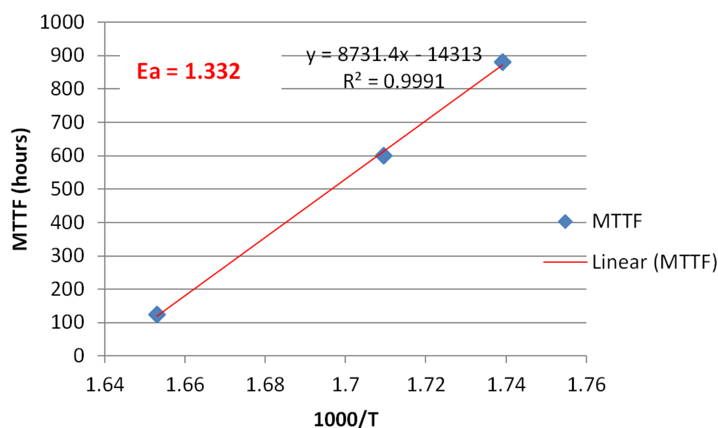
High Temperature Operating Life Test for AT125-XX

Over view: This test report summarizes the results of accelerated life testing or High Temperature Operating Life Test (HTOL) designed to demonstrate failures due to electromigration, the predominant failure mode concern for integrated circuits. This test was performed in accordance with **JEDEC JESD22-A108.** A lifetime of use at typical operating temperatures is simulated by stressing the devices at high temperature and high DC bias. The acceleration factor (AF) is calculated using the Arrhenius model for the stress testing based on the stress temperature and the typical use operating temperature. All the stress testing performed on the AT125 attenuators to date in included in this report and it will be updated periodically as additional data becomes available. The AT125-10 was chosen to represent the AT125 family because it absorbs the most power.

Activation Energy: The AT125-10 was stressed at three different temperatures, 305, 315 and 335 degrees C through a combination of base plate and device heating using DC current. The temperatures were calculated using a one dimensional steady state heat flow[i]. The devices were continuously monitored at the stress temperature. The failure criterion was a 0.3 dB change in attenuation. Based on the Arrhenius model, the activation energy from the plot below is 1.332 eV.



Estimate of Failure Rate: The AT125-10 was subjected to a stress of 250 degrees C for 1 week (168 hours) with no failure. Using the accelerated factor technique[ii], the estimated life for the ATT125 at rated power (27 dBm) and temperature (80 deg C) is **22.6 million hours**.

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[i] AVX High Power Resistive Products, Resistors and terminations : Engineering Guidelines
[ii] http://en.wikipedia.org/wiki/Highly_accelerated_stress_test

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