Apex Microtechnology

Failure Rate (in FIT) estimated using long-term reliability tests (Base line Temperature of 85C Baseline Confidence Level of 90%)

Date Prepared: 1/9/2026	By: Jim Thompson	Model: PA04

One-sided confidence limits on MTBF in a failure terminated test
Reliability and Life Testing Handbook Volume 1, Dimitri Kececioglu, PTR Prentice Hall, 1993 pp184 -186

$n =$	30	units tested		
$r =$	1	units failed		
$T =$	15312.18	hrs. Life test duration	638.008	days of testing
$\alpha =$	0.1	alpha		
$T_C =$	125	Case temperature		
$CL\ (1-\alpha) =$	0.9	Confidence level for MTBF		
$X^2_{\alpha;df} =$	4.605	Critical value of the Chi-Squared distribution for $\alpha =$ 0.1 and df = 2		
$T_a =$	459365.4	accumulated unit hours of operation		

$MTBF_{L1} = 2T_a/X^2_{\alpha;df} =$ 199499.9 hours (eq 7.10 pg 184) Lower Confidence Limit for MTBF

thus

MTBF at 90% confidence is (199499.9 hr; ∞)
(22.77 yr; ∞)

and

Failure rate <= 5012.535 failures per billion hours

MTBF and FIT for given use temperature

$T_U =$	85	Tc (°C) use temperature =	358	°K
$EA =$	0.7	Select appropriate activation energy ev for device, see text, pg 610		

MTBF at 90% confidence is (1948386.7 hr; ∞)
(222.4 yrs; ∞)

Failure rate <= 513.25 failures per billion hours