



# Vishay T54 Stacked Polymer Capacitors in High Reliability Applications

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The use of polymer tantalum capacitors is growing rapidly in the commercial, industrial, and automotive industries, and is likely the future of small size bulk capacitance. The avionics, military, and space (AMS) market has been slower to adopt polymer tantalum technology. However, it is believed that once the polymer MIL spec that is currently underway is released, adoption will rapidly increase. Polymer tantalums solve many problems that have plagued their manganese dioxide (MnO<sub>2</sub>) solid tantalum counterparts, while still maintaining the benefits that tantalum capacitors have always offered. They do not produce the same potential failure mode as MnO<sub>2</sub> tantalums, which is why the mobile phone and laptop markets welcomed the switch to polymer more than a decade ago. Additionally, the voltage derating of polymer tantalums is much lower (as shown in Fig. 1) and the ESR is roughly an order of magnitude lower than standard MnO<sub>2</sub> tantalum capacitors by comparison, while still providing excellent capacitance stability over temperature and voltage. In order to maintain high reliability, Vishay offers a suite of tests and screenings in its high reliability COTS products, which promise much higher reliability than commercial offerings.

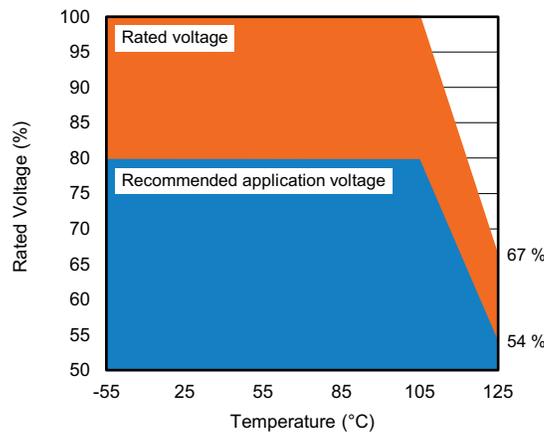


Fig. 1 - Recommended Voltage Derating for Polymer Tantalums

Vishay currently offers two series of high reliability polymer tantalum COTS products. The first, the T56, is a standard molded undertab series. The second, the T54, uses Vishay’s patented advanced packaging technology, which eliminates the standard undertab leadframe in favor of a 360° sputtered termination, and makes room for a higher capacitance in the same space as the standard J-lead uses. This makes for a simple way to create a stacked polymer tantalum capacitor, which provides much higher bulk capacitance while saving valuable real estate on the circuit board. Vishay offers several options for stacked polymer capacitors, including a two-stack, three-stack, four-stack, and six-stack, as shown in Table 1. Fig. 2 shows the current available capacitance values and corresponding stack configurations. Contact your local Vishay sales representative for availability and sampling.

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**TABLE 1 - VISHAY T54 STACKED POLYMER TANTALUM CONFIGURATIONS AND DIMENSIONS**

					
<b>PRODUCT</b>	<b>T54 EE SINGLE</b>	<b>T54 E2 STACK</b>	<b>T54 E4 STACK</b>	<b>T54 E3 STACK</b>	<b>T54 E6 STACK</b>
<b>FOOTPRINT (METRIC)</b>	7343 - 43	8044 - 89	8089 - 89	8044 - 130	8089 - 130
<b>ENERGY (0.5 CV<sup>2</sup>)</b>	0.06 J	0.12 J	0.25 J	0.19 J	0.37 J

T54Ex: RATINGS AND CASE CODES TABLE (ESR mΩ)						
μF	16 V	30 V	35 V	50 V	63 V	75 V
30					E2 (50)	E2 (50)
45				E2 (50)	E2 (50) E3 (35)	E2 (50) E3 (35)
60					E4 (25)	E4 (25)
66				E3 (35)	E3 (35)	E3 (35)
90				E4 (25)	E4 (25) E6 (17)	E4 (25) E6 (17)
95			E2 (35/28)	E2 (50)		
130				E6 (17)	E6 (17)	E6 (17)
140			E3 (25/18)	E3 (35)		
190			E4 (18/14)	E4 (25)		
280			E6 (12/10)	E6 (17)		
300		E2 (75, 38)				
450	E2 (13)	E3 (50, 25)				
600		E4 (38, 20)				
660	E2 (13) E3 (9)					
900	E4 (7)	E6 (25, 13)				
940	E2 (13, 10)					
990	E3 (9)					
1300	E4 (7) E6 (5)					
1400	E3 (9, 7)					
1900	E4 (7, 5)					
2000	E6 (5)					
2800	E6 (5)					

Fig. 2 - Vishay T54 Stacked Polymer Capacitor Offering With Configuration

**FOR FURTHER INFORMATION, PLEASE VISIT THE FOLLOWING RESOURCE LINKS:**

**Vishay's Polymer Capacitor Home Page:**

Datasheets and product descriptions

[www.vishay.com/capacitors/polymer/](http://www.vishay.com/capacitors/polymer/)

**Vishay's Polymer Capacitor Document Library:**

FAQs, technical papers, and infographics

[www.vishay.com/capacitors/polymer/tab/doclibrary/](http://www.vishay.com/capacitors/polymer/tab/doclibrary/)