techniques. Preheating of these stress. KEMET's recommended profile conditions for convection and IR reflow reflect the profile conditions of the The devices can safely withstand a maximum of three reflow withstand wave soldering, the tall profile (4.3 mm maximum) difficulty in process control. If performed, care should be reflow occurs. Once reflow occurs, the iron should be

Profile Feature	SnPb Assembly	Pb-Free Assembly
	100°C	150°C
	150°C	200°C
	3°C/seconds maximum	3°C/seconds maximum
	183°C	217°C
	220°C* 235°C**	250°C* 260°C**
Time within 5°C of Maximum		
	6°C/seconds maximum	6°C/seconds maximum
Time 25°C to Peak		

## Construction



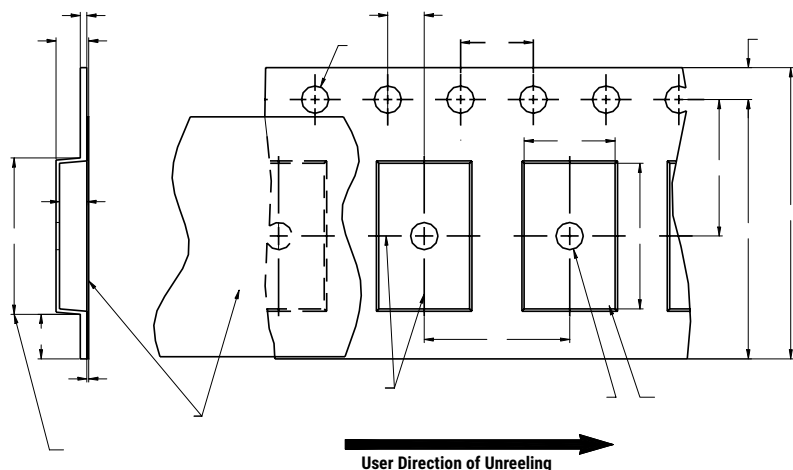
## Capacitor Marking



Date Code *	



**Figure 1 – Embossed (Plastic) Carrier Tape Dimensions**



**Table 4 – Embossed (Plastic) Carrier Tape Dimensions**

Constant Dimensions – Millimeters (Inches)									
	1.5 +0.10/-0.0 (0.059+0.004/-0.0)								

Variable Dimensions – Millimeters (Inches)									

1. The embossment hole location shall be measured from the sprocket hole controlling the location of the embossment. Dimensions of embossment location and hole location shall be applied independent of each other.
2. The tape, with or without components, shall pass around R without damage (see Figure 4).
3. If  $S_1 < 1.0$  mm, there may not be enough area for cover tape to be properly applied (see EIA Standard 481-D, paragraph 4.3, section b).
4.  $B_1$  dimension is a reference dimension for tape feeder clearance only.
5. The cavity defined by  $A_v$ ,  $B_0$  and  $K_0$  shall surround the component with sufficient clearance that:
  - (a) the component does not protrude above the top surface of the carrier tape.
  - (b) the component can be removed from the cavity in a vertical direction without mechanical restriction, after the top cover tape has been removed.
  - (c) rotation of the component is limited to 20° maximum for 8 and 12 mm tapes (see Figure 2).
  - (d) lateral movement of the component is restricted to 0.5 mm maximum for 8 mm and 12 mm wide tape (see Figure 3).
  - (e) see Addendum in EIA Standard 481-D for standards relating to more precise taping requirements.

4 EGOEKMRK - RJSVQEXMSR 4IVJSVQERGI 2SXIW

'SZIV 8ETI & VIEO \* SVGI 1.0 kg minimum.

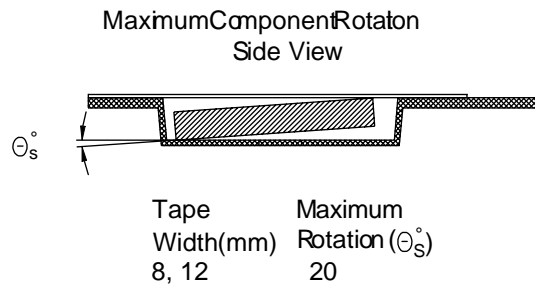
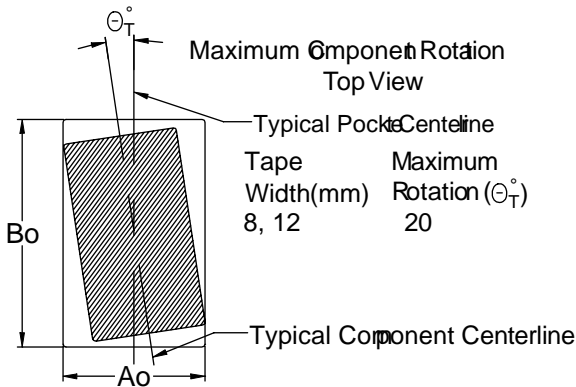
'SZIV 8ETI 4IIP 7XVIRKXL The total length of the cover tape from the carrier tape shall be:

8ETI ; MHXL	4IIP 7XVIRKXL
8 mm	0.1 to 1.0 Newton (10 to 100 gf)
12 and 16 mm	0.1 to 1.3 Newton (10 to 130 gf)

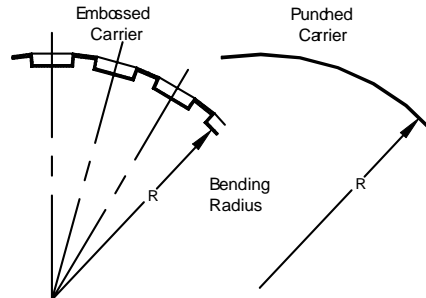
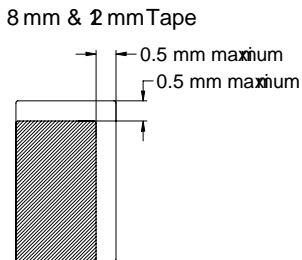
The direction of the pull shall be opposite the direction of the carrier tape travel. The pull angle of the carrier tape shall be  $90 \pm 10$  degrees. The carrier tape shall be pulled at a rate of  $300 \pm 10$  mm/minute.

0EFIPMRK Bar code labeling (standard or custom) shall be on the side of the reel opposite the sprocket hole. Standards 556 and 624.

\*MKYVI • 1E\MQYQ 'SQT SRIRX 6SXEXMSR

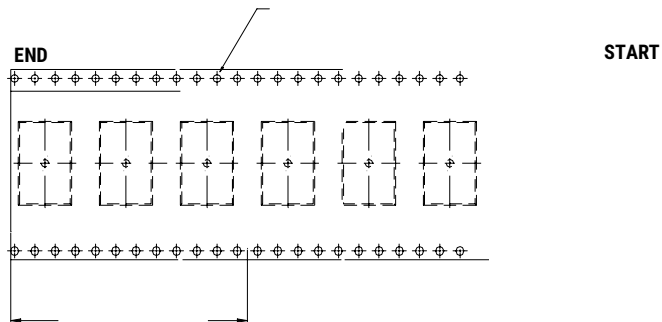


\*MKYVI • 1E\MQYQ 0EXIVE\*MK\$ZIQIR&IRHMRK 6EHMYW





**Figure 6 – Tape Leader & Trailer Dimensions**





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